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Version 8.1

## IBM System/360 Time Sharing System

### Operator's Guide

This guide presents the basic information an operator needs to run the IBM System/360 Time Sharing System. The book is divided into four main parts. These parts present a general view of the system, descriptions of the commands used by the operator, an explanation of the operator's terminal, and procedures the operator uses to run the system. Additional information that supplements the operator's knowledge of the system is presented in the appendixes. These appendixes include a description of the system control panel, a definition of the types of data set names, an explanation of device addresses, and summaries of the formats of the operator's commands and the TSS commands.

The system operator should be familiar with the following publications:

IBM System/360 Time Sharing System: Concepts and Facilities, GC28-2003

IBM 1052 Printer-Keyboard Model 7 with IBM 2150 Console, GA22-6877

If he is using a terminal other than the 1052 Printer-Keyboard, the operator should read Terminal User's Guide, GC28-2017. In addition, the operator may keep near him, for reference, System Messages, GC28-2037.



Ninth Edition (September 1971)

This is a revision of, and replaces, IBM System/360 Time Sharing System: Operator's Guide, GC28-2033-7, and Technical Newsletter GN28-3175.

Now, the operator can control system activity by using a new command, FLOW. New restrictions have been placed on the DROP command.

A change to the text or illustration is indicated by a vertical line to the left of the change.

This edition is current with Version 8, Modification 1, and remains in effect for all subsequent versions or modifications of IBM System/360 Time Sharing System unless otherwise indicated. Significant changes or additions to this publication will be provided in new editions or Technical Newsletters.

Before using this publication in connection with the operation of IBM systems, refer to the latest edition of IBM System/360 Time Sharing System: Addendum, GC28-2043, for the editions of publications that are applicable and current.

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This manual provides the operator of the IBM System/360 Time Sharing System (TSS/360) with the basic information he needs to run the system. The content of the manual is divided into four main topics:

- Part I, Introduction, presents an overall view of the system, explains the work the system operator does as he monitors and controls the system, and explains the way the system communicates with the operator.
- Part II, System Operator's Commands, describes in detail each of the commands used primarily by the operator.
- Part III, Terminal Usage, explains how to use the IBM 1052 Printer-Keyboard Model 7 (the operator's terminal).
- Part IV, System Operator Procedures, describes the way the operator runs the system.

The appendixes contain closely related, supplementary information that an operator may find helpful.

This guide is concerned with time sharing operations only. It does not discuss system generation or system build of the system, nor does it cover IBM System/360 Operating System operations. Those areas are described in IBM System/360 Time Sharing System: System Generation and Maintenance, GC28-2010 and IBM System/360 Operating System: Operator's Guide, GC28-6540.

Other publications contain information relevant to the operation of the system. These publications and a brief note about their relationship to operating TSS/360 follow.

For a detailed description of the IBM 1052 Printer-Keyboard Model 7, consult IBM 1052 Printer-Keyboard Model 7 with IBM 2150 Console, GA22-6877.

If a terminal other than the IBM 1052 Printer-Keyboard Model 7 is used, consult IBM System/360 Time Sharing System: Terminal User's Guide, GC28-2017.

The system operator must know how to operate the System/360 Model 67 computer. Information is provided in IBM System/360 Model 67 Functional Characteristics, GA27-2719.

The operator can use all commands of the command system. For an explanation of how to use the command system, see IBM System/360 Time Sharing System: Command System User's Guide, GC28-2001.

All messages issued by the system and the action to be taken for each are provided in IBM System/360 Time Sharing System: System Messages, GC28-2037.

Descriptions of the independent utility programs that the operator may be required to use are in IBM System/360 Time Sharing System: Independent Utilities, GC28-2038.

The complete facilities and use of the Time Sharing Support System are described in IBM System/360 Time Sharing System: Time Sharing Support System, GC28-2006.

For a broader understanding of the time sharing system, operators should read IBM System/360 Time Sharing System: Concepts and Facilities, GC28-2003.

See the table that lists TSS/360 SRLs in the IBM System/360 Time Sharing System Addendum, GC28-2043, for a list of other publications that describe TSS/360.

CONTENTS

PART I: INTRODUCTION . . . . .	1
General View of TSS/360 . . . . .	1
System Operator Functions . . . . .	1
Startup and Shutdown . . . . .	1
Configuration Control . . . . .	2
Bulk I/O . . . . .	2
Communications . . . . .	2
Other Functions . . . . .	2
System Messages . . . . .	2
Command Messages . . . . .	2
System Request Messages . . . . .	3
Informational Messages . . . . .	3
PART II: SYSTEM OPERATOR'S COMMANDS . . . . .	4
Command Format and Notation . . . . .	4
Command Statement . . . . .	5
Operand Representation . . . . .	5
Format Illustrations . . . . .	5
Operation Format . . . . .	5
Operand Format . . . . .	5
Coded Value . . . . .	6
Command Punctuation . . . . .	6
Use of Metasymbols . . . . .	6
Commands . . . . .	6
Operand Descriptions . . . . .	6
Function and Use . . . . .	6
ASNBD Command . . . . .	7
BCST Command . . . . .	7
CANCEL Command . . . . .	8
DIRECT Command . . . . .	8
DMPRST Command . . . . .	9
DROP Command . . . . .	11
EXHIBIT Command . . . . .	11
FLOW Command . . . . .	13
FORCE Command . . . . .	15
HOLD Command . . . . .	15
LABEL Command . . . . .	16
MSG Command . . . . .	17
PATCLEAR Command . . . . .	18
PRINT Command . . . . .	19
REPLY Command . . . . .	20
RT Command . . . . .	21
SARD Command . . . . .	22
SHUTDOWN Command . . . . .	23
USAGE Command . . . . .	24
PART III: TERMINAL USAGE . . . . .	25
Machine Controls . . . . .	26
Control Lights . . . . .	26
Keyboard Controls . . . . .	27
Uppercase and Lowercase Characters . . . . .	28
Underlined Defaults in Messages . . . . .	28
PART IV: SYSTEM OPERATOR PROCEDURES . . . . .	29
Startup Procedure . . . . .	29
Readying System Volumes and Devices . . . . .	29
Selecting System Configuration . . . . .	29
Selecting Individual I/O Devices . . . . .	31
Quick Start . . . . .	31
IPL Procedure . . . . .	32
Startup Messages . . . . .	33
Setting Dump Tape Address . . . . .	35

Restart . . . . .	35
Time-Sharing Operations . . . . .	35
Communications . . . . .	36
Bulk I/O Operations . . . . .	37
Card Input . . . . .	37
Express Batch . . . . .	37
Tape Input . . . . .	38
Remote Job Entry . . . . .	38
Scratch Tape Handling . . . . .	38
Task Operations . . . . .	39
Printer Recovery . . . . .	39
Operator's Log . . . . .	39
Operator's User Profile . . . . .	40
Exception Handling . . . . .	40
Program Control System . . . . .	42
Time Sharing Support System . . . . .	42
CALL Command . . . . .	42
DUMP Command . . . . .	43
RUN Command . . . . .	43
Shutdown Procedure . . . . .	44
APPENDIX A: SYSTEM CONTROL PANEL . . . . .	45
APPENDIX B: DATA SET NAMES . . . . .	50
APPENDIX C: PHYSICAL DEVICE ADDRESSES . . . . .	51
APPENDIX D: COMMAND FORMATS . . . . .	52
APPENDIX E: TSSS COMMANDS . . . . .	53
INDEX . . . . .	54

ILLUSTRATIONS

Figure 1. IBM 1052 printer-keyboard model 7 . . . . .	25
Figure 2. Time-sharing configuration console . . . . .	30
Figure 3. Configuration console -- channel controllers, processors, and main storage units . . . . .	31
Figure 4. Configuration console -- I/O control units . . . . .	32
Figure 5. System control panel . . . . .	46
Table 1. System operator's commands . . . . .	4
Table 2. Command format metasymbols . . . . .	6
Table 3. Effect of pressing REQUEST key . . . . .	26



The operator of the IBM System/360 Time Sharing System (TSS/360) is responsible for operation of the computer and its peripheral equipment. He monitors input and output devices and keeps them supplied with tapes, disk packs, paper forms, cards, etc.

The system operator communicates with TSS/360 by typing in commands at his terminal. The commands the system operator uses let him adjust the system configuration, enter bulk card and tape input, terminate tasks, respond to system messages, send messages to other users, and maintain the operator's log that contains those messages. These commands are described in Part II, System Operator's Commands.

#### GENERAL VIEW OF TSS/360

From the operator's viewpoint, TSS/360 consists of a set of programs (on disk packs) and one or two System/360 Model 67 computers. This system offers two basic modes of operation, conversational and nonconversational. In conversational mode, the user interacts directly with the system and, if he wishes, with his executing programs; he is online and acts in real-time. In nonconversational mode, the system acts much like a conventional batch processor, executing programs without any user intervention. The user decides which mode he will employ for each of his tasks. (A task is a unit of work performed by the system under the direction of a stream of commands from system input supplied by the user.) Operators, however, always use the conversational mode.

Conversational users communicate with the system by means of terminals such as the 1052 Printer-Keyboard or the IBM 2741 Communications Terminal. The terminals may be at the computer installation or thousands of miles away. The general operation is the same in either case. The user types in his input at his terminal, receives responses from the system, and enters further input in the light of those responses. This procedure continues until the user finishes his task.

The user and system thus carry on a conversation that can be read in the listing printed at the user's terminal. In a broad sense, this conversation is the basic idea of time sharing: to let each user feel that he has the entire system at his command. He can start and stop his programs, collect intermediate results, put in new

data, shift the sequence of execution, alter instructions, and perform other operations as he wishes. This interaction is possible because the system allocates intervals of the computer's time so that each conversational user is provided with execution time. Time is made available to the user often enough that the system appears to him to be responding solely to his requests. During the user's processing time, he can call on all the system's programs and equipment, and he can proceed as if all available storage space were available to him.

In nonconversational mode, the system communicates with a stored sequence of commands instead of with a user. The system executes that sequence -- at its own convenience -- and issues the results as listings, tapes, card decks, etc., which will later be returned to the user. Nonconversational processing is done when conversational processing is not taking place.

#### SYSTEM OPERATOR FUNCTIONS

The primary functions of the system operator are to:

- Start the system and shut it down
- Control the system configuration
- Initiate bulk input to the system
- Communicate with the system and with other users

A general description of these functions is given below; detailed instructions for performing them are in Part IV, System Operator Procedures.

#### Startup and Shutdown

The system operator is responsible for starting up the system and shutting it down. At system startup, he selects the basic components -- central processing units, core storage units, channel controllers (I/O channels), and I/O control units -- that will be used by the time-sharing system. He may also control the assignment of I/O devices, as discussed below in "Configuration Control."

When the system is to be shut down, the system operator usually informs all conversational users in advance, so that they can end their own tasks as they wish. He makes

this announcement by issuing a BCST command, telling all conversational users how much time they have before shutdown occurs. At the specified time, he issues a SHUTDOWN command to terminate all tasks that are still active, including all nonconversational tasks, and then he shuts down the system.

### Configuration Control

The system operator is responsible for establishing and maintaining the configuration of components within the time-sharing system environment at his installation. At startup, he selects the basic configuration of the system. By selecting which components will be used, he partitions the equipment available at his installation and can thus allocate components for non-time-sharing use.

During and after startup, the system operator may use two commands to control I/O device assignment. The HOLD command disassociates one or more devices from the time-sharing system; the DROP command cancels the effects of a HOLD, making the device again available for time-sharing use. HOLD and DROP commands can be used at any time after startup, whenever it is necessary to make a device unavailable to time sharing or to make a device (previously held) again available. Thus a suspected malfunctioning device does not require system shutdown. Instead, that device can be made inactive by a HOLD command, for investigation, and can later be reactivated by a DROP command.

### Bulk I/O

The operator may, at startup or at a later time, make devices available for bulk I/O operations. These devices are assigned by entering their addresses in response to a system message during startup, as described in Part IV, System Operator Procedures, or by means of the ASNBD command, as described in Part II, System Operator's Commands.

The system operator is also responsible for initiating bulk input operations, which are used to introduce data into the time-sharing system from either punched cards or magnetic tape. A description of these operations appears in Part IV, System Operator Procedures.

### Communications

The system operator replies to system messages printed out at his terminal that require a response. If the message is prefixed by an identifying number of four decimal digits, he must respond with the REPLY command, using the number as an

operand; he may enter all four digits, or he may omit leading zeros. If the message has no identifying number or other identifier, the operator types his answer to whatever the message asks.

Note: Message prefixes, except those that precede request messages, are not shown in this text.

The system operator can also initiate messages to other conversational users. He can send a message to all such users by issuing a BCST command, for example, to warn of an impending system shutdown. Or he can send a message to a specific conversational user by issuing an MSG command.

### Other Functions

The system operator can terminate any task prior to its normal end by issuing either a FORCE or a CANCEL command. The FORCE command is used to terminate a specified conversational task; the CANCEL command is used to terminate a specified non-conversational task.

The system operator is also concerned with the operator's log, which is maintained by the system as a record of all communications between operators and the system. The log includes (1) all request messages issued to the system operator, (2) all replies to those messages, and (3) all messages that the system operator sends using BCST and MSG commands.

At each startup, a listing of the log for the preceding session (that is, startup to shutdown) is printed out automatically. If the system operator wants the log of any other session, he can issue a PRINT command to have it listed. His PRINT command will be honored if the requested session log is still retained. Five session logs are retained.

### SYSTEM MESSAGES

The system communicates with the operator by sending three types of messages to his terminal:

- Command messages
- System request messages
- Informational messages

These types of messages are summarized below.

#### Command Messages

The system reacts to each command by printing messages at the operator's termin-

al. These messages may ask the operator to supply mandatory operands which he omitted or they may tell him of errors he has made in entering a command.

#### System Request Messages

The system prints three groups of request messages. The first group requests the operator to act (for example, mount tapes or remove output from printers) or supply some information. Some are prefixed with an identifying number of four decimal digits. The operator must use the REPLY command to answer these messages, with the message number as an operand. Operator-action-request messages that are originated by users with the WTOA macro instruction do not require a reply.

The second group asks the operator to type information directly at the terminal; he does not answer with a REPLY command. The third group merely presents information; no reply is expected. Messages originated by the WTOR or WTO user macro instructions may be included in the first and third groups.

#### Informational Messages

Informational messages include ABEND, LOGON, and LOGOFF messages, which tell the operator when tasks are abnormally terminated or logged on or off. Each contains user's identification, time, task identification (TASKID), and either the symbolic device address (SDA) of the transmission line connected to a conversational user's terminal or the batch sequence number (BSN) of a nonconversational task. The operator can use these messages to keep aware of the load on the system or to find batch sequence numbers or task identification numbers. Examples:

LOGON messages are printed at the operator's terminal when a task is logged on.

LOGON TREADWEL AT  
11:11 TASKID=002B SDA=005D

records that a conversational task with task identification 002B, belonging to a user with user identification TREADWEL (whose terminal is on line 5D) was logged on at 11:11 a.m.; and

LOGON MALLOY AT  
13:56 TASKID=003A BSN=0283

records that nonconversational task 3A, with batch sequence number 283, for user MALLOY, was logged on at 1:56 p.m.

LOGOFF messages are printed at the operator's terminal when a task is logged off.

LOGOFF TOLIVER AT  
07:42 TASKID=00AA SDA=005E

records that conversational task AA, for user TOLIVER (at a terminal connected to transmission line 5E), was logged off at 7:42 a.m.; and

LOGOFF WWATSON AT  
20:31 TASKID=00A1 BSN=284

records that WWATSON's nonconversational task, with task identification A1 and batch sequence number 284, was logged off at 8:31 p.m.

ABEND messages are printed at the operator's terminal when the system ends a user's task in a way that was not planned in the user's program.

ABEND TJPERRY AT 14:21  
TASKID=0077 SDA=0066

records that conversational task 77 for TJPERRY was abnormally ended at 2:21 p.m.; and

ABEND BETTGER AT 9:15  
TASKID=0011, BSN=0291

records that nonconversational task 11 for BETTGER was abnormally ended at 9:15 a.m.

If the operator's task is abnormally terminated, he receives the message

ABNORMAL TASK TERMINATION

and messages explaining the cause.

Certain other ABEND messages inform the operator of failures in recovery procedures that may cause future system problems. They contain task and user identification and are preceded by the word "ABEND" and a hyphen (-). For example:

ABEND-USERID01 0026 RELEASE  
OF PRIVATE DEVICE FAILED

records that the system was unable to release a private device while attempting to restore task 26 for USERID01, which had been abnormally ended.

PART II: SYSTEM OPERATOR'S COMMANDS

Table 1 lists commands that are used exclusively by the operator. (CANCEL, DMPRST, EXHIBIT, PRINT, and USAGE are not strictly reserved for the operator, but are also listed.) The operator may, however, use any command available to other users (except those commands specifically limited to managers and administrators). For an explanation of user commands, see Command System User's Guide.

Operation	Operand
command name	one or more operands, delimited by commas; this field may be blank

The operation field contains a command name, such as CANCEL or REPLY, that identifies the command and its requested action. The command name may not exceed eight characters or contain an embedded blank.

COMMAND FORMAT AND NOTATION

The basic format of a command is:

Table 1. System operator's commands

Command	Function
ASNBD	Assigns and deletes devices for bulk I/O operations.
BCST	Sends a message to all active conversational users.
CANCEL	Terminates a nonconversational task before its normal end.
DIRECT	Reroutes output from a remote job entry station to a local printer or another station.
DMPRST	Performs a time-shared dump or restore of VAM2-formatted disk volumes.
DROP	Removes a device from HOLD status, which makes the device available for use by TSS/360.
EXHIBIT	Displays information regarding all active system users or the batch work queue.
FLOW	Regulates the number of tasks in execution in the system.
FORCE	Terminates a conversational task before its normal end.
HOLD	Makes a device unavailable for use by TSS/360.
LABEL	Performs time-shared labeling of magnetic tapes.
MSG	Sends a message to an active conversational user or enters a message in the operator's log.
PATCLEAR	Performs time-shared initialization of disks in VAM2 format.
PRINT	Prints a portion of the operator's log.
REPLY	Responds to a numbered request message issued by the system.
RT	Reads a data set from magnetic tape.
SARD	Displays information concerning system activity and resources.
SHUTDOWN	Ends time-sharing operations by terminating all active tasks in the system.
USAGE	Ascertains system resource usage, current and accumulated, for a specified user.

While the operation field specifies the action to be performed, the operand field indicates the elements upon which the command is to act. The operand field may be blank or may contain several operands, depending on the requirements of the operation. If the operand field is present, it must be separated from the operation field by one or more blanks or by a tab. Multiple operands in the operand field must be delimited by either a comma or a tab. A blank between multiple operands is not a delimiter; but if blanks surround the operand, they are ignored. For example, specifying the operands a, b, and c in the operand field of a command as:

```
a,b,c
a ,b ,c
or a(tab)b ,c
```

will yield identical results when the command is executed.

#### Command Statement

A command statement is a command, or a series of commands, that the system recognizes as one SYSIN (the data set that contains the input to the system) record. To end a command statement, the operator holds down the ALT N CODE key and presses the EOB key. Normally, one command statement can be written on one line. If the statement is too long for one line, a hyphen (-) is used as a continuation character in the last position of the line and the command is continued on the next line. When a command statement contains more than one command, the commands must be separated by semicolons.

#### Operand Representation

Command operands are represented in two ways: by position or by keyword. The system can determine the value of a specific operand from either the relative position of that operand within a series of operands or from a descriptive keyword preceding the operand value.

Positional operands must be supplied by the operator in the same order shown in the command format illustration. If a positional operand is omitted and another positional operand is written following the omitted operand, the comma that would have followed the omitted operand must be retained to indicate the relative position of the operand that is included. For example, positional operands a, b, and c may be written as:

```
a,b,c
a,,c
a,b
a
```

```
,b,c
,b
,,c
(blank)
```

Keywords may appear in any order, in the general form: KEYWORD=value, where KEYWORD is the name of the operand, and value is the actual value of the operand. This value is the one that would be specified for the operand in positional representation. Commas are not required to indicate omitted keyword operands.

Keyword and positional representation of operands may be used simultaneously in the same operand field. Where one operand is expressed in both manners, the last in the series is assumed to be the value. For example, assuming three operands with keyword representations expressed as A=x, B=y, and C=z, the operand field may be represented as:

```
A=x,y,z
A=x,B=y,z
x,C=z,B=y
x,C=z
x,y,A=d,C=z
B=y
```

Note that in the fifth example of an operand field (x,y,A=d,C=z), the keyword form of representation for the operand specifying "A=d" contains the value that is assumed, since the last value encountered for each operand, from left to right, is assumed by the system. The examples are a guide; they do not contain all possible ways of entering these three operands.

#### FORMAT ILLUSTRATIONS

The notational conventions described in the following paragraphs are used in the command format illustrations to explain how an operand is to be written.

##### Operation Format

To distinguish command names in the format illustrations, uppercase letters are used. The operator may enter command names in either uppercase or lowercase letters.

##### Operand Format

Within the operand field of the format illustration, the word or phrase that is used to identify each operand is written entirely in lowercase letters. For positional operands, only the lowercase word or phrase appears; for keyword operands, the keyword (to the left of the equal sign) is in uppercase letters and the keyword descriptor (to the right of the equal sign) is in lowercase letters. All operands

shown in keyword format may be specified positionally. The converse is not true; operands shown in positional format must be specified in positional notation.

#### Coded Value

This is a character or string of characters that is to be written exactly as shown in the format illustration. Coded values always appear in format illustrations as numbers or uppercase letters, either to the right of the equal sign or standing alone.

#### Command Punctuation

The comma, the period, and the parentheses have special significance in format illustrations. Commas must be written to separate operands (unless a tab is used to separate operands) or to show the omission of positional operands, unless no other operand follows the omission. Parentheses and periods must be written as shown in the illustrations.

#### Use of Metasymbols

Metasymbols are used in the illustrations of the command statements to help you understand the format of each command. A metasymbol is used in the operation field of a command statement, for example, to group alternatives or to show that a choice must be made from two or more items. The four metasymbols and the explanation of their use are shown in Table 2.

#### COMMANDS

The examples of the commands used by the system operator illustrate typical conversation between the operator and the system. The operator presses the REQUEST key, which causes an attention interruption. Normal-

ly, the system writes out an exclamation point (!) to the operator's terminal. The exclamation point is a request for the operator to enter his input. The operator types in his input on the line after the exclamation point. The input the operator enters can be in uppercase or lowercase type; however, the system always types out uppercase messages.

#### Operand Descriptions

Each of the operands that is shown in the format illustration is explained. Following the explanation of the operand is information labeled "Specified as," which describes the valid specifications for the operand. If there is a system default, this information is presented under the heading "System default," which follows "Specified as."

#### Function and Use

The discussions about each command are presented under the following headings:

"Functional Description," which explains the action the system takes when the command is received.

"Operating Notes," which describes how to use the command. This heading is omitted if the information is not pertinent to a particular command.

"Cautions," which warn the operator about difficulties he may have in using the command. This information appears only where applicable.

One or more examples of using each command follows the command description. These examples describe, briefly, what the operator wants to do and then show the events that occur.

Table 2. Command format metasymbols

Name	Symbol	Use
braces	{ }	Delimit syntactical units (one or more operands) that may be repeated; delimit alternatives.
brackets	[ ]	Delimit optional names and operands within the field.
vertical stroke		Separates alternative representations of operands; for example, {A B} denotes that, for the syntactical unit enclosed by the braces, either A or B may be chosen but <u>not</u> both. {A B C} denotes that a choice may be made between alternatives A, B, and C. Alternatives may be indicated also by aligning the choices vertically within the braces: $\begin{Bmatrix} A \\ B \end{Bmatrix}$
ellipses	...	indicate that the preceding syntactical unit may be repeated one or more times. If there is a system limit to the number of repetitions permitted, the limit will be given in the operand list that follows the format illustration.

## ASNBD Command

This command allows the operator to assign or delete ownership of devices for bulk I/O operations.

Operation	Operand
ASNBD	{ <sup>A</sup> <sub>D</sub> } symbolic device address{[,...]}

A specifies that the I/O device at the following symbolic device address is to be added to the BULKIO task table.

D specifies that the following I/O device specified by the symbolic device address is to be deleted from the BULKIO task table.

**symbolic device address**  
specifies the symbolic device address of a bulk I/O device (printer, reader, or punch).

Specified as: any hexadecimal integer from 0 to FFF. (These addresses were specified at system generation; see the list of devices for your installation.) A maximum of 10 devices may be specified in one command. To specify more than 16 devices, issue another ASNBD command.

Functional Description: ASNBD initializes the BULKIO task, if it was not created at startup. The command may also be used to reinitialize the task after it has been abnormally terminated.

Example: The operator wants to add devices at symbolic addresses 050 and 060 and delete the device at address 052.

Operator: Presses REQUEST key  
System: !

Operator: asnbd a050, a060, d052

The system responds with self-explanatory diagnostic messages. For example, an attempt to assign a device that has already been assigned will result in a message to that effect.

Any error detected in the operand of the ASNBD command requires entry of the correct operand only, not the entire command. If the assignment is properly performed, the system will respond:

ASNBD'S DONE: A050, A060, D052

## BCST Command

This command sends a message from the system operator to all active conversational users.

Operation	Operand
BCST	TEXT=text of message

**TEXT**  
is the message the operator wants to send to users.

Specified as: not more than 120 characters, including blanks.

Functional Description: The system attaches the current date and time to the end of the message, sends the message (with date and time) to every active conversational task, prints it on the users' terminals, and records it in the operator's log.

Caution: The system truncates messages longer than 120 characters (excluding date and time), without sending the operator a message.

The diagnostic message

INVALID RETURN CODE FROM NEXTPAR.  
SYSTEM ERROR. COMMAND IGNORED.

indicates an error in scanning the text portion of the command. The error is generally not permanent, and the command can be reentered.

Examples:

1. Assume that the operator wants to warn all users that he will shut down the system in 15 minutes.

Operator: Presses REQUEST key  
System: !

Operator: bcst shutdown at 1800 hours

The users receive:

SHUTDOWN AT 1800 HOURS 1745  
HOURS 4/3/68

2. Assume the same conditions as in example 1, except that no conversational users are active.

Operator: Presses REQUEST key  
System: !

Operator: bcst shutdown at 1800 hours  
System: NO ACTIVE TERMINAL USERS.  
COMMAND IGNORED.

CANCEL Command

System: BSN 0271 NONEXISTENT OR COMPLETED.

This command cancels a nonconversational task.

Operation	Operand
CANCEL	BSN=batch sequence number

BSN

is the batch sequence number of the nonconversational task to be canceled.

Specified as: a four-digit decimal integer.

Functional Description: A task canceled during execution has a SYSOUT (system output stream) data set (probably incomplete) printed by the system. There will be in that printed SYSOUT data set the following message, which tells the user why his task was terminated:

LOGOFF DUE TO CANCEL ISSUED BY A PRIVILEGE A USER

Privilege A indicates the system operator.

A task canceled before its execution starts has no SYSOUT data set (although it may have a SYSOUT device); therefore, the user won't receive the above message, and probably will ask why his task was never executed. The operator will be notified if the task to be canceled was previously executed.

Operating Notes: The system assigns all batch sequence numbers to nonconversational tasks. The operator can obtain these batch sequence numbers (except those started by the BACK command) from messages printed at his terminal. Tasks started by PRINT and RT send messages that give their task's BSN. Tasks started by PRINT, PUNCH, EXECUTE, and WT send to the operator's terminal a LOGON message with the BSN in it. Otherwise, ask the user for the BSN.

If the operator enters CANCEL without any operands, the system will prompt for batch sequence numbers.

Example: Assume that the operator wants to cancel the task that was assigned batch sequence number 0271.

Operator: Presses REQUEST key  
System: !

Operator: cancel 271  
System: CANCEL ACCEPTED

If the task has already been executed, the last message will be:

DIRECT Command

The TSS/360 remote job entry (RJE) function includes the DIRECT command, which allows the system operator to route all of the output for a given RJE station to a local online printer or to reroute it to another RJE station.

Operation	Operand
DIRECT	STAID1={ALL rjesta1} [,STAID2=rjesta2]

STAID1

designates the name of the RJE station from which output is to be rerouted.

Specified as: three to eight alphanumeric characters, the first of which must be alphabetic. If the station specified in STAID1 has no entries on the batch work queue at the time the command is issued, a diagnostic message is issued.

ALL--all output queued for RJE devices will be rerouted to local online high-speed printers. If ALL is specified, STAID2 should not be specified and will be ignored.

STAID2

specifies the name of the RJE station to which the queued output for the station specified in the STAID1 parameter is to be directed.

Specified as: three to eight alphanumeric characters, the first of which must be alphabetic.

System default: The output for STAID1 is routed to the local online high-speed printers in default of STAID2.

Functional Description: This command is used in the event that an RJE station malfunctions and the user does not wish to wait for repairs to be completed before receiving his output. DIRECT may also be used to relieve the burden on public storage if one or many RJE stations are inactive. If public storage is being exhausted, the ALL option will cause all RJE output to be directed to the much faster local printers.

Examples:

1. The operator wishes to direct the printed output of RJE station ALPHA3,

which is experiencing mechanical difficulties, to station GAMMA4.

Operator: Presses REQUEST key  
System: !

Operator: direct alpha3, gamma4

- The operator attempts to direct printed output of RJE station BETA6, which does not currently have a batch work queue entry, to another station.

Operator: Presses REQUEST key  
System: !

Operator: direct beta6, omega  
System: NO ENTRIES FOUND FOR RJE STATION BETA6

- Due to heavy demands for public storage during a user session, the operator wishes to direct all RJE output from the remote printers to the much faster online local printers.

Operator: Presses REQUEST key  
System: !

Operator: direct all

#### DMPRST Command

This command performs a time-shared dump or restore of VAM2-formatted disk volumes.

Operation	Operand
DMPRST	FROMDEV={ 2311 2314 }, 2400  FRVOLID={{(disk valid) (tape valid[,...])}},  TODEV={ 2311 2314 2400 }  [,TOVOLID={{(disk valid) (tape valid[,...])}}] PRIVATE  [,NEWVLID=valid]  [,WRITCHK={ YES } NO }]  [,LABEL={ RETAIN } NO }]  [,IPL={ RETAIN } NO }]  ,RUNMODE={ BACK   FORE }

#### FROMDEV

designates the device type on which the from-volume is to be mounted. If this operand is omitted, the command is canceled.

Specified as:  
2311 or 2314, for dump.

2400 -- 9-track tape containing a properly formatted dump, for restore.

#### FRVOLID

specifies the volume identification of the from-volume. If this operand is not specified, the command is canceled.

Specified as: one to six alphanumeric characters.

Note: Only one VOLID may be specified for disk. More than one tape VOLID may be specified, and each must have a standard label. In addition, multiple tape VOLIDS must be specified in the order that the tapes are to be used. Duplicate VOLIDS for the same device type are not permitted.

#### TODEV

designates the device type on which the to-volume is to be mounted. If this operand is omitted, the command is canceled.

Specified as:  
2311 or 2314.

2400 -- labeled 9-track scratch tape.

Note: If FROMDEV is 2400, TODEV cannot be 2400. If FROMDEV is either 2314 or 2400 with a tape dumped from a 2314, TODEV cannot be 2311.

#### TOVOLID

designates the volume identification of the to-volume.

Specified as: one to six alphanumeric characters.

PRIVATE -- a scratch volume will be requested.

System default: PRIVATE

Note: The note under FRVOLID also applies to TOVOLID. In addition, if TODEV is 2400 and more tapes than specified are required, the system will request scratch volumes.

#### NEWVLID

specifies the volume identification to be inserted in the label of the to-disk at the completion of the job.

This parameter is ignored if TODEV is 2400.

Specified as: one to six alphameric characters, which may duplicate a volume identification already in use.

System default: the volume identification in the volume label used (see LABEL) remains unchanged.

#### WRITCHK

specifies that the data just written is to be immediately read back and checked byte by byte for accuracy. This parameter is ignored if TODEV is 2400.

Specified as:  
YES -- write checking is performed.

NO -- there is no write checking.

System default: NO

#### LABEL

designates whether the volume label on the to-disk is to stay the same or the label on the from-disk is to be used. This parameter is ignored if TODEV is 2400.

Specified as:  
RETAIN -- the label on the to-disk is used.

NO -- the label on the from-disk is used.

System default: NO

#### IPL

indicates whether the IPL text on the to-disk is to remain or the IPL text on the from-disk is to be used. This parameter is ignored if the TODEV is 2400.

Specified as:  
RETAIN -- the IPL text on the to-disk remains the same.

NO -- the IPL text on the from-disk is used.

System default: RETAIN

#### RUNMODE

specifies whether a nonconversational task is to be created to run the dump/restore. This operand is ignored if the task is nonconversational. If not given for a conversational task, the command is canceled.

Specified as:  
BACK -- a nonconversational task is

created to run the dump and restore. If this option is specified, the maximum command string length (not counting keywords) is 120 bytes.

FORE -- the dump and restore is run in the user's conversational task.

Functional Description: DMPRST may be used to dump a VAM2-formatted disk to either a 9-track tape with standard labels or to a VAM2-formatted disk that has been initialized with the DASDI program. The command can also be used to restore a dump tape to a VAM2-formatted disk. The dump tape must be one that was produced by DMPRST or a standard labeled tape dumped by the independent utility DASDDR.

Caution: When dumping to a tape (TODEV is 2400), if the tape is file protected (no ring), the task will abnormally terminate in the attempt to write a tape label.

Operating Notes: DMPRST will not dump or restore user labels. If these records are desired, the independent utility DASDDR must be used.

The to-volume is assumed to be a scratch volume; that is, one in which all space is available. Disk pages not actually used are made available and are left unchanged. No entries are made in or deleted from the catalog.

If the volume identification (VOLID) of the to-disk is changed by this command, the operator is requested to change the external identification of the disk. If, as a result of this change, the VOLID duplicates one already in use, care must be taken to insure that the proper volume is used.

The maximum tape record length for 2311 dumps is 4096 bytes. For a 2314 dump tape, the maximum record length is 8192 bytes. If a dump tape is copied, care must be taken to ensure that a full-length record is copied for each record.

If a dump requires more than two tape volumes, DMPRST cannot be used for the restore; the independent utility DASDDR should be used.

Example: The operator, running a conversational task, wishes to restore two tapes with the identifications 0700 and 0900 to a disk volume with the identification TSSAUX. The disk volume is to be mounted on a 2314, and the volume is to be given the new identification CDSCAT at the end of the job. Write checking is to be performed, and the volume label on the disk is to stay the same. The IPL text on the disk is to be left alone.

Operator: Presses REQUEST key  
System: !

Operator: dmprst 2400, (0700,0900),  
 2314,tssaux,cdscat,yes,  
 retain  
 (Note that the IPL operand  
 is defaulted)

System: (Issues mount requests for  
 tape 0700 and pack TSSAUX,  
 then requests mounting of  
 tape 0900 when 0700 is pro-  
 cessed; requests that the  
 operator change external  
 identification of the to-  
 volume to correspond with  
 the new volume identifica-  
 tion specified.)  
 0700, 0900 RESTORED TO DISK  
 TSSAUX, NEW VOLID CDSCAT.

If a mount request is outstanding for  
 any device, the operator must respond to it  
 before issuing a DROP.

Example: The operator decides to restore  
 to active status two devices previously  
 inactivated by HOLD.

Operator: Presses REQUEST key  
System: !

Operator: drop 53, 61  
System: CONFIGURATION COMPLETE.  
 DISPOSITION OF AFFECTED  
 COMPONENTS FOLLOWS:

D=53 AVAILABLE  
 D=61 AVAILABLE

### DROP Command

This command reverses the effect of a  
 HOLD command. A device may not be dropped  
 that has not first been held.

Operation	Operand
DROP	symbolic device address[,...]

symbolic device address  
 is the symbolic address of an I/O  
 device to be made available for use by  
 TSS/360; limited to nine addresses; to  
 drop 10 or more devices, issue more  
 DROP commands.

Specified as: a hexadecimal integer  
 from 0 to FFF; these addresses are  
 assigned to devices during system  
 generation (see the list for your  
 installation).

Functional Description: DROP reverses the  
 effect of a HOLD, making the addressed I/O  
 devices available to TSS/360.

The operation of the DROP command on a  
 device not currently held is the same as if  
 the device were held; its effect depends on  
 the type of device and its status. If the  
 device is a terminal, DROP enables its 2702  
 transmission line.

Caution: An error will be caused if a DROP  
 command attempts to address a CPU, channel  
 controller, storage element, or any other  
 system device that is not an I/O device,  
 and a command message will be issued.

Operating Notes: If DROP addresses a ter-  
 minal on a transmission line that cannot be  
 enabled (or prepared), a message is issued.  
 The operator must then reissue DROP to  
 enable the line. If the condition per-  
 sists, there may be a hardware problem.

### EXHIBIT Command

This command displays either information  
 concerning all active system users or  
 information from the batch work queue  
 (BWQ). The functions are described separ-  
 ately below.

Operation	Operands
EXHIBIT	OPTION=UID { ALL UID.userid } [,TYPE={ CONV BACK LONG }] [,FORM={ SHORT }]

OPTION  
 indicates the type of information to  
 be displayed at the operator's  
 terminal.

Specified as: UID -- information  
 about active system users and their  
 tasks is displayed.

TYPE  
 indicates the type of tasks for which  
 information is to be displayed.

Specified as: ALL -- all active tasks  
 are displayed.

UID.userid -- all tasks for the speci-  
 fied user ID are displayed. The user  
 ID is specified as three to eight  
 alphanumeric characters, the first of  
 which must be alphabetic. The four  
 characters UID. must appear before the  
 user ID to identify the correct UID  
 type.

CONV -- only conversational tasks are  
 displayed.

BACK -- only nonconversational tasks are displayed.

System default: ALL

**FORM**

indicates the length of the display.

Specified as: LONG -- all fields of the UID information are displayed as shown in example 1, below.

SHORT -- only the first four fields of information for each user are displayed, five units of information (information for five users) per line, as shown in example 2, below.

System default: LONG

Caution: The FORM operand that is used by operators on the EXHIBIT command is not the same as the FORM operand that is used on the PRINT and PUNCH commands. Therefore, be careful when you enter a specific value for FORM in your user profile.

Functional Description: The OPTION=UID use of the EXHIBIT command tabulates the following information for each active system user:

USERID	The user's identification.
TASKID (TID)	The task number assigned to the task.
CONV or BACK	CONV indicates that the user is running in conversational mode; BACK indicates the user is running in nonconversational mode.
SDA or BSN	For conversational tasks, SDA represents the symbolic device address of the SYSIN/SYSOUT device; for nonconversational tasks, BSN represents the batch sequence number.
TIMEON	The time that task LOGON occurred.
TSTOR	The number of pages of temporary storage assigned to the task.
DSK	The number of direct access devices assigned to the task.
PRT	The number of printers assigned to the task.
RDR/PUN	The number of card readers/punches assigned to the task.

**TAPE**

The number of magnetic tape drives assigned to the task.

Examples:

1. The operator wishes to examine all fields of information for system users. The example shows data for two users only.

Operator: Presses REQUEST key  
System: !

Operator: exhibit option=uid  
System:

ACTIVE USER STATUS AT 5/17/70 AND 11:15

USERID	TID	CONV/ BACK	SDA/ BSN	TIMEON	TSTOR	DSK	PRT	RDR/ PUN	TAPE
MULFORD	0056	BACK	0259	10:15	00598	001	001	001	001
BRUCE	0058	CONV	030	10:17	00500	002	000	000	001

2. The operator wishes to examine the abbreviated display of data concerning active system users. While the output at the terminal appears with data for five users per line, the example only shows data for two users.

Operator: Presses REQUEST key  
System: !

Operator: exhibit option=uid,  
form=short  
System:

ACTIVE USER STATUS AT 6/2/70 AND 18:15

USERID	TID	TYPE	SYSI.
LYLE	0056	CONV	0089 BETTGER 0057 CONV 0090

The SYSI. heading represents the SYSIN for the task: either the symbolic device address for a conversational user or the batch sequence number for a nonconversational user.

Operation	Operands
EXHIBIT	OPTION=BWQ  [ ,TYPE= ( ALL UID.userid BSN.number PRINT PUNCH TAPE EXEC RJE ) ]

**OPTION**

indicates the type of information to be displayed at the operator's terminal.

Specified as: BWQ -- a display of batch work queue entries is extracted from the system and displayed at the operator's terminal.

**TYPE**

indicates what information is to be displayed from the batch work queue.

Specified as: ALL -- all entries in the batch work queue are displayed.

UID.userid -- all entries bearing the specified user ID are displayed. The user ID may be from three to eight alphanumeric characters, the first of which must be alphabetic. The four characters UID. must appear before the user ID to identify the correct BWQ type.

BSN.number -- the entry bearing the particular batch sequence number is displayed. The number may be a decimal number between 257 and 9999 and must be preceded by the four characters BSN. to identify the correct BWQ type.

PRINT -- only print requests are displayed.

PUNCH -- only punch requests are displayed.

TAPE -- only tape requests are displayed.

EXEC -- only execute jobs are displayed.

RJE -- only remote job entry output requests are displayed.

System default: ALL

Functional Description: The OPTION=BWQ use of the EXHIBIT command tabulates the following information for BWQ entries:

- BSN        The batch sequence number.
- USERID    The user's identification.
- TID        The task number assigned, if active.
- TYPE       The nature of the task; LIST (PRINT), EXEC (EXECUTE), PUN (PUNCH), RTAP (RT), or WTAP (WT).

**STAT**    The status of the job: A (active), P (awaiting execution), C (canceled), or S (shut down); the preceding may be followed by /E (indicating whether ERASE was specified).

**DEV**      The type of device required: U/R (unit record) or RJE (remote job entry terminal).

**STAID**    The station identification for an RJE terminal, where applicable.

**DSNAME**   The data set name, up to 35 characters.

Examples:

1. The operator wishes to examine the batch work queue entries for all users. The example shows, only a few entries.

Operator:    Presses REQUEST key  
System:        !

Operator:    exhibit option=bwq  
System:

```
BATCH WORK QUEUE STATUS AT 7/8/70 AT 10:00
BSN  USERID  TID  TYPE  STAT  DEV  STAID  DSNAME
0262 MCTIGUE 057  LIST  A/E   RJE  RJEST1 DYLAN
0263 GARRETT 061  PUN   P     U/R           GWEN
0264 HARVEY  065  EXEC  C     RJE  MENSA  DUMMY
```

2. The operator wishes to examine the batch work queue entry for batch sequence number 278. He uses positional notation for the operands.

Operator:    Presses REQUEST key  
System:        !

Operator:    exhibit bwq,bsn.278  
System:

```
BATCH WORK QUEUE STATUS AT 7/10/70 AT 11:15
BSN  USERID  TID  TYPE  STAT  DEV  STAID  DSNAME
0278 STONERD 051  RTAP  P/E   U/R           HAROLD
```

FLOW Command

This command allows the operator (as well as the system manager and administrator) to regulate and display the number of tasks that the system will process at one time.

Operation	Operands
FLOW	[BATCH=batch task limit] [,CONV=conversat. task limit] [,BACK=background task limit] [,BULKIO={Y N}] [,MTT=mtt administrator limit] [,APP=(mtt application name, relative application number, application user limit),...]

#### BATCH

specifies the maximum number of batch jobs that the system will process at one time.

Specified as: a decimal number between 0 and 255. If specified as 0, no further nonconversational tasks will be initiated, but those in execution will be permitted to continue. New requests for execution will be queued, but none will be dispatched. To resume batch execution, a BATCH parameter other than 0 must be specified.

System default: the state of batch execution is unaffected.

#### CONV

specifies the maximum number of conversational users that the system will allow to be logged on at one time.

Specified as: a decimal number between 0 and 255. If the value specified is 0, no new conversational tasks will be logged on. Tasks currently in execution are unaffected, and the parameter may be revised at any time. MTT administrators are included in the count of conversational tasks.

System default: the state of conversational execution is unaffected.

Note: If a conversational task is abnormally terminated, a new task is created regardless of the conversational limit.

#### BACK

specifies the maximum number of non-conversational tasks created by the BACK command that the system will process at one time.

Specified as: a decimal number between 0 and 255. If specified as 0, no further BACK jobs will be

initiated. Those BACK jobs currently in execution will be allowed to continue. To resume execution of BACK jobs, a value other than 0 must be specified with the BACK parameter.

System default: BACK task initiation is not affected.

#### BULKIO

specifies whether new BULKIO jobs may be initiated.

Specified as: Y -- BULKIO jobs may be initiated.

N -- no further BULKIO jobs, public or private, may be initiated. BULKIO job requests will be queued, however, and work already in execution will be allowed to continue.

System default: BULKIO execution is unaffected.

#### MTT

specifies the maximum number of MTT administrators (or tasks) that the system will allow to process at one time.

Specified as: a decimal number between 0 and 255. If 0 is specified, the system will not allow any more MTT administrator tasks to be initiated.

System default: the MTT administrator limit is unaffected.

#### APP

identifies the name, number, and user limits of an MTT application program.

Specified as: from one to eight alphameric characters for the name of an application for which a limit on the number of terminals allowed is to be set.

A decimal number between 1 and 255, representing the number assigned to the application by the system when the application is created.

A decimal number between 1 and 255, representing the maximum number of terminals that the specified application is to process concurrently.

System default: the state of the application execution is unaffected.

Functional Description: The FLOW command allows the operator to limit tasks in the system prior to actual shutdown, so that most BULKIO and nonconversational jobs in execution may be completed before the SHUTDOWN command is issued. By limiting the

number of conversational tasks, the operator may also prevent new conversational users from logging on or may regulate the number allowed in execution. In addition, the number of MTT tasks, as well as the number of users per task, may be regulated and determined.

When the command is issued, the system compares each specified limit with the values established at system generation. If the specified value is higher than that value, an error message is issued.

Entering the command with no parameters displays the status of job initiation.

Examples:

1. The operator wishes to display the status of job flow.

Operator: Presses REQUEST key  
System: !

Operator: flow  
System:

BATCH=xxx,yyy,zzz;CONV=xxx,yyy,zzz;  
 BACK=xxx,yyy,zzz;BULKIO=YES;MTT=xxx,  
 yyy,zzz;mttappn,001=aaa,bbb,ccc

In the above example, xxx represents the current number of tasks in execution, yyy represents the current limit for such tasks, and zzz represents the maximum number allowed for tasks of this type as specified at system generation. xxx may exceed yyy, since more tasks may have been in execution at the time the limit was reset. mttappn represents an MTT application name, as specified by the MTT administrator. aaa is the current number of users connected to this application, bbb is the current user limit for this application, and ccc is the maximum number of tasks for this application as specified by the MTT administrator.

2. The operator wishes to reset system limits to allow 10 conversational tasks and five background tasks.

Operator: Presses REQUEST key  
System: !

Operator: flow conv=10,back=5  
System: (resets limits)

FORCE Command

This command terminates a conversational task by causing it to be logged off.

Operation	Operand
FORCE	USERID=user identification

USERID

is an alphanumeric symbol, assigned to the user when he is joined to the system, that identifies the user to the system.

Specified as: three to eight alphanumeric characters, the first of which must be alphabetic.

Operating Notes: If a user loses communication with his conversational task, he must ask the operator to terminate that task for him by a FORCE command. Such loss of communication may be caused by some kinds of terminal failures or by a program error when the user handles his own attention interruptions.

Example: The operator is asked to terminate the conversational task of user GKUMMER.

Operator: Presses REQUEST key  
System: !

Operator: force gkummer  
System: GKUMMER FORCED

HOLD Command

This command makes the addressed I/O devices unavailable for use by TSS/360 so that repair and maintenance procedures may be performed.

Operation	Operand
HOLD	symbolic device address[,...]

symbolic device address

is the symbolic address of an I/O device to be segregated from the system; restricted to nine addresses; to hold 10 or more devices, issue more HOLD commands.

Specified as: a hexadecimal integer from 0 to FFF. These addresses are assigned to devices during system generation (see the list for your installation).

Functional Description: When HOLD addresses a system-dedicated device, other than a terminal, the system asks the operator to confirm the action. Given confirmation, it executes the HOLD, cutting off the device from TSS/360. Terminals, even when

system-dedicated, are an exception to this rule, and are held without confirmation.

If HOLD addresses a terminal on a 2702 transmission line that can't be disabled, the terminal is held, but a message tells the operator to reissue the HOLD to disable the line. If the condition persists, there may be a hardware malfunction.

The status imposed on a device by a HOLD command (not available for use by TSS/360) is canceled by addressing it in a DROP command. TSS/360 can then allocate the device to a user.

The operation of the HOLD command routine on a device currently held is the same as it would be for a device not held; its effect depends on the type of device and its status. If the device is a terminal, HOLD disables its transmission line.

**Caution:** The operator must set a HOLD on any I/O device known to the system that is not controlled by the configuration console and not switched into the configuration by the partition switches on the configuration console. A device is known to the system if its address has been placed in the symbolic device allocation table (SDAT) during system generation.

As a general rule, the following devices should not be held:

- System devices, such as the operator's terminal or the paging drum
- Devices assigned to BULKIO or the main operator task
- Private devices that are in use because SYSESRs and unpredictable results may occur
- MTT terminals
- A 2702 line for which there is an active user because a SYSER may result. The operator should request that the user log off.

**Operating Notes:** HOLD should be used to make a device available for servicing and maintenance, not for partitioning or operator-initiated device management. HOLD should be used when the operator wants to process without certain I/O devices put into the system by system generation but does not want to disconnect those devices. Physically disconnecting devices from the system when it is running causes destructive interruptions. To disconnect devices, first stop the system (see Part IV, "Shutdown Procedure").

In the event that a device that is held is in use by a task, the affected task should be terminated by the FORCE command.

Examples:

1. Assume that partition switches have been set on the configuration console to form a subsystem. During startup, the operator, when the main operator housekeeping routine asks him to verify the system configuration, issues a HOLD to complete the partition.

Operator: Presses REQUEST key  
System: !

Operator: hold 48, 49, 58, 59, 60, 67  
System: CONFIGURATION PROCEDURE COMPLETE. DISPOSITION OF AFFECTED COMPONENTS FOLLOWS:

D = 48 HELD  
 D = 49 HELD  
 D = 58 HELD  
 D = 59 HELD  
 D = 60 HELD  
 D = 67 HELD

2. Assume that after startup, the operator decides to segregate a malfunctioning tape drive.

Operator: Presses REQUEST key  
System: !

Operator: hold 43  
System: CONFIGURATION PROCEDURE COMPLETE. DISPOSITION OF AFFECTED COMPONENTS FOLLOWS:

D = 43 HELD

LABEL Command

The LABEL command allows the system operator to place a standard volume label on a tape or produce an unlabeled tape in a time-shared environment. The form of the labels may be standard EBCDIC, BCDIC, or ASCII. (ASCII is used throughout this book to refer to the American National Standard for Information Interchanges, ANSI X3.4-1968.)

Operation	Operand
LABEL	{NEWLABEL={volume serial NL}} {[,TAPE={7 7DC 9}][,DEN={0 1 2}]} {[,OWNER=ownerid][,ASCII={Y N}]}

NEWLABEL specifies that the tape is to be labeled with the indicated new volume

serial or that the tape is to be unlabeled after processing is completed.

Specified as: one to six alphanumeric characters indicating the new volume serial to be placed in the new volume label.

NL -- indicates that the volume is to have no label.

System default: NL; an unlabeled tape is produced.

#### TAPE

specifies the type of tape required.

Specified as:

7 -- 7-track tape

7DC -- 7-track tape with data conversion

9 -- 9-track tape

System default: The system selects the type of tape specified at system generation.

#### DEN

specifies the density of the tape volume to be processed.

Specified as:

0 -- density=200

1 -- density=556

2 -- density=800

System default: The system selects the tape density specified at system generation, usually 9-track, 800 b.p.i.

#### OWNER

specifies the 10 bytes of owner and address information to be placed in the volume label. If the field is longer than 10 characters, only the first 10 characters are used.

Specified as: alphanumeric characters.

System default: If this field is not specified, blank characters are included in the volume label.

#### ASCII

indicates that an ASCII label is to be produced.

Specified as: Y or N

System default: N; if tape is 9-track, an EBCDIC tape is requested; if 7- or 7DC-, a BCDIC tape is requested.

Operating Notes: The LABEL command may be used in either conversational or nonconversational tasks. If the command is initiated from the operator's terminal, an independent nonconversational task is created to perform the actual processing. At the completion of the labeling operation, the following message is sent to the operator's terminal:

REMOVE TAPE VOLUME FROM DEVICE [XXXX]

Example: The operator is asked by user Goldberger to label a tape for him. The new label is to be standard EBCDIC, volume serial 100670, and the tape is 9-track, mounted on device 18.

Operator: Presses REQUEST key  
System: !

Operator: label 100670,9, ,goldberger  
System: REMOVE TAPE VOLUME FROM DEVICE 18.

#### MSG Command

This command sends a message to a conversational user or to the operator's log.

Operation	Operand
MSG	USERID=user identification, TEXT=text of message

#### USERID

is an alphanumeric symbol assigned to the user when he is joined to the system. It identifies him to the system.

Specified as: three to eight alphanumeric characters, the first of which must be alphabetic.

#### TEXT

is the message the operator wants to send to a user.

Specified as: not more than 120 characters, including blanks. Commas are not allowed in the message text, since they are treated as delimiters and will cause the message to be truncated.

Functional Description: The system attaches the current date and time to the end of the message, writes the message (with date and time) at the user's terminal, and records it in the operator's log.

Caution: The system truncates messages longer than 120 characters (excluding date and time) without sending the operator a command message. If the MSG command is rejected, the message will not be entered in the operator's log.

The diagnostic message

INVALID RETURN CODE FROM NEXTPAR.  
SYSTEM ERROR. COMMAND IGNORED.

indicates an error in scanning the text portion of the command. The error is generally not permanent and the command can be reentered.

Operating Notes: To add information to the operator's log, the operator puts the information in the form of a message and sends that message to himself with an MSG command; that is, he writes his own user identification (SYSOPER0) as the USERID operand of an MSG command and the information as the TEXT operand.

Examples:

- 1. The operator wants to tell user BOBGRANT that tape 7842 is missing.

Operator: Presses REQUEST key  
System: !

Operator: msg bobgrant, tape 7842 cannot be found

The system writes the following message to the terminal of user BOBGRANT:

BOBGRANT, TAPE 7842 CANNOT BE FOUND.  
1435 HOURS 5/7/68

- 2. The operator wants to add a message to the operator's log.

Operator: Presses REQUEST key  
System: !

Operator: msg userid=sysoper0,nick cardaropoli on as sysop 4/17/68 at 0800

The system adds the message to the operator's log and writes the following at the operator's terminal:

SYSOPER0, NICK CARDAROPOLI ON AS SYSOP  
4/17/68 AT 0800.

- 3. The operator tries to send a message to user GSNOWDEN, who has no active conversational task.

Operator: Presses REQUEST key  
System: !

Operator: msg gsnowden, card missing for a28-1 job  
System: GSNOWDEN NOT AT TERMINAL.  
COMMAND IGNORED.

Because the command has been rejected, the message is not added to the operator's log.

PATCLEAR Command

The PATCLEAR command provides the system operator with a time-shared means of initializing disks in VAM2 format, as an alternative to the independent utility program DASDI.

Operation	Operand
PATCLEAR	DEVICE={2311 2314}, VOLID={volume serial PRIVATE}, RUNMODE=BACK

DEVICE

specifies the type of direct access device on which the pack to be initialized is mounted.

Specified as: 2311 or 2314

VOLID

specifies the identification of the volume to be initialized.

Specified as: one to six alphanumeric characters, which are the serial of the volume on which the PATCLEAR is to be performed.

PRIVATE -- indicates that a system scratch pack should be mounted.

RUNMODE

indicates that the PATCLEAR operation is to be run in nonconversational (background) mode. Since the operator may not run PATCLEAR in foreground mode, the only use of this parameter is when running conversationally to specify that a separate background task is to be created to perform the PATCLEAR.

Specified as: BACK

While there is no system-supplied default for this operand, the operator may establish one as follows: DEFAULT RUNMODE=BACK, followed by PROFILE, and a subsequent LOGOFF. See "Operator's User Profile" in Part IV, System Operator Procedures.

Functional Description: PATCLEAR zeros the one-byte entries and the relocation entries in the page assignment table (PAT) on VAM2-formatted 2311 or 2314 disk packs, thus freeing the data pages (including data set control block pages) for reuse. The one-byte entries in the PAT for the following pages are not zeroed:

- The first four relative pages
- The PAT pages
- Any error pages

The pages on cylinder 199 (the error retry cylinder)

**Caution:** The volume to be initialized must be mounted on a private device and may not be in use at the time the PATCLEAR is performed. The VOLID must not match any VOLID in the public volume table (PVT).

**Example:** The operator is asked to initialize a volume, with the serial 122700, which is mounted on a 2311. At the present time, the operator's task is running conversationally.

**Operator:** Presses REQUEST key

**System:** !

**Operator:** patclear 2311,122700,back

**System:** PATCLEAR COMPLETE.

### PRINT Command

This command prints a session of the operator's log on a high-speed printer.

Operation	Operand
PRINT	DSNAME=SYSLOG(integer) [, STARTNO=first byte position] [, ENDNO=last byte position] [, PRTSP={1 2 3}] [, HEADER=H] [, LINES=lines per page] [, PAGE=P][, ] [, ERROROPT={ACCEPT SKIP END}] [, FORM=paper form] [, STATION=station id]

### DSNAME

is the data set name of the operator's log.

**Specified as:** SYSLOG

### integer

is the relative generation number of the session log to be printed.

**Specified as:** an integer from 0 to -4; 0 indicates the current log, the number -1 retrieves the log of the most recently cataloged session, -2 the session before that, etc.

### STARTNO

is the number of the byte at which printing is to start in each record.

**Specified as:** one to six decimal digits.

**System default:** printing starts at the first byte of each record.

### ENDNO

is the number of the byte at which printing is to stop for each record; this end byte will be printed.

**Specified as:** one to six decimal digits; it must be greater than STARTNO.

**System default:** prints through the last byte of each logical record or the end of the printer's line, whichever comes first.

### PRTSP

is the number of spaces to be skipped between lines.

**Specified as:**

1 -- lines are single-spaced

2 -- lines are double-spaced

3 -- two spaces between lines

**System default:** 1

### HEADER

requests the system to print on each page, as a header line, the first logical record of the session log or its first 132 bytes, whichever is shorter.

**Specified as:** H

**System default:** no header printed.

### LINES

is the number of lines to be printed on a page.

**Specified as:** one to four decimal digits.

**System default:** 54 lines printed on each page.

### PAGE

requests pages to be numbered.

**Specified as:** P

**System default:** no page numbers.

**Note:** The comma indicated as an optional operand in the illustration of the command format represents a parameter that is omitted for this application of the PRINT command and is required for system compatibility when any of the following operands are specified in positional notation. (The omitted parameter is the ERASE option and is not used for SYSLOG because the system defaults to no erasure.)

## ERROROPT

informs the system of the action to take if it finds an uncorrectable error while reading a record; it applies only if the session log is on magnetic tape.

### Specified as:

ACCEPT -- print the error record  
SKIP -- skip the error record  
END -- terminate the print task

System default: END

## FORM

is the form number of the paper to be used in the printer.

Specified as: one to six characters.

System default: the installation's standard printer form is used.

## STATION

identifies a remote station to which the printed output is to be directed.

Specified as: one to eight alphanumeric characters.

System default: station ID from Task Common is used.

Functional Description: After accepting the command, the system issues a batch sequence number that identifies the job entry for the PRINT request on the batch work queue.

If the FORM operand specifies a form number for paper different from the installation's standard form, a system message tells the operator to put the specified type of paper on the printer.

If the system finds errors while printing the log, it tallies them at the end of the printout in the trailer.

Operating Notes: This is the same PRINT command that is available for all users, described to fit the operator's specialized use of it -- to print SYSLOG. The operator usually supplies just the command name, followed by the first operand (SYSLOG) and a relative generation number enclosed in parentheses. The rest of the command is defaulted.

For more information about how to use PRINT to print other data sets, see its complete description in Command System User's Guide.

To cancel the PRINT task, issue a CANCEL command with the task's BSN as the operand.

Example: The operator wants to print the log of the session before the last one, using the installation's default parameters.

Operator: Presses REQUEST key  
System: !

Operator: print syslog(-2)  
System: PRINT ACCEPTED AND  
ASSIGNED BSN 0272

## REPLY Command

The operator uses this command to reply to numbered system request messages.

Operation	Operand
REPLY	MSGNO=message number [,TEXT=text of message]

## MSGNO

is the number that identifies the system request message being answered.

Specified as: a four-digit decimal integer; leading zeros may be omitted.

## TEXT

is the operator's reply.

Specified as: one to seven characters if a specific one-word reply is requested, or 120 characters otherwise.

Note: This operand can be omitted only for messages that include explicit default instructions.

Functional Description: The system compares the number in REPLY (the first operand) with lists of numbers that identify request messages from tasks waiting for replies. When it finds the matching number, the system answers the corresponding message with the text in REPLY (the second operand) and continues to process the task that was waiting for the reply.

Caution: If a mount request is outstanding for any device, the operator must reply to the mount request message before issuing any command affecting that device.

Operating Notes: The operator must use this command to answer numbered messages that demand a reply. The message number is the first operand (MSGNO). If the message asks for a reply with one specific word, such as YES or NO, the operator's reply is acceptable only if he uses that word as text; otherwise, he can use as text whatever the message asks for.

Replies need not be entered in any particular sequence; therefore, the reply to 0099 may be given before the reply to 0001. The system will match the reply to the system request message that has the same identifying number.

Examples:

1. The operator receives a system request message that specifies the word to be used in the reply.

System: 0114, MOUNT VOLUME 33 ON 18. REPLY YES WHEN DONE OR NO IF CANNOT BE DONE.

Operator: Mounts volume and then presses REQUEST key.

System: !

Operator: reply 114, yes

System: REPLY ACCEPTED

2. The operator receives a system request message that asks for variable information.

System: 2126, HOW MANY VOLUMES IN DATA SET PR66. REPLY

Operator: Finds there are six volumes in the data set and then presses REQUEST key.

System: !

Operator: reply 2126,6

System: REPLY ACCEPTED

Having received the variable data it needed (the number 6), the system continues to process the task that sent message number 2126.

3. The operator fails to give the exact reply specified in the message.

System: 0009, ATTENTION NEEDED BY 31. REPLY YES WHEN DONE OR NO IF CANNOT BE DONE.

Operator: Makes necessary adjustment, then presses the REQUEST key.

System: !

Operator: reply 9, ok

System: REPLY INVALID. COMMAND IGNORED.

Operator: Presses REQUEST key

System: !

Operator: reply 9, yes

System: REPLY ACCEPTED

RT Command

This command initiates a nonconversational task that reads a BSAM data set from magnetic tape into the system and puts it, in VSAM or VISAM organization, on a disk pack.

Operation	Operand
RT	{ VOLUME=volume serial number [, TATYPE=tape type] CTLG=CTLG ,USERID=user identification, DSNAME1=input data set name, DSNAME2=new data set name [, LINE=LINE] [, ERROROPT={ACCEPT SKIP END}]

VOLUME

is a serial number on the tape label that identifies the tape.

Specified as: one to six alphanumeric characters.

TATYPE

is the type of tape.

Specified as:

7 -- 7-track tape

7DC -- 7-track tape with data conversion

9 -- 9-track tape

System default: the type of tape specified for the installation by system generation; usually 9-track, 800 b.p.i.

CTLG

informs the system that the input data set is cataloged.

Specified as: CTLG

USERID

is an alphanumeric symbol, assigned to the user when he is joined to the system, that identifies him to the system.

Specified as: three to eight alphanumeric characters, the first of which must be alphabetic.

DSNAME1

is the name of the input data set.

Specified as: a fully qualified data set name (see Appendix B).

## DSNAME2

is the name under which the VSAM or VISAM data set being created is to be cataloged.

Specified as: a fully qualified data set name (see Appendix B); it must differ from DSNAME1 if DSNAME1 is cataloged.

## LINE

instructs the system to create a VISAM data set and number its lines.

Specified as: LINE

System default: a VSAM data set with no line numbers.

## ERROROPT

informs the system what to do for an uncorrectable error while reading the tape.

Specified as:

ACCEPT -- accept the error record  
SKIP -- skip the error record  
END -- terminate the RT task

System default: END

Functional Description: The system informs the operator that it has accepted the command and issues the BSN at his terminal.

When it is ready to process the entry, the system creates the RT task and sends the operator a message that tells him on which drive to mount the input tape. It fills the VOLUME field in the mount request message from the VOLUME operand. After the operator mounts the tape and readies the drive, the system compares the volume serial number given by the operator to the number on the tape label (to verify that it has the correct tape); reads the input data set (DSNAME1); converts it to VISAM organization (if the LINE operand was included) or VSAM (if the LINE operand was defaulted); stores the new data set; and catalogs the new data set in the user's catalog under the name used as DSNAME2.

If the system finds errors while reading the tape, it lists them in the SYSOUT of the RT task.

Caution: The RT command routine processes only fixed-length records.

Operating Notes: The information needed for the operand fields of this command is supplied by the user to whom the tape belongs, but the operator must issue the command.

If a message appears after the operator has entered all operands, he should check to make sure that the entry is exactly what the user supplied. If the user made a mistake, the operator should press the REQUEST key to cancel the RT command and inform the user of the mistake. If the operator made an error in entering the operands, he should respond to the message with the proper operand, if possible. Otherwise, he should press the REQUEST key and reenter the command.

To cancel the RT task, issue a CANCEL command, using for its operand the BSN that the system issued when it accepted the RT command.

## Examples:

1. User CACOOPER wants data set DATASET1 read from a 9-track tape, volume number 123. He wants the data set stored under the name LOGTABLE. He does not want line numbering; and if read errors occur, he wants them skipped.

Operator: Presses REQUEST key  
System: !

Operator: rt 123,9,cacooper,dataset1,  
logtable,,skip  
System: READ TAPE TASK ASSIGNED BSN  
0909

2. User GRIFFIN wants his data set ACMOD2, which is already cataloged, read and stored on disk under the name DIANE; he does not want line numbering; and if a read error occurs, he wants reading to end.

Operator: Presses REQUEST key  
System: !

Operator: rt ctlg=ctlg,griffin,  
acmod2,diane  
System: READ TAPE ASSIGNED BSN 0762

## SARD Command

This command displays information concerning system activity and resources at the operator's terminal.

Operation	Operand
SARD	

Note: There are no operands.

Functional Description: The SARD command tabulates and displays information summarizing current system activity, work pending, and current resources. The display serves as a useful monitor of the sys-

tem and allows the operator to exercise more control over it.

The information is displayed on five lines at the terminal:

Line 1: The rightmost portion of this line indicates the number of system messages for which replies are required and have not yet been received.

Line 2: This line indicates the current number of users (by type) on the system, in the following categories:

- CONV -- conversational tasks
- BACK -- nonconversational tasks that exist due to the BACK (background) command
- REM -- nonconversational tasks on the system, including remote and bulk I/O
- RJEA -- active remote job entry

Line 3: This line indicates the current number of each type of job that is pending in the batch work queue and awaiting dispatch by the batch monitor, in the following categories:

- EXEC -- EXECUTE tasks
- PRNT -- PRINT jobs, both public and private
- PNCH -- PUNCH jobs
- TAPE -- tape jobs, both RT and WT
- RJE -- remote job entry jobs

Line 4: This line indicates the current number of certain specified private devices that are available for assignment, in the following categories:

- PTRS -- printers
- RDRS -- card readers
- PUNS -- card punches
- TAPS -- tape drives, both 7- and 9-track
- DISK -- disk storage devices, both 2311 and 2314

Line 5: This line indicates the current number of auxiliary and public storage pages available for assign-

ment, in the following categories:

- PUB -- public storage pages
- TEM -- public storage pages in temporary use, which may become available as tasks log off
- AUXDR -- auxiliary drum pages
- AUXDK -- auxiliary disk pages

Example: The operator wishes to display the current system activity and resources.

Operator: Presses REQUEST key  
System: !

Operator: sard  
System:

SYSTEM ACTIVITY AND RESOURCES AT 6/3/70 AND 12:00

REPLYS: xxx

USERS - CONV: xxxx BACK: xxxx REM: xxxx RJEA: xxxx

QUEUES - EXEC: xxxx PRNT: xxxx PNCH: xxxx TAPE: xxxx RJE: xxxx

AVAIL - PTRS: xxxx RDRS: xxxx PUNS: xxxx TAPS: xxxx DISK: xxxx

PAGES - PUB: xxxxxxxx TEM: xxxxxxxx AUXDR: xxxxxxxx  
AUXDK: xxxxxxxx

### SHUTDOWN Command

This command terminates all tasks in the system in preparation for physical shutdown of the system.

Operation	Operand
SHUTDOWN	

Note: There are no operands.

Functional Description: Upon receiving this command, the system immediately terminates all conversational and nonconversational tasks and prohibits the starting of new tasks. For each conversational task, it prints a message at the related user's terminal to explain why the task was terminated. The same message is issued to the system output of each nonconversational task. Nonconversational tasks initiated by PUNCH, PRINT, and WT commands also receive a message stating that the task will be restarted automatically when the system resumes operation. No other kind of task will be restarted by the system.

Operating Notes: Except in an emergency, the operator should issue BCST commands before the SHUTDOWN command to warn users to terminate their tasks and tell them the time remaining before shutdown. For example, such BCST commands at 30, 15, and

5 minutes before shutdown would be helpful. The FLOW command should be used to limit system activity prior to shutdown.

Example: Assume that the operator has already issued BCST commands to warn conversational users of the impending shutdown.

Operator: Presses REQUEST key  
System: !

Operator: shutdown  
System:

1. Sends the following message to all tasks:

TASK TERMINATED BECAUSE OF SHUTDOWN

2. Sends the following message to nonconversational tasks initiated by PUNCH, PRINT, and WT commands:

REQUEST WILL BE RESTARTED

3. Sends the following message to all nonconversational tasks other than PUNCH, PRINT, and WT:

NO RESTART WILL BE ATTEMPTED

When it has terminated all tasks, the system sends the following message to the operator:

SHUTDOWN COMPLETED  
 4/5/68 AT 1712

USAGE Command

The operator may determine the system resource usage of any user by examining the

entry for that user. (The entry will be found in shared virtual storage if the user is active or in the user table if he is inactive.)

Operation	Operand
USAGE	USERID=user identification

USERID is an alphameric symbol assigned to the user when he is joined to the system. It identifies him to the system.

Specified as: three to eight alphameric characters, the first of which must be alphabetic.

Functional Description: This command presents the accounting data that has been accumulated for the user specified. The information is displayed as a message that takes the following format:

PERM STOR = cur;accum/TEMP STOR = cur;accum/DA DEV = cur;accum/MAG TAPE = cur;accum/PRINTERS = cur;accum/RDR-PU = cur;accum/TSS TASKS = cur/BULKIN = accum/BULKOUT = accum/CONN TIME = cur;accum/CPU TIME = cur,accum

Note: cur = current allocation; accum = total resource usage to date. Where applicable, the accumulated usage is the product of usage and time.

This chapter contains instructions for operating the IBM 1052 Printer-Keyboard Model 7 in the system. For further information about the Model 7, which normally serves as the system operator's terminal, consult IBM 1052 Printer-Keyboard Model 7 with IBM 2150 Console. If any other terminal is to be used, refer to Terminal User's Guide.

**Note:** When running in duplex mode, the second operator's terminal should never be used as a conventional user's terminal.

The indicator panel and keyboard of the IBM 1052 Printer-Keyboard Model 7 are shown in Figure 1. The conversation carried on through this terminal between the operator and the system is controlled by Gate, a

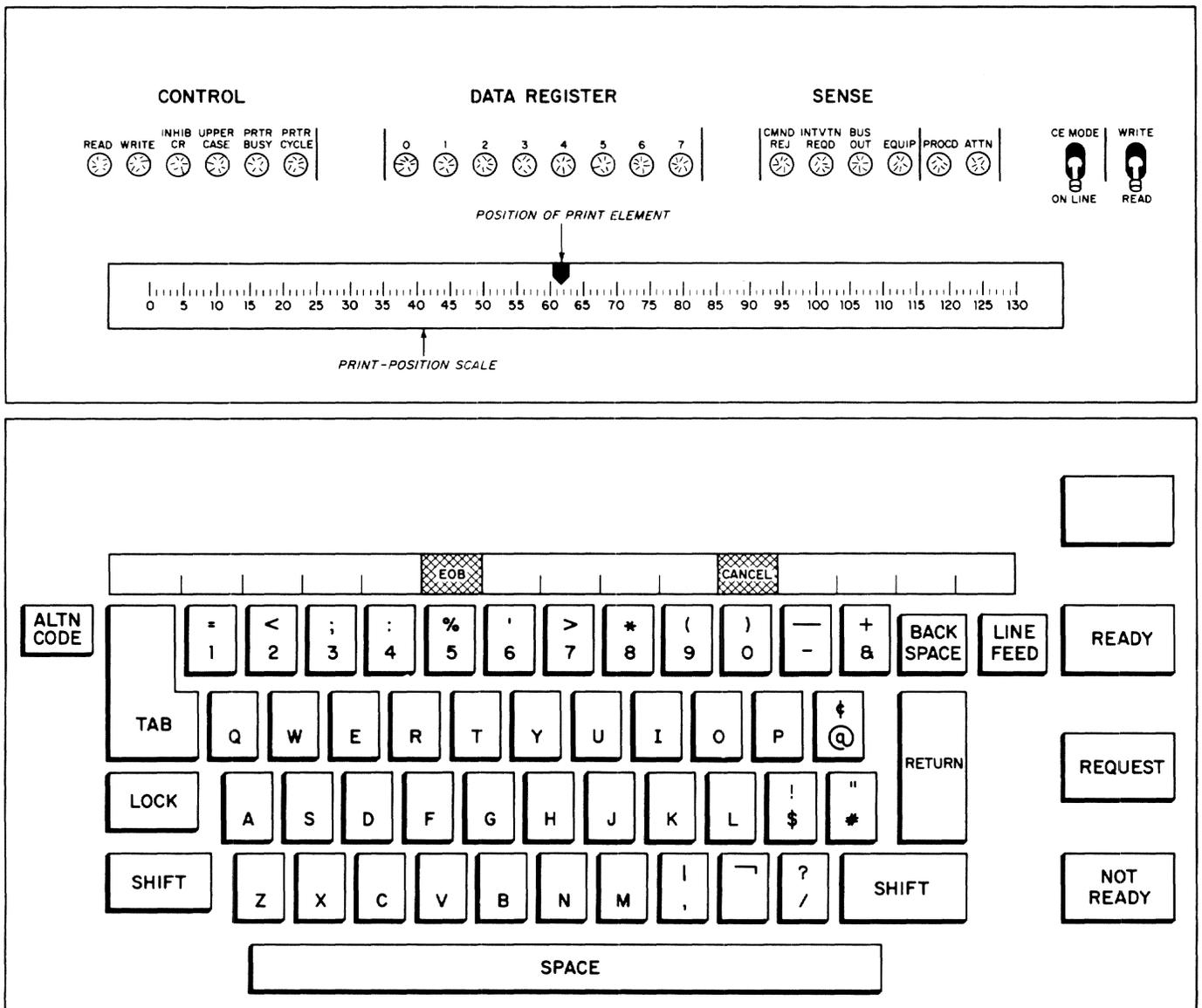


Figure 1. IBM 1052 printer-keyboard model 7

routine in the command system. Gate uses the resident terminal access method (RTAM) to read from or write to the terminal. When a system program executes an I/O instruction directed at the operator's terminal, Gate calls RTAM and passes to it a code that tells RTAM what to do. RTAM Read/Write generates a sequence of channel command words (CCWs) that cause a channel to read or write at the terminal. RTAM then calls the I/O Supervisor (IOS), which completes the operation by executing the sequence of commands.

#### Machine Controls

READY key makes the 1052 ready to read and write. It clears conditions requiring intervention, frees the channel, and overrides other not-ready conditions.

REQUEST key sends an attention interruption to the CPU. The system responds by sending a READ command to the 1052. If the READ is accepted and executed, the READ and PROCD lights go on; and, in almost every case,

the system prints an exclamation point (!) at the terminal, inviting the operator's next command. Any other system response to the attention interruption depends on what was happening when the interruption occurred (see Table 3).

NOT READY key causes the 1052 to become not ready for operation. When the terminal is not ready, the system cannot read from it or write to it.

#### Control Lights

READ light indicates that the system is attempting to read from the terminal and is waiting for the operator to enter data to be read. IOS has started I/O for the CCW list (with READ code) constructed by RTAM at Gate's request. The command sequence remains active, and the READ light stays on until the operator finishes typing characters on his keyboard and presses EOB.

WRITE light goes on when the system prints out characters on the terminal. It indi-

Table 3. Effect of pressing REQUEST key

Situation When Key Is Pressed	Effect
Operator is typing in command, but has not yet pressed EOB key to end current line.	If interruptions are not masked out, all characters entered for command are canceled; the system prints a logical not (¬) to invite for the next command. The operator may then retype the command, if desired.
Operator's command is being executed.	The command is completed before the system prints an exclamation point (!) to request the next command.
System has just issued a message asking for information needed to execute operator's command.	The last command issued by the operator is canceled. The operator, after the logical not (¬) is printed, may type in the next command or repeat the previous command. <u>This use of the REQUEST key is important.</u> It allows the operator to break out of loops formed when the system prompts for an operand the operator is unable to give.
Message is being printed out at the terminal because of operator's command.	The line is finished and the remainder of the message is canceled; the system prints a logical not (¬) to invite the next command.
System request message is being printed out at the terminal.	The operator's task will "hang up." To resolve this, the operator must enter a dummy command, such as an MSG command to himself, using blanks as the text of the message. The dummy command will make the task operational again. If the request message that was being printed required immediate response from operator, it will be reissued when the operator's task is again operational; the interval before reissue depends on the installation. If the request message was for information only, it will not be reissued.

cates that IOS has executed, for Gate, a WRITE command sequence generated by RTAM.

INHIB CR light indicates that a WRITE (Inhibit Carrier Return) command has been sent to the terminal. It goes on when carrier is returning.

UPPER CASE light goes on when operator types uppercase characters; it is not on when he types commands in lowercase.

PRTR BUSY light indicates that the terminal's printer is busy during a read or write operation.

PRTR CYCLE light is on when the terminal's printer is printing something.

Data Register lights display the contents of the data register. All data read from the keyboard or written on the printer passes through the data register one byte at a time. The lights flash on and off as they display data being read or written.

Sense lights indicate that errors have occurred during transfer of data between the terminal and the system. IOS issues SENSE commands to gather information about such errors and passes the information to RTAM Posting. The latter gives the information to Gate, which may send out error messages, reissue commands, or terminate tasks abnormally.

CMND REJ light indicates that the system sent an invalid command to the terminal. Push the READY key to turn off this light.

INTVTN REQD light indicates that the 1052 is not ready because operator's intervention is required (for example, to put paper in the printer); it will go on if the NOT READY key is pressed.

BUS OUT light indicates a parity error on the cable that connects the terminal to the computer.

EQUIP light indicates a keyboard parity error, an error in the data path between the keyboard and the printer, or a mechanical malfunction in the printer.

PROCD light indicates that the 1052 has accepted and executed a READ command, the keyboard is unlocked, and characters may be typed on it. When the PROCD light is off, the system controls the terminal, and the keyboard is locked.

ATTN light indicates that the REQUEST key has been pressed and the 1052 is waiting for the system to accept the attention interruption.

CE MODE/ON LINE switch at CE MODE, disconnects the terminal from the rest of the system, so that maintenance can be performed on it. Leave it at ON LINE for normal operations.

CONTIN WRITE/READ switch has no effect unless the terminal has been switched to CE MODE. Then, CONTIN WRITE makes the printer write continuously. At READ, the switch allows the terminal to be used as a typewriter and the terminal is disconnected from the system.

### Keyboard Controls

ALTN CODE key gives to numeric keys the alternative meaning shown on the labels above the row of numeric keys. When you hold down ALTN CODE, "5" becomes EOB (End-of-Block) and "0" becomes CANCEL.

EOB (End-of-Block) key (5 with ALTN CODE held down) returns the carriage, feeds a line, and sends to the system an end-of-transmission character. The last of these actions locks out the keyboard so it will neither type nor print and transfers control to the system. Press EOB to end every line of input from the keyboard or to select default options when replying to messages. The system will unlock the keyboard when it is ready to read the next input line.

CANCEL key (0 with ALTN CODE held down) cancels all the characters on the line currently being entered. When running TSS/360, the system then prompts with a message for reentry of data. If no new data is to be entered, just press EOB to terminate the input operation. Otherwise, enter the correct information followed by EOB. In RSS mode, the procedure is the same except that the message prompting for data reentry does not appear.

RETURN key returns the print-element carrier to the left margin stop and advances the printer paper by one space. Because it does not generate an end-of-transmission character, RETURN cannot be used, as on a user's terminal, to signal the end of an input line. Use EOB to terminate lines.

TAB key is disabled on Model 7; receipt of a tab character causes a single forward space.

BACKSPACE key is disabled on Model 7. If the operator's terminal receives a backspace character from the system, it prints a pound sign (#). The controlling program translates a pound sign into a single backspace; to backspace, press the pound sign key.

LINE FEED key is disabled on Model 7; receipt of a line feed character causes a forward space.

#### How to Enter Commands Through the Keyboard

1. Press REQUEST. The ATTN light may go on if the system does not accept the request. When the request is accepted, the READ and PROCD lights will go on, and the system will type an exclamation point (!) to invite entry of the command.
2. Type the command on the keyboard (using the format given in Part II, System Operator's Commands); start the command on the line beneath the exclamation point for example,

System:       !  
Operator:   hold 31

3. Press and hold ALTN CODE, and then press EOB to mark the end of input and transmit the command to the system. Until EOB is pressed, the system is locked out and cannot send messages to the operator. The READ and PROCD lights will go out when the system accepts the command.

#### How to Respond to System Messages

If the message is a numbered request message, answer it with a REPLY command, entering the REPLY as you would any other command (explained above). Numbered request messages are held on a queue (from which they may be retrieved at any time by their numbers) to free the terminal for other uses.

If the message demands an immediate answer (it is not a numbered request), the PROCD light will be on. Type on the keyboard whatever data the message asks for, then press and hold ALTN CODE, and press EOB.

Note: Respond promptly to such messages because, until you press EOB, the system is locked out and cannot transmit information.

#### How to Correct Typing Errors

Errors made in typing a line can be corrected, before pressing EOB for the line, either by replacing the wrong characters or canceling the line. To replace characters, first backspace over the wrong ones, and then type the right characters. The carriage on Model 7 does not space backward; to backspace, type the backspace character (#) the number of times that

equals the number of characters to be erased; then type the new characters after the backspace characters. For example, the correction to an error made in typing the SYSLOG operand of the PRINT command would look like this:

```
print sys$pg###log(-1)
```

To cancel a line, hold down ALTN CODE and press the CANCEL key. All entries in the current request will be canceled. A replacement line may now be entered, followed by EOB.

If you notice the error after pressing EOB, it is too late to cancel the line. You must then find some indirect way to rectify the mistake.

Note: During startup, there are two ways to cancel a line that has been typed but has not been ended by pressing EOB:

1. If the line to be canceled is in response to a message not preceded by an identifying number, hold down ALTN CODE and press CANCEL (replies to non-numbered messages are canceled in this special way because such messages come from the Startup module, which has its own message-handling system).
2. If the line to be canceled is a reply to a numbered request message, hold down ALTN CODE and press EOB (such numbered messages come from the Main Operator Task, which takes control from Startup, so responses are canceled in the usual way).

#### Uppercase and Lowercase Characters

Commands and responses may be typed on the operator's terminal in either uppercase or lowercase letters.

A system routine translates lowercase alphabetic characters into equivalent uppercase forms. (The KA and KB commands, available to users of the Model 2 to control this translation, are not available to operators on the Model 7.)

#### Underlined Defaults in Messages

When messages containing underlined defaults are printed on the operator's terminal, the underscores follow the pound signs that stand for backspaces. For instance, message A067, with default option END, is printed as follows:

```
ENTER ERROR OPTION:  
ACCEPT, SKIP, OR END###__.
```

STARTUP PROCEDURE

The system operator must perform these steps to start time-sharing system operations.

1. Ready the system volumes and devices.
2. Select the system configuration by designating which CPUs, main storage units, channel controllers, and I/O control units are to be used for time sharing; he may also designate I/O devices.
3. Execute initial program load (IPL).
4. Respond to startup messages issued by the system.

Each of the four steps is described in detail below.

Readying System Volumes and Devices

1. Place the IPL volume on a 2314 disk drive, which will become the IPL device for the current startup.
2. Place the auxiliary control volume (ACV) on a 2314 disk drive. The ACV initially includes the entire system catalog.
3. Place all online public volumes on 2314 disk drives. These disk packs have to be mounted on drives that were not specified for paging packs at system generation.
4. Ensure that the online printer is ready for use. If Startup cannot find a ready printer, it will issue the following message:  
  
READY PRINTER AND PRESS REQUEST
5. Ensure that the paging drum is ready. If a drum is not available, the system will ask -- during a startup -- that the operator enter the address of the paging disk. A disk can be used, but causes a great loss in system efficiency.
6. Ensure that the system operator's terminal, a 1052 Printer-Key-board Model 7, is ready for use. The CE MODE/ON LINE and CONTIN WRITE/READ switches must be set to their ON LINE and READ positions. Operating instructions for this terminal appear in Part III.

Note: No other devices need be readied at this time; they will be called for by the system, as required.

Selecting System Configuration

Selection of a system configuration means to designate which CPUs, channel controllers, main storage units, and I/O control units are to be part of the system. Selection during the startup process also includes the individual I/O devices. (Refer to the section "Startup Messages," later in this section.) The selection procedure, except for the I/O devices, depends on the installation's size.

At a simplex installation (single CPU, no configuration console, no channel controller), the configuration is selected just as for any other System/360. No special time-sharing procedures are needed.

At a half-duplex (one of two CPUs, configuration console, and channel controllers) or duplex (two CPUs, configuration console, and channel controllers) installation, the system operator must set switches on the time-sharing configuration console to configure one or two systems. He sets switches to select the CPUs, channel controllers, main storage units, and I/O control units that will be used in each system (see Figure 2). By positioning the console switches, the system operator selects the components for time sharing, but he also partitions the remaining components, which may then be employed for another time-sharing system or some operation other than time sharing.

Note that the minimum time-sharing configuration must include one CPU and two main storage units. The maximum configuration includes two CPUs and two channel controllers, with four main storage units per CPU.

To select the time-sharing configuration at a half-duplex or duplex installation:

1. Set the appropriate CHANNEL CONTROLLER COMPATIBILITY ADDRESSING dial, shown in Figure 3, to agree with the channel controller and CPU that will be used for IPL; this setting has effect only at IPL. For example, if CPU P1 and channel controller 1 are to be used for IPL, set the P1 CHANNEL CONTROLLER COMPATIBILITY ADDRESSING dial to

CC-1  
0-6

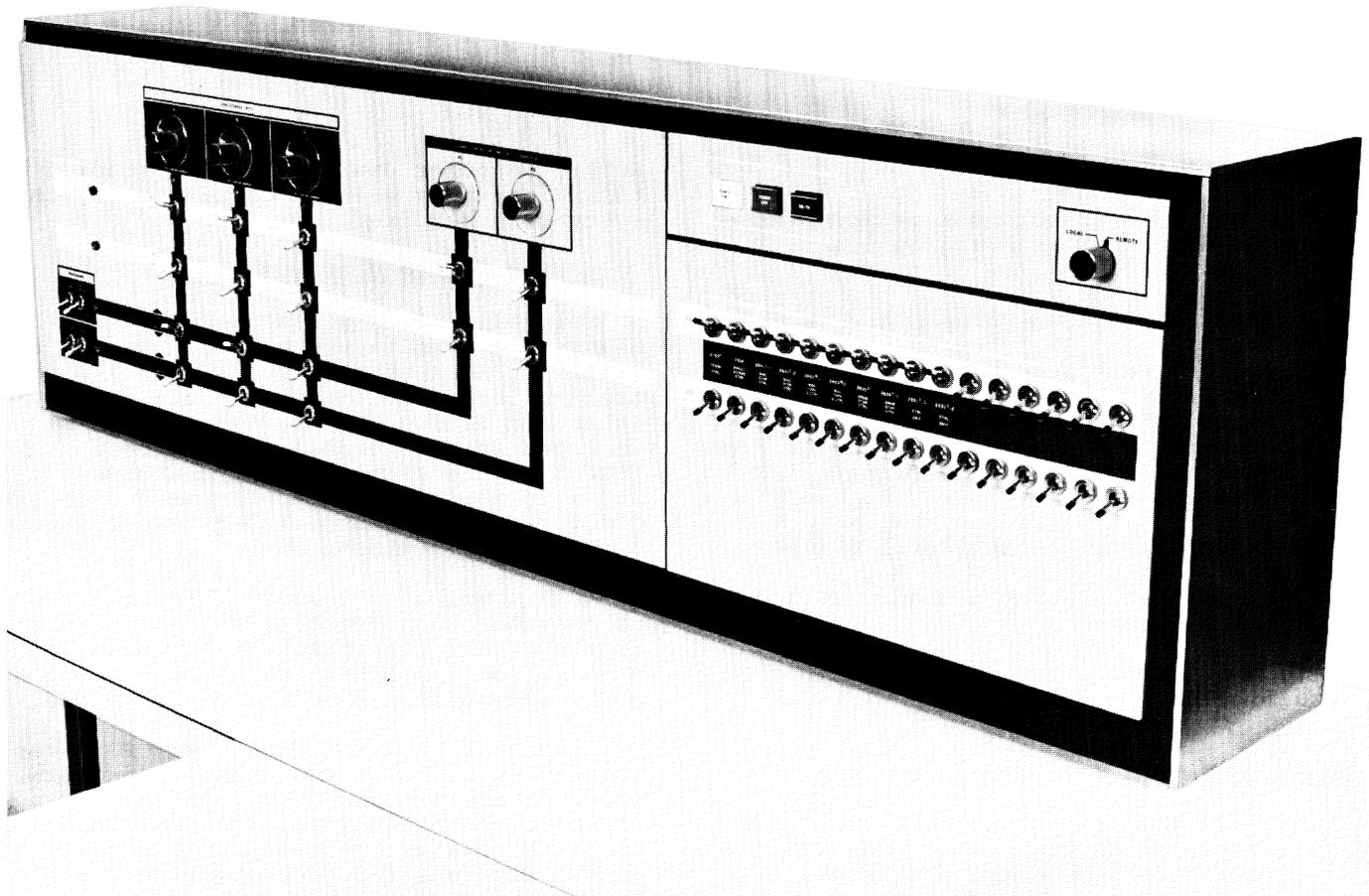


Figure 2. Time-sharing configuration console

(CC = channel controller; 0-6 = channels used during IPL.)

2. Turn the PREFIX and DIRECT CONTROL switches on (to the up position). (See Figure 3.)
3. Set the CORE STORAGE UNIT dials to the range of addresses for each unit. Each active unit must be set to a different range of floating addresses; the ranges need not be contiguous, nor need they be assigned in any particular order. The maximum address, however, must not be greater than 256K multiplied by the number of main storage units at the installation. Therefore, at an installation with four main storage units, the maximum range that may be assigned is 768K to 1024K.
4. Set the CHANNEL CONTROLLER switches to ACTIVE or INACTIVE, indicating which controllers are active and which CPUs and storage units are attached to them. Each active main storage unit and CPU must be attached to every

active channel controller by setting the appropriate CHANNEL CONTROLLER switches to ACTIVE. All other CHANNEL CONTROLLER switches must be set to INACTIVE.

5. Set the CPU (processor) switches to ACTIVE or INACTIVE, indicating which CPUs and main storage units will be active in the system. Each active CPU must be attached to every active main storage unit by setting the appropriate switches to ACTIVE. Set all other processor switches to INACTIVE.
6. Set the I/O CONTROL UNIT switches so that each active control unit is attached to every active channel controller. Set all other I/O CONTROL UNIT switches to INACTIVE (see Figure 4).

**Caution:** During system operation, do not change the setting of any switch or dial on the time-sharing configuration console unless directed by a system message. Disobeying this rule may result in a system failure.

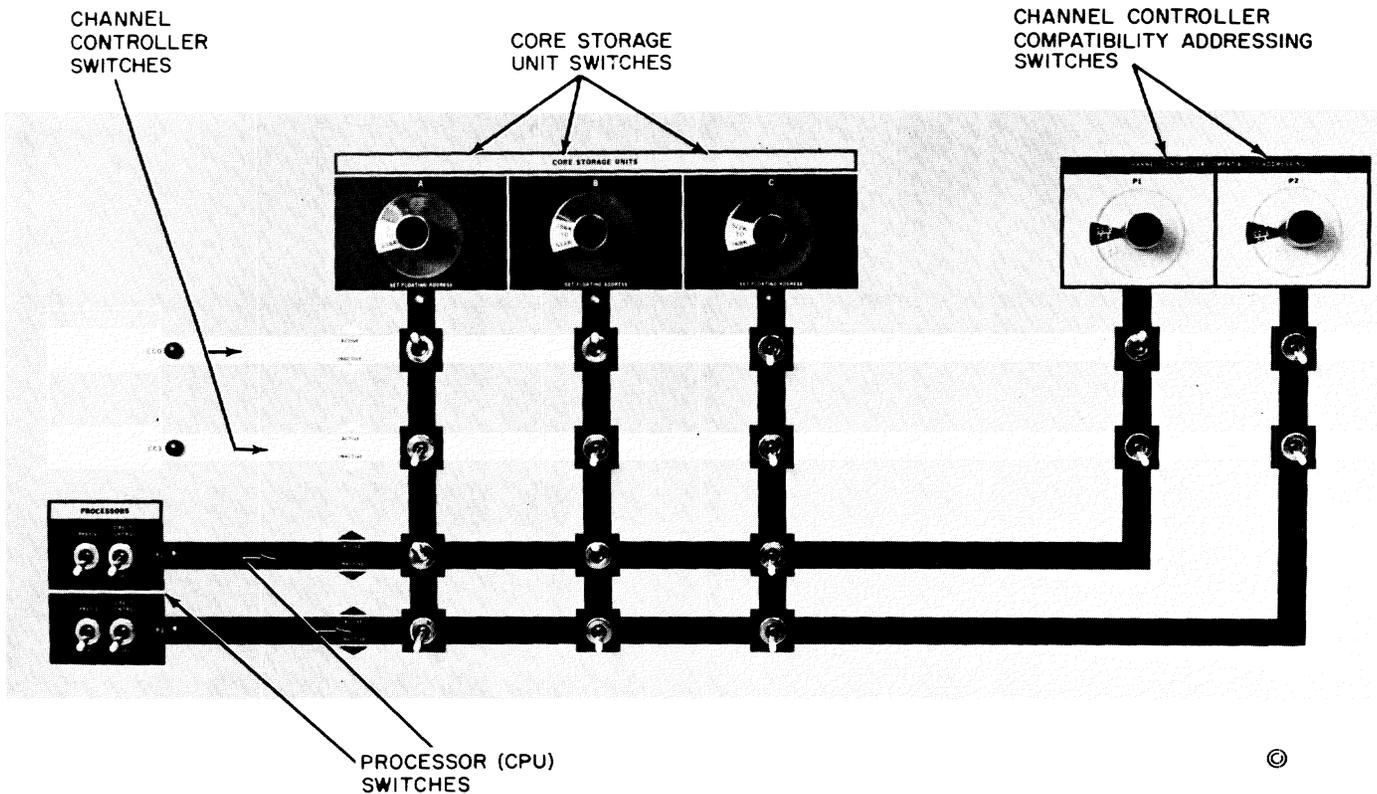


Figure 3. Configuration console -- channel controllers, processors, and main storage units

Selecting Individual I/O Devices

I/O devices can be attached to one side or the other by switching units that connect them to their control units (which are connected to one side or the other through the configuration console). The IBM 2816 Switching Unit controls which tape drives are on each 2803 tape control unit, and the IBM 2973 File Switch controls which 2311 disk drives are attached to each 2841 disk control unit. Therefore, to put a set of tape drives and 2311 disk drives on one side, set the switches in their 2816 and 2973 switching units to connect them to the control units on that side.

Note: The IBM 2314 Direct Access Storage Facility contains its own control unit, which can be configured (with all of its eight disk drives) onto either one "side" (connected to one of the half-duplexes) or the other, but not both. Configuration of the 2314 can be done on the configuration console or at the 2314 itself. However, system generation may make the 2314 known to both sides. If it has been identified to both sides by system generation, and configured with one processor, and the con-

figuration was done at the 2314, then if the second processor attempts to use it, the operator at the second CPU will receive, for each of the disk drives, malfunction messages of the following form:

```
MALFUNCTION ON CHANNEL xx
ACCESSING DEVICE yyyy
CSW STATUS BYTES CONTAIN 0000
CONDITION CODE 3
```

where xx is the channel the drive is on, and yyyy is the physical address of the drive. If the operator gets such a message, it means the 2314 is not on his side. Such messages are not produced if configuration was done at the configuration console.

Quick Start

During startup the operator may create a quick start data set to expedite subsequent startups and restarts. The data set consists of certain system modules which, at the time of creation, are link-edited, cataloged, and placed on a specified volume. The pack used for creation of the

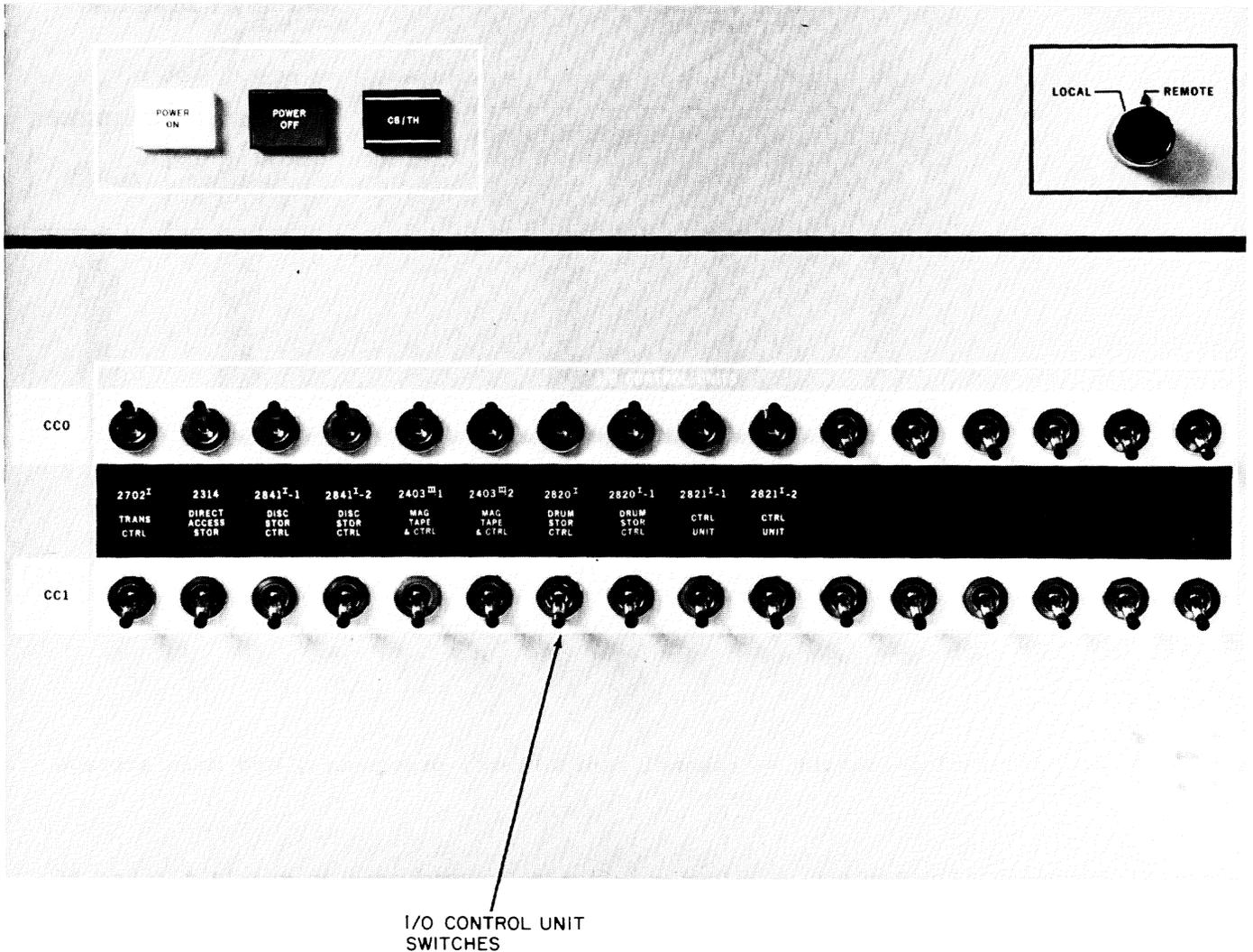


Figure 4. Configuration console -- I/O control units

data set must have been mounted on a 2314 and initialized with the DASDI program, and a copy of Prelude must have been written on cylinder 0, track 0, record 0. The pack may be a public or private VAM2 volume, including the IPL pack, that is on line during startup. The paging pack may not be used for the quick start data set. The advantage in creating the quick start data set on a pack other than the IPL volume is that a subsequent restart may be accomplished from the quick start volume, allowing the demounting of the IPL pack.

The quick start facility allows a restart or a startup to occur more rapidly than the normal method. A single load is performed (for the quick start data set), greatly reducing the time needed for system initialization. Multiple quick start data sets may be created for simplex, half-duplex, or duplex system configurations.

#### IPL Procedure

The IPL device is the disk drive upon which the IPL volume, or the volume on which the quick start data set resides, has been mounted. Select that device by switches on the operator's console, then press the LOAD button to complete IPL.

The IPL process reads in Prelude, which, after initial processing, turns control over to the Startup module. If Prelude encounters a machine check, or if the operator's console malfunctions at this time, wait state may be entered and 'FFFFFF' displayed in the D-register on the console (see Appendix A). The operator should then re-IPL the system or notify the system manager or administrator.

Immediately after IPL, the system goes into wait state. To begin startup proces-

sing, the system operator must press his REQUEST key to identify the operator's terminal to the system; startup proceeds automatically.

### Startup Messages

In a normal, error-free startup the system operator receives the following system messages and, if necessary, gives the indicated responses.

In the case of an initial startup, or a startup for which no quick start data set has been created, the following message is issued:

STARTUP IN PROGRESS

No response is required; the message indicates that IPL was successful and that startup has begun. If the volume on the IPL device contains both the quick start data set and the normal startup modules, the following message is issued:

STARTUP? Y OR N

A reply of Y indicates that a normal startup is desired, and the "STARTUP IN PROGRESS" message is then issued. If the operator replies N, or if the quick start data set is on the IPL device without the conventional startup modules, the message

QKSTART IN PROGRESS

is issued. In this case, the next message issued will be "ENTER ADDR OF PAGING DISK," as described below. Otherwise, the next message is:

ENTER PHY ADDRESS OF CARD RDR OR  
DEFAULT = EOB.

It is possible for any or all of the remainder of startup to be accomplished by means of punched card input. If an erroneous address is entered for the card reader, the question is repeated until the proper address is entered or the answer is defaulted.

Entry of the card reader address means that Startup will expect to find cards containing the proper answers to the regularly issued startup questions (described below). The information must begin in column 1, and no imbedded blanks are permitted. The address of the delta data set volume and the names of the delta data sets may be on one or more cards, with entries separated by commas. Processing of the cards is concluded either when the card reader is found empty, or a card is encountered with END in columns 1-3.

As each card is read and processed, it is printed at the operator's console. If errors are found, diagnostic messages are issued to the console, and the operator may enter the proper response. If the card reader is found empty before all startup questions are answered, processing continues with the appearance of the remaining questions at the operator's terminal and the manual entry of responses.

If the operator defaults by entering EOB, or if he enters the address of the card reader and it is empty, the remainder of startup is performed by the direction of system questions to the operator's terminal and the entrance of typed replies. In such case, the next system message is:

ENTER TWO CHARACTERS FOR EACH SE IN  
FORM | XN, XN, ... |

X = SE ID ( A, B, ... )  
N = FSA CODE ( 0, 1, ... for 0/  
256k, 256k/512k, ...)

This message (which does not occur in half-duplex or duplex mode) requests floating storage addresses assigned to storage elements. The operator enters for each storage element (SE) a two-character code in the form XN, where X identifies the SE, and N assigns to it a range of floating storage addresses.

If no paging drum is available, the following message is issued:

ENTER ADDR OF PAGING DISK

The operator enters the physical address of a disk to be used for paging private initial virtual storage.

Message:

PRINT MAPS? 0 1 2 3 ... NONE IVM  
RESSUP BOTH

The operator enters 0, 1, 2, or 3 to choose printing of no maps, a virtual storage map of all modules in the IVM data set, a real core map of the Resident Supervisor, or both maps.

The startup message

ENTER CODE FOR FUNCTION NOT TO BE  
LOADED. ALL FUNCTIONS WANTED = EOB.

asks the operator to enter the codes for modules or system functions that are not to be loaded. The codes are in the hexadecimal range between 01 and FF. (Code 01 is reserved for the RJE modules.) The codes may be entered at the terminal or by means of cards at the card reader. If all functions are desired, the operator replies to

the message by entering EOB at the terminal, or by using a blank or END card at the card reader.

The message:

```
QUICK START REQUESTED? IF Y ENTER
ADDR OF PACK FOR QUICK START DATA
SET--EOB=N.
```

allows the operator to create a quick start data set. If he replies Y, he must enter a three- or four-character physical device address of the device on which the data set is to be created. Any subsequent IPL can then be made from the volume on which the quick start data set resides. If he enters EOB, startup continues without the creation of the quick start data set. If insufficient space is available for the creation of the data set, a message is issued to that effect.

Message:

```
DELTA DATA SETS? Y OR N
```

asks the operator if delta data sets will be used to modify the contents of initial virtual storage, the Resident Supervisor, or RSS. If he answers Y (for yes), he will also receive the following message:

```
ENTER DEVICE ADDRESS AND DATA SET
SPECIFICATION
```

If delta data sets are to be included, a system programmer will inform the system operator of the procedure to be followed. Details of these dynamic modification procedures are in System Generation and Maintenance.

After the system has loaded the routines that make up the delta data set, the following message is issued:

```
REMOVE AND/OR REPLACE DELTA VOLUME IF
NECESSARY.
```

This message appears if a quick start data set has been created on the IPL pack. If quick start was created on a public pack, the message

```
REMOVE AND/OR REPLACE IPL AND/OR DELTA
VOLUME IF NECESSARY.
```

allows the operator to remove the IPL volume and mount a public pack on that drive, making it available for other system use. If he does not, the drive is left in ready status with the IPL volume mounted. If there are no delta data sets, the message

```
REMOVE AND/OR REPLACE IPL VOLUME IF
NECESSARY
```

is issued, permitting the same option as the preceding message.

The following message appears at the operator's console if a volume in the public volume table is not mounted (the public volume table identifies and locates all volumes dedicated to public storage):

```
FOLLOWING ARE MISSING RELATIVE PUBLIC
VOLUMES. MOUNT PACK(S) ON ANY AVAIL-
ABLE DRIVE AND PRESS EOB AFTER DRIVE
BECOMES READY.
```

The following message appears if a duplicate relative volume number is found:

```
DISK PACKS ON DRIVES xx AND yy (SYM-
BOLIC) ARE BOTH RELATIVE VOLUME NUMBER
zz. REMOVE THE PACK DESIRED AND PRESS
EOB.
```

where xx and yy are the symbolic device addresses of the drives upon which the duplicate relative volumes are mounted, and zz is the relative volume number of the duplicate volume.

The following message appears if a mounted public volume is found with a relative volume number that exceeds the maximum number of public volumes allowed at system generation:

```
RELATIVE PUBLIC VOLUME xxxx MOUNTED ON
DEVICE yyyy EXCEEDS MAXIMUM NUMBER
ALLOWED. REMOVE OR REPLACE PACK AND
HIT EOB.
```

where xxxx is the relative volume number of the extra volume. The extra volume must be removed and the system restarted.

The next mandatory system message is:

```
ENTER DATE IN MM/DD/YY FORMAT.
```

The system operator responds by typing in the current month (01 to 12), date (01 to 31), and year (00 to 99). For example, he would give this response on March 3, 1972:

```
03/03/72
```

The system then asks for the time.

```
ENTER TIME IN HH.MM.SS FORMAT.
```

The system operator responds by typing in the current hour (00 to 23), minute (00 to 59), and second (00 to 59). For example, he might respond:

```
22.45.00
```

The next message is:

```
BULKIO REQUIRED?
```

This message requests the symbolic device addresses of devices that are to be used for bulk I/O operations. If the operator replies N, he signifies that no devices are required now. Later assignments may be made with the ASNBD command.

If the reply is Y, symbolic device addresses may be entered, specified in hexadecimal notation.

Y 032,034,036

A maximum of 16 devices may be so specified. A reply of Y without any specified device addresses means that all available devices may be used for bulk I/O operations.

The next system message is:

(xxxx) VALIDATE THE SYSTEM HARDWARE CONFIGURATION. REPLY OK WHEN DONE.

This message will be preceded by an identifying number (xxxx) that must be included in the operator's reply. If necessary, the operator may now issue HOLD commands to partition a group of I/O devices for non-time-sharing use. If it is desired to reserve a tape device for TSSS dumps, the operator should at this time issue a HOLD command with the symbolic device address of the tape unit as an operand. When the configuration is set, the operator must enter a REPLY command. For example, if the identifying number of the message is 0001, when the configuration had been established, the operator would respond (after pressing the REQUEST key)

reply 1, ok

The last message requires no response. It informs the operator that startup has been completed successfully, and that normal time-sharing operation has begun. The text of this message is:

STARTUP COMPLETE.

#### Setting Dump Tape Address

Immediately after completion of startup, the operator should give to TSSS the address of the tape (the same address specified during startup) that he will use to take dumps called for by SYSER messages:

1. Push the INTERRUPT button on the control panel. The resulting interruption sends control to RSS, which writes a dollar sign (\$) to the operator's terminal.
2. Issue a SET command with the symbolic device address of the dump tape in the \$DOUT operand. For example, if the

tape were at symbolic device address 70, the command would be:

```
SET $DOUT=$IO(C'70')
```

The \$IO is a necessary system symbol that tells TSSS that the address is for an I/O device. This SET will be good for the remainder of the current startup.

3. Issue a RUN command to turn control back to TSS/360.

#### RESTART

Restart of the system after a shutdown is performed exactly like start up; see "Startup Procedure," at the beginning of this part.

The quick start facility allows a restart equivalent to the original startup to occur much more rapidly than a conventional restart. If the operator elected to demount the IPL volume during startup, or if a quick start data set was created and is not mounted, he will be required to mount the appropriate volume and wait until the device is ready before responding to the mount request. If a quick start data set was created, and the pack is mounted, restart should be effected from that volume without remounting the IPL volume (unless the quick start data set resides on the IPL volume).

When time-sharing operations cannot continue due to a hardware malfunction, but sufficient facilities remain to restart the system, restart is performed automatically. This restart is essentially equivalent to startup, with two exceptions:

1. The message sent to the operator and to active terminals is:

RESTART IN PROGRESS.

2. A damage report indicating the malfunctioning units and the latest effective setting of the time-sharing configuration console switches is passed along to Startup. This information is used by Startup to initialize the system tables.

#### TIME-SHARING OPERATIONS

Before issuing a command, the system operator should be familiar with the detailed description of the command that is given in Part II. He should also consult, in Part III, the discussion on entering commands from the terminal.

Time-sharing operations are divided into six general areas:

- Communications between the system and the operator
- Handling bulk I/O operations
- Starting and stopping tasks
- Maintaining the operator's log
- Operator's user profile
- Handling exceptions

The operations are described from the system operator's viewpoint, showing him how to perform them.

### Communications

Sending a Message to Specific Conversational User: To send a message to a specific conversational user, issue an MSG command; that user's identification (user ID) must be included in the command. If that user is not currently logged on, no message is sent and the system operator is so informed.

Sending a Message to All Conversational Users: To send a message to all active conversational users, issue a BCST command. The system operator will be informed if there are no active users.

Regulating Message Output to the Operator's Terminal: Normally, messages are sent to both the operator's terminal and the operator's log. However, many of these messages are useful only for operations control purposes and need to go only to the operator's log. To avoid the distraction of having these messages appear at the terminal, it is possible to specify that such messages be written only to the log by setting a switch in the operator's user profile. The switch may be set, for the duration of the current task, to Y (write to log only) or N (write to both terminal and log) by issuing the DEFAULT command as follows:

$$\text{DEFAULT STOPLOG}=\left\{\begin{array}{l} \text{Y} \\ \text{N} \end{array}\right\}$$

To establish the choice as permanent, rather than just for the current task, the operator must issue the PROFILE command, with no operands, immediately following the use of DEFAULT as shown above. It is also necessary for the LOGOFF command to be issued at a subsequent time during the current session for the choice to be cataloged as permanent.

Responding to System Messages: If a message requiring a reply is not replied to within a specific period, the operator is prompted for his response as follows:

PLEASE REPLY TO (message number)

The prompting insures that a task will not be kept waiting for an operator's reply.

If an unacceptable reply, or an invalid reply number, is entered, the following message appears at the operator's terminal:

INVALID REPLY ENTERED

After this message, the command that caused the message is canceled and the operator is required to reenter the complete command. The message is repeated until the correct reply is entered or the ATTENTION key is hit.

The following message:

INVALID WTO FROM TID = (task ID)

indicates that an invalid message was received from the task that is identified.

If a system request is prefixed by an identifying number of four decimal digits, perform the requested action or get the desired information; then respond to the request by issuing a REPLY command. Include in the command the identifying number of the corresponding system request message; the number is the key that relates reply and request. For example, the system may issue a mount request message such as this:

R=0039 SUMNER 002D MOUNT VAM SCRATCH  
TAPE WITH RING ON SDA 052. THEN REPLY  
Y VOLID OR N.

After mounting the volume, the operator presses the REQUEST (or ATTENTION) key at his terminal and then enters:

reply 39,y volid

where volid is the required volume identification. If he is unable to mount the volume, he types n.

The following message indicates that a reply is no longer required to that message:

IGNORE REQUEST R = xxxx...

where xxxx is the identifying number of a previously received system request message.

If a command message is involved, it is prefixed by an eight-character identifier (message prefixes are not shown in this text). Merely type in the appropriate

response. For example, if the operator enters a CANCEL command but does not supply an operand, the system issues this message:

ENTER BSN

The operator responds to this by entering the batch sequence number:

9045

Similarly, if the system issues a request that has no identifying number but still demands a response, type in the appropriate response. For example, the operator receives this message during startup:

ENTER ADDR OF PAGING DISK

He responds by entering the physical device address:

a03

After the system has sent a mount request message to the operator, the user may cancel his request for the volume. The system then issues the following message:

IGNORE REQUEST R = xxxx...

Operator action request messages that are originated by users with the WTOA macro instruction do not require a reply. These messages, which are identified by the three arrows that precede the message text, appear at the operator's terminal as follows:

->->->NOT READY, READY PRINTER

#### Bulk I/O Operations

The BULKIO task is concerned with data sets on public storage. In order to perform a bulk operation, the task must first be initialized. This is done either by the specification of a bulk I/O device at startup (see "Startup Procedure" at the beginning of this part), or through an ASNBD command.

The system attempts to keep the operator well informed as to the progress of a bulk I/O operation assigned to it. When an error is detected in the task, the system attempts to recover and informs the operator of the error and the action taken. Should the task be abnormally terminated, the operator will have first received a message such as:

NO RECOVERY POSSIBLE

This message will be followed by:

BULK-IO TASK REMOVED FROM SYSTEM

After the last message, the task has been abnormally terminated and must be reinitialized by issuing of another ASNBD command.

#### Card Input

The operator may submit card decks as bulk input to the system. The card reader is designated as a bulk input device at startup, or the device is assigned with an ASNBD command. Correctness of input is not the responsibility of the operator; the cards must contain all the information necessary for proper execution of the job by the system. It is suggested, however, that the validity of a user's card deck be checked to ensure system integrity. For example, user IDs might be checked to prevent unauthorized use of system-sensitive names, such as TSS and SYSMANGR.

#### Express Batch

A number of nonconversational user-submitted card jobs may be run as a single installation-defined task in express batch mode. Each user job constitutes one subtask in the job stream. While each user job retains the usual LOGON and LOGOFF cards, the job stream logs on fully only once (to process the first subtask in the job stream) and logs off fully only after the last subtask in the stream has completed its processing. Each individual user ID in the stream is charged for its use of time and resources.

The following control card effects log on for the job stream and places the card reader from which it is entered in express mode:

Operation	Operand
'EXPRESS'	[TIME=value]

#### TIME

this optional operand specifies the number of minutes of execution time that each subtask may run. If the time limit is reached before normal subtask completion, the subtask is terminated and the next subtask begun.

Specified as: a decimal integer between 1 and 450, representing the number of minutes.

System default: the value specified at system generation.

Note: The time option, if specified, overrides any user-specified time limit within a task if the cumulative user-specified time exceeds the installation-defined time.

If no 'EXPRESS' card is used, individual batch tasks are created for each job.

The following control card effects log off for the job stream and must be the last card in the job stream:

Operation	Operand
'END'	

Note: There are no operands.

When the 'END' card is read, the card reader is taken out of express mode, and individual batch tasks are created for each job.

The following restrictions apply to express batch input:

1. No job should be included that requires the use of a private device. If such a request is detected, the system prints a suitable message at the operator's console. The rest of that subtask in the express stream is ignored and the next subtask is begun.
2. DATASET decks should not be included in the express batch stream. If the DATASET card is detected in the job stream, it is rejected and the next subtask is begun. Any data sets needed by a subtask in express batch should be defined for the subtask prior to running the express job stream. For example, DATASET card input should precede the express stream.

Error handling is as follows:

1. Occurrence of a minor software error (ABEND COMP CODE 1) in a user's subtask aborts that subtask. Control is passed to the next subtask, and the following message is issued to the operator's terminal:  
  
EXPRESS BATCH SUBTASK ABENDED;  
BSN=xxxx; USERID=user identification
2. Occurrence of either a recoverable system error that damages some of virtual memory or a major software error from which recovery is not possible aborts the subtask in which the error occurs and all remaining subtasks in the stream. Subtasks already completed are unaffected. The operator must resubmit the jobs. A message is issued informing the operator at which point the express operation should be restarted.

Accounting information of system facilities used by subtasks within the express job stream is accumulated in the user table for the user ID of each subtask. This information is accessible by means of the USAGE command, as described in Part II, System Operator's Commands.

#### Tape Input

Bulk input from magnetic tape is a private task that is started by the RT command, using operand information supplied by the tape owner. Tape mounting instructions are issued by the system at its own convenience. Each RT command causes the input of one data set.

As is the case with card input, the operator is not responsible for the correctness of the input.

All other I/O operations are controlled by the system, which directs the operator by means of system request messages.

#### Remote Job Entry

The TSS/360 RJE facility permits users to initiate any batch or nonconversational job from a remote 2780-1 terminal. Output created by the remote job entry is returned to the originating terminal, unless otherwise directed (see DIRECT command in Part II, System Operator's Commands). RJE users must communicate with the system operator before each session to have a dial-up line or a dedicated line enabled for use. If the operator can grant the user's request, he issues an ASNBD command. The SDA (symbolic device address) operand of the command is the address directly associated with a dedicated line or an address reserved for RJE at system generation for a dial-up line. A list of symbolic device addresses dedicated to RJE, and the associated line numbers, should be available at all times. When a user requests that a line be enabled, the operator should tell him the line number associated with the symbolic device address.

#### Scratch Tape Handling

An installation that intends to use 7-track tapes with different densities should have separate bins set up for each density. The message sent to the operator to mount a scratch tape has the density information included in the message of the form

MOUNT LABELED SCRATCH 7 TRACK TAPE  
WITH 200 BPI DENSITY ON SDA XXXX.

The label is checked for the specified density; if it is correct, the volume serial in the label is placed in the SDAT. The operator is not asked to enter a volume

serial under these conditions. If the label cannot be read, the operator is given the message

TAPE LABEL CANNOT BE READ, MOUNT ANOTHER TAPE ON SDA XXXX.

For an unlabeled tape the operator receives a message containing the same information with the word UNLABELED in place of LABELED.

For a SCRATCH labeled tape only, the expiration date in the first header label is also checked when the tape is mounted. If the expiration date has not been reached, a message is sent to the operator stating "EXPIRATION DATE NOT REACHED, (original mount message inserted here), OR REWRITE THIS TAPE." If the operator responds to rewrite the tape, a new expiration date is assigned.

If an unlabeled scratch tape is requested, the system checks for the existence of a label, trying to read once in all three densities without standard retry procedures. If a label is not detected, the system turns the tape over to the user. If a label is detected, the operator is given the message,

A LABEL WAS DETECTED ON SCRATCH TAPE, MOUNT AN UNLABELED TAPE ON SDA XXXX.

In general, the user should not be consulted concerning existing problems with a SCRATCH tape; the operator should take the necessary action.

If an installation chooses to use both 7-track and 9-track, labeled and unlabeled tapes in all available densities, the SCRATCH tapes must be separated into the proper bins to ensure correct procedural and system operations. The bins would be set up as follows:

Scratch Bin No.	Labels		Tracks		Density		
	Yes	No	7	9	200	556	800
1	X		X		X		
2	X		X			X	
3	X		X				X
4	X			X			X
5		X	X		X		
6		X	X			X	
7		X	X				X
8		X		X			X

The label, track, and density information also should be placed on the label attached to the external surface of the reel for all tapes.

## Task Operations

**Task Initiation:** The operator initiates a new nonconversational task every time he enters an RT or PRINT command. These are the only tasks he can initiate. (His own task is established automatically at system startup.) The system assigns an identifier, called a batch sequence number (BSN), to each nonconversational task. Any subsequent reference to the task, such as in a CANCEL command, must make use of the batch sequence number.

**Task Termination:** To terminate any nonconversational task, the operator issues a CANCEL command. The batch sequence number of the task to be canceled must be given in the command.

To terminate a conversational task, he issues a FORCE command and gives the user identification associated with that task. In most cases, the FORCE command is employed only if the user has somehow lost control of his task and asks the system operator to terminate it.

The system operator can terminate all tasks in the system by issuing a SHUTDOWN command; see "Shutdown Procedure," later in this part.

## Printer Recovery

Under certain conditions, a printer may rapidly eject paper without printing. For example, a user may have requested the EDIT option with his PRINT request, and a bad carriage control character may have been encountered. To rectify the problem:

1. Press CARRIAGE STOP on the printer.
2. Issue a CANCEL command for the batch sequence number of the offending task. A diagnostic message will confirm cancellation and ask you to ready the printer.
3. Ready the printer so that the next task can use it.

## Operator's Log

The system maintains the operator's log by inserting in it every system request message issued to the system operator and responses to those messages. The log also includes every MSG, BCST, and SHUTDOWN command.

The log consists of from one to five session logs, each of which contains the messages for a single TSS/360 session (from startup to shutdown). To retrieve a listing of the log of a session (except the

current session), the operator issues a PRINT command. The options of that command allow printout of any of the five session logs that are still maintained by the system. Each session log is identified by a number that is relative to the one most recently cataloged; for example, the current log is identified by SYSLOG(0), and the preceding one by SYSLOG(-1). Logs are not accessible until they have been cataloged and closed. Therefore, the current log is not accessible until after it has been closed at shutdown; it can be retrieved during the next session as SYSLOG(-1).

To add an entry to the log, the operator issues an MSG command that specifies his own user identification. This is equivalent to sending a message to his own task.

### Operator's User Profile

The user profile is a specialized data set that the operator, like all users, may manipulate to tailor certain aspects of his operating environment. Commands and keyword operands may be renamed, and default values for operands may be provided, either permanently or temporarily. The original (prototype) profile is provided by the system and contains system-generated values.

After LOGON, the task profile that controls the operator's environment is established. In the absence of any modifications, the task profile contains the system user profile values. A modification made to the task profile overlays the user profile and becomes the value for that task. When the task is terminated, the task profile is erased and the user profile values specified by the system are used for the next session. However, the changes made during a task may be made permanent by issuing the PROFILE command (which in this case uses no operands), thus overlaying the existing user profile. LOGOFF or ABEND will catalog the change after PROFILE so that it may be found for the next session.

The operator may establish his own defaults to be used instead of the system-supplied values with the DEFAULT command. Commands or operand keywords may be renamed with the SYNONYM command.

For a full description of profile management, as well as further discussion of synonyms and defaults, see Command System User's Guide.

As an example of profile management, the operator may wish to substitute a symbol for a command in order to save time in replying to system messages that require a reply. He may define:

synonym r=reply

For the remainder of that task, or permanently with the use of PROFILE as described above, the operator may use R or REPLY for the same purpose. An example of the use of DEFAULT appears in the section "Regulating Message Output to the Operator's Terminal," under "Communications" earlier in this part.

### Exception Handling

Commands: If an error occurs in a command, the system prints a diagnostic message at the system operator's terminal, asking him to make a correction or telling him that his command has been ignored.

If he makes a mistake while typing a command, but has not yet pressed the EOB key, he can cancel that command by pressing the BACKSPACE (#) and EOB keys. After the system types out its underscore, he can reenter the command.

Once his command is accepted, however, the system operator has no further control over it, except that he can stop execution of PRINT or RT commands (which result in creation of nonconversational tasks) by entering a CANCEL command with the appropriate batch sequence number. To be effective, this must be done before the nonconversational task has finished execution.

Hardware Malfunction Messages: During execution, system messages regarding hardware malfunction are sent to the operator. Normally, no response or action is required.

The following messages may occur:

IPL VOLUME NOT ACCESSIBLE.

will appear if a malfunction requires a system restart, but the system residence device is not accessible. The operator must move the volume to another device and respond by typing in the device address in hexadecimal as xxxx.

SYSTEM CANNOT PROCEED - THE ONLY CPU IS MALFUNCTIONING.

may appear under certain peculiar circumstances. As an example, the CPU may be malfunctioning upon execution of certain instructions. The system program issuing the message could operate in the defective CPU, providing it did not attempt execution of the instructions causing the malfunction. No corrective action is possible. When sufficient hardware is available, the operator must perform the startup procedure.

SYSTEM CANNOT PROCEED - NO OPERATING PSA AVAILABLE.

will occur when a storage element or the 4K block containing the prefixed storage area (PSA) for the only CPU is malfunctioning, and the other PSA is in a storage element not available in the time-sharing configuration (for example, partitioned). No corrective action is possible. When sufficient hardware is available, the operator must perform the startup procedure.

CPU x IS MALFUNCTIONING.

will occur when a CPU malfunction requires that the CPU be deleted from the available system resources. The CPU designated by x may be 1 or 2. If this is the only CPU, the message

SYSTEM CANNOT PROCEED - THE ONLY CPU IS MALFUNCTIONING

is sent to the operator. If the CPU malfunction affects only a single task or group of tasks, the users affected are notified, and the system tries to continue operation. If the CPU malfunction causes the destruction of a system control program, system restart is automatically initiated, and all users are affected.

STORAGE ELEMENT y IS MALFUNCTIONING.

occurs when a malfunction requires that a complete storage element (256K) be deleted from the system resources. The storage element designated by y may be 1 through 8. A system restart is automatically initiated.

CPU x AND STORAGE ELEMENT y ARE MALFUNCTIONING.

combines the conditions of the two preceding messages.

SOLID STORAGE PARITY ERRORS ON PAGE nnnnK.

That message occurs when a 4096-byte block of main storage is causing solid-parity errors (nnnn is the address of the page in decimal; for example, 0272K is the fifth page of the storage element that has been set to 256K). A system restart occurs when the page contains resident supervisor coding or tables. Otherwise, the affected user is notified, the block is deleted from the system resources, and the system continues operation.

INTERMITTENT STORAGE PARITY ERRORS ON PAGE nnnnk.

has the same effect as the preceding message. It provides a more precise description of the failure for the customer engineer.

INTERMITTENT STORAGE PARITY ERRORS ON STORAGE ELEMENT y.

has the same effect as the message STORAGE ELEMENT y IS MALFUNCTIONING.

These error messages always cause an automatic system restart:

INTERMITTENT MACHINE ERROR WITH GLOBAL DAMAGE.

SERR AUXILIARY QUEUE OVERFLOW.

SERR AUXILIARY QUEUE INTERLOCKED.

SOFTWARE-DETECTED MACHINE ERROR.

System Error Processor Messages: When a system error occurs, the System Error Processor writes a SYSER message on the operator's terminal. Examples follow:

1. ER RC 1300 MIN SYSOPERO 001C N 0000 09:27

This message informs the operator of a minor software error in real storage.

2. ER VM 050502509 MIN TSS\*\*\*\*\* 0017 N 0011 09:04

This message indicates a minor software error in virtual storage.

Note: Two SYSER messages also have the current user's virtual PSW appended, in the following form: [VPSW = word 1 word 2].

The system, according to the type of error, then tests one of three programmed switches:

CEAISR1 (real storage minor software)

CEAISV1 (virtual storage minor software)

CEAISV2 (virtual storage major software or hardware failure)

If the switch has been set to X'FF' (a byte of ones), the system rings the CPU alarm bell and stops execution. The operator, depending on installation requirements, may be requested to use the Time Sharing Support System (TSSS; see description, below) to take a dump or to notify a system programmer to use TSSS.

To resume TSS/360 execution from the location after the SYSER, the RUN command is entered with CEAIS3 as an operand.

If the relevant switch has not been set to X'FF', the system writes this message that requests the operator to perform IPL again:

REAL CORE MAJOR SOFTWARE ERROR --  
 RESTART CANNOT BE ACCOMPLISHED, RE-IPL

The programmed switches mentioned above can be changed by using the PATCH command of TSSS.

PROGRAM CONTROL SYSTEM

The facilities of the Program Control System (PCS) may be invoked from the operator's terminal, but should only be used by a system programmer. See Command System User's Guide and Assembler Programmer's Guide.

TIME SHARING SUPPORT SYSTEM

The Time Sharing Support System (TSSS) is a subsystem within the TSS/360 operating environment that has its own commands. This subsystem is used by system programmers to analyze TSS/360 programming errors, mainly from a terminal, and to correct these errors dynamically. TSSS provides access to all real, virtual, and secondary storage and to machine registers.

TSSS consists of the Resident Support System (RSS) and the Virtual Support System (VSS). RSS and VSS are modes of operation under TSSS.

RSS is the more powerful system. It has its own I/O capability and may use any device in the system's configuration. It has access to real storage, virtual storage, and storage of all current tasks. RSS does not rely on TSS/360, is not associated with any TSS/360 task, and is not time-sliced. When in use, RSS temporarily suspends all time-sharing activity.

On the other hand, VSS executes within the TSS/360 environment, is time-sliced, and is associated with a TSS/360 task. Other system users are not affected by system programmers using VSS. Although VSS resides in each task's initial virtual storage, it does have the ability to address real storage, as well as the virtual storage of its own task.

System programmers (authority code O or P) can run TSSS. These programmers use the same commands whether they are executing RSS or VSS. The system programmer who uses RSS has a different classification from the system programmer who uses VSS.

The user of RSS is a master system programmer (MSP). He is connected to the system only by pressing the CPU external INTERRUPT button on the system control panel. (See Appendix A for a description of the system control panel.) An MSP uses

the system operator's terminal. Only one MSP can be connected to the system at a given time.

The user of VSS is a task system programmer (TSP). A TSP can be connected to the system in one of two ways: (1) an MSP can connect a TSP to a logged-on terminal in the system by issuing a CONNECT command, or (2) the TSP can issue a VSS command (without operands) from an active terminal in the system. Several TSPs can be connected to the system at once, but each task (one task per terminal) can have only one TSP connected to it.

The operator is concerned with RSS for these reasons:

1. RSS can be invoked only from the operator's terminal by pressing the external interrupt button on the console.
2. When a SYSER occurs and the system stops execution, the operator may be requested by his installation to use the facilities of RSS to take a dump; he then needs to use the RUN command with CEAIS3 as an operand to resume TSS/360 execution.
3. The operator may also be requested by his installation to use RSS to enter patches into the system.

The following TSSS commands are used by the system operator. A complete list of TSSS commands appears in Appendix E, and a detailed description appears in Time Sharing Support System.

CALL Command

The CALL command is used to initiate execution of a predefined set of TSSS command statements that have been stored on tape or as a deck of punched cards. The format is:

Operation	Operand
CALL	{ X'xxxx' C'xxxx' decimal integer sp symbol           }

xxxx is a device address; X indicates a physical path; C indicates a symbolic device address.

Specified as: hexadecimal digits.

**decimal integer**  
is a device address which, when converted into hexadecimal, represents the physical path.

**sp symbol**  
is a data field containing a device address, with a type attribute of character to indicate a symbolic device address. Any other type attribute indicates the physical path.

Specified as: a character string.

DUMP Command

This command is used to write the contents of a specified data field on a previously specified output device. In the case of SYSER dumps, the address will have been specified at startup.

Operation	Operand
DUMP	{ data field } [,...] { literal }

**data field**  
is the location of data residing within the system.

Specified as: any representation of a data field, or an arithmetic or Boolean expression.

**literal**  
is the immediate data in the input stream.

Specified as: a character, hexadecimal, or decimal integer literal.

Functional Description: In actual practice, the data field to be dumped will invariably be supplied to the operator by the system programmer or user.

If multiple operands are used with the DUMP command, the data specified by each operand will be written beginning on a new page.

Operating Notes: Dumps may be printed by designating the printer as the output device with the \$DOUT system symbol. A dump may also be taken to tape, and the tape printed on a peripheral machine's printer by means of a user-supplied print program.

The dump tapes generated by TSSS are unlabeled tapes, and such a tape may be printed on the Model 67 by issuing a DDEF command for the tape, prior to the PRINT request. For a description of the procedure for printing unlabeled tapes, see Command System User's Guide. The specific procedure for printing a TSSS dump tape is described in Time Sharing Support System.

The address of the output device must have been specified in the data field \$DOUT prior to the execution of the DUMP command, and the device must be a printer or a tape drive. For a TSP the device must be one that is connected to his task. When a valid designation has been made with the \$DOUT system symbol, each subsequent execution of a DUMP command will automatically use that device for output. The output device may be specified either from the operator's terminal or by means of a punch card, as follows:

SET \$DOUT=\$IO(C'XX')

XX is a symbolic device address in hexadecimal format.

Examples:

1. DUMP \$B(COLLAREA)%(,512)

Execution of this DUMP command results in a 512-byte dump. The indirect addressing operator (%) causes the data field represented by \$B(COLLAREA) to be used as the starting address. Since this indirect addressing operator is used, the defined length of COLLAREA is lost, and the desired length must be specified (in this case, 512 bytes).

2. DUMP \$VM.1'0':\$VM.1'1000'

Execution of this DUMP command dumps virtual storage from location 0 through location 1000.

RUN Command

This command is used to transfer control from TSSS to TSS/360 for resumption of TSS/360 execution without disconnecting the system programmer. The format is:

Operation	Operand
RUN	[address]

**address**  
is the symbolic or actual storage location, assumed to be an instruction address, where TSS/360 execution is to resume.

Specified as: a symbol or L-notation.

TSSS default: the point at which TSSS received control, with TSS/360 restored.

Examples:

RUN

gives control to TSS/360.

RUN CEAIS3

gives control to TSS/360 at symbolic location CEAIS3.

RUN L'5000'

gives control to TSS/360 at real location 5000.

SHUTDOWN PROCEDURE

The system operator should perform these steps to shut down the system:

1. Issue a BCST command to warn all conversational users of the impending shutdown. The BCST command should be repeated at specified intervals to indicate the time remaining before shutdown; intervals of 30, 15, and 5 minutes are recommended.
2. Issue a FLOW command to suppress new system activity and allow those tasks in execution an opportunity to reach completion.
3. Issue a SHUTDOWN command. This will terminate all tasks in the system.
4. Clear all I/O devices.

The control panel of the IBM 2067 Processing Unit, shown in Figure 5, contains switches, dials, keys, and lights used to operate, control, monitor, and reset the system and to store and display information. To locate controls and indicators, look in the section of the panel labeled with the capital letter that appears in parentheses following the name of the control. Only controls and indicators normally used by operators are explained here; those not explained (all in sections A and B, and some in section F) are used mainly for maintenance purposes.

The CPU is activated by the clock and controlled by read-only storage (ROS). The clock is a 10 MHz oscillator, coupled with a frequency divider, that generates a 5 MHz signal that drives the computer's circuits at the rate of one machine cycle every 200 nanoseconds (a nanosecond is one-billionth of a second).

ROS is a device in the control section of the CPU that contains several control registers and 2816 permanent words of 100 bits each. During each machine cycle, the CPU fetches a new ROS word, which controls the CPU for the next cycle. Conditions inside the computer, and the program being executed, combine ROS words into microprograms that run the computing system.

The CPU must stop before manual operations are performed. It is stopped normally by performing a power-on-reset operation (see POWER ON button, below), pressing the SYSTEM RESET or STOP pushbutton, coming to an address-compare stop (see ADDRESS COMPARE STOP switch, below), or using the instruction-step mode of operation (see RATE switch, below). When the CPU stops, an ROS microprogram (stop loop) turns on the MANUAL light, suspends execution of program instructions, stops the interval timer and usage meters, and puts the address of the next instruction into the D register.

The system-reset microprogram in ROS enables processing to begin without machine checks, except those caused by subsequent malfunctions. It stops the CPU, eliminates pending interruptions, puts good parity into general floating-point registers and the PSW, and turns off error indicators. System-reset occurs when the SYSTEM RESET button is pushed or during IPL or the power-on sequence. When system-reset occurs in the middle of an operation, the contents of registers and storage are unpredictable.

A,B registers (E), located on roller 3, position 3 (bits 0-31), and roller 4, position 3 (bits 32-63), respectively, are used as working registers and as a buffer for doubleword operands from main storage. These registers are used also to display the contents of locations in main storage.

ADDRESS COMPARE STOP switch (F), when turned to the down position, causes the CPU to stop executing instructions at the address set in ADDRESS keys 2-20. The CPU finishes the instruction preceding the doubleword boundary, reads the next doubleword of instructions into the Q register, and stops.

ADDRESS keys (E) address locations in main storage or local storage, depending on the position of the STORAGE SELECT switch. These 24 toggle switches are arranged in six groups (colored alternately white and black) of four keys each, to make it easier to address storage by hexadecimal notation. Turning a key down turns on the address bit; leaving it at the center position leaves the bit off (the keys do not turn to an up position). The first three half-bytes (keys 0-11) address ROS blocks, and keys 2-20 can address up to 1,048,575 locations (the contents of four storage elements).

B register: See A, B registers.

CHECK RESET button (F) resets all check indicators in the CPU to nonerror state. If the CPU has stopped because of a machine check, processing continues when check indicators are reset.

CPU CHECK switch (F) controls the actions of the CPU after a machine check, according to the following positions:

STOP: The CPU comes to a hard stop, and the PROC CHK light goes on. Error data is not logged out. To restart, you must clear storage and go through IPL and startup.

PROC: When machine check interruptions are not masked (bit 13 of PSW is on), ROS writes all data from the CPU's working registers into the logout area of the CPU's PSA and causes an interruption that will be handled by system error routines. If interruptions are masked (PSW bit 13 is off), the CPU does not accept the interruption, but turns on the red PROC CHK light and the check indicators on the rollers.

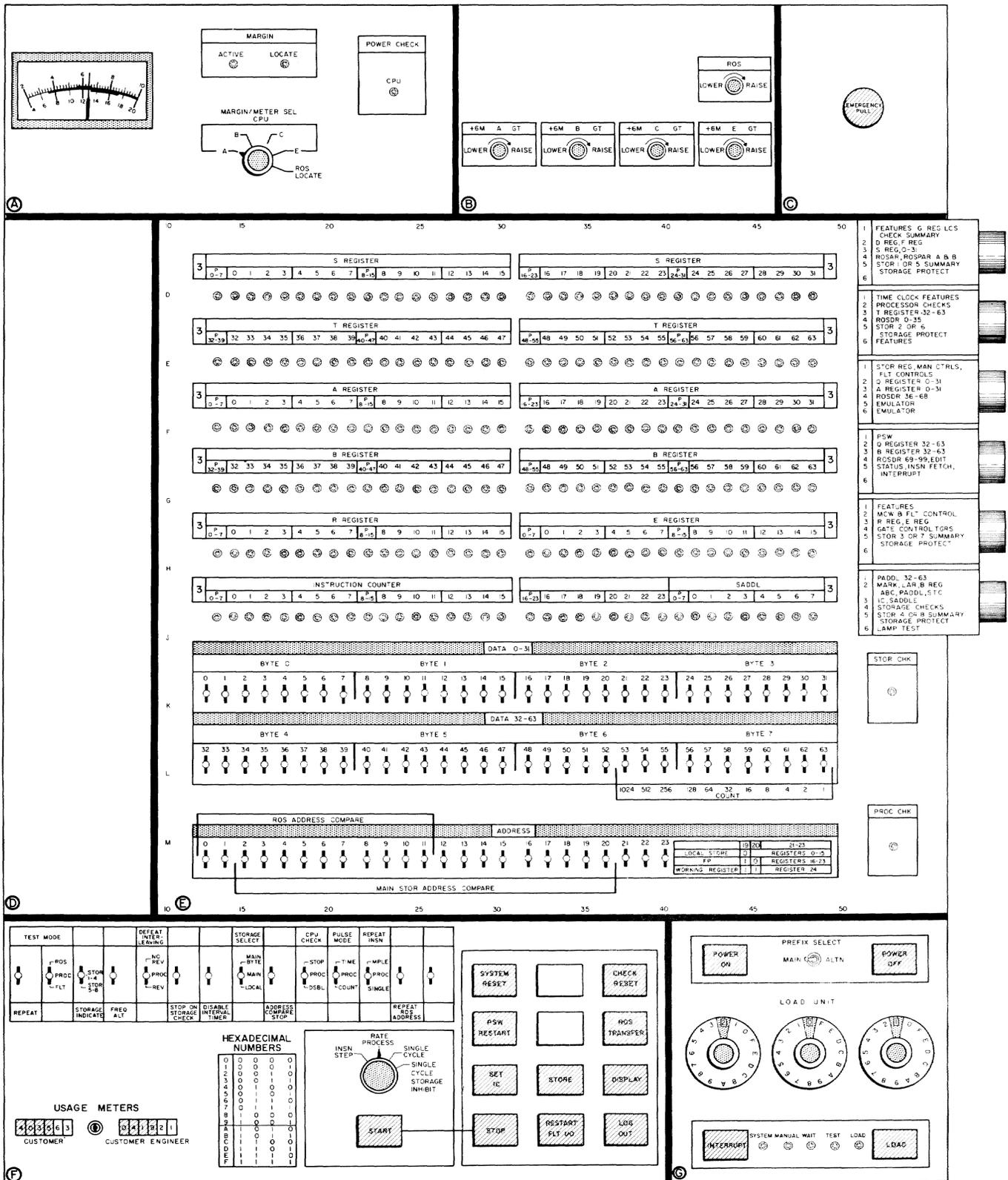


Figure 5. System control panel

DSBL: The check triggers are set. Log-out, interruption, and termination do not occur. The check triggers can be reset by pressing the CHECK RESET button or by a system reset.

DATA keys (E) hold data to be placed manually into locations selected by the STORAGE SELECT and ADDRESS switches. These 64 toggle switches are arranged in 16 groups (colored alternately white and black) of four keys each to make it easier to enter data by hexadecimal notation. Turning a key down turns on the data bit; leaving it at center leaves the bit off (the keys do not turn up).

DISABLE INTERVAL TIMER switch (F), when down, prevents the CPU from reducing the value of the interval timer. The high-resolution interval timer is a fullword at permanent storage location 50 (decimal 80) that the CPU reduces in value every 13 microseconds. The Resident Supervisor uses the timer to account for time allocated to tasks, system elapsed time, time of day, and any other timekeeping functions necessary to task management. System elapsed time is initialized during startup to the date and time entered by the operator in response to messages A117 and A118 and is then updated by the timer. Disabling the timer after TSS/360 is running causes errors in recording of time.

DISPLAY button (F), when STORAGE SELECT is at MAIN, displays the doubleword at the location addressed by the ADDRESS keys in the AB and ST registers. (If the result in AB differs from that in ST, the AB register is correct.) When STORAGE SELECT is on LOCAL, the DISPLAY button displays in the T register the contents of the general or floating point register selected by the five low-order ADDRESS keys (the doubleword floating-point registers must be displayed in the T register, one word at a time). The T register is the only means of getting access to local storage.

D register (E), found on roller 1, position 2 (bits 0-23), is a working register used to address operands in main storage, to address I/O devices, or to hold the number of bits to be shifted during shifting operations. After a normal stop, it holds the address of the next instruction to be executed.

EMERGENCY (EPO) switch (C), if pulled out, cuts all power immediately, without a power-down sequence, at the entry terminal of every piece of equipment electrically connected to the system, whether online or offline. Shutting off power abruptly is not good for the equipment, so use this switch only in an emergency. It locks in

its OUT position, and only authorized service personnel can put it back.

E register (E), located on roller 5, position 3 (bits 16-31), contains the first halfword of the instruction being executed, including the operation code in the leftmost byte.

Instruction counter (E), found on roller 6, position 3 (bits 0-23), contains the address of the next sequential doubleword of instructions to be fetched from main storage.

INTERRUPT button (G) generates an external interruption. The interruption remains pending if masked or if the CPU is stopped; otherwise, an interruption occurs, and bit 25 of the PSW is turned on.

LOAD button (G) resets the system, turns the LOAD light on and the MANUAL light off, and calls the ROS IPL microprogram, which reads into main storage the IPL records on the input device addressed by the LOAD UNIT dials. If the reading is completed satisfactorily, the ROS load-PSW microprogram loads a new PSW, the CPU starts operating, and the LOAD light turns off; otherwise, the CPU idles, and the LOAD light remains on.

LOAD light (G) is on during IPL; it turns on when the LOAD button is pushed and it turns off after the new PSW is loaded.

LOAD UNIT dials (G) select the physical address of an input device used for IPL. The leftmost dial selects the channel; the other two select the device.

MANUAL light (G) goes on when the CPU stops.

POWER ON and POWER OFF buttons (G) start power-on and power-off sequences, respectively. After power is on, the power-on-reset microprogram in ROS resets the system and clears local storage, but not main storage. The POWER ON button does not work if the EMERGENCY switch is in the out position.

PREFIX SELECT switch (G) selects the address of the CPU's main or alternate PSA. If you are not prefixing, leave the switch on MAIN, and the CPU will use the main PSA at address zero.

PROC CHK and STOR CHK lights (E) indicate machine checks in the CPU and storage elements.

PSW register (E), found on roller 4, position 1, holds 22 bits of data from the current PSW (system mask, key, AMWP, condition code, and program mask). The instruction

address portion is on the D register. The interruption code and ILC are not displayed.

PSW RESTART button (F), if pushed when the CPU is in stopped or reset state, loads into the CPU a new IPL PSW from storage location zero. If the RATE switch is on PROCESS, processing continues with the new PSW. The CPU enters the running state if bit 14 of the PSW is off, and the wait state if it is on.

Q register (E) is a 64-bit instruction buffer displayed on roller 3, position 2 (bits 0-31) and roller 4, position 2 (bits 32-63). To save trips to main storage, the CPU fetches two words of instructions at a time and puts them into this register, from which they are subsequently processed. Since instructions can be one, two, or three halfwords long, the Q register holds from one to four instructions at any time.

RATE switch (F), when turned to the following positions, selects the rate at which the CPU executes instructions:

INSN STEP: Every time you press the START button, the CPU processes one complete instruction and then stops.

PROCESS: The CPU fetches and executes instructions one after the other at normal clock speed.

SINGLE CYCLE: Pressing START executes one machine cycle. With the switch in this position, you can execute, one cycle at a time, instructions that require more than one cycle.

The RATE switch is used in the fourth position (SINGLE CYCLE STORAGE INHIBIT) by maintenance personnel only.

Roller indicators (E): Section E contains six rows of 36 indicator lights each (four bytes plus four parity bits). Above each row of lights is a rectangular window. Behind each window is a roller with six flat faces on it. You can expose the roller faces in the windows by turning the rollers with the knobs on the right side of panel E. (The topmost roller is number 1.) On each roller face you can see a label, such as A REGISTER, INSTRUCTION COUNTER, PSW, that refers to the row of lights below it. When you turn the roller, you turn a switch that makes the row of lights display whatever data is labeled by the exposed face of the roller. Beside the knobs that turn the rollers are other labels that tell what is on each of the six positions of each roller.

ROS TRANSFER button (F) starts execution of whatever ROS microprogram begins at the address set in the ADDRESS keys.

R register (E), found on roller 5, position 3 (bits 0-15), contains the first halfword of the next instruction to be executed, including the operation code in the left-most byte.

SET IC button (F) puts the address that is in the ADDRESS keys (starting address of next instruction) into the instruction address portion of the PSW (bits 0-23 of the D register), fills the Q register (instruction buffer) with the doubleword beginning at that address, puts operation code bytes from the Q register into the R register, and adds 8 to the new address in the D register and places the sum in the instruction counter.

START button (F) makes the CPU start executing instructions at the rate selected by the RATE switch. Pressing START after a normal stop causes processing to continue as if no stop had occurred, provided the RATE switch is at PROCESS or INSN STEP; pressing it after system-reset, without first putting a new address into the instruction counter (by PSW-restart or IPL), yields unpredictable results.

STOP button (F) stops machine operations and preserves the contents of storage and registers. Before it stops, the CPU completes the instruction being executed (and all I/O operations in progress) and accepts pending interruptions not masked.

STOP ON STORAGE CHECK switch (F), when on (that is, in the down position), causes the CPU to stop when it recognizes a storage check and to turn on the STOR CHK light. This stop is not a normal one (under control of ROS stop loop) -- it is a hard stop (the CPU clock is turned off.) You cannot restart with the START button, but must go through IPL and startup. Cause of the error and address of the failing main storage word can be found on the rollers. When this switch is on, the CPU CHECK switch should be on STOP.

STOP ON STORAGE CHECK can be left off (center) when system error recovery routines handle hardware errors. The error routines will retry the operation and, if they cannot fix the error, bring the CPU to a hard stop. System Environment Recording and Retry (SERR) records information about errors at interpage gaps on the paging drum, and it prints a message identifying the failing CPU or storage element and type of error on the operator's terminal. Later, the operator must run Error Recording Edit and Print (EREP) to recover the error information from the drum.

STORAGE SELECT switch (F), in the following positions, selects main storage or local storage areas to be addressed by ADDRESS keys when you display or store data:

MAIN BYTE: ADDRESS keys 2-23 address a byte in main storage. The STORE button puts the data byte selected by keys 21-23 into this addressed byte in storage, but the DISPLAY button displays the whole doubleword addressed by keys 2-20.

MAIN: ADDRESS keys 2-20 address a doubleword in main storage.

LOCAL: ADDRESS keys 19-23 select a general or floating-point register or the working register.

STOR CHK light: See PROC CHK and STOR CHK lights.

STORE button (F) stores the contents of DATA switches (with good parity) into locations that are selected both by the ADDRESS keys and the following settings of the STORAGE SELECT switch:

MAIN BYTE: The data byte selected by the three low-order ADDRESS keys (21-23) is stored into the main storage byte addressed by the ADDRESS keys. The result is in the T register.

MAIN: All 64 bits in the DATA keys are stored into main storage at the doubleword boundary addressed by ADDRESS keys 2-20. Results of the store operation appear in the ST register.

LOCAL: Bits in the right half (bytes 4-7) of the DATA keys are stored into local storage selected by ADDRESS keys 19-23. Data is stored into general registers if ADDRESS key 19 is off (center) and into floating-point registers if the

key is on (down). ADDRESS keys 20-23 select the particular register. Setting ADDRESS keys 19 and 20 to the down position addresses the working register. The result appears in the T register.

S, T registers (E), found on roller 1, position 3 (bits 0-31), and roller 2, position 3 (bits 32-63), respectively, are used as arithmetic and logical working registers and to display the contents of locations in main storage. After an interruption, the ST register holds the current PSW.

SYSTEM light (G) is on when the system is working (that is customer or maintenance personnel usage meters are running).

SYSTEM RESET button (F) resets (as defined above) CPU controls and check indicators; resets online, nonshared channels, control units, and I/O devices; and stops the CPU, but does not affect data flow registers. A system-reset signal to a shared device resets only the functions belonging to the signaling CPU. To protect the contents of storage and registers, press STOP before pressing SYSTEM RESET.

TEST light (G) is on when a lever switch in section F is not at its normal (center) position, the RATE switch is not at PROCESS, a channel is in TEST mode, or a DIAGNOSE instruction is active.

T register: See S, T registers.

Usage meters (F) are driven by the clock and record CPU time used by customers (left) and maintenance personnel (right).

WAIT light (G) is on when the CPU is in the wait state. When it is waiting, the CPU decreases the value of the interval timer and accepts I/O and external interruptions, but does not process instructions.

## APPENDIX B: DATA SET NAMES

FULLY QUALIFIED NAMES - These names identify one data set.

1. Stand-Alone Data Set Name - A stand-alone data set name identifies a data set that is not a member of a partitioned data set or a generation of a generation data group. The name of a stand-alone data set is written as a series of symbols separated by periods.

For example:

```
SWINL
SWIN.G.H.RT.KOWR44.P
TRIAL.TIME56.PASS4
```

In TSS/360, for cataloging considerations, the maximum number of characters, including periods, is 35. The rightmost symbol is the data set's simple name (SWINL,P,PASS4). The other symbols are qualifiers. The maximum number of qualifiers for a one-character simple name is 17.

2. Partitioned Data Set and Member Names - A partitioned data set name identifies a single data set composed of individual data sets, called members. The partitioned organization allows the user to refer to either the entire data set or to an individual member of the partitioned data set.

To refer to a member of a partitioned data set, the operator must give the fully qualified member name. This consists of the name of the partitioned data set, suffixed by the simple member name in parentheses.

For example:

```
HQW(ONETRY)
G.H.AB(H)
```

Here HQW and G.H.AB are partitioned data sets with members ONETRY and H.

The partitioned data set name portion of the overall name is written with the same rules as for stand-alone data sets. The parentheses and member name are considered as an appendage to that name.

3. Generation Names - These names identify data sets that are part of a generation data group. These data sets can be referred to on an absolute or relative basis:

- a. Absolute Generation Names are written as the name of the generation data group followed by a period and the characters GxxxxVyy, where xxxx is a four-digit decimal generation number, and yy is a two-digit decimal version number.

For example:

```
HURST.LINER.TT.G0001V00
HF.LA4.WW.G0003V01
HARQ.G0147V03
```

The characters GxxxxVyy are considered a fixed part of the overall name. The name of the generation data group is a partially qualified name applicable to all generations in the group.

- b. Relative Generation Names are written as the name of the generation data group followed by the appropriate relative generation number enclosed in parentheses, as G.D.G(0)

The relative generation number of the most recently cataloged generation is (0); the generation just prior to that is (-1); the next before that is (-2), etc.; a new generation to be added is (+1):

```
GOST.UU.L19P(+1)
GOST.UU.L19P(-3)
MRQ.T.L5.SWIM(0)
```

PARTIALLY QUALIFIED NAMES - These names refer to all data sets having the partially qualified name as their common higher-order qualifier.

1. Generation Data Group Names - As noted above, the name of a generation data group is common to the name of each generation in the group. Generation data group names are restricted to a maximum of 26 characters, including periods.
2. Other Partially Qualified Names - Other forms of partially qualified names can also be used to refer to two or more data sets. For example, the partially qualified name GO.AB14 can be used to refer to both the data sets GO.AB14.A and GO.AB14.B.

APPENDIX C: PHYSICAL DEVICE ADDRESSES

Some messages ask the operator to supply a physical (hardware) device address. This appendix explains how such addresses are developed.

In IBM System/360 Operating System, each physical device address is expressed by three hexadecimal digits, which represent an 11-bit address. For example, the address 206 represents these bits:

010	0000	0110
digit1	digit2	digit3
(2)	(0)	(6)

The time-sharing system uses a 13-bit address. The two extra bits precede the standard 11-bit address. They address the channel controller, which is not needed under System/360 Operating System, but is always present in half-duplex or duplex time-sharing systems. The two prefix bits may have the following values (depending on the addresses of the channel controllers):

<u>Channel Controller</u>	<u>Bit Value</u>
0	00
1	01

To construct a physical device address for TSS/360, first prefix the proper 2-bit value to the standard 11-bit address; then convert the 13-bit result back to hexadecimal digits, ignoring the leading zero if one is present (the first digit will always be zero, unless the installation uses more than two channel controllers).

For example, if the device at standard address 206 (in binary, 01000000110) is connected to channel controller 1 (binary 01), its physical device address is A06.

1010	0000	0110
digit1	digit2	digit3
(A)	(0)	(6)

Note: The leading zero is dropped from the front of address A06.

APPENDIX D: COMMAND FORMATS

Operation	Operand
ASNBD	{ $\begin{matrix} A \\ D \end{matrix}$ } symbolic device address}{,...]}
BCST	TEXT=text of message
CANCEL	BSN=batch sequence number
DIRECT	STAID1={ALL rjesta1}{,STAID2=rjesta2}
DMPRST	FROMDEV={2311 2314 2400},FRVOLID={{(disk valid) (tape valid{,...})}}, TODEV={2311 2314 2400}{,TOVOLID={{(disk valid) (tape valid{,...}) PRIVATE}} {,NEWVLID=valid}{,WRITCHK={YES NO}}{,LABEL={RETAIN NO}}{,IPL={RETAIN NO}} ,RUNMODE={BACK FORE}
DROP	symbolic device address{,...]}
EXHIBIT	OPTION= $\left. \begin{matrix} \text{UID}{,TYPE}=\{\text{ALL} \text{UID.userid} \text{CONV} \text{BACK}\}\{,FORM}=\left\{ \begin{matrix} \text{LONG} \\ \text{SHORT} \end{matrix} \right\} \\ \text{BWQ}{,TYPE}=\{\text{ALL} \text{UID.userid} \text{BSN.number} \text{PRINT} \text{PUNCH} \\ \text{TAPE} \text{EXEC} \text{RJE}\} \end{matrix} \right\}$
FLOW	[BATCH=batch task limit]{,CONV=conversational task limit} [,BACK=background task limit]{,BULKIO={Y N}} [,MTT=mtt administrator limit]{,APP=(mtt application name, relative application number,application user limit),...}
FORCE	USERID=user identification
HOLD	symbolic device address{,...]}
LABEL	[NEWLABEL={volume serial NL}] [,TAPE={7 7DC 9}]{,DEN={0 1 2}}{,OWNERID=ownerid}{,ASCII={Y N}}
MSG	USERID=user identification,TEXT=text of message
PATCLEAR	DEVICE={2311 2314},VOLID={volume serial PRIVATE},RUNMODE=BACK
PRINT	DSNAME=SYSLOG(integer){,STARTNO=first byte position} [,ENDNO=last byte position]{,PRTSP={1 2 3}} [,HEADER=H]{,LINES=lines per page}{,PAGE=P}{,} [,ERROROPT={ACCEPT SKIP END}}{,FORM=paper form}{,STATION=station id}
REPLY	MSGNO=message number{,TEXT=text of message}
RT	{VOLUME=volume serial number{,TATYPE=tape type}} {CTLG=CTLG} ,USERID=user identification,DSNAME1=input data set name ,DSNAME2=new data set name{,LINE=LINE}{,ERROROPT={ACCEPT SKIP END}}
SARD	
SHUTDOWN	
USAGE	USERID=user identification

Operation	Operand	Function
AT	address[,...]	Designates dynamic statement and point in TSS/360 execution at which it is to be executed.
CALL	{ X'xxxx' C'xxxx' decimal integer sp symbol }	Initiates execution of a prestored set of command statements.
COLLECT	sp symbol={data field literal }[,...]	Moves data from the specified area into the specified collection area.
CONNECT	parameter	Causes TSP to be connected to VSS at the terminal of the specified task. Valid command for use by MSP only.
DEFINE	symbol[(o,1,t,s)][,...]	Enables the system programmer to define temporary symbols and allocates storage when necessary.
DISCONNECT		Removes system programmer capability from the terminal, restores TSS/360 (except for patches), and permanently transfers control to TSS/360.
DISPLAY	{data field literal }[,...]	Writes data requested by the system programmer out on his terminal.
DUMP	{data field literal }[,...]	Writes data requested by the system programmer out on specified output device.
END		Terminates reading of device being used for input of prestored statement sets.
IF	expression	Designates a conditional statement; execution of the statement is dependent on a predetermined condition.
PATCH	data field <sub>1</sub> ={data field <sub>2</sub> literal }[,...]	Alters contents of the specified data field and keeps a record of the patch.
QUALIFY	system symbol	Establishes implicit "real memory," "virtual memory," or "global" qualification for subsequent operands.
REMOVE	{ \$AT \$PATCH [,location][,...]	Deletes AT commands and their associated dynamic statements or deletes patches.
RUN	[address]	Causes control to revert to TSS/360; AT commands can then be executed.
SET	data field <sub>1</sub> ={data field <sub>2</sub> literal }[,...]	Alters the contents of the specified data field. SET can be used to copy from one I/O device to another.
STOP		Causes TSS/360 or a specific task to halt.

## INDEX

Where more than one page reference is given, the major reference is first.

\$DOUT symbol 35,43

A register 45  
accounting, resource (see USAGE command)  
activity, system  
    information regarding (SARD command) 22-23  
    regulating (FLOW command) 13-15  
ACV (see auxiliary control volume)  
addresses  
    physical device 33,43  
        how developed 51  
        maximum range of 30  
    symbolic device, operand (see ASNBD, CALL, DROP, HOLD commands)  
ADDRESS COMPARE STOP switch 45  
ADDRESS keys 45,46  
ALTN CODE key 27  
ASCII 17  
ASNBD command 7,4,37,52  
AT command 53  
ATTN light 27  
authority codes 42  
auxiliary control volume 29

B register 45  
BACKSPACE key 27  
backspacing 27,28  
batch sequence number (BSN)  
    operand (see CANCEL command)  
    information on (see EXHIBIT command)  
    response to system message 37  
batch work queue (BWQ) 13,11,20  
    operand (see EXHIBIT command)  
BCST command 7,4,52  
    general uses of 36  
    in shutdown procedure 23  
BSN (see batch sequence number)  
bulk I/O 37,2,34-35  
    (see also card input, tape input)  
    device assignment 2  
    task initialization 7  
BUS OUT light 27  
BWQ (see batch work queue)

CALL command 42-43,53  
CANCEL command 8,4,52  
    task termination 2,22  
CANCEL key 27  
canceling input lines 27  
card input 37  
card requirements 33  
CE MODE/ON LINE switch 27  
central processing unit (CPU) 45  
CHANNEL CONTROLLER COMPATIBILITY ADDRESSING

dial 29-30  
CHANNEL CONTROLLER switches 30  
characters, uppercase and lowercase 28  
CHECK RESET button 45  
clock (CPU) 45  
CMND REJ light 27  
coded value 6  
COLLECT command 53  
command formats 52  
    TSSS 53  
command name 4  
commands  
    entering through keyboard 28  
    error correction 28  
    how described 4-5  
    how to rename 40  
    how to write 5-6  
    summary of operator's 4  
    TSSS 53  
communications (see BCST, MSG, REPLY commands)  
configuration  
    console (illustrations) 30-32  
    control of 29,2  
    duplex 29  
    half-duplex 29  
    selecting 29  
    simplex 29  
    validating 35  
CONNECT command 53  
CONTIN WRITE/READ switch 27  
continuation character 5  
control lights 26-27  
control panel  
    description 45-49  
    illustration 46  
conversational mode 1  
CORE STORAGE UNIT dials 30  
correcting typing errors 28  
CPU 45  
CPU CHECK switch 45  
CPU (processor) switches 30

D register 47  
DATA keys 47  
DATA REGISTER lights 27  
data set names 50,21-22  
date, entry of 34  
DEFAULT command 37,41  
defaulted operands 5  
defaults in messages 28  
DEFINE command 53  
delta data sets 34  
DIRECT command 8-9,4,52  
DIRECT CONTROL switches 30  
DISABLE INTERVAL TIMER switch 47  
DISCONNECT command 53  
DISPLAY button 47  
DISPLAY command 53  
DMPRST command 9-11,4,52  
\$DOUT symbol 35,43

DROP command 11,4,52  
 DUMP command 43,53  
 dumps, system error 35,43  
  
 E register 47  
 EMERGENCY switch 47  
 END command 53  
 EOB (end-of-block) key 27  
 EPO Switch 47  
 EQUIP light 27  
 exception handling 40-41  
 EXHIBIT command 11-13,4,52  
 express batch 37  
  
 floating storage addresses 30,33  
 FLOW command 13-15,4,52  
 FORCE command 52  
     description 15  
     general information 4,39  
  
 hardware malfunction 40-41  
 HOLD command 15-16,4,52  
  
 IF command 53  
 INHIB CR light 27  
 initial-program-load (IPL)  
     demonstrating the volume 34  
     device address for 47  
     mounting the volume 29  
     procedure 32-33  
 initial virtual storage, modification  
     of 34  
 instruction counter 47  
 INTERRUPT button 47  
 INTVTN REQD light 27  
 I/O CONTROL UNIT switches 30  
 I/O device partitioning 29  
 IPL (see initial-program-load)  
 IPL device 29,30  
 IPL volume 29  
     option to demount 34  
  
 keyboard controls 25  
  
 LABEL command 16-17,4,52  
 LINE FEED key 28  
 LOAD button 47  
 LOAD light 47  
 LOAD UNIT dials 47  
 log, operator's  
     adding information to 18  
     general description 39-40  
     listing 19-20,2  
     session 2  
  
 machine controls 26  
 MANUAL light 47  
 maps, storage 33  
 master system programmer (MSP) 42  
 messages  
     ABEND 3

    action request 3  
     command 2-3  
     diagnostic 7,17-18  
     hardware malfunction 40  
     informational 2-3  
     LOGOFF 3  
     LOGON 3  
     regulating output of 36  
     replying to (see REPLY command)  
     request 36,2-3  
     sending to users 17,2,7,36  
     startup 33,29  
     System Error Processor 41  
 metasymbols, command format 6  
 mount request 20,36  
 MSG command 17-18,4,36,39-40,52  
 MSP 42  
  
 nonconversational mode 1  
 NOT (logical negation) 26  
 NOT READY key 26  
 number sign (#) 27,28  
  
 operands (command)  
     keyword 5  
     positional 5  
     renaming 40  
  
 paging device 29,33  
 paper form 19-20  
 partitioning system devices (see  
     configuration)  
 PAT 18-19  
 PATCH command 53  
 PATCLEAR command 18-19,4,52  
 PCS 42  
 physical device addresses 33,43  
 POWER OFF button 47  
 POWER ON button 47  
 PREFIX SELECT switch 47  
 PREFIX switches 30  
 PRELUDE 32  
 PRINT command 19-20,4,39,52  
 printer malfunction 39  
 PROC CHK light 47  
 PROCD light 27  
 PROFILE command 40  
 program control system (PCS) 42  
 PRTR BUSY light 27  
 PRTR CYCLE light 27  
 PSW register 47-48  
 PSW RESTART button 48  
 public volume table (PVT) 34  
  
 Q register 48  
 QUALIFY command 53  
 quick start  
     creation of 34  
     general description of 31-32  
  
 R register 48  
 RATE switch 48  
 READ light 26  
 read-only storage (ROS) 45  
 READY key 26

registers (CPU control)  
   A,B 45  
   D,E 47  
   PSW,Q 47-48  
   R 48  
   S,T 49  
 remote job entry (RJE)  
   activity 23  
   general description 38  
   module code 33  
   rerouting output (see DIRECT)  
 REMOVE command 53  
 REPLY command 20-21,4,35-36,52  
 REQUEST key 26  
 reset state 45  
 resident support system (RSS) 42  
 resident terminal access method (RTAM) 26  
 resource control 24  
 resources, system  
   use by user (USAGE command) 24  
   use by system (SARD command) 22-23  
 restart 35  
 RETURN key 27  
 RJE (see remote job entry)  
 roller indicators 48  
 ROS 45  
 ROS TRANSFER button 48  
 RSS 42  
 RSS mode 42  
 RT command 21-22,4,38-39,52  
 RTAM 26  
 RUN command 43-44,53

S register 49  
 SARD command 22-23,4,52  
 scratch tapes 38-39  
 selective loading 33  
 sense lights 27  
 SET command 53  
 SET IO button 48  
 shutdown 44,1-2  
 SHUTDOWN command 23-24,4,39,44,52  
 START button 48  
 startup 29-35  
   general introduction to 1-2  
   via card reader 33  
 STOP button 49  
 STOP command 53  
 STOP ON STORAGE CHECK switch 48  
 STOR CHK light 49  
 STORAGE SELECT switch 49  
 STORE button 46  
 switches, programmed SYSERR 41-42  
 SYNONYM command 41  
 SYSER  
   dump 35,43  
   message 41-42  
 SYSIN 5  
 SYSOPER0 18  
 SYSOUT 8  
 system control panel 45-49  
 SYSTEM light 49  
 SYSTEM RESET button 49

T register 49  
 TAB key 27  
 tape  
   address 35  
   density 39  
   dump, printing 43  
   labeling (see LABEL command)  
   reading (see RT command)  
   scratch 38-39  
   TSSS dump 35,43  
   types 38-39  
 tape input 21-22,2,38  
 task  
   (see also FORCE, CANCEL commands)  
   conversational 1  
   initiation of 39  
   nonconversational 1  
   termination of 15,2,8,39  
 task system programmer (TSP) 42  
 terminal  
   operator's (illustration) 25  
   use of 25-28  
   users 1  
 TEST light 49  
 time sharing support system  
   (TSSS) 42-44,53  
 time  
   entry 34  
   stamping 7  
 TSP 42  
 TSSS 42-44,53

UPPER CASE light 27  
 USAGE command 24,4,52  
 usage meters 49  
 user identification, operator's 18  
 user profile, operator's 40  
 users, determining number of (see EXHIBIT  
   command)

virtual support system (VSS) 42

WAIT light 49  
 WRITE light 26-27



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