SDS SIGMA 5/7 BATCH PROCESSING MONITOR

Operations Manual

SCIENTIFIC DATA SYSTEMS

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BATCH PROCESSING MONITOR
OPERATIONS MANUAL

for

SDS SIGMA 5/7 COMPUTERS

90 11 98B

March 1969

SDS

SCIENTIFIC DATA SYSTEMS/701 South Aviation Boulevard/El Segundo, California 90245

REVISION

This publication, SDS 90 11 98B, is a revision of the Batch Processing Monitor Operations Manual for Sigma 5/7 Computers, 90 11 98A, dated January 1968. The principal revision is the elimination of Chapters 2 and 3 on Meta-Symbol and Symbol operations, which have been modified and incorporated in the SDS 5/7 Symbol/Meta-Symbol Reference Manual, 90 09 52B, dated November 1968. Other revisions are all minor and are marked by a vertical bar in the margin alongside the revised item.

RELATED PUBLICATIONS

Title	Publication No.
Mathematical Routines Technical Manual for SDS Sigma Computers	90 09 06
SDS Sigma 7 Universal Time-Sharing Monitor Reference Manual	90 09 07
SDS Sigma 7 Computer Reference Manual	90 09 50
SDS Sigma Symbol/Meta-Symbol Reference Manual	90 09 52
SDS Sigma 5/7 Basic Control Monitor Reference Manual	90 09 53
SDS Sigma 5/7 Batch Processing Monitor Reference Manual	90 09 54
SDS Sigma 5 Computer Reference Manual	90 09 59
SDS Sigma 5/7 Stand-Alone Systems Operations Manual	90 10 53
SDS Sigma FORTRAN IV-H Reference Manual	90 09 66
SDS Sigma FORTRAN IV-H Operations Manual	90 06 44
SDS Sigma FORTRAN IV-H Library/Run-Time Technical Manual	90 11 38
SDS Glossary of Computer Terminology	90 09 57

CONTENTS

OPERATOR/SYSTEM INTERFACE

Operator key-ins and Monitor type-outs provide the means of communication between the operator and the system when operator intervention is necessary to maintain and/or control system operation. Monitor type-outs inform the operator of various error or abnormal conditions affecting system operation. All messages from the Monitor to the operator are preceded by two exclamation marks (!!).

The common characteristics of all key-ins, whether solicited or not, are:

1. To initiate a key-in, the operator presses the INTERRUPT switch on the processor (CPU) control panel or Free-standing Console. The Monitor will type

    !!KEYIN

2. The operator always types an exclamation mark (!) as the first character, and terminates each key-in by a carriage return (i.e., the NEW LINE key).

3. The blank (i.e., space) is used as a field delimiter, and any number of blanks may be used to separate fields.

4. Each BACKSPACE means "delete the previously typed character" (but only for consoles equipped with a BACKSPACE key).

5. To delete an entire message prior to the termination of the key-in, the operator presses the EOM (end of message) key.

Some key-ins require a device name. This device name is of the form yyndd

where

    yy specifies the type of device (see Table 1).

    n specifies the channel letter (see Table 2).

    dd specifies the device number (see Table 3).

Examples:

    CRA02   means the card reader on channel A, device number 03.

    MTA08   means the magnetic tape on channel A, controller 8, device number 0.

Table 1.   I/O Device Type Codes

yy	Device Type
MT	Magnetic tape
7T	7-track magnetic tape
9T	9-track magnetic tape
CP	Card punch
CR	Card reader
PP	Paper tape punch

Table 1.   I/O Device Type Codes (cont.)

yy	Device Type
PR	Paper tape reader
TY	Typewriter
LP	Line printer
DC	Magnetic disc
NO	No device

Table 2.   Channel Designation Codes

Specified Channel Letter (n)	Corresponding Decimal Digit of Unit Address
A	0
B	1
C	2
D	3
E	4
F	5
G	6
H	7

Table 3.   Device Designation Codes

Hexadecimal Code (dd)	Device Designation
00 dd 7F	Refers to a device number (00 through 7F).
80 dd FF	Refers to a device controller number (8 through F) followed by a device number (0 through F).

Some key-ins require a system ID, a job sequence number assigned to each job by the Monitor. The system ID is output on the OC device, with the time and date, when the job begins execution. It is also output for the operator, with the JOB control command, when an input symbiont encounters one. In a nonsymbiont system, the system ID is 0 and may be omitted from key-ins.

No special operating procedures are required for standard Sigma 5/7 processors. Special processors (such as the 1401 Simulator) may require additional operator actions. These are described in the processor's reference manual or in its associated operations manual.

LOADING AND SAVING THE SYSTEM

This section discusses procedures for loading the system onto the RAD from tape and for saving the system, including all files, on tape for backup against possible disc failure.

LOADING THE SYSTEM TO DISC

The operator mounts the current system tape on any tape unit. He then follows the normal bootstrap procedure with that unit address. The tape will be copied to the RAD or RADs. At the normal termination of this procedure, the WAIT indicator is illuminated. The operator then bootstraps from the RAD by following normal bootstrap procedure with the unit address of the RAD on which the Monitor is resident. At this point, the system is in core storage and the Monitor is in the "wait state".

At this time, the operator may enter the current date and time through the appropriate unsolicited key-in (see below).

DATE/D KEY-IN

The DATE or D key-in may be used to inform the Monitor of the current date.

The DATE key-in has the form

$$\left\{\begin{matrix} !DATE \\ !D \end{matrix}\right\} month,\ day,\ year$$

where

    month   specifies the current month ($1 \leq$ month ≤ 12)

    day   specifies the current day of the month ($1 \leq$ day ≤ 31)

    year   specifies the two least significant digits of the current year ($00 \leq$ year ≤ 99)

TIME/T KEY-IN

The TIME or T key-in may be used to set the system clock to the current time of day.

The TIME key-in has the form

$$\left\{\begin{matrix} !TIME \\ !T \end{matrix}\right\} hour,\ minute$$

where

    hour   specifies the current hour ($0 \leq$ hour ≤ 23)

    minute   specifies the current minute ($0 \leq$ minute ≤ 59)

SAVING THE SYSTEM ON TAPE

Before the system may be dumped, it must be in the "wait state" and all symbionts must be terminated. The operator mounts a tape and loads the disc dump program from the card reader by following normal bootstrap procedure. The program requests tape unit and disc addresses and sizes, then writes. The tape rewinds if the dump terminated normally.

If normal termination is not encountered while dumping, the operator may again bootstrap the disc dump and repeat the above process.

SYSTEM INITIATION AND TERMINATION

DISPATCHING

A dispatcher should ensure that each JOB control command has a correct account number and priority for that job. The dispatcher should also ensure that no !FIN control commands are in the job deck (they cause a Monitor "wait state").

For a nonsymbiont system, the operator will place the job or jobs (job stream) in the C device (normally a card reader).

For a symbiont system, the operator will place the job stream in one or more symbiont input devices, ensuring that no job is split between input symbiont devices.

INITIATION

START/S KEY-IN

A nonsymbiont system is initiated by the unsolicited START or S key-in.

The START key-in has the form

$$\left\{\begin{matrix} !START \\ !S \end{matrix}\right\}$$

The system exits from the "wait state", outputs the message

    EXIT WAIT STATE

on the OC device, and reads the first record from the C device.

A symbiont system is initiated by initiating one or more symbiont input devices. To initiate a symbiont device, a key-in of the form

    !Syyndd,I

is used. This is a symbiont key-in. "I" means initialize.

The input symbiont begins reading records from the symbiont input device specified. The Monitor exits from the "wait state" upon encountering a JOB control command.

TERMINATION

A nonsymbiont system terminates upon encountering a FIN control command on the C device. The Monitor outputs the message

    ENTER WAIT STATE

on the OC device and goes into the "wait state".

A symbiont system is terminated as follows: Each input symbiont device is terminated upon encountering a FIN control command. The Monitor continues to run until all jobs previously read by the input symbionts have been

processed. It then enters the "wait state" after typing the message

ENTER WAIT STATE

Active output symbionts, if any, continue their operations until outputs from all jobs are complete. The Monitor types a message of the form

!!Syyndd TERMINATED

for each symbiont as it terminates. At this point, all system operations are idle and the Monitor will type

SYSTEM QUIESCENT

SYSTEM CONTROL

The operator may alter the system and its job stream or he may request information about the current status of the system, through the use of unsolicited key-ins.

REQUESTING INFORMATION FROM THE MONITOR

DISPLAY KEY-IN

The DISPLAY key-in may be used to request display (on the OC device) of specified information regarding system operation.

The DISPLAY key-in has the form

!DISPLAY (option)

where the option may be any of the following:

DISC   causes the Monitor to list the current amount of disc storage space available for user files. In the case of a symbiont system, the amount of disc storage space available for symbiont files is also listed. The listing is of the form

user=no. of granules [symbiont=no. of granules]

TAPES   causes the Monitor to list the device name and status of each of the tape units currently available to the system. The listing is of the form

$$yyndd \left. \begin{array}{l} \text{EMPTY} \\ \text{SCRATCH} \\ \text{USER} \\ \text{SYSTEM} \end{array} \right\} \text{reel no.} \left\{ \begin{array}{l} \text{IN USE} \\ \text{AVAILABLE} \end{array} \right\}$$

for each tape drive in the system.

system id   causes the Monitor to list the device and priority for each symbiont I/O file of the specified job. This option is meaningful only for symbiont systems. The listing produced is of the form

Syyndd,priority

JOB   causes the Monitor to list the system ID of the currently active background job. The listing is of the form

ID = system id

If no option is specified, the Monitor lists the system ID, device, and priority of all symbiont I/O files in the system. The listing is of the form

Syyndd,system id,priority

CONTROL OF SYMBIONTS

SYMBIONT KEY-IN

Any explicit control of symbionts is done by the operator via the symbiont key-in.

The key-in has the form

!Syyndd,m

where

m   specifies the action to be taken (I, S, C, R, X, or L).

The possible actions and their uses are:

I   initiate symbiont activity for the specified device.

S   suspend symbiont activity for the specified device.

C   continue suspended symbiont activity for the specified device.

R   recover a suspended printer symbiont. The symbiont will reprint the last 66 records of output to ensure clean pagination. For a nonprinter symbiont, R has the same effect as C.

X   release the current job file and begin processing the next job file. In the case of a card-reader symbiont, cards are skipped until the next JOB card is encountered.

L   lock-out the symbiont from future activity after this file. This feature is designed for output files (i.e., to release a printer to the Customer Engineers). After completing the current file, the symbiont terminates. On input files the symbiont continues processing until the next JOB control command is encountered before terminating, and the JOB control command is lost.

When a symbiont is suspended, the Monitor outputs the message

!!Syyndd SUSPENDED

on the OC device.

If the symbiont suspended itself due to a disc error, the Monitor outputs the message

disc address DISC BLK BAD

or

disc address CORE BLK BAD

on the OC device.

If the message says "CORE" the system is recoverable, although some information in the symbiont file being processed will be lost. If the message says "DISC" the entire symbiont file has been lost and its disc space will never be returned to the system. In either case, Customer Engineer attention to the disc is indicated.

Upon encountering an M:DEVICE(FORM) procedure call, after outputting the message on the OC device, an output symbiont will also suspend itself. The operator should perform the instructions contained in the message and then continue the symbiont (via an !Syyndd, C key-in).

Initiating an already active symbiont results in the message

!!Sname ACTIVE

on the OC device.

Suspending an inactive symbiont results in the message

!!Sname NOT ACTIVE

Attempting to continue or recover a symbiont which has not been suspended will result in the message

!!Sname NOT SUSPENDED

Attempting to initiate a symbiont may result in the message

disc address SYMB BLK BAD

This message means that a read error was encountered on the disc, and symbiont initiation did not take place.

CONTROL OF SYMBIONT I/O FILES

Once input files have been introduced to the system by the input symbionts, or output files by jobs, it may be desirable to delete a file or change its priority.

DELETE KEY-IN

The DELETE key-in is used to delete symbiont files from the system. It has the form

!DELETE system id [,yyndd]

where

yyndd   specifies the name of the symbiont I/O device by which, or for which, the file was created.

In the case of multiple symbionts for the same type of device, it may be necessary to use the DISPLAY key-in to determine this device name. If yyndd is omitted, all files associated with the system id (i.e., the job) are deleted.

PRIORITY KEY-IN

The PRIORITY key-in is used to alter an I/O files's priority. It has the form

!PRIORITY system id,yyndd,priority

where

priority   specifies the new priority to be associated with the I/O file specified.

The DISPLAY key-in may be used to determine the yyndd for all files associated with the job. A priority of 0 implies that the file is to be deferred until assigned a higher priority; it will not be activated even if there is no other I/O outstanding.

OTHER SYSTEM CONTROL KEY-INS

SYST KEY-IN

At System Generation time, standard system assignments for Monitor operational labels are established. As a rule, the user should have no control over these standard assignments (he may use STDLB control commands to alter assignments for the duration of his job) but the installation may wish to alter any of them without regenerating the system. The SYST key-in is used for this purpose. It has the form

!SYST label,name

where

label   specifies the Monitor operational label which is to be altered.

name   specifies the physical device (yyndd) or another Monitor operational label to which the above operational label is to be assigned.

WRITELOG KEY-IN

An accounting summary for each job is written into a Monitor file. The WRITELOG key-in may be used to request the Monitor to output this file to the accounting log (AL) device. The WRITELOG key-in has the form

!WRITELOG

The accounting file will be output at the end of the next job and all records will be deleted from the file.

JOB CONTROL

The operator has limited control over the execution of a job. This control is described below. For all key-ins referencing the system ID, the specified system ID is compared with that of the job currently running and

!!KEYERR

is typed if they do not compare. For nonsymbiont systems, the system ID is always omitted from control key-ins.

ERROR AND ABORT KEY-INS

ERROR KEY-IN

If the operator wishes to terminate a job step (i.e., a load, assembly, user execution, etc.) for any reason, he may use the ERROR or E key-in. The ERROR key-in forces an error return to the Monitor. The job step is terminated immediately. The message

!!JOB ERRORED BY OPERATOR

is output on the OC device. If the Monitor has been paused (see "Pausing a Job", below), it is taken out of that state. The job continues at the next control command.

The ERROR key-in has the form

$$\left\{\begin{matrix}\text{!ERROR}\\\text{!E}\end{matrix}\right\}\text{system id}$$

ABORT/X KEY-IN

If the operator wishes to terminate a job, he may use the ABORT or X key-in. It functions in the same way as the ERROR key-in, except that the Monitor skips to the next job. The ABORT key-in has the form

$$\left\{\begin{matrix}\text{!ABORT}\\\text{!X}\end{matrix}\right\}\text{system id}$$

The Monitor will acknowledge the request by outputting the message

!!JOB ABORTED BY OPERATOR

Note: The ERROR and ABORT key-ins will not have effect until any outstanding I/O requests have been satisfied. (This may require a key-in to satisfy any device error or interlock, or it may require making a device ready. See "Device Control".)

PAUSING A JOB

WAIT/W KEY-IN

If the operator wishes to halt a job with the intent of immediately continuing it, erroring it, or aborting it, he may use the WAIT or W key-in. The WAIT key-in has the form

$$\left\{\begin{matrix}\text{!WAIT}\\\text{!W}\end{matrix}\right\}\text{system id}$$

START/S KEY-IN

To continue a job that has been halted by a WAIT or W key-in, the operator may use the START or S key-in. The START key-in has the form

$$\left\{\begin{matrix}\text{!START}\\\text{!S}\end{matrix}\right\}\text{system id}$$

The ERROR and ABORT key-ins will cancel the wait and cause the Monitor to take the appropriate action.

SETTING SENSE SWITCHES

SWITCH KEY-IN

The Monitor maintains 6 pseudo sense switches which may be set or reset via the SWITCH key-in. The SWITCH key-in has the form

!SWITCH system id,[(SET,value,...)][(RESET,value,...)]

where

SET,value   specifies which pseudo sense switches are to be set. The "value" may be from 1 to 6, and more than one "value" may be specified. If "ALL" is specified, all pseudo sense switches will be set.

RESET,value   specifies which pseudo sense switches are to be reset. The "value" may be from 1 to 6, and more than one "value" may be specified. If "ALL" is specified, all pseudo sense switches will be reset.

TAPE HANDLING

A major part of the operator's task normally will be tape handling. The operator will be called upon to mount or dismount tapes requested by the user. He also will be asked to mount tapes and return tapes to a scratch pool. The Monitor keeps a table of tape units and the reel number of the tapes currently mounted on those units. Therefore, operator-Monitor communication is concerned with requests for the operator to take a specified action on a particular unit and with a particular reel number, or the operator informing the Monitor of some action he has taken on a particular unit with a particular reel number. The latter usually occurs when there is an empty tape drive and the operator wishes to premount a tape for an upcoming job or make a scratch tape available to the Monitor.

LABELED AND UNLABELED TAPES

The Monitor handles two types of tapes — labeled and unlabeled. Labeled tapes have the reel number of the tape written in a special record so that the Monitor can read the label and learn or verify the reel number. The label also contains the account number of the job that created the tape. Unlabeled tapes have no information on them for Monitor use.

AUTOMATIC VOLUME RECOGNITION

Some tape devices have an ATTENTION button on them. Pressing the RESET, ATTENTION and START buttons in that order initiates the Monitor's Automatic Volume Recognition (AVR) routine. This routine checks the label of the tape, if it has one, and enters the information into its label table. If the tape is not labeled but was requested by the Monitor, the AVR procedure informs the Monitor that a tape, presumably the requested one, has been mounted.

The message

!!AVRERR

indicates that the tape was not labeled properly. If the tape was mounted in response to a Monitor request, the job should probably be aborted even though the correct reel was mounted, since the user expected the tape to be

labeled and it was not. If the tape was unsolicited, the operator should inform the Monitor of its proper identification through the MOUNT key-in (see below).

MONITOR REQUESTED TAPE HANDLING

MOUNT KEY-IN

The user's job may request the Monitor to perform an I/O operation on a particular tape reel. If that reel is not available to the Monitor, it types

!!MOUNT ndd,reel number

The operator is to mount the specified tape on the specified unit. If the tape unit has the ATTENTION button, the operator may initiate the AVR procedure. In any case, he may use the unsolicited MOUNT key-in. The MOUNT key-in has the form

!MOUNT ndd[,reel number]

If the reel is specified, the Monitor makes the appropriate entry in its table. If not, the Monitor will initiate the AVR procedure. The reel number must be specified for all unlabeled tapes.

SCRATCH KEY-IN

The user may request the Monitor to perform an I/O operation on a tape without specifying a reel number. If the Monitor has no scratch tape available, it types

!!SCRATCH ndd

The operator takes a tape from the scratch pool and places it on the specified unit. He informs the Monitor that he has done so through the unsolicited SCRATCH key-in. This key-in has the form

!SCRATCH ndd,reel number

When the user's job has indicated that it is finished with a tape and wishes to have it saved, the Monitor will type

!!DISMOUNT AND SAVE reel number,system id

The operator is to remove the tape. The tape belongs to the user whose system ID is specified.

OPERATOR-INITIATED TAPE HANDLING

At any time, the operator may use the DISPLAY key-in to learn the status of each tape drive.

When one or more tape drives are empty, the operator may wish to premount some tapes for the next job. He may do this by mounting the tape on an empty unit and either initiating the AVR procedure or using the MOUNT key-in. The AVR procedure may be used only if the tape is labeled. If

the operator wishes to add a scratch tape to the system, he may mount the tape on an empty unit and use the SCRATCH key-in to inform the Monitor.

REQUEST ndd KEY-IN

The operator may request the Monitor to let him dismount a tape from a particular unit. He does this through the REQUEST key-in. The REQUEST key-in has the form

!REQUEST ndd

The Monitor will respond with

!!ndd

followed by nothing if the tape unit is empty, or followed by

DISMOUNT SCRATCH reel number

if a scratch tape is on the unit and may be removed and returned to the scratch pool, or followed by

DISMOUNT AND SAVE reel number

if the tape belongs to someone.

If the unit is in use, the Monitor will type

LATER

REQUEST 7T/9T/MT KEY-IN

If the operator wishes the Monitor to tell him on which unit he may mount a tape, he may use the following form of the REQUEST key-in:

$$!REQUEST \begin{Bmatrix} 7T \\ 9T \\ MT \end{Bmatrix}$$

where

7T   requests a 7-track unit.

9T   requests a 9-track unit.

MT   requests any available unit.

The form of the responses are the same as to the REQUEST key-in discussed previously.

FOREGROUND TASK CONTROL

F KEY-IN

Foreground tasks are controlled by the operator through use of the F key-in. The F key-in has the form

!F name,m

where

name   specifies the load module name of the pertinent real-time program.

m   specifies the action to be taken (I, X, S, L, C).

The possible actions are:

I   initiate the specified task, if inactive.

X   abort the specified task, if active.

S   suspend the specified task, until reinitiated by a C foreground key-in. This causes the foreground task's interrupt to be disarmed immediately.

L   lock the specified task until reinitiated by a C foreground key-in. This will cause the foreground task's interrupt to be disarmed when the task terminates itself.

C   continue the specified task. This key-in cancels the effect of a suspend (S) or lock (L) key-in by arming the interrupt.

DEVICE CONTROL

If the Monitor encounters an abnormal condition during an I/O operation, a message to the operator is output on the OC device. Such a message is of the form

!!yyndd message

where

a   is the action that is to be taken (C, E, or R).

The actions which may be taken are:

C   continue "as is".

E   set the appropriate error flag in the DCB associated with the I/O operation and continue.

R   repeat the I/O operation.

All operator actions suggested below are recommended procedures and may be altered by the installation as desired.

CARD READER

If the card reader fails to read properly, if a validity error occurs, or in some cases if a feed check occurs, the Monitor outputs the message

!!CRndd ERROR

If there is a feed check (indicated by the interlock light), the operator should clear the card reader, replace the rejected card, and respond with the I/O key-in.

!CRndd,R

If there is no feed check, the operator should respond with the I/O key-in

!CRndd,E

since, typically, this is the result of a bad deck setup (e.g., nonstandard binary card not preceded by a !BIN card).

If a power failure occurs, or in some cases, if there is a feed check, the Monitor outputs the message

!!CRndd INTLK

In the event of a power failure, the operator presses the RESET button on the card reader and responds to the Monitor with the I/O key-in

!CRndd,R

In the event of a feed check, the operator follows the procedure outlined under card reader error.

If the card stacker is full, the hopper is empty, or the device is in the manual mode, the Monitor outputs the message

!!CRndd EMPTY

The operator should correct the condition and press the START button on the card reader.

CARD PUNCH

Instead of outputting an error message when a punch error is first detected, the I/O handler ejects the bad card into the alternate hopper on the card punch and attempts to repunch the card x times (3 times for symbionts, 10 times for system DCBs, and a user-supplied number for special DCBs) before outputting the message

!!CPndd ERROR

on the OC device. This message indicates that the punch is malfunctioning.

The operator might place a colored card in the hopper to indicate that a punched card is missing and respond to the Monitor with the I/O key-in.

!CPndd,C

The operator can return the cards in the alternate hopper (the errored cards) to the user.

If a power failure or a feed check occurs, the Monitor outputs the message

   !!CPndd INTLK

To recover, the operator presses the RESET button on the card punch and types the key-in

   !CPndd,R

In the event of a feed check, the operator clears the jam and types

   !CPndd,R

If the hopper is empty, the stacker full, the chip box full, or if the device is in the manual mode, the Monitor outputs the message

   !!CPndd EMPTY

The operator should correct the condition and press the START button on the card punch.

LINE PRINTER

Whenever a print error is detected, the I/O handler suppresses the post-print upspace and attempts to reprint the line x times (usually 3) before outputting the message

   !!LPndd ERROR

The operator should respond to the Monitor with the I/O key-in

   !LPndd,C

to obtain as much of the user's output as possible. If the line printer power is off, the Monitor outputs the message

   !LPndd INTLK

on the OC device.

The operator should press the RESTART button on the line printer and respond to the Monitor with the I/O key-in

   !LPndd,R

If the line printer is out of paper, or if it is in the manual mode, the Monitor outputs the message

   !!LPndd EMPTY

The operator should correct the condition and press the START button on the line printer.

PAPER TAPE

If an error occurs during the reading or writing of paper tape, it is due to a power failure while operation was in progress. The Monitor outputs the message

   !!PRndd ERROR

or

   !!PPndd ERROR

The operator should respond with

   !PRndd,E

or

   !PPndd,E

If the power is off on the paper tape reader or punch, the Monitor outputs the message

   !!PRndd INTLK

or

   !!PPndd INTLK

The operator should restore power and type the key-in

   !PRndd,R

or

   !PPndd,R

If the paper tape reader or punch is in the manual mode, the Monitor will output the message

   !!PRndd EMPTY

or

   !!PPndd EMPTY

Both conditions are detected in either operation (i.e., a read operation will report that the reader is empty for each record read if the punch is in the manual mode, or vice versa).

The operator should ensure that the START buttons on the paper tape reader and punch are depressed.

MAGNETIC TAPE

If a tape is not dialed to a requested unit or if one is dialed but does not have its window up, the Monitor will type the message

   !!MTndd BAD I/O

The operator should dial in the appropriate unit (or close the unit's window) and type the key-in

   !MTndd,R

If a unit is dialed to the correct address, but has neither the START nor READY lights on (e.g., off-line manual rewind) the Monitor will type the message

   !!MTndd INTLK

The operator should ready the tape and type

   !MTndd,R

If a unit is dialed to the correct unit but the START indicator is not illuminated, the Monitor will output the message

   !!MTndd EMPTY

The operator should press the START button on the tape drive.

All errors on magnetic tape are handled by the Monitor and/or reported to the user. The operator is not informed, and no operator action is required.

MAGNETIC DISC (RAD)

All errors on disc are handled by the Monitor and/or reported to the user. The operator is not informed, and no interaction is required.

If the Monitor outputs the message

!!DCndd INTLK

on the OC device, the operator should turn disc power on if it has been turned off or call customer service. In either event, he should begin making plans for reloading the system.

MONITOR MESSAGES TO THE OPERATOR

Several of the messages that the Monitor outputs on the OC device are for purposes of information only and require no operator action. These are listed below.

At the beginning of each job, the time, data, and system ID of the job are output followed by the JOB control command. An example of this output is

16:30   MAR7,'69
!JOB   ACCT,NAME,1

When an input symbiont encounters a JOB control command, it outputs the JOB control command and system ID (inserted between the name and priority) on the OC device. An example of this output is

!!JOB   ACT,NAME,0007,7***

If the user's program (or a processor) executes an illegal instruction or an unrecognizable CAL, the Monitor outputs

!!ILLEGAL   TRAP

When a tape or disc error occurs the Monitor outputs

!!I/O ERROR xx

where

xx   specifies an error code

When a job is aborted or a job step is errored, the Monitor outputs this information on the OC device. This message has the form

!!JOB system id

$$\begin{Bmatrix} \text{ERRORED} \\ \text{ABORTED} \end{Bmatrix} \begin{Bmatrix} \text{AFTER loc} \\ \text{BY} \begin{Bmatrix} \text{PROCESSOR} \\ \text{USER} \end{Bmatrix} \text{AFTER loc} \end{Bmatrix}$$

according to whether the job was errored or aborted while the Monitor, a processor, or the user's program was in execution.

APPENDIX A. INDEX OF KEY-INS

APPENDIX B. INDEX OF MONITOR MESSAGES

SDS 701 South Aviation Blvd./El Segundo, California 90245

EXECUTIVE OFFICES
AND OPERATING DIVISIONS
701 South Aviation Blvd.
El Segundo, Calif. 90245
(213) 679-4511

EASTERN SYSTEMS DEPT.
12150 Parklawn Drive
Rockville, Maryland 20852
(301) 933-5900

PRINTED CIRCUITS DEPT.
600 East Bonita Avenue
Pomona, Calif. 91767
(714) 628-7371

TECHNICAL TRAINING
5250 West Century Blvd.
Los Angeles, California 90045
(213) 679-4511

SALES OFFICES

Eastern

Maryland Engineering Center
12150 Parklawn Drive
Rockville, Maryland 20852
(301) 933-5900

69 Hickory Drive
Waltham, Mass. 02154
(617) 899-4700

Brearley Office Building
190 Moore Street
Hackensack, New Jersey 07601
(201) 489-0100

1301 Avenue of the Americas
New York City, N.Y. 10019
(212) 765-1230

673 Panorama Trail West
Rochester, New York 14625
(716) 586-1500

P.O. Box 168
1260 Virginia Drive
Fort Washington Industrial Park
Fort Washington, Pa. 19034
(215) 643-2130

Southern

Suite 620
State National Bank Bldg.
200 W. Court Square
Huntsville, Alabama 35801
(205) 539-5131

Orlando Executive Center
1080 Woodcock Road
Orlando, Florida 32803
(305) 841-6371

2964 Peachtree Road, N.W.
Suite 350
Atlanta, Georgia 30305
(404) 261-5323

Suite 311-B
First National Bank Office Bldg.
7809 Airline Highway
Metairie, Louisiana 70003
(504) 721-9172

8383 Stemmons Freeway
Suite 233
Dallas, Texas 75247
(214) 637-4340

3411 Richmond Avenue
Suite 202
Houston, Texas 77027
(713) 621-0220

Midwest

2720 Des Plaines Avenue
Des Plaines, Illinois 60018
(312) 824-8147

17500 W. Eight Mile Road
Southfield, Michigan 48076
(313) 353-7360

4367 Woodson Road
St. Louis, Missouri 63134
(314) 423-6200

Seven Parkway Center
Suite 238
Pittsburgh, Pa. 15220
(412) 921-3640

Western

1360 So. Anaheim Blvd.
Anaheim, Calif. 92805
(213) 865-5293

5250 West Century Blvd.
Los Angeles, California 90045
(213) 679-4511

505 W. Olive Avenue
Suite 300
Sunnyvale, Calif. 94086
(408) 736-9193

World Savings Bldg.
Suite 401
1111 So. Colorado Blvd.
Denver, Colo. 80222
(303) 756-3683

Fountain Professional Bldg.
9004 Menaul Blvd., N.E.
Albuquerque, N.M. 87112
(505) 298-7683

Dravo Bldg., Suite 501
225 108th Street, N.E.
Bellevue, Wash. 98004
(206) 434-3991

Canada

864 Lady Ellen Place
Ottawa 3, Ontario
(613) 722-8387

England

London Branch
I.L.I. House
Olympic Way
Wembley Park
Middlesex

INTERNATIONAL
REPRESENTATIVES

France

Compagnie Internationale
pour l'Informatique, C.I.I.

EXECUTIVE AND
SALES OFFICES
66-68 Route de Versailles
78 – Louveciennes
951 86 00 (Paris area)

MANUFACTURING
AND ENGINEERING
Rue Jean Jaures
Les Clayes-sous-Bois
Seine et Oise
950 94 00 (Paris area)

Israel

Elbit Computers Ltd.
Subsidiary of Elron
Electronic Industries Ltd.
88 Hagiborim Street
Haifa
6 4613

Japan

F. Kanematsu & Co. Inc.
Central P.O. Box 141
New Kaijo Building
Marunouchi, Chiyoda-Ku
Tokyo

90 11 988