

**CONTROL DATA**  
CORPORATION

# **BULLETIN**

**APPLICATIONS DEVELOPMENT**

**6400/6500/6600 SCOPE OPERATING SYSTEM  
OPERATING GUIDE**



# PREFACE

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This manual contains operator information regarding the SCOPE Operating System, Version 3.0.

A knowledge of the CONTROL DATA<sup>®</sup> 6400/6500/6600 Computer System and the SCOPE Operating System is assumed.

Additional information may be found in the following publications:

	<u>Publication Number</u>
Computer Systems Reference Manual	60100000, Rev. B
SCOPE Operating System Reference Manual	60189400

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SCOPE is the Operating System used with the CONTROL DATA 6400/6500/6600 Computer System. The system has been optimized to give the operator additional latitude in providing rapid and efficient control of job flow.

Thorough familiarity with basic concepts and procedures are required prior to initiating job processing. Once the job is initiated however, operator intervention is minimal.

## 1.1 SYSTEM FEATURES

The system provides efficient utilization of all control points to effect improved scheduling and consequently increase throughput. The system includes:

- Priority scheduling
- Table structuring for additional software
- Extended core storage (ECS); ECS device allowing the allocation and release of ECS
- Disk random access; optional 6638 disk devices
- Provision for checkpoint and restart
- Tape labeling

## 1.2 SYSTEM OPERATION

6400/6500/6600 Computer Systems consist of ten peripheral processors and one or two central processors. The ten peripheral processors (PP's) perform the peripheral and operating system functions. The central processors handle main memory computation and processing. All processors have separate memories and operate concurrently under control of the SCOPE Operating System. Central memory is accessible to all processors, and the operating system is in constant control of all jobs in process. The usual equipment connected with a system includes: card reader, card punch, printer, tape transports, disk unit, and the console display and keyboard.

The SCOPE Operating System is file-oriented. All information contained within the system is considered to be a file or part of a file. The File Name/Status Table (FNT/FST) is used by SCOPE to contain information about these files. The operating system is initially loaded from the system tape by toggle settings on a Dead Start panel and cards read through the card reader; processing is initiated by the operator from the console keyboard.

A system display provides an overall status display of all current jobs. Job decks are loaded from the system input unit into disk storage. Jobs are selected on a priority basis. Seven programs may be processed at one time according to the amount of available memory space. Each job is assigned a control point which contains all information necessary to continue the job. The operator manipulates job flow through these control points via the display console.

The SCOPE Operating System processes jobs via system control cards which specify operations the computer is to perform. Jobs are assigned to specific system control points (which appear on a display scope); these control points release the jobs for processing according to a priority grouping.

The operator and the system communicate through console keyboard entries and two display scopes.

The system informs the operator as to the status of operations through the display on the console scopes. Upon request by the operator, system status or selected portions of a job may be displayed. Data entered at the console keyboard is also displayed.

Basically, there are two major categories of displays — System Display (DSD) and Job Display (DIS). The latter is used by the operator only when intervention pertinent to a single job is required.

## 2.1 SYSTEM DISPLAYS

System Displays consist of dayfile, job status, storage displays, and system file displays. The keyboard is used to initiate and control equipment assignment and job progress. The console scopes may be assigned any combination of two displays.

<u>DISPLAY (Code)</u>	<u>Description</u>
DAYFILE (A)	Running account of all jobs introduced into the system, equipment assignments, error diagnostics, central and peripheral processor time used, and I/O functions.
JOB STATUS (B)	Status of all current jobs in execution with all operator messages, equipment assignments, etc.
DATA STORAGE (C,D,E)	Five groups of four octal digits that reflect central memory word locations.
PROGRAM STORAGE (F,G)	Four groups of five octal digits that reflect central memory word locations.
SYSTEM FILE (H)	List of jobs not in execution with the name and priority of each.



### 2.1.1 DAYFILE

The dayfile (Figure 1) consists of messages, each starting with the time and job name; on the left is the actual time since system initiation, or the real time (if this was entered into the system by a TIME command to DSD).

Dayfile messages are entered as the job is processed. Each job (control card) processed is listed. Dayfile messages may be checked as follows:

1. On a console scope (Display A), the file moves up as messages are generated.
2. At the end of job printout, all dayfile messages with that job name are printed.
3. Dayfile is preserved on disk storage; its entire contents can be accessed for logging.

### 2.1.2 JOB STATUS

For the Job Status (B) display (Figure 2) DSD provides the status of all control points.

#### Control Points

System control points are used for the orderly distribution of machine facilities among concurrent activities.

#### Program Status

This area on the display is reserved for coded designations which reflect program status.

- |       |  |
|-------|--|
| A     | Job currently using central processor 0.   |
| B     | Job currently using central processor 1.   |
| X     | Input/output job awaiting recall to central processor.   |
| W     | Job waiting for central processor will not be admitted until its priority is higher than the A or B job. |
| Blank | No need for central processor.   |

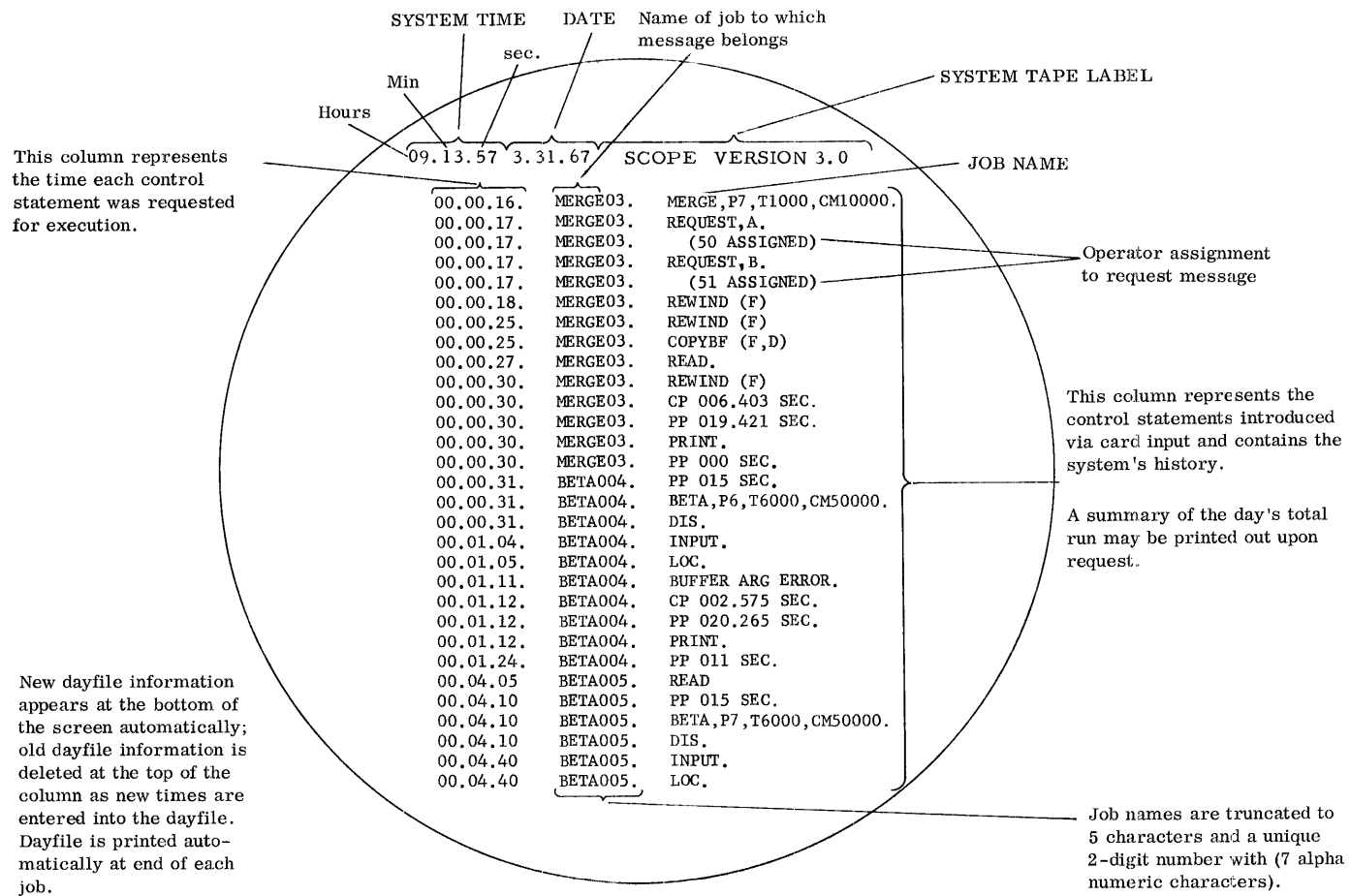


Figure 1. Dayfile (A) Display

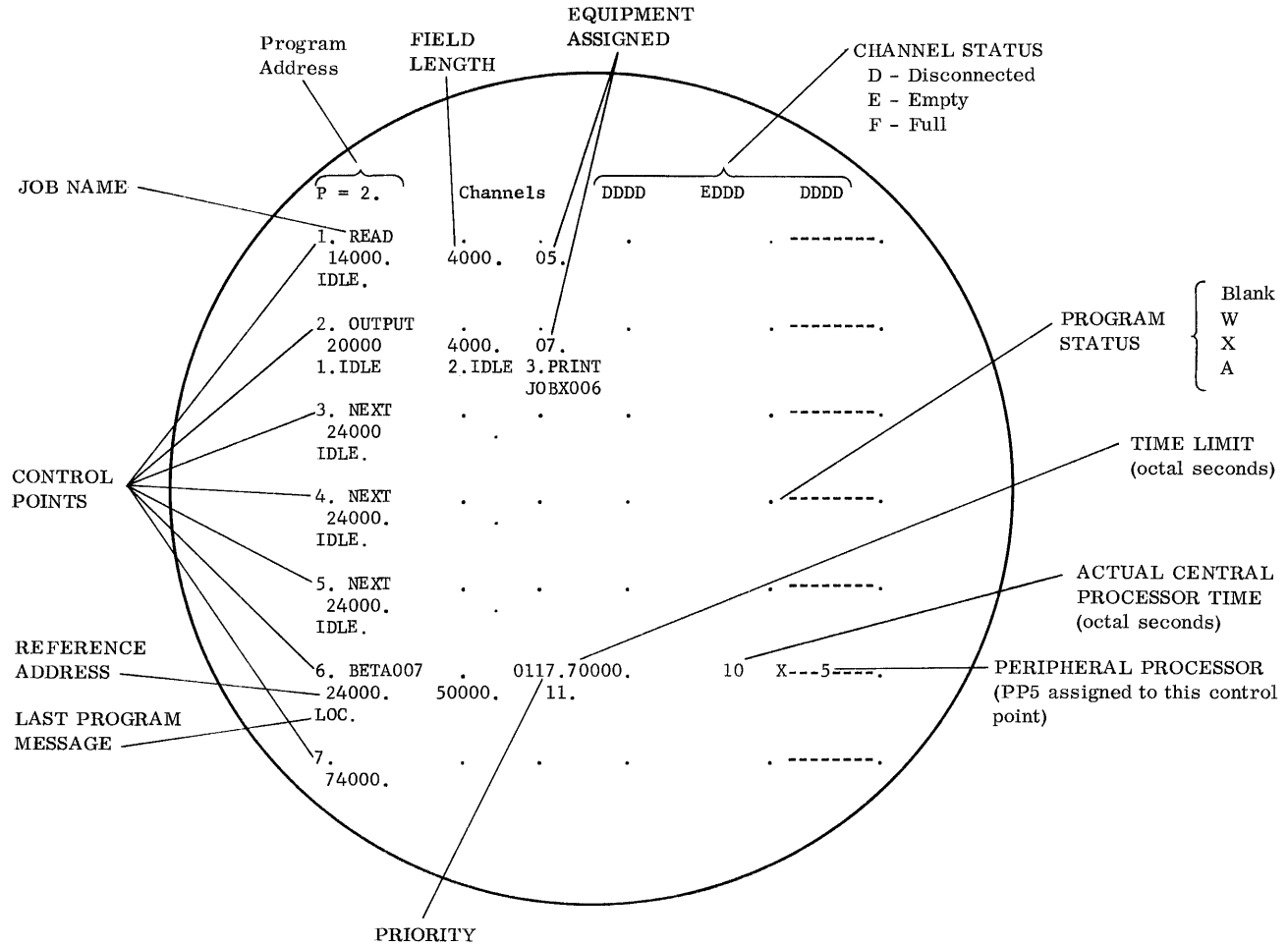


Figure 2. Job Status (B) Display

Job Name

The name of the job or control point operation.

READ	Loads jobs from card reader.
OUTPUT	Brings the output job to the assigned control point.
NEXT	Brings the next job (in order of priority) to the assigned control point.
BETA007	The name of a job to be processed.

Field Length

Amount of central memory space required for job execution as set by the programmer on the job card. It is an octal number rounded upward to nearest hundreds.

Reference Address

Beginning central memory location of the current job assigned to the control point.

Priority

Priority of job (1-7777 octal) as given on the job card or updated by the operator or the system monitor. The system processes the job with the highest priority first.

Last Program Message

Operator message area.

Program Address

Current relative program address of running program.

Status of Channels

Status display of the 12 I/O channels.

Time Limit

Time limit in octal seconds as defined on job card or updated by operator.

### Actual Central Processor Time

Actual accumulated central processor time in octal seconds.

### Peripheral Processor

PP's currently assigned to the control point.

### Equipment Assignments

Designations for equipment currently assigned to control point; equipment designations are unique to each installation.

## **2.1.3 PROGRAMMER DISPLAYS**

The displays described below are used by the programmer for storage manipulation.

### STORAGE DISPLAYS

Storage display of types C through G (Figure 3) contains groupings of central memory words. Each group preceded by its address, is displayed in octal on a separate line. The address is absolute for DSD (system display), relative for DIS (job display).

### SYSTEM FILES DISPLAY

The progress of any job (not at a control point) can be viewed in the system files (H) displays. The H displays (Figure 3) under DSD show lists of INPUT, LOCKED, OUTPUT, PUNCH, and COMMON files, with the name and priority of each file (except COMMON).

## **2.2 JOB DISPLAYS**

Job displays (DIS) are also programmer displays. They are similar to DSD and are used to display information more relevant to a single job. Using DIS, for example, the D display can indicate central memory addresses relative to the job's reference address.

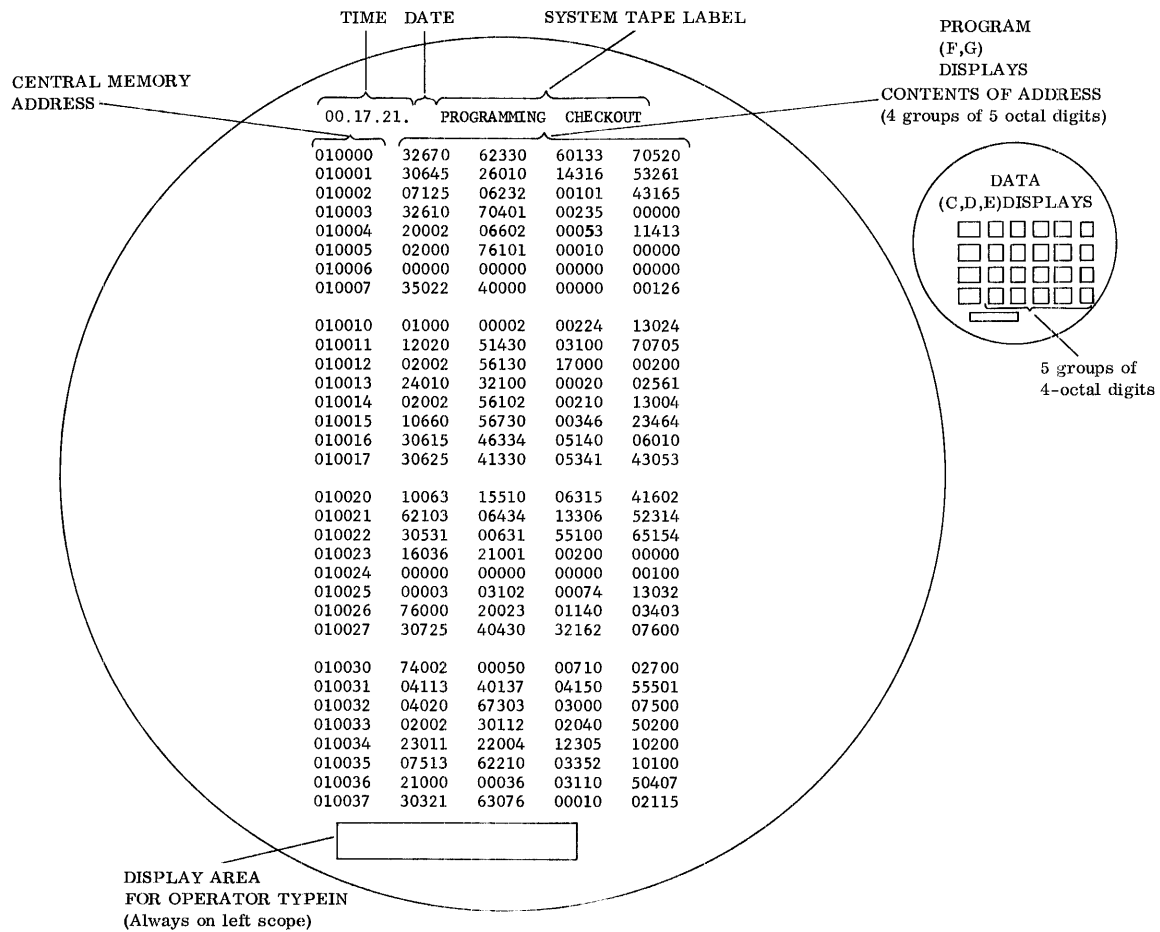


Figure 3. Storage (C Thru H) Displays

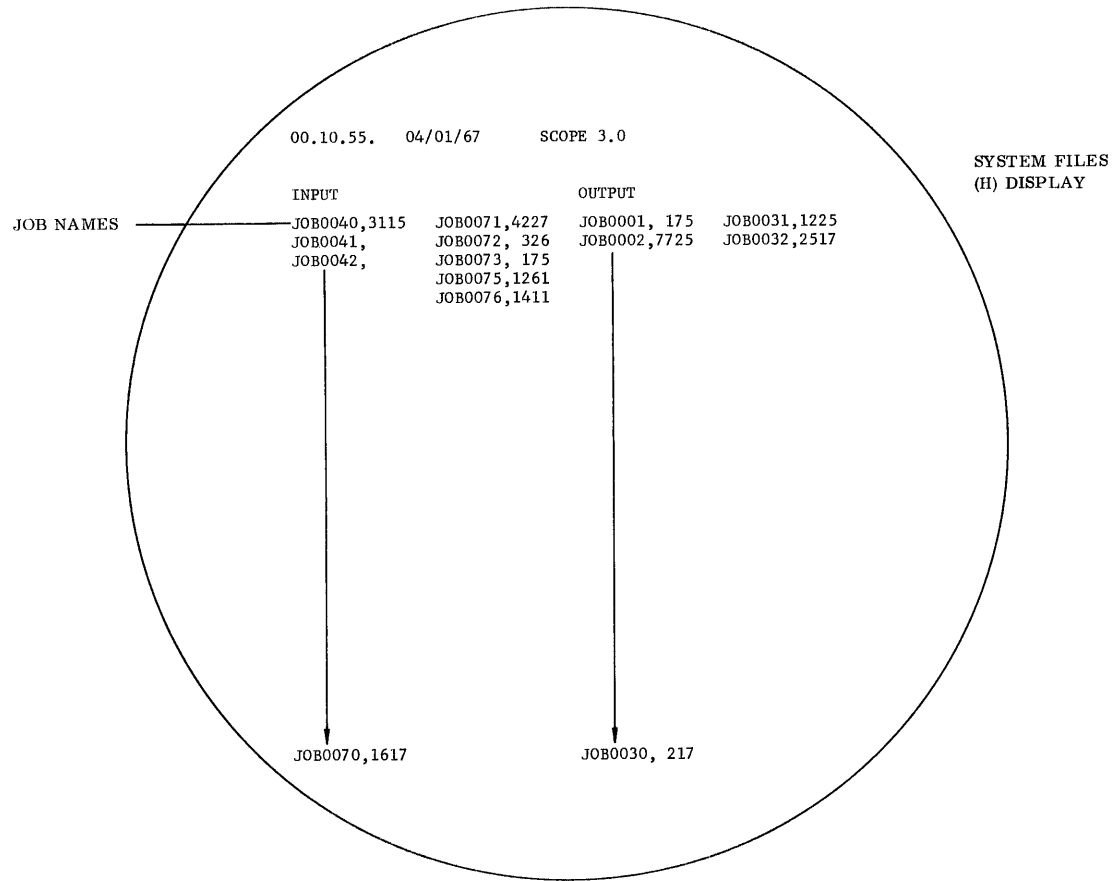


Figure 3 (cont) System Files (H) Display

**3.1  
OPERATING  
THE KEYBOARD**

Each keyboard initiated command is displayed as a single line at the bottom of the left display scope (Figure 3) as it is typed in. The operator may check and correct entries prior to initiating execution. Backspacing blanks out the last character keyed; an ERASE type-in clears the entire line.

Each command should end with a period followed by a carriage return at which point the message will be interpreted by the system. If the command is acceptable, it is acted upon and the line on the scope is cleared; if not acceptable one of the following messages appears above the erroneous line, and corrections can be made to the command.

<u>Message</u>	<u>Description</u>
FORMAT ERROR	Type-in contains a formatting error
ILLEGAL ENTRY	Keyboard input is unrecognizable to system
WAIT MTR FCN xx	System is in step mode, or monitor busy and DSD is waiting for Monitor.

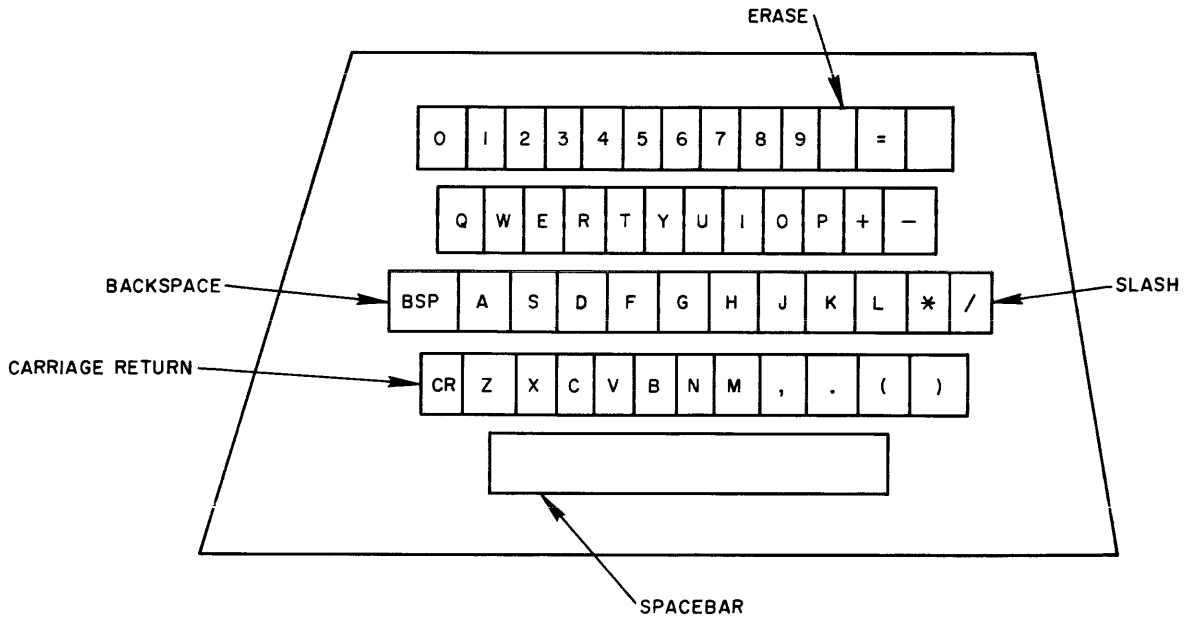


Figure 4. Console Keyboard



Keyboard entries can be separated into the following four basic groups (x = control point number):

Display section	mn.	(3.2.1)
System command	Command.	(3.2.2)
Control point operation	x. Operation.	(3.2.3)
Control point command	x. Command.	(3.2.4)

### 3.2

#### CONSOLE DISPLAYS

The two console scopes may display any combination of two out of eight possible patterns which inform the operator of system activity. One line of information always appears at the top of each scope no matter which displays have been selected.

At the top of the left scope (Figure 1) is the system header line, which includes the current time, date and system tape label entries.

Time	Date	System Tape Label
09.13.57.	3/31/67.	SCOPE SYSTEM VERSION 3.0 3/31/67.

Time is the current operating system running time in hours. minutes. seconds. This entry can be set to current time by the operator with the TIME system command (3.2.2). Date indicates the current date of operation and is entered by the operator with the DATE system command (3.2.2). The system tape label indicates the system tape in current use; it may be preset when the tape is updated. This entire line is printed out after the dayfile for every job.

At the top of the right scope (Figure 2) is a line containing the program address and channel status:

Program Address	Channel Status
P = 3765	CHANNELS FDDD EDDE EDFD

This indicates the current relative program address of the active program. If no program is running, the system idles at P = 2.

The current activity for each data channel is indicated:

- D - Disconnected
- E - Empty
- F - Full

The channels are ordered left to right from 0 to 13<sub>8</sub>.

### 3.2.1

#### DISPLAY SELECTION

The following displays allow the operator to monitor overall system operation, including the console messages to the operator. The system displays are identified by a unique letter:

Dayfile	A
Job status	B
Data storage	C, D, E
Program storage	F, G
System files	H

Under normal job flow, the A and B displays are generally active with the H display referenced occasionally. In general, the C, D, E, F and G displays are used only by the system programmer. To monitor overall system operation, including console messages, the operator selects two displays by entering a two letter code at the console keyboard and typing a period and a carriage return: mn.  $\text{\textcircled{CR}}$

m is the left scope display, n is the right scope display.

AB. will give the dayfile display on the left scope and the Job Status display on the right on the system console. However, the two letters may be the same, so both scopes will display the same information.

#### DAYFILE (A) DISPLAY

The dayfile (Figure 1) is a system file containing a chronological history of system operation. All control cards, pertinent keyboard entries and system diagnostics are recorded as dayfile messages in the form:

Time	CName	Message
08.43.22	PDQ0007	OPERATOR DROP

Time is current system time at entry of dayfile message. CName is job name of control point issuing message.

The dayfile is kept on disk with the latest messages displayed on scope display A. The dayfile display stack is pushed up as new messages are entered when display A is selected. Otherwise, all messages are saved until the dayfile is selected; this allows the operator to scan all system messages.

Upon completion of printing of the OUTPUT file for a particular job, all the dayfile entries for that job while at a control point are printed out as a permanent record for the user.

### JOB STATUS (B) DISPLAY

This display (Figure 2) provides an overall summary of current job execution at each control point. Almost all operator involvement with the operating system is through this display.

Each control point is displayed with the following format:

x.CPname, Priority, Time Limit, Running Time, S-----

RA ,FL Equipment Numbers  
Program message to operator  
Equipment message to operator

x Control point number (1-7)

CPname Either the name from a job card or a control point operation name. A blank name indicates no activity at the control point.

Priority, Time Limit, and FL (field length)

Values indicated on the job card unless manually changed by the operator.

Running Time Accumulated central processor running time for this job.

RA (reference address) Absolute central memory address where the control point operation begins.

Equipment Numbers Logical equipment numbers for all equipment currently assigned to control point.

S Single letter indicating central processor status:

A Job currently using central processor 0.

B Job currently using central processor 1.

W Job waiting for central processor.

X Input/output job in recall.

blank No current need for central processor.

----- Indicate PP's currently being used by the control point. The number of a PP in use will appear replacing the - at the control point position.

### STORAGE (C-G) DISPLAYS

Type C through G storage displays (Figure 3) display portions of the content of central memory. They are used primarily by the system programmers to observe and update system operation.

Each display is divided into four groups (0-3) of eight consecutive central memory words. Each word is displayed in octal on a separate line preceded by its address in octal.

Data display (C,D,E) words are divided into 5 groups of 4 digits; program displays (F,G) separate the words into 4 groups of 5 digits.

To select the starting address of any 8-word group, type:

RS, ADDRESS.

R storage display (C-G)

S group number (0-3)

4 will set all four groups to display 32 consecutive words

ADDRESS is the starting address for the group.

Though only two of the A through H displays can be seen at a time, the settings for C through G displays are retained for future reference.

Any central memory word can be changed by a console command:

ADDRESS,DATA.

ADDRESS absolute octal address of memory location to be changed.

DATA contents to be placed in ADDRESS.

Leading zeros may be dropped in both the address and data words.

Sample entries:

AF. Display dayfile on left scope and program storage (F) on right.

F4,1000. Display words 1000-1037 on right scope .

F3,1100. Display 1000-1027 and 1100-1107 on right scope. Change group 3 to display 1100-1107.

1100, 3762. Insert 0000 0000 0000 0000 3762 in location 001100.

### SYSTEM FILES (H) DISPLAYS

These displays (Figure 3) show a list of file types INPUT, OUTPUT, COMMON, LOCKED, and PUNCH; giving the priority for all except COMMON. As many as two types may be displayed at one time. The H display is set to display INPUT and OUTPUT files. This may be changed in the following manner:

To alter the choice of file types for the H display type in:

H, *lr*.

*l* is the code for the left selection, *r* is for the right selection. *l* and *r* can assume the following values:

- I INPUT Files
- O OUTPUT Files
- C COMMON Files
- L LOCKED Files
- P PUNCH Files

For example, to display OUTPUT and PUNCH files on the H display, the entry would be:

H, OP.

OUTPUT files would be displayed in the two left columns of the H display, and PUNCH files in the two right columns.

To use the entire H display for files of one type, for example COMMON file, the following entry would be made:

H, C.

### **3.2.2 SYSTEM COMMANDS**

The following keyboard entries are for overall control of the operating system. They have no specific relation to any job in process and are used mainly for system initialization and by the system programmer.

All entries must be left justified (no preceding spaces) in the operator type-in area, with a period and carriage return to enter the command.

AUTO. Control point operation is initiated for automatic job processing. The operator is freed from entering individual control point operations manually. This command should be used only when all control point names are blank, usually only immediately after a dead start operation. The normal control point operation layout is as follows:

<u>Control Point Number</u>	<u>Control Point Operation</u>
1	READ.
2	OUTPUT. (section
3	NEXT. 3.2.3)
4	NEXT.
5	NEXT.
6	NEXT.
7	(blank)

ENPR,pppp,fffff,y. This entry allows the operator to change the priority of any system file of type INPUT, OUTPUT and PUNCH listed in the H display.

pp is the new priority (octal).

fffff is name of file to be changed.

y indicates file type: I=INPUT, O = OUTPUT and P = PUNCH;  
I is assumed if type is not specified.

OFFcc. This entry informs the operating system that logical equipment number cc is not available for system usage. After every dead start operation, an entry should be made for each equipment that is to be unavailable for automatic system assignment.

**ONcc.** This entry informs the operating system that logical equipment number cc is now available for automatic system assignment.

Example:

A system printer may be inoperative because of a ribbon change. Since the operating system continually assigns printers as needed, OFF22. must be typed to remove control of the printer from the operating system. When the printer is again operative, the entry ON22. restores it to system control.

**TIME.hh.mm.ss.** The operator can update the system real-time clock to current time of day. This entry is necessary after any dead start and to reset the clock at mid-night. No spaces are allowed and no characters may be omitted; hh = hours, mm = minutes, ss = seconds.

The following system commands should be used only by experienced personnel. Incorrect use will create a total system hangup.

**DCNzz.** This allows the operator to disconnect I/O channel zz (octal).

**FCNzz.** This allows the operator to enter a zero function code to I/O channel zz (octal), thereby removing all equipment selections on that channel.

**MCHzz.** With this entry, the operator can master clear I/O channel zz (octal). This is used to clear a channel transmission parity indication on 3000 series peripheral equipment. It will master clear and remove all equipment selections on the specified channel.

STEP. This entry initiates a step mode for monitor processing of PP requests. For each keyboard spacebar entry a single PP monitor request will be honored. High speed operation is resumed when a period is entered.

### 3.2.3 CONTROL POINT OPERATIONS

The following keyboard entries can be directed to any control point with a blank control point name. The control point will then be set up for the indicated operation. Every entry is preceded by x (a digit from 1-7) indicating the control point to which the command is directed.

x.DAYFILE,uu. This keyboard entry permits the Dayfile to be dumped.

The DAYFILE will be changed to the medium (uu) specified by the operator. Permissible values of uu are MT, LP, or CP.

If MT is specified the operator will be requested to assign a tape. If LP or CP is requested, no assignment will be necessary, the dayfile dump will be placed in the output stacks for those devices.

x.DIS. This entry allows an operator to enter and execute a job directly through the console. It calls a job to the assigned control point. A field length of 60,000<sub>8</sub>, time limit and priority will be entered into the control point area. The message WAITING FOR STORAGE appears if not enough central memory storage is available. DIS is automatically entered to this control point giving direct control of this job to the operator.

x.DUMP. This entry enters a magnetic tape dump operation at the designated control point. A REQUEST TAPE message appears prior to the operation; and the operator responds:

x. ASSIGNyy.

yy is the equipment status entry for the magnetic tape unit to be used for the dump and x is the control point requesting the tape. See section 3.2.4 for ASSIGN command.



The current backlog of complete OUTPUT files, not currently being processed, is written on this tape according to job priority. A file mark is recorded upon completion of the operation, the tape is backspaced over the file mark (to allow repeated dumps on the same tape) and the control point operation is dropped. The tape can then be listed off-line with a tape-to-printer utility program.

**x.LOAD.** A magnetic tape load operation is entered at the designated control point. This statement may be used for tapes generated in the SCOPE 3.0 binary format. A REQUEST TAPE message for operator assignment of a magnetic tape unit containing the input job files will appear.

Jobs will be transferred to the disk file and given the file type INPUT just as if they were read from a card reader under a READ operation. The tape read on this unit must have input jobs stacked to a double file mark; they can be prepared by a utility program off-line. When the double file mark has been read, the LOAD package will drop, and the control point will be cleared for another operator assignment.

**x.LOADX.** This statement is essentially the same as x.LOAD. It is to be used with input tapes generated in binary format by an earlier version of SCOPE.

**x.NEXT.** NEXT is brought to the control point to search for an unassigned INPUT file and start job execution. The control point name is then changed from NEXT to the name of the assigned job. When the job terminates, the control point again brings up NEXT as its name and the search resumes.

Jobs can be processed at control points only when NEXT is specified.

**x.OUTPUT.** The OUTPUT control point provides off-line processing for print and punch output. Output is generated by a job and stored on the disk as special files until processed by the OUTPUT control point according to priority.

This OUTPUT operation requests 1000 octal central memory words for each output device to a maximum of six.

Each block is called a buffer point (bp). Each buffer point can output a single file type to an available equipment.

The File Name Table is continually scanned for output files. If an OUTPUT or PUNCH file is encountered and equipment is available; the output process will begin at a buffer point. Entries used for controlling the operations are:

x.ENDbp.	Terminate operation at buffer point bp.
x.REPEATbp.	Repeat current operation at bp. Allows an output operation to be repeated if a printer malfunction occurs.
x.SUPPRESSbp.	(OUTPUT file only) Suppress page control of printer at bp.

#### PUNCH FILES

At the beginning of a punch operation, the job name is punched into each job card for ease of identification. A blank card is offset at the beginning of each logical record and two cards are offset when a compare error occurs during repunching. A clean deck should result if the identification card and all off-set cards are removed.

#### PRINT FILES

The print file may cause a message to appear at the control point. If so, make the proper response and type x.GO. The output for each job ends with the dayfile printout for the job.

x.READ. This entry calls a card reader input package to the control point.

Automatic assignment is made of the first unassigned card reader; jobs loaded into that card reader are transferred to the disk as type INPUT (job) files. They will then be processed at a NEXT control point.

If a card reader is unavailable for assignment, NO CR AVAILABLE will be displayed and the operation will wait either for the operator to enable logically a card reader, drop the control point operation (3.2.4) or wait for a card reader to be released from another control point.

### 3.2.4 CONTROL POINT COMMANDS

The following entries refer to a specific control point where an operation is in progress. Every entry is prefixed by x, the control point number (1-7).

x.ASSIGNyy. Equipment yy is assigned to a specified control point. This method should be used only when the job is waiting for the equipment assignment as indicated by a REQUEST statement display.

Care must be taken not to ASSIGN an equipment already assigned to another control point. The display area for each control point indicates the logical units assigned to that control point. If a double assignment of an equipment is made, operation halts at the duplicate control point until the first control point releases the equipment.

x.COMMENT. This entry is followed by operator comments. It is used by the operator to inform the programmer of special action taken on a job, as the message is printed out in the dayfile of the particular job.

x.DIS. With this entry, the operator calls the special display (DIS) to the control point to allow a more detailed examination and control of the control point. This display requires an entire console. If a console is unavailable for display assignment, a control point message requests operator assignment of a display console. If only one console is available, operator control and observation of the system ends until both consoles are released.

x.DROP. All operation at control point x ends; the control point is cleared to allow a new operator assignment. Careful consideration must be given to specifying control points to be dropped. It is generally used when a program halts (P counter constants) in an active condition. With the COMMENT statement, the operator informs the user as to the cause of abnormal job termination before entering the DROP statement.

- x.ENPR,yyyy. The current priority of the specified control point may be changed to yyyy (1-7777 octal).
- x.ENTL,yyyyy. A new time limit yyyyy (octal seconds) may be established for the job in process at control point x.
- x.GO. This entry restarts a job in a pause condition. It signals completion of operator action to control point messages. This command should be entered after a FORTRAN PAUSE message. It may also be entered when an irrecoverable tape parity error has occurred if the job is to be continued.
- x.OFFSWz. This entry clears sense switch z (1-6).
- x.ONSWz. This entry sets sense switch z (1-6).
- n.RECHECK. This entry tells the system to reread a tape label following a pause for operator action due to a label error. Operator may mount new reel prior to this tape in.
- n.VRN, xxxxxx. The visual reel number xxxxxx will be used as a portion of the labeling information for a labeled tape. This entry should only be used in response to a request for a visual reel number.

### 3.3

#### CONSOLE MESSAGES

During normal job processing, a variety of messages appear in the system display. The dayfile contains a running log of system operation including all control cards, equipment assignments, error diagnostics programmer messages and central and peripheral processor times.

Also, below each control point on the Job Status display, two lines contain specific information for the operator concerning current jobs. These messages are of immediate concern, and the operator should take immediate action to maximize system throughput.

The first display line at a control point normally contains the last dayfile message from that control point; the second line handles transient equipment messages not intended for the permanent record.

The following abbreviations are used in the messages:

EQ	Equipment
CR	Card Reader
CP	Card Punch
MT	Magnetic Tape Unit
xx	Two-octal-digit equipment entry
aa	Two-character equipment type entry

### 3.3.1 CONTROL POINT MESSAGES

The following messages appear below the requesting control point display. When operator action is required, the message is displayed until remedial action is taken.

EQ xx REJECT.

Equipment cannot be connected. Compare xx entry with site provided equipment select code. If possible, change equipment or unit select code; otherwise DROP control point. With the exception of disks units, an equipment may be assigned to only one control point at a time. Equipment status entry must agree with configuration prior to reinitiating a job. If a transmission parity error is indicated, master clear channel yy by typing MCHyy.

EQ xx NOT READY.

Make equipment ready; or, for magnetic tape, unload and remount tape on another unit on same controller; switch the unit selection.

CR xx RE-READ LAST CARD.

Reload last card from the output tray, make reader ready.

**CR xx RE-READ LAST 2 CARDS.**

Reload last two cards in output tray, make reader ready, and type x.GO (x is control point). One of two messages in dayfile indicate the cause for re-read:

CR xx COMPARE ERROR

CR xx BINARY CARD ERROR

**MT xx PARITY ERROR.**

Read parity error. The block is re-read 10 times before this message is displayed. To accept information as is, type x.GO. To drop current control point job, type x.DROP. Message appears in dayfile.

**MT xx WPE UNRECOVERED.**

A write parity error could not be corrected by erasing and rewriting the tape. To accept information as written, type x.GO. To drop current control point job, type x.DROP. Message appears in dayfile.

**PAUSE xxxxx.**

The program PAUSE allows special operator action before program proceeds. After specified action is completed, typing x.GO. resumes program execution. The program indicates which PAUSE occurred with xxxxx, a decimal number. Message appears in dayfile along with response.

**NO aa AVAILABLE**

Job is waiting for equipment. Turn on equipment of type aa if logically OFF but operative, by typing ONxx. (xx is logical equipment number). If equipment is available but assigned to another control point, operation cannot proceed until equipment is released.

**3.3.2  
DAYFILE MESSAGES  
TO OPERATOR**

The following messages appear in dayfile with the current system, time of entry, and the name of the control point issuing the message. A job may be dropped, equipment and/or unit numbers changed, and malfunctions corrected while an error message is displayed. If an abnormally large number of dayfile error messages are encountered, a Control Data Field Engineer should be consulted.

Example:

Time	CPname	Message
13.37.57.	JTC0423	(53 ASSIGNED)

CR xx COMPARE ERROR.

A compare error was detected during a card read operation.

CR xx BINARY CARD ERROR.

A binary checksum error was detected during a card read operation.

CP xx COMPARE ERROR.

A compare error was detected during a card punch operation.  
Two cards including the one in error will be offset and repunched.

JOB CARD ERROR

Incorrect job card format was encountered during READ operation.  
The job is not processed, but dayfile output will indicate the error occurred.

xx ASSIGNED.

Issued in response to an operator assignment to a request message.

OPERATOR DROP.

Issued in response to an operator DROP of specified job.

## 4.1 SYSTEM TAPE LOADING

The procedures for loading the SCOPE Operating System Tape on a 607 magnetic tape transport are given below:

1. Before mounting the System Tape, check the back of the reel to make sure a WRITE ENABLE ring is not present.
2. Mount System Tape and thread through guides and under head.
3. Set density selectors on the tape unit as specified on the System Tape label.
4. Press LOAD switch, followed by READY switch on the tape unit.
5. Select the tape unit number, 0-7, by rotating the selector at the top of the tape unit on which System Tape is mounted. Make certain it is not the same number as any other tape unit also linked to the system.
6. Set the Dead Start panel switches.

## 4.2 DEAD START SETTINGS AND LOADING

The dead start panel consists of a 12 by 12 matrix of toggle switches plus four additional toggle switches located, below the matrix, on the lower portion of the panel. The dead start switches are set manually as shown in Figures 5, 6, and 7.

Two cards are required for normal dead start: The first is the bootstrap for dead starting from tape, disk, or recovery and the second is an end-of-file. The procedure is shown below:

**DEAD-START FROM TAPE.** Put the TAPE DEAD START card and the EOF card in the reader, press the dead-start button, and then make the card reader ready. The system tape will be read and rewound.

**DEAD-START FROM DISK.** This can be done only if the system is intact on disk. (Dead start has previously been done from tape and information on the disk has not been destroyed.) The procedure is the same as above except the first card is labeled DISK DEAD-START. The system tape is not used.



**DEAD-START RECOVERY.** This can be done only if the system is intact on disk and central memory. Input, output, common, and locked files will be recovered. The jobs which were running at the time the dead-start button was pressed will be returned to the input queue. The procedure is the same as above except that the first card is labeled RECOVERY DEAD-START. The system tape is not used.

RECOVERY RISKY will be displayed if recovery conditions are doubtful. If GO is typed in, recovery will be attempted anyway; and if LOAD is typed in, no recovery will be attempted and the system will be re-loaded from disk.

The dead start panel setting if the card reader is on channel 0, 12, or 13 is shown in Figure 5.

If the card reader is on channels 1-11, the setting is as shown in Figure 6.

If it is necessary to dead start from tape without the use of cards (this need be done only if the card reader is unavailable), mount the tape and press the dead-start button. The panel setting for this special case is shown in Figure 7.

### **4.3 INITIALIZING THE SYSTEM**

After the dead-start operation is completed, the left scope will display the message:

ENTER DATE

followed by the installation-selected date format. The operator must type in the proper date terminating with a carriage return. When the system has accepted the date, the A and B displays will appear on the left and right scopes. Display intensity may be adjusted using the controls on the panel directly beneath the scopes.

### **4.4 TIME ENTRY**

The operator types in the time as shown below:

TIME.10.15.10 (CR) As it is typed, this entry is displayed on the bottom of the left scope. The carriage return enters the type-in into the system, and the time is displayed at the top of the left scope, left justified.

MEMORY

0001 Binary	(UP) (UP) (UP) 1 1 1	(UP) (DN) (UP) 1 0 1	( ) ( ) ( ) X X X	( ) ( ) ( ) X X X †
0002 Binary	(UP) (UP) (UP) 1 1 1	(UP) (UP) (UP) 1 1 1	( ) ( ) ( ) X X X	( ) ( ) ( ) X X X †
0003 Binary	( ) ( ) ( ) e e e	(DN) (DN) (DN) 0 0 0	(DN) (DN) (DN) 0 0 0	( ) ( ) ( ) 0 0 0
0004 Binary	(UP) (UP) (UP) 1 1 1	(UP) (UP) (UP) 1 1 1	( ) ( ) ( ) X X X	( ) ( ) ( ) X X X †
0005 Binary	(DN) (DN) (UP) 0 0 1	(UP) (DN) (DN) 1 0 0	(DN) (DN) (DN) 0 0 0	(DN) (DN) (DN) 0 0 0
0006 Binary	(UP) (UP) (UP) 1 1 1	(UP) (DN) (DN) 1 0 0	( ) ( ) ( ) X X X	( ) ( ) ( ) X X X †
0007 Binary	(UP) (UP) (UP) 1 1 1	(DN) (DN) (UP) 0 0 1	( ) ( ) ( ) X X X	( ) ( ) ( ) X X X †
0010 Binary	(DN) (DN) (DN) 0 0 0	(DN) (DN) (DN) 0 0 0	(DN) (DN) (DN) 0 0 0	(DN) (DN) (DN) 0 0 0
0011 Binary	(DN) (DN) (DN) 0 0 0	(DN) (DN) (DN) 0 0 0	(DN) (DN) (DN) 0 0 0	(DN) (DN) (DN) 0 0 0
0012 Binary	(DN) (DN) (DN) 0 0 0	(DN) (DN) (DN) 0 0 0	(DN) (DN) (DN) 0 0 0	(DN) (DN) (DN) 0 0 0
0013 Binary	(DN) (DN) (DN) 0 0 0	(DN) (DN) (DN) 0 0 0	(DN) (DN) (DN) 0 0 0	(DN) (DN) (DN) 0 0 0
0014 Binary	(DN) (DN) (DN) 0 0 0	(DN) (DN) (DN) 0 0 0	(DN) (DN) (DN) 0 0 0	(DN) (DN) (DN) 0 0 0

$\left( \begin{array}{c} (+)HIGH \\ (X)NORM \\ (+)LOW \end{array} \right)$ 
 $\left( \begin{array}{c} (+)HIGH \\ (X)NORM \\ (+)LOW \end{array} \right)$ 
 $\left( \begin{array}{c} (+)SWEEP \\ (X)LOAD \\ (+)DUMP \end{array} \right)$ 
 $\left( \begin{array}{c} (+)ON \\ (X)OFF \end{array} \right)$

Toggle this switch only after all others are set.

DN = down

e = controller number

u = unit number

†XX = 2-digit channel number is set by these 6 switches.

(For 3000 systems, XX may only be channels 12 or 13.)

Figure 5. Dead Start Panel (Normal Settings 0, 12, 13)

MEMORY

0001 Binary	(DN) (DN) (UP) 0 0 1	(UP) (DN) (DN) 1 0 0	(DN) (DN) (UP) 0 0 1	(DN) (DN) (DN) 0 0 0
0002 Binary	(UP) (UP) (UP) 1 1 1	(DN) (UP) (UP) 0 1 1	( ) ( ) ( ) X X X	( ) ( ) ( ) X X X †
0003 Binary	(DN) (DN) (DN) 0 0 0	(DN) (DN) (DN) 0 0 0	(DN) (DN) (DN) 0 0 0	(UP) (UP) (DN) 1 1 0
0004 Binary	(UP) (UP) (UP) 1 1 1	(UP) (DN) (UP) 1 0 1	( ) ( ) ( ) X X X	( ) ( ) ( ) X X X †
0005 Binary	(UP) (UP) (UP) 1 1 1	(DN) (DN) (UP) 0 0 1	(DN) (DN) (UP) 0 0 1	(DN) (UP) (DN) 0 1 1
0006 Binary	(DN) (DN) (DN) 0 0 0	(DN) (DN) (DN) 0 0 0	(DN) (DN) (DN) 0 0 0	(DN) (DN) (DN) 0 0 0
0007 Binary	(UP) (UP) (UP) 1 1 1	(UP) (UP) (UP) 1 1 1	( ) ( ) ( ) X X X	( ) ( ) ( ) X X X †
0010 Binary	( ) ( ) ( ) ℓ ℓ ℓ	(DN) (DN) (DN) 0 0 0	(DN) (DN) (DN) 0 0 0	(DN) (DN) (DN) 0 0 0
0011 Binary	(UP) (UP) (UP) 1 1 1	(UP) (UP) (UP) 1 1 1	( ) ( ) ( ) X X X	( ) ( ) ( ) X X X †
0012 Binary	(DN) (UP) (UP) 0 0 1	(UP) (DN) (DN) 1 0 0	(DN) (DN) (DN) 0 0 0	(DN) (DN) (DN) 0 0 0
0013 Binary	(UP) (UP) (UP) 1 1 1	(UP) (DN) (DN) 1 0 0	( ) ( ) ( ) X X X	( ) ( ) ( ) X X X †
0014 Binary	(UP) (UP) (UP) 1 1 1	(DN) (DN) (UP) 0 0 1	( ) ( ) ( ) X X X	( ) ( ) ( ) X X X †

$\left( \begin{array}{c} (\uparrow)\text{HIGH} \\ (\text{X})\text{NORM} \\ (\uparrow)\text{LOW} \end{array} \right)$ 
 $\left( \begin{array}{c} (\uparrow)\text{HIGH} \\ (\text{X})\text{NORM} \\ (\uparrow)\text{LOW} \end{array} \right)$ 
 $\left( \begin{array}{c} (\uparrow)\text{SWEEP} \\ (\text{X})\text{LOAD} \\ (\uparrow)\text{DUMP} \end{array} \right)$ 
 $\left( \begin{array}{c} (\uparrow)\text{ON} \\ (\text{X})\text{OFF} \end{array} \right)$

Toggle this switch only after all others are set.

- ℓ = controller number of card reader.
- DN = down
- u = unit number
- † XX = 2-digit channel number is set by these 6 switches.

Figure 6. Dead Start Panel (Normal Settings 1-11)

MEMORY

0001 Binary	(UP) (UP) (UP) 1 1 1	(UP) (DN) (UP) 1 0 1	( ) ( ) ( ) X X X	( ) ( ) ( ) X X X †
0002 Binary	(UP) (UP) (UP) 1 1 1	(UP) (UP) (UP) 1 1 1	( ) ( ) ( ) X X X	( ) ( ) ( ) X X X †
0003 Binary	( ) ( ) ( ) e e e	(DN) (DN) (DN) 0 0 0	(DN) (DN) (DN) 0 0 0	( ) ( ) ( ) u u u
0004 Binary	(UP) (UP) (UP) 1 1 1	(UP) (UP) (UP) 1 1 1	( ) ( ) ( ) X X X	( ) ( ) ( ) X X X †
0005 Binary	(DN) (DN) (DN) 0 0 0	(DN) (DN) (DN) 0 0 0	(DN) (DN) (DN) 0 0 1	(DN) (DN) (DN) 0 0 0
0006 Binary	(UP) (UP) (UP) 1 1 1	(UP) (UP) (UP) 1 1 1	( ) ( ) ( ) X X X	( ) ( ) ( ) X X X †
0007 Binary	(DN) (DN) (UP) 0 0 1	(UP) (DN) (DN) 1 0 0	(DN) (DN) (DN) 0 0 0	(DN) (DN) (DN) 0 0 0
0010 Binary	(UP) (UP) (UP) 1 1 1	(UP) (DN) (DN) 1 0 0	( ) ( ) ( ) X X X	( ) ( ) ( ) X X X †
0011 Binary	(UP) (UP) (UP) 1 1 1	(DN) (DN) (UP) 0 0 1	( ) ( ) ( ) X X X	( ) ( ) ( ) X X X †
0012 Binary	(DN) (DN) (DN) 0 0 0	(DN) (DN) (DN) 0 0 0	(UP) (UP) (UP) 1 1 1	(DN) (UP) (UP) 0 1 1
0013 Binary	(DN) (DN) (DN) 0 0 0	(DN) (DN) (UP) 0 0 1	( ) ( ) ( ) 0 0 1	( ) ( ) ( ) 0 1 0
0014 Binary	(DN) (DN) (DN) 0 0 0	(DN) (DN) (DN) 0 0 0	(DN) (DN) (DN) 0 0 0	(UP) (UP) (UP) 1 1 1

$\left( \begin{array}{c} (†) \text{HIGH} \\ (X) \text{NORM} \\ (†) \text{LOW} \end{array} \right)$ 
 $\left( \begin{array}{c} (†) \text{HIGH} \\ (X) \text{NORM} \\ (†) \text{LOW} \end{array} \right)$ 
 $\left( \begin{array}{c} (†) \text{SWEEP} \\ (X) \text{LOAD} \\ (†) \text{DUMP} \end{array} \right)$ 
 $\left( \begin{array}{c} (†) \text{ON} \\ (X) \text{OFF} \end{array} \right)$

Toggle this switch only after all others are set.

DN = down

e = controller number

u = unit number of system tape

†XX = 2-digit channel number for tapes is set by these 6 switches.

Figure 7. Dead Start Panel (Special Settings)

Every time a dead start is initiated, the time of day must be re-entered into the system, as this is the only means for informing the system of clock time.

The system uses this time (updated every second) for dayfile messages. If a time entry is not made, the time since dead start is used. The left scope also displays the dayfile message DEAD START each time a dead start occurs.

The system tape, rewound to LOAD POINT, will not be referenced again during operation, unless another dead start is necessary. The tape unit, containing the system tape, may be cleared, unloaded, removed, and used for other operations.

## 4.5 INITIATING JOB PROCESSING

The SCOPE System may be initialized in one of two modes. An operator may automatically load the control point areas with the standard instructions by entering AUTO. (CR) on the console keyboard, or he may manually load each control point separately from the console keyboard. Several programs may be run concurrently; programs may be added, deleted, or modified and priorities changed as the need arises.

### 4.5.1 SELECTING AUTOMATIC MODE

For automatic mode processing, punched card input and printer output is assumed.

In normal operation, job processing is initiated with the type-in AUTO. which brings the following activities to control points.

<u>Control Point Number</u>	<u>Job Name</u>	<u>Activity</u>
1	READ	Load jobs from card reader and store on disk.
2	OUTPUT	Transfer job output from disk to printers and punches.
3	NEXT	Search for job on disk to process at this control point.
4	NEXT	
5	NEXT	
6	NEXT	
7	-	No activity

#### 4.5.2 SELECTING MANUAL MODE

Manual operation is similar to automatic, except that each operation must be requested by the operator or the job itself. For example, the operator may enter: 2. READ. **CR**

If an input job stack is prepared off line, the operator enters: 3. LOAD. **CR**  
or 3. LOADx. **CR**

To execute, the operator types x. NEXT. for each control point to be assigned a job. (x is a control point number.) As each job is executed, output files are entered on the disk. No output processing will result until the operator enters: 4. OUTPUT. **CR**

An alternate method is to enter x. DUMP. **CR** on the keyboard; the accumulated output files are dumped on magnetic tape in the order of job priorities for printing off-line.

#### 4.5.3 DROPPING A JOB

When the operator enters: x. DROP. **CR** jobs at the designated control point drop. READ, LOADx, or LOAD may be dropped to allow another job to use the control point. This operation may be used in both automatic and manual mode.

#### 4.5.4 ROLLOUT AND ROLLIN

A job at a specified control point may be "rolled out" or "rolled in" at the request of the operator. Memory assigned to the job is released. Neither the control point nor the equipment assigned to the job is released.

To roll out memory assigned to a job at control point x, type:

x. ROLLOUT. **CR**

To roll in memory, type:

x. ROLLIN. **CR**

#### 4.5.5 DAYFILE DUMP

The operator can request the dayfile to be dumped and the disk space released.

Type: x. DAYFILE, uu.

where:

x is the control point number.

uu is the unit type to which the dayfile is to be dumped.

The valid unit types are:

LP - line printer  
CP - card punch  
MT - magnetic tape

#### 4.5.6

**CHANGING PRIORITIES** Priorities may be changed on the console keyboard as follows:

##### I/O Files in the H Display

To change the priority of an INPUT/OUTPUT/PUNCH file listed in the System Files (H) display, the operator must type the following message:

ENPR, xxxx, fffff;t. (CR)

x        new priority number.

fffff   name of the file to be changed; may be any file in the system.

t        type = I, input; O, output; P, punch

##### Control Point Job

To change a job at a control point (without using DIS. ), the operator must type the following message:

x. ENPR, yyyy. (CR)

x        control point number.

yyyy    new priority.

**5.1  
CARD READER**

This section contains information necessary to prepare the 405 card reader for operation under external or manual control after all power and control cables have been connected.

**5.1.1  
APPLICATION  
OF POWER**

To energize the card reader initially:

1. Open left front cabinet door.
2. Push the main power circuit breaker to the UP position. If the three main power indicators fail to light, notify field engineer.
3. Push the remaining circuit breakers to the UP position.
4. Push Operate-Calibrate toggle switch to OPERATE position.
5. Press Main Power switch on operator panel. Switch indicator should light. If not, repeat the procedure; notify field engineer if indicator still does not light.
6. Close the front cabinet door.

**5.1.2  
LOAD CARD  
PROCEDURE**

1. Set guide edge of supply tray and receiving tray for length of card being used. Narrow half of each tray may be removed, turned end-for-end and reassembled as necessary.
2. Load cards into supply tray, placing column one at right as cards face entrance of read station.
3. Check input wall of secondary and main receiving trays if 8-column (long) cards are used. Hinged card-stopping blocks should be positioned such that a flush surface is formed at each input wall. The hinged block assemblies must be pivoted to protrude from the wall surfaces of each receiving tray if 51-column (short) cards are to be used.
4. At input tray, set card-stopping pin to protrude from the face plate if short cards are to be used; turn pin in clockwise direction to form flush wall if long cards are being used.



5. Place equipment in manual mode of operation by pressing Auto/Man switch to MAN.
6. Stop indicator (operator panel) should be on. If not press Run/Stop switch (operator panel).
7. Press Motor Power switch (operator panel). Light should turn on.
8. Press Ready switch (operator panel).
9. Press Single Pick switch (operator panel) to initiate transport of single card from supply tray to receiving tray. If operation is not satisfactory (failure to pick single card), check input throat for possible obstruction.
10. Remove card from receiving tray or secondary bin and replace in supply tray.
11. Press Auto/Man switch back to AUTO to return equipment to automatic mode.

CAUTION

Cards may not be removed from the secondary stacker while the card reader is operating. With care, cards may be added to the input tray or removed from the primary stacker during operation.

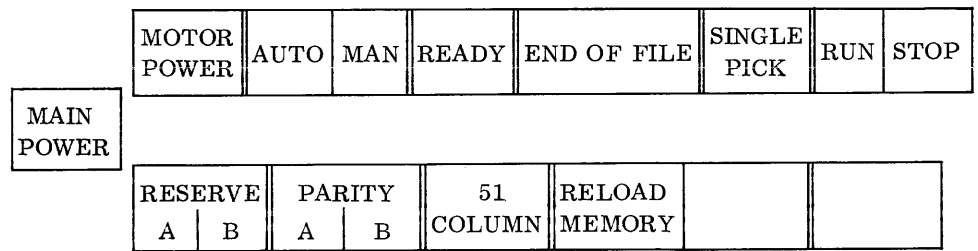


Figure 8. Card Reader Switches and Indicators  
(Used With 3649 Controller)

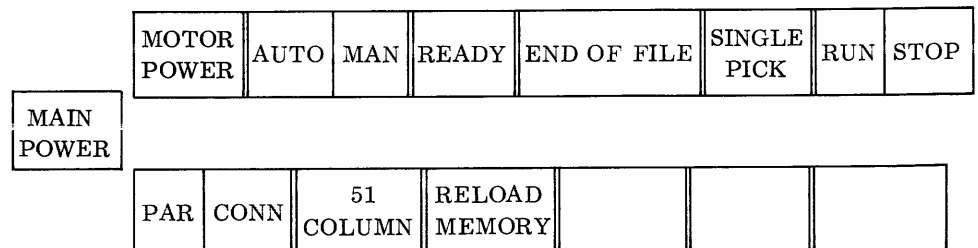


Figure 9. Card Reader Switches and Indicators  
(Used With 3447 Controller)

#### MAIN POWER Switch

This switch controls all primary power and turns on the photocell light source. It is lighted when power is on.

#### MOTOR POWER Switch

This switch controls power to the drive motors, the vacuum-pressure system, and the hopper-stacker vibrators.

#### AUTO/MAN Switch

This two-position switch selects manual- or program-controlled modes of operation. Changing switch position to MAN drops the ready status bit. The switch must be in the AUTO position when the reader system is used for computer input/output operations.

#### READY Switch

This switch activates the reader if:

1. Input tray is not empty.
2. No error conditions exist in the unit.
3. Primary and secondary stackers are not full.

The switch lights to indicate the ready condition. When the switch is pressed, the first card is read into buffer memory. Thereafter, the reader system is under program control.

#### END-OF-FILE Switch

This switch enables the reader system to generate an end-of-file status bit following the transmission of the data from the last card in the input tray. It is lighted when set.

#### SINGLE PICK Switch

A single card may be cycled through the reader when the Auto/Man switch is in MAN position. It does not light.

#### RUN/STOP Switch

The card feed may be controlled manually when the Auto/Man switch is in MAN position. The set side is lighted.

#### RESERVE A/B Indicator\*

If either data channel is reserving the read station, the corresponding side is lighted.

#### PARITY A/B Indicator\*

The channel on which a parity error occurred during the transmission of a Connect or Function code is indicated by a light.

#### 51 COLUMN Switch

This switch allows short (51-column) cards to be read. It is lighted when set.

#### RELOAD MEMORY Switch

Pressing this switch feeds data from a new card into memory when the Auto/Man switch is set to AUTO. It does not light.

## 5.2

### CARD PUNCH

Card punches 415/523 are prepared for operation as follows:

1. Turn punch on.
  - 415 Punch: Two power switches are located on switch panel.
  - 523 Punch: Power switch is located on end panel.
2. Place cards face down in hopper with row 9 toward the direction of card feed.
3. Check that chip box and stacker are not full.
4. Advance cards into prepunch and postpunch stations.
  - 415 Punch, press SINGLE PICK switch twice.
  - 523 Punch, press START switch twice.
4. Master Clear from computer.
6. The NOT READY and FAIL TO FEED indicators on the controller should not be lighted.
7. The punch is now ready for an operation under program control.

---

\*3649 Controller only

**5.2.1  
415 SWITCHES  
AND INDICATORS**

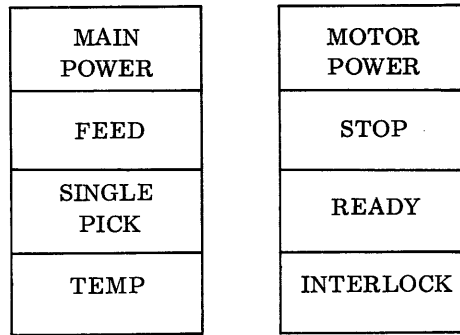


Figure 10. 415 Punch Switches and Indicators

**MAIN POWER Switch**

This switch applies power to the cooling fans and the power supplies. It is lighted when power is on.

**MOTOR POWER Switch**

This switch applies power to the punch motor. It is lighted when power is on.

**FEED Indicator**

This indicator is lighted when a card jam exists.

**STOP Switch**

This switch causes the punch to become Not Ready. It is lighted when the punch is in a Not Ready condition.

**SINGLE PICK Switch**

This switch advances cards one cycle. It is lighted until the advance has been completed.

**READY Switch**

This switch clears punch logic and puts the punch in Automatic mode. It is lighted when punch is in Ready condition.

#### TEMPERATURE Indicator

This indicator is lighted when the card punch temperature exceeds 100°F.

#### INTERLOCK Indicator

This indicator is lighted when the head panel, hood panel, or right door is open.

### 5.2.2 523 SWITCHES AND INDICATORS

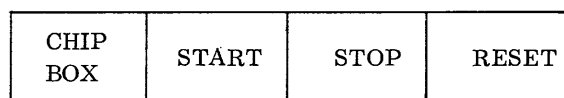


Figure 11. 523 Punch Switches and Indicators

#### OFF/ON Switch

This switch, on the end panel on the right, applies power to the punch.

#### START Switch

This momentary-contact switch causes the cards to advance one cycle. From an initial load, pressing this switch twice advances cards into all stations. When the operation is complete, pressing the switch twice unloads punched cards.

#### STOP Switch

This switch causes the punch to become Not Ready.

#### RESET Switch

This switch causes the punch to become Ready following a reload or unload. It does not advance the cards.

#### CHIP BOX Indicator

This indicator is lighted when the chip box is full.

### 5.3 TAPE UNIT

The procedures given below prepare the 603/604/606/607 tape units for operation.

#### 5.3.1 APPLICATION OF POWER

To initially energize the tape unit:

1. Open doors at back of cabinet.
2. Set the two-line circuit breakers (on power supply) to UP. The neon indicator should light.
3. Set the two-reel power circuit breakers (on power supply) to UP.
4. Hold the Power On switch on the maintenance panel for about 2 seconds. The pump motor should start.
5. The POWER indicator on the operator's control panel should light. If not, repeat the procedure.
6. Close the back doors.

The POWER switch on the operator's control panel is used only to remove power from the unit. Once this switch is pushed, the above procedure must be repeated in order to apply power to the unit.

#### 5.3.2 TAPE LOAD

1. Slide front door down to lowest position.
2. Check that supply reel has been file-protected as necessary.
3. Mount reel on supply reel hub and tighten hub knob.
4. Make sure that tape load arms are in up position.
5. Pull tape from supply reel to reach takeup reel. Thread tape on the outside of the supply tape load arm, over the head assembly, around the outside of the takeup load arm, and over the top of the takeup reel. Release tape and spin the takeup reel hub two or three times.
6. Slide tape under head assembly.
7. Snap tape load arms down.
8. Set Unit Select switch (0-7 or STANDBY) to program selection number.
9. Press CLEAR switch.

10. Press LOAD switch. Tape drops in columns, moves forward, and stops on load point marker. LOAD indicator lights. If tape continues moving forward for more than 3 or 4 seconds, either no load point marker was placed on the tape, or the operator manually wound the marker onto the takeup reel during step 5.
11. If the unit is to be operated by the controller, press the READY switch. If it is to be manually operated and the READY switch has been pushed, set the CLEAR switch.
12. Push door up.

If the supply reel contains a file protection ring, the overhead lights should be on, indicating that a write operation may be performed.

### **5.3.3 TAPE UNLOAD**

1. Press CLEAR switch.
2. Press UNLOAD switch. All tape is automatically drawn from the takeup reel and wound on the supply reel. The UNLOAD indicator lights.
3. Slide down front door.
4. Loosen supply reel hub knob and remove supply reel.
5. Check if reel needs to be file-protected and if it is labeled adequately prior to storage.

### **5.3.4 SPECIAL INSTRUCTIONS**

To simulate an UNLOAD condition without removing all tape from the takeup reel, simultaneously push the CLEAR and UNLOAD switches. The Unload condition is simulated, but tape does not move. To place the unit in operational status, remove all tape from the vacuum columns by revolving the takeup reel clockwise and the supply reel counterclockwise. Snap the tape load arms down and push the LOAD switch. The tape moves forward and stops on the nearest load point marker. The LOAD indicator lights.

If all tape is unwound from the supply reel:

1. Snap the tape load arms up, if necessary.
2. Guide tape around the tape load arms, over the head assembly, and wrap approximately 10 turns around the supply reel.
3. Slide tape under head assembly.
4. Press the LOAD switch.

5. As soon as the FORWARD indicator lights, press the CLEAR switch and then the REVERSE switch. Tape will rewind on the nearest load point marker.

The following information is applicable when a number of load point or end of tape markers are used on a single tape:

To move forward from a reflective marker and stop at nearest end of tape marker, push the FORWARD switch.

To move forward off a reflective marker and stop at nearest load point or end of tape marker, press the FORWARD and then the LOAD switch. The LOAD indicator lights if motion stops at load point marker.

To reverse from a reflective marker and stop at nearest load point marker, press the UNLOAD, CLEAR, and REVERSE switches in that order.

Tape motion may be stopped at any time by pressing the CLEAR switch. An UNLOAD operation may be performed by pressing the UNLOAD switch.

### 5.3.5 MANUAL CONTROLS

The manual controls (Figures 12 and 13) are effective when the CLEAR switch is lighted. The indicators, however, reflect both manual- and processor-imposed operating conditions.

#### UNIT SELECT Switch

A 10-position switch is mounted on each tape unit. The settings (0-7 or STANDBY) designate the control. Units in a Standby condition cannot be used by the processor.

A white indicator in this switch is lighted while the unit is connected to a data channel. A red indicator is lighted while the unit is reserved by a data channel.

#### POWER Switch/Indicator

This switch turns off tape unit power. It is lighted when power is on.

#### FORWARD Switch/Indicator

This switch moves the tape forward and is lighted when selected. Motion stops when the end of tape marker is sensed or the CLEAR switch is pressed.



POWER	FORWARD	REVERSE	REWIND
WRITE	READ	DENSITY LO	DENSITY HI
UNLOAD	LOAD	READY	CLEAR

Figure 12. 603/606 Operator's Control Panel

POWER	FORWARD	REVERSE	REWIND
WRITE	READ	200 556	800
UNLOAD	LOAD	READY	CLEAR

Figure 13. 604/607 Operator's Control Panel

**REVERSE Switch/Indicator**

This switch rewinds the tape. Motion stops when the load point marker is sensed or the CLEAR switch is pushed. It is lighted during this operation.

**REWIND Switch/Indicator**

This switch rewinds the tape to load point. It is lighted during this operation.

**WRITE Indicator**

This indicator is lighted during a write or write-file-mark operation.

**READ Indicator**

This indicator is lighted during a read operation.

**DENSITY LO<sup>†</sup> Switch/Indicator**

This switch selects low density and is lighted when selected.

**DENSITY HI<sup>†</sup> Switch/Indicator**

This switch selects high density and is lighted when selected.

**200/556<sup>††</sup> Switch/Indicator**

This alternate-action switch selects either 200 or 556 bits per inch density. The selected side is lighted.

**800<sup>††</sup> Switch/Indicator**

This switch selects 800 bits per inch density and is lighted when selected.

**UNLOAD Switch/Indicator**

This switch moves all the tape to the supply reel. It lights when the tape unit is in unload status.

**LOAD Switch/Indicator**

This switch moves tape forward to load point. It lights when the tape is at load point.

**READY Switch/Indicator**

This switch places the unit under processor control. It is lighted when selected.

**CLEAR Switch/Indicator**

This switch master clears the tape unit and places the unit under manual control. It is lighted when selected.

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<sup>†</sup> 603/606 Tape units

<sup>††</sup> 604/607 Tape units

## 5.4 PRINTER

Procedures for preparing the 501 printer are given below.

The manual controls and indicators on the control panel are on the upper right side of the printer.

### 5.4.1 MANUAL CONTROLS

POWER ON	START	SINGLE SPACE	PAPER OUT
POWER OFF	STOP	PAGE EJECT	PARITY ERR OVERRIDE

Figure 14. 501 Printer Operator Control Panel

#### DRUM SPEED TOGGLE Switch

Print drum speeds of 1000 or 667 RPM may be selected with the LOW/HIGH switch. High speed 1000 RPM is considered normal operating speed.

Low speed should be selected when a 48-character printing format is used as it provides a printing rate of 667 lines per minute with double spacing. Otherwise under high speed, this format reduces the printer rate to 500 lines per minute. Printer rate is increased by 167 lines per minute for this format when LOW is selected.

### 5.4.2 PAPER LOADING

1. Turn hammer crank two to three turns counterclockwise.
2. Press PAGE EJECT switch on control panel.
3. Raise hinged pressure plates of all four tractors to permit insertion of paper forms.
4. Loosen extended locking screws (long shafts) of upper and lower left tractors.
5. When left edge of paper is positioned, tighten extended locking screws to fix upper and lower (left) tractors in position.

6. Insert paper between lower side of print drum and hammer bank, extending paper to upper tractors.
7. Turn hammer crank fully clockwise.
8. Engage perforated edges of paper with drive pins.
9. Set vernier thumb screw of upper and lower right tractors to approximate central position. Tighten extended locking screws to set general position of these tractors.
10. Close pressure plates.
11. Set horizontal paper tension by varying the vernier thumb screws of right tractors.
12. Adjust Paper Tension control at left panel for proper tension in vertical direction.
13. Press Single Space switch several times and observe paper holes and action of paper tear switches.
  - a. If vertical paper tension is too loose, whipping action will result, activating paper tear switches. If vertical paper tension is too tight, paper holes will tear and elongate in the vertical direction. Adjust Paper Tension control at left panel.
  - b. If horizontal paper tension is too tight, tearing will occur at the outer edges of paper holes. Adjust vernier thumb screw at both upper and lower right-hand tractors.
14. Press START switch and observe position of type with respect to top of paper form. If print is not properly positioned within one line of the correct location, paper must be removed from tractors, moved up or down as required and reinserted on tractor drive pins.
15. If paper forms are ruled, initiate print operation and adjust Forms Positioning Control to locate printed line relative to ruled paper line.
16. Initiate another print operation. When this procedure places type alignment within one line of the correct location, use Form Positioning Control in making final adjustments.

### 5.4.3

#### RIBBON REPLACEMENT

1. Turn hammer crank two to three turns in the counterclockwise direction to obtain necessary clearance between print drum and hammer bank assembly.
2. Press Ribbon Rewind pushbutton and hold until ribbon is transferred to outer roll.
3. Slacken ribbon by manually turning outer roll several revolutions in forward direction.
4. Grasp outer roll and push toward left side of printer. The drive cap at the right end of roll will disengage, permitting removal of roll.

5. Unwind remaining ribbon from inner roll. Pull free end of ribbon from aperture between drum and hammer assembly. Discard worn ribbon and roll.
6. Remove inner roll by pushing to left until drive cap at the right end of roll disengages. Reinstall in outer position.
7. Place new roll in the inner position so the ribbon leaves from bottom of roll. Be sure slot on right end of roll engages drive cap pin.
8. Insert two sheets of paper between print drum and hammer assembly. Attach the leader of the new ribbon roll to the outer sheets. Draw paper and ribbon through toward front of printer.
9. Detach ribbon leader from paper. Pull ribbon leader over outer roll and fasten to the roll. Wind a few turns onto the roll, taking up slack by rotating roll several revolutions. Be sure slot in right end of roll engages drive cap pin.
10. Press Ribbon Rewind pushbutton. Ribbon should move at a steady rate and wind evenly.
11. If the ribbon telescopes during the loading procedure, grasp the ribbon firmly in both hands and place the end against a table. Press slowly and firmly until the ribbon is recentered on its core.

## **APPENDIX SECTION**

# 6400/6500/6600 CHARACTER SET

A

<u>Char.</u>	<u>Display</u>	<u>Hollerith</u>	<u>EXT BCD</u>	<u>Char.</u>	<u>Display</u>	<u>Hollerith</u>	<u>EXT BCD</u>
A	01	12-1	61	/	50	0-1	21
B	02	12-2	62	(	51	0-8-4	34
C	03	12-3	63	)	52	12-8-4	74
D	04	12-4	64	\$	53	11-8-3	53
E	05	12-5	65	=	54	8-3	13
F	06	12-6	66	blank	55	space	20
G	07	12-7	67	,	56	0-8-3	33
H	10	12-8	70	.	57	12-8-3	73
I	11	12-9	71	≡	60	0-8-6	36
J	12	11-1	41	[	61	8-7	17
K	13	11-2	42	]	62	0-8-2	32
L	14	11-3	43	:	63	8-2	00
M	15	11-4	44	≠	64	8-4	14
N	16	11-5	45	→	65	0-8-5	35
O	17	11-6	46	V	66	11-0	52 <sup>†</sup>
P	20	11-7	47	^	67	0-8-7	37
Q	21	11-8	50	↑	70	11-8-5	55
R	22	11-9	51	↓	71	11-8-6	56
S	23	0-2	22	<	72	12-0	72 <sup>††</sup>
T	24	0-3	23	>	73	11-8-7	57
U	25	0-4	24	≤	74	8-5	15
V	26	0-5	25	≥	75	12-8-5	75
W	27	0-6	26	┘	76	12-8-6	76
X	30	0-7	27	;	77	12-8-7	77

<sup>†</sup> 11-0 and 11-8-2 are equivalent  
<sup>††</sup> 12-0 and 12-8-2 are equivalent

## 6400/6500/6600 CHARACTER SET (CONT'D)

<u>Char.</u>	<u>Display</u>	<u>Hollerith</u>	<u>EXT BCD</u>
Y	31	0-8	30
Z	32	0-9	31
0	33	0	12
1	34	1	01
2	35	2	02
3	36	3	03
4	37	4	04
5	40	5	05
6	41	6	06
7	42	7	07
8	43	8	10
9	44	9	11
+	45	12	60
-	46	11	40
*	47	11-8-4	54



## DEAD START LOADER MESSAGES

B

BLOCK COUNT SHOULD BE xxxxxx, IS xxxxxx

The number of physical records written on the tape does not agree with the number read.

CONTROL POINT OCCUPIED

Operator tried to dump the dayfile from an occupied control point. A control point must be vacant (have no job name).

CREATION DATE SHOULD BE xxxxxx, IS xxxxxx.

Creation date which should be in the tape label is not the one found. Operator may type in n. RECHECK or n. GO or n. DROP.

DEAD START RECOVERY

Placed in the system dayfile when recovery is unsuccessful.

DISK PARITY ERROR

Displayed when a parity error is encountered when loading from disk. Loading terminates.

EDITION NUMBER SHOULD BE xx, IS xx

The edition number which should be in the tape label is not the one found. Operator may provide another tape and type in n. RECHECK or n. GO or n. DROP.

ENTER DATE MM/DD/YY

Appears at DEADSTART time. Operator must type today's date in the specified format before beginning operation.

EQ xx PARITY ERROR

Displayed when transmission parity error occurs during card reader connect function.

EQ xx REJECT

Displayed when card reader connect function is rejected.

EXPIRATION DATE SHOULD BE xxxxx, IS xxxxx

Expiration date which should be in the tape label is not the one found. Operator may accept the tape anyway by typing n.GO; he may mount a different tape and type n.RECHECK; or he may drop the job n.DROP.

FILENAME SHOULD BE xxxx...xx, IS xxxx...xxx.

File name error; first 20 characters are the FET file name entry and the second set are the tape label's file name entry; n.GO, n.DROP, or n.RECHECK may be typed.

ILLEGAL EQUIPMENT

Displayed if the equipment assigned to a LOAD or LOADX control point is not a magnetic tape.

ILLEGAL EQUIPMENT REQUEST

Operator did not request MT, CP, or LP on a request to dump the dayfile.

ILLEGAL TERMINATOR

Operator did not use a period to end a request to dump the dayfile.

MOUNT REEL SHOWN ON UNIT xx MOUNT REEL NUMBER ONE

The first reel of a set of multi-file, multi-reel group should be mounted.

MT xx END OF TAPE

Processing on magnetic tape xx is terminated because of end-of-reel condition of CLOSER request.

MT xx ENTER VISUAL REEL NO.

Operator should respond with n.VRN,xxxxxx., where xxxxxx is label number pasted on the tape reel.

MT xx LABEL UNRECOGNIZABLE

Label of MT xx is not EOF1 or EOVI as expected; operator action is requested by additional message.

MT xx NOT READY

Tape unit xx is not ready; the message will continue to be displayed until the unit is readied or the job is dropped.

MT xx REJECT

Tape unit xx cannot be connected. Compare xx entry with site-provided equipment select code. If possible, change equipment or unit select code; otherwise type, n.DROP.

MT xx RESERVED

An attempt was made to connect to tape xx which is reserved by another channel. Message is displayed until the condition is corrected or until the job is dropped.

MT xx NO WRITE ENABLE RING

An attempt was made to write on tape unit xx which has no write enable ring; the message will be displayed until a ring is inserted or the job is dropped.

MT xx WPE RECOVERED

Write parity error was encountered and recovery was successful. The job continues normally.

MT xx WPE UNRECOVERED

A write parity error was irrecoverable. The job may be continued by typing n.GO or terminated by typing n.DROP.

MT xx XMSN PARITY ERROR

Transmission parity error in the 6681 data channel converter.

MULTIFILE NAME SHOULD BE xxx, IS xxx

The multi-file name of the assigned tape does not agree with that requested. The tape may be accepted, n.GO; a different tape may be mounted and checked, n.RECHECK; or the job may be dropped, n.DROP.

#### NO CP AVAILABLE

A card punch cannot be assigned to PBC. The PP loops until a card punch is available, or until the job is dropped.

#### NO CR AVAILABLE

No card reader is available to the READ control point.

#### PAUSING FOR OPERATOR ACTION

Error was detected in processing the file label. Operator is expected to enter n.GO, n.RECHECK or to drop the job; the routine pauses and waits for operator decision.

#### RECOVERY RISKY

It appears that central memory resident may not be intact. Operator action is awaited; type GO if recovery is to proceed anyway; type LOAD if the system should be reloaded from the disk.

#### REEL NUMBER SHOULD BE xxxx, IS xxxx

The requested tape reel number does not agree with that specified in the tape file label.

#### REQUEST lfn

Displayed when processing the request function or card before the operator has made the assignment. The operator is expected to assign equipment for file lfn. If the device type is specified (dt), the proper equipment type must be assigned.

#### REQUEST lfn, dt, dc, x.

Displayed after the assignment has been made by the operator followed by  
(xx ASSIGNED)

#### REQUEST DISPLAY

DIS is in HOLD, waiting for operator assignment of display console.

RESTART CONTROL CARD ERROR — Job dayfile

Issued when the RESTART control card has two or more parameters and the second one is not CLEAR, or when no parameters appear on the card.

SYSTEM ERROR IN LOADER..HELP..CALL CDC

LOADER has been designed to fail safe; that is, all communications with the system are checked out and edited in some manner. If one of the interfaces degenerates or a new bug appears in LOADER, communication checking can result in this error comment.

TAPE PARITY ERROR

Parity error was encountered in loading the system tape. Loading terminates.

TIME LIMIT

Job has exceeded the requested CP time limit.

UNEXPIRED SCRATCH TAPE ON UNIT xx

Write tape has a label with an unexpired expiration date.

WAITING FOR CKP STORAGE

No storage available for the buffer needed for a checkpoint dump. The program loops until storage is available or until the job is dropped.

WAITING FOR COMMON FILE

Displayed under the control point assigned to the job whenever a common card is being processed and the requested file is assigned to another control point or is not in the FNT.

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