Program Product

Information Management System/360 for the IBM System/360 Operations Manual Volume II - Machine Operations

Program Number 5736-CX3

The Information Management System/360 is an Operating System/360 processing program designed to facilitate the implementation of medium to large common date bases in a multiapplication environment. This environment is created to accommodate both online message processing and conventional batch processing, either separately or concurrently. The system permits the evolutionary expansion of data processing applications from a batch-only to a teleprocessing environment.

This volume of the Operations Manual supplies detailed information on the relationship of the Machine Operations function to IMS/360.

IBM

Second Edition (July 1970)

This edition applies to Version 1, Modification Level 1, of Program Product Information Management System/360 for the IBM System/360, 5736-CX3.

This is a major revision obsoleting H20-0636-0. Besides correcting errors, this edition contains additions and changes supporting Release 18 of the Operating System.

Here is a summary of the major new and changed items in this revision.

- Master terminal command references to physical telecommunication terminals are changed from terminal address to relative terminal number.
- The JOBLIB statements embedded in procedures are replaced with STEPLIB statements.
- User ABEND Codes 0460, 0464, and 0468 are corrected; 0472 and 0825 are added. The master terminal message IMS1101 is deleted.

Other changes to the text and small changes to illustrations are indicated by a vertical line to the left of the change; changed or added illustrations are denoted by the symbol • to the left of the caption.

This edition applies to Release 18 of IBM System/360 Operating System and to all subsequent releases until otherwise indicated in new editions or Technical Newletters.

Changes are continually made to the specifications herein. Therefore, before using this publication, consult the latest System/360 SRL Newsletter (GN20-0360) for the editions that are applicable and current.

Copies of this and other IBM publications can be obtained through IBM branch offices.

A form for readers' comments is provided at the back of this publication. If the form has been removed, address comments to: IBM Corporation, Technical Publications Department, 112 East Post Road, White Plains, New York 10601.

CONTENTS

The Machine Operations Manual is one of a set of manuals prepared to define the various functions and personnel relationships involved in the implementation and system operation of Information Management System/360 (IMS/360). The other manuals in the set are:

| IMS/360 Application Description Manual (GH20-0524)

| IMS/360 Program Description Manual (SH20-0634)

| IMS/360 Operations Manual, Volume I - Systems Operation (SH20-0635)

| IMS/360 System Manual, Volume I - Program Logic (LY20-0431)

| IMS/360 System Manual, Volume II - Flowcharts (LY20-0432)

This introductory chapter restates some of the same information found in the introductory chapter of the Program Description and Systems Operations Manuals.

The necessity for these manuals became apparent during the design phase of the IMS/360. The usual mix of data processing personnel normally provides for application programming, system programming, and machine operations functions. With the introduction of IMS/360, however, the need for a fourth function, a coordinating force in implementing, administering, and maintaining the system, became apparent. The function is the "heart" of the IMS/360 system and has been designated the "Systems Operation" function. The Systems Operation function and its interface with other functions are delineated in this manual (see Figure 1).

An understanding of the following is a prerequisite for a thorough comprehension of this manual:

| IMS/360 Application Description Manual (GH20-0524)

| IMS/360 Program Description Manual (SH20-0634)

| OS/360 Supervisor and Data Management Services (GC28-6646)

| OS/360 Operator's Guide (GC28-6540)

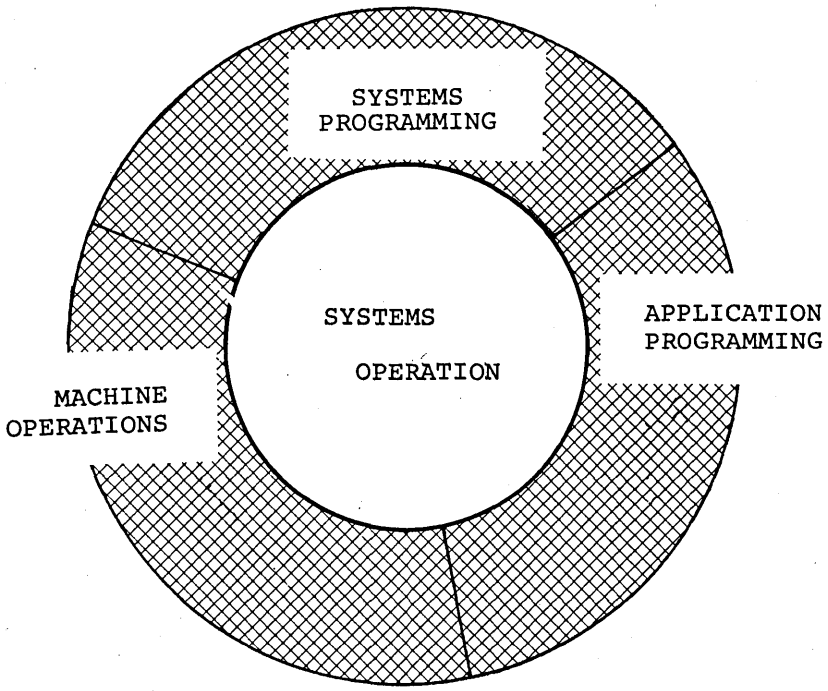


Figure 1. IMS/360 functional relationships

MACHINE OPERATIONS FUNCTION

In addition to the usual operational assignments, the Machine Operations function shall be responsible for:

- All master terminal capabilities in accordance with established procedures, with especially prepared instructions to cover extraordinary happenings
- Assisting terminal operators at remote terminals in the initial diagnoses of apparent problems, be they concerned with the remote terminal, the connecting communication line, the central hardware, the central software, or message processing application programs. After the initial diagnoses, the Machine Operations function should have accumulated sufficient information to determine whose assistance is required and to intelligently describe the problem, and will be able to assist in determining the degree of emergency sustained.

SYSTEMS OPERATION FUNCTION

The function of Systems Operation is the following:

- Responsibility for control over and approval of all new data base designs and descriptive control blocks
- Maintenance of the data bases under Data Language/I, including all control, allocation, and data base creation and reorganization

- Maintenance of a catalog of programs "certified" to operate as message processing programs under IMS/360, including related documentation, processing priorities, transaction codes, control blocks, etc.

- Responsibility to provide the capability for reconstruction and recovery of IMS/360 and its associated data bases when routine procedures known and understood by the Machine Operations function are insufficient for such recovery and reconstruction. The Systems Operation function also has the responsibility to be available to participate in such extraordinary operations whenever they are required.

- Responsibility for the utility programs which process the IMS/360 system log tapes and for causing these programs to process the log tapes and to yield accounting information, machine operations statistics, usage and data base statistics, and certain management reports on utilization and errors incurred. The function shall also have the responsibility for auditing these reports for quality and for assigning certain reports to other functions for analysis, as appropriate.

- Accounting and billing for IMS/360 and message programs and a background batch program in the IMS/360 environment are provided as a part of the Systems Operation function. Statistics from the system log tape reflecting activity by system, transaction type, terminal, line, etc. are also distributed.

- Responsibility for IMS/360 system definition and modification

- Maintenance of all IMS/360 documentation

- Configuration planning, for all purposes, of new applications so that communication lines, consoles, and software are available to support approved applications

SYSTEMS PROGRAMMING FUNCTION

The functions of Systems Programming encompass the following:

- Assistance and participation in the hardware installation, test, and initial operations of any new equipment or changed configurations

- Consultation with IMS/360 application programmers in conjunction with the Systems Operation function to assist in the integration of applications with IMS/360

- Software maintenance and improvement of IMS/360 utility programs and modifications to Operating System/360

APPLICATION PROGRAMMING FUNCTION

The Systems Operation function provides for applications planning, implementation, and audit. The application programming function must consider the following in its analysis of a proposed application:

- Configuration and storage device requirements for anticipated applications

- Data base structuring, storage device cost/performance tradeoffs, and sharing of mutual data with existing data bases

- Program structuring, core limits, duration of execution, overlay structure, and program chaining
- Message formats and length, transaction types, priorities, passwords, and logical terminal names
- Schedule of data base checkpoints and checkpoint cost versus reconstruction cost
- Schedule of data base dumps and reorganization

MACHINE OPERATIONS CHECKLIST

The following Machine Operations checklist provides a further aid to understanding the tasks of the Machine Operations function.

The items or tasks in the checklist are enumerated in detail in Chapters 3, 4, 5, and 6. Chapter 7 describes the possible messages and codes of IMS/360.

This checklist is not to be considered chronological, nor are the checks to be accomplished in the sequence given. It is directed toward the information needed for control and maintenance of the IMS/360 system.

The following is an explanation of the columns of the checklist:

Column 1 is the item under consideration.

Column 2 is the name of the function that has the responsibility for providing the information.

Column 3 lists the manuals that provide more details about the particular item.

PDM = Program Description Manual.
SOM = Systems Operation Manual.
MOM = Machine Operations Manual.
SM = System Manual.

ITEM	RESPONSIBILITY IN PROVIDING	DETAIL IN WHICH MANUAL
1. Has Type I programming system been selected? (PCP, MVT, or MFT-II)	Sys. Oper. Func.	SOM
2. Will all types of IMS/360 processing regions be standard?	Sys. Oper. Func.	PDM, SOM
3. How many regions or partitions are to be initiated normally?	Sys. Oper. Func.	PDM, SOM
4. Coordinate terminal and hardware network installation and operation.	Sys. Oper. Func. Mach. Oper. Func.	PDM, SOM, MOM

ITEM	RESPONSIBILITY IN PROVIDING	DETAIL IN WHICH MANUAL
a. Keep necessary manual records of network. If dialup, telephone numbers.	Mach. Oper. Func.	MOM
5. Keep a valid list of transaction codes, their relationship to the application program, and which data base.	Sys. Oper. Func. from Appl. Prog. Func.	PDM, SOM, MOM
a. List their priority and whether it is allowed to be changed at any time.	Sys. Oper. Func. from Appl. Prog. Func.	PDM, SOM, MOM
b. What transaction codes are allowed single or multiple line entry?	Sys. Oper. Func. from Appl. Prog. Func.	PDM, SOM, MOM
6. Follow through on the plan of the residence of MACLIB, RESLIB, PGMLIB, PSBLIB, DBDLIB, and PROCLIB.	Work in conjunction with Sys. Oper. Func. and Sys. Programming Func.	SOM, MOM, SM
7. Has the proper setup been made with regard to specifying the data sets, volumes, and I/O devices required for running IMS/360 System Definition utility?	Sys. Oper. Func.	SOM, MOM SM
8. In readying IMS/360, have the numbers been specified for the Operating System/360 SVC's (Type 1 and 2) and have they been relink-edited into the Operating System/360 nucleus?	Sys. Oper. Func.	SOM, MOM, SM
9. Has the OSAM channel end appendage load module been moved to the SYS1.SVCLIB?	Sys. Oper. Func.	SOM, MOM, SM
10. Has the sequence list of events for readying IMS/360 been checked? (Chapter 5, MOM)	Work in conjunction with Sys. Oper. Func.	SOM, MOM
11. Has the plan been specified for the statistics reports from the IMS/360 system?	Sys. Oper. Func.	SOM, MOM
a. Has the card deck been specified from which to execute the IMS/360 Statistics Utility?	Sys. Oper. Func.	SOM, MOM

	ITEM	RESPONSIBILITY IN PROVIDING	DETAIL IN WHICH MANUAL
12.	Do you know the location of remote terminals, the telephone number closest to that location, and the lead remote terminal operator's name?	Mach. Oper. Func.	MOM
13.	What is status of each remote terminal operator's training?	Mach. Oper. Func.	MOM
14.	Concerning the Master Terminal and the Machine operator function:	Mach. Oper. Func.	MOM, SOM
	a. Has the Master Terminal operator received adequate training and kept current with changes?	Mach. Oper. Func.	MOM, SOM
	b. Have the instructions to the MT operator about the types of checkpoints been delineated?	Mach. Oper. Func.	MOM, SOM
	c. Have the instructions to the MT operator about the restart procedures been delineated?	Mach. Oper. Func.	MOM, SOM
	d. Has an operating plan been worked out between the MT operator and the computer console operator for the system log tapes?	Mach. Oper. Func.	MOM, SOM
	e. Are the types of system shutdown procedures described?	Mach. Oper. Func.	MOM, SOM
	f. Have the instructions for alternate master terminals been delineated?	Mach. Oper. Func.	MOM, SOM
	g. Is the remote terminal trouble procedure adequate?	Mach. Oper. Func.	MOM, SOM
	h. Have adequate IPL instructions been delineated?	Mach. Oper. Func.	MOM, SOM

ITEM	RESPONSIBILITY IN PROVIDING	DETAIL IN WHICH MANUAL
i. Has a group of command language verbs been restricted to entry from the master terminal?	Mach. Oper. Func.	MOM, SOM
j. Keep necessary records available to the master terminal operator concerning the security program changes; that is, the date from security change, list of secured items, etc.	Mach. Oper. Func.	MOM, SOM
k. Have adequate instructions been delineated for recovery from data base failure?	Mach. Oper. Func.	MOM, SOM
15. Are there adequate procedures for both the master terminal operator and the System/360 operator for handling the IMS/360 log tapes?	Mach. Oper. Func.	MOM, SOM
16. Are procedures delineated for remote terminal start-up and shutdown?	Mach. Oper. Func.	MOM, SOM
17. Have the procedures been delineated and the JCL been available for these IMS/360 Utilities:	Mach. Oper. Func.	MOM, SOM
a. Statistics Report	Mach. Oper. Func.	MOM, SOM
b. DBD Generation	Mach. Oper. Func.	MOM, SOM
c. PSB Generation	Mach. Oper. Func.	MOM, SOM
d. Security Maintenance	Mach. Oper. Func.	MOM, SOM
e. System Definition	Mach. Oper. Func.	MOM, SOM
18. Make necessary coordination to handle system ABENDS, error conditions, and trouble reports.	Sys. Oper. Func.	PDM, SOM, MOM
19. Have schedules been planned for system checkpoint, data base dumps, and reorganization?	Sys. Oper. Func.	SOM, MOM

CHAPTER 2. IMS/360 AND MACHINE OPERATIONS

Information Management System/360 (IMS/360) is designed to make possible the creation and maintenance of medium to large common data bases with many applications. It allows both online message processing and conventional batch processing either individually or simultaneously. IMS/360 operates under the control and facilities of Operating System/360 with Multiprogramming with a Fixed Number of Tasks (MFT) or Multiprogramming with a Variable Number of Tasks (MVT).

The IMS/360 user should realize that a complete, thorough understanding of Operating System/360 operation is prerequisite to a like understanding of the information in this manual. This manual is provided as an aid to proper, accurate processing under Operating System/360. A review of IBM System/360 Operating System, Operator's Guide (GC28-6540) is recommended.

GENERAL DESCRIPTION OF IMS/360

IMS/360 is a set of control program modules designed to operate under the control of and within the framework of Operating System/360. The intent is to give the user of Operating System/360 the ability to construct large data bases and to interface with the data in an efficient teleprocessing manner. To gain maximum utilization of the resources of IMS/360, a multiprogramming environment is required and is obtained through the facilities of Operating System/360 with Multiprogramming with a Fixed Number of Tasks (MFT) or Multiprogramming with a Variable Number of Tasks (MVT).

At initial program load (IPL) time (see Figure 2), the Operating System/360 nucleus is brought into core storage to become the foundation of this multiprogramming environment. The highest priority region of Operating System/360 is used for the IMS/360 resident control program. The remainder of the available core storage is divided into message regions and batch regions, depending upon user requirements.

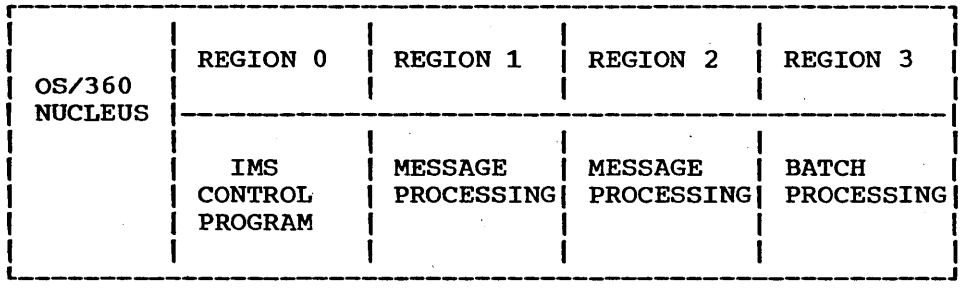


Figure 2. Operating System/360-IMS/360 multiprogramming environment

The Operating System/360 nucleus and its resident extensions provide the nucleus resident service modules, resident access methods, SVC's, etc. that are required when running in an IMS/360 environment.

The IMS/360 control program region includes all the resident control modules and facilities available to the application program.

IMS/360 was developed to improve the ability of the computer user to operate teleprocessing and/or batch-type application systems.

TELEPROCESSING AND BATCH PROCESSING

In batch processing, single transactions are accumulated as a batch and processed periodically against the data base. The use of batch processing should depend on how current the user's data needs to be and on the costs of alternate forms of processing.

Under teleprocessing, remote terminals provide the ability to enter transactions as "messages", allowing inquiry and update capability to the data base. Data bases used for teleprocessing may also be used for batch processing programs for functions like the production of reports.

DATA BASE

With the introduction of the "data base" concept, users can share common data and be assured that that data is current.

A data base is considered to be a nonredundant collection of interrelated data items processable by one or more applications (see Figure 3).

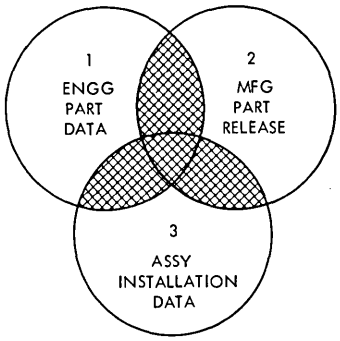


Figure 3. Application data integration - data base concepts

As an example, a company with an application for release of engineering parts data may combine some of its data with a file of manufacturing parts release information. Later, there may be the need for additional data to be added on assembly installation. The point is that, even with the addition of the third application, the data and programs of the first two applications need not change. This is a basic concept of the term data base.

This example also illustrates the flexibility of the data organization. Data may be added to a new or existing application without the need for modifying existing programs. Obviously, this will result in a savings on storage and processing costs.

The functions of data base definition, creation, access, and maintenance are accomplished through an IMS/360 facility called Data Language/I. This facility may be used in either the batch or the teleprocessing environment.

DATA LANGUAGE/I

The full data base facilities of Data Language/I can be used in the IMS/360 batch processing or teleprocessing environment. Data Language/I gives users the ability to adapt IMS/360 to the data requirements of their own applications. It can be used to assist in the creation and maintenance of data, to promote the integration or sharing of data, and

to reduce application program maintenance caused by changes in the data requirements of the application user.

DATA COMMUNICATION FACILITY

The data communication facility of IMS/360 provides support of IBM 1050, or 2260, or 2740 communication terminals for message input and output, with one terminal (1050, 2740) acting as the "master terminal" of the system. This provides a control center for all message processing.

MESSAGE SCHEDULER

A message scheduler initiates message processing when required resources become available.

CHECKPOINT AND RESTART FACILITIES

Checkpoint and restart facilities provide the ability to check system status and to restart at explicit intervals. Checkpoint and restart are available to the extent that queuing functions and data base modifications are logged.

PROCESSING REGIONS AND SYSTEM FLOW

Four types of Operating System/360 regions or partitions represent the system structure of IMS/360: Types 0, 1, 2, and 3. The processing regions and system flow are detailed in Chapter 3 of the IMS/360 Operations Manual, Volume I - Systems Operation and Chapter 5 of the IMS/360 Application Description Manual.

TYPE 0 PROCESSING REGION

Processing region Type 0 is the IMS/360 control program and is created at system definition time. Once operative, the Type 0 region uses the Operating System/360 multiple wait capability.

TYPE 1 PROCESSING REGION

Any IMS/360 message region is considered to be an IMS/360 Type 1 processing region. Its existence is established by entering the job control statements (JCL) for an Operating System/360 job representing this region into the input job stream (SYSIN) or via a command from the IMS/360 master terminal. The Operating System job scheduler establishes the existence of the region and loads into it the IMS/360 region controller. It is the responsibility of the region controller to keep the message region under the control of IMS/360. In a sense, it establishes an endless Operating System/360 job, which maintains control of the message region for an indefinite period of time. The JCL statement may be entered into the Operating System/360 job stream as many times as desired to establish as many message regions as desired.

TYPE 2 PROCESSING REGION

After Operating System/360 initiates the IMS/360 regions associated with teleprocessing, a Type 2 (batch) processing region can be established. Programs operating in this region that reference teleprocessing (online) data bases enter the system as Operating

System/360 jobs and are scheduled and loaded by the Operating System job scheduler. A batch program utilizing a teleprocessing data base and a message processing program using that same teleprocessing data base can concurrently operate against that data base with only a GET function (read-only) processing option. A program operating in a Type 2 processing region can use all the facilities of Operating System/360 data management. A program operating in a Type 2 processing region cannot access an IMS/360 nonteleprocessing data base.

TYPE 3 PROCESSING REGION

Type 3 batch programs also enter the system as Operating System/360 jobs, are scheduled and loaded by the Operating System job scheduler, and may create, reference or modify IMS/360 data bases not concurrently being used for teleprocessing. A program in a Type 3 processing region can use all the facilities of Operating System/360 data management.

HISTORY

Until IMS/360 it was typical for data files to be designed for individual applications. Each file was designed with its own storage location in the computer, on tape, or on disk. It is obvious that some of these files would hold information much like the information in some of the other files and that the same information would often be kept in more than one file. This often resulted in the common data not being maintained current in all files, since some files would necessarily be used less frequently than others. And, of course, the cost of data processing would be increased because of the extra storage required for this duplicate data and its maintenance. IMS/360 provides several features which assist in establishing, changing, and expanding application systems and information files. Applications may now be designed to interface with information files, from remote, typewriter-like terminals.

THE MASTER TERMINAL

Just as the operational "hub" of Operating System/360 is the System/360 console, the operational hub of the IMS/360 system is the user's master terminal. The importance of the IMS/360 master terminal cannot be overstressed. The master terminal is an IBM 1050 or 2740 communications terminal, which controls IMS/360 communications, message scheduling, and data base operation. It is used for checkpointing and restarting the system, for monitoring the system, and for altering operation of the system. An alternate master terminal may be defined, and, at the user's option, the System/360 console may be so designated.

In effect, there are always two master terminals, since the System/360 console can serve as an alternate master terminal and may be used as such should the master terminal malfunction. When it is serving as the master terminal, all master terminal commands, except /DISPLAY, /RDISPLAY, /TEST, /EXCLUSIVE, /END, and /BROADCAST, can be issued from the computer console. It is not recommended that the System/360 console be normally used as the master terminal. It should be used only in emergencies.

Although IMS/360 supports IBM 2740 and 1050 terminals connected to leased communication lines or common carrier switched communication facilities, the master terminal must be connected through a leased or nonswitched communication line. The 2260 Display Station cannot be used as a master terminal.

THE COMMAND LANGUAGE

A master terminal language allows the master terminal operator to interrogate, alter, or control the entire IMS/360 system. All security capabilities of IMS/360 are also controlled by means of this language to assist in maintaining proper access to and the integrity of information.

A list of terminal commands follows. Proper entry of these commands is essential to the success of the Machine Operations function. Details of all the commands are found in Chapters 3 and 4. (A review of the appropriate SRL Operator's Guide for the terminal being operated would be helpful.)

LIST OF ALL TERMINAL COMMANDS

COMMAND NAME	DETAILS FOUND		COMMAND NAME	DETAILS FOUND	
	Chap 3	Chap 4		Chap 3	Chap 4
ASSIGN	X		IAM		X
BROADCAST		X	LOCK		
CANCEL		X	LOG		X
CHANGE	X		NRESTART	X	
CHECKPOINT	X		PSTOP	X	
DBDUMP	X		PURGE	X	
DBLOG	X		RDISPLAY		X
DBNOLOG	X		RESET		X
DBRECOVERY	X		SET		X
DELETE	X		START	X	
DISPLAY	X				
END		X	STOP	X	
ERESTART	X		TEST		X
EXCLUSIVE		X	UNLOCK		X

PHYSICAL AND LOGICAL TERMINALS

IMS/360 conceptually makes use of two types of terminals: physical and logical. Physical terminals are the hardware devices used to enter or record messages being sent or received over communication lines. Logical terminals (LTERM) are primarily names which are related to physical terminals (PTERM) or their components. It is the logical terminal that is referenced in the construction and transmission of messages. There may be one or more logical terminals associated with a particular physical terminal. This association of logical terminals to a physical terminal is created by the Systems Operation function during IMS/360 system definition. Each logical terminal associated with a physical terminal may have different security restrictions.

References to physical terminals in the following discussions refer to the relative physical terminal on the line; that is, the first physical terminal on any line is always physical terminal 1 (PTERM1); the second, physical terminal 2 (PTERM2); etc.

In a switched network environment, a further distinction is made between logical terminals that are normally connected to a physical line in idle, answering, or calling status, and logical terminals that may be specified for attachment to an answered switched line. The former type

of logical terminal is called a line logical terminal, and the latter is called a subpool logical terminal.

Remote switched network terminals must call IMS/360 line groups that correspond to the type of terminal and feature of the calling terminal.

Subsequent to connection of the switched line call, the sign-on procedure will accomplish the connection of the specified logical terminals to the physical line. Since there are no physical attribute specifications in the subpool logical terminal, sign-on may be specified for more than one type of physical terminal.

For more details, see Chapter 3 in the IMS/360 Operations Manual, Volume I - Systems Operation.

REMOTE TERMINALS AND THEIR LANGUAGE

The remote terminal command language is detailed in Chapter 4 of this manual. Note that all commands from remote terminals are also available for use by the master terminal. Of course, the entry of remote terminal commands can be regulated through the use of passwords. The remote terminal command applies only to the terminal from which it is entered.

INITIAL PROGRAM LOADING

Initial program load (IPL) is a procedure that is carried out at such times as the beginning of a shift or after scheduled maintenance. It must be accomplished for the Operating System/360 before IMS/360 can be initiated as jobs under control of Operating System/360. The details for the initialization, execution, and termination of IMS/360 under Operating System/360 are provided in Chapter 5 of this manual.

MESSAGE PROCESSING REGION ABENDS

The message processing regions (MVT) or partitions (MFT), of IMS/360 perform all message processing. An application program for message processing resides and executes within a message processing region or partition. When operating with Operating System/360 MVT, a message processing program operates as an Operating System/360 task subordinate to the task that controls the message processing region. When operating with Operating System/360 MFT, hold a message processing program operates as part of the same task as the IMS/360 modules that control the message partition.

If the application-message processing ABENDs during execution, the state in which the message processing region or partition is left depends upon whether MFT or MVT is being used. If MVT is being used, the Operating System/360 subtask containing a message processing program is ABENDed, but the Operating System/360 task containing the IMS/360 modules for message region control continues to execute. (A subtask is a task that is created by another task by means of the ATTACH macro-instruction.) The master terminal operator is notified about the ABENDed message processing program and the transaction code it was processing at the time of ABEND. The program and transaction code are stopped and are unavailable for processing until a /START command is issued from the master terminal. Since the message region still exists, the transaction type of highest priority in the input queue is scheduled for processing in the message region.

If MFT is being used and the message processing program ABENDs, the entire Operating System/360 job representing the message partition terminates. Another Operating System/360 job representing an IMS/360 message processing region must be initiated immediately in the same partition. This can be accomplished through the job class scheduling function of Operating System/360.

The problems of message region ABENDs should be thoroughly considered with the user's Systems Operation function.

LOG TAPE LABELS

The IMS/360 system log is an Operating System/360 QSAM tape data set with variable length records. This data set has standard labels. If a failure occurs that terminates not only IMS/360 but Operating System/360 as well, a trailer tape label is not written on the IMS/360 system log. The normal operating procedure is to manually tape-mark the tape from the tape control unit. However, no trailer label is written. Before this log tape can be used for restart of IMS/360 or data base recovery, a trailer label must be supplied by the user of IMS/360. This can be accomplished through a batch job execution to copy the log to another tape. When the manually applied tape-mark on the log is read, the user-provided batch job will ABEND, but Operating System/360 will write a trailer label on the copied-to tape. The Basic Sequential Access Method with one buffer for both input log and output tape should be used in the user-provided program. See the Systems Operation function for assistance in this area.

This chapter supplements the quick-reference checklist provided in Chapter 1 and emphasizes the master terminal and terminal command responsibilities of the Machine Operations function when operating the Information Management System/360.

Selection of a qualified master terminal operator and an equally capable System/360 console operator is extremely important. The Systems Operation function should provide the training, with hands-on time, for each operator. The importance of these two operators cannot be overstressed. It is recommended that this manual not be used as final procedure within the user's installation. IMS/360 has built into it a great flexibility; therefore, each individual installation will have its preference for proper procedures. As an example, not all the commands are to be used. Each installation will want only certain commands used from the remote terminal and others from the master terminal. It is recommended that the user prepare his own more detailed written operating procedure.

The proximity of the master terminal of IMS/360 and the System/360 computer console must be considered with regard to security, ease of communication with each other, and the IMS/360 log tape library. Manual logs of the user's choosing will aid in IMS/360 operation reconstruction. Current lists of data bases and application programs, the relationship of transaction codes to the application programs and their data bases, the physical terminal location and the lead remote terminal operator at that location, the type of terminal, telephone numbers, and the IBM Field Engineers' phone numbers are possible considerations for reference material.

In this chapter considerable detail is supplied on each of the IMS/360 master terminal commands. Remote terminal command details are supplied in Chapter 4. Instructions for their use are also contained in this chapter. There are three types of terminal input formats: the normal message format, the message switching format, and the command message format.

Messages and codes of IMS/360 are listed in Chapter 7 of this manual as they apply to the master terminal and the System/360 console.

MASTER TERMINAL OPERATION

This section describes items relating to the operation of the master terminal and should be used in conjunction with the IBM SRL Operator's Guide for the type of terminal being used. The master terminal is defined as the terminal that is the heart of the Information Management System, as it is the source of systems control and information messages. The master terminal may be either an IBM 1050 or 2740 typewriter terminal. The master terminal language is discussed as if a 2740 is being used. The differences between the 2740 and the 1050 are described. Although the master terminal may be located near the computer, it has a function that is different from that of the System/360 console. Use of the System/360 console as master terminal is permitted but not recommended.

References to physical terminals in the following discussions refer to the relative physical terminal on the line; that is, the first physical terminal on any line is always physical terminal 1 (PTERM1); the second, physical terminal 2 (PTERM2); etc.

MASTER TERMINAL COMMAND LANGUAGE

A master terminal command is acceptable from only the master terminal. Any master terminal command results in the issuance of completion or error messages to the originating and affected terminals. There are no terminal commands that cannot be entered from the master terminal. A terminal command is formatted as follows:

```
/VERB (Password) KEYWORD P1 KEYWORD P2, P3.  COMMENTS
```

The /VERB (such as /STOP) is the first element. (Command verbs may be abbreviated to their first three characters.) The carriage-return key on the keyboard may be depressed (in order to position the print element at the left margin) before entering the /VERB. A password may be required, depending upon the definition of the verb at IMS/360 security maintenance time. If it is required, the password should be entered next. The password is normally enclosed in parentheses: (Password). However, when entry is being made from a 1050 terminal, it may not be desired to print the password. Therefore, as an alternative, the password may be enclosed between bypass and restore characters:

```
%PASSWORD*
```

No spaces or intervening characters may be entered between the /VERB and the left parenthesis or bypass character and/or between the right parenthesis or restore character and the first letter of the first keyword. One or more keywords may be required, depending upon the format of the particular verb statement. The keyword may be separated from its parameter (as designated by P1 or P2 above) by a space, a dash (-), or an equal sign (=). Unless otherwise noted, multiple parameters may be attached to a given keyword, as designated by P2, P3 above. Multiple parameters must be separated by a comma or a comma followed by a blank. A blank (no comma) must separate the last parameter for a given keyword from the next keyword, as designated by P1 above. For purposes of documentation, comments or notes may be added at the end of a terminal command. However, in order to mark the end of the command, a period must be entered following the last parameter, if comments are to be added thereafter.

MASTER TERMINAL COMMANDS

CORRECTION OF MASTER TERMINAL COMMANDS

The following are methods to be used in case an error has been made when entering a master terminal command:

Backspacing - If the EOB or CR (carriage-return) key has not been depressed, a typing error may be corrected by depressing the backspace key to the incorrect character, retyping it correctly, and retyping all subsequent characters.

Single line deletion - If it is necessary to delete a typed line, ** must be typed before the EOB or CR key is depressed.

MASTER TERMINAL COMMAND KEYWORD DEFINITIONS

Since many commands utilize the same keywords and parameters, reference should be made to the following directory when reviewing the commands:

LINE

is the keyword referring to a communication line; correct parameters are one- to three-character line numbers.

PTERM

is the keyword referring to a relative physical terminal; correct parameter is a number corresponding to the relative position of the terminal on the line.

LTERM

is the keyword referring to a logical terminal; correct parameters are one- to eight-alphameric-character logical terminal names.

TRAN

is the keyword referring to a transaction code; correct parameters are one- to eight-alphameric-character transaction codes.

PROGRAM

is the keyword referring to a program; correct parameters are one- to eight-alphameric-character program names.

DATABASE

is the keyword referring to a data base; correct parameters are one- to eight-alphameric-character data base names.

ALL

may be used as a parameter with many keywords. The specific acceptable uses of this parameter are duly noted in the descriptions of the individual commands.

P1, P2, etc.

are abbreviations used to designate possible parameters in the descriptions of the various verbs.

MASTER TERMINAL KEYWORD SYNONYMS

The following table relates the keywords used in the master terminal commands to their allowable synonyms. Where no synonym is listed, none is permitted.

Keyword	Synonym
ABDUMP	
ACTIVE	
ASSIGNMENT	
BLDQ	BLDQS, BUILDQ, BUILDQS
CHECKPOINT	CHKPT, CHECKPT, CHKPOINT
CPRI	
DATABASE	DATABASES, DB, DBS
DUMPQ	DUMPQS
FORMAT	FMT
FREEZE	
LINE	LINES
LMCT	LCT
LPRI	
LTERM	LTERMS
NPRI	
PASSWORD	PASSWORDS, PSWD, PSWDS
PRIORITY	PRTY
PLMCT	PLCT
PROGRAM	PROGRAMS, PROG, PROGS, PGM, PGMS
PTERM	PTERMS
PURGE	
QUEUE	QUEUES, Q, QS
REGION	REGION, REG, REGS, MSGREG, MSGREGS, MSGREGION, MSGREGIONS
RESEND	
SER	SERS, SERIAL, SERIALS
STATUS	
STOP	
TAPE	TAPES
TERMINAL	TERMINALS, TERM, TERMS, TER, TERS
TRAN	TRANS, TRANSACTION, TRANSACTIONS, TRANCODE, TRANCODES

MASTER TERMINAL NULL WORDS

For purposes of clarity, at the user's discretion the following words are considered null words. They may be used within commands at any time.

AFTER
FOR
SECURITY
TO
ON
MODE

TERMINAL COMMAND SYNTAX

The syntax for all terminal command parameter descriptions is much like that of Operating System/360:

1. Words written in all capital letters must appear exactly as written.

2. Words written in lowercase letters are to be replaced by a user-specified value.

3. Enclosing a parameter in brackets indicates that it is optional. If more than one parameter is thus enclosed, either all must be present or all must be omitted.

4. Enclosing a group of parameters in braces on several lines indicates that a choice is to be made of <u>one</u> of the lines of parameters.

5. The symbols [ ], { }, and ,... are used as an aid in defining the instructions. THESE SYMBOLS ARE NOT CODED; they act only to indicate how an instruction may be written.

   [ ] indicates optional operands. The operand enclosed in the brackets (for example, [VL]) may be coded or not, depending on whether the associated option is desired. If more than one item is enclosed in brackets (for example, $\left[\begin{matrix}\text{REREAD}\\\text{LEAVE}\end{matrix}\right]$), one or more may be coded.

   { } indicates that a choice must be made. One of the operands from the vertical stack within braces (for example, $\left\{\begin{matrix}\text{input}\\\text{output}\end{matrix}\right\}$) must be coded, depending on which of the associated services is desired.

   ,...indicates that more than one set of operands may be designated in the same instruction.

COMPARISON OF START, STOP, PSTOP, AND PURGE COMMANDS

The first group of commands, /START, /STOP, /PSTOP, and /PURGE, are all functionally related. Therefore, it should be noted that each of these commands completely overrides any previously issued related command. With the exception of /START, none of these commands is instantly effective. For example, if /STOP is issued relative to a given terminal that is receiving output, the report will be completed, rather than being stopped immediately. Thereafter, the response to the /STOP command will be printed on the stopped terminal. The message that is a response to a terminal command will override the generated status of the line, terminal, etc. Although issued by the master terminal, the commands /STOP, /PSTOP, and /PURGE are not acceptable for the master terminal logical terminal, the master terminal physical terminal, or the line on which the master terminal is located. See Figure 4 for a comparison of this first group of commands.

COMMAND	TERMINAL/LINE			TRANS		PROGRAM	DB
	REC	SEND	Q O/P	SCHED	Q	EXECUTE	USE
/START	YES	YES	YES	YES	YES	YES	YES
/STOP	NO	NO	YES	NO	NO	NO	NO
/PSTOP	NO	NO	YES	NO	YES		
/PURGE	NO	YES	YES	YES	NO		

REC allows receipt of input messages.

SEND initiates sending of output messages.

Q O/P allows output message queuing from processing.

SCHED allows scheduling of messages for processing.

Q allows input queuing of messages.

EXECUTE allows use of a program for processing.

USE allows use of data base for processing.

Figure 4. Comparison of /START, /STOP, /PSTOP, and /PURGE commands

START AND STOP COMMANDS

Since they are exact opposites, these two commands are discussed together. Entry of either of these commands would normally be restricted to the master terminal but could be allowed from any remote terminal. /STOP stops the sending, receiving, or queuing of output messages relative to a particular communications line or terminal, stops the scheduling or queuing of messages containing a specific transaction code, stops the execution of a specific program, and/or stops the use of a given data base. Note that /START and /UNLOCK commands or /STOP and /LOCK commands are not identical. The formats of /START and /STOP are identical. The following /START and /STOP formats are acceptable:

```
/START
  or    [(Password)]   { DATABASE }
/STOP                  { LINE     }  { P1,...Pn }
                       { LTERM    }  {          }
                       { PROGRAM  }  { ALL      }
                       { TRAN     }
        - - - - - - - - - - - - - - - - - - - - -
        [(Password)] LINE P1 PTERM  { P1,...Pn }
         (See Note)                 { ALL     }
        - - - - - - - - - - - - - - - - - - - - -
        [(Password)] REGION
```

Note: When used with PTERM, multiple parameters cannot be used with the LINE keyword.

EXAMPLES OF START AND STOP COMMANDS

EXAMPLE 1:

- Entry MT: /START LINE 4,5,6,7,8,9,10,11
- Response MT: *START COMMAND COMPLETED
- Response RT: *TERMINAL STARTED

Explanation: /START with keyword LINE means start polling, send output, and queue output to those terminals on the above lines. MT means master terminal and RT means remote terminal.

EXAMPLE 2:

- Entry MT: /START LINE 4 PTERM 1, 2
- Response MT: *START COMMAND COMPLETED
- Response RT: *TERMINAL STARTED

Explanation: /START with keyword LINE and PTERM means start receiving input, start sending output, and start queuing output to relative physical terminals 1 and 2 on Line 4.

EXAMPLE 3:

- Entry MT: /START LTERM APPLE, TREE, FRUIT
- Response MT: *START COMMAND COMPLETED
- Response RT: *TERMINAL STARTED (*appropriate terminal started)

Explanation: /START with keyword LTERM means queue output messages and send messages to the specified logical terminals.

EXAMPLE 4:

- Entry MT: /START TRAN PIT, SEED
- Response MT: *START COMMAND COMPLETED
- Response RT: NONE

Explanation: /START with keyword TRAN means queue input messages and schedule this transaction code. Warning: When /STOP and /PURGE are used with this keyword, queuing of input is stopped only if the message to be queued originates at a terminal. Output from an application program is always queued.

EXAMPLE 5:

- Entry MT: /START DATABASE TREEFARM
- Response MT: *START COMMAND COMPLETED
- Response RT: NONE

- Entry MT: /START DATABASES ALL
- Response MT: *START COMMAND COMPLETED
- Response RT: NONE

Explanation: /START with keyword DATABASE means to allow scheduling of any program using this data base or all the data bases.

EXAMPLE 6:

- Entry MT: /START PROGRAM APPLETREE1
- Response MT: *START COMMAND COMPLETED
- Response RT: NONE

- Entry MT: /START PROGRAM ALL
- Response MT: *START COMMAND COMPLETED
- Response RT: NONE

Explanation: /START with keyword PROGRAM means to allow scheduling of this program or, when used with ALL, to allow scheduling of all the programs.

EXAMPLE 7:

- Entry MT: /START REGION
- Response MT: *START MSGREG COMMAND IN PROGRESS
- Response MT: IMS116I MESSAGE PROCESSING REGION STARTED
- Response RT: NONE

Explanation: /START with keyword REGION means to use the facilities of Operating System/360 to start a message region (one). This command and its keyword are cumulative in effect. To start two message regions, the command would be entered twice. The processing is also done on a net basis. If /START were entered once, the net result would be to start one message region.

EXAMPLE 8:

- Entry MT: /STOP LINE 4,5,6,7,8,9,10,11
- Response MT: *STOP COMMAND COMPLETED
- Response RT: *TERMINAL STOPPED

Explanation: /STOP with keyword LINE means do not poll, do not send output, and do not queue output. /PURGE and /STOP stop queuing of output only if the message to be queued originates at a terminal (message switching). Output from an application program is always queued. MT means master terminal and RT means remote terminal.

EXAMPLE 9:

- Entry MT: /STOP LINE 4 PTERM 1, 2
- Response MT: *STOP COMMAND COMPLETED
- Response RT: *TERMINAL STOPPED

Explanation: /STOP with keywords LINE and PTERM means do not receive input, do not send output, and do not queue output.

EXAMPLE 10:

- Entry MT: /STOP LTERM APPLE, TREE, FRUIT
- Response MT: *STOP COMMAND COMPLETED
- Response RT: *TERMINAL STOPPED

Explanation: /STOP with keyword LTERM means do not queue output messages, and do not send messages to this logical terminal.

EXAMPLE 11:

- Entry MT: /STOP TRAN PIT, SEED
- Response MT: *STOP COMMAND COMPLETED
- Response RT: NONE

Explanation: /STOP with keyword TRAN means do not queue input and do not schedule this (these) transaction code(s). /STOP and /PURGE with keyword TRAN mean stop queuing of input only if the message to be queued originates at a terminal. Output from an application program is always queued.

EXAMPLE 12:

- Entry MT: /STOP DATABASE TREEFARM
- Response MT: *STOP COMMAND COMPLETED
- Response RT: NONE

Explanation: /STOP with keyword DATABASE means do not schedule a program using this data base.

EXAMPLE 13:

- Entry MT: /STOP PROGRAM APPLETREE1
- Response MT: *STOP COMMAND COMPLETED
- Response RT: NONE

Explanation: /STOP with keyword PROGRAM means do not schedule this program.

EXAMPLE 14:

- Entry MT: /STOP REGION
- Response MT: *STOP COMMAND COMPLETED
- Response MT: IMS117I MESSAGE PROCESSING REGION STOPPED
- Response RT: NONE

Explanation: /STOP with keyword REGION means to use the facilities of Operating System/360 to terminate a message region (one). This command is cumulative in effect. To stop two message regions, the command would be entered twice. The processing is also done on a net basis. If /STOP were entered once, the net result would be to stop one message region.

PROCESS STOP COMMAND (PSTOP)

This command (Process Stop) stops the sending and receiving of messages relative to a particular communications line or terminal, or stops the scheduling of messages containing specific transaction codes. This command allows the queuing of output messages relative to the specified communications line or terminal and/or allows the input and output queuing of messages containing the specified transaction codes.

/PSTOP and /LOCK are functionally similar in that they both allow queuing. Entry of either of these commands would normally be restricted to the master terminal but could be allowed from any remote terminal. In addition, different bits are affected, so as to allow both operational and security control. The same formats are acceptable for /PSTOP as were described for the verbs /START and /STOP, except DATABASE or PROGRAM. (See format description under START and STOP Commands.)

```
/PSTOP  [(Password)] -{LINE  } {P1,...Pn}
                      {LTERM } {      }
                      {TRAN  } {ALL   }

        [(Password)]  LINE P1 PTERM {P1,...Pn}
                                    {ALL   }
              (See Note)
```

Note: Multiple parameters cannot be used with the LINE keyword.

EXAMPLES OF PSTOP COMMAND

EXAMPLE 1:

- Entry MT: /PSTOP LINE 4 PTERM 1
- Response MT: *PSTOP COMMAND COMPLETED
- Response RT: *TERMINAL PSTOPPED

Explanation: /PSTOP with keyword LINE or keywords LINE and PTERM means do not receive input, do not send output, but queue output. MT means master terminal and RT means remote terminal.

EXAMPLE 2:

- Entry MT: /PSTOP LTERM APPLE, TREE
- Response MT: *PSTOP COMMAND COMPLETED
- Response RT: *TERMINAL PSTOPPED

Explanation: /PSTOP with keyword LTERM means queue output messages and do not send messages to this logical terminal.

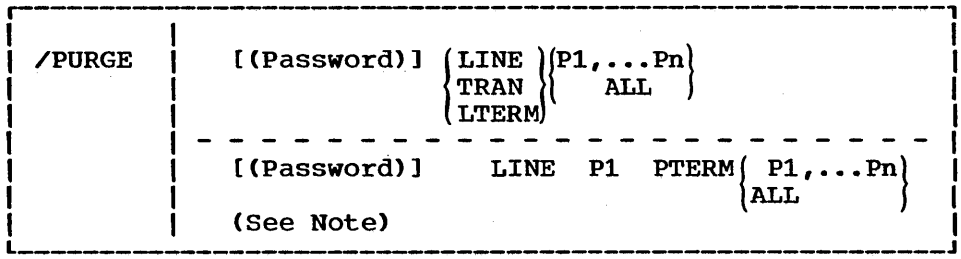
EXAMPLE 3:

- Entry MT: /PSTOP TRAN SEED
- Response MT: *PSTOP COMMAND COMPLETED
- Response RT: NONE

Explanation: /PSTOP with keyword TRAN means queue input and do not schedule this transaction code.

PURGE COMMAND

This command stops the receiving and input queuing of messages relative to a particular communications line or terminal, or stops the input and output queuing of messages containing the specified transaction code. This command allows the sending of messages relative to the specified communications line or terminal and/or allows the scheduling of messages containing the specified transaction code. See Figure 4 for a comparison of commands. Entry of this command would normally be restricted to the master terminal but could be allowed from any remote terminal. The following formats are acceptable for the /PURGE verb:



Note: Multiple parameters cannot be used with the LINE keyword.

EXAMPLES OF PURGE COMMAND

EXAMPLE 1:

- Entry MT: /PURGE LINE 4
- Response MT: *PURGE COMMAND COMPLETED
- Response RT: *TERMINAL PURGING

Explanation: /PURGE with keyword LINE means do not poll, send output, and do not queue output. /PURGE and /STOP stop queuing of output only if the message to be queued originates at a terminal (message switching). Output from an application program is always queued. MT means master terminal and RT means remote terminal.

EXAMPLE 2:

- Entry MT: /PURGE LINE 4 PTERM ALL
- Response MT: *PURGE COMMAND COMPLETED
- Response RT: *TERMINAL PURGING

Explanation: /PURGE with keywords LINE and PTERM means do not receive input, send output, and do not queue output.

EXAMPLE 3:

- Entry MT: /PURGE LTERM APPLE, TREE, FRUIT
- Response MT: *PURGE COMMAND COMPLETED
- Response RT: *TERMINAL PURGING

Explanation: /PURGE and keyword LTERM means do not queue output messages, and send messages to this logical terminal.

EXAMPLE 4:

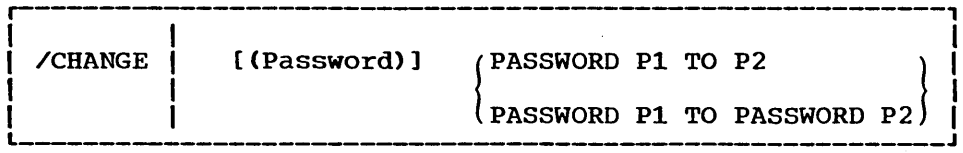
- Entry MT: /PURGE TRAN PIT, SEED
- Response MT: *PURGE COMMAND COMPLETED
- Response RT: NONE

Explanation: /PURGE with keyword TRAN means do not queue input, and schedule this transaction code. /STOP and /PURGE with keyword TRAN mean stop queuing of input only if the message to be queued originates at a terminal. Output from an application program is always queued.

CHANGE COMMAND

This terminal command is used to change one password to another password. Password security is created by the IMS/360 security maintenance program and invoked at IMS/360 restart time through the presence of the PASSWORD operand. Entry of this command would normally be restricted to the master terminal but could be allowed from any

remote terminal. Once deleted, password or terminal security is not reestablished until either a cold start or a warm start with TERMINAL or PASSWORD parameters is performed. These formats are acceptable for this type of command:



PASSWORD P1 must be defined prior to the entry of this command at security maintenance time, as its execution results in a direct password replacement. If the password operand P1 does not exist in the user's IMS/360 system, the /CHANGE command is rejected. When this command is entered, PASSWORD P2 must not have been previously defined, as duplicate passwords are not acceptable and will result in rejection of the command.

EXAMPLE OF CHANGE COMMAND

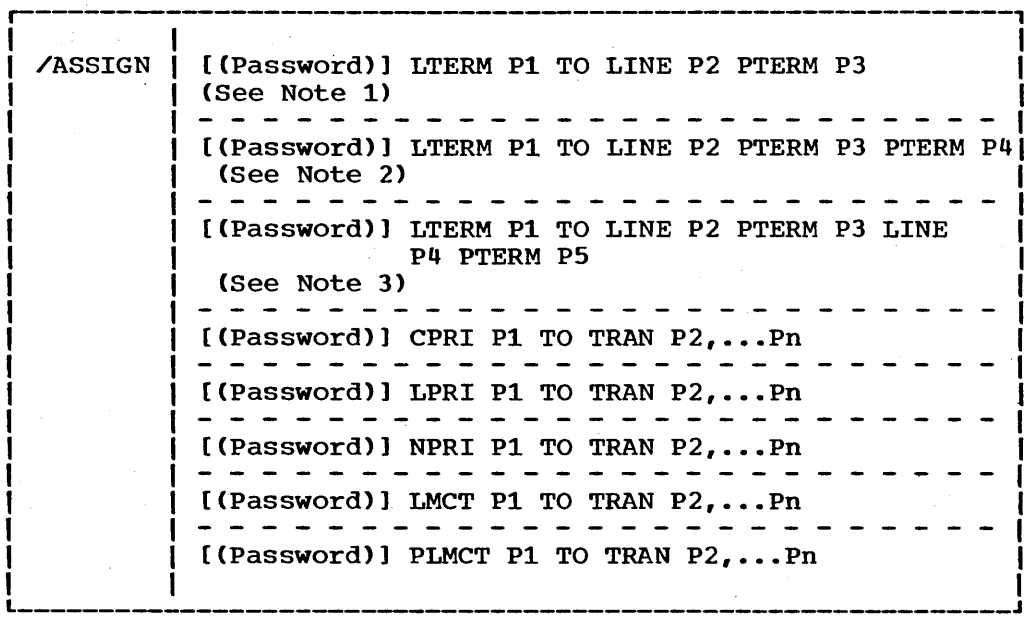
- Entry MT: /CHANGE PASSWORD 1234 to WXYZ
- Response MT: *CHANGE COMMAND COMPLETED
- Response RT: NONE

Explanation: This command is used to change one password to another. MT means master terminal and RT means remote terminal.

ASSIGN COMMAND

The /ASSIGN command is used to correlate the specified logical terminal to relative physical terminals on communication lines for input and output. It can also be used to temporarily assign a current priority, a normal priority, a limit priority, a limit count, or a processing limit count to one or more transaction codes. (See Notes 4 and 5.)

The /ASSIGN command is rejected if a LINE or PTERM operand relates to a switched network. Unless the logical terminal to be reassigned is the master terminal, it must be stopped prior to being reassigned.



Note 1: LTERM P1 will be assigned to LINE P2 PTERM P3 for both input and output.

Note 2: LTERM P1 will be assigned to LINE P2 PTERM P3 for input and will be assigned to LINE P2 PTERM P4 for output.

Note 3: LTERM P1 will be assigned to LINE P2 PTERM P3 for input and will be assigned to LINE P4 PTERM P5 for output.

Note 4: If the logical terminal to be assigned is the master terminal, the logical terminal and the line and relative physical terminal to which it is to be assigned must be in a start status. In addition, the line and relative physical terminal for input and output must be the same.

Note 5: If the logical terminal to be assigned is not the master terminal, the logical terminal must be in a stop status prior to the entry of this command.

where:

CPRI

is the keyword referring to the current priority of a transaction code; correct parameters are one- or two-character numeric priorities, from 0 to 14, inclusive.

LPRI

is the keyword referring to the limit priority of a transaction code; correct parameters are one- to two-character numeric priorities, from 0 to 14, inclusive.

NPRI

is the keyword referring to the normal priority of a transaction code; correct parameters are one- or two-character numeric priorities, from 0 to 14 inclusive.

LMCT

is the keyword referring to the limit count of a transaction code; correct parameters are numeric values ranging from 0 to 65,535.

PLMCT

is the keyword referring to the processing limit count of a transaction code; that is, the maximum number of messages enqueued on this SMB that will be allowed to be in process during any single program load. Correct parameters are numeric values ranging from 1 to 65,535.

EXAMPLES OF ASSIGN COMMAND

EXAMPLE 1:

- Entry MT: /ASSIGN LTERM APPLE TO LINE 5 PTERM 1
- Response MT: *ASSIGN COMMAND COMPLETED
- Response RT: NONE

Explanation: /ASSIGN with keywords LTERM, LINE, and PTERM correlates a specified logical terminal with a specific relative physical terminal. MT means master terminal and RT means remote terminal.

EXAMPLE 2:

- Entry MT: /ASSIGN CPRI 8 TO TRAN PIT, SEED
- Response MT: *ASSIGN COMMAND COMPLETED
- Response RT: NONE

Explanation: /ASSIGN with keyword CPRI and TRAN means to temporarily assign a current priority level to one or more specific transaction codes.

DELETE COMMAND

The DELETE command is used to eliminate password security for a given transaction code, logical terminal, relative physical terminal, data base, or program. Entry of this command would normally be restricted to the master terminal but could be allowed from any remote terminal. It may also be used to eliminate terminal security for a given transaction code. Logical terminals, physical terminals, data bases, and programs cannot be secured by terminal security. Once deleted, password or terminal security is not reestablished until either a cold start or a warm start with TERMINAL or PASSWORD parameters is performed. Acceptable formats of this command are:

```
/DELETE  [(Password)] PASSWORD SECURITY FOR
                      (DATABASE)
                      (LTERM   )
                      (PROGRAM ) P1,...Pn
                      (TRAN    )
         ------------------------------------------
         [(Password)] PASSWORD SECURITY FOR LINE P1 PTERM
                      P1,...Pn
          (see Note)
         ------------------------------------------
         [(Password)] TERMINAL SECURITY FOR TRAN P1,...Pn
```

Note: Multiple parameters cannot be used with the LINE keyword.

where:

PASSWORD

is the keyword referring to password security; correct parameters are of length n or less, as designated in the security maintenance program.

TERMINAL

is the keyword referring to terminal security; correct parameters are of length n or less, as designated in the security maintenance program.

EXAMPLES OF DELETE COMMAND

EXAMPLE 1:

- Entry MT: /DEL PSWD FOR DATABASE TREEFARM
- Response MT: *DELETE COMMAND COMPLETED
- Response RT: NONE

Explanation: /DELETE with keyword PASSWORD eliminates password security for one or more transaction codes, relative physical terminals, logical terminals, programs, or data bases. MT means master terminal and RT means remote terminal.

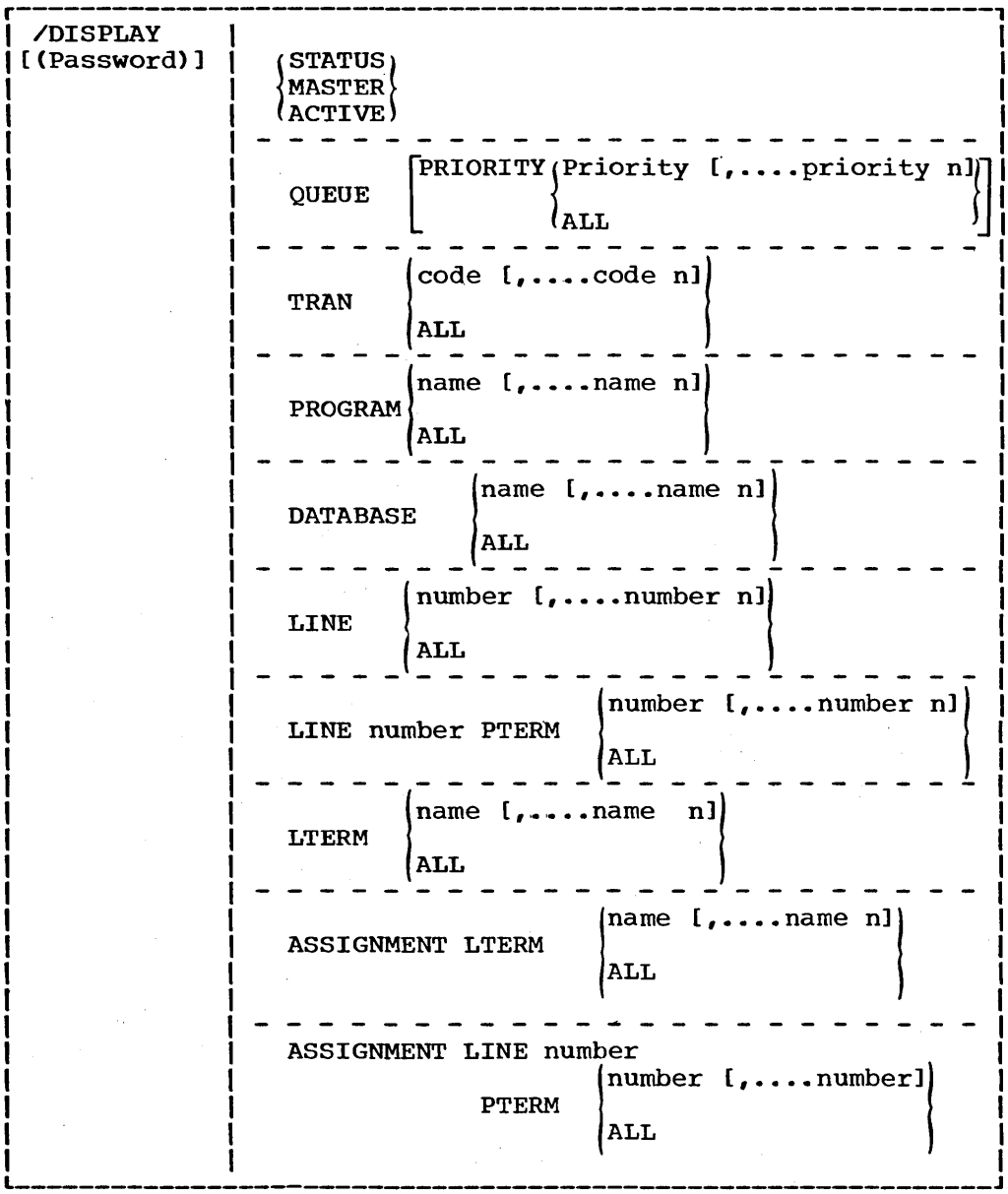
EXAMPLE 2:

- Entry MT: /DEL TERM SECURITY FOR TRAN PIT, SEED
- Response MT: *DELETE COMMAND COMPLETED
- Response RT: NONE

Explanation: /DELETE with keyword TERMINAL eliminates terminal security for one or more transaction codes.

DISPLAY COMMAND

Entry of the DISPLAY command would normally be restricted to the master terminal but could be allowed from any remote terminal, depending on what commands the particular system allows and has had defined at security maintenance time. The command provides the ability to display critical fields of specific IMS/360 control blocks and certain system queues. The purpose of these displays is to enable the master terminal operator to gain an insight into his dynamically changing system so that he can more effectively control operation of his IMS/360 system through the use of other command language verbs.



where:

STATUS displays all the:

- Transaction codes (TRAN) for which input is not to be queued, for which the transaction code is not to be scheduled, for

which the transaction code is locked, or for which the transaction code is locked specifically for DBDUMP.

- Data bases that are not to be used or that are locked.
- Programs that are not to be executed or that are locked.
- Lines where no input and/or output activity is allowed, where no queuing is allowed, or where the line is idle.
- Relative physical terminals (PTERM) where no input and/or output activity is allowed, where no queuing is allowed, where the Communication Terminal Block (CTB) is locked, or where the relative physical terminal is inoperable.
- Logical terminals (LTERM) where no output activity is allowed, where no queuing is allowed, or where the logical terminal is locked.

MASTER

displays the logical terminal name, the relative physical terminal address, and the line number assigned as the master terminal.

ACTIVE

displays which transaction code for which program is active in the Type 1 processing (message) region(s) and Type 2 processing (batch) region at that particular instant.

QUEUE

displays the message queue according to priority, transaction type, and message count. Messages enqueued upon transactions which have been scheduled for processing by a message processing program are not included in the queue counts as a result of the /DISPLAY QUEUE command. This verb can be further broken down by adding another keyword, PRIORITY n, followed by the priority numbers or ALL, to display those transaction types by name.

TRAN code,....

displays the specific data for the transaction code(s) following the verb TRAN.

PROGRAM name,....

displays the specific data for the program name(s) following the verb PROGRAM.

DATABASE name,....

displays the specific data for the data base name(s) following the verb DATABASE.

LINE number,....

displays the specific data for each numbered communication line(s) following the verb LINE.

This LINE verb has a further breakdown. Example:

/DISPLAY LINE 3 PTERM ALL

This means display all data concerning line 3 by relative physical terminal.

LTERM name,....

displays specific data concerning the logical terminal name(s).

ASSIGNMENT LTERM name,....

displays what input and output communication line and relative physical terminal are assigned to each LTERM.

The ASSIGNMENT keyword can have LINE number with PTERM following. Example:

/DISPLAY ASSIGNMENT LINE 2 PTERM ALL

This means that for line 2 and the relative physical terminal a display will list the logical terminal name assigned at present.

EXAMPLES OF DISPLAY COMMAND

The responses in the following examples use abbreviations which are defined below.

Abbreviation	Definition
ADDR	Unit address in IMS/360 system definition
B-II	Batch region 2
CP	Current priority
DIAL	Indicates pool CTB
DIAL CTB	Telephone number instead of terminal address
ERRCT	Error count (number of transmission line errors)
INV COUNT	Invocation count
LCT	Limit count
Line 1	Indicates computer console
LIN/PTE	Line and relative physical terminal address (a number corresponding to the relative position of the terminal on the line)
LOG	Updates log for this data base
LP	Limit priority
MT	Master terminal
NP	Normal priority
OUTPUT DEQCT	Number of messages sent on this line
OUTPUT ENQCT	Number of messages enqueued for output on this line
OUTPUT QCT	Number of messages remaining to be sent

PEM	Partially entered messages
PLCT	Processing limit count
QCT	Queue count
RECD	Number of messages received on this line
RT	Remote terminal
TP	Teleprocessing

Note: Exception status is also listed, on the far right side of the message.

EXAMPLE 1:

- Entry MT: /display status
- Response MT:

```
**TRAN**
DFSIBDRS     PSTOPPED
DLI          PSTOPPED
DLN          PSTOPPED
ICS          PSTOPPED
NOP          PSTOPPED
SWI          PSTOPPED
SWIBR        PSTOPPED

**DATABASE**
DFSIBDRT     STOPPED,LOCKED,NOTOPEN
DI31IPH01    NOTOPEN
DI31IPH02    NOTOPEN

**PROGRAM**
HIMASN01     STOPPED
SWITCH       STOPPED

**LINE**
4            STOPPED,IDLE
5            STOPPED,IDLE
6            STOPPED,IDLE
7            STOPPED,IDLE
8            STOPPED,IDLE
9            STOPPED,IDLE
10           STOPPED,IDLE
11           STOPPED,IDLE
12           STOPPED,IDLE
13           STOPPED,IDLE
14           STOPPED,IDLE,NOTOPEN

**PTERM**
2-1          PURGING
4-1          COMPINOP

**LTERM**
L2740SM1     STOPPED
L2740S1      STOPPED

*68295/122834
```

EXAMPLE 2:

- Entry MT: /display master
- Response MT:

```
LTERM MASTER
PTERM 3-1

*68295/130245*
```

EXAMPLE 3:

- Entry MT: /display active
- Response MT:

```
JOBNAME     TYPE    TRAN/STEP   PROGRAM

MESSAGE     TP      WAITING
BATCHREG    B-11    NONE

ACTIVE-IN - 1
ACTIV-OUT - 1

*68295/124909*
```

EXAMPLE 4:

- Entry MT: /display queue
- Response MT:

```
            NUMBER OF   MESSAGE
PRTY        TRAN CODES  COUNT

NO QUEUES

*68276/124724*
```

- Entry MT: /display queue
- Response MT:

```
            NUMBER OF   MESSAGE
PRTY        TRAN CODES  COUNT

8               1       4
5               3       6
1               2       4

TOTAL           6      14

*68295/123016*
```

- Entry MT: /display queue priority 0,1,5,8,12,16
- Response MT:

```
                          MESSAGE
PRTY      TRAN            COUNT

0         NO QUEUES

1         NOP             1
1         SWI             3
TOTAL                     4

5         DLI             2
5         ICS             3
5         SWIBR           1
TOTAL                     6

8         DLN             4
TOTAL                     4

12        NO QUEUES

16 IS INVALID

TOTAL MSG COUNT           14

*68295/123106*
```

- Entry MT: /display queues priority all
- Response MT:

```
                          MESSAGE
PRTY      TRAN            COUNT

0         NO QUEUES

15        NO QUEUES

14        NO QUEUES

13        NO QUEUES

12        NO QUEUES

11        NO QUEUES

10        NO QUEUES

 9        NO QUEUES

 8        DLN             4
TOTAL                     4

7         NO QUEUES

6         NO QUEUES

5         DLI             2
5         ICS             3
5         SWIBR           1
TOTAL                     6

4         NO QUEUES

3         NO QUEUES

2         NO QUEUES

1         NOP             1
1         SWI             3
TOTAL                     4

TOTAL MSG COUNT    14

*68295/123204*
```

EXAMPLE 5:

- Entry MT: /display tran ims, swi, dln, ics, dli
- Response MT:

```
TRAN     PEM QCT  LCT     PLCT    CP  NP  LP
IMS        0   0   10    61223    2   2   5  PSTOPPED
SWI        0   0 1000    61223    1   1   7  PSTOPPED
DLN        0   0    3    61223    0   0   8  PSTOPPED
ICS        0   0    5       10    5   5  12
DLI        0   0    5       10    5   5  10

*69155/132753*
```

- Entry MT: /display tran all
- Response MT:

TRAN	PEM	QCT	LCT	PLCT	CP	NP	LP	
#	0	0	6	65535	10	10	14	
ADDI	0	0	5	65535	7	7	9	
ADDINV	0	0	5	65535	7	7	9	
ADDPART	0	0	5	65535	7	7	9	
ADDPN	0	0	5	65535	7	7	9	
CLOSE	0	0	65535	65535	1	1	1	
CLSORD	0	0	5	65535	7	7	9	
DFSIBDRS	0	0	65535	65535	0	0	15	
DISB	0	0	2	65535	9	9	10	
DISBURSE	0	0	65535	65535	1	1	1	
DLETI	0	0	2	65535	5	5	7	
DLETINV	0	0	2	65535	5	5	7	
DLETPART	0	0	2	65535	5	5	7	
DLETPN	0	0	2	65535	5	5	7	
DLI	0	0	5	10	5	5	10	
DLN	0	0	3	61223	0	0	8	PSTOPPED
DSPALLI	0	0	65535	65535	1	1	1	
DSPINV	0	0	65535	65535	1	1	1	
DSPPN	0	0	65535	65535	1	1	1	
ENQ	0	0	65535	65535	8	8	8	
ICS	0	0	5	10	5	5	12	
IMS	0	0	10	61223	2	2	5	PSTOPPED
INVTORY	0	0	65535	65535	1	1	1	
NOP	0	0	1	5	1	1	1	
PART	0	0	65535	65535	1	1	1	
RJE	0	0	10	65535	2	2	4	
SKH1	0	0	65535	65535	8	8	8	
SKI1	0	0	65535	65535	8	8	8	
SKI2	0	0	65535	65535	8	8	8	
SWI	0	0	1000	61223	1	1	7	PSTOPPED
SWIBR	0	0	4	20	5	5	5	
SWIPASS	0	0	1	20	4	4	6	
SWIPR	0	0	100	20	14	14	14	
SWITS	0	0	1	20	4	4	6	
SWN	0	0	4	5	0	0	4	
SW1	0	0	65535	65535	0	0	0	
SW2	0	0	1000	65535	0	0	0	
TPPL1	0	0	65535	65535	8	8	8	
TPPL2	0	0	65535	65535	8	8	8	
TUBE	0	0	65535	65535	8	8	8	

69155/132309*

EXAMPLE 6:

- Entry MT: /display program himasn01, switch
- Response MT:

PROGRAM	TYPE	
HIMASN01	TP	STOPPED
SWITCH	TP	STOPPED

68295/124649

- Entry MT: /display program all
- Response MT:

```
PROGRAM     TYPE

DFSIDBR0    TP
HIMASN01    TP  STOPPED
NOPSB       TP
SWITCH      TP  STOPPED

*68295/124740*
```

EXAMPLE 7:

- Entry MT: /display database di21sn01, di31ph01
- Response MT:

```
                INV
DATABASE        COUNT   LOG

DI21SN01        0       YES STOPPED, LOCKED, NOTOPEN
DI31PH01        0        NO NOTOPEN

*68276/130115*
```

- Entry MT: /display database all
- Response MT:

```
                INV
DATABASE        COUNT   LOG

DFSIBDRT        0       NO  STOPPED, LOCKED, NOTOPEN
DI21SN01        0       NO  STOPPED, LOCKED, NOTOPEN
DI21SN02        0       NO  STOPPED, LOCKED, NOTOPEN
DI22SN01        0       NO  STOPPED, LOCKED, NOTOPEN
DI22SN02        0       NO  STOPPED, LOCKED, NOTOPEN
DI31PH01        0       NO  NOTOPEN
DI31PH02        0       NO  NOTOPEN
DI31SK01        0       NO  NOTOPEN
DS21SN01        0       NO  STOPPED, LOCKED, NOTOPEN
DS21SN02        0       NO  STOPPED, LOCKED, NOTOPEN
DS21RB02        0       NO  STOPPED, LOCKED, NOTOPEN
ZZZZZZZZ        0       NO  STOPPED, LOCKED, NOTOPEN

*68276/126913*
```

EXAMPLE 8:

- Entry MT: /display line 1, 3, 5, 12
- Response MT:

LINE	TYPE	RECD	OUTPUT ENQCT	OUTPUT DEQCT	OUTPUT QCT	ERRCT
1	SYSTEM	CONSOLE				
3	2740	18	12	12	0	0
5	2740	7	0	0	0	0
12	1050	DIAL	1	1	0	DIAL STOPPED, IDLE

68295/125116

- Entry MT: /display line all
- Response MT:

LINE	TYPE	RECD	OUTPUT ENQCT	OUTPUT DEQCT	OUTPUT QCT	ERRCT
1	SYSTEM	CONSOLE				
2	2740	6	6	6	0	0
3	2740	21	14	14	0	0
4	2740	0	2	0	2	0 STOPPED,IDLE
5	2740	4	12	4	0	0
5	2740	12	4	4	0	0
6	2740	0	0	0	0	0 STOPPED,IDLE
7	2740	0	0	0	0	0 STOPPED,IDLE
8	1050	0	0	0	0	0 STOPPED,IDLE
9	1050	0	0	0	0	0 STOPPED,IDLE
10	1050	0	0	0	0	0 STOPPED,IDLE
11	1050	DIAL	0	0	0	DIAL STOPPED,IDLE
12	1050	DIAL	1	1	0	DIAL STOPPED,IDLE
13	1050	DIAL	0	0	0	DIAL STOPPED,IDLE
14		0	0	0	0	0 STOPPED,IDLE,NOTOPEN

68295/125326

EXAMPLE 9:

- Entry MT: /display line 4 pterm all
- Response MT:

```
                                                OUTPUT  OUTPUT  OUTPUT
LIN/PTE     TYPE     ADDR   RECD    ENQCT      DEQCT   QCT     ERRCT
| 4-1       2740     032    0         2          0      2       0 PURGING,COMPINOP
| 4-2       2740     032    0         0          0      0       0
```

68295/125912

- Entry MT: /display line 12 pterm all
- Response MT:

```
                                                OUTPUT  OUTPUT  OUTPUT
LIN/PTE     TYPE     ADDR   RECD    ENQCT      DEQCT   QCT     ERRCT

12-1        1050     038    DIAL      1          1      0       DIAL
```

68295/125745

- Entry MT: /display pterm 1, 2 on line 4
- Response MT:

```
                                                OUTPUT  OUTPUT  OUTPUT
LIN/PTE     TYPE     ADDR   RECD    ENQCT      DEQCT   QCT     ERRCT
| 4-1       2740     032    0         2          0      2       0 PURGING,COMPINOP
| 4-2       2740     032    0         0          0      0       0
```

68295/125514

EXAMPLE 10:

- Entry MT:
  /display lterm dialq1,inquiry1,l2740s1,l2740sm1,master,wtor
- Response MT:

```
                OUTPUT  OUTPUT  OUTPUT
LTERM           ENQCT   DEQCT   QCT

DIALQ1            0       0       0
INQUIRY1          0       0       0
L2740S1           1       1       0     STOPPED
L2740SM1          1       0       1     STOPPED
MASTER           12      12       0
WTOR              0       0       0
```

68295/123755

- Entry MT: /display lterm all
- Response MT:

```
                OUTPUT   OUTPUT   OUTPUT
LTERM           ENQCT    DEQCT    QCT

*AUDIO1         0        0        0
*AUDIO2         0        0        0
*AUDIO3         0        0        0
*DSPLY1         0        0        0
*DSPLY2         0        0        0
*DSPLY3         0        0        0
*MASTER         8        8        0
*WTOR           0        0        0
*1050AA1        0        0        0
*1050AA2        0        0        0
*1050AA3        0        0        0
*2740AA1        0        0        0
*2740AA2        0        0        0
*2740AA3        0        0        0
*2740C1         0        0        0
*2740C2         0        0        0
*2740SM1        2        2        0    STOPPED
*2740SM2        2        2        0    STOPPED
*2740S1         1        1        0
*2740S2         1        1        0

*68276/125448*
```

EXAMPLE 11:

- Entry MT:

```
/display assignment lterm dialq1,inquiry1,l2740s1,l2740sm1,master,wtor
```

- Response MT:

```
                  INPUT    OUTPUT
      LTERM       LIN/PTE  LIN/PTE

      DIALQ1      11-1     11-1
      INQUIRY1     5-1      5-1
      L2740S1      3-1      3-1
      L2740SM1     4-1      4-1
      MASTER       3-1      3-1
      WTOR         1-SC     1-SC

      *68295/130657*
```

- Entry MT: /display assignment lterm all

- Response MT:

```
                  INPUT    OUTPUT
      LTERM       LIN/PTE  LIN/PTE

      CARDPUNCH   14-1     14-1
      DIALQ1      11-1     11-1
      DIALQ2      12-1     12-1
      DIALQ3      13-1     13-1
      INQUIRY1     5-1      5-1
      INQUIRY2     6-1      6-1
      INQUIRY3     7-1      7-1
      INQUIRY4     8-1      8-1
      INQUIRY5     9-1      9-1
      INQUIRY6    10-1     10-1
      L2740SM1     4-1      4-1
      L2740SM2     4-2      4-2
      L2740S1      3-1      3-1
      L2740S2      2-1      2-1
      MASTER       3-1      3-1
      NS1050      14-1     14-1
      PTPPUNCH    14-1     14-1
      WTOR         1-SC     1-SC

      *68295/160953*
```

EXAMPLE 12:

- Entry MT: /display assignment line 2 pterm all

- Response MT:

```
      LIN/PTE

      2-1     IN  - L2740S2
              OUT - L2740S1, L2740S2

      *68295/130910*
```

- Entry MT: /display assignment line 12 pterm all
- Response MT:

```
LIN/PTE

12- 1   IN  - INQUIRY1
        OUT - INQUIRY1

*68295/130005*
```

- Entry MT: /display assignment line 3 pterm all
- Response MT:

```
LIN/PTE

3-1     IN  - MASTER, L2740S1
        OUT - MASTER

*68295/130848*
```

- Entry MT: /display assignment line 4 pterm 1, 2
- Response MT:

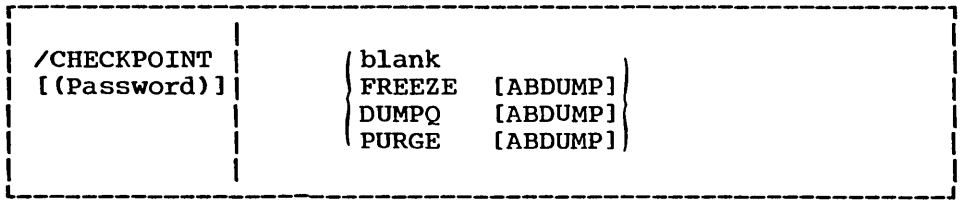
```
LIN/PTE

4-1     IN  - L2740SM1
        OUT - L2740SM1
4-2     IN  - L2740SM2
        OUT - L2740SM2

*68295/130328*
```

CHECKPOINT COMMANDS

The checkpoint facilities of the IMS/360 control program provide the means for periodically recording control information and status to enable IMS/360 restart after failure. This failure may be the termination of the IMS/360 control program or the loss of Operating System/360. In addition, the checkpoint facilities are the means for orderly termination of the IMS/360 system, creating a tape image (backup) of a data base used for message processing, or assisting in the reconstruction of a data base that has been destroyed. There are four checkpoint commands and two data base dump commands. Entry of these commands would normally be restricted to the master terminal but could be allowed from any remote terminal.



where:

blank

means simple checkpoint, /CHECKPOINT with no operands. It may be invoked automatically by the IMS/360 control program or from the master terminal. The automatic invocation of simple checkpoint is based upon the number of entries to the system log. The user of IMS/360 may specify the number of entries between system-invoked checkpoints during the system definition. The simple checkpoint, like all other checkpoint commands, uses the IMS/360 system log for recording control data. The simple checkpoint logs the status of all dynamically changeable IMS/360 control blocks. These include the logical to physical terminal relationships, the input and output message queue control blocks, the security blocks, and others. The simple checkpoint command causes the scheduling of programs into message processing regions to halt momentarily while IMS/360 control block information is logged. The simple checkpoint command has no effect upon internal operations in the IMS/360 control program or operations upon the communication lines. As soon as the simple checkpoint command is terminated, scheduling into message regions is automatically initiated by the IMS/360 control program.

FREEZE

is a checkpoint FREEZE command. The command /CHECKPOINT FREEZE is the fastest means for orderly termination of the IMS/360 system. This command is invoked from the master terminal. Input communication lines are stopped as soon as any messages being entered are completely received. Output communication lines are stopped as soon as any messages in the process of being sent are completely transmitted. Message regions are terminated as soon as the current messages being processed have been completed. All input messages remaining to be processed and all output messages remaining to be transmitted are retained in the message queue data sets. The same mechanics as in simple checkpoint are then invoked to log all control block status. Finally, the checkpoint facility causes the termination of the IMS/360 control program job. The IMS/360 user should employ the /NRESTART command without message queue reconstruction to restart IMS/360 after a /CHECKPOINT FREEZE. This command should be entered only from the master terminal.

DUMPQ

The /CHECKPOINT DUMPQ command operates in exactly the same manner as the /CHECKPOINT FREEZE command, but performs the additional function of dumping all of the input and output messages from the message queue data sets to the IMS/360 system log tape. The /NRESTART command with message queue reconstruction should be employed to restart IMS/360 after a /CHECKPOINT DUMPQ termination. The restart of IMS/360 in this manner causes allocation of space in the queue data sets to start from the beginning of the data sets. The messages dumped from the queue data sets during the /CHECKPOINT DUMPQ command are reloaded into

the message queue data sets during the /NRESTART with-message-queue-reconstruction BLDQ command.

PURGE

The /CHECKPOINT PURGE command is the most orderly yet most time-consuming manner of terminating IMS/360. The input communication lines are stopped first, as soon as all messages being entered are completely received. All messages in the input queue are processed, and all resultant output messages are transmitted to their specified destinations. The message regions are then terminated, and output communication lines are stopped. Finally, any input messages which could not be processed or any output messages which could not be transmitted are dumped to the IMS/360 system log, and the IMS/360 control program job is terminated. The /NRESTART command with message queue reconstruction (BLDQ) should be employed to restart IMS/360 after termination with a /CHECKPOINT PURGE command.

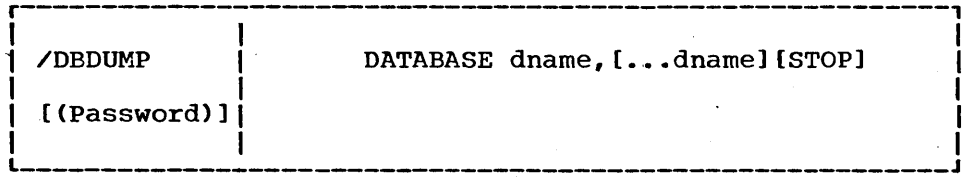
ABDUMP

The inclusion of the operand with FREEZE, DUMPQ, or PURGE will provide a SYSUDUMP of the IMS/360 Type 0 region.

EXAMPLES OF CHECKPOINT COMMANDS

See Chapter 5 for uses of checkpoint commands.

DATA BASE DUMP COMMANDS



DBDUMP DATABASE dname

is the /DBDUMP command with DATABASE operand. DATABASE dname means the actual name of the data base being dumped. The command is entered from the master terminal and creates a dump tape image. This is accomplished by stopping all input of transactions (from terminals) that would update the data base and by processing all transactions already in the input queue against the data base. A special utility (a message processing program) is then scheduled for execution. This message processing program retrieves all segments from the data base with GET calls and creates a copy in the form of an HSAM tape data base with ISRT calls. When the data base dump is complete, the tape volume containing the copy is unloaded. Finally, the update transactions which had been stopped are again allowed entry from terminals. This command causes a force-end-of-volume on the IMS/360 log so that a new log is started immediately after the data base dump. The use of this command performs preparation functions for reconstruction of a data base. The format of the tape to which a data base is dumped is determined by the DD card contents with the ddname DBDUMP in the IMS/360 Type 0 region JCL.

DBDUMP DATABASE dname STOP

is the /DBDUMP command with operand STOP. DATABASE dname means the actual name of the data base being dumped. The command is used in preparatory procedures prior to data base reconstruction. The /DBDUMP with STOP command causes all transactions (against a data base that must be reconstructed) to be retained in the input message queue and forces end-of-volume on the current log tape. The transactions left in the input queue are not scheduled for processing. The continuation of input of these transaction types is allowed, but no processing occurs. The data base must be reconstructed with a user-supplied batch program executed from an IMS/360 Type 3 region and a previously dumped copy of the data base. Once the data base is reconstructed with the last dump tape, all transactions from the data base dump until the current point in time must be reprocessed. This is accomplished with the old system log tapes and the data base recovery command.

The /BROADCAST command (defined later) may be helpful in coordinating checkpoint and restart with remote terminal operators.

EXAMPLES OF DBDUMP COMMANDS

See Chapter 5 for uses of DBDUMP commands.

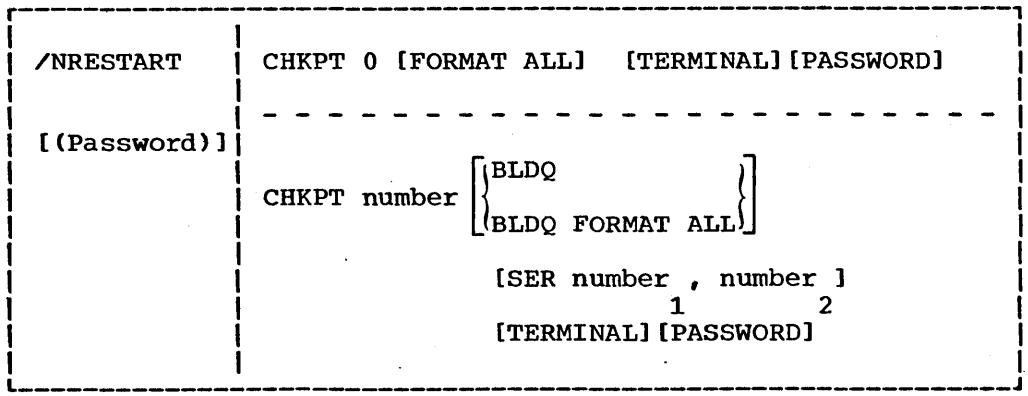
RESTART COMMANDS

The restart facilities of the IMS/360 system provide for recovery after a failure of IMS/360, its message queues, and the data bases used for message processing. Depending upon the type of failure, the result may involve the loss of core storage contents or the loss of both core storage contents and contents of the message queue data sets. The restart facilities are designed to provide recovery from these described failures.

In addition, the data base recovery capabilities of IMS/360 restart assist the IMS/360 user in reconstruction of data bases used for message processing. Reconstruction is necessary if the application programs have destroyed the meaningful content of a data base or if an input/output error occurs.

Two types of restart command exist, normal and emergency restart. The normal restart command is used after the IMS/360 system has been terminated in a normal manner (for example, with a /CHECKPOINT command). The emergency restart command is employed when the IMS/360 system was not terminated normally.

Normal Restart



where:

CHKPT 0

is a form of normal restart called a "cold start" and involves no previous system log tape.

CHKPT number

is the other form of normal restart, a "warm start". The system is restarted with the checkpoint data on a previous (normally the last used) system log tape. The checkpoint number specifies Julian date and time of day (yyddd/hhmmss). This would have been recorded on the master terminal when a checkpoint was executed. The warm start version of the /NRESTART command without BLDQ assumes that the IMS/360 system had been terminated with a /CHECKPOINT FREEZE command. All messages are retained in the message queue data sets. When the /NRESTART command (with warm start) is executed, the data on the old system log tape provides the IMS/360 system with correct positioning within the data set.

FORMAT ALL

causes all message queue data sets to be formatted. The formatting of the message queue data sets need be done only at initial system start (first-time use of system), when a message queue data set input/output error occurs, or when the size of the message queue data sets is to be changed. For a warm start, if FORMAT ALL is present, BLDQ must also be.

BLDQ

is an additional operand, Build Queue, which may be specified with the warm start version of the normal restart command. The BLDQ operand should be specified if the system was terminated with a /CHECKPOINT PURGE or /CHECKPOINT DUMPQ command. The BLDQ operand assumes that any messages remaining in the message queue data sets when the /CHECKPOINT PURGE or DUMPQ terminated were logged to the system log tape. The BLDQ operand causes the normal restart command to use the old log tape specified in the CHKPT operand and reloads any retained messages from the log to the message queue data sets.

See Chapter 5 for additional information on performing a warm start.

TERMINAL

is an optional operand. If TERMINAL is specified, the latest terminal security specifications from the user's IMS.RESLIB library (generated by the IMS/360 Security Maintenance Program) will be operational at completion of this normal restart.

PASSWORD

is an optional operand. If PASSWORD is specified, the latest password security specifications from the user's IMS.RESLIB library (generated by the IMS/360 Security Maintenance Program) will be operational at completion of this normal restart.

SER

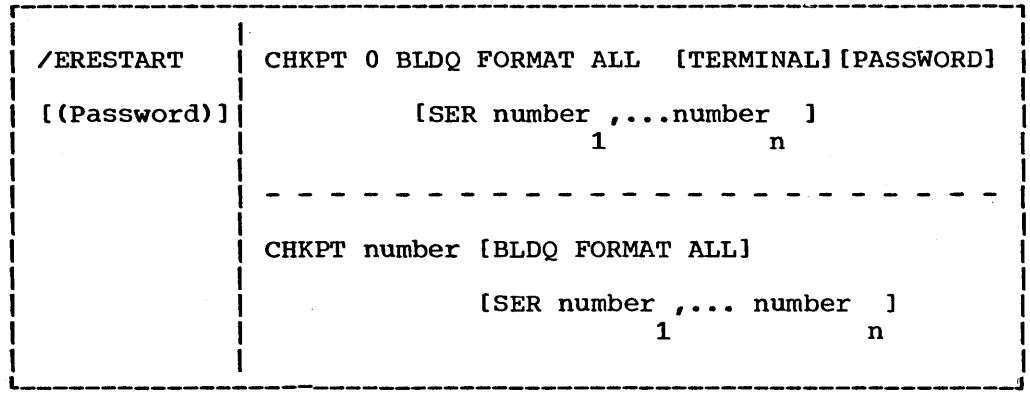
means that the six-character serial number of the tape on which the checkpoint number resides may be specified. No more than two serial numbers may be specified. Normally, one tape serial number is used. The ability to enter two serial numbers considers the situation in which the checkpoint information spans two volumes. This operand is optional because the information may be entered through a dd card for the old log tape if procedures are not used for IMS/360.

Examples of NRESTART Command

See Chapter 5 for uses of normal restart commands.

Emergency Restart

The emergency restart command is used to restart IMS/360 after a failure that caused the IMS/360 nucleus or Operating System/360 to terminate abnormally. The emergency restart command always employs the last IMS/360 log tape to reinitiate system operation if only the contents of core storage are lost. The simplest version of the emergency restart command is used when a failure occurs that involves only the loss of the contents of core storage. The formats for emergency restart are:



where:

CHKPT 0

is an emergency restart from a previous cold start.

CHKPT number

is the checkpoint number from which the restart is to be processed. This would have been recorded on the master terminal, when a checkpoint was executed, as:

*CHECKPOINT COMMAND COMPLETE *68176/105010*SIMPLE*TAPE50

where *SIMPLE indicates simple checkpoint, and *TAPE50 indicates that the volume serial of the system log tape was tape 50. The checkpoint number specifies Julian date and time of day (yyddd/hhmmss).

BLDQ FORMAT ALL

The failure of the IMS/360 or Operating System/360 system may have included a failure of the message queue data sets. In this situation, the emergency restart command with FORMAT ALL and BLDQ operands should be employed. This command causes all of the message queue data sets to be formatted. It also causes all messages that have not been processed or transmitted to be reloaded from old system log tapes to the proper message queue data set. Emergency restart with BLDQ and FORMAT ALL operands requires the IMS/360 system to be restarted from the last cold start or last system termination where the message queue data sets were dumped (that is, /CHECKPOINT PURGE or /CHECKPOINT DUMPQ). If the emergency restart is performed from a previous cold start, the checkpoint number must be 0.

SER

means that the six-character serial number of the tape on which the checkpoint number resides may be specified. Any number of serial numbers may be specified. However, the command may be no longer than one line of typing. This operand is optional because the information may be entered through a dd card for the old log tape if procedures are not used for IMS/360.

TERMINAL

is an optional operand. If TERMINAL is specified, the latest terminal security specifications from the user's IMS.RESLIB library (generated by the IMS/360 Security Maintenance Program) will be operational at completion of this emergency restart.

PASSWORD

is an optional operand. If PASSWORD is specified, the latest password security specifications from the user's IMS.RESLIB library (generated by the IMS/360 Security Maintenance Program) will be operational at completion of this emergency restart.

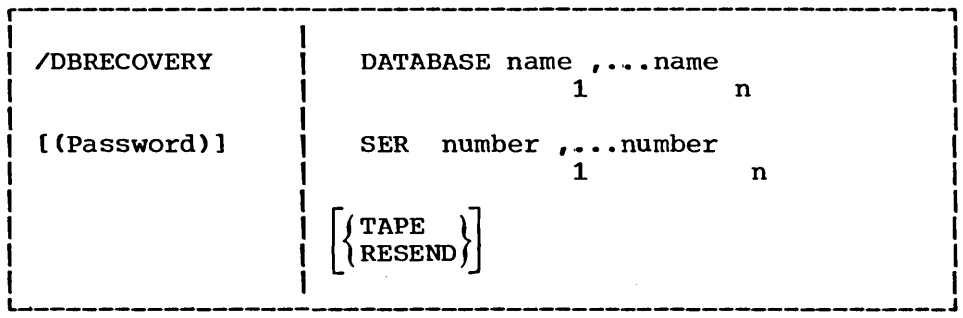
Examples of ERESTART Commands

See Chapter 5 for uses of emergency restart commands.

DATA BASE RECOVERY COMMAND

The final capability of the restart facilities of IMS/360 is data base recovery. Data base recovery is used to rebuild or recreate a data base used for message processing. A /DBRECOVERY command specifying the data base names and the volume serial numbers of the log tapes to be

used in reconstruction is issued from the master terminal. The format of the /DBRECOVERY command is:



where:

DATABASE

means that the DATABASE operand may have multiple names to allow multiple data base reconstruction.

SER

specifies the six-character volume serial numbers since the last dump of the named data base.

TAPE

specifies that all output messages resultant from reprocessing transactions to recover the data bases specified will only be written on the log tape. The messages will not be queued for output. See below.

RESEND

specifies that all output messages resultant from reprocessing transactions to recover the data bases will be enqueued for output and written to the tape log. See below.

If neither RESEND nor TAPE is specified, all output messages resultant from reprocessing transactions to recover the data bases specified are discarded by the system. Neither queuing nor logging of the messages occurs.

The data base recovery concept involves the periodic dumping of each data base with the /DBDUMP command. This command is part of the checkpoint facility of IMS/360. The /DBDUMP command causes a copy of a data base to be created as an HSAM tape data base.

The data base to be recreated must be restored as of the last dumped copy. This is accomplished by:

1. Issuing a /DBDUMP command with STOP operand to halt all processing against the data base

2. Restoring the data base to its state of the last dumped copy. A user-supplied batch program executed in a Type 3 processing region is employed.

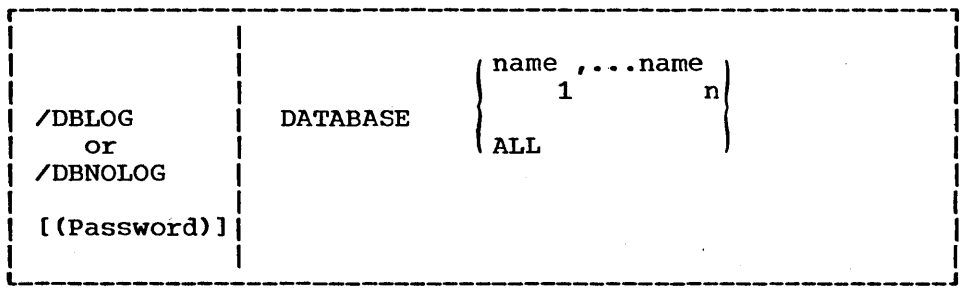
3. Employing the /DBRECOVERY command to cause the reprocessing of all teleprocessing transactions since the last DBDUMP

EXAMPLE OF DBRECOVERY COMMAND

See Chapter 5 for uses of the data base recovery command.

DATA BASE LOG AND NO LOG COMMANDS

/DBLOG and /DBNOLOG are two commands that enable the user of IMS/360 to dynamically specify whether he desires the changes (inserts, deletions, and updates) to a given data base to be logged on the system log tape. Entry of either of these commands would normally be restricted to the master terminal but could be allowed from any of the remote terminals. The formats are:



where:

DATABASE

is the operand indicating the data bases that are to be either logged or not logged. Multiple names or the operand ALL (implying all data bases specified at system definition time) can be specified. This command is used to modify the conditions under which logging is performed as defined at system definition time.

The use of data base modification logging is employed during emergency restart if a message processing program was in execution at the time of system failure and the message processing program had modified data bases. During emergency restart, the data base modifications previously logged are used to restore the accuracy of the data base.

EXAMPLES OF DBLOG AND DBNOLOG COMMANDS

EXAMPLE 1:

- Entry MT: /DBLOG DATABASE TREEFARM
- Response MT: *DBLOG COMMAND COMPLETED
- Response RT: NONE

Explanation: /DBLOG starts data base segment logging, which allows backout of data base modifications during emergency restart. MT means master terminal. RT means remote terminal.

EXAMPLE 2:

- Entry MT: /DBNOLOG DATABASE FOREST
- Response MT: *DBNOLOG COMMAND COMPLETED
- Response RT: NONE

Explanation: /DBNOLOG stops data base segment logging.

CHAPTER 4. IMS/360 REMOTE TERMINAL COMMANDS AND EXECUTION

Even though the following IMS/360 commands are designated as remote terminal commands, they can also be used at the master terminal. The same general format is followed as previously described under "Master Terminal Commands". Correction of remote terminal commands is given and keyword definitions are defined before the additional commands are given.

References to physical terminals in the following discussions refer to the relative physical terminal on the line; that is, the first physical terminal on any line is always physical terminal 1 (PTERM1); the second, physical terminal 2 (PTERM2); etc.

REMOTE TERMINAL COMMANDS

CORRECTION OF REMOTE TERMINAL COMMANDS

The following are methods to be used in case an error has been made when entering a remote terminal command:

Backspacing - If the EOB or CR (carriage-return) key has not been depressed, a typing error may be corrected by depressing the backspace key to the incorrect character, retyping it correctly, and retyping all subsequent characters.

Single line deletion - If it is necessary to delete a typed line, ** must be typed before the EOB or CR key is depressed.

REMOTE TERMINAL COMMAND KEYWORD DEFINITIONS

Since several of the commands utilize the same keywords and parameters, reference should be made to the following directory when reviewing the commands:

LINE

is the keyword referring to a communication line; correct parameters are one- to three-character line numbers.

PTERM

is a keyword referring to a relative physical terminal; correct parameter is a number corresponding to the relative position of the terminal on the line.

LTERM

is a keyword referring to a logical terminal; correct parameters are one- to eight-character logical terminal names.

TRAN

is a keyword referring to a transaction code; correct parameters are one- to eight-alphameric-character transaction codes.

PROGRAM

is a keyword referring to a program; correct parameters are one- to eight-alphameric-character program names.

DATABASE

is a keyword referring to a data base; correct parameters are one- to eight-alphameric-character data base names.

ALL

may be used as a parameter with many keywords. The specific acceptable uses of this parameter are noted in the descriptions of the individual commands.

P1, P2, etc.

are abbreviations used to designate possible parameters in the descriptions of the various verbs.

REMOTE TERMINAL KEYWORD SYNONYMS

The following table relates the keywords used in the remote terminal commands to their allowable synonyms.

KEYWORD	SYNONYM
DATABASE	DATABASES, DB, DBS
LINE	LINES
LTERM	LTERMS
PROGRAM	PROGRAMS, PROG, PROGS, PGM, PGMS
PTERM	PTERMS
TRAN	TRANS, TRANSACTION, TRANSACTIONS, TRANCODE, TRANCODES

REMOTE TERMINAL NULL WORDS

The following words are considered null words. For purposes of clarity, at the user's discretion, they may be used within commands at any time.

AFTER
FOR
SECURITY
TO
ON
MODE

TERMINAL COMMAND SYNTAX

The syntax for all terminal command parameter descriptions is much like that of Operating System/360:

1. Words written in all capital letters must appear exactly as written.

2. Words written in lowercase letters are to be replaced by a user-specified value.

3. Enclosing a parameter in brackets indicates that it is optional. If more than one parameter is thus enclosed, either all must be present or all must be omitted.

4. Enclosing a group of parameters in braces on several lines indicates that a choice is to be made of <u>one</u> of the lines of parameters.

5. The symbols [ ], { }, and ,... are used as an aid in defining the instructions. THESE SYMBOLS ARE NOT CODED; they are only to indicate how an instruction may be written.

   [ ] indicates optional operands. The operand enclosed in the brackets (for example [VL]) may be coded or not, depending on whether the associated option is desired. If more than one item is enclosed in brackets (for example, [REREAD / LEAVE]), one or more may be coded.

   { } indicates that a choice must be made. One of the operands from the vertical stack within braces (for example, {input / output}) must be coded, depending on which of the associated services is desired.

   ,... indicates that more than one set of operands may be designated in the same instruction.

LOCK AND UNLOCK COMMANDS

These two commands are discussed together, since they are opposites. For example, /LOCK stops the sending and receiving of messages relative to a particular communications line or terminal, stops the scheduling of messages containing a specific transaction code, stops the scheduling of a specific program, and/or stops the scheduling or use of a given data base. This command allows the queuing of output messages relative to a particular communications line or terminal and/or allows the queuing of messages containing a specific transaction code. Therefore, functionally, /LOCK is similar to /PSTOP in that it allows queuing.

If the terminals are on a switched network, these are the LOCK and UNLOCK command considerations: an implied /UNLOCK command is processed against a switched network PTERM and inquiry logical terminal whenever a physical or logical terminal disconnect occurs between a remote terminal and the IMS/360 system. Subpool logical terminals, however, are not affected by a disconnect.

COMMAND	TERMINAL/LINE			TRANSACTION		PROG	DATABASE
	REC	SEND	Q O/P	SCHED	Q	EXECUTE	USE
/LOCK	NO	NO	YES	NO	YES	NO	NO
/UNLOCK	YES	YES	YES	YES	YES	YES	YES

where:

REC allows receipt of input messages.

SEND initiates sending of output messages.

Q O/P allows output message queuing from processing.

SCHED allows scheduling of messages for processing.

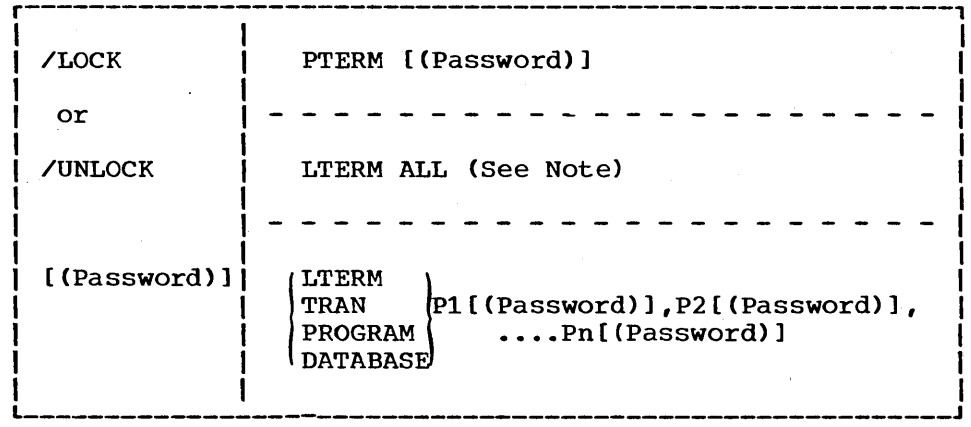
Q allows input queuing of messages.

EXECUTE allows use of a program for processing messages.

USE allows use of data base for processing messages.

Note that /START and /UNLOCK, /STOP and /LOCK, or /PSTOP and /LOCK are not the same. Entry of these commands would normally be restricted to the master terminal but could be allowed from any remote terminal. /LOCK and /UNLOCK, relative to a physical terminal, are applicable only to the physical terminal from which the command is entered. These two commands (/LOCK and /UNLOCK), relative to logical terminals, are applicable only to logical terminals that are assigned to the physical terminal from which the command is entered. The objective of the /LOCK command is to allow the terminal user to secure a specific physical terminal, one or more logical terminals associated with the user's specific physical terminal, one or more data bases, one or more programs, and/or one or more transaction codes.

The following /LOCK and /UNLOCK formats are acceptable:



Note: /LOCK LTERM ALL is the only acceptable use of the parameter ALL relative to these commands.

where:

PTERM

is the operand that secures the user's physical terminal. Note that no keyword parameters are acceptable, since the user can lock only his own physical terminal.

LTERM

is the operand that secures one or more logical terminals associated with the user's physical terminal.

TRAN

is the operand that secures one or more transaction codes.

PROGRAM

is the operand that secures one or more programs.

DATABASE

is the operand that secures one or more data bases.

EXAMPLES OF LOCK AND UNLOCK COMMANDS

EXAMPLE 1:

- Entry RT: /LOCK TRAN SEED
- Response RT: *LOCK COMMAND COMPLETED

Explanation: /LOCK with keyword TRAN means do not schedule this transaction code. If a particular transaction code cannot be processed correctly, use this command at the remote terminal to ensure that this transaction code is not scheduled. RT means remote terminal.

EXAMPLE 2:

- Entry RT: /LOCK DATABASE TREEFARM
- Response RT: *LOCK COMMAND COMPLETED

Explanation: /LOCK with keyword DATABASE means do not schedule any program that uses this data base. If a particular data base is not correct, use this command at the remote terminal to ensure that no program is scheduled that uses this data base.

EXAMPLE 3:

- Entry RT: /LOCK PTERM
- Response RT: *LOCK COMMAND COMPLETED

Explanation: /LOCK with keyword PTERM means queue output, but do not send to this physical terminal. PTERM applies to the physical terminal into which the command is entered. A password may be included with the keyword PTERM; no parameters are acceptable. /LOCK and /UNLOCK are used with nonimmediate-response-type messages only. The user can enter a series of nonimmediate-response-type messages and /LOCK his terminal. No response will be printed on the terminal until such time as the terminal is unlocked (exception: system messages will always be printed).

EXAMPLE 4:

- Entry RT: /LOCK LTERM ALL
- Response RT: *LOCK COMMAND COMPLETED

Explanation: /LOCK with keyword LTERM queues output, but does not send to these logical terminals. These commands are used with nonimmediate-response-type messages only. The user can enter a series of nonimmediate-response-type messages and /LOCK his logical terminal. This normally implies that the messages must be secured by logical terminal, since the user must know what logical terminal or terminals to lock. No responses will be printed on the terminal until such time as the terminal is unlocked (exception: system messages will always be printed).

EXAMPLE 5:

- Entry RT: /LOCK PROGRAM APPLETREE1
- Response RT: *LOCK COMMAND COMPLETED

Explanation: /LOCK with keyword PROGRAM means do not schedule this program. If a particular program cannot be executed correctly, use this command at the remote terminal to ensure that this program is not scheduled or used.

EXAMPLE 6:

- Entry RT: /UNLOCK TRAN SEED
- Response RT: *UNLOCK COMMAND COMPLETED

Explanation: /UNLOCK with keyword TRAN means schedule this transaction code. RT means remote terminal.

EXAMPLE 7:

- Entry RT: /UNLOCK PROGRAM APPLETREE1
- Response RT: *UNLOCK COMMAND COMPLETED

Explanation: /UNLOCK with keyword PROGRAM means schedule this program.

EXAMPLE 8:

- Entry RT: /UNLOCK DATABASE TREEFARM
- Response RT: *UNLOCK COMMAND COMPLETED

Explanation: /UNLOCK with keyword DATABASE means a program may be scheduled that uses this data base.

EXAMPLE 9:

- Entry RT: /UNLOCK PTERM
- Response RT: *UNLOCK COMMAND COMPLETED

Explanation: /UNLOCK with keyword PTERM means queue output and send output to this physical terminal. PTERM applies to the physical terminal into which the command is entered. A password may be included with the keyword PTERM; no parameters are acceptable. /LOCK and /UNLOCK are used with nonimmediate-response-type messages only. The user can enter a series of nonimmediate-response-type messages and /LOCK his terminal. No responses will be printed on the terminal until such time as the terminal is unlocked (exception: system messages will always be printed).

EXAMPLE 10:

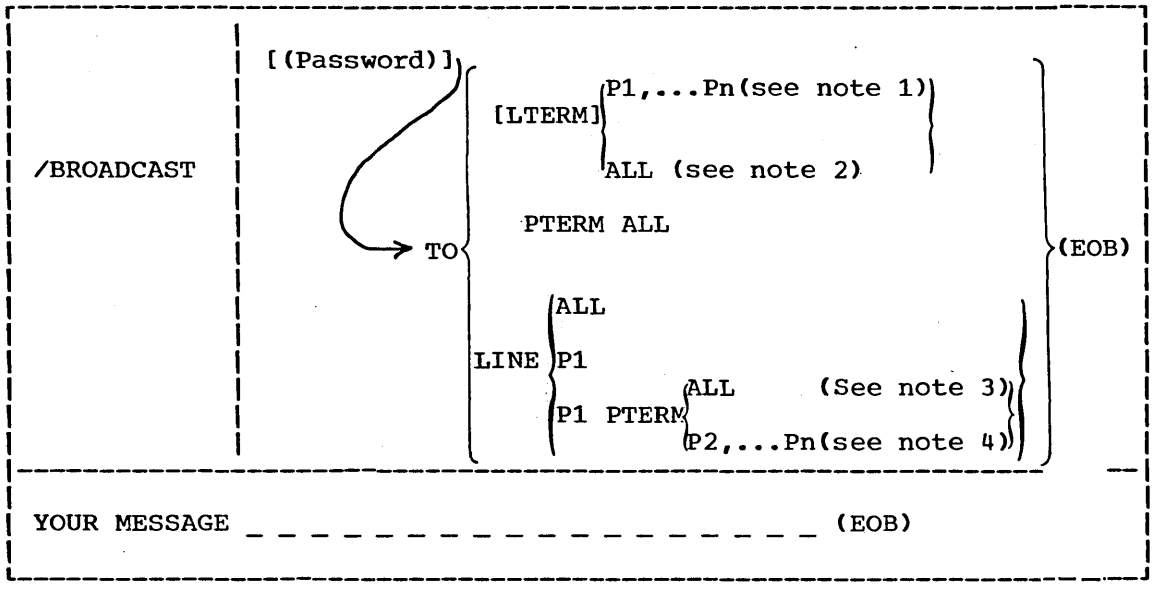
- Entry RT: /UNLOCK LTERM ALL
- Response RT: *UNLOCK COMMAND COMPLETED

Explanation: /UNLOCK with keyword LTERM means queue output and send output to these logical terminals.

BROADCAST COMMAND

Entry of this command would normally be restricted to the master terminal but could be allowed from any remote terminal. The command is used to transmit a keyed warning or informational message to one or more terminals. The message can be only one line in length. An end-of-block key must be depressed prior to the keying of the message to be broadcast.

The format of the /BROADCAST command is:



Note 1. This form of the broadcast command results in the transmission of the broadcast message to the physical terminals to which terminals P1,...Pn are assigned.

Note 2. This form of the broadcast command results in the transmission of the broadcast message to all the physical terminals in the system.

Note 3. This form of the broadcast command results in the transmission of the broadcast message to all the physical terminals located on line P1. Multiple line parameters are acceptable when using these two forms.

Note 4. This form of the broadcast command results in the transmission of the broadcast message to physical terminals P2, ...Pn located on line P1.

EXAMPLES OF BROADCAST COMMAND

EXAMPLE 1:

- Entry MT: /BROADCAST TO ALL. (EOB)
  system will shutdown at 5. (EOB)
- Response MT: *BROADCAST COMMAND COMPLETED
- Response RT: SYSTEM WILL SHUTDOWN AT 5.

Explanation: /BROADCAST, in this case, means transmit the message to all physical terminals. MT means master terminal and RT means remote terminal.

EXAMPLE 2:

- Entry MT: /BROADCAST TO LTERM APPLE, TREE (EOB)
  DON'T USE PGM GREENTREE. (EOB)
- Response MT: *BROADCAST COMMAND COMPLETED
- Response RT: DON'T USE PGM GREENTREE.

Explanation: /BROADCAST with keyword LTERM means transmit the message to only those physical terminals which have these logical terminal names.

EXAMPLE 3:

- Entry MT: /BROADCAST TO LINE 13 PTERM ALL (EOB)
  EXPECT DEMO YOUR LINE AT 9. (EOB)
- Response MT: *BROADCAST COMMAND COMPLETED
- Response RT: EXPECT DEMO YOUR LINE AT 9.

Explanation: /BROADCAST with keywords LINE and PTERM results in the transmission of the message to all physical terminals on LINE 13.

TEST COMMAND

This command can apply only to the user's terminal. It is used to place the user's own terminal into test mode. No independent output messages will be transmitted to the user's terminal. Any input messages that are entered into the user's terminal will be transmitted back to the user's terminal. After the /TEST verb is entered, the user's terminal will remain in the test mode until an /END command has been received from the user's terminal. There are no acceptable keywords or parameters. The only acceptable format is:

```
/TEST

[(Password)]
```

EXAMPLES OF TEST COMMAND

EXAMPLE 1:

- Entry RT: /TEST
- Response RT: *TEST COMMAND COMPLETED
- Entry RT: NOW IS THE TIME TO COME TO THE AID
- Response RT: NOW IS THE TIME TO COME TO THE AID

Explanation: /TEST implies that no independent messages will be transmitted to the user's terminal. Messages entered into the user's terminal are transmitted back to the user's terminal. The exception is shown in Example 2. RT means remote terminal.

EXAMPLE 2:

- Entry RT: /TEST
- Response RT: *TEST COMMAND COMPLETED
- Entry RT: 99999074A
- Response RT:

```
123456c890 space&bksp
          c
1f
  1
   2
    3
```

Explanation: Same as the explanation in Example 1, except that the entry is an IBM FE terminal test as described in the BTAM SRL. The response in this case is different from the entry and exercises the terminal as shown.

EXCLUSIVE COMMAND

This command is used to place the user's own terminal into exclusive use or inquiry mode. The user enters this mode, through the entry of the /EXCLUSIVE verb, if he desires to enter one or more inquiries into his terminal and wants to receive only the responses to his inquiries, without receiving output from other miscellaneous sources. Scheduling and queuing are allowed to continue. After this command has been entered, the user's terminal will remain in the inquiry mode until an /END command has been received from the user's terminal. There are no acceptable keywords or parameters.

Since messages are displayed as soon as possible after queuing, the /EXCLUSIVE command is recommended for proper operation of the 2260 terminal. It will protect the screen of information from being overlaid by message switching, system messages, and messages generated by processing programs initiated by other terminals while the operator is viewing a response he initated. These messages will remain on the queue until a /END command is entered.

The only acceptable format is:

EXAMPLE OF EXCLUSIVE COMMAND

- Entry RT: /EXCLUSIVE
- Response RT: *EXCLUSIVE COMMAND COMPLETED

Explanation: /EXCLUSIVE places the user's terminal into exclusive use or inquiry mode. RT means remote terminal.

END COMMAND

The /END command is used to terminate the mode that was originally initiated through the entry of /TEST or /EXCLUSIVE. This command can apply only to the user's terminal. There are no acceptable key words or parameters. The only acceptable format is:

EXAMPLE OF END COMMAND

- Entry RT: /END
- Response RT: either

  *TEST MODE ENDED (/TEST)

  or

  *EXCLUSIVE MODE ENDED (/EXCLUSIVE)

  or

  *END COMMAND COMPLETED

  Explanation: /END terminates the mode initiated through the /TEST or /EXCLUSIVE command. RT means remote terminal.

LOG COMMAND

This terminal command is limited to one line in length, as is any command (slash-type) message. The function of the command is to cause the contents of the entered message to be logged, not processed by a program, with the slash (/LOG) being the first character logged. This command applies only to the currently entered message line and does not establish a continuing operational mode. There are no acceptable keywords or parameters as such. One or more spaces must separate the verb from the first letter of the message to be logged. The first word of the message, following the /LOG verb, may be a transaction code. To log the message "Today is Monday", the following format would be acceptable:

/LOG TODAY IS MONDAY

/LOG	[(Password)] text

where:

text

means the alphameric character message to be logged.

EXAMPLE OF LOG COMMAND

- Entry MT or RT: /LOG TODAY IS MONDAY
- Response MT or RT: *LOG COMMAND COMPLETED

  Explanation: /LOG causes contents of the message at this terminal to be logged but not processed by a program. It applies only to the currently entered message line and does not establish a continuing operational mode. MT means master terminal and RT means remote terminal.

CANCEL COMMAND

The function of this command is to cause the cancellation of all lines of a multiple-line message that is currently being entered (prior to EOT) into this same terminal. Note that this command causes the cancellation of a complete message. It cannot be used to cancel a single-line input message. An erroneous single line can be canceled through the entry of two asterisks (**), immediately followed by an end-of-block (EOB) character, at the end of the segment to be canceled. There are no acceptable keywords or parameters. The only acceptable format is the verb itself, as follows:

/CANCEL	[(Password)]

EXAMPLE OF CANCEL COMMAND

- Entry MT or RT: /CANCEL
- Response RT or MT: *CANCEL COMMAND COMPLETED

Explanation: /CANCEL is used to cause cancellation of a complete message currently being entered into this same terminal. MT means master terminal and RT means remote terminal.

SET COMMAND

This terminal command sets the destination of all messages entered into this terminal to another terminal (/SET MODE to LTERM master) or to a particular transaction code (/SET MODE to TRAN IMS) (password). It may be changed by /RESET, /START LINE for present terminal, or by the /IAM command. If the transaction is secured by password, checking is done at the time of processing the command. The allowable format is:

/SET	[MODE] {TRAN name / LTERM name}	[(Password)]
[(Password)]		

EXAMPLE OF SET COMMAND

EXAMPLE 1:

- Entry RT: /SET MODE TO LTERM MASTER
- Response RT: *SET COMMAND COMPLETED

Explanation: /SET with keyword LTERM allows the setting of a destination mode for messages entered thereafter into the entering physical terminal. LTERM relates to message switching. In this case, any message entered hereafter from this terminal would not have to have a destination terminal code name at the beginning of the text of the message.

Message editing considerations: Set command destination (TRAN name or LTERM name) is edited as leading field of first segment of message. A blank separator will be inserted between text

EXAMPLE 2:

- Entry RT: /SET MODE TO TRAN IMS(Password)
- Response RT: *SET COMMAND COMPLETED

Explanation: /SET with keyword TRAN allows the setting of a destination mode for messages entered thereafter into the entering physical terminal. TRAN relates to a normal message where a transaction code is referenced by the first eight characters in the first segment of the message. By the entering of this command, any message entered hereafter cannot have a transaction code at the start of the text of the message. RT means remote terminal.

RESET COMMAND

This terminal command eliminates the preset destination invoked by the /SET command.

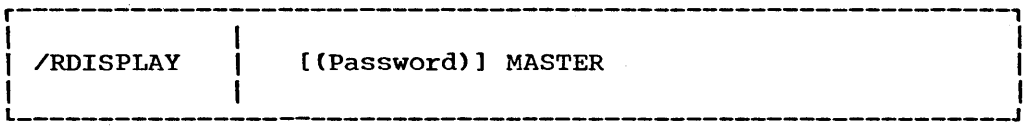
EXAMPLE OF RESET COMMAND

- Entry RT: /RESET
- Response RT: *RESET COMMAND COMPLETED

Explanation: /RESET negates the action of the /SET command. RT means remote terminal.

RDISPLAY COMMAND

The /RDISPLAY command provides the ability from a remote terminal to display the logical terminal name, the physical terminal address, and the line number assigned as the master terminal.



where:

MASTER

is a part of the command that requests the identity of the terminal designated as master.

EXAMPLE OF /RDISPLAY COMMAND

- Entry RT: /RDISPLAY MASTER

- Response RT:
```
LTERM MASTER
PTERM 3-1
*69010/123704
```

Explanation: /RDISPLAY MASTER displays the identification of the master terminal. RT means remote terminal.

IAM COMMAND

The /IAM command applies only to a switched communications network on dialup facilities. This command must be entered before any input transaction codes or other remote terminal commands will be accepted. The following formats are acceptable:

/IAM	LTERM P1 [(Password)]
[(Password)]	LTERM P2 [(Password)]
	PTERM [(Password1)] LTERM P1 [(Password2)]

where:

LTERM P1

means that this command automatically accomplishes the attachment of pool logical terminal P1 to the switched (dialup) communications line over which the call was received from the remote (physical) terminal.

LTERM P2

means that this command automatically accomplishes the logical attachment of the inquiry logical terminal to the switched (dialup) communications line over which the call was received from the remote (physical) terminal. Only the first four characters of the inquiry logical terminal name are compared with the first four characters of the P2 parameters. Reference should be made to the IMS/360 Operations Manual, Volume I - Systems Operation for definition of an inquiry logical terminal.

PTERM (Password1) LTERM P1(Password2)

has the same meaning as the above operand, but accomplishes the attachment of all logical terminals associated with the subpool in which P1 exists.

EXAMPLES OF IAM COMMAND

EXAMPLE 1:

- Entry RT: /IAM LTERM *1050AA1
- Response RT: *IAM COMMAND COMPLETED

Explanation: /IAM with keyword LTERM is the form LTERM P1 as described above. This allows a terminal user at a switched line terminal to identify himself. (Required if a switched (dialup) line terminal.) RT means remote terminal.

EXAMPLE 2:

- Entry RT: /IAM LTERM INQUIRY
- Response RT: *IAM COMMAND COMPLETED

Explanation: /IAM with keyword LTERM is the form LTERM P2 described above. This example illustrates signon procedure for a switched line terminal signing on for entry of response-type, nonupdate-type transactions. Only the first four characters of the LTERM parameters are significant.

EXAMPLE 3:

- Entry RT: /IAM PTERM (DOLLY) LTERM SUE (GIRL)
- Response RT: *IAM COMMAND COMPLETED

Explanation: /IAM with keywords PTERM and LTERM is the third form of the IAM command. It accomplishes the basic signon capabilities.

REMOTE TERMINAL STARTUP

Refer to the appropriate IBM SRL manual for instructions on the use of 1050, 2740, or 2260 terminals.

TERMINAL STARTUP

It is assumed that the remote terminal power switch has been turned on so that, when the /START LINE XXX command is completed by the IMS/360 master terminal, the message on the remote terminal will be:

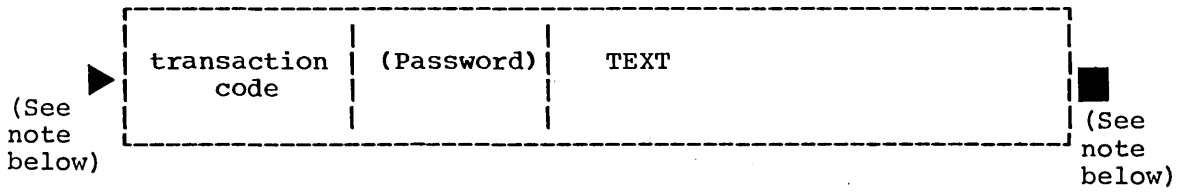
*TERMINAL STARTED

Before the communication line is started for that physical terminal, the keyboard will be locked. Only after that message is received can any entry be made into the remote terminal.

REMOTE TERMINAL INPUT FORMATS

Normal Message Format

Probably the majority of remote terminal inputs will be with the IMS/360 normal message format:



where:

transaction code

is the one- to eight-character alphameric code that is defined at system definition time. It may not start with a / (slash). The special characters embedded blank, dash, equal sign, comma, and period are not allowed.

(Password)

is a password (when security provisions require) that must be entered with the transaction code. It must be enclosed in parentheses (with 1050 terminals, bypass and restore characters are also acceptable).

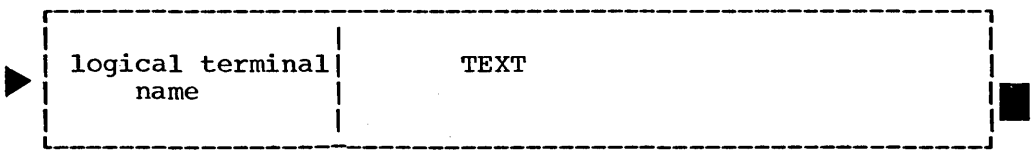
TEXT

is the input message. It may be single or multiple lines in length followed by an EOB after each line and an EOT after multiple-line messages for 1050 or 2740 terminals.

Note: The input message for a 2260 is considered to be that data contained between the START MI symbol (▶) and the position of the CURSOR (■) symbol at the time the ENTER key is depressed. These two symbols are used only when a 2260 Display Station is used as the input device. The 1050 and 2740 terminals do not require these symbols. All other data displayed on the screen at this time is ignored and is not transmitted to the CPU. If no START MI (▶) symbol is displayed at the time the ENTER key is depressed, no data is sent to the CPU. New-line characters may be used to separate lines of a 2260 message.

Message Switching Format

Another input format that may be entered from a remote terminal is the message switching format:



where:

logical terminal name

represents the terminal on which the message will be printed, if the input message starts with a logical terminal name. The allowable logical terminal names are to be specified by the Application Programming function.

TEXT

is the input message. It may be single or multiple lines in length. Each line must be followed by an EOB; the last line must end with an EOB and an EOT.

Command Message Format

The command message format is detailed in Chapter 3. This is the general format:

SWITCHED (DIALUP) TERMINAL STARTUP

Operation of the switched (dialup) terminal is the same as the nonswitched or hardwired terminal, with these exceptions:

- Turn power on to the terminal.
- Check for proper positioning of all assignment and function switches located on the 1052/1053 switch panel.

  Suggested for 1052 keyboard entry are:

Attend	ON
Master	OFF
Printer 1	Send Rec
Keyboard	Send
EOB	Auto
Test	OFF
Single Cycle	OFF
Rdr Stop	OFF

- Depress Line Reset Key (1050).
- Depress Bid Request Key (1050).
- Set the data set to talk.
- Dial the number of the computer.
- Listen for the continuous tone.
- Press the data button on the data set.
- Enter the /IAM command (see Chapter 3 for details). Because dialup terminals may not always be internally associated with the same communication line, IMS/360 includes a recognition feature. The terminal operator is permitted five opportunities to accomplish a valid signon. If, after entry of five messages from the remote terminal, the terminal has not been signed on, the terminal will be notified that the line is being disconnected; the line will be disconnected and restored to answering status.
- The reply will be:

  *IAM COMMAND COMPLETED

- Enter any of the preceding three message formats. The switched terminal is online.

- Following signon, the terminal will be alternately permitted to enter a message and receive an output message from the queue(s) of signed-on logical terminals. Terminal operation closely resembles that of a nonswitched 1050 terminal, with the exception of the handling of transactions defined during IMS/360 system definition as single segment transactions. After enqueuing a single segment transaction, if no output is queued on the signed-on logical terminal(s), the terminal is immediately restored to 'text' mode. The operator need not depress the request key to facilitate entry of the next message. If no other data is ready to be transmitted, the operator should depress 'EOT'. If approximately 40 seconds pass without input or output of data from or to the remote terminal, the terminal will be notified that the line is being disconnected; the line will be disconnected and restored to answering status.

2260 OPERATOR CONSIDERATIONS

It is recommended that after a transaction is input the operator should await his reply, if one is expected, before entering another transaction. This will prevent the reply from one program overlaying the reply from another before the operator has viewed it.

Since messages are displayed as soon as possible after queuing, the /EXCLUSIVE command is recommended for proper operation of the 2260 terminal. It will protect the screen of information from being overlaid by message switching, system messages, and messages generated by processing programs initiated by other terminals while the operator is viewing a response he initiated. These messages will remain on the queue until a /END command is entered.

REMOTE TERMINAL TROUBLE PROCEDURE

When a remote terminal operator believes that he is having trouble, that is, he has pressed the bid key on a polled 2740 and received no response, or the three lights on a polled 2740 are not observed going on and off, he probably should contact the master terminal operator or the user's designee to handle trouble reports from remote terminals. First, however, a few simple checks should be made. Is the terminal plugged in? Is it turned on? Are the switches on the end correctly positioned? Are they properly installed?

Another common trouble occurs when the master terminal operator has not broadcast a message that the system has had to be shut down, and the remote terminal keyboard is locked.

When using dialup facilities there will be no response when the system is shut down for an emergency reason and the dialup terminal was not online when the master terminal operator broadcast a message concerning the problem.

All IMS/360 teleprocessing installations must have a procedure for handling problems with remote terminals. A suggested procedure is:

1. Have the remote terminal operator call the master terminal operator and inform him that his terminal is not performing correctly.

2. The master terminal operator may ask the following questions:

- What is the nature of the problem?
- Is the terminal polling (if station control terminal)?
- Is the paper properly inserted in the terminal?
- Is the terminal on and in the communication (MPLX) mode? (With the 1050 terminal, check the appropriate SRL for correct settings.)
- If possible, have the remote operator use the /TEST command and input a message, observing whether a reply back is the same as that which was sent.

3. If the remote terminal user's problem cannot be solved immediately, the master terminal operator should probably ask the necessary questions to fill out the first three columns of a form that may be designated "Log of Reported IMS/360 Remote Terminal Failures" (see Figure 5).

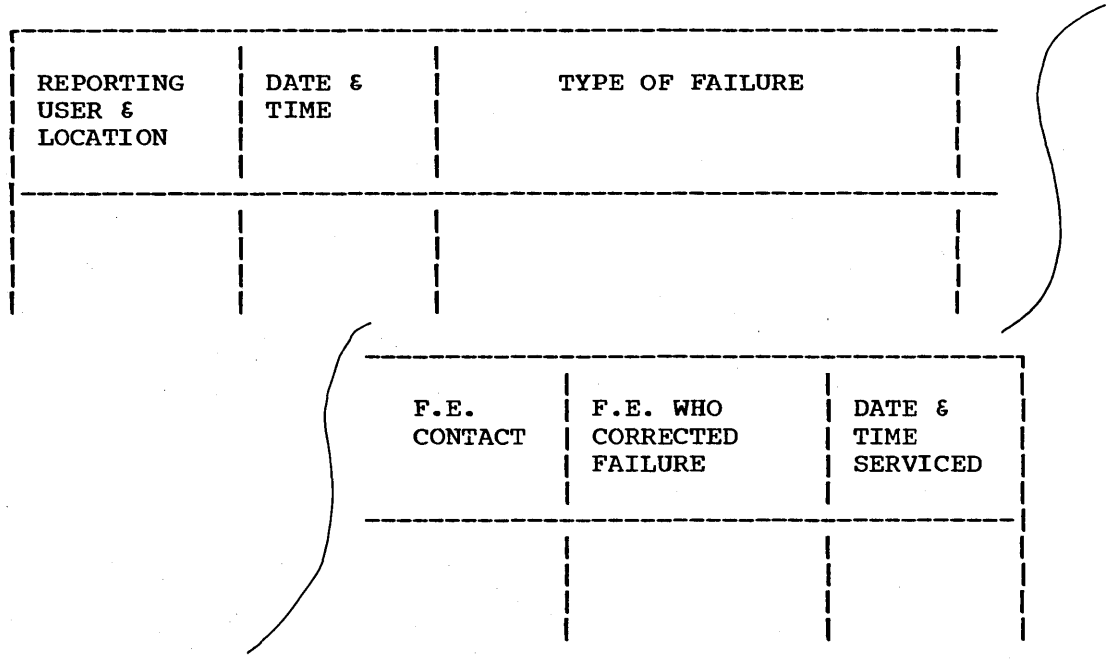


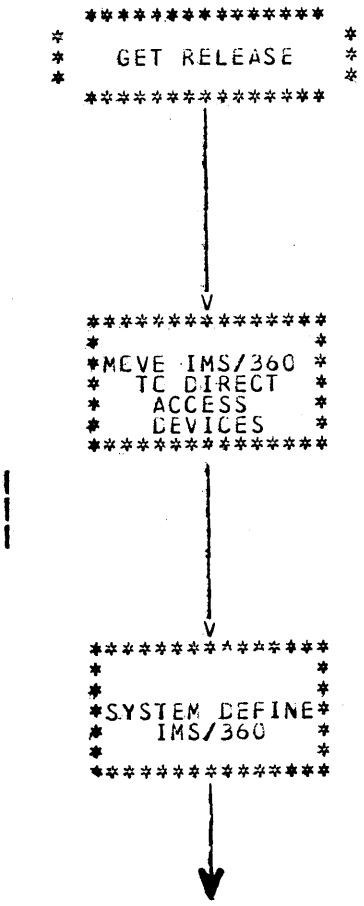
Figure 5. Log of reported IMS/360 remote terminal failures

4. The Master Terminal Operator then notifies an IBM field engineer of the problem and writes the field engineer's name on the form.

This chapter contains the information necessary for the Machine Operations function to execute IMS/360. Such topics as readying IMS/360, starting IMS/360, stopping IMS/360, data base maintenance and reconstruction, and the IMS/360 log tape are discussed. Examples are furnished in this chapter to emphasize individual points.

READYING MACHINE OPERATIONS FOR IMS/360

Before IMS/360 can be run in the machine room, there are a number of items that the Machine Operations function can do to assist the Systems Operation function up until IPL (Initial Program Load) time.

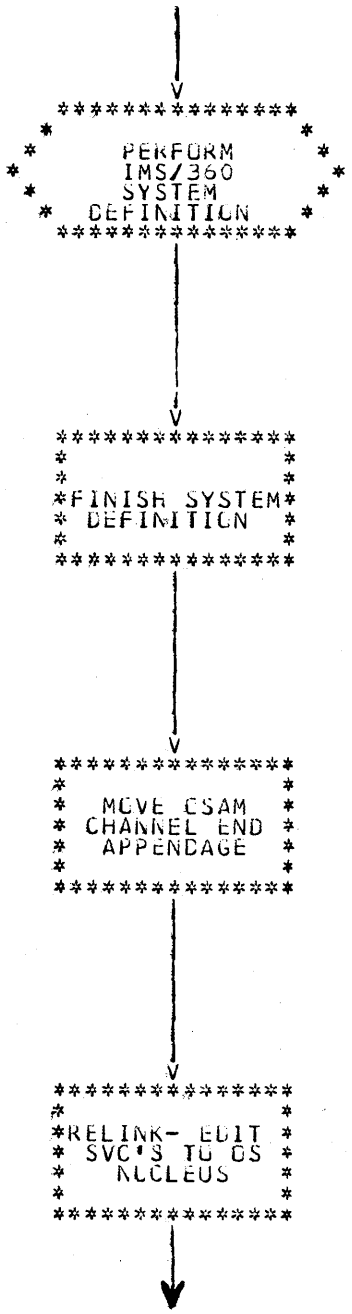


1. A release of IMS/360 was procured on either 7- or 9-track tapes (two).

2. IEHMOVE utility must be employed to transfer these libraries to direct access devices.

   (Note: These first two items are detailed in the IMS/360 Operations Manual, Volume I - Systems Operation, Chapter 2.)

3. IMS/360 must be defined to the user's data processing environment.



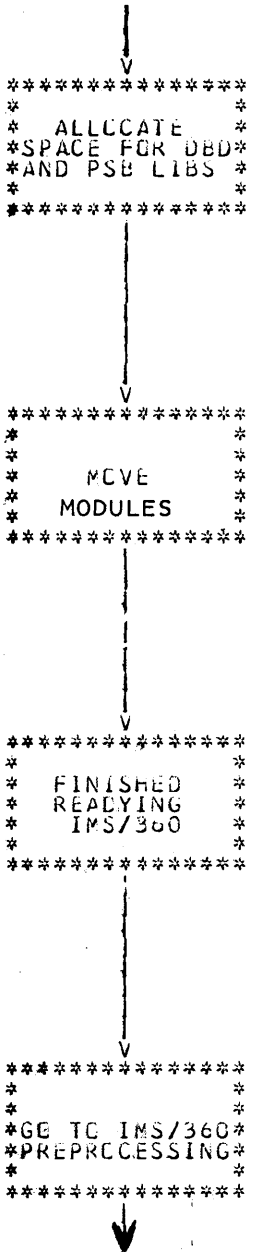
4. An IMS/360 utility, IMS/360 System Definition, must be performed either on the computer on which IMS/360 will be operating or on an alternate machine.

5. System definition is a two-stage operation: The Stage 1 output is a punched card deck for input to Stage 2, which builds the blocks, tables, and libraries for use by IMS/360.

   (Items 3, 4, and 5 are discussed in more detail in the IMS/360 Systems Operation Manual, Chapter 2, System Handling, and in Chapter 4, System Definition.)

6. The OSAM (Overflow Sequential Access Method, new with IMS/360) channel end appendage module must be moved into SYS1.SVCLIB.

7. Some (three maximum) SVC routines must be relink-edited with the Operating System/360 nucleus.



8. Direct access space must be allocated for DBD and PSB libraries. If the system is online, additional space must be allocated for message queue data sets.

9. Move recommended reentrant IMS/360 modules to SYS1.LINKLIB in order to place them in MFT or MVT link pack at Operating System/360 IPL time.

10. After the above 9 items are accomplished, they need not be accomplished again until the IMS/360 system definition changes or an Operating System/360 system generation is performed.

11. At this point, the Machine Operations function is ready to begin the following periodic IMS/360 processing techniques.

STARTING IMS/360

This discussion assumes that the normal procedures of IPL, readying Operating System/360, have been followed according to IBM System/360 Operating System, Operator's Guide (GC28-6540).

It is assumed that the recommended procedures have been placed in MFT or MVT SYS1.PROCLIB and that a direct access storage device reader procedure is being used in accordance with IMS/360 Operations Manual, Volume I - Systems Operation.

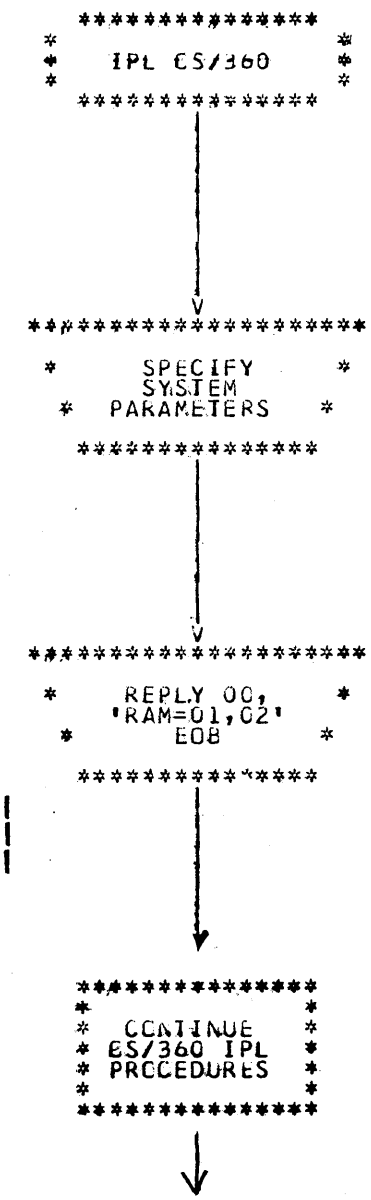
The recommended library procedures should have been selected by IMS/360 system definition. A list of these procedures follows:

Procedure Library

Member Name	Description
PSBGEN	A two-step assemble and link-edit procedure to produce program specification blocks
DBDGEN	A two-step assemble and link-edit procedure to produce data base definition blocks
IMSCOBOL	A two-step compile and link-edit procedure for IMS/360 applications written in COBOL
IMSPLI	A two-step compile and link-edit procedure for IMS/360 applications written in PL/I
DLIBATCH	A one-step execution procedure for stand-alone Data Language/I Type 3 processing region
IMSCOBGO	A three-step compile, link-edit, and go procedure combining the procedures IMSCOBOL and DLIBATCH
IMSPLIGO	A three-step compile, link-edit, and go procedure combining the procedures IMSPLI and DLIBATCH
IMS	DASD reader procedure to read IMS0 procedure into Operating System/360 job stream from direct access devices
IMS1	Execution of IMS/360 Type 0 region, the IMS/360 online control program with JCL from system input stream
IMS0	Execution of IMS/360 Type 0 region, the IMS/360 online control program with complete JOB PROCEDURE LIBRARY
IMSMSG	Execution of IMS/360 Type 1 region, a message processing region
IMSBATCH	Execution of IMS/360 Type 2 region, an online batch region
SECURITY	A three-step execution, assembly, and link-edit procedure for terminal and password security which invokes the Security Maintenance Program
DLITCBL	A SYSIN member used by the link steps of procedures IMSCOBOL and IMSCOBGO
DLITPLI	A SYSIN member used by the link steps of IMSPLI and IMSPLIGO. Note that entry point IHESAPD is specified. This corresponds to the PARM value OPT=1 in the corresponding compile procedures.

Note that the generated procedures accommodate the OS/360-MVT or MFT.

Based on these assumptions, the following are the steps to start IMS/360:

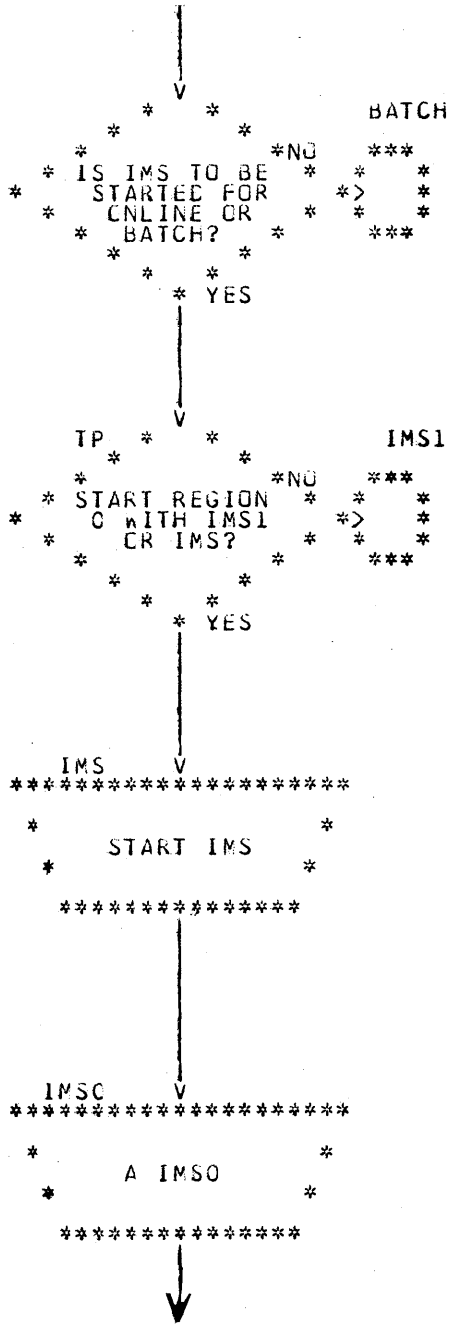


IPL Operating System/360

A message is received back on the computer console, SPECIFY SYSTEM PARAMETERS.

Answer the message on the System/360 console by entering REPLY 00,'RAM=01,02'. This places the modules defined by two procedures in the MFT or MVT link pack area. Refer to the IMS/360 Operations Manual, Volume I - Systems Operation for definition of procedures IEAIGG01, IEAIGG02. OS/360 defines these procedures by the last two digits.

Continue standard Operating System/360 IPL procedures.

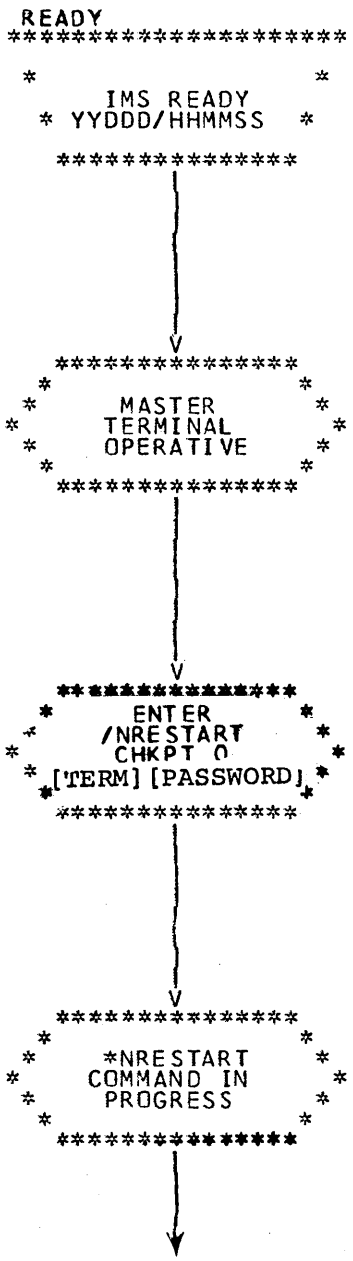


Is the IMS/360 that is to be started a teleprocessing system (online) or batch? If batch, go to label BATCH.

LABEL TP: Does Machine Operations wish to start IMS/360 Region Type 0 (the IMS/360 Control Program Region) with JCL from system input stream (IMS1) or with the disk reader procedure named IMS? If IMS1, go to label IMS1.

LABEL IMS: It is assumed that the user wishes to start with a complete JOB from the procedure library. Therefore, enter START IMS on the System/360 console. This causes the disk reader procedure named IMS to read the JCL procedure named IMS0 for the IMS/360 control program from the procedure library to an Operating System/360 SYSIN stream.

LABEL IMS0: The job control language statements named IMS0, which are the JCL required for the IMS/360 control program job, cause that job to be placed in the Operating System/360 input job hold queue. The operator must activate the job before it will start. IMS0 is initially placed in the hold queue of Operating System/360 to allow coordination of the computer workload.

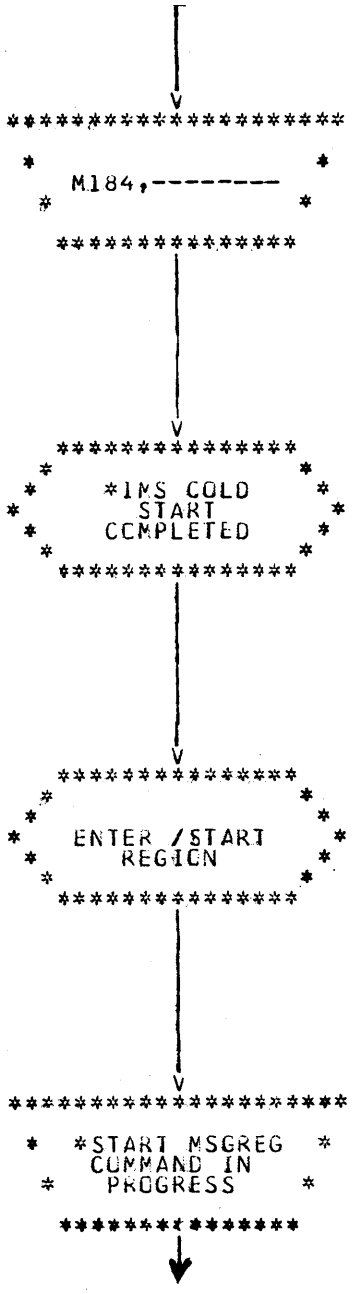


LABEL READY: A message to both the master terminal and the System/360 console signifies that the IMS/360 control program is now ready for restart.

The master terminal is now operative and is being polled.

Before any other IMS/360 regions or partitions can be started for processing, a cold start must be entered at the master terminal (MT). User has an option of including terminal and/or password security.

Reply from IMS/360 to the master terminal.

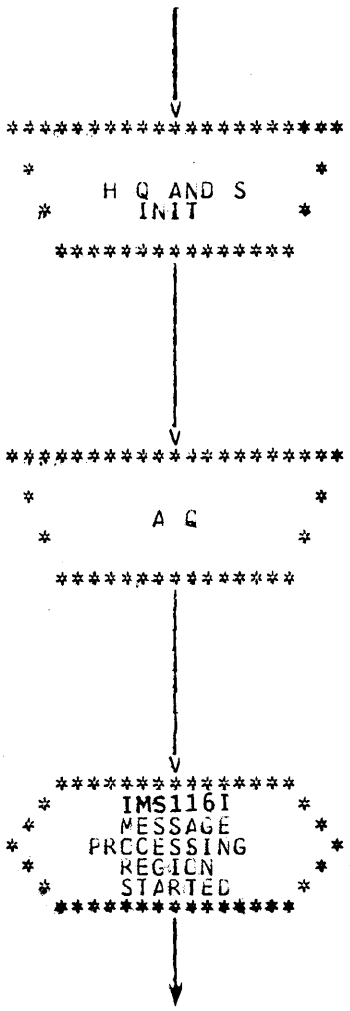


A message will be sent to the System/360 console asking that a tape be mounted at some location. This tape is the IMS/360 log tape, which is necessary for checkpoint and restart of the system.

After the log tape is mounted and the cold start is complete, this is the response to the master terminal.

From the master terminal, enter /START REGION. The IMS/360 command invokes the procedure IMSMSG, which executes an IMS/360 Type 1 processing region (teleprocessing).

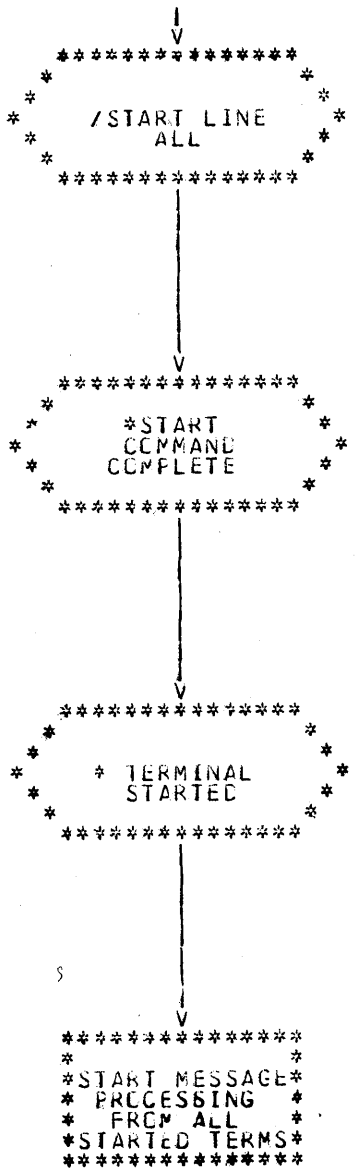
The reply from IMS/360 on the master terminal will be *START MSGREG COMMAND IN PROGRESS.



At the same time that the reply goes to the MT saying that the start message region command is in progress, two messages are received at the System/360 console.

The response to these messages is RELEASE QUEUE, which specifies that all jobs in the input queue are to be made available for processing.

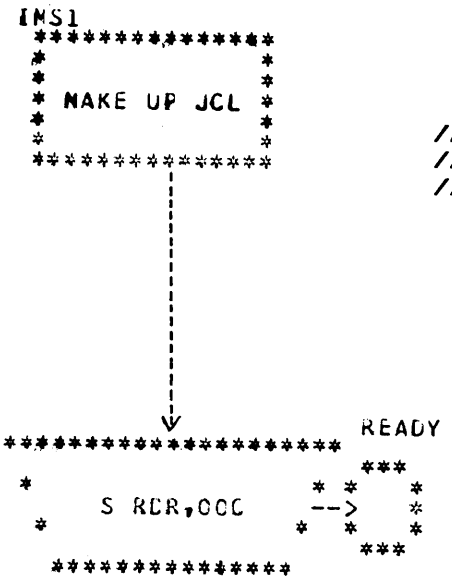
When the message region (Type 1) has actually been started, the reply to the master terminal is IMS116I MESSAGE PROCESSING REGION STARTED.



As a result of the START command, a *TERMINAL STARTED message is enqueued on the first logical terminal of each physical terminal on the specified lines.

When the reply to the MT is *START COMMAND COMPLETE, IMS/360 teleprocessing has begun.

The *TERMINAL STARTED message is transmitted to all nonswitched remote terminals, and the line is conditioned to accept input from and transmit messages to remote terminals. Switched lines will also be enabled to answer dialup calls placed from remote terminals.



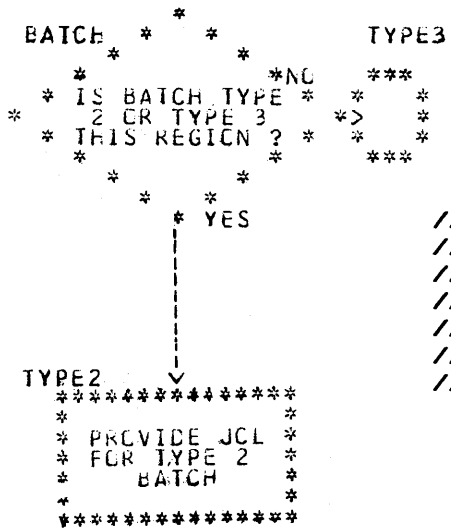
LABEL IMS1: The option has been taken to start the IMS/360 Region Type 0 with JCL from a card reader system input stream. This is the following JCL:

```
//IMS1  JOB  MSGLEVEL=1,PRIORITY=13
//      EXEC IMS1,REGION=160K,      X
//           PARM='00DFSINUC1
```

Note that 160K is assumed to be the size of the user's system and that IMS/360 modules reside in the IMS.RESLIB data set.

Enter START RDR, 00C on System/360 console when card reader address is 00C. Otherwise, specify proper reader address. The IMS/360 procedure named IMS1 may be used with JOB, JOBLIB, and data base DD cards from the card reader. Go to LABEL named READY. This job must be a single step.

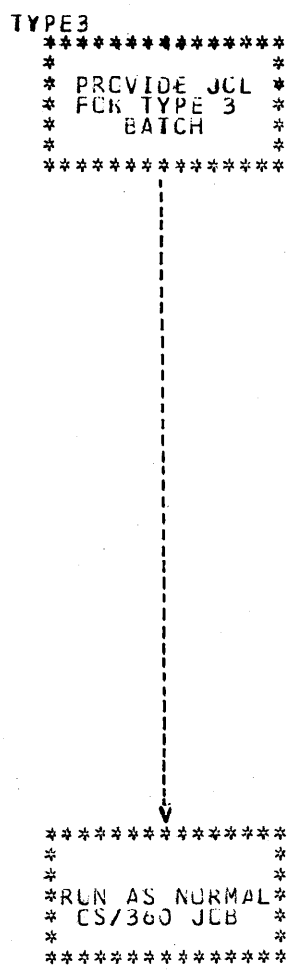
LABEL BATCH: Is the batch environment that is wanted an IMS/360 Type 2 or Type 3 processing region? If Type 3, go to LABEL TYPE 3.



It is an IMS/360 Type 2 processing region that is wanted. Use this JCL (invokes IMSBATCH processing) through the input stream, start initiator, and run in the batch jobs:

```
//TYPE2  JOB  848  name, MSGLEVEL=1
//JOBLIB DD DSNAME=IMS.RESLIB,DISP=SHR
//       DD DSNAME=IMS.PGMLIB,DISP=SHR
//       EXEC IMSBATCH,                X
//            PARM='2,AAAAAAAA,        X
//            BBBBBBBB,CCCCCCCC,       X
//            DDDDDDDD'
```

Note: The user should refer to Chapter 4 of the IMS/360 Operations Manual, Volume I - Systems Operation for explanation of the PARM operand. Either a JOBLIB or a STEPLIB must be provided for execution of the IMSBATCH procedure.



Type 3 processing region is run as any normal Operating System/360 job. To use the Data Language/I modules for those jobs, DLIBATCH processing may be used, and this is the JCL to use to invoke DLIBATCH.

```
//DLIBATCH JOB MSGLEVEL=1
//JOBLIB  DD DSNAME=IMS.RESLIB,DISP=SHR
//  DD  DSNAME=IMS.PGMLIB,DISP=SHR
```

Where the application program and PSB have the same name, use:

```
//  EXEC  DLIBATCH,PARM='3,PSBNAME'
```

Where PSB has a different name than the application program, use:

```
// EXEC DLIBATCH,PARM='3,PGMNAME,PSBNAME'
```

where PGMNAME equals the application program name, and PSBNAME equals the PSB name.

Note: DD cards must be appended to this DLIBATCH procedure for the data sets which represent the physical storage of this data base. Either a JOBLIB or a STEPLIB must be provided for execution of the IMSBATCH procedure.

Run the batch processing program as a normal Operating System/360 job.

TYPES OF RESTART OF IMS/360

The type of IMS/360 restart employed is dependent upon how IMS/360 was shut down. Figure 6 is a chart showing which restart command should be used for the type of checkpoint taken at shutdown.

TYPE OF RESTART	TYPE OF CHECKPOINT			
	/CHECKPOINT SIMPLE	/CHECKPOINT FREEZE	/CHECKPOINT PURGE	/CHECKPOINT DUMPQ
COLD START	Sequence1* /NRE CHKPT0 [FORMAT ALL]			
WARM START		Sequence2* /NRE CHKPT#		
WARM START			Sequence3* /NRE CHKPT# BLDQ	Sequence3* /NRE CHKPT# BLDQ
EMERGENCY RESTART (Loss of core only)	Sequence4* /ERE CHKPT#			
EMERGENCY RESTART (Loss of message queues)			Sequence5* /ERE CHKPT# BLDQ FORMAT ALL	Sequence5* /ERE CHKPT# BLDQ FORMAT ALL

*See Figure 7.

Figure 6. IMS/360 restart relationship to checkpoint

Normal Restart

Figure 7 reflects the details of Figure 6: what the types of restart are, and what the command entries are. Blocks A1 and A2 of Figure 7, page 1, summarize the events that are described in detail through the READY block in the previous section, "Starting IMS/360".

In Figure 7 it is assumed that a predefined process symbol, like symbol A4, is the term to be entered into the master terminal. The subroutine symbols, like symbol A2, are output messages to the master terminal. Figure 7 shows the sequence of events to produce the type of restart needed for that particular type of previous shutdown. Figure 7 details are given in the IMS/360 Operations Manual, Volume I - Systems Operation, in Chapter 3, under the section "Restart".

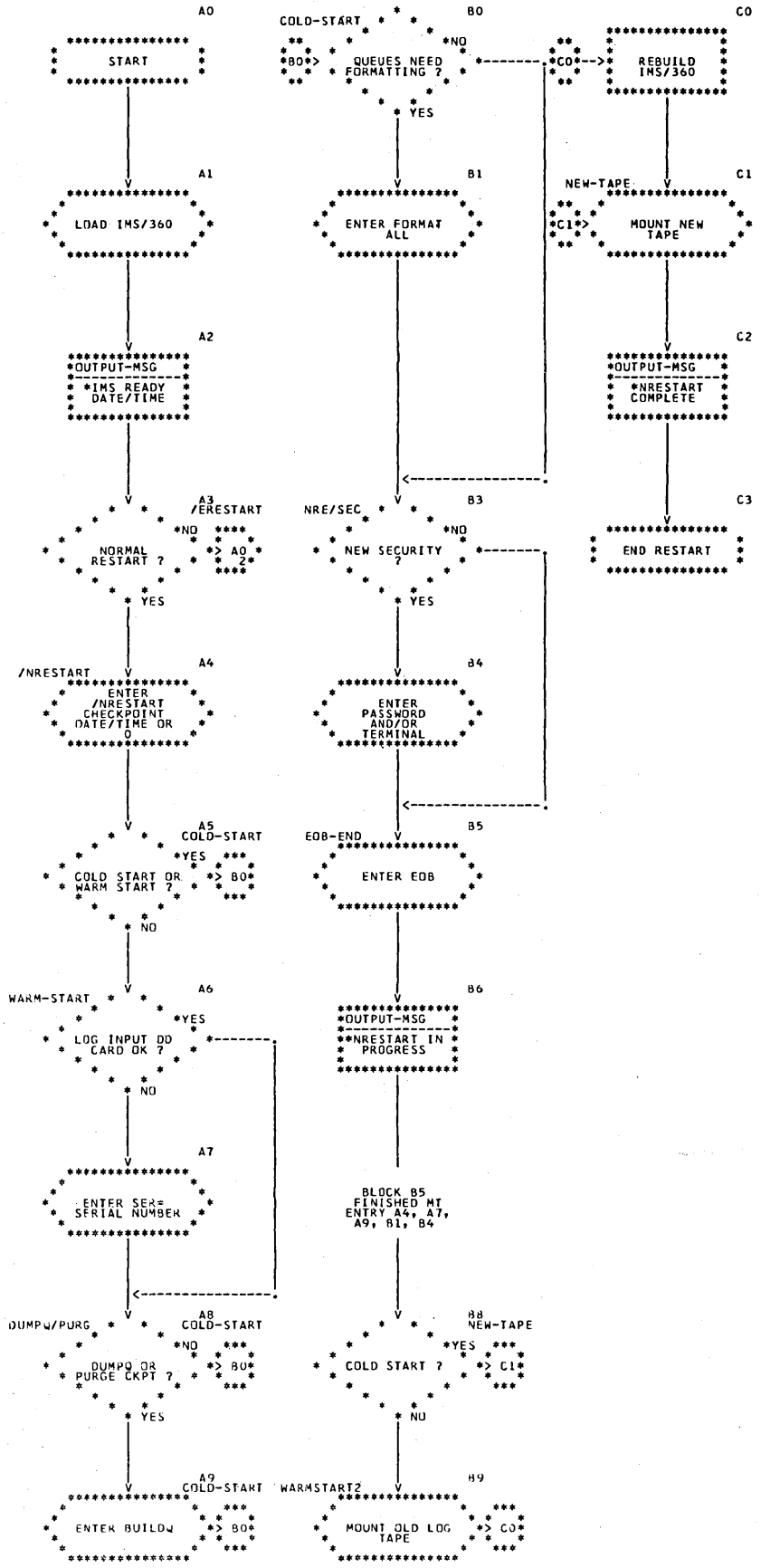


Figure 7. Sequence of events for restart types (page 1 of 2)

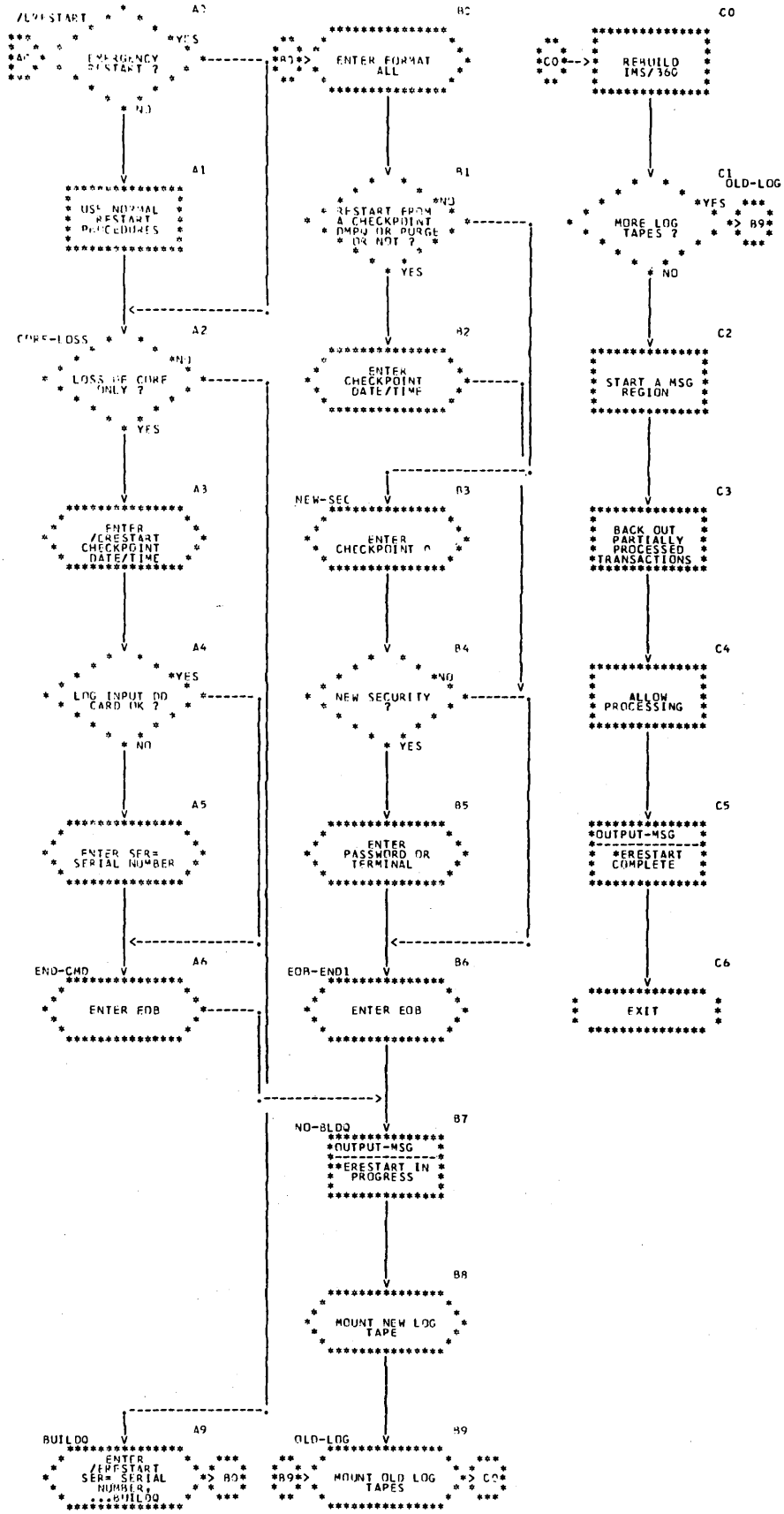


Figure 7. Sequence of events for restart types (page 2 of 2)

To show the relationships more closely and all the operands associated with each command, lists are noted with symbol numbers (A2 through A7, page 1 etc.).

Example:

In cold start with a previous simple checkpoint, follow symbols A0 through A5, B0 through B3, and B5 in Figure 7, page 1. This is the logical sequence in determining the complete command to enter. The sequences are numbered and entered in Figure 6 for reference.

Sequence 1: Figure 7, page 1, shows a cold start with simple checkpoint. Follow A0 through A5, B0 through B3, and B5 for the sequence of events for master terminal entry. Symbol B0 means: Is the disk message queue allocation new? Has the space been used by another program? If the answer is yes (B1), enter FORMAT ALL to the restart command. This will preformat the disk message queues.

Sequence 2: Figure 7, page 1, shows a warm start with a previous shutdown of checkpoint FREEZE. Follow A0 through A8 and B0 through B5 for the sequence of events for master terminal entry. Symbol A6 means: If the input system log DD card specifies the proper log volume, the serial number of that checkpoint log tape need not be entered as the SER parameter to the master terminal. Symbols B3 and B4 show that terminal and/or password security can be invoked at this time.

Sequence 3: Figure 7, page 1, shows a warm start with either checkpoint PURGE or checkpoint DUMPQ. Follow A0 through B5 for the sequence of events for master terminal entry. Symbols A8 and A9 deal with the PURGE and DUMPQ checkpoint, during which the BLDQ parameter should be entered to the restart command. This reconstructs the disk message queues from the specified checkpoint.

Note that, with reference to Sequence 1, 2, and 3, after the entry of the command into the master terminal, symbols B6 through C3 continue.

Emergency Restart

To restart using emergency restart, again refer to Figures 6 and 7. The same assumptions stated in the normal restart section are valid.

Sequence 4: Figure 7 shows an emergency restart with a simple checkpoint. This emergency restart is performed because core was the only thing lost. Follow A0 through A3, page 1, and A0 and A2 through A6, page 2, for the sequence of events for master terminal entry. Symbol A4, page 2, shows that if the DD input card does not specify proper volume the serial number of that checkpoint log tape should be entered to the master terminal by the SER parameter.

Sequence 5: Figure 7 shows an emergency restart with a previous checkpoint PURGE or DUMPQ. This type of emergency restart is wanted because of the loss of message queues. Follow A0 through A3, page 1; A0, A2, and A9 on page 2; then, B0 through B6. B1 question means: Is the checkpoint either DUMPQ or PURGE or is it a simple checkpoint? Yes means it is a DUMPQ or PURGE, so proceed to B2. Symbol A9 indicates that many tape log serial numbers may be entered.

Note that, with reference to Sequences 4 and 5 after the entry of the command into the master terminal, symbols A7 through B6 on the second page of Figure 7 continue.

Details of the restart commands are contained in Chapter 3 of this manual. If an emergency failure of a data base occurs, see "Data Base Maintenance and Failure" in this chapter.

STOPPING IMS/360

There are four checkpoint commands which may be entered at the master terminal. The simple checkpoint command does not shut down IMS/360; it takes a "snapshot" of the status of the control program blocks and then continues.

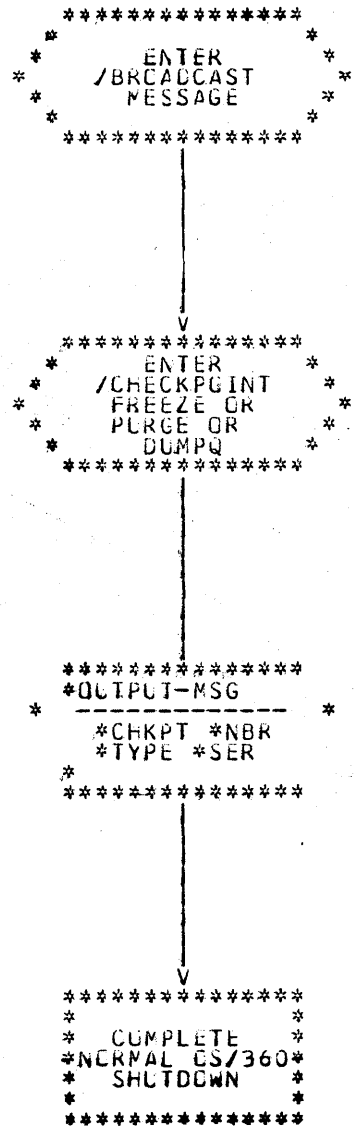
The three checkpoint commands which terminate all message regions and the IMS/360 control region 0 are:

1. /CHECKPOINT FREEZE — Use this command if (1) IMS/360 must be terminated quickly, (2) the disk message queues will not be disturbed before restarting, or (3) the output messages can wait until later.

2. /CHECKPOINT DUMPQ — Use this command if (1) IMS/360 must be terminated, (2) the disk message queue space may be used before restarting or (3) the output messages can wait until later.

3. /CHECKPOINT PURGE — Use this command if (1) IMS/360 must be terminated, or (2) it is desired to process and send all messages currently in the system.

The sequence of events is:



If time permits, broadcast messages to all remote users that the system is being terminated.

Select and enter into the master terminal one of the above checkpoint commands.

A message comes back to the master terminal with the time and date, the type of checkpoint, and the serial number of the volume on which the checkpoint was written. This indicates that the checkpoint is complete and that IMS/360 is stopped.

Complete normal Operating System/360 shutdown procedures to terminate Operating System/360.

After normal shutdown is complete, the IMS/360 log tape will rewind and unload. Dismount it, label it, and give it to the master terminal operator for logging and filing.

A recommended procedure after each shutdown, whether normal or emergency, is to manually record the information in a form similar to that shown in Figure 8. This information will be used later for restarting the system.

DATE	TYPE OF SHUTDOWN	CHECKPOINT NUMBER	VOLUME SERIAL NUMBER OF TAPE	REASON FOR SHUTDOWN

Figure 8. Example of IMS/360 manual shutdown log

DATA BASE MAINTENANCE AND FAILURE

At periodic intervals, a data base should be scheduled to be checkpointed, or a data base will be determined to have failed and a restart is needed to place the data base back on line.

There is a checkpoint command called data base dump (DBDUMP) that handles a scheduled data base dump, and a DBDUMP with STOP that is used to stop all activity against a data base without a dump. The DBDUMP with STOP is used in preparation for data base recovery.

Figure 9 shows the sequence of events for data base dump and for data base dump with STOP. Figure 10 shows the sequence of events for data base recovery.

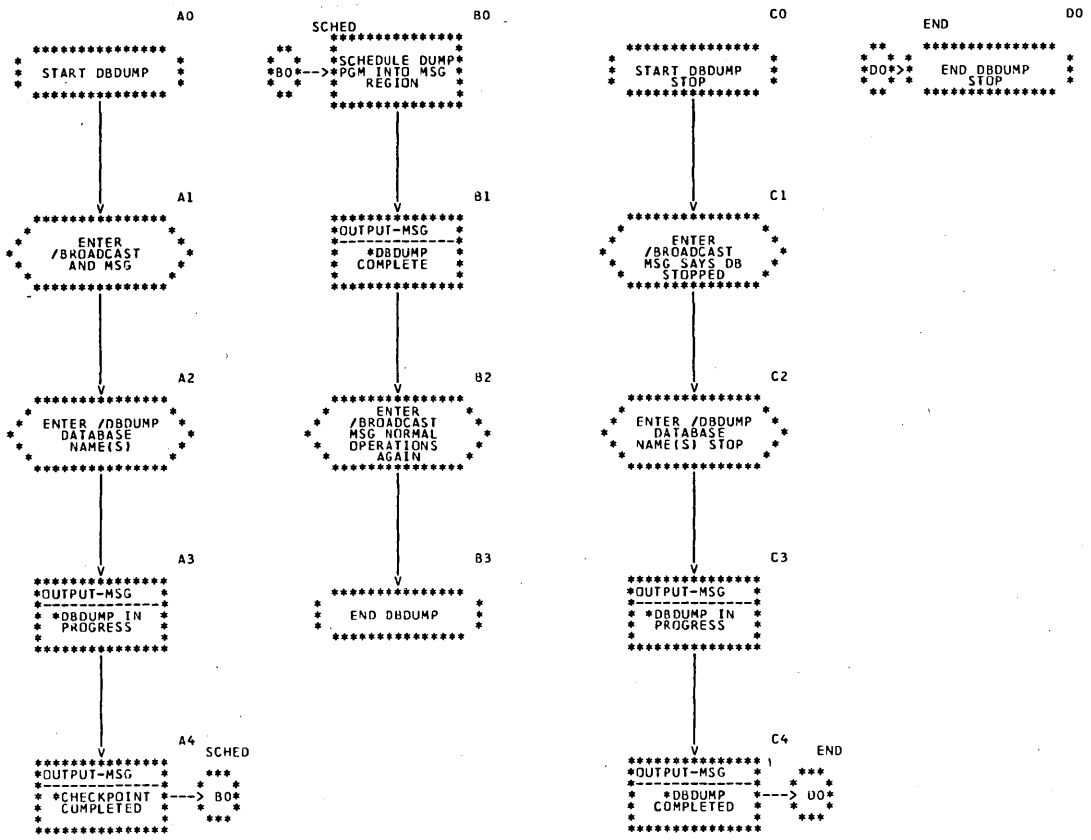


Figure 9. Sequence of events -- DBDUMP and DBDUMP with STOP

DATA BASE DUMP - NORMAL MAINTENANCE

In Figure 9, symbols A0 through A4 and B0 through B3 are the events for data base dump.

Symbol A1 of Figure 9 means that, when it is decided to do a data base dump from the master terminal, a broadcast message should be placed to notify the remote terminals that a certain data base is being dumped and is not to be used. Symbol A3 shows an output message that a data base dump is in progress, indicating that all activity against the data base(s) is stopped and a simple checkpoint is taken. Symbol A4 indicates to the master terminal that a checkpoint is complete, that a current log is closed, and that a new log is opened to provide a clean starting point in case of a later data base recovery.

DATA BASE DUMP WITH STOP FROM FAILURE

In Figure 9, symbols C0 through C4 and D0 are the events of a data base dump with STOP.

Symbol C3 of Figure 9 shows the output message to the master terminal, which means that all transactions that use the data base(s) are PSTOPed and that the data base(s) is also closed. Symbol C4 notifies the master terminal that all data base activity is stopped.

In order that the data base can be restored, the next sequence of events is concerned with the data base recovery command.

DATA BASE RECOVERY FROM FAILURE

The data base recovery command is used to rebuild or recreate a data base used for message processing. It is usually used for emergency failures of a data base.

When a data base must be recreated, the DBDUMP command with the STOP operand, the DBRECOVERY command, and all system log tapes since the /DBDUMP are employed.

Figure 10 shows the sequence of events for data base recovery.

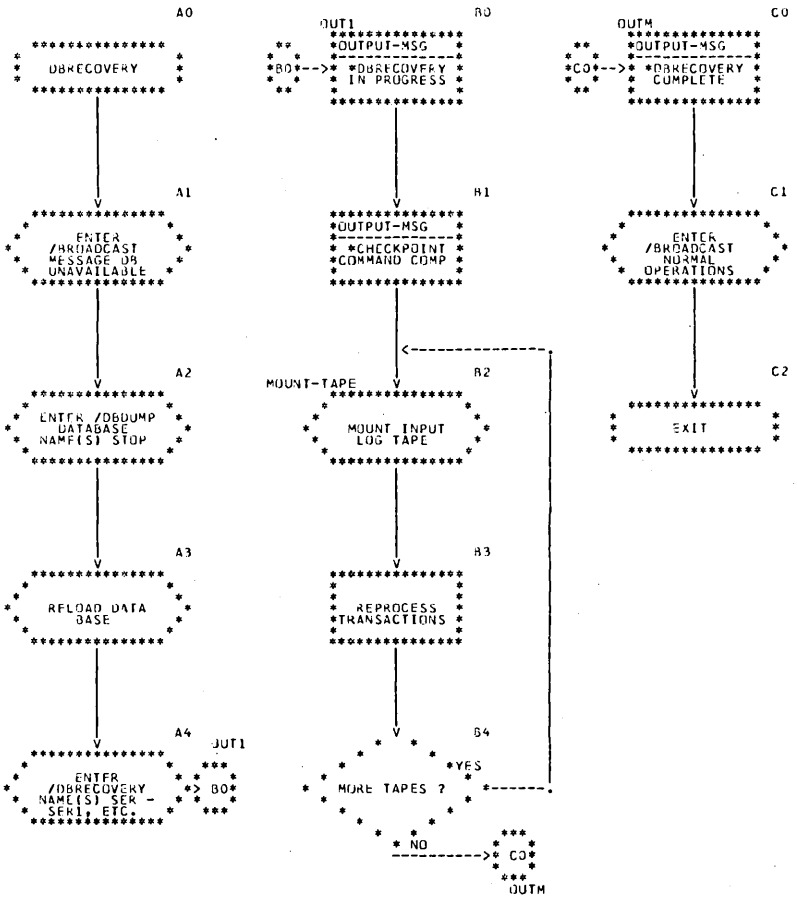


Figure 10. Sequence of events -- DBRECOVERY

In Figure 10, symbol A3 means that the latest backup copy of the data base should be used to reload it; this is done in an IMS/360 Type 3 processing region (batch) environment. Symbol A4 indicates the data base(s) to be recovered and the log tapes needed. The serial numbers must be in chronological sequence. The sequence starts with the first one after the backup copy was created with /DBDUMP command.

Those log tapes that are used to restore the data base(s) include all those from the dump to the log tape mounted when this command is given. Symbol B1 shows a message returned to the master terminal. At this point, the current log tape is closed so that it may be used as input to the recovery program. A new log tape will be opened. This message is to the master terminal only. Symbol B3 means that the input messages

will be processed from the log tape as if they were from the terminals. Symbol C0 means to start all transactions and notify the master terminal that normal operations may resume. Symbol C1 means that the master terminal should notify the remote terminals, by the BROADCAST command, that normal operations have been resumed.

Note that the /DBRECOVERY command is a single-line command. If there are too many tapes for one line, the command must be reentered for the extra tapes after the first one is completed. If the serial number of the current log tape is not known, issue a /CHECKPOINT command. The checkpoint-completed message will contain the desired serial number.

IMS/360 LOG TAPE

In the section "Starting IMS/360" in this chapter, it is shown that a mount message is returned to the System/360 console. This is the message to mount the IMS/360 log tape. The mounting of a new log tape should be done without delay, as the whole system is in a wait state until the tape is mounted.

It is recommended that all IMS/360 log tapes be filed and accounted for by the master terminal operator. The physical location of the master terminal and the computer console plays a part in this decision.

With the assumption that the master terminal operator is responsible for the log tapes, the following steps should be considered by the Machine Operations function:

1. Console Operator

   - As a result of an EOV (end of volume) or FEOV (forced end of volume) condition on the IMS/360 log tape, the old log tape is taken down and a new one is mounted.
   - Pull the write protect ring from the old log tape.
   - Put a tape label on the old log tape and fill in the required information.

Example of label:

```
┌──────────────────────────────────────────────────┐
│                                                  │
│              IMS/360 LOG TAPE                    │
│                                                  │
│   Shutdown _____________                         │
│                                                  │
│                                                  │
│                        Begin Time _____________  │
│                        End Time   _____________  │
│                                                  │
│   Density _____________     Date _____________   │
│                                                  │
└──────────────────────────────────────────────────┘
```

   - Send the old IMS/360 log tape to the master terminal operator for logging and filing.

2. Master Terminal Operator

   - All IMS/360 log tapes received should be checked before filing to make sure the label is filled out properly.

- Record the information from the log tape label in a manual record. Figure 11 is an example of a manual record.

- Set a release date for all old log tapes. Monitor these dates, keeping in mind that data base dumps have an effect on when log tapes can be released.

DATE	CHECKPOINT NUMBER	VOLUME SERIAL NO.	REEL NO.

Figure 11. Record of IMS/360 log tapes

CHAPTER 6. EXECUTION OF IMS/360 UTILITY PROGRAMS

These are the IMS/360 utilities which the Machine Operations function will have to process from time to time:

- IMS/360 System Log Utility Program (to produce statistical reports)
- Data Base Description Generation (DBDGEN)
- Program Specification Block Generation (PSBGEN)
- Security Maintenance Program
- IMS/360 System Definition

IMS/360 STATISTICS REPORTS

The IMS/360 statistics reports can be run by date or by a time period greater than a day. The time for running the reports can be agreed upon between Systems Operation and Machine Operations functions.

Statistics reports are run from the IMS/360 system log tape(s) as a standard Operating System/360 batch job. The system log utility program provides all of the reports:

- Messages Queued But Not Sent Report -- by terminal
- Line and Terminal Report
- Error Report
- Messages Queued But Not Sent Report -- by transaction code
- Transaction Report
- Transaction Response Report
- Application Accounting Report
- IMS/360 Accounting Report
- Operating Information Report -- can be varied by various control cards (sort fields)

This utility program has two edit passes and two sorts before the reports are produced.

The Systems Operation function must provide the complete card deck for this utility including the JCL. For more details see the section "IMS/360 System Log Utility Program" in Chapter 6 of the IMS/360 Operations Manual, Volume I - Systems Operation.

DATA BASE DESCRIPTION GENERATION (DBDGEN)

DBDGEN must be run as a normal Operating System/360 job after IMS/360 system definition. IMS/360 system definition causes the DBDGEN procedure to be placed in the user's specified procedure library. To process a request for a DBDGEN, Machine Operations must assume that the

DBD generation control cards are provided. Using the procedure DBDGEN, the JCL cards are:

```
//DBDGEN  JOB  MSGLEVEL=1
//       EXEC  DBDGEN,MBR=
//C.SYSIN  DD  *
```

```
DBD
DMAN
SEGM
FLDK
FLD
DBDGEN
FINISH
END
```

DBD generation control cards

```
/*
```

where keyword operand MBR= is the name of the DBD to be generated.

More details about DBDGEN are found in the IMS/360 Program Description Manual and the Systems Operation Manual.

PROGRAM SPECIFICATION BLOCK GENERATION (PSBGEN)

PSBGEN is run as a normal Operating System/360 job after IMS/360 system definition. IMS/360 system definition causes the PSBGEN procedure to be placed in the user's specified procedure library. To process a request for a PSBGEN, Machine Operations must assume that the PSB generation control cards are provided. The following JCL cards are used to invoke the PSBGEN procedure.

```
//PSBGEN   JOB  MSGLEVEL=1
//         EXEC    PSBGEN,MBR=
//C.SYSIN  DD   *
```

```
PCB
SENSEG
PSBGEN
END
```

The control cards for PSB generation

```
/*
```

where keyword operand MBR= is the name of the PSB to be generated.

More details about PSBGEN are found in the IMS/360 Program Description Manual and the Systems Operation Manual.

SECURITY MAINTENANCE PROGRAM

Before a request can be processed for new security for IMS/360 using the IMS/360 Security Maintenance Program, see the Systems Operation function for the allocation of certain data sets.

Make sure that the input statements are provided. Then this JCL can be used to process the Security Maintenance Program using a procedure, SECURITY, supplied through IMS/360 system definition:

```
//JOBNAME  JOB 1,SMP,MSGLEVEL=1
//STEP     EXEC SECURITY
//S.SYSIN  DD  *

      {Input statements}

/*
```

The following keywords may be used on the EXEC card for the supplied SECURITY procedure:

```
OPTN = [UPDATE]
       [LIST  ] ,
```

where:

UPDATE — replaces existing security tables.

LIST — edits and verifies input statements.

```
IMS  = [  ',0'    ]
       [',number' ] ,
```

where:

number — represents the suffix character of the IMS/360 control program member name in IMS.RESLIB (that is, DFSINUC0 or DFSINUCn). The reader should reference the IMSTEST macro-instruction in the IMS/360 Systems Operation Manual.

```
SOUT = [ A     ]
       [class ] ,
```

where:

class — represents the SYSOUT class for message data sets used in security maintenance.

The procedure supplied by IMS/460 system definition is found in Chapter 3 of the IMS/360 Systems Operation Manual.

IMS/360 SYSTEM DEFINITION

System definition is the process of defining or redefining the IMS/360 system for a given user's data processing environment. It is similar to Operating System/360 system generation. IMS/360 system definition is a two-stage operation. It is recommended that a member of Systems Operation be present when this utility is run. Systems Operation should provide the Stage 1 input control cards.

The Job Control Language (JCL) for Stage 1 of system definition is for an assembly execution. Use of the standard Operating System/360 Assembler procedure (ASMFC) with the following SYSLIB DD card override is possible. The user generates a card deck of the following format and places these cards in the job stream.

```
//          JOB
//          EXEC    ASMFC
//ASM.SYSLIB   DD  DSNAME=IMS.GENLIB,DISP=OLD
//ASM.SYSIN    DD  *

      {    IMS/360 Stage 1 -      }
      {INPUT CONTROL CARDS -      }
      {SYSTEM DEFINITION PROGRAM  }

/*
```

The result of system definition Stage 1 is the construction of a JCL stream card deck. This card deck becomes input to the system definition Stage 2. The JCL supplied by the user generating the system for Stage 2 is only a JOB card, which is placed in front of the punched card deck received from Stage 1. Place this deck of cards in the job stream.

An example of system definition is shown in Chapter 4 of the IMS/360 Systems Operation Manual.

USER ABEND CODES

Comp. Code	Issuing Component	Explanation
0004	DFSIRC00	An attempt was made to initiate an IMS/360 Type 1 or Type 2 processing region when the IMS/360 control program (Region Type 0) was not active in the Operating System.
0008	DFSIRC00	System error. While attempting to initiate a message processing region or a Type 2 batch region, the IMS/360 region control program passed an invalid event control block address to the IMS/360 interregion communication SVC's.
0016	DFSIRC00	The IMS/360 region control program was unable to complete initiation of a Type 1 or a Type 2 processing region. The addition of another region to the number then executing would have exceeded the value specified in the MAXTASK operand of the IMSCTRL macro-instruction at IMS/360 system definition time.
0024	DFSIRC00	System error during initiation cycle of region controller. A message or Type 2 batch region has been activated asynchronously because of an error in the IMS/360 control program (Type 0 region).
0032	DFSIRA00	PARM field was omitted from the EXEC statement. PARM field controls type of execution. (See Chapter 4 of the IMS/360 Systems Operation Manual for explanation.)
0036	DFSIRA00	Program (PSB) name was omitted from the PARM field on the EXEC statement of an IMS/360 Type 2 or 3 region (batch).
0040	DFSIRA00	PARM field of EXEC card is invalid format for Type 2 or 3 IMS/360 region. Comma does not follow first positional parameter.
0044	DFSIRA00	PARM field of EXEC card specifies an invalid region-type code.
0048	DFSIRA00	PARM field of the EXEC card contains an excessive number of positional parameters.
0052	DFSIRA00	First character of a positional parameter in PARM field of the EXEC card is blank or invalid.

0056	DFSIRA00	A positional parameter in the PARM field of the EXEC card exceeds maximum allowable length.
0060	DFSIRA00	A required positional parameter is omitted from the PARM field of the EXEC card.
0064	DFSIRC00	Dispatching priority of a message partition running in an MFT-II environment is higher than that of the IMS/360 control program (Type 0 region).
0068	DFSIRA00	Invalid second character in Type 0 PARM field. Value must be zero or one.
0072	DFSIRA00	Issued following the message IMS100I, the IMS/360 control region Type 0 was not executed because another Type 0 region was currently active in the same system.
0076	DFSIRA00	Operator replied CANCEL to the message IMS050D.
0150	DFSIDBA0	PCB address passed in the USING list of a Type 3 batch program is not the same as any passed to the program by IMS/360 at first entry. The PCB referred to in the CALL statement may not have been defined at PSBGEN time. The USING list of the CALL statement may be improperly constructed.
0151	DFSIDBA0	USING list of CALL statements in a Type 3 batch program is truncated at the function position. There is no PCB address in the call. Call list has only one entry.
0200	DFSIDLK0	The available dynamic main storage in the Operating System/360 region or partition in which a Type 1, 2, or 3 region is operating is not sufficient to allow the Data Language/I block loader to fetch the required PSB's and DBD's. Increase region size.
0201	DFSIDLK0	PSB loaded in the application program processing region has invalid or inconsistent processing options specified. Check PSB generation.
0202	DFSIDLK0	The data bases named at PSBGEN do not agree with those specified for the same PSB name at IMS/360 online system definition. Check IMS/360 online Stage 1 DMB directories and PSB generation.
0203	DFSIDLK0	The first defined segment in DBD is not a root segment. Register 2 points to the DBD. Add 8 to contents of register 10. This points to the segment name in question. Check DBD generation.

0204	DFSIDLK0	Error in implied hierarchical definition of sensitive segments in PSB. Register 10 points to segment name at which error was discovered. Check both DBD and PSB generation for conflicting definitions.
0206	DFSIDLK0	Unable to open PSB and DBD libraries. Check proper allocation for DD name IMS/360 in JCL for Type 1, 2, or 3 region.
0208	DFSIDLK0	A sensitive segment is named in PSBGEN for which no corresponding segment name was defined in the associated DBDGEN. Register 3 at ABEND points to the unmatched sensitive segment name. Register 9 points to the DBD name. Register 8 points to the data base PCB name in the PSB. Check PSBGEN and DBDGEN.
0209	DFSIDLK0	DBD specifies an unsupported or unknown access method. Register 8 or register 4 points to the DBD name. An offset of 8 from the address pointed to by register 11 is the specific DCB within the DBD that is in error. Check DBD generation.
0210	DFSIDLK0	System error. DBD does not contain a DCB type required to construct the DMB. DCB type required is pointed to by register 3. An offset of 12 from register 2 points to the first DCBTAB in the group of DCB's examined.
0211	DFSIDLK0	System error. SDB (SEGM) is followed by more than one key (FLDK) definition. Register 11 points to FLDTAB, register 6 to SDB, and register 7 to FDB in error. Register 2 points to DBD.
0212	DFSIDLK0	System error. The first FDB is not the key FDB (FLDK) definition, yet physical codes for field and SDB are equal. Register contents same as 0211.
0213	DFSIDLK0	System error. SDB has no key field defined. SEGM statement not followed by FLDK or FLD statement. Register contents same as for 0211.
0225	DFSIBDR0	Error return code on write to master terminal. Will appear as a message region ABEND on the master terminal.
0228	DFSIBDP0	Cannot find the master terminal CNT. Will appear as a message region ABEND on the master terminal.
0229	DFSIBDP0	Cannot find key field for a segment in the DBD. Will appear as a message region ABEND on the master terminal.
0240	DFSIPC00	Message processing application exceeded allowable execution time in a Type 1

		message region. See Chapter 4 of the IMS/360 Systems Operation Manual under the heading "TRANSACT Macro" for a further explanation.
0260	DFSIPR00	Number of parameters (data items named in USING list) in the application program CALL exceeds the allowable limit.
0261	DFSIPR00	One of the values passed in the USING list of the application program Data Language/I CALL is invalid. It either exceeds object machine size, does not meet alignment requirements, or violates storage protection boundaries.
0301	DFSICLI0	System error. CLBSTATS vector contained an invalid value entry to input processor.
0302	DFSICLI0	Unidentifiable terminal address while searching for input CTB. System error; polling list probably no good.
0303	DFSICLI0	System error. Illegal return to input processor from message generator.
0305	DFSICLM0	System error. Invalid return code from ICREATE buffer request.
0306	DFSICLM0	System error. Invalid return code from IWRITEQ buffer request.
0404	DFSIPR00	During execution of a Type 1 message processing program or a Type 2 batch program, the IMS/360 control program (Type 0 region) terminated abnormally.
0408	DFSIPR00	During execution of a message processing application or a Type 2 batch program, an invalid event control block address was passed to the IMS/360 interregion communication SVC.
0424	DFSIPR00	System error. A message or Type 2 batch region has been activated asynchronously because of an error in the IMS/360 control program (Type 0 region). System error during the application program communication cycle of the program request handler.
0428	DSFIAS00	A Type 2 batch step could not be initiated because the program named in the second positional operand of the PARM field was not defined at system definition time.
0432	DFSIAS00	A Type 2 batch step could not be initiated because the program named in the second positional operand of the PARM field was not defined as a Type 2 program at system definition time.

0436	DFSIAS00	A Type 2 batch step could not be initiated because the input symbolic queue named in the fourth positional operand of the PARM field was not defined at system definition time. Check PARM field to ensure that input symbolic name is correct.
0440	DFSIAS00	A Type 2 batch step could not be initiated because the input symbolic queue named in the fourth positional operand of the PARM field was a logical terminal name. It may be only a transaction code.
0444	DFSIAS00	A Type 2 batch step could not be initiated because the output symbolic queue named in the fifth positional operand of the PARM field was not defined at system definition time. Check PARM field to ensure that output symbolic name is correct.
0448	DFSIAS00	A Type 2 batch step could not be initiated because the input transaction code named in the fourth positional operand of the PARM field had a nonzero limit, normal, or current priority. All priorities for a transaction code to be used as input by a Type 2 batch program must be zero.
0452	DFSIAS00	A Type 2 batch step could not be initiated because the transaction named in the fourth positional operand of the PARM field has been stopped or locked by a command or by a prior program failure.
0456	DFSIAS00	A Type 2 batch step could not be initiated because the program named in the second positional operand of the PARM field has been stopped or locked by a command or by a prior program failure.
0460	DFSIASE0	During an attempt to complete scheduling of a Type 2 batch region, the Type 0 control region was unable to communicate with the Type 2 region which requested scheduling. Possible reasons are that the Type 2 region job was canceled by the system console operator; was canceled by job step timer expiration; was canceled for exceeding specified queue space; or was canceled for exceeding wait-time limitations. This completion code will appear on the IMS/360 master terminal in message number IMS901I.
0464	DFSIASE0	During scheduling of a Type 1 message processing region by module DFSIASI0, the Type 0 region was unable to communicate with the Type 1 region. See 0460 for an explanation of possible reasons. A

		message processing region should be stopped only through the use of the IMS/360/STOP REGION command.
0468	DFSIASE0	After processing a DL/I call for a Type 1 or a Type 2 region, the DL/I analyzer, DFSIDLA0, was unable to communicate with the caller's region. See 0460 for an explanation of possible reasons.
0472	DFSIASE0	During termination processing by module DFSIAST0, the Type 0 region was unable to communicate with a Type 1 or Type 2 region. See 0460 for an explanation of possible reasons.
0476	DFSIDLA0	A Type 1 or 2 processing application provided an invalid PCB address in a Data Language/I call. 2nd program was scheduled
0501	DFSICLO0	System error. CLBSTATS vector contained an invalid value upon entry to output processor.

0502	DFSICLO0	System error. RWQ0 was unable to complete a read request for first buffer or segment. Register 4 at ABEND contains the return code from RWQ0.
0503	DFSICLO0	System error while core enqueuing or dequeuing a CNT in the output processor.
0504	DFSICLA0	Read or write queuing error. Return code from RWQ0 in register 2 at ABEND.
0505	DFSICLP0	System error. Invalid entry number from DFSICLD0.
0701	DFSIIDE0	System error. Invalid control blocks passed. Unable to determine whether QE or QCB.
0702	DFSIIDE0	System error. Attempted to dequeue a QE which indicated no optional backward pointer slot available. Must be present if called with only a QE pointer.
0703	DFSIIEN0	System error. Attempted to enqueue using either an invalid QCB or QE.
0704	DFSISMN0	System error. Attempted to ICREATE using a pool name which already exists. Duplicate pool error.
0705	DFSISMN0	System error. Attempted to IDESTROY using a pool name which does not exist.
0706	DFSISMN0	System error. While attempting to IDESTROY using a valid pool name, the zone end block has been altered.
0707	DFSISMN0	System error. Attempted to get buffer (GETBUF) using a nonexistent pool name. Register 2 at ABEND contains the erroneous pool name.
0708	DFSISMN0	System error. Attempted to free a buffer (FREEBUF) using a nonexistent pool name. Register 2 at ABEND contains the erroneous pool name.
0709	DFSISMN0	System error. Attempted to get a buffer (GETBUF) which exceeded the total length of a variable-length pool. Register 2 at ABEND contains the pool name. Register 3 contains the requested size.
0710	DFSIOS60	During OPEN of a Data Language/I overflow data set, the calculated block length exceeded the maximum track length for the device allocated. Check DD cards for OSAM data set allocation. Register 3 points to the Data Control Block (DCB) at ABEND time.
0711	DFSIDLM0	System error. Attempted to acquire pool space for a DMB whose name could not be found in the list of DMB directories

		pointed to by the scheduled PSB directory entry.
0712	DFSIDLM0	System error. Attempted to move a DMB whose name could not be found (see 0711).
0713	DFSIAS00	Unable to schedule an application program because insufficient data base buffer space available. Check TP and OSAM buffer pool size specified in the PARM field of the Type 0 EXEC statement.
0715	DFSIINT0	During initialization of the IMS/360 control program, one of the following errors occurred which relate to DBD's known to the system: 1. No allocation was made for DBDLIB in the IMS/360 Type 0 job step. 2. An I/O error occurred while reading the DBDLIB PSB directory. 3. None of the defined DBD names could be found on the data sets allocated for DBDLIB. See messages numbered IMS102I IMS103I IMS104I IMS105I IMS106I for further information.
0716	DFSIINT0	System error. Initialization table NTB0 contains invalid transfer vectors.
0717	DFSIINT0	An error occurred during attempt to establish pool sizes as specified or implied by the PARM field of the IMS/360 Type 0 region EXEC card. Check JCL, partition/region sizes, etc.
0718	DFSIINT0	An error occurred during IMS/360 initialization. Either a required load member could not be found or a permanent I/O error was encountered while searching library directories. See messages IMS112I, IMS113I, and IMS114I. One of these messages will appear on the Operating System/360 operator's console printout.
0719	DFSIINB0	Type 0 initialization was unable to successfully open any line groups. See message IMS115I for further explanation.
0720	DFSIDLM0	The DMB pool is too small to hold the required DMB's, or the PSB pool is too small to hold the PSB. Change the PARM value for PSB pool size or the DMB pool size in the Type 0 region EXEC card.

0721	DFSIDLM0	The IMS/360 dequeue module (DFSIIDE0) encountered an error while attempting to dequeue a PSB from the SCDPSBMU QCB.
0750	DFSIISM0	System error. While processing a call for a message processing or Type 2 batch region, ISAM record read was of greater length than buffer allocated.
0751	DFSIISM0	System error. SYNAD routine entered after a SETL, but synchronous error routine did not return a known SETL error code.
0752	DFSIISM0	A SETL returned a not found, so a second SETL for what was found was issued. This also returned a not found, which should not happen. Data base was probably not completely loaded or DD cards for the ISAM data set have RECFM=F.
0753	DFSIISM0	System error. SYNAD routine entered after a GET, but synchronous error routine did not return a known GET error code.
0754	DFSIISM0	System error. SYNAD routine entered after an unknown operation, that is, not a GET or SETL.
0755	DFSIISM0	System error. Unable to obtain an IOB from the BISAM read queue of IOB's while preparing for an update write.
0756	DFSIRST0	Unable to open input log file. Check IMSLOG and IMSLOGR DD cards.
0757	DFSIRWQ0	Queue data set overflowed. (Too few shutdown buffer records to handle shutdown, or shutdown delayed by Data Base Recovery.) Register 7 indicates the queue data set which caused the ABEND: 0 - Input QCR 4 - Input Msg 8 - Output QCR C - Output Msg Restart with a build queue
0758	DFSIRWQ0	Queue data set overflowed after reuse routine was unable to provide a record. Register 7 indicates the queue data set which overflowed (see 0757 User ABEND). Register 6 indicates the reason that the reuse routine ceased: 4 - No reusable records available 8 - Nonhardware-caused I/O error C - I/O error count exceeded
0759	DFSIRWQ0	Unrecoverable I/O error. Register 5 points to the OSAM DECB in error. The status bytes in the DECB will indicate

		one or more of the following error conditions: • Invalid request • Unable to convert relative block number to actual disk address • End of data set reached • DCB not open • New extent just obtained • Data set not preformatted • Space not found to add a block
0800	DFSIDLR0	QISAM I/O error or IMS/360 system error. Register 9 contains JCBIND2, JCBIND3, JCBIND4, and JCBIND5. See the IMS/360 System Manual, Volume I, for a description.
0804	DFSIDLD0	QISAM I/O error or IMS/360 system error. Register 9 contains JCBIND2, JCBIND3, JCBIND4, and JCBIND5. See the IMS/360 System Manual, Volume I, for an explanation.
0808	DFSIDLH0	Operating System error while back-spacing HSAM file. JCB address is in register 8.
0809	DFSIDLH0	During read backward, relative block number decreased to less than 1. JCB address is in register 8.
0810	DFSIDLH0	Buffer space not available.
0815	DFSIDLI0	Same as 0800, but in module DFSIDLR0.
0820	DFSIDLA0	Invalid return code detected from IREADQ, IWRITEQ, or the Router.
0825	DFSIDBL0	Space not available in data base buffer pool to perform data base logging as requested. Verify SSI value for DBD load module not altered since DBD generation.
0901	DFSISMP0	Error in security maintenance parameter field. See the IMS/360 Systems Operation Manual for format required.
0902	DFSISMP0	JOBLIB does not contain the SDB specified by the parameter field.
0903	DFSISMP0	DD required by SMP was not supplied. Register 2 points to the DD name of card required.
0904	DFSISMP0	SSI set on DFSISDB0 is invalid or nonexistent. This SSI is set by system definition and is required to validity-check the system having security generated for it.

Comp. Code	Issuing Component	Explanation
FFE	DSP0	Completion code if ABEND dump at termination is requested in a checkpoint termination command.

MSGNUMB	COMP	MESSAGE AND EXPLANATION
IMS050D	RA00	JJJJJJJJ.SSSSSSSS.PPPPPPPP CTL PGM NOT PRESENT REPLY 'WAIT' OR 'CANCEL' Explanation: If a Type 1 message or Type 2 batch region is initiated prior to the Type 0 region, the above message is issued. JJJJJJJJ - job name SSSSSSSS - step name, if any PPPPPPPP - procedure step name, if any
IMS051I	RA00	jobname.stepname.procstepname WAITING TO INITIATE Explanation: If the operator replies WAIT to message IMS050D, the job will attempt to locate the Type 0 region every 30 seconds until it is found. Each unsuccessful attempt will result in the above message at the system console.
IMS052I	RA00	jobname.stepname.procstepname JOB CANCELLED BY OPERATOR Explanation: If the operator replies CANCEL to message IMS050D, the job step will be terminated abnormally with a user completion code of 0076, and the above message will be displayed at the system console.
IMS100I	RA00	jobname.stepname.procstepname CTL PGM NOT EXECUTED Explanation: This message is issued to the system console when an attempt is made to initiate the second copy of a Type 0 region.
IMS101I	IND0	NO DATA BASE DIRECTORIES DEFINED Explanation: At system definition time, no data bases were defined to the system. Therefore, no data base directory initialization is required. Action: None required.
IMS102I	INT0	NO ALLOCATION FOR DDN 'IMS' Explanation: To initialize IMS/360, the IMS/360 control program must have allocation for PSBLIB and DBDLIB. Action: See the IMS/360 Systems Operation Manual for further information on JCL requirements for a Type 0 region.

IMS103I IND0 UNABLE TO SUCCESSFULLY OPEN DDN 'IMS'

Explanation: A permanent I/O error may have occurred during OPEN.

Action: Ensure that DD name IMS is allocated properly and that the data sets specified at IMS/360 system definition time or PSBLIB and DBDLIB exist.

IMS104I IND0 PDS DIRECTORY READ ERROR DDN 'IMS'

Explanation: An I/O error has occurred while trying to read the PDS directory for DD name 'IMS' (PSBLIB and DBDLIB).

Action: Check JCL to ensure proper allocation per Chapter 4 of the IMS/360 Systems Operation Manual.

IMS105I IND0 BLDL FAILED FOR ALL DEFINED DATA BASE DIRECTORIES

Explanation: None of the data base definitions (DBD's) for data bases which were named at IMS/360 system definition time could be found on the data sets allocated to DD name IMS.

Action: Check JCL for proper allocation. Ensure that at least one DBDGEN for the defined system has been run.

IMS106I IND0 BLDL FAILED FOR FOLLOWING DBD's

Explanation: DBD names are listed which could not be found or did not meet requirements on DBDLIB. A reason follows each name.

DBDNAME		
	• NOFND	Not found
	• DIRNG	Directory entry incomplete
	• NOBUF	Directory entry correct size but buffer size was zero
	• ALIAS	Alias names not allowed
	• CNCAT	DBD was found in PSBLIB portion of concatenated data sets

Action: None. Note, however, that no programs or transactions which use the named data bases will be scheduled for execution by IMS/360.

IMS109A INT0 LAST IMS NUCLEUS TERMINATED ABNORMALLY

Explanation: Either the last execution IMS/360 control program nucleus (Type 0 region) terminated with a system completion code or it was canceled by the operator, step time expiration, etc.

Action: As indicated by message.

IMS111I INT0 WARNING... DEFINED AND ACTUAL PROGRAMMING SYSTEMS DIFFER

Explanation: At IMS/360 system definition, the programming system under which IMS is to run is specified as MFT or MVT. The programming system has no effect upon the Type 0 region. However, it does determine which of certain IMS/360 routines are to be included in the OS/360 nucleus.

Action: Notify system programmers responsible for IMS/360.

IMS112I INL0 PERMANENT I/O ERROR ON JOBLIB/LINKLIB

Explanation: While searching the PDS directories for JOBLIB and SYS1.LINKLIB, a permanent I/O error occurred.

Action: Ensure that JOBLIB allocation for Type 0 region is correct. If it is correct, seek assistance from the installation systems programming staff.

IMS113I INL0 BLDL FAILED FOR FOLLOWING JOBLIB/LINKLIB

Explanation: While searching the PDS directories for JOBLIB and SYS1.LINKLIB, modules required to support IMS/360 could not be found. Module names follow message.

Action: Notify systems programmer responsible for IMS/360.

IMS114I INB0 LINE GROUP NOT ALLOCATED, DDNAME - XXXXXXXX

Explanation: The line group of DDNAME XXXXXXXX is defined to the IMS/360 control program, but there was no DD card provided in the Type 0 region JCL.

Action: The DDNAME referenced may be a line group which was defined for expansion purposes, or it could be a JCL omission. If allocation for all line groups is omitted, this message will be followed by IMS115I.

IMS115I INB0 UNABLE TO OPEN LINEGROUPS

Explanation: During initialization of the Type 0 control region, it was not possible to open any communication line groups. The

reason may be improper allocation or lack of allocation for any line groups.

Action: Ensure that line groups are allocated using correct DDNAMEs as shown in output from Stage 2 of IMS/360 system definition.

IMS116I AST0 XX...X PROCESSING REGION STARTED

Explanation: Indicates that a dependent processing region has started. XX...X may be:

MESSAGE - Type 1 region
BATCH - Type 2 region
USER - Undefined direct interface

Action: None. Information message.

IMS117I AST0 XX...X PROCESSING REGION STOPPED

Explanation: Indicates that a dependent processing region has stopped. XX...X may be:

MESSAGE - Type 1 region
BATCH - Type 2 region
USER - Undefined direct interface

Action: None. Information message.

IMS118I AST0 JJJJJJJJ.SSSSSSSS UNKNOWN CALL FUNCTION 'FFFF'

Explanation: The IMS/360 control program has received a request to schedule a program in a dependent region. The type of request cannot be identified.

JJJJJJJJ - Jobname of requesting region
SSSSSSSS - Step name of requesting region
FFFF - Call function code

Action: Notify the system programmer responsible for IMS/360.

IMS551I INT0 UNABLE TO OUTPUT TO MASTER TERMINAL

Explanation: There have been uncorrectable I/O errors while attempting to output to the master terminal.

Action: Either restart the master terminal at its present location or reassign it to another physical terminal.

IMS901I AS00 JJJJJJJJ KK SSSSSSSS PPPPPPPP (X) TTTTTTTT SYS, USER SMB PSB

Explanation: Message number.

JJJJJJJJ Input logical terminal name if X=1 and name is available; if X=2, job name. If X=0 or terminal name is not available, JJJJJJJJ will appear in lowercase letters as "not avail" unless the master terminal device does not have lowercase capability.

KK Protection key of abending region/partition.

SSSSSSSS Operating System/360 step name of region or partition

PPPPPPPP PSB or program name.

X If=0, IMS/360 region control program ABENDed

If=1, Message processing program ABENDed

If=2, Type 2 batch program ABENDed

TTTTTTTT Transaction code

SYS System completion code

USER User completion code

SMB If this appears, transaction code at TTTTTTTT was stopped.

PSB If this appears, program named at PPPPPPPP was stopped.

Action: Notify persons responsible for program and/or transaction code. Restart program unless persistent ABENDs indicate that problem is not isolated to stopped transaction code.

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