

## Systems Reference Library

### IBM 7040/7044 Operating System (16/32K)

#### Operator's Guide

This publication provides detailed instructions for the 7040/7044 machine operator who runs jobs using the IBM 7040/7044 Operating System — 7040-PR-150, which consists of the following parts:

System Monitor	(#7040-SV-951)
Input/Output Control System	(#7040-IO-952)
Generalized Sorting System	(#7040-SM-953)
Monitored Utility Programs	(#7040-UT-975)
Processor	(#7040-PR-954)
Monitor	(#7040-SV-811)
Loader	(#7040-SV-812)
Library	(#7040-LM-813)
Macro Assembly Program	(#7040-SP-814)
FORTRAN IV Compiler	(#7040-FO-815)
COBOL Compiler	(#7040-CB-816)
Debugging Processor	(#7040-TA-817)
Update Program	(#7040-UT-955)

This publication includes machine requirements, descriptions of System Monitor control cards and their use, operating procedures, and a listing of on-line messages.

Separate publications describe the MAP, FORTRAN IV, COBOL, and Debugging languages, the Input/Output Control System, and the Generalized Sorting System. Other related publications contain instructions for the programmer, information needed by systems programmers, and information on the contents of the Subroutine Library, which is a Processor component.

NOTE: The IBM 1302 Disk Storage Unit is now designated the IBM 2302 Disk Storage Unit; there has been no change in the unit itself, in the applications for which the unit may be used, or in the programming parameters used to specify those applications. References in this publication to IBM 1302 Disk Storage Units should be understood to be references to IBM 2302 Disk Storage Units.

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This publication supersedes Form C28-6338-3 and Technical Newsletters N28-0519-0 and N28-0527-0, which are now obsolete. Technical corrections and changes for the sake of clarity have been made throughout this publication. Significant changes are indicated by a dot (•) to the left of the subject heading on the Contents page.

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### **Introduction to the 7040/7044 Operating System**

The IBM 7040/7044 Operating System is an integrated group of programs that permits continuous job processing on 7040/7044 Data Processing Systems with 16/32K capacity. With this system, operator intervention between jobs is generally unnecessary and manual procedures are minimized.

The 7040/7044 Operating System includes a generalized sorting system and a language processor with FORTRAN IV and COBOL compilers, an assembler, a relocatable program loader, and a library of subroutines. The operating system monitor provides a communications area and supervisory and service routines. User's programs and subroutines can be added to the system by means of the editing program, which also provides for system maintenance.

A flexible input/output control system permits the programmer using the Macro Assembly Program to specify which sections of the input/output system he needs to have in core storage at execution time.

An auxiliary program, the 7040/7044-1401 Input/Output Control Program, is available to increase the input/output capacity of the system.

The use of all input/output devices is controlled through a symbolic unit reference scheme. If sufficient input/output devices are available, the devices required for a job or just used during a job can be readied or serviced while other jobs are being run.

Under normal conditions, it is not necessary for the computer to be idle; however, it may be idled for operator action. For example, facilities are provided for operator interruption for unusual, priority, or error conditions.

### **Use of the Operating System**

The System Monitor enables several subsystems, that is, the language Processor, the Generalized Sorting System (Sort), the Editor, the Update program, the monitored utility programs, and the installation programs, to be supervised by a control program. Input to this monitored operating system consists of a variety of jobs that may involve one or more applications of one or more subsystems.

The 7040/7044 Operating System can be used for a variety of productive applications. These applications fall into the following categories:

1. Language processing
  - a. Compiling or assembling
  - b. Loading only, for analysis of assigned storage
  - c. Compiling or assembling, and loading
  - d. Loading and executing an object program (debugging optional)
  - e. Compiling or assembling, loading, and executing a source program (debugging optional)
2. Sorting or merging
3. Executing installation programs
4. Editing the System Library
5. Updating
6. Performing utility functions

Control cards ensure an even flow of processing by specifying the subsystem required and by adapting the subsystem to the specific needs of the user.

### **Input**

Control cards and other input to the system are stacked in a system input file. The input to the Processor, Sort, Editor, or object programs may be in the system input file or in any other file designated by the programmer. The system input file may be blocked or unblocked, but all \$ control cards with a \$ in column one are always unblocked and in BCD form. The input may consist of control cards, binary cards, BCD cards, data cards, symbolic cards, absolute cards, relocatable cards, or images of these cards on other storage media.

### **Output**

The print output of all system programs is written on a system output file. Punched card output appears in the system punch file. If desired, print output and punch output may be combined into one file. These output files may be processed off-line with auxiliary 1401 programs.

An object program may use either of these output files or any files defined by the programmer.

### **Messages**

Operating System messages fall into two categories: messages to the programmer and messages to the machine operator. Programmer messages are written on the system output file. The following types of messages appear on the console typewriter:

1. Instructions to ready devices
2. Error messages for conditions that result in a pause or job termination with a dump
3. Log of unit reassignments
4. Copy of all \$\*, \$PAUSE, \$STOP, and \$JOB cards
5. Copy of all System Monitor control cards following a \$LIST card
6. Log of all unit and device assignments if a \$UNITS card is used
7. Informative messages

All operator messages associated with a pause, i.e., a suspension of machine processing, are prefixed by a five-digit code number. This allows the descriptive portion of the message to be brief. Detailed explanations are provided in Appendix C of this publication.

Self-explanatory messages that are not associated with a pause often do not have code numbers. For example, the Generalized Sorting System types unnumbered on-line messages that inform the operator of the progress of the sort or merge application. These messages appear in order by Sort phases following the numbered messages in Appendix C.

### Machine Requirements

The following minimum machine configuration is required for use of the 7040/7044 Operating System:

**Processing System:** An IBM 7040/7044 Data Processing System with the extended performance instruction set and with at least 16,384 locations of core storage. The single-precision floating-point instruction set is required if FORTRAN is to be used.

**Input Unit:** An IBM 1402 Card Read Punch with an IBM 1414-4 Input/Output Synchronizer that has the column binary feature, a magnetic tape unit, IBM 1301 Disk Storage, IBM 1302 Disk Storage, or IBM 7320 Drum Storage. An IBM 1622 Card Read Punch may be used if the input is entirely symbolic. If the 1622 Card Read Punch is used, it must have the Expanded Character Set, Feature #3831, to obtain proper translation of IBM card code (H code) to BCD characters.

**Punch Unit:** An IBM 1402 Card Read Punch, a magnetic tape unit, IBM 1301 Disk Storage, IBM 1302 Disk Storage, or IBM 7320 Drum Storage. (This unit may be attached to the same device as the output unit for off-line processing.)

**Output Unit:** An IBM 1403 Printer, a magnetic tape unit, IBM 1301 Disk Storage, IBM 1302 Disk Storage, or IBM 7320 Drum Storage.

Application	Required Utility Units
Compile or assemble only	3
COBOL compilation	4
Load only	3
Compile or assemble, and load	4
Compile, assemble, and load (COBOL)	5
Load and go	3
Compile or assemble, load, and go	4
Compile, assemble, load, and go (COBOL)	5
Two-way merge	4*
Three-way merge	6*
Four-way merge	8*
Five-way merge	10*
Six-way merge	12*
Seven-way merge	14*
Eight-way merge	16*
System Editing (absolute modification cards only)	2

\*Magnetic tape units and/or disk storage units (not attached to a 1401)

Figure 1. Utility Unit Requirements

**Library Unit:** A magnetic tape unit, IBM 1301 Disk Storage, IBM 1302 Disk Storage, or IBM 7320 Drum Storage.

**Utility Units:** These units may be magnetic tape units, IBM 1301 Disk Storage, IBM 1302 Disk Storage, or IBM 7320 Drum Storage. Utility unit requirements are shown in Figure 1.

**Checkpoint Unit:** A magnetic tape unit, IBM 1301 Disk Storage, IBM 1302 Disk Storage, or IBM 7320 Drum Storage. If this unit is not provided, snapshots are not taken and core storage dumps are incomplete. This unit must be provided for load-time debugging runs unless an extra utility unit is available.

NOTE: The checkpoint unit may not be a magnetic tape unit attached through a 1401.

The console typewriter is used for operator messages.

### Use of Input/Output Devices

Input/output devices are addressed by symbolic names that indicate their functions. This symbolic unit reference scheme permits operational reassignment of both devices and functions under unusual conditions. If enough devices are available, the computer need not be idle from the time an input reel is mounted until the output reel is dismounted. The operator need only dismount unloaded reels and replace them with reels to be used later in the job or in succeeding jobs.

The machine operator can determine the relationship between the system units and the physical units from the table of standard device assignments for the installation. This table can be obtained by using the operator interrupt procedure. This table is updated by the log of modifications to device assignments that is typed on line.

The System Monitor is used for scheduling jobs to be processed and for controlling the use of input/output devices. Job identification and phase identification are communicated to the operator for logging.

### Attachment of Input/Output Devices

All input/output devices physically connected to the 7040/7044 Data Processing System must be defined as part of the machine configuration, attached to the system, and assigned to symbolic units during system assembly in a symbolic units table.

Figure 2 lists the symbolic units and their functions.

Control cards are used to detach and attach devices and/or symbolic units. For instance, the \$DETACH control card is used to remove an inoperative device from the system, and the \$ATTACH card is used to reassign

its symbolic unit(s) to another device. When the device again becomes operative, it may be reattached to the system and assigned a function by using a \*ATTACH control card. These cards modify the Symbolic Units Table.

Several symbolic units may be attached to a single device. For example, the system output and the system punch functions may both be assigned to the same magnetic tape unit, or s.SLB1 and s.SLB2 may be assigned to cylinders 0-99 and 100-199, respectively, of a single disk module.

Figure 3 illustrates the symbolic units that are necessary for the operation of the system. Additional units may be used.

Figure 4 illustrates a typical configuration.

### Reservation Codes

Reservation codes are used to indicate the availability of a unit for assignment. They may also be used as special identifiers for particular files within a series of applications. The reservation codes that may be used are:

- 00 Unreserved and not in use.
- 01-24 An intersystem reservation made by the user. This unit is assigned only if specific reference is made to its intersystem reservation code or to its symbolic unit designation.
- 25-61 These codes are not specified at present.
- 62 Unreserved but in use as a system work unit. This unit may be assigned to object programs when it is made available by the Loader (IBLDR).
- 63-67 These codes are not specified at present.
- 70 Unreserved but in use by the object program. This unit is assigned only if specific reference is made to its symbolic unit designation.
- 71 Unreserved but in use by a priority program.
- 72 Unreserved but in use by a permanent program.
- 73 In use as a system library unit (S.SLBx).
- 74 In use as a system input unit (S.SINx).
- 75 In use as a system output unit (S.SOUx).
- 76 In use as a system punch unit (S.SPPx).
- 77 In use as the system checkpoint unit (S.SCK1).

### Available Units

When the term "available unit" is used in this publication, the unit meets the following conditions:

1. The unit is attached.
2. The unit is ready (if the IFSNS assembly parameter in IBNUC is 1).
3. The reservation code for the unit is 00.
4. The unit is not unit record.
5. The format of a disk or drum unit is a standard format of the installation.
6. If the system is assembled with LABELS SET 2, the label is standard and the retention period specified in the label has expired.

Mnemonic	Function
S.SLB1	LIBRARY1
S.SLB2	LIBRARY2
S.SIN1	INPUT1
S.SIN2	INPUT2
S.SOU1	OUTPUT1
S.SOU2	OUTPUT2
S.SPP1	PUNCH1
S.SPP2	PUNCH2
S.SCK1	CHECKPOINT
S.SU00	UTILITY0
S.SU01	UTILITY1
S.SU02	UTILITY2
.	.
.	.
.	.
S.SU99	UTILITY99

Figure 2. Symbolic Units and Their Functions

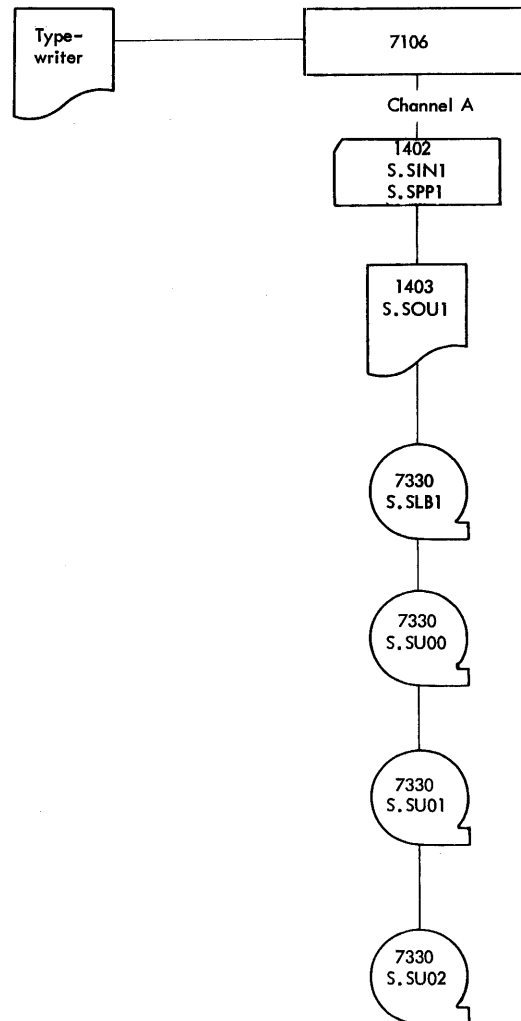


Figure 3. A Minimum Configuration for a System

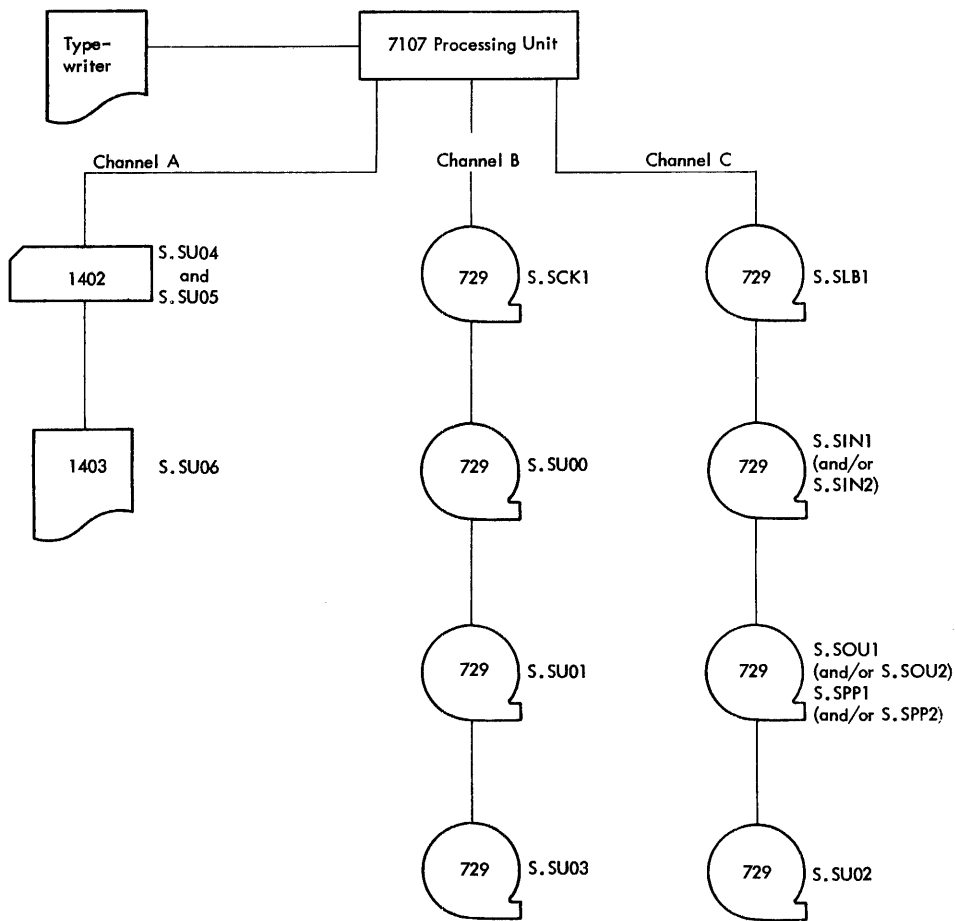


Figure 4. A Typical Configuration for a System

### System Monitor Control Cards

The System Monitor control cards enable the machine operator to control the 7040/7044 Operating System. They are always unblocked. The programmer also uses some of these cards to delimit his job and to indicate the subsystems it requires. The System Monitor control cards are:

#### Subsystem Control Cards:

\$IBJOB  
\$IBSRT  
\$IBEDT  
\$EXECUTE

#### Operational Control Cards:

\$IBSYS  
\$JOB  
\$UNLIST  
\$LIST  
\$ID  
\$PAUSE  
\$STOP  
\$RESTART

#### Information Control Cards:

\$DATE  
\$TIME  
\$\*

#### Unit Assignment Control Cards:

\$DETACH  
\$ATTACH  
\$SWITCH  
\$RESTORE  
\$OPEN  
\$CLOSE  
\$UNITS  
\$CHANNEL

#### Control Card Format

The general format for the System Monitor control cards is:

COLUMNS	CONTENTS
1	\$
2-8	Control card name, left-justified
16-72	Variable field information, no embedded blanks, fields separated by commas
73-80	Serialization

A comma delimits an option; a blank ends the list of options and begins the comments portion of a card. The order of the options in the variable field is not significant, unless otherwise stated.

In this publication, the following conventions are used for variable field information:



1. Lower case letters indicate that a substitution must be made.
2. Upper case letters must be punched exactly as shown, if used.
3. Material in brackets [ ] represents an option that may be omitted or included at the user's choice.
4. Material in braces { } indicates that a choice of the contents is to be made.
5. A number over the first character in a field indicates the first card column of the field.

### Subsystem Control Cards

Subsystem control cards enable the programmer to designate the subsystem or user's program to which control should be passed. These cards are seldom used by the machine operator. Complete descriptions of the subsystem control cards are in the publication *IBM 7040/7044 Operating System (16/32K): Programmer's Guide*, Form C28-6318.

### Operational Control Cards

Operational control cards are used primarily by the machine operator. They permit him to control typing of System Monitor control cards, to control use of the installation accounting routine, to suspend machine processing, and to restart a program for which a checkpoint has been taken.

#### \$IBSYS CARD

The format of the \$IBSYS card is:

```

1
-----
$IBSYS

```

This card is used to return control to the System Monitor. The Supervisor is loaded if it is not already in core storage. Except at initial start, the \$IBSYS card must precede all other System Monitor control cards or any control cards that cannot be processed by the subsystem currently in control.

Each return to the System Monitor releases all units with code 62 (system work units) and code 70 (units reserved for the object program). Units with inter-system reservation codes are not released.

#### \$JOB CARD

The format of the \$JOB card is:

```

1         16
-----
$JOB      any text

```

This optional card denotes the beginning of a job. When a \$JOB card is read, all programmer unit reservations are canceled, the interval timer is reset, and the listing of subsequent control cards is terminated. The card is typed and listed, and the installation accounting routine is called. Any System Monitor card, other than a Subsystem control card, may precede the \$JOB card.

The variable field of the \$JOB card may contain a message or job identification for the machine operator and the programmer.

An example of a typical \$JOB card follows:

```

1         16
-----
$JOB      FORTRAN PROGRAM 12345

```

This cancels any programmer unit reservations. It is typed on the console typewriter to identify the job and the subsequently typed output; it is listed on s.SOU1; and the installation accounting routine is then called.

#### \$UNLIST CARD

The format of the \$UNLIST card is:

```

1
-----
$UNLIST

```

The \$UNLIST card suppresses typing of all subsequent System Monitor control cards except the \$\*, \$JOB, \$PAUSE, and \$STOP cards. This is the normal mode of operation. The \$UNLIST card does not affect the listing of System Monitor control cards on the system output unit.

This card suppresses the typing of control cards that began with the \$LIST card.

#### \$LIST CARD

The format of the \$LIST card is:

```

1
-----
$LIST

```

This card causes all System Monitor control cards to be typed. In addition, all of these cards continue to be listed on the system output unit.

#### \$ID CARD

The format of the \$ID card is:

```

1         16
-----
$ID      any text

```

The \$ID card transfers control to the installation accounting routine, if one exists. It permits several entries to the accounting routine within one job.

An example of a typical \$ID card follows:

```

1           16
┌───────────┴───────────┐
$ID           REASSEMBLY OF OPSYS 27041

```

This card passes control to the installation accounting routine.

**\$PAUSE CARD**

The format of the \$PAUSE card is:

```

1           16
┌───────────┴───────────┐
$PAUSE      any text

```

This card causes the machine to suspend processing. Trapping remains enabled, and any interrupts are serviced.

A message in the variable field of the \$PAUSE card can identify the reason for the pause, since this card is always typed.

Control card processing resumes when START is pressed.

An example of a typical \$PAUSE card follows:

```

1           16
┌───────────┴───────────┐
$PAUSE      FILE PROTECT NEW TAPE

```

This \$PAUSE card suspends the processing of control cards to allow the operator to remove file protect rings from the new system tape reels.

**\$STOP CARD**

The format of the \$STOP card is:

```

1
┌───────────┴───────────┐
$STOP

```

This card causes the current system input unit to be closed, the system output units to be closed with 1EOF trailer labels, and input/output record and error counts to be listed. The installation accounting routine is called and the interval timer is reset to zero. A machine pause occurs after the \$STOP card is encountered, and the message "END OF JOBS" is typed. Trapping remains enabled, and any interrupts are serviced.

If START is pressed, the System Monitor restores the initial start conditions. Unit functions available at that time are reinstated. Pressing START also causes the System Monitor to reopen the system input and output units and to resume processing.

If a priority job is being processed, this card causes a return to the system input unit.

The \$STOP card is always typed on-line.

**\$RESTART CARD**

The format of the \$RESTART card is:

```

1           16
┌───────────┴───────────┐
$RESTART      6xxxxxdddddd

```

This card may be used to pass control to the Restart routine. It may be prepared from the information typed by the Checkpoint routine on the console typewriter.

The variable field contains a twelve-character octal restart code in which xxxxx is the unit code for the checkpoint device and ddddd is the checkpoint identification number.

The Restart routine may also be entered by placing the appropriate restart code in the entry keys and then executing the operator interrupt procedure. A description of the operator action required to restart a program for which a checkpoint has been taken may be found in the section "Restart" which appears later in the text.

An example of a typical \$RESTART card follows:

```

1           16
┌───────────┴───────────┐
$RESTART      610011000002

```

This card causes a restart from checkpoint number two on the system checkpoint unit.

**Information Control Cards**

Information control cards permit the machine operator to provide the current date, to limit the execution time available for a job, or to write information on the console typewriter and the system output unit.

**\$DATE CARD**

The format of the \$DATE card is:

```

1           16
┌───────────┴───────────┐
$DATE      {mm/dd/yy}
           {mmddy }

```

This card provides the current date to the system.

The content of the variable field is:

```
{mm/dd/yy}  
{mmddy}
```

This is the current date in the form of a six-digit number, where mm is the month (01-12), dd is the day of the month (01-31), and yy is the year (00-99).

The \$DATE card must be the first card on the system input unit at an initial start. The date it provides is used to verify the header label of the system output unit before it is used. If a \$DATE card is not the first card on s.SIN1, the machine pauses and an on-line message instructs the operator to place the date in the entry keys.

The \$DATE is ignored if it is encountered at other than an initial start.

An example of a typical \$DATE card follows:

```
1           16  
-----  
$DATE      09/01/63
```

This card provides the date September 1, 1963 to the system. This date may be punched on the card as 090163, 9/01/63, or 9/1/63.

#### \$TIME CARD

The format of the \$TIME card is:

```
1           16  
-----  
$TIME      xxx
```

This card is useful only for the 7040/7044 Data Processing Systems that have the storage clock/interval timer feature available to the System Monitor. It causes the interval timer to be set to a value that causes a timer overflow trap xxx minutes after this card is processed. The trap results in a transfer to the Dump Program and a skip to the next \$JOB card. The interval timer may be reset by another \$TIME card or a \$JOB card.

If the \$TIME card is omitted, the timer is set during the processing of any Subsystem control card to the value given during assembly of the system. The section "System Assembly," in the publication *IBM 7040/7044 Operating System (16/32K): Systems Programmer's Guide*, Form C28-6339, contains further information regarding the assembly parameters.

If the computer does not have the core storage clock/interval timer option or if the timer is switched off, location 00005 is treated as a clock that cannot increment or overflow.

The content of the variable field is:

xxx

This is a three-digit number giving the number of minutes until the next timer interrupt.

The following is an example of a typical \$TIME card:

```
1           16  
-----  
$TIME      5
```

Five minutes after the first \$EXECUTE card or any Subsystem control card is processed following the \$TIME card, the job being executed is terminated if it is not already completed.

#### \$\*CARD

The format of the \$\* card is:

```
1           3  
-----  
$* any text
```

This card serves as a comments card. It is written on the system output unit and is always typed. The text of the comment may begin in any column after column two.

The following is an example of a typical \$\* card:

```
1           16  
-----  
$* BEGINNING PHASE ONE
```

This card is typed and appears on the system output unit, but it causes no other action.

#### Unit Assignment Control Cards

Unit Assignment control cards enable the operator to modify the input/output unit assignments specified during assembly of the system.

#### \$DETACH CARD

The format of the \$DETACH card is:

```
1           16  
-----  
$DETACH {S.Sxxx  
         {device, chan, number [, , dir] }
```

This card causes one or more units to be detached from the Operating System. A symbolic unit name or a device name may be specified. If a symbolic unit name is specified, only that unit is detached. If a device name is specified, all symbolic units assigned to that device are detached, and the system references to the units are canceled. The units may not be used until they are reattached or until the system is restored.

The devices assigned to s.SIN1, s.SOU1, s.SLB1 cannot be detached. Units that have been reserved by a programmer cannot be detached until they have been closed, e.g., by using a \$CLOSE card.

The subfields in the variable field are described below. When a device name is specified, the subfields are separated by commas.

S.Sxxx

One of the following mnemonics:

MNEMONIC	SYSTEM FUNCTION
S.SLB1	Library 1
S.SLB2	Library 2
S.SIN1	Input 1
S.SIN2	Input 2
S.SOU1	Output 1
S.SOU2	Output 2
S.SPP1	Punch 1
S.SPP2	Punch 2
S.SCK1	Checkpoint
S.SU00	Utility 00
S.SU01	Utility 01
.	.
.	.
S.SUmn	Utility mn

device

One of the following symbols:

T	Magnetic tape
DT	Data transmission unit
PT	Paper tape reader
RI	Remote inquiry unit
D	Disk or drum storage
RD	Card reader
PU	Card punch
PR	Printer
TT	Telegraph unit
BX	Communication control system

chan

Channel or channel A interface to which the device is connected. It must be one of the following characters, consistent with device and system configuration: A, B, C, D, E, and S for the appropriate channel; or, in the case of devices attached to channel A (other than magnetic tape units), the appropriate 1, 2, or 3 interface to which the device is attached. The letter S indicates that the device is attached to channel A through an on-line 1401. For example, the 1403 Printer can be attached only to interface 1, 2, or 3, or to channel S.

number

This is the device number. It must be one of the following numbers, consistent with device, channel, and system configuration: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, or 20. The numbers 0 through 9 are used for tape; the numbers 1 through 10 are used for 1301 Disk Storage, 1302 Disk Storage, and 7320 Drum Storage; the numbers 11 through 20 are used for 1302 Disk Storage.

The device number may not be larger than the quantity of these devices defined as available on the channel, except that device numbers 11 through 20 are treated as 1 through 10. Since each access mechanism is treated as a device, "number," for example, is a 1 for access 0 module 0, etc. (see Figure 5). For magnetic tape units, this digit designates the number that is dialed on the tape unit.

dir

One of the following symbols: I for an input unit, O for an output unit, or blank for both. This option is required for devices that need separate input and output unit control blocks (1009, 1014, 7740, and telegraph).

Access 0	module	0	1	2	3	4	5	6	7	8	9
	number	1	2	3	4	5	6	7	8	9	10
Access 1	module	0	1	2	3	4	5	6	7	8	9
	number	11	12	13	14	15	16	17	18	19	20

Figure 5. Disk and Drum Device Numbers

The device name on a \$DETACH card must be identical to the device name used to attach the device to the system.

Three error conditions are possible:

1. The specified device does not exist or has no symbolic unit attached to it.
2. The specified symbolic unit is reserved.
3. The specified symbolic unit does not exist or is not attached.

Error condition 1 results in an error message, and the card is ignored. Conditions 2 and 3 result in an error message, and processing is suspended. When START is pressed, the erroneous card is ignored, and the next control card is processed.

The following is an example of a typical message that is typed when a system unit is detached by its symbolic unit name:

```
S.SU03 IS DETACHED FROM T,A,6
```

The following is an example of a typical message that is typed when a device is detached by its device name:

```
S.SU25 IS DETACHED FROM D,C,1
S.SU26 IS DETACHED FROM D,C,1
S.SU27 IS DETACHED FROM D,C,1
```

Two examples of typical \$DETACH cards follow:

```
1           16
┌───────────┴───────────┐
$DETACH  S.SU22
└───────────┬───────────┘
This card causes the device assigned as utility unit 22 to be detached from the system.
```

```
1           16
┌───────────┴───────────┐
$DETACH  T,B,6
└───────────┬───────────┘
This card causes the symbolic unit attached to tape unit 6 on channel B to be detached.
```

\$ATTACH CARD

The format of the \$ATTACH card is:

```
1           16
┌───────────┴───────────┐
$ATTACH  S.Sxxx,device,chan,number,type
          [ , { n [,from,to] } ] [ , { I57 } ]
          [ { dir } ]
└───────────┬───────────┘
```

This card causes the specified device (device, chan, number) to be reattached to the Operating System and assigned to the specified symbolic unit (S.Sxxx).

The device must have been included in the machine configuration defined and attached during system as-

sembly. It must have been detached. It may now be attached and assigned to another symbolic unit. However, the \$ATTACH card may not refer to a symbolic unit to which a device is already assigned. Thus, it may not refer to the system units S.SLB1, S.SIN1, or S.SOU1.

In general, each system unit should refer to a unique physical unit. However, the system checkpoint unit (S.SCK1) may be the same physical unit as a system utility unit (S.SUXX).

The subfields S.Sxxx, device, chan, number, and dir are as described for the \$DETACH card. The other subfields are:

type

One of the following equipment type numbers, consistent with device, channel, and system configuration: 729, 1009, 1011, 1014, 1301, 1302, 1402, 1403, 1622, 7320, 7330, 7740, and telegraph.

(The following options are omitted for sequential access devices, such as unit record equipment or magnetic tape units.)

n

Method of operation. This specifies the method of using a random access device, such as a disk storage unit. It is one of the following symbols, or a number from 1-63:

- R Random access.
- FT Full track mode with record addresses.
- CY Cylinder mode (optional feature).
- x Single record operation. The letter x represents the number of records (from 1-63) defined on one format track.

from

Logical starting point for the symbolic unit within the device. For disk storage, it is the cylinder number of the first cylinder assigned to the unit (0-249).

to

Logical ending point for the symbolic unit within the device. For disk storage, it is the number of the last cylinder assigned to the unit (0-249). This must be supplied for units for which a logical starting point has been supplied.

If the *from* and *to* limits are omitted for a random access device, the symbolic unit is assumed to be the entire device.

(The following option applies to sequential and random access devices.)

I57 or I58

The permanent reservation code (71<sub>s</sub> or 72<sub>s</sub>) to be assigned to the device being attached. If the device is a disk or drum, preceding fields, if null, must be indicated by commas.

Three error conditions are possible:

1. The specified device has not been defined as part of the machine configuration or is not detached.
2. The specified symbolic unit has not been defined as part of the machine configuration or is not detached.
3. There was an attempt to attach more symbolic units to a device than were attached at system assembly time.

These conditions result in an error message and the suspension of processing. When START is pressed, the

erroneous \$ATTACH card is ignored and the next control card is processed.

When a device is attached, a message such as the following is typed:

S.SU25 IS ATTACHED TO T,B,4

If the device is a disk module, a message such as the following is typed:

S.SU33 IS ATTACHED TO D,B,2 FROM 125 TO 174

An example of a typical \$ATTACH card follows:

```

1          16
┌──────────┴──────────┐
$ATTACH S.SCK1,T,B,4,729

```

This card causes 729 Magnetic Tape Unit 4 on channel B to be attached as the system checkpoint unit.

\$SWITCH CARD

The format of the \$SWITCH card is:

```

1          16
┌──────────┴──────────┐
$SWITCH {S.Sxxx }      {S.Sxxx }
        {Iyy [R] }      {Iyy [R] }

```

This card interchanges the devices assigned to the symbolic units that are specified or represented by intersystem reservation codes. R, if used, causes the release of the intersystem reservation code when the switch occurs.

The rules for switching are as follows:

1. Units having identical codes (e.g., both zero, both 74<sub>8</sub>) may be switched.
2. A unit having a code from 1 through 24<sub>8</sub> may be switched with another unit having a code in that range. If this is done, the codes remain assigned to the physical units.
3. A unit having a code in the range from 1 through 24<sub>8</sub> may be switched with a unit having a zero reservation code. In this case, the reservation code will be treated as in 2 above.
4. A unit having a code from 1 through 24<sub>8</sub> may be switched with a system unit. The reservation codes of the two units are switched.
5. A unit that is not reserved may be switched with a system unit. In this case, the system unit code remains assigned to the system unit and also is assigned to the new unit.

The content of the variable field is:

S.Sxxx

This is a mnemonic representing a symbolic unit (the definition of S.Sxxx is the same as that given for S.Sxxx in the section "ATTACH Card").

Iyy [R]

This specifies that the device to be used was previously assigned intersystem reservation code yy. If R is appended to the Iyy code, the intersystem reservation code is released when the switch occurs.





$n_i D_{n_a} / I_{yy}$	A symbolic module is to be defined as in $n_i D_{n_a}$ . The selected module must not be the one on which the file designated by intersystem reservation code $yy$ is located.
$/I_{yy}$	The actual channel chosen must not be the channel on which the file designated by intersystem reservation code $yy$ is located.
$R_{yy}$	The actual channel chosen must be the channel on which the system unit that has system reservation code $yy$ is located.
$/R_{yy}$	The actual channel chosen must not be the channel on which the system unit that has system reservation code $yy$ is located.
$r$	The actual channel chosen must be channel $r$ .
$/r$	The actual channel chosen must not be channel $r$ .

In defining a symbolic channel, as many parameters as desired may be used. All reservation codes must be decimal. If a real channel that satisfies all of the requirements cannot be found, the job will be terminated. From one through five symbolic channels, V through Z, may be defined by a single \$CHANNEL card and its associated \$ETC card(s). These definitions are effective until the next \$CHANNEL card or the next \$JOB card. As many \$CHANNEL cards as desired may be used within a given job, but all \$CHANNEL cards must be processed on the IBSYS level.

### Typical Card Decks

The portion of a system input card deck in Figure 6 illustrates the use of the \$IBSYS card and the subsystem control cards with which the programmer designates either the subsystem monitor under which his job is to be run or the program that he intends to execute.

Figure 7 shows the card deck that should be placed

on the system input unit to perform the following functions:

CARD	FUNCTIONS
\$DATE	Enter date into the system at initial start.
\$JOB	Begin job, cancel programmer unit reservations, reset interval timer, and transfer to the installation accounting routine.
\$*	Type a comment on-line and write it on the system output unit.
\$LIST	Begin typing control cards.
\$PAUSE	Suspend processing for action by the machine operator.
\$TIME	Set the time interval that may elapse before an overflow occurs.
\$IBJOB	Pass control to the Processor to execute a processor application. (These cards indicate the type of processing required.)
(Processor control cards)	
\$IBSYS	Return control to the System Monitor.
\$UNLIST	Stop typing control cards.
\$TIME	Reset the interval timer to the amount specified on this card as the allowable time that may elapse before an overflow occurs.
\$ID	Execute the installation accounting routine.
\$IBSRT	Pass control to the Sort Monitor and start the interval timer running.
(Sort control cards)	
\$IBSYS	These cards supply sorting information to the Generalized Sorting System.
\$STOP	Return control to the System Monitor.
	Transfer to the installation accounting routine, set the interval timer to zeros, close the system input and output units, and suspend processing.

Figure 8 illustrates the control cards that are used to change system unit function assignments, to attach and detach devices, and to call in the Processor. The comments on these cards explain their functions.



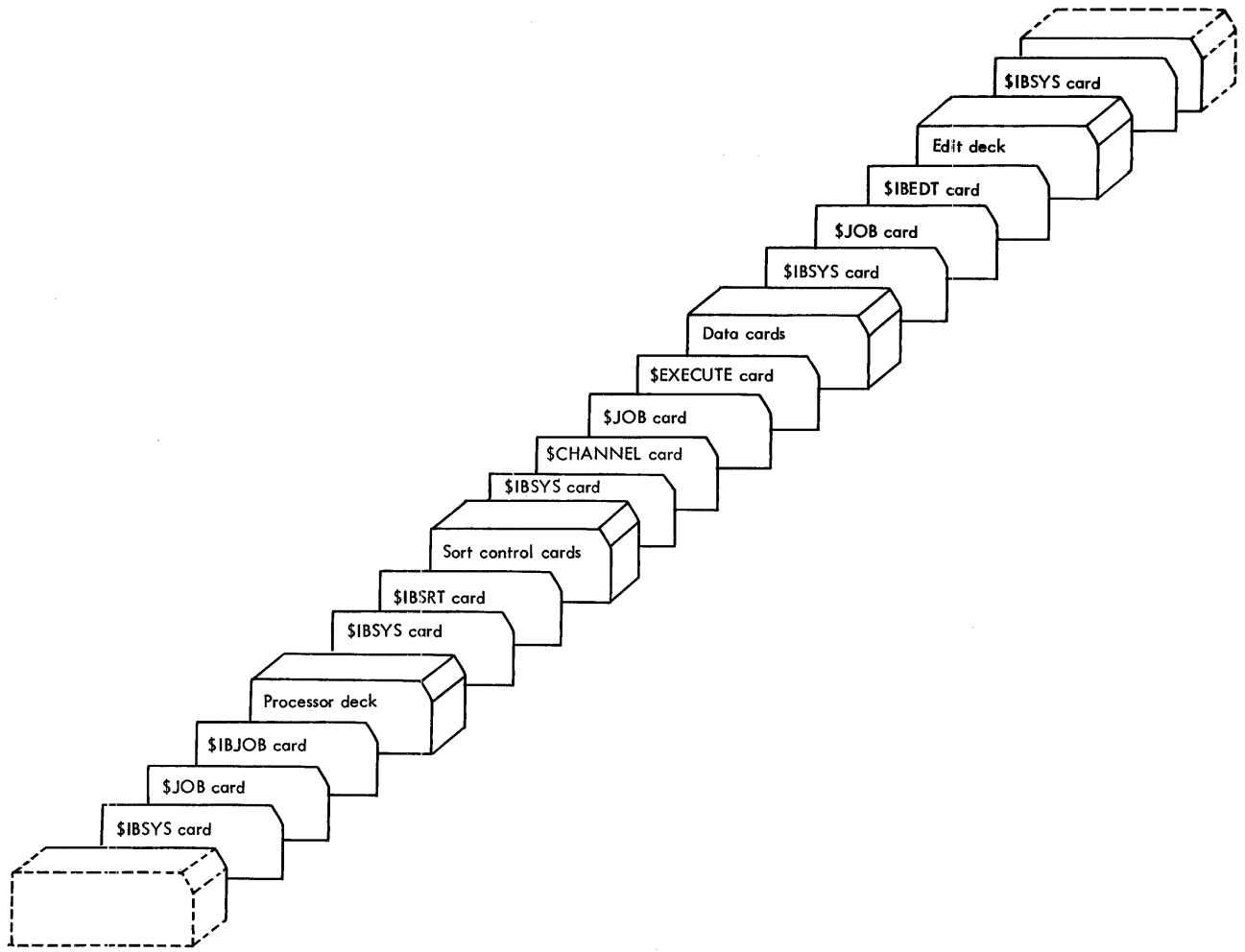


Figure 6. Use of Subsystem Control Cards

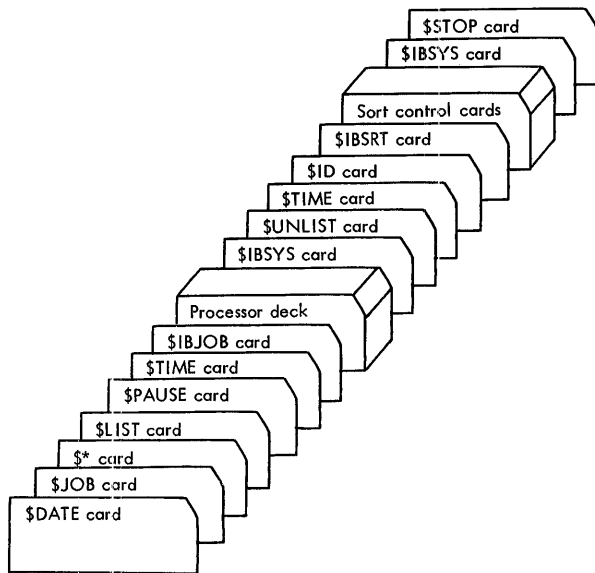


Figure 7. Use of Operational and Information Control Cards

1	8	16	
\$IBSYS			GIVE CONTROL TO SYSTEM MONITOR
\$JOB			
\$RESTORE			CANCEL PREVIOUS UNIT ASSIGNMENTS
\$CLOSE	S.SU30,MARK		CLOSE UTILITY UNIT 30 WITH FILE MARK
\$SWITCH	S.SU30,S.SU31		SWITCH UNITS 30 AND 31
\$DETACH	S.SU35		DETACH UNIT 35 FOR MAINTENANCE
\$ATTACH	S.SU35,D,C,2,1301,CY,200,249		ATTACH DISK AS UNIT 35
\$UNITS			TYPE SYMBOLIC UNIT ASSIGNMENTS
\$PAUSE	CONFIRM PROPER DEVICE ASSIGNMENT		
\$IBJOB	NOGO		OTHER STANDARD JOB OPTIONS ASSUMED
	.		
	.		
	(DECK FOR PROCESSOR APPLICATION)		
	.		
	.		
\$IBSYS			RETURN CONTROL TO SYSTEM MONITOR
\$JOB			

Figure 8. Use of Unit Assignment Control Cards

## Initial Start

The first record in the System Library is the Bootstrap routine. The operator loads the Bootstrap routine, using the initial start procedure outlined below.

The initial start procedure must be followed to resume operations after the power has been turned off. It must also be used after a machine halt resulting from a machine or object program error that makes it impossible for the Operating System to continue processing.

At an initial start, the machine configuration is assumed to be as defined at assembly time.

### Procedure

The normal start procedure is:

1. Ready the devices to which s.SLB1, s.SLB2 (if applicable), s.SIN1, and s.SOU1 are assigned.
2. Select s.SLB1. If s.SLB1 is assigned to disk or drum, the operator must first place a two-card bootstrap routine (such as the one shown in Appendix B) into a card reader. To select s.SLB1, the operator must enter the following instruction (octal) into the entry keys:

PREFIX	DECREMENT	TAG	ADDRESS
0	7 6 2 0 i	0	0 1 2 1 0

(In the above instruction, i is the adapter interface code as shown in Figure 9.)

If the Operating System cannot be loaded from the system library unit (s.SLB1), the operator can load the system from any tape unit assigned to a system or utility function. To do this, the normal initial start procedure should be followed except that the entry keys should be set to -1762 instead of +0762.

If s.SLB1 is defined as a disk or drum device but the System Library is on tape, the two-card bootstrap routine for disk or drum is not used. Instead, the normal initial start procedure should be followed except that the entry keys should be set to -17620000xxxx, where xxxx is the address of the unit on which the System Library tape is mounted.

## Running the Programmer's Jobs

Once the initial start procedure has been performed, the operator must ensure that the required tapes are mounted and the tape units are ready and set for the

correct density. File-protection rings should be removed from the reels that contain the System Library and system input file. They should be inserted in all other reels unless otherwise indicated by the programmer's special instructions.

No error messages will be printed if a write is attempted on a file-protected reel. Messages to ready a 1622 Card Read Punch or a 1401 Data Processing System are not typed. However, if any other required conditions are not met, the system will cause a message to be typed indicating the action to be taken by the operator. Thus, once the initial start procedure is executed, the operator may rely on the Operating System messages and information from the programmer for any instructions that are required for running jobs.

### Standard Operating Procedure

Many of the on-line messages permit several optional procedures. The programmer should indicate any special procedures to be followed in these situations, if no standard operating procedure is determined for an installation.

### Job Termination With a Dump

The machine operator may use the Dump program to terminate programs. This action is necessary when an error condition, such as an endless loop, makes further processing impossible. Operator-initiated job termination with a dump can be effected by a TRA to octal location 00101 or, if the contents of the location counter are to be saved, a TSL to 00100. The machine operator places the computer in manual status and sets up either of the following instructions in the entry keys:

PREFIX	DECREMENT	TAG	ADDRESS
0	0 2 0 0 0	0	0 0 1 0 1

PREFIX	DECREMENT	TAG	ADDRESS
5	6 2 7 0 0	0	0 0 1 0 0

He then presses ENTER INSTRUCTION. This action dumps the contents of core storage and the console panel onto the system output unit. A pause follows to allow operator action (see "Operator Interrupt").

If the operator does not intervene during the pause that follows execution of the Dump program, the System Monitor automatically begins processing the job that begins with the next \$JOB card.

No operator action can be taken with reference to the user's files, unemptied buffers, or record counts. As subsystem housekeeping is not possible, the information is lost to the system and is available to the programmer only through the dump. The operator may interrupt to close any units by using the entry keys.

If location 00100 is storage protected, a message appears in the dump to indicate that storage protection has been violated; however, the instruction counter is correct.

### Operator Interrupt

The machine operator can interrupt the flow of processing to change unit assignments or to process a priority job by using the operator interrupt procedure. The operator enters the desired instructions in the entry keys (explained in the section "Use of the Entry Keys") and sets sense switch 1 on (see "Use of the Sense Switches"). When the System Monitor gains control, it tests the sense switch and performs the indicated operation. Sort also tests the interrupt sense switch.

It is thus possible to alter unit assignments through the keys before the monitor reads the \$DATE card. It is also possible to request a restart, job skip, or other procedure, through the keys; however, the \$DATE card is read and s.SIN1 and s.SOU1 are opened before any of these requests are acted upon.

### Use of the Sense Switches

The Operating System assumes that the following sense switches are assigned to the indicated functions:

SENSE SWITCH	USE
1	Operator interrupt
5	Sort
6	Label verification, or Sort

The installation has the option of changing the assignment of functions to sense switches and of modifying the operator interrupt procedure. Details about these modifications are in the publication *IBM 7040/7044 Operating System (16/32K): Systems Programmer's Guide*, Form C28-6339.

### Use of the Entry Keys

The use and interpretation of the entry keys are described in the following text. The symbol x may be any octal digit, since it is not interpreted by the System Monitor.

#### PREFIX 0 — INTERRUPT JOB ON CARD READER

PREFIX	DECREMENT	TAG	ADDRESS
0	xxxxx	x	xxxxx

Place a 0 in the prefix to process an interrupt job from the card reader (not attached through an on-line 1401). The interrupt job is terminated by a \$STOP card. The interrupted processing is then resumed.

#### PREFIX 1 — INTERRUPT JOB ON A SPECIFIED DEVICE

PREFIX	DECREMENT	TAG	ADDRESS
1	x sbad	x	i c add

Place a 1 in the prefix to process input from a specified device. The symbols used to specify the device are defined as follows:

sbad	Device subaddress if one must be specified for the device. The subaddress is expressed as the octal equivalent of two BCD characters, representing the access mechanism and module. For example, 0000 specifies access 0, module 0; 0100 specifies access 1, module 0 (see Figure 10).
i	Device interface
c	Channel
add	Device address

NOTE: See Figure 9 for icadd specifications.

If limits must be specified for the device, a message requests the operator to enter yyyyyy, the logical starting point, and zzzzzz, the logical ending point.

PREFIX	DECREMENT	TAG	ADDRESS
y	yyyyyy	z	zzzzz

The limits are the same as those described for the *from* and *to* options in the \$ATTACH card. These limits are specified as the octal equivalents of three BCD characters. Pressing START will cause the keys to be read.

If the device is attached in random access mode, the interrupt is ignored.

The following examples show key settings that indicate the input device for the interrupt job.

DEVICE	KEY SETTING
1. Magnetic tape, C9	100000003211
2. Disk storage, channel C module 2 (Message—PLEASE ENTER (BCD) DISK LIMITS) cylinders 125-200	100002030000  010205020000

Processing is resumed at the beginning of the next input job. If processing was interrupted during a job, the remainder of the interrupted job is not processed.

The unit that contains the interrupt job should not be used by that job as an intermediate unit. This may be avoided in one of the following ways:

1. The programmer can use the "any available unit" technique of unit assignment and not include any direct references to symbolic units in the interrupt program.
2. The operator can specify as the interrupt device a device that is known not to be attached as a symbolic unit used by the interrupt program.

3. The operator can specify as the interrupt device the device assigned to the highest symbolic unit available to the system.

**PREFIX 2 — DETACH**

PREFIX	DECREMENT	TAG	ADDRESS
2	unicod	x	i c add

Place a 2 in the prefix to detach a specified device or logical unit.

Only one of the fields, unicod or icadd, must be provided to identify the unit or device.

The unit code (unicod) specifies a symbolic unit. It consists of one octal digit (p) and two BCD digits (m and n).

p is defined as follows:

- 0 Utility unit
- 1 System unit

The symbols m and n are two BCD-digits, expressed as octal numbers. They range from 00 to 99. If p is 0, m and n identify the utility unit number. For example, utility unit 88 is identified by the unit code 01010. If p is set to 1, m and n specify the system unit as follows:

BCD NUMBER	SYSTEM UNIT	UNICODE
01	Library 1	1 00 01
02	Library 2	1 00 02
03	Input 1	1 00 03
04	Input 2	1 00 04
05	Output 1	1 00 05
06	Output 2	1 00 06
07	Punch 1	1 00 07
08	Punch 2	1 00 10
09	Checkpoint	1 00 11

The code icadd specifies an input/output device as shown in Figure 9.

If a subaddress must be specified for the device, a message requests the operator to enter the subaddress in the address portion of the keys and a pause occurs. The subaddress is specified as the octal equivalent of two BCD characters, right-justified in the address portion of the entry keys (see Figure 10).

The following examples illustrate the use of the entry keys to detach symbolic units and devices:

DEVICE/UNIT	KEY SETTING
1. S.SU12	200102000000
2. Disk storage, channel C (Message—PLEASE ENTER SUBADDRESS IN KEYS) module 3	200000003000 000000000003

After detaching the specified unit, the computer pauses to allow additional setting of entry keys.

**PREFIX 3 — SWITCH**

PREFIX	DECREMENT	TAG	ADDRESS
3	unicod	x	unicod

Place a 3 in the prefix to "switch" (see "SWITCH Card") the devices specified in the decrement and address. The section "Prefix 2 — Detach" gives the definition of unicod.

Device	Chan- nel*	Adapter Inter- face	Device Address (octal)	ICADD
Tape	A	0	201-212	01201-01212
	B	0	201-212	02201-02212
	C	0	201-212	03201-03212
	D	0	201-212	04201-04212
	E	0	201-212	05201-05212
Control Adapter	A	0	000	01000
	B	0	000	02000
	C	0	000	03000
	D	0	000	04000
	E	0	000	05000
Direct Data Connection	B	0	240	02240
	C	0	240	03240
	D	0	240	04240
	E	0	240	05240
1622 Card Reader	A	3	210	31210
1622 Card Punch	A	3	211	31211
1402 Card Reader	A	3	210	31210
1402 Card Punch	A	3	211	31211
1403 Printer	A	3	212	31212
Typewriter	A	4	000	41000
1401 Data Processing System, On Line	A	5	201-212	51201-51212
1011 Paper Tape Reader	A	3	601	31601
1009 Data Transmission Unit	A	3	301	31301
1014 Remote Inquiry Unit	A	3	701-702	31701-31702
Telegraph Type Units	A	3	401-404	31401-31404

\*Specified by the digits 1 through 5 for channels A through E

Figure 9. Device Specifications (icadd)

After interchanging these units, the computer pauses to allow additional setting of the entry keys.

**PREFIX 4 — ATTACH**

PREFIX	DECREMENT	TAG	ADDRESS
4	unicod	x	i c add

Place a 4 in the prefix to attach a logical unit to a symbolic unit. The specified device (icadd) is attached to the specified symbolic unit (unicod). The definition of unicod is contained in the section "Prefix 2 — Detach." Device specifications (icadd) are shown in Figure 9.

If a subaddress must be specified for the device, a message requests the operator to place the subaddress (as shown in Figure 10) in the address of the entry keys, and a pause occurs. If the mode of operation must be specified for the device, the mode is placed in the decrement of the keys at the same time.

PREFIX	DECREMENT	TAG	ADDRESS
x	z mode	x	x sbad

z is 0 for disk storage or 1 for drum storage.

Four octal digits are used to express the BCD number for the mode.

MODE	METHOD OF USE
0 0 0 0	Random access.
0 0 0 1	Single-record operation. This specifies the number of records defined on one format track.
.	.
.	.
0 6 0 3	.
0 6 0 4	Full track with record addresses.
0 6 0 5	Cylinder mode (optional feature).

sbad is the device subaddress if one must be specified for the device. See Figure 10 for subaddress specifications.

If limits must be specified for the device, the operator is requested to place the logical starting point in the decrement of the keys and the logical ending point in the address portion. The limits are the same as those described for the from and to options in the \$ATTACH card.

Access 0	module	0	1	2	3	4	5	6	7	8	9
	sbad	0000	0001	0002	0003	0004	0005	0006	0007	0010	0011
Access 1	module	0	1	2	3	4	5	6	7	8	9
	sbad	0100	0101	0102	0103	0104	0105	0106	0107	0110	0111

Figure 10. Device Subaddress (sbad) Designation

The following is an example of the entry key settings used to attach disk storage, channel B, module 2, cylinders 125 to 200, in full-track mode as s.SU39:

```
KEY SETTING
400311002000
(Message - PLEASE ENTER SUBADDRESS IN KEYS)
400604000002
(Message - PLEASE ENTER (BCD) DISK LIMITS)
010205020000
```

After the specified logical unit is attached, the computer pauses to allow additional setting of the entry keys.

#### PREFIX 5 - LONG OPERATION CODE

If the first octal character in the entry keys is a 5, the second octal character determines the operation to be performed.

##### Setting 50: Close.

PREFIX	DECREMENT	TAG	ADDRESS
5	0 xx r m	x	unicod

Set the two leftmost entry keys to 50 to close the specified symbolic unit and to set its reservation code to zero.

r is defined as follows:

0	Do not reposition.
1	Rewind the unit.
2	Rewind and unload the unit.

m is defined as follows:

0	Do not write a file mark.
1	Write a file mark.

The section "Prefix 2 - Detach" gives the definition of unicond.

To write a file mark and rewind and unload s.SU08, the following entry key setting is used:

```
500021000010
```

A message is typed indicating the unit that has been closed. The message is followed by:

```
M if file mark was written
R if rewind
U if rewind and unload
```

For example, if s.SU08 is closed and a file mark is written and the tape is rewound and unloaded, the following message is written:

```
S.SU08 IS CLOSED. M U
```

After the specified unit is closed, the computer pauses to allow additional setting of the entry keys. s.SIN1, s.SOU1, and s.SLB1 cannot be closed using the entry keys or the \$CLOSE card. They are closed by the \$STOP card. s.SPP1 may be closed. This causes the print/punch status to be set to combined. System punch output will appear on s.SOU1.

##### Setting 51: Open.

PREFIX	DECREMENT	TAG	ADDRESS
5	1xxxx	x	1 0 0 0 7

Set the two leftmost keys to 51 and the five rightmost keys to 10007 (unicod for s.SPP1) to change the combined print/punch status to uncombined. This setting of the entry keys has the same effect as a \$OPEN s.SPP1 card. System punch output will appear on the unit assigned to s.SPP1.

##### Setting 52: Units.

PREFIX	DECREMENT	TAG	ADDRESS
5	2xxxx	x	xxxxx

Set the two leftmost entry keys to 52 to cause a listing of the unit assignments. This setting has the same effect as the \$UNITS control card.

After the list of unit assignments is typed, the computer pauses to allow additional setting of the entry keys.

##### Setting 53: Restore.

PREFIX	DECREMENT	TAG	ADDRESS
5	3xxxx	x	xxxxx

Set the two leftmost entry keys to 53 to cause the restoration of the unit assignment scheme that was in effect upon the loading of the Operating System. Setting 53 has the same effect as the \$RESTORE control card. In addition, it causes the word RESTORING to be typed.

The computer does not pause after restoring the unit assignments.

*Setting 54: Job Skipping.*

PREFIX	DECREMENT	TAG	ADDRESS
5	4xxxx	x	xxxxx

Set the two leftmost entry keys to 54 to cause a skip to the next job. Setting 54 initiates a skip to the next \$JOB control card.

The \$STOP card and all Unit Assignment control cards are processed during job skipping. All other cards are ignored. Appropriate end-of-reel procedures are taken.

When the next \$JOB card is read, it is processed and then the computer pauses. If the operator pushes START without changing the keys, the next job is skipped. If the system input unit (S.SIN1) is properly positioned, the operator may continue with any other entry key setting or he may enter a 7 in the prefix portion of the keys and push START to continue processing.

*Setting 55: Pause.*

PREFIX	DECREMENT	TAG	ADDRESS
5	5xxxx	x	xxxxx

Set the two leftmost entry keys to 55 to cause a pause in processing. This setting has the same effect as the \$PAUSE card. In addition, it causes the word PAUSING to be typed.

*Setting 56: List.*

PREFIX	DECREMENT	TAG	ADDRESS
5	6xxxx	x	xxxxx

Set the two leftmost entry keys to 56 to cause the typing of control cards. This setting has the same effect as the \$LIST card. In addition, it causes the word LISTING to be typed.

*Setting 57: Unlist.*

PREFIX	DECREMENT	TAG	ADDRESS
5	7xxxx	x	xxxxx

Set the two leftmost entry keys to 57 to stop the typing of control cards. This setting has the same effect as the \$UNLIST card. In addition, it causes the word UNLISTING to be typed.

**PREFIX 6 — RESTART**

PREFIX	DECREMENT	TAG	ADDRESS
6	unicod	d	dddd

Place a 6 in the prefix to initiate a restart. The system unit specified in the decrement portion is used as the

checkpoint device. The symbols ddddd are the octal checkpoint identification number. (The discussions under "Checkpoint" and "Restart" give a description of these routines. The section "Prefix 2 — Detach" gives the definition of unicod.)

**PREFIX 7 — RETURN**

PREFIX	DECREMENT	TAG	ADDRESS
7	xxxxx	x	xxxxx

Place a 7 in the prefix to resume normal processing. Except as noted, when all modifications using prefixes 2, 3, 4, and/or 5 have been made, the computer pauses and the operator must enter a 7 in the prefix of the entry keys to cause processing to continue.

**EXAMPLES**

The console typewriter output shown in Figure 11 illustrates the use of the entry keys.

```

$PAUSE          SET SENSE SWITCH 1 ON
KEYS READ 20000001202
30517 UNIT IS ALREADY DETACHED
KEYS READ 200000051201
30517 UNIT IS ALREADY DETACHED
KEYS READ 20000002000
PLEASE ENTER SUB-ADDRESS IN THE KEYS
KEYS READ 00000000001
S.SU23 IS DETACHED FROM D,B,2
KEYS READ 31000300103
S.SIN1 NOW SWITCHED TO T,C,2
S.SU13 NOW SWITCHED TO RD,3,1
KEYS READ 300111010011
S.SU19 NOW SWITCHED TO T,B,2
S.SCK1 NOW SWITCHED TO D,B,1
KEYS READ 500021000111
S.SU19 IS CLOSED... M U
KEYS READ 52000000000
S.SLB1 IS 59 T,C,1
S.SIN1 IS 60 T,C,2
S.SOU1 IS 61 T,B,1
S.SPP1 IS 62 PU,3,1
S.SCK1 IS 63 D,B,1 FT FROM 000 TO 099
S.SU00 IS 00 T,C,3
S.SU01 IS 00 T,B,3
S.SU02 IS 00 T,B,4
S.SU03 IS 00 T,C,4
S.SU04 IS 00 T,B,5
S.SU05 IS 00 T,C,5
S.SU06 IS 00 T,A,4
S.SU07 IS 00 T,B,7
S.SU08 IS 00 T,A,5
S.SU09 IS 00 T,A,6
S.SU10 IS 00 T,A,1
S.SU11 IS 00 T,B,6
S.SU13 IS 00 RD,3,1
S.SU14 IS 00 RD,S,1
S.SU15 IS 00 T,C,6
S.SU16 IS 00 PU,S,1
S.SU17 IS 00 PR,3,1
S.SU18 IS 00 PR,S,1
S.SU19 IS 00 T,B,2
S.SU20 IS 00 D,B,1 FT FROM 100 TO 149
S.SU21 IS 00 D,B,1 FT FROM 150 TO 199
S.SU22 IS 00 D,B,1 FT FROM 200 TO 249
S.SU25 IS 00 T,A,3
KEYS READ 53000000000
RESTORING
    
```

Figure 11. Use of the Entry Keys

## Checkpoint

Checkpoint is a routine that may be used by any program. This routine saves the settings of the console panel registers, console switches, file control information, and the contents of core storage on a specified unit.

The function of the Checkpoint routine is to provide a basis for later restart of the job. The Checkpoint routine, upon completing its functions, types a restart code.

Checkpoints are initiated under program control. No action is required of the machine operator.

## Restart

A program for which a checkpoint has been taken may be restarted with the Restart routine. This routine is entered by using a \$RESTART control card or by executing an operator interrupt procedure after placing a restart code with a prefix of 6 in the entry keys. The section "Operator Interrupt" contains a definition of the interrupt procedure.

In all cases, the checkpoint unit and the location of the checkpoint record are determined from the restart code created by the Checkpoint subroutine. If the specified checkpoint unit is not attached or the specified checkpoint record cannot be located on the unit, an error message is typed and a pause follows to allow operator action.

A restart from the entry keys repositions s.SIN1, s.SOU1, and s.SPP1. A restart initiated by a \$RESTART control card does not reposition these units. Only units associated with the current job are repositioned. Therefore, jobs processing data in file s.FBIN should not be restarted with a \$RESTART card. In no case is a card reader, punch unit, printer, or random-access device repositioned.

If the symbolic unit assignments have changed between the taking of the checkpoint and the initialization of the restart, messages are typed concerning units that conflict with the checkpoint. In this event, the operator has the choice of either (1) switching the units through the entry keys or (2) matching the files, if they are tape files, to the devices to which the units are currently attached.

The core storage limits to be restored are checked against current core storage limits. If these limits

are exceeded, a message is typed and the restart is terminated.

## Initiating a Restart

To restart a program with the \$RESTART card, the operator must cause the \$RESTART control card to be read by the System Monitor. The control card should be punched as follows:

1. Columns 01-08 contain \$RESTART.
2. Columns 16-27 contain the twelve-character octal restart code that was typed when the checkpoint was taken (see message 10280).

To restart a program by using the interrupt procedures, the operator must:

1. Execute the operator interrupt procedure, setting the entry keys to the restart code that was typed when the checkpoint was taken (see message 10280).
2. Mount the files that were saved when the checkpoint was taken.
3. Press START.
4. Set the sense switches according to typed instructions.

## Restart Routine

The Restart routine performs the following actions:

1. Checks the restart code to determine the checkpoint device and the location of the checkpoint record.
2. Compares the core storage limits that are to be restored with the current limits. If the current limits will be exceeded, the restart is terminated, and error message 20292 is typed.
3. Checks the compatibility of the restart input/output data with current input/output data. It verifies labels, if applicable, and positions devices.
4. Notifies operator of switch settings at checkpoint time. Switch settings need not be in agreement, although a message is typed if they are not.
5. Reads in the panel record to the final phase of the Restart routine.
6. Restores appropriate monitor job data.
7. Restores core storage by reading the record(s) containing storage dumps from the device on which the checkpoint is located.
8. Restores the console panel and registers.
9. Transfers control to the location that was specified as the point of return.



## System Editor Operating Information

The System Editor constructs and updates the System Library. Components of the Operating System are assembled by the Macro Assembly Program, formed into absolute core storage loads by the Loader, and placed into the System Library by the System Editor.

### **System Unit Requirements**

The System Editor uses the system library unit, system input unit, system output unit, and two utility units selected for it by the Editor Monitor. One utility unit is used for intermediate storage and one for the new System Library. The new library unit may be specified with the `$IBEDT` card instead of having it selected by the Editor Monitor.

The configuration described in the above paragraph is limited to edit runs that contain only absolute column binary cards or the special OCT patch cards. An additional utility unit is necessary for an edit run that

alters the relocatable Subroutine Library. Another utility unit may be required for the edit file.

### **Edit Run**

The System Monitor transfers control to the Editor Monitor when a `$IBEDT` card is encountered on the system input unit. (The publication *IBM 7040/7044 Operating System (16/32K): Systems Programmer's Guide*, Form C28-6339, gives a description of the Editor.)

At the end of editing, a message is typed indicating the unit that contains the new System Library.

If the programmer includes more than one `REMARK` card in the edit deck, each of the `REMARK` cards (except the first one) is typed. A machine pause follows the typing of each card to allow the operator to take any action that may be indicated in the text of the remark.

## Processor Operating Information

The Processor translates input from source language into machine language. The components of the Processor are: the FORTRAN IV Compiler (IBFTC), the COBOL Compiler (IBCBC), the Macro Assembly Program (IBMAP), the Loader (IBLDR), and the Subroutine Library (IBLIB).

For a general description of the Processor, see the publication *IBM 7040/7044 Operating System (16/32K): Programmer's Guide*, Form C28-6318.

Additional operating information in the form of a listing of on-line messages is contained in Appendix C of this manual.

### Processor Input/Output Unit Use

Input to the Processor is on the system input unit unless an alternate input unit is specified by the programmer.

Output from the Processor is in two forms: punched cards and printed listings. The punched card output is produced on S.SPP1. The printed output is produced on

the system output unit unless an alternate unit is specified by the programmer.

If the system peripheral punch unit and the system output unit are assigned to the same logical unit, all output is produced on this unit.

For each Processor application, available units are chosen as work units. When a unit required by the Processor is not available, a halt occurs to allow the operator to ready an additional unit. If a required unit is not made available, the job is terminated.

Figure 12 shows the Processor's use of input/output units.

### Loader Mount Messages

The Loader types messages identifying each unit that the operator is required to ready. Then, just before the Loader transfers control to the object program, it types message 21901 and pauses to allow the operator to ready the required unit.

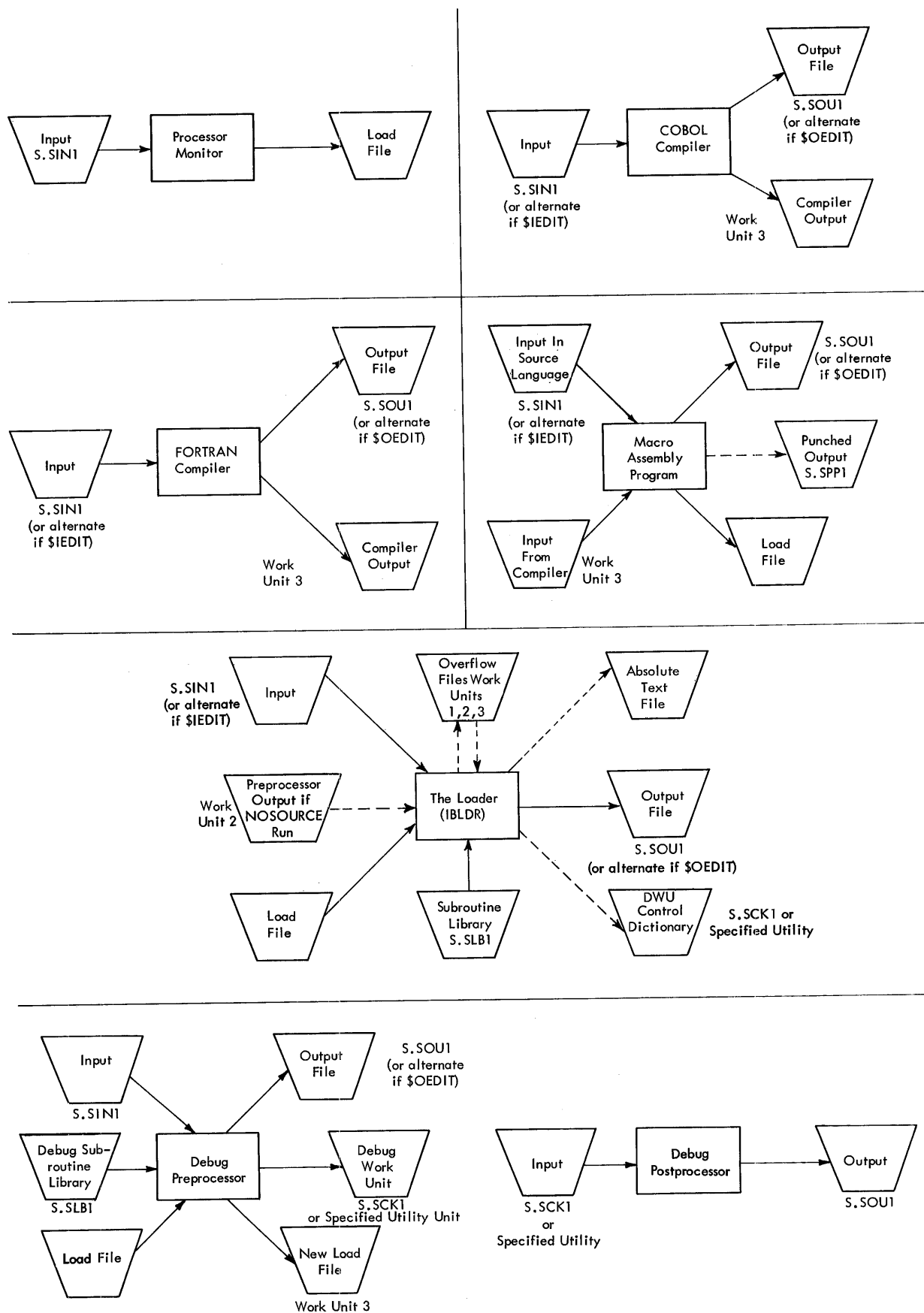


Figure 12. Flow of Input/Output Data During a Processor Application

## Update Facilities

The Update program is provided with the 7040/7044 Operating System (16/32K) to allow the programmer to maintain master files of program decks on magnetic tape rather than on punched cards and to list punch output on s.SOU1 and/or s.SPP1. Control for this program is in the form of subsystem control cards, which are provided by the programmer.

### Control Cards

The following list of control cards used by, and with, the Update program, although supplied by the programmer, is presented here as an aid to facilitate the program run.

CONTROL CARD	FUNCTION
\$RUN	Initializes the Update program.
\$OBTAIN	Requests supplementary listing.
\$ENDRUN	Terminates transactions.
\$ASSIGN	Assigns auxiliary input units.
\$LOCATE	Positions the input tape and requests update action.
\$NUMBER	Requests resequencing.
\$DELETE	Requests deletion of serialized cards.
\$PLACE	Makes selective insertion for the output auxiliary file.
\$MESSAGE	Types out a message for the operator, with an optional pause for operator action.
\$OUTPUT	Assigns output units.

The control card sequence used to initialize an update run is as follows:

CONTROL CARD	FUNCTION
\$DATE	Provides current date for each job.
\$JOB	Names the job and cancels programmer unit reservations.
\$EXECUTE UPDATE	Initializes loading of the Update program.
\$RUN	Initializes the Update program.

### Units Used During an Update Run

Figure 13 lists the standard units used during an update run and indicates the purpose for which each is used.

### Messages

Only the following messages are typed during an update run. All other messages are listed on the system output unit (s.SOU1) for the programmer's use.

10650 UPDATE DISCONTINUED DUE TO ERRORS.  
JOB SKIPPED.

10651 UPDATE OUTPUT ON XXXX, HOLD.

Detailed information regarding the Update program may be found in the publication *IBM 7040/7044 Operating System (16/32K): Programmer's Guide*, Form C28-6318.

Symbolic Unit	Description
S.SLB1	System Library File
*S.SU01	Old Master File (input)
*S.SU04	Auxiliary Master File (input)
**S.SU00	New Master File (output)
**S.SU03	Auxiliary Master File (output)
S.SIN1	Transaction File
S.SOU1	Supplementary Listing

\*These units are used unless the user specifies other input units with a \$ASSIGN control card.

\*\*These units are used unless the user specifies other output units with a \$OUTPUT card or the units are unavailable. Whenever these units are not used, units are chosen by availability and indicated by messages. Output units that are chosen by availability and not specified on a \$OUTPUT card are unloaded when they are closed.

Figure 13. Unit Assignment for an Update Run

## Generalized Sorting System Operating Information

The IBM 7040/7044 Generalized Sorting System is a flexible program that offers the user both sorting and merging capabilities. The 7040/7044 Generalized Sorting System (Sort) is designed to operate under the System Monitor, which determines the availability of all input/output units. Specifically, Sort uses the Nucleus, IOLS, IOOP2, IOOP1, and IOEX. However, Sort uses its own buffering schemes.

For a general description of the Generalized Sorting System, see the publication *IBM 7040/7044 Operating System (16/32K): Generalized Sorting System*, Form C28-6337.

Additional operating information in the form of a listing of on-line messages is contained in Appendix C of this publication.

### Sort Input Unit and Merge Tape Usage

The Generalized Sorting System types messages such as the following to the operator:

#### Sort Run:

INPUT UNITS	A2, A3
MERGE UNITS	C1, C2
MERGE UNITS	CD20, CD21
OUTPUT UNITS	CD19
CHECKPOINT UNIT	B1

This message indicates that two input units have been assigned on channel A, two tape units have been assigned on channel C for merging, two disk units have been assigned on channel C for merging, a disk unit has been assigned on channel C for output, and a checkpoint unit has been assigned on channel B.

#### Sort and Merge Run:

INPUT UNITS	C4
MERGE UNITS	B2, B3
MERGE UNITS	C2, C3
.	.
.	.
.	.
20303-MOUNT EXTERNAL MRG FILE	2112 ON UNIT C3
READY UNITS-HIT START OUTPUT UNIT	B2

This message indicates that one input unit has been assigned on channel C, two tape units have been assigned on channel B for merging, two tape units

have been assigned on channel C for merging, that the external merge file is to be mounted on tape unit C3, and that the final output will appear on tape unit B2.

#### Merge Run:

MERGE INPUT UNITS		
FILES	REELS	UNITS
2122	1	B2
2112	1	B3
OUTPUT UNITS		C4, C5

This message indicates that the input file designated as logical file 2122, and consisting of one reel, has been assigned to unit B2. Similarly, the input file designated as logical file 2112, also contained on one reel, has been assigned to unit B3. Two output units have been assigned on channel C.

### Sort Interrupt and Restart

If programs that have precedence make it necessary to interrupt and restart a sort application, the operator interrupt procedure may be used. (The section "Operator Interrupt" discusses this.) Subsequent restart of the sort may be accomplished using the system restart procedure. (The section "Restart" describes this procedure.)

If NOCKPT is not specified on the OPTION card and S.SCK1 is attached, checkpoints are taken in the Sort at the following points:

1. In the Internal Sort phase, at the end of each input reel, except the last reel
2. In the Merge phase, at the beginning of each pass
3. In the Final Merge phase, at the beginning of the phase, and at the end of each output reel, except the last reel

The interrupt switch is interrogated at these points, whether or not the checkpoints are taken. If a checkpoint is taken, the interrupt switch is interrogated after the checkpoint is taken. If an interrupt occurs, all tapes must be saved and remounted to restart the program.

### Overflow

When the number of records to be sorted exceeds the maximum number (sort capacity) that can be processed in the Sort application, an overflow condition occurs. If an overflow condition occurs, message 30320 is printed.

## Utility Programs Operating Information

The IBM 7040/7044 Operating System includes utility programs that perform printing functions and various utility functions for magnetic tape, 1301 Disk Storage, 1302 Disk Storage, and 7320 Drum Storage. The programs are controlled by a Utility Monitor that operates under the System Monitor.

The publication *IBM 7040/7044 Operating System (16/32K): Programmer's Guide*, Form C28-6318, contains a description of the monitored utility programs.

### **Format Switches**

When message 20401 is typed to indicate that format tracks are to be written, the format switch should be

turned on for the module and access mechanism that the user wants to format. All other format switches must be off. All format switches must be turned off when message 20404 indicates that the writing of format tracks is completed.

### **Utility Program Messages**

A complete list of on-line messages associated with the monitored utility programs is contained in Appendix C.

## Appendix A. Control Card Check List

	Source language programs included:			Relocatable Binary Programs	Comments
	COBOL	FORTRAN	IBMAP		
\$JOB	X	X	X	X	One required at the beginning of each job
\$ID	O	O	O	O	Transfers control to installation accounting routines
\$*	O	O	O	O	Comments card
\$PAUSE	O	O	O	O	Permits operator action
\$IBJOB	X	X	X	X	Initiates an IBJOB application; one required for each processor application
\$IBSYS	O	O	O	O	Next job segment will not be processed by IBJOB; control is passed to IBSYS
\$IBFTC		X			Precedes each FORTRAN deck
\$IBCBC	X				Precedes each COBOL deck
\$CBEND	X				Follows each COBOL deck
\$IBMAP			X		Precedes each MAP deck
\$IBLDR				X	Precedes each relocatable binary program to be loaded
\$ENTRY	X	X	X	X	Specifies location of initial transfer; initiates object program loading
\$RELOAD	O	O	O	O	Reloads absolute program produced by IBLDR
\$FILE	O	O	O	O	Provides file specifications; supersedes any deck specifications
\$LABEL	O	O	O	O	Provides label information for files
\$POOL	O	O	O	O	Designates files to share common buffer areas, i.e. pools
\$USE	O	O	O	O	Specifies data, procedure, or file sections to be used
\$OMIT	O	O	O	O	Deletes file, data, or procedure sections
\$NAME	O	O	O	O	Used to change control section or file names
\$ETC	O	O	O	O	Continues variable fields of the above Preprocessor cards
\$CHAIN	O	O	O	O	One required to initiate a CHAIN application
\$LINK	O	O	O	O	One required at the beginning of a link deck
\$ENDCH	O	O	O	O	One required to terminate a CHAIN application

Notation: X necessary; O optional; blank does not apply.

Figure 14. Control Cards Needed to Run a Job (Processor Applications)

\$*	O	For comments
\$IBSYS	X	One required to transfer control to the Supervisor
\$ID	X	One required to transfer control to installation accounting routine
\$JOB	X	One required at the beginning of each job
\$IBSRT	X	One required at the beginning of each sort application
FILE (Input)	X	One required for each input file
FILE (Output)	X	One required for the output file
RECORD	X	One required to describe the record format
SORT	X	One required for each file to be sorted, if any
MERGE	X	One required for the files to be merged, if any
SYSTEM	X	One required to specify the 7040/7044 System environment
LABEL	O	Required for nonstandard labels only
MODIFICATION	O	For introducing modification programs only
OVERFLOW	O	For restarting a sort application after overflow
OPTION	O	Provides for additional sort application options
END	X	One required to indicate end of sort control cards

Notation: X necessary; O optional.

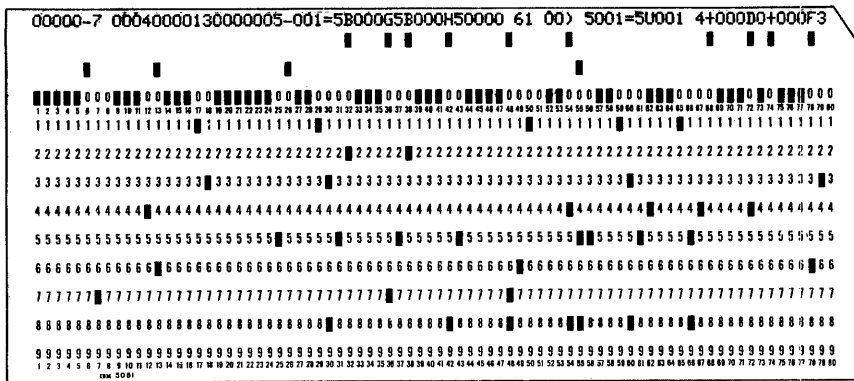
Figure 15. Control Cards Needed to Run a Job (Sort Applications)

## Appendix B. Disk Load Cards

Two cards are used at initial start for a bootstrap-load routine when the system library unit is assigned to disk. The first card to be used is shown in Figure 16. The second card for the two-card bootstrap routine must be selected, according to the channel on which s.SLB1 is attached, from the four cards shown in Figure 17.

Cards are shown for channels B through E. The module and starting track must be punched in columns 76-80 of the second card.

The procedure for using these cards at initial start is described in the section "Initial Start."



Note: Multiple punching is used in these Bootstrap cards; in some cases, the printed characters are incorrect.

Figure 16. Card One of the Two-Card Bootstrap Routine.





## Appendix C. On-Line Error Messages

This section includes each message typed by the distributed version of the 7040/7044 Operating System as a result of an error condition. It explains the message and indicates the appropriate action to be taken.

The messages are listed in order by five-digit error code numbers for convenient reference by the operator. Informative messages that can be identified by code numbers are also included.

The significance of the error code number assigned to a message is determined as follows:

- A. Ten thousands position
  - 1 – Message without pause.
  - 2 – Pause which requires a specified manual action before continuing.
  - 3 – Pause which requires a choice of specified manual actions before continuing.
- B. Thousands position
  - 0, 1, and 2 are for IBM use only.
- C. Hundreds position
  - 1 – IOEX, IOOP
  - 2 – IOLS, IOBS
  - 3 – Sort/Merge
  - 4 – Utilities
  - 5 – Supervisors
  - 6 – Simulators and Peripheral Programs
  - 7 – FORTRAN IV Compiler
  - 8 – COBOL Compiler
  - 9 – Macro Assembly Program
- D. Tens and units position. These positions ensure that every code number is unique. They are left to the discretion of the programmer.
- E. The following additional number assignments have been made.
  - x1500-x1549 System Editor
  - x1550-x1599 Processor and Input/Output Editors
  - x1900-x1999 Loader (IBLDR)

### 10000 OPERATOR CALL TO DUMP

*Explanation:* This message appears when the operator makes a call to dump through the keys.  
*Action:* None.

### 10101 I/O CHECK

*Explanation:* The I/O check indicator has been turned on. A hardware failure has occurred.  
*Action:* None.

### 10110 xxxxx iiiii ERR – yyyyy LAST CALL S.Sxxx S.SSCH IS zzzzzzzzzzzz

*Explanation:* Error condition – no error routine is supplied with call to IOOP. The first word of this message, xxxxx, is the error number in octal. The octal location of the most recent call to IOOP replaces yyyyy. The symbolic unit specified in the calling sequence is entered at S.Sxxx. The word IOOP or IODER is entered at iiiii to indicate whether it was an IOOP or IODER error. The contents of the store channel word are also typed at zzzzzzzzzzzz.

*Action:* None.

### 10120 IOBS ERROR n ON xxxxxx

*Explanation:* xxxxxx is the device on which the error occurred. The specific error and its location are given on the system output unit. n refers to the error number of one of the following errors.

- 1 – Block sequence error
- 2 – Check sum error
- 3 – Block sequence and check sum error
- 4 – Permanent read error
- 5 – Attempt to PUT on an unopened file
- 6 – Attempt to PUT on record longer than defined block size
- 7 – Attempt to GET more words than remain in buffer
- 8 – Unexpected mode change
- 9 – Permanent write error
- 10 – Incomplete word was read
- 11 – Caller returned from error number 5 without opening the file
- 12 – Insufficient buffers to open this file
- 13 – No end-of-file exit provided
- 14 – Attempt to GET or PUT on the checkpoint file
- 15 – Attempt to PUT on an input file
- 16 – Attempt to GET on an output file
- 17 – Attempt to perform an illegal non-data-transmitting operation
- 18 – Attempt to write a file mark on an input file
- 19 – Attempt to reel switch a single reel output file

*Action:* None.

### 10200 IOLS ERROR xxxxxxxxxxxx

*Explanation:* xxxxxxxxxxxx designates a calling sequence error, a permanent write error while attempting to write a label, or a reel switch error resulting from an illegal attempt to switch a disk or drum. On the system output unit, S.SOU, a corresponding message will be written indicating the location of the last call to IOLS and the locations of the label and file control blocks.

*Action:* None.

### 10203 DISMT xxxxxx BLKS yyyyy

*Explanation:* Device xxxxxx is unloaded. yyyyy blocks were written.

*Action:* If xxxxxx is a tape unit, dismount the reel.

### 10205 SRCH S.SUyy

*Explanation:* This message appears following message 30200 or 30201 when the operator uses the keys to specify the unit S.SUyy should be used in a label search.

*Action:* None.

### 10280 CODE 6wxxxxxyyyyy

*Explanation:* This message indicates that the checkpoint is complete. The restart code always has a prefix of six. The w is zero if the checkpoint device was a utility unit, or one if it was a system unit. xxxx is the unit code and yyyyyy is the checkpoint identification number, which is formed as the sum of the read plus write operations on the checkpoint device. If the phrase 'CKPT MAY BE INVALID' is added to the above message, the checkpoint may be incomplete or the checkpoint records may be separated from one another by a second checkpoint. The checkpoint is incomplete if an input/output error has occurred. The checkpoint records are separated by another checkpoint if an interrupt occurred while the first checkpoint was being written.

*Action:* None.

- 10281 zzzzzzzzzz ERROR ON S.Sxxx nnnnnn  
*Explanation:* An irrecoverable error has occurred on the checkpoint device (designated S.Sxxx nnnnnn, where nnnnnn is the device address). The store channel word (S.SSCH), represented by 12 z's, is given and the checkpoint is terminated. The panel is restored and control is returned to the calling program.  
*Action:* None.
- 10282 nnnnn DETACHED  
*Explanation:* The device designated by nnnnn is detached. nnnnn is the unit code. The panel is restored, and control is returned to the calling program.  
*Action:* None.
- 10301 OUTPUT ON xxxx  
*Explanation:* The Final Merge phase of the Generalized Sorting System has written the final output file, or a portion of the final output file, on unit xxxx.  
*Action:* None.
- 10401 LOAD DISK/DRUM  
*Explanation:* Introductory message written on the system output unit when an IBULx card is encountered.  
*Action:* None.
- 10402 LAST TRK LOADED bbbbaa  
*Explanation:* Terminating message for a disk/drum function in which an IBULD card is used. The b's are the track address and the a's the record address of the last track loaded. The message is written on the system output unit. If bbbbaa is not given, nothing was loaded.  
*Action:* None.
- 10403 DEVICE PRINT  
*Explanation:* Introductory message written on the system output unit when an IBUUD card is encountered.  
*Action:* None.
- 10404 NO. OF REC. TO SPACE IS INCORRECT  
*Explanation:* The IBUUD control card for the Device Print Program specified too many records or files to be positioned. The positioning specification is met as far as possible. The message is written on the system output unit.  
*Action:* None.
- 10405 S.SSCH IS eeeeeeeeeee FOR S.Sxxx  
*Explanation:* An error has occurred in the Device Print Program while reading from the symbolic unit S.Sxxx. The e's are the contents (octal) of S.SSCH. The prefix and decrement of S.SSCH are set for the following conditions:  
 5 - The record was successfully read in the opposite mode (BCD/binary) from that specified for the operation.  
 5 - The transmission of one or two words was requested (729/7330 Magnetic Tape Units only).  
 6 - No record found (for 1301 and 7320 only).  
 7 - End-of-medium indicator was detected while writing.  
 9 - Program error occurred.  
 10 - External device error was encountered.  
 11 - External device error was encountered and ignored.  
 12 - Unusual end occurred (incomplete word was transmitted if the device was a 729/7330 Magnetic Tape Unit).  
 13 - Recovered error.  
 14 - Channel parity.  
 16 - Permanent error.  
 17 - The operation was completed.  
 This message is written on the system output unit and the typewriter.  
*Action:* None.
- 10406 THE FOLLOWING SETS HAVE NOT BEEN FOUND  
*Explanation:* Set names specified on the IBURD control card cannot be found on the input tape. The message is followed by the set names that cannot be found. The message is written on the system output unit.  
*Action:* None.
- 10407 CLEAR DISK/DRUM  
*Explanation:* Introductory message written on the system output unit when an IBUCD card is encountered.  
*Action:* None.
- 10408 LAST TRK CLEARED bbbbaa  
*Explanation:* Terminating message where the b's are the track address and the a's the record address of the last track cleared. If full tracks are cleared, aa is 00. The message is written on the system output unit. If bbbbaa is not given, nothing was cleared.  
*Action:* None.
- 10409 NO RECORD FOUND  
*Explanation:* A read or write operation has resulted in a 'NO RECORD FOUND' return. The message is written on the system output unit. Program execution is terminated and control is returned to the Utility Monitor. The next control card is read. If the next message is 10402, 10408, 10414, or 10435, it contains the incorrect address.  
*Action:* None.
- 10410 xxxxx REDUNDANCY  
*Explanation:* xxxxx will be replaced with either the word READ or the word WRITE to indicate that a permanent redundancy has occurred. The message is written on the system output unit. Program execution is terminated and control is returned to the Utility Monitor. The next control card is read.  
*Action:* None.
- 10411 EXTERNAL DEVICE ERROR. S.SSCH eeeeeeeeeee S.SSNS IS ssssss  
*Explanation:* A read or write operation has resulted in an irrecoverable error. The e's are replaced with the channel results (see message 10405) and the s's are replaced with the sense information in word S.SSNS. S.SSNS is zero when tape is used. Program execution is terminated and control is returned to the Utility Monitor. The next control card is read. If the next message is 10402, 10408, 10414, or 10435, it contains the incorrect address.  
*Action:* None.
- 10412 DUMP DISK/DRUM  
*Explanation:* Introductory message written on the system output unit when an IBUDD card is encountered.  
*Action:* None.
- 10413 (No Message)  
*Explanation:* The track to be restored by the Restore Disk/Drum Program was not defined at the time the disk/drum was attached. This error number is always followed by message 10419.  
*Action:* None.
- 10414 LAST TRK DUMPED bbbb  
*Explanation:* Terminating message where the b's are replaced with the track address of the last track which was dumped. The message is written on the system output unit. If bbbb is not given, nothing was dumped.  
*Action:* None.
- 10415 CNTRL CRD IS BINY  
*Explanation:* The last card that was read was a binary card. The card is ignored. Control is returned to the Utility Monitor. Five consecutive occurrences of binary cards will result in the printing of message 30403.  
*Action:* None.
- 10416 NAME xxxxxx NOT IN ATOC  
*Explanation:* The program name xxxxxx, appearing in the control card most recently encountered, cannot be found in the Abbreviated Table of Contents. The control card is ignored and control is returned to the Utility Monitor. Five consecutive illegal program names will result in the printing of message 30403.  
*Action:* None.

- 10417 FILE 1 EOF  
*Explanation:* An end of file has been read and a \$STOP card has been generated.  
*Action:* None.
- 10418 FILE NOT ATTACHED  
*Explanation:* An S.Sxxx specification refers to a unit that has not been attached at system assembly time. A \$STOP card has been generated.  
*Action:* None.
- 10419 THE FOLLOWING CARD IS INCORRECT  
*Explanation:* This message precedes the writing of an illegal control card. If the incorrect card is a label control card, the program will assume zeros for all parameters in the card. If the incorrect card is not a label control card, it is ignored and control is returned to the Utility Monitor.  
*Action:* None.
- 10420 (No Message)  
*Explanation:* A skip to the next job is occurring.  
*Action:* None.
- 10422 ILL CHAR  
*Explanation:* An invalid character has been found in an IBUxx control card. The message and the control card are written on the system output unit. The control card is ignored and control is returned to the Utility Monitor.  
*Action:* None.
- 10423 EXT FLD ERR  
*Explanation:* An IBUxx extension card was read but the preceding IBUxx control card did not end with a comma followed by a blank. The extension card is ignored and control is returned to the Utility Monitor.  
*Action:* None.
- 10424 ILL CONN  
*Explanation:* The connection used between parameters of an IBUxx control card is not a slash, comma, or hyphen. Both the message and the control card are written on the system output unit. The control card is ignored and control is returned to the Utility Monitor.  
*Action:* None.
- 10425 ZERO RCD COUNT  
*Explanation:* A record area of zero words was specified on an IBUFx, IBUGx, or IBUHx control card. Both the message and the control card are written on the system output unit. The control card is ignored and control is returned to the Utility Monitor.  
*Action:* None.
- 10426 ILL TCK/CYL  
*Explanation:* A cylinder that has not been defined, or a track on an undefined cylinder, has been specified on an IBUFx, IBUGx, or IBUHx control card. Both the message and the control card are written on the system output unit. The control card is ignored and control is returned to the Utility Monitor.  
*Action:* None.
- 10427 ILL RCD COUNT NO  
*Explanation:* The number of record areas specified on an IBUxF or IBUxB control card does not agree with the number of record-area length specifications. Both the message and the control card are written on the system output unit. The control card is ignored and control is returned to the Utility Monitor.  
*Action:* None.
- 10428 SEQ ERR  
*Explanation:* The IBUFx, IBUGx, or IBUHx control cards have not been read as complete sets. The permissible combinations are: IBUFH and IBUFF, IBUGH and IBUGF, IBUHH and IBUHF, IBUFB and IBUFH, IBUGB and IBUGH, or IBUHH and IBUHF. Both the message and the control card in error are written on the system output unit. The control cards are ignored and control is returned to the Utility Monitor.  
*Action:* None.
- 10429 TCK SEQ ERR  
*Explanation:* Sequential tracks are indicated on a control card, but do not appear in ascending sequence on the card. The message and the control card in error are written on the system output unit. The control card is ignored and control is returned to the Utility Monitor.  
*Action:* None.
- 10430 TCK OVFL0  
*Explanation:* The total number of data words in the record address areas specified on an IBUFx, IBUGx, or IBUHx control card exceeds the length of the format track. Both the message and the control card are written on the system output unit. The control card is ignored and control is returned to the Utility Monitor.  
*Action:* None.
- 10431 xxxxxx GENERATION . . . yyyyyy  
*Explanation:* The Format, Home Address, and Record Address Generator prints this message after processing a control card. The xxxxxx will read FORMAT if the Format Generator was requested or ADDRESS if the Home Address and Record Address Generator was requested. If both were requested, two messages will be printed. The y's will be replaced with DONE if the operation was completed or DELETED if the operation was unsuccessful.  
*Action:* None.
- 10432 LAST TCK RESTORED bbbbbb  
*Explanation:* bbbbbb is the address of the last track that was restored. If bbbbbb is blank, no tracks have been restored. The message is written on the system output unit.  
*Action:* None.
- 10434 RESTORE DISK/DRUM  
*Explanation:* Introductory message written on the system output unit when an IBURD card is encountered.  
*Action:* None.
- 10435 ERROR IN SKIPPING  
*Explanation:* The Load Disk/Drum Program cannot skip to a designated record. Program execution is terminated and control is returned to the Utility Monitor. The next control card is read. The message is written on the system output unit.  
*Action:* None.
- 10436 LAST REC LOADED bbbbbb  
*Explanation:* Terminating message for a load disk/drum in which an IBULS control card was used. The b's are replaced with the number of the last record that was loaded. The message is written on the system output unit.  
*Action:* None.
- 10437 FORMAT AND ADDRESS GENERATOR DELETED  
*Explanation:* The message typed immediately preceding this one gives the cause of the deletion.  
*Action:* None. Control is given to the next job.
- 10438 LOADING TERMINATED AT END OF MEDIUM  
*Explanation:* When loading a disk or drum attached for sequential access, an end-of-medium return causes the loading to be terminated.  
*Action:* None.
- 10440 BEGIN UTIL xxxxxx  
*Explanation:* The x's are replaced with the address to which the operator must transfer in order to call the Dump program.  
*Action:* None.
- 10441 END UTIL  
*Explanation:* This message indicates that the operator can transfer to octal location 101 to call the Dump program.  
*Action:* None.

- 10442 LAST WRITE WAS OVER THE DEFINED LIMITS  
*Explanation:* When loading the disk in accordance with the user's options, the program has attempted to write past the last track defined at system assembly. Execution is terminated and control is returned to the Utility Monitor.  
*Action:* None.
- 10443 S.SU<sub>xx</sub> ALTERNATE UNIT NOT FOUND AND IGNORED  
*Explanation:* The alternate unit specified in a control card cannot be assigned and the program continues without it.  
*Action:* None.
- 10490 BEGIN BXLOAD yyyyy  
*Explanation:* The initial message of the BXLOAD program. The yyyyy will be replaced with the address that the operator can transfer to in order to restart the program. If a restart is tried, the device containing the 7740 CCP and its loader should be positioned to the first record.  
*Action:* None.
- 10491 INT LD  
*Explanation:* This message will be followed by a loop while the 7040/7044 awaits the initial load attention signal from the 7740.  
*Action:* Initial load procedures should be initiated on the 7740.
- 10492 END  
*Explanation:* The BXLOAD program has finished loading the 7740. Control will be returned to the System Monitor.  
*Action:* None.
- 10501 ILLEGAL INSTR TRAP xxxxx  
*Explanation:* Invalid instruction trap. xxxxx is the address of the illegal instruction.  
*Action:* None.
- 10503 INTVL TIMER OVRFLO xxxxx  
*Explanation:* Interval timer overflow trap. The x's are the contents of the instruction counter at the time the overflow occurred.  
*Action:* None.
- 10505 STO PROTECT VIOLAT xxxxx  
 ILL PROTECT VIOLAT xxxxx  
 RPM PROTECT VIOLAT xxxxx  
*Explanation:* Storage protection violation trap. The x's are the contents of the instruction counter at the time the trap occurred.  
*Action:* None.
- 10506 INTVL TIMER RESET xxxxx  
*Explanation:* Interval timer reset trap. The x's are the contents of the instruction counter at the time the trap occurred.  
*Action:* None.
- 10507 E CYC /I CYC /CHANN /TIMER /UNIDT /STACK /PARITY ERROR \*\*\*\*\*  
*Explanation:* Storage or channel parity trap. The appropriate six characters are inserted in the message ahead of the basic message format.  
*Action:* None.
- 10510 (No Message On-Line)  
*Explanation:* Snapshot records on the system checkpoint unit are being interpreted or developed by the Dump program. They will then be written on the system output unit. The Dump program has been called in automatically.  
*Action:* None.
- 10511 ILLOGICAL ENTRY TO MONITOR.  
*Explanation:* The Dump program has been called in automatically to dump the console panel, the system panel, and all of core storage.  
*Action:* None.
- 10512 \$CHANNEL CARD IN ERROR  
*Explanation:* One or more errors have been found in a \$CHANNEL card. The card is typed and the system skips to the next job.  
*Action:* None.
- 10513 UNABLE TO LOCATE xxxxxx IN TABLE OF CONTENTS.  
*Explanation:* The phase name xxxxxx is not in the table of contents. This condition is the result of either a machine error or the intentional deletion of the program from the System Library.  
*Action:* None.
- 10514 UNABLE TO PROCESS THESE CARDS.  
*Explanation:* The first of one or several cards that cannot be processed is typed above this message.  
*Action:* None.
- 10515 UNABLE TO LOCATE xxxxxx IN TABLE OF SYSTEMS  
*Explanation:* The name xxxxxx is not in the Index. This indicates that the \$EXECUTE card typed on-line below this error message is erroneous.  
*Action:* None.
- 10517 SYSTEM UNIT FUNCTION IN ERROR-SKIPPED  
*Explanation:* An ATTACH macro did not expand correctly. Any program referring to the system unit in error will not execute properly.  
*Action:* None.
- 10518 \$CHANNEL REQUIREMENTS CANNOT BE SATISFIED  
*Explanation:* This message was preceded by message 20518. Requirements specified by the \$CHANNEL card still cannot be satisfied.  
*Action:* None.
- 10529 SECOND CALL TO DUMP FROM xxxxx. ALL DUMPING TERMINATED  
*Explanation:* An irrecoverable error on unit xxxxx has resulted in a call to the Dump program while the Dump program is in control. Dumping is terminated, and control is returned to the monitor.  
*Action:* None.
- 10530 ERRNO xxxxx NOT FOUND IN TABLE  
*Explanation:* Error number for which parameters are sought is not in the ERRNO table.  
*Action:* None.
- 10531 PARAM CELL AT xxxxx IN ERROR. DUMP CANNOT PROCEED  
*Explanation:* The parameter address or word count is in error. The Dump program is unable to derive the location of the message string.  
*Action:* None.
- 10532 TYPE/LIST MESSAGE FOR ERRNO xxxxx NOT RELIABLE WRONG PFX BITS IN PARAM CELL  
*Explanation:* The prefix bits indicate a word in the Dump program, but the address is that of a word outside the Dump program.  
*Action:* None.
- 10533 TYPE/LIST MESSAGE FOR ERRNO xxxxx NOT RELIABLE MESSAGE TOO LONG FOR BUFFER  
*Explanation:* The total number of words in the message exceeds the size of the message buffer.  
*Action:* None.

- 10534 TYPE/LIST MESSAGE FOR ERRNO **xxxxx** NOT RELIABLE TOO MANY OVERLAID PARAM CELLS  
*Explanation:* The number of message parameter words overlaid by the Dump program exceeds the size of the table in which such words are stored.  
*Action:* None.
- 10535 ILL LGL REC POSITION CODE. DUMP TERMINATED  
*Explanation:* A reference has been made within the Dump program to a logical record that does not exist on the checkpoint tape. This message is caused by an invalid modification of the Dump program.  
*Action:* None.
- 10536 IRREC ERROR S.SSCH WD IS **xxxxxxxxxxxxx**  
*Explanation:* Error return from IOOP. In the event of an irrecoverable error while the Dump program is in control, Dump supplies this return and continues on.  
*Action:* None.
- 10537 INVALID PARAMETER SET **xxxxxxxxxxxxx**  
**xxxxxxxxxxxxx xxxxxxxxxxxxxxx**  
*Explanation:* Dump parameters specified are incorrect and are ignored.  
*Action:* None.
- 10538 NO. OF REC. TO SPACE IS INCORRECT  
*Explanation:* The number of records and/or files to be skipped or backspaced has resulted in a programmer error.  
*Action:* None.
- 10539 DMP INCOMPLETE, PARAM CELLS EXCEED BF  
*Explanation:* This message appears when the number of dump parameter cells exceeds the size of the buffer in which they are stored by phase 2 of the Dump program for phase 3.  
*Action:* None.
- 10540 ERR IN DMP PARAM ANALYSIS. DUMP TERMINATED  
*Explanation:* The routine analyzing dump parameters has arrived at a result that is logically impossible.  
*Action:* None.
- 10541 SNAP SW SET, NO S.SCK1  
*Explanation:* Switch has been set for snapshots, but there is no tape on which they could have been taken.  
*Action:* None.
- 10542 SNAP SW SET, 1ST REC NOT SNAP, DEVELOPING TERMINATED  
*Explanation:* The first record on the snapshot file is not a snapshot record, as it should be.  
*Action:* None.
- 10543 S.SIN1/S.SOU1/S.SPP1 ERROR  
*Explanation:* IOOP has returned control to the System Editor with an error flag. The Input/Output Editor will place the appropriate system function in the message without any attempt at diagnostics.  
*Action:* None.
- 10544 FILE 1EOF  
*Explanation:* End of file was read on this file and a \$STOP card was generated.  
*Action:* None.
- 10545 FILE NOT ATTACHED  
*Explanation:* A request was made for a nonexistent S.Sxxx unit. A \$STOP card has been generated.  
*Action:* None.
- 10546 DUMP OF THESE PARAMETERS DISCONTINUED BECAUSE OF 5 NO RECORDS FOUND  
**xxxxxxxxxxxxx xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx**  
*Explanation:* Five no-record-found returns from IOOP have occurred while dumping the disk.  
*Action:* None.
- 10547 DUMP DISCONTINUED. 3 ERROR CALLS  
*Explanation:* Parameters have been given by a program. Dumping terminated.  
*Action:* None.
- 10550 INITIAL START PROCEDURE INCOMPLETE. RESUME FROM COLD START  
*Explanation:* Self-explanatory.  
*Action:* Resume from the beginning of the initial start procedure (cold start).
- 10551 POINTER (S.SLOC) IS INVALID. NO TRACEBACK GIVEN  
*Explanation:* S.SLOC does not refer to a TSL instruction, as it should.  
*Action:* None.
- 10552 DUMP DISCONTINUED DUE TO ERRORS  
*Explanation:* Three consecutive attempts to write on S.SOU1 have failed. The dump is terminated.  
*Action:* None.
- 10650 UPDATE DISCONTINUED DUE TO ERRORS JOB SKIPPED  
*Explanation:* The Update run has been discontinued because too many errors have occurred. The run is terminated. This message is followed by message 10420.  
*Action:* None.
- 10651 UPDATE OUTPUT ON **xxxx**, HOLD  
*Explanation:* The output of the Update run is on unit **xxxx**.  
*Action:* The output should be saved, unless otherwise directed by the programmer.
- 10701 INVALID ARGUMENTS  
*Explanation:* An error has occurred while using the FORTRAN routine XP1, XP2, XP3, FDX1, or FDX2. The function (0\*\*0) is mathematically meaningless.  
*Action:* None.
- 10702 INVALID ARGUMENTS  
*Explanation:* An error has occurred while using the FORTRAN routine XP1, XP2, FDX1, or FDX2. The function (0\*\*( -X )) is mathematically indeterminate.  
*Action:* None.
- 10703 ARGUMENT EXCEEDS COMPUTABLE LIMITS  
*Explanation:* An error has occurred while using the FORTRAN routine TNCT. The argument is too large to compute tangent or cotangent.  
*Action:* None.
- 10704 ARGUMENT EXCEEDS COMPUTABLE LIMITS  
*Explanation:* An error has occurred while using the FORTRAN routine TNCT. The function is too steep to produce a reliable answer for tangent or cotangent.  
*Action:* None.
- 10705 ARGUMENT EXCEEDS COMPUTABLE LIMITS  
*Explanation:* An error has occurred while using the FORTRAN routing SCNH. The argument for sinh or cosh is too large for the exponential function used to compute the answer.  
*Action:* None.
- 10707 INVALID ARGUMENTS  
*Explanation:* An error has occurred while using the FORTRAN routine XP3 or FDX2. The arguments may produce a complex number when C is real for the function -B\*\*C.  
*Action:* None.

- 10708 ARGUMENT EXCEEDS COMPUTABLE LIMITS  
*Explanation:* An error has occurred while using the FORTRAN routine XPN. The argument is too large for the exponential function.  
*Action:* None.
- 10709 INVALID ARGUMENTS  
*Explanation:* An error has occurred while using the FORTRAN routine ATN (ATAN2 entry). Arc tangent arguments (0/0) are invalid.  
*Action:* None.
- 10710 INVALID ARGUMENT  
*Explanation:* An error has occurred while using the FORTRAN routine LOG. Zero is invalid for the log function argument.  
*Action:* None.
- 10711 INVALID ARGUMENT  
*Explanation:* An error has occurred while using the FORTRAN routine LOG. A negative number is invalid for the log function argument.  
*Action:* None.
- 10712 ARGUMENT EXCEEDS COMPUTABLE LIMITS  
*Explanation:* An error has occurred while using the FORTRAN routine SCN. The argument is too large to compute sine or cosine.  
*Action:* None.
- 10713 ARGUMENT EXCEEDS COMPUTABLE LIMITS  
*Explanation:* An error has occurred while using the FORTRAN routine ARSCN. The arc sine or arc cosine argument is not in the interval  $-1$  to  $+1$ .  
*Action:* None.
- 10714 INVALID ARGUMENT  
*Explanation:* An error has occurred while using the FORTRAN routine SQR. Negative numbers are invalid for the square root function argument.  
*Action:* None.
- 10715 ARGUMENT EXCEEDS COMPUTABLE LIMITS  
*Explanation:* An error has occurred while using the FORTRAN routine FCXP. The real part of the complex argument is too large.  
*Action:* None.
- 10716 ARGUMENT EXCEEDS COMPUTABLE LIMITS  
*Explanation:* An error has occurred while using the FORTRAN routine FCXP. The imaginary part of the complex argument is too large.  
*Action:* None.
- 10717 INVALID ARGUMENT  
*Explanation:* An error has occurred while using FORTRAN routine FCLG. Zero is invalid for the complex log function argument.  
*Action:* None.
- 10718 ARGUMENT EXCEEDS COMPUTABLE LIMITS  
*Explanation:* An error has occurred while using FORTRAN routine FCSC. The imaginary part of a complex argument is too large.  
*Action:* None.
- 10719 ARGUMENT EXCEEDS COMPUTABLE LIMITS  
*Explanation:* An error has occurred while using FORTRAN routine FCSC. The real part of a complex argument is too large.  
*Action:* None.
- 10720 ARGUMENT EXCEEDS COMPUTABLE LIMIT  
*Explanation:* An error has occurred while using FORTRAN routine GAMA (GAMMA entry). Negative arguments are invalid. If an argument is near zero or too large, the answer is of overflow proportion for the gamma function.  
*Action:* None.
- 10721 ARGUMENT EXCEEDS COMPUTABLE LIMITS  
*Explanation:* An error has occurred while using FORTRAN routine GAMA (ALGAMA entry). Negative arguments are invalid. If an argument is zero or too large, the answer is of overflow proportion for the natural log of the gamma function.  
*Action:* None.
- 10722 INVALID ARGUMENT  
*Explanation:* An error has occurred while using FORTRAN routine FDAT (DATAN2 entry). Arc tangent arguments (0/0) are invalid.  
*Action:* None.
- 10724 ARGUMENT EXCEEDS COMPUTABLE LIMITS  
*Explanation:* An error has occurred while using FORTRAN routine FDXP. The argument is too large for the exponential function.  
*Action:* None.
- 10725 INVALID ARGUMENT  
*Explanation:* An error has occurred while using FORTRAN routine FDLG. Zero is invalid for the log function argument.  
*Action:* None.
- 10726 INVALID ARGUMENT  
*Explanation:* An error has occurred while using FORTRAN routine FDLG. A negative number is invalid for the log function argument.  
*Action:* None.
- 10727 ARGUMENT EXCEEDS COMPUTABLE LIMITS  
*Explanation:* An error has occurred while using FORTRAN routine FDSC. The argument is too large to compute sine or cosine.  
*Action:* None.
- 10728 INVALID ARGUMENT  
*Explanation:* An error has occurred while using FORTRAN routine FDSQ. A negative number is invalid for the square root function argument.  
*Action:* None.
- 10729 INVALID ARGUMENT  
*Explanation:* An error has occurred while using FORTRAN routine FCA. Complex division by zero is invalid.  
*Action:* None.
- 10731 TOO MANY TRAPS  
*Explanation:* Floating-point traps in this job have exceeded the limit specified in FORTRAN library routine FPT.  
*Action:* None.
- 10732 NO SUCH UNIT  
*Explanation:* An invalid unit number has been encountered by the FORTRAN library routine UTV.  
*Action:* None.
- 10733 ILLEGAL BACKSPACE  
*Explanation:* FORTRAN library routine BST will not allow backspacing a tape past beginning-of-file.  
*Action:* None.
- 10734 ILLEGAL END FILE  
*Explanation:* FORTRAN library routine EFT will not allow an end-of-file mark to be written on the system input, system output, or system punch unit.  
*Action:* None.
- 10735 ILLEGAL REWIND  
*Explanation:* FORTRAN library routine RWT will not allow rewinding of the system input, system output, or system punch file.  
*Action:* None.

- 10736 ILLEGAL WRITE  
*Explanation:* FORTRAN library routine IOS will not allow writing on the system input file.  
*Action:* None.
- 10737 ILLEGAL READ  
*Explanation:* FORTRAN library routine IOS will not allow reading past the end of data on the system input file.  
*Action:* None.
- 10738 EOF READING  
*Explanation:* IOBS has read an EOF mark or a IEOF trailer label, and taken the EOF exit into FORTRAN library routine IOS.  
*Action:* None.
- 10739 BIN READ ERR  
*Explanation:* FORTRAN library routine RWB has discovered a discrepancy between its input record word count and that of IOCS.  
*Action:* None.
- 10740 INPUT LIST EXCEEDS FORTRAN RECORD LENGTH WHILE READING BINARY  
*Explanation:* FORTRAN library routine RWB finds the input list longer than the FORTRAN input record. This message also appears on the system output unit.  
*Action:* None.
- 10741 OUTPUT OVFL0  
*Explanation:* FORTRAN library routine RWD does not provide for an output record in excess of 22 words.  
*Action:* None.
- 10742 BAD INPUT  
*Explanation:* FORTRAN library routine ICV has discovered data in the current input record which is unacceptable for decimal conversion of input.  
*Action:* None.
- 10743 ILLEGAL LOGICAL INPUT CHARACTER IN THIS DATA FROM  
*Explanation:* FORTRAN library routine LCV has discovered data in the current input record which is unacceptable for logical conversion of input. This message also appears on the system output unit.  
*Action:* None.
- 10744 ILLEGAL OCTAL INPUT CHARACTER IN THIS DATA FROM  
*Explanation:* FORTRAN library routine OCV has discovered data in the current input record which is unacceptable for octal conversion of input. This message also appears on the system output unit.  
*Action:* None.
- 10745 BAD FORMAT  
*Explanation:* FORTRAN library routine SCA has discovered an unacceptable character in a FORMAT statement.  
*Action:* None.
- 10746 NO SUCH LITE  
*Explanation:* An invalid sense light number has been encountered by the FORTRAN library routine SLN.  
*Action:* None.
- 10747 NO SUCH LITE  
*Explanation:* An invalid sense light number has been encountered by the FORTRAN library routine SLT.  
*Action:* None.
- 10748 NO SUCH SWCH  
*Explanation:* An invalid sense switch number has been encountered by the FORTRAN library routine SWT.  
*Action:* None.
- 10749 IOBS ERTYP 1  
*Explanation:* IOBS has discovered a block sequence error and taken the error exit into FORTRAN library routine IOS.  
*Action:* None.
- 10750 IOBS ERTYP 2  
*Explanation:* IOBS has discovered a check sum error and taken the error exit into FORTRAN library routine IOS.  
*Action:* None.
- 10751 IOBS ERTYP 3  
*Explanation:* IOBS has discovered block sequence and check sum errors and taken the error exit into FORTRAN library routine IOS.  
*Action:* None.
- 10752 IOBS ERTYP 4  
*Explanation:* IOBS has discovered a permanent read redundancy and taken the error exit into FORTRAN library routine IOS.  
*Action:* None.
- 10753 IOBS ERTYP 5  
*Explanation:* IOBS has discovered an attempt to write on an unopened file and taken the error exit into FORTRAN library routine IOS.  
*Action:* None.
- 10754 IOBS ERTYP 6  
*Explanation:* IOBS has discovered a buffer overflow and taken the error exit into FORTRAN library routine IOS.  
*Action:* None.
- 10755 IOBS ERTYP 7  
*Explanation:* IOBS has discovered a count in a Type 2 or Type 3 record control word that is greater than the number of words remaining in the input buffer, and has taken the error exit into FORTRAN library routine IOS.  
*Action:* None.
- 10756 IOBS ERTYP 8  
*Explanation:* IOBS has discovered an unexpected change of mode on an input file and taken the error exit into FORTRAN library routine IOS.  
*Action:* None.
- 10757 IOBS ERTYP 9  
*Explanation:* IOBS has discovered an irrecoverable write error and taken the error exit into FORTRAN library routine IOS.  
*Action:* None.
- 10758 IOBS ERTYP 10  
*Explanation:* IOBS has read an incomplete word and taken the error exit into FORTRAN library routine IOS.  
*Action:* None.
- 10759 ILLEGAL BACKSPACE  
*Explanation:* An attempt has been made to backspace the system output file or the system peripheral punch file.  
*Action:* None.
- 10760 ILLEGAL GO TO  
*Explanation:* An illegal value has been detected for a FORTRAN computed GO TO statement.  
*Action:* None.
- 10800 COBOL PROCEDURE DIVISION MISSING  
*Explanation:* A Procedure Division must be present to ensure completion of compilation.  
*Action:* None.
- 10801 INVALID INPUT IN PHASE 1 PART 1 PREVENTS COMPLETION OF COMPILATION  
*Explanation:* Phase 1 Part 1 encountered an unexpected situation.  
*Action:* None.
- 10802 INVALID INPUT IN PHASE 1 PART 2 PREVENTS COMPLETION OF COMPILATION  
*Explanation:* Phase 1 Part 2 encountered an unexpected situation.  
*Action:* None.



- 10803 INVALID INPUT IN PHASE 2 PREVENTS COMPLETION OF COMPILATION  
*Explanation:* Phase 2 encountered an unexpected situation.  
*Action:* None.
- 10805 COBOL PHASE 3 TABLE OVERFLOW  
*Explanation:* An 01 to 01 entry for the Data Division cannot fit into the table in Phase 3. Suggest fewer names for record description.  
*Action:* None.
- 10806 COBOL PHASE 3 TABLE SPACE TOO SMALL  
*Explanation:* The amount of table space available to Phase 3 is less than 370 words.  
*Action:* None.
- 10807 INVALID INPUT IN PHASE 3 PREVENTS COMPLETION OF COMPILATION  
*Explanation:* Phase 3 encountered an unexpected situation.  
*Action:* None.
- 10808 INVALID INPUT IN PHASE 4 PREVENTS COMPLETION OF COMPILATION  
*Explanation:* Phase 4 encountered an unexpected situation.  
*Action:* None.
- 10809 COBOL PHASE 2 TABLE OVERFLOW  
*Explanation:* Number of files specified exceeds maximum able to be handled by compiler.  
*Action:* None.
- 10810 COBOL PHASE 2 TABLE OVERFLOW  
*Explanation:* The number of PERFORM statement items and/or external dictionary items exceeds table capacity.  
*Action:* None.
- 10811 NOT ENOUGH AVAILABLE UNITS, JOB TERMINATED  
*Explanation:* There are not enough available units for a COBOL compile and load application. The job is terminated.  
*Action:* None.
- 10812 PHASE 4 TABLE OVERFLOW  
*Explanation:* More than 25 temporary storage areas are required at one time.  
*Action:* None.
- 10813 COBOL PHASE 1 PART 1 TABLE OVERFLOW  
*Explanation:* A Data Division entry has too many illegal COBOL words or names.  
*Action:* None.
- 10850 COBOL BASIC LOCATOR ERROR  
*Explanation:* A basic locator is used to refer to a field in a record before the associated file has been opened or read.  
*Action:* None.
- 10851 COBOL EXECUTION ERROR  
*Explanation:* A statement in the COBOL object program was executed in error either because a compiler error condition was ignored or because the necessary parameters were not specified in a GO TO statement.  
*Action:* None.
- 10875 TABLE OVERFLOW IN IBDEF. JOB SKIPPED  
*Explanation:* Self-explanatory.  
*Action:* None.
- 10876 SYSTEM OR MACHINE ERROR. JOB SKIPPED  
*Explanation:* Self-explanatory.  
*Action:* None.
- 10877 BITS S-12 ILLEGAL ON BINARY CARD IN DECK xxxxxx. CONTENTS FIRST WORD yyyyyyyyyyy. JOB SKIPPED  
*Explanation:* The yyyyyyyyyyy represents the contents of the first word of the binary card.  
*Action:* None.
- 10878 BINARY CARD OUT OF SEQUENCE IN DECK xxxxxx. CONTENTS FIRST WORD yyyyyyyyyyy. NUMBER zzzzzz EXPECTED. JOB SKIPPED  
*Explanation:* The yyyyyyyyyyy represents the contents of the first word of the binary card. The zzzzzz represents the correct sequence number.  
*Action:* None.
- 10879 CHECKSUM ERROR IN DECK xxxxxx. CONTENTS FIRST WORD yyyyyyyyyyy. JOB SKIPPED  
*Explanation:* The yyyyyyyyyyy represents the contents of the first word of the binary card.  
*Action:* None.
- 10880 I/O ERROR ON FILE xxxxxx DEVICE yyyyyyyyyyy. JOB SKIPPED  
*Explanation:* The yyyyyyyyyyy represents the device address specified in the first word of the unit control block.  
*Action:* Rerun the job.
- 10881 UNEXPECTED MODE CHANGE FILE xxxxxx DEV. yyyyyyyyyyy. JOB SKIPPED  
*Explanation:* The yyyyyyyyyyy represents the device address specified in the first word of the unit control block.  
*Action:* None.
- 10882 UNEXPECTED EOF ON FILE xxxxxx DEV. yyyyyyyyyyy. JOB SKIPPED  
*Explanation:* The yyyyyyyyyyy represents the device address specified in the first word of the unit control block.  
*Action:* None.
- 10883 END OF REEL ON FILE xxxxxx, DEVICE yyyyyyyyyyy. JOB SKIPPED  
*Explanation:* The yyyyyyyyyyy represents the device address specified in the first word of the unit control block.  
*Action:* None.
- 10884 UNEXPECTED BINARY CARD ENCOUNTERED. JOB SKIPPED  
*Explanation:* Self-explanatory.  
*Action:* None.
- 10885 JOB SKIPPED DUE TO PREVIOUS ERROR.  
*Explanation:* Self-explanatory.  
*Action:* Follow action specified for "previous error" for which a message was typed.
- 10886 TOO MANY DECKNAMES CHANGED. JOB SKIPPED  
*Explanation:* Self-explanatory.  
*Action:* None.
- 10887 ILLEGAL STR AT xxxxx  
*Explanation:* Location xxxxx contains an illegal STR (store location and trap) instruction.  
*Action:* None.
- 10888 STACKED STR REQUESTS AT LOCATIONS xxxxx AND yyyyy. DEBUG UNABLE TO PROCEED  
*Explanation:* Self-explanatory.  
*Action:* None.
- 10889 NOSOURCE WAS SPECIFIED IN DEBUG RUN. JOB SKIPPED  
*Explanation:* \$IBJOB card contains the NOSOURCE option. This option is illegal in an application that includes load-time debugging.  
*Action:* None.
- 10890 DWU WD COUNT ERROR ON S.Sxxx, nnnnn  
*Explanation:* The nnnnn is the device address. No debugging dumps will be listed. One of the following explanations applies:  
1. Format tracks for the unit assigned to DWU do not all have the same number of words.

2. Checkpoint, snapshot, or the object program has used the DWU.

Action: None.

#### 11500 BEGIN EDIT

*Explanation:* This message is typed and control is transferred to Phase 1 of the Editor following the opening of the input/output devices and interpretation of the \$IBEDT card. This message also appears following use of processor programs for special preprocessing of edit input.

Action: None.

#### 11501 BEGIN EDIT PREPROCESSING. EDIT FILE xxxxxx

*Explanation:* This message is typed when the Editor Monitor temporarily releases control to the Supervisor for processing of a System Monitor control card, because the SOURCE-NO SOURCE option is specified on the \$IBEDT card. The Edit file is identified so that it may be saved for reuse. Message number 11500 is typed when the \$END-EDIT card is read, and control is transferred to the Editor program.

Action: None.

#### 11502 PREPROCESSOR DETECTED ERROR

*Explanation:* One or more errors that would cause deletion of execution in a non-edit run have been detected by IBLDR and/or IBCBC during edit preprocessing. The specific error(s) is listed on the system output unit. This message is always followed by message 11541.

Action: None.

#### 11503 S.SU01 NOT AVAILABLE, NEWLU IS xxxxxx

*Explanation:* The new library unit was not specified in the \$IBEDT card. Since S.SU01 is not available, xxxxxx is the unit chosen for the new library unit.

Action: None.

#### 11504 xxxxxx FIELD IN ERROR, OPTION IGNORED

*Explanation:* This message is typed when an option on the \$IBEDT card is not valid. For example, this message would be used if the LABEL option specifies six new library units or if the specified new library unit is the same unit as the one for the edit stack file.

Action: None.

#### 11540 xxxxxx xxxxxx ERROR ON S.Sxxx nnnnnn EDIT TERMINATED

*Explanation:* This message is typed by using the IODER routine of IOOP for all input/output errors detected through IOCS. xxx . . . xxx is the kind of error encountered, such as a permanent redundancy error. S.Sxxx and nnnnnn are the symbolic unit name and device address. Editing is terminated following this message.

Action: None.

#### 11541 EDIT TERMINATED

*Explanation:* Edit cannot proceed because of machine error or incorrect deck setup.

Action: None.

#### 11545 S.SUxx CANNOT BE USED FOR MERGING

*Explanation:* Phase 2 of the Editor must perform a duplication pass to insert an updated Table of Contents into the new System Library. S.SUxx, the work unit to be used for this pass, cannot accept the records from the new library because their block size is too great. The edit run is terminated.

Action: None.

#### 11549 EDIT COMPLETE - NEWLU xxxxxx, AND yyyyyy

*Explanation:* The edit run has been completed. xxxxxx is the primary new library unit, and the secondary new library unit, if applicable, is indicated by yyyyyy.

Action: None.

#### 11550 UNIT FOR xxxxx NOT AVAILABLE.

*Explanation:* This message is issued by the Processor Moni-

tor or the Editor Monitor when one of the following occurs:

1. A job is skipped because (a) the Start key was pressed after message 31550 but a unit was not placed in ready status or (b) a unit for file xxxxxx is not available. xxxxxx may be any of the unit identifiers described in the explanation of message 31550.

2. A unit is not available for S.FBOA (alternate output file).

After this message is typed, the job is terminated.

Action: None.

#### 11551 UNABLE TO LOCATE xxxxxx IN THE INDEX

*Explanation:* The Processor component identified by xxxxxx is not in the System Library. xxxxxx can be IBCBC, IBLDR, or LDRPRE. This is a catastrophic condition for Processor applications. Processing is suspended.

Action: Repeat the initial start procedure using a new System Library, or press START to skip to the next job.

#### 11552 END OF FILE SENSED READING xxxxx

*Explanation:* S.Sxxx is S.SINI or alternate input unit. When this occurs, the Input Editor terminates the job with a dump.

Action: None.

#### 11553 UNRECOVERABLE REDUNDANCY ON xxxxxx

*Explanation:* S.Sxxx can be S.SINI, S.SOU1, S.SPP1, alternate input, or alternate output. The \$IEDIT card or \$OEDIT card indicates which unit is the alternate utility unit. When this condition occurs, the Input or Output Editor terminates the job with a dump.

Action: None.

#### 11554 DECK xxxxxx NOT FOUND ON ALTERNATE INPUT UNIT

*Explanation:* A \$IBMAP or \$IBLDR card has been read. The deck specified (xxxxxx) should have been on the alternate input unit, but it was not. The Input Editor skips to the next job without suspending machine processing.

Action: None.

#### 11555 UNITS Uxx Uxx Uxx Uxx Uxx Uxx

*Explanation:* The lowest numbered system utility units are unavailable for use in a Processor or Editor application; also, the channel optimization feature (an IBNUC assembly parameter) is not being used. The Uxx representations in this message indicate the system utility units to be used. In the order of their appearance in the message, the Uxx representations indicate WORK1, WORK2, WORK3, WORK4, the unit for the load file, and the Copy unit. If no system utility unit is assigned as any of the above, 000 is typed instead of Uxx for that particular unit.

Action: None.

#### 11557 PRINT ERROR

*Explanation:* A line has been misprinted on the on-line printer. This message appears on the same device, immediately after the erroneous record. The error will be ignored and the job will continue.

Action: None.

#### 11560 Iyy SPECIFIED ON xxxxxx CARD NOT DEFINED.

*Explanation:* Iyy is an intersystem reservation code used on one of the following cards: \$IBEDT, \$IEDIT, \$OEDIT, \$OPEN, \$CLOSE, \$SWITCH, \$FILE, or \$IBJOB. Either the code was not assigned previously, or it is an illegal intersystem reservation code.

Action: None.

#### 11561 Iyy SPECIFIED ON xxxxxx CARD WAS ALREADY ASSIGNED.

*Explanation:* An attempt has been made to use a control card to assign Iyy as an intersystem reservation code. The code is already assigned.

Action: None.

- 11562 S.SUxx SPECIFIED ON xxxxxx CARD WAS ALREADY RESERVED.  
*Explanation:* An attempt has been made to use a control card to assign an intersystem reservation code to a unit (S.SUxx) that is already reserved.  
*Action:* None.
- 11900 LOADER TERMINATED AT LOC xxxxxx  
*Explanation:* xxxxx is a five-character address in octal. Loading is being terminated due to an error described on the system output unit.  
*Action:* None.
- 11902 LOADER 4 ERROR  
*Explanation:* This is a result of a machine error. No dump is taken.  
*Action:* Rerun the job.
- 11903 BEGIN  
*Explanation:* Signals beginning of object program.  
*Action:* None.
- 11904 (No Message)  
*Explanation:* Skipping to next job because of previously described error.  
*Action:* None.
- 11905 OBJ PRO NOT IN TOC  
*Explanation:* The object program being loaded or reloaded is not in the Table of Contents. The job will be skipped.
- 11906 FILE xxxxxx SPECIFIED ON \$LABEL CARD DOES NOT EXIST. CARD WAS IGNORED.  
*Explanation:* During a RELOAD run a \$LABEL card was included to label or relabel a file that was not defined for the current application. The \$LABEL card was ignored.  
*Action:* None.
- 13000 [ ]  
*Explanation:* General parameters open to any routine that provides its own message and desires the Dump program to process dump parameters only.  
*Action:* None.
- 20200 INVALID UNICOD  
*Explanation:* This message appears following message 30200 or 30201 if the unit code entered in the keys is invalid.  
*Action:* Enter the correct unit code for the utility unit in positions 21-35 of the keys and press START.
- 20201 uuuuu xxxxx READ/SOUGHT  
*Explanation:* uuuuu is the device being read. The first line after the message is the label as read from the device. If input, the second line is the label sought for as constructed from the label control block; if output, a second line will not appear. If xxxxx is HEADR, set sense switch 6 on to accept the file, off to reject it. If xxxxx is TRALR, set sense switch 6 on for IEOR, off for IEOF.  
*Action:* Set sense switch 6 as desired and press START.  
*Note:* The sense switch to which the label verification function is assigned may be changed by an installation.
- 20202 COUNT LABEL mmmmm READ nnnnn  
*Explanation:* mmmmm is the count in the trailer label. nnnnn is the block count.  
*Action:* Press START to accept this condition.
- 20288 SET SWITCHES  
 1 2 3 4 5 6  
 (on or off, reflecting condition at the time the checkpoint was taken)  
*Explanation:* The console switches were set as indicated when the checkpoint was taken.  
*Action:* Set the console sense switches to the condition desired. Press START.
- 20289 SWITCHES ARE SET  
 1 2 3 4 5 6  
 (on or off, reflecting condition at the time the checkpoint was taken)  
*Explanation:* The console switches are now set as indicated. This setting does not agree with the checkpoint condition.  
*Action:* If the setting is nevertheless correct, press START. No further check will be made.
- 20290 END OF REEL ON RESTART DEVICE  
 MOUNT NEW REEL, PRESS START  
*Explanation:* This message indicates that a IEOR or IEOF record has been read on the restart device or that a file mark has been read on an unlabeled device.  
*Action:* Mount a new reel. Press START.
- 20292 CKPT LIMITS EXCEED S.SCOR. CANNOT PROCEED.  
*Explanation:* The core storage limits to be restored are less than IBORG, greater than S.SEND, or both.  
*Action:* Press START to return control to the System Monitor.
- 20293 UNEXPECTED EOF ON RESTART DEVICE  
*Explanation:* Self-explanatory.  
*Action:* Press START to read the next record and to attempt to continue the restart.
- 20294 READY RESTART UNITS, THEN PRESS START  
*Explanation:* A series of file identifiers, device names, and device addresses follows this message. The format is READY xxxxxxxxxx ON S.Sxxx D, C, N where xxxxxxxxxx is a file identifier, S.Sxxx is a device name, and D, C, N is a device address.  
*Action:* Mount and ready specified files and press START.
- 20298 xxxxxx bbbbb ERROR ON S.Sxxx uuuuu  
*Explanation:* An irrecoverable I/O error has occurred on the indicated device during a dump or a restart. xxxxxx is replaced by positions 0-17 of S.SSCH for the operation. bbbbb is replaced by either the word READ or the word WRITE. uuuuu is replaced by the machine address of the device in error.  
*Action:* Press START to return control to the System Monitor.
- 20301 PREPARE UNITS-READY-HIT START  
*Explanation:* Ready the units designated by the preceding message. Sort assigns two input units when a channel designation is given on the SYSTEM card, even if only one reel of input exists. When input is specified by a S.SUxx designation, only one input unit is assigned.  
*Action:* Ready designated units. Press START.
- 20302 MOUNT SCRATCH TAPE ON xx-PRESS START  
*Explanation:* xx is the unit.  
*Action:* Mount scratch (work) tape on unit indicated and press START.
- 20303 MOUNT EXTERNAL MERGE FILE xxxxxx ON UNIT xx. READY UNITS-PRESS START.  
*Explanation:* xx is the unit.  
*Action:* Mount external merge file on unit indicated. Ready the units and press START.
- 20305 FILE xxxxxx - KEY IN NO. OF REELS - HIT START  
*Explanation:* xxxxxx is the file number.  
*Action:* Enter the number of reels, in octal, for the file specified. Press START.
- 20401 FORMAT GENERATOR. TURN SW TO WRITE-CH x, MOD y, ACCESS ARM z, START  
*Explanation:* Indicates that format tracks are to be written. The message is written on the system output unit and the typewriter.  
*Action:* Turn on the format switch and press START to continue.

- 20402 ADDRESS GENERATOR-HAO SW UP-CH  
x-START.  
*Explanation:* Indicates that home and record addresses are to be written. The message is written on the system output unit and the typewriter.  
*Action:* Turn on the home address switch and press START to continue.
- 20403 FILE ERROR  
*Explanation:* Permanent read/write error in either the system input file or the system output file.  
*Action:* Press START to continue.
- 20404 TURN ALL FORMAT SWITCHES OFF-  
HIT START  
*Explanation:* Formatting is completed.  
*Action:* Turn all format switches off and press START.
- 20512 ERROR IN THE DATE CARD LOOK xxxxxx  
*Explanation:* The \$DATE card that is typed on-line with this error message is erroneous. During the pause that follows this typing, the operator can take corrective action through the entry keys.  
*Action:* Enter the date in the entry keys and press START.
- 20516 PLEASE RESET INTERRUPT SWITCH.  
*Explanation:* The interrupt switch is on but a 7 is in the prefix of the entry keys.  
*Action:* Set the interrupt switch off.
- 20518 \$CHANNEL CARD REQUIRES MORE UNITS  
*Explanation:* Not enough units ready to satisfy the \$CHANNEL card requirements.  
*Action:* Ready as many units as possible and press START.
- 20526 THIS CONTROL CARD IS MISPUNCHED.  
*Explanation:* The control card typed above this message is mispunched. Corrective action may be possible through the entry keys.  
*Action:* Press START to ignore the mispunched card.
- 20527 LIBRARY DEVICE MISPOSITIONED LOADING  
xxxxxx.  
*Explanation:* Self-explanatory.  
*Action:* If this message occurs during the execution of an object program and the installation is a fully labeled shop, rerun the job. Otherwise press START to rewind and try again.
- 20528 UNABLE TO SORT SCB'S.  
*Explanation:* Initial start condition.  
*Action:* Repeat the initial start procedure.
- 20529 LDERR POS xxxxxx or LDERR WD CT xxxxxx or  
LDERR READ xxxxxx  
*Explanation:* S.SLDR has detected an error on the library device. xxxxxx is positions S, 1-17 of the S.SSCH word for the operation in error. POS—the error occurred while positioning to a phase. READ—the error occurred while reading a record of the phase. WD CT—the number of words read did not agree with the expected word count.  
*Action:* If this message occurs during the execution of an object program and the installation is a fully labeled shop, rerun the job. Otherwise press START to rewind and try again.
- 20530 ABBREV. TOC OR CON. CARD LIST  
OVERFLOW NOT ALLOWED.  
*Explanation:* Either the Abbreviated Table of Contents or the control card list has exceeded its limits. The card that caused this is ignored.  
*Action:* Press START to return control to the System Monitor.
- 20531 CAN NOT SWITCH ABOVE UNIT  
*Explanation:* An attempt has been made to switch a system unit with another system unit with a different system reservation code.  
*Action:* None.
- 20543 FILE ERROR  
*Explanation:* Permanent read/write error on file.  
*Action:* Push START to accept first six words of the block listed.
- 21502 S.Sxxx IS UNATTACHED, INTERVENTION  
REQUIRED  
*Explanation:* This message is typed when the Editor Monitor finds that the Symbolic Units Table entry for the specified unit is zero. Control is temporarily released to the Supervisor to allow the operator to attach the unit.  
*Action:* Follow the interrupt procedure to attach the specified unit through the entry keys. The interrupt switch must be on.
- 21503 S.Sxxx IS UNAVAILABLE, INTERVENTION  
REQUIRED  
*Explanation:* This message is typed when the Editor Monitor finds that the specified unit is reserved. This does not apply to the system library units. Control is released to the Supervisor to allow the operator to close the unit.  
*Action:* Follow the interrupt procedure to close the specified unit through the entry keys. The interrupt switch must be on.
- 21555 COMBINED PRINT/PUNCH DEVICE CANNOT  
BE A PRINTER. SWITCH S.SOU1.  
*Explanation:* This message occurs when a \$SWITCH card has switched S.SOU1 to a printer in a combined print/punch installation.  
*Action:* Set keys to switch S.SOU1 to off-line. Press interrupt switch and follow interrupt procedure.
- 21556 CD RD ERR  
*Explanation:* A read error has occurred on the card reader.  
*Action:* Reload the card reader, including the misread card, for retry.
- 21558 CD PNCH ERR  
*Explanation:* The card just punched by the card punch was erroneous.  
*Action:* Mark the mispunched card and push START to ignore bad card and continue job.
- 21901 READY UNITS  
*Explanation:* Units referred to are those previously described on the type sheet. They are of the form:  
MOUNT cu d x filenm sssss iiiiiiiiii  
This message contains the following information:  
c channel, indicated by A, B, C, D, E, or S  
u unit, indicated by a digit from 0 through 9  
d density, indicated by H or L  
x P for a primary unit, S for a secondary unit  
filenm six-character file name  
sssss five-character serial number, if the file is labeled  
iiiiiiiiii ten-character identification, if the file is labeled  
*Action:* Ready units indicated. Press START.
- 30200 xxxxxx FILE SOUGHT ON S.SUxx  
*Explanation:* xxxxxx is either INPUT or OUTPUT. A line is typed after the message shown above to indicate the label being sought for an input file. S.SUxx is a symbolic unit on which the operator can mount the file being sought.  
*Action:* The following options are available:  
1. Mount the file being sought on S.SUxx. Turn off sense switch 6 and press START. The file will be accepted without further checking.

2. Mount the file being sought on a utility unit other than S.SUxx, enter the unit code for the unit in 21-35 of the keys, set the sign of the keys to plus, set sense switch 6 on, and press START. The file will be accepted without further checking.
  3. To skip to the next job, set the sign of the keys to minus, set sense switch 6 on, and press START.
- 30201 RES CODE yy FOUND  
*Explanation:* This message appears when option 2 is taken for messages 30200 and 30201 and the utility unit specified by the operator has a reservation code other than zero.  
*Action:* The following options are available:
1. Enter the octal reservation code that should be assigned to the file in 30-35 of the keys. Turn off sense switch 6 and press START. Note that only codes 01-24 and 70 are valid entries in the keys.
  2. Enter the UNICOD for a different unit in the keys, set the sign of the keys to plus, set sense switch 6 on, and press START.
  3. To skip to the next job, set the sign of the keys to minus, set sense switch 6 on, and press START.
- 30291 CKPT ID RECORD SEQUENCE ERROR  
 KEYS SIGN MINUS—CONTINUE THIS REEL  
 KEYS SIGN PLUS—NEW REEL WILL BE MOUNTED  
*Explanation:* This message indicates that restart codes on this restart device are out of sequence. One attempt to rewind and start a search from the beginning of the device has been made.  
*Action:* Set the sign of the entry keys to minus to continue reading this device and to ignore future sequence errors. Set the sign plus if a new reel is mounted before START is pressed.
- 30294 nnnnn, S.Sxxx IS DETACHED.  
*Explanation:* The designated unit is detached.  
*Action:* Set the interrupt switch on to perform an operator interrupt. To skip this job, turn the interrupt switch off.
- 30295 nnnnnnnnnnn ERROR ON S.Sxxx. zzzzzz  
 RE-TRY, SET KEYS PLUS  
 ACCEPT, SET KEYS MINUS  
*Explanation:* An irrecoverable transmission error has occurred on the indicated restart device. The store channel word, S.SSCH, here represented by 12 x's is typed.  
*Action:* To reread, set the sign of the entry keys plus. To accept this record, set the keys minus. Press START.
- 30296 RESTART CONFLICT ON       aaaaa  
 ACTUAL STATUS RESTART NEED  
 UCUNI xxxxxx                   xxxxxx  
 SCLIM  
 SCSIZ xx                           xx  
 SCTYP xx                           xx  
 SCRES xx                           xx  
*Explanation:* The information in the UCB and SCB for the unit under consideration conflicts with the restart UCB and SCB information. The interrupt switch will be interrogated.  
*Action:* Set the interrupt switch on to perform an operator interrupt. Set it off to skip this job.
- 30297 POSITIONING ERROR ON S.Sxxx zzzzzz  
*Explanation:* An input/output error occurred while attempting to position a device. The interrupt switch will be interrogated.  
*Action:* Set the interrupt switch on to perform an operator interrupt. Set it off to skip this job.
- 30298 xx SCRES ERROR ON S.Sxxx zzzzzz  
*Explanation:* The reservation code given has not been specified as valid. The interrupt switch will be interrogated.  
*Action:* Set the interrupt switch on to perform an operator interrupt. Set it off to skip this job.
- 30301 TO TRY READING AGAIN PUT SSW 6  
 DOWN-HIT START  
*Explanation:* An error has occurred while reading.  
*Action:* To attempt another read, set sense switch 6 down and press START.
- 30302 TO CONTINUE IGNORING ABOVE ERRORS  
 PUT SSW 6 DOWN-HIT START  
*Explanation:* The errors above are minor and may be tolerated.  
*Action:* To continue the run, ignoring the errors, set sense switch 6 down and press START.
- 30303 TO DELETE RUN-HIT START  
*Explanation:* Self-explanatory.  
*Action:* Pressing START deletes the run.
- 30304 TO ASSUME END CARD AND CONTINUE  
 EDIT PUT SSW 6 DOWN-HIT START  
*Explanation:* This message is preceded by the message NO END CARD FOLLOWING SORT CONTROL CARDS. TO DELETE RUN, PRESS START.  
*Action:* To continue the Sort run, set sense switch 6 down and press START. To delete run, press START.
- 30308 TO CONTINUE WITHOUT MOD PUT SSW 6  
 DOWN-HIT START  
*Explanation:* Self-explanatory.  
*Action:* Set sense switch 6 down and press START to cause Sort to proceed without modification program.
- 30310 TO CONTINUE WITHOUT CHKPT-PUT SSW 6  
 DOWN-HIT START  
*Explanation:* Self-explanatory.  
*Action:* To continue without writing checkpoint records, set sense switch 6 down and press START.
- 30311 TO USE 2 MERGE CHAN UNITS AS INP  
 UNITS PUT SSW 6 DOWN-HIT START  
*Explanation:* Sort cannot find specified input units and recommends the use of merge units as input units.  
*Action:* If this recommendation is acceptable, set sense switch 6 down and press START.
- 30312 TO CONTINUE USING A REDUCED MERGE  
 ORDER, PUT SSW 6 DOWN-HIT START  
*Explanation:* The number of available units is not sufficient for the specified order of merge.  
*Action:* To proceed with a reduced merge order, set sense switch 6 down. (Note that this action may increase the time required for the run.)
- 30314 TO HAVE SORT ASSIGN OUT CHAN PUT  
 SSW 5 DOWN-HIT START  
*Explanation:* The assignment of output units cannot be made as requested.  
*Action:* To allow the Sort program to make the assignment, set sense switch 5 down and press START.
- 30315 TO CONTINUE USING xxxxxx OUT UNITS PUT  
 SSW 6 DOWN-HIT START  
*Explanation:* The program does not find a sufficient number of output units.  
*Action:* To continue the run, set sense switch 6 down and press START.
- 30316 TO CONTINUE WITH INP CHAN = xxx AND  
 OUT CHAN = xxx PUT SSW 6 DOWN-HIT  
 START  
*Explanation:* The indicated assignments cannot be made as requested.  
*Action:* Set sense switch 6 down to accept the alternate assignment of units.

- 30317 TO CONTINUE WITH INP CHAN = xxx AND OUT CHAN = xxx PUT SSW 5 DOWN-HIT START  
*Explanation:* The indicated assignments cannot be made as requested.  
*Action:* Set sense switch 5 down to accept the alternate assignment of units.
- 30318 TO DELETE RUN HIT START. TO CONTINUE PUT SSW 6 DOWN-HIT START  
*Explanation:* Self-explanatory.  
*Action:* Set sense switch 6 up and press START to delete run. Set sense switch 6 down and press START to continue run.
- 30320 SORT CAPACITY REACHED. SW 6 DOWN TO IGNORE THIS WARNING AND CONTINUE. OR SW6 UP TO SORT REST OF FILE IN SUBSEQUENT RUN WITH OVERFLOW CARD — OVERFL, BLO/xxxxxx, REE/xxxxxx, RLS/xxxxxx AND, KEY IN xxxxxx REELS AT MESSAGE 20305 FILE xxxxxx PRESS START.  
*Explanation:* The expected maximum number of records (for a fixed-length sort) or words (for a variable-length sort) has been read. If the warning is ignored, an endless merge condition may result.  
 REE/xxxxxx is printed if REELS/nn is specified in the Sort Input FILE card. RLS/xxxxxx is printed if RLS/nnnnn is specified in the Sort Input FILE card. AND, KEY IN xxxxxx REELS AT MESSAGE 20305 FILE xxxxxx is printed if REELS/x is specified in the Sort Input FILE card. The number of reels is printed in octal.  
*Action:* Set sense switch 6 down to ignore this warning and continue. Set sense switch 6 up to sort only those records already read in. In either case, press START. If the rest of the file is to be sorted in a subsequent run, use the OVERFLOW card supplied in this message in the overflow run. Column 1 of the OVERFLOW card must be blank. If REELS/x is specified in the Sort Input FILE card, key in the exact number of reels from message 30320 at message 20305 in the overflow run.
- 30321 ALL OUTPUT TAPES FILLED (SHORT REELS). SSW 6 DOWN TO DELETE RUN. TO RESTART INTERNAL SORT, MOUNT FULL REELS, PRESS START.  
*Explanation:* The output reels from phase 1 do not contain 2400 feet of magnetic tape. The reels are full, and the Sort cannot continue.  
*Action:* To delete the run, set sense switch 6 down. To continue, set sense switch 6 up. In either case press START.
- 30322 INPUT AND OUTPUT COUNTS DO NOT AGREE. SSW 6 DOWN TO DELETE RUN. UP, TO RESTART INTERNAL SORT. PRESS START.  
*Explanation:* The input record count does not equal the output record count.  
*Action:* To ignore the error, set sense switch 6 up and press START. To delete the run, set sense switch 6 down and press START.
- 30330 SSW 6 DOWN TO DELETE RUN, UP TO CONTINUE. PRESS START.  
*Explanation:* Self-explanatory.  
*Action:* Set sense switch 6 up and press START to continue the run. Set sense switch 6 down and press START to delete the run.
- 30331 INPUT AND OUTPUT WORD COUNTS DIFFER. SSW 6 DOWN TO DELETE RUN, UP TO CONTINUE. PRESS START.  
*Explanation:* The input word count does not equal the output word count (variable-length file).  
*Action:* To ignore the error, set sense switch 6 up and press START. To delete the run, set sense switch 6 down and press START.
- 30332 SSW 6 DOWN TO DELETE RUN, UP TO CONTINUE. PRESS START.  
*Explanation:* Self-explanatory.  
*Action:* Set sense switch 6 up and press START to continue the run. Set sense switch 6 down and press START to delete the run.
- 30333 NOT ENOUGH MEMORY FOR EXTERNAL FILE BLOCKING. TO RUN SORT ONLY, SSW 6 DOWN. TO DELETE RUN, SSW 6 UP. HIT START.  
*Explanation:* Not enough core storage available to accommodate the external file blocking.  
*Action:* Set sense switch 6 down to run a sort only. Set sense switch 6 up to delete run. Press START.
- 30334 NO TAPES AVAIL ON OUT CHAN. TO USE OTHER CHAN, PUT SSW 6 DOWN. TO DELETE RUN—HIT START.  
*Explanation:* Self-explanatory.  
*Action:* To use other channel, set sense switch 6 down and press START. To delete run, press START.
- 30335 NO OUT TAPES AVAIL FROM MRG CHAN. TO USE IN CHAN, PUT SSW 6 DOWN. TO DELETE RUN—HIT START.  
*Explanation:* Self-explanatory.  
*Action:* To use input channel, set sense switch 6 down and press START. To delete run, press START.
- 30340 SORT AND MERGE NOT ALLOWED WHEN USING DISK AS A MERGE UNIT. TO RUN SORT ONLY, PUT SSW 6 DOWN. TO DELETE RUN, HIT START.  
*Explanation:* A sort and merge run is permitted only when merge units are tape units.  
*Action:* To run sort only, set sense switch 6 down and press START. To delete run, press START.
- 30391 TO ACCEPT ERROR, PUT SSW 6 DOWN—HIT START  
*Explanation:* The indicated error may have been intended or may be of no consequence.  
*Action:* Setting sense switch 6 down and pressing START causes Sort to continue, ignoring the error.
- 30392 TO CONTINUE, IGNORING ALL SUBSEQUENT MODS, PUT SSW 5 DOWN-HIT START  
*Explanation:* An error has occurred while attempting to load the indicated modification program.  
*Action:* Setting sense switch 5 down and pressing START causes all modification programs that have not been executed to be ignored.
- 30393 TO DELETE RUN-HIT START  
*Explanation:* Self-explanatory.  
*Action:* Pressing START deletes the run.
- 30394 TO TRY READ AGAIN, PUT SSW 6 DOWN-HIT START  
*Explanation:* An error has occurred while reading a modification program.  
*Action:* To attempt another read, set sense switch 6 down and press START.
- 30395 TO SEARCH FORWARD FOR MOD PROG, PUT SSW 6 DOWN-HIT START  
*Explanation:* The first record read from the tape did not contain the modification program name specified on the MODIFICATION card.  
*Action:* Setting sense switch 6 down and pressing START initiates a forward search of the tape.

- 30401 ERROR CANNOT BE IGNORED. ENTER +0  
IN THE KEYS TO RETRY, -0 TO GET NEXT  
PARAM. START. PRINT OF S.Syyy  
*Explanation:* A read operation during execution of the De-  
vice Print Program has resulted in an error that cannot be  
ignored. yyy is the unit. The message is written on the  
system output unit and the typewriter.  
*Action:* Enter a + through the entry keys to retry the  
read. Enter a - to return control to the Utility Monitor.  
Press START.
- 30403 FVE BAD CNTRL CRDS. SET KEYS + TO  
RETRY, - TO RETURN TO IBSYS  
*Explanation:* Five consecutive control cards are unaccepta-  
ble. The message is written on the system output unit and  
the typewriter after five occurrences of message 10415 or  
message 10416.  
*Action:* Set + in the entry keys to reset the counter and  
continue. Set - in the entry keys to return to the System  
Monitor.
- 30404 SEQ. CHECK IN KEYS + TO ACCEPT, - FOR  
NEXT CARD  
*Explanation:* The block number of the input to a load disk  
utility function for which sequence checking was specified  
is incorrect. The message is written on the system output  
unit and the typewriter.  
*Action:* Enter a + through the entry keys to accept the  
block. Enter a - to return control to the Utility Monitor.  
Press START.
- 30405 CHECKSUM ERROR + TO ACCEPT - TO  
REJECT  
*Explanation:* The checksum option of the Load Disk Pro-  
gram was specified and checksums do not agree. The mes-  
sage is written on the system output unit and the typewriter.  
*Action:* Enter a + through the entry keys to accept the  
block. Enter a - to return control to the Utility Monitor.
- 30406 INVAL S.Snnn ENTER +0 IN THE KEYS TO  
RETRY, -0 TO RETURN  
*Explanation:* The Restore Disk/Drum Program has en-  
countered a record that was not written by the Dump  
Disk/Drum Program.  
*Action:* Enter a +0 to retry reading the input device.  
Enter a -0 to return control to the Utility Monitor.
- 30488 PLATTER MODE. ENTER +0 to PROCEED, -0  
TO READ NEXT CARD.  
*Explanation:* The Dump Disk Program has been requested  
to dump in platter mode. The control card is typed out  
preceding this message to permit verification.  
*Action:* Enter +0 to proceed to dump or -0 to ignore this  
control card and read the next one.  
*Note:* Platter mode is used only by customer engineers  
(for maintenance).
- 30489 READ ERROR. ENTER +0 INTO KEYS TO  
ACCEPT, +1 TO SKIP, +2 TO RETRY  
*Explanation:* A read error has occurred and cannot be  
corrected.  
*Action:* The following options are provided:  
1. To accept the erroneous record, enter +0 into the keys.  
2. To skip the erroneous record and read the next record,  
enter +1.  
3. To repeat the read operation, enter +2.
- 30490 INPUT ERROR  
*Explanation:* An irrecoverable error has occurred while the  
input device containing the CCP program was being read.  
*Action:* If the operator wishes to retry, the device con-  
taining the CCP program and its loader should be posi-  
tioned to the first record. Then START should be pressed.
- 30491 CONTROL CARD ERROR  
*Explanation:* An error has been encountered in trying to  
decode the parameters on the control card.
- Action:* If the operator wishes to retry decoding of the  
control card, START is to be pressed.
- 30501 ERROR CANNOT BE IGNORED. ENTER IN  
KEYS, +0 TO RETRY, -0 TO GET NEXT  
PARAM. START. DUMP OF yyyyyy  
*Explanation:* An unusual end return from IOOP has oc-  
curred on device yyyyyy.  
*Action:* To retry read of device, enter +0 in keys and  
press START. Enter -0 to get next parameter, if any.
- 30502 PAUSE FOR OPERATOR INTERRUPT  
*Explanation:* This message appears prior to opening of the  
system input unit, when the operator interrupt switch is on.  
*Action:* Unit assignments may be altered through use of  
the entry keys. To continue processing, turn off the inter-  
rupt switch, place a 7 in the prefix portion of the entry  
keys, and press START.
- 30517 xxxxxx IS ALREADY DETACHED.  
*Explanation:* The \$DETACH card or the entry key setting  
typed above this message is erroneous. The operator can  
take corrective action during the pause that follows through  
use of the entry keys.  
*Action:* Press START to ignore the erroneous \$DETACH  
card or use a new key setting.
- 30518 CAN NOT SWITCH TWO DETACHED UNITS.  
*Explanation:* The \$SWITCH card or the entry key setting  
typed above this message is erroneous. Corrective action  
can be taken through use of prefix 3 in the entry keys.  
*Action:* Press START to ignore the erroneous \$SWITCH  
card or use a new key setting.
- 30519 UNABLE TO ATTACH.  
*Explanation:* The \$ATTACH card or the entry key setting  
typed above this message is erroneous. Corrective action  
can be taken through use of the entry keys.  
*Action:* Press START to ignore the erroneous \$ATTACH  
card or use a new key setting.
- 30520 xxxxxx IS ALREADY ATTACHED.  
*Explanation:* The \$ATTACH card or the entry key setting  
typed above this message is erroneous. Corrective action  
can be taken through use of the entry keys.  
*Action:* Press START to ignore the erroneous \$ATTACH  
card or use a new key setting.
- 30521 CAN NOT IDENTIFY REQUEST  
*Explanation:* Either an invalid entry key setting or an in-  
valid control card is typed above this message.  
*Action:* For an invalid entry key setting, correct the set-  
ting and press START. For an invalid control card, press  
START to return control to the System Monitor.
- 30522 xxxxxx IS DETACHED OTHER IS SYSTEM UNIT.  
*Explanation:* The \$SWITCH card typed above this mes-  
sage is erroneous. S.SIN1, S.SOU1, or S.SLB1 cannot be  
switched with a device that is not attached. Corrective ac-  
tion can be taken through use of the entry keys.  
*Action:* Press START to ignore the request to switch these  
units.
- 30523 xxxxxx CAN NOT BE DETACHED.  
*Explanation:* The \$DETACH card typed above this mes-  
sage is erroneous. The operator can take corrective action  
through use of the entry keys.  
*Action:* Press START to ignore the erroneous \$DETACH  
card or key settings.
- 30524 UNABLE TO CLOSE xxxxxx.  
*Explanation:* The \$CLOSE card typed above this message  
is erroneous. S.SIN1, S.SOU1, or S.SLB1 cannot be closed.  
The operator can take corrective action through use of the  
entry keys.  
*Action:* Press START to ignore the erroneous \$CLOSE card.

- 30525 UNABLE TO RESTORE ALL DEVICES.  
*Explanation:* The \$RESTORE card or the entry key setting typed above this message cannot be fully processed. Corrective action can be taken through the entry keys during the pause that follows.  
*Action:* Press START to ignore. As this action may cause IOCS problems, the recommended procedure is to use the setting 52 in the entry keys to type the symbolic units and the device assignments. Then, the necessary units can be attached through the keys.
- 30526 UNABLE TO REMOVE  
*Explanation:* The symbolic unit in the \$CLOSE card typed above this message cannot be closed.  
*Action:* Press START to continue. Rewind and unload the unit manually.
- 30527 UNABLE TO REWIND  
*Explanation:* The symbolic unit in the \$CLOSE card typed above this message cannot be closed.  
*Action:* Manually rewind the unit. Press START to continue.
- 30528 xxxxxx IS NOT ATTACHED  
*Explanation:* A control card refers to a unit that is not attached. The control card is ignored.  
*Action:* None.
- 30652 READY ADDITIONAL UPDATE OUTPUT UNIT ON \*\*\*\*  
*Explanation:* The Update program has searched for an output file requested on a \$OUTPUT control card and has failed to find an available unit. The \*\*\*\* gives the channel required. If a specific channel is not required, the words ANY CHANNEL are printed.  
*Action:* Machine processing is suspended to permit the operator to mount and ready an additional unit.
- 31501 INVALID S.SLVL CHECK OF OLDLU. MZE IN KEYS ACCEPTS  
*Explanation:* First word on master system library is not identical to the n and m values on the \$IBEDT card.  
*Action:* To continue this run, place -0 in the entry keys.
- 31550 UNIT FOR xxxxxx NOT AVAILABLE  
*Explanation:* This message is given by the Processor Monitor or the Editor Monitor when a required unit is not available. One of the following is indicated by xxxxxx: WORK1, WORK2, WORK3, WORK4, S.SPP1, LOADUN (the load file), S.FBIA (the alternate input file), S.FBED (the system edit file), \$OEDIT, or \$OPEN.  
*Action:* Machine processing is suspended to allow the operator to ready the necessary unit and press START. If the operator presses START without placing a unit in ready status, message 11550 is typed and the job is terminated.
- 31907 READY \*\*\*\*/INPUT FILE/CHANNEL x  
xxx...xxx  
*Explanation:* IBLDR has searched for a labeled input file and has failed to locate it on the proper unit or any available unit. The \*\*\*\* is the type of device. The x is the actual channel required; this is omitted if any channel is acceptable. The xxx...xxx is the label being sought.  
*Action:* Machine processing is suspended to allow the operator to mount the labeled file and ready the unit.
- 31908 READY ADDITIONAL OUTPUT UNITS REQUIRED BY OBJECT PROGRAM CHANNEL x  
nn TAPES, nn DISKS, nn TAPES OR DISKS  
*Explanation:* IBLDR could not locate sufficient output units to satisfy the object program requirements for primary units. x may be Channel A, B, C, D, E, or ANY. nn is the number of devices required.  
*Action:* Machine processing is suspended to allow the operator to ready additional units on the specified channels. CAUTION: Only units which were not physically in ready status should be used.

## System Messages Without Numbers

- ERRRDS xxxxx  
*Explanation:* Fifty entries have been made to the Read Error routine for tape unit xxxxx.  
*Action:* Clean the tape-drive head.
- ERRWBT xxxxxx  
*Explanation:* A redundancy was encountered while writing blank tape. The tape may not be readable.  
*Action:* Rerun the job if the tape is a critical one.
- ERRWRS xxxxx  
*Explanation:* Twenty-nine permanent write errors have occurred on tape drive xxxxx.  
*Action:* Clean tape-drive head, strip tape, and/or mount new tape.
- PLEASE ENTER (BCD) DISK LIMITS  
*Explanation:* The disk limits are the octal equivalents of three BCD characters.  
*Action:* Enter disk limits in the entry keys.
- PLEASE ENTER SUBADDRESS IN KEYS  
*Explanation:* The subaddress is the machine language subaddress expressed as two BCD characters.  
*Action:* Enter subaddress in keys.
- READY xxxxxx  
*Explanation:* Unit specified by xxxxxx is not in ready status.  
*Action:* Ready the unit.
- UNITS DETACHED BY SYSTEM  
S.Sxxx yyyyyy  
*Explanation:* Unit yyyyyy is not physically available to the system. S.Sxxx has been detached.  
*Action:* None.
- UNLOAD xxxxxx  
*Explanation:* Unit specified by xxxxxx was requested to be unloaded.  
*Action:* Unload the device, if possible.
- NOTE: xxxxxx is the octal value for the unit. It has the following format:
- |   |        |
|---|--------|
| For tape-direct data                        | 00cuuu |
| For control adapter devices                 | amcuuu |
| For unit record and Tele-processing devices | 0i1uuu |
- The following definitions apply to the above list:  
a is access number  
c is channel number  
i is channel A interface number  
m is module number  
uuu is unit address
- ## Sort Messages Without Numbers
- The following Sort messages are not associated with a waiting loop or halt and have not been assigned numbers.
- SORT MONITOR MESSAGES**  
SORT MONITOR NOW LOADING EDIT PHASE.  
SORT MONITOR NOW LOADING PHASE ONE—INTERNAL SORT.  
SORT MONITOR NOW LOADING PHASE TWO—MERGE.  
SORT MONITOR NOW LOADING PHASE THREE—FINAL MERGE.  
SORT MONITOR RETURNING TO IBSYS VIA S.SRET.  
SORT MONITOR RETURNING TO IBSYS VIA S.SRUP.  
SORT MONITOR RETURNING TO IBSYS VIA S.SDMP.  
SORT MONITOR CANNOT FIND EDIT PHASE IN TABLE OF CONTENTS—RUN DELETED



SORT MONITOR ABSOLUTE LOADER MESSAGES  
UNABLE TO READ MOD PROGRAM  
EOF SENSED READING MOD PROGRAM  
BCD READ ATTEMPT SUCCESSFUL IN BIN MODE  
MOD PROGRAM xxxxxx READ. SM LOADER EXPECTS  
xxxxxx  
ILLEGAL BINARY CARD FORMAT FOUND IN READING  
MOD PROGRAM.  
CHECKSUM ERROR  
xxxxxx CARD READ  
MOD PROGRAM BLOCKING NOT MULTIPLE OF 27  
NOW LOADING MOD PROGRAM xxxxxx FROM  
xxxxxx

EDIT PHASE MESSAGES

*Control Card Analysis Messages:*

Label Card:

LABEL-IDENTIFICATION-H NOT GIVEN-LABEL WILL  
BE ANALYZED.

LABEL-IDENTIFICATION-OVER 20 WORDS LONG.

File Card:

FILE-REQUIRED FILE STATEMENTS NOT GIVEN

FILE-TWO OUTPUT FILES GIVEN

FILE-NO INPUT FILE GIVEN

FILE-INPUT SAME NUMBER GIVEN TWICE. SECOND  
ONE IGNORED

FILE-NO OUTPUT FILE GIVEN

FILE-MODE-PARAMETER INCORRECTLY GIVEN

FILE-MODE-ALL INPUT FILES DO NOT HAVE SAME  
MODE

FILE-MODE-x SPECIFIED TWICE

FILE-LABEL-ILLEGAL CHARACTER GIVEN

FILE-OUTPUT OR INPUT NOT SPECIFIED

FILE-BLOCKSIZE NOT SPECIFIED

FILE-INPUT-NO NUMBER GIVEN

FILE-BLOCKSIZE-OVER 2000 OR UNDER 3 WORDS ON  
THIS STATEMENT.

CHECKSUM OR BLOCKSEQUENCE GIVEN ON BCD  
FILE-THIS IS NOT ALLOWABLE.

FILE-BOTH REW AND UNL GIVEN. WILL USE UNL.

INPUT BLOCKSIZE EXCEEDS MAXIMUM DISK  
BLOCKING-RUN DELETED

OUTPUT BLOCKSIZE EXCEEDS MAXIMUM DISK  
BLOCKING-RUN DELETED

Modification Card:

MODIFICATION-UNIT xxxxxx NOT ALLOWABLE MOD  
UNIT

MODIFICATION-PROGRAM-INCORRECT PARAMETER

MODIFICATION-PROGRAM-INCORRECT MODIFICA-  
TION NUMBER

MODIFICATION-INCOMPLETE SET OF MOD PARA-  
METER-MOD SKIPPED

MODIFICATION-NAME-2 MOD CARDS HAVE SAME IN-  
DICES I, J OF PIMJX-MOD xxxxxx SKIPPED

System Card:

SYSTEM-REQUIRED SYSTEM STATEMENT NOT GIVEN

SYSTEM-NO INPUT CHANNEL GIVEN

SYSTEM-NO MERGE CHANNEL GIVEN

SYSTEM-MERGE-SAME CHANNEL SPECIFIED TWICE

SYSTEM-INP UNIT xxxxxx NOT DEFINED IN SYSTEM

SYSTEM-INP UNIT xxxxxx NOT ATTACHED  
SYSTEM-INP UNITS xxxxxx AND xxxxxx ON DIFFERENT  
CHANNELS

SYSTEM-INP UNIT xxxxxx GIVEN TWICE

SYSTEM-INP UNIT xxxxxx NOT A TAPE

SYSTEM-INP CHAN HAS ILLEG PARAMETER xxxxxx

SYSTEM-OUT CHAN HAS ILLEG PARAMETER xxxxxx

SYSTEM-MRG CHAN HAS ILLEG PARAMETER xxxxxx

SYSTEM-OUTPUT CHANNEL MUST BE GIVEN FOR  
MERGE ONLY

SYSTEM-CORE-NO. OF CELLS xxxxxx-PHASE xxxxxx NOT  
ENOUGH CORE SET TO S.SEND

SYSTEM-CORE-NO. OF CELLS xxxxxx-PHASE xxxxxx NOT  
ENUF OF SORT-CORE SET TO S.SEND

SYSTEM-CORE-ILLEGAL CHAR xxxxxx-PHASE xxxxxx-  
CORE SET TO S.SEND

SYSTEM-CORE-ONLY 2 CORE PARAMS GIVEN. PHASE  
3 CORE SET TO S.SEND

SYSTEM CARD-MERGE CHANNEL PARAMETERS  
IGNORED

NO TAPE UNITS AVAILABLE ON BOTH MERGE  
CHANNELS-RUN DELETED

SYSTEM-OUTPUT UNIT xxxxxx NOT DEFINED IN  
SYSTEM

SYSTEM-OUTPUT UNIT xxxxxx NOT ATTACHED

SYSTEM-OUTPUT UNITS xxxxxx AND xxxxxx ON  
DIFFERENT CHANNELS

SYSTEM-OUTPUT UNIT xxxxxx GIVEN TWICE  
SYSTEM-OUTPUT-Iyy HAS BEEN PREVIOUSLY  
ASSIGNED - RUN DELETED

SYSTEM-DISK-PARAMETER TOO LARGE-REDUCED  
TO xxxx. (Note: xxxx is 1856 if DS MAX is 460, 1944  
if DS MAX is 970.)

Record Card:

RECORD-REQUIRED RECORD STATEMENT NOT GIVEN

RECORD-TYPE-INCORRECTLY SPECIFIED

RECORD-FIELD-ILLEGAL PARAMETER

RECORD-NO LENGTH GIVEN

RECORD-LENGTH-TOO MANY PARAMETERS FOR  
FIXED LENGTH SORT

RECORD-FIELD-EXTENDS PAST MAXIMUM RECORD  
LENGTH

RECORD-FIELD-EXTENDS PAST MINIMUM RECORD  
LENGTH

RECORD-LENGTH-LMIN AND LMAX INTERCHANGED

RECORD-FIELD-MORE THAN 64 CONTROL FIELDS  
GIVEN. FIRST 64 WILL BE ANALYZED

RECORD-FIELD-WHEN BCD MODE GIVEN FIELD  
LENGTH MUST BE DIVISIBLE BY 6.

MERGE RECORD LENGTH EXCEEDS DISK  
PARAMETER-RUN DELETED

Sort Card:

SORT-SEQUENCE-OTHER THAN S OR C GIVEN

SORT-ORDER-MERGE ORDER TOO HIGH

SORT-FIELD-OTHER THAN A OR D GIVEN

SORT-FIELD-MORE THAN 32 CONTROL FIELDS GIVEN.  
FIRST 32 WILL BE ANALYZED

SORT-FILE TO BE SORTED NOT FOUND IN FILE  
STATEMENTS

Merge Card:

MERGE-SEQUENCE-OTHER THAN S OR C GIVEN  
MERGE-ORDER-MERGE ORDER TOO HIGH  
MERGE-FIELD-MORE THAN 32 CONTROL FIELDS  
GIVEN. FIRST 32 WILL BE ANALYZED  
MERGE-FIELD-OTHER THAN A OR D GIVEN  
MERGE-FILE xxxxxx NOT FOUND IN FILE  
STATEMENTS

Option Card:

CHECKSUMS OR EQUAL NOT ALLOWED IN MERGE  
RUN. OPTION DELETED  
NO EXTRACT - NOT ALLOWED IN MERGE RUN -  
OPTION DELETED  
OVERFLOW-NO REELS GIVEN

*Explanation:* A reels definer is needed on the overflow card  
but it has not been specified. The run is deleted.

Combinations:

SORT OR MERGE STATEMENT NOT GIVEN  
SORT-MERGE CARDS-NO MERGE ORDER GIVEN  
SORT-MERGE-NO FIELD DEFINERS GIVEN  
SORT-FIELD-xxxxxx NOT DEFINED ON RECORD  
CARD OR DEFINED TWICE ON SORT CARD  
FILE xxxxxx DOES NOT AGREE WITH FILE TO BE  
MERGED  
SORT-MERGE-NO FILES GIVEN TO SORT OR MERGE  
NUMBER OF FILES TO BE MERGED IS HIGHER THAN  
MERGE ORDER  
MERGE ORDER SET EQUAL TO NUMBER OF FILES  
TO BE MERGED  
FILE xxxxxx-RECORD LENGTH NOT FACTOR OF  
INPUT BLOCK LENGTH  
RECORD LENGTH NOT FACTOR OF OUTPUT FILE  
BLOCKING  
FIELD MUST BE DIVISIBLE BY SIX WHEN COMM  
SEQ GIVEN  
SIGNED FIELD NOT ALLOWED WHEN COMM SEQ  
GIVEN  
INPUT LABEL SEARCH REQUIRES STANDARD  
LABELS AND IDENTIFICATION  
MERGE ORDER OF 1 OR LESS GIVEN FOR SORT-NOT  
A VALID MERGE ORDER  
BOTH STANDARD AND NON STANDARD OUTPUT  
LABEL SPECIFIED. WILL USE STANDARD LABEL.  
SORT-MERGE-FILE xxxxxx NOT FOUND IN SORT/  
MERGE CARD

Tape Mount Messages:

MERGE UNITS xx, xx  
INPUT UNITS xx, xx  
OUTPUT UNITS xx, xx  
CHECKPOINT UNIT xx  
MERGE INPUT UNITS xx, xx

Card Read Error Messages:

TOO MANY xxxxxx STATEMENTS. LAST ONE IGNORED  
THIS IS NOT A SORT CONTROL CARD. IT IS IGNORED  
CONTINUATION CARD IS FIRST SORT CONTROL  
CARD. IT IS IGNORED.  
CONTINUATION CARD IGNORED DUE TO ABOVE  
ERROR

UNABLE TO READ SORT CONTROL CARD FROM  
S.SINI  
RUN DELETED

Definer Analysis Error Messages:

xxxxxx-----xxxxxx-----ILLEGAL CHARACTER  
xxxxxx-NO DEFINER GIVEN. CONTROL CARD  
IGNORED.  
xxxxxx-TOO MANY DEFINERS GIVEN. ALL DEFINERS  
FOR THIS CONTROL CARD IGNORED.  
xxxxxx-ILLEGAL DEFINER. DEFINER GIVEN-xxxxxx.  
THIS DEFINER WILL BE IGNORED.  
xxxxxx-----xxxxxx-----TWO GIVEN. WILL ACCEPT FIRST  
DEFINER GIVEN.  
xxxxxx-----xxxxxx-----NO PARAMETER GIVEN. DEFINER  
WILL BE IGNORED.  
xxxxxx-----xxxxxx-----TOO MANY PARAMETERS GIVEN.

Unit Assignment Error Messages:

NO CHECKPOINT UNIT ATTACHED  
NO UNITS AVAILABLE ON INPUT CHANNEL-RUN  
MUST BE DELETED  
INPUT INTER-SYS UNIT xxxxxx NOT FOUND  
xxxxxx UNITS AVAILABLE ON MRG CHANNEL xxxxxx-  
RUN DELETED  
NOT ENOUGH MRG UNITS AVAILABLE ON CHANNEL  
xxxxxx  
xxxxxx UNITS AVAILABLE ON OUT CHANNEL xxxxxx  
NO. OF INPUT UNITS GIVEN NOT EQUAL TO MRG  
ORD - DELETED  
NOT ENOUGH UNITS AVAILABLE ON CHANNEL  
xxxxxx - RUN DELETED  
INPUT INTER-SYST UNIT xxxxxx NOT FOUND  
xxxxxx UNITS AVAILABLE ON OUT CHANNEL  
INTER-SYS OUT UNITS SPECIFIED BUT NO MRG  
CHAN GIVEN - RUN DELETED  
INP CHANNEL xxxxx NOT 1 OF MRG CHANNELS  
INP AND OUT BOTH ON CHANNEL xxxxxx  
SYMBOLIC CHANNEL x ASSIGNED TO REAL  
CHANNEL S  
OUTPUT INTERSYST UNIT xxxxxx NOT FOUND  
xxxxxx NOT AVAILABLE - RUN DELETED  
OUTPUT UNIT S.Sxxx WAS PREVIOUSLY RESERVED -  
RUN DELETED

*General Edit Phase Messages:*

PROGRAM xxxxxx CANNOT BE FOUND IN TABLE OF  
CONTENTS  
RUN MUST BE DELETED  
PROGRAM OR MACHINE ERROR-RUN DELETED  
INSUFFICIENT MEMORY AVAILABLE FOR SORT TO  
CONTINUE-RUN DELETED  
LENGTH OF TOC FORCES EDIT PHASE AND COMMON  
TO OVERLAP-RUN DELETED  
SORT CANNOT CONTINUE DUE TO ABOVE ERRORS-  
RUN DELETED

*Dump Messages:*

BLOCK DUMPED  
BLOCK IGNORED  
RECORD DUMPED  
RECORD IGNORED

INTERNAL SORT PHASE MESSAGES

INPUT FILE READ IN WRONG MODE. xxx MODE  
EXPECTED.  
RETURN IS TO SORT MONITOR  
INPUT UNIT xxxxxx-BLOCK xxxxx  
PERM REDUNDANCY  
CHECKSUM IN ERROR  
INPUT BLOCK SEQ NO xxxxxx DISAGREES  
BLOCK COUNT ADJUSTED TO AGREE WITH SEQ  
NO  
NOT AN INTEGRAL NO. OF RECORDS  
BLOCK EXCEEDS SPECIFIED LENGTH  
WRITE ERROR xxx-RETURN IS TO SORT MONITOR  
TOTAL RECORDS DUMPED xxxxxxxxxxxx  
TOTAL RECORDS DELETED xxxxxxxxxxxx  
TOTAL RECORDS OF INPUT xxxxxxxxxxxx  
TOTAL RECORDS PROCESSED xxxxxxxxxxxx  
TOTAL RECORDS OF OUTPUT xxxxxxxxxxxx  
INTERNAL SORT COMPLETED  
LOGICAL RECORD EXCEEDS MAXIMUM INPUT  
LENGTH  
RECORD COUNT CONTROL WORD CONTAINS ZERO  
LOGICAL RECORD NOT MULTIPLE OF SIX  
CHARACTERS  
READY NEXT INPUT UNIT-HIT START  
NO VALID INPUT TO BE SORTED - RUN DELETED

MERGE PHASE MESSAGES

NOTHING TO MERGE-RETURN IS TO SORT  
MONITOR.  
MERGE PHASE PASS x COMPLETED.  
RECORDS MERGED-xxxxxxxxxxxx  
RECORDS DUMPED-xxxxxxxxxxxx  
RECORDS DELETED-xxxxxxxxxxxx  
RECORDS ADDED - xxxxxxxxxxxx  
INTER-PHASE RECORD COUNTS DO NOT AGREE.  
MERGE PHASE COMPLETED.  
OUT OF SORT-RETURN IS TO SORT MONITOR.

MERGE TAPES TOO SHORT-RETURN IS TO SORT  
MONITOR.  
LOGICAL CHECKSUMS DO NOT AGREE.  
SEQUENCE NUMBER ERROR.  
MERGE INPUT UNIT xxx-Block xxxxxx READ IN  
BCD MODE. RETURN IS TO SORT MONITOR.  
PERM REDUNDANCY  
OFF SIZE BLOCK READ. xxxxxx WORDS EXPECTED.  
xxxxxx WORDS FOUND.  
HEADWORD OR TAILWORD INCORRECT.  
WRITE ERROR xxx-RETURN IS TO SORT MONITOR.

FINAL MERGE PHASE MESSAGES

NOTHING TO MERGE-RETURN IS TO SORT MONITOR.  
RECORDS MERGED-xxxxxxxxxxxx  
RECORDS DUMPED-xxxxxxxxxxxx  
RECORDS DELETED-xxxxxxxxxxxx  
INTER-PHASE RECORD COUNTS DO NOT AGREE.  
FINAL MERGE PHASE COMPLETED.  
OUT OF SORT-RETURN IS TO SORT MONITOR.  
SEQUENCE NUMBER ERROR.  
LOGICAL CHECKSUMS DO NOT AGREE.  
MERGE INPUT UNIT xxx-Block xxxxxx READ IN  
WRONG MODE. xxx MODE EXPECTED. RETURN  
IS TO SORT MONITOR.  
CHECKSUM ERROR.  
INPUT BLOCK SEQUENCE NO xxxxxx DISAGREES.  
BLOCK COUNT ADJUSTED TO AGREE WITH SEQ.  
NO.  
NOT AN INTEGRAL NO OF RECORDS.  
BLOCK EXCEEDS SPECIFIED LENGTH  
OFF SIZE BLOCK READ. xxxxxx WORDS EXPECTED.  
xxxxxx WORDS FOUND.  
PERM REDUNDANCY.  
HEADWORD OR TAILWORD INCORRECT.  
REMOVE OUTPUT UNIT xxx. REPLACE WITH  
SCRATCH TAPE-HIT START.  
WRITE ERROR xxx-RETURN IS TO SORT MONITOR.  
DISK OUTPUT UNITS TOO SMALL

## Appendix D. 7040/7044 — 1401 Auxiliary Programs

### Input/Output Utility Program

The 7040/7044 — 1401 Input/Output Utility program is designed to produce, off-line on the 1401, a stacked system-input tape for the 7040/7044 Operating System (16/32K), and to process, off-line, the system-output and system-peripheral-punch tapes produced by the Operating System. The two major functions of the program, the input stacking function and the output print/punch function, are selected and controlled by a control card and sense-switch settings which are described below under separate headings for each function.

### Input Stacking Function

The input stacking function provides the operator with a facility to produce a stacked 7040/7044 Operating System input file (e.g., s.SIN1) tape, off-line on the 1401. This function is essentially a specialized card-to-tape run which places the stacked card decks of jobs for the system on magnetic tape with correct blocking of the data.

Optionally, the BCD input data may be card images on magnetic tape in unblocked form. This tape must be labeled if the output tape is to be labeled. The input label, if any, will be printed.

### Control Cards

The input stacking function requires a \$RUN control card. This must be the first card in the stack of job input decks, and is of the fixed-form type. Each field associated with this card, whether required or optional, occupies a unique position on the card. In the card formats given below, the first number directly above a card field indicates the card column in which the field must begin. This number is followed immediately by another number in parentheses, indicating the maximum length of the field.

Parameters that are specified literally — that is, as they appear on the card — are given in capital letters; e.g., LABEL, as opposed to fields the contents of which are merely named. Also, fields which are optional or not essential to the running of the program are enclosed in square brackets. Where a choice of alternative parameters exists, they are enclosed in braces.

### \$RUN CARD

The format of the \$RUN card is:

```

1(4)          6(5)          14(2)          17(5)          23(5)
┌──────────┬──────────┬──────────┬──────────┬──────────┐
$RUN      INPUT  blocking factor [yyddd] [LABEL]
29(5)          35(10)         46(4)
└──────────┴──────────┴──────────┴──────────┴──────────┘

```

[ output file serial number ] [ output file identification ] [ output file retention cycle ]

This card must be the first card of the input deck.

\$RUN This is the control card name. It is used for all 7040/7044 — 1401 auxiliary programs.

INPUT For the input stacking function, INPUT must be specified.

blocking factor This is a two-position field specifying the desired blocking factor in BCD-logical-records per block, up to a maximum of 10. (The maximum binary blocking factor is one-half the specified BCD factor.)

[yyddd] This is the current date used for label checking, where yy is the year and ddd is the day of the year.

[LABEL] Specifies labeled files. Leaving the field blank specifies unlabeled files. All input and output files must have the standard 120-character tape label, if label is specified. Input file labels will be printed. Labels of tapes to be used for output will be checked for expiration of retention period and the program will halt if the reel should not be used.

[ output file serial number ] A five-character alphameric serial number used in the header label of the output file. This field may be omitted for inappropriate files or if LABEL is omitted.

[ output file identification ] A ten-character alphameric identification number used in the header label of the output file. This field may be omitted for inappropriate files or if LABEL is omitted.

[ output retention cycle ] A four-digit numeric field that gives the number of days the file is to be retained. This field may be omitted for inappropriate files or if LABEL is omitted.

### Input/Output Device Requirements

The input/output units required for the input stacking function are the 1402 Card Read Punch; one or two magnetic tape units, depending upon the input option; and the 1403 Printer. The input may be (1) punched cards only, or (2) a control card and magnetic tape; the output consists of a magnetic tape and, optionally, a listing of the BCD contents of the output tape.

### Operating Procedures

#### TAPE UNIT ASSIGNMENTS

Tape Unit 1:	Work tape for output.
Tape Unit 2:	(Optional.) BCD card-image tape. Unblocked BCD card images of those records which are considered data to the program (excludes \$RUN card). May be multireel if labeled.

**SENSE SWITCH ASSIGNMENTS**

- Sense Switch A: ON.
- Sense Switch B: If ON, each time a \$JOB control card is read, its contents are printed on a new page and a program halt occurs.
- Sense Switch C: If ON, all BCD card records will be read from tape unit 2. However, the \$RUN card must go through the card reader. The tape mark or tape trailer label will indicate the end of job.
- Sense Switch D: Use is optional after certain program halts (see below).
- Sense Switch E: If ON, \$ control cards only on the system input file will be printed as the file is being generated. Any \$JOB card that is read is printed on a new page.
- Sense Switch F: If ON, all BCD records on the system input file are printed as the file is being generated. Any \$JOB card that is read is printed on a new page.

**Output Print/Punch Function**

The output print/punch function is an off-line aid for printing or punching the 7040/7044 system output tapes produced by the s.SOU1 and s.SPP1 symbolic units, or for printing or punching other tapes with the same format. This function is controlled by the \$RUN control card described below, but control information included with the data on tape determines whether printing or punching is to be performed with any given block of input. Therefore, the operator must know whether the data will require the printer or punch only, or both. The data on an input tape produced on symbolic unit s.SPP1 will only be punched, and the data on a tape produced on s.SOU1 (or its alternate) will normally only be printed, but if the 7040/7044 system does not include a separate s.SPP1 unit, the s.SOU1 tape will contain both print records and punch records.

**Control Cards**

The print/punch function requires one control card, read with the program deck, to describe the type of run and specify the operations to be performed for label processing. This card is of the fixed-form type as described under "Input Stacking Function."

**\$RUN CARD**

The format of the \$RUN card is:

1(4)	6(6)	17(5)	23(5)
\$RUN	{ OUTPUT } { PRINT }	[yyddd]	[LABEL]
{ OUTPUT } { PRINT }	OUTPUT must be specified for S.SOU1 and/or S.SPP1 tapes. PRINT must be specified to print BCD tapes containing card records (7040 type 3), in conjunction with the use of sense switches B and C (see "Sense Switch Assignments").		
[yyddd]	This is the current date used for label checking, where yy is the year and ddd is the day of the year.		

[LABEL]

If this field is blank, the program assumes that the tape files are unlabeled, and no label processing is performed. If LABEL is specified, the program will print header labels and permit multireel input, dependent upon trailer label content.

**Input/Output Device Requirements**

The input/output units required for the print/punch function are the 1402 Card Read Punch, one magnetic tape unit, and the 1403 Printer. The input is always on magnetic tape; the output consists of a listing of a s.SOU1 (or equivalent) tape, or punched cards from a s.SPP1 (or equivalent) tape, or a combination of both from a s.SOU1 tape.

**Operating Procedures**

**TAPE-UNIT ASSIGNMENTS**

The input tape is assigned to tape unit 2.

**SENSE SWITCH ASSIGNMENTS**

Sense Switch A: ON

The sense switch B and C assignments given in the following table are relevant, and effective, only if the PRINT option is specified on the \$RUN control card.

SENSE SWITCH B	SENSE SWITCH C	EFFECT AND PROCEDURE
OFF	OFF	Entire contents of input file are listed with no intervening halts.
OFF	ON	Only \$IBMAP cards will be printed with no intervening halts.
ON	OFF	The program halts after printing of each \$IBMAP card. Press START to list the associated MAP program deck. To bypass listing of the associated deck, set sense switch C ON and press START. The program will print the next \$IBMAP card.
Sense Switch B:	ON	to cause a program halt after printing, on a new page, each \$JOB control card that is read, under the OUTPUT option only.
Sense Switch C:	ON	under the OUTPUT option, to suspend printing. Punching, if any, will be done.
Sense Switch D:		Use optional after certain program halts (see below).
Sense Switch E:	ON	under the OUTPUT option, to suspend punching. Printing, if any, will be done.
	ON	under the PRINT option, to cause binary records on the input tape to be ignored.

NOTE: Under the OUTPUT option, setting sense switch B ON in conjunction with sense switch C and/or E will cause processing of the current job to be terminated and the input tape to be searched for the next \$JOB control card. The card is printed on a new page and the program halts for operator action.

**Program Halts**

A-ADDRESS REGISTER	CAUSE	ACTION
0 0 0 0	End-of-reel indicator on tape unit 2 (labeled unit 2 and press START. tapes only).	Mount new reel on tape unit 2 and press START.

A-ADDRESS REGISTER	CAUSE	ACTION
0 3 3 3	No tape mark read following header label on tape unit 2.	Press START to reread.
0 5 5 5	Header label on tape unit 2 has been printed.	If correct, press START. If incorrect, mount new reel, turn sense switch D ON, press START, and turn sense switch D OFF.
0 6 0 1	Permanent Write error on tape unit 1.	Press START to SKIP and rewrite.
0 7 7 7	\$JOB control card has been detected and printed under the INPUT or OUTPUT option. Either sense switch B or E is ON.	Set sense switch B or E as described under "Sense Switch Assignments." Press START to continue.
0 8 8 8	Trailer label read error on tape unit 2.	Press START to reach end of job, or turn sense switch D ON, press START, and turn sense switch D OFF to reach end of reel.
0 9 0 1	Permanent read error on tape unit 1.	Press START to reread. If the error persists, space the tape forward manually.
0 9 0 2	Permanent read error on tape unit 2.	Press START to reread. If the error persists, space the tape forward manually.
0 9 8 7	\$IBMAP card has been printed under PRINT option. Sense switch B is ON.	Use sense switches B and C as described under "Sense Switch Assignments."
0 9 9 9	End of Job	Press START to read control card for next run.
1 1 1 1	An invalid logical record has been detected.	Press START to bypass the entire tape record. The program will continue.
1 2 2 2	Blocking factor on \$RUN card is not between 01 and the maximum.	Press START to assume the maximum or turn sense switch D ON, reload \$RUN control card and data file, press START and turn sense switch D OFF.
1 3 3 3	Invalid run type specified on \$RUN card.	Press START to read next control card.
1 4 4 4	Retention period in the tape label on output tape unit 1 has not expired.	Mount new work tape and press START.
1 5 5 5	End-of-reel indicator on tape unit 1.	Mount new reel on tape unit 1, and press START to continue.
1 6 6 6	First card of data is not a \$ control card.	Press START to accept the card as is, or turn sense switch D ON, reload \$RUN control card and data file, press START and turn sense switch D OFF.
1 7 7 7	\$RUN not first control card.	Press START to read next control card.

### Map Symbolic Update Program

The 7040/7044 - 1401 MAP Symbolic Update program allows the user to maintain the symbolic master tape containing the MAP language programs available at 7040/7044 installations. This program eliminates the necessity of keeping a card file since the user can

change, delete, replace, or add programs to the existing master file. The extract option available with this program permits the user to create a system input file (S.SIN1) containing MAP language programs. Program input must be an all-symbolic master tape file in the MAP language only.

### Control Cards

The user controls the update program through the use of control cards which specify the various options available to the program and describe the type of run required. These control cards, interspersed in a deck of symbolic correction cards (in strict sequence), are normally supplied to the machine operator by the programmer.

The nine different \$ control cards are as follows:

\$RUN	\$DELETE
\$ASSIGN	\$PLACE
\$OUTPUT	\$NUMBER
\$REWIND	\$ENDRUN
\$LOCATE	

These cards can be divided into two groups: (1) the \$RUN, \$ASSIGN, and \$ENDRUN cards, which must be used in an invariable sequence in every running of the program and (2) the other six cards, the occurrence and sequence of which are completely dependent upon the requirements of a particular run. Of the first group, the \$RUN card must be the first card in the change file deck (only one may be used). A \$ASSIGN card with the OPEN parameter specified must be the second card if a master input file is present (other \$ASSIGN cards may be used in the body of the deck), and the \$ENDRUN card must be the final card in the change file deck (only one of these may occur). Any of the other six cards may occur any number of times in the body of the change file, interspersed between symbolic correction cards containing changes to program decks on the master file, and complete symbolic decks to be inserted into the master file or placed on the extract file.

A detailed description of the control cards and the use of the program is given in the publication *IBM 7040/7044 Operating System (16/32K): Programmer's Guide*, Form C28-6318.

### Input Files

The input files to the update program are the unblocked or blocked master tape file(s) and the change file (cards). An alternate master tape file may be used to add MAP language programs to the primary master tape. The change-file card deck, including control cards, is normally provided by the programmer.

### Output Files

The output files consist of the updated master tape and/or the extract tape created according to instructions on the control cards. The new master file and

the extract file are blocked by the number of records per block specified on the \$RUN card except that all \$ control cards for the 7040/7044 Operating System (16/32K) are unblocked. The extract file is usually intended for use as a 7040/7044 system input file (s.SIN1), but may also function as master input to a subsequent update run.

### Operating Procedures

#### TAPE UNIT ASSIGNMENTS

The following table gives the possible tape unit assignments.

TAPE UNIT	FILE
1	Master Input
2	Master Output
3	Extract Output
4	Alternate Master Input

#### SENSE SWITCH ASSIGNMENTS

The only sense switch assignments for this program are the normal sense-switch-A (Last-Card-Switch) ON condition, and sense-switch-D ON after certain program halts (described below).

### Program Messages

The update program will produce a log on the printer consisting of four columns with the following headings:

- |                   |                   |
|-------------------|-------------------|
| (1) MASTER I/P U1 | (3) MASTER O/P U2 |
| (2) MASTER I/P U4 | (4) EXTRACT U3    |

The six-character name of each symbolic deck will be printed in one of the first two columns as the deck is read from the currently assigned master input file. The name will also be printed in the third and/or fourth columns as the deck is written on the updated master and/or extract output files.

As each deck is read from the master input file, columns 73-80 of the records within the deck are sequence checked. If an out-of-sequence condition occurs, the following message is printed:

```
xxxxxx, yyyyyyy AFTER zzzzzzz
where: xxxxxx is the deckname,
       yyyyyyy is columns 73-80 of the out-of-sequence
       zzzzzzz is columns 73-80 of the previous record.
```

A record or group of records containing blanks in columns 73-80, however, will not be considered out of sequence, but will be considered to have the same serial number as the last numbered card encountered.

### Program Halts

A-ADDRESS REGISTER	CAUSE	ACTION
0 2 4 0	On a deck insert or replace operation. The card following the \$LOCATE	Press START to read next card.

A-ADDRESS REGISTER	CAUSE	ACTION
	card in the card reader is either not a \$IBMAP card or the deckname does not match that of the \$LOCATE card.	
0 2 4 1	An unknown 1401 \$ control card has been read from the card reader.	Press START to read next card.
0 2 4 2	A \$ASSIGN or \$OUTPUT card has been read from the card reader with an invalid tape number.	Press START to read next card.
0 2 8 1	A \$PLACE card has been read from the card reader and update was specified on the \$RUN card.	Remove all cards up to the next 1401 \$ control card and press START.
0 3 3 1	No tape mark read following header label on currently assigned master input tape.	Press START to reread.
0 3 4 1	The currently assigned master tape has been opened and its header label printed.	If correct, press START. If incorrect, mount correct reel, set sense switch D ON, press START, and set sense switch D OFF.
0 3 4 2	The last card has been read from the card reader with no \$ENDRUN card encountered.	Press START to read more cards.
0 6 0 2	Permanent write error on tape unit 2.	Press START to skip and rewrite.
0 6 0 3	Permanent write error on tape unit 3.	Press START to skip and rewrite.
0 7 7 7	An input tape record exceeding the maximum 1401 block size has been read, or An insert or replacement deck on the change file has no terminating END statement.	Press START to terminate run.
0 9 0 1	Permanent read error on tape unit 1.	Press START to reread. If the error persists, space the tape forward manually.
0 9 0 2	Permanent read error on tape unit 2.	Press START to reread. If the error persists, space the tape forward manually.
0 9 0 3	Permanent read error on tape unit 3.	Press START to reread. If the error persists, space the tape forward manually.
0 9 0 4	Permanent read error on tape unit 4.	Press START to reread. If the error persists, space the tape forward manually.
0 9 8 1	End-of-reel on a currently mounted output tape. Reel will be rewound and unloaded.	Mount new scratch tape and press START.
0 9 8 8	End-of-reel on the currently assigned master input tape.	Mount next reel of file and press START.
0 9 9 9	End of job.	None
1 2 2 2	Blocking factor on \$RUN card is not between 01 and the maximum.	Press START to assume the maximum, or turn sense switch D ON, reload \$RUN control card

A-ADDRESS REGISTER	CAUSE	ACTION
		and change-file deck, press START and turn sense switch D off.
1 4 4 4	An output tape reel currently mounted cannot be written on (retention period in the tape label has not expired). Reel will be rewound and unloaded.	Mount new work tape and press START.
1 7 7 7	The first card read is not a \$RUN card.	Press START to read next control card.



# Appendix E. 7040/7044 — 1401 Auxiliary Program Control Card Summary

## 1401 Symbolic Update Program

1            9(1)            18(4)

\$ASSIGN    u            [ OPEN ]

1            9(8)            18(8)

\$DELETE    from            [ to ]  
             serial            serial  
             number            number

1            9(6)

\$ENDRUN    [ deckname ]

1            9(6)            18(7)            27(7)            36(6)

\$LOCATE    deckname    [ { INSERT }  
                                  { REPLACE }  
                                  { REMOVE } ]    [EXTRACT]    [to deckname]

1            9(8)            18(8)            27(8)

\$NUMBER    new serial    [ from serial ]    [ to serial ]  
             number            number            number

1            9(1)

\$OUTPUT    u

1

\$PLACE

1  
\$REWIND

1            6(7)            14(2)            17(5)            23(5)            29(5)            35(10)            46(4)

\$RUN    [ { UPDATE } ] blocking factor    [ yyddd ]    [ LABEL ]    [ master serial number ]    [ master identification ]    [ master retention cycle ]

51(5)            57(10)            68(4)

[ extract serial number ]    [ extract identification ]    [ extract retention cycle ]

### 1401 Input/Output Utility Program

1            6(5)            14(2)            17(5)            23(5)            29(5)            35(10)            45(4)

\*\$RUN    INPUT            blocking factor    [ yyddd ]    [ LABEL ]    [ output serial number ]    [ output identification ]    [ output retention cycle ]

1            6(6)            17(5)            23(5)

\*\*\$RUN    { OUTPUT }            [ yyddd ]    [ LABEL ]  
          { PRINT }

\*For Input Stacking function of 1401 Input/Output Utility Program  
\*\*For Output Print/Punch function of 1401 Input/Output Utility Program

\$* card	11, 16, 31	\$LABEL	31
accounting routine, installation	9	library unit	6
\$ATTACH	12	limits, logical	20
attach	21	\$LIST	9, 16
auxiliary programs, 1401	52	list	23
available units	7	Loader mount messages	26
card decks, typical	16	loading	6
card readers	6, 20	long operation code	22
\$CHANNEL	15	machine requirements	6, 25, 52, 53
checkpoint	23, 29	MAP symbolic update program	54
checkpoint unit	6	merge	
\$CLOSE	15	order of	29
close	22	tapes	6, 29
comments card	11, 16, 31	messages	5
control card(s)		Loader mounting	26
auxiliary programs, 1401	52, 57	on-line error	34
check list	31	Sort	48
format (System Monitor)	8	system, unnumbered	48
information	10	Update program	28
operational	9	mode	22
print/punch	53	Monitored Utility Programs	30
Processor	31	on-line messages	34
sort	31	\$OPEN	14
subsystem	9	operating information	5
System Monitor	8	operational control cards	9
unit assignment	11	operator	
update	28	action (restart)	23
\$DATE	10, 16	interrupt	20
\$DETACH	11	interrupt (sort)	29
detach	21	output print/punch function	53
device		overflow, sort	29
limits	20	\$PAUSE	10, 16
subaddress	22	pause	23
disk		\$POOL	31
limits	13, 20	print/punch function	53
Load cards	32	Processor	
storage	6	control cards	31
drum storage	6	operating information	26
Dump program	19	punch unit	6
edit run	25	\$RELOAD	31
entry keys	20	remark card	25
error messages	34	reservation codes	7
\$FILE	31	\$RESTART	10
file protect rings	19	restart	23
\$IBEDIT	25	routine	24
\$IBJOB	16, 31	sort	29
\$IBSYS	9, 16, 31	\$RESTORE	14
\$ID	9, 16, 31	restore	22
information control cards	10	return	23
initial start	19	\$RUN	52, 53
input operating information	5	sense switches	20
input/output		skipping, job	23
units	26	Sort	29
utility program	52	control cards	31
input stacking function	52	start, initial	19
interface	19	\$STOP	10, 16
interrupt	20	subaddress	22
\$JOB	9, 16, 31	subsystem control cards	9
job		\$SWITCH	13
skipping	23	switch	21
termination	19	symbolic unit	6

System		unit	
Editor .....	25	available .....	7
input file .....	5	assignment control cards .....	11
output file .....	5	code .....	21
unit requirements .....	25	list .....	15
termination, job .....	19	requirements, system .....	25
\$TIME .....	11, 16	\$UNLIST .....	9, 16
unicod .....	21	unlist .....	23
\$UNITS .....	15	Update program .....	28
		\$USE .....	31
		utility	
		programs .....	30
		units .....	6



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