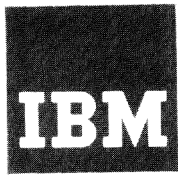


TSS



Systems Reference Library

IBM System/360 Time Sharing System Support for Time Sharing

This manual describes the Support for Time Sharing (STS) support operating system, which provides serviceability aids for Time Sharing System/360. The support command language is described, with the formats and functions of its commands.



PREFACE

Support for Time Sharing (STS) is a support operating system designed to provide a set of serviceability aids for IBM System/360 Time Sharing System (TSS/360). The reader should be familiar with the following publications, in addition to pertinent TSS/360 manuals.

IBM System/360 Principles of Operations, Form A22-6821

IBM System/360 Basic Operating System: Programmer's Guide, Form C24-3372

IBM System/360 Basic Operating System: Assembler With Input/Output Macros, Form C24-3361

IBM System/360 Basic Operating System: Macro Definition Language (8K Tape), Form C24-3364

First Edition (October 1967)

Specifications contained herein are subject to change from time to time. Any such change will be reported in subsequent revisions or Technical Newsletters.

Requests for copies of IBM publications should be made to your IBM representative or to the IBM branch office serving your locality.

A form is provided at the back of this publication for reader's comments. If the form has been removed, comments may be addressed to IBM Corporation, Time Sharing System/360 Programming Publications, Department 561, 2651 Strang Boulevard, Yorktown Heights, N.Y. 10598.

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INTRODUCTION

SYSTEM SUMMARY

STS is built upon the supervisor of the IBM System/360 basic operating system (BOS) with the addition of a command--recognition routine that directs various transient support processors according to commands entered at the 1052-7 console typewriter. One of these commands (RUN) is the means by which the mode of system operation changes, from support to normal TSS/360 execution. When the system is in normal mode all details of TSS/360 design are exactly as described in the documentation of the TSS resident monitor; that is, the resident monitor does not "know" that a support supervisor is interposed between the hardware and itself. Support mode is usually entered by pressing the CPU interrupt key, followed by pressing the attention button on the IBM 1052-7. During support mode, no execution of TSS/360 takes place with the exception of the stacking of interrupts for later processing.

This manual describes the commands available in support mode and gives examples of typical use.

INTERFACE WITH THE TSS/360 RESIDENT MONITOR

To provide an adequate background for understanding the support commands, it is necessary to describe the interface between STS and the TSS resident monitor. IPL of the system residence volume results in initialization and loading of the various components of the time sharing system, including the loading of the STS supervisor into a reserved area (X'1000' to X'6FFF'). Control is passed by STARTUP to a point within the STS supervisor, which initializes various constants including the addresses in the new PSWs and then passes control to the command recognition routine. The operator then initializes the I/O device assignments for STS, for the particular installation, and performs any other action necessary to prepare the system for execution. Upon issuance of the first RUN command, the necessary linkage between STS and the TSS resident monitor is completed.

Figure 1 shows the assignment of core for the support supervisor, the transient processor execution area, the command recognition routine, the prefixed storage area, and the remainder of core allocated to TSS/360. Within the support supervisor, an area called the communication region provides space for save areas used to hold status of the system during execution in support mode, as well as space used by the transient processors to communicate with one another. Through the principle of saving system status at point of entry to support mode, the various commands may be used to examine and modify the state of the system in its "frozen" condition.

To assist the support commands in referring to locations within the TSS resident monitor, a program control and symbol table is constructed at system initialization time. Details pertinent to dynamic dump requests and communication points are stored within this table.

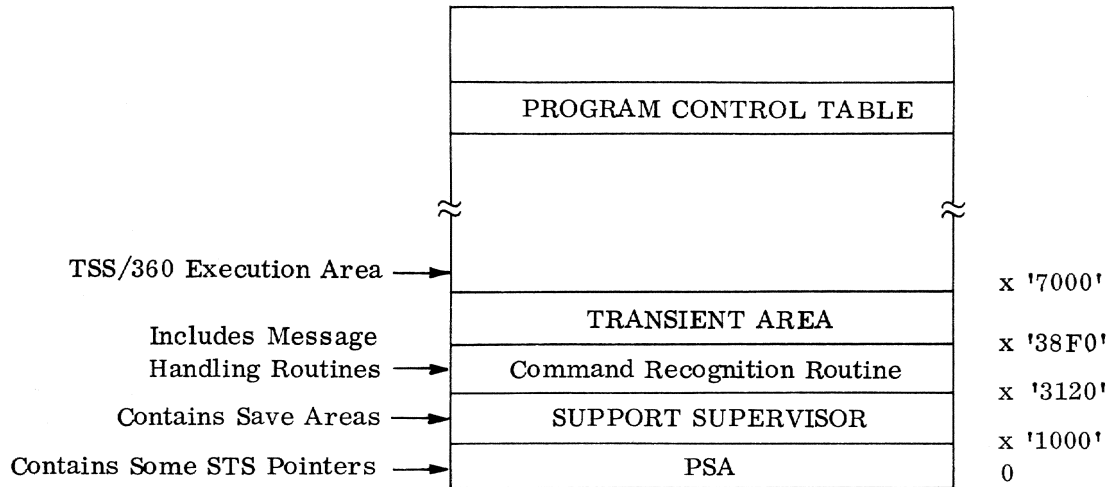


Figure 1. Relationships of Support Supervisor

Only one transient processor (command) executes at one time. Execution is complete when the command request is satisfied or the console typewriter attention button is depressed to indicate that command recognition is desired. In support mode, the console interrupt key need not be depressed to get support attention. The various transient processors reside in a data set on the system residence volume; as they are needed, the STS supervisor fetches them and gives control to the appropriate entry point. This data set is built by a command processor from an input tape produced by another command processor which obtains the core image (machine instructions) for each transient processor from the core image library of a BOS system volume. The transient processors, which consist of one or more "phases", are assembled and link-edited as in any BOS programs.

Certain SVCs are not allowed to be issued by virtual memory tasks unless their use is for requesting support functions. These are SVC 5 and SVC 10 (described later). The resident monitor may issue SVC 6 in order to enter support mode.

To maintain the integrity of the interface, the TSS resident monitor does not modify the addresses in the new PSWs. After stacking the interrupts delivered to it when the system is in support mode, the interrupt stacker exits according to an agreed--upon convention relating to the resumption of support mode execution.

SUMMARY OF SUPPORT COMMANDS

<u>Command</u>	<u>Operand</u>	<u>Function</u>
ASN	symbolic/physical CARDS	Symbolic I/O device assignment command stream is on cards
RUN	none/location	execute TSS/360
DIS	location(s) PUB GR FR CR CSW	display core contents on 1052-7 display physical unit block display general registers display floating point registers display control registers display channel status word

SUMMARY OF SUPPORT COMMANDS (Continued)

<u>Command</u>	<u>Operand</u>	<u>Function</u>
DIS (cont.)	CAW	display channel address word
	PSW	display program status word
	EXTPSW	display external old PSW
	SVCPSW	display supervisor call old PSW
	MCPSW	display machine check old PSW
	IOPSW	display input/output old PSW
	2301	display drum records
	2311	display 2311 disk records
	2314	display 2314 disk records
	VM locations	display virtual memory contents
	VM GR	display virtual memory general register
	VM FR	display virtual memory floating pt. register
	VM PPSW	display virtual memory program intpt. PSW
	VM SPSW	display virtual memory SVC PSW
	VM XPSW	display virtual memory external intpt. PSW
	VM APSW	display virtual memory asynchronous int. PSW
VM TPSW	display virtual memory timer intpt. PSW	
VM IPSW	display virtual memory I/O intpt. PSW	
DUM	location/location	dump core contents to SYS001/SYS010
	ATD	dump selected TSS tables and task status
	MAP	dump resident monitor symbol map
	2301	dump drum records
	2311	dump 2311 disk records
	2314	dump 2314 disk records
	VM location/location	dump virtual memory contents
	VM MAP	dump virtual memory map
PAT	location	patch core contents
	CARDS	patch command stream is on cards
	GR	patch general registers
	FR	patch floating point registers
	CR	patch control registers
	PSW	patch program status word
	SYM	patch symbol table with new symbol
	DDR	patch dynamic dump request
	CMP	patch communication point
	2301	patch drum records
	2311	patch 2311 disk records
	2314	patch 2314 disk records
	VM location	patch virtual memory contents
	VM GR	patch virtual memory general register
VM FR	patch virtual memory floating pt. register	
VM PSW	patch virtual memory program status word	
DEL	DDR	delete dynamic dump request
	CMP	delete communication point
SET	PAUSE	set pause at point of specific task dispatch

COMMAND LANGUAGE STATEMENT

COMMAND FORMAT AND NOTATION

The general format of command language statements is:

Command	Operand
A command name	Depending on particular command issued, this field may be blank, contain one operand, or more than one operand separated by delimiters.

The command operator field contains a command name, such as DIS or DUM, that identifies the command and its requested action. All commands may be entered in lower case.

The command operand field is separated from the operation field by one or more blanks. The operand field itself may be blank for certain commands or may contain several operands, separated by delimiters, such as commas. Successive blanks are regarded as one delimiter. The conventions used to present operands in the command format illustrations are explained later in this section.

Only one command may be processed at a time. Command entry is completed by holding down the "alternate code" and then pressing the "5" key on the keyboard.

OPERAND REPRESENTATION

Most commands use positional operands. If a positional operand is omitted (the rules for omission are explained later) and another positional operand is written to the right of the omitted operand, the delimiter that would have preceded the omitted operand must be retained.

Operand Name

This may be a mnemonic or a phrase that identifies the nature of the operand. Unless shown in upper-case letters in the command format, operand name represents a variable for which the user must supply specific information.

Value Mnemonics

This may be a single word, a phrase, or mnemonic that tells how an operand should be written. The value mnemonics in this publication are:

absolute location

1 - 6 hexadecimal characters (if first hex character is alphabetic, it should be preceded by a + sign); or * followed by 1-6 decimal digits; the * is mandatory to indicate a decimal field is supplied.

symbol

used interchangeably with alphaname.

simple expression

created when a symbol and an absolute location are connected by either a + or - operator:

LOOP + A008 (hex)
LOOP - *2345 (decimal)

alphname

the operand can be written as eight or fewer alphameric characters; the first character must be alphabetic. Examples are:

RESUP
UNPKLOOP
CHECK1
DUMP02

code

the operand can be written as one of a set of coded values (see coded value); these values are defined in the command description; e. g. , A8 is the code for the ASN and PSV command designating a seven-track tape with 800 bpi, even parity, with translator on and converter off.

hex

hexadecimal characters, 0-F. The number of hex characters to be coded are specified with each command.

integer

the operand can be written as one or more numeric characters, using decimal digits 0-9; example:

51 may be used for a dynamic dump ID.

indirect address

specifies an address that is to be used indirectly. The address specification is followed by a percent sign, %, as follows:

$$\text{addr } [\pm \text{int}] \% \{ [\pm \text{int}] [\%] \} . . .$$

This specification may be used whenever a simple address is required.

The most recently used address may be retained and thus used as a base address in a simple address specification, as follows:

$$\& \pm \text{int}$$

where & denotes the most recently used address.

Coded Values

This is a string of characters that is to be written exactly as shown; in the command formats they appear as numbers or upper case letters.

Positional parameters are represented in one of three ways, shown below. The hyphen, braces, brackets, and the value mnemonics are never written in the actual command; they serve only as a convenience in displaying the command format.

<u>Operand</u>	<u>Example From Command Format</u>
operand name - value mnemonic	beginning address - $\left\{ \begin{array}{l} \text{alphname} \\ \text{hex} \\ \text{simple expression} \end{array} \right\}$
operand name - coded value	format - $\left\{ \begin{array}{c} \underline{X} \\ C \end{array} \right\}$
coded value	VM CORE

The operator actually types in, for each kind of positional operand, the positional operand

<u>Representation</u>	<u>User writes</u>
beginning address - $\left\{ \begin{array}{l} \text{alphname} \\ \text{hex} \\ \text{simple expression} \end{array} \right\}$	The appropriate address, for example: LOOP45, 40A, LOOP45+78
format - coded value	The appropriate format value, either X or C
VM	VM
CORE	CORE

Notational Symbols

The symbols listed below are used in the command formats to help the operator decide how and when to write certain operands. None of these symbols are written by the operator.

[] Brackets indicate that the items, or groups of items within the brackets, are optional and may be omitted at the operator's discretion.

If items are stacked within the brackets, they represent alternate choices. Underlining a stacked element means it is the default; i. e., the system automatically assumes the underlined item was the operator's choice if none of the items was entered. For example

\underline{X}
D
F

means the operator may write any one of these operands or, if X is his choice, he may specify it by default.

{ } braces indicate the operand is mandatory and one of the alternative items within the braces must be included in the command.

In addition to the notational symbols described above, the commas and spaces have a special significance in the command format.

Commas and spaces are used to separate (i. e., delimit) operands. Commas are given for omitted positional operands, unless no positional operands appear after those that are omitted. (Successive spaces are regarded as one space.)

COMMAND DESCRIPTION

Descriptions of the commands in the STS command language follow. Each one has the following arrangement:

1. The command name is given.
2. A brief statement of the command's functions is made.
3. The command format is illustrated, the standard abbreviation for the command name is given, and each operand is described.
4. A description of the command is then given, describing what the command does from the operator's standpoint, and noting any restrictions.
5. Next, all messages that might be issued for the commands are listed, with the message number (if any), and the English text of each. Messages appear in this order:

Prompting
Response
Diagnostic

6. Examples of the use of the command are given.

COMMANDS

ASN -- Assign Device Address

The assign (ASN) command allows temporary changes to be made to the STS PUB (physical unit block) table.

Command	Operand
ASN	sysname - SYSxxx, c ₁ c ₂ uu - hex devtype $\left\{ \begin{array}{c} \text{see} \\ \text{Type} \\ \text{Table} \end{array} \right\} \left[\text{devmode} - \left\{ \begin{array}{c} \text{see} \\ \text{Mode} \\ \text{Table} \end{array} \right\} \right]$

sysname

device symbolic name, written as SYS followed by three alphameric characters to form a six-character name; where

xxx may be one of these coded values

- RDR
- LST
- IPT
- OPT
- OPT
- 000-026

Note: The symbolic names used for STS are in no way related to the symbolic names used by TSS/360.

Type Table

dd	Meaning	
C1	1052 VII	Printer/keyboard
U1	2741	Communications terminal
U2	Mod 35	Teletype
U3	1050	System on 2702 with 1052
U4	1050	System on 2702 with 1056
U5	1050	System on 2702 with 1052/1056
D1	2311	Disk drive
D2	2314	Direct-access storage facility
D3	2301	Drum
D4	2321	Data cell drive
D5	2302	Disk file
D6	2303	Drum
F1	2280	Film recorder
F2	2282	Film recorder/scanner
L1	1403	Printer
L2	1443	Printer
L3	1405	Printer
L4	1445	Printer

Type Table (Continued)

dd	Meaning	
P1	2540	Punch
P2	1442	Punch
P3	2520	Punch
R0	2671	Paper tape reader
R1	2540	Card reader
R2	2540	Using punch read feed feature
R3	1442	Reader/punch
R4	2501	Reader
R5	2520	Reader/punch
RR	1285	Optical reader
S1	1015	Inquiry display terminal
S2	2250	Display unit
S3	2260	Display station
ST	STR	STR devices on 2701
T1	2400	Seven-track tape
T2	2400	Nine-track tape

Mode Table

For 7-Track Tapes (Type T1)

MM	Density	Parity	Translator	Convertor
10	200	Odd	Off	On
20	200	Even	Off	Off
28	200	Even	On	Off
30	200	Odd	Off	Off
38	200	Odd	On	Off
50	556	Odd	Off	On
60	556	Even	Off	Off
68	556	Even	On	Off
70	556	Odd	Off	Off
78	556	Odd	On	Off
90	800	Odd	Off	On
A0	800	Even	Off	Off
A8	800	Even	On	Off
B0	800	Odd	Off	Off
B8	800	Odd	On	Off

For 1403 with feature installed (EC 125632)

Mode Bytes	Meaning
73	IGNORE DATA CHECK
7B	ACCEPT DATA CHECK

$c_1 c_2 uu$

device physical address, in the form of $c_1 c_2 uu$; where

c_1 = channel controller 0-7

c_2 = channel number 0-7

uu = control unit and device 00-FF

devtype device type — see Type Table.
devmode device mode — see Mode Table.

Command	Operand
ASN	CARDS

CARDS

cause ASN commands to be read from the card reader assigned to SYSIPT. This process ends with a ASN END card.

Note: It is necessary to assign (ASN) a SYSIPT to the card reader and then execute the command ASN CARDS after each STARTUP of TSS/360.

RUN -- Execute User Program

The RUN command restores saved status and causes execution to proceed from the point of entry to support mode.

Command	Operand
RUN	location - [symbol simple expression absolute location] [,state-alphabet]

location

an optional operand, specifying the location in storage to which control is to be passed for execution. If defaulted, the current setting of the instruction counter is used.

state

a one-character code
P-Problem program state
S - Supervisory state

Response:

XXXXXX IS RUNNING

where XXXXXX is the last user phase (usually RESSUP)

Error Responses:

ILLEGAL TRANSFER LOC. WITHIN SUPERVISOR

This occurs when the requested transfer location is within the STS supervisor and the state is problem program. No transfer will occur.

CAUTION: TRANSFER LOC. WITHIN SUPERVISOR

This warning occurs when the requested transfer location is below the STS supervisor - end location, and the state is supervisory. A transfer will occur as usual.

Functional Description: The command initially restores the machine registers, then determines the physical address (for symbol = displacement), if needed, and sets up the PSW - IC -. The supervisor is then called upon to issue a LPSW, which activates processing at the specified address in the desired execution mode.

DIS--Display

The DISPLAY command provides a means of displaying the contents of storage and registers, virtual storage and registers, and direct-access volumes. Output is presented on the 1052-7 console.

Display Real Storage

Command	Operand
DIS	$\left. \begin{array}{l} \text{from address-} \\ \text{simple expression} \\ \text{absolute location} \\ \text{indirect address} \end{array} \right\} , \left[\text{to address-} \left. \begin{array}{l} \text{simple expression} \\ \text{absolute location} \\ \text{indirect address} \end{array} \right\} \right]$ $\text{format - } \left\{ \begin{array}{c} \text{X} \\ \text{C} \end{array} \right\}$

from address

the first location in real core which is to be displayed.

to address

the last location in core to be displayed; this operand may be defaulted if only one word is to be displayed.

format

the format in which the defined core storage area is to be presented on the 1052-7 console, codes as follows:

- X-hexadecimal full word
- C-EBCDIC
- b-blank, will assume X is desired

Display Resident Monitor Status

Command Operation	Command Operand
DIS	saved status - $\left\{ \begin{array}{l} \text{PSW} \\ \text{EXPSW} \\ \text{SVCPSW} \\ \text{PGPSW} \\ \text{IOPSW} \\ \text{MCPSW} \end{array} \right\}$

Where saved status is the status of TSS/360 to be displayed.

- PSW - current PSW
- EXPSW - old external PSW
- SVCPSW - old SVC PSW
- PCPSW - old program check PSW
- IOPSW - old I/O PSW
- MCPSW - old machine check PSW

Display CAW/CSW

Command	Operand
DIS	CAW CSW

CAW

coded value, for channel address word

CSW

coded value, for channel status word

Note: The fields of the CAW and CSW will be labeled and displayed in hexadecimal.

Display Registers

Command	Operand
DIS	$\left\{ \begin{array}{l} \text{GR} \\ \text{CR} \\ \text{FR} \end{array} \right\}, \left\{ \text{reg number}_1 \left\{ \begin{array}{l} \text{hex} \\ \text{integer} \end{array} \right\} \right\} \left[/ 1 \text{ reg number}_2 - \left\{ \begin{array}{l} \text{hex} \\ \text{integer} \end{array} \right\} \right],$ format*- (X)

GR, CR, FR

coded values; mnemonics for general registers, control registers, and floating point registers.

reg number

register number in hexadecimal or decimal. If the optional parameter is coded, the register number₂ entered must be higher than the register number. This command will display an inclusive range of registers when register number₂ is specified.

format

same coded values as for displaying real core.

Note: For floating point registers, only 0, 2, 4, 6 may be specified as register numbers.

Error Responses:

ILLEGAL FORMAT

'TO' ADDRESS LESS THAN 'FROM' ADDRESS

MISSING PARAMETER

INVALID REGISTER SPECIFICATION

INVALID ADDRESS

Note: All entries of "reg number" field can be either decimal or hexadecimal.

Display Virtual Storage of Current Task

Command	Operand
DIS	VM, logical from address - hex, logical to address - hex, format <u>X</u>

VM

coded value, if virtual storage is to be displayed

logical "from" address

indicate first virtual location to be displayed. Virtual storage address, as defined in TSS/360, is in the form of SSSPPDDD where

SSS segment number
PP page number
DDD displacement

Only hex characters are valid.

logical "to" address

indicates last virtual storage location to be displayed; may be defaulted if only one location is to be displayed.

format (a one-character code)

X - Hexadecimal fullword

Display Virtual Registers and Status of Current Task

To display an inclusive range of general purpose registers.

Command	Operand
DIS	$\text{VM} \left\{ \begin{array}{l} \text{GR} \\ \text{FR} \end{array} \right\}, \text{register number}_1 - \left\{ \begin{array}{l} \text{integer} \\ \text{hex} \end{array} \right\} \left[/ \text{register number}_2 \right. \\ \left. - \left\{ \begin{array}{l} \text{integer} \\ \text{hex} \end{array} \right\} \right] \\ \left[\text{format} - \underline{\text{X}} \right]$

VM

virtual memory — a coded value

GR

general register — a coded value

FR

floating point register — a coded value

general register number 1

the first general register to be displayed; may be in hexadecimal or decimal.

general register number 2

the last general register to be displayed; if only one register is to be displayed, this operand may be defaulted.

format

the format in which the contents of the registers are to be displayed; where:
X - hexadecimal full word.

Note: The value of register number₂ must be greater than register number₁. Only 0, 2, 4, 6 are allowed for FR specification.

Display a Task Interrupt Old PSW

Command	Operand
DIS	VM, pswtype - { PPSW SPSW XPSW APSW TPSW IPSW }

pswtype

type of PSW to be displayed

- PPSW - virtual program interrupt PSW
- SPSW - virtual SVC PSW
- XPSW - virtual external PSW
- APSW - asynchronous interrupt PSW
- TPSW - timer interrupt PSW
- IPSW - virtual I/O interrupt PSW

Note: The fields of the PSW are labeled and displayed in hexadecimal.

Error Responses:

MISSING PARAMETER

REQUEST NOT VALID

'TO' ADDRESS LESS THAN 'FROM' ADDRESS

ILLEGAL FORMAT

INVALID REGISTER SPECIFICATION

ERROR X IN LOCATING A VM PAGE

ERROR X IN LOCATING ISA

ERROR X IN LOCATING XTSI

where X is:

- 0 - page allocated but not assigned to an external device
- 1 - segment portion of address is too large
- 2 - segment specified is not assigned to program's virtual storage
- 3 - page portion of address is too large
- 4 - page table specification error
- 5 - error in trying to locate the SYSTEM TABLE (CHBSYS)
- 6 - no active TSI on system
- 7 - XTSI is not in core
- 8 - reserved code
- 9 - no tables are available for converting symbolic device address to an actual address
- A - invalid symbolic device address for an external page

Display Direct-Access Device Contents

Command	Operand
DIS	2301
	2311
	2314

2301, 2311, 2314

coded values relating to direct-access device type.

Response:

UNIT CYL TRK REC FROM TO FORMAT

The operator must then enter the following parameters, separated by delimiters and terminated by EOB.

UNIT

symbolic name or physical address of unit to be processed; e. g. , SYSRES, SYS009, 190, etc.

CYL

number of cylinder to be processed.

TRK

address of track to be processed; if this field is void, the entire cylinder is processed.

REC

number of the record within the track to be processed; if this field is void, the entire track (all records) is processed.

FROM

relative address of 1st byte of record to process (1-n); assumed 1 if void.

TO

relative address of last byte of record to be processed; if this field is void, the remainder of the record is processed.

Format

- C - EBCDIC
- X - hexadecimal

DUM - Dump

The dump command provides the STS user with a means of

1. taking static dumps of real core storage and virtual storage (current task only) areas,
2. dumping the contents of direct-access devices,
3. dumping a numerically sorted version of the resident monitor symbol table.
4. dumping certain TSS/360 tables.

The dump information will be written on the output device assigned to SYS001. The 1403 printer can be assigned to SYS001 if immediate listing of dump output is desired, or SYS001 can be assigned to a tape drive and dump information collected for a later tape-to-print operation. At end of reel on SYS001 the assignments for SYS001 and SYS010 are swapped (if for same device type and mode) and dumping continues.

Dump of Real Memory Contents

Command	Operand
DUM	from . address - $\left\{ \begin{array}{l} \text{alphanumeric} \\ \text{simple expression} \\ \text{absolute location} \\ \text{indirect address} \end{array} \right\}$, to-address - $\left\{ \begin{array}{l} \text{alphanumeric} \\ \text{integer} \\ \text{hex} \\ \text{alphanumeric} \end{array} \right\}$ $\left\{ \begin{array}{l} \text{alphanumeric} \\ \text{simple expression} \\ \text{absolute location} \\ \text{indirect address} \end{array} \right\}$ [, format - <u>X</u>] , dumpid - $\left\{ \begin{array}{l} \text{alphanumeric} \\ \text{integer} \\ \text{hex} \\ \text{alphanumeric} \end{array} \right\}$

"from" address

first location in core in which dumping is desired.

"to" address

last location in core in which dumping is desired.

format

format in which the output is to be presented; a one-character code:

X - Hexadecimal fullword

C - EBCDIC

b - If blank, 'X' will be assumed; if illegal, field will be assumed equal to dumpid.

dumpid

1-6 character information for user convenience in identifying the dump.

Note: Current TSS/360 status is always dumped.

Response:

DONE

Error Responses:

INVALID CPU SPECIFIED (indicates error in CPU status table)

MISSING PARAMETER

'TO' LOCATION IS LESS THAN 'FROM' LOCATION

INVALID ADDRESS

DUMP REQUEST SPANS A STORAGE ELEMENT NOT AVAILABLE TO THIS CPU

Dump of Entire Memory Contents

Command	Operand
DUM	ALL, {dumpid}

ALL

coded value. This command will cause the entire core storage and the saved user conditions to be dumped.

dumpid

1-6 character information for identifying dump.

Dump Direct-Access Device Contents

Command	Operand
DUM	da-device { 2301 2311 2314 }

2301, 2311, 2314

coded values relating to direct-access device type.

Response:

UNIT CYL TRK REC FROM TO FORMAT

The user must then enter the following parameters, separated by delimiters and terminated by EOB.

UNIT

symbolic name or physical address of unit to be processed; e.g., SYSRES, SYS009, +190, etc.

CYL

address of cylinder to be processed (in case of 2301 drum, CYL must be entered as zero).

TRK

address of track to be processed; if this field is void, the entire cylinder is processed.

REC

number of the record within the track to be processed; if this field is void, the entire track (all records) is processed.

FROM

relative address of first byte of record to process (1-N); assumed 1 if void.

TO

relative address of last byte of record to process; assumed to be the last byte of the record if void or if greater than the record length.

FORMAT

a one-character code specifying the format of the text to be processed.

X - Hexadecimal
C - EBCDIC

Note: All numbers must be preceded by an asterisk (*), if decimal.

Dump of Virtual Memory Contents (Current Task Only)

The PSWs, general registers, control registers, the task status index (TSI), the extended TSI, and shared page tables will be printed followed by that portion of virtual storage specified in the command.

Command	Operand
DUM	VM, from address (logical) - hex [, to address (logical) - hex] , format { $\frac{X}{}$ } [dumpid - { any 1-6 characters }]

VM

coded value, to indicate virtual storage dumping.

logical "from" address

first virtual storage location to be dumped.

logical "to" address

last virtual storage location to be dumped; may be omitted if only one location is to be dumped.

format

one-character code:

X - hexadecimal

dumpid

1-6 character user information for identifying his dump.

Note: "from" and "to" addresses are hexadecimal virtual storage addresses (SSSPDDDD) specifying the portion of virtual storage to be dumped. Either both of these or the "to" address parameter may be replaced by ALL.

Error Responses:

ERROR IN PARAMETER M
ERROR TYPE N

where N is:

- 4 page table specification error
- 5 system table (CHBSYS) not specified
- 6 no active TSI
- 7 XTSI not in core
- 8 reserved
- 9 error searching RSPI

INVALID UNIT
INVALID CYLINDER ADDRESS
INVALID TRACK ADDRESS
INVALID FIELD
REQUESTED RECORD NOT FOUND
FROM ADDRESS TOO LARGE
TO ADDRESS LESS THAN FROM
I/O ERROR
SPECIFIED UNIT NOT A SUPPORTED DIRECT ACCESS DEVICE

Dump Numerically Sorted Symbol Table

Command	Operand
DUM	MAP

MAP

a coded value; leading to dump of resident supervisor external symbols, numerically sorted.

PAT -- Patch

The PATCH command provides the capability of (1) modifying the contents of real storage locations, saved register, and current PSW information, (2) entering DDR and CMP requests, (3) entering auxiliary real core symbols into the SYMBOL table, (4) modifying the contents of virtual storage locations and registers (current task), and (5) modifying the contents of direct-access volumes.

Patch Real Memory

Command	Operand
PAT	patch-address { symbol simple expression absolute location indirect address } , format { X C } content-data

patch address

the first location to be patched.

format

a one-character code:

X - hexadecimal

C - EBCDIC characters

content

supplies replacement data for the core location specified. Data must be supplied in integrals of bytes, and start from the core location specified in the patch address. The input stream of data will overlay consecutive locations in core until the input is exhausted. The "content" is expressed in terms associated with the format specified.

Patch General Registers and PSW

Command	Operand
PAT	GR, reg. no - $\left\{ \begin{array}{l} \text{integer} \\ \text{hex} \end{array} \right\}$, format - $\left\{ \underline{X} \right\}$, content-data

GR

a coded value for general register.

regno

the register into which is loaded the value specified in the 'content' field.

format

the format in which the value will be presented to the system for patching.

a one-character code:

X - hexadecimal fullword

content

this field contains the value which is to be loaded into the specified general register. The format of this field must be consistent with the specified format.

Patch Floating Point Registers

Command	Operand
PAT	FR, regno - $\begin{cases} \text{integer} \\ \text{hex} \end{cases}$, format - $\begin{cases} \text{X} \\ \text{F} \end{cases}$, content-data

FR

coded value for floating point registers.

regno

the floating point register into which will be loaded the value specified in the content field.

format

a one-character code:

X - hexadecimal fullword

content

this field contains the value which will be used to replace the current content of the specified floating point register.

Patch Control Registers

Command	Operand
PAT	CR, regno - $\begin{cases} \text{integer} \\ \text{hex} \end{cases}$, content-hex

CR

coded value for control register.

regno

the control register into which will be loaded the value specified in the content field.

content

this field contains a value for loading into the control register; specified in hexadecimal format.

Patch PSW Instruction Address

Command	Operand
PAT	PSW, IC, icaddr - $\left. \begin{array}{l} \text{alphanumeric} \\ \text{simple expression} \end{array} \right\}$

PSW

coded value for program status word.

IC

coded value for instruction count.

icaddr

the instruction address which is to be replaced in the address portion of the current PSW.

Patch PSW Condition Code/Program Mask

Command	Operand
PAT	PSW, $\left. \begin{array}{l} \text{CC} \\ \text{PM} \end{array} \right\}$, code or mask - hex

PSW

program status word.

CC

condition code.

PM

program mask.

code or mask

If CC is coded, the condition code will be set (since the CC field of the PSW is two bits long, only X'0, 1, 2, 3' are allowed).

If PM is coded, program mask will be set as specified; hex values 0 thru F are valid.

Patch DDR Requests

Command	Operand
PAT	DR, corloc - { symbol simple expression absolute location indirect address } , begin dum addr - { symbol simple expression absolute location indirect address }
	stop dumpaddr { symbol simple expression absolute location indirect address } , format {X} , dumpid - integer

DR

coded value for dump request.

corloc

core location; when the instruction address of the PSW matches this specified value, a dump is to take place.

begin dump addr

the first core location to be dumped.

stop dump addr

the last core location to be dumped.

format

the format in which the dump is to be written:

X - hexadecimal fullword

dumpid

ID for the dumps belonging to this PAT command, in range of 01-99. When ID is greater than 50, the symbol table is not printed.

Patch CMP Request

Command	Operand
PAT	CMP, location, - $\left. \begin{array}{l} \text{alphname} \\ \text{simple expression} \\ \text{absolute location} \\ \text{indirect address} \end{array} \right\}$ cmpid-integer
	location ₂ - $\left. \begin{array}{l} \text{alphname}_2 \\ \text{simple expression}_2 \\ \text{absolute location}_2 \\ \text{indirect address}_2 \end{array} \right\}$ cmpid-integer
	location _n - $\left. \begin{array}{l} \text{alphname}_n \\ \text{simple expression}_n \\ \text{absolute location}_n \\ \text{indirect address}_n \end{array} \right\}$, cmpid-integer

CMP

coded value for communication point, which interrupts execution of the problem program at the location designated by 'location₁', and establishes terminal communications between the operator and the STS manual mode of operation, after saving resident monitor status.

location

the location for passing control to STS manual mode.

cmpid

two-character decimal code, associated with each CMP location; valid values from 01-99.

Patch TSS/360 Resident Supervisor Addressing Symbol

Command	Operand
PAT	SYM, symbol name-alphameric, value - { simple expression }

SYM

a value to be coded as shown.

symbol name

the symbol to be entered into the symbol table of the resident supervisor.

value

a relative addressing value, formed by adding or subtracting a displacement from an existing symbol. After execution of the command, the location associated with the value may be addressed by the assigned symbol name.

For example, if a new symbol NEWCMP is to be added to the symbol table, which is 20 bytes from an existent symbol LOOP, the operator may code

PAT SYM, NEWCMP, LOOP+*20 in decimal

or

PAT SYM, NEWCMP, LOOP +14

After execution of this command, the new symbol NEWCMP is used to reference a location.

Patch Via CARDS

Command	Operand
PAT	CARDS

CARDS

coded value

This command facilitates the input of successive PATCH commands. By issuing this command on the 1052-7 console, prepunched PATCH commands will be read in from SYSIPT, and processed in the same manner as if entered via the console.

Note: A PAT END card or a blank card should be the last of the PATCH deck, to indicate the end of input. Column 1 of this card must be blank.

Patch Registers and PSW of Current Virtual Memory Task

Command	Operand
PAT	VM, reg type $\left\{ \begin{array}{l} \text{GR} \\ \text{FR} \\ \text{CR} \end{array} \right\}$, regno- $\left\{ \begin{array}{l} \text{integer} \\ \text{hex} \end{array} \right\}$, format - X content-data

VM

coded value operand.

reg type

type of register for patching.

GR

coded value for general register patching.

FR

coded value for floating point register patching.

CR

coded value for control register patching.

regno

the register number in hex or decimal that is desired; may be specified in decimal or hexadecimal.

for FR, only 0, 2, 4, 6 are valid.

format

the format into which the input data, as specified in the content field, must be converted before it is loaded into the register.

X - hexadecimal fullword, valid for all reg types.

Patch IC/CC/PM

Command	Operand
PAT	VM, PSW, pswfld - $\left\{ \begin{array}{c} \text{IC} \\ \text{CC} \\ \text{PM} \end{array} \right\}$, code or logical location-hex

VM

coded value operand.

PSW

coded value operand.

pswfld

fields in PSW to be set.

IC - fields in PSW - instruction counter
 CC - fields in PSW - condition code
 PM - fields in PSW - program mask

code or logical location

if IC is coded, logical location is used, in the format of SSSPPDDD as in the PATCH virtual memory (current task) illustration. If CC is coded, only a one-character hex character within the value of 0-3 is allowed. If PM is specified all hex digits or value 0-F are allowed.

Response:

DONE

Error Responses:

INVALID ADDRESS
 INVALID FORMAT
 INVALID REGISTER
 INVALID DUMP PARAMETER
 INVALID PARAMETER
 INVALID ID
 INVALID SYMBOL
 BAD BOUNDARY ALIGNMENT
 DUMP REQUEST TABLE FULL (max. #50)
 CMP TABLE FULL (max. #50)
 NON-REPLACEABLE INSTRUCTION
 PATCH WILL EXCEED CORE LIMITS
 FROM ADDRESS EXCEEDS THRU ADDRESS
 EDITING ERROR
 PATCH EXTENDS INTO CORE BOX NOT ASSIGNED

Patch Virtual Memory (Current Task)

Command	Operand
PAT	VM, logical address - hex, format - $\left\{ \begin{matrix} C \\ X \end{matrix} \right\}$, content - data

VM

coded value.

logical address

the logical address of virtual storage to be patched, in the form SSSPPDDD

where

SSS = segment
 PP = page
 DDD = displacement

If more than one byte is to be patched, the input information will overlay successive virtual storage locations until the input stream is exhausted.

format

indicates to STS the format of the input data, and any necessary conversion to EBCDIC code will be performed

where:

C - EBCDIC character
 X - hexadecimal

content

the input information to be used for patching the VM locations; a maximum of 32 bytes is allowed for each command; they must be integral numbers of bytes; e.g., 2A432 in the content field will produce an erroneous result.

Error Responses:

ILLEGAL LOCATION FIELD
 ILLEGAL FORMAT FIELD
 EXCESSIVE PATCH DATA*
 NO PATCH DATA
 ILLEGAL HEX CHARACTER
 ILLEGAL ADDRESS ALIGNMENT
 INVALID REQUEST - TSS NOT THE USER

Patch Contents of Direct-Access Device

COMMAND	OPERAND
PAT	da-device { 2301 2311 2314 }

da-device

coded value operand for direct-access device patching.

*A maximum of 32 bytes may be patched with one usage of the PAT VM command.

Response:

UNIT CYL TRK REC AT FORMAT TEXT

The user must then enter the following parameters, separated by delimiters and terminated by EOB:

UNIT

symbolic name or physical address of unit to be processed; e. g. , SYSRES, SYS009, +190, etc.

CYL

address of cylinder to be processed (in case of 2301 drum, CYL must be entered as zero).

TRK

address of track to be processed; if this field is void, the entire cylinder is processed.

REC

number of this record within the track to be processed; if this field is void, the entire track (all records) is processed.

AT

relative address of first byte of record to process (1-N); assumed 1 if void.

FORMAT

one-character code specifying the format of the text to be processed.

X - hexadecimal
D - EBCDIC

TEXT

contents to patch into record

Note: All numbers must be preceded by an asterisk (*) if decimal. After the device type has been determined, the desired patch is made.

Error Responses:

INVALID UNIT
INVALID CYLINDER ADDRESS
INVALID TRACK ADDRESS
INVALID TEXT CODE
INVALID FIELD

REQUESTED RECORD NOT FOUND
 I/O ERROR
 SPECIFIED UNIT NOT A SUPPORTED DIRECT ACCESS DEVICE
 NO TEXT FIELD

DEL -- Delete

The DEL command provides the capability of deleting dump requests and communication points from the STS program control table (PCT), which is constructed by STARTUP and filled by the PAT command.

Command	Operand
DEL	$\left\{ \begin{array}{l} \text{ALL} \\ \text{CMP} \\ \text{DDR} \end{array} \right\} \left[, \text{location} - \left\{ \begin{array}{l} \text{symbol} \\ \text{simple expression} \\ \text{absolute location} \end{array} \right\} \right] \left[, \text{id-integer} \right]$

ALL

coded value implying deletion of all DDR and CMP requests.

CMP
 DDR

coded values implying communication point and dynamic dump request, respectively; must be coded as shown.

location

further specifies the particular DDR and CMP locations that were created previously (see PAT command); if defaulted all DDRs and CMPs will be deleted.

id

the ID given in previous DDR or CMP of a PAT command; default results in deletion of all DDRs and CMPs at that address.

Response:

DONE

Error Responses:

INVALID ID
 INVALID ADDRESS
 NO ENTRY AT THIS ADDRESS

SET -- Set Control Function Status

The SET command allows the user to activate and deactivate the various control functions related to STS/TSS operations:

- (1) Pausing virtual task execution
- (2) Establishing 2702 lines to be enabled upon restore from checkpoint; this may be used only when the TSS monitor is in core and before it has been run.

This command is used to set the pause mechanism, for a particular task, on or off. A task is "paused" (if the TSI pause bit is on) each time the dispatcher is about to run the task. A message, which identifies the task, is printed on the 1052 when a task pauses as:

```
TASK PAUSE: USER-ID = XXXX  DEVID = XX  TASKID = XXXX
```

The user then has control at the 1052 console and may display, patch, etc., or continue running as he desires.

Set Pause for Virtual Task

Command	Operand
SET	PAUSE, tsi pause bit $\left\{ \begin{array}{l} \text{ON} \\ \text{OFF} \end{array} \right\}$

PAUSE

coded value for the pause mechanism.

tsi pause bit

as name implies, ON and OFF are coded values for setting the TSI pause bit of a particular task on and off, respectively.

SAMPLE:

```
Entry:   SET PAUSE ON
Response: CONV/BATCH USER--ID
Entry:   CONV USER--ID
         or
         BATCH USER--ID
```

(User--ID is the 1- to 8-character user identification for the task.)

Response: OK

Error Responses:

YOU ARE IN THE MIDDLE OF A PAUSE NOW

ENTER--RUN--THEN SET PAUSE OFF AFTER TASK PAUSES

Task is in the process of pausing and the current request cannot be accepted.

NO ENTRY WITH MATCHING USER-ID

NO MATCH FOUND IN ACTIVE SCAN

A search of the active chain of TSIs produced no USER-ID matching the one specified.

or

a matching USER-ID was found, but not in CONV/BATCH mode.

THERE ARE NO ACTIVE TASKS

The first byte in CHBSYS, the pointer to the first active TSI, contains zeros.

THERE ARE NO INACTIVE TASKS.

The pointer to the first inactive task contains zeros.

NO MATCH FOUND IN INACTIVE SCAN.

A search of the inactive chain of TSIs produced no USER-ID matching the one specified,

or

a matching USER-ID was found, but not in CONV/BATCH mode.

APPENDIX

Supervisor and transient processor short form messages to operator

During execution of transient processors certain messages may appear on the 1052-7 which relate to operator intervention that may be needed in connection with an I/O device or may relate to a particular illogical condition the solution to which depends on operator choice. All such messages are distinguished by a proceed condition which is established at the 1052-7 following a five-character message ending with A. To all such messages, the following responses apply:

- 0 - Enter command recognition routine by fetching new copy from STS data set.
- 1 - Dump all of real core and return to command recognition routine.
- 2 - Set user program switch indicator (UPSI) bit 7 on and return to program that issued message.
- 3 - Set user program switch indicator (UPSI) bit 7 off and return to program that issued message.
- 4 } - Ignore I/O operation and continue, or if following ATT2A message, record
5 } attention and give later retry I/O operation (condition has been corrected); if
6 } following ATT1A or ATT2A message; ignore request for attention
- 6 - Following ATT1A or ATT2A message: give attention anyway, otherwise return to program issuing message.
- 7,8,9, or return to program issuing message.
any character
- ? - enter command recognition routine.

These responses are made to communicate operator intention to the program issuing the message. The majority of such messages originate within the STS supervisor but transient programs may use this mechanism for obtaining one character operator responses. Such usage by transient processors is discussed in the sections relating to the specific processor. Note that responses 5-9 and other characters not indicated above are for use of the transient processors.

Messages relating to operator intervention with I/O devices are distinguished by their being issued in two parts. Below is an example of operator intervention necessary to ready a printer to complete a dump:

DUM CEAJIL CEAJIL+1000	command to dump
0030	address of printer
4000A	two bytes sense data
5	operator response
?	command completed

Other messages issued by the supervisor are:

USDVA	An error has occurred on an unsupported I/O device.
CCUU	
CHECK	An unexpected unit check has occurred on device indicated by CCUU.

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International Business Machines Corporation
Data Processing Division
 112 East Post Road, White Plains, N.Y. 10601
 [USA Only]

IBM World Trade Corporation
 821 United Nations Plaza, New York, New York 10017
 [International]



Technical Newsletter

File Number S360-48
Re: Form No. C28-2035-0
This Newsletter No. N28-3019
Date March 11, 1968
Previous Newsletter Nos. None

IBM System/360 Time Sharing System Support for Time Sharing

This Technical Newsletter, a part of Version 1, Modification 2 of the IBM System/360 Time Sharing System, provides replacement pages for the publication IBM System/360 Time Sharing System: Support for Time Sharing, Form C28-2035-0. All current editions of C28-2035-0 are herewith updated to Version 1, Modification 2, and these replacement pages remain in effect for all subsequent versions or modifications unless specifically altered. Pages to be inserted or removed are listed below. Changes or additions to the text and minor changes in illustrations are flagged by a vertical line to the left of the change; all changed or added illustrations are flagged by the symbol • to the left of the caption.

<u>Attached Pages</u> <u>To Be Inserted</u> <u>In Publication</u>	<u>Publication Pages</u> <u>To Be Replaced</u>
1-2	1-2
5, 5.1, 6	5-6
7-8	7-8
9-10	9-10
11-12	11-12
17-18	17-18
21-22	21-22
25-26	25-26

The PSV command has been removed. Indirect addressing can be specified for the DIS, DUM, and PAT commands.

Note: File this cover letter at the back of the publication. It will then serve as a record of the changes received and incorporated.

