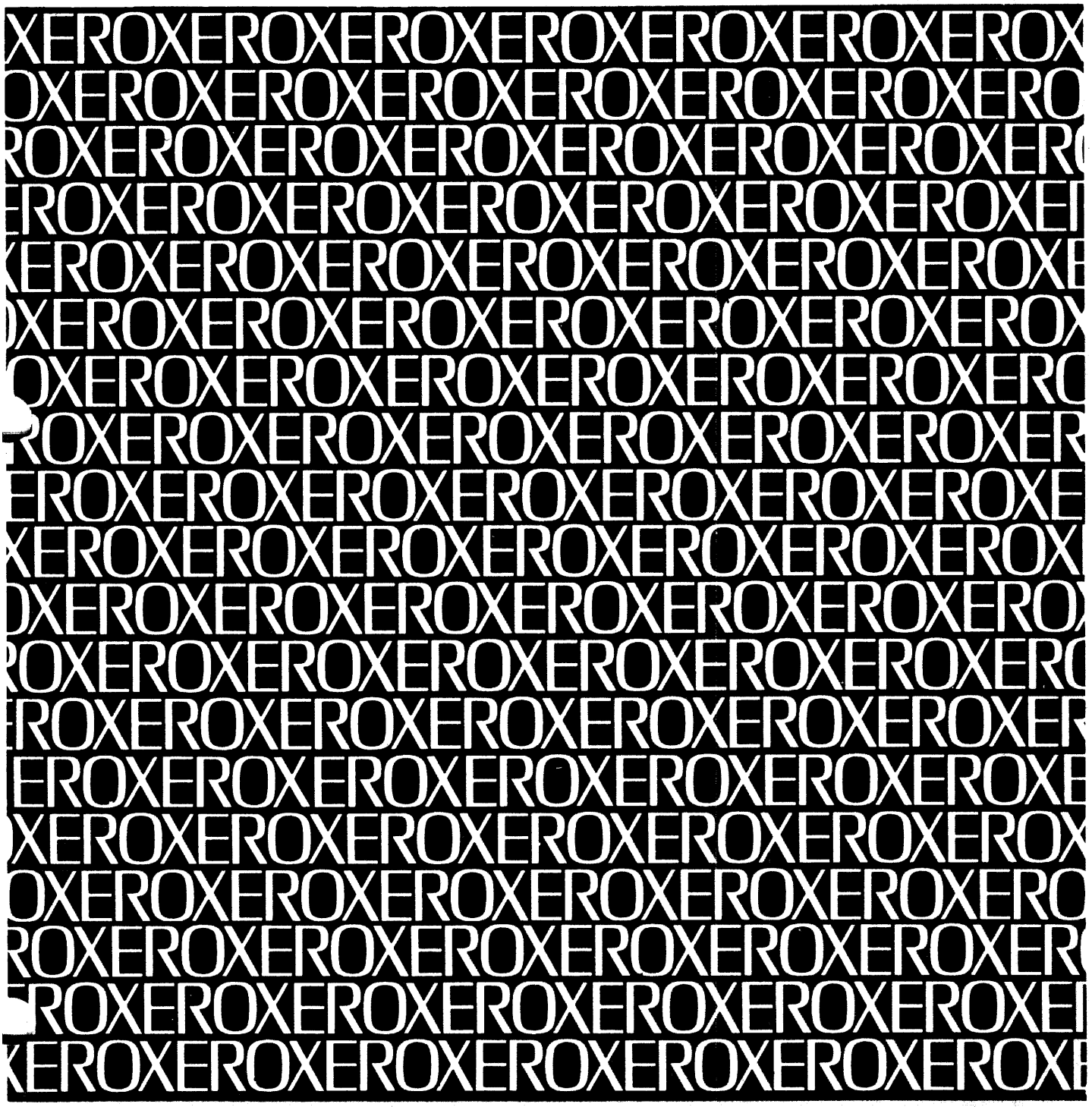
Xerox Control Program-Five (CP-V)

Xerox 560 and Sigma 6/7/9 Computers

Operations
Reference Manual



90 16 75H

XEROX

Xerox Control Program-Five (CP-V)

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Operations

Reference Manual

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90 16 75H-1
90 16 75H-2

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REVISION

This publication documents the F00 version of Control Program-Five (CP-V). The publication consists of the H edition of this manual (90 16 75H, dated November 1975) and the revision packages numbered 90 16 75H-1 (11/76) and 90 16 75H-2(9/78). Vertical lines in the margins of pages labeled 90 16 75H-2(9/78) indicate changes that reflect the F00 version of CP-V. Vertical lines in the margins of other pages indicate changes that occured in a previous release of the system.

RELATED PUBLICATIONS

Title	Publication No.
Xerox Sigma 6 Computer/Reference Manual	90 17 13
Xerox Sigma 7 Computer/Reference Manual	90 09 50
Xerox Sigma 9 Computer/Reference Manual	90 17 33
Xerox 560 Computer/Reference Manual	90 30 76
Xerox Control Program-Five (CP-V)/TS Reference Manual	90 09 07
Xerox Control Program-Five (CP-V)/SM Reference Manual	90 16 74
Xerox Control Program-Five (CP-V)/BP Reference Manual	90 17 64
Xerox Control Program-Five (CP-V)/TS User's Guide	90 16 92
Xerox Control Program-Five (CP-V)/RP Reference Manual	90 30 26
Xerox Control Program-Five (CP-V)/TP Reference Manual	90 31 12
Xerox Control Program-Five (CP-V)/SP Reference Manual	90 31 13
Xerox Control Program-Five (CP-V)/Common Index	90 30 80
Xerox EASY/LN,OPS Reference Manual	90 18 73
Xerox BASIC/LN,OPS Reference Manual	90 15 46
Xerox Meta-Symbol/LN,OPS Reference Manual	90 09 52
Xerox Assembly Program/Reference Manual	90 30 00
Xerox Extended FORTRAN IV/LN Reference Manual	90 09 56
Xerox Extended FORTRAN IV/OPS Reference Manual	90 11 43
Xerox FORTRAN Debug Package (FDP)/Reference Manual	90 16 77
Xerox FLAG/Reference Manual	90 16 54
Xerox ANS COBOL/LN Reference Manual	90 15 00
Xerox ANS COBOL/OPS Reference Manual	90 15 01
Xerox Manage/Reference Manual	90 16 10
Xerox Sort-Merge/Reference Manual	90 11 99
Xerox Functional Mathematical Programming System (FMPS)/Reference Manual	90 16 09
Xerox SL-1/Reference Manual	90 16 76
Xerox 1400 Series Simulator/Reference Manual	90 15 02

Manual Content Codes: BP – batch processing, LN – language, OPS – operations, RP – remote processing, RT – real-time, SM – system management, SP – system programming, TP – transaction processing, TS – time-sharing, UT – utilities.

The specifications of the software system described in this publication are subject to change without notice. The availability or performance of some featu may depend on a specific configuration of equipment such as additional tape units or larger memory. Customers should consult their sales representative fo details.

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PREFACE

This manual is the principal source of reference information for CP-V computer operators. It defines the rules for operator communication (i.e., key-ins and messages), system start-up and initialization, job and system control, peripheral device handling, recovery, and file preservation. Manuals describing other features of CP-V are described below.

- The CP-V Time-Sharing Reference Manual, 90 09 07, is the principal source of information for the time-sharing features of CP-V. It defines the rules for using theTerminal Executive Language and other on-line processors.

- The CP-V Time-Sharing User's Guide, 90 16 92, describes how to use the various time-sharing features. It presents an introductory subset of the features in a format that allows the user to learn the material by using the features at a terminal as he reads through the document.

- The CP-V Batch Processing Reference Manual, 90 17 64, is the principal source of reference information for the batch processing features of CP-V (i.e., job control commands, system procedures, I/O procedures, program loading and execution, debugging aids, and service processors). The purpose of the manual is to define the rules for using the batch processing features.

- The CP-V Remote Processing Reference Manual, 90 30 26, is the principal source of information about the remote processing features of CP-V. All information about remote processing for all computer personnel (local and remote users, system managers, remote site operators, and central site operators) is included in the manual.

- The CP-V Transaction Processing Reference Manual, 90 31 12, provides information about dynamically modifying and querying a central database in a transaction processing environment. The manual is addressed to system managers, database administrators, applications programmers, and computer operators.

- The CP-V System Management Reference Manual, 90 16 74, is the principal source of reference information for the system management features of CP-V. It defines the rules for generating a CP-V system (SYSGEN), authorizing users, maintaining user accounting records, maintaining the file system, monitoring system performance, and other related functions.

- The CP-V System Programming Reference Manual, 90 31 13, describes the CP-V features that are designed to aid the system programmer in the development, maintenance, and modification of the CP-V system.

- The CP-V Common Index, 90 30 80, is an index to all of the above CP-V manuals.

Information for the language and application processors that operate under CP-V is also described in separate manuals. These manuals are listed on the Related Publications page of this manual.

COMMAND SYNTAX NOTATION

Notation conventions used in command specifications and examples throughout this manual are listed below.

Notation	Description
lowercase letters	Lowercase letters identify an element that must be replaced with a user-selected value. CRndd could be entered as CRA03.
CAPITAL LETTERS	Capital letters must be entered as shown for input, and will be printed as shown in output. DPndd means "enter DP followed by the values for ndd".
[ ]	An element inside brackets is optional. Several elements placed one under the other inside a pair of brackets means that the user may select any one or none of those elements. [KEYM] means the term "KEYM" may be entered.
{ }	Elements placed one under the other inside a pair of braces identify a required choice. {A / id} means that either the letter A or the value of id must be entered.
...	The horizontal ellipsis indicates that a previous bracketed element may be repeated, or that elements have been omitted. name[,name]... means that one or more name values may be entered, with a comma inserted between each name value.
⋮	The vertical ellipsis indicates that commands or instructions have been omitted. MASK2 DATA,2 X'1EF' ⋮ BYTE DATA,3 BA(L(59)) means that there are one or more statements omitted between the two DATA directives.
Numbers and special characters	Numbers that appear on the line (i.e., not subscripts), special symbols, and punctuation marks other than dotted lines, brackets, braces, and underlines appear as shown in output messages and must be entered as shown when input. (value) means that the proper value must be entered enclosed in parentheses; e.g., (234).
Subscripts	Subscripts indicate a first, second, etc., representation of a parameter that has a different value for each occurrence. $sysid_1$,$sysid_2$,$sysid_3$ means that three successive values for sysid should be entered, separated by commas.

GLOSSARY

ANS tape — a tape that has labels written in American National Standard (ANS) format.

automatic recovery procedure — the procedure that is automatically initiated to restore CP-V and its files every time a hardware or software failure that could have adverse effect on the system is detected.

backup tapes — magnetic tapes containing files that are used to restore user files after a system failure or during a system restart.

batch job — a job that is submitted to the batch job stream through the central site card reader, through an on-line terminal (using the Batch processor), or through a remote terminal.

concatenation — a process whereby a number of files with the same filename and format are treated as one logical file. Concatenation applies only to ANS tapes.

control command — any control message other than a key-in. A control command may be input via any device to which the system command input function has been assigned (normally a card reader).

cooperative — a monitor routine that transfers information between a user's program and symbiont disk storage (see symbiont).

ghost job — a job that is neither a batch nor an on-line program. It is initiated and logged on by the monitor, the operator, or another job and consists of a single job step. When the ghost program exits, the ghost is logged off.

granule — a block of disk sectors large enough to contain 512 words of stored information.

key-in — information entered by the operator via the keyboard of the operator's console.

logical device — a peripheral device that is represented in a program by an operational label rather than by a physical device name.

monitor — a program that supervises the processing, loading, and execution of other programs.

on-line job — a job that is submitted through an on-line terminal by a processor other than the Batch processor.

operational label — a symbolic name used to identify a logical system device.

physical device — a peripheral device that is referred to by a name specifying the device type, I/O channel, and device number.

PIGEON — a ghost job that handles the SEND key-in.

primary CPU — the CPU in a multiprocessing system on which the boot process (from tape or disk) has been performed and on which all system functions may be performed.

protective mode — a mode of tape protection (determined at SYSTEM) that applies to ANS tapes only. (The opposite mode is called semi-protective mode.) Certain operator responses are affected by this mode; therefore, the operator should ask the system manager which mode the system is in.

secondary CPU — any CPU in a multiprocessing system other than the one on which the boot process (from tape or disk) has been performed and on which only a subset of the total system functions are performed.

semi-protective mode — a mode of tape protection (determined at SYSGEN) that applies to ANS tapes only. (The opposite mode is called the protective mode.) Certain operator responses are affected by this mode; therefore, the operator should ask the system manager which mode the system is in.

stand-alone program — a program which runs by itself, without the monitor.

symbiont — a monitor routine that transfers information between disk storage and a peripheral device independent of and concurrent with job processing (see cooperative).

symbiont files — files that serve as buffers between user programs and the various peripheral devices.

system files — files that are created and maintained by CP-V.

system generation (SYSGEN) — the process of creating an operating system that is tailored to the specific requirements of an installation.

unprotected mode — a mode of tape handling that provides no monitor protections against overwriting tapes.

user files — files that are created, maintained, and read by the users of CP-V.

1. KEY-IN PROCEDURES AND MESSAGE FORMATS

INTRODUCTION

This manual contains operations information for the Control Program-Five (CP-V) System. Five types of information are included:

1. System start-up and initialization.
2. Job and system controls.
3. Peripheral device handling.
4. System recovery and file preservation.
5. Descriptions of major operator tasks.

The general rules for operator key-ins and system messages that apply to all of these areas are defined in this chapter.

KEY-IN PROCEDURES

Operator key-ins and monitor type-outs provide the means of communication between the operator and the system.

Operator key-ins give the operator control over system operation. Monitor type-outs inform the operator of error or abnormal conditions affecting system operation.

The key-in procedure is initiated by the console interrupt which is triggered on Sigma machines by pressing the INTERRUPT button on the central processor control panel (see Figure 1) or on the operator's console. On the Xerox 560, the operator's console serves both as the communications link to the monitor and as the facility for controlling the machine (i.e., control panel functions). A complete description of the control function commands is given in the Xerox 560 Computer Reference Manual, 90 30 76, in Chapter 5. The command which triggers the console interrupt on the 560 is Z^C1 or Y^C.

For both types of machines, CP-V responds with a carriage return/line feed and prompts with a bang (!) character. The operator may then type in any appropriate key-in.

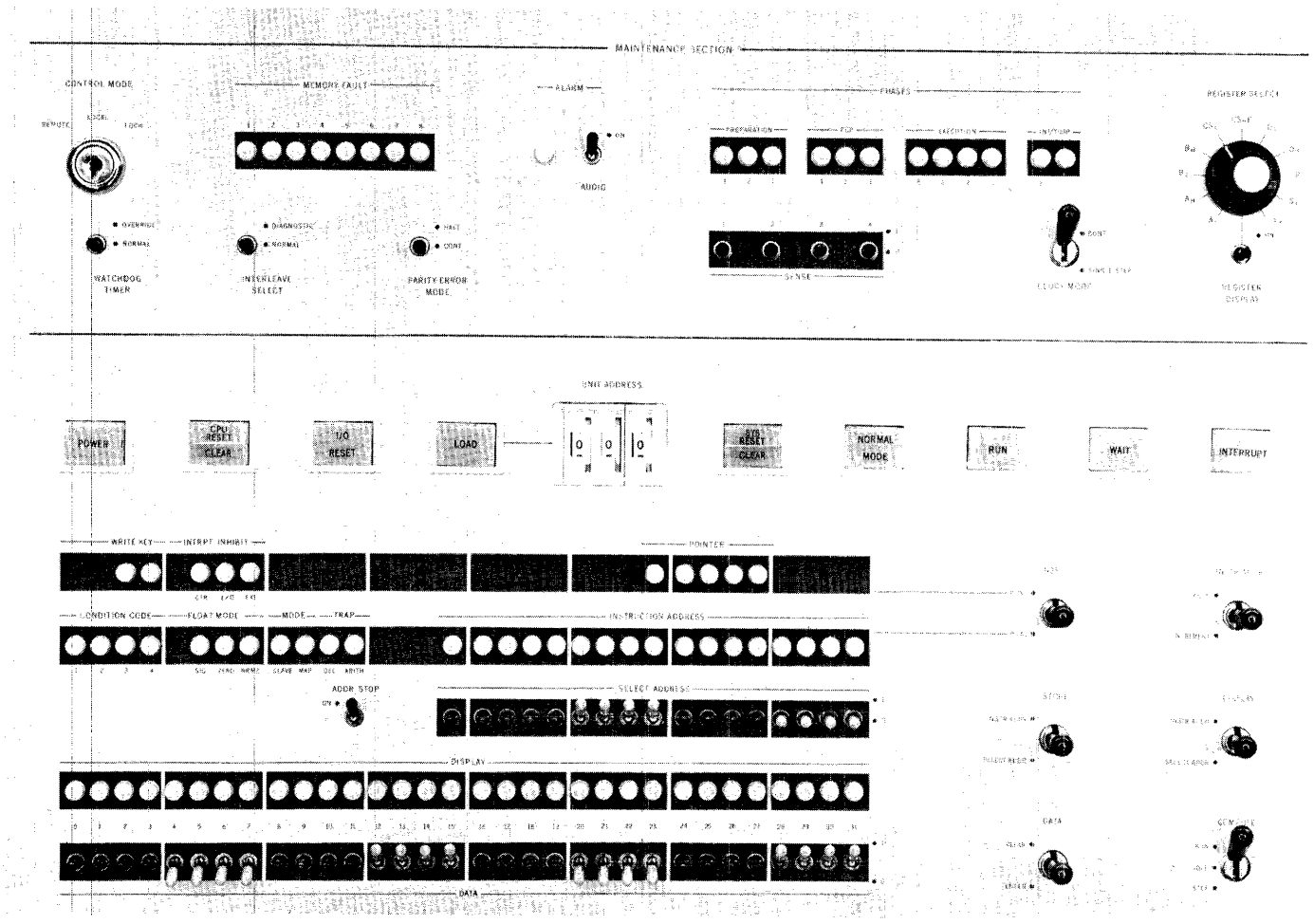


Figure 1. Sigma 6 CPU Control Panel

Each key-in must be terminated with a new line (NL) character on Sigma machines or a return or line feed character on the Xerox 560. (The terminating character causes the key-in to be transmitted to CP-V.)

The fields of key-ins must be separated by one or more blanks, or by a comma, colon, or slash character. An incorrect key-in that has not yet been transmitted to the system may be deleted by typing an end-of-message (EOM) character for Sigmas or an H^C or X^C character for Xerox 560s.

Minor typing errors may be corrected with the '_' (underscore) key, which effectively erases the last unerased character to the left of the '_'. An '_' character cannot be included in the text of an operator keyin (a !SEND keyin, for example). This error-correction facility is available only for normal CP-V keyins and for responses to programmed requests for console input. It cannot be used during CP-V initialization or recovery, or when a stand-alone program such as VOLINIT or DEVDMP is running.

If CP-V detects an error in the input, it responds with

```
EH?
```

and prompts (!) for another key-in. If the operator does not wish to enter a message, a new line (Sigma) or return (Xerox 560) character may be entered to exit the key-in mode. It is not a good idea to leave a key-in pending since no system messages will be output while the system is waiting for a response, except as described in the next paragraph. On Sigma consoles, a pending key-in is indicated by the light on the console. On Xerox 560 consoles, there is no such light, but characters typed on the keyboard will be echoed (printed) only when a key-in is pending.

A key-in message must be completed within 60 seconds. Otherwise, the read request will be timed out, the alarm will be sounded, any pending output will be sent to the operator's console, and the read operation will be retried. (This feature permits unattended operation.)

For key-ins that require a device name, the name has the form

yyndd

where

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

n specifies the IOP letter for Sigma computers (see Table 2) or cluster/unit for the Xerox 560 (see Table 3).

dd specifies the device number (see Table 4).

Examples:

CRA03 For Sigma, specifies the card reader on IOP A (unit address 0), device number 03.

For Xerox 560, specifies the card reader on cluster 0, unit 0, device number 03.

9TB80 For Sigma, specifies the 9-track magnetic tape drive on IOP B (unit address 1), controller 8, device number 0.

For Xerox 560, specifies the 9-track magnetic tape drive on cluster 1, unit 0, controller 8, device number 0.

Table 1. I/O Device Type Codes

Device Code (yy)	Device Type
7T	7-track magnetic tape
9T	9-track magnetic tape
BT	9-track 1600 bpi magnetic tape
DT	9-track dual density 800/1600 bpi magnetic tape
MC	Maintenance console (Remote Assist Station)
ME	Character-oriented controller (COC)
MO	Message-oriented controller
CP	Card punch
CR	Card reader
TY	Operator's typewriter
LP	Line printer
DC	Disk file (RAD)
DP	Disk pack
RB	Remote processing controller

Table 2. IOP Designation Codes

IOP Letter (n)	Unit Address
A	0
B	1
C	2
D	3
E	4
F	5
G	6
H	7

Table 3. Xerox 560 Cluster/Unit Matrix

Unit No.(UA)	Cluster Number (CA) 0	1	2	3	4	5	6	7
0	A	B	H	N	T	Z	5	*
1	$	C	I	O	U	0	6	*
2	#	D	J	P	V	1	7	*
3	@	E	K	Q	W	2	8	*
4	:	F	L	R	X	3	9	*
5	*	G	M	S	Y	4	␣	*
6	*	*	*	*	*	*	*	*
7	*	*	*	*	*	*	*	*

*Reserved

NOTE: When booting, the device hex address (dddd) is constructed from the cluster number and unit number in the table as follows:

00	CA	UA	D	D
0 1 2 3	4 5 6 7	8 9 10 11	12 13 14 15	
	d	d	d	d

Table 4. Device Designation Codes

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

Some key-ins (for example, ABORT and ERROR) require a user identification (ID), which is a job sequence number assigned by the monitor to each job as it enters the system or to each user who logs on. The user ID is output on the operator's console with the JOB control command when a batch job is read from the card reader, when a batch job begins and ends execution, and when an on-line user logs on and off.

Each user-associated message that is output on the operator's console is preceded by the user ID for identification. The ID is separated from the remainder of the message by a colon and space corresponding to one or two tabs.

Example:

id:acct_[t] SCRATCH A80

[t]The system normally skips 1 inch for each tab in a message. A tab is identified throughout this manual by a short line. The actual message will have 1 inch of blank space for each of these lines.

MESSAGE FORMATS

Four classes of messages are printed in four different formats on the operator's console. These formats are outlined below.

1. Messages without tabs are for operator's reference at a later time. They are typed at the left margin.

   Examples:

   id:acct_ ON

   id:acct_ OFF

   JOB acct, name, id, priority

2. Messages preceded by a single tab are for symbiont operations. With normal tab setting, they are positioned 1 inch to the right of the left margin.

   Examples:

   _ Syyndd ACTIVE

   _ Syyndd NOT ACTIVE

3. Messages preceded by two tabs either concern specific users or are generated by on-line users. (All terminals logged into the system have the capability of sending messages to the operator's console.) With normal tab setting, these messages are positioned 2 inches to the right of the left margin. When messages generated by on-line users exceed 44 characters they are broken into two messages, the first message containing 44 characters and the second message the remainder. Both parts of the user message have the format shown below.

   Examples:

   id:acct_ **** (user message)

   (A message from a user is always preceded by four asterisks to distinguish it from other types of messages.)

   id:acct_ ndd DISMOUNT AND SAVE reel number

   id:acct_ MOUNT ndd,reel number

4. Messages preceded by four tabs are for operator actions that are related to physical devices. With normal tab setting, they are positioned 4 inches to the right of the left margin.

Examples:

```
____yyndd MANUAL
```

```
____yyndd ERROR
```

The operator may cancel the printing of any message by depressing the BREAK key.

CONSOLE ERRORS

If a problem occurs that prevents normal output of messages to the operator's console, the alarm will be activated and messages will be discarded until the problem is fixed. Most intermittent terminal problems can be cured by a power-off, power-on sequence. If the problem persists, a Customer Engineer should be called.

2. SYSTEM START-UP AND INITIALIZATION

SYSTEM LOADING

The operator should begin system loading by mounting the current system (usually a "PO" tape made by SYSGEN) on any 9-track tape unit and using the normal bootstrap procedure which is outlined in Chapter 7, "Task Descriptions". After the initial portion of the tape has been read in, the following message is issued:

```
ENTER ANY OF:
    I = TTY I/O
    P = LP OUTPUT
    F = TAPE FILES
    S = :SYS FILES
    T = TAPE PATCHES
    C = CARD PATCHES
    D = XDELTA
```

The response must end in (NL), which may be preceded by any combination of I, P, F, T, C, D, S, and N, or by nothing. If nothing, T is assumed.

I enables the normal OC interaction described below during the boot (except the date/time request, which cannot be disabled).

P enables printer output during the boot.

F causes a new file system to be created. Its absence keeps the old file system (boot-under-the-files).

S causes the files to be copied from the PO tape into :SYS without destroying the entire file system.

C and T indicate that the patch deck(s) are to come from cards or tape, respectively. Either, neither, or both may be specified.

D causes XDELTA to be retained after the boot for debugging purposes.

N is meaningful only by itself and means "none of the above".

The message

```
NEW FILE SYSTEM
```

indicates that F was specified. If F was specified, the old file system is not destroyed until the entire patch deck has been read. The bootstrap operation may be halted at any time during this interval by triggering a console interrupt. The message

```
INITIALIZATION HALTED – RESTART O.K.
```

indicates a successful halt; the PO tape is rewound.

The next request, if I was specified and if the system includes the real-time option, is

```
RESET RESDF YYY,XXXXX
```

This message allows the operator to override the SYSGEN-defined values for the size of the RESDF area (dedicated real-time memory pages) and its starting address. The operator should respond:

[yyy] [,xxxxx]NL

where

yyy is the optional decimal number of pages to be in the RESDF area; a value of 0 through 999 may be used.

xxxxx is the optional hexadecimal word address of the first page to be in the RESDF area. Any page address representing a value greater than or equal to $10{,}000_{16}$ (64K) may be used.

If either or both optional parameter(s) are not specified, the SYSGEN-defined default(s) will be used.

CP-V will then request the date

```
DATE (MM/DD/YY) =
```

and the operator should enter the date (e.g., 2/5/74).

Then CP-V will request the time

```
TIME (HH:MM) =
```

and the operator should type the time, which is represented by a 24-hour clock (e.g., 6:05 PM is typed as 18:05). The time of day is typed at the left margin of the console once every minute after the system has been initialized. The form of this type-out is

```
hh:mm
```

Next, the system issues the following message to ensure that the card reader, line printer, and swapping disk are addressed correctly:

```
C/LL/DC ASSIGN OK (YES/NO)
```

The response must be YES or NO. If NO, CP-V will request a new address for these devices.

Whether YES or NO, CP-V will check to ensure that the SYSGENed or modified swap device address is for the correct device type. If the swapper assignment is incorrect, one of the following messages will be displayed:

```
!!yyndd INOPERATIVE
yyndd => yy
```

(The device address is unrecognizable by the hardware.)

```
!!yyndd NOT device type
yyndd =>yy
```

(The device type indicated was expected as the swap device.)

The message on the second line is output to indicate that a new swap device address is requested. The operator should input the correct swap device address or contact the system analyst for assistance.

Upon verification that the swap device address is correct, the system will test the first cylinder of the swap device for flawed tracks if the swap device is a disk pack rather than a RAD. If flawed tracks are discovered, the following message is output:

```
PSA TRACK FLAWED
```

The operator should replace the disk pack and reboot from the PO tape.

After the above tests are complete, CP-V will type its version, creation date, patching, and sense switch information.

The operator may suppress this information (up to sense switch information) by pressing the BREAK key, and he may suppress sense switch information by pressing the BREAK key a second time. If sense switch information is suppressed, no additional response is needed. If sense switch information is not suppressed, the operator must set the sense switches and type a character (any character).

CP-V will then read the patch deck. Any errors in the deck will be displayed at the operator's console, along with an indication of the point-of-error within the incorrect field.

For example:

```
/@/YW,5 DCT20,3/
```

followed by a message giving the relative character position when the error was discovered – usually just following the incorrect information.

```
****************************************
                CP-V
SYSTEM GENERATED ON:
    12:00 AUG 16, '74
VERSION NO. IS:              C01
****************************************

PATCH SEGMENT NAMES:
                (ROOT)
    ALLOCAT0    (DATA)
    ALLOCAT1    (PROC)
    FIX0        (DATA)
    FIX2        (DCBS)
    FIX1        (PROC)
    GHOST10     (DATA)
    GHOST12     (DCBS)
    GHOST11     (PROC)
    CLOSE       (DATA)
    DEBUG       (DATA)
    ENQOV       (DATA)
    KEYIN       (DATA)
    LDLNK       (DATA)
    LTAPE       (DATA)
    MISOV       (DATA)
    MULOV       (DATA)
    OPEN        (DATA)
    OPENTP      (DATA)
    RMAOV       (DATA)
    RTOV        (DATA)
    STEPOVR     (DATA)
    TQOV1       (DATA)
    TQOV2       (DATA)
    UMOV        (DATA)
    RECOVER     (DATA)
****************************************
SET SENSE SWITCHES AND TYPE N/L
    SSW1 => CHECKWRITE DISC WRITES
    SSW2 => NO AUTOMATIC LOGON/NO
            TERMINAL TIME-OUT
    SSW3 => FOR RESTART ON DISC BOOT
    SSW4 => SYSTEM SECURITY CHECKING
```

```
?4
```

The operator (or system programmer) must correct the patch card. Patch card correction procedures are described in the CP-V/SP Reference Manual, 90 31 13.

If F was specified and the files are on a different tape, a mount message is typed next.

```
MOUNT A80, serial no.
```

The operator should then notify the monitor that the tape is ready by keying in

MOUNT A80 [,serial no.]

or optionally, with some models, by pressing the RESET, ATTENTION, and START buttons on the tape unit.

The tape will then be copied to the file disk and the swapping disk will be initialized. During the time the tape is copied to disk, the operator may adjust the number of on-line users allowed on the system at the same time by using the ON and OFF key-ins (see "Miscellaneous Controls", Chapter 3). In a system that uses a disk pack rather than a RAD as a swap device, the number of users allowed on the system may be reduced automatically by CP-V due to the limited amount of swap space. In such case, the following message is output on the operator's console:

```
MAX OUM + BUM = n
```

where n specifies the number of non-ghost users allowed.

CP-V will next type the dismount message for the system tape. Terminal users will receive the CP-V salutation and log-on request if their terminals are connected to the system and sense switch 2 is down.

After the swapping disk has been initialized, the system file maintenance ghost, FILL, will initialize itself and inform the operator with the message

```
4:(FILL)  FILL GHOST INITIATED – USE 'INT,FILL.'
          -- FOR COMMANDS
```

FILL then goes to sleep. If the operator wishes to activate FILL to enter commands to it, the following key-in should be used:

INT,FILL.

The FILL commands are described in Chapter 6.

Another system ghost, GOOSE, is also initiated at this time. GOOSE in turn initiates other ghost jobs which the installation always has running. GOOSE commands are described in Chapter 6.

When an MPC cannot receive firmware the following message is output on the operator's console:

```
CANT LOAD MPC
```

The computer will then halt. While halted, CPU registers 1-6 have the following meaning:

1	DCTX of the device on the MPC
2	Status bits from a TIO to the device
3	TDV odd status word from the device
4-5	TIO status doubleword from the device
6	Device address on the MPC

When register 3 contains FFFFFFFF, register 2 contains the SIO condition codes from the device on the MPC.

To retry the firmware download, the operator puts the CPU into IDLE, increments the instruction address by one, and returns the CPU to RUN.

BATCH INITIATION

To initiate the batch system, the operator should place the deck of jobs to be run in a symbiont card reader and terminate the deck with a FIN control card. (The FIN control card contains !FIN in columns 1 through 4 and informs the system that the end of the deck of jobs has been reached.) The operator should then start the selected symbiont input devices with a key-in of the form

Syy[ndd],I

where

S identifies the symbiont key-in.

yy[ndd] specifies the device name (see Chapter 1).

I specifies initialization.

The system will begin reading records from the symbiont input device specified.

If only one symbiont input device exists, the input symbiont may be started by a key-in of the form

SS

If more than one input symbiont device exists and the SS key-in is used, the following message will be returned to the operator's console:

```
EH?
```

REMOTE PROCESSING

The following sections describe the procedures and key-ins used by the central site operator to initiate and control the connection of remote processing terminals to his system. Chapter 3 contains additional information on job control procedures for remote processing terminals. Complete descriptions of the remote processing features of this system may be found in the CP-V/RP Reference Manual, 90 30 26.

CONNECTING A REMOTE PROCESSING TERMINAL TO THE SYSTEM

There are several types of data sets that may be used to connect a remote processing terminal to the system. The most frequently selected type is the Bell System 201A or 201B data set. This data set can be used in full-duplex configuration or in half-duplex configuration. Operating procedures for the two configurations are discussed separately.

FULL-DUPLEX CONFIGURATION

The Bell System 201A or 201B data set used with the remote system in full-duplex configuration does not have an automatic answering capability. Therefore, the central site operator must work with the remote operator to establish a manual connection of the data set lines.

Most full-duplex data sets have the following six buttons:

AUX (HOLD)	DD1 (XMIT)	DD2 (REC'V)	TEST	TALK	DATA

The buttons perform the following functions:

AUX	Used to put a data line in auxiliary mode so that the phone may be used to dial the other data line.
DD1,DD2	Used to connect the phone to the line for dialing, answering, and vocal communication.
TEST	Used for line testing by the phone company. (It is not used in data transmission or in the data line connection procedure.)
TALK	Used to change the data set from the data communication mode to the voice communication mode.
DATA	Used to change the data set from the voice communication mode to the data communication mode.

A data set should always be maintained in the voice communication mode when it is not connected to another data set for data communication purposes. In this mode, it is like any standard telephone with two phone lines and two phone numbers associated. When in this mode, the data set will have none of the lights in the buttons illuminated, and only the TALK button will be depressed.

The sequence for connecting the central site data set and the remote site data set must be followed carefully. In most cases, the remote operator initiates the connection sequence. Therefore, the operation will be described with the remote operator initiating the sequence. The central site operator may initiate the sequence, however. In this case, the functions of the two operators are reversed.

The remote operator picks up his handset (with TALK depressed) and depresses the DD1 button to get a dial-tone. He dials the number of the central site data set's DD2 line. The central site operator answers the phone by picking up the handset (again with TALK depressed) and depressing his blinking DD2 button. The ringing is stopped and vocal connection is automatically made. Each operator then depresses his AUX button. The remote site DD1 is now connected to the central site DD2 and the connection sequence is halfway completed. Neither operator may hang up at this time because to do so would disconnect and the sequence must be restarted. The remote operator now depresses his DD2 button to get the dial tone and he dials the central site DD1 number. The central site operator answers the phone by depressing his blinking DD1 button. Each operator now depresses the AUX button once again. The final connection is made when each operator depresses the DATA button. Each phone should now have no buttons depressed and the DD1, DD2, and DATA lights on, whereupon each operator may hang up the handset and proceed with other work. If at any time any of the three lights, DD1, DD2, or DATA, are not illuminated and the handset is hung up, the connection must be considered broken and a complete dialing sequence is necessary.

The button and dialing sequences for connecting a remote terminal to the system are summarized in Figure 2.

LOCAL	REMOTE
	Dial DD2 on DD1
Answer DD2	
AUX	AUX
	Dial DD1 on DD2
Answer DD1	
AUX	AUX
DATA	DATA
Hang up	Hang up

Figure 2. Connecting a Remote Terminal to the System

HALF-DUPLEX CONFIGURATION

In the half-duplex configuration, the data set can automatically answer. Most half-duplex data sets have the following buttons:

AUTO ____ ____ TEST TALK DATA

The central site data set should be maintained with the TALK button not depressed (obtained by depressing the DATA button), the AUTO button depressed, and the handset hung up. To establish connection, the remote operator may then pick up his handset, depress TALK to get the dial tone, dial the central site data set, depress DATA when the automatic answer occurs, and hang up to complete the connection. The central site operator may establish the connection, in which case the remote site data set should be maintained as described above for the central site data set and the central site operator follows the same steps outlined for the remote site operator.

AUTOMATIC LOG-ON

The central site operator may establish an automatic log-on for a given remote processing terminal by means of the RBLOG key-in. When the automatic log-on is in effect, the !RBID card need not be submitted by the remote site user; the system will automatically log the remote terminal on as soon as the transmission line is connected. This key-in, which may not be issued if the line is currently connected, has the form

RBLOG RBndd[,wsn]

where

RBndd specifies the Data Set Controller.

wsn specifies the workstation name of the remote terminal. If this parameter is omitted, the effect of the key-in is to cancel the previous RBLOG key-in, if any, or a SYSGEN-defined wsn.

CONTROLLING THE NUMBER OF USERS

The central site operator may control the number of remote processing terminals connected to the system at any one time by means of the following key-ins:

RBDISC [&RBndd / wsn]

disconnects any terminal using DSC RBndd or the terminal being used by the specified wsn. If the RBndd form is used, it must be preceded by an &.

RBX [&RBndd / wsn]

disconnects the specified terminal (or all currently connected terminals if no single terminal is named) and causes the system to ignore new connections. If the RBndd form is used, it must be preceded by an &.

RBS [&RBndd / wsn]

allows the specified terminal (or all currently disconnected terminals) to be connected again following an RBX or ZAP key-in. The ZAP key-in is described in Chapter 3. If the RBndd form is used, it must be preceded by an &.

If transmission errors are detected on a given communication line, the system may automatically disconnect the affected terminal after sending the following message to the central operator:

```
*RBndd    ERROR    MAX
```

When this message is output, an RBS key-in is required to restart the line.

3. JOB AND SYSTEM CONTROLS

INTRODUCTION

The operator controls system operation through the use of key-ins. He may request system status type-outs to aid in this task. These key-ins and status requests are described below.

In addition, the contents of the error log file (ERRFILE), a file which keeps a record of hardware and software failures, may be listed via the Error Log Listing processor (ELLA). See the section "Error Log File" in Chapter 5.

MONITOR INFORMATION

Several monitor messages are output for information only and require no operator action. They are described below.

When an input job is added to the list of symbiont files, the monitor outputs the JOB control command. If the job was entered through an on-line terminal, the JOB control command is preceded by id: acct TERMINAL; if entered by a processor, it is preceded by id: acct PROCESSOR. The format of the JOB control message is then

```
*  id:acct {TERMINAL  } JOB acct,name,id,
           {PROCESSOR}
        [priority, workstation name]
```

An ON message is typed whenever a job is selected for execution.

```
id:acct ON
```

An OFF message is typed at the end of each job. OFF ABORTED is typed if the job was aborted for any reason.

```
id:acct {OFF       }
        {OFF ABORTED}
```

A user-identification message is sent to the operator's console whenever an on-line user enters the system.

```
id:acct USER,line,acct,name
```

An OFF message is sent to the operator's console whenever an on-line user leaves the system.

```
id:acct OFF
```

DISPLAY KEY-IN

The DISPLAY key-in may be used to display (on the operator's console) specific information regarding system operation.

The DISPLAY key-in has the form

DI[SPLAY] option

where the option may be any of the following:

DISC causes the monitor to list the current amount of RAD and disk pack storage available for user and symbiont files. The listing is of the form

```
USER=nnnn DC, nnnn DPnnnn CYL;SYMBIONT=nnnn
```

where nnnn is the number of granules.

TAPES causes the monitor to list the device name and status of each of the tape units. The listing is of the form

```
yyndd {SOLICIT } serial number,id[,filename
      {AVAIL   }
      {SCRATCH }
      {USER    }
      {EMPTY   }
   ,volume sequence number,julian
    expiration date]
```

for each tape drive in the system. Filename, volume sequence number, and julian expiration date are listed for ANS tapes only.

PACKS causes the monitor to list the device name and status of each of the disk drives. The listing is of the form:

```
yyndd {SOLICIT  } serial number, id
      {LOCKED   }
      {SCRATCH  }
      {USER     }
      {SHARED   }
      {PUBLIC   }
      {AVAIL    }
      {SYSTEM   }
      {EMPTY    }
```

for each drive in the system.

VOLUMES causes the monitor to list the device name and status of each of the disk drives and tape units available to the system. The listing is of the form

```
yyndd { LOCKED  }
      { SCRATCH }
      { USER    }
      { SHARED  }  serial number,id
      { PUBLIC  }
      { AVAIL   }
      { SYSTEM  }
      { EMPTY   }
```

for each tape and disk drive in the system.

RES causes the monitor to list the current allocation for each system resource. The listing has the form

```
                BATCH          ON-LINE        GHOST
resource    # allocated    # allocated    # allocated
```

CPU causes the monitor to list the current status of all secondary CPUs. The listing has the form

```
CPU n-a { STOPPED }
        { IDLE    }
        { ACTIVE  }
```

where

n is the logical number of the secondary CPU.

a is the hardware address of the secondary CPU.

COC causes the monitor to list each active COC line and its corresponding user number. The listing has the form

```
LINE#      ID
line #     id
```

JOB causes the monitor to display the ID of the currently executing jobs. The display is of the form

```
ID=xxxx ACCT=xxxxxxxx  PART=xx
```

If no job is executing, nothing is displayed.

USER causes the monitor to list the ID of each user known to the system. The listing produced is of the form

```
BATCH: id,id,...
ONLINE: id,id,...
ASLEEP: id,id,...
```

If there are no users in a category, the line for that category is not printed.

SYMB[IONTS] causes the monitor to display the form currently mounted on each symbiont device as well as the concurrent output mode id of the output file. Zero represents the standard form.

```
Syyndd   FORMS = xxxx   COMID = xxxx
```

OUTP[UT] causes the monitor to display the output symbiont queue and noncontrol input files.

*PRIO	SYSID	RBID	H	DEVICE	FORMS	#GRANS	COPIES
1	4C	0	0	CR		99	1
7	4A	0	0	LP		300	1
7	4D	3	0	LP		4444	1
7	4E	3	1	CP		20	1
4	50	0	0	LP		15	1

The headings in this display are described under "id" below.

RBT causes the monitor to list the status of each remote processing Data Set Controller (DSC). The listing is of the form

```
RBndd -- wsn -- rbid -- status
```

wsn and rbid are the workstation name and remote processing identification number that have been logged onto the specified (RBndd) Data Set Controller. Status may be

EMPTY	No remote processing terminal is connected.
LOGGING ON	A remote processing terminal is connected, but has not yet logged on.
INPUTTING	The wsn is inputting to the central site.
OUTPUTTING	The wsn is receiving output from the central site.

ACTIVE	The wsn is logged on and is either transmitting or receiving data. (The status displayed for Intelligent Remote Terminals can only be ACTIVE or INACTIVE.)
INACTIVE	The wsn is logged on, but inactive.
SUSPENDED	The wsn is inputting with an output symbiont suspended.
LOGGED OFF	The wsn is receiving output and will be disconnected when outputting is completed.

If status is EMPTY or LOGGING ON, wsn and rbid are not listed since neither has been associated with the specified DSC unless automatic log-on is requested.

id causes the monitor to list current information for the specified job id. If the specified job id exists in the system, one of two printouts will occur at the OC.

For a job that has already been run and still has symbiont output to be printed or punched, the following information is listed:

PRIO	The job's priority. A priority of 0 implies that the file will not be processed until given a higher priority, even if there are no other tasks to be processed. A priority of M is used to designate a special output file created by the system, e.g., the message file associated with a remote processing terminal. A priority of I designates a nonjob symbiont input file, i.e., one that does not contain control commands. The name of an I priority file may sometimes appear under the FORMS heading in the display (see below).
SYSID	The job id.
RBID	The remote processing id for remote processing jobs (or zero for local batch jobs).
ORIG	The origin of the job: T for terminal or processor jobs, L for local card reader jobs, and remote processing id for remote processing jobs.
H	Indicates whether (H=1) or not (H=0) a remote processing job's file is being held by request of the remote processing user.
DEVICE	The device type to which this job will be output. For remote terminals which are not connected, RB is used.
FORMS	Indicates the type of form that must be mounted on the designated output device. If the field is blank, the standard form for that device is to be used. See also "Form Changes", later in this chapter.
#GRANS	The size of the output symbiont file or noncontrol input file in number of disk granules (2048 bytes per granule).
COPIES	The number of copies of the output file that will be generated (maximum 255).
COMID	The concurrent output mode id of the file.

For a job that has not yet been run, all of the above information (except DEVICE, FORMS, and COPIES) is listed, plus the following:

O	The job is (O=1) or is not (O=0) order dependent.
A	The job is (A=1) or is not (A=0) account dependent.
TIME	The maximum CPU time (in minutes) that the job can run.
SP, 7T, 9T CO, etc.	The resource values allocated to this particular job.
ACCOUNT	The job's account.

PARTITIONS — The partitions in which the job can execute (.=no, 1=yes), read from left to right as 16, 15, . . . , 2, 1. If a period is output for all valid partitions, the resources requested to run the job are not valid for any existing partition and the job will never execute.

NORUN causes the monitor to list all jobs that are not valid for any unlocked partition and therefore cannot execute.

If no option is specified, the monitor will list, for all job ids, the information described above for DISPLAY id. An example of this listing appears in Figure 3. This listing can be obtained at the operator's console by the key-in DISPLAY OC. This option, however, would not normally be used, due to the length of time required to print a listing at the OC. When the number of resource types exceeds four, only the first four will be displayed if the key-in is DISP OC. This is due to the limited width of the OC paper. If the display is taken on the printer, all resource values are displayed.

When the display is taken on the printer, each resource type's serial number is printed after the normal display for that job; for example

```
*PRIO    SYSID    ORIG    H0A    --------
   7       3A       L     000    --------
*SHARED:    SP,aaaa                DA,bbbb
*EXCLUSIVE:     DA,cccc
```

JOB CONTROL

The operator exercises control over job execution through the key-ins described in this section. If a user ID that is not currently in the system is specified, the system will respond with

```
EH?
```

The system will then send a prompt character (!) to the operator's console.

If the operator does not wish to enter another command, he should type a new line (NL) character.

ERROR KEY-IN

If the operator wishes to terminate a job step (i.e., a load, assembly, user execution, etc.) for any reason, he may use the ERROR or E key-in. This key-in forces an error return to the monitor and initiates the user's exit control routine, if appropriate. An exit control routine usually performs housekeeping tasks (taking dumps, etc.) then exits to the monitor. It may, however, return to program execution instead of exiting to the monitor, in which case the user has made it impossible for the operator to simply terminate a job step. If the user's program is not using exit control, the ERROR key-in terminates the job step immediately and the job proceeds to the next step. The ERROR key-in has the form

$$\left\{\begin{matrix}\text{ERROR}\\ \text{E}\end{matrix}\right\},\left\{\begin{matrix}\text{id}\\ \text{ghostname.[account]}\end{matrix}\right\}$$

where

id is the job's id.

ghostname specifies the name of a ghost job. (This is useful if the ghost's job id is not known.)

account specifies the account of the ghost's load module. If account is not specified, the :SYS account is assumed by default.

```
*PRIO SYSID RBID H DEVICE FORMS #GRANS COPIES COMID
  7      4A    0  0   LP            40     1       5
  7      4D    3  0   LP          5555     1
  7      4E    3  1   CP            15     1
  4      50    0  0   LP            27     1
*PRIO SYSID ORIG H O A TIME SP 7T 9T  CO  ACCOUNT  16 *PARTITIONS* 1
  7      53    T  0 0 0    1  0  0  0  12  ABLE       ...1.11........1
  7      54    T  0 1 0   10  0  0  3   5  ABLE       ..........1..1..
  5      4B    L  0 1 0    5  1  0  0  12  ABLE       ..........1..111
  5      51   27  0 1 1   15  0  0  1  12  ABLE       ...11..1.1.....1
  4      4C    3  1 0 0    5  0  0  0  22  CHARLEY     ...1.......11...
  4      52    3  0 0 0    5  0  1  0  12  CHARLEY     ...1....1......1
  3      49    L  0 0 0   25  0  0  1  60  BAKER      11..............
  3      4F    L  0 0 0    5  0  0  0  12  BAKER       ...1...........1
```

Figure 3. Sample Listing from DISPLAY Key-In

ABORT KEY-IN

If the operator wishes to terminate an entire job or to log off an on-line user, he may use the ABORT or X key-in. This key-in forces an error return to the monitor and initiates the user's exit control routine, if appropriate. An exit control routine usually performs housekeeping tasks (taking dumps, etc.) and exits to the monitor. It may, however, return to program execution instead of exiting to the monitor. A second ABORT key-in, during any one job, will cause an unconditional termination of the job, without any further processing. The ABORT key-in has the form

$$\begin{Bmatrix}\text{ABORT}\\ \text{X}\end{Bmatrix},\begin{Bmatrix}\text{id}\\ \text{ghostname.[account]}\end{Bmatrix}$$

where

id is the job's id.

ghostname specifies the name of a ghost job. (This is useful if the ghost's job id is not known.)

account specifies the account of the ghost's load module. If account is not specified, the :SYS account is assumed by default.

Note: ERROR and ABORT key-ins are not effective until all outstanding I/O requests have been satisfied. This may require a key-in to satisfy a device error or interlock, or it may require making a device ready.

START KEY-IN

The START key-in causes the monitor to search the input symbionts for jobs to execute. This is used when a job's priority has just been changed from zero. The format of the START key-in is

$$\begin{Bmatrix}\text{START}\\ \text{S}\end{Bmatrix}$$

SYMBIONT CONTROL

A number of key-in commands are provided to give the operator control of the symbionts. Most of these key-ins are for special situations. The operator will ordinarily need to use only the "symbiont (I)" key-ins. All other operations are automatic.

The symbiont key-in has the form

Syy[ndd],option

where

ndd must be specified only if the system configuration has more than one device of the type yy.

option specifies the action to be taken. The possible actions and their uses are

I initiate (start up) symbiont I/O on the specified device. (Note that OUTPUT symbionts start automatically without operator action unless otherwise specified at SYSGEN or locked by bad disk block.)

S suspend symbiont activity for the specified device (possibly to free the device for diagnostic use or to change the paper or ribbon, etc.).

C continue (resume) symbiont activity for the device that was suspended previously.

K keep the file intact until it has all been output. (Applies only to output symbionts; may be used only when the symbiont is inactive.)

D delete file as it is printed. (Applies only to output symbionts; may be used only when the symbiont is inactive.) Note that some overlap is retained for R and Q below.

R retry an output symbiont. The symbiont will return logically to a spot a large number of records back, and then resume. R may be used when the symbiont is either suspended or active.

A align the page for a printer symbiont. The symbiont will return logically to the last top of form, print one page, and suspend. If A is used to resume, the process is repeated. Banners do not count as pages: using A to initiate a symbiont will cause the banner and one page to be printed. Subsequent specification of A will print only the page, but no banner.

Q save the current output file and terminate. What remains of the file is returned to the output queue, and the symbiont is locked immediately. The entire file is saved if the symbiont is in keep mode, or if another copy of the file remains to be output. Otherwise the file is saved as though R had been used. Q is useful in moving a file from a down device to one that is working.

F['xxxx'] change the form name associated with this file, where 'xxxx' represents the new form name (see "Form Changes", below). If 'xxxx' is omitted, the standard form for that device is used.

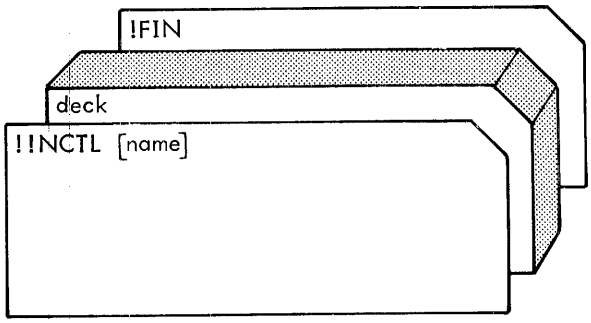
X release the current job file and begin processing the next job file.

L lock out the symbiont from future activity after this file. This feature is designed for

symbiont output files (i.e., to release a printer to the Customer Engineers). After completing the current file, the symbiont terminates. When processing input files, the symbiont continues until the next JOB or FIN control command is encountered before terminating.

Note: Symbiont key-ins of the form syy[ndd],option may not be used for remote processing terminals. The DELETE and PRIORITY key-ins, however, do apply to I/O from remote jobs.

The NCTL (noncontrol) command can be used to create symbiont files from card decks, without waiting for job scheduling. The NCTL command (which has the form !!NCTL) is entered as the first card in the reader. The deck should be set up as shown below,



where name specifies the one- to four-character name of the noncontrol input deck. (The name is output under the heading FORMS when the DISPLAY key-in is used.)

The deck may be read into the symbiont from the card reader by one of the following key-ins.

```
!SS
```

or

```
!SCRndd,I
```

If there is no name on the !!NCTL command and the user wishes to give the deck a name, the key-in

```
!SCRndd,F'xxxx'
```

should precede the above key-in (where xxxx specifies the requested name). (This key-in can also be used to override the name on the !!NCTL command.)

The user may then enter commands to retrieve the symbiont file, in either on-line or batch modes.

When a symbiont is suspended, the monitor outputs the following message to the operator's console.

```
_Syyndd SUSPENDED
```

If the output symbiont encounters an error while processing a file and retries do not clear the problem, the file is terminated and the output symbiont is locked. The following message is printed on the operator's console:

```
yyndd DISK BLOCK & OUTPUT BAD FOR SYSID nnnn n
```

Sysid nnnn informs the file's owner that the file is bad.

Error code n indicates the nature of the problem; the errfile gives an extensive explanation of the problem.

To restart the symbiont, the operator must keyin

```
Syy[ndd], option
```

If while reading binary input (which was initiated by a !BIN command), the input symbiont does not detect a !EOD or !BCD command to terminate binary input before detecting another ! control command, the following message is printed on the operator's console:

```
AN EOD OR BCD CARD IS MISSING
_ CRndd SYMB SUSPENDED
```

To recover, the operator should perform the following:

1. Get the last card read from the output hopper and place it at the read station as the next card to be read.
2. Put the card reader in the ready state and key-in

```
!SCRndd,C
```

FORM CHANGES

Each symbiont file and symbiont device has an associated form. This form is expressed as a one- to four-character name designated by the installation for a particular paper form, card stock, etc. The form on which a given symbiont file is to be output is specified by the user program, and unless the matching form is actually mounted on the symbiont device, the file will not be output. When a symbiont device is idle because the correct form is not mounted, the following message appears on the operator's console to indicate that a form change is needed:

```
*Syyndd SETUP REQUIRED
```

The operator should use the DISPLAY key-in to determine which form to mount, then change the form, and type the following symbiont key-in to inform the system of the form change:

Syy[ndd],F['xxxx']

where xxxx is the new form name. Standard forms for that device may be indicated by omitting the 'xxxx' parameter.

If the above key-in is attempted for an output device that is currently active, the following message is typed on the operator's console and the key-in is ignored:

```
*ILLEGAL FORMS CHANGE
```

It is therefore wise practice to lock the device with the Syy[ndd],L key-in before changing forms, and then reactivate the device by means of the Syy[ndd],I key-in after the form change is completed.

To change the form name on output files currently in the system, the following key-in may be entered:

FORM sysid[,device[,form]]

where

sysid is the id of the file.

device is the device type (e.g., LP or LPA02).

form is the new form name for the file. If the form name is absent, the default is assumed. Thus,

FORM 3A

sets the form on all output files with file-id 3A to the default. This key-in is particularly useful in a situation where a user has inadvertently specified an unprintable form name for a file.

Programs that make use of the old UTS/BPM forms control procedure (M:DEVICE (FORMS)) will produce a different operational effect under CP-V: if the M:DEVICE procedure is executed while the program is running (i.e., before the symbiont output file is created), the user specified forms message is immediately output on the operator's console. The operator is then requested to type in a one- to four-character form name to be associated with the output file for later use in forms scheduling. The format of the message is

```
id:acct __ message
id:acct __ FORM:
```

where message is the text of the user's form control message.

If standard forms are to be used for the output file, the operator need only enter a new line (NL) character in response to the message.

SYMBIONT ERROR MESSAGES

Attempting to enter an initiating command to a device already active will result in the message

```
_Syyndd ACTIVE
```

Attempting to enter a command to suspend a device that is inactive will result in the message

```
_Syyndd NOT ACTIVE
```

Attempting to enter a command to continue or restart a device that has not been suspended will result in the message

```
_Syyndd NOT SUSPENDED
```

Attempting to enter a command to start, continue, or restart a device that has been partitioned will result in the message

```
_Syyndd NOT AVAIL
```

Additional error messages resulting from device errors are described in Chapter 5.

CONTROL OF SYMBIONT I/O FILES

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

DELETE KEY-IN

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

DELE[TE] id,yy[ndd]

where

id is the job ID.

yy[ndd] specifies the symbiont I/O device by which, or for which, the file was created. If yyndd is omitted, all files associated with the ID (i.e., the job) will be deleted.

In the case of multiple symbiont devices of the same type, it may be necessary to use the DISPLAY key-in to determine the device name.

PRIORITY KEY-IN

The PRIORITY key-in is used to alter a file's priority. It has the form

PRIO[RITY] id, yy[ndd], priority

where priority specifies the new priority to be associated with the I/O file specified. Priorities are expressed in hexadecimal values 0 through F, where F is the highest priority.

CONCURRENT OUTPUT MODE

Concurrent output mode is a job-associated mode in which output is broken into groups ("chunks" and released to the symbiont system for output. The mode may be applied to all output streams of a job or to certain selected streams. The chunk size is controlled by a parameter which may be set by the system management processor Control.

Once an output file is selected by the symbiont for printing or punching, the particular device is held until all output produced by the job has been processed, except as otherwise directed by an operator key-in.

Control of this feature is via both operator key-in and a user control command. The operator key-in has the form

OUTPUT {GO, id / STOP, yyndd}

where

GO, id specifies that all output streams of the job identified by id are to be placed in concurrent output mode.

STOP, yyndd specifies that the output device identified by yyndd is to be released temporarily from concurrent output mode. This option is primarily used by the operator to reacquire the symbiont device for higher priority use. The current file "chunk" finishes output and the symbiont resumes priority scheduling; i.e., it outputs higher priority output file(s), if any. Concurrent output mode is resumed automatically after any higher priority file(s) have completed output (unless the concurrent output mode job was aborted).

Whenever an output stream is placed in concurrent output mode, whether by user control command or operator key-in, the following message is printed on the operator's console:

id IN CONCURRENT OUTPUT MODE ON yyndd

If it is necessary to acquire the printer sooner than the three or four minutes required to complete output of the current "chunk", the operator may use the key-in sequence

!Syyndd, Q	(to repackage the currently printing chunk)
!OUTPUT STOP, yyndd	(to resume priority scheduling)
!Syyndd, I	(to restart the symbiont)

Do <u>not</u> use the reverse sequence of the key-ins Syyndd,Q and OUTPUT STOP, yyndd since that will only result in resumption of the concurrent output mode job when the Syyndd,I key-in is given.

In order to abort a concurrent output mode job and prevent its output from being output, the following key-ins must be given

!X, id	(to abort the job)
!FLUSH yyndd, id	(to get rid of any concurrent mode output generated by the job)

The FLUSH key-in's format is

FLUSH yyndd, id

where

yyndd specifies the symbiont device.

id specifies the sysid of the job by which concurrent mode output is being generated for the device.

The FLUSH key-in should be used only when a concurrent mode job has already taken control of a particular device. It has the effect of executing the following three key-ins in sequence:

!DELETE id, yyndd	(to delete any concurrent mode output)
!Syyndd, X	(to immediately halt output at the device)
!OUTPUT STOP, yyndd	(to free the device for normal priority scheduling)

MISCELLANEOUS CONTROLS

There are several other control key-ins that allow the operator to request system action. These key-ins are described below.

USER'S EXECUTION PRIORITY

The operator may display or change a currently running job's execution priority by the key-in

PRIO id[,priority]

where

id is the job ID.

priority specifies the new execution priority to be given the job. It must be a hexadecimal value between F0 and FF. If priority is omitted, the job's current execution priority is displayed as follows:

```
IS xx
```

where xx is the current priority.

If the key-in to change a job's execution priority is accepted, the job's old priority is displayed as follows:

```
WAS xx
```

where xx is the old priority.

NUMBER OF ON-LINE USERS

The operator may control the number of on-line users allowed on the system at one time by the following key-ins:

ON n

sets the number of on-line users allowed to "n". When "n" users are on, no additional users are allowed to log on until one of the current users logs off.

OFF

prevents new on-line users from logging on and prevents any batch jobs from starting. OFF performs the same functions as the key-ins ON 0, ONB 0 and RBX combined.

ZAP

immediately disconnects all on-line and remote processing terminals, and aborts all on-line, batch, and ghost jobs. All open users' files are closed. It is good practice to notify all users with a SEND message prior to keying in ZAP. This message is broadcast to all on-line users to inform them when the system will be shut down. When peripheral device activity has terminated, the system tables and current CONTROL values are saved on the system disk by the recovery routine. The message "__THAT'S ALL, FOLKS!! " informs the operator of a successful shutdown. To restart the system after a ZAP key-in, the system must be booted back in from the system disk. ZAP sets ON and ONB to 0 and they must be reset before on-line and batch users will be allowed on the system.

NUMBER OF BATCH USERS

The operator may limit the number of batch users on at any one time with the ONB key-in. The ONB key-in has the form

ONB n

where n is the maximum number of batch users allowed on at one time. When n batch users are on, no additional batch jobs will be started until one currently executing is completed.

TERMINAL AND PROCESSOR ACCESS TO THE BATCH STREAM

The operator may disallow the entry of jobs to the batch stream from on-line terminals and by processors with the OBOFF key-in which has the form

OBOFF

Note that the OBOFF key-in does not prevent jobs that have already been entered from running; it only prevents new job submissions.

The OBON key-in is used to reallow jobs to be entered to the batch stream from on-line terminals and processors after an OBOFF key-in. The form of the key-in is

OBON

MESSAGES TO ON-LINE USERS

A line is typed at the top of each page for every on-line user. This line includes date, time, user name, account, user ID, line number, page number, and the most recent heading supplied by the operator. A heading is supplied by the HEADING key-in which has the form

HEAD[ING] [message]

where "message" is the heading to be printed and must be 54 characters or less. The current heading is deleted if HEADING is immediately followed by a new line (NL) character.

Messages may be sent to on-line users via the SEND key-in. A message may be sent to a specific user via the following form of the SEND key-in

SEND,id message

The message will appear immediately at the user's terminal anywhere in his output. Therefore, the message text should be identifiable as being from the operator.

A message may be sent to all on-line users via the following form of the SEND key-in

SEND,ALL message

The message will appear immediately at all user's terminals except at those terminals whose users have explicitly requested that such messages be deferred (via the TEL processor's DONT SEND command).

MESSAGES TO REMOTE PROCESSING USERS

Messages can be sent to remote terminal operators either by including the message in the message file that is printed at each remote terminal or by sending a message file directly to a remote terminal. A new message is included in the remote message file with the RBBDCST (Remote Batch Broadcast) key-in. The RBBDCST key-in has the form

RBBDCST message

where message is the text to be printed. The current message is deleted if RBBDCST is immediately followed by a new line (NL) character.

A message to a specific remote terminal can be issued with an RBSEND key-in of the form

RBSEND {&RBndd / wsn} message

which places the message in a message file for the remote terminal connected to RBndd or the one being used by the specified wsn. The message file will be the next file output to the specified remote terminal. RBSEND is only legal for remote terminals that are logged on.

GHOST JOB INITIATION

Some system jobs are executed as ghost jobs. These can be initiated by the operator by means of the GJOB key-in:

GJOB name[.account]

where name is the name of the ghost job and account specifies the number of the account in which the load module can be found. If no account number is specified, the :SYS account is assumed by default.

Examples:

GJOB ANLZ

Starts the ANLZ load module which is in the :SYS account.

GJOB ABC.TEMP

Starts ABC from the TEMP account.

If the name or account number that is specified on the GJOB key-in cannot be found, the following message is output

```
GJOB name.account ERR
```

If the named ghost was sleeping, the following message is output

```
**GHOST AWAKENED
```

If the named ghost was already running, the following message is output

```
**GHOST ALREADY ACTIVE
```

If the named load module cannot be started because the monitor's ghost tables are all busy, the following message is output

```
**GHOST TABLES FULL
```

DATE KEY-IN

The DATE key-in changes the date. It has the form

{DATE / D} mm/dd/yy

where mm, dd, and yy, respectively, represent the month (1 through 12), day (1 through 31), and the last two digits of the year.

TIME KEY-IN

The TIME key-in changes the time of day. It has the form

{TIME / T} hh:mm

where hh represents the hour (0 through 24) and mm represents minutes (0 through 59). A comma or a blank may be used in place of the colon.

INTERRUPT KEY-IN

The INT key-in may be used to transfer control to the user's console interrupt routine. Note that the user's program must set the console interrupt linkage (e.g., by means of a M:INT procedure call).

The INT key-in has the form

INT, {id / ghostname.[account]}

where

id is the job's id.

ghostname specifies the name of a ghost's load module. (This is useful if the ghost's id is not known.)

account specifies the account of the ghost's load module. If account is not specified, the :SYS account is assumed by default.

RBSWITCH KEY-IN

The RBSWITCH key-in allows the operator to switch output files from one workstation to another. A file can only be RBSWITCHed once. The RBSWITCH key-in has the form

RBSWITCH wsn,dev,user

where

wsn is the workstation name that is to receive the file. Central site devices have the wsn LOCAL.

dev is the device type. (The device must exist at the workstation.)

user is the id of the job that output the file.

ERSEND KEY-IN

The ERSEND key-in allows the operator to build a record in ERRFILE, the system error log file, in order to help clarify the circumstances surrounding a serious hardware problem. The information thus entered in ERRFILE will assist the Customer Engineer in analyzing the problem at a later time. The ERSEND key-in has the form

ERSEND text

where text is a message of up to 72 characters.

MCSEND KEY-IN

On the Xerox 560, the operator may send a message to the Maintenance Console (Remote Assist Station) with the MCSEND key-in. The MCSEND key-in has the form

MCSEND text

where text is a message of up to 72 characters.

If the Maintenance Console is not currently logged onto the system, or if the system is not running on a Xerox 560, the response will be

```
EH?
```

DIAGNOSTIC AUTHORIZATION KEY-IN

The DIAG key-in can be entered to permit a user to run CP-V VOLINIT or On Line Diagnostics (OLTEST), which use the diagnostic CALs described in the CP-V/SP Reference Manual, 90 31 13. This authorization has the following effect: when the diagnostic CALs are processed, a test is made to ascertain whether the user's id is the same as the id from the last DIAG key-in. If they are identical, the user's processing continues; if not, the user's processing is terminated. This ensures that one and only one user may use these CALs at a given time, and provides a level of communication security between the potential user and the computer operator. The DIAG key-in has the form

DIAG id

where id is the user identification.

DELTA KEY-IN

If XDELTA was retained for debugging purposes, the DELTA key-in causes XDELTA to take control of the system and accept commands from the console. If XDELTA was not retained at boot time, the DELTA key-in has no effect. The DELTA key-in has the form:

DELTA

SENSE SWITCH ASSIGNMENT

On Sigma computers, some operator control of the system is carried out by the setting of the processor (CPU) control panel sense switches (see Figure 1). When set, the four sense switches have the effect listed below.

Sense Switch 1 All disk write operations are followed by write checks. (The swapping disk is not affected, as write checks are always performed on it.)

Sense Switch 2 Automatic log-on of lines calling in and time-out of inactive lines are inhibited.

Sense Switch 3 When booting from the swapping device, sense switch 3 indicates that an operator recovery is desired.

Sense Switch 4 Software checks for consistency are performed.

On the Xerox 560, the sense switches are set by the Z^{c}SS command which is described in the Xerox 560 Computer Reference Manual, 90 30 76.

Sense switch settings have no meaning on secondary CPUs in multiprocessing systems.

4. REMOVABLE STORAGE HANDLING

This chapter describes the initialization and handling procedures for disk packs and for magnetic tapes.

REMOVABLE DISK STORAGE (DISK PACKS)

Disk pack devices to be used as private volumes or public devices are initialized by the VOLINIT processor. There are two versions of VOLINIT. One is a CP-V processor which runs in the batch, on-line, and ghost modes under CP-V. Hereafter, it will be referred to as CP-V VOLINIT. The other version is a stand-alone processor which runs on the computer when CP-V is not in control. Hereafter, it will be referred to as stand-alone VOLINIT. In addition there are utility routines in the diagnostic programs, which can be used to initialize disk packs.

Warning: The VOLINIT processors described here must be used to initialize private disk packs for CP-V. The diagnostic programs do not initialize a private pack in a CP-V compatible format.

CP-V VOLINIT PROCESSOR

The CP-V VOLINIT processor may be used in on-line ghost, or batch mode to initialize disk packs concurrently with normal CP-V operation provided that the system has the appropriate devices SYSGENed as private resources.

The CP-V VOLINIT processor requires a privilege of X'A0' or higher and the DIAG key-in of the operator.

CP-V VOLINIT is called in the on-line mode via TEL with the command.

!VOLINIT ⏎

The processor prompts for commands with a greater than (>) character.

It is called in the batch mode with the control command

!VOLINIT

In the ghost mode, it is called with the operator key-in

!GJOB VOLINIT ⏎

The processor prompts on the operator's console with the greater than (>) character.

Command input is normally read through the on-line terminal in the on-line mode and through the card reader in the batch mode. (This may be changed by modifying the setting of the M:SI DCB.) Command input is always read through the operator's console in the ghost mode.

CP-V VOLINIT will process any number of commands during a session. A session is terminated by the keyword END.

CP-V VOLINIT CONTROL COMMANDS

CP-V VOLINIT has nine mnemonic commands which allow easy usage of the processor for the most common types of volume initialization. All commands are read through the M:SI DCB; also, all commands except those for on-line jobs are echoed to the M:LO DCB.

After CP-V VOLINIT has been loaded and started, it prints its name and version number, then prompts for a command. The VOLINIT commands are described below.

CVOL The CVOL command initiates a complete volume initialization. After the CVOL command is entered, CP-V VOLINIT requests the device address; this may be entered either in the form yyndd or in the form yy, where the device mnemonic yy can be DP or any other form which was set up at system generation. The address ndd must be an address of a private disk pack not currently in use by another user, and the disk drive must be empty. If only the device mnemonic yy is entered, a disk drive that meets these criteria is searched for.

CP-V VOLINIT then requests a serial number (SN) of 1-4 characters and a list of not more than 96 account numbers (ACCT). If the serial number request is terminated by a carriage return only, the default value of the serial number, P000 or last SN specified, is used. If the first account request is terminated by a carriage return only, the default account number, null, is used. (This account number is updated with the account number of the first file written to the pack.) If account numbers are entered, the list is terminated when 96 account numbers have been entered or when the ACCT>>prompt is responded to with a carriage return only. CP-V VOLINIT further requests the number of granules per logical cylinder (NGC) in hexadecimal form. If this request is terminated by a carriage return only, the default value is taken from the current CP-V system. The following example shows the user interactions, with the output underlined:

```
!VOLINIT
VOLINIT A00 HERE
>CVOL
YYN00>>DPB82
SN    >>PK01
ACCT  >>CPVULS
ACCT  >>CPVPRY
ACCT  >>
NGC   >>1E
VOLINIT WAITS FOR OPERATOR KEYIN
RUNNING

≥END
```

In this example CP-V VOLINIT performs a complete volume initialization. First new headers are written onto the disk pack. Then the surface of the disk pack is tested for flaws. If flaws are found, the headers of the affected sectors and the headers of the assigned alternate secotrs are rewritten. Finally the volume table of contents (VTOC), the account directory and an empty file directory for each account number are written to the disk pack.

If flaws are found the addresses of the bad sectors and the starting addresses of the assigned alternates are printed. The printout has the following form:

```
LIST OF SECTORS WITH FLAWS AND ASSIGNED ALTERNATES
   SEEK ADR ALT. ADR
   00010003 01900000
   00240300 01900200
```

The run time for a complete volume initialization is dependent on the device type, system configuration, and concurrent system activities.

FVOL The FVOL command initiates a fast volume initialization. The user interactions are the same as for the CVOL commands:

```
!VOLINIT
VOLINIT A00 HERE
≥FVOL
YYNDD>>DPB82
SN     >>PK01
ACCT   >>CPVULS
ACCT   >>CPVPRY
ACCT   >>
NGC    >>1E
VOLINIT WAITS FOR OPERATOR KEYIN
RUNNING
≥END
```

In this example, CP-V VOLINIT performs a fast volume initialization. It writes new headers on the whole surface and then writes the volume table of contents, the account directory, and file directories onto the first three granules of the disk pack.

Warning: This routine should be used only if one is sure that there are no flaws on the disk pack.

Run time for fast volume initialization is dependent on device type, system configuration, and concurrent system activities.

WVTOC The WVTOC command initiates the writing of volume table of contents (VTOC), the account directory, and file directories. The user interactions are the same as for the CVOL command:

```
!VOLINIT
VOLINIT A00 HERE
≥WVTOC
YYNDO  >>DPB82
SN     >>PK01
ACC    >>CPVULS
ACCT   >>CPVPRY
ACCT   >>
NGC    >>1E
VOLINIT WAITS FOR OPERATOR KEYIN
RUNNING
≥END
```

This routine should be used whenever a user wants a different serial number and account numbers on a pack that has previously been initialized. The run time is insignificantly short.

Warning: All files residing on the pack are lost.

RVTOC The RVTOC command initiates the reading of the serial number (SN), the account number (ACCT), and the number of granules per logical cylinder (NGC). The user interactions have the form:

```
!VOLINIT
VOLINIT A00 HERE
≥RVTOC
YYNDD >>DPB82
RUNNING
SN       = PK01
ACCT = CPVULS  FD 0004
ACCT = CPVPRY  FD 003C
NGC      = 1E
 END
```

The RVTOC command can be used to investigate the serial number, account numbers, and the NGC number of a private pack. The run time is insignificantly short.

LIST The LIST command reads the headers of the alternate sectors, checks the headers and prints the flawed sectors (RMP) or tracks (RDC and RMC) and the assigned alternates. The user interactions have the form:

```
!VOLINIT
VOLINIT A00 HERE
≥LIST
YYNDD>>DPAF4
VOLINIT WAITS FOR OPERATOR KEYIN
RUNNING
FLAWED TRACK : 00240200 ALTERNATE TRACK : 01900000
FLAWED TRACK : 00240300 ALTERNATE TRACK : 01900100
FLAWED TRACK : 00560E00 ALTERNATE TRACK : 01900200
FLAWED TRACK : 00560F00 ALTERNATE TRACK : 01900300
≥END
```

FLAW The FLAW command provides a convenient method of flawing additional sectors. After requesting the device address, the flaw routine asks for the sector seek addresses with the message 'SEEK>>'. The user can insert seek addresses as they appear in the column 'SEEK ADRS' of the Error Log List and Analysis program (ELLA). The inserted address is checked. If the address is found invalid, the message 'EH?' is printed, and the sector address is requested again. Entering a carriage return alone terminates the input phase, and starts the operation. The alternate disk pool is searched for the next available sector (RMP), track (RDC), or track pair (RMC). Then the assigning of alternates and the flawing proceeds as in the CVOL command:

```
!VOLINIT
VOLINIT A00 HERE
≥FLAW
SEEK >>00010003
SEEK >>00240300
SEEK >>

VOLINIT WAITS FOR OPERATOR KEYIN
RUNNING
```

```
LIST OF SECTORS WITH FLAWS AND ASSIGNED ALTERNATES
   SEEK ADR ALT. ADR
   00010003 01900000
   00240300 01900200
>END
```

HELP The HELP command prints the command names and their significance. The printout has the following form:

```
Command    Significance
CVOL       Complete volume initialization
FVOL       Fast volume initialization
           (use FVOL only for disk packs without
           flaws)
WVTOC      Write volume table of contents
           (use WVTOC only to change SN, ACCT, or
           NGC)
RVTOC      Read volume table of contents
LIST       List all flawed sectors and the alter-
           nates
FLAW       Flaw the specified sectors and assign
           the next available alternate sector
HELP       Print Commands and their significance
DIAG       Enter the diagnostic direction level
END        Terminate the execution of CP-V VOLINIT
YYNNDD >>  Enter device address in the form YYNNDD
           or enter only the mnemonic YY.
SN     >>  Enter the serial number of the pack
ACCT   >>  Enter account number
NGC    >>  Enter the number of granules per
           logical cylinder; CR only gives the sys-
           tem default
SEEK   >   Enter the sector (or one sector address
           for each track or track pair) which
           shall be flawed in addition. Check with
           LIST.
```

DIAG The DIAG command initiates entry into the diagnostic level of CP-V VOLINIT.

Note: This is a CP-V VOLINIT command, and should not be confused with the DIAG key-in entered by the operator.

END The END command terminates the CP-V VOLINIT execution. The disk device is returned to the system.

PROGRAM MESSAGES

Program messages are printed through the M:UC DCB for on-line jobs and ghost jobs, and through the M:LO DCB for batch jobs. There are two types of messages: report messages, which inform the user about the normal operation of CP-V VOLINIT, and operation error messages, which report abnormal conditions and events.

REPORT MESSAGES

The report messages print all necessary information for the normal operation of CP-V VOLINIT. These messages include the title message, the requests for device address, serial number, and account numbers.

Additional report messages are printed by some routines, such as the volume initialization routine. The reports of this type are suppressed if there is nothing to report.

Table 5-1 lists messages of the report type and their meanings.

Message	Meaning
VOLINIT WAITS FOR OPERATOR KEYIN	CP-V VOLINIT uses the diagnostic CALs to perform the disk device I/O functions. The use of these CALs requires at least an 'A0' privilege and the DIAG key-in of the operator. While this message is printed on the terminal, the operator receives a message to perform the DIAG key-in. Only one user can execute diagnostic CALs in a system. The CAL execution program checks the user identification against the present DIAG key-in number; if they do not match the user is aborted.
MOUNT PACK SN #### ON DPndd AND KEYIN: DIAG 0082	The operator receives this message on the operator console. It contains the device address at which a CP-V VOLINIT function is to be performed, the serial number of the pack which was inserted by the user and which will be written during a volume initialization onto the disk pack, and the form of the DIAG key-in with the user number. If the serial number contains the characters '####', no serial number has been specified by the user. The operator should check for the availability of the disk drive. If the drive is in use, the MOUNT key-in should be used to keep-in new users from accessing the pack; if the drive is not in use, the REQUEST key-in should be used to request the dismount of the currently mounted pack, which then is saved and the pack which has been requested by the CP-V VOLINIT user is mounted. After the pack has been mounted, the DIAG key-in should be made in the given form.
DPndd PARTITIONED BY VOLINIT	This message is printed at the operator console. It is only printed if the device was not previously partitioned.
DPndd RETURNED BY VOLINIT	This message is printed at the operator console. A device is returned if CP-V VOLINIT partitioned it out of the system. (The SYSCON processor can be used to partition and return devices.)
LIST OF SECTORS WITH FLAWS AND ASSIGNED ALTERNATES SEEK ADR ALT. ADR	This message is printed after a complete volume initialization (CVOL), if any flaws were found. The header SEEK ADR heads the column of the sector addresses where the flaws have been detected. The header ALT. ADR heads the column of the starting seek addresses of the assigned alternate tracks, track pairs, or sectors, depending on the device type.
WARNING: VTOC TOO BIG FOR CURRENT SYSTEM	This warning is issued when there would be insufficient room in the current system to store this pack's VTOC information, if it were to be mounted as a private pack. This may be caused by the user selecting an NGC value that is too small.

OPERATION ERROR MESSAGES

The operation error messages are printed to report abnormal events. These events are caused mostly by incorrect input data. In many cases CP-V VOLINIT aborts the operation after such a report.

Table 5-2 lists messages of the operation error type and their meanings.

Table 5-2. CP-V VOLINIT Operation Error Messages

Message	Meaning
CANNOT GET OPERATOR RESPONSE	CP-V VOLINIT needs the operator's DIAG key-in. If the operator does not respond after several requests, the program is aborted.
CANNOT GET MONITOR LOCATIONS	CP-V VOLINIT maps the locations of the DCT tables into the virtual memory area, in order to read these tables with 'A0' privilege. The mapping operation failed. The program has to be aborted.
DEVICE CANNOT BE PARTITIONED	CP-V VOLINIT uses the M:DPART system procedure to partition the device. The system procedure could not partition the device. (Contact a system analyst for further information.)
VTOC IS TOO BIG	The specified number of granules per logical cylinder is too small for the volume table of contents (VTOC). The bit map exceeds the available room of one page.
DUPLICATE ACCT IGNORED	An account number was entered that had already been entered. Account numbers must be unique.
DISK PACK I/O ERROR	The returned device status indicates I/O errors. On a RVTOC or a WVTOC command this might indicate that the pack has not been initialized: execute the CVOL command. (Contact a Customer Engineer.)
VOLINIT CANNOT HANDLE THIS MODEL	The system indicates a model number that cannot be handled by CP-V VOLINIT.
NO DEVICE ADDRESS RECOGNITION	The returned device status indicates that there is no address recognition, Check if the device is powered down.
DEVICE NOT OPERATIONAL	The returned device status indicates that the device is not operational. Check if a disk is mounted and on-line. Check if a fault light is on; if so, reset the fault.
INSUFFICIENT PRIVILEGE	The privilege of the user must be at least 'A0' to execute CP-V VOLINIT.
EH?	The program received incorrect input. The program returns to the command input level.
DEVICE NOT PRESENT	The specified device does not exist in the current system. It was not part of the SYSGEN, or it was removed with the RECONFIG program during booting. (NOTE: A message like this can also appear if CP-V VOLINIT was not correctly linked with MONITOR REF/DEF stack.)
DEVICE NOT A DISK PACK	The specified device is not a disk pack device.
DEVICE NOT A PRIVATE PACK	The specified device is not a private disk drive. CP-V VOLINIT can only be executed at a private disk drive.
DEVICE BUSY	The specified disk drive is currently used by other users or it still has a pack mounted. The operator should use the MOUNT key-in to keep new users from accessing the pack or should use the REQUEST key-in to request the removal of the pack.
NO SUCH DEVICE AVAILABLE	This message is printed when the user specified the device address in the mnemonic form yy and there is no such device present, or there is no such private pack, or there are private packs but all are busy.

Table 5-2. CP-V VOLINIT Operator Error Messages (Continued)

Message	Meaning
DEVICE IS WRITE PROTECTED	The device status indicates that the device is write protected. To remove the write protection, push the device's write protect switch.
ERR OR ABN: xxxx AT yyyy	The M:BLIST CAL which is used to issue I/Os to the disk device returned the error or abnormal code xxxx. (See the CP-V Batch Processing Reference Manual for the significance of the error code.)

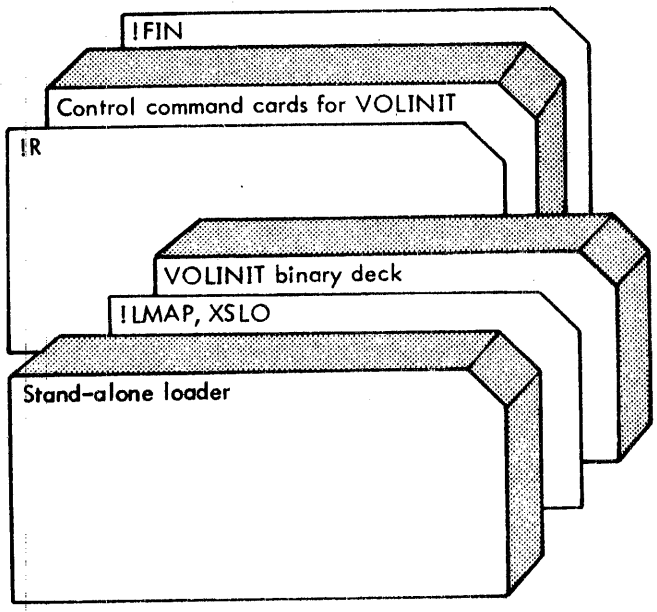
STAND-ALONE VOLINIT PROCESSOR

Disk pack devices to be used as private volumes or public devices may be initialized by stand-alone VOLINIT. As a stand-alone processor, it is not run under CP-V but is executed via a stand-alone loader (see Catalog Number 704142). VOLINIT establishes serial numbers and ownership, writes headers and other system information in selected areas of the volumes, and tests the surface of the disks, selecting alternate tracks to be used in place of flawed tracks. (Reference Catalog Number 706226-11 E00.)

STAND-ALONE VOLINIT LOADING PROCEDURES

The stand-alone VOLINIT processor is loaded by following the steps outlined below. (Also refer to the Stand-Alone Systems Reference Manual, 90 10 53.)

1. Form the following deck:



Note: To load stand-alone VOLINIT on a Sigma 9 having less than 128K, place an address stop (stop on instruction) at location 10C5, then continue. (When the program stops prior to step 3 at location 10C5, place the machine in instruction hold and step once, then release instruction hold and continue.)

2. Set Sense Switch 1 and boot from card reader. Reply YES or NO as desired to the request to make any hardware assignment changes.

   If loading stand-alone VOLINIT on a Sigma 9 having less than 128K, see note in step 1.

3. When reading stops, key-in

   ```
   !SYST  C,CRA03
   ```

4. Reset Switch 1. The program will now be loaded and executed.

STAND-ALONE VOLINIT CONTROL COMMAND

Any number of disk pack devices can be initialized. The form of the stand-alone VOLINIT processor control command is

DPndd,mmmm[,(option)]...

where

ndd specifies the address of the device containing the volume to be initialized.

mmmm specifies the model number of the device (see Table 6).

Table 6. Disk Devices

Model Number	Number of Granules per Cylinder (NGC)	Cylinder Numbers for Alternate Tracks
7242	30	200 - 203
7261 (7260)	55	200 - 203
7270	30	400 - 407
7275	52	404 - 410

The following is a list of the possible stand-alone VOLINIT control command options. Note that a command may be continued onto more than one card by using the semicolon (;) character.

{PUBLIC / PRIVATE},sn specifies whether the volume being initialized is public or private. The serial number (sn) parameter is the 1- to 4-byte EBCDIC serial number of the volume. If the volume is private, a Volume Table of Contents (containing the volume serial number and allocation table) is written on granule 0. Empty file directory and account directory table formats will be written on granules 1, 2, and 3 to be used by primary volumes only.

FORMAT, $\left\{\begin{matrix} adr_1[-adr_2],\ldots \\ NONE \end{matrix}\right\}$ specifies areas of the device to be formatted. Formatting consists of the writing of sector headers and test patterns to verify the recording capability of a given area of a volume. If the FORMAT option is omitted, the entire device will be formatted by default. If the option (FORMAT, NONE) is specified, formatting will not be performed. Otherwise, only those tracks specified in the range(s) adr_1 -adr_2 will be formatted. Each parameter 'adr' specifies a cylinder/track address, with a group of tracks specified by giving the addresses of the first and last tracks separated by a hyphen. Thus, for example, the specification (FORMAT, 0/0, 100/0-202/19) will cause the first track and the last 103 cylinders of a disk pack volume to be formatted.

An acceptable maintenance procedure is to format new disk packs and any volume being initialized that has not been formatted in the preceding two months.

FLAW,$adr_1[-adr_2]$,... specifies areas on the device that will be unconditionally flawed. The parameter $adr_1[-adr_2]$ specifies a single cylinder/track address or a range of cylinder/track addresses as in FORMAT. Those tracks that are found to be bad while formatting are automatically flawed; consequently, the FLAW option is necessary only for deleting tracks that are marginal or troublesome. The error summary should be maintained for each volume to keep a record of bad tracks.

When stand-alone VOLINIT finds a bad surface on a disk pack, flaw marks are written in each sector header of the tracks which are flawed. Alternate tracks are selected from a spare pool allocated on each pack (see Table 5). The address of the tracks is recorded in the sector header.

NO TEST specifies that surface testing will be inhibited. Areas specified by FORMAT are automatically surface tested unless NO TEST is specified. A surface test consists of writing preselected patterns on the device.

ACCT, value specifies the account number to be inserted in the private volume's account directory. The parameter, value, is a 1- to 8-byte EBCDIC account number.

NGC, value is for private volumes only and specifies the number of granules per logical cylinder. The default is 30 granules per logical cylinder. See Table 6 for the value of NGC for each type of disk.

If a processor command contains only the device name, DPndd, and no options are specified, the stand-alone VOLINIT processor logs the contents of the volume (serial number; date; public/private indicator; home address, if public; account number, if private; and the number of available cylinders, if private) and does not write on the volume. If options have been specified, the previous contents of the volume are invalid.

STAND-ALONE VOLINIT OUTPUT

Operational messages issued by VOLINIT which require a response are shown in Table 7. Error messages are listed in Table 8. If an error message from Table 8 is output, call the Customer Engineer.

Table 7. Stand-Alone VOLINIT Operational Messages

Message	Meaning
PLEASE KEY-IN DATE: ID MM/DD/YY	The date should be entered in the format specified.
INVALID KEY-IN, PLEASE TRY AGAIN	The date entered in response to the previous messages was invalid. It should be retyped.
DEVICE ndd NOT OPERATIONAL. RETRY? (YES/NO).	The device with I/O address 'ndd' is not operational (stand-alone mode). The operator should reply YES to retry the I/O operation after clearing the condition. The reply NO will abort initialization of that device.
BE SPECIFIC, PLEASE..TYPE YES OR NO FOLLOWED BY N/L.	The operator replied with other than YES or NO in response to the preceding error message.
SERIAL NUMBER OF PACK = nnnn TYPE "C" TO INITIALIZE PACK. ELSE THIS PACK WILL BE SKIPPED.	The disk pack has been written on before. "C" should be entered in order to initialize this pack.

Table 8. Stand-Alone VOLINIT Error Messages

Message	Meaning
DEVICE yyndd INITIALIZATION FAILURE, TIO STATUS nnnn TDV STATUS = nnnn	Routine IOINITT experienced an unusual end executing the I/O initialization sequence.
DEVICE yyndd INITIALIZATION FAILURE-- UNABLE TO RESTORE CARRIAGE	Routine IOINITT was unable to execute RESTORE order as part of the initialization sequence.
DEVICE I/O ADDRESS ndd NOT RECOGNIZED JOB ABORTED	The I/O address ndd, previously recognized as valid, was not recognized by a TIO/TDV instruction.
DEVICE yyndd I/O START FAILURE UNABLE TO INITIALIZE	Routine IOINITT was unable to set up the device because of I/O start failure in IOSTART.
DISK INITIALIZATION ABORTED DUE TO MEMORY PARITY ERROR	A transmission or IOP memory error was detected by IOEX.
END OF JOB	VOLINIT has been terminated. For Stand-Alone mode, a WAIT has been executed.
ERROR IN STROBE OFFSET WITH ORDER CODE 1. RESTORE CARRIAGE --- TIO = nnnn, TDV = nnnn 2. ENTER TEST MODE --- TIO = nnnn, TDV = nnnn 3. TDV --- CC = nnnn 4. HIO --- CC = nnnn	VOLINIT was unsuccessful in attempting to advance or retard the read strobe for check-write of patterns on 7261/7266.
ERROR READING SPARE-TRACK cyl/trk LOG-ON NOT PERFORMED	VOLINIT was unable to read the spare track 'cyl/trk' in conjection with the log-on operation.
HEADER READ ERROR ON THIS TRACK	This message will appear in the error statistics listing, under COMMENTS, for any track on which an unrecoverable header read error occurred.
INITIALIZATION ABORTED FOR THIS DEVICE	This message is printed after the error statistics listing if any of the three preceding messages appeared.
INVALID INPUT; EXPECT CONTINUATION CARD	An end-of-file was read following a card termination in a semicolon character (continuation).
INVALID INPUT FORMAT OF DATA, CARD REJECTED	An error was detected in the interpretation of the control card preceding this message. A '$' will be printed under the offending characters.
INVALID I/O INTERRUPT, CONDITION CODE = cccc, AIO STATUS = nnnn	There was no interrupt recognition in response to an AIO instruction; or the device issuing an interrupt is not being initialized by VOLINIT.
INVALID TIO/TDV STATUS RESPONSE, TIO STATUS - nnnnnnnn nnnnnnnn, TDV STATUS = nnnnnnnn nnnnnnnn	There was a discrepancy between the command address counters returned with the TIO and TDV instruction in the IOCHECK subroutine.
JOB ABORTED AT LOCATION nnnn (Printed on both LO and OC)	A software validity error has been detected in VOLINIT. The error was detected at location 'nnnnn'. The condition code, floating control, and registers will be listed on the LO device. The listing must be consulted to determine the cause of the abort.
MORE THAN 400 ENTRIES TO ERROR MAP, INITIALIZATION INCOMPLETE	More than 400 tracks had conditions requiring an entry in the statistics map.
NO INITIALIZATION--UNABLE TO START I/O ON DEVICE	Device was not initialized due to failure of IOINITT to execute initial command sequence.
UNABLE TO ASSIGN ALTERNATE TRACK	This message will appear in the error statistics listing, under COMMENTS, for any track requiring an alternate when no alternate tracks are available (alternate pool exhausted).
UNABLE TO FLAW THIS TRACK	This message will appear in the error statistics listing, under COMMENTS, for any track on which VOLINIT cannot write a good header with flaw marks and alternate track.

MOUNT KEY-IN

When the system requires a private disk storage volume that is not mounted, the following message is sent to the operator's console:

```
id:acct__MOUNT yyndd,serial number
```

where

yyndd specifies the disk unit on which the private volume is to be mounted.

serial number specifies the serial number of the private volume to be mounted.

The operator must respond with the following key-in after mounting the volume:

```
M[OUNT] ndd[,serial number [,id / ,PUBLIC / ,LOCK]]
```

where

ndd specifies the disk unit on which the private volume is to be mounted.

serial number specifies the serial number of the private volume to be mounted.

id specifies the job id.

PUBLIC specifies that the volume is to be accessible by any authorized user (multiaccess volume). An explicit resource declaration is not required for access to packs designated as public. The PUBLIC option is not permitted if a running batch job has requested exclusive access to the volume or if all the free spindles have been allocated to running jobs.

LOCK specifies that no new users are allowed access to the pack. The operator uses this key-in on a multiaccess volume to permit its removal.

If the operator does not respond to a MOUNT message within 20 seconds, the message will be repeated.

DISPLAY KEY-IN

The operator may determine the volumes currently mounted at any time by using the DISPLAY key-in

```
DI[SPLAY] PACKS
```

When a private disk unit is required for a private volume, all units are scanned for the presence of the volume. If the volume is not mounted, an empty unit is sought. If none is available, a unit containing a volume not in current use is requested and the following message is output to the operator's console:

```
id:acct__DISMT yyndd,serial number
```

The requested unit is marked empty and a MOUNT message is output.

At the end of the job, volumes remain mounted but are marked unused.

REQUEST ndd KEY-IN

The operator may request to dismount a private volume from a particular unit with the REQUEST key-in. This key-in has the form

REQUEST ndd

The monitor will respond with

```
_ndd
```

followed by nothing if the unit is empty or followed by

```
_yyndd DISMOUNT AND SAVE serial number
```

if the volume is not empty.

If the volume is in use, the monitor will type

```
LATER
```

MAGNETIC TAPES

LABEL PROCESSOR

The primary function of the Label processor is to initialize ANS tapes by writing ANS formatted labels. (Xerox labeled tapes are not initialized; they are labeled as part of the I/O procedures.) A secondary purpose is to label any unlabeled tape to be used in a protected or semi-protective system. In the ANS protective mode, all ANS tapes must be prelabeled by Label. In the semi-protective mode, ANS tapes may be prelabeled by Label or may be given ANS labels as the result of an operator key-in.

The Label processor performs the following three functions:

1. It initializes ANS tapes by writing standard expired ANS labels.

2. It creates "unlabeled" tapes to be used as scratch tapes. These tapes contain three dummy records and

two tape marks which facilitate using new tapes as scratch tapes. (The tapes will no longer be degaussed and therefore will not "run away" when AVRed.)

3. It prints the contents of the header and trailer labels of input labeled tapes or the first 80 bytes of each block if the tape is not a labeled tape.

LABEL COMMANDS

The Label processor may be used in on-line, batch, or ghost mode. In on-line or ghost mode, it prompts for each command with:

LABEL (

Each option should be entered on a separate line. No parentheses are required. A null response terminates the control input.

The control command card for the Label processor running in batch mode begins with !LABEL in columns 1 through 6. The rest of the card is free format. Keywords can start anywhere, but cannot extend beyond column 72. If a continuation card is necessary, a semicolon must be placed after the last character on the card (and before column 72). The card is resumed with the first nonblank column of the next card. The LABEL control input may contain the following commands:

(SN,nnnnnn$_1$[,...,nnnnnn$_{25}$])

signifies that tapes are to be initialized with the specified serial numbers, where

nnnnnn$_i$ is a serial number consisting of six alphanumeric characters. Up to 25 serial numbers may be specified. The sequence in which tapes are given serial numbers is determined by the sequence of the numbers specified following SN.

(MSN,nnnnnn,xx)

signifies that multiple tapes are to be initialized with consecutive serial numbers, where

nnnnnn is the serial number of the first tape to be initialized. The serial number must consist of six numeric characters. (Note that alphabetic characters are not allowed.)

xx specifies the number of tapes to be initialized. The starting serial number is incremented by one for each additional tape to be initialized. Any number of tapes may be initialized so long as the final serial number does not exceed 999999.

(DEVI,xx)

specifies the resource type (xx) of the tape(s) to be processed.

(PRINT[,xx])

signifies that the contents of all header and trailer labels are to be printed from an input tape or that the first 80 byte of each block are to be printed if the tape is unlabeled, where

xx specifies the number of tapes to be processed. The default value is 1. Any number of tapes may be processed. The serial numbers of the tapes to be processed must be listed on the job sheet.

(NOLABEL[,xx])

signifies that the output tape is to have three dummy records and two tape marks, where

xx specifies the number of tapes to be processed. The default value is 1.

(BLP)

signifies that the system's label checking mechanism is to be circumvented. C0 privilege is required. This command must be present in order to use degaussed tapes in an ANS-protected system, since the operator MOUNT key-in BLP option is not honored in protected systems.

LABEL EXAMPLES

Two examples of Label jobs are given below. Note that tapes mounted for Label should always be set at the load point and should be mounted with the BLP option.

1.

```
!JOB
!LIMIT  (TIME,312),(CORE,63),(9T,1),(LO,999),(UO,999),(DO,999)
!MESSAGE   PROCESS A DEGAUSSED TAPE -- REQUIRES CO PRIVILEGE
!LABEL    (NOLABEL)(BLP)
```

2.

```
!JOB
!LIMIT  (TIME,312),(CORE,63),(9T,1),(LO,999),(UO,999),(DO,999)
!MESSAGE    CREATE A LABELED ANS TAPE -- REQUIRES CO PRIVILEGE
!LABEL    (SN,REEL##)(BLP)
```

LABEL ERROR MESSAGES

Table 9 lists the error messages that are generated by the Label processor. The messages are sent to the operator's console.

MAGNETIC TAPE HANDLING PROCEDURES

The operator is frequently called upon to mount or dismount tapes requested by the users and to return tapes to a scratch pool. The monitor keeps a table of tape units and the reel number of the tapes currently mounted on those units. Therefore, operator-monitor communication is concerned with requests for the operator to take a specified action on a particular unit and with a particular reel number, or with the operator informing the monitor of some action he has taken on a particular unit with a particular reel number. The latter usually occurs when there is an empty tape unit and the operator wishes to premount a tape for an upcoming job or to make a scratch tape available to the monitor.

The operator should not change the unit number of tape drives in the system. If it is necessary to redial tapes, RESET should be held depressed during the redialing so that the numbers being dialed will not be recognized by the system. The operator should take care so that two tape units are never dialed to the same number.

TYPES OF TAPES

The monitor handles three types of tapes: Xerox labeled tapes, ANS labeled tapes, and scratch tapes. Xerox labeled tapes have a four-character identifier written in a special header record that the monitor can read to identify the reel. ANS labeled tapes have a six-character identifier written in an ANS formatted header record that the monitor can read to identify the reel. Scratch tapes contain no information for monitor use.

AUTOMATIC VOLUME RECOGNITION

For some tape drive models, pressing the tape RESET, ATTENTION, and START buttons (the AVR sequence) initiates the monitor's automatic volume recognition routine. This routine checks the label written on the tape and enters the information into its label table. The AVR sequence may only be used with tapes that have previously been labeled.

If the tape is not labeled but was requested by the monitor, the AVR procedure may not be used to inform the monitor that a tape has been mounted. In this case the MOUNT or ANSMOUNT key-in must be used.

SYSTEM-INITIATED AVR PROCESSING

At system generation time, the system manager may choose to enable the "hot AVR" feature. When this feature is enabled, the operator can mount write-protected Xerox or ANS labeled tapes without issuing any key-ins. When a write-protected tape is mounted and the tape drive is made operational (i.e., the START button is pressed), the system will attempt to read the tape label. If the tape has a valid label, the label information will be entered into the monitor's label tables. If the tape is unlabeled, the message "yyndd UNLABELED TAPE" is output and the tape is rewound; the MOUNT key-in should then be used. (The hot AVR feature does not apply to MPC tape drives.)

MOUNT AND ANSMOUNT KEY-INS

A user's job may request the monitor to perform an I/O operation on a particular tape reel. If that reel is not already mounted and an ANS tape is not requested, the monitor will type

```
id:acct__MOUNT yyndd,serial number
```

The operator should mount the tape. If the tape was previously labeled, the operator should use the AVR procedure, or simple MOUNT key-in as follows:

MOUNT nnd [,BLP] [,serial number [,id]]

If the tape is to be mounted on a drive different from the one requested, the serial number is required unless the operator uses the switch MOUNT key-in as follows:

MOUNT nnd_1.nnd_2 [,BLP] [,serial number [,id]]

Table 9. Label Error Messages

Message	Meaning
CONTROL CARD ERROR, LABEL ABORTING	The LABEL control card contains the error listed previously. The Label processor is aborted.
EXPECTED LEFT PARN MISSING	Self-explanatory.
EXPECTED RIGHT PARN MISSING	Self-explanatory.
ILLEGAL KEYWORD	A keyword used is not one of the following: SN, MSN, PRINT, or NOLABEL.
ILLEGAL VALUE	An expected parameter is not numeric or not within limits.
SN LIMIT EXCEEDED	The maximum of 25 serial numbers has been exceeded.
SYNTAX ERROR	A comma is missing in the syntax.

where ndd_1 is the requested drive, and ndd_2 is the drive on which the tape is to be mounted.

If the tape was not previously labeled, the MOUNT key-in must be used.

In a system SYSGENed for tape protection (protective or semi-protective), the monitor will try to read the label even if there is none. Therefore if the tape has not been initialized by the Label processor, the Bypass Label Processing (BLP) option may be used if the system is only semi-protective:

MOUNT ndd_1 [.ndd_2] ,BLP [,serial number] [,id]

The use of the id option with the serial number is recommended. It identifies the user with the specific tape and avoids any problems caused by having two tapes with the same serial number on the system at once. It also prevents other users from accessing the tape accidentally, which could happen, for example, when a premount without an id allows the first job asking for that serial number to get it, without telling the operator to whom it was allocated.

If an I/O operation is requested on an ANS tape by volume serial number and the particular tape is not already mounted, the monitor will type

```
id:acct__ANSMOUNT yyndd,serial number
```

If an input operation is requested on an ANS tape by filename and the particular tape is not already mounted, the monitor will type

```
id:acct__ANSMOUNT yyndd,'filename',vsn
```

where

filename is the ANS filename and is enclosed in quotes to distinguish it from a volume serial number.

quotes to distinguish it from a volume serial number.

vsn is the volume sequence number relative to the beginning of the file. (A file may extend over more than one volume.) In the context of concatenation (see Glossary), vsn represents the sequence number of a volume relative to the first volume involved in the concatenation.

Note that when an ANSMOUNT message of the second format is issued, the operator must check the user's job sheet to determine which tape reel is to be mounted.

Both ANSMOUNT requests are processed exactly as a MOUNT request except that the ANSMOUNT key-in must be used and has the form

ANSM[OUNT] ndd_1[.ndd_2][,BLP][,serial number][,id]

where BLP specifies that the tape is not to be examined for an ANS label. (This is primarily useful for degaussed tapes.)

SCRATCH AND ANSSCRATCH KEY-INS

The user may request output on a scratch tape without specifying a reel number. If the monitor has no scratch tape available and an ANS tape is not requested, the monitor will type

```
id:acct__SCRATCH yyndd
```

The operator should take a tape from the scratch pool and place it on a tape unit. He should then inform the monitor that he has done so through the SCRATCH key-in.

The SCRATCH key-in has the form

SCRATCH ndd_1[.ndd_2][,BLP],serial number[,id]

Specifying ndd_2 causes the system to expect the tape requested for tape drive ndd_1 to be found on ndd_2.

If an ANS tape is requested for output and no serial number is specified, the ANSSCRATCH request will be issued.

```
id:acct__ANSSCRATCH yyndd[,'filename',vsn]
```

where

filename is the ANS filename.

vsn is the volume sequence number relative to the beginning of the file. (A file may extend over more than one volume.) In the context of concatenation (see Glossary), vsn represents the sequence number of a volume relative to the first volume involved in the concatenation.

The operator should place an ANS scratch tape on a tape unit. He should then inform the monitor that he has done so through the ANSSCRATCH key-in.

In the protective mode, the ANSSCRATCH response is of the form

ANSS[CRATCH] $ndd_1[.ndd_2]$

In the semi-protective mode, the ANSSCRATCH response is of the form

ANSS[CRATCH]$ndd_1[.ndd_2]$[,BLP][,serial number][,id]

where BLP specifies that the tape is not to be examined for an ANS label. (This is primarily useful for degaussed tapes.)

If the serial number is omitted from the key-in, the serial number on the tape will be retained in the volume header label. If a serial number is specified in the key-in, it becomes the new volume serial number in the volume header label.

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

```
id:acct__SAVE yyndd,serial number
```

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

OPERATOR-INITIATED TAPE HANDLING

The operator may use the DISPLAY key-in at any time to learn the status of each tape unit. When one or more tape units are empty, he may premount tapes for the next job. He may do this by mounting the tape on an empty unit and by initiating the AVR procedure or by using the MOUNT or ANSMOUNT key-in. The AVR procedure may be used only if the tape is labeled; if it is unlabeled, the MOUNT key-in must be used.

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

SIMPLE TAPE MOUNTING RULES

If the monitor requests the mounting of a tape, the operator should mount the tape and use one of the following:

1. The AVR sequence.
2. The MOUNT or ANSMOUNT key-in.

If the operator wishes to premount a tape, the MOUNT or ANSMOUNT key-in should always be used. There are two restrictions on premounting ANS tapes:

1. Output tapes opened by filename cannot be premounted.
2. During the processing of concatenated files, premounting is restricted to the next volume.

REQUEST ndd KEY-IN

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

REQUEST ndd

The monitor will respond with one of three messages.

```
_ndd
```

The above message will be returned to the operator's console if the tape unit is empty.

```
_ndd DISMOUNT SCRATCH serial number
```

The above message will be returned if the indicated scratch tape is no longer in use.

```
_ndd DISMOUNT AND SAVE serial number
```

The above message will be returned if a tape is to be saved. If the unit is in use, the monitor will type

```
_LATER
```

REQUEST TAPE UNIT KEY-IN

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

REQUEST rt

where rt specifies the 2-character identifier of a device that was defined at SYSGEN to be a tape type resource. Typical resource names are:

MT	requests any available magnetic tape unit.
7T	requests a 7-track magnetic tape unit.
9T	requests a 9-track magnetic tape unit.
BT	requests a 1600 bpi tape unit.
DT	requests a dual density 800/1600 bpi tape unit.

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

5. PERIPHERAL DEVICE ERROR PROCEDURES

DEVICE ERROR AND FAILURE LOGGING

If the monitor encounters an abnormal condition during an I/O operation, it will send a message (Table 10) to the operator. These device error messages are generated both for errors that are irrecoverable and for errors that are recoverable with operator assistance. All device error messages are preceded by four tabs to position them 4 inches to the right of the left margin. The operator may respond with a device key-in

yyndd, action

where the action is one of the following:

C continue as is.

E continue but inform the program of the error.

R retry I/O operation, possibly after correcting the problem (e.g., by moving the error card back to the read station).

Table 10. Device Error Messages and Operator Action

Message	Operator Action
yyndd MANUAL	Ready the device.
yyndd WRITE PROTECT	Error (yyndd, E) or remove write-protect and retry (yyndd,R).
yyndd TIMED OUT	Retry (R) or error (E). Time-out values are measured in ticks of a 5-second clock. 1. Tape rewind and space file – 50 ticks. 2. Operator terminal input – 100 ticks. 3. All others – 2 ticks.
yyndd ERROR	Retry (R), continue (C), or error (E) if card reader or line printer; otherwise the error is irrecoverable and no operator action is needed or possible.
yyndd NOT OPERATIONAL	Device busy, not recognized, or I/O not accepted. Correct the condition, usually dial tape unit or turn power on, and error (E) or retry (R).

If a required device is in manual status, the following message is typed every 20 seconds.

```
yyndd MANUAL
```

In all other cases, if an operator action is required and none is received, the following message is issued.

```
yyndd PLEASE RESPOND
```

A special form of message is issued for read, write, or write-check errors occurring on the swapping disk. A message is issued each time an initial or retry error occurs; multiple messages are issued if several types of errors are indicated on one operation. An accumulated count of retries within any one recovery attempt is given in the message. The format is:

```
n op error
```

where

n is the number of retries (0 for initial occurrence of the error).

op is RD(read), WRT(write), or WCK(write-check).

error is one of the following:

IOP CONTROL ERR
IOP MEMORY ERR
MEMORY ADR ERR
XMISS MEM ERR
XMISS DATA ERR

ERROR LOG FILE

In addition to logging errors on the operator's console, the system also maintains a system error log file called ERRFILE. This file contains a log of system and peripheral device failures that were corrected, that were irrecoverable, or that required operator assistance for recovery.

The contents of ERRFILE may be summarized, sorted, and chronologically listed through use of the Error Log Listing processor (ELLA). ELLA can also be used to selectively list portions of the error log file. A comprehensive description of ELLA is given in the CP-V/SP Reference Manual, 90 31 13. The step-by-step procedures for ELLA operation that are most frequently used are detailed in Chapter 7, "Task Descriptions".

RECOMMENDED ERROR PROCEDURES

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

Appendix C contains a tabular summary of operator responses to monitor peripheral device messages.

CARD PUNCH

For a 7160 card punch, instead of issuing an error message immediately when a punch error is first detected, the I/O handler ejects the bad card into the alternate hopper on the card punch and attempts to repunch the card x times (3 times for synbionts, 10 times for system DCBs, and user-supplied number for special DCBs) before outputting the message

```
____CPndd ERROR
```

on the operator's console. This message indicates that the punch is malfunctioning. The operator should call the Customer Engineer.

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

CPndd,C

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

For any error on the 7165 card punch or if a card punching operation is not completed within a specified time on a 7160 card punch, the monitor will output the message

```
____CPndd TIMED OUT
```

The operator should enter the key-in

CPndd, R

and note the occurrence. If it happens repeatedly, he should keyin

CPndd, E

and call the Customer Engineer. The punched output should be checked since a duplication can occur following this message.

If the hopper is empty, the stacker is full, the chip box is full, or the punch is in the manual mode, the monitor outputs the message

```
____CPndd MANUAL
```

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

If any condition exists that prevents the card punch from being started, the monitor outputs the message

```
____CPndd NOT OPERATIONAL
```

The operator should correct the condition and key in

CPndd,R

Failure of the operator to respond to a message from the monitor referring to this card punch will result in the message

```
____CPndd PLEASE RESPOND
```

The operator should check the previous message referring to this card punch and respond to it.

CARD READER

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

```
____CRndd ERROR
```

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

CRndd,R

If the feed or error light is not on, the card has been read through. The operator should examine the last card to come through the reader, replace it with a corrected or duplicated card, and retry the read by keying in

CRndd,R

If the card still is bad, allow the card to be flagged as an error and go on to read the next card by keying in

CRndd,E

If a card is not picked and remains in the read hopper, or if a card becomes jammed in the reader, the feed light comes on and the following message is printed:

```
____CRndd FEED ERROR
```

To restart, key in

CRndd,R

If the read light comes on and the FEED ERROR message is printed, the card was read but an error occurred. The last card in the output hopper should be examined for error, and replaced for a retry, keying in

CRndd,R

or accepted as an error, keying in

CRndd,E

If the card stacker is full, the hopper is empty, or the reader is in the manual mode, the monitor outputs the message

```
____CRndd MANUAL
```

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

If any condition exists that prevents the card reader from being started, the monitor outputs the message

```
____ CRndd NOT OPERATIONAL
```

The operator should correct the condition and key in

CRndd,R

Failure of the operator to respond to a message from the monitor referring to this card reader will result in the message

```
____ CRndd PLEASE RESPOND
```

The operator should check the previous message referring to this card reader and respond to it.

If a card read operation is not completed within a specified time, the monitor will output the message

```
____ CRndd TIMED OUT
```

The operator should enter the key-in

CRndd, R

and note the occurrence. If it happens repeatedly, he should keyin

CRndd, E

and call the Customer Engineer.

MAGNETIC DISK (RAD)

If the RAD fails to read or write properly, the monitor outputs the message

```
____ DCndd ERROR
```

The operator should call the Customer Engineer.

If any condition (such as lack of power) exists that prevents the RAD from being started, the monitor outputs the message

```
____ DCndd NOT OPERATIONAL
```

The operator should correct the condition and key in

DCndd,R

Failure of the operator to respond to a message from the monitor referring to this RAD will result in the message

```
____ DCndd PLEASE RESPOND
```

The operator should check the previous message referring to this RAD and respond to it.

If a RAD read or write operation is not completed within a specified time, the monitor will output the message

```
____ DCndd TIMED OUT
```

The operator should key in

DCndd, R

and note the occurrence. If it happens repeatedly, he should key in

DCndd, E

and call the Customer Engineer.

If the desired RAD address is in a track that is write-protected, the monitor will output the message

```
____ DCndd WRITE PROTECT
```

The operator should reset the write-protect switches and key in

DCndd,R

or, if he does not want to allow the program to write on the RAD, he should respond with

DCndd,E

REMOVABLE DISK STORAGE (DISK PACKS)

If the disk pack fails to read or write properly, the monitor will output the message

```
____ DPndd ERROR
```

The operator should key in

DPndd,R

If the message repeats, he should call the Customer Engineer.

If any condition exists that prevents the disk pack from being started, the monitor outputs the message

```
____ DPndd NOT OPERATIONAL
```

The operator should correct the condition and key in

DPndd,R

Failure of the operator to respond to a message from the monitor referring to this disk pack will result in the message

```
____ DPndd PLEASE RESPOND
```

The operator should check the previous message referring to this disk pack and respond to it.

If a read or write operation is not completed within a specified time, the monitor will output the message

```
____ DPndd TIMED OUT
```

The operator should key in

DPndd,R

and note the occurrence. If it happens repeatedly, he should key in

DPndd,E

and call the Customer Engineer.

If the disk is write-protected, the monitor will output the message

```
____ DPndd WRITE PROTECT
```

The operator should reset the write-protect switch and key in

DPndd,R

or, if he does not want to allow the program to write on the disk, he should respond with

DPndd,E

If an attempt is made to mount two volumes with the same serial number, the monitor will output the message

```
_yyndd NOT UNIQUE
```

The operator should determine which disk pack is desired and dismount the other disk pack.

If an attempt is made to mount a volume that a running batch job has requested to be on a different spindle type, the monitor will output the message

```
_yyndd WRONG TYPE
```

Either mount the disk pack on the correct type spindle or error the job with the key-in ERROR,id.

If a read or write error occurs while trying to update the VTOC of a private volume which is in use, the monitor will output the message

```
_yyndd VTOC ERROR
```

The operator should consult the installation manager or the volume owner since files may be lost if the condition persists.

The system checks the serial number before it uses a private volume that has been mounted. If the serial number on the volume does not match the serial number specified by the operator in the MOUNT key-in, the following message is output to the operator's console:

```
id:acct__serial number REEL NO. ERROR
```

The disk unit containing the volume in error is marked empty and another MOUNT message is output to the operator's console.

If the private volume has not been initialized by VOLINIT, the following message is output to the operator's console:

```
id:acct__serial number NOT INIT
```

The disk containing the uninitialized volume is marked empty and another MOUNT message is output.

If the cylinder allocation of the disk unit differs from that of the mounted private volume, so that the monitor cannot read the volume's table of contents into core, the following message is output to the operator's console:

```
id:acct__serial number VTOC TOO BIG
```

The disk unit containing the volume in error is marked empty and another MOUNT message is output.

If the private volume set being mounted consists of more than one volume, the monitor verifies that the volume currently being mounted belongs to the set. If it does not belong to the set, the following message is output to the operator's console.

```
id:acct__serial number NOT IN SET
```

The disk unit containing the foreign volume is marked empty and another MOUNT message is output. If the operator then errors, aborts, or interrupts the job, the primary volume of the set will be updated so that it won't include the volume that does not belong.

If an I/O error occurs while verifying the volume, the following message is output to the operator's console:

```
id:acct__serial number I/O ERROR
```

The disk unit containing the volume in error is marked empty and another MOUNT message is output.

Certain types of disk units (e.g., 7275) send an interrupt to the computer when first started spinning. The operating system treats this as an AVR sequence so that private volumes are automatically mounted when the device becomes operational.

If an I/O error occurs during the AVR process, the following message is output:

```
_ __yyndd AVR I/O ERROR
```

The operator should attempt to repeat the AVR on another drive. Repeated failures indicate a bad disk pack and the requesting job should be aborted.

If the volume is not initialized, the following message is output:

```
___yyndd VTOC LABEL BAD
```

The requesting job should be aborted unless it is VOLINIT or some other diagnostic user, in which case the message should be ignored.

If the AVR occurs on a busy spindle (e.g., one reserved for the system or already in use by a user) the following message will be output:

```
_yyndd AVR DRIVE BUSY
```

The message should be ignored unless it indicates an operator error which should be corrected.

If the AVR occurs on a partitioned device, the following message is output:

```
_yyndd DEVICE DOWN
```

If the volume is being mounted for diagnostic purposes, the message should be ignored. If not, the volume should be moved to a nonpartitioned drive.

MPC FIRMWARE DOWNLOAD

If the yyndd, R command fails to correct a problem, or the firmware needs to be loaded (e.g., return of a partitioned MPC controller), the operator can download the firmware with the key-in

yyndd,F

LINE PRINTER

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

```
____ LPndd ERROR
```

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

LPndd,C

or

LPndd,R

as appropriate to obtain as much of the user's output as possible. If the problem persists, the operator should call the Customer Engineer.

If the line printer is out of paper or is in the manual mode, the monitor outputs the message

```
____ LPndd MANUAL
```

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

If any condition exists that prevents the line printer from being started, the monitor outputs the message

```
____ LPndd NOT OPERATIONAL
```

The operator should correct the condition and key in

LPndd,R

Failure of the operator to respond to a message from the monitor referring to this line printer will result in the message

```
____ LPndd PLEASE RESPOND
```

The operator should check the previous message referring to this line printer and respond to it.

If a line printing operation is not completed within a specified time, the monitor will output the message

```
____ LPndd TIMED OUT
```

The operator should key in

LPndd,R

and note the occurrence. If it happens repeatedly, the operator should key in

LPndd, E

and call the Customer Engineer.

The following message is issued when a code disk error (a type of hardware malfunction) is detected for line printer models 7441 and 7446:

```
____ LPndd CODE DISC ERR
```

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

LPndd, R

If the condition persists, the operator should key in

SLPndd,Q
LPndd,E

and should call the Customer Engineer.

MAGNETIC TAPE

If an I/O error occurs during the AVR process, the following message is output

```
__yyndd AVR I/O ERROR
```

The operator should attempt to repeat the AVR on another drive. Repeated failures indicate a bad tape and the requesting job should be aborted.

If the first record on a tape mounted with the AVR sequence is not VOL1 or :LBL, the following message is output

```
__yyndd UNLABELED TAPE
```

If the tape was solicited, the operator should abort the requesting job. If the tape was unsolicited, the operator should inform the monitor of its proper identification by using the MOUNT key-in.

If the operator mistakenly dismounted an active tape and an AVR for another tape is attempted on the drive, the following message is output

```
__yyndd AVR DRIVE BUSY
```

The dismounted tape should be remounted on the drive and then dismounted correctly. The other tape should be mounted on another available drive.

If the label is written in ASCII code and cannot be read by the drive on which it is mounted, the following message is output

```
__yyndd ASCII TAPE
```

The tape should be remounted on a drive having the ASCII/EBCDIC code conversion feature.

If the AVR occurs on a partitioned device, the following message is output:

```
_yyndd DEVICE DOWN
```

If the volume is being mounted for diagnostic purposes, the message should be ignored. If not, the volume should be moved to a nonpartitioned drive.

If the operator notices a degaussed tape run-away, he may halt it and recover by depressing the RESET and REWIND buttons on the tape unit. He may then mount the correct tape and respond to the resulting error message with the following key-in.

yyndd,R

If a magnetic tape unit fails to read or write properly, the monitor will output the message

```
____yyndd ERROR
```

and the user's program is notified. No operator action is necessary.

If a tape write error occurs and the tape handler cannot rewrite and verify that record, the message

```
____yyndd WRITE RECOVERY FAILURE
```

is sent to the operator's console, and the user's program is notified of the error. No operator action is required. Frequent appearance of this message indicates hardware failures.

If a tape write or read error occurs and the tape fails to operate the recovery steps properly, the handler outputs the message

```
____yyndd ERROR - TAPE LOST POSITION
```

and the user's program is notified of the error. No operator action is required. Frequent appearance of this message indicates hardware errors.

On Xerox 560s only: if the tape handler discovers that an I/O operation failed due to a user requesting I/O into a part of memory that is not allowed, the message

```
____yyndd WRITE LOCK VIOLATION
```

is sent to the operator's console, and the user's program is notified of the error. No operator action is required.

If a tape error occurs and an on-line user specifies ERROR then enters a control-Y, the message

```
____yyndd ERRORED BY USER
```

is sent to the operator's console. This operation has the same effect as the operator key-in yyndd,E.

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

```
____yyndd MANUAL
```

The operator should ready the tape.

If any condition exists that prevents the magnetic tape unit from being started, the monitor outputs the message

```
____yyndd NOT OPERATIONAL
```

The operator should correct the condition and key in

yyndd,R

Failure of the operator to respond to a message from the monitor referring to this tape unit will result in the message

```
____yyndd PLEASE RESPOND
```

The operator should check the previous message referring to this magnetic tape unit and respond to it.

If a magnetic tape operation is not completed within a specified time, the monitor will output the message

```
____yyndd TIMED OUT
```

The operator should keyin

yyndd, R

and note the occurrence. If it happens repeatedly, he should keyin

yyndd,E

and call the Customer Engineer.

If the magnetic tape handler cannot determine the cause of an error, the monitor will output the message

```
____yyndd INCONSISTENT STATUS
```

and the user's program will be notified that an error has occurred. No operator action is required. However, frequent appearance of this message indicates hardware failure and in such case, the Customer Engineer should be called.

If a magnetic tape unit fails to properly write a record at load point, the monitor will output the message

```
____yyndd STRIP TAPE AND RETRY
```

The operator should either strip the tape or replace it on the drive and key in

yyndd,R

When the magnetic tape handler retries a tape function in which no motion of the tape is to occur, the monitor will ask for operator intervention with the message

```
____yyndd REQ RETRY
```

The operator should key in

yyndd, R

If the operator notices the tape run-away, he may halt it and recover by depressing the RESET and REWIND buttons on the tape unit. He may then mount the correct tape and respond to the resulting message.

If the magnetic tape unit fails to read or write properly, the monitor will output the message

```
____yyndd ERROR
```

and the user's program is notified. No operator action is necessary.

If an attempt is made to output on an ANS unexpired labeled tape when a non-ANS tape has been requested, the monitor will type

```
id:acct__ANS VOL,ndd
```

The operator should replace the ANS tape with a non-ANS tape and repeat his original response or use the OVER key-in to permit writing on the mounted tape.

If an attempt is made to output on a non-ANS tape when an ANS tape has been requested, the monitor will type

```
id:acct__NOT ANS,ndd
```

In the protective mode, the non-ANS tape must be replaced with an ANS tape because the protective mode requires that all tapes be prelabeled. The operator should then repeat his original response. In the semi-protective mode, the tape may be physically replaced as above, or the tape may be overwritten using the OVER key-in (in which the serial number must be supplied).

If an unexpired ANS tape is mounted when a request was made for an ANS labeled output tape, the monitor will output the message

```
id:acct__NOT EXPIRED,ndd,yyddd
```

where yyddd is the Julian date on the tape.

In the protective mode, the tape must be replaced with an ANS unexpired tape. The operator should then repeat his original response. In the semi-protective mode, the tape may be physically replaced as above or the tape may be overwritten by using the OVER key-in. If the request was an ANSMOUNT with serial number, then no serial number is permitted in the OVER key-in. If the request was ANSSCRATCH, the serial number is optional. If it is omitted, the old serial number is retained.

If the serial number of an ANS tape does not match the serial number in the ANS output DCB that requested it, the following message is output:

```
id:acct__ANS REEL NO. ERR
```

The operator may replace the tape or the tape may be overwritten by using the OVER key-in (only if the system is operating in the semi-protective mode).

If a program causes the tape to be mounted in the update (INOUT) mode, and a write ring is not in the reel, the following message is output:

```
id:acct__RING,ndd
```

If the tape should be written as well as read, the operator should place a write ring in the reel and either AVR the device or enter the MOUNT nnd key-in (note: do not use ANSMOUNT). If the tape should be read only, then the write ring should not be placed in the reel but the operator should use the READ key-in to inform the monitor that the tape will be read only.

OVER KEY-IN

The OVER key-in allows the operator to override a rejection of an output tape if an ANS tape is requested, provided that the system is not in the protective mode. The OVER key-in is given after an error message has been issued to the operator and has the form

OVER ndd[,serial number]

The legality of specifying a serial number varies with the particular error message that was issued and with the request that preceded the mounting of the tape. This is summarized in Table 11.

READ KEY-IN

The READ key-in allows the operator to override a write-ring request for an update tape. The READ key-in is given after a RING message has been issued to the operator, and has the form

READ ndd[,serial number]

Note: If the operator inadvertently dials two drives to the same number and an attempt is made to read one, both will run away. The remedy for this situation is to press RESET on both drives, dial one out, press READY on the desired drive, and respond to the resultant error message appropriately.

A good practice to follow when dialing a drive to a new number is to hold RESET depressed while dialing the drive to a new number.

Table 11. OVER Key-In Serial Numbers

Error Message	Request	Serial Number in OVER Key-in	Comment
id:__NOT ANS,ndd	ANSMOUNT or ANSSCRATCH	Must appear.	The tape is not prelabeled and the DCB has no serial number. Therefore, it must be supplied by the operator.
id:__ANS VOL,ndd	MOUNT or SCRATCH	Must not appear.	The serial number has already been determined for the ANS user.
id:__NOT EXPIRED,ndd,yyddd	ANSMOUNT	Must not appear.	The ANS user requested a particular serial number and that tape was mounted. The OVER key-in is used to override the expiration requirement.
id:__NOT EXPIRED,ndd,yyddd	ANSSCRATCH	May appear.	If the serial number is not specified, the old number is retained.
id:__ANS REEL NO. ERR	ANSMOUNT	May appear.	The serial number of the tape does not match the serial number in the ANS output DCB that requested it.

TAPE MPC ERROR MESSAGES

If an MPC magnetic tape unit reads 25 feet of blank tape, the monitor will output the message

```
____yyndd 25 FT. BLANK TAPE READ
```

The operator should replace the tape and key in

yyndd,R

or

yyndd,E

Frequent appearance of this message could indicate a dirty tape drive or a hardware failure. If it happens repeatedly, call the Customer Engineer.

If an MPC magnetic tape unit reads a tape that is written in an unknown format (e.g., a 7 track tape), the monitor will output the message

```
_____yyndd BAD TAPE FORMAT
```

The operator should replace the tape and key in

yyndd,R

or

yyndd,E

Frequent appearance of this message could indicate a dirty tape drive or a hardware failure. If it happens repeatedly, call the Customer Engineer.

If an MPC magnetic tape unit detects multiple BOT markers, the monitor will output the message

```
_____yyndd MULTIPLE BOT MARKERS
```

The operator should key in

yyndd,E

MPC FIRMWARE DOWNLOAD

If the yndd,R command fails to correct a problem, or if the firmware needs to be loaded, the operator can download the firmware with the key-in

yyndd,F

RESOURCE PARTITIONING

SYSCON PROCESSOR

SYSCON is a system control processor that enables the following functions to be performed:

- A resource may be partitioned out of the CP-V system so that it is no longer available to the users (the only exception being a user who is using special peripheral diagnostic procedures). In general, this is used for removing faulty resources from the system. The following types of devices and their associated controllers are the only types of resources that cannot be partitioned:
- Teletypes
- COC
- RAD
- Public disk pack spindles
- A partitioned resource may be returned to the system.
- The status of the various system resources can be displayed.

SYSCON can also be used to build, update, and display a file called M:MODNUM, but this is a system management function and is described in the CP-V/SM Reference Manual, 90 16 74.

SYSCON can be run either as a ghost job or as an on-line job. The user must have at least A0 privilege. SYSCON is called as a ghost job with the operator key-in

GJOB SYSCON

It is called as an on-line job with the command

SYSCON

If the user privilege level is sufficient, SYSCON displays the message

SYSCON HERE

and prompts for a command with the 'greater than' character (>).

SYSCON COMMANDS

Many of the SYSCON commands contain the following parameter as part of the command format:

[yy]value

The description of this parameter is quite detailed. To avoid repeating the description several times, it will be given here and references will be made back to this section in the command descriptions.

Example:

```
!GJOB SYSCON ⓃⓁ
id:(SYSCON)  SYSCON HERE
id:(SYSCON) >
:
:
```

The yy portion of the parameter specifies the device type (e.g., LP, 9T). The brackets indicate that the yy portion is unnecessary and optional. However, if the yy portion is specified, it is verified by SYSCON. Also, note that there must be no space between yy and value.

The format of the value portion is dependent on the CPU being used.

For Sigma 5/6/7/9 systems, value must be in the format

ndd

where

n represents an IOP unit address and is specified as a letter. See Table 2.

dd specifies the device number. See Table 4.

For Xerox 560 systems, value may take one of two formats. The first format is

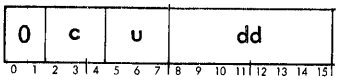
ndd

where

n represents a cluster number and a unit number. See Table 3.

dd specifies the device number. See Table 4.

The second format consists of four hexadecimal digits which represent a hardware address in the format



where

c specifies the cluster number.

u specifies the unit number.

dd specifies the device number.

DISPLAY COMMAND

The DISPLAY command displays the status of resources. The format of the command is:

DI[SPLAY] [value | yy | CONT[,value] | PART | ALL]

where

value requests the status for the specified device.

yy requests the status for all devices of type yy.

CONT[,value] requests the status of all controllers within the system if the value portion is omitted, or requests the status of just the controller for the devices specified by value.

PART requests a display of all partitioned resources (i.e., partitioned devices and controllers).

ALL requests a display of all resources within the system and their status. (The display includes every device and controller, not just those that are partitionable.)

If no parameter is specified, ALL is the default.

The general format of the display is as follows:

```
**************************************

        RESOURCE          STATUS

--------------------------------------

yyndd  { PART                          }
       { IDLE                          }
       { uid      }[NON-PART]          }
       { blank    }                    }

CONT,yyndd { PART     } [PRIM]
           { UP       } [ALT]
           { NON-PART } [****]

**************************************
```

where

yyndd specifies the device name.

CONT,yyndd specifies the controller associated with the device specified by yyndd.

PART indicates that the resource is partitioned.

IDLE indicates that the device is idle.

uid indicates that the device is busy and specifies a tape label or a disk pack serial number. (This is only applicable for a tape drive or a private disk pack spindle.)

blank indicates that the device is busy. This is only applicable for devices other than tape drives or private disk pack spindles.

UP specifies that the controller is available.

PRIM specifies that the controller is a primary path for pooled devices.

ALT specifies that the controller is an alternate path for pooled devices.

**** specifies that the controller resides in a dual access channel but is not pooled.

PARTITION COMMAND

The PARTITION command attempts to remove a resource from the system. It may not be possible to partition a resource because, for example, the resource may be nonpartitionable. If it is not possible to partition the requested resource, a message is output to indicate the reason why the resource was not partitioned. When a resource is successfully partitioned from the system, any user currently associated with it is allowed to access the resource until completion. However, no new user will be permitted association with the resource unless that user is using special peripheral diagnostic procedures. (In the case of a failing resource, the operator may want to abort the user(s) associated with the resource.) The partitioning of an allocatable resource (e.g., tape) is not allowed when the total number of resources currently allocated is equal to the total number of resources available for that device type. This also applies to a partition controller request where the request results in the partitioning of devices in the controller and the total number of resources currently allocated is equal to the total number of resources available for that device type. However, one or more of the devices within the controller may end up partitioned.

The format of the PARTITION command is:

PA[RTITION]{value / CONT,value}

where

value specifies the address of the device that is to be partitioned.

CONT, value specifies the name of a controller that is to be partitioned. When a controller is partitioned, all of its devices are also partitioned unless the controller is dual access. When the controller is dual access, only the path specified by value is partitioned unless the other path to the device is already partitioned or doesn't exist (i.e., single access within dual access channel). Then all of the controller's devices are also partitioned. If any of its devices cannot be partitioned for any reason, then the controller (and its devices) will not be partitioned. However, some of its devices may be partitioned.

RETURN COMMAND

The RETURN command attempts to return a partitioned resource to the system. It may not be possible to return a resource to the system because, for example, the resource may be busy. If it is not possible to return the requested resource, a message is output to indicate the reason why the resource was not returned. When a resource is successfully returned to the system, it becomes available to users in the same manner as it was available before it was partitioned.

The format of the RETURN command is

RE[TURN]{value / CONT,value}

where

value specifies the name of a device that is to be returned to the system.

CONT, value specifies the name of a controller that is to be returned. When it is requested that a controller be returned to the system and one or more devices within the controller are busy with on-line diagnostics, the controller will not be returned. If a device was partitioned individually prior to a partition controller request for that device, a return controller request for that device will result in that device not being returned.

LIST COMMAND

The LIST command causes SYSCON to output to the M:LO device when on-line or ghost. In the batch mode, the LIST command is ignored. When on-line, a ISET M:LO LP command must be given prior to calling SYSCON. Otherwise, M:LO is assigned to M:UC. The format of the command is

LIST

NOLIST COMMAND

The NOLIST command causes SYSCON to output to the M:UC device when on-line or ghost. In the batch mode, the NOLIST command is ignored. The format of the command is

NOLIST

END COMMAND

The END command terminates SYSCON. The format of the command is

END

SAMPLE SYSCON SESSION

Figure 4 is a sample on-line SYSCON session in which a line printer and a controller with five devices are partitioned. The DISPLAY command is used to list all devices and controllers that are partitioned. All terminal output is underscored; terminal input is not.

```
!SYSCON(↵)
SYSCON HERE

>PA LPAOF(↵)
SYMBIONT LPAOF TERMINATED
LPAOF PARTITIONED

>PA CONT,9TA80(↵)
9TA80 PARTITIONED
9TA81 PARTITIONED
9TA82 PARTITIONED
9TA83 PARTITIONED
CONT. PARTITIONED

>DI PART(↵)

**********************************
  RESOURCE                STATUS
----------------------------------

  LPAOF          PART
  9TA80          PART
  9TA81          PART
  9TA82          PART
  9TA83          PART
  CONT,9TA80     PART
**********************************

>END(↵)
```

Figure 4. Sample SYSCON Session

SYSCON MESSAGES

There are two types of messages that are output by the SYSCON processor. The first type (Table 12) is output on the terminal from which SYSCON is being run (either an on-line terminal or the operator's console). The second type (Table 13) is output on the operator's console to notify the operator that a resource has been partitioned or returned. The latter type of message only appears when SYSCON is not being run from the operator's console.

Message

Table 12. SYSCON Messages for the User's Terminal

Message	Description
CANNOT MAP INTO MONITOR	SYSCON cannot be run because required tables of information cannot be made accessible to SYSCON. Contact the system manager.
CANNOT PARTITION, yyndd ALREADY PARTITIONED	The specified resource is already partitioned. The command is ignored.
CANNOT PARTITION, yyndd NON-PARTITIONABLE	Either the resource specified is not partitionable or the resource is a symbiont that has been suspended. The command is ignored.
CANNOT PARTITION, yyndd NOT PRESENT	The resource specified does not exist in the system. The command is ignored.
CANNOT RETURN CONT. -yyndd	The controller associated with the specified device is not partitioned. The RETURN command is ignored.
CANNOT RETURN DEV. -yyndd	The specified device is not partitioned or is busy. The RETURN command is ignored.
CANNOT RUN AS BATCH JOB	The SYSCON processor cannot be run as a batch job.
CONTROLLER HAS BUSY DEVICE	A controller return request cannot be performed because one of its devices is busy with on-line diagnostics.
INSUFFICIENT PRIVILEGE	The user must have at least A0 privilege to run SYSCON.

Table 12. SYSCON Messages for the User's Terminal (cont.)

Message	Description
INVALID TERMINATOR	The field terminator is either misplaced or unknown. When running SYSCON in the on-line mode, a dollar sign ($) is used to indicate the character position within the input command at which the error was found.
yyndd NOT PRIVATE PACK	Either the specified disk pack or one or more disk packs associated with the specified controller is not private. The command is ignored.
yyndd PARTITIONED	The resource specified in a PARTITION command has been successfully partitioned. This message will appear once for each device associated with a controller when partitioning of a controller is requested.
PARTITIONED yyndd RETURNED	A resource that was partitioned has been returned to the system. This message will appear once for each device associated with a controller when it is requested that a controller be returned to the system.
SOME DEV. IN CONTROLLER MAY BE PARTITIONED	A controller partition request started partitioning devices in a controller and then encountered a non-partitionable device. Therefore, the controller is not partitioned but one or more of its devices may have been partitioned.
SYMBIONT yyndd TERMINATED	The specified symbiont device or the controller associated with the specified symbiont device has been partitioned.
UNKNOWN KEYWORD OR VALUE	A field in the preceding command is not valid. When running SYSCON in the on-line mode, a dollar sign ($) is used to indicate the end of the character string within the input command at which the error was found.
UNKNOWN PARAMETER	The parameter given on the preceding command is not valid for the command. The command is ignored. When running SYSCON in the on-line mode, a dollar sign ($) is used to indicate the end of the character string within the input command at which the error was found.

Table 13. SYSCON Messages for the Operator's Console

Message	Description
CONT. PART. FOR-yyndd	The controller for the specified device has been partitioned. All devices associated with this controller are also partitioned.
CONT. RET. FOR-yyndd	The controller for the specified device has been returned to the system. All devices associated with this controller that are not busy have also been returned.
DEV. PART. -yyndd	The specified nonsymbiont device has been partitioned.
DEV. RET. -yyndd	The specified device has been returned to the system.
PACK yyndd PARTITIONED DIAL ndd NOT AVAILABLE	The private disk pack spindle specified by yyndd has been partitioned. The dial number for the device is specified by ndd.
SYMB. DEV. TERMINATED-yyndd	The specified symbiont device has been terminated because it has been partitioned.
TAPE yyndd PARTITIONED DIAL ndd NOT AVAILABLE	The tape drive specified by yyndd has been partitioned. The dial number for the device is specified by ndd.

6. RECOVERY AND FILE PRESERVATION

FILES

In practice, the computer operator must concern himself with three groups of files. They are (1) user files, which users create and save for data storage, etc.; (2) symbiont files, which serve as buffers between CP-V and the various I/O devices; and (3) system files, which the system uses to store data (e.g., accounting and error recording data).

Since file management is handled automatically (during recovery operations as well as normal operations), the computer operator will seldom have to deal directly with files without the assistance of the system. However, some understanding of what the system does with these files is helpful.

USER FILES

User files are created, maintained, and read by the computer center's customers – the engineers, accountants, mathematicians, etc. who use the computer in support of their own work. These files are updated almost on a random basis.

SYMBIONT FILES

Symbiont files can be thought of as buffers between the system and the various peripheral devices. They prevent peripheral devices from slowing down the system. Symbiont routines read data from input devices into symbiont input files and write data from symbiont output files onto output devices. Cooperative routines read data from symbiont input files and write data into symbiont output files.

SYSTEM FILES

The system files with which the computer operator has most contact are the accounting and error log files. The accounting file serves as a location for CP-V to store accounting information for the users. The error log file receives data from the system each time a hardware component detects a malfunction. Some of these malfunctions, such as card reader errors, are noted on the operator's console because the operator's assistance is needed to recover from the malfunction. Other malfunctions, such as magnetic tape errors, are recovered automatically and are identified only to provide information. Entries in the error log do not normally reflect system failures. Their main usage is in preventing system failures and in tracing the development of these failures when they do occur.

RECOVERY

AUTOMATIC RECOVERY

CP-V initiates an automatic recovery procedure every time it detects a software failure that could have an adverse effect on the system. The automatic recovery procedure is also entered for some hardware failures (such as memory parity) from which the system has a chance of recovering. Other hardware failures (such as multiple memory errors, double traps, etc.) cause a shutdown sequence to be entered. The shutdown sequence is described below in the section "Central System Errors".

When automatic recovery takes place, the following sequence of events takes place:

1. The monitor types the following message on the operator's console, along with the date and time (users are told to stand by):

   ```
   SOFTWARE CHECK xx-yy
   ```

   where xx and yy are the software check code and subcode that identify the cause of the failure. (See Appendix D for a listing of software check codes, and Appendix B for explanations of messages output during the recovery process.)

2. A check is performed on those system tables that are required for a successful recovery.

3. In most cases, recovery begins. However, if the required system tables are not intact,

   a. A request for magnetic tape is issued and core is dumped on tape.

   b. If the recovery fails, the operator is notified that recovery is impossible. The operator should perform a boot from disk with sense switch 3 off. If that fails, a boot under files should be performed.

   c. When the system has been restarted, the operator should initiate the ANLZ ghost job, which will request the tape written in step a.

4. As recovery begins, a snapshot of core is dumped on disk storage. If an I/O error occurs while dumping core or while reading recovery, the message

   ```
   RCIO ERR
   ```

is typed on the operator's console. The computer will then halt. While halted, CPU registers 1-6 and 15 have the following meaning:

1	DCTX of the device
2	Status bits from a TIO to the device
3	TDV odd status word from the device
4-5	TIO odd status word from the device
6	Device address
15	Software check code

When register 3 contains FFFFFFFF, register 2 contains the SIO condition codes from the device.

To retry the I/O operation, the operator places the CPU in idle, increments the instruction address by one, and returns the CPU to RUN.

5. Vital information is moved to a protected portion of the swapping disk and a new copy of the currently running version of CP-V is read in from disk storage. Before recovery is completed, this previously saved information is then inserted into the new copy of CP-V, bringing it up to date.

6. All open files are checked for consistency and, whenever possible,

   a. User files are closed and saved so that they are accessible to the user.

   b. Input symbiont files are preserved with two exceptions: if a symbiont routine was loading a job into a file, that job is deleted and must be reloaded; if a cooperative was reading from a symbiont input file, the job that was being processed by CP-V is aborted and the remainder of its input deck is deleted from the input symbiont.

   c. Output symbiont files are preserved. If a cooperative was writing output from the current batch job into the file, the output from that job is ended with a message to the user, informing him that his job was terminated at that point. The message is

   ```
   ***LAST RECORD SUPPLIED BY RESTART***
   ```

   If a symbiont was reading output from the file to print or punch, the symbiont backspaces far enough into the file to ensure a "clean" set of output from the job.

   d. The error log is maintained for use in analyzing the cause of failure except when HGP reconstruction is required.

7. The crash analysis program (ANLZ) is initiated to process the snapshot on disk storage.

8. The accounting summary for each batch job running at the time of the recovery is printed by the recovery procedure. If no batch jobs were running at the time of the recovery, only a burst page gets printed.

SINGLE USER ABORT

If the system failure can be safely isolated to one user, that user is aborted and all others continue. A MONDMP file is created which causes a 5 to 30 second delay in service, (depending on the type of swapper and memory size) and an informational message is output to the operator's console as follows:

```
RECOVER GHOST CREATING MONDMPn
```

where n is a dump identification number between 0 and 7.

ANLZ is initialized as a ghost job and the standard crash analysis report is output to the line printer.

If an attempt to abort a single user produces a second failure, an automatic system recovery results.

Sometimes severe software or hardware failures cause the batch queue to be lost. When this occurs, the following message is printed:

```
*BATCH QUEUE LOST --CODE = xxxx
```

where xxxx is the error code. If the first character of the code is not *, the code is the error/abnormal code and subcode received opening or reading the queue recovery file (:RBBRVR.:SYS). If the * is present, the code is one of those below:

- * 1 - The environment record is required to recover and is not present.
- * 2 - The dynamic data record is not the correct size (a page was lost or gained).
- * 3 - The system crashed while the batch queue was in the process of recovery.
- * 4 - The static data record is not the correct size.
- * 5 - Recovery discovered an inconsistency in the communication buffers.
- * 6 - Recovery was unable to find the queue in core or on disk.

OPERATOR INITIATED RECOVERY

The computer operator may initiate the recovery procedure manually by performing a swapper boot with sense switch 3 on. (See Example 15 in Chapter 7.)

SWAPPER BOOT AND BOOT UNDER FILES

A swapper boot (with sense switch 3 off) and a boot under files are very similar operations. Both restore CP-V to an operational state with the previously existing file system intact. Both should normally only be performed after a ZAP key-in, or an emergency situation such as after a recovery attempt fails. Use of either procedure in any situation except after a ZAP key-in will, in general, cause the following problems:

1. Loss of all symbiont files.
2. Loss of 50 to 300 public file granules.
3. Loss of system parameters changed by Control.
4. Loss of accounting records for any batch or on-line users who were running.
5. Loss of some ERRLOG records.
6. The return of all partitioned devices.
7. Possible damage to open batch, on-line, and ghost job files.

It may be possible to recover the symbiont files by responding Y to the message

```
ATTEMPT BATCH QUEUE RECOVERY (Y/N)?
```

Any other response will cause the symbiont files to be lost.

A boot under files reads a new copy of the monitor root and monitor overlays from the P0 tape and writes them to the swapper after applying the patches from the patch deck and/or tape. This procedure should be used whenever new patches are to be applied, or if the copy of the monitor residing on the swapper has been damaged.

Booting from the swapper is described in Example 18 of Chapter 7. Booting under files is a normal boot routine with F not specified. (See System Loading in Chapter 2.)

Either type of boot may result in the message

```
DO YOU WANT ALLOCAT'S DUAL (Y/N)?
```

which indicates that the swapper copy of the system's free granule list is not consistent with the backup copy imbedded in the file system. Some possible causes for this are the following:

1. The contents of the swapper were destroyed since the last ZAP occurred with this public file system.
2. Disk packs for the public file system were removed and incorrectly replaced since the last ZAP.
3. During the last ZAP, an irrecoverable error prevented one of the free granule pool lists from being successfully recorded.
4. The system was stopped abnormally, without a ZAP, such that the free granule list was not completely written to the swapper and public file area.
5. Contents of one or more of the public file disk packs were destroyed since the last ZAP.

Serious file damage can be avoided through careful review and consideration at this point. The operator should contact the installation manager and review the activities since the last ZAP. The operator should

- Check that public packs are replaced on the right spindles.
- Determine if the contents of either public packs or the swapper RADs were destroyed since the last ZAP.
- Review output from the operator's console and error log file immediately preceding the last ZAP.

If there is no apparent reason for the message, HGP RECONSTRUCTION should be performed. If the reason for the message (that is, the inconsistency) is apparent and has been corrected, then initialization may be resumed by responding Y or N as appropriate. The operator can respond with Y to use the backup copy or with N to use the swapper copy.

GOOSE PROCESSOR

The GOOSE processor performs the last step of a recovery by restarting selected ghost jobs. These ghost jobs may be specified during system generation (see CP-V/SM Reference Manual, 90 16 74) or added when the system is running. The ghost jobs are specified in the M:GHOST file in the :SYS account, which is an Edit-compatible file built during system generation. A file entry has the form

```
ghost[.account[(priority)]]
```

where "ghost" is the name of a ghost job that GOOSE is to start, "account" is the account that the ghost job is to run under (the default is :SYS), and "priority" is the hexadecimal base execution priority that the ghost job is to have (the system default is used if "priority" is not specified). The ghost name must have one to seven characters; the account, if specified, must have one to eight characters; and priority must be in the range C0 to FF.

If an error is detected in the M:GHOST file, the entry in error is printed on the operator's console followed by a question mark (?).

If there is no room in the system tables for another ghost user user, GOOSE prints the following message on the operator's console:

```
GHOST
OR USER TABLES FULL...UNABLE TO START GHOSTS:
```

followed by a list of the ghost jobs that have not been initiated.

CENTRAL SYSTEM ERRORS

For some hardware faults in the central system (i.e., CPU, memory, IOPs), it is not always possible or advisable to enter automatic recovery. Instead, the system enters a shutdown sequence which attempts to collect as much status information as possible from the failing hardware. This status information is recorded in the error log file ERRFILE and the CSE STOP TABLE, both of which are resident in core. After the status information is collected, the audible alarm is turned on and, if possible, a message is printed on the operator's console in the format

```
CSESTOP - reason
```

where reason indicates what type of problem caused the stop sequence to be entered. The complete list of CSESTOP messages and their meanings is included in Appendix B.

After printing the message, the system branches to a WAIT instruction at location 5. At this time, the display lights on Sigma machines will indicate the instruction address of

location 6 (which contains a branch to 5) and register 7 contains the address of the CSE STOP TABLE. The format of the CSE STOP TABLE is given in Appendix F.

When detecting most hardware faults, a secondary CPU in a multiprocessing system will (if possible) collect the status information and signal the primary CPU which will log the information and output the following message on the operator's console:

```
CPU n-a reason FAULT
```

The secondary CPU will climb into its registers and sound the audible alarm. (That is, it will load a small program into its registers and continue operation from there. This allows the secondary CPU's memory to be modified.)

HGP RECONSTRUCTION

HGP reconstruction, the rebuilding of the disk allocation tables, may be initiated either by the monitor or by the operator. The monitor will force HGP reconstruction to take place after a software check 89, which occurs when inconsistencies are detected in the HGPs. The operator initiate HGP reconstruction by replying Y to the message

```
DO YOU WANT HGP RECONSTRUCTION (Y/N)?
```

This message is output after a boot from disk or a boot under files if the I option was specified. (See Chapter 2 for a description of the I option.)

During HGP reconstruction, all directories and files are examined and any errors detected are fixed.

At any time during the HGP reconstruction process, the operator may change the line printer address or the mode of operation by entering the key-in

```
!INT,FIX.
```

Two questions will then be asked. The first allows the operator to change the line printer I/O address.

```
CHANGE LPndd TO LP
```

The response may be either a three-character device address or a carriage return alone (which leaves the current address unchanged).

The second question allows the mode of operation to be changed.

```
PRINT ALL, FILENAMES, ERRORS ONLY, OR NOTHING
(A/F/E/N)?
```

Entering an A causes the name of each file in the system to be printed, along with a hexadecimal dump of any file or directory granules containing errors. Entering an F suppresses the dump of incorrect granules, but is otherwise similar to A. An E (the default) suppresses all printing except for error messages and granule dumps. An N suppresses all printing. The use of N is recommended only if it is absolutely necessary to perform an HGP reconstruction when the line printer is not operational, as it will be impossible to determine which files and/or accounts have been damaged. Entering a carriage return leaves the mode unchanged.

If an HGP reconstruction does not terminate normally, the following message is output:

```
HGP RECONSTRUCTION FAILURE
```

At this point, an attempt should be made to boot the system from disk and do a SQUIRREL to save as many files as possible. When the SQUIRREL is complete, or if the system cannot be booted from disk, the system should be brought up fresh by booting the PO tape and restoring files.

MAINTENANCE OF THE FILE SYSTEM

Within CP-V there are several processors involved in the tasks of file maintenance. Their purpose is briefly discussed below, and some restrictions are noted. Greater detail on how they should be scheduled and how they interact can be found in the CP-V/SM Reference Manual, 90 16 74. Details about their usage follow in this chapter.

Throughout this discussion, the term "disk" refers to public RAD and public disk pack storage.

The Fix processor performs consistency checking and repair functions for the file management system. Fix is initiated automatically during boot-time and recovery. It may also be run at any time in the ghost, on-line, or batch modes.

The FILL processor consists of three functional parts:

- Backup — copies files from disk to tape.
- Fill — restores files from tape to disk.
- Purge — deletes files from disk.

All file operations performed by the FILL processor are standard file management operations, so the full error checking facility of the system is used, and changes and enhancements to the file management system are automatically available to FILL. Device errors are localized and FILL is a standard ghost user, and its use of system resources is scheduled on that basis.

The FILLA00 processor is needed to perform selective restoration of backup tapes created by versions of Backup prior to CP-V B00.

The Fast Save (FSAVE) processor writes disk files to tape in the same format as the tapes created by the Backup function of FILL. FSAVE does not use file management, and uses

more than a standard user's share of system resources. The tapes move at a rate close to device speed; the information on the tape is formatted to that of a standard Xerox labeled tape.

Note: Standard users get little or no computer time while FSAVE is running.

The File Restore (FRES) processor restores disk files from tape. It does not use file management for reading the tapes, but it does use file management for writing the disk files. While this improves reliability and maintainability, it costs in throughput time; consequently, the tapes move more slowly than those in FSAVE.

The Device Save/Restore (DEVDMP) processor is a stand-alone device save and restore program. It copies either public or private disks to tape at device speed, with no formatting changes, and with no interface to file management. The restore function recreates the device exactly as it was. Any data errors are preserved. Any device errors during the operation may cancel the entire operation.

The Granule Accounting Cleanup (GAC) processor is used to restore the granule accounting information in the :USERS file because the file maintenance processors and other operations within the system do not accurately update the amount of file space used by an account.

FIX PROCESSOR

The Fix processor performs the following functions for the file management system:

- HGP reconstruction.
- Consistency checking and repair of directories and files.
- Deletion of account and file names from directories without release of granules.

The Fix processor may be run in the on-line, batch, or ghost modes. The user must have a privilege level of C0 or higher.

Fix is called in the on-line mode via TEL with the command

!FIX ⏎

Fix prompts for commands with a less than (<) character.

Fix is called in the batch mode with the control command

!FIX

When Fix is run on-line, commands are normally read through the user's terminal. In the batch mode, they are normally read through the card reader. If this is not the case (i.e., if the M:SI DCB assignment has been changed to a tape file for example), any syntax error in a command will cause Fix to abort. In the on-line mode, a CONTROL Y or ESC ESC sequence also causes Fix to abort.

The ghost version of Fix is initiated at system boot-time. It performs an HGP reconstruction if requested by the operator; then it sleeps. (See Chapter 2.) Upon detection of a file inconsistency, the system file management facilities awaken and notify the Fix ghost. Fix then prints a message containing the error code, file name, and account on the operator's console.

The operator may communicate with the Fix ghost by entering the key-in

INT, FIX.

Fix then prompts for commands (described below) at the operator's console with a less than (<) character.

The ghost version of Fix may not access private disk pack sets. When pack sets are accessed on-line or in the batch mode, the log-on account must be authorized for enough spindles of the proper type to mount all volumes in the pack set at the same time.

The BREAK key (on-line) or the INT, FIX. key-in (batch and ghost) may be used at any time when Fix is running to determine the name and account of the file that Fix is currently processing.

FIX COMMANDS

There may be only one command per input line (or card). Continuation to another line is not permitted. The command verb begins with the first non-blank character and ends with the next blank, semi-colon, slash or the end of the input line. The options, separated by a semi-colon, slash or blanks, follow the command verb.

A character string (beginning and ending with a single quote) must be used to include delimiters and special characters (blank # . ; /) in a field. Characters which cannot be entered directly via the input device may be specified in a hexadecimal string (beginning with X' and ending with a single quote). The following examples illustrate equivalent fields:

1. ABC 'ABC' A'BC' ABX'C3'
2. X'0152C2' X'0152'B X'152C2'

The following symbols are used in the command formats:

sn private pack identifier of the form:

$\left\{\begin{matrix}DP\\rt\end{matrix}\right\}$ #nnnn[-rt][/]

where

rt is the 2-character identifier of a device defined at SYSGEN to be a resource.

nnnn is the primary volume serial number.

account 1 to 8 character account.

file 1 to 31 characters file name.

CHECK The CHECK command examines the specified item and reports any errors found. The report is sent to the line printer as described in the section "Fix Error Messages" below. The format of the command is

CHEC[K] [sn] option

where option specifies what is to be checked and may be one of the following:

AD specifies the account directory.

.account FD specifies the file directory for the specified account.

FD specifies all file directories.

file.account specifies a particular file.

FIX The FIX command examines the specified item and repairs any errors found. The format of the command is

FIX [sn] option

where option specifies what is to be fixed and may be any of the options described for the CHECK command. In addition, the following options are available:

VTOC specifies that a new copy of the private pack's VTOC is to be written. An HGP reconstruction must be run on the packset after using this option if more files are to be added to the set. If this option is specified, the serial number of the volume to be accessed must be specified. Thus, the command has the format

FIX sn VTOC

When the VTOC option is specified, three requests for additional information (listed below) will be output if Fix is run in the on-line mode. If Fix is run in the batch mode, the requests must be anticipated and correctly ordered cards containing the appropriate responses (left-justified) must follow the FIX command. The three requests are made in the following order:

GRANULES/CYL (Respond with the decimal number of granules per logical cylinder. If a carriage return alone or blank card is the response, the value is 30 by default.)

PRIMARY SN (Respond with the primary serial number of the set. If this volume is the primary volume, the response may be a carriage return alone or a blank card.)

OTHER SN'S (Respond with the list of serial numbers in the set other than the primary serial number. One serial number should be entered per line or card. A carriage return alone or a blank card ends the list of serial numbers.)

file.account CFU specifies that any CFU (current file usage) entries for the specified file are to be deleted from the CFU tables.

hhhhhh specifies any single granule's (hexadecimal) disk address. DELTA will be associated to facilitate modification of the granule's contents. THIS IS A DANGEROUS OPTION.

DUMP This command dumps the specified item to the line printer. The format of the command is

DUMP [sn] option

The option specifies what is to be dumped and may be any one of the following:

AD specifies the account directory.

.account FD specifies the file directory for the specified account.

FD specifies all file directories.

file.account [FIT / CFU] specifies a particular file. If FIT is specified, only the file's FIT is to be dumped; if CFU is specified, any CFU entries for the file are to be dumped. Otherwise, all control granules are dumped.

VTOC specifies that the VTOC of the specified pack is to be dumped.

hhhhhh specifies any single granule's (hexadecimal) disk address. DELTA will be associated to facilitate modification of the granule's contents. THIS IS A DANGEROUS OPTION.

REMOVE This command removes a key without releasing any granules. Any granules in the file or file directory will be lost. The format of the command is

REMO[VE][sn] {.account / file.account}

If .account alone is specified, the key is to be removed from the account directory. If file.account is specified, the key is to be removed from the file directory.

This command should only be used if the file or file directory is dually allocated.

HGPRECON This command performs HGP reconstruction on the indicated private volume set. The format of the command is

HGPR[ECON] sn [.account]

SNAP This command specifies whether or not the context area of each user who encounters a file inconsistency is to be dumped to the line printer. The format of the command is

SNAP{YES / NO}

The default is NO. This command is ignored in the on-line and batch modes.

COMPACT This command specifies whether or not during every directory search, an attempt is to be made to compact the directory by moving keys toward the front of the directory. The format of the command is

COMP[ACT] {YES / NO}

The default is YES.

PRINT This command causes any accumulated Fix printer output to be printed and has the format

PRINT

END This command causes an exit from Fix in the on-line and batch modes. In the ghost mode, it terminates the reading of commands. The format of the command is

END

FIX EXAMPLES

1. Check, but do not repair, file TSTHGP in account ABC.

```
CHECK TSTHGP.ABC
```

2. Check and repair any errors found in the file directory of the :SYS account.

```
FIX .:SYS FD
```

3. Remove the file RA from the file directory for account XYZ without releasing any granules from the file.

```
REMO RA.XYZ
```

4. Check all file directories in the system. If there are no users in the system except for system ghosts, empty file directories are to be deleted.

```
CHECK FD
```

5. Perform an HGP reconstruction on the private pack set for which serial number K101 is the primary volume. The pack set is of resource type DA.

```
HGPR DA#K101
```

FIX MESSAGES

The messages of the Fix processor are listed in Tables 14 and 15. The messages in Table 14 are sent directly to the user; that is, they are written on the user's terminal in the on-line mode, on the line printer in the batch mode, and on the operator's console in the ghost mode. The messages in Table 15 are written on the line printer regardless of the mode of operation.

When an error is detected in a file or directory, a message is written on the line printer indicating the area of the error (directory, file, or FIT), a description of the error, a dump of the offending granule, and the repair action taken (if any).

Table 14. Fix Messages Sent Directly to the User

Message	Meaning
CONFLICTING OPTIONS	An option conflicts with a preceding option. This may be due to options being out of order.
DUPLICATE OPTION	An option occurs more than once.
FIELD TOO LONG	The file name is greater than 31 characters or the account number is greater than 8 characters.
FILE BUSY	The specified file is busy. Fix will try to open the file five times and will give up if it is still busy.
ILLEGAL DEVICE TYPE	The device type is greater than two characters or is missing.
ILLEGAL HEX DIGIT	A hexadecimal field contains a nonhexadecimal digit.
ILLEGAL SN	The serial number is too long or is missing.
ILLEGAL SYNTAX	The syntax of the command is illegal.
INSUFFICIENT PRIVILEGE	The user must have a privilege level of C0 or higher.

Table 14. Fix Messages Sent Directly to the User (cont.)

Message	Meaning
I/O ERROR xx-yy	An unexpected I/O error occurred. xx indicates the error code and yy indicates the subcode.
LOADED WITH WRONG MONSTK	Fix was loaded with a MONSTK that does not reflect the current monitor.
MISSING ACCOUNT AFTER FILE NAME	A field was interpreted as a file name, but no account follows it.
NO SUCH ACCOUNT	The account specified does not exist.
NO SUCH FILE	The file specified does not exist.
OPTION ILLEGAL FOR GHOST	It is not legal to specify a serial number when running Fix as a ghost.
OPTION ILLEGAL WITH COMMAND	The indicated option is not legal with this command.
UNKNOWN COMMAND	Fix does not recognize the command.
UNTERMINATED FIELD	A hexadecimal or character string field does not have a terminating quote character.
nn ERRORS	One or more errors were encountered during the processing of the last command. nn indicates the number of errors.

Table 15. Fix Messages Sent to the Line Printer

Message	Meaning
ATTEMPTING TO READ DUAL GRANULE	The dual of a directory granule will be read. (Informational message only.)
BAD FIT VLPS	The VLP list in the FIT is bad.
BAD KEY	The key contains a bad byte count, an illegal disk address, a bad data byte count, or a bad byte displacement.
BLINK/FLINK DISC ADDRESS BAD	Either the backward link or the forward link is a bad disk address.
DUAL BLINK WRONG	The directory dual backward link is wrong.
DUAL DISC ADDR WRONG	The directory dual disk address is not the same as the dual forward link of the previous granule.
DUAL FLINK MISSING OR BAD	The directory dual forward link disk address is zero or illegal.
DUAL SUCCESSFULLY READ	The dual of a directory granule has been read and verified. It will be written over the bad main granule.
END OF GRANULE SET AT WORD nn	A bad consecutive file granule has been repaired by deleting all record segments from word nn to the end of the granule.
ERROR IN ACCOUNT DIRECTORY	An error has been detected in the account directory. The disk address is also displayed.

Table 15. Fix Messages Sent to the Line Printer (cont.)

Message	Meaning
ERROR IN FILE DIRECTORY	An error has been detected in a file directory. The account name is also displayed.
ERROR IN {FIT / FILE}	An error has been detected in a FIT or a file. The file name and account is also displayed.
FDA BAD – FILE REMOVED FROM DIRECTORY	The first granule of a file directory or file is bad. The account or file directory key has been removed from the directory.
FIT NAME DOESN'T MATCH DIRECTORY	The file directory points to a legal FIT, but the name in the FIT differs from the name in the directory.
GRANULE CONTROL WORD BAD	Word two of the granule is bad.
HARDWARE I/O ERROR	A hardware I/O error has occurred.
KEY DELETED	A key has been deleted from a directory or file. The key is also displayed.
KEY LOCATION = WORD xx BYTE yy	This message specifies the word and byte index into the granule of the key that is bad.
LINK CHECK FAILURE	The link check failed.
SCR	The SCR field in word two is bad.
SEGMENT CONTROL WORD ERROR	A consecutive file has an illegal segment control word.
TRUNCATED AT PREVIOUS GRANULE	A bad directory or file has been repaired by truncation.
UNBLOCKED SEGMENT DISC ADDRESS BAD	A consecutive file unblocked segment disk address is bad.

FILL PROCESSOR

The FILL processor is run as a standard ghost user, utilizing the standard facilities of the file management system. FILL consists of three functional parts – Backup, Fill, and Purge – descriptions of which follow.

BACKUP

Files are copied from disk to tape so that they may be restored whenever necessary (for example, after a system catastrophe). Files are automatically backed up according to a schedule established by the system manager. The

schedule may be modified by the operator when necessary. Individual files may also be backed up at any time at the request of an on-line user or the operator through use of the TEL BACKUP command (described in the CP-V/TS Reference Manual, 90 09 07).

The system manager may specify three types of automatic backup in the backup schedule. All three types of backup exclude files copied from the system tape during tape boot and any other files whose NOBACKUP descriptors are set. The three types of backup are

1. SAVEALL – saves all files currently known to the system. This provides a starting point for recovery and allows the release of all previous backup tapes.

2. INCREMENTAL – saves all files that have been created or modified since the last INCREMENTAL or SAVEALL. In addition, INCREMENTAL writes file lists for each account so that during a fill operation, only the current files need be kept (i.e., deleted files will not reappear).

3. SQUIRREL – saves all files that have been created or modified since the last backup or fill operation. These tapes provide for a minimal loss of data but occupy a large volume of tape and therefore are replaced periodically by the INCREMENTAL tapes.

User requested backup of a specific file causes FILL to copy the file immediately to the tape that will be used for the next scheduled backup or to copy the file to the current tape if a backup is in progress.

Since an INCREMENTAL tape normally includes all files on all the SQUIRREL tapes produced since the last INCREMENTAL, several SQUIRRELs may be scheduled and followed by an INCREMENTAL. Similarly, several INCREMENTALs may be scheduled and followed by a SAVEALL. This type of scheduling minimizes the number of tapes required to contain the backed up files. In the event of a catastrophic failure during which the data on disk is lost, all files may be restored. Also, files that have been deleted for any reason may be retrieved.

AUTOMATIC BACKUP SCHEDULING

Backup processing is automatically initiated by entries in a scheduling file that must be created under account :SYS with the name BACK:SCHED. This file may be created by using either the Peripheral Conversion Language (PCL) or the Edit processor. (See the CP-V/TS Reference Manual, 90 09 07.)

Each entry in the BACK:SCHED scheduling file consists of backup type, an equal sign, and the time at which the type of backup is to be executed. Time entries are expressed in hours and minutes of a 24-hour clock with a colon separating the two. Multiple time entries must be separated by commas. Only the first two letters of a backup type need be used. Blanks are ignored. If NULL is specified for any type of backup, any other mention of that type in the scheduling file will be ignored. If a type is not entered in the scheduling file, that type of backup will not be automatically initiated. All entries with errors are automatically deleted from the scheduling file.

Example:

```
SAVEALL = 23:59

INCREMENTAL = 10:00, 13:00, 16:00

SQUIRREL = 8:00, 9:00, 11:00, 12:00

SQ = 14:00, 15:00
```

Whenever the automatic backup program has completed a request, it will put itself to sleep until the next scheduled time in the scheduling file or 15 minutes, whichever is shorter. Thus, if changes are made to the BACK:SCHED file, they will be noticed in 15 minutes at the latest. If immediate attention to the schedule is desired, the operator can initiate FILL with the key-in

```
GJOB FILL
```

A backup operation can also be initiated by waking FILL with the key-in

```
INT, FILL.
```

This key-in is described in the section "FILL Commands" below.

BACKUP TAPE SERIAL NUMBERS

Each backup tape is given a serial number (SN) that helps identify when it was generated. The format of the serial number is

```
digit digit letter digit
```

where

digit digit identify the creation date of the tape expressed as the last two digits of the Julian date.

For example, 01 would represent a tape created on either January 1, April 11, July 20, or October 28 of a non-leap year. Thus, serial numbers have a 100 day cycle.

letter identifies the set of tapes for each scheduled backup. The first set of tapes is labeled A, the second set B, and so on.

digit represents the reel number within the set in the range 0-9, A-Z.

Example:

April 12 (day 102)

02A0 – first reel for first scheduled backup

02A1 – second reel for first scheduled backup

.
.
.

02AB – twelfth reel for first scheduled backup

.
.
.

02C0 – first reel for third scheduled backup

If no files are written to tape at a scheduled backup, the serial number is used for the next scheduled backup.

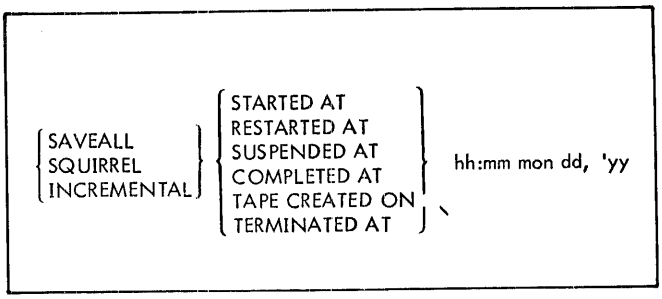
BACKUP MESSAGES

As each file is successfully copied to tape, a description of the file is sent to a symbiont file that will be printed on the line printer at the completion of a scheduled backup.

The description of the file includes the date and time of backup, the serial number, and the account and file name. If the backup is the result of a user BACKUP command, the completion message is also written in the MAILBOX file for the same account as the file.

If the backup is unsuccessful, a similar message is sent to the printer symbiont and MAILBOX files. It contains the appropriate abnormal/error code instead of the serial number.

When a backup operation begins or ends, one of the following messages is sent to the operator's console.



The message is for information only.

BACKUP RECOVERY

If the system crashes or FILL is aborted while performing a scheduled backup, the operation will automatically resume following recovery. The operator may terminate the operation at any time with the key-in

INT, FILL.

followed by a QUIT command.

FILL

Files may be restored from tape to disk during system initiation, during recovery after a system catastrophe, and, on a selective basis, at any time. Restoring the files is known as the fill operation.

TAPE SEQUENCE FOR THE FILL OPERATION

During system initiation or recovery after a system catastrophe, sets of backup tapes can be processed by FILL for the fill operation in any order. The most recent INCREMENTAL tape, if one exists, should be processed last, because the incrementals have the file lists used to prevent reappearance of deleted files. When there are several sets of tapes, the following procedure is recommended for the fastest fill operation:

1. If any SQUIRREL tapes were written since the last INCREMENTAL, process the most recent SQUIRREL set first, then the next most recent, etc.

2. If any INCREMENTAL tapes are to be filled, process the second most recent set, then the next older set, etc.

3. If there is a SAVEALL set of tapes, process them next.

4. Process the most recent INCREMENTAL set of tapes.

The above procedure virtually eliminates duplicate copying of two versions of the same file, thus speeding the fill process.

To illustrate the procedure, assume that the following schedule was followed prior to a total restart on September 5 (day 248):

Time	Type	SN for first reel of set
0030	SAVEALL	48A0
0130	SQUIRREL	48B0
0230	SQUIRREL	48C0
0330	SQUIRREL	48D0
0430	INCREMENTAL	48E0
0530	SQUIRREL	48F0
0630	SQUIRREL	48G0
0730	SQUIRREL	48H0
0830	INCREMENTAL	48I0
0930	SQUIRREL	48J0
1030	SQUIRREL	48K0

The tape sets should be restored in the following sequence:

48K0, 48J0, 48E0, 48A0, 48I0

SYSTEM INITIATION

When FILL is initiated during system initiation the operator is notified with the following message

```
FILL GHOST INITIATED – USE 'INT,FILL.'
FOR COMMANDS
```

This message is for the operator's information only. FILL then goes to sleep.

SELECTIVE FILL

The selective fill operation allows specific files or all the files of a specific account to be restored from backup tape to disk. Selective fill operates whenever the FILL processor detects the presence of commands in the SEL:FIL file of the :SYS account.

The SEL:FIL file is built via EDIT or PCL. There can only be one command per record. The commands are of the format

FILL=([filename].account),(REEL=ddld)

where

filename is the name of the file if a specific file is to be filled.

account specifies the account number. If a file name is not specified, all files of the account will be filled.

ddld specifies the serial number of the tape reel.

Blanks may be inserted between fields of the command.

In selective fill operations, tape files that are older than existing disk files (based on modification date) are not copied. However, expired files are copied from tape to disk.

Selective fill processes commands in the order of the serial numbers, and will process all commands for one set of tapes in a single pass of the tapes.

When the selective fill operation begins, Fill copies the commands from the SEL:FIL file to its own file and deletes the SEL:FIL file. A new set of selective fill commands may be given by building a new SEL:FIL file.

If an operator recovery occurs while selective fill is operating, following recovery, selective fill will automatically restart at the beginning of the current set of tapes.

FILL MESSAGES

The messages that may be generated during a fill operation are described below.

When a selective fill command is garbled, the command is typed on the operator's console preceded by the message

```
BAD SEL:FIL INPUT
```

When a request for a specific file is unfilled upon reaching the end of the specified tape set, the message

```
UNFILLED REQUEST – FID
```

followed by the file name and preceded by the date, time, and account number is sent to the printer symbiont file and to the MAILBOX file for the account.

All successful fills are logged on the line printer by name and account. Date and time are noted in the page header. For selective fills, a message also goes to the MAILBOX file for the appropriate account.

When an attempt is made to fill an incremental tape set, the following message appears on the operator's console:

```
DELETE FILES AS PER INCREMENTAL FILELIST (Y/N)
```

A Y response deletes any file that was not present in the account when the incremental tape set was created, unless the file's creation/modification date is more recent than that of the incremental tape set. This prevents deleted files from being reentered in the system. An N response prevents FILL from deleting any files. If the request for input times out (after about 30 seconds), a Y response is assumed.

When FILL detects a file on tape that is out of sequence, the following message appears on the operator's console:

```
FILE OUT OF SEQUENCE – QUIT OR
CONTINUE (Q/C)
```

The condition suggests that the files following the sequence error are of questionable origin. If the operator's response is Q, the current operation on this tape is ended. If his response is C, processing proceeds normally.

A fill that aborts due to an abnormal/error condition causes the following message to be sent to the printer symbiont file and to the MAILBOX file for the account:

```
ERROR dddd FAILED TO RECOVER filename
```

where dddd indicates the abnormal/error code and filename specifies the file name. The message is preceded by the date, time, and account.

The following message is typed on the operator's console at the beginning of a selective fill operation:

```
SELECTIVE FILL STARTED AT current time and date
```

The message is for information only.

PURGE

The purge operation of the FILL processor deletes files from the public file system at the request of the operator. Files are deleted on the basis of last access, the least recently accessed files generally being purged before more recently accessed files. Files in the :SYS account and files with an expiration date of 'NEVER' are not subject to deletion by FILL. The operator has the option to save (on a single tape set) either all files that are purged, only those files being purged which were not previously backed up, or none of the files being purged.

Any time the number of available permanent file storage granules falls below a system threshold (the threshold having been specified by the system manager at SYSGEN), FILL will type the following messages on the operator's console:

```
CURRENT AVAILABLE GRANULES IS BELOW THRESHOLD
CURRENT THRESHOLD = nnnn; CURRENT GRANULE COUNT = nnnn;
NEW THRESHOLD = nnnn
```

The NEW THRESHOLD is one-fourth the previous threshold.

The above message is for the operator's information only. To initiate a purge operation, the operator must key in

INT,FILL.

and follow the key-in with a PURGE or BEGIN PURGE command as described in the section below, "FILL Commmands". The purge sub-processor will then request input from the operator's console with:

```
PURGE COMMAND?
```

Any of the commands described in the following section may then be entered. The four commands listed below apply most directly to a purge operation.

MIN n

PURGE [ALL][X] { UNTIL n / OLDER { d / :h } }

SET PURGE TAPE = { N[ONE] / O[NE] / S[ELECT] }

DISPLAY PURGE TAPE

FILL COMMANDS

Whenever the FILL processor is entered via the key-in

INT, FILL.

the operator will be requested for input with the following query:

```
FILL COMMAND?
```

The operator may then enter any of the commands described below. If a command such as SET or DISPLAY is entered, FILL may prompt for another command. If the operator does not wish to enter any further commands, NL alone should be entered.

Note: FILL should not be interrupted when a tape mount for FILL is pending; this generally causes FILL to abort.

BEGIN To begin one of the FILL operations described previously, the following command may be used.

BE[GIN] { SA[VEALL] / SQ[UIRREL] / IN[CREMENTAL] / PU[RGE] / FI[LL] / SE[LECTIVE FILL] }

If an operation other then backup is currently active, FILL will respond with

{ SAVEALL / SQUIRREL / INCREMENTAL / PURGE / FILL / SELECTIVE FILL } IS CURRENTLY ACTIVE

The operator must then issue the QUIT command to terminate the current activity.

QUIT The QUIT command terminates the current FILL process. Any tapes mountcd are closed and removed.

The only thing remembered by FILL is the serial number of the current backup tape. The format of the command is

QU[IT]

SUSPEND The SUSPEND command ends the current process, but FILL remembers where it was and the process may later be restarted with the RESTART command. Any tapes mounted are closed and removed. This command applies only to SAVEALL, SQUIRREL, and INCREMENTAL backup operations. The format of the command is

SU[SPEND]

RESTART The RESTART command restarts a process that was SUSPENDed. The format of the command is

RE[START]

PRINT This command causes any current line printer output to be printed and has the format

PR[INT]

SET The SET command sets optional FILL processor parameters. The format of the command is

SE[T] option

where option may be one of the following:

RE[EL = dddd] sets the tape serial number to be used in the backup operation. (This option should generally never be used. It is not possible to set the serial number to that of a different day; i.e., the first two characters will not be changed although FILL accepts the command. When a tape is actually required, a correct serial number will be used.)

TY[PE] = xx specifies the device type of the tape drive to be used for FILL operations (e.g., 9T, BT, 7T). The default is 9T.

DE[NSITY] = {800 / 1600} specifies which density to use when writing tapes on dual-density drives.

US[ER BACKUP] = {Y[ES] / N[O]} specifies whether the TEL BACKUP command (available to on-line users) will (YES) or will not (NO) be honored. If NO is specified, any TEL BACKUP command will be accepted but ignored. The default is YES.

SQ[UIRREL TAPE MOUNT] = {Y[ES] / N[O]} if YES, specifies that user-initiated backup (via the TEL BACKUP command) is to be processed and the tape left mounted. If NO, the tape is to be dismounted after each user-initiated backup. Subsequent user-initiated backups will request the same backup tape and the file will be saved immediately following the previously backed up file. (This parameter may be overridden by the USER BACKUP option above.) The default is YES.

MA[ILBOXES] = {Y[ES] / N[O]} specifies whether or not MAILBOX files are to be built in the users' accounts. The default is YES.

OC[DISPLAY] = {Y[ES] / N[O]} specifies whether or not the current account is to be dispalyed on the operator's console during backup operations. The default is YES.

PU[RGE TAPE] = {N[ONE] / O[NE] / S[ELECT]} specifies which of the files being purged are to be saved on a backup tape when a file purge is performed. NONE specifies that no files are to be saved. ONE specifies that all files are to be saved. SELECT (the default) specifies that only those files that have not been previously backed up are to be saved. The files are saved on a single tape set.

MOUNT The MOUNT command is identical to the SET SQUIRREL TAPE MOUNT=YES command described above. The format of the command is

MO[UNT]

DISMOUNT The DISMOUNT command is identical to the SET SQUIRREL TAPE MOUNT=NO command described above. The format of the command is

DISM[OUNT]

PURGE The PURGE command enters the PURGE subsystem of the FILL processor and is identical to the BEGIN PURGE command. The format is

PU[RGE]

STATUS The STATUS command displays the current condition of FILL (i.e., operation active or suspended), the current account if any is applicable, the current purge threshold value, and the current granule count. The format of the command is

ST[ATUS]

SNAP The SNAP command causes the internal FILL data to be snapped and printed on the line printer. This command should be used to document problems which may occur with the FILL processor. Other diagnostic snaps are also taken automatically at various places within the FILL processor. The operator is notified that this has occurred by the message:

```
ERROR SNAP
```

This message is for information only.

The format of the command is:

SN[AP]

DISPLAY This command displays the current setting of the optional FILL parameters on the operator's console. The format of the command is

DI[SPLAY] { RE[EL] | TY[PE] | DE[NSITY] | US[ER BACKUP] | SQ[UIRREL TAPE] | MA[ILBOX] | OC[DISPLAY] | PU[RGE TAPE] | AL[L] }

where

REEL specifies the current reel number. (See the first message in Figure 5.)

TYPE specifies the current device type for backup, fill, and purge operations. (See the second message in Figure 5.)

DENSITY specifies the density to be used when writing tapes on dual-density tape drives; it is ignored if drives are not dual-density.

USER BACKUP specifies whether or not user-initiated backup is allowed. (See the fourth message in Figure 5.)

SQUIRREL TAPE specifies that only the message concerning the mounting or dismounting of user-initiated backup tapes is to be printed. (See the fifth message in Figure 5.)

MAILBOX specifies whether or not MAILBOX files will be built in user accounts. (See the sixth message in Figure 5.)

OC DISPLAY specifies whether or not the current account will be displayed on the operator's console during a backup operation. (See the seventh message in Figure 5.)

PURGE TAPE specifies that only the message pertaining to the saving of purge files on tape is to be displayed. (See the last three messages in Figure 5.)

ALL specifies that the entire display is to be given. (See Figure 5.) If no parameters are specified, ALL is assumed by default.

```
CURRENT REEL NUMBER =dddd

DEVICE TYPE = xx

OUTPUT TAPE DENSITY IS {800}  BPI
                       {1600}

USER-INITIATED BACKUP IS [NOT] ALLOWED

USER-INITIATED BACKUP TAPES ARE {LEFT MOUNTED                  }
                                {DISMOUNTED AFTER EACH CALL    }

MAILBOXES IN USERS' ACCOUNTS ARE [NOT] BUILT

OPERATOR'S CONSOLE DISPLAY IS TURNED {ON }
                                    {OFF}

{ ALL PURGED FILES ARE SAVED TO TAPE                  }
{ or                                                  }
{ PURGED FILES ARE NOT SAVED TO TAPE                  }
{ or                                                  }
{ ONLY UPDATED PURGED FILES ARE SAVED TO TAPE         }
```

Figure 5. The FILL DISPLAY Command Listing

The following two commands are legal responses to the message

```
PURGE COMMAND?
```

PURGE This command specifies what type of purge is to take place. The format of the command is

PURGE[ALL] [X]{UNTIL n / OLDER {d / :h}}

where

ALL specifies that all files are to be considered for deletion. Those not previously backed up will be backed up. If ALL is not specified, files that are not backed up will not be deleted.

X specifies that only expired files are to be deleted. Those files which have not yet expired are to be ignored even though they may qualify for deletion on the basis of access date.

UNTIL n specifies that files are to be purged according to recency of access (from least recent to most recent) until there are at least n granules available. The entire file system is searched, making this the most time-consuming purge function. A table of files sorted on the basis of access date is also created. This table is of limited size, which means that only a limited number of files may be purged. If the oldest files in the system are also the smallest, not many granules will be returned to the system. It may be necessary to repeat PURGE UNTIL commands several times to release the desired number of granules.

OLDER{d / :h} specifies that files are to be purged for which the last access was more than d days or h hours.

When the purge operation is complete, the operator will be notified of the current granule status by the message:

```
CURRENT THRESHOLD = nnnn;
CURRENT GRANULE COUNT = nnnn
```

MIN To change the minimum number of granules that must be available for users (the threshold value), the operator enters the command

MIN n

where n is a decimal integer representing the new threshold value in number of granules.

FAST SAVE PROCESSOR (FSAVE)

The Fast Save (FSAVE) processor is designed to save files on tape at or near tape speed. The processor is considerably faster than any other file saving procedure under CP-V. Since FSAVE does not use File Management to read file directories or data, an occasional error may occur if users are updating files at the same time FSAVE is processing. FSAVE must be run under an account with C0 privilege. The tapes saved by FSAVE can be restored by using FRES or FILL. The tape serial numbers assigned are the same as those assigned by the Backup routine of the FILL processor.

INPUT PREPARATION

The tasks to be performed by FSAVE are defined by control commands and optional data cards that are input through the SI device. The files and/or accounts to be processed (selected, skipped, etc.) are defined by the data cards.

The control commands are described in Tables 16 and 17. Any commands listed in Table 16 must precede those listed in Table 17.

All control commands and data cards are free-forms: fields are separated by one or more blanks. The only restriction is that control commands must start in card column zero.

DATA CARDS

Pseudo file names may be used with the +START command to begin saving files at a given spot in an account; for example

```
+START
:SYS   G
+END
```

indicates that files with names at or beyond "G" in the collating sequence are to be saved (whether a file named "G" exists or not).

The +START and +STOP commands may be used in pairs (any number of these is permissible) to identify groups of accounts or files to be saved; for example

```
+START
:SYS   G
+STOP
:SYS   O
+START
CPVACT F
+STOP
CPVACT M
+END
```

indicates that files with names in the collating range "G" to "O" in the :SYS account are to be saved, and then the files with names in the collating range "F" to "M" in the CPVACT account are to be saved.

SELECT and SKIP lists may be mixed if file names are used. (Pseudo file names can be used to conform to this restriction.) START, SELECT, SKIP, and STOP commands can be mixed to control the files to be processed; for example

```
+START
:SYS        A
+SKIP
:SYS        COBOL
:SYS        METASYM
+STOP
:9999
+START
CPVACT      ANSM
+STOP
CPVACT      MN
+SELECT
X
+END
```

indicates that files in the :SYS account beginning with "A" through the :9999 account (all files therein) will be saved, skipping COBOL and METASYM; also, files between ANSM and MN in account CPVACT will be saved, and the entire X account will be saved.

Note that if +START, +SKIP and +STOP commands are used together, they must be entered in that order.

SAMPLE INPUT DECKS

Sample FSAVE input decks are provided in Examples 1 through 8.

SPECIAL NOTE FOR DUAL-DENSITY TAPE DRIVES

If the FSAVE tape is to be created with a density that is different from the default density of the tape drive (i.e., 800 bpi vs. 1600 bpi, the following card should be inserted in the deck immediately preceding the !FSAVE command.

```
!ASSIGN M:EO, (DEN, 800)
```

FSAVE ERROR MESSAGES

FSAVE error messages are summarized in Table 18. Certain error conditions will cause partial memory dumps (SNAPs) to be displayed. These conditions are defined in Table 19.

FILE RESTORE PROCESSOR (FRES)

The File Restore (FRES) processor is designed to restore files from tapes created by the Fast Save (FSAVE) or FILL processors. The account under which FRES is run must have C0 privilege. (FRES can also restore files from tapes created by the BPM FSAVE processor.)

Note: FRES does not operate as a shared processor with all of core available. Therefore, to enable files containing large records to be restored, a large value for CORE must be specified on the !LIMIT card for the FRES job.

INPUT PREPARATION

The tasks to be performed by FRES are defined by control commands that are input on the SI device. The commands are described in Table 20. All commands except the +END command are optional.

The format of the data cards is:

Column 1: Account number (or volume number for +VOL).

Column 14: File name (optionally used for +START).

SAMPLE INPUT DECKS

Sample FRES input decks are provided in Examples 9 through 12.

COMPATIBILITY WITH PREVIOUS VERSIONS OF FRES

If for any reason, CP-V B00 or C00 file maintenance tapes are to be restored to an earlier CP-V system, FRES-C00 may be used. The FRESB0 file can be copied from the C00 release tape via PCL. Because of a PREF, it must be loaded with a modify card as follows:

```
!LOAD (EF, (FRESB0), (MONSTK, :SYS)), (PERM), ;
!      (LMN, FRES), (NOTCB), (SL, F)
!MODIFY EAREAD+19, 21F00015
```

If BPM/BTM file maintenance tapes are restored using CP-V C00, the following modify card is required.

```
!MODIFY BPMTAPE, 1
```

FRES ERROR MESSAGES

FRES error messages are summarized in Table 21. When useful, a SNAP is also printed showing the contents of the registers and the buffers.

Table 16. First Set of FSAVE Control Commands

Command Name	Description
+BLOCKS	Lists output buffers as they are built.
+DEBUG	Provides SNAPs and dumps of errors found in the file management tables.
+DIRECTORY	Lists file and account directories.
+FIT	Lists the File Information Table.
+INDEX	Lists file index sectors.

Table 17. Second Set of FSAVE Control Commands

Command Name	Description
+DAY	Selects all files modified on and since the month, day, and year defined in card column 9 and following. A two-digit month is followed by a two-digit day and a two-digit year. For example, 080272 defines August 2, 1972. If the month, day, and year field is left blank, the current day's data will be used.
+DUMP	Causes the selected files in the selected accounts to be output on tape. (If the +DUMP command is used, the +LOG command cannot be used.) The word STATS may optionally be added to this command beginning in card column 9. See the +LOG command, below, for a description of the STATS option.
+VOL	Specifies that the files are to be output to tape beginning with the tape volume or serial number defined on the data card that follows. (The volume specified on the data card must conform to the Fill format.
+PACK serial number[.account] [.device type].	Causes the selected files in the selected accounts to be output from the private disk pack volume that is specified beginning in column 9. If the account is not specified, the running account is used. If device type is not specified, the default is DP.
+DEVICE	Specifies that the device type of the tape drive to be used for save operations is defined by the data card that follows. Example device types are 9T, BT, and 7T. The default is 9T.
+END	Terminates the job. This command may also be used to terminate a series of data cards.
+HOUR	Selects all files modified since the hour defined in card column 9 and following. 0900 defines 9:00 a.m. and 1800 defines 6:00 p.m.
+LOG	Causes information about selected files in the selected accounts to be output on the line printer. No output tape reel is used. (If the +LOG command is used, the +DUMP command cannot be used.) The word STATS may optionally be added to this command beginning in card column 9. The STATS option creates a statistical file called DISKPOOL in the 99999999 account. In DISKPOOL, a record of seven words is reserved for each account. The record contains the following information: Word — Contents 0 and 1 — Account name. 2 — Number of files in the account. 3 — Number of granules in the account. 4 — Number of bytes in the account. 5 — Number of RAD granules. 6 — Number of disk pack granules. After termination of FSAVE, the records in file DISKPOOL can be accessed (by key or sequentially) for accounting purposes.
+SELECT	Selects only the accounts and files specified on the data cards that follow. The series of data cards is terminated by an +END command.
+SKIP	Selects all files except for the accounts and files specified on the data cards that follow. The series of data cards is terminated by an +END command.
+START	Selects all files starting at the account number defined on the data card that follows.
+STOP	Selects all files until the account number defined on the data card that follows is reached.

Example 1. Save Selected Files to Tape

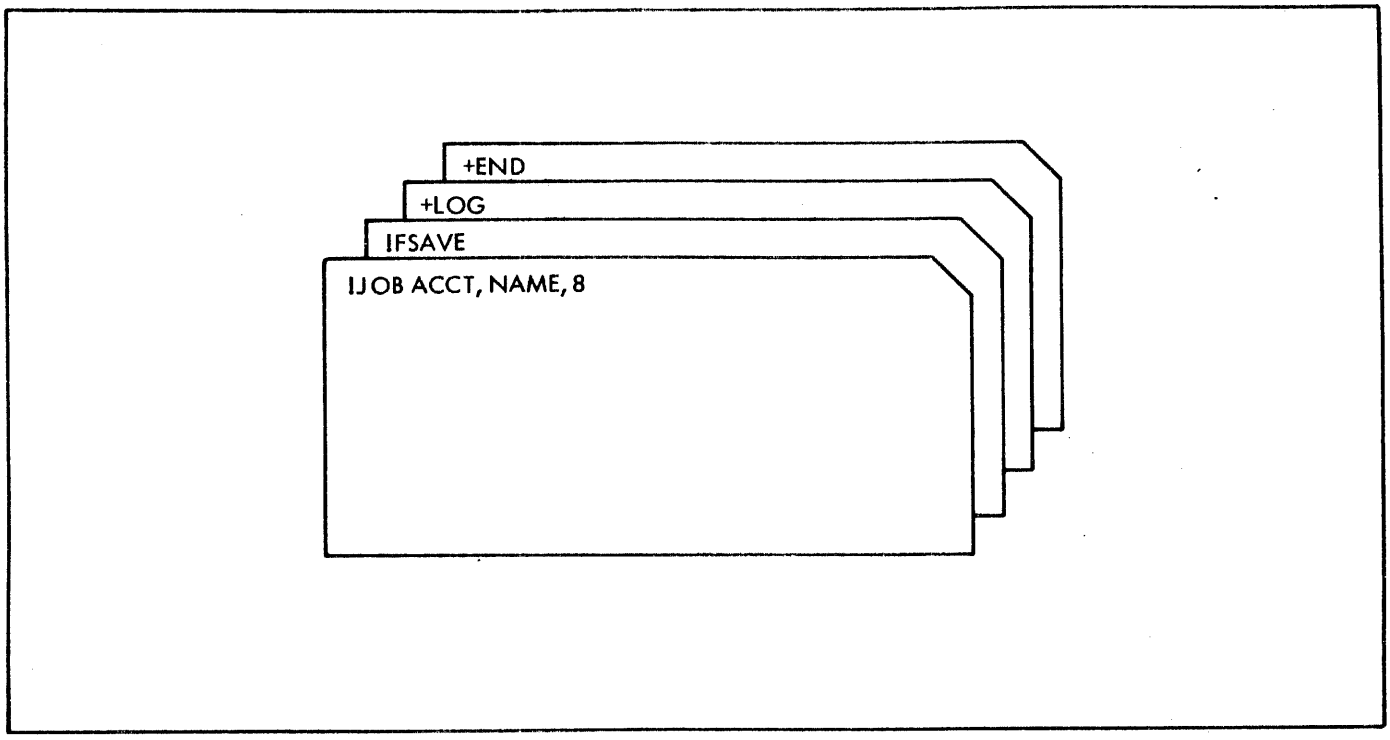
```
+END
32301          C
32301          B
32301          A
:SYSGEN        LOCCTC
:SYSGEN        LOCCTB
:SYSGEN        LOCCTA
+SELECT
+DUMP
+DEBUG
!FSAVE
!LIMIT (9T,1),(CORE,24),(LO,999),(UO,999),(DO,999)
!JOB ACCT,NAME,8
```

Example 2. Save All Files, Specifying a Series of Files to Skip

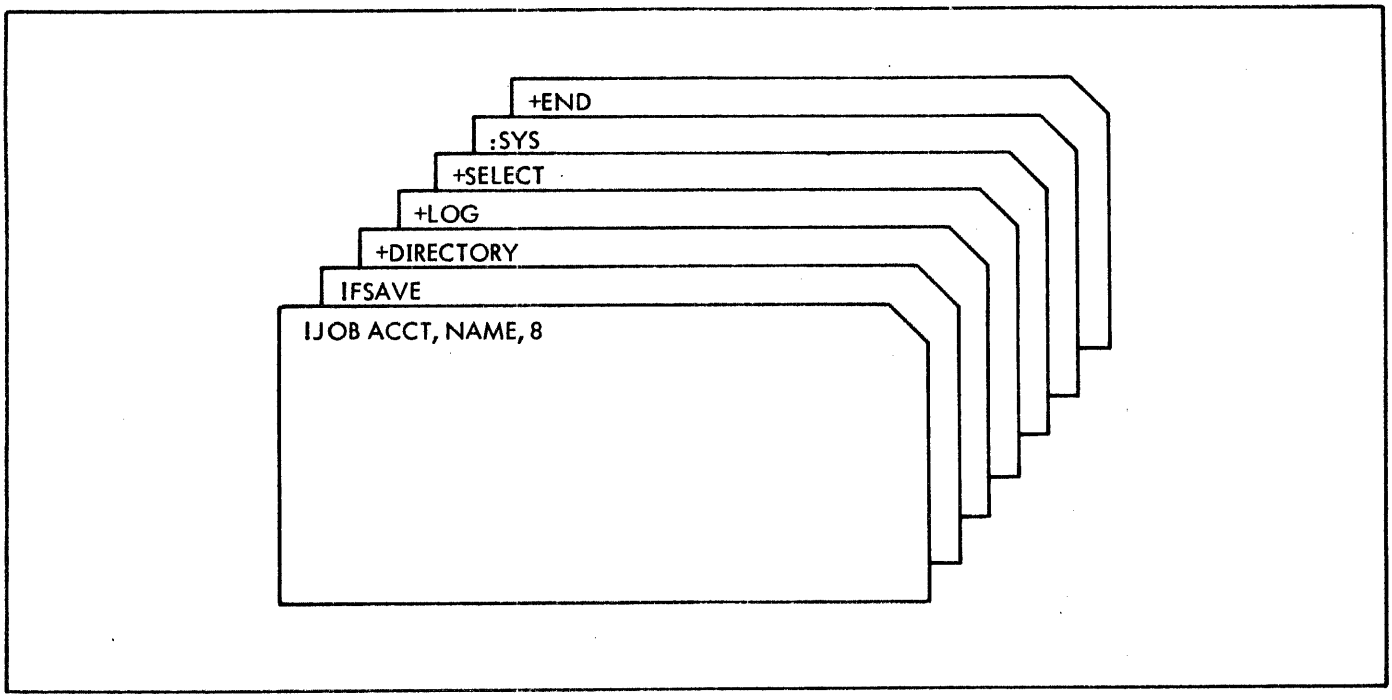
```
+END
G2708300       FILEB
G2708300       FILEA
F5608318
F5608312
:SYSGEN
+SKIP
+DUMP
+DEBUG
!FSAVE
!LIMIT (9T,1),(CO,24),(LO,999),(UO,999),(DO,999)
!JOB ACCT,NAME,8
```

(Note that the absence of a file name in the :SYSGEN, F5608312, and F5608318 data cards specifies that the three entire accounts are to be skipped.)

Example 3. List All Files in the System without Saving the Files on Tape



Example 4. List a File Directory



Example 5. List a File Information Table

```
+END
:SYS                METASYM
+SELECT
+LOG
+FIT
IFSAVE
IJOB ACCT, NAME, 8
```

Example 6. Save Files Modified Since 5:00 a.m. on February 25, 1972

```
+END
+HOUR               0500
+DAY                022572
+DUMP
+DEBUG
IFSAVE
ILIMIT (9T, 1), (CO, 24), (LO, 999), (UO, 999), (DO, 999)
IJOB ACCT, NAME, 8
```

Example 7. Save All Files in the System Beginning at a Specified Account

```
+END
F5608312
+START
+DUMP
+DEBUG
!FSAVE
!LIMIT (9T,1),(CO,24),(LO,999),(UO,999),(DO,999)
!JOB ACCT, NAME, 8
```

Example 8. Save a File on Tape and List Information About It

```
+END
:SYS          METASYM
+SELECT
+DUMP
+BLOCK
+INDEX
+DIRECTORY
+FIT
!FSAVE
!LIMIT (9T,1),(CO,24),(LO,999),(UO,999),DO,999)
!JOB ACCT, NAME, 8
```

(Note that this job saves the METASYM file in the :SYS account on tape, lists its account directory sector, lists its file directory sector, lists its File Information Table, lists all its index sectors, and lists the tape buffers as they are written to tape.)

Table 18. FSAVE Error Messages

Message	Meaning
BAD ACCOUNT SPECIFICATION ON +PACK CARD	The account specified is greater than eight characters in length.
BAD DEVICE SPECIFICATION ON +PACK CARD	The device specification is not two characters in length.
BAD OPEN TO PRIMARY PRIVATE PACK	An error occurred opening the private pack. Register 10 contains the error code.
BAD SN SPECIFICATION ON +PACK CARD	The volume specification is not four characters in length, or no volume was specified.
C0 PRIVILEGE REQUIRED TO USE FSAVE	FSAVE can only be run under an account with C0 privilege.
CANNOT READ FIRST ACCOUNT DIRECTORY SECTOR	ACNCFU contains an invalid disk address. FSAVE is aborted.
CONTROL CARD ERROR	The FSAVE commands are not in the correct order.
ERROR IN FILE INFORMATION TABLE	An entry required to process this file is missing from the FIT.
ERROR IN MASTER INDEX	An invalid entry was found in the index sector.
FILE DIRECTORY ADDRESS ERROR IN ACCOUNT KEY	The disk address for the file directory is invalid. The account is skipped.
FILE NAME DOES NOT MATCH FILE DIRECTORY KEY	The FIT read does not match the current file directory name.
n FILES NOT FOUND	During a selective save operation, n files were not found.
FIT DISC ADDRESS ERROR IN FILE DIRECTORY KEY	Self-explanatory. The file is not processed.
FSAVE LOADED WITH WRONG MONSTK ... TRY AGAIN	FSAVE was loaded with the monitor stack belonging to a different monitor version. Reload FSAVE.
INVALID DATA ON +DAY COMMAND	The data given in column 9 of the +DAY command is either incomplete or incorrectly formatted.
IRRECOVERABLE TAPE WRITE ERROR	Self-explanatory. The next reel is requested and processing continues.
LINK FAILURE IN ACCOUNT DIRECTORY	FSAVE cannot link forward due to an invalid disk address. FSAVE is aborted.
LINK FAILURE IN FILE DIRECTORY	FSAVE cannot process any more of this account. It continues with the next account in the directory.
LINK FAILURE IN INDEX CHAIN	FSAVE cannot process this file any further. The output tape is closed for the current file.
NEW REEL STARTED	Self-explanatory.
NOT ENOUGH CORE TO RUN LESS THAN FIVE PAGES AVAILABLE	Self-explanatory. (Less than five pages of dynamic storage is insufficient due to the paging buffer system.)
PARTIAL FILE	The file could not be saved completely. As much of the file as possible was saved.

Table 18. FSAVE Error Messages (cont.)

Message	Meaning
PRIVATE VOLUME IS NOT PRIMARY	The AVR table indicates that the volume is not mounted. (This should not happen.) FSAVE is aborted.
PRIVATE VOLUME NOT AVR'D	Same as above.
PRIVATE VOLUME NOT MOUNTED	Same as above.
PRIVATE VOLUME NOT PRIVATE	Same as above.
PROCESSING TERMINATED	FSAVE has completed the job.
SYNON FILE CANNOT BE SAVED	Synonymous file names that appear in the file directory before the parent file cannot be saved.
UNRECOGNIZED CONTROL CARD... RUN ABORTED	Self-explanatory.

Table 19. Error SNAPs

SNAP Title	Meaning
ABNIO	A TYC other than normal (i.e., other than '01') was returned.
ACLINK	A link failure occurred in the account directory.
ACNCFU	ACNCFU contains an invalid disk address.
DCTERR	The first tape open did not return a valid DCTX to the M:EO DCB.
FDLINK	A link failure occurred in the file directory.
MIXLINK	A link failure occurred in the index chain.
OPNFAIL	An I/O error occurred with the M:EO DCB. (This will probably never occur because all I/O is performed through NEWQ.)

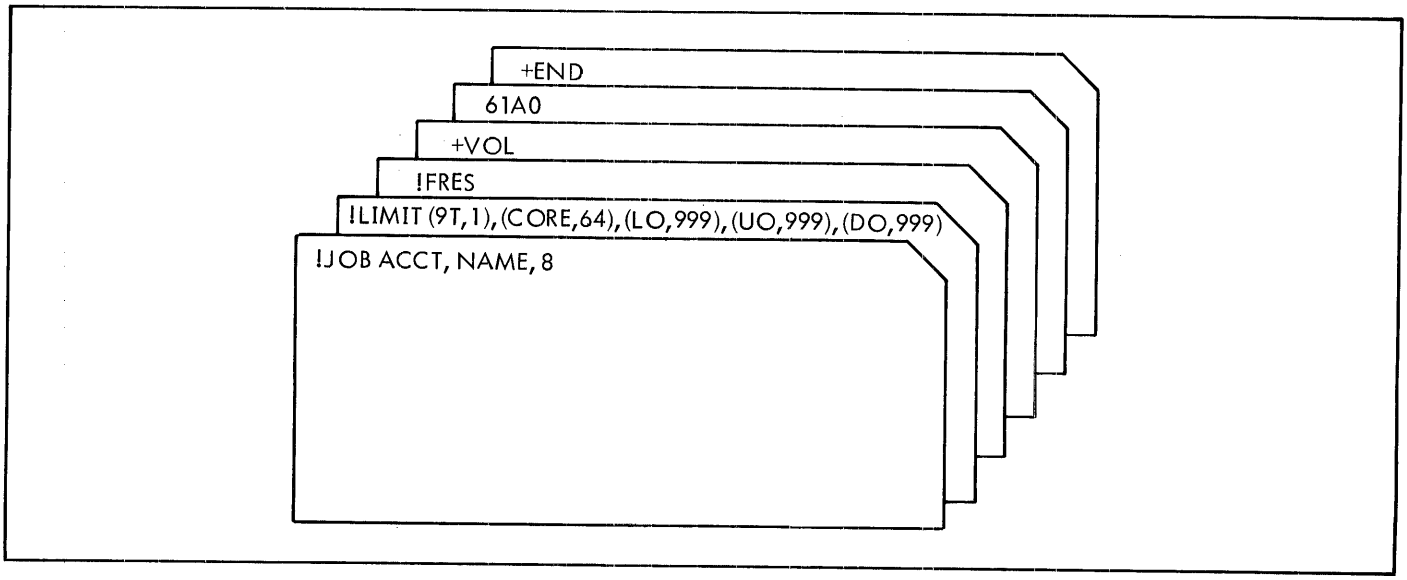
Table 20. FRES Commands

Command Name	Description
+VOL	Specifies that restoration of files is to begin with the tape volume defined on the data card that follows. (If no +VOL is included, PRG1 is assumed.)
+PACK	Causes the files to be restored to the private disk pack volume specified on the data card that follows. (Otherwise, files are restored to public disk.)
+START	Specifies that restoration of files is to begin at the account (and file, if specified) that is defined on the data card that follows.

Table 20. FRES Commands (cont.)

Command Name	Description
+SKIP	Specifies that all files of the account defined on the data cards that follow are to be skipped (i.e., are not to be restored). Individual files within an account cannot be skipped. Up to 16 data cards may follow this command. The list of data cards is terminated by any control command.
+SELECT	Specifies that the files to be restored are defined by the data cards that follow. The list of data cards is terminated by any control command.
+CHECK	Specifies that the files on the volume are to be checked for errors without restoration of files (i.e., the tape volume is to be verified).
+DEVICE	Specifies that the device type of the tape drive to be used for save operations is defined by the data card that follows. Example device types are 9T, BT, and 7T. The default is 9T.
+NEWFILE	Specifies that the files to be restored will be treated as new files (i.e., new creation date).
+END	Specifies that no more control commands follow. If +END is the only control command in the FRES deck, all files that were saved are restored.

Example 9. Restore All Files Saved by FSAVE



Example 10. Restore All Files Except Those in Two Specified Accounts

```
+END
F123
:SYS
+SKIP
12C0
+VOL
!FRES
!LIMIT (9T,1),(CORE,64),(LO,999),(UO,999),(DO,999)
!JOB ACCT, NAME, 8
```

Example 11. Restore Files Starting at a Specified Volume and Account

```
+END
GAB
+START
61B3
+VOL
!FRES
!LIMIT (9T,1), (CORE,64),(LO,999),(UO,999),(DO,999)
!JOB ACCT, NAME, 8
```

Example 12. Restore File F1 in Account XYZ, File AUDIT in Account :SYS, and All Files in Account ABCD.

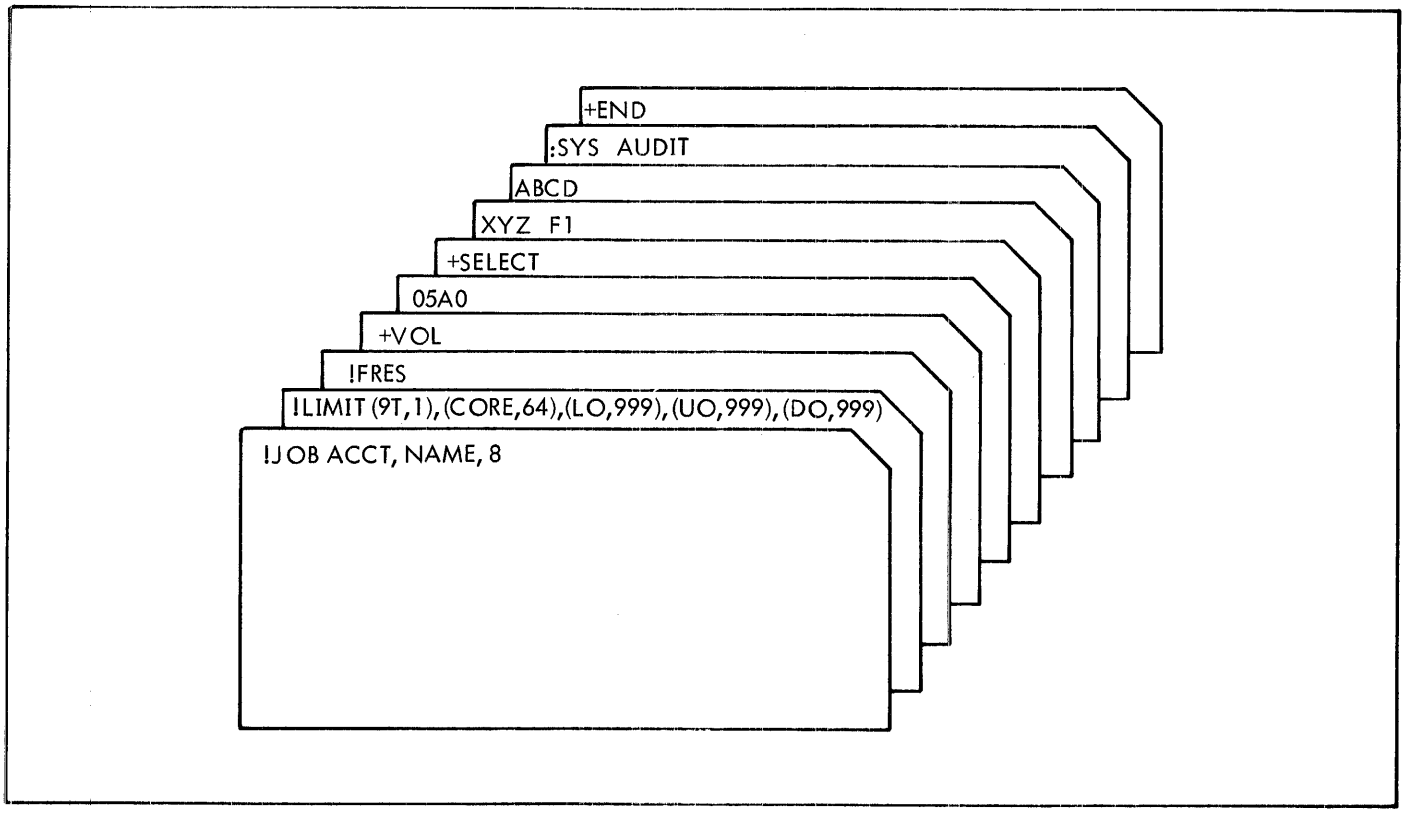


Table 21. FRES Error Messages

Message	Meaning
ABNORMAL OPENING TAPE . . . SEE R10	Self-explanatory. R10 contains the abnormal code.
BAD INSN ON TAPE	The serial number on the tape does not match the serial number specified by +VOL.
BAD TAPE BLOCK — SKIP THIS FILE	The labeled tape control information is illegal. See the SNAP of the buffer.
C0 PRIVILEGE REQUIRED TO USE FRES	FRES can only be run under an account with C0 privilege.
CONTROL OR DATA CARD ERROR — RUN ABORTED	Self-explanatory.
ERROR/ABNORMAL OPENING FILE	Self-explanatory. R10 contains the error or abnormal code.
ERROR/ABNORMAL WRITING FILE	Self-explanatory. R10 contains the error or abnormal code.
FATAL ERROR — SEE R15 AND REFER TO LISTING	An unexpected error condition occurred. R15 contains the address at which the error was detected.
FILE SEQUENCE ERROR . . . JOB ABORTED	The files on the tape are not in the chronological order in which they were saved.
FRES LOADED WITH WRONG MONSTK . . . TRY AGAIN	FRES was loaded with the monitor stack belonging to a different monitor version. Reload FRES.

Table 21. FRES Error Messages (cont.)

Message	Meaning
NO 09 ENTRY IN :BOF — SKIP TO NEXT FILE	The :BOF sentinel is incorrect. See the SNAP of the buffer.
NOT ENOUGH PAGES	The authorized value for core space or the value specified for CORE on the !LIMIT card must be increased.
RECORD TOO BIG — CANNOT GET BUFFER	A file contains a record that is larger than the available buffer. The file cannot be restored.

DEVICE SAVE/RESTORE PROCESSOR (DEVDMP)

The Device Save/Restore (DEVDMP) processor is a stand-alone utility program designed to dump entire disk volumes to magnetic tapes for restoration at a later time. Restoration may only be accomplished to an identical storage unit.

DEVDMP FEATURES

The features of the DEVDMP processor are as follows:

- Multiple disk storage devices may be saved to a single tape unit.
- Multi-reel tape saves are possible.
- Both regular 9-track and MPC tapes can be used. Moreover they are interchangeable, provided that the density to be used applies to both, so that
  - SAVEs on one type can be RESTOREd on the other.
  - multi-reel operations can be performed on any sequence of drive types.
- 7-track tape units can be used.
- A directory of contents may be displayed, showing the date the tape was created and the unit addresses of the disk volumes whose contents are saved on the tape.
- All commands except CR (see description of CR in the following text) can be entered either from the card reader or the operator console.
- Accounting routines display accumulated computer time as well as actual time required for executing the commands.
- The size of the program is about 18K including core, I/O buffers, and the MPC tape firmware.
- Under sense switch control, bad disk sectors can be skipped (the default is to abort) and automatic RESTORE verification can be invoked.

DEVDMP TAPE FORMAT

Before the information from the source volume is copied, a bootable copy of the DEVDMP program is written on the tape, followed by a directory of contents and a tape mark. The exact format is as follows:

Bootstrap program
Device Save/Restore program
Directory of contents
———— Tape mark ————
Data in blocks of 12304 bytes
———— Tape mark ————
Trailer label
———— Tape mark ————
———— Tape mark ————

INPUT PREPARATION

CONTROL COMMANDS

The tasks to be performed by DEVDMP are defined by control commands that are input on the card reader or the operator's console, with the exception of the CR command which is a key-in only command. The commands are summarized in Table 22.

The rules for the content of the control cards are identical to those for key-ins with these exceptions:

1. Commands must start in column 1.
2. The new line character (NL) should not be punched.
3. A card reader command entry is terminated upon encountering the first card which does not include a continuation character (;).
4. Any blank encountered prior to a continuation character will be considered the terminating character.
5. Any number of continuation cards may be used.

In the event that a command cannot be interpreted, the user will be notified via a console message. At this time all commands are removed from the table of commands to be executed and control returns to the operator keyboard printer.

One of the commands COPY, CMPR, or RESTORE must be entered. There is no default value. If the new line character (NL) is encountered before one of these commands, it is treated as a continuation character. When command entry is from the card reader and the last card is interpreted without having encountered a COPY, CMPR, or RESTORE on any of the cards, all commands are removed from the table of commands to be executed, and control returns to the operator console.

Table 22. DEVDMP Commands

Command	Description
CR[ndd]	Assigns the unit address of the card reader. Must be used to initiate card reader command entry. n = IOP number (0-7) dd = Controller and device number (00-FF) The default card reader address is the boot address if from a single device controller, otherwise it is X'003'.
# model number	Specifies model number of the disk volume to be saved. This command is normally the first command entered for the Copy function; it is not required for the Restore and Compare functions and will be ignored if specified. Valid model numbers are #3214 #7212 #7260 #3277 #7232 #7270 #3282 #7242 #7275
DCndd$_1$[-ndd$_2$]	Specifies address of disk unit or units to be saved. This command must be entered for the Copy function; it is not required for the Restore and Compare features and will be ignored if specified. The [-ndd$_2$] option means save disks ndd$_1$ through ndd$_2$, where n = IOP number (0-7) dd = Controller and device number (80-FF) If two consecutive DC commands are encountered without an intervening model command (#), they will be accepted as being all the same model.
GROUP	Denotes the end of a model type. All DC commands keyed in between GROUP commands are assumed to be of the same model number. This command must not be entered before the # and DC commands. There may be as many groups entered as required to dump the units desired. The GROUP command is not required for the Compare or Restore functions.
tTndd	Specifies the address of the magnetic tape unit to be used. If this command is not entered, the default is to the boot device address if it is on a multidevice controller; otherwise, default is to X'080'. t=X specifies MPC tape unit n=IOP number (0-7) t=M specifies a regular 9T tape unit dd=Controller and device number (00-FF) Note: The tape unit address is reset to the assumed value X'080' after completion of commands RESTORE and COPY.
DNdddd	Specifies the desired density for the specified tape unit where: dddd = 800 specifies 800 bpi dddd = 1600 specifies 1600 bpi This command is used when the tTndd parameter specifies the address of a dual density tape unit. The MT field should always precede the DN field in the argument list. Note: Since MPC drives boot only 800 bpi tapes, this is their default density. There is no default for other dual-density units.
PRINT	Prints the directory of contents on the operator's console from the tape mounted on the currently assigned tape unit. The tape device address must have been previously specified or unit address X'080' will be assumed. This command is executed immediately following recognition of either the next continuation character or the end character; it does not cancel the effect of a continuation character, and continuation lines may be entered after the directory has been typed. Results are unpredictable for tapes not created by this program, or if this command is used with the COPY command.

Table 22. DEVDMP Commands (cont.)

Command	Description
X	Allows the operator to supply new unit addresses for use by the Restore and Compare functions of the program. This enables a tape to be restored to a device with a different address than was originally copied to the tape. As each address is recovered from the tape, the new address will be requested by the program.
COPY	Copies disk to tape. If SSW4 is down, any irrecoverable disk read error will cause DEVDMP to abort the current operation. If SSW4 is up, DEVDMP will report and zero out the problem sector. If the error persists, DEVDMP will discontinue that read, report the sectors skipped, and continue.
RESTORE	Copies tape to disk. If SSW1 is up, DEVDMP will automatically verify the RESTORE operation as it proceeds.
CMPR	Compares tape to disk.

SPECIAL CHARACTERS

Special characters used in the DEVDMP commands are as follows:

; The semicolon is the continuation character. When this character is encountered, the current command string being interpreted is considered terminated. (The remainder of the line is considered a comment.) A continuation of the command string is accepted from the input device.

When the semicolon is encountered on a control card, the card is considered complete and a new card is read and interpreted. Any characters after the semicolon are considered comments and no attempt is made to interpret them.

NL New-line key. This character is used to terminate a key-in. If a semicolon has not been encountered at the time this character is interpreted, the key-ins are considered complete and the program will begin execution of the table of commands. (This character does not apply to card reader input.)

BLANK (space) A blank card column or the operator's console space bar causes command interpretation to stop for the card or the key-in. On the console, any characters after the blank will be treated as comments and ignored. On the card reader, the blank card column is treated as a termination character and no further cards will be read.

EOM The end-of-message character is used as the rubout character. When it is encountered, all previous characters are deleted from the input buffer. (This character does not apply to card reader input.)

The comma separates full commands for both console and card reader input. A comma must appear between commands on the same line.

SAMPLE INPUT

When the program is initially loaded, the following typeout occurs:

```
SYSTEM SAVE/RESTORE VERSION xxx
ENTER DATE (DD MM YY) – 06/11/78
KEY-IN COMMANDS
```

Examples of the command language from the console:

```
RESTORE
```

Restores the default tape contents to disk. The disk unit addresses specified during the Copy function are contained on the tape; therefore, they need not be entered.

```
PRINT,RESTORE
```

Prints the directory of contents from the default tape unit, and restores the tape's contents to disk.

```
#7232,DC0F0-0F2,XT1E1,DN1600;
COPY (NL)
```

Copies the contents of model 7232 RADs with unit addresses X'0F0', X'0F1', and X'0F2' to an MPC tape at unit addresses X'1E1' at 1600 bpi.

```
#7212,DC1F0,GROUP,#7232,DC2F0,COPY
```

Copies the contents of a model 7212RAD with unit address X'1F0', and a model 7232 RAD with unit address X'2F0', to tape X'080'.

INITIALIZATION

During the initialization phase of the program, a check is made to see if there is a device at the default operator console address X'01'. If no device is at that address the program goes into a wait. When this wait occurs, the address for the operator console should be entered into register 0 from the processor control panel, and the wait cleared.

INFORMATION MESSAGES

The following are information messages not requiring a reply or other action.

The program identifies itself when it is initially booted by:

```
SYSTEM SAVE/RESTORE VERSION xxx
```

When a typeout of the directory of contents has been requested:

```
DIRECTORY OF CONTENTS
TAPE CREATED – dd mm yy
MODEL xxxx RAD(s)
ndd
:
:
ndd
```

where

dd mm yy is the day, month, and year the tape was created

xxxx is the model of the following disks (packs or RADs) whose contents are stored on the tape.

ndd is the unit address of the disk(s).

END-OF-JOB MESSAGES

When all commands have been executed (or in case of irrecoverable I/O errors, when the execution is aborted), the following messages occur:

```
LAST USED SEEK ADDRESS – tttsOOOO
TIME FOR THIS JOB mmm MINUTES ss SECONDS
TOTAL COMPUTER TIME mmm MINUTES ss SECONDS
```

where

The time for the job is defined as the time the job starts until the time this message is typed.

The total computer time is defined as the time the program is first booted into memory until the time this line is typed. (This time will not necessarily be the total of all accumulated "job times" as the program has housekeeping to do that is not included in the total job time.)

ttts is the last seek address issued to the disk.

mmm is the number of minutes.

ss is the number of seconds.

```
TOTAL DISK ERRORS  xxxx
TOTAL TAPE ERRORS  xxxx
```

These messages indicate the number of recoverable I/O errors encountered during the execution of the commands. They are reset to zero after the message.

ERROR MESSAGES

The messages in Table 23 are typed when an error is detected. The AIO STATUS, TDV STATUS, and TIO STATUS error messages are typed as an aid to diagnosis of hardware malfunctions and require a Customer Engineer for their interpretation.

MESSAGES REQUIRING KEY-INS

The messages in Table 24 require a response to be entered by the operator.

Table 23. DEVDMP Error Messages

	Message	Description
1	UNRECOVERABLE TAPE ERROR	A tape error persists on read or write after seven retries including "set erase". This message is accompanied by either message 2 or 3 as described below, and messages 5, 6, 4, and 15.
2	READ OPERATION	Detail line typed with message 1, 7, or 8.
3	WRITE OPERATION	Detail line typed with message 1, 7, or 8.
4	-ABORT	Detail line used with messages 1, 7, 8, and 9. When this message is typed, no further attempt is made to execute the current commands and the user must key in a new set of commands from the console.
5	AIO STATUS – xxxxxxxx	Detail line used with messages 1, 7, 8, and 9. This message displays the contents of the status register (represented here as xxxxxxxx) addressed in the interrupt acknowledgment instruction.
6	TDV STATUS – xxxxxxxx	Detail line used with messages 1, 7, and 8. This message displays the contents of the status register addressed in a "TDV" instruction to the failing device.
7	UNRECOVERABLE ERROR ON DISK	A disk error persists after seven retries. This message is accompanied by either message 2 or 3 and messages 4, 5, 6 and 15.
8	UNDEFINED I/O ERROR	An I/O error has been encountered that the program is not equipped to handle (i.e., an unusual combination of errors or hardware faults, causing impossible errors to be indicated). This message is accompanied by either message 2 or 3 and messages 5, 4, and 15.
9	INVALID SECTOR ADDRESS tttsOOOO	A sector address has been issued that is greater than the highest valid address for the disk. This occurs when the wrong model number is specified in a command (e.g., a 7212 RAD is installed and the user enters #7232). ttt is the invalid track used; s is the sector address used.
10	RAD WRITE-PROTECTED – CLEAR WAIT WHEN READY-ttts	An attempt has been made to write on an area of the disk that is write-protected. Clear the wait condition (flick the run-idle switch) when corrective action has been taken. ttts is the actual seek address used.
11	TAPE UNIT WRITE-PROTECTED – CLEAR WAIT WHEN READY	Self-explanatory.
12	TAPE UNIT NOT READY–CLEAR WAIT WHEN READY	Tape unit is in manual mode.
13	CANNOT DECODE COMMAND xxxx	A command (characters between commas) has been entered that cannot be interpreted. The first four characters of the command input are printed (represented as xxxx) and the operator must replace the defective command (the characters between commas) with a correct one.
14	SPURIOUS INTERRUPT	An unexpected or unidentified I/O interrupt has occurred (either tape unit attention key or machine error). The interrupt is ignored and execution continues.
15	TIO STATUS – xxxxxxxx	Detail line used with messages 1 and 8. This message displays the contents of the status register addressed in a "TIO" instruction to the failing device.

Table 23. DEVDMP Error Messages (cont.)

	Message	Description
16	CR BAD	Issued when the operator has specified the card reader as the command input device and it cannot be accessed. After this message, commands are again accepted from the console.
17	DISK UNIT UNAVAILABLE – 0ndd	This message indicates disk unit "0ndd" is not currently available. If the message is accompanied by message 4, the job is aborted and control is passed to the accounting routine, then to the command input routine where operator commands are accepted. The message appears alone when checking for validity of disk addresses at key-in time.
18	-WHILE WRITING BOOT RECORDS	Accompanies message 1 when errors are encountered writing tape bootstrap and directory of contents.
19	ABORT – NO MODEL NBR BEFORE GROUP	A group command has been entered without previously specifying a disk model number.
20	ABORT – NO DISK ADR BEFORE GROUP	A group command has been entered without specifying a disk address.
21	UNABLE TO RECOGNIZE DISK TYPE	A disk type in the tables is not recognizable. This can only occur during a copy command.
22	***CHECK-WRITE... VERIFICATION ABORTED***	Compare error during execution of a compare command.
23	MT MUST PRECEDE DN IN CMMND LIST	The density has been specified before the logical address of the desired tape unit has been assigned.
24	...BAD SECTOR AT xxxxxxxx; ZEROED	This message, which further qualifies message 7, provides the seek addresses of the problem sector (during COPY & SSW1 up). The read operation is then retried.
25	AGAIN...SECTORS LOST: xxxxxxxx THRU yyyyyyyy	This message further qualifies message 7 if, after attempting to zero the bad sector, an irrecoverable disk read error condition persists.
26	MPC TAPE DRIVE ERROR— CLEAR WAIT WHEN READY	Self-explanatory.
27	25 FT. BLANK TAPE READ— CLEAR WAIT WHEN READY	Self-explanatory (MPC tape).
28	MULTIPLE BOT MARKERS— CLEAR WAIT WHEN READY	Self-explanatory (MPC tape).
29	STRIP TAPE—CLEAR WAIT WHEN READY	An irrecoverable write error has occurred (MPC tape) on the very first record. Either strip this tape or mount another.

Table 24. DEVDMP Messages Requiring Key-Ins

	Message	Description
1	ENTER DATE (DD MM YY) –	The data (eight characters maximum) keyed in at this time is moved without any validity checking to a save area where it can be used to form the directory of contents and placed on the heading line of any printing operations on the line printer.
2	KEY-IN COMMANDS	Commands are to be entered at this time. (See Control Commands.)
3	END OF REEL. ASSIGN NEW TAPE	The end-of-reel indication has been sensed (i.e., either the reflective marker during Copy or the trailer label during Restore/Compare). The new tape is assigned by keying in the new tape address. The allowable replies are ndd(NL) MTndd(NL) XTndd(NL) where n = IOP number dd = two-digit controller and device number

Table 24. DEVDMP Messages Requiring Key-Ins (cont.)

	Message	Description
4	xxxWILL BE REPLACED BY ?	The X command has been entered under Restore or Compare. This message follows the printing of each successive disk address from the tape. The new disk address is assigned by typing a three-digit hexadecimal number.
5	ASSIGN NEW TAPE UNIT NUMBER	This message follows the occurrence of an unrecoverable read error from the tape. The allowable replies are: X(NL) Abort ndd (NL) Use tape unit ndd (assumed to be of same drive type as last). MTndd (NL) Tape unit is regular 9-track. XTndd (NL) Tape unit is MPC tape Note: The tape will not be rewound; if the current tape address is specified, the operation will continue with the record following the bad record.
6	?	This message occurs if a null line is entered following any request for a key-in. A null line consists of only an NL character.

GRANULE ACCOUNTING CLEANUP PROCESSOR (GAC)

The Granule Accounting Cleanup (GAC) processor is a tool for the use of the CP-V installation manager. The GAC processor correlates information between the file DISKPOOL and the account authorization file, :USERS.

DISKPOOL is created by the FSAVE processor for the +LOG or +DUMP command with the STATS option, and contains specific account information. Each account record in DISKPOOL contains an entry for accumulated public disk pack granules and an entry for accumulated RAD granules. When the GAC processor is run, these accumulated values are compared against the maximum values for the corresponding accounts in the :USERS file. When the accumulated RAD or disk granules exceed the corresponding maximum values, this fact is noted in the report that is produced by the GAC processor.

The user's entry in :USERS is always updated to reflect the latest accumulated values for RAD and disk.

When several users are authorized for one account, and that account appears in the DISKPOOL file, then each user entry in :USERS will be updated to the account's value for accumulated RADs and disks.

OPERATION

The GAC processor should be run as a ghost job so that the accounting for the :SYS file will be accurate; however, it may also be run on-line or as a batch job.

The system should be quiescent when the GAC processor is run. A message to this effect is output on the operator's console, as follows, before any file operations begin:

```
RECOMMEND SYST QUIESCENT BEFORE
RUNNING GAC PROCESSOR
```

Any user or job logged on during or following the FSAVE LOG and preceding the completion of GAC may cause the updating of :USERS to be invalid and/or inaccurate for that account.

FSAVE creates DISKPOOL in the 99999999 account in order that it may itself be saved on the end of the last save tape. GAC reads that DISKPOOL and updates :USERS in the :SYS account. After completing the updating, GAC deletes DISKPOOL.

OUTPUT

When GAC operation first begins, the following message is output:

```
FULL UPDATE OF :USERS IN PROGRESS
```

A listing of all selected users is produced. Any user which has an asterisk (*) in column 1 has exceeded either the maximum batch and on-line RAD limits or maximum batch and on-line disk limits. (Both the batch and the on-line limits in either the RAD or disk category must be exceeded for the output entry to be flagged.)

A listing of all the entries occurring in the DISKPOOL file that are not currently authorized in the :USERS file is output.

A summary sheet notes the type of run and the number of records read in DISKPOOL and :USERS, and the number of records in DISKPOOL that were not authorized in :USERS.

At the end of the GAC job,

```
**END OF GAC**
```

is printed on the operator's console.

7. TASK DESCRIPTIONS

This chapter contains step-by-step descriptions of the tasks to be performed by the computer operator for the operation of CP-V. The described tasks assume that everything is proceeding smoothly. Any deviation from the steps as they are described has been covered elsewhere in this manual. The tasks are

- Bringing Up the System (Booting the PO Tape) with File Restore.
- Entering Key-Ins.
- Initiating Operator Recovery.
- Recovering after HGP Reconstruction failure.
- Scheduling Backup.
- Booting from Swapper.
- Booting under files.
- Symbiont-Saving Shutdown and Restart.
- Running ELLA to Examine the ERRFILE Contents for the Current Day.
- Running ELLA to Examine the Entire ERRFILE.

The following conventions are used throughout this chapter to simplify presentation of material.

1. Everything typed at the operator's console (either by the operator or by the system) is presented in capital letters as it appears at the console, except for variables.
2. Variables are represented by lower case letters and, since the actual values are fairly obvious in most cases, the letter "x" is used extensively. The three primary exceptions are the date (mm/dd/yy – month, day, year; e.g., 02/17/70); the time (hh:mm – hour, minute; e.g., 09:15); and device labels (yyndd – e.g., CRA03).
3. Messages typed by the system on the operator's console (OC) are underlined – operator type-ins are not.

With very few exceptions, the operator's interaction with all jobs processed by the system is the same. First, he monitors the processing of the job by reading the operator's console type-outs and generally noting that all equipment appears to be operating normally. Second, he responds to the various messages and error conditions with key-ins. Requests for mounting and dismounting magnetic tapes and disk packs and for reserving scratch tapes constitute the majority of normal messages to which the operator must respond. Other messages, in addition to error indications, include such items as notification that the card punch hopper is out of cards, etc.

Every job processed has at least three pages of output printed on a line printer. These pages provide job identification and accounting information for the user and also list the kinds of output that were generated by the job. The pages serve two purposes for the operator. First, they identify the beginning and end of the printed output for the job, since the system ID is printed on the first two pages and the last page of printed output. Second, they provide a reference to any other output for the job. For each job processed, then, the operator first separates the printed output, then gets the punched output (if any) and bundles it all with the input deck for pickup by the user.

Normally, the computer operator's interaction (and concern) with on-line time-sharing terminal users is limited. He is notified when each user logs on and off, and he occasionally sends a message to or receives a message from one of them. One capability available to the on-line terminal user, however, is that of initiating a batch processing job from his terminal. When he does this, his job is run in the normal batch processing mode as if he had delivered a deck of cards to the computer room. For the computer operator, all interaction with this type of job is the same as for a normal batch job.

Example 13. Bringing Up the System (Booting the PO Tape) with File Restore

Purpose:

To load the monitor and system files from tape and bring the system to the point of being operational.

Setup:

1. Card decks needed: Patch deck.

   (Patch decks may be on tape or cards or both. The following text assumes both are used.)

2. Tapes needed: PO Tape.

Procedure:

1. Mount PO tape on an available 9-track tape unit.

2. Put patch deck in card reader and bring to ready mode.

3. On Processor Control Panel (for Sigma 5/6/7/9):

   Set:

   WATCHDOG TIMER - NORMAL

   INTERLEAVE SELECT - NORMAL

   PARITY ERROR MODE - CONT

   SENSE Switches 2,3 - SET

   SENSE Switches 1,4 - RESET

   CLOCK MODE - CONT

   ADDR STOP - RESET

   UNIT ADDRESS - xxx (address of tape unit containing PO tape)

   COMPUTE Switch - IDLE

   (Use the same settings on all secondary CPUs.)

   Press (on the primary CPU only):

   SYS RESET/CLEAR

   LOAD

   Set the COMPUTE Switch - RUN

   On Operator's Control Console (for Xerox 560):

SENSE SWITCHES 2,3	-Z^{C}SS6
HALT	-Z^{C}HLT
RESET	-Z^{C}RSY
LOAD FROM dddd	-Z^{C}LDNdddd (where dddd is the address of the tape unit; e.g., 0080)

   The Xerox 560 will begin reading the tape after a brief pause during which it executes a micro-diagnostic test and clears memory.

4. ENTER ANY OF:

   I = TTY I/O

   P = LP OUTPUT

   F = TAPE FILES

   S = :SYS FILE

   T = TAPE PATCHES

   C = CARD PATCHES

   D = XDELTA

   Enter appropriate parameters (refer to Chapter 2 for detail). ITFC assumed for following text.

5. RESET RESDF YYY,XXXX

   This message is optional. Enter response (e.g., 16,1E000 NL; or NL alone to obtain SYSGEN-defined defaults).

6. DATE (MM/DD/YY) =

   Enter current date (e.g., 2/5/74).

7. TIME (HH:MM) =

   Enter current time, on a 24-hour-clock basis (e.g., 19:17).

8. C/LL/DC ASSIGN OK (YES/NO)

   Enter reply (YES, NL, or NO). YES or NL assumed for following text.

9.	A list of monitor segment numbers (which can be discontinued by pressing the BREAK key) and a list of sense switch settings (which can be discontinued by pressing the BREAK key again) is printed on the operator's console. If the sense switch settings message is not interrupted by the BREAK key, a NL must be entered before the system will continue.	
10.	SAVE ndd,xxxx	Dismount and save PO tape xxxx from tape drive ndd.
11.	FILL GHOST INITIATED – USE 'INT, FILL.' FOR COMMANDS	
12.	Place any secondary CPU to be started in RUN after pressing CPU RESET.	
13.	Interrupt and key-in SCPU n where n is the number of the CPU to be started.	
14.	When the secondary CPU is successfully started, the system will output CPU n-addr LOGGED ON.	
15.	Interrupt and key in ON 0.	
16.	Interrupt and key in INT, FILL.. (The key-in must include one period character.)	
17.	FILL COMMAND? BEGIN FILL	
18.	FILL REEL NUMBER=	Enter the first tape serial number to be used by FILL.
19.	SKIP TO FILE	Enter file name or NL alone.
20.	MOUNT ndd, xxxx	Mount the first FILL tape.
21.	SAVE ndd, xxxx	Dismount the tape and save it.
22.	ARE THERE MORE SETS OF BACKUP TAPES (YES/NO)	Enter reply (YES or NO). NO is assumed for the following text.
23.	Key in ON xx	xx represents the number of on-line users allowed.
24.	Reset SENSE Switch 2	If automatic log-on is desired. Otherwise, on-line users must depress the BREAK key in order to establish a "connect" with the system.

The system is now operational.

Example 13a. Bringing Up the System from an MPC Tape Drive

Purpose:

To load the monitor and system files from an MPC tape drive and bring the system up.

Setup:

Same as for normal bootload procedure (see Example 13).

Procedure:

1. Mount PO tape on drive address 1-8. Select the binary equivalent of the drive address on switches 5-7 on the MPC panel as shown below:

MPC Configuration Switch			Tape Bootload Drive No.
5	6	7	
0	0	1	1
0	1	0	2
0	1	1	3
1	0	0	4
1	0	1	5
1	1	0	6
1	1	1	7
0	0	0	8

MPC configuration switch number 11 must always be selected. This sets boot tape density to 800 bpi.

2. Put patch deck in card reader and bring to ready mode.

3. On Processor Control Panel (for Sigma 5/6/7/9):

   Set:

   same as normal boot (see Example 13)

   Press (on primary CPU only):

   SYS RESET/CLEAR

   LOAD

   Press (on MPC panel):

   INITIALIZE

   START

   Set the COMPUTE switch (on PCP) to RUN

   On Operators Control Console (for Xerox 560):

   SENSE SWITCHES 2,3 -Z^{C}SS6

   HALT -Z^{C}HLT

   RESET -Z^{C}RSY

   LOAD FROM dddd -Z^{C}LDSxxxx (where xxxx is the load device address)

   Press (on MPC panel):

   INITIALIZE

   START

   On Operator's Control Console:

   RUN -Z^{C}RUN

4. Continue as a normal bootload procedure (see Example 13).

   Continue as a normal bootload procedure (see Example 13).

Example 14. Entering Key-Ins

Purpose:

To allow the computer operator to enter information from the operator's console (OC).

Setup:

System operational

Procedure for Sigma 5/6/7/9:

1. On Processor Control Panel, press INTERRUPT switch. The system is ready to accept a key-in when it responds with a ! prompt character.

2. Type the key-in message; then press the new-line, NL, key.

3. If an error is made when typing the key-in, the EOM key deletes the line and the correct key-in can be entered. The key-in is accepted (or rejected by EH?). If the key-in is rejected, the system responds with a further ! prompt character. If the operator does not want to enter another key-in, the response should be pressing the new line, NL, key only.

Procedure for Xerox 560:

1. On the operator's console, key in Y^C or Z^CI. This causes an interrupt. When the system is ready to accept a key-in, it responds with a ! prompt character.

2. Type the key-in message followed by carriage return (CR).

3. If an error is made when typing the key-in, the X^C character deletes the line and the correct key-in can be entered. The key-in is accepted (or rejected by EH?). If the key-in is rejected, the system responds with a further ! prompt character. If the operator does not want to enter another key-in, respond by pressing the return (CR) key only.

Example 15. Initiating Operator Recovery

Purpose:

To recover, under system control, from a suspected system failure. When the system appears to be in a loop or when there are reasons to suspect that the operating system is not running properly, the operator can initiate an Automatic Recovery as if it were initiated by the system.

Setup:

If the system has multiple CPU's, the secondary CPU's should be Z^CHLTed or set to IDLE.

Procedure:

1. For Sigma 5/6/7/9, set (on the primary CPU only):

   COMPUTE Switch - IDLE

   UNIT ADDRESS - xxx (address of system swap device)

   SENSE Switch 3 - SET

   For Xerox 560, key-in:

   Z^CHLT

   Set SENSE switch 3 (Z^CSS2)

2. If swapping device is a disk pack (not a RAD), turn power on that disk drive OFF, then ON again. (This restores carriage to home location.) Wait until pack is ready, then continue.

3. For Sigma 6/7/9, set:

   CPU RESET

   I/O RESET

   LOAD

   For Xerox 560, key-in:

   Z^CRIO

   Z^CRBP

   Z^CLDSdddd (where dddd is the address of the system swap device)

   Z^CRUN

4. Set COMPUTE switch to RUN.

An operator recovery should result.

Example 15a. Alternate Method for Initiating Operator Recovery.

Purpose:

To recover, under system control, from a suspected system failure. This method should be used only when the first few locations of memory have not been wiped out; its major advantage over the method described above is that it does not destroy general registers 0 and 1, and these values may be of use in determining the cause of the system malfunction.

Setup:

None.

Procedure:

For Sigma 5/6/7/9 (on primary CPU only)

1. Compute switch –IDLE
2. CPU RESET
3. Move INSTR ADDR to the INCRM position — once for Sigma 9, twice for Sigma 5/6/7
4. Move Compute switch to STEP
5. Place Compute switch in RUN

For Xerox 560, key-in:

1. Z^{C}HLT
2. Z^{C}RBP
3. P^{C}
4. 0.27MGX
5. Z^{C}RUN

An operator recovery should result.

Example 16. Recovering after HGP Reconstruction failure.

Purpose:

To save as many files and to record as much useful information as possible when the HGP reconstruction is impossible.

Setup:

None.

Procedure:

1. HGP RECONSTRUCTION FAILURE

2. Reboot the system from the swapping device without HGP reconstruction (see Example 18). If the swapper boot fails, perform a boot under files without HGP reconstruction (see Example 19). If the boot under files fails, the current file system has been irrecoverably damaged; boot the system from the PO tape with "F" specified and perform a full file restore (see Example 13).

3. FILL GHOST INITIATED – USE 'INT, FILL.' FOR COMMANDS

4. Interrupt and key in ON 0 followed by INT, FILL.

5. FILL COMMAND? BEGIN SQUIRREL

6. SQUIRREL STARTED AT hh:mm mmm dd'yy

7. MOUNT ndd, xxxx

8. Mount a scratch tape with serial number xxxx.

9. SQUIRREL COMPLETED AT hh:mm mmm dd'yy

10. SAVE ndd, xxx

11. Perform the entire "Bringing Up the System" task, using the backup squirrel that was just created after the normal set of backup tapes have been read in by FILL.

Example 17. Scheduling Backup

Purpose:

To establish a schedule for Automatic Backup. Separate procedures are given for three variations of this task, as follows:

A. Create the schedule file from a card deck, batch mode.

B. Create the schedule from an on-line terminal.

C. Modify the schedule file from an on-line terminal.

Procedure A (Create schedule, batch mode):

1. Prepare a card deck of the form shown below but with the desired schedule.

```
!JOB  :SYS, LBE, 8
!PCL
COPY CR TO DC/BACK:SCHED
SA = 23:59
IN = 10:00, 12:00, 14:00   } Sample values. Specify a 24-hour schedule.
SQ = 11:00, 13:00, 16:00
!EOD
!EOD
!FIN
```

2. Load the deck into the batch stream.

3. After the job has logged off, key in GJOB FILL.

Procedure B (Create schedule, on-line mode):

1. Log on under account :SYS at on-line terminal.

2. Enter

```
!BUILD BACK:SCHED ↵
SA = 23:59
SQ = 11:00 ↵ Sample values. Specify a 24-hour schedule.
IN = 12:00
↵
!BACKUP xx ↵
!OFF ↵
```

Procedure C (Modify schedule, on-line mode):

1. Log on under account :SYS at on-line terminal.

2. Enter

```
!EDIT BACK:SCHED ↵
TY 1-10 ↵
IN line number of line to be replaced ↵
SQ = 9:00, 12:00 (Sample value for line to be inserted) ↵
IN last line number plus 1 if another line is to be inserted ↵
SA = 23:59 ↵
↵
END ↵
!BACKUP xx ↵
!OFF ↵
```

Example 18. Booting from Swapper

Purpose:

To return the system to an operational state after it has been maintained in a nonoperational state on disk for some period of time.

Setup:

None.

Procedure:

1. On Processor Control Panel (for Sigma 5/6/7/9):

   Set:

   WATCHDOG TIMER - NORMAL

   INTERLEAVE SELECT - NORMAL

   PARITY ERROR MODE - CONT

   SENSE Switch 2 - SET

   SENSE Switch 1, 3, 4 - RESET

   CLOCK MODE - CONT

   ADDR STOP - RESET

   UNIT ADDRESS - xxx (swapping device)

   COMPUTE Switch - IDLE

   (Use the same settings for all secondary CPUs.)

   Press (on the primary CPU only):

   SYS RESET/CLEAR

   LOAD

   On Operator's Control Console (for Xerox 560):

SENSE SWITCHES 2	-Z^{C}SS4
HALT	-Z^{C}HLT
RESET	-Z^{C}RSY
LOAD FROM dddd	-Z^{C}LDNdddd (where dddd is the address of the system swap device; e.g., 09F0)

   The Xerox 560 will begin reading the disk after a brief pause during which it executes a micro-diagnostic test and clears memory.

   If the swapping device is a disk pack, the read heads must be returned to their starting position by stopping the disk drive from spinning and then starting it again. (Sigma 5/6/7/9 and Xerox 560.)

   Set COMPUTE Switch - RUN

2. RESET RESDF YYY, XXXX

   This message is optional. Enter response (e.g., 16, 1E000 NL; or NL alone to obtain SYSGEN-defined defaults).

3. DATE (MM/DD/YY) = Enter current date (e.g., 2/5/71).

4. TIME (HH:MM) = Enter current time (e.g., 19:17).

5. DO YOU WANT DELTA (Y/N)

   Enter response (Y or N). N assumed for following text.

6. DO YOU WANT HGP RECONSTRUCTION

   Enter response (Y or N). N assumed for following text.

7. ATTEMPT BATCH QUEUE RECOVERY (Y/N)?

   This message appears only if a ZAP was not done prior to the swapper boot. A response of N will cause the batch queue (if any) to be lost.

8. Place any secondary CPUs to be started in RUN after pressing CPU RESET on each of them.

9. For any secondary CPUs to be started, interrupt and key in

   SCPU n

   where n is the logical number of the CPU to be started.

10. CPU n-a LOGGED ON — This message is output for each secondary CPU that is started.

11. FILL GHOST INITIATED – USE 'INT,FILL.' FOR COMMANDS

12. On Processor Control Panel

    SENSE Switch 3 - SET

    SENSE Switch 2 - RESET to allow automatic log-on

The system is now operational, ready to accept time-share and batch users.

It is possible to attempt to recover the batch queue when booting from the swap device without previously having done a ZAP. A response of 'Y' to the message:

ATTEMPT BATCH QUEUE RECOVERY (Y/N)?

will cause the recovery attempt to be made; any other response will cause the batch queue to be lost. Note that this procedure cannot be guaranteed to work, and that a boot from the swapper should only be performed after a ZAP or if a recovery fails.

Example 19. Booting under Files

Purpose:

To restore files to :SYS or to recover the system if the system RAD is destroyed.

Setup:

None.

Procedure:

1. Mount PO tape on an available 9-track tape unit.
2. Put patch deck in card reader and bring to ready mode.
3. On Processor Control Panel (for Sigma 5/6/7/9):

   Set:

   WATCHDOG TIMER - NORMAL

   INTERLEAVE SELECT - NORMAL

   PARITY ERROR MODE - CONT

   SENSE Switches 2, 3 - SET

   SENSE Switches 1, 4 - RESET

   CLOCK MODE - CONT

   ADDR STOP - RESET

   UNIT ADDRESS - xxx (address of tape unit containing PO tape)

   COMPUTE Switch - IDLE

   (Use the same settings on all secondary CPUs.)

   On Operator's Control Console (for Xerox 560):

SENSE SWITCHES 2, 3	-Z^{C}SS6
HALT	-Z^{C}HLT
RESET	-Z^{C}RSY
LOAD FROM dddd	-Z^{C}LDNdddd (where dddd is the address of the tape unit; e.g., 0080)

   The Xerox 560 will begin reading the tape after a brief pause during which it executes a micro-diagnostic test and clears memory.

Press (on the primary CPU only):

SYS RESET/CLEAR

LOAD

Set the COMPUTE Switch - RUN

4. ENTER ANY OF: I = TTY I/O P = LP OUTPUT F = TAPE FILES S = :SYS FILE T = TAPE PATCHES C = CARD PATCHES D = XDELTA	Enter the parameters I, P, S, T, C. (S restores :SYS. I causes steps 5-9 to take place.)
5. RESET RESDF YYY,XXXX	This message is optional. Enter response (e.g., 16,1E000 NL; or NL alone to obtain SYSGEN-defined defaults).
6. DATE (MM/DD/YY) =	Enter current date (e.g., 2/5/74).
7. TIME (HH:MM) =	Enter current time, on a 24-hour-clock basis (e.g., 19:17).
8. DO YOU WANT DELTA (Y/N)	Enter response (Y or N).
9. DO YOU WANT HGP RECONSTRUCTION	Enter response (Y or N). Respond Y if there was possible damage to the file system.

Example 20. Symbiont-Saving Shutdown and Restart

Purpose:

To shut the system down for Preventive Maintenance (PM) while retaining symbiont input and output files. These files may be processed after PM.

Setup:

None.

Procedure:

To shut the system down:

1. Key in ONB 0 -- This means "don't schedule any more batch jobs". The current jobs continue running. In addition, ON0will prevent new on-line jobs. OBOFF will prevent on-line users from submitting additional batch jobs.
2. Lock all output symbiont printers (e.g., SLPA02, L). This means "don't print any more jobs". Currently printing jobs may be stopped and requeued for later printing (e.g., SLPA02, Q).

3. When all batch jobs have completed running (use DISPLAY JOB to be sure), key in ZAP to force off any remaining on-line users, disconnect all remote batch terminals, and bring the system to quiescence. An appropriate sign-off message is printed when this action is completed.

4. You may not restart from this position with an ON 1. You must reboot as below.

5. Write protect the RADs and packs as usual and turn over to Customer Engineers.

To restart the system:

1. Unprotect the RADs and packs.

2. Boot from swapping device (see Example 18).

3. Establish correct number of on-line users – ON n.

4. Establish correct number of batch users – ONB n.

5. Key in IS to resume scheduling of batch jobs.

6. Unlock and initiate symbionts locked during shutdown (e.g., SLPA02,I).

7. Key in IRBS to restart remote processing if desired.

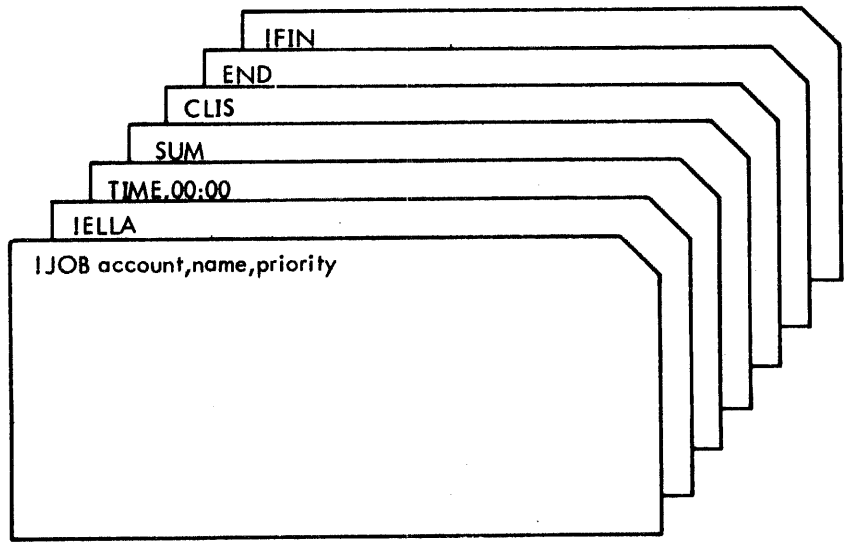
Example 21. Running ELLA to Examine the ERRFILE Contents for the Current Day

Purpose:

To obtain both a summary of the error log file ERRFILE and a formatted dump of its contents that is restricted to the current day's entries.

Procedure:

Run the following job. (The account on the JOB card should have a privilege level of A0 or higher.)



Results:

An error log summary and chronological listing will be produced on the line printer.

Example 22. Running ELLA to Examine the Entire ERRFILE

Purpose:

To obtain both a summary and a formatted listing of the entire contents of the error file.

Procedure:

Run the job in Example 20 with the TIME command omitted.

APPENDIX A. INDEX OF KEY-INS

Key-In	Function	Page
ABORT, {id / ghostname.[account]}	Abort user or job.	14
ANSM[OUNT] ndd$_1$[.ndd$_2$][, BLP]	Inform monitor that an ANS tape has been mounted.	29
ANSS[CRATCH] ndd$_1$[.ndd$_2$][, BLP] [,serial number]	Inform monitor that an ANS scratch tape has been mounted.	30
D mm/dd/yy	Enter date.	19
DATE mm/dd/yy	Enter date.	19
DELE[TE] id, yyndd	Delete symbiont file from system.	16
DIAG id	Authorize customer engineers to run diagnostics.	20
DISP[LAY] option	Send system information to operator.	10,26
E, {id / ghostname.[account]}	Error (terminate) job step -- go to next job step.	13
ERROR, {id / ghostname.[account]}	Error (terminate) job step -- go to next job step.	13
ERSEND text	Build a record in the system error log file.	20
FLUSH yyndd, id	Deletes concurrent mode output being generated by the specified job for the specified device.	16
FORM sysid[,device[,form]]	Change the form name on output files in the system.	16
GJOB name[.account]	Initiate ghost job.	19
HEAD[ING] [message]	Provide message for on-line top-of-page heading or cancel previous heading.	18
INT, {id / ghostname.[account]}	Transfer control to user's console interrupt routine.	19
MCSEND text	Sends message to a Xerox 560 Maintenance Console (Remote Assist Station).	20
MOUNT ndd$_1$[.ndd$_2$][, BLP] [,serial number[, {id / PUBLIC / LOCK}]]	Inform monitor that tape or pack is mounted.	26,28
OBOFF	Disallow entry of jobs to the batch stream from on-line terminals and processors.	18
OBON	Reallow on-line and processor entry of jobs to the batch stream after an OBOFF key-in.	18
OFF	Allow no more users to log on.	18

Key-In	Function	Page
ON n	Set maximum number of on-line users.	18
ONB n	Set maximum number of batch users.	18
OUTPUT {GO, id / STOP, yyndd}	Places all output streams of a job into concurrent output mode or releases a device from the concurrent output mode.	17
OVER ndd[,serial number]	Override the rejection of an output tape. (Applicable only for ANS tapes in the semi-protective mode.)	37
PRIO[RITY]id [, {priority / [yyndd], priority}]	Change user file or execution priority.	17
RBBDCST message	Add message to the remote message file.	19
RBDISC [&RBndd / wsn]	Disconnect a remote processing terminal.	9
RBLOG RBndd,wsn	Allow automatic log-on of a remote processing terminal.	9
RBS [&RBndd / wsn]	Allow connection of remote processing terminal.	9
RBSEND {&RBndd / wsn} message	Send a message to a remote terminal.	19
RBSWITCH wsn,dev,user	Switch output files from one workstation to another.	20
RBX [&RBndd / wsn]	Disconnect (and disallow connection of) one or all remote processing terminals.	9
READ ndd[,serial number]	Override a RING message.	37
REQUEST ndd	Prepare to dismount tape from unit ndd.	26
REQUEST rt	Request the tape type resource specified by rt.	30
S	Search for input symbiont files to run.	14
SCPU n	Start the specified secondary CPU.	121
SCRATCH ndd_1[.ndd_2][,BLP],serial number	Use the specified tape as a scratch unit.	29
SEND,{ALL / id} message	Issue message to a specific on-line user or to all on-line users.	18
SS	Start symbiont card reader.	15

Key-In	Function	Page
START	Search for input symbiont files to run.	14
Syy[ndd], option	Initiate symbiont action.	14,7
T hh:mm	Enter time.	19
TIME hh:mm	Enter time.	19
X, {id / ghostname.[account]}	Abort user or job.	14
XCPU n	Stop specified secondary CPU.	121
yyndd, action	Initiate action indicated in response to device message.	31
ZAP	Abort all users and shut down the system.	18

APPENDIX B. INDEX OF OPERATOR CONSOLE MESSAGES

Message	Meaning	Action	Page
id:acct__****message	Message is up to 44 characters from specified job id.	Depends on message contents.	3
id:acct__ message id:acct__ FORM:	A user program is requesting a form specification for a symbiont output file, "message" is the text of the user's form control message.	Enter a one- to four-character forms name to be associated with the output file, or enter NL to indicate standard form.	16
id:acct ABNORMAL ERROR ON LOG ON FILE† ERROR CODE = xx	Trouble with :USERS file detected while logging a user on.	Recreate account with SUPER. If unsuccessful, delete :USERS file and recreate file with SUPER.	–
*ABOVE JOB NEEDS PARTITION CHANGE	This message follows the JOB, account, ... message and indicates that the job will never fit into a batch partition with the current partition settings.	Inform the system manager.	–
ACNCFU NAME/ACCOUNT POINTERS BAD	CFU area in core is bad.	None. Information only.	–
id xxxx AJIT DA	Recovery error message: bad JIT disk address in UH:AJIT, where xxxx is address in recovery.	None. Information only.	–
AN EOD OR BCD CARD IS MISSING – CRndd SYMB SUSPENDED	While reading binary input, the input symbiont did not detect a !EOD or !BCD command to terminate binary input before detecting another ! control command.	1. Get the last card read from the output hopper and place it at the read station as the next card to be read. 2. Put the card reader in the ready state and key-in !SCRndd,C	15
id:acct ANS REEL NO. ERR	The serial number of an ANS tape does not match the serial number in the ANS output DCB that requested it.	Replace the tape or use the OVER key-in (if in the semi-protective mode).	37
id:acct__ANS VOL,ndd	An attempt was made to output an ANS unexpired labeled tape when a non-ANS tape was requested.	Replace the ANS tape with a non-ANS tape and repeat the original response, or use the OVER key-in to permit writing on the mounted tape.	37
id:acct__ANSMOUNT yyndd,'filename', vsn	A request was made to mount an ANS tape and the filename, rather than the volume serial number, was specified.	Check the user's job sheet to see which tape should be mounted. Mount the tape and use the ANSMOUNT key-in.	29

†All messages shown in this index preceded by id are messages that the system identifies with a user. The system prints the user's job or scheduling number followed by the user's account number (or ghost job name in parentheses) at the beginning of the message line. For all messages which include ERROR CODE = xx, see Appendix B of the CP-V/TS Reference Manual, 90 09 07, for the error code.

Message	Meaning	Action	Page
id:acct__ANSMOUNT yyndd, serial number	A request was made to mount the specified ANS tape.	Mount the tape and use the ANSMOUNT key-in.	29
id:acct__ANSSCRATCH yyndd [,'filename',vsn]	An ANS tape was requested for output and no serial number was specified.	Mount an ANS scratch tape. Use the ANSSCRATCH key-in.	29
id:acct ARE THERE MORE SETS OF BACKUP TAPES (YES/NO)†	FILL is asking about additional reels for restoring file system.	Enter YES or NO. See "Bringing Up the System" task description.	–
ATTEMPT BATCH QUEUE RECOVERY?	This message occurs during a disk boot or a boot under files.	Enter Y if you want the system to attempt to recover the batch queue.	45
__yyndd AVR DRIVE BUSY	The operator mistakenly dismounted an active volume and an AVR for another volume was attempted on drive.	The dismounted volume should be remounted on the drive and then dismounted correctly. The other volume should be mounted on another available drive.	36
__yyndd AVR I/O ERROR	An I/O error occurred during the AVR sequence.	Attempt to repeat the AVR on another drive. Repeated failures indicate a bad volume and the requesting job should be aborted.	36
BACKUP TAPE INACCESSIBLE – BACKUP TERMINATED	FILL was unable to open the backup tape and has terminated. Selective fill and purge functions are still operable.	None. Information only.	–
BACK:SCHED CONTAINS MORE THAN 47 ENTRIES – EXCESS IGNORED	There are more than 47 entries in the BACK:SCHED file that determines when scheduled backups will occur. Entries after the 47th will be ignored.	The file should be rebuilt to assure that BACKUP operates at the times and in the manner desired.	–
id xxxx BAD JIT	Recovery error message: bad stack pointer doubleword in JIT, where xxxx is address in recovery.	None. Information only.	–
id xxxx BAD MAP	Recovery error message: bad map image in JIT, where xxxx is address in recovery.	None. Information only.	–
BAD SEL:FILL INPUT...	The SEL:FILL record following the message is not a proper selective FILL command and has been deleted and ignored.	The command should be corrected and reentered into the SEL:FILL file via EDIT.	54

†All messages shown in this index preceded by id are messages that the system identifies with a user. The system prints the user's job or scheduling number followed by the user's account number (or ghost job name in parentheses) at the beginning of the message line. For all messages which include ERROR CODE = xx, see Appendix B of the CP-V/TS Reference Manual, 90 09 07, for the error code.

Message	Meaning	Action	Page
*BAD WSN ON !RBSW	The wsn specified in RBSWITCH key-in was invalid.	Reenter keyin.	–
BATCH: id, id, ... ONLINE: id, id, ... ASLEEP: id, id, ...	The monitor is responding to a DISPLAY key-in that has a USER option.	None. Information only.	11
*BATCH QUEUE LOST -- CODE = xxxx	A severe software or hardware failure has caused the batch queue to be lost.	Note code and report to system analyst.	44
id:acct__BROADCAST IMPOSSIBLE - BAD MONSTK – RELOAD PIGEON	The ghost job that handles the SEND key-in was incorrectly loaded at SYSGEN.	Reload PIGEON with the correct MONSTK.	–
CANNOT ACCESS :RBLOG–CODE=xxxx	The monitor cannot access the workstation authorization file. xxxx = error or abnormal code and subcode.	None. Information only.	–
CHANGE LPndd TO LP	The Fix processor is allowing the operator to change the line printer address during HGP reconstruction.	Enter a three-character device address or a carriage return alone to leave the address unchanged.	46
C/LL/DC ASSIGN OK (YES/NO)	Are the startup device addresses right?	Enter YES or NL (unless specifically instructed otherwise).	5
CONT. PART. FOR – yyndd	Controller identified by yyndd is partitioned from the system, and all devices within the controller are also partitioned.	None. Information only.	–
CONT.RET.FOR – yyndd	Controller returned to the system along with all of its devices (previously partitioned) that are not busy.	None. Information only.	–
CONTROL CARD ERROR, LABEL ABORTING	The LABEL processor is aborted because of previously listed errors in the control card.	Correct the control card and restart the job.	–
id xxxx CONTXT DA	Recovery error message: bad disk address in JH:DA, where xxxx is address in recovery.	None. Information only.	–
CORE SIZE TOO SMALL FOR HGP RECONSTRUCTION	Recovery was unable to obtain a sufficient amount of core to reconstruct the HGP tables. The operator will be notified that recovery is impossible.	None. Information only.	–
CPU n-a { T46 / T4D / BUS / MAP / MEM } FAULT	The secondary CPU identified by logical number n and hardware address a has detected a hardware fault. The information gathered by the secondary CPU has been logged by the primary CPU.	None. Information only.	46

Message	Meaning	Action	Page
CPU n-a CANNOT BE STOPPED	The secondary CPU identified by logical number n and hardware address a cannot be shut down by the system.	If the operator has placed the CPU in manual prior to issuing the XCPU key-in, then placing the CPU in RUN should correct this. If the alarm on the secondary CPU is on, there is a hardware problem and no action should be taken.	122, 126
CPU n-a LOGGED OFF	The secondary CPU identified by logical number n and hardware address a has been stopped by the system.	Place the identified CPU in IDLE.	122, 126
CPU n-a LOGGED ON	The secondary CPU identified by logical number n and hardware address a has been initialized.	None. Information only.	122, 126
CPU n PLEASE RESPOND	The secondary CPU identified by logical number n has been partially initialized by the system but has not been placed in RUN.	Press CPU RESET on the secondary CPU. Then put the CPU in RUN.	122, 126
CRndd MISSING !BCD	A user failed to terminate his !BINary deck with a !BCD card, causing a control command to be read in binary mode on the device CRndd. The device CRndd is suspended.	Take the last card read from the output hopper of CRndd and place it in the front of the cards in the input hopper. Key in: SCRndd,C. (The reader will automatically be reset to BCD mode.)	–
CSESTOP – 4C TRAP	Central system error; a hardware error trap occurred and the retry counter is zero. (Sigma 9 and Xerox 560 only.)	Record the contents of the CSE STOP TABLE as described in Appendix F and call the Customer Engineer.	45
CSESTOP – DBL FLT	A central system error occurred while processing a previous hardware fault.	Same as above.	45
CSESTOP – FLT DURING INIT	A central system error occurred during initialization or recovery.	Same as above.	45
CSESTOP – I/O INST FAIL	Central system error; an I/O instruction failed to execute during initialization or recovery. (Sigma 9 and Xerox 560 only.)	Same as above.	45
CSESTOP – MAP PE	Central system error; a map parity error occurred and the retry counter is zero. (Sigma 9 and Xerox 560 only.)	Same as above.	45
CSESTOP – MEM PE	Central system error; an incorrectable memory fault has occurred.	Same as above.	45
CSESTOP – REG PE	Central system error; a register block parity error occurred and the retry counter is zero.	Same as above.	45

Message	Meaning	Action	Page
CSESTOP – WD TRAP	Central system error; a watchdog timer runout occurred and the retry counter is zero.	Same as above.	45
CURRENT AVAILABLE GRANULES IS BELOW THRESHOLD CURRENT THRESHOLD=nnnn; CURRENT GRANULE COUNT=nnnn NEW THRESHOLD=nnnn	The number of available permanent granules fell below a system threshold and the threshold has been changed.	None. Information only.	55, 58
DATE (MM/DD/YY) =	The monitor is requesting the date.	Enter the date (e.g., 2/5/71).	5
DCndd WRITE PROTECT	A write operation was performed on a RAD with the write protect switches set.	Reset write protect switches and try again. See Appendix C.	–
id xxxx DCB TABLES	Recovery error message: bad DCBTAB, where xxxx is address in recovery.	None. Information only.	–
id DELETED	The job was deleted because a serious error occurred or an irrecoverable swap error occurred.	None. Information only.	–
DEVICE I/O ADDRESS ndd NOT RECOGNIZED	A power failure may have occurred during VOLINIT processing.	Restart the job.	25
DEVICE yyndd WRITE PROTECTION VIOLATION	VOLINIT processing has been suspended due to a write-protect condition on the device.	Contact the Customer Engineer.	–
DEV. PART. – yyndd	Nonsymbiont device yyndd partitioned from system.	None. Information only.	–
DEV. RET. – yyndd	Device yyndd returned to system (previously partitioned).	None. Information only.	–
name xxxx DEVICE yy PRIORITY z DISCARDED	The indicated symbiont file has been released and the space reclaimed.	After system reinitialization, resubmit the discarded job to the symbiont input stream.	–
_yyndd DEVICE DOWN	AVR attempted on a partitioned device.	If volume is being mounted for diagnostic purposes, ignore message. Otherwise move volume to a nonpartitioned drive.	36
id:acct__DSMNT ndd,xxxx	The system has finished using tape xxxx.	Dismount tape xxxx.	–
_ndd DISMOUNT AND SAVE serial number	The tape on tape drive ndd is no longer needed.	Dismount tape specified by "reel number" and save.	26, 30
_ndd DISMOUNT SCRATCH serial number	The scratch tape on tape drive ndd is no longer needed.	Dismount tape specified by "reel number" if the tape drive is needed.	30

Message	Meaning	Action	Page
idtacct__DISMT yyndd, serial number	System is requesting a disk pack to be dismounted so requested private volume may be mounted.	Dismount the specified disk pack.	26
DO YOU WANT ALLOCAT'S DUAL (Y/N)?	Primary (swapper) copy of system's free granule pool is not the same as backup copy recorded in the public file area.	Enter Y to use the backup copy or N to use the swapper copy.	45
DO YOU WANT DELTA (Y/N)	During system startup or recovery, the operator can choose to retain Executive Delta.	In normal operations, no response is required. The system assumes N to release Delta if no operator response is received within 10 seconds.	-
DO YOU WANT HGP RECONSTRUCTION (Y/N)?	During a reboot from the swapping device or a reboot from PO tape under the files, the operator may elect to invoke HGP reconstruction for a file consistency check or to rebuild the granule map.	In normal operations, no response is required. The system assumes N by default if no operator response is received within 60 seconds.	46
DUMP TAPE - RCVT - IS ON UNIT ndd	The tape dump was successful.	Save the tape on the tape drive ndd for later analysis. When the system is reinitialized, key in GJOB ANLZ.	-
EH?	Key-in is not valid or request is not needed. For example, GJOB when ghost job is active.	Try again.	2,7, 13,20
ENTER ANY OF: I = TTY I/O P = LP OUTPUT F = TAPE FILES S = :SYS FILES T = TAPE PATCHES C = CARD PATCHES D = XDELTA	During a normal bootstrap procedure, this message appears after a PO tape is loaded, presenting the operator with boot message routing options (I,P), patch check input options (T,C), file system option (F), and XDELTA option (D). Any number of options or N, meaning none of the above, may be entered, followed by (NL).	Enter the desired parameters. The response must end in (NL). The default T is assumed if no response is received within 10 seconds or if NL alone is entered.	5
ENTER I/O ADDRESS FOR TAPE DUMP (0 = NONE)	A scratch tape is needed in order to dump core.	Mount a scratch tape and type the I/O address of the tape unit on which it is mounted. The address must be of the form ndd; e.g., A80.	-
→ CENTRAL SYSTEM ERROR RECORDED-CHECK THE ERROR LOG	A hardware fault has been recorded in the error log file.	Information only.	-
→ THE ERROR LOG FILE IS INACCESSIBLE	The error log file is no longer usable.	Give Fix output to analyst and delete ERRFILE :SYS file.	-
ERROR IN IN-CORE DISK ADDRESS BUFFERS - BAD DISK ADDRESS FOUND	The error noted has been detected in the core-resident disk address buffers maintained by ALLOCAT. All granules in the buffers (up to 400 granules) are lost.	If the message occurs several times, perform an HGP reconstruction to reclaim the lost granule space.	-

Message	Meaning	Action	Page
ERROR IN IN-CORE DISK ADDRESS BUFFERS – BUFFER OVERLAP	Same as above.	Same as above.	–
ERROR IN IN-CORE DISK ADDRESS BUFFERS – COUNT ERROR	Same as above.	Same as above.	–
ERROR xx UPDATING VTOC ON ssss, yyndd [RECOVERED OK]	Error xx occurred while attempting to update the VTOC of private pack ssss mounted on drive yyndd. RECOVERED OK indicates that the I/O was retried successfully. Absence of this phrase indicates that the HGP on the pack was not updated.	None. Information only.	–
id:acct ERROR IN 'SEND' KEY-IN-PLEASE RETRY	A bad id was specified in a SEND key-in or another key-in was typed before the PIGEON ghost could process the SEND key-in.	Retry the key-in.	–
id:acct ERROR IN SYSTEM ACCOUNT FILE DIRECTORY ERROR CODE = xx	LOGON detected an error in :SYS account file directory.	Action varies with error type. (See Appendix B, CP-V/TS Reference Manual, 90 09 07, for error codes.)	–
____yyndd ERROR-TAPE LOST POSITION	A tape write or read error has occurred and the tape failed to operate the recovery steps properly. Frequent appearance of this message indicates hardware errors.	None. Information only.	36
____yyndd ERRORED BY USER	A tape error has occurred, and an on-line user has keyed in an ERROR command.	None. Information only.	36
EXPECTED LEFT PARN MISSING	A left parenthesis is missing on the LABEL control card.	Correct the card and restart the job.	28
EXPECTED RIGHT PARN MISSING	A right parenthesis is missing on the LABEL control card.	Correct the card and restart the job.	28
EXPIRED FILE PURGE INITIATED	A file purge operation has been initiated by the operator.	None. Information only.	–
FILE OUT OF SEQUENCE – QUIT OR CONTINUE (Q/C)	FILL has encountered a file on tape for which the time of writing is out of sequence, suggesting that there are no more valid files on this tape.	To ignore the time of writing and continue, enter C. To terminate use of this tape, enter Q.	55
FILE REEL NUMBER =	Requests the SN of the first tape reel used by FILL.	Enter the digit-digit-letter-digit SN of the tape to be used.	-
FILL COMMAND?	This is a response to the INT, FILL. key-in.	Enter the desired FILL command.	55
FILL GHOST INITIATED – USE 'INT, FILL.' FOR COMMANDS	During system startup, FILL initiates itself and issues this message to inform the operator. It then goes to sleep.	Key-in INT, FILL. to issue commands to FILL when necessary.	7, 54

Message	Meaning	Action	Page
FILL UNABLE TO OPERATE - NO TAPES AVAILABLE	A Backup Fill, or Purge operation was initiated, but there are no free tape drives for the FILL program to use. The message is repeated every 2 minutes until a drive becomes available.	Try to free a tape drive.	-
FSAVE I/O COUNT NON ZERO - QUIT OR CONT (Q/C)?	The master function count indicates that one or more I/O operations are outstanding after FSAVE processing is complete.	Unless an operator key-in is pending in response to a tape error, enter Q to terminate the job.	-
FSAVE TAPE CREATED ON hh:mm mon dd, 'yy	A Fill operation was initiated using a tape created by FSAVE on the specified date.	None. Information only.	-
**GHOST ALREADY ACTIVE	The ghost job specified in a GJOB key-in is already running.	None. Information only.	19
**GHOST AWAKENED	The ghost job specified in a GJOB key-in was sleeping and has been awakened.	None. Information only.	19
**GHOST OR USER TABLES FULL... UNABLE TO START GHOSTS:	There is no room left in the system tables to start another ghost job; lists unstarted ghosts.	Attempt to run the ghost again after another ghost job has ended.	19,45
GJOB name.account ERR	The name or account number that is specified on the GJOB key-in cannot be found.	Reenter key-in with correct name and/or account.	19
HGP MALFORMED	HGP area in core is bad.	None. Information only.	-
HGP RECONSTRUCTION FAILURE	HGP reconstruction cannot be completed and recovery is impossible.	The system should be rebooted from tape and file restoration should be performed from save tapes.	46
id:acct__ID jid CANCELLED	An on-line user cancelled a batch job specified by jid.	None. Information only.	-
ID = xxxx ACCT =xxxxxxxx PART = xx	Response to DISPLAY key-in with JOB option.	None. Information only.	11
id:acct__serial number I/O ERROR	An I/O error occurred while verifying the volume. The disk unit containing the volume in error is marked empty and another MOUNT message is output.	None. Information only.	35
I/O ERROR, TAPE DUMP DEVICE	The tape dump device malfunctioned during recovery.	When requested, mount scratch tape on a new tape drive.	-
*ILLEGAL FORMS CHANGE	The operator has attempted to initiate a forms change on an active output symbiont device.	Wait until the device is idle.	16

Message	Meaning	Action	Page
*ILLEGAL JOB COMMAND – JOB ABORTED	An illegal JOB command has been entered, and the entire job has been aborted.	None. Information only.	–
ILLEGAL KEYWORD	A keyword used on the control card input for LABEL processing was not one of the following: SN, MSN, PRINT, or NOLABEL.	Correct the card if possible and restart the job.	28
ILLEGAL VALUE	An expected parameter on the LABEL control card was either not numeric or not within limits.	Correct the card if possible, or return to the user for resubmittal.	28
id IN CONCURRENT OUTPUT MODE ON yyndd	A file of the job specified by id has been placed in concurrent output mode on the symbiont device identified by yyndd.	None. Information only.	
INCREMENTAL { STARTED AT / RESTARTED AT / SUSPENDED AT / COMPLETED AT / TAPE CREATED ON / TERMINATED AT } hh:mm mon dd, 'yy	Self-explanatory.	None. Information only.	
INITIALIZATION HALTED – RESTART O.K.	The bootstrap operation was halted by the operator.	None. Information only.	5
*INPUT id, yyndd [,xxxx]	The system is acknowledging receipt of an I priority file, i.e., a symbiont input file that does not contain control commands. yyndd is the input device and xxxx is the file name.	None. Information only.	–
INSUFFICIENT PHYSICAL STORAGE TO COMPLETE FILL	All available disk storage is in use. FILL cannot build more files until storage becomes available.	Start a Purge operation to make room for new files.	–
INVALID I/O INTERRUPT, AIO ADDRESS = nnn	A possible hardware failure has occurred during VOLINIT processing.	Give output, if any, to the system analyst or the Customer Engineer.	25
INVALID KEYIN, PLEASE TRY AGAIN	The previous key-in command issued during VOLINIT was in error.	Reissue the correct key-in command.	24
IS xx	This is the response to the PRIO key-in requesting a job's current execution priority. The value xx indicates the job's current execution priority.	None. Information only.	18

Message	Meaning	Action	Page
processor IS TOO LARGE	The specified processor is too large and cannot be shared (i.e., only one user may use it at a time). This message is only applicable for systems without disk storage.	None. Information only.	–
id xxxx JIT DA	Recovery error message: bad JIT disk address in UH:JIT, where xxxx is address in recovery.	None. Information only.	–
*JOB ABORTED	The job specified above this line is being aborted for limit card errors.	None. Information only.	–
JOB ABORTED AT LOCATION nnnn	A hardware or software error was detected during VOLINIT processing.	Give output, if any, to the system analyst.	–
*JOB acct, name, id, priority [, work-station name]	The specified batch job has been entered.	None. Information only.	10
JOB xxxx PARTIALLY COMPLETED	The specified job, running when recovery began, will not be completed.	Return completed output to the user for resubmittal of remainder of job.	–
KEYIN BUSY	The system was processing an operator key-in or AVR sequence and could not accept a second key-in at this time.	Wait a few seconds and re-enter the key-in.	–
LATER	The requested unit is in use. The tape cannot be dismounted now.	Try for another tape unit or wait until one is available.	26, 30
MAX OUM + BUM = n	The system has automatically reduced the number of non-ghost users allowed on the system to n due to lack of swap storage space. (This message is only applicable for systems that use a disk pack rather than a RAD for swap storage.)	None. Information only.	7
id:(PIGEON) MESSAGE REJECTED BY USER-PLS RETRY LATER	A SEND key-in was issued for a specific user who had issued the TEL DONT SEND command.	Retry the key-in later.	–
MESSAGE TRUNCATED	The test of a !SEND or !HEADING key-in was too long; only part of the message was sent or placed in the page heading.	If !HEADING, re-enter the command with a shorter message. If !SEND, retransmit last part of message if necessary.	–
*MISSING JOB COMMAND – JOB IGNORED	Other than a JOB command was read at the start of a job, and the job has been ignored.	None. Information only.	–
id:acct__MOUNT yyndd,serial number	The system is requesting that the specified disk pack be mounted on a disk unit.	Mount the disk pack on the unit specified.	26

Message	Meaning	Action	Page
id:acct__MOUNT yyndd,serial number	The system is requesting that the specified tape reel be mounted on a tape unit.	Mount reel specified by "serial number" on tape drive ndd. Use the AVR procedure or the MOUNT key-in.	7, 28
NEW FILE SYSTEM	The F option was specified during system initialization.	None. Information only.	5
NONE	Acknowledgment of the purge command NONE, or an incorrect command has been treated as 'NONE'.	None. Information only.	–
id:acct__NOT ANS,ndd	An attempt was made to output on a non-ANS tape when an ANS tape was requested.	In the protective mode, mount an ANS tape. Then repeat the original response. In the semi-protective mode, either mount an ANS tape as above or use the OVER key-in.	37
id:acct__NOT EXPIRED,ndd,yyndd	An unexpired ANS tape was mounted when a request was made for an ANS output tape.	In the protective mode, replace the tape with an ANS unexpired tape. Then repeat the original response. In the semi-protective mode, either replace the tape as above or use the OVER key-in.	37
id:acct__serial number NOT IN SET	The volume mounted on a disk pack does not belong to the set.	Dismount the volume and mount the correct volume in response to a mount message or abort the job.	34
id:acct__file NOT IN :SYS	The system initialization program was unable to find an expected file in the :SYS account.	None. Information only.	–
id:acct__serial number NOT INIT	The private volume has not been initialized by VOLINIT.	Dismount the volume and mount another volume in response to a mount message or abort the job.	34
____yyndd NOT UNIQUE	An attempt was made to mount two volumes with the same serial number.	Dismount the disk pack that is not desired.	34
NOTHING TO DISPLAY	There are no symbiont files to list in response to the previous DISPLAY key-in.	If key-in was in error, reenter it correctly.	–
id:acct OFF	The job has finished execution or a user has logged off.	None. Information only.	10

Message	Meaning	Action	Page
id:acct OFF ABORTED	The job was aborted.	None. Information only.	10
id:acct ON	The job has begun execution.	None. Information only.	10
OPERATOR RECOVERY	An operator-initiated recovery has begun.	None. Information only.	-
PACK yyndd PARTITIONED, DIAL ndd NOT AVAILABLE	The disk pack yyndd has been partitioned, and its dial number, ndd, is not available for future allocation until the device is returned to the system.	Operator should ensure that the indicated dial number is not used by some other device or that the indicated dial number is not changed to some other number.	–
*PARTIAL INPUT FILE DELETED BY RECOVERY	Job being read in when system failure occurred has been deleted.	Reload the job.	–
id xxxx PHY PG MAP	Recovery error message: bad JIT pointers into MX:PPUT, where xxxx is the address in recovery.	None. Information only.	–
PLEASE KEY IN DATE ID MM/DD/YY	The date previously issued is in error (message generated by VOLINIT).	Enter the correct date (e.g., 3/14/73) in the format specified.	24
yyndd PLEASE RESPOND	Operator has not returned an action key-in response to an abnormal condition.	Respond with proper action key-in for the I/O device.	31
POWER FAIL-SAFE	A power failure of some kind occurred and the system recovered itself.	None. Information only.	–
PRINT ALL, FILENAMES, ERRORS ONLY, OR NOTHING (A/F/E/N)?	The FIX processor is allowing the operator to change the amount of information that is to be printed during an HGP reconstruction. (A means all, F means filenames only, E means errors only, N means nothing.)	Enter A, F, E, or N, or a carriage return alone to leave the current specifidation in effect.	46
PSA TRACK FLAWED	The disk pack being used as a swap device contains flawed tracks in the PSA (Permanent System Allocation) area. (Applicable only to systems that do not have a RAD swap device.)	Replace the disk pack and reboot from the PO tape.	6

Message	Meaning	Action	Page
PURGE {STARTED AT / RESTARTED AT / SUSPENDED AT / COMPLETED AT / TAPE CREATED ON / TERMINATED AT} hh:mm mon dd, 'yy	Self-explanatory.	None. Information only.	-
PURGE COMMAND?	Response to interrupt directed to the purge function of the FILL ghost job.	Enter the desired command. (See Chapter 6.)	55, 58
RBndd – wsn – rbid – status	Response to DISPLAY key-in with RBT option.	None. Information only.	11
*RBndd – wsn – (!JOB acct, . . .)	The specified job has been accepted from wsn at RBndd.	None. Information only.	–
*RBndd CONNECTED	A remote terminal has been connected to DSC RBndd.	None. Information only.	–
*RBndd – DISCONNECTED	The remote terminal that was connected to RBndd is no longer connected.	None. Information only.	–
*RBndd ERROR MAX	The remote terminal connected to RBndd is about to be disconnected because of errors detected on the communication line.	None. Information only.	9
*RBndd FAILED TO LOG STATION ON!	An attempt to log on the remote terminal connected to RBndd was rejected by the monitor.	None. Information only.	–
*RBndd – wsn ** INPUT id,yy[,xxxx]	The system is acknowledging receipt from a remote terminal of an I priority file, i.e., a symbiont input file that does not contain control commands. yy is the input device at the remote site and xxxx is the file name.	None. Information only.	–
*RBndd – wsn – LOGGED ON	Workstation name wsn has been logged on.	None. Information only.	–
*RBndd – wsn – LOGGED OFF	The wsn has sent an RBDISC command and will be disconnected when output is complete.	None. Information only.	–

Message	Meaning	Action	Page
*RBndd -- wsn – *MSG* message	A message has been sent from specified wsn.	Depends on message content.	–
RCIO ERR	An I/O error has occurred during recovery.	Obtain the information from registers 1-5 and 15. To retry the I/O, place the COMPUTE switch in IDLE, increment the instruction address by moving the INSTR ADDR switch to INCREMENT, and return the COMPUTE switch to RUN.	43
REALTIME PAGES LOST	Recovery has detected an inconsistency in the realtime page tables. The pages are returned to the system and the realtime page settings are reset to their SYSGEN defaults.	Use the PPS ghost job to reacquire any necessary DYNRESDF segments.	–
RE-BOOT SYSTEM – SAVE DUMP TAPE FOR ANLZ	Recovery failure.	Boot the system from disk.	–
RECOVER GHOST CREATING MONDMPn	A user is being aborted instead of the system crashing. A crash dump will be output on the line printer. (n = 0-7.)	None. Information only.	44
RECOVERY ERROR	Recovery has failed.	None. Information only.	–
RECOVERY FOR UNKNOWN REASON	An automatic recovery has been started.	None. Information only.	–
RECOVERY TABLES CLOBBERED – UNABLE TO CONTINUE REBOOT FROM RAD	Recovery is unable to continue due to a bad recovery buffer.	Reset SENSE switch 3 and reboot from RAD.	–
id:acct__serial number REEL NO. ERROR	The serial number on the volume does not match the serial number specified by the operator in the MOUNT key-in.	Respond to the MOUNT request that is issued after this message.	34
RESET RESDF YYY,XXXXX	During system startup, the operator may override the SYSGEN-defined values for the beginning and/or the size of the dedicated real-time memory pages.	Enter [yyy][,xxxxx]Ⓝ where yyy is the number of page (0-99) and xxxxx is the hexadecimal word address of the first page (value must be greater than $10{,}000_{16}$). A Ⓝ above indicates that both SYSGEN-defined values are to be retained.	5

Message	Meaning	Action	Page
id:acct__RING, ndd	A tape mounted for updating does not have a write ring.	Insert ring and enter MOUNT key-in, or use READ key-in to override	37
RVGHOST I/O ERROR xx-yy, ON KEY zzz	I/O error xx-yy occurred while writing the page for key zzz to the MONDMP file. The page for that key may be bad in the MONDMP file.	None. Information only.	–
_Syyndd ACTIVE	The prior key-in attempted to initiate an already active symbiont.	Check the prior key-in for possible errors.	16
Syyndd FORMS = xxxx	Response to Display key-in with SYMB option.	None. Information only.	11
_Syyndd NOT ACTIVE	The prior key-in attempted to suspend an already inactive symbiont.	Check the key-in for possible error.	16
_Syyndd NOT AVAIL	The specified symbiont device has been partitioned.	None. Information only.	16
_Syyndd NOT SUSPENDED	The prior key-in attempted to continue or recover a symbiont which has not been suspended.	Check the prior key-in for possible error.	16
*Syyndd SETUP REQUIRED	A forms change is required on the specified device so that a symbiont file can be output.	Use DISPLAY key-in to determine the appropriate form, then use Syy[ndd],F['xxxx'] key-in to inform the system of the change.	15
_Syyndd SUSPENDED	The indicated symbiont has been suspended as requested.	None. Information only.	15
id:acct__SAVE ndd,xxxx	Tape reel xxxx is no longer needed.	Dismount and save tape xxxx.	–
SAVEALL {STARTED AT / RESTARTED AT / SUSPENDED AT / COMPLETED AT / TAPE CREATED ON / TERMINATED AT} hh:mm mon dd, 'yy	Self-explanatory.	None. Information only.	53

Message	Meaning	Action	Page
id:acct SCRATCH ndd	A scratch tape is needed.	Mount a scratch tape and use the SCRATCH key-in.	29
SINGLE USER ABORT xx-yy USER NO. zz	Software check code xx-yy is being processed as a single user abort for user zz.	None. Information only.	44
SIO TIME-OUT ON DEVICE nnn	The specified device cannot be started for input or output on a VOLINIT job. The cause may be a hardware failure.	Contact the Customer Engineer.	–
SKIP TO FILE	Requests the id of the first file to be copied to disk by FILL.	If no files are to be skipped, enter line feed. To skip to the first file of an account, enter account and line feed. To skip to a specific file, enter file-name,account and line feed.	–
SN LIMIT EXCEEDED	More than 25 serial numbers were specified for LABEL processing.	None. Information only.	–
SOFTWARE CHECK xx-yy	An automatic recovery has been started.	None. Information only.	43
SQUIRREL {STARTED AT / RESTARTED AT / SUSPENDED AT / COMPLETED AT / TAPE CREATED ON / TERMINATED AT} hh:mm mon dd, 'yy	Self-explanatory.	None. Information only.	53
id xxxx SWAP DA	Recovery error message: bad disk address in JH:DA, where xxxx is address in recovery.	None. Information only.	–
SYMB. DEV. TERMINATED – yyndd	The symbiont device yyndd has been terminated due to device partitioning which simulates the Syyndd, L or Syyndd, Q key-ins.	None. Information only.	–
id xxxx SYMBT LOST	Recovery error message: unable to read symbiont ghost data pages.	None. Information only.	–

Message	Meaning	Action	Page
SYNTAX ERROR	A comma is missing in the LABEL control command card.	Correct the card and restart the job.	–
*SYSID = id ACCT = nnnnnnnn CANNOT BE RERUN	A job requesting RERUN on its !LIMIT command was running during a crash but cannot be rerun because it is suspected of having a role in the cause of the crash.	Inform the job's owner and the system analyst.	–
*SYSID = id DOESN'T EXIST	The job id specified in a DELETE, DISPLAY, PRIORITY, or RBSWITCH key-in does not exist and the key-in cannot be processed.	If wrong id was entered, reenter the key-in with the correct id.	–
*SYSID = id RUNNING	The job id specified in a DELETE, DISPLAY, PRIORITY, or RBSWITCH key-in is currently running and the key-in cannot be processed.	Varies, depending on key-in entered.	–
*SYSID = id WILL BE RERUN	A job requesting RERUN on its !LIMIT command was running during a crash and will be rerun.	None. Information only.	–
SYSTEM REQUIRES A {SIGMA 7 / SIGMA 9 / XEROX 560}	The system being booted cannot operate on the current machine.	Mount the correct master system tape and begin the "Bringing up the System" task again.	–
TAPE yyndd PARTITIONED, DIAL ndd NOT AVAILABLE	The tape drive yyndd has been partitioned, and its dial number, ndd, is not available for future allocation until the device is returned to the system.	Operator should ensure that the indicated dial number is not used by some other device or that the indicated dial number is not changed to some other number.	–
__THAT'S ALL FOLKS!!	System has been successfully brought to a quiescent condition following a !ZAP key-in.	None	18
TIME (HH:MM) =	The monitor is requesting the time.	Enter the current time of a 24-hour clock. For example 9:15 or 14:30.	5
id:acct__UNABLE TO ACCESS RATE FILE ERROR CODE = xx	LOGON is unable to access the RATE file due to a bad account directory.	Action varies with error type. (See Appendix B, CP-V/TS Reference Manual, 90 09 07, for error codes.)	–
id:acct__UNABLE TO OPEN :ACCTLG FILE FOR ACCOUNTING ERROR CODE = xx	An error prevented opening the :ACCTLG file.	Delete :ACCTLG file. This will cause all accounting information to be lost.	–
id:acct__UNABLE TO OPEN :PROCS FILE ERROR CODE = xxxx	The monitor is unable to open the :PROCS file.	Action varies with error type. (See Appendix B, CP-V/TS Reference Manual, 90 09 07, for error codes.)	–

Message	Meaning	Action	Page
id:acct__UNABLE TO OPEN RATE FILE	:RATE file has an error.	Delete :RATE file and recreate with RATES.	–
id:acct__UNABLE TO OPEN USERS FILE FOR UPDATE ERROR CODE = xx	Error in :USERS file.	Try to recreate account with Super.	–
id:acct__UNABLE TO READ :PROCS FILE ERROR CODE = xxxx	The monitor is unable to read this user's :PROCS record.	Using Super, remove and re-create this user specifying the appropriate RP options.	–
id:acct__UNABLE TO READ RATE FILE ERROR CODE = xx	Error in :RATE file.	Delete :RATE file and recreate with RATES.	–
id:acct__UNABLE TO WRITE ASSIGN-MERGE RECORD	System was unable to write an assign/merge record for this user.	Contact the systems analyst. If a batch job, rerun.	–
id:acct__UNABLE TO WRITE ACCOUNTING RECORD	The system was unable to write on the accounting record for this user.	The action varies with error type. Contact the systems analyst.	–
_yyndd UNLABELED TAPE	The tape mounted with the AVR sequence has no label.	Mount the tape with the !MOUNT or !ANSMOUNT key-in.	36
id:acct UNRECOVERABLE ERROR READING USERS FILE ERROR CODE = xx	Error in :USERS file record for indicated user.	Recreate indicated user's record with Super.	–
id:acct USER, line,acct,name	An on-line user has logged on.	None. Information only.	10
USER = nnnn DC, nnnn DP nnnn CYL; SYMBIONT = nnnn	Response to DISPLAY key-in with DISC option.	None. Information only.	10
id xxxx USR CNTL T	Recovery error message: user tables in core are bad, where xxxx is address in recovery.	None. Information only.	–
_yyndd VTOC LABEL BAD	The private volume in question cannot be AVRed because its VTOC is invalid.	Try to mount the pack with the !MOUNT key-in. If that fails, reinitialize the pack with VOLINIT and restore the files from the most recent backup tapes.	–
id:acct__serial number VTOC TOO BIG	The cylinder allocation of the disk unit differs from that of the mounted private volume.	Dismount the volume and mount another volume in response to a mount message or abort the job.	34
WARNING: SBCE THRESHOLD EXCEEDED ON MOS MEMORY BANK n,UNIT m	The MOS memory band in the specific unit will no longer record single bit correctable errors.	None. Information only.	–

Message	Meaning	Action	Page
WAS xx	This is output following a successful PRIO key-in requesting a change in a job's current execution priority. The value xx specifies the job's old execution priority.	None. Information only.	18
9Tndd WRITE PROTECT	An attempt has been made to write on 9Tndd, but the mounted tape does not have a write ring.	If the batch job procedure so states, insert write ring. Otherwise, abort the job. If an on-line user is trying to write the tape, notify him via SEND. On positive response, insert write ring, remount the tape, and key in 9Tndd,R.	–
____yyndd WRITE LOCK VIOLATION	A user requested I/O into a part of memory that is not allowed.	None. Information only.	36
____yyndd WRITE RECOVERY FAILURE	A tape write error has occurred and the tape handler cannot rewrite and verify that record. Frequent appearance of this message indicates hardware failures.	None. Information only.	36
____ yyndd WRONG TYPE	An attempt was made to mount a volume that a running batch job requested to be on a different spindle type.	Either mount the disk pack on the correct type spindle or error the job with the key-in ERROR,id.	34
yyndd => yy	A new device address is being requested.	Input a new device address.	6
_yyndd,#nnnn	Volume number nnnn has been successfully mounted on unit yyndd by the AVR sequence.	None. Information only.	-
yyndd DISC BLOCK & OUTPUT BAD FOR SYSID nnnn n	Bad data in symbiont.	See error log. Use Syyndd,option to restart	15
!!yyndd INOPERATIVE	The swapper device address is unrecognizable by the hardware.	Input the correct swapper device address.	6
!!yyndd NOT device type	The device type indicated was expected as the swap device.	Input a new swapper device address.	6
yyndd { SOLICIT / AVAIL / SCRATCH / USER / EMPTY } serial number, [id [,filename, volume sequence number, [julian expiration date]]	Response to DISPLAY key-in with TAPE option.	None. Information only.	10

yyndd{SOLICIT / LOCKED / SCRATCH / USER / SHARED / PUBLIC / AVAIL / SYSTEM / EMPTY} serial number,id	Response to DISPLAY key-in with VOLUMES or PACKS option.	None. Information only.	10

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APPENDIX C. OPERATOR RESPONSES TO PERIPHERAL DEVICE MESSAGES

Message		Operator Action and Response
CPndd	MANUAL	Ready card punch.
	TIMED OUT	Enter CPndd, R. If it persists in happening, enter CPndd, E and call the Customer Engineer.
	ERROR	Correct condition (e.g., clear jam), enter CPndd, R.
	NOT OPERATIONAL	Correct condition (e.g., turn power on), enter CPndd, R.
	PLEASE RESPOND	Check the previous message referring to this card punch and respond to it.
CRndd	MANUAL	Ready card reader.
	TIMED OUT	Enter CRndd, R. If it persists in happening, enter CRndd, E and call the Customer Engineer.
	ERROR	Put the card that was read last back in the read hopper and enter CRndd, R or CRndd, E.
	FEED ERROR	Check the card in the read hopper for defects. If there are none, put the card back in the hopper and enter CRndd, R or CRndd, E.
	NOT OPERATIONAL	Correct condition (e.g., turn power on), enter CRndd, R.
	PLEASE RESPOND	Check the previous message referring to this card reader and respond to it.
DCndd	MANUAL	Call the Customer Engineer.
	WRITE PROJECT	Reset write protect switches, enter DCndd, R or DCndd, E.
	TIMED OUT	Enter DCndd, R. If it persists in happening, enter DCndd, E and call the Customer Engineer.
	NOT OPERATIONAL	Correct condition (e.g., turn power on), enter DCndd, R.
	ERROR	Call the Customer Engineer if problem persists.
	PLEASE RESPOND	Check the previous message referring to this RAD and respond to it.
DPndd	MANUAL	Ready device.
	WRITE PROTECT	Reset write protect switches, enter DPndd, R or DPndd, E.
	TIMED OUT	Enter DPndd, R. If it persists in happening, enter DPndd, E and call the Customer Engineer.
	NOT OPERATIONAL	Correct condition (e.g., turn power on), enter DPndd, R.
	ERROR	Call the Customer Engineer if problem persists.
	PLEASE RESPOND	Check the previous message referring to this disk pack and respond to it.
LPndd	MANUAL	Ready printer.
	TIMED OUT	Enter LPndd, R. If it persists in happening, enter LPndd, E and call the Customer Engineer.
	ERROR	Enter LPndd, R or LPndd, C, as appropriate.
	NOT OPERATIONAL	Correct condition (e.g., turn power on), enter LPndd, R.
	PLEASE RESPOND	Check the previous message referring to this line printer and respond to it.
	CODE DISC ERR	Enter LPndd, R or SLPndd, Q followed by LPndd, E, as appropriate.
{MTndd, 7Tndd, 9Tndd}	MANUAL	Ready device.
	WRITE PROTECT	If tape is at load point, insert write ring if so instructed by user or job procedure and enter yyndd, R. Otherwise, abort the job.
	TIMED OUT	Enter yyndd, R (where yy is MT, 7T, or 9T). If it persists in happening, enter yyndd, E and call the Customer Engineer.
	ERROR	Call the Customer Engineer if problem persists.
	NOT OPERATIONAL	Correct condition (e.g., turn power on), enter yyndd, R.
	PLEASE RESPOND	Check the previous message referring to this tape drive and respond to it.
	ASCII TAPE	Remount the tape on a drive having the ASCII/EBCDIC code conversion feature.
	INCONSISTENT STATUS	No response required. However, if the message occurs frequently, call the Customer Engineer.
	REQ RETRY	Enter yyndd, R.
	WRITE RECOVERY ERROR	Call the Customer Engineer if problem persists.

APPENDIX D. SOFTWARE CHECK CODES

Software check messages are maintained in the ERMSG file in the :SYS account.

Code	Subcode	Originating Monitor Routine	Description
01	–	SCHED, MM	Either a user's or a processor's physical pages are not consistent, or more than one user is connected to the same physical device.
02	–	SCHED	The event reported is not consistent with the user's state.
04	04	SCHED	Operator initiated shutdown.
0A	–	DPSIO, TSIO	The op codes in the swap I/O chain are not all read or all write orders.
0B	–	DPSIO, TSIO	A seek or TIC does not occur in every I/O chain element.
0C	–	DPSIO, TSIO	An attempt was made to swap into the monitor core area.
0D	–	TSIO	The swap I/O command chain prepared by swapper does not terminate with IOCD halt flags.
0E	–	TSIO	An I/O request contained a null command chain.
0F	–	DPSIO, TSIO	The input parameter function code is neither read nor write.
10	–	COC, ECBBLK	An attempt was made to release a COC core buffer with an impossible address.
11	–	COC	An input interrupt occurred on a line in an impossible state.
12	–	COC	The line state is inconsistent with the write operation.
13	–	COC	The line state is inconsistent with the read operation.
14	–	THEUNCOC	COC routine called in a non-COC system.
14	01	THEUNCOC	COCIO called in a non-COC system.
14	02	THEUNCOC	COCOFF called in a non-COC system.
14	03	THEUNCOC	COCSENDX called in a non-COC system.
14	04	THEUNCOC	ECHOCR2 called in a non-COC system
17	–	IOQ	An illegal DCT index was detected.
19	–	BUFF	An attempt was made to return a core buffer with an impossible address.
19	01	BUFF	Too many CDWs in MPOOL.
1A	–	CLS	The file system account directory linkages have been destroyed. Monitor unable to reconstruct it. All files lost.
1B	–	SWAPPER	The number of pages remaining in the swapper's free page pool at the end of the swap is nonzero.
1C	–	SWAPPER	The size of inswap processors exceeds inswap processor command list size.
1D	–	T:OV	The requested monitor overlay is not in the shared processor table.

Code	Subcode	Originating Monitor Routine	Description
1F	–	SWAPPER	The swap scheduler has not provided enough pages to perform this swap.
21	–	MM	An attempt was made to set access control on a nonexistent virtual page.
22	–	PV	A private volume allocation error occurred.
23	00	CSES7, CSES9 CSEX560, CSECOM	An invalid entry is in the CSEBRANCH table. (This should never occur.)
24	00	CSEHAND	Sigma 9 and Xerox 560: An instruction exception trap occurred in the master mode.
25	00	CSEHAND	An unrecoverable watchdog timer runout occurred in the master mode.
26	00	CSEHAND	Sigma 9 and Xerox 560: A hardware fault trap occurred while processing MFI or PFI.
27	00	CSEHAND	Xerox 560: A processor fault interrupt from BP or MI occurred.
28	00	CSEHAND	A memory parity error occurred.
29	00	CSEHAND	Sigma 9 and Xerox 560: A bus check fault occurred.
29	01	CSEHAND	Sigma 9 and Xerox 560: A map register parity error occurred.
29	02	CSEHAND	Xerox 560: A register block parity error occurred.
29	03	CSEHAND	Xerox 560: A write lock register parity error occurred.
2C	00	ADD	A batch job was created but no control command input existed or the job did not terminate when the control command input stream terminated.
2D	00	COOP	An attempt was made to obtain a cooperative buffer and none existed. The user cannot continue.
2D	01	COOP	The symbiont/coop file device containing this user's file is down. If only one symbiont/coop file device exists, it is pointless to run the system with that device down.
2D	02	COOP	A buffer has been lost at context block open time.
2D	03	SACT	Either J:USCDX or context block 0 (special pointers) were lost.
2D	04	SUPCLS	An attempt was made to release a COOP data buffer when the free data buffer pool was full. Either the free data buffer pool has been clobbered or too many buffers have been allocated meaning some other COOP data area has been clobbered.
2E	-	RDF	All FPOOL care buffers are lost. Probably either DCB chain, or one or more DCBs, have been destroyed.
2E	01	RA	An attempt was made to add an AIR block to the tables when it was already there.

Code	Subcode	Originating Monitor Routine	Description
30	-	PFSR	More power-on interrupts than power-off interrupts have occurred.
31	-	IORT	Invalid resource type found.
32	00	IOQ	DCT index not present in DCB.
34	00	TPQ1	The system Queue Manager for transaction processing has discovered an unrecoverable state while processing transactions.
37	00	ENQUE	ENQ/DEQ tables are malformed.
3B	-	OUTSYM	OUTSYM attempted I/O on a mission or down device.
41	01	RTROOT	Failed to find real-time user's state while processing an M:INSTAT CAL1.
41	10	RTROOT	NEWQNW returned to BAL + 1.
41	11	RTNR	RTNR's call to RAMOV was invalid.
43	01	CLOCK4	No active ICBs chained into RTICBCLKHDR.
43	02	CLOCK4	ICBCLK field of an ICB became a negative value.
43	03	CLOCK4,RTNR	No back-link when attempt made to de-chain an ICB from RTICBCLKHDR.
46	21	PV	There is a private volume logic inconsistency.
49		TYPR	Tape preallocation is inconsistent with run-time requests. (This is usually due to an MBS failure to properly set/reset resource flags, or an inaccurate SYSGEN.)
56		MOCIOP	Unable to release a physical work page locked in core during transaction processing I/O on a message-oriented controller (e.g., 7605).
60	00	TEL	User already has SBUF1 at entry to TEL.
60	01	TEL	TEL failed to get SBUF2 to read the assign/merge record.
60	02	TEL	TEL failed to get SBUF2 for a GET.
60	03	TEL	The assign/merge record is inconsistent with a user in the command file mode.
60	04	TEL	TEL caused the user's map to be left "dirty" from a previous SAD (M:CVM)
61	xx(Trap cell)	INITRCVR	Trap occurred while operating mapped, slave, with TEL-in-control set. Subcode is trap location.

Code	Subcode	Originating Monitor Routine	Description
62	-	SCHED	The user program is too large to fit in physical memory.
63	-	DPSIO	Insufficient data to complete function, follow-on function code invalid, or flags not set properly; disk pack-only swappers.
6A	-	MM	An attempt to release a page was made by a program that does not have the proper privilege level.
6B	00	MM/SWAPPER	There is an error in the spare buffer tables.
78	00	SMON/MPSUB	A secondary processor initiated recovery.
78	01	ENTRY	A slave CPU trapped with no user associated.
78	7F	SCHDSUB	Master CPU began executing code reserved for slave CPU(s).
79	-	ENTRY	Master bit on in PSD, overflow, underflow, or pointer to monitor stock lost.
79	01	T:OV	A user has associated too many monitor overlays.
79	02	S5SIM	Simulators caused TSTACK overflow.
7C	-	ALTCP	A CAL1,1 or CAL1,2 was passed to ALTCP but should have been handled by CALPROC.
7E	xx (Trap cell)	INITRCVR	The monitor trapped; subcode is trap location.
87	00	ALLOCAT	The allocation buffer contains an invalid word count.
88	-	SCHED	ALLOCAT end action has discovered discrepancy in granule/cylinder.
89	00	ALLOCAT	ALLOCAT's HGP chain is destroyed.
89	10	ALLOCAT	ALLOCAT data has been destroyed.
93	-	DPSIO, TSIO	IOP/memory failure; the TDV command address does not point to the command list.
94	-	DPSIO, TSIO	IOCD orders were destroyed during a swapper write check.
95	-	DPSIO, TSIO	An irrecoverable I/O error occurred when reading a user's JIT.
96	-	DPSIO, TSIO	An irrecoverable I/O error occurred when reading a shared processor.
FF	00	BOOTSUBR	An operator-initiated boot from disk has been called.

APPENDIX E. XEROX 560 REMOTE ASSIST STATION

The Xerox 560 provides for remote diagnostic assistance over a dial-up connection to the System Control Processor. (This processor is documented in the Xerox 560 Computer Reference Manual, 90 30 76.) Remote assistance can take two major forms:

1. Off-line assistance in which the diagnostic programs are run in a stand-alone mode (i.e., without the CP-V operating system).

2. On-line assistance in which the diagnostic programs are run under the CP-V operating system as privileged diagnostic user programs.

In either case, the connection procedure is basically the same.

CONNECTION PROCEDURE FOR REMOTE ASSISTANCE

1. Verify these switch settings on the Configuration Control Panel located inside the endbell housing:

   ALTSEL switch - down

   FSELA switch - up

2. Turn the REMOTE CHANNEL rotary switch located on the System Control Panel to the appropriate position:

   SCC for off-line connection

   I/O for on-line connection

3. After establishing voice contact with the Remote Assist individual (by using the data set in the TALK mode), inform him that everything is ready, place the data set in the AUTO mode, and hang up the receiver.

For off-line connection, the Remote Assist Station will have immediate contact with the computer and will be able to perform the necessary control functions just as if it were the primary operator's console.

For on-line connection, the communication with CP-V must be initiated at the operator's console after the dial-up connection is established. This is accomplished with the special key-in

```
!GJOB  LOGON,MC
```

If the connection has been established, LOGON will give the normal CP-V salutation to the Remote Assist Station user and request a log-on identification. If the account and name that the user types is authorized to use the Maintenance Console (MC) resource, the user will be logged on and the following message will appear on the operator's log:

```
nn:  MC,account,name
```

where nn specifies the system identification number and account,name specify the log-on account of the user using the MC resource.

If LOGON cannot acquire the MC resource for some reason, the following message is output:

```
**LOGON:  CANNOT ACQUIRE RESOURCE
```

If LOGON receives an error return when trying to open the MC resource, the following message is output:

```
**LOGON:  CANNOT LOGON RESOURCE
          REQUESTED
```

If either one of these last two messages occur, it should be reported to the system manager or system analyst.

TERMINATION OF REMOTE ASSISTANCE

At the completion of a remote assist session, the following actions should be taken:

1. Return the data set to the TALK mode.
2. Return the REMOTE CHANNEL rotary switch to the OFF position.

APPENDIX F. CSE STOP TABLES

In the event of a catastrophic hardware failure in the central system components (i.e., CPU, memory, IOPs, and data buses), the fault handling system attempts to log the faults in the in-core error log buffers at BUF1 and BUF2. The system also collects additional information into tables in memory. These tables are collectively called the CSE STOP tables. In the event of a CSE STOP message being output on the operator's console, the operator should record the contents of these tables before attempting an operator recovery or before turning the machine over to the Customer Engineer.

The address of the main CSE STOP table is in register 7. The addresses of the three other CSE STOP tables are stored within the main CSE STOP table.

The format of the main CSE STOP table is shown in Table F-1. The items are shown in the order in which they appear and are contiguous within memory.

The format of the Memory Contents Polling table is shown in Table F-2. The items are shown in the order in which they appear and are contiguous within memory. All items are one word in length.

Table F-1. Main CSE STOP Table

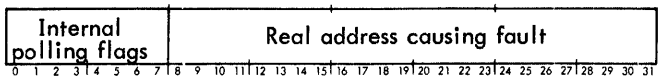
Item Label	Size (in words)	Contents
CSED$CF	1	High order byte contains trap condition codes.
CSED$REGS	16	Registers at time of last CSE trap.
CSED$WHY	1	Internal code for cause of trap.
CSED$PSD	2	Current PSD at time of trap.
CSED$MSTAT$ADR	1	0 for the Sigma 5/6/7; address of CSED$MSTAT table for Sigma 9 and Xerox 560.
CSED$PSTAT$ADR	1	0 for Sigma 5/6/7/9; address of CSED$PSTAT table for Xerox 560.
CSED$3STAT$ADR	1	Address of Memory Content Polling table. Add 2 to this WORD to find address of 3 COUNT (below).
CSED$MSG	7	Buffer containing CSE STOP MSG (reason for stopping).
CSED$STOP	2	First word - numerical indicator of the stop reason. Second word - pointer to the error log buffer entry.

Table F-2. Memory Contents of Polling Table

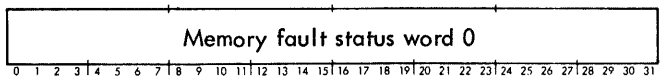
Item Label	Contents
3COUNT	Number of bad locations in memory.
3ANDADD	Logical AND of addresses of bad locations.
3ORADD	Logical OR of addresses of bad locations.
3ANDCONT	Logical AND of contents of bad locations.
3ORCONT	Logical OR of contents of bad locations.
3FIRST	Address of lowest cell with bad contents.
3FIRSTC	Contents of lowest cell with bad contents.
3LAST	Address of highest cell with bad contents.
3LASTC	Contents of highest cell with bad contents.

The Memory Fault Status Register Polling table is an optional table that is only applicable to the Sigma 9 and the Xerox 560. The table contains up to five entries of the form:

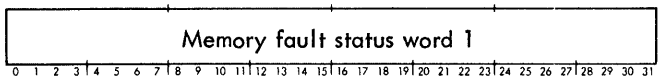
word 0



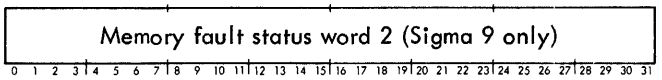
word 1



word 2

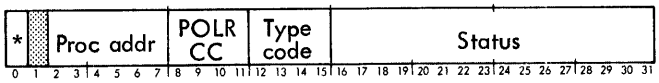


word 3



Additional information about this table is given in the Xerox Sigma 9 Computer/Reference Manual, 90 17 33, and the Xerox 560 Computer/Reference Manual, 90 30 76.

The Processor Fault Status Register Polling table is an optional table that is available for the Xerox 560 only. The table consists of up to 7 entries in the following format:



where

*(bit 0) when set, indicates the presence of valid status information.

proc addr contains the processor's cluster/unit address.

POLR CC contains the condition codes for the POLR instruction.

type codes specifies the processor type:

1 - BP	5 - RMP
2 - MI	6 - CT
3 - PI	7 - SU
4 - MIOP	

status contains the 16-bit contents of the fault status register (as the result of a POLR instruction). The status codes are described in detail in the Xerox 560 Computer/Reference Manual, 90 30 76.

For multiprocessing systems, the active secondary CPUs may also detect hardware faults. After analyzing the fault and collecting the status data, the particular secondary CPU will climb into its registers and sound the audible alarm. (That is, it will load a small program into its registers and continue operation from there.) If the primary CPU has also been affected by the particular fault, it will perform its designated functions. The primary CPU will attempt to log the information gathered by the secondary CPU. In any event, at the time the secondary CPU gets into its registers, it loads the address of its fault data area into its register 7. The items in the data area are listed in Table F-3. They are shown in the order in which they appear and are contiguous in memory. If the primary CPU is unable to log the information from the secondary CPU (i.e., if the primary CPU is involved in the catastrophic fault), then the information pointed to by the secondary CPU's register 7 should be recorded.

Table F-3. Fault Table for Secondary CPUs

Item Label	Size (in words)	Contents
FD:PSD	2	PSD at time of hardware fault.
F:REGS	16	Registers at time of hardware fault.
FB:CF	1	Trap condition codes (in high order byte).
FB:END	1	Reason for stopping (in high order byte).
F:ELOGB	11	Formatted ERRLOG buffer entry.
F:BREG	1	Contents of the last branch register. (Meaningful for X560 only.)

APPENDIX G. XEROX 560 LOAD-AND-GO DIAGNOSTICS

The Xerox 560 computer system includes hardware diagnostic facilities as a combined hardware and software feature. The diagnostic programs described in the appendix are referred to as the Diagnostic Programming System (DPS). DPS runs off-line and is loaded into the machine in place of the CP-V operating system to verify the operational status of the hardware and to aid in the diagnosis of any problems found.

These diagnostics can be loaded by the CP-V system operator in "load-and-go" mode, an easily operated, essentially automatic mode of operation. The diagnostics may be used periodically to determine the condition of the machine, or may be used whenever hardware problems are suspected.

If no problems are found by the load-and-go diagnostic system, the operator can have a high degree of confidence in the operation of the hardware. When problems are found, however, the operator should contact the service representative and relay the status information reported by the diagnostics (as explained below).

The load-and-go diagnostics are normally loaded in a manner that will not destroy any of the resident files that CP-V was maintaining, though still providing some measure of secondary storage testing. If full testing of rotating memories is desired, the CP-V file structure should be saved with normal file maintenance procedures, and the diagnostics can then be directed to do full testing.

After using the load-and-go diagnostics, the CP-V operating system may be reloaded simply by booting from disk or booting under the files if normal diagnostic operation was followed. If full testing of secondary storage was performed, the operating system must be loaded by booting the PO tape with file restore.

LOADING DPS

The procedure listed in Table G-1 is recommended for execution of the load-and-go diagnostics. The procedure will result in

1. Execution of the system microdiagnostics for each system element (i.e., Basic Processor, MIOP, and Processor Interface).

2. Execution of the Basic Processor self-test.

3. Testing of the basic instruction set.

4. Loading and execution of the Diagnostic Programming System.

The console printout created by steps 2 through 8 of Table G-1 is shown in Figure G-1.

Each of the step-by-step actions that are necessary to run these tests are listed in the "Action" column of the table. The results that one should expect from a correctly functioning system are explained next to each "Action" item in the "Expected Results" column. If these results are not obtained and, instead, the results listed under "Abnormal Results" are observed, the operator should note the data described under "Initial Data to Report" and relay that information to the service representative. It is important that the sequence listed in Table G-1 be carefully followed, since failure notification from an altered sequence may result in erroneous failure analysis.

Table G-1. Load-and-Go Diagnostic Initialization

Action	Expected Result	Abnormal Result	Initial Data to Report if Result is Abnormal
1. If CP-V is operational, bring it to a quiescent condition (i.e., ZAP it).	System notifies: THAT'S ALL FOLKS!!	System cannot be brought to a quiescent condition. (It may eventually be necessary to reboot the system and the file structures. Some files, jobs, and the symbiont may be lost.)	If hardware problems are suspected, no data should be reported at this time. Continue with the procedure in order to load the Diagnostics. If software problems are suspected, this procedure should not be used since it verifies only the hardware.
2. Remove all tapes, other than scratch tapes, from all tape drives, and mount the Diagnostic Program Library tape on an available tape drive.	-	-	-

Table G-1. Load-and-Go Diagnostic Initialization (cont.)

Action	Expected Result	Abnormal Result	Initial Data to Report if Result is Abnormal
3. Bring all devices on the system to the ready state. (Ensure that line printers have an adequate supply of paper, that card punches have a full hopper of cards, that scratch tapes are mounted on tape drives, etc.).	-	-	-
4. On the System Control Panel (SCP), position the MAINT MODE rotary switch to the ON position.	MAINTENANCE MODE status indication illuminates.	No MAINTENANCE MODE indication.	Report that this event occurred.
5. Type: $Z^{C}MM4$ (RET)	Hardware responds: XEROX *EVENT 00*.	No XEROX *EVENT 00* message is output.	Report that "Super Reset" (MM4) has failed.
6. Type: $Z^{C}LDNdddd$ (RET), where dddd is the 4-digit hexadecimal address of the tape drive on which the Diagnostic Program Library tape was mounted in step 2. This will initiate a 4-step test sequence.	-	-	-
a. Microdiagnostics for all system elements are executed.	No output.	Hardware reports: EVENT F9 followed by the contents of the Single Clock Status Register for the failing system element.	Report the occurrence of EVENT F9 and the displayed contents of the Single Clock Status register.
b. The FROM test (BP self-test) is executed.	No output.	The Diagnostic Tape has not moved off of Load Point within 60 seconds, and EVENT F9 has not occurred.	Type: P^{C} and observe the displayed contents of Program Status Word One (PSW1). Report the failure of the FROM test, and the contents of PSW1.
c. The Hardcore Instruction Set test is executed.	Diagnostic Tape has moved off Load Point.	The tape has moved off Load Point, but no messages are printed on the console within 2 minutes.	Type: P^{C} followed by 1/0. Observe the displayed contents of Program Status Word One (PSW1) and the contents of General Register One (R1). Report the failure of the Hardcore Instruction Test and the contents of PSW1 and R1.
d. The Diagnostic Programming System Monitor is loaded.	The monitor title message is printed on the operator's console.	-	-

Table G-1. Load-and-Go Diagnostic Initialization (cont.)

Action	Expected Result	Abnormal Result	Initial Data to Report if Result is Abnormal
7. The Diagnostic Programming System (DPS) will request configuration confirmation. Type: Y ⏎ (for "yes").	DPS proceeds to step 8.	Failure to proceed to step 8.	Report that this failure occurred.
8. DPS will type :H> (H indicates the halt state; > is the DPS prompt character). Type: LAG ⏎ (for "load-and-go" operation). DPS will type :R> (indicating that it is now running the test sequence).	See "Running DPS-Normal Operation".	See "Running DPS-Error Detection".	See "Error Reporting".

```
(MM□
XEROX *EVENT 00*
(LDN@0080)

**** DPS MONITOR 730012-A00(Vxxx)

ACCEPT CONFIGURATION-YES(Y) OR NO(N)

Y

H>LAG

R>

**** LAG 730013-A00(Vxxx)
.
.
.
```

Figure G-1. Console Display During Loading of DPS

LOADING DPS FOR MORE THOROUGH TESTING OF ROTATING MEMORY

If it is desired to write on the surfaces of rotating memory devices and thereby obtain a more thorough testing, the procedures outlined in Table G-1 should be modified as follows:

1. After Step 1 is completed and before mounting the Diagnostic Library Tape, the CP-V file structure should be saved through normal file saving methods. All private packs should be removed from disk drives and scratch packs should be mounted in their place.

2. Before typing "LAG" in Step 8, the following action should be taken:

   a. Type: REP, OP ⏎
   (The contents of the Operator Table will be printed.)

   b. Type: 08, ⏎
   (This sets a flag permitting writing on disk surfaces.)

RUNNING DPS – NORMAL OPERATION

Each test program is read from the Diagnostic Program Library tape and executed sequentially by the Diagnostic Programming System. The main frame is the first segment of the hardware to be tested. Several diagnostic programs will be called from the diagnostic tape for this purpose. After the main frame tests are complete, an applicable peripheral test

is run on each peripheral device in turn. The "load device" (the unit on which the diagnostic tape was mounted) will not be tested, however.

When all peripheral units have been tested, a final test called the Systems Exerciser (SYSX) is loaded. Initially, SYSX gives the user the opportunity to change certain conditions of the test by printing status messages and then pausing for input. No action should be taken; the testing sequence will continue after a ten second delay.

When the testing is complete, DPS prints a completion message, halts, and types H> on the console. If no error messages (discussed below) have been produced, the system has passed all testing without error. A typical DPS console listing from an error-free run is shown in Figure G-2.

```
  .
  .
  .
* * * * LAG  730013-A00(Vxxx)

LOAD DEVICE NOT TESTED

SYSX 730010-A00(Vxxx)

IN OPERATOR TABLE, SET SOFTWARE 'SS' #5 ('08')
TO EXERCISE STORAGE DEVICES, AND TO ALLOW A BASE DEVICE

H>

R>

***02F0 READ ONLY
***01F0 READ ONLY
***0080 READ ONLY
***0081 READ ONLY
***0082 READ ONLY

H>

R>

LOAD-AND-GO TESTING COMPLETE

H>
```

Figure G-2. Typical DPS Listing from an Error-Free Run

RUNNING DPS – ERROR DETECTION

If at any time during the testing cycle, the Diagnostic Programming System detects an error, it prints the message FDP ERROR or one of the SYSX error messages listed in Table G-2 below, preceded by a one-digit number (an index representing the amount of isolation data the system can produce on the error). Testing will stop at this point and H> will be typed on the operator's console.

Table G-2. SYSX Error Headings

```
DATA ERROR
INST ERROR
I/O TIME OUT
POSITION ERROR
UNEXPECTED I/O INTERRUPT
SIO FAILURE
I/O ERROR
DATA OVERRUN
I/O MEM FLT
IOP ERROR
```

ERROR REPORTING

The Diagnostic Programming System selects a line printer on which to list detailed status and error information. Tables are periodically dumped on this logging device as testing progresses. Additionally, the name of each test is printed when it is executed. If an error is detected, as described above, information about its nature is printed on this device prior to the system halt. The format of all error data logged on the printer is similar to the partial illustration given in Figure G-3. When your service representative is contacted, he will request that you relay some of this data to him.

```
  .
  .
  .
   1-FDP ERROR

      SEQ# S  ID    TIME
      0001 4 3000 00:00:00

      PROG  TM  MODE  ERRORS  MOD# UNAD
      AUTO 02FB 0001 00000001 A560 0000

      NAME CH LOC
       BPA 1B A11
       BPB 1B A10
       BPC 1B A08
  .
  .
  .
```

Figure G-3. Error Data Listing

TERMINATING DPS AND RELOADING CP-V

DPS may be terminated prematurely by typing HALT at any time. When DPS completes its test cycle or is halted, it types:

H>

After DPS has halted, return the MAIN MODE rotary switch on the System Control Panel to the OFF position. The MAINTENANCE MODE status indicator will be extinguished.

If the normal load-and-go diagnostic procedure has been used, CP-V may be reloaded by booting from the disk or by booting under the files. If full testing of disk surfaces was performed, CP-V must be reloaded from the P0 tape and the file structure must be restored from the appropriate file save tapes.

APPENDIX H. OPERATION OF THE SECONDARY CPUs IN A MULTIPROCESSING SYSTEM

This appendix contains descriptions of the tasks to be performed by the computer operator for the correct operation of CP-V Sigma 7, Sigma 9 or 560 multiprocessing system. The following tasks are included:

- System initialization and rebooting.
- Stopping, starting, and displaying the current state of secondary CPUs while the system is operational.
- Recovery procedures.
- Taking the system down.
- Handling secondary CPU errors.

OPERATION OF A MULTIPROCESSING XEROX 560 CP-V SYSTEM

SYSTEM INITIALIZATION AND REBOOTING

The boot process (from tape or swap device) is performed in a monoprocessor mode. However, prior to the standard boot process there are several actions to be taken in regard to the secondary (slave) CPUs. One of the CPUs will have been designated as the primary (master) CPU on which all standard operations and operator interface is to take place. CP-V does not require a particular CPU to be preselected, because given the appropriate 560 Configuration Control Panel (CCP) switch settings, CP-V can utilize any CPU in the group as the primary CPU.

560 CONFIGURATION CONTROL PANEL

The Configuration Control Panel (CCP) determines which 560 CPU and corresponding operator's console is the master. There is a row of CCP switches for each of the two PU1s in the system. CP-V requires that the PU1 for the master CPU be assigned cluster address 0 (zero) and that the PU1 for the slave CPU be assigned cluster address 1 (one). This and other PU1 switch settings which determine the master or slave CPU role are given in Table H-1.

Table H-1. PU1 Switch Positions

PU1 Switch / CPU role	SYSTEM SEL	CLUSTER ADDRESS	INTSEL
Master	Up[t]	Down, down	Down
Slave	Down[t]	Down, up	Up

[t] This assumes that system SEL for all other CCP switch rows are also up.

Warning: Any incorrect CCP switch settings or changes during system operation can render the system inoperative. Any switch position changes other than those detailed above must be made with the concurrence of the Customer Engineer.

An example of all CCP switch settings for an operational 560 multiprocessing system is given in Figure H-1.

560 STARTUP

After the CCP PU1 switch settings have been verified, the operator should key-in Z^CMM4 at both CPUs, and then should key-in Z^CBP1 at the slave CPU. (Note that the CLUSTER ADDRESS switches for the slave CPU read as a one, and the Z^CBP1 key-in designates the Basic Processor address as "1".)

The operator may now complete the standard boot operation using the master CPU.

After the boot process is complete, the next action that the operator takes depends upon whether or not the CP-V system was SYSGENed to provide automatic startup of the secondary CPU. If so, then shortly after the PO tape dismount message or the DO YOU WANT HGP RECONSTRUCTION message during a boot from the Swapper, the following message is output on the operator's console (OC):

```
CPU#n PLEASE RESPOND
```

where n is the logical number of the CPU.

Figure H-1. 560 Configuration Control Panel Switch Settings

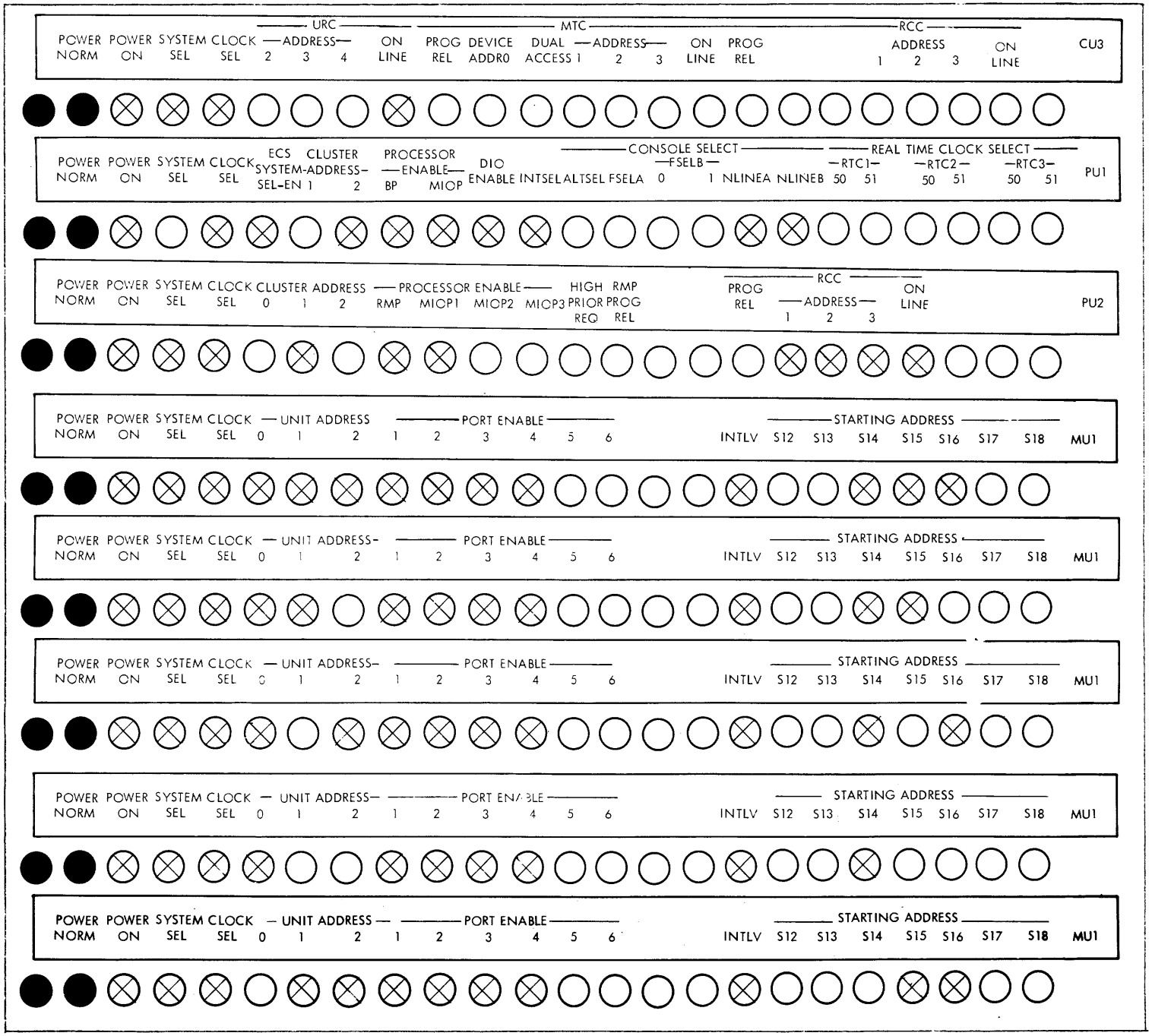
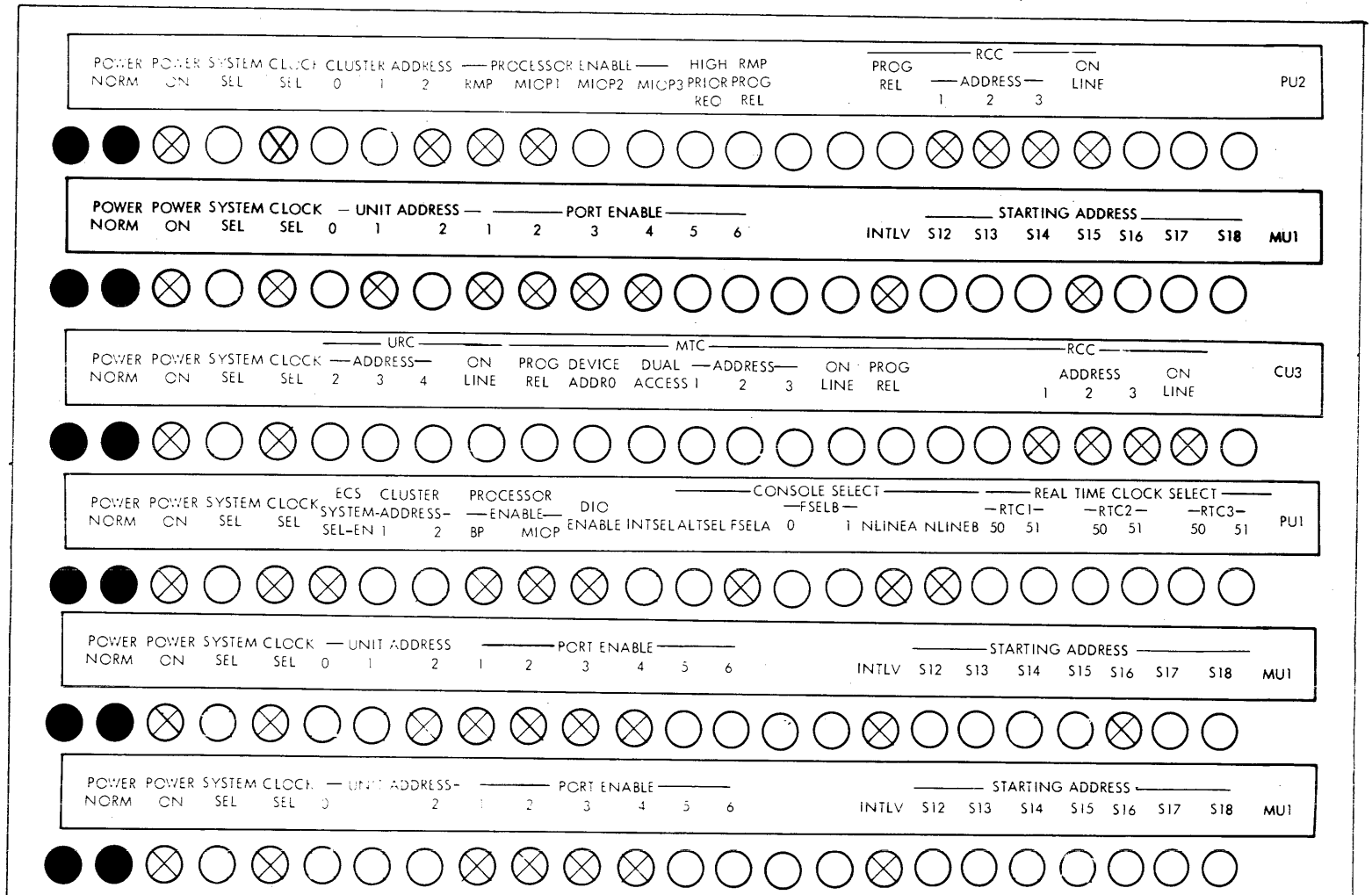


Figure H-1. 560 Configuration Control Panel Switch Settings (cont.)



NOTE: System timing and internal communications on the System Bus require that all clusters and memory units select the same clock source (CLOCK SELECT) and that all (except the PU1 for the slave CPU) select the same System Bus (SYSTEM SELECT). The PU1 for the slave CPU must select the BP in cluster 1 (INTSEL) to recieve the interrupts it generates.

On a 560 secondary CPU, the operator should key-in Z^cRUN on the secondary CPU's corresponding operator's console.

After a short delay, the following message will be printed on the operator's console to indicate that the CPU has been started properly:

```
CPU n - a LOGGED ON
```

where

n is the logical CPU number.

a is the CPU hardware address.

If the CP-V system has not been SYSGENed to provide for automatic startup of the secondary CPU, then the operator must key-in the following command to initiate operation of a secondary CPU:

!SCPU n

where n is the logical number of the CPU to be started. If n is greater than the number of CPUs SYSGENed for the system, the EH? message is returned.

STOPPING, STARTING, AND DISPLAYING THE CURRENT STATE OF THE SECONDARY CPUs WHILE THE SYSTEM IS OPERATIONAL

If, during the period of normal system operation, it is necessary to shut down a given secondary CPU, the operator need only key in

!XCPU n

where n is the logical number of the secondary CPU.

After a short delay, the following message is output on the operator's console:

```
CPU n - a LOGGED OFF
```

where

n is the logical number of the secondary CPU.

a is the hardware address of the CPU.

At this point, on a Xerox 560, the operator should key-in Z^cHLT at the secondary CPU. This action is taken to protect the system in the event of a power off interrupt while the secondary CPU is in a "stopped" state.

To start a previously "stopped" CPU, the operator need only key in

!SCPU n

where n is the logical number of the secondary CPU.

The system will respond with

```
CPU n PLEASE RESPOND
```

if the secondary CPU is HLTed. The operator should repeat startup procedures. The system will then notify the operator with

```
CPU n - a LOGGED ON
```

If the operator had not previously taken the CPU out of RUN when "stopping" the CPU, then only the LOGGED ON message will be output and the operator need not do anything at the secondary processor operator's console.

If the message

```
CPU n - a CANT BE STOPPED NOW
```

is output in response to an XCPU key-in, more than likely one of the following conditions has occurred:

1. The CPU has been Z^cHLTed prior to issuing an XCPU key-in.
2. A secondary CPU hardware fault has occurred and the CPU is unable to reach a logical shutdown state.

In the first case, the operator should place the CPU in Z RUN and perform a DISPLAY CPU key-in as described below. The LOGGED OFF message will then be output. In the second case (that of a hardware fault), the operator should take no action.

If the operator wishes to know the status of the secondary CPUs in the system, the key-in

! DISP CPU

on the primary CPU's operator's console will return the following information about each slave CPU in the system:

```
CPU n - a condition
```

where n is the logical number of the secondary CPU
a is the hardware port address of the CPU
condition can be:

IDLE	indicates no user is using the slave at this instant
ACTIVE	indicates a user is using the slave
STOPPED	indicates the system will not try to use this CPU until a !SCPU key-in or an auto-startup following a crash (if SYSGENed for auto-startup).

REVERSING CPU ROLES

On the 560, the master/slave roles are determined by the CCP switches. To change roles, the operator should ZAP the system, idle the CPUs, and then reset the switches as detailed in the section "System Initialization and Rebooting". The system may then be rebooted from tape or swap device.

SECONDARY CPU RESTART PROCEDURES

To restart a 560 secondary CPU, the operator should key-in Z^{C}HLT, Z^{C}RBP, and Z^{C}RUN.

Once the appropriate procedure has been completed, the operator should return to the primary CPU and key-in:

!SCPU,n

where n is the CPU logical number.

RECOVERY PROCEDURES

When initiating an operator recovery, the operator must first Z^{C}HLT the secondary CPUs in the system, then proceed with the operator recovery on the primary CPU as currently defined. The system automatically handles the CPUs during the initial recovery phase. If automatic software initialization of the CPUs has been SYSGENed into the system, the system will automatically reinitialize the secondary CPUs (which is indicated by a LOGGED ON message at the operator's console). Otherwise, the operator does the SCPU key-in and does not touch the processor control panel at all.

For a system-initiated, single-user abort, no operator intervention is required. For full system-initiated recoveries, the operator may have to start the secondary CPUs as described above.

TAKING THE SYSTEM DOWN

The system automatically handles the secondary CPUs in response to a ZAP key-in. Therefore, the normal procedures for taking the system down remain unchanged except that the compute switches on the secondary CPUs should be placed in IDLE prior to turning the system over to the Customer Engineers.

HANDLING SECONDARY CPU ERRORS

When a secondary CPU alarm sounds and is accompanied by a fault message on the operator's console, a hardware fault has occurred on the secondary CPU. The CPU has been properly shut down by the system and the system is continuing without the faulty CPU. The operator may restart the secondary CPU by following the secondary CPU restart procedures detailed above.

When a secondary CPU alarm sounds and is not accompanied by a fault message on the operator's console, a serious fault (either hardware or software) has occurred which caused the secondary CPU to stray into code reserved for the primary CPU. The operator should take the faulty CPU out of RUN and perform an operator recovery sequence. Note that a delay of about 30 seconds will occur at the beginning of the operator recovery sequence as the primary CPU attempts to synchronize with the secondary CPU which is presently unable to respond.

If the secondary CPU is observed with the interrupt inhibits light on or the map bit light off, the operator should take the processor out of RUN and perform an operator recovery sequence.

In the event of a problem requiring manual recovery, the PSD information (while in IDLE) for all processors and a description of the circumstances surrounding the problem should be written down and attached to the recovery dump.

OPERATION OF A SIGMA 9 OR SIGMA 7 MULTIPROCESSING SYSTEM

SYSTEM INITIALIZATION AND REBOOTING

The boot process (from tape or swap device) is performed in a monoprocessor mode. However, prior to the standard boot process there are several actions to be taken in regard to the secondary (slave) CPUs. One of the CPUs will have been designated as the primary (master) CPU on which all standard operations and operator interface is to take place. CP-V does not require a particular CPU to be preselected, because given the appropriate Sigma 9 configuration, CP-V can utilize any CPU in the group as the primary CPU.

SIGMA 7 OR SIGMA 9 PROCESSOR CONTROL PANELS

The operator must ensure that the following switches are set:

Switch:	Setting (Master and Slaves):
WATCHDOG TIMER	NORMAL
INTERLEAVE SELECT	NORMAL
PARITY ERROR MODE	CONT
CLOCK MODE	CONT
ADDR STOP	RESET
COMPUTE SWITCH	IDLE

SIGMA 7 OR SIGMA 9 STARTUP

The operator should depress CPU RESET at each CPU [illegible]P and leave the COMPUTE SWITCH set to IDLE.

The operator may now complete the standard boot operation using the master CPU.

After the boot is complete, the next action that the operator takes depends upon whether or not the CP-V system was SYSGENed to provide automatic startup of the secondary CPU. If so, then shortly after the PO tape dismount message or the DO YOU WANT HGP RECONSTRUCTION message during a boot from the Swapper, the following message is output on the operator's console (OC):

CPU#n PLEASE RESPOND

where n is the logical number of the CPU.

On a Sigma 7 or Sigma 9 secondary CPU, the operator should depress the CPU RESET switch and place the COMPUTE SWITCH in RUN mode.

After a short delay, the following message will be printed on the operator's console to indicate that the CPU has been started properly:

```
CPU n - a LOGGED ON
```

where

n is the logical CPU number.

a is the CPU hardware address.

If the CP-V system has not been SYSGENed to provide for automatic startup of the secondary CPU, then the operator must key-in the following command to initiate operation of a secondary CPU:

```
!SCPU n
```

where n is the logical number of the CPU to be started. If n is greater than the number of CPUs SYSGENed for the system, the EH? message is returned.

STOPPING, STARTING, AND DISPLAYING THE CURRENT STATE OF THE SECONDARY CPUs WHILE THE SYSTEM IS OPERATIONAL

If, during the period of normal system operation, it is necessary to shut down a given secondary CPU, the operator need only key in

```
!XCPU n
```

where n is the logical number of the secondary CPU.

After a short delay, the following message is output on the operator's console:

```
CPU n - a LOGGED OFF
```

where

n is the logical number of the secondary CPU.

a is the hardware address of the CPU.

At this point, on a Sigma 7 or Sigma 9, the operator should place the compute switch on the designated secondary CPU in IDLE. This action is taken as a precaution to protect the system in the event of a power off interrupt when the secondary CPU has been "stopped" in terms of software.

To start a previously "stopped" CPU, the operator need only key in

```
!SCPU n
```

where n is the logical number of the secondary CPU.

The system will respond with

```
CPU n PLEASE RESPOND
```

if the secondary CPU compute switch is in IDLE. The operator should repeat startup procedures. The system will then notify the operator with

```
CPU n - a LOGGED ON
```

If the operator had not previously taken the CPU out of RUN when "stopping" the CPU, then only the LOGGED ON message will be output and the operator need not do anything at the secondary processor control panel.

If the message

```
CPU n - a CANT BE STOPPED NOW
```

is output in response to an XCPU key-in, more than likely one of the following conditions has occured:

1. The CPU has been manually placed in IDLE prior to issuing an XCPU key-in.

2. A secondary CPU hardware fault has occured and the CPU is unable to reach a logical shutdown state.

If the first condition seems to be the reason, the operator should place the CPU in RUN and perform a DISPLAY CPU key-in as described below. The LOGGED OFF message will then be output. In the second case (that of a hardware fault), the operator should take no action.

If the operator wishes to know the status of the secondary CPUs in the system, the key-in

```
!DISP CPU
```

on the primary CPU's operator's console will return the following information about each slave CPU in the system:

```
CPU n - a condition
```

where n is the logical number of the secondary CPU
a is the hardware port address of the CPU

condition can be:

IDLE	indicates no user is using the slave at this instant
ACTIVE	indicates a user is using the slave
STOPPED	indicates the system will not try to use this CPU until a !SCPU key-in or an auto-startup following a crash (if SYSGENed for auto-startup).

REVERSING CPU ROLES

On the Sigma 7 or Sigma 9, the CPU that starts the boot process becomes the master. To change master/slave roles, the system must be brought down with the !ZAP key-in, and all CPUs placed in IDLE; then it may be rebooted onto the CPU that is to be the new master.

SECONDARY CPU RESTART PROCEDURES

To restart a Sigma 7 or Sigma 9 secondary CPU, the operator should set the CPU COMPUTE SWITCH to IDLE, depress CPU RESET, and return the COMPUTE SWITCH to RUN.

Once the appropriate procedure has been completed, the operator should return to the primary CPU and key-in:

!SCPU,n

where n is the CPU logical number.

RECOVERY PROCEDURES

When initiating an operator recovery, the operator must first put any secondary CPU in IDLE by moving the COMPUTE switch to IDLE, then proceed with the operator recovery on the master CPU as currently defined. The system automatically handles the CPUs during the initial recovery phase. If automatic software initialization of the CPUs has been SYSGENed into the system, the system will automatically reinitialize the secondary CPUs (which is indicated by a LOGGED ON message at the operator's console). Otherwise, the operator does the SCPU key-in and does not touch the processor control panel at all.

For a system-initiated, single-user abort, no operator intervention is required. For full system-initiated recoveries, the operator may have to start the secondary CPUs as described above.

TAKING THE SYSTEM DOWN

The system automatically handles the secondary CPUs in response to a ZAP key-in. Therefore, the normal procedures for taking the system down remain unchanged except that the compute switches on the secondary CPUs should be placed in IDLE prior to turning the system over to the Customer Engineers.

HANDLING SECONDARY CUP ERRORS

When a secondary CPU alarm sounds and is accompanied by a fault message on the operator's console, a hardware fault has occured on the secondary CPU. The CPU has been properly shut down by the system and the system is continuing without the faulty CPU. The operator may restart the secondary CPU by following the secondary CPU restart procedures detailed above.

When a secondary CPU alarm sounds and is not accompanied by a fault message on the operaotr's console, a serious fault (either hardware or software) has occured which caused the secondary CPU to stray into code reserved for the primary CPU. The operator should take the faulty CPU out of RUN and perform an operator recovery sequence. Note that a delay of about 30 seconds will occur at the beginning of the operator recovery sequence as the primary CPU attempts to synchronize with the secondary CPU which is presently unable to respond.

If the secondary CPU is observed with the interrupt inhibits light on or the map bit light off, the operator should take the processor out of RUN and perform an operator recovery sequence.

In the event of a problem requiring manual recovery, the PSD information (while in IDLE) for all processors and a description of the circumstances surrounding the problem should be written down and attached to the recovery dump.

APPENDIX I. L6G – LEVEL 6 FECP GHOST

L6G is the ghost job that is in control of the Level 6 FECP (Front End Communication Processor). The L6G ghost handles startup and recovery of the Level 6 CPU and any error situations that occur during normal operation. When the ghost is initiated, L6G prints the following messages:

```
L6G HERE. USE INT, L6G. FOR COMMANDS
```

```
# i:    CONNECTED
```

where i is 1 or 2 and indicates the FECP number. The #i: CONNECTED message is repeated for each Level 6 FECP and indicates that CP-V is ready to communicate with the specified FECP. If the Level 6 is running at this point, a bell is rung on terminals connected to the Level 6 to indicate that CP-V is up and running.

L6G COMMANDS

DISCONNECT The DISCONNECT command is used to disconnect an FECP. CP-V no longer communicates with the specified FECP and any terminal that is logged-on through the FECP is treated as though it had hung up. The format of the command is:

```
DI[SCONNECT] i
```

When FECP i is disconnected, the following message appears on the operator's console:

```
# i  DISCONNECTED
```

When the specified FECP is not connected, the following message appears on the operator's console:

```
# i  ALREADY DISCONNECTED
```

CONNECT The CONNECT command re-initializes an FECP. The format of the command is:

```
CO[NNECT] i
```

If the specified FECP is connected, the following message appears on the operator's console:

```
# i  ALREADY CONNECTED
```

When the connection is complete, the following message appears on the operator's console:

```
# i  CONNECTED
```

REARM The REARM command is used to arm the interrupts for any FECP that has been disarmed. The format of the command is

```
REARM
```

When a hardware malfunction occurs that causes the interrupts for an FECP to be disarmed, one of the following messages appears on the operator's console:

```
# i  FEP READ DIRECT FAILED
```

or

```
# i  FEP WRITE DIRECT FAILED
```

TON The TON command is used for debugging only and should not be used during normal operation. This command turns on the trace mode of operation for the specified FECP. The format of the command is

```
TON  i
```

While the specified FECP is in trace mode, all messages sent between CP-V and the Level 6 are formatted and sent to the output device. While this tracing is being performed, the L6G ghost will not service any other FECPs on the system.

TOFF The TOFF command is used for debugging only and should not be used during normal operation. This command turns off the trace mode for the specified FECP. The format of the command is

```
TOF[F] i
```

ME The ME command is used for debugging only and should not be used during normal operation. This

command directs trace output that is normally directed to the line printer to the user's terminal when L6G is being run at a terminal. The format of the command is

ME

LP The LP command is used for debugging only and should not be used during normal operation. This command directs trace output to the line printer. The format of the command is

LP

PRINT The PRINT command is used for debugging only and should not be used during normal operation. This command is used to write to the line printer all of the accumulated error and trace messages that have been generated by the FECP's on the system. The format of the command is

P [RINT]

EXITING THE COMMAND MODE

A blank is entered to exit command mode. L6G resumes servicing the FECPs. If no FECPs are connected when command mode is terminated, L6G exits to CP-V. L6G can be restarted by using the CP-V GJOB key-in.

BOOTING THE LEVEL 6 FECP

While L66 is running on the CP-V system, perform the following operations:

1. On the L6 processor, depress the following keys:

Key Description	Key
A. Stop	Black Key - Red "S"
B. Select	Black Key - Green "S"
C. Register/Data "E"	Black Pad on White Key With White "E"
D. Register/Data "0"	Black Pad on White Key With White "0"
E. Clear	White Key - Black "CLR"
F. Load	Black Key - Green "L"
G. Execute	Red Key - Black "E"

The Level 6 processor will now run internal checks and will halt at location '0002'. Red check light should be out.

2. Continue boot by closing diskette door with diskette mounted and pressing the execute key again. The diskette will now read and execute a bootstrap program from the diskette. This bootstrap program will request CP-V to send the rest of the FECP software to the Level 6. The names of the files containing the software will be typed on the CP-V operator's console as well as the version name of the software. The Level 6 will halt at location "1DC2'. Now open the diskette door.

3. Continue the boot by pressing the execute key again.

4. The Level 6 is now operational and will not require rebooting unless power is turned off or diagnostics are run. The Level 6 remembers line speeds and currently connected terminals even if CP-V stops operating.

When the Level 6 is booted from CP-V, the following messages appear on the CP-V operator's console.

#i	LOADING	DISKETTE
#i	LOADING	$L600
#i	VERSION	xxx
#i	LOADING	$L6CP
#i	VERSION	xxx
#i	LOADING	$L6CFi
#i	VERSION	xxx
#i	LOAD	COMPLETE

The last message will appear on the CP-V operator's console only after the halt in the Level 6 program at X'1DC2' has been cleared.

LEVEL 6 ERROR RECOVERY

If the Level 6 program malfunctions, the contents of Level 6 memory are dumped to L6G. L6G formats this dump. The completed dump, which appears on the line printer, should be saved for the system programmer. The Level 6 should then be re-booted following the procedure described above. Any users that are logged on to CP-V through the Level 6 will be treated as though they had hung up.

L6G MESSAGES

Table I-1 lists the L6G Messages.

Table I-1. Summary of L6G Messages

Message	Description
# i CONNECTED	CP-V is ready to communicate with FECP i.
# i DISCONNECTED	CP-V will no longer communicate with FECP i.
# i ALREADY CONNECTED	A connect key-in has been performed on an FECP that is connected.
# i ALREADY DISCONNECTED	A disconnect key-in has been performed on an FECP that is disconnected.
L6G TERMINATED	All FECPs have been disconnected. L6G exits to CP-V and may be restarted with a GJOB L6G key-in.
L6G VERSION xxx. USE INT, L6G. FOR COMMANDS	This message is printed when the L6G ghost is started. xxx is the version number of L6G.
# i LOADING DISKETTE # i LOADING $L600 # i LOADING $L6CP # i LOADING $L6CF # i LOAD COMPLETE # i VERSION xxx	These messages appear on the OC device when the Level 6 is booted. The version number of each file is output after the module name.
# i UNABLE TO OPEN BOOT FILE # i UNABLE TO READ BOOT FILE	These messages are printed on the OC device when L6G cannot open (or read) a file. The file name appears before the message. The system programmer should be notified.
# i STATE ERROR # i HOST QUEUE OVERFLOW	These messages indicate that a software problem exists; contact your systems programmer.
# i READ DIRECT FAILED # i WRITE DIRECT FAILED	These messages indicate that a hardware problem exists. Use the REARM command to restart FECP operation.
EH?	This message indicates that an incorrect command has been given to L6G.
UNABLE TO ACQUIRE PHYSICAL PAGE FOR L6 FEP DATA	A software problem exists during the initialization of L6G.
MINIMUM OF CO PRIVILEGE REQUIRED	L6G is being run from a terminal without CO privilege.
L6G HANDLER NEED TO BE RELOADED WITH NEW MONSTK	The SYSGEN was done improperly or the wrong copy of L6G is in the :SYS account.

APPENDIX J. CP-V POWER FAIL SAFE CONSIDERATIONS FOR 560

In CP-V, a power reduction traps through trap location X'51' to PFSR, where the machine environment is saved. A WAIT loop is then entered.

Power restoration traps through X'50' to PFSR, where the saved environment is restored, the POWER FAIL-SAFE message is sent to the operator, and the system resumes operation.

On the 560, any power drop for longer than 500 milliseconds deliberately forces suppression of the X'50' trap. It follows that there will be no recovery unless some manual action takes place. Recommended operator action is as follows:

First, insure that your WAIT loop is, indeed, caused by power failure. One simple method is to enter P-mode (control-P), and verify that your loop is at symbol BEGINOFF (from your system's M:MON MAP) plus X'2E' - X'2F'.

If you are in the PFSR WAIT loop, then determine the contents of the X'50' trap location by typing:

50/

(this should be an XPSD instruction, 0FXXXXXX) then copy the XPSD instruction into special internal register 5 by typing:

5. (which selects internal Register 5)
0FXXXXXXM (which stores into 5.)

Then execute the XPSD by typing:

G (which executes the instruction)
X (which exits P-mode).

Under the same conditions as for Sigma computer, you should then successfully execute the power fail safe recovery.

For further documentation on this subject, see the TAURUS CONVERSION INTERNAL SPECIFICATION, Xerox Drawing 703260, section 2.6; the CP-V C00-11, section 1.2.2.4; the 560 Reference Manual XQ31 (Xerox 90-30-76).

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The attached pages contain changes for the E00 version of CP-V. Pages in the H edition of the manual that are to be replaced are: title page/ii, 7 through 10, 19 through 22, 22-1/22-2, 22-3/blank, 27 through 30, 33 through 36, 36-1/blank, 37/38, 45 through 50, 55 through 60, 67/68, 93 through 100, 107 through 110, 121 through 124, 125/blank.

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