File Number 7090-36
Form C28-6355-1

IBM Systems Reference Library

IBM 7090/7094 IBSYS Operating System Operator's Guide

This publication provides the operator and machine-room personnel with complete instructions required to operate the IBM 7090/7094 IBSYS Operating System.

Descriptions of System Monitor control cards, initial start procedures, system halts, and the on-line messages and their explanations are included in this publication.

Preface

This publication serves as a guide for computer operators and machine-room personnel. It contains a functional description of the IBM 7090/7094 IBSYS Operating System and procedures for its use.

The reader is assumed to have a knowledge of the 7090 or 7094 Data Processing Systems, and to have read the publication *Operator's Guide for IBM 7090 Data Processing System*, Form A22-6535.

MAJOR REVISION (March 1964)
This edition, Form C28-6355-1, is a major revision of the previous edition, Form C28-6355, and makes that publication obsolete. Operating information for the IBM Generalized Sorting System, formerly available in a preliminary edition, and additional information for use of 1401 Peripheral Input/Output Programs have been added. This publication makes obsolete *IBM 7090 Programming Systems, Share 7090 9PAC Part 4: Operating Instructions*, Form J28-6215, and incorporates and makes obsolete the technical newsletter *IBM 7090/7094 Operator's Guide; 7320 Drum Storage*, Form N28-0098.

Copies of this and other IBM publications can be obtained through IBM Branch Offices.
Address comments concerning the contents of this publication to:
IBM Corporation, Programming Systems Publications, Dept. D91, PO Box 390, Poughkeepsie, N. Y. 12602

© 1964 by International Business Machines Corporation

Form C28-6355-1
Page Revised 6/15/64
by TNL N28-0104

Contents

The IBM 7090/7094 IBSYS Operating System 5
Function 5
Components 5
System Monitor (IBSYS) 5
IBJOB Processor (IBJOB) 7
FORTRAN II Processor (FORTRAN) 7
Input/Output Control System (IOCS) 7
Restart Program (RESTART) 7
Commercial Translator Processor (CT) 7
Generalized Sorting System (SORT) 8
9PAC Processor (9PAC) 8
Utility Routines 8
User Programs 9
Application 9
System Unit Functions 10
System Input 10
System Output 10
System Peripheral Punch 10
System Library 10
System Utility 10
Checkpoint 10
System Printer 11
System Card Reader 11
System Card Punch 11
Alternate Units 11

Control Cards 12
System Monitor (IBSYS) 12
Operational Control Cards 12
Unit Assignment Control Cards 14
Tape Manipulation Control Cards 15
Miscellaneous Control Cards 16
IBJOB Processor (IBJOB) 17
$EXECUTE IBJOB Card 17
Input Deck Cards 18
FORTRAN II Processor (FORTRAN) 18
$EXECUTE FORTRAN Card 18
$EXECUTE IBSFAP Card 18
$JOB Card 18
$IBSYS Card 18
$ID Card 18
$STOP Card 18
Commercial Translator Processor (CT) 18
$EXECUTE CT Card 18
$LOAD Card 18
$MAIN Card 18
$SUBUP Card 18
$CMPLE Card 18
Generalized Sorting System (SORT) 18
$EXECUTE SORT Card 18
$IBSYS Card 19
$ID Card 19
$STOP Card 19
$JOB Card 19
9PAC Processor (9PAC) 19
Utility Routines 19
$EXECUTE DK90UT Card 19
Identification Codes 19

Off-Line Preparation of Input 20
Procedure 20
1401 Peripheral Input Program 20
Messages 21

Use of Input/Output Units 22
IBSYS Operating System 22
FORTRAN II Processor 22
Commercial Translator Processor 22
IBJOB Processor 22
Generalized Sorting System 23
9PAC Processor 23
Disk/Drum Utilities 23
Input/Output Control System 23

System Operation 24
Initial Start Procedure 24
Console Controls 24
Sense Switches 24
Sense Lights 25
Console Entry Keys 25
Interrupt 25
Checkpoint 25
Restart 25
Function 25
Restart Procedure 26
Debugging Postprocessor 26
System Core-Storage Dump Program (SYSDMP) 26
Dump Parameters 27
Machine Status at the End of Core Storage Dump 27.1

On-Line Messages 28

Off-Line Processing of Output 46
1401 Peripheral Output Program 46
On-Line Messages 46

Appendix: IBM 1401 Peripheral Input/Output Programs 47
Minimum Machine Configuration 47
Form of Look Ahead Bits onTape 47
Form of Control Words on Tape 47

Function

The 7090/7094 IBSYS Operating System consists of an integrated set of system programs operating under the executive control and coordination of the System Monitor. The System Monitor, by coordinating the operation of the subsystems, allows a series of unrelated jobs to be processed with little or no operator intervention. By reducing the degree of human participation in the mechanics of data processing, the 7090/7094 IBSYS Operating System ensures that jobs are processed faster, more efficiently, and with less likelihood of human error. As a result, turn-around time (i.e., the interval between the time a programmer submits a job for processing and the time he receives results) is significantly reduced.

The various components of the Operating System are described in the following section and illustrated in Figure 1.

Components

System Monitor (IBSYS)

The System Monitor consists of the following:

1. The Supervisor (IBSUP), whose primary function is to control and coordinate the processing of jobs by passing control from one subsystem to another.
2. The Editor (IBEDT), which provides the systems programmer with facilities for modifying and maintaining the 7090/7094 IBSYS Operating System.
3. The Nucleus (IBNUC), which remains in core storage at all times and provides common facilities for intercommunication and control among the subsystems and between the System Monitor and the subsystems.
4. The System Core-Storage Dump Program, which may be used to facilitate the testing and analysis of any program executed under the control of the 7090/7094 IBSYS Operating System.
5. The Input/Output Executor (IOEX), which may remain in core storage to coordinate and control input/output and other trapping operations.

The System Monitor may also contain an Installation Accounting routine, tailored to the specific requirements of the installation. If included as part of the System Monitor, the Installation Accounting routine, like the Nucleus and the IOEX, remains in core storage at all times.

The subsystems operating under the System Monitor provide the programmer with a variety of programming aids, which he may use either individually or in combination, to process a particular job. Brief descriptions of these subsystems are described in the following text.

DEFINITION OF A JOB

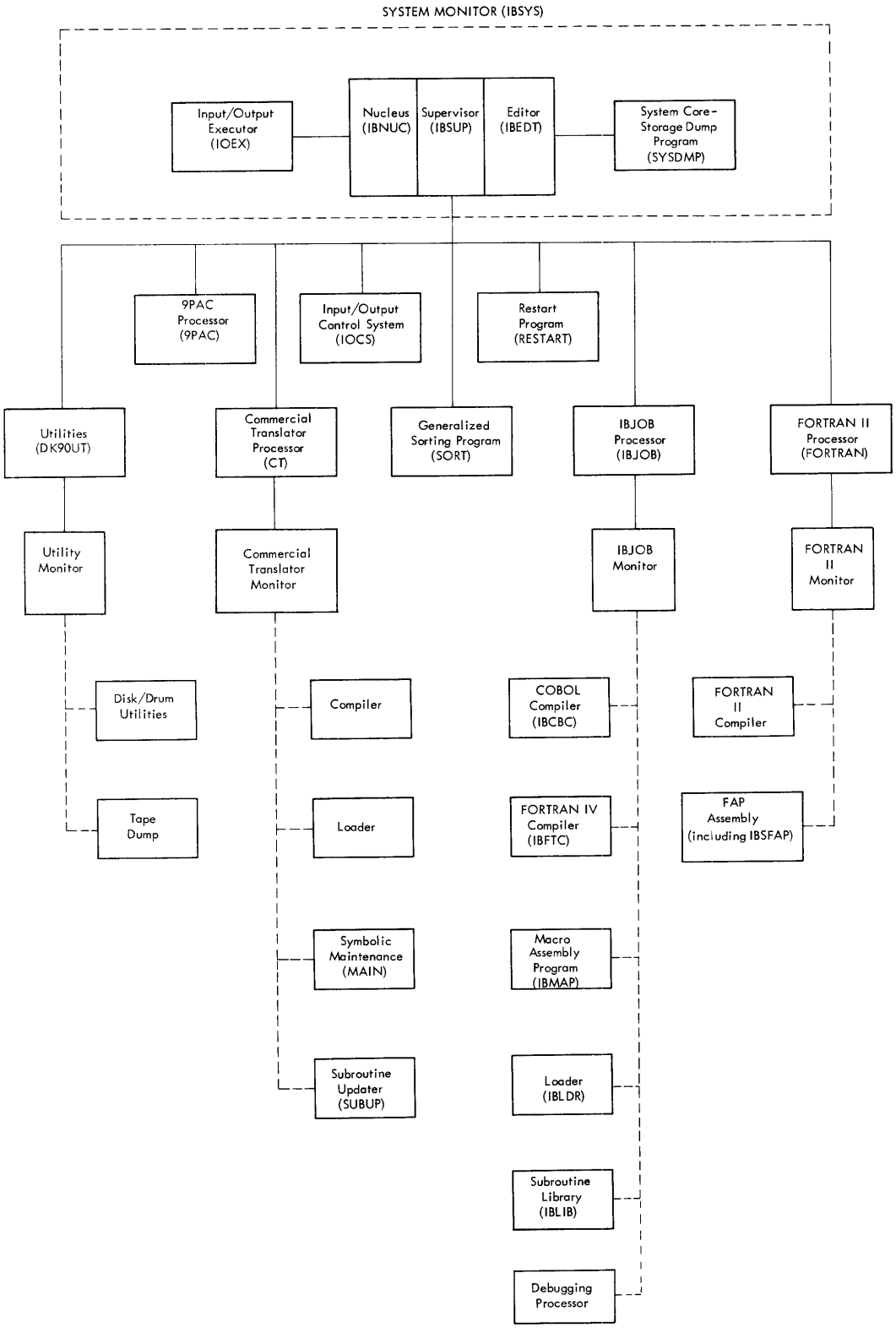
Of the many control cards that are recognized by the Supervisor, the key cards in controlling the continuous processing of jobs are the $JOB, $EXECUTE, $IBSYS, and $STOP cards. Each of these cards is recognized and acted upon by all of the subsystems operating under the control of the Supervisor, as well as by the Supervisor.

Each job in a stack of jobs on the input file is considered to be entirely independent of any other job. The $JOB card is the first card in each job deck. A job consists of all of the cards beginning with a $JOB card and ending with, but not including, the next $JOB card. A job may consist of any logical combination of job segments (applications) to be performed by the subsystems and the Supervisor. When a $JOB card is recognized by the Supervisor or a subsystem, the Supervisor will, if necessary, restore to its original assignment any unit that was reassigned or made unavailable during the previous job, with the exception of System Input and Output Units and units that were logically detached from control by the IBSYS Operating System. Therefore, the programmer is assured that the unit assignments at the beginning of each job are as they were at initial start, except for detached units.

A $JOB card may be followed by a $EXECUTE, $IBSYS or $ID card. If a $ID card (an optional card used to transfer control to the Installation Accounting routine) follows the $JOB card, it must itself be followed by either a $EXECUTE or $IBSYS card.

The $EXECUTE card contains the name of a subsystem and defines the beginning of a job segment to be performed by the specified subsystem. When the Supervisor recognizes a $EXECUTE card, it passes control to the subsystem specified on the card. When it is recognized by a subsystem, the subsystem retains control and reads the next card, if it is the subsystem specified on the card. Otherwise, the subsystem returns control to the Supervisor, which then passes control to the subsystem specified on the card.

The $IBSYS card is used to define the beginning of a job segment to be performed by the Supervisor.



• Figure 1. 7090/7094 Operating System and Components

When it is recognized by a subsystem, the subsystem returns control to the Supervisor, which then proceeds to read and process control cards.

A $STOP card defines the end of a stack of jobs. When it is recognized by the Supervisor or a subsystem, the Supervisor causes an end-of-jobs sequence to occur.

A job segment to be performed by a subsystem consists of all cards beginning with a $EXECUTE card and ending with, but not including, the next $EXECUTE, $IBSYS, $JOB, or $STOP card. The job segment may consist of one or more applications of the particular subsystem specified on the $EXECUTE card. Any cards in the job segment that follow the $EXECUTE card are read and interpreted by the subsystem specified on the $EXECUTE card. Therefore, they must conform to the requirements of the specified subsystem.

A job segment to be performed by the Supervisor consists of all cards beginning with a $IBSYS card and ending with, but not including, the next $EXECUTE, $JOB, or $STOP card. The job segment may contain any of the Supervisor control cards, except a $EXECUTE, $JOB, or $STOP card.

IBJOB Processor (IBJOB)

The IBJOB Processor is the major subsystem of the 7090/7094 IBSYS Operating System. This highly integrated processor can be used to compile, assemble, load, and execute programs written in either the FORTRAN IV or COBOL language. It can also be used either to assemble, load, and execute programs written in the Macro Assembly Program (MAP) language or to load and execute previously assembled object programs. Facilities are provided for combining program segments written in different languages with previously assembled segments to form a single executable object program.

The IBJOB Processor contains a complete library of relocatable subroutines, including a complete Input/Output Control System (IOCS). When an object program is loaded preparatory to execution, only those portions of IOCS that are actually required are loaded.

The IBJOB Processor and its use are described in detail in the publication *IBM 7090/7094 IBSYS Operating System: IBJOB Processor*, Form C28-6275.

FORTRAN II Processor (FORTRAN)

The FORTRAN II Processor can be used to compile, load, and execute source programs written in the FORTRAN II language. It can also assemble programs written in the FORTRAN Assembly Program language (FAP) and load and execute previously assembled object programs. Facilities are provided for combining program segments written in FORTRAN II and FAP languages with previously assembled segments to form a single executable object program. Facilities are also provided for chaining core storage loads so that executed portions of a program can be overlaid with portions yet to be executed.

The FORTRAN II Processor and its uses are described in detail in the publication *IBM 7090/7094 Programming Systems: FORTRAN II Operations*, Form C28-6066.

FORTRAN ASSEMBLY PROGRAM (IBSFAP)

The FORTRAN Assembly Program can be used to assemble, but not load and execute, programs written in the FAP language. An assembled object program can be loaded and executed under control of the FORTRAN II Processor. The FORTRAN Assembly Program can also be used to update symbolic tapes by changing, deleting, or adding instructions.

The FORTRAN Assembly Program and its use are described in detail in the publication *IBM 7090/7094 Programming Systems: FORTRAN Assembly Program (FAP)*, Form C28-6235.

Input/Output Control System (IOCS)

The Input/Output Control System (IOCS) provides input/output control for programs assembled by the FORTRAN Assembly Program (IBSFAP). It relieves the programmer of the task of writing complex input/output routines by automatically controlling the preparation and checking of labels, the blocking and unblocking of data words, and the overlapping of processing with input and output. Only those portions of IOCS actually required are loaded with the assembled object program.

IOCS and its use are described in detail in the publication *IBM 7090/7094 IBSYS Operating System: Input/Output Control System*, Form C28-6345.

Restart Program (RESTART)

Unlike the other subsystems operating under the System Monitor, the Restart program is used exclusively by the operator of the system. It is designed to enable the operator to restart an interrupted program using a checkpoint record recorded by IOCS before the interruption occurred.

The Restart program and its use are described later in this publication.

Commercial Translator Processor (CT)

The Commercial Translator Processor operates as one of a group of processors that are controlled by the System Monitor. The flow of jobs through the Commercial Translator Processor is controlled by the Commercial Translator Supervisor.

The system input file is read from the System Input Unit (SYSIN1). Since subroutine updating and file

maintenance are rarely performed, input to the Commercial Translator Processor usually consists of one or more of the following types of applications:

1. Compile
2. Load and run
3. Compile, load, and run

Each application must be separated from other applications by a file mark, which is generally obtained by placing an end-of-file card in back of each application deck.

Generalized Sorting System (SORT)

The Generalized Sorting System can be used to sort fixed-length or variable-length records written in either binary or decimal mode. The control fields of the records may be signed or unsigned. Records may be sorted in ascending or descending order, using either the scientific or commercial collating sequence.

The Generalized Sorting System and its use are described in the publication *IBM 7090/7094 Generalized Sorting System: 7090/7094 Sort,* Form C28-6307.

9PAC Processor (9PAC)

The 9PAC Processor can be used to establish and maintain data files and to generate reports on the data in the files.

The 9PAC Processor and its use are described in the publications *IBM 7090 Programming Systems, Share 7090 9PAC Part 1: Introduction and General Principles,* Form J28-6166, *Part 2: The File Processor,* Form J28-6167, and *Part 3: The Reports Generator,* Form J28-6168.

Utility Routines

The IBM 7090/7094 Utilities consist of a Utility Monitor and seven routines to perform operations such as storage, retrieval, and preservation of data on IBM 1301 Disk Storage Units, IBM 7320 Drum Storage Units, IBM 729 Magnetic Tape Units, and IBM 7340 Hypertape Drives. The seven routines and their symbolic names are as follows:

1. Format Track Generation routine (DK90FA)
2. Home Address and Record Address Generation routine (DK90FA)
3. Load Disk/Drum routine (DK90L)
4. Dump Disk/Drum routine (DK90D)
5. Restore Disk/Drum routine (DK90R)
6. Clear Disk/Drum routine (DK90C)
7. Tape Dump routine (HT90D)

UTILITY MONITOR

The Utility Monitor, operating under the System Monitor, controls the loading and execution of the utility routines. It reads and interprets the control cards that direct utility program applications. The Utility Monitor is called into core storage by a $EXECUTE DK90UT card.

DISK/DRUM UTILITIES

Format Track Generation Routine: The arrangement of the home addresses, record addresses, and record areas of each track in a cylinder is specified by the format track for that cylinder. The Format Track Generation routine generates the characters that describe the arrangement of the information that is to be stored on the cylinder and writes the characters onto the specified format tracks.

When the Format Track Generation routine is loaded into core storage, it prints an on-line message requesting the operator to verify that the format key-lock switch is in the WRITE position. The program then halts and waits for the operator to press START, which indicates that he has performed the action requested.

Home Address and Record Address Generation Routine: Upon the first entrance into this routine by the Utility Monitor, after it has been loaded into core storage, a message is printed on-line advising the operator to verify that the HAO (Home Address Operation) switch on the file control is ON, and a halt is executed. When this action is completed, START is pressed to continue.

This routine, under the System Monitor, uses the IOEX to monitor its input and output. If an error occurs during address generation, a message is printed on-line to indicate this condition and the application is discontinued (i.e., control is returned to the System Monitor, which then proceeds with the next job segment).

Load Disk/Drum Routine: The Load Disk/Drum routine loads data from magnetic tape into designated sections of disk or drum storage by one of two types of operation. The magnetic tape records may be written in binary or BCD mode and must be prepared so that the length of each tape record fulfills the requirements outlined under the appropriate method.

A maximum of three input reels is acceptable. Each reel is allowed to contain from one through nine files. Only one input tape unit is assigned; therefore, when all of the files on a tape have been loaded and it is determined that more reels are to be loaded, the present reel is rewound, unloaded, a message is printed on-line to indicate this condition, and the computer halts. The next reel should then be loaded on this unit or on a waiting unit. The next reel is then dialed to this tape unit number and START is pushed to continue.

Dump Disk/Drum Routine: The Dump Disk/Drum routine writes the data contained on one or more full tracks onto magnetic tape or on the on-line printer. When the tape option is used, its format is such that it may be used as input to the Restore Disk/Drum routine. The on-line printer option allows the operator to display the contents of one or more tracks for visual scanning.

Restore Disk/Drum Routine: The Restore Disk/Drum routine reads all or selected portions (sets) of the data placed on magnetic tape by the Dump Disk/Drum routine and returns it to its original area in disk or drum storage. If more than one set of tracks has been loaded onto the magnetic tape, the Restore Disk/Drum routine restores only the sets that are specified in the control cards. The Restore Disk/Drum routine searches the magnetic tape for the identification (set names) of the specified groups and restores only those sets for which restoration is requested.

When the Restore Disk/Drum routine detects a file mark, it reads the following trailer record. If the first word is TERMINATION, it prints an on-line comment that restoration is complete. If the first word is CONTINUATION, it begins processing the alternate input tape and prints an on-line message for the operator to load the next input reel.

Clear Disk/Drum Routine: The Clear Disk/Drum routine clears (i.e., fills with one specified character) the record area(s) of one or more tracks. The character that is to be used to fill the record areas must be specified in a control card.

TAPE UTILITY

Tape Dump Routine: The contents of tapes written in either BCD or binary mode and mounted on a 729 Magnetic Tape Unit or a 7340 Hypertape Drive are written as output by this routine. The output is written either on-line by the printer, or on tape, or both.

All necessary information is entered through control cards. When the program is loaded, any number of tape dumps can be produced without reloading the program. Each binary and/or BCD tape can be dumped entirely or in part. The program accepts tape records up to 10,000 words in length. If a tape record to be dumped is longer than this, the record is truncated and the excess words are deleted.

The Tape Dump routine operates under the Utility Monitor, which operates under the System Monitor. The System Monitor contains routines that control the assignments of all input/output components.

Tape Dump routine error messages are written on the on-line printer only when operator intervention is requested to correct error conditions.

User Programs

In addition to the subsystems shown in Figure 1, the user of the IBM 7090/7094 IBSYS Operating System may design programs and incorporate them as subsystems operating under the System Monitor. Conversely, the user may remove subsystems or portions of subsystems that are not required at his installation.

Application

In constructing a job, the programmer may employ any logical combination of the subsystems operating under the System Monitor. The programmer, in effect, controls and directs the processing of his job from his desk, by inserting the proper control cards into his job deck. Before a particular job is processed, it may be combined with other jobs to form a single input file of unrelated jobs. The input file can then be processed by the 7090/7094 IBSYS Operating System without long, costly setup delays between jobs or job segments while the 1401 Data Processing System lies idle.

The operator of the system performs routine functions, such as loading or unloading tape reels. Usually, he is told what to do and when by means of an on-line message from the 7090/7094 IBSYS Operating System. If the 7090/7094 IBSYS Operating System cannot complete a job or job segment because of a programming error, it automatically skips to the next job or job segment without requiring operator intervention. However, the operator can, if he chooses, interrupt the 7090/7094 IBSYS Operating System at the end of any job. He can then, by means of control cards, direct the 7090/7094 IBSYS Operating System to perform any one of several operations; for example, to restart at the beginning of another job on the System Input File.

If an error occurs during the execution of an object program, the operator, the 7090/7094 IBSYS Operating System, or the object program itself can call for a postmortem dump of any part or all of core storage (to facilitate analysis of the error), followed by a skip to the next job segment.

When an input file of jobs is completed, the 7090/7094 IBSYS Operating System stops, after providing the operator with information on the status of the system input and output files. The operator can then, by the use of control cards, direct the 7090/7094 IBSYS Operating System to perform any one of a number of operations. For example, he may direct it to restart at the beginning of a job on the input file just completed, to restart at the beginning of a new input file, or to tape-mark the output file, and rewind and unload the input and output units.

System Unit Functions

To ensure continuous job processing and proper coordination between subsystems, the System Monitor provides a logical framework for assigning input/output devices to specific functions and retains a record of the exact status of every unit at all times. Some devices are assigned System Unit functions; that is, they are assigned specific functions required by the 7090/7094 IBSYS Operating System and are used in that capacity by the System Monitor and each of the subsystems operating under it. For example, at least one device is used as a System Input Unit, on which a series of jobs are stacked so that they can be processed without interruption by the System Monitor and the various subsystems. The assignments of devices to System Unit functions are recorded in the System Unit Function Table (SYSUNI). Any devices not assigned to System Unit functions are available for use by the programmer, provided that they are not logically detached from the 7090/7094 IBSYS Operating System. The following text describes the System Unit functions to which input/output devices can be assigned. (The System Unit functions and their symbolic names are shown in Figure 2.) Some functions may not have devices assigned to them, depending on the requirements of a particular installation.

System Input

A System Input Unit is required by every installation in order to read the common job input file. It may be a 729 Magnetic Tape Unit, a 711 Card Reader, or a 7340 Hypertape Drive. The card reader may also be used as a substitute input unit for processing small job files. Normally, an input file tape is prepared off-line on an auxiliary 1401 Data Processing System. The input file may contain System Monitor and subsystem control cards, symbolic source programs, binary object programs, and data.

Symbolic Name	Function
SYSLB1	Library 1
SYSLB2	Library 2
SYSLB3	Library 3
SYSLB4	Library 4
SYSCRD	Card Reader
SYSPRT	Printer
SYSPCH	Card Punch
SYSOU1	Output
SYSOU2	Alternate Output
SYSIN1	Input
SYSIN2	Alternate Input
SYSPP1	Peripheral Punch
SYSPP2	Alternate Peripheral Punch
SYSCK1	Checkpoint
SYSCK2	Alternate Checkpoint
SYSUT1	Utility 1
SYSUT2	Utility 2
SYSUT3	Utility 3
SYSUT4	Utility 4

Figure 2. Symbolic Names of System Unit Functions

System Output

A System Output Unit is required by every installation in order to write the common output print file. It may be a 729 Magnetic Tape Unit or a 7340 Hypertape Drive. The output file may contain messages from the IBSYS Operating System, program listings, system core-storage dump listings, and output data in BCD or octal form.

System Peripheral Punch

A device must be assigned as a System Peripheral Punch. However, it can be the same device assigned as the System Output Unit. The device may be a 729 Magnetic Tape Unit or a 7340 Hypertape Drive. The peripheral punch file may be processed off-line to produce object program card decks.

System Library

At least one device must be assigned as a System Library Unit, on which the 7090/7094 IBSYS Operating System is recorded. Up to four devices may be assigned as library units. These can be 729 Magnetic Tape Units, 7340 Hypertape Drives, or cylinders of 1301 Disk Storage Units or of 7320 Drum Storage Units. When magnetic tape units are used, the operating system may be duplicated on two system library tapes, which can be referred to alternately in order to reduce delays in processing while the library tape is being rewound. The operating system can also be split between two or more library tapes in order to reduce the time required to gain access to particular parts of the operating system.

System Utility

Four System Utility Units are required by every installation for general use by the System Monitor and the subsystems operating under it. These units can be 729 Magnetic Tape Units, 7340 Hypertape Drives, or cylinders of 1301 Disk Storage Units or of 7320 Drum Storage Units. The System Utility Units may also be used by object programs. The programmer should avoid assigning any files that are to be retained to System Utility Units that will be used by the operating system during the job.

A device assigned as a System Utility Unit may also be assigned as a Checkpoint Unit.

Checkpoint

A device may be assigned for a Checkpoint File on which checkpoint records are recorded under IOCS control. The same device may also be assigned as a System Utility Unit. The Checkpoint File (SYSCK2) is

required if debugging is requested. The devices for Checkpoint Files can be 729 Magnetic Tape Units, 7340 Hypertape Drives, cylinders of 1301 Disk Storage Units, or 7320 Drum Storage Units.

System Printer

A 716 Printer is required by every installation. It is used mainly by the 7090/7094 IBSYS Operating System to print messages to the operator.

System Card Reader

A 711 Card Reader may be assigned as the System Card Reader. Normally, the card reader is used for reading control cards that direct the operating system.

System Card Punch

A 721 Card Punch may be assigned as the System Card Punch. The punch may be used to punch control cards for use by the operator or it may be used as a substitute output unit for punching a limited file of object program decks.

Alternate Units

A second device may be assigned to the System Input, Output, Peripheral Punch, or Checkpoint functions. If a second unit is assigned, it serves as an alternate unit to eliminate delays due to reel switching. When the end of tape is reached on a unit, an automatic switch is made to the alternate unit.

The following conventions are used in the control card descriptions in this publication:

1. Lower-case letters indicate that a substitution must be made.
2. Upper-case letters must be present, if used, in the form given.
3. Material in brackets [ ] represents an option that may be omitted or included, at the user's discretion.
4. Material in braces { } indicates that a choice of the contents is mandatory.
5. A number over the first letter of a field indicates the initial card column of the field.
6. Where SYSXXX or SYSYYY appears, it must be replaced by names from the System Unit Function Table.

System Monitor (IBSYS)

The following general format applies to System Monitor control cards processed by the Supervisor:

COLUMNS	CONTENTS
1	$
2-15	Control card name, usually a verb, left-justified
16-72	Variable field information (argument 1, argument 2, . . . , argument n)

Although columns 2-15 are available, the Supervisor recognizes only the first five columns of the control card name. No blanks are allowed within or between arguments; a comma separates arguments, and a blank separates the last argument from comments.

The System Monitor control cards are divided into the following four categories:

1. Operational
2. Unit Assignment
3. Tape Manipulation
4. Miscellaneous

Operational Control Cards

$JOB CARD

Format:

```
1          16
$JOB       any text
```

This card defines the beginning of a job. When a $JOB card is read by a subsystem, the Supervisor is called into core storage only if it is required either to restore the status of a unit or to control a between-jobs interrupt condition. Further information may be found in the section "$RESTART Card."

The $JOB card is recorded on both the System Printer and the System Output Unit (SYSOU1). Columns 16 through 72 of the card are normally used to identify a job and may contain any combination of alphameric characters and blanks.

$EXECUTE CARD

Format:

```
1          16
$EXECUTE   subsystem name
```

This control card defines the beginning of a job segment that is to be processed by the specified subsystem. If the $EXECUTE card is read by the Supervisor, the Supervisor positions the proper System Library Unit to the specified subsystem, reads in the first record of the subsystem, and relinquishes control to it. If the control card is read by a subsystem other than the one specified, control, as well as the subsystem name, is passed to the Supervisor, which, in turn, reads in the first record of the specified subsystem and relinquishes control to the subsystem. If the control card is read by the specified subsystem, that subsystem retains control and proceeds to process the job segment.

The subsystem name consists of six or fewer BCD characters corresponding to a name in the System Position Table of the Supervisor. The System Position Table indicates the arrangement of the participating subsystems on the System Library Units and is used by the Supervisor to locate a subsystem specified by a $EXECUTE card.

The $EXECUTE RESTART card differs from the others in that it is normally used by the machine operator, rather than the programmer.

$IBSYS CARD

Format:

```
1          16
$IBSYS
```

When this control card is read by a subsystem or by the Editor, the Supervisor is called into core storage and control is returned to it. The Supervisor then reads and processes subsequent control cards until control is relinquished to a subsystem (when a $EXECUTE card is encountered) or to the Editor (when a $IBEDT card is encountered).

$PAUSE CARD

Format:

```
1              16
$PAUSE         instructions to operator
```

This control card causes the machine to stop after printing the contents of the control card and the message:

OPER. ACTION PAUSE

on the System Printer. When START is pressed, . . CONTINUING is printed and the processing of cards from the System Input File is resumed. Columns 16 through 72 of the control card may contain any combination of alphameric characters and blanks.

This control card provides the programmer with a means of temporarily interrupting processing to enable the operator to perform a specific task, such as file-protecting a reel of tape.

$CARDS CARD

Format:

```
1              16
$CARDS
```

This control card causes the Supervisor to read succeeding control cards from the unit assigned as the System Card Reader (SYSCRD).

$TAPE CARD

Format:

```
1              16
$TAPE
```

This control card causes the Supervisor to read succeeding control cards from the unit assigned as the System Input Unit (SYSIN1).

$RESET CARD

Format:

```
1              16
$RESET
```

This control card causes the assignment of a device to any System Unit function that currently has no device assigned to it, but did have a device assigned to it at initial start. There is no change in the reserve status of any unit as a result of reading this control card.

The $RESET card may be used following a $IBSYS card and preceding a $EXECUTE card to ensure that all System Utility functions have units assigned before the start of a new application.

$RESTORE CARD

Format:

```
1              16
$RESTORE
```

This control card causes the restoration of the Supervisor and the regeneration of the Nucleus, as specified by assembly parameters.

The $RESTORE card causes the System Monitor to be called into core storage from the System Library Unit, giving the same effect as an initial start, except that the tape positions and the SYSDAT word in the Nucleus are not disturbed. The effect of all previous control cards is canceled, except for the effect of the $CARDS or $TAPE cards. The $RESTORE card does not affect the source of input as specified by $CARDS or $TAPE cards. However, the unit assigned as the System Card Reader or the System Input Unit may change as a result of the $RESTORE card, due to a different unit having been assigned previously by $ATTACH, $AS, or $SWITCH cards.

$STOP CARD

Format:

```
1              16
$STOP
```

This control card is used to define the end of a stack of jobs. It is normally placed at the end of a stack of jobs on the System Input File. When the control card is read by a subsystem, the Supervisor is called into core storage and alerted to the fact that the control card was read. Upon recognition of the $STOP card, the Supervisor performs the following actions:

1. Prints, on the System Printer and on the System Output Unit, the physical unit assignment and tape position (record and file count) of the System Output Unit (SYSOU1), the System Peripheral Punch (SYSPP1), and the System Input Unit (SYSIN1), followed by the message:

   END OF JOBS

2. Writes a trailer label on the System Peripheral Punch, if it is not at load point, and backspaces over the trailer label.

3. Writes a trailer label on the System Output Unit, if a $REWIND SYSOU1 card or a $REMOVE SYSOU1 card was not read during the last job, and backspaces over the trailer label. After a $REWIND SYSOU1 or $REMOVE SYSOU1 card is read and processed, further use of the System Output Unit is suspended until a $JOB card is read or the Supervisor is called into core storage again by a $IBSYS card or by a subsystem.

4. Stops the machine with the System Card Reader temporarily assigned to the System Input function.

When START is pressed, the control cards in the card reader, if any, are read and processed by the Supervisor until they are depleted. When the control cards in the card reader have all been read, the Supervisor begins to read control cards from the tape unit originally assigned as the System Input Unit. There-

fore, when the machine stops at the end of a stack of jobs, the operator is provided with a number of alternatives. He may, for example, terminate job processing by using any of the Supervisor control cards, such as the $ENDFILE and $REMOVE cards; or he may begin processing a new stack of jobs after replacing the tape on the System Input Unit and, if necessary, the tapes on the System Output Unit and the System Peripheral Punch.

Unit Assignment Control Cards

The purpose of the unit assignment control cards is twofold. First, they provide a means whereby an installation can indicate to the System Monitor and the subsystems under its control changes in the input/output capabilities of the machine. Second, they provide a means for changing input/output unit assignments within a job.

A distinction is made between the physical attachment of a unit and the assignment of a unit to a System Unit function. Two bits in the first word of the unit control block associated with each input/output device indicate if the device is logically attached to the 7090/7094 IBSYS Operating System (i.e., if it can be referred to legitimately). A device that is not in proper working order should be marked as detached, so that no subsystem will attempt to use it.

The unit assignment control cards fall into two categories: those which define the physical availability (attachment or detachment) of an input/output device and those which reassign input/output devices to System Unit functions. Input/output devices are initially assigned by assembly parameters when the 7090/7094 IBSYS Operating System is assembled. The unit assignment control cards are normally used only for the temporary reassignment of units.

PHYSICAL DEVICE DESIGNATION

Physical input/output devices and System Unit functions are designated on the unit assignment control cards, as described in the following text.

729 Magnetic Tape Units: A 729 Magnetic Tape Unit is designated as xk, where x is the channel (A through H) and k is the tape unit number (0 through 9) on that channel.

Card and Printer Units: The card and printer units are designated as RDx, PUx, and PRx, where RD, PU, and PR are the card reader, card punch, and printer, respectively, and x is the channel (A through H).

Disk/Drum Storage Units: A disk storage unit is designated as xDam/s, where x is the channel (A through H), D designates disk, a is the access arm (0), m is the module (0 through 9), and s is the setting of the data channel switch (0 for switch setting 1; 1 for switch setting 2).

A drum storage unit is designated as xNam/s, where x is the channel (A through II), N designates drum, a is the access arm (0), m is the module (0, 2, 4, 6, or 8), and s is the setting of the data channel switch (0 for switch setting 1; 1 for switch setting 2).

7340 Hypertape Drives: A 7340 Hyptertape Drive is designated as xHk/s, where x is the channel (A through H), H designates Hyptertape, k is the drive number (0 through 9), and s is the setting of the data channel switch (0 for switch setting 1; 1 for switch setting 2). If the s is missing from the unit designation, switch setting 1 is assumed.

System Unit Functions: A System Unit function is designated as SYSXXX or SYSYYY, where SYSXXX or SYSYYY is the symbolic name for one of the System Unit functions listed in Figure 2.

$DETACH CARD

Format:

```
1          16
$DETACH    unit
```

This control card causes the specified unit to be detached. If the unit is assigned to a System Unit function, the assignment is canceled. The unit remains unavailable and unassigned until it is made available by a $ATTACH card, or until its status is restored by a $RESTORE card or an initial start. The $DETACH card may be used to deactivate a unit temporarily for maintenance purposes.

$ATTACH CARD

Format:

```
1          16
$ATTACH    unit  [,II]
```

This control card causes the specified unit to become attached. The unit attached by this control card can be assigned to a System Unit function by the next $AS card. This card may be used without a following $AS card.

If the specified unit is a Model II or Model V 729 Magnetic Tape Unit, this must be specified by II in the variable field of the control card. If II does not appear in the variable field when a 729 Magnetic Tape Unit is specified, the Supervisor assumes that the unit is a Model IV or VI.

The $ATTACH and $DETACH cards may be used to alert the System Monitor to a physical change in the status of the unit. For example, at an installation having six units assembled on channel D, if the sixth unit

on channel D were physically disconnected and then reconnected as the fifth unit on channel C, this change in status might be indicated to the System Monitor by the following control cards:

```
1          16
$ATTACH    C5
$DETACH    D6
```

$AS CARD

Format:

```
1          16
$AS        SYSxxx [,H]
                  [,L]
```

This control card causes the unit specified on the last recognized $ATTACH card to be assigned to the specified System Unit function. If the tape density is specified by H, HI, or HIGH, the density for the System Unit Function Table entry is set to high. It is set to low if the specification is L, LO, or LOW. If the density specification is absent, the density is set according to the assembly parameter HIGHLO. With the distributed system tape, low density is assumed if the density is not specified on the control card.

This card may apply to a unit already attached. In this case, there is no need to detach and reattach the unit. The $AS card releases the unit that was assigned to the System Unit function before the $AS card was recognized.

If the last attached unit was a disk or drum storage unit, the $AS card is expanded as follows:

```
1          16
$AS        SYSxxx, nnn, ccc, hh
```

Here, nnn and ccc must be replaced by three-digit numbers denoting the number of cylinders (nnn) and the starting cylinder (ccc) defined for the System Unit Function Table entry. When drum storage units are used, no more than one significant digit may be specified. A two-character symbol, representing the HA2 home address identifier, should be placed in the next field (hh) Any blanks or zeros in this field are converted to octal 12s.

Example for disk: To attach the system utility unit to 25 cylinders, the following control cards may be used:

```
1          16
$ATTACH    ED00/1
$AS        SYSUT3, 025, 125, PO
```

These specifications attach SYSUT3 to module 0 on channel E with a data channel switch setting of 2. The utility unit will use 25 cylinders, starting with cylinder number 125, and the Home Address 2 is PO.

Example for drum: To attach the system utility unit to two cylinders, the following control cards may be used:

```
1          16
$ATTACH    CN02/1
$AS        SYSUT2, 002, 003, RS
```

These specifications attach STSUT2 to module 2 on channel C with a data channel switch setting of 2. The utility unit will use two cylinders, starting with cylinder number 3, and the Home Address 2 is RS.

$RELEASE CARD

Format:

```
1          16
$RELEASE   SYSxxx
```

This control card causes the unit assigned to the specified System Unit function to be released from that particular System Unit function. If the unit was concurrently assigned to other System Unit functions, it remains assigned to those particular functions.

$SWITCH CARD

Format:

```
1          16
$SWITCH    SYSxxx,SYSyyy
```

This control card causes the units assigned to the specified System Unit functions to be transposed; that is, the unit assigned to SYSXXX is assigned to SYSYYY, and the unit that was assigned to SYSYYY is assigned to SYSXXX. Physical density settings remain the same, and, after the transposition, the transposed units accept the established density settings.

Tape Manipulation Control Cards

The tape manipulation control cards provide the operator with facilities for the automatic manipulation of tape units assigned to System Unit functions. If no unit is assigned to the System Unit function specified on a tape manipulation control card, or if a card or printer unit is assigned to the function, the control card has no effect. The $ENDFILE, $REWIND, and $REMOVE cards have the same effect on a 7340 Hypertape Drive and a 729 Magnetic Tape Unit.

$ENDFILE CARD

Format:

```
1          16
$ENDFILE   SYSxxx
```

This control card causes an end-of-file gap followed by a tape mark to be written on the unit assigned to SYSXXX. No test is made to determine if the operation is an invalid one, such as writing a tape mark on the System Input Unit.

$REWIND CARD

Format:

```
1          16
$REWIND    SYSxxx
```

This control card causes a tape unit assigned to the specified System Unit function to be rewound. If the specified function is SYSOU1, further use of the System Output Unit by the Supervisor is suspended until a $JOB card is read or the Supervisor is called into core storage again by a $IBSYS card or a subsystem.

$REMOVE CARD

Format:

```
1          16
$REMOVE    SYSxxx
```

This control card causes a tape unit assigned to the specified System Unit function to be rewound and unloaded. If the specified function is SYSOU1, further use of the System Output Unit by the Supervisor is suspended until a $JOB card is read or the Supervisor is called into core storage again by a $IBSYS card or a subsystem.

$UNLOAD CARD

Format:

```
1          16
$UNLOAD    SYSxxx
```

This control card causes a Hypertape assigned to the specified System Unit function to be unloaded without rewinding. If a 729 Magnetic Tape Unit is assigned to the specified System Unit function, the $UNLOAD card is interpreted as a $REMOVE card.

$PROTECT CARD

Format:

```
1          16
$PROTECT   SYSxxx
```

This control card causes the Hypertape assigned to the specified System Unit function to be file-protected. The $PROTECT card is ignored if a Hypertape drive is not assigned to the specified System Unit function.

Miscellaneous Control Cards

$DATE CARD

Format:

```
1          16
$DATE      mmddyy
```

This control card causes the six characters in columns 16 through 22 of the control card to be stored in the SYSDAT word of the Nucleus. Although a subsystem may display or otherwise use the SYSDAT word, it should not be modified by the subsystem. If an installation has an interval timer that produces the current date, it should be stored in the form specified for the $DATE card, where:

mm = Month (01 to 12)
dd = Day (01 to 31)
yy = Year (63 to 99)

$* CARD

Format:

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

This control card is written on the System Printer and System Output Unit. No further action occurs. Columns 3 through 72 of the control card may contain any combination of alphameric characters and blanks.

$UNITS CARD

Format:

```
1          16
$UNITS
```

This card causes all System Unit function names, physical unit assignments, and assigned densities to be listed on the System Output Unit. If a disk is assigned to a System Unit function, the HA2 home address identifier and the cylinder limits for the function are included.

This information is also printed on the System Printer if the $UNITS card was read from the System Card Reader or if a $LIST card was read and a subsequent $UNLIST card was not read.

The printout caused by the $UNITS card may be used to verify all unit assignment operations.

$LIST CARD

Format:

```
1          16
$LIST
```

This control card causes all control cards to be recorded on the System Printer as well as on the System Output Unit. Normally, all cards are recorded on the System Output Unit, and only the $JOB, $ID, $*, $PAUSE, $RESTART, $STOP, $CARDS, $TAPE, $LIST, and $UNLIST cards are recorded on the System Printer.

$UNLIST CARD

Format:

```
1          16
$UNLIST
```

This control card negates the effect of the $LIST card by causing only the $JOB, $ID, $*, $PAUSE, $RESTART, $STOP, $CARDS, $TAPE, $LIST, and $UNLIST cards to be

printed on the System Printer. The normal mode is UNLIST, unless the control cards are being read by the System Card Reader.

$IBEDT CARD

Format:

```
1          16
$IBEDT
```

Upon recognizing this control card, the Supervisor calls the Editor into core storage from a System Library Unit and relinquishes control to it.

$ID CARD

Format:

```
1          4
$ID        any text
```

This control card results in a transfer of control to the Installation Accounting routine. Columns 4 through 72 of the control card may contain any combination of alphameric characters and blanks. The control card is recorded on both the System Printer and the System Output Unit. Any further action initiated by the control card depends upon the design of the accounting routine, if any, employed by the installation. Upon completion of the accounting routine, the next control card in the System Input File is read and processed.

The exact use and placement of the $ID card depends upon the accounting practices and regulations in force at the installation.

$RESTART CARD

Format:

```
1          16
$RESTART  [ { ±n    } ]
          [ { MATCH } ]
```

This control card is normally used by the operator to restart at the beginning of a particular job in the System Input File after a *between-jobs* or *end-of-jobs interrupt* occurs. A between-jobs interrupt occurs when a $JOB card is read while sense switch 1 is DOWN and the card reader is not assigned as the System Input Unit. When these conditions exist, the Supervisor selects the System Card Reader as the temporary source of control cards. The operator may restart at the beginning of any job in the System Input File by placing a $RESTART ±n card or a $RESTART MATCH card, followed by a $JOB card, in the card reader when he executes a between-jobs interrupt procedure.

It is important that the operator distinguish between the $RESTART card and the Restart Program. The Restart Program allows the operator to restore a program to operation from a *checkpoint* ($EXECUTE RESTART card), whereas the $RESTART card initiates a restart after an interrupt has occurred *between jobs* and allows a skip to another job.

If the variable field of the $RESTART card is +n, the Supervisor will restart at the beginning of the nth job following the last completed job. For example, if n is +1, the Supervisor restarts at the beginning of the next job on the input file, as though no $RESTART card were processed. If the variable field is −n, the Supervisor restarts at the nth job preceding the present job. The value n may range from 0 to 9999. If n is 0 or blank, the Supervisor restarts at the beginning of the last completed or partially completed job.

When the word MATCH is specified in the variable field of the $RESTART card, the control card should be followed by a $JOB card corresponding to a $JOB card in the System Input File. The Supervisor reads the $JOB card following the $RESTART MATCH card, rewinds the System Input Unit, searches the System Input File for a job with a matching $JOB card and, if found, restarts at the beginning of the job. If a $STOP card is encountered before a matching job card, the System Input Tape is repositioned to the end of the last completed job and the restart request is ignored. Only nonblank characters in the variable field of the $JOB card following the $RESTART card are compared when matching job cards.

If an application destroys the contents of core storage and it is necessary to use the initial start procedure to restart a job, sense switch 1 should be set down and a $TAPE card followed by a $RESTART MATCH card (followed by a $JOB card) should be placed in the card reader. The $TAPE card informs the System Monitor that the input unit is SYSIN1, not the card reader. The $RESTART MATCH card determines the beginning of the job and adjusts the job count to the correct value.

When a $JOB card is read from SYSIN1 with sense switch 1 down, an interrupt occurs and the $RESTART MATCH card is read. It is advisable to rewind SYSIN1 before following this procedure so that a $JOB card will be the first control card read. If any other IBSYS control card were read, the interrupt would not occur.

IBJOB Processor (IBJOB)

$EXECUTE IBJOB Card

The System Monitor passes control to the IBJOB Monitor when a $EXECUTE IBJOB card is encountered. It regains control at the end of each object program execution and whenever a $IBSYS or $EXECUTE card for another system is encountered. Control can be returned to the System Monitor at the end of any job by the use of the interrupt sense switch (sense switch 1).

Input Deck Cards

For greatest efficiency, all input to the IBJOB Processor should be prepared off-line. Each job segment begins with a $EXECUTE IBJOB card, followed by a $IBJOB card, and ends with a file mark. If the System Input Unit holds data that is to be processed by an object program compiled or assembled by the IBJOB Processor, the data has been preceded and is followed by a file mark.

Each input deck in an IBJOB Processor job segment begins and ends with certain control cards, as follows:

1. Each FORTRAN IV source language deck begins with a $IBFTC card and ends with an END statement.
2. Each COBOL source language deck begins with a $IBCBC card and ends with a $CBEND card.
3. Each MAP source language deck begins with a $IBMAP card and ends with a control card containing END in columns 8-10.
4. Each relocatable binary object program begins with a $IBLDR card and ends with a $DKEND card.
5. The load-time debugging packet for FORTRAN IV and MAP programs begins with a $IBDBL card and ends with an *DEND card. Each compile-time debugging packet for COBOL programs begins with a $IBDBC card and is terminated by an end-of-file card, another $IBDBC card, or a $-control card.

FORTRAN II Processor (FORTRAN)

The FORTRAN II Monitor recognizes the following System Monitor control cards:

$EXECUTE FORTRAN

$EXECUTE IBSFAP

$EXECUTE FORTRAN Card

The $EXECUTE FORTRAN card causes control to be passed to the FORTRAN II Monitor. If this control card is read by the FORTRAN II Monitor, the monitor retains control.

$EXECUTE IBSFAP Card

The $EXECUTE IBSFAP card causes the FORTRAN II Monitor to operate in the IBSFAP mode. This is a restricted use of the FORTRAN Assembly Program, allowing only the assembly of symbolic programs and the updating of symbolic tapes. No compilations or object program executions can be performed while the FORTRAN II Monitor is in the IBSFAP mode. The FORTRAN II Monitor in the IBSFAP mode recognizes the five System Monitor control cards and all standard FORTRAN II control cards, except those directing execution.

Commercial Translator Processor (CT)

$EXECUTE CT Card

All Commercial Translator Processor card decks must be preceded by the $EXECUTE CT card and followed by an end-of-file card. The end-of-file card marks the end of a preceding Commercial Translator Processor deck, and the next control card signifies that control is being obtained from the System Monitor.

Following this control card, four different types of decks are possible. These decks are defined by specific control cards, as described in the following text.

$LOAD Card

The $LOAD card is the first control card in a Loader deck.

$MAIN Card

The $MAIN card is the first control card in a Symbolic Maintenance deck. The last card of a Symbolic Maintenance deck may be an end-of-file card or the following card:

```
1       8       16
        *END
```

$SUBUP Card

The $SUBUP card is the first control card in a Subroutine Updater deck.

$CMPLE Card

The $CMPLE card is the first control card in a Compiler deck.

Generalized Sorting System (SORT)

The Generalized Sorting System recognizes the System Monitor control cards described below. If Sort reads a card that is neither a System Monitor card nor a Sort control card, it prints the contents of the card and the message NOT A SORT CONTROL CARD. Options are then given either to ignore the card and continue or to delete Sort.

$EXECUTE SORT CARD

Format:

```
1                16
$EXECUTE    SORT
```

The $EXECUTE SORT card calls Sort and causes control to be transferred from the System Monitor to the Sort Monitor. If this card is read by Sort, the Sort Monitor retains control and Sort reads the next card from the System Input Unit (SYSIN1).

$IBSYS CARD

Format:

1 16

$IBSYS

When Sort reads the $IBSYS card, it returns control to the System Monitor.

$ID CARD

Format:

1 16

$ID

Upon reading a $ID card, Sort transfers to the installation accounting routine.

$STOP CARD

Format:

1 16

$STOP

The $STOP card causes all processing to come to a halt.

$JOB CARD

Format:

1 16

$JOB

The $JOB card indicates the beginning of a new job.

If a Sort run cannot proceed to completion and is deleted, all subsequent Sort runs will automatically be deleted until a $JOB card is processed.

9PAC Processor (9PAC)

The following list represents the order of control cards for a 9PAC Processor application. The first of a series of 9PAC Processor applications is normally preceded by a $EXECUTE 9PAC card, and the file mark after the last of the series is normally followed by a $IBSYS card.

1 7 16

*JOB
*FILE
*END
Program cards
End-of-File (tape marks)

Utility Routines

$EXECUTE DK90UT Card

The $EXECUTE DK90UT card is used to call the Utility Monitor into core storage.

Identification Codes

If the Utility Monitor encounters a control card with an invalid identification code, the Utility Monitor prints an error message and returns control to the System Monitor. Only the following program identification codes are valid:

DK90FA
DK90F
DK90A1
DK90A2
DK90L
DK90C
DK90D
DK90R
HT90D

Off-Line Preparation of Input

Procedure

The operator receives input in various forms. Input may be prepared on card decks, magnetic tape, or both. Card decks contain control cards checked by the programmer and presumed, for all useful purposes, to be valid and in correct sequence. The only check performed by the operator is of the first and last control cards in the deck. The first control card should be a $JOB card and the last control card either a $EOF card or an end-of-file card with a 7, 8 punch in column 1. The presence of a $EOF card or an end-of-file card with a 7, 8 punch in column 1 guarantees no overlap into the next job.

1401 Peripheral Input Program

The 1401 Peripheral Input Program, designed to produce consistent records as input, is available to the operator. It is a card-to-tape routine for the IBM 1401 Data Processing System. This program reads control cards on the IBM 1402 Card Read Punch and prepares the system input tape for the 7090/7094 IBSYS Operating System. It writes card images on the system input tape, and prints a log of the jobs recorded on the tape. Select 2 is used for input to this program.

This program is designed to treat several different types of input for the 7090/7094 IBSYS Operating System. Input may be of the following four varieties:

1. BCD, on tape, in even-parity recording mode
2. Binary, in odd-parity recording mode
3. Blocked input (card images with look-ahead bits)
4. Unblocked input (card images with look-ahead bits)

The program produces the following consistent records from the previously listed records:

1. Unblocked card images with look-ahead bits
2. Blocked card images with look-ahead bits (when generated for the IBJOB Processor)
3. Blocked card images with blocking as specified on the $BLOCK card
4. Odd-parity recording mode when specified on the $BLOCK card

System input for the IBJOB Processor (excluding data input for object programs) is blocked in ten BCD or five column-binary card images. All other input is unblocked, unless otherwise specified on the following optional control card:

```
1              16              20
$BLOCK        {BCD}  ,  size
              {BIN}
```

where the field BCD/BIN specifies the recording mode. BCD is considered to be standard mode. A blank in this field is interpreted as BCD. When BIN is specified, the magnetic tape is unconditionally written in odd-parity, logical record control words are written, and the text of the BCD card images is converted into internal 7090/7094 representation. The program continues this conversion until another $BLOCK card (with BCD or blank specified) or a file mark is read. This program blocks a maximum of 1,344 characters per block (16 BCD or 8 BIN cards).

The field size is read as a four-digit number representing a character count. This number is divided by 168 to obtain a quotient. This quotient then represents the number of column-binary cards for one block; twice this quotient represents the number of BCD cards.

The blocking factor is initiated by either a $IBJOB or $BLOCK card. It is specified by implied size, as on

the $IBJOB card, or explicitly designated in the size field of the $BLOCK card.

If a $BLOCK card is read after a $JOB card, the size specification of the $BLOCK card supersedes any such specification on the $IBJOB card. The blocking condition is terminated by a $DATA, a $EOF, or an end-of-file card (7, 8 punch in column 1).

Control cards with a dollar sign ($) in column 1 are not blocked. Column-binary cards (identified by a 7, 9 punch in column 1) are not mixed with BCD cards in the same block.

Control cards and their respective effect upon this program are shown in Figure 3.

Messages

The message:

END OF JOBS

indicates that the present job is finished. The new job stack is initialized by pressing START. The message:

NO STOP CARD

indicates that all cards have been read and the last card was not a $STOP card. A pause allows the operator to place a $STOP card or more data cards in the card hopper. To continue, START is pressed.

Control Card	Function
$any	Terminates previous blocking.
$JOB	Is printed on the log with the sequence number in the input stack.
$*	Is printed on the log.
$IBJOB	Initiates blocking, standard size.
$BLOCK	Initiates blocking, specified size. If BIN, odd-parity recording mode, use of logical record control words, and character translation for BCD card image is initiated.
$DATA or $EOF or 7 or 8 Punch in column 1	Terminates blocking and the odd-parity mode; writes a tape mark.
$STOP	Writes a tape mark after this image and, if this card is the last card in the deck, it rewinds and unloads the tape. If the last card in the hopper is not a $STOP card, a message is printed, followed by a pause, allowing the operator to supply the missing $STOP card.

Figure 3. Effect of Control Cards on 1401 Peripheral Input Program

Use of Input/Output Units

IBSYS Operating System

The symbolic unit-reference structure of the 7090/7094 IBSYS Operating System is intended to allow the installation more flexibility in the use of the available input/output units. Certain input/output units are assigned to System Unit functions, and the remainder are made available for use by object programs. The following chart shows the over-all requirements of the 7090/7094 IBSYS Operating System:

SYSTEM UNIT FUNCTION	REQUIRED	CAN BE:					
		729	7340	1301	711	716	7320
System Library Unit (SYSLB1)	Yes	X	X	X			X
System Input Unit (SYSIN1)	Yes	X	X		X		
System Output Unit (SYSOU1)	Yes	X	X				
System Peripheral Punch (SYSPP1)	Yes	X	X				
System Card Reader (SYSCRD)	Yes				X		
System Printer (SYSPRT)	Yes					X	
System Utility Unit 1 (SYSUT 1)	Yes	X	X	X			X
System Utility Unit 2 (SYSUT 2)	Yes	X	X	X			X
System Utility Unit 3 (SYSUT 3)	Yes	X	X	X			X
System Utility Unit 4 (SYSUT 4)	Yes	X	X	X			X

The use of cylinders of 1301 Disk Storage or 7320 Drum Storage as one of the system units requires a 7631 File Control with the cylinder-mode feature.

FORTRAN II Processor

The following chart specifies the input/output unit requirements of the FORTRAN II Processor:

SYSTEM UNIT FUNCTION	REQUIRED	CAN BE:					
		729	7340	1301	711	716	7320
System Library Unit (SYSLB1)	Yes	X		X			X
System Input Unit (SYSIN1)	Yes	X					
System Output Unit (SYSOU1)	Yes	X					
System Peripheral Punch (SYSPP1)	Yes	X					
System Card Reader (SYSCRD)	Yes				X		
System Printer (SYSPRT)	Yes					X	
System Utility Unit 1 (SYSUT 1)	Yes	X	X				
System Utility Unit 2 (SYSUT 2)	Yes	X	X				
System Utility Unit 3 (SYSUT 3)	Yes	X	X				
System Utility Unit 4 (SYSUT 4)	Yes	X	X				

Commercial Translator Processor

The following chart specifies the input/output unit requirement of the Commercial Translator Processor:

SYSTEM UNIT FUNCTION	REQUIRED	CAN BE:					
		729	7340	1301	711	716	7320
System Library Unit (SYSLB1)	Yes	X		X			X
System Input Unit (SYSIN1)	Yes	X					
System Output Unit (SYSOU1)	Yes	X					
System Peripheral Punch (SYSPP1)	Yes	X					
System Card Reader (SYSCRD)	Yes				X		
System Printer (SYSPRT)	Yes					X	
System Utility Unit 1 (SYSUT 1)	Yes	X					
System Utility Unit 2 (SYSUT 2)	Yes	X					
System Utility Unit 3 (SYSUT 3)	*	X					
System Utility Unit 4 (SYSUT 4)	No						

* System Utility Unit 3 is used as an overflow unit, and may not be used for short programs.

IBJOB Processor

The following chart specifies the input/output unit requirements of the IBJOB Processor:

SYSTEM UNIT FUNCTION	REQUIRED	CAN BE:					
		729	7340	1301	711	716	7320
System Library Unit (SYSLB1)	Yes	X	X	X			X
System Input Unit (SYSIN1)	Yes	X	X		X		
System Output Unit (SYSOU1)	Yes	X	X				
System Peripheral Punch (SYSPP1)	Yes	X	X				
System Card Reader (SYSCRD)	Yes				X		
System Printer (SYSPRT) (SYSPRT)	Yes					X	
System Utility Unit 1 (SYSUT 1)	Yes	X	X	X			X
System Utility Unit 2 (SYSUT 2)	Yes	X	X	X			X
System Utility Unit 3 (SYSUT 3)	Yes	X	X	X			X
System Utility Unit 4 (SYSUT 4)	Yes	X	X	X			X
System Checkpoint Unit (SYSCK2)	*	X	X	X			X

* The System Checkpoint Unit (SYSCK 2) is required if load-time debugging is requested.

Generalized Sorting System

The following chart specifies the input/output unit requirements of the Generalized Sorting System:

SYSTEM UNIT FUNCTION	REQUIRED	CAN BE:					
		729	7340	1301	711	716	7320
System Library Unit (SYSLB1)	Yes	X	X	X			X
System Input Unit (SYSIN1)	Yes	X	X		X		
System Output Unit (SYSOU1)	Optional	X	X				
System Peripheral Punch (SYSPP1)	No						
System Card Reader (SYSCRD)	Optional				X		
System Printer (SYSPRT)	Yes					X	
At least four tape units	*	X	X				
System Utility Unit 1 (SYSUT1)	**	X	X				
System Utility Unit 2 (SYSUT2)	**	X	X				
System Utility Unit 3 (SYSUT3)	**	X	X				
System Utility Unit 4 (SYSUT4)	**	X	X				

* At least two tape units on each of two channels.

** System Utility Units may be used as any of the four required tape units as specified by Sort Control cards.

9PAC Processor

The following chart specifies the input/output unit requirements of the 9PAC Processor:

SYSTEM UNIT FUNCTION	REQUIRED	CAN BE:					
		729	7340	1301	711	716	7320
System Library Unit (SYSLB1)	Yes	X		X			X
System Input Unit (SYSIN1)	Yes	X					
System Output Unit (SYSOU1)	Yes	X					
System Peripheral Punch (SYSPP1)	*	X					
System Card Reader (SYSCRD)	Yes				X		
System Printer (SYSPRT)	Yes					X	
System Utility Unit 1 (SYSUT 1)	No						
System Utility Unit 2 (SYSUT 2)	**	X					
System Utility Unit 3 (SYSUT 3)	**	X					
System Utility Unit 4 (SYSUT 4)	**	X					

* The System Peripheral Punch is required only when the programmer requests a binary deck.

** System Utility Units 2, 3, and 4 may or may not be required, depending on the kind of application. The programmer should inform the operator of the utility units that will be required.

Disk/Drum Utilities

The following chart specifies the input/output unit requirements of the Disk/Drum Utilities:

SYSTEM UNIT FUNCTION	REQUIRED	CAN BE:					
		729	7340	1301	711	716	7320
System Library Unit (SYSLB1)	Yes	X	X	X			X
System Input Unit (SYSIN1)	Yes	X	X	X			
System Output Unit (SYSOU1)	No	X	X				
System Peripheral Punch (SYSPP1)	No						
System Card Reader (SYSCRD)	No						
System Printer (SYSPRT)	Yes					X	
System Utility Unit 1 (SYSUT1)	No						
System Utility Unit 2 (SYSUT2)	No						
System Utility Unit 3 (SYSUT3)	No						
System Utility Unit 4 (SYSUT4)	No						

Input/Output Control System

The following chart specifies the input/output unit requirements of the Input/Output Control System:

SYSTEM UNIT FUNCTION	REQUIRED	CAN BE:					
		729	7340	1301	711	716	7320
System Library Unit (SYSLB1)	Yes	X	X	X			X
System Input Unit (SYSIN1)	Yes	X	X		X		
System Output Unit (SYSOU1)	Yes						
System Peripheral Punch (SYSPP1)	No						
System Card Reader (SYSCRD)	No						
System Printer (SYSPRT)	Yes					X	
System Utility Unit 1 (SYSUT1)	No						
System Utility Unit 2 (SYSUT2)	No						
System Utility Unit 3 (SYSUT3)	No						
System Utility Unit 4 (SYSUT4)	Yes						

NOTE: The Restart program's input/output unit requirements are the same as those required for the Input/Output Control System above.

System Operation

Once the IBSYS Operating System is in control, operation proceeds continuously until some operator action is required or until the operator decides to change the normal sequence of processing. The following sections describe the methods by which the operator and the operating system communicate with each other.

Initial Start Procedure

The procedure for initiating processing under the IBSYS Operating System is as follows:

1. If the operating system is on magnetic tape, mount the system tape on the System Library Unit, rewind it, and set the density on the unit in accordance with the specifications for that system tape.

2. Clear the entry keys and set sense switch 1 to determine the unit that is to be used to read the first control card. If sense switch 1 is DOWN, control cards are read from the System Card Reader; if sense switch 1 is UP, the cards are read from the System Input Unit.

3. Clear core storage and load the System Supervisor. If the System Library Unit is magnetic tape unit A1, press LOAD TAPE; if it is any other magnetic tape unit, loading of the Supervisor from that tape is accomplished by a self-loading program read from the card reader. If the System Library Unit is 7340 Hypertape Drive, 1301 Disk Storage, or 7320 Drum Storage, loading of the Supervisor is accomplished by the use of the Load Hypertape or Load Disk/Drum card that is punched out whenever the IBSYS Operating System is edited onto such a unit.

After this procedure has been completed, normal processing should begin. If it does not, the operator should check the ready status of all of the units being used (only the System Library and System Input or System Card Reader Units need be ready at an initial start) and, if the System Library Unit is a 729 Magnetic Tape Unit, he should check that the correct density setting is being used.

Sort Start Operations

The operator must take the following information and modifications into consideration when he is running a Sort program:

1. Sort occupies two consecutive files on the system unit. If this unit is a tape drive, the system uses its own loader to load the relocatable subprograms. If the system unit is a disk or drum, the System Loader (SYSLDR) is used for loading.

2. If sense switch 1 is set up, the System Monitor control cards must be on a tape unit attached as the System Input Unit. If sense switch 1 is set down, these control cards must be in the card reader.

3. If the Sort control cards are in the card reader, the card reader must be attached as the System Input Unit. If the cards are on tape, this unit must be attached as the System Input Unit.

4. If the System Monitor is on tape unit A1, core storage must be cleared. The Load Tape button must be pressed to start the system. If the System Monitor is on any other unit, whether it be tape, disk, or drum, a start card must be placed in the card reader, core storage cleared, and the Load Card button pressed.

Console Controls

The operator's primary method of controlling the operating system is the use of the 7090 Console. All components of the operating system recognize certain standard uses of the various controls.

Sense Switches

The 7090 Console sense switches are used by the operator to change the normal sequence of processing or to communicate decisions to subsystems of the IBSYS Operating System. The standards that are used are as follows:

SENSE SWITCH	USE
1	*Input Control:* The position of this sense switch determines the unit from which the System Input File is read: if UP, system input is read from the System Input Unit; if DOWN, system input is read from the System Card Reader.
2	*Checkpoint Control:* This sense switch determines whether or not a checkpoint of the program in operation is to be taken at this time. It is tested before every exit from an Input/Output Control System routine. If sense switch 2 is DOWN and the object program has opened a checkpoint file, a checkpoint is placed in that file; if UP, no checkpoint is taken. Once sense switch 2 has been sensed as being DOWN and the required checkpoint has been taken, the sense switch must be sensed once as being UP before another checkpoint can be initiated by placing it DOWN.

Generalized Sorting System Job Interrupt Control: In the Generalized Sorting System, sense switch 2 is used to request a job interrupt at the end of the current pass of the Merge Phase. For such a request, the switch must be set DOWN. If checkpoints are being taken, the pause occurs immediately after the next one has been taken.

3 — *Label Control:* This sense switch determines the action to be taken by the Input/Output Control System after it detects an error in the label of an input file or an output unit. Whenever any such error is detected, IOCS prints a message describing the problem and pauses to allow the operator to set sense switch 3 as appropriate for the condition encountered. If sense switch 3 is DOWN when START is pressed the file or unit is accepted, despite the error. If sense switch 3 is UP when START is pressed, the tape with the label in error is rewound and unloaded. The operator should replace the tape. The label on the new reel is then verified.

Generalized Sorting System Error Control: In a Sort run, this sense switch is generally used after an error has been detected to indicate whether the run is to be continued or deleted. Sort prints an on-line message directing the operator to set the switch either UP or DOWN.

4 — *9PAC Processor End-of-File Indicator:* This sense switch is used to reply to an inquiry from the 9PAC Processor as to the availability of further input. If sense switch 4 is DOWN when START is pressed, there is more input available. If sense switch 4 is UP when START is pressed, the end of the input file has been reached.

Generalized Sorting System Label and Error Control: In a Sort run, this sense switch is used after an error has been detected on an input file label or an intermediate merge tape label. The Sort Label Routine prints an error message describing the problem and the options available to the operator.

This switch is also used with sense switch 3 after other errors to indicate whether the run is to be deleted, restarted at the last checkpoint, or continued.

5, 6 — These sense switches do not have standard uses. They may be used for inquiry either by subsystems or by object programs.

Sense Lights

The sense lights on the 7090 Console are not used by the operating system for communication with the operator. They are used by some subsystems as switches, but their use does not have any external significance.

Console Entry Keys

The entry keys of the 7090 Console are used to provide the system with information that is more than a simple affirmative or negative response. The keys may also terminate the operation of a program that has halted or entered an endless loop. The entry keys may also enter the address of the unit that contains the checkpoint from which a program is to be restarted, to specify the limits of the sections of core storage to be written out by the System Core-Storage Dump program, and to answer interrogative messages from various subsystems.

Interrupt

The IBM 7090/7094 IBSYS Operating System allows the operator to halt system operation between jobs. The following procedure must be performed to interrupt the system:

1. On the card reader, STOP is pressed, thereby placing it in a nonready condition.
2. Sense switch 1 is placed DOWN.
3. The control cards that are to be read by the System Monitor are placed in the card reader.
4. On the card reader, READY is pressed.
5. As soon as the cards are read, sense switch 1 is placed UP, thereby preventing an interrupt at the end of the succeeding job.

By using this procedure, the operator can interpose, between the jobs being processed, any combination of System Monitor control cards or, if he chooses, a complete job deck.

Checkpoint

If a checkpoint file has been assigned in the Preprocessor and the file has been opened by the program, IOCS has provision for an operator to take a checkpoint. This feature may be used to interrupt the execution of a program and to restart it at some later time. The procedure is as follows:

1. The checkpoint sense switch is placed DOWN.
2. The following message is printed:

```
UNIT xxxxxx
CHECKPOINT xxxxx CODE yyyyyyzzzzzz
```

The checkpoint identification is xxxxx, and the restart code is yyyyyyzzzzzz. The physical tape address of the unit on which the checkpoint is taken is yyyyyy.

3. The checkpoint sense switch is restored.

Restart

Function

The Restart program is an independent subsystem that operates under the control of the System Monitor and uses the facilities of the Input/Output Executor (IOEX). It allows the operator to restore a program to operation from a checkpoint that has been taken under the control of IOCS. The minimum machine configuration requirements of the Restart program are the same as those for IOCS. The procedures

for operator-initiated checkpoints are described elsewhere in this publication. The procedures for program-initiated checkpoints are described in the publication *IBM 7090/7094 IBSYS Operating System, Input/Output Control System,* Form C28-6345.

The Restart program uses the information in the checkpoint record to do the following:

1. Print messages to assist the operator in mounting tapes and setting sense switches.
2. Reposition tapes.
3. Restore core storage, index registers, sense indicators, and sense lights to their status at the time that the checkpoint was taken.

The program is then restarted from the point at which the checkpoint was taken.

Restart Procedure

The following are the steps in the operator's procedure for restarting a program:

1. The identification number (xxxxx) and restart code (yyyyyyzzzzzz) of the required checkpoint record is obtained. This information is printed on-line whenever a checkpoint is taken.

Example:

```
UNIT B2 CHECKPOINT 00002 CODE 102      206      000001
```

2. The tape that contains the checkpoint record is mounted on the magnetic tape unit indicated in the message (B2 in the example).

3. A $EXECUTE RESTART card is placed in the System Card Reader.

4. If the System Monitor is in control and has reached the end of the System Input File, START is pressed. Otherwise, the operator performs the Initial Start procedure.

5. After the message SET KEYS TO RESTART CODE is printed, a pause occurs. The code from the message (yyyyyyzzzzzz) is entered in the console entry keys, and START is pressed.

6. The following message is printed:

```
RESTART    xxxxx
```

The identification number is verified.

7. The following message is printed:

```
SET SENSE SWITCHES
1{UP DN} 2{UP DN} 3{UP DN} 4{UP DN} 5{UP DN} 6{UP DN}
```

The sense switches are set accordingly.

8. A File Description Table is printed, and another pause occurs. This table is similar to the File List printed at the beginning of a job. Tapes are mounted as indicated, and START is pressed. An example of a File Description Table is included in the section "On-Line Messages."

Debugging Postprocessor

The IBJOB Monitor automatically calls in the Debugging Postprocessor upon return from execution of an application in which debugging was requested. If an application failed during execution, the operator obtains a core storage dump by a manual STR. The buffers will be closed and the dump will be taken by the IBJOB Debugging core dump facility if it is in storage; otherwise the dump will be taken by SYSDMP. In either case the Debugging Postprocessor will be called in automatically after the dump is taken.

In order to save debugging output if the STR is inoperative, TRA to 115_8 (or to the address referenced in location 115_8) to call in SYSDMP, set sense switch 1 down, and insert the following deck to call the Postprocessor.

```
1          16
$ATTACH    RDA
$AS        SYSIN1
$EXECUTE IBJOB
$POST
$IBSYS
$RESTORE
$TAPE
```

This procedure is necessary only if the message DEBUG INFORMATION ON SYSCK2 (n) has been printed on-line. Since these cards must be read by the card reader, the debugging ouput will not be printed until the card reader reads the next card. If the card reader is not used again during the run, the initial start procedure must be followed to cause the cards to be read and the Postprocessor to be called in.

System Core-Storage Dump Program (SYSDMP)

The System Core-Storage Dump Program allows the operator or object program to write out the contents of core storage in easily readable form.

It was designed to facilitate the testing of programs under System Monitor control. To best perform this function, snap dump and post-mortem dump options have been provided. The snap dump option of the System Core-Storage Dump Program can dump and edit one or more sequential locations of core storage during the execution of an object program. After the dump is completed, core storage is returned to its original condition, and control is returned to that point in the object program from which the dump was called. The post-mortem dump option dumps core storage in the same manner as the snap dump option; but at its completion, control is returned to the System Monitor, which skips to the next job segment.

The System Core-Storage Dump Program is a generalized program called at object time to provide either a snap shot dump or a post-mortem dump. The format, limits, and output units for both types of dump may be either assembly defined* or specified with a control word. For the post-mortem dump, the additional option of defining these parameters with the console entry keys is provided.

When a dump is requested, the Nucleus writes a portion of core storage onto the alternate System Peripheral Punch unit, reads in the System Core-Storage Dump Program, and transfers control to it. If the console entry key option is requested, a halt occurs to allow the insertion of dump parameters. The System Core-Storage Dump Program dumps the edited output onto either a previously assigned magnetic tape, or the on-line printer, or both.

The assignment of work tapes and output tapes is a function of the System Monitor; however, other magnetic tapes may be used by altering the parameters of the System Core-Storage Dump Program. If this is done, care should be taken to ensure that the new tape has been logically attached before a dump is requested. In the following example, the attach sequence for defining magnetic tape unit A3 as SYSxxx is shown:

```
1          16
$ATTACH    A3
$AS        SYSxxx
```

The System Unit functions used by the System Core-Storage Dump Program [alternate Peripheral Punch (SYSPP2) and System Output Unit (SYSOU1)] must have physical units attached.

All input/output functions are performed under the control of IOEX through select routines contained in the System Core-Storage Dump Program.

System Core-Storage Dump Program error messages and IOEX messages are written on the on-line printer. Operator intervention to correct error conditions is requested whenever possible.

To initiate a dump of the contents of core storage, the following steps are taken by the machine operator.

1. A transfer instruction to location 115_8 is placed in the instruction register and START is pressed.

2. The operator has the following dump options:

If sense switch 4 is UP, a SQUEZY format mnemonic dump of all core storage is written on the System Output Unit.

If sense switch 4 is DOWN, the dump program halts and waits for limits to be entered in the keys, as follows:

DECREMENT PORTION OF THE ENTRY KEYS	ADDRESS PORTION OF THE ENTRY KEYS
Origin of dump	Ending location of dump

Any tag bit causes an octal dump. Repeated halts occur for new limits. To terminate the dump, all keys are set UP and START is pressed. This returns control to the System Monitor.

3. After the dump is taken, the System Monitor begins processing at the start of the next job segment. If this was the last segment, the next job is started.

Dump Parameters

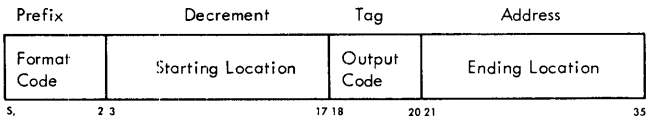
The dump parameters are entered either by a parameter control word for a snap dump or by a parameter control word or the console entry keys for a post-mortem dump. Any one of six dump formats can be specified. In the distributed version of the Core-Storage Dump Program, output is single spaced. The various parts of the parameter control word are interpreted as follows:

Prefix
- PON 1 FORMAT A – Octal, eight words per line.
- PTW 2 FORMAT B – BCD, sixteen words per line.
- PTH 3 FORMAT C – SQUEZY, Mnemonics with address and tag field. If the Core-Storage Dump Program cannot interpret the operation code, the octal representation is given.
- MZE 4 FORMAT D – Octal and SQUEZY. If the SQUEZY word would normally have appeared in octal form, it is not listed twice, but is suppressed. Otherwise, both the octal word and the SQUEZY word are listed.
- MON 5 FORMAT E – Octal and mnemonics.
- MTW 6 FORMAT F – Octal, mnemonics, and BCD. A BCD intepretation of the word is listed to the right of the mnemonic.

Address — The ending location of the dump.

Tag
- 0 = Dump onto System Output Unit.
- 1 = Dump onto System Printer.
- 2 = Dump onto both System Output Unit and System Printer.

Decrement — The starting location of the dump.



The limits of the requested dump may be stated in any order, i.e., the starting parameter in the address field and the ending parameter in the decrement field, or vice versa.

In the distributed version of the Core-Storage Dump Program, the dump is always made onto the System Output Unit only, regardless of the contents of the tag position of the parameter control word.

* If no parameters are specified, the requested core-storage dump is accomplished using parameters within the System Core-Storage Dump Program. (These parameters are established when the program is assembled.)

A parameter control word of all zeros will provide a full core storage dump in the assembly defined format. In the distributed version, format 3(C) is used.

Machine Status at the End of a Core Storage Dump

If any input/output operation had been in progress when the snap dump routine was called, the traps resulting from this operation are lost if they occurred on the channels used by the Core-Storage Dump Program. Since the System Loader disables all traps when loading the Core-Storage Dump Program, and the dump resets the work tape data chanel when restoring core storage, it is recommended that all input/output operations be terminated before calling in the Core-Storage Dump Program.

The following section lists, in alphabetical order, the messages that are always printed on-line by the IBM 7090/7094 IBSYS Operating System. In some cases, the system involved can be made to print on-line messages that are ordinarily printed only off-line. It is recommended that this procedure be used only if the programmer is present to interpret the messages as they appear, since they usually concern details of the programmer's job with which the operator is not familiar. On-line messages printed by the Generalized Sorting System are listed separately at the end of this section.

ACTION LABEL INCORRECT
Subsystem in Control: IBJOB processor.
Explanation: This message occurs if an argument to ACTION, sent by some part of the system to cause positioning or reading of the system unit, does not match any of the ACTION table entries.
Action: No operator action is required.

*ALTER OUT OF SEQUENCE
Subsystem in Control: Commercial translator.
Explanation: An *ALTER card has appeared out of sequence.
Action: The operator presses START. The out-of-sequence set is ignored, and normal operation continues.

ATTACH ERROR AT xxxxx
Subsystem in Control: Input/Output Control System (IOCS) as a subsystem.
Explanation: A calling sequence at xxxxx has requested the attaching of files that exceed the number of available buffers. A dump is taken.
Action: No operator action is required.

BASIC IOCS NECESSARY xxxxx
Subsystem in Control: Input/Output Control System (IOCS) as a subsystem.
Explanation: Minimum IOCS was specified in the *JOB card, but a call has been made to internal files or to one of the following routines: JOIN, COPY, REW, WEF, BSF, or CKPT. A dump is taken.
Action: No operator action is required.

BASIC MONITOR HAS ENTERED INPUT/OUTPUT CONTROL SYSTEM
Subsystem in Control: Input/Output Control System (IOCS) with Preprocessor.
Explanation: IOCS has received control from the System Monitor.
Action: No operator action is required.

BASIC MONITOR HAS ENTERED THE RESTART SYSTEM
Subsystem in Control: Restart Program.
Explanation: The Restart Program is in control of the computer.
Action: No operator action is required.

BETA REQUESTS UNSERVICED
Subsystem in Control: Random Input/Output Control System (IOCS).
Explanation: An object program error has occurred. The job is terminated with a dump.
Action: No operator action is required.

CANNOT CONTINUE THIS JOB.
ANY KEY DOWN – DUMP, PROCEED TO NEXT
ALL KEYS UP – PROCEED TO NEXT
Subsystem in Control: 9PAC Processor.
Explanation: The operator is given a choice of terminating the job with or without a dump. Each installation should establish a standard procedure specifying when and how dumps are to be taken.
Action: The operator sets the entry keys as required and presses START.

CANNOT FIND FILE 'name'
Subsystem in Control: Commercial Translator.
Explanation: The Commercial Translator Processor cannot find an *FILE card with the symbol 'name' in the filename location. If START is pressed, the program continues as though an *END card had been encountered.
Action: The operator terminates the job with a dump by a manual STR, unless otherwise instructed by the programmer.

CARD xxx CONTROL CARD EOF
Subsystem in Control: Input/Output Control System (IOCS) with Preprocessor.
Explanation: More control cards are required for the System Input Unit.
Action: The operator places more control cards on the System Input Unit. If no such cards are available, the operator causes a dump by a manual transfer to 115.

CARD xxx CONTROL CARD REDUNDANCY
Subsystem in Control: Input/Output Control System (IOCS) with Preprocessor.
Explanation: A redundancy error has been detected while reading control cards from magnetic tape. The card is processed as read.
Action: No operator action is required.

CARD xxx CYLINDER START NON-NUMERIC
Subsystem in Control: Input/Output Control System (IOCS) with Preprocessor.
Explanation: A file card has been read which has alphabetic character(s) in columns 38-41. A dump is taken.
Action: No operator action is required.

CARD xxx DATE ERROR
Subsystem in Control: Input/Output Control System (IOCS) with Preprocessor.
Explanation: An incorrect *DATE card has been read. The date stored in the Nucleus of the System Monitor is used.
Action: No operator action is required.

CARD xxx FCB OVERLAPS IOCS
Subsystem in Control: Input/Output Control System (IOCS) with Preprocessor.
Explanation: The origin of the file control blocks, as specified in the *JOB card, is below the end of IOCS. The standard origin (the location immediately following the end of IOCS) is used.
Action: No operator action is required.

CARD xxx FILE BLOCK ORIGIN NOT OCTAL

Subsystem in Control: Input/Output Control System (IOCS) with Preprocessor.

Explanation: The origin specified in the *JOB card is not an octal number and will be ignored. The standard file block origin (the location immediately following the end of IOCS) will be used instead.

Action: No operator action is required.

CARD xxx FILE BLOCK WILL NOT FIT

Subsystem in Control: Input/Output Control System (IOCS) with Preprocessor.

Explanation: There is insufficient space to generate a file control block for the specified control card. A dump is taken.

Action: No operator action is required.

CARD xxx FILE CONTROL BLOCK COUNT ERROR

Subsystem in Control: Input/Output Control System (IOCS) with Preprocessor.

Explanation: The programmer has specified the number of file control blocks incorrectly. An arbitrary count of 50 will be used.

Action: No operator action is required.

CARD xxx FILE CONTROL BLOCK NUMBER ERROR

Subsystem in Control: Input/Output Control System (IOCS) with Preprocessor.

Explanation: A file card has been read which specifies a file control block number that is either nonnumeric or greater than the number of file control blocks specified in the *JOB card. No file control block is generated for this file.

Action: No operator action is required.

CARD xxx HYPER UNIT NOT AVAILABLE

Subsystem in Control: Input/Output Control System (IOCS) with Preprocessor.

Explanation: A file card has requested that a Hypertape drive be assigned to that file, and no Hypertape drive is available. Any reference to the file causes an error halt.

Action: No operator action is required.

CARD xxx ILLEGAL OPERATION – (xxxxxx)

Subsystem in Control: Input/Output Control System (IOCS) with Preprocessor.

Explanation: Columns 7–12 of a control card contain information (xxxxxx) that is not *JOB, *FILE, *DATE, *LOAD, *RESTART, or *IBSYS. The card is ignored.

Action: No operator action is required.

CARD xxx JOB CARD OUT OF PLACE

Subsystem in Control: Input/Output Control System (IOCS) with Preprocessor.

Explanation: An *JOB card has accidentally been placed in the middle of the IOCS control card deck. The misplaced card is ignored.

Action: No operator action is required.

CARD xxx NO SUCH ACCESS-MUST CORRECT

Subsystem in Control: Input/Output Control System (IOCS) with Preprocessor.

Explanation: A file card has requested the use of a nonexistent disk or drum storage access. Any reference to the file causes an error halt.

Action: No operator action is required.

CARD READER ERROR
PRESS START TO CONTINUE

Subsystem in Control: Utility Monitor.

Explanation: An invalid control card has been read.

Action: The operator presses START. An attempt is made to process the card.

CARD xxx REEL SEQUENCE NUMBER NOT NUMERIC

Subsystem in Control: Input/Output Control System (IOCS) with Preprocessor.

Explanation: The message is self-explanatory. The reel sequence number is assumed to have initialized as 1.

Action: No operator action is required.

CARD xxx SOME UNIT 1 IS (*)

Subsystem in Control: Input/Output Control System (IOCS) with Preprocessor.

Explanation: File card xxx specified the primary unit for the file as *. The * stands for: "Assign all units and then assign any available unit to this file."

Action: No operator action is required.

CARD xxx UNIT 1 ILLEGAL

Subsystem in Control: Input/Output Control System (IOCS) with Preprocessor.

Explanation: The card in question contains an invalid specification for the primary unit for the file. The file control block is not initialized properly, and any reference to the file causes an error halt.

Action: No operator action is required.

CARD xxx UNIT 2 ILLEGAL

Subsystem in Control: Input/Output Control System (IOCS) with Preprocessor.

Explanation: The card in question contains an invalid specification for the secondary unit for the file. If the primary unit was specified properly, it is used as the secondary unit.

Action: No operator action is required.

CHANGE READ ERROR

Subsystem in Control: Commercial Translator.

Explanation: A permanent read error has occurred on the input tape. If START is pressed, the program continues to read, accepting the input as it stands.

Action: The operator terminates the job with a dump by a manual STR, unless otherwise instructed by the programmer.

CHECKPOINT INVALID, MOUNT NEW REEL TO CONTINUE UNIT xxxxx
CHECKPOINT xxxxxx CODE yyyyyy

Subsystem in Control: Input/Output Control System (IOCS) as a subsystem.

Explanation: An attempt to write a checkpoint on the specified tape has failed because of bad tape or because the end of the tape was reached.

Action: The operator should mount a new reel of tape on the unit and press START.

Page Eject
CONTINUE IF CONTROL CARDS ERRORS CAN BE IGNORED
OPER. ACTION PAUSE

Subsystem in Control: Input/Output Control System (IOCS) with Preprocessor.

Explanation: The page eject and this message occur at the end of the Preprocessor list.

Action: The operator takes a dump by a manual transfer to location 115_8, unless otherwise instructed by the programmer.

CONTROL CARDS NEEDED IN CARD READER
OPER. ACTION PAUSE

Subsystem in Control: System Monitor.

Explanation: The System Monitor has detected the end of-file condition in the card reader while attempting to read a control card.

Action: The operator supplies the card reader with more control cards. If some control cards from the current job remain, they are placed in the card reader. If there are more control cards or another job in the System Input Unit, the operator places a $TAPE card in

the card reader. If there are no more jobs to be run, the operator places a $STOP card in the card reader.

As soon as some control card has been placed in the card reader, the operator presses START.

CYL LIMIT ERROR – MAX SIZE GIVEN PRESS START TO CONTINUE
OPER. ACTION PAUSE

Subsystem in Control: Input/Output Control System (IOCS) with Preprocessor.

Explanation: A file card has an error in the number of cylinders of disk or drum storage defined for the file. IOCS will assume the upper limit to be the end of the disk or drum storage module specified.

Action: The operator considers whether or not to destroy information on the module before pressing START to continue operation.

(File Identification) CYL. LIMITS XCEDED

Subsystem in Control: Input/Output Control System (IOCS) as a subsystem.

Explanation: The allotted number of cylinders specified in the secondary unit field of the *FILE card has been exceeded.

Action: No operator action is required.

DATA CHECK WHILE WRITING ON DISK

Subsystem in Control: Random Input/Output Control System (IOCS).

Explanation: Random IOCS has detected an error while attempting to write a record on disk or drum. This message is always preceded by the message: PERSISTENT ERROR – BETA (Verification Address).

Action: No operator action is required.

DEBUG INFORMATION ON SYSCK2 (N)

Subsystem in Control: IBJOB Processor

Explanation: Debugging records have been written on SYSCK2. N is the system unit to which SYSCK2 is assigned.

Action: If the object program destroys the system so that a restart is necessary, the operator should restart using the $POST card procedure discussed in the section "Debugging Postprocessor." Otherwise no action is required. If the unit specification N differs from the installation standard for SYSCK2, the operator should supply the necessary $ATTACH card for SYSCK2.

DEBUG REQUESTS PAUSE

Subsystem in Control: IBJOB Processor

Explanation: This is a programmed pause.

Action: If the programmer has not specified action on the request sheet or by an on-line message, the operator presses START to continue.

***DEBUG UNIT NOT ATTACHED.
JOB RUN WITHOUT DEBUGGING

Subsystem in Control: IBJOB Processor.

Explanation: SYSCK2 (or the installation's debugging unit) was not attached so there is no debugging output.

Action: No operator action is required.

DISREGARD MOUNTING INSTRUCTIONS

Subsystem in Control: IBJOB Processor.

Explanation: After printing tape mounting instructions, an error that prevents execution was detected.

Action: The operator dismounts the tapes.

$PAUSE
OPER. ACTION PAUSE

Subsystem in Control: System Monitor.

Explanation: The System Monitor has read a $PAUSE card inserted in the job deck to allow some programmer-specified operator action. The $PAUSE card is printed on-line, as shown. The variable field of the control card should contain explicit instructions from the programmer.

Action: When the operator has performed the specified action, he presses START, whereupon the message . . . CONTINUING is printed.

$RESTART IGNORED – ABSOLUTE VALUE OF COUNT TOO LARGE
PROVIDE CLARIFICATION IN CARD READER
OPER. ACTION PAUSE

Subsystem in Control: System Monitor.

Explanation: One of the following conditions has occurred:

1. If a $RESTART +n card has been used, this message indicates that a $STOP card was encountered before the system had spaced forward n jobs.
2. If a $RESTART –n card has been used, this message indicates that the beginning-of-tape marker was encountered before the system had backspaced n jobs.

Action: The operator places the corrected card in the card reader and presses START.

$RESTART IGNORED – ILLEGAL FIELD
PROVIDE CLARIFICATION IN CARD READER
OPER. ACTION PAUSE

Subsystem in Control: System Monitor.

Explanation: The System Monitor has read a $RESTART card with an invalid character in the variable field.

Action: The operator places the corrected control card in the card reader and presses START.

$RESTART IGNORED – NO MATCH FOUND
PROVIDE CLARIFICATION IN CARD READER
OPER. ACTION PAUSE

Subsystem in Control: System Monitor.

Explanation: There is no $JOB card on the System Input Unit with an identification that corresponds to that of the $JOB card that follows the $RESTART MATCH card just read.

Action: The operator places the corrected control cards in the card reader and presses START.

$STOP
PERIPHERAL UNIT POSITIONS AT END OF JOBS
SYSPP1 IS xxxx REC. x, FILE x
SYSOU1 IS xxxx REC. x, FILE x
SYSIN1 IS xxxx REC. x, FILE x
END OF JOBS

Subsystem in Control: System Monitor.

Explanation: This listing of the positions of all of the system units at end-of-jobs informs the operator of the unit to which each of the principal units is currently assigned, the number of records that have been read from or written on each unit, and the number of file marks that have been read from or written on each unit.

Action: The operator's reaction to this message depends on the availability of further jobs and the use that is to be made of the system after the current batch of jobs has been completed.

END OF FILE IN CARD READER HALT
PRESS START TO CONTINUE

Subsystem in Control: Utility Monitor.

Explanation: A file mark has been read on the System Input Unit.

Action: The operator presses START to continue.

END OF JOB

Subsystem in Control: Input/Output Control System (IOCS) with Preprocessor.

Explanation: The end of the job has been reached. A dump is taken only if an error has occurred.
Action: No operator action is required.

ENTER KEYS AND PRESS START
Subsystem in Control: System Core Storage Dump Program.
Explanation: A dump with limits specified by the entry keys has been requested.
Action: The format code and dump limits should have been specified to the operator. He enters these in the entry keys and presses START.

EOB OR EOT CONDITION-DECK CANNOT BE PROCESSED
Subsystem in Control: IBJOB Processor.
Explanation: The IBJOB Processor either has arrived at the end of the cylinder limits for a System Unit Function assigned to disk or drum storage or has received the end-of-buffers return from IOCS while attempting to place alter cards on an input/output unit for merging with an input deck.
Action: The operator terminates the job with a dump by a manual transfer to location 115_8.

1EOR MOUNT NEW SYSOU1
OPER. ACTION PAUSE
Subsystem in Control: System Monitor.
Explanation: The program has written over the end-of-reel reflective spot on the System Output Unit.
Action: The operator rewinds and unloads the magnetic tape on the System Output Unit and replaces the reel with a blank tape.

EOT ON INTERMEDIATE UNIT OR EOB EXIT ERROR CONDITION
Subsystem in Control: IBJOB Processor.
Explanation: The IBJOB Processor has exceeded the capacity of a work tape or has received the end-of-buffers return from IOCS.
Action: The operator terminates the job with a dump by a manual transfer to location 115_8.

ERROR IN RELOCATABLE CARD TYPE
Subsystem in Control: Input/Output Control System (IOCS) with Preprocessor.
Explanation: An error in card type has been detected while loading Random IOCS. Such an error probably indicates a faulty system tape.
Action: If possible, the operator changes the system tape.

EXECUTION
Subsystem in Control: IBJOB Processor.
Explanation: Execution of the object program is about to begin.
Action: No operator action is required.

*FILE CARD MISSING
Subsystem in Control: Commercial Translator.
Explanation: The first card of a file on the master tape is not an *FILE identifier on an *END card. If START is pressed, the program continues normal operation. The master tape should be replaced, however, since modifications to the file with the missing identifier are not possible.
Action: The operator terminates the job with a dump by a manual transfer to location 115_8, unless otherwise instructed by the programmer.

MOUNT INDICATED TAPES
OPER. ACTION PAUSE
Subsystem in Control: Restart Program; Input/Output Control System (IOCS) with Preprocessor.
Explanation: The example of a File Description Table shown below informs the operator of the positions of the various files that were being processed at the time the checkpoint was taken. When this message occurs under control of the Input/Output Control System, it indicates the tapes to be mounted.
Action: The operator mounts the reels as instructed and presses START to continue.

FOLLOWING HORIZONTAL RECORD CKSUM ERROR
Subsystem in Control: 9PAC Processor.
Explanation: A horizontal check sum error has occurred.
Action: No operator action is required.

xxxxxx HAS NO UNIT ASSIGNED
RESTRICTED USAGE OF CT IS POSSIBLE
Subsystem in Control: Commercial Translator.
Explanation: One of the less essential System Unit functions, such as the System Peripheral Punch, or one of the System Utility Units used by the Commercial Translator Processor (SYSUT1, SYSUT2, and SYSUT3) has no unit assigned.
Action: The operator terminates the job with a dump by a manual store location and trap (STR), unless otherwise instructed by the programmer.

xxxxxx HAS NO UNIT ASSIGNED. RESTRICTED USAGE OF IBJOB IS POSSIBLE
Subsystem in Control: IBJOB Processor.
Explanation: This message occurs if the System Peripheral punch or any of the system utility units have no unit assigned when IBJOB gained control.
Action: Press START to retry, or use procedure to skip the job.

xxxxxx HAS NO UNIT ASSIGNED CANNOT PROCEED
Subsystem in Control: Commercial Translator.
Explanation: The System Unit function specified by xxx xxx has no unit assigned. The symbol xxxxxx may stand for either the System Input Unit (SYSIN1) or the System Output Unit (SYSOU1).
Action: This error causes the system to stop completely. The operator performs the Initial Start procedure to resume system operation.

IBJOB SYSTEM SPLIT BETWEEN TWO CHANNELS IS ILLEGAL
PROCEED TO NEXT JOB
Subsystem in Control: IBJOB Processor.
Explanation: This message occurs when the IBJOB Processor is divided on two units, and these units are mounted on two different channels.
Action: No operator action is required.

IBDBL CANNOT PROCEED. POSSIBLE IBDBL OR MACHINE ERROR.
PUSH START TO CONTINUE JOB WITHOUT DEBUGGING.
ENTER STR TO KILL JOB WITH SYSTEM DUMP.
Subsystem in Control: IBJOB Processor.
Explanation: A system or machine error has occurred and debugging cannot continue.
Action: The operator either terminates the job with a dump by a manual STR or returns to the main program by pressing START.

IF THERE IS ANOTHER REEL OF INPUT TO GO, LOAD SAME ON TO SYSxxx
Subsystem in Control: Restore Disk/Drum Routine.
Explanation: The message is self-explanatory.
Action: The operator mounts the next reel of input on the specified unit.

ILLEGAL BCD DATE IN CTM COMMUNICATION DATE CELL. ENTER CURRENT DATE IN KEYS (mmddyy) AND HIT START.

Subsystem in Control: Commercial Translator.

Explanation: The word in the Nucleus of the System Monitor that is supposed to contain the current date has an invalid combination of characters in it.

Action: The current date, in the form of two characters for the number of the month (mm), two characters for the day of the month (dd), and two characters for the last two digits of the year (yy), are entered in the entry keys, and START is pressed.

FILE DESCRIPTIONS (MOUNT FILES MARKED WITH *) – –

	NUMBER	FILE NAME	UNIT	MOUNT TAPES – –	
*	1	FILE A	B5	REEL 0001	
	2	FILE B	B6	REEL 0001	BLANK-HI DEN LAB
			A5	REEL 0002	BLANK-HI DEN LAB
	3	FILE C	A3	REEL 0001	BLANK-LO DEN LAB
	5	FILE D	B1	REEL 0002	BLANK-LO DEN LAB
	7	FILE E	B2	REEL 0004	BLANK-HI DEN LAB
	10	FILE F	ED00/0	TRKS 8000-8399	
	11	FILE G	DH0/1	REEL 0001	BLANK-LABELLED
			DH1/1	REEL 0002	BLANK-LABELLED
*	12	FILE H	A6	REEL 0002	BLANK-HI DEN LAB
	20	FILE J	EN02/0	TRKS 0000-0399	
	21	FILE K	PRA		
	22	FILE L	B6	REEL 0001	
			A5	REEL 0002	
	25	FILE M	ED01/0	TRKS 0000-0999	BLANK-LABELLED
*	26	FILE N	CH0/1	REEL 0003	
			CH1/1	REEL 0004	
	27	FILE P	EN04/0	TRKS 0000-0399	

ILLEGAL FILE USE

Subsystem in Control: Input/Output Control System (IOCS) as a subsystem.

Explanation: Either a file designated as total block output has been used for partial block output or an attempt has been made to copy when the two files are not in the same pool. A dump is taken.

Action: No operator action is required.

ILLEGAL SYSUNI DEFINITION
PROVIDE CLARIFICATION IN CARD READER
OPER. ACTION PAUSE

Subsystem in Control: System Monitor.

Explanation: One of the following conditions has occurred:

1. The system unit specified on either a $RELEASE or $AS card cannot be found in the System Unit Name Table.
2. The starting cylinder or number of cylinders specified on a $AS card contains a nonnumeric character.
3. One or both of the system units specified on a $SWITCH card cannot be found in the System Unit Name Table.
4. The system unit specified on a $REWIND, $ENDFILE, $REMOVE, $PROTECT, or $UNLOAD card cannot be found in the System Unit Name Table.

Action: The two possible actions are as follows:

1. If the operator can tell, from the control card contents that are printed before the message, what the correct card should be, he places a corrected version of the control card in the card reader and presses START.
2. If the operator cannot correct the error, he enters a $RESTART+1 card in the card reader and presses START.

ILLEGAL TRANSMIT {READ / WRITE} xxxxx

Subsystem in Control: Input/Output Control System (IOCS) as a subsystem.

Explanation: A calling sequence at xxxxx has requested the transmission of data into or from the area of core storage occupied by IOCS. A dump is taken.

Action: No operator action is required.

ILLEGAL UNIT SPECIFIED
PROVIDE CLARIFICATION IN CARD READER
OPER. ACTION PAUSE

Subsystem in Control: System Monitor.

Explanation: The control card printed on-line before the message is a $ATTACH or $DETACH card with an invalid unit specification in the variable field.

Action: The operator has the following two choices:

1. If the operator can punch a card with the correct unit specification, he places this control card in the card reader and presses START.
2. If the operator cannot correct the control card, he places a $RESTART + 1 card in the card reader and presses START.

ILL UNIT REQ'ST AT xxxxx

Subsystem in Control: Input/Output Executor.

Explanation: A calling sequence to IOEX from octal location xxxxx has requested an operation on an invalid unit.

Action: No operator action is required.

IMPOSSIBLE MASTER INPUT SEQUENCE OR RECORD TYPE
xxxxxx PRIORITY NOT FOUND FOR COUNTING
OUTPUT GROUPED xxxxxx CHAR/REC, yyyyyy REC/BLOCK

Subsystem in Control: 9PAC Processor.

Explanation: An irrecoverable error has occurred.

Action: The operator terminates the job with a dump by a manual transfer to location 115_8.

(File Identification) INPUT REEL, NO LABEL

Subsystem in Control: Input/Output Control System (IOCS) as a subsystem.

Explanation: The first record read from a supposedly labeled file was not the correct length for the label. A 1BLANK header label is assumed by IOCS.

Action: No operator action is required.

INSERT NEW TAPE REEL ON SYSxxx TAPE UNIT

Subsystem in Control: Dump Disk/Drum Routine.

Explanation: The message is self-explanatory.

Action: The operator mounts a blank tape on the specified unit.

INTERSYSTEM RESERVE INPUT NOT AVAILABLE.
IF SENSE SWITCH 4 DOWN, ANOTHER UNIT WILL BE ASSIGNED.
IF SENSE SWITCH 4 UP, JOB WILL BE SKIPPED.
PRES START TO GO ON

Subsystem in Control: Input/Output Control System (IOCS) with Preprocessor.

Explanation: A certain reserve input file is not being held in reserve status as requested.

Action: The operator sets sense switch 4 in accordance with unit availability and the standards for his installation and presses START.

{INTF CK / SEQ CK}
PRES START TO GO ON

Subsystem in Control: Input/Output Executor.

Explanation: An interface check (INTF CK) or a sequence check (SEQ CK) on a 7909 data channel has been detected.

Action: There is no operator action required for this message, but if it occurs in two or more jobs, the IBM Customer Engineer should be notified of the condition.

INVALID REQ IDENTIFIER

Subsystem in Control: Random Input/Output Control System (IOCS).

Explanation: An object program error has occurred. The job is terminated with a dump.

Action: No operator action is required.

IOBS NECESSARY xxxxx

Subsystem in Control: Input/Output Control System (IOCS) as a subsystem.

Explanation: IOEX was specified as the desired IOCS configuration, but the object program has requested some routine in Minimum or Basic IOCS at octal location xxxxx. A dump is taken.

Action: No operator action is required.

I/O CHECK

Subsystem in Control: Restart Program.

Explanation: An input/output check on some unit has occurred. Recovery is impossible.

Action: There is no operator action required for this message, but if it occurs in two or more jobs, the IBM Customer Engineer should be notified of the condition.

I/O CHECK
PRES STRT TO GO ON

Subsystem in Control: Input/Output Control System (IOCS) as a subsystem.

Explanation: An input/output check on a 7607 or 7909 Data Channel has been detected.

Action: There is no operator action required for this message, but if it occurs in two or more jobs, the IBM Customer Engineer should be notified of the condition.

I/O CK.
PRES STRT TO GO ON

Subsystem in Control: Input/Output Executor.
Explanation: An input/output check on 7607 or 7909 data channel has been detected.
Action: There is no operator action required for this message, but if it occurs in two or more jobs, the IBM Customer Engineer should be notified of the condition.

IOCS LOOKING FOR CONTROL CARDS

Subsystem in Control: Input/Output Control System (IOCS) with Preprocessor.
Explanation: IOCS is searching the System Input Unit for one of the following control cards: $ID, $JOB, $EXECUTE, $STOP, $IBSYS, *IBSYS, *JOB, or *RESTART.
Action: No operator action is required.

IOCS PREPROCESSOR ERROR LIST JOB – (Job Identification) PAGE xx

Subsystem in Control: Input/Output Control System (IOCS) with Preprocessor.
Explanation: This message is the heading for the Preprocessor error list, and will be followed by specific error information. If no errors occur, the heading is not printed.
Action: No operator action is required.

IOCS RETURNING TO BASIC MONITOR

Subsystem in Control: Input/Output Control System (IOCS) with Preprocessor.
Explanation: IOCS is returning control to the System Monitor.
Action: No operator action is required.

IS THERE MORE INPUT ON UNIT xxxxxx
SW 4 UP – NO SW 4 DOWN YES
PRESS START TO PROCEED

Subsystem in Control: 9PAC Processor.
Explanation: This message allows the operator to indicate to the 9PAC Processor when the end of the data file is reached on an unlabeled input file.
Action: The operator sets sense switch 4 appropriately and presses START.

JOB (Job Name) DATE xx/xx/xx PAGE xx

Subsystem in Control: Input/Output Control System.
Explanation: This heading indicates the name of the job, the date, and the page number. It is printed on each page.
Action: No operator action is required.

JOB DISCONTINUED

Subsystem in Control: Input/Output Control System with Preprocessor.
Explanation: This message indicates that the execution of the present job has been suppressed.
Action: No operator action is required.

JOB RESTART PAGE xx

Subsystem in Control: Restart Program, Input/Output Control System.
Explanation: This heading indicates that the Restart program has control. It is printed on each page.
Action: No operator action is required.

LABEL IOCS NECESSARY xxxxx

Subsystem in Control: Input/Output Control System (IOCS) as a subsystem.
Explanation: A reference has been made to labeled IOCS at octal location xxxxx. Labels were requested for some file cards, but not on the *JOB card. A dump is taken.
Action: No operator action is required.

xxxxxx LINES OUTPUT

Subsystem in Control: IBJOB Processor.
Explanation: The number xxxxxx is the number of lines of print that have been written on the System Output Unit for this job by the IBJOB Processor.
Action: No operator action is required.

LOAD NEXT DATA TAPE AND PRESS START TO GO

Subsystem in Control: Load Disk/Drum Routine.
Explanation: This message is self-explanatory.
Action: The operator should mount the next reel of input data on the input unit and press START.

MACHINE OR SYSTEM FAILURE HAS OCCURRED. TO RETRY THIS P/A, PRESS START
TO CONTINUE THIS P/A, PRESS START WITH KEY 'S' DOWN
TO DELETE THIS P/A, PRESS START WITH KEY '1' DOWN
ONLY SYSIN1, SYSOU1, AND SYSPP1 WILL BE REPOSITIONED FOR RETRY

Subsystem in Control: IBJOB Processor.
Explanation: This message occurs if a machine or system failure is detected by some portion of the IBJOB Processor.
Action: The operator has the two options contained within the message.

MAJOR CONTROL MISSING

Subsystem in Control: Commercial Translator.
Explanation: The first card of the change sequence is not a major control card.
Action: The operator presses START. The program continues normally, ignoring all change cards prior to the first major control card. This occurrence is normal, if the input tape was prepared as the second output of a previous update for which the C option was not used, since some *FILE identifier card must always be first on such a tape.

MINOR CONTROL ERROR

Subsystem in Control: Commercial Translator.
Explanation: The identifier 'name' on the minor control card does not agree with the identifier on the file. If START is pressed, the program continues normally, ignoring all cards on the input tape until the next control card is read.
Action: The operator terminates the job with a dump by a manual STR, unless otherwise instructed by the programmer.

MINOR CONTROL MISSING

Subsystem in Control: Commercial Translator.
Explanation: The first card following a major control card is not a minor control card.
Action: The operator presses START. The program continues normally, ignoring all cards on the input tape until the next control card.

NEED RANDOM

Subsystem in Control: Input/Output Control System (IOCS) as a subsystem.
Explanation: The object program has attempted to TSX to RANDEF. The IOCS configuration in core storage, however, does not contain Random IOCS. A dump is taken.
Action: No operator action is required.

xxxxxx NO ASSIGNMENT MADE
PROVIDE CLARIFICATION IN CARD READER
OPER. ACTION PAUSE

Subsystem in Control: System Monitor.
Explanation: One of the following conditions has occurred:

1. The library unit on which the System Monitor expected to find a particular subsystem is unassigned.

2. The unit from which the System Monitor should read control cards (according to the setting of sense switch 1) is unassigned.

Action: The operator places the necessary unit assignment control cards in the card reader and presses START.

NO REQUESTS WAITING

Subsystem in Control: Random Input/Output Control System (IOCS).

Explanation: This message is printed if there are no requests for operations waiting at the time of the error.

Action: No operator action is required.

NOT A BASIC MONITOR CONTROL CARD
PUSH START TO IGNORE OR
PROVIDE CLARIFICATION IN CARD READER
OPER. ACTION PAUSE

Subsystem in Control: System Monitor.

Explanation: The System Monitor has read a control card that it cannot recognize. The control card itself is printed just before the message.

Action: The operator must proceed as follows:

1. If the operator thinks that the error cannot adversely affect the proper execution of the job, he presses START with the card reader empty and the System Monitor ignores the error.

2. If the operator recognizes the problem and can punch the card or cards necessary to correct the error, he places these cards in the card reader and presses START. The System Monitor continues reading control cards from the card reader until the end of file is reached, whereupon it returns to reading control cards from the System Input Unit.

3. If the operator cannot correct the error or does not have time to do so, he places a $RESTART +1 card in the card reader and presses START. This causes the System Monitor to skip to the next job. If the error occurred while control cards were being read from the card reader, the $RESTART card cannot be used. The operator removes from the card reader all cards that are part of the current job and presses START.

(File Identification) NO TRAILER

Subsystem in Control: Input/Output Control System (IOCS) as a subsystem.

Explanation: The record read as the trailer label of an input file was not of the required length. The end-of-file condition is assumed. There is no stop associated with this error. A dump is taken if the error is irrecoverable.

Action: No operator action is required.

OLD MASTER READ ERROR

Subsystem in Control: Commercial Translator.

Explanation: A permanent Read error has occurred on the input tape. If START is pressed, the program continues to read, accepting the input as it stands.

Action: The operator terminates the job with a dump by a manual STR, unless otherwise instructed by the programmer.

ON-LINE PRINTER AND PUNCH MAY NOT BE ATTACHED AS SYSOU1 AND SYSPP1. CANNOT PROCEED.

Subsystem in Control: IBJOB Processor.

Explanation: The System Output Unit and the System Peripheral Punch have been assigned to on-line unit record equipment. A complete stop occurs.

Action: The operator performs the initial start procedure to restore the system to operation.

(File Identification) OPEN COUNT EXCEEDED – OPEN NOT POSSIBLE
PRES START TO GO ON

Subsystem in Control: Input/Output Control System (IOCS) as a subsystem.

Explanation: An attempt has been made to open too many files in a Reserve or Internal Group.

Action: If START is pressed, IOCS ignores the invalid request. Unless otherwise instructed, the operator should take a dump by a manual transfer to 115_8.

OPER. ACTION PAUSE

Subsystem in Control: Input/Output Executor.

Explanation: The object program has transferred to the (PAUSE routine, in IOEX, which prints the above message and then waits until the operator has completed the indicated actions which preceded this message.

Action: When the operator has performed the specified action, he presses START, whereupon the message... CONTINUING is printed.

OUTPUT END OF REEL

Subsystem in Control: System Core Storage Dump Program.

Explanation: The end-of-reel reflective spot has been encountered on the output tape.

Action: The operator mounts a new tape on the System Output Unit and presses START.

OUTPUT END OF REEL, MOUNT NEW TAPE
PRESS START

Subsystem in Control: Tape Dump Routine.

Explanation: The end-of-reel reflective spot has been encountered on the output tape.

Action: The operator mounts a new tape and presses START to continue.

OUTPUT TAPE INVALID, PRESS START TO RETRY

Subsystem in Control: Tape Dump Routine.

Explanation: The retention cycle of the output tape has been compared with the current date, and it has been found that the retention period has not expired.

Action: The operator either mounts a new tape and presses START to execute the tape dump, or presses START to retry.

OUTPUT TAPE LABEL ERROR, PRESS START TO RETRY

Subsystem in Control: Tape Dump Routine.

Explanation: A redundancy error has occurred while reading the output tape header label.

Action: The operator either mounts a new tape and presses START to execute the dump, or presses START to retry.

9 PAC (rec name) LOST CONTROL AT (xxxxx)

Subsystem in Control: 9PAC Processor.

Explanation: Either a system error has occurred or an attempt by the operator to recover an error has been unsuccessful.

Action: No operator action is required.

PERSISTENT ERROR – BETA (Verification Address)

Subsystem in Control: Random Input/Output Control System (IOCS).

Explanation: Random IOCS has found it impossible to read or write the record whose verification address is given.

Action: No operator action is required.

POOL ERROR TSX AT xxxxx

Subsystem in Control: Input/Output Control System (IOCS) as a subsystem.

Explanation: An attempt has been made either to define a buffer pool using the area of core storage occupied by IOCS, to join a buffer pool to a nonexistent pool, to join a pool to two different pools, or to join two pools of different buffer sizes. A dump is taken.
Action: No operator action is required.

PRES STRT TO GO ON
Subsystem in Control: Input/Output Executor.
Explanation: The object program has transferred to the (PAWSX routine in IOEX.
Action: When the operator presses START, the message . . . CONTINUING is printed and processing continues.

PRIORITY xxxxxx SEQ ERROR
Subsystem in Control: 9PAC Processor.
Explanation: This message should not concern the operator if it appears only once. If it appears several times consecutively, however, the operator should skip to the next job. Installations should have standards for the number of consecutive error messages that must be printed before a job is skipped.
Action: When the specified number of such messages has been printed, the operator terminates the job with a dump by a manual transfer to location 115_8.

PROCESSING HALTED DUE TO EDIT ERRORS INDICATED
Subsystem in Control: 9PAC Processor.
Explanation: An irrecoverable error has occurred.
Action: The operator terminates the job with a dump by a manual transfer to location 115_8, unless otherwise instructed by the programmer.

PROGRAM HALT TO MAKE SURE HAO SWITCH UP
PRESS START TO CONTINUE
Subsystem in Control: Format and Home Address Generation Routine.
Explanation: This message allows the operator to check the position of the Home Address Operation switch.
Action: The operator ensures that the Home Address Operation switch is UP. He then presses START to allow the program to continue.

PROGRAM HALT TO MAKE SURE KEY-LOCK SWITCH IN *WRITE POSITION
PRESS START TO CONTINUE
Subsystem in Control: Format and Home Address Generation Routine.
Explanation: This message allows the operator to check the position of the key-lock switch.
Action: The operator ensures that the key-lock switch is set to WRITE. He then presses START to allow the program to continue.

xxxxxxRECORD TYPE NOT FOUND
Subsystem in Control: 9PAC Processor.
Explanation: An irrecoverable error has occurred.
Action: The operator terminates the job with a dump by a manual transfer to location 115_8.

xxxxxxRECORD TYPE NOT SPECIFIED FOR INPUT
PRESS START TO START NEW TAPE BLOCK
Subsystem in Control: 9PAC Processor.
Explanation: An invalid record has been read. Installations and/or the programmer should have standards for the procedures to be followed when this message is printed.
Action: The operator terminates the job with a dump by a manual transfer to location 115_8, unless otherwise instructed by the programmer.

REDUNDANCY ON SYSTEM TAPE
Subsystem in Control: Input/Output Control System (IOCS) with Preprocessor.
Explanation: A redundancy error has occurred during reading from the System Library Unit. IOCS may not have been read into core storage intact.
Action: The operator changes the system tapes.

REDUNDANT CONTROL CARD TAPE
PRESS START TO IGNORE ERROR
Subsystem in Control: Utility Monitor.
Explanation: A redundancy error has occurred while the Utility Monitor was reading control cards from the System Input Unit.
Action: The operator presses START. An attempt is made to process the card.

RESTART xxxxxx
SET SENSE SWITCHES

$$1\left\{\begin{matrix}\text{UP}\\\text{DN}\end{matrix}\right\}\ 2\left\{\begin{matrix}\text{UP}\\\text{DN}\end{matrix}\right\}\ 3\left\{\begin{matrix}\text{UP}\\\text{DN}\end{matrix}\right\}\ 4\left\{\begin{matrix}\text{UP}\\\text{DN}\end{matrix}\right\}\ 5\left\{\begin{matrix}\text{UP}\\\text{DN}\end{matrix}\right\}\ 6\left\{\begin{matrix}\text{UP}\\\text{DN}\end{matrix}\right\}$$

OPER. ACTION PAUSE
Subsystem in Control: Restart Program, Input/Output Control System (IOCS).
Explanation: The sense switch settings in this message are those that were recorded in the checkpoint from which the restart is being accomplished.
Action: The operator sets all of the sense switches according to the specifications of the message and presses START.

RESTRICTED USAGE OF IBJOB IS POSSIBLE
Subsystem in Control: IBJOB Processor.
Explanation: One of the System Unit functions normally used by the IBJOB Processor has no unit assigned to it, but it may be possible for part of the application to be completed.
Action: No operator action is required.

(File Identification) SEARCH SKIP LIST FOLLOWS... IF SSW x DOWN REMOUNT
(label of file skipped)
(label of file skipped)
. . .
. . .
(label of file skipped)

(File Identification) FOUND
Subsystem in Control: Input/Output Control System (IOCS) as a subsystem.
Explanation: A search for a particular labeled file is in progress.
Action: If the specified sense switch is depressed, the tape is rewound and unloaded and the search continues on the next reel mounted on the tape unit. Reel switching may occur during the search.

SEGMENT OF JOB IN ERROR
RETURNING TO IBSYS
Subsystem in Control: Utility Monitor.
Explanation: Either a control card error or a machine error has been detected. If it is a machine error, an IOEX message precedes this message. Control is returned to the System Monitor.
Action: No operator action is required.

SEQ ERROR ON MASTER FILE
Subsystem in Control: Commercial Translator.
Explanation: A gap in the sequence numbers was found while the file was being positioned to the first card involved in some modification set.
Action: The operator presses START. The program continues normally, ignoring all cards on the input tape until the next control card is read. The sequence gap will be repaired. Such an error can only occur on a master tape that was not prepared by the system.

SEQUENCE ERROR (or CHECKSUM ERROR)
SET ONE OF KEYS 33-35 DOWN
33 - TO SKIP THIS TAPE RECORD
34 - TO ACCEPT THIS TAPE RECORD
35 - TO REREAD THIS TAPE RECORD

Subsystem in Control: 9PAC Processor.

Explanation: If a checkpoint tape has been specified, an IOCS checkpoint has been taken before this message is printed. If no IOCS messages precede this message, the record has been read ten times without redundancy error. Installations and/or the programmer should have standards for choosing which of the three options to take.

Action: The operator sets the entry keys in accordance with previous instructions and presses START.

SET KEYS FOR FP SYMBOLIC LISTINGS

Subsystem in Control: 9PAC Processor.

Explanation: The programmer has requested a symbolic listing of a file processor object program.

Action: The programmer should have instructed the operator as to the settings of the entry keys when this message is printed. If the operator has received no instructions, he places all of the entry keys DOWN and presses START.

SET KEYS TO RESTART CODE
OPER. ACTION PAUSE

Subsystem in Control: Restart Program, Input/Output Control System (IOCS).

Explanation: The console entry keys should be set to the restart code corresponding to the checkpoint record with which restarting is to begin (usually the last checkpoint written).

Action: The operator enters (in the entry keys) the entry code that was printed out when the checkpoint was taken and presses START.

SPILL TAPE READ ERROR

Subsystem in Control: System Core Storage Dump Program.

Explanation: A read error has occurred on the overflow tape, but the dump will proceed without a halt to ensure at least a partial recovery of the contents or core storage and to allow the system to continue. If this procedure is not satisfactory for a particular application, the job should be rerun.

Action: No operator action is required.

STATUS OF REQUESTS FOLLOWS
ALPHA BETA STATUS
(octal location) (verif addr) (status code)

Subsystem in Control: Random Input/Output Control System (IOCS).

Explanation: This message is a list describing the status of the random processing application when the error occurred.

Action: No operator action is required.

SYSxxx HAS NO UNIT ASSIGNED.
CANNOT PROCEED

Subsystem in Control: IBJOB Processor.

Explanation: System Unit function SYSxxx has no unit assigned to it.

Action: The operator terminates the job with a dump by a manual transfer to location 115_8. At some later time, he uses a $RESTART card to repeat the job, this time with a unit assigned to SYSxxx.

SYSLBx NOT TAPE (LB1 IS) – CANT $EXECUTE

System in Control: System Monitor

Explanation: The $EXECUTE card has requested a subsystem on an alternate library unit (SYSLBx). If this is a disk or drum unit and if IBSYS resides on tape, this request is invalid.

Action: The operator can take one of the following two actions:

1. If possible, he assigns a tape unit to the alternate library unit.
2. To delete the run, he places a $RESTART+1 card in the card reader and presses START.

SYSOU1 IS NOT ASSIGNED. NO DUMP CAN BE TAKEN

Subsystem in Control: System Monitor.

Explanation: The System Output Unit has not been assigned; therefore, a dump cannot be taken at this time.

Action: No operator action is required.

SYSPP2 IS NOT ASSIGNED, NO DUMP CAN BE TAKEN

Subsystem in Control: System Monitor.

Explanation: The System Peripheral Punch has not been assigned; therefore, a dump cannot be taken.

Action: No operator action is required.

SYSPP2 IS NOT 729 OR HYPER. NO DUMP CAN BE TAKEN

Subsystem in Control: System Monitor.

Explanation: The alternate System Peripheral Punch is neither a 729 Magnetic Tape Unit nor a 7340 Hypertape Drive; therefore, a dump cannot be taken at this time.

Action: No operator action is required.

SYSTEMS CORE DUMP TAKEN AT THIS POINT

Subsystem in Control: System Core Storage Dump Program.

Explanation: This message is printed before a post-mortem dump is taken. No pause accompanies the message.

Action: No operator action is required.

THERE IS NO xxx UNIT
JOB DISCONTINUED

Subsystem in Control: Input/Output Control System (IOCS) as a subsystem.

Explanation: System Unit function SYSxxx has been requested in a file card, but is not attached. The job segment is terminated.

Action: No operator action is required.

UNEXPECTED END OF FILE

Subsystem in Control: Commercial Translator.

Explanation: The master tape contains some file mark other than the normal file separators. If START is pressed, operation will be continued, although recovery is probably not possible. The master tape should be replaced.

Action: The operator terminates the job with a dump by a manual STR, unless otherwise instructed by the programmer.

xxxxxx UNKNOWN SYSTEM
PROVIDE CLARIFICATION IN CARD READER
OPER. ACTION PAUSE

Subsystem in Control: System Monitor.

Explanation: The $EXECUTE card that is printed before this message specified a program that the System Monitor could not find on the System Library Unit.

Action: The operator can take one of the following two actions:

1. If he recognizes the error as a mispunch in the control card, the operator punches out a corrected card, places it in the card reader, and presses START.
2. If the operator cannot correct the error, he places a $RESTART+1 card in the card reader and presses START.

UNIT xxxxx
CHECKPOINT xxxxxx CODE yyyyyy zzzzzz

Subsystem in Control: Input/Output Control System (IOCS) as a subsystem.

Explanation: A checkpoint with the identification number xxxxxx has just been taken. The restart code for this checkpoint is yyyyyy zzzzzz. The octal select address of the unit on which the checkpoint was taken is contained in yyyyyy.

Action: No operator action is required.

UNIT xxxxx
EOT ON ERASE

Subsystem in Control: Input/Output Control System (IOCS) as a subsystem.

Explanation: In erasing tape while trying to write a record on which a write error has previously occurred, IOCS has encountered the end of the tape. A dump is taken.

Action: No operator action is required.

UNIT xx yyyy ERROR
$m_1m_2m_3 \ldots m_{24}$

Subsystem in Control: Input/Output Executor.

Explanation: A read or write error has occurred on the Hypertape drive with the symbolic address xx. The symbolic address is the same as that used on the $ATTACH card. The letters yyyy are either READ or WRITE. The m_n are 24 octal characters of sense data received from the file control. There is no pause associated with this message.

Action: There is no operator action required for this message, but if it occurs in two or more jobs, the IBM Customer Engineer should be notified of the condition.

UNIT xx yyy ERROR-TRK 00zzzz
$m_1m_2m_3 \ldots m_{24}$

Subsystem in Control: Input/Output Executor.

Explanation: A read or write error has occurred on the disk or drum unit with symbolic address xx. The symbolic address is the same as that used on the $ATTACH card. The letters yyyy are either READ or WRITE. The letters zzzz stand for the track address of the last seek performed by IOEX. The m_n are 24 octal characters of sense data received from the file control. There is no pause associated with this message.

Action: There is no operator action required for this message, but if it occurs in two or more jobs, the IBM Customer Engineer should be notified of the condition.

UNIT xxxxxx
INCORRECT CHECKPOINT TAPE ADDRESS

Subsystem in Control: Input/Output Control System (IOCS) with Preprocessor, Restart Program.

Explanation: An invalid unit address for the checkpoint unit was entered in the console entry keys during restart. A dump is taken.

Action: No operator action is required.

UNIT xxxxxx
INCORRECT CHECKPOINT TAPE ADDRESS
RESTART RETURNING TO BASIC MONITOR

Subsystem in Control: Tape Dump Routine.

Explanation: The address specified in the entry keys for the checkpoint unit is incorrect. A phase error return is made to the System Monitor.

Action: No operator action is required.

UNIT xxxxx (File Identification) LABEL ERROR
(entire label image)
{INPUT REEL INVALID / OUTPUT REEL INVALID / RETENTION NOT EXPIRED / NO LABEL, BLANK CREATED}
IF SSWx DOWN IGNORED
OPER. ACTION PAUSE

Subsystem in Control: Input/Output Control System (IOCS) as a subsystem.

Explanation: One of the following conditions has occurred:

1. INPUT REEL INVALID – Either the file serial number, the reel sequence number, or the file name is incorrect.
2. OUTPUT REEL INVALID – The reel is not labeled (i.e., the label does not begin with 1HDR or 1BLANK.)
3. RETENTION NOT EXPIRED – For tape xxxxx (creation date + retention days) > (current date).
4. NO LABEL, BLANK CREATED – The record read from an output file as the label was not the required length.

Action: The following operator action corresponds to the explanation given in items 1, 2, 3, and 4.

1. INPUT REEL INVALID – If sense switch x is DOWN when START is pressed, the reel is accepted as correct; if UP, the tape is rewound and unloaded. When a new tape is readied, it will be checked.
2. OUTPUT REEL INVALID – If sense switch x is DOWN when START is pressed, the dummy file serial number xxxxx is used for the label; if UP, the reel is rewound and unloaded. When a new reel is loaded, the label will be checked.
3. RETENTION NOT EXPIRED – If sense switch x is UP, the tape is rewound when START is pressed. When a new tape is readied, it will be checked. If sense switch 3 is DOWN, the system will proceed.
4. NO LABEL, BLANK CREATED – If sense switch x is UP, the tape is rewound when START is pressed. When a new tape is readied, sense switch x will be checked. If the switch is DOWN, the system will proceed. (NOTE: Care should be used, since a 1BLANK-type label is created which may cause a subsequent error message.)

UNIT xxxxxx (File Identification)
{LABEL HIGH DENSITY / LABEL LOW DENSITY / DISK FILE LABEL / HYPERTAPE LABEL}
(entire label image)

Subsystem in Control: Input/Output Control System (IOCS) as a subsystem.

Explanation: This message is printed to indicate the contents of the label on the specified unit.

Action: No operator action is required.

UNIT xxxxxx (File Identification)
{MOUNT / MOUNT BLANK / MOUNT LAB. BLANK} REEL xxxx
OPER. ACTION PAUSE

Subsystem in Control: Input/Output Control System (IOCS) as a subsystem.

Explanation: Another reel of magnetic tape is required for the specified file.

Action: The next reel of the file is mounted, if MOUNT is specified. IF MOUNT BLANK is specified, a blank tape is mounted on the indicated unit. If MOUNT LAB. BLANK is specified, a tape with a 1BLANK header label or a header label with an expired retention date is mounted. If there are two input/output units assigned to

the file, the second line of the message is not printed and no halt occurs.

UNIT xxxxxx
NOISE RECORDS MAY CAUSE INCORRECT POSITIONING

Subsystem in Control: Input/Output Control System (IOCS) as a subsystem; Restart Program.
Explanation: Noise records were read while positioning unit xxxxxx. This fact may cause the unit to be positioned incorrectly.
Action: No operator action is required.

UNIT xxxxxx (File Identification) NOT AVAILABLE FOR INITIALIZATION
PRESS START TO GO ON

Subsystem in Control: Input/Output Control System (IOCS) as a subsystem.
Explanation: A program error has occurred. An attempt has been made to attach a file to two buffer pools or to attach a file that has already been closed with a rewind and unload.
Action: If START is pressed, IOCS ignores the invalid request. Unless otherwise instructed, the operator should take a dump by a manual transfer to 115_8.

UNIT xx { NTRDY / NTLOD / FILPR }
OPER. ACTION PAUSE

Subsystem in Control: Input/Output Executor.
Explanation: The condition specified prevents the program from reading or writing with the specified Hypertape drive. The symbols are as follows:
1. NTRDY – Hypertape drive xx is not ready.
2. NTLOD – Hypertape drive xx is not loaded.
3. FILPR – Hypertape drive xx is file protected.

Action: The operator corrects the condition and presses START.

UNIT xxxxxx
POSITIONING FAILED

Subsystem in Control: Input/Output Control System (IOCS) with Preprocessor.
Explanation: While restarting, the program has been unable to position unit xxxxxx correctly. A dump is taken.
Action: No operator action is required.

UNIT xxxxxx
POSITIONING FAILED
RESTART RETURNING TO BASIC MONITOR

Subsystem in Control: Restart Program.
Explanation: The system has been unable to position the specified unit properly. A phase error return is made to the System Monitor.
Action: No operator action is required.

UNIT xx REC. yyyyy FILE zzzzz 25 ERASES ON WRITE

Subsystem in Control: Input/Output Executor.
Explanation: The program has tried to write record yyyyy in file zzzzz on unit xx, and has failed 26 times.
Action: The magnetic tape on unit xx is changed and the job is restarted. If a checkpoint was taken before the error occurred, it is used to restart the job. Otherwise, a $RESTART-1 card is used when the end of the current job is reached.

UNIT xx REC. yyyyy FILE zzzzz REC. DISCRDED-NOISE

Subsystem in Control: Input/Output Executor.
Explanation: Record number yyyyy in file number zzzzz on unit xx has been discarded because it was a noise record.
Action: No operator action is required.

UNIT xx REC. yyyyy FILE zzzzz – NOISE ON ERASE

Subsystem in Control: Input/Output Executor.
Explanation: An error occurred while the program was trying to erase an area of magnetic tape.
Action: No operator action is required.

UNIT xx REC. yyyyy FILE zzzzz PERM. READ REDUN.

Subsystem in Control: Input/Output Executor.
Explanation: An uncorrectable error occurred in reading record yyyyy of file zzzzz from unit xx.
Action: No operator action is required, unless the operator feels that the permanent error will cause the entire job to be worthless, in which case he causes a dump by a manual transfer to location 115_8.

UNIT xx REC. yyyyy FILE zzzzz WROTE SHORT REC

Subsystem in Control: Input/Output Executor.
Explanation: Record yyyyy of file zzzzz on unit xx is less than three words in length and will therefore be indistinguishable from a noise record when it is read.
Action: No operator action is required.

UNIT xxxxxx (File Identification) REEL xxxx-xxxx RECORDS REDUNDANCY HISTORY xxxxx { RETRYS / ERASES } xxxx PERM.

Subsystem in Control: Input/Output Control System (IOCS) as a subsystem.
Explanation: This message specifies the number of retries or erases that were necessary to read the data from the reel or write the data on the reel and the number of permanent errors that occurred.
Action: No operator action is required.

UNIT xxxxxx (File Identification) REMOVE REEL xxxx

Subsystem in Control: Input/Output Control System (IOCS) as a subsystem.
Explanation: Reel xxxx of the specified file has been rewound and unloaded.
Action: The operator removes the used reel.

UNIT xx SEEK UN END
PRES STRT TO GO ON

Subsystem in Control: Input/Output Executor.
Explanation: An unusual ending has resulted from a search (SEEK) of the disk or drum unit with symbolic address xx.
Action: The seek will be repeated if the operator presses START. If the condition persists, the operator terminates the job with a dump by a manual transfer to location 115_8. If the condition occurs in subsequent jobs, the IBM Customer Engineer should be notified.

xxxxx UNITS NOT ASSIGNED. NONE AVAILABLE

Subsystem in Control: Input/Output Control System (IOCS) with Preprocessor
Explanation: Input/output units required for the current job segment are not assigned, and there are no units available to be assigned. This job segment is terminated.
Action: No operator action is required.

Generalized Sorting System On-Line Messages

The following messages are printed on-line by Sort:

*CK01 UNIT XX (UNRT) EOT. CHANGE TAPE.

Explanation: The end-of-tape marker was sensed while SYSCK2 was being opened. This indicates a very short tape.
Action: After Sort unloads tape, make another tape ready. Sort reselects the unit.

*CK02 UNIT XX, EOT WRITING DICTIONARIES.
CHANGE TAPE. PRESS START FOR RESTART.
OPERATOR ACTION PAUSE.

Explanation: The final output tape is too short to accommodate the entire 9PAC Dictionary. The dictionary has been saved from the input tape and is being written on the output tape.

Action: After Sort unloads the tape, mount a longer work tape. Then press START.

*CS02 CKSUM ERROR, RECORD, LOC XXXXX
PRESS START TO GO ON.

Explanation: A logical record check sum does not check properly. The record is dumped. This message can occur only during the Merge Phase.

Action: Press START to continue. Processing continues with the next logical record.

*CS03 CKSUM ERROR, RECORD, LOC XXXXX
PRESS START TO GO ON.

Explanation: A logical record check sum does not check properly. The record is dumped. This message can occur only during the Final Merge Phase.

Action: Press START to continue. Processing continues with the next logical record.

*EP01 FOLLOWING ERRORS FOUND IN CONTROL CARDS
XXXXX XXXXX XXXXX ETC.
SORT DELETED.

Explanation: Sort cannot continue. Control returns to the IBSYS System Monitor. The message provides the code number of each of the control card errors found. An explanation of each code number is given below.

*E001 An error was found while a control card read from the card reader was being converted from card image to BCD format.

*E002 A read error, or redundancy, was encountered while reading a control card.

*E003 Some control card has been included more than the allowable number of times. The limits given below are for the number of statements allowed for each sort and/or merge run. Each statement may use one or more continuation cards.

STATEMENT	NUMBER OF TIMES PERMITTED
CHANNELS	1
DELETE	100
FILE	9
LABEL	1
MERGE	1
MODIFICATION	50
OPTION	1
OVERFLOW	1
RECORD	1
RESTART	1
SORT	1

*E004 There is no CHANNELS card, one is required.

*E005 The INPUT parameter has not been correctly specified on the CHANNELS card.

*E006 There are no FILE cards. Both an input FILE card and an output FILE card are required.

*E007 BLOCKSIZE has not been correctly specified on one or more of the FILE cards.

*E008 The CKSUMS and/or BLKSEQ fields have been specified on a FILE card on which decimal mode has also been specified. This is invalid.

*E009 The densities for the DICTIONARY and the LABEL on a FILE card differ.

*E010 Either one of the FILE cards is missing or one of the FILE cards did not have INPUT or OUTPUT specified.

*E011 Two or more output FILE cards have been included; only one is allowed.

*E012 The MODE parameter has not been correctly specified on an input FILE card. All input files must be in the same mode.

*E013 There is no RECORD card; one is required.

*E014 The LENGTH parameters have not been correctly specified on the RECORD card. A length must be given. No more than three lengths are allowed. The input length must not exceed the input block size. In a Sort of fixed-length records, the output length must not exceed the output block size.

*E015 The FIELD parameters have not been correctly specified on the RECORD card. The fields may not exceed the record length. Incorrect parameters are not allowed.

*E016 The FIELD parameter has not been correctly specified on the DELETE card.

*E017 The parameter of the FIELD definer specified for deletion on the DELETE card has not been specified on the RECORD card.

*E018 The IDENT parameter has not been correctly specified on the DELETE card. The identification length must equal the control field length. A check for invalid binary or octal characters should be made.

*E019 The MERGE parameters have not been correctly specified on the CHANNELS card.

*E020 There is no SORT or MERGE card; one is required.

*E021 The ORDER parameter has not been correctly specified on the SORT or MERGE card. A merge order which is not less than two nor greater than eight must be specified.

*E022 The FILE parameter has not been correctly specified on the SORT or MERGE card. In order to be sorted, the file must be designated by a FILE card. There should be no FILE cards for files not mentioned on the SORT or MERGE cards.

*E023 The ORDER parameter has not been correctly specified on the SORT or MERGE card. For a merge run, the merge order must equal the number of files to be merged. For a sort-and-merge run, it must be at least one greater than the number of external files to be merged in during the Final Merge Phase.

*E024 For a run of fixed-length records, the record length is not a factor of block size. The input record length must be a factor of the input block size, and the output record length must be a factor of the output block size.

*E025 The number of merge files is greater than the merge order.

*E026 The FIELD parameters have not been correctly specified on the SORT or MERGE card. They must correspond to FIELD parameters specified on the RECORD card.

*E027 There is no available unit for output on the output channel.

*E028 The number of input units specified for the input to a merge-only run does not equal the merge order.

*E029 The utility tape requested for input is not attached.

*E030 The input channel specified for a merge-only run is not one of the channels specified for merging.

*E031 There are not enough units available on the input channel to be assigned to the input function.

*E032 There are not enough units available on the merge channels to be assigned to the merge function.

*E033 A required parameter has not been specified on a control card.

*E034 Too many fields have been specified on a control card.

*E035 An invalid field has been specified on a control card.

*E036 The same field has been specified more than once on a control card.

*E037 A parameter required by a field on a control card has been omitted.

*E038 An invalid parameter has been specified on a control card.

*E039 The parameter for the RELCOM field on the OPTION card is 10,000 or more. This may not allow enough room for sorting.

*E040 The IDENT parameter has not been correctly specified on the LABEL card; an H is required.

*E040 The IDENT parameter has not been correctly specified on the LABEL card; it must be at least 18 and not more than 120 characters in length.

*E042 The MERGE parameters have not been correctly specified on the CHANNELS card. Exactly two merge channels must be given.

*E043 The OUTPUT parameter has not been correctly specified on the CHANNELS card.

*E044 The MODE parameter has not been correctly specified on a FILE card.

*E045 The DENSITY parameter has not been correctly specified on a FILE card.

*E046 The DICTIONARY parameter has not been correctly specified on a FILE card.

*E047 The INPUT parameter has not been correctly specified on the input FILE card. An input file number must be given.

*E048 The BLOCKSIZE parameter has not been correctly specified on a FILE card.

*E049 The PADDING parameter has not been correctly specified on the output FILE card.

*E050 The LABEL parameter has not been correctly specified on a FILE card.

*E051 The CHECKPOINT parameter has not been correctly specified on the input FILE card.

*E052 The PROGRAM parameter has not been correctly specified on the MODIFICATION card.

*E053 The LOCATION parameter has not been correctly specified on the MODIFICATION card.

*E054 The FORMAT parameter has not been correctly specified on the MODIFICATION card.

*E055 The TYPE field has not been correctly specified on the RECORD card.

*E056 Too many fields have been specified on the RECORD card.

*E057 Control fields of records in BCD mode are not a multiple of six bits in length.

*E058 The SEQUENCE field has not been correctly specified on the SORT or MERGE card.

*E059 The commercial collating sequence has been requested, but the control fields are not a multiple of six bits in length.

Action: No operator action is required for any of the above.

*EP02 NO END CARD FOUND BEFORE EOF.
TO DELETE SORT, PUT SS3 UP, START.
TO CONTINUE AND IGNORE ERROR, PUT SS3 DOWN, START.
END CARD WILL BE ASSUMED AT THIS POINT.
OPERATOR ACTION PAUSE.

Explanation: The deck of cards in the card reader is incomplete; it lacks the END card for Sort and the IBSYS control cards that should follow the Sort control cards.

Action: The operator can take one of the following two actions:

1. If deck contains all required Sort control cards, set sense switch 3 down and press START.

2. If Sort deck is incomplete, set sense switch 3 up and press START. Sort then returns control to the IBSYS System Monitor, which pauses. During pause, provide required IBSYS control card in card reader.

*EP03 NOT A SORT CONTROL CARD.
TO DELETE SORT, PUT SS3 UP, START.
TO CONTINUE AND IGNORE ERROR, PUT SS3 DOWN, START.
THE CARD WILL BE IGNORED.
OPERATOR ACTION PAUSE.

Explanation: Sort has read a card that is not a Sort control card.

Action: The operator can take one of the following two actions:

1. To delete Sort, set sense switch 3 up and press START.

2. To ignore the card, set sense switch 3 down and press START.

*EP04 NO SYSCK2 ATTACHED.

Explanation: No SYSCK2 is attached, and either the NOF option has been taken or no SYSOU1 is attached. Sort assumes that the NOCKPT option has been taken, sets the internal switch indicating that neither dictionaries nor unreadable records will be saved, and continues.

Action: No operator action is required.

*EP05 INTERSYSTEM INPUT UNIT NOT FOUND.
TO DELETE SORT, PUT SS3 UP, START.
TO HAVE SORT ASSIGN AN INPUT UNIT, PUT SS3 DOWN, START.
OPERATOR ACTION PAUSE.

Explanation: Sort cannot locate the intersystem reserve unit specified for input by the CHANNELS control card.

Action: The operator can take one of the following two actions:

1. If the reel(s) of tape containing input is known, set sense switch 3 down and press START. Sort then assigns an input unit and prints the unit number on-line as part of message *EP06.

2. If tape reel containing input is not known, delete Sort by setting sense switch 3 up and pressing START.

*EP06 PREPARE UNITS AS FOLLOWS –
UNIT XX (FUNCTION)
UNIT XX (FUNCTION)
ETC.
PRESS START WHEN ALL UNITS ARE PROPERLY PREPARED AND IN READY STATUS.
OPERATION ACTION PAUSE.

Explanation: The tapes table is printed on-line if the TAPES option is specified. The units are listed in the order in which they are used by Sort.

Each 729 tape unit is checked for ready status; if a unit is not ready the message

NOT IN READY STATUS

is printed after the function of the unit. Hypertape units are not checked for ready status.

Action: Ready units properly and press START.

*IN01 UNIT XX EOF INPUT REEL. LOAD NEXT REEL ON UNIT XX.

Explanation: The input reels are to be switched.

Action: If unit containing next reel is not ready, make it ready during pause provided by Sort.

*IN02 UNIT XX TRAILER LABEL UNREADABLE.
IF MORE REELS, SET SS3 DOWN.
IF NO MORE REELS, SET SS3 UP –
PRESS START.
OPERATOR ACTION PAUSE.

Explanation: The label, which controls the number of input reels, is unreadable.

Action: The operator can take one of the following two actions:

1. If there is another reel of input, set sense switch 3 down and press START.
2. If there are no more input reels, set sense switch 3 up and press START.

*LB01 UNIT XX, LABEL ERROR. LABEL IS
X X X X X X
X X X X X X
PUT SS4 DOWN TO IGNORE LABEL. PUT SS4 UP TO RETRY, PRESS START.
OPERATOR ACTION PAUSE.

Explanation: Sort has found that the header label read from SYSCK2 at restart time is in error. The label that Sort writes on SYSCK2 contains the name SORT SYSCK2.

Action: The operator can take one of the following two actions:

1. If tape on unit attached as SYSCK2 contains Sort checkpoint, set sense switch 4 down and press START.
2. If tape does not contain checkpoint, mount correct tape on unit attached as SYSCK2, set sense switch 4 up, and press START.

*LB02 UNIT XX BLKCNT ERROR

Explanation: The trailer label record count does not match the count of blocks on the input tape.

Action: No operator action is required.

*LB03 UNIT XX, LABEL ERROR. LABEL IS
X X X X X X
X X X X X X
PUT SS4 DOWN TO IGNORE LABEL. PUT SS4 UP TO RETRY, PRESS START.
OPERATOR ACTION PAUSE.

Explanation: The name on the input file label does not match the name on the input FILE card.

Action: The operator can take one of the following two actions:

1. If wrong tape has been mounted, mount correct tape, set sense switch 4 up, and press START.
2. To ignore label, set sense switch 4 down and press START. (Note that because indicators for mode, density, and check-sum block-sequence word from label override indications of input FILE card, care should be taken when label is ignored.)

*LB04 UNIT XX, LABEL ERROR. LABEL IS
X X X X X X
X X X X X X
PUT SS4 DOWN TO IGNORE LABEL. PUT SS4 UP TO RETRY, PRESS START.
OPERATOR ACTION PAUSE.

Explanation: The file serial number on the input file label does not match the number on the input FILE card.

Action: The operator can take one of the following two actions:

1. If wrong tape has been mounted, mount correct tape, set sense switch 4 up, and press START.
2. To ignore label, set sense switch 4 down and press START. (Note that because indicators for mode, density, and check-sum block-sequence word from label override indications of input FILE card, care should be taken when label is ignored.)

*LB05 UNIT XX, LABEL ERROR. LABEL IS
X X X X X X
X X X X X X
PUT SS4 DOWN TO IGNORE LABEL. PUT SS4 UP TO RETRY, PRESS START.
OPERATOR ACTION PAUSE.

Explanation: The reel sequence number on the input file label does not match the number on the input FILE card.

Action: The operator can take one of the following two actions:

1. If the wrong tape has been mounted, mount correct tape, set sense switch 4 up, and press START.
2. To ignore label, set sense switch 4 down and press START. (Note that because indicators for mode, density, and check-sum block-sequence word from label override indications of input FILE card, care should be taken when label is ignored.)

*LB06 UNIT XX, LABEL ERROR. LABEL IS
X X X X X X
X X X X X X
PUT SS4 DOWN TO IGNORE LABEL. PUT SS4 UP TO RETRY, PRESS START.
OPERATOR ACTION PAUSE.

Explanation: The name of the intermediate merge tape label does not match the name expected in the label.

Action: The operator can take one of the following two actions:

1. If tape on unit is one just created by Sort, set sense switch 4 down and press START.
2. If a Sort restart, make certain that tapes are mounted correctly. Then set sense switch 4 up and press START.

*LB07 UNIT XX, LABEL ERROR. LABEL IS
X X X X X X
X X X X X X
PUT SS4 DOWN TO IGNORE LABEL. PUT SS4 UP TO RETRY, PRESS START.
OPERATOR ACTION PAUSE.

Explanation: The header label on the input tape does not have the proper first word (1HDR).

Action: The operator can take one of the following two actions:

1. If proper tape has been mounted, set sense switch 4 down and press START.
2. If proper tape has not been mounted, mount correct one, set sense switch 4 up, and press START.

*LB08 UNIT XX, LABEL ERROR. LABEL IS
X X X X X X
X X X X X X
PUT SS4 DOWN TO IGNORE LABEL. PUT SS4 UP TO RETRY, PRESS START.
OPERATOR ACTION PAUSE.

Explanation: The trailer label on the input tape does not have the proper first word (either 1EOR or 1EOF).

Action: The operator can take one of the following two actions:

1. To ignore label, set sense switch 4 down and press START.
2. To read and check label again, set sense switch 4 up and press START.

*LD01 UNIT XX HAS PROGRAM(S) MISSING
XXXXXX MISSING FROM ABOVE UNIT.

TO DELETE SORT	SS3	UP
TO GO ON	SS3	DN

OPERATOR ACTION PAUSE.

Explanation: One or more Sort subprograms cannot be found and loaded from the IBSYS system unit.

Action: The operator can take one of the following two actions:

1. To delete Sort, set sense switch 3 up and press START. Sort prints SORT DELETED and returns control to the IBSYS System Monitor.
2. To continue loading without the missing subprogram(s), set sense switch 3 down and press START. If the missing subprogram(s) is called, Sort is deleted and a core dump is automatically taken.

*LD02 CKSM ERROR LOADING XXXXXX
PRESS START TO GO ON.

Explanation: A check-sum error has occurred while a Sort subprogram was being loaded.

Action: The operator can take one of the following two actions:

1. To ignore check-sum error, press START.
2. To terminate run with a dump, execute manual transfer to location 115_8.

*LD03 CONTROL PROGRAM MISSSING, XXXXXX
PRESS START TO DELETE SORT.
OPERATOR ACTION PAUSE.

Explanation: The main subprogram of a phase cannot be found and loaded from the system unit.

Action: The operator can take one of the following two actions:

1. To return control to IBSYS System Monitor, press START. Sort prints SORT DELETED.
2. To terminate run with a dump, execute manual transfer to location 115_8.

*LE03 COUNTS OF RECORDS DO NOT AGREE.
THE COUNTS ARE AS FOLLOWS –

READS	WRITES	DUMPED
XX	XX	XX

OPTIONS	SS3	SS4
TO DELETE SORT	UP	UP
TO RETURN TO LAST CKPT	UP	DN
TO GO ON (IGNORE)	DN	UP

OPERATOR ACTION PAUSE.

Explanation: The count of the records written and/or dumped due to bad check sums during this pass of Merge Phase does not agree with the count of records read.

Action: The operator can take one of the following three actions:

1. To delete Sort, set sense switches 3 and 4 to up and press START.
2. To return to last checkpoint if one was taken and if this option is given, set sense switch 3 up, set sense switch 4 down, and press START.
3. To ignore error and continue merging those records written during this pass, set sense switch 3 down, set switch 4 up, and press START.

*LE04 NO READ AREAS AVAILABLE

OPTIONS	SS3	SS4
TO DELETE SORT	UP	UP
TO RETURN TO LAST CKPT	UP	DN

OPERATOR ACTION PAUSE.

Explanation: To continue, Merge Phase must read a record from a merge tape. However, there are no available buffers into which records can be read. When this stop occurs, it is probably due to a machine error.

Action: The operator can take one of the following two actions:

1. To delete Sort, set sense switches 3 and 4 up and press START.
2. To return to last checkpoint if one was taken and if this option is given, set sense switch 3 up, set sense switch 4 down, and press START.

*LE05

Explanation: The DEBLK subprogram has been entered to dump an unreadable record, but a word count of zero is given, indicating a possible program or machine error.

Action: No operator action is required. To determine if any records were dropped, the programmer should compare the output record counts with the input counts.

*LE10 ERROR. LOC. XX

OPTIONS	SS3	SS4
TO DELETE SORT	UP	UP
TO RETURN TO LAST CKPT	UP	DN
TO GO ON (IGNORE)	DN	UP

Explanation: A logical error has been found at location XX. Using the listing and the load address of the Final Merge Phase found in the map, the user can determine the logical error. In some cases, the option TO GO ON is not given. If no checkpoints have been taken, the option TO RETURN TO LAST CKPT is not given.

Action: The operator can take one of the following four actions:

1. To delete Sort, set sense switches 3 and 4 up and press START. This is the normal action.
2. To restart at last checkpoint if one was taken, set sense switch 3 up, set sense switch 4 down, and press START. For a long Sort run, this might be the option taken.
3. To ignore error and continue, set sense switch 3 down, set sense switch 4 up, and press START. (This option is not recommended.)
4. To terminate run with a dump, execute a manual transfer to location 115_8.

*MR01 UNIT XX TO BE USED FOR MERGING.
LOAD THIS UNIT WITH A SCRATCH TAPE.
OPERATOR ACTION PAUSE.

Explanation: Unit XX, which was used for input, is now to be used for merging. Depending upon programmer specifications, Sort either has rewound or has rewound and unloaded the tape.

Action: The operator can take one of the following two actions:

1. If Sort has unloaded the input tape, it does not pause. Mount a work tape and make it ready. Sort selects unit and continues.
2. If Sort has not unloaded input tape, it pauses. Mount a work tape and make it ready. Then press START.

*MR02 UNIT XX LOAD NEXT REEL OF MERGE FILE YY.
OPERATOR ACTION PAUSE.

Explanation: The next reel of an external merge file contained on more than one reel must be loaded. Depending upon programmer specifications, Sort either has rewound or has rewound and unloaded the tape.

Action: The operator can take one of the following two actions:

1. If Sort has unloaded previous tape, it does not pause. Mount and make ready next tape. Sort selects unit and continues.
2. If Sort has not unloaded previous tape, it pauses. Mount and make ready next tape. Then press START.

*MR03 EOT WRITING HEADER LABEL – CHANGE TAPE.
OPERATOR ACTION PAUSE.

Explanation: The merge tape is too short to contain the header label and end-of-file mark. Sort unloads the tape.

Action: Replace tape with longer work tape. When this tape is ready, press START.

*MR04 ALL INPUT TAPES TO PHASE 2 ARE AT END OF FILE

OPTIONS	SS3	SS4
TO DELETE SORT	UP	UP
TO RETURN TO LAST CKPT	UP	DN

Explanation: None of the merge tapes have records on them when the phase begins.

Action: The operator can take one of the following two actions:

1. To delete Sort, set sense switches 3 and 4 up and press START.
2. To return to last checkpoint if one was taken and if this option is given, set sense switch 3 up and sense switch 4 down. Then press START.

*MR05 MERGE TAPES TOO SHORT

OPTIONS	SS3	SS4
TO DELETE SORT	UP	UP
TO RETURN TO LAST CKPT	UP	DN
TO GO ON (IGNORE)	DN	UP

OPERATOR ACTION PAUSE.

Explanation: All merge output tapes are at end of tape. Sort can continue properly only if longer merge tapes are used in a rerun.

Action: The operator can take one of the following three actions:

1. To delete Sort, set sense switches 3 and 4 up and press START.
2. To return to last checkpoint if one was taken and if this option is given, set sense switch 3 up, set sense switch 4 down, and press START.
3. To ignore error and to continue, set sense switch 3 down, set sense switch 4 up, and press START.

NOTE: Options 2 and 3 are not recommended.

*OU01 UNIT XX CLOSING OUTPUT REEL NO. XXXX.

Explanation: An output reel is being closed. The first reel may be other than reel number 1 if a reel sequence number has been specified on the output FILE card.

Action: If reel is to be saved rather than used for a succeeding run during the same job, remove it from unit.

*OU02 UNIT XX MAKE READY FOR NEXT OUTPUT REEL.
WHEN BLANK REEL IS LOADED – PRESS START.
OPERATOR ACTION PAUSE.

Explanation: Unit XX is to be used for output.

Action: Make unit ready to receive output, and press START.

*OV01 CAPACITY REACHED OVERFLOW, BLOCKS/XXXXX

TO STOP INPUT	SS3	UP
TO KEEP READING	SS3	DN

OPERATOR ACTION PAUSE.

Explanation: The capacity of Sort, calculated on the basis of full reels of tape, has been reached. The reading of more input records may cause the merge to be unending.

Action: The operator can take one of the following two actions:

1. To stop reading and to continue with records already read, set sense switch 3 up and press START. (Note that the remaining input can be sorted at a later time using same control information and using OVERFLOW card as specified in message.)
2. If it is known that very few logical records remain on input reel, set sense switch 3 down and press START. (Note that this may cause an unending merge.)

*RD01 UNIT XX FILE XX, RECORD XX UNRDBL BLK DUMPED YYYYY.

Explanation: An off-size or redundant block has been read by one of the READ subprograms of the Internal Sort Phase. It cannot be processed and has been written out for user examination. YYYYY is the length of the block. When variable-length records are being read, this message will not appear off-line.

Action: No operator action is required.

*RD02 UNIT XX FILE XX, RECORD XX INPUT CHKSM ERROR.

Explanation: The folded IOCS check sum in the last word of tape record XX did not check properly. However, the block is accepted. This message will not appear off-line.

Action: No operator action is required.

*RD03 INPUT BLOCK SEQ ERROR – XX

Explanation: The block sequence number in the last word of block XX did not agree with the count in the unit control block. The unit control block is changed. This message will not appear off-line.

Action: No operator action is required.

*RD04 FILE XX, REC XX OFSZ XX WORDS.

Explanation: An off-size block has been read by the Merge Phase or Final Merge Phase. It is being dumped.

Action: No operator action is required.

*RD05 UNRDBL BLK DUMPED XXXX WORDS.

Explanation: An off-size or redundant block has been read by the Merge Phase. It cannot be processed and has been written out for user examination.

Action: No operator action is required.

*RD06 UNRDBL BLK DUMPED XXXX WORDS.

Explanation: An off-size or redundant block has been read by the Final Merge Phase. It cannot be processed and has been written out for user examination.

Action: No operator action is required.

*RD07 BLKSEQ ERROR-UCW3 CHGD FROM XX TO XX

Explanation: An external file being merged during the Final Merge Phase contains a block in which the block count in the check-sum block-sequence word does not agree with the count in the unit control block. The unit control block count is changed. This message will not appear off-line.

Action: No operator action is required.

*RD08 UNIT XX RECORD NO. YY
CKSUM ERROR.

Explanation: The folded IOCS check sum in the last word of tape record YY read as external input during the Final Merge Phase did not check properly. However, the block is accepted. This message will not appear off-line.

Action: No operator action is required.

*RD09 BLKSEQ ERROR-UCW3 FROM XX TO XX

Explanation: The Internal Sort Phase or Merge Phase has written an internal file containing a block in which the block count does not agree with the count in the unit control block. The unit control block count is changed. This message will not appear off-line.

Action: No operator action is required.

*RD10 UNIT XX APPEARS TO HAVE MALFUNCTIONED.
PRESS START TO DELETE SORT.
OPERATOR ACTION PAUSE.

Explanation: The interrupt at the end of the read instruction on Hypertape drive XX did not signal a normal read or an error condition. Sort cannot continue.

Action: To delete Sort, press START.

*RD11 UNIT XX, FILE XX, RECORD XX
LONG BLK ACCEPTED.

Explanation: A block that is longer than the length specified on the input FILE card has been read by the Internal Sort Phase. It is accepted. This will not appear off-line.

Action: No operator action is required.

*RP01 SORT INTERRUPT REQUESTED.

1. LABEL AND SAVE ALL TAPES FOR A LATER RESTART. THEN PRESS START.
2. IF SORT IS TO CONTINUE – RESET SS2 AND PRESS START.

OPERATOR ACTION PAUSE.

Explanation: Sense switch 2 is used to request an interrupt of the Sort run during the Merge Phase. If the switch has been set down and if checkpoints are being taken, a pause occurs immediately after the next checkpoint of the phase has been taken.

Action: The operator can take one of the following two actions:

1. If run is to be continued at a later time, label merge tapes with their individual unit numbers. These tapes and the checkpoint tape are saved for use when run is restarted. With sense switch 2 down, press START. Control is then returned to IBSYS System Monitor.
2. If sense switch 2 is inadvertently down and a program interrupt is not desired, set switch up and press START.

*RS01 RESTART FAILED – CHKPNT MISSING OR UNREADABLE.

Explanation: Sort RESTART is being requested but either there is no checkpoint file or it cannot be read.

Action: No operator action is required.

*SA02 CORE TOO SMALL. SORTING IMPOSSIBLE.
TO DELETE SORT, START.
OPERATOR ACTION PAUSE.

Explanation: The parameters given on the Sort control cards require Sort to use more core storage than is available. Sort cannot continue.

Action: Press START. Sort is deleted, and control is returned to IBSYS System Monitor.

*SQ02 RECORD OUT OF SEQUENCE
THIS RECORD IS AT LOC. XX
LAST RECORD IS AT LOC. XX
UNIT XX IS THE UNIT WHERE OUT-OF-SORT ORIGINATED
IT IS IN TAPE RECORD NUMBER XXXXX

OPTIONS	SS3	SS4
TO DELETE SORT	UP	UP
TO RETURN TO LAST CKPT	UP	DN
TO GO ON (IGNORE)	DN	UP

OPERATOR ACTION PAUSE.

Explanation: A record is not in the correct sequence. This was probably caused by a machine error. This message occurs only during the Merge Phase.

Action: The operator can take one of the following three actions:

1. To delete Sort, set sense switches 3 and 4 up and press START.
2. To restart at last checkpoint if this option is given, set sense switch 3 up and sense switch 4 down. Then press START.
3. To ignore error and to continue, set sense switch 3 down, set sense switch 4 up, and press START. The record will be positioned as if it began a new sequence or string. (Note that this action may cause an extra merge pass.)

*SQ03 RECORD OUT OF SEQUENCE
THIS RECORD IS AT LOC. XX
LAST RECORD WAS AT LOC. XX
AND IS NOW AT LOC. XX IN OUTPUT BUFFER.
UNIT XX IS THE UNIT WHERE OUT-OF-SORT ORIGINATED

OPTIONS	SS3	SS4
TO DELETE SORT	UP	UP
TO RETURN TO LAST CKPT	UP	DN
TO GO ON (IGNORE)	DN	UP

OPERATOR ACTION PAUSE.

Explanation: A record is not in the correct sequence. This was probably caused by a machine error. This message occurs only during the Final Merge Phase.

Action: The operator can take one of the following three actions:

1. To delete Sort, set sense switches 3 and 4 up and press START.
2. To restart at last checkpoint if this option is given, set sense switch 3 up and set sense switch 4 down. Then press START.
3. To ignore error and continue, set sense switch 3 down, set sense switch 4 up, and press START. (Note that if this option is taken, the output file will contain more than one sequence.)

*VR01 INVALID RECORD FORMAT
RECORD AT LOC. XX
PRESS START TO DELETE SORT
OPERATOR ACTION PAUSE.

Explanation: The record-length control word in an input record does not contain a number within the limits specified on the RECORD control card. Sort cannot continue.

Action: To delete Sort, press START.

*VR03 RECORD, LOC XX, INVALID FORMAT
XX WORDS
PRESS START TO DELETE SORT
OPERATOR ACTION PAUSE.

Explanation: The record-length control word of a record that is about to be written in the output file does not contain a number within the limits specified on the RECORD control card. Sort cannot continue.

Action: To delete Sort, press START.

*WR01 EOT ON ALL MERGE TAPES
TO DELETE SORT ..... SS3 UP
TO IGNORE EOT ..... SS3 DOWN
OPERATOR ACTION PAUSE.

Explanation: The Internal Sort Phase has written on each of the merge tapes to the end-of-tape marker without exceeding the Sort capacity calculated for full tape reels.

Action: The operator can take one of the following two actions:

1. If it is known that there is very little information remaining on input reel or that end-of-tape markers are far from the end of the tape, set sense switch 3 up and press START.

NOTE: This may result in a tape being pulled off ehe reel.

2. To delete Sort, set sense switch 3 down and press START. Control is returned to IBSYS System Monitor. (Note that if Sort is rerun at a later time, care should be taken to use longer tapes.)

*WR02 EOT, SYSCK2-NO MORE UNRDBL RECORDS CAN BE SAVED
PRESS START TO GO ON.

Explanation: The DEBLK subprogram has written on SYSCK2 to the end-of-tape marker.

Action: Press START to continue Sort. No more unreadable records are dumped; they are ignored.

Off-Line Processing of Output

1401 Peripheral Output Program

The 1401 Peripheral Output Program is a combined tape-to-printer/punch routine utilizing the IBM 1401 Data Processing System. This program reads the system output tape and produces a listing on the IBM 1403 Printer or a deck of column-binary cards on the IBM 1402 Card Read Punch. If a deck of column-binary cards is punched, it is not necessary that the control cards have a 7, 9 punch in column 1. Select 3 is used for output from this program.

This program acts on data of the following types:

1. Print-line images (on magnetic tape) in even-parity mode, blocked by a record mark in the last character position of each print-line; or column-binary card images in odd-parity mode, blocked with a record mark or unblocked.

2. Output from the IBJOB Processor consisting of either of the following:

   a. Print-lines (with a maximum of 132 characters including the carriage-control character) with characters translated by the 1401 Data Processing System into characters accepted by the 1403 Printer.

   b. Column-binary card images.

The distinction between these types of data is concerned with the presence or absence of the block control word. If the block control word is present, logical control words are written; if the block control word is not present, the mode is recorded on tape.

In all print-lines, the first character is interpreted as a carriage-control character. These characters and their effect are described as follows:

+	= Single space before printing
blank	= No skip before printing
−	= Double space before printing
0	= Single space before printing

NOTE: Any other character causes a skip to channel 1.

The number of characters expected by this program are as follows:

1. Print-lines = a maximum of 132 characters (including a record mark).

2. Column-binary card images = 168 characters (in column-binary format). This allows 6 characters for block control words, and 6 characters for record control words.

3. BCD card images = 84 characters, written in the odd-parity mode with characters translated from 7090 core storage images into 1401 images.

On-Line Messages

The message END OF JOBS indicates that a file mark has been encountered while the program was reading the binary tape. The message BAD TAPE indicates that an input tape error has occurred. After the program has reread the tape nine times, START is pressed to reread nine more times.

Appendix: IBM 1401 Peripheral Input/Output Programs

This appendix includes additional material on the IBM 1401 Peripheral Programs.

Minimum Machine Configuration

1. 4,000 positions of core storage
2. One 729 or 7330 Magnetic Tape Unit
3. Advanced programming feature
4. High-low-equal compare feature
5. Sense switch feature
6. One IBM 1402 Card Read Punch with column binary feature
7. One IBM 1403 Printer with 132 print positions and the print control feature

Form of Look Ahead Bits on Tape

Binary Record:
Followed by another binary record – 05010504
Followed by a BCD record – 04000100

BCD Record:
Followed by another BCD record – 0000
Followed by a binary record – 9977

Form of Control Words on Tape

A control word is represented by 12 octal digits which, in turn, represent 36 bits. Control words are used only when the tape is written in odd-parity recording mode. The forms of these control words follow:

1. Block control word: 76vvwwxxyyzz

where v, w, x, y, and z are the BCD representation of the number of logical records in this particular block.

2. Logical record control words are as follows:

Column-binary card images	5xyyzz200120
BCD card images	5xyyzz200360
Print-line	5xyyzz200460

where x, y, and z represent the count of characters in a logical record, exclusive of the control word. The y and z represent BCD, and x represents the three low-order bits of a BCD digit.

Index

Checkpoint 10, 24
Clear Disk/Drum routine 9
COBOL language 7
Commercial Translator Processor (CT) 7, 18
Console controls 24
Console entry keys 25
Control cards 12
Control cards,
  miscellaneous 16
  operational 12
  tape manipulation 15
  unit assignment 14
Control cards, System Monitor 12

Debugging 10, 18, 26
Debugging Postprocessor 26
Disk/Drum Utilities 8
$AS card 15
$* card 16
$ATTACH card 14
$BLOCK card 20, 21
$CARDS card 13
$SCMPLE card 18
$DATE card 16
$DETACH card 14
$ENDFILE card 15
$EXECUTE card 12
$EXECUTE CT card 18
$EXECUTE DK90UT card 19
$EXECUTE FORTRAN card 18
$EXECUTE IBJOB card 17
$EXECUTE IBSFAP card 18
$EXECUTE 9PAC card 19
$EXECUTE SORT card 18
$IBEDT card 17
$IBSYS card 12, 18
$ID card 17, 18
$JOB card 12, 18
$LIST card 16
$LOAD card 18
$MAIN card 18
$PAUSE card 13
$PROTECT card 16
$RELEASE card 15
$REMOVE card 16
$RESET card 13
$RESTART card 17
$RESTORE card 13
$REWIND card 16
$STOP card 7, 13, 18
$SUBUP card 18
$SWITCH card 15
$TAPE card 13
$UNITS card 16
$UNLIST card 16
$UNLOAD card 16
Dump Disk/Drum routine 9
Dump options 27
Dump parameters (SYSDMP) 27

Editor (IBEDT) 5

File Description Table 26, 31.1

Format Track Generation
  routine 8

FORTRAN Assembly Program
  (IBSFAP) 7
FORTRAN Assembly Program (FAP)
  language 7
FORTRAN II Processor (FORTRAN) 7, 18
FORTRAN II Processor (FORTRAN) language 7
FORTRAN IV language 7

Generalized Sorting System (SORT) 8, 18

Home Address and Record Address
  Generation routine 8

IBJOB Processor (IBJOB) 7, 17
IBSYS Operating System
  application 9
  components 5
  function 5
  System Unit Functions 10
Initial start procedure 24
Input/Output Control System (IOCS) 7
Input/Output Executor (IOEX) 5
Input/Output units, use of 22
  Commercial Translator Processor 22
  FORTRAN II 22
  IBJOB Processor 22
  IBSYS 22
  Input/Output Control System 23
  9PAC Processor 22
  Generalized Sorting System 23
  Utilities 23
Installation accounting routine 5
Interrupt 25

Job, definition of 5

Load Disk/Drum routine 8

Macro Assembly Program (MAP)
  language 7
Messages, on-line 28
Messages, 1401 programs 21, 46
Messages, Sort 38

Nucleus (IBNUC) 5

Off-line preparation of input
  procedure 20
Off-line processing of output 46

9PAC Processor (9PAC) 8, 19
1401 Peripheral Input/Output programs
  form of control words on tape 47
  form of look ahead bits on tape 47
  minimum machine configuration 47
1401 Peripheral Input program 20
1401 Peripheral Output program 46
Physical device designation 14
  card and printer units 14
  Disk/Drum Storage Units 14
  7340 Hypertape Drives 14
  729 Magnetic Tape Units 14
Post-mortem dump 9, 26

Restart program 7, 25
  function 25
  procedure 26
Restore Disk/Drum routine 9
Sense lights 25
Sense switches 24
  checkpoint 24
  input control 24
  label control 25
  9PAC Processor End-of-File indicator 25
  Sort job interrupt control 25
  Sort label and error control 25
  Sort error control 25

Snap drum 26
SORT 8, 18
Supervisor (IBSUP) 5, 7
SYSDAT word 13
System card punch 11
System card reader 11
System Core-Storage Dump program (SYSDMP) 5, 26
System input 10
System library 10
System Monitor 5, 7
System operation 24
System output 10
System peripheral punch 10
System Position Table 12
System printer 11
System Unit Function Table 10
System utility 10

Tape Dump routine 9

Utility Monitor 8
Utility routines 8, 19
Utilities' identification codes 19

IBM Technical Newsletter

File Number	7090-36
Re: Form No.	C28-6355-1
This Newsletter No.	N28-0104
Date	June 15, 1964
Previous Newsletter Nos.	None

IBM 7090/7094 OPERATOR'S GUIDE

This newsletter contains addenda and errata to the publication IBM 7090/7094 IBSYS Operating System: Operator's Guide, Form C28-6355-1. It contains information about the IBJOB Processor Debugging Package.

In the subject publication, replace the pages listed below with the pages that are attached to this newsletter:

1. Contents
2. Pages 5 and 6
3. Pages 9 and 10
4. Pages 11 and 12
5. Pages 13 and 14
6. Pages 17 and 18
7. Pages 19 and 20
8. Pages 21 and 22
9. Pages 23 and 24
10. Pages 25 and 26
11. Pages 27 and 28
12. Pages 29 and 30
13. Pages 31 and 32
14. Pages 33 and 34
15. Pages 47 and 48

A vertical line immediately to the left of the column shows where the text was changed.

File this cover page at the back of the bulletin. It will provide a reference to changes, a method of determining that all amendments have been received, and a check for determining if the bulletin contains the proper pages.

International Business Machines Corp., Programming Systems Publications, P. O. Box 390, Poughkeepsie, N. Y.

PRINTED IN U.S.A.

CUT ALONG LINE

COMMENT SHEET

IBM 7090/7094 IBSYS OPERATING SYSTEM

PROGRAMMING SYSTEMS PUBLICATIONS, FORM C28-6355-1

FROM

NAME _____

OFFICE NO. _____

FOLD FOLD

CHECK ONE OF THE COMMENTS AND EXPLAIN IN THE SPACE PROVIDED

☐ SUGGESTED ADDITION (PAGE , TIMING CHART, DRAWING, PROCEDURE, ETC.)

☐ SUGGESTED DELETION (PAGE)

☐ ERROR (PAGE)

EXPLANATION

FOLD FOLD

NO POSTAGE NECESSARY IF MAILED IN U.S.A.
FOLD ON TWO LINES, STAPLE, AND MAIL

STAPLE

C28-6355-1

FOLD

FOLD

FIRST CLASS
PERMIT NO. 81

POUGHKEEPSIE, N. Y.

BUSINESS REPLY MAIL
NO POSTAGE STAMP NECESSARY IF MAILED IN U. S. A.

POSTAGE WILL BE PAID BY
IBM CORPORATION
P. O. BOX 390
POUGHKEEPSIE, N. Y. 12602

ATTN: PROGRAMMING SYSTEMS PUBLICATIONS,
DEPARTMENT D91

FOLD

FOLD

CUT ALONG LINE

Printed in U.S.A. C28-6355-1

IBM

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

4/64:4M-FAW-52

STAPLE