

**I/O Subsystem (IOS™)
Operator's Guide for COS™**

SG-0051 G

Cray Research, Inc.

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NEW FEATURES

The I/O Subsystem (IOS) Operator's Guide for COS contains new material supporting features of COS 1.17 and IOS release 4.2. These new features are summarized in this description.

The Kernel commands section (section 2) presents three new Kernel commands. The VME and VMEND commands initiate and terminate VMEbus driver activities for a channel. The PLOT command replaces the PLOTIT command of previous releases.

The Station commands section (section 3) describes two new Station commands and lists new options on three Station commands. The DSPL command displays a screen built by the CPU and used to monitor system performance. The TCLEAR command resolves an internal deadlock that has caused a tape job to become hung. The CONFIG command now has parameters to configure stations; the LPATH command is enhanced to display information on the VMEbus logical path connection; the MONITOR command now displays information on HSX channels.

Appendix D explains how to dump table memory from within the SYSDUMP function. Cartridge tape messages are listed and explained in appendix G. Information to support DS-40 disk controllers and CRAY Y-MP and CRAY X-MP EA computer systems is included throughout the manual.

Two features are documented that will be supported in the next major release of the IOS. The SSDCLR Kernel command writes a pattern to SSD memory to initialize it. The CONFIG Station command allows the configuration of automated tape loaders.

Each time this manual is revised and reprinted, all changes issued against the previous version are incorporated into the new version and the new version is assigned an alphabetic level.

Every page changed by a reprint with revision has the revision level in the lower righthand corner. Changes to part of a page are noted by a change bar in the margin directly opposite the change. A change bar in the margin opposite the page number indicates that the entire page is new. If the manual is rewritten, the revision level changes but the manual does not contain change bars.

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<u>Revision</u>	<u>Description</u>
	November 1980 - Original printing.
A	June 1981 - This rewrite and reorganization supports the 1.10 version of the station. The MONITOR station command and a number of new Kernel commands have been added. Several appendixes have been added including appendix F, which describes the parameter file editor and the file utilities. Also, to provide consistent terminology among station manuals, the term master operator station replaces system operator station. Changes are not noted by change bars.
B	June 1982 - Rewrite. This printing supports the 1.11 version of the station and includes on-line tape information and new Kernel commands. It also includes new station command and message display information. Appendixes G, H, and I have been added and appendix B has been reorganized.
C	May 1983 - Rewrite. In accordance with the 1.12 version of the station, this printing supports the CRAY X-MP and features that include deadstart from an 80 Mbyte disk on the I/O Subsystem (IOS), new concentrator software (NSC), and miscellaneous changes to startup procedures, IOS dump programs, file utilities, and Kernel and station commands. In addition to these changes, new commands have been added to both the Kernel and Station command sections. The Kernel command section contains some information previously in appendixes and several appendixes, have been added to provide new operator message information.
D	January 1984 - This reprint with revision supports the 1.13 version of the station. Major changes include multitasking, multiple streams, dataset disposition to Peripheral Expander devices, a new HELP command, STATION command display changes, command file capabilities added to the IOS station, and BMX monitor display entries. Miscellaneous technical and editorial changes are also included.

- D-01 October 1984 - This change packet supports the 1.14 version of the station. Major changes include DD-49 Disk support, dataset acquisition and disposition, station messages, and the addition of the DEFAULT command. Changes and additions have been made to I/O Subsystem restart and mainframe deadstart procedures, file utility commands, and the @filename, MONITOR, DISK, SAVE, and SUBMIT station commands.
- E January 1986 - This rewrite supports the 1.15 version of the station. Major changes include the addition of DD-39 disk support, automatic volume recognition, Job Scheduler (JSH) performance displays, and the FORMAT utility command. Changes and additions have been made to the CONFIGURE, STMSG, and TAPE commands. The MASTER Kernel command has been deleted. The SYSTEM command and PART utility command have been added. Miscellaneous technical and editorial changes are also included.
- F April 1987 - This rewrite and reorganization supports the 1.16 version of the Cray operating system COS. Technical changes include the addition of the DKERR, LPATH, MSG, RELEASE, RESTORE, SWAP, and SWEEP station commands; the addition of the AVAIL and NAVAIL parameters to the CONFIGURE station command for tapes, the STK and NTK parameters for disk, as well as the format for SUPERLINK; the deletion of the DEVICE Kernel command; and the moving of the DSPL station command to the COS Operational Procedures Reference Manual, publication number SM-0043. Organizational changes include moving the startup procedures from section 2 to appendix B; moving the File Utility commands from appendix C to the Kernel commands, section 2; and combining the on-line device, NSC activities, and File Utility error messages under the heading of Kernel Console Messages in appendix G. The interactive station commands were moved (from appendix I) and combined with the IACON station command in section 3. All trademarks are now documented in the record of revision.
- G September 1988 - This reprint with revision supports the 1.17 version of the Cray operating system COS. Support for the CRAY Y-MP and CRAY X-MP EA computer systems and support for the DS-40 disk controller has been documented throughout this manual. New Kernel commands (section 2) include SSDCLR, VME, and VMEND. The PLOT Kernel command replaces the PLOTIT Kernel command. The CONFIG, LPATH, and MONITOR station commands (section 3) contain new parameters. DSPL and TCLEAR are new station commands. In addition, the dumping Table Memory from SYSDUMP has been added (appendix D); coverage of the DMP dead dump utility is expanded (appendix D), and many new tape messages (appendix G) and a clock message (appendix H) are listed. Appendix C, IOS File Editor, has a new title and is divided into subsections.

PREFACE

This manual describes the operational features of a Cray Research, Inc. (CRI) I/O Subsystem (IOS) using a peripheral expander and is for use by computer operators using CRAY X-MP, CRAY X-MP EA, CRAY Y-MP, CRAY-1 S (models S/1200 through S/4400), or CRAY-1 M computer systems operating under the Cray operating system COS.

Section 1 presents an overview of the hardware and software system configurations. Section 2 describes the Kernel commands. Section 3 summarizes station commands in general and then presents them in detail in alphabetical order. Appendixes include the following:

- A conversion chart for ASCII code
- Startup procedures
- Startup file creation
- IOS dump programs
- Dataset transfers using expander devices
- Tape mount requests
- Kernel console and station console error messages
- Peripheral Expander error messages

A physical description of the IOS is available in the I/O Subsystem hardware reference manual for your site. Detailed information on the IOS software is contained in:

- IOS Software Internal Reference Manual, CRI publication SM-0046
- IOS Table Descriptions Internal Reference Manual, CRI publication SM-0007
- I/O Subsystem (IOS) Administrator's Guide, CRI publication SG-0307

Additional information on the IOS is contained in:

- COS Operational Procedures Reference Manual, CRI publication SM-0043
- COS Operational Aids Reference Manual, CRI publication SM-0044
- COS Internal Reference Manual, Volume II: STP, CRI publication SM-0141

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1. INTRODUCTION

The CRI I/O Subsystem (IOS) provides high-capacity data communications between a Cray mainframe's Central Memory and peripheral devices, data storage devices, and front-end computers. In doing so, it increases a Cray mainframe's throughput by reducing its I/O responsibilities.

The IOS allows you, the operator, to control the operating system and to perform the following tasks:

- Communicate with front-end computers
- Submit jobs to COS through the IOS station
- Initiate interactive jobs
- Transmit data between the Cray mainframe and Cray data storage devices (disk storage units and tape drives)
- Transfer jobs and data from IOS Peripheral Expander devices (tapes and disks) to Cray mass storage, or from Cray mass storage to Peripheral Expander devices (tapes, disks, and printers)
- Perform system maintenance (deadstart the Cray mainframe, provide control of the CPU, and drive Peripheral Expander devices for maintenance purposes)

This manual describes the operation of the IOS running under COS. Figure 1-1 shows the hardware configuration for a typical CRAY X-MP computer system with a four-processor IOS.

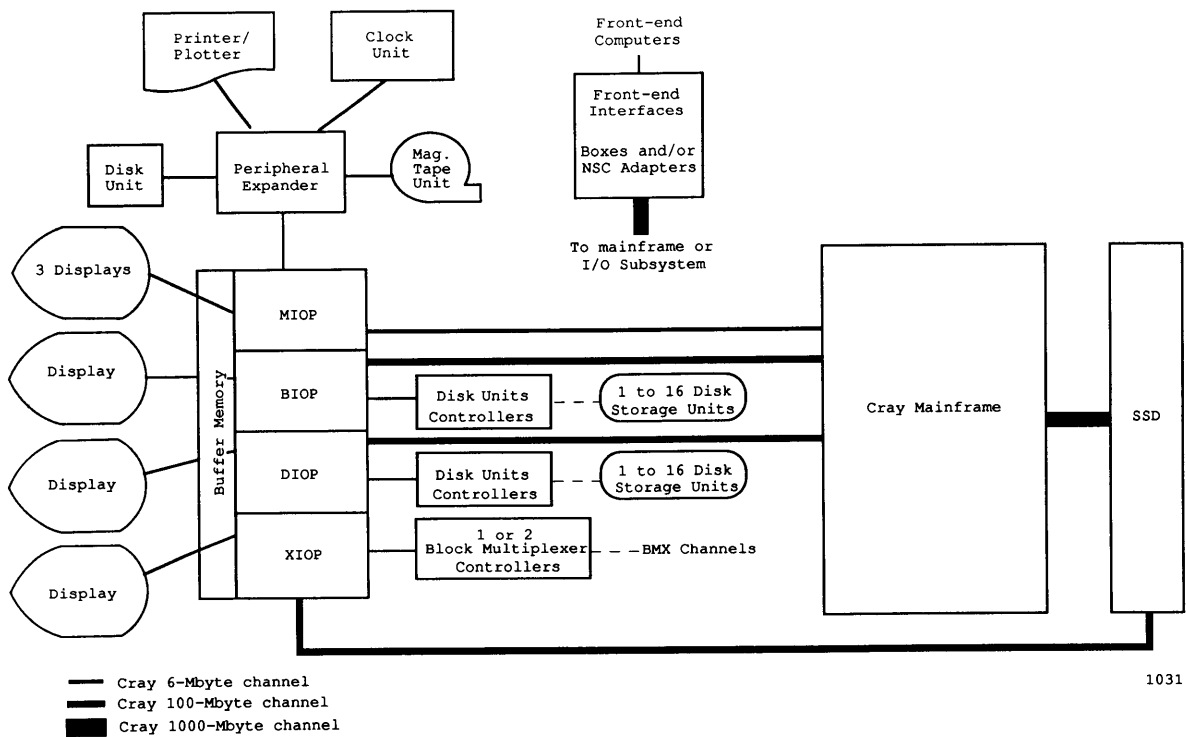


Figure 1-1. A Typical CRAY X-MP Computer System with an I/O Subsystem

1.1 HARDWARE CONFIGURATION

An IOS chassis (figure 1-2) is similar to the Cray mainframe chassis and houses from two to four I/O Processors (IOPs), at least one-half million words (64-bits each) of Buffer Memory, and channel interfaces. It might also contain a 32-Mword SSD. Four types of IOPs may be used:

MIOP	Master I/O Processor (required)
BIOP	Buffer I/O Processor (required)
DIOP	Disk I/O Processor (one or two, optional)
XIOP	Auxiliary I/O Processor (one, optional)

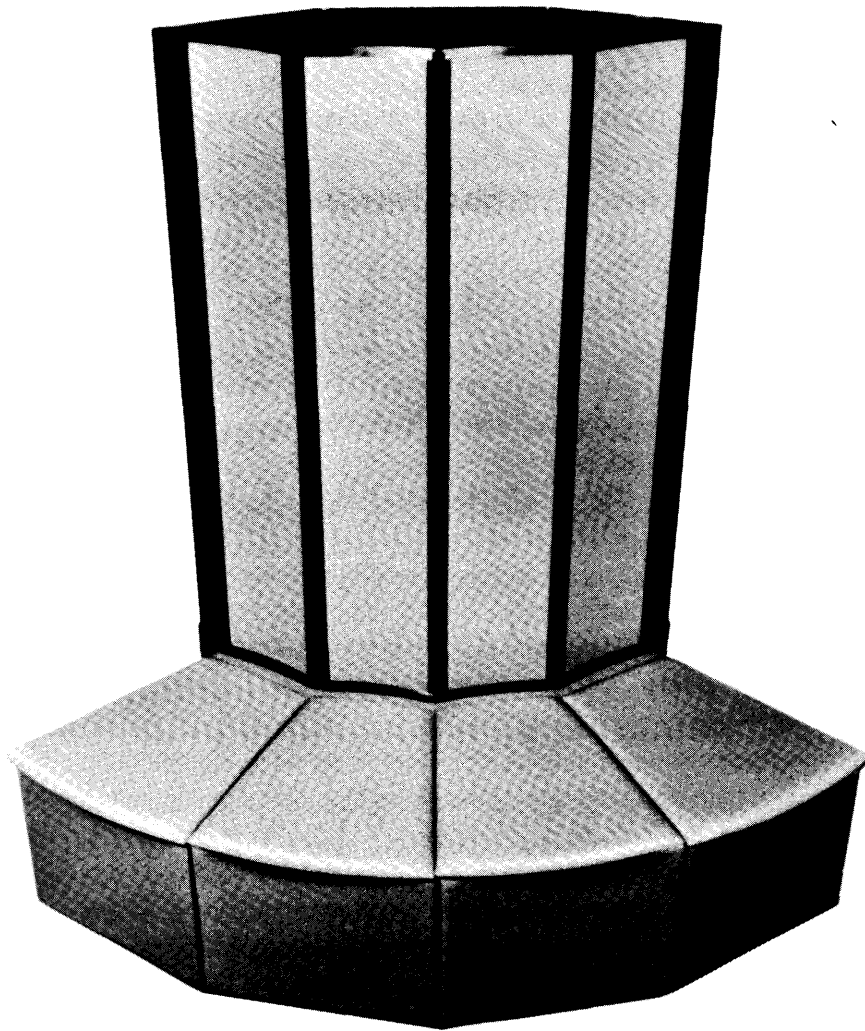


Figure 1-2. I/O Subsystem Chassis

In addition to the IOPs, the IOS consists of the following devices:

- Two to four display/consoles attached to the MIOP; and one display/console attached to each of the other IOPs (figure 1-3).
- A magnetic tape unit (Peripheral Expander device) used for deadstarting the Cray mainframe (figure 1-4)
- An expander disk storage unit (Peripheral Expander device) also used for deadstarting (figure 1-4)
- A printer/plotter (Peripheral Expander device) (figure 1-5)
- At least one disk storage unit (DSU) attached to the BIOP, operating as the master disk under COS (figure 1-6)
- An optional external clock (Peripheral Expander device)



Figure 1-3. Display/Console



Figure 1-4. Peripheral Expander Magnetic Tape and Disk Units

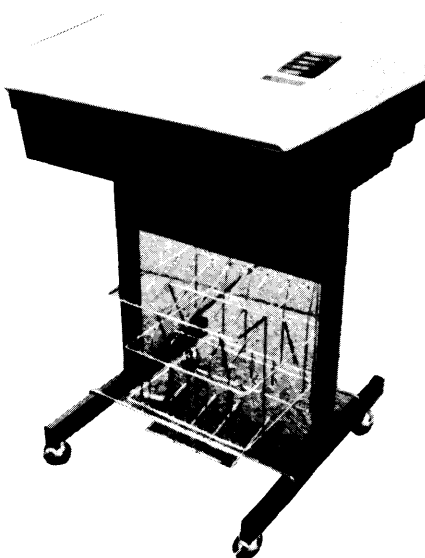


Figure 1-5. Peripheral Expander Printer/Plotter

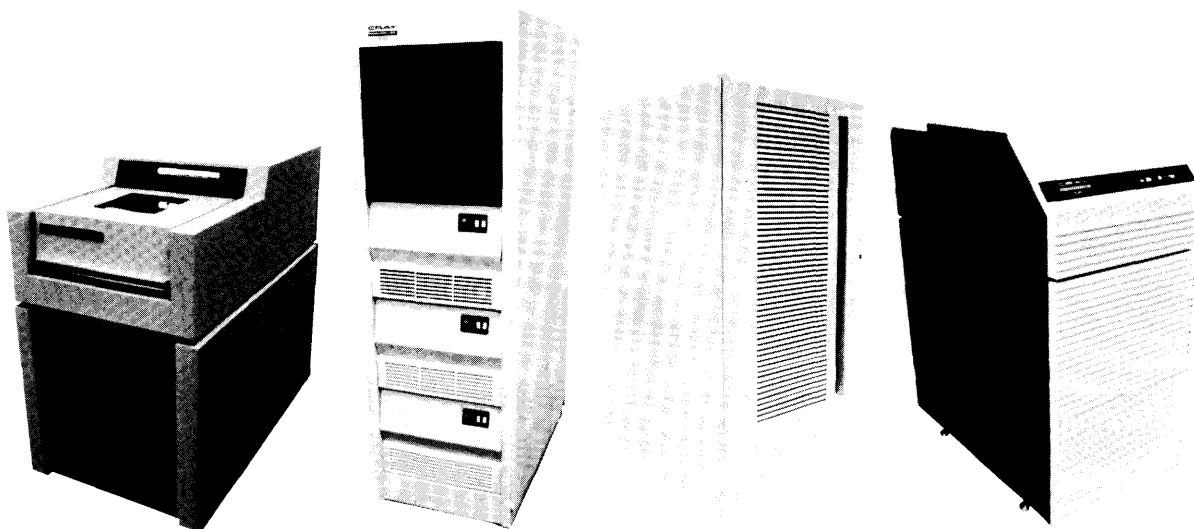


Figure 1-6. Possible Disk Storage Units
(DD-29, DD-39, DD-40, and DD-49)

1.2 I/O PROCESSORS

Each IOP of the IOS is a fast, multipurpose computer (composed of a control section, a computation section, an input/output section, and a Local Memory section) capable of transferring data at extremely high rates. The IOPs run independently and are responsible for their own set of functions. The IOP functions are defined by the way the individual IOP is attached to the mainframe and other processors and by the peripheral equipment attached to it.

Each processor's software performs its specific functions as efficiently as possible. Each IOP logs information and keeps statistics about channel use, error detection, and recovery. The IOPs use Buffer Memory to communicate with each other and in doing so, they are able to perform functions for one another.

1.2.1 MASTER I/O PROCESSOR

The Master I/O Processor (MIOP) is required on the IOS and communicates with the Cray mainframe and other IOPs. The MIOP is the first IOP to be deadstarted, and when it is deadstarted, it initializes the contents of Buffer Memory and deadstarts the other IOPs. The MIOP, together with the BIOP, deadstarts the Cray mainframe.

Through the Peripheral Expander, the MIOP supports a clock (some models), a printer/plotter, a magnetic tape unit, and a disk storage unit. The MIOP also supports from two to four display consoles (operating as MIOP Kernel and station consoles), and up to seven front-end computer interfaces may be specified. The front-end interfaces may be connected through Cray-designed front-end interface boxes (FEI) or through a Network Systems Corporation (NSC) HYPERchannel. (The NSC HYPERchannel is described in section 2 of this manual and in the IOS Software Internal Reference Manual, CRI publication SM-0046.)

1.2.2 BUFFER I/O PROCESSOR

The Buffer I/O Processor (BIOP) is also required on the IOS. Its primary duties are to transfer data between the Cray mainframe's Central Memory and the IOS Buffer Memory (using a 100-Mbyte/s channel) and to control attached DSUs.

In addition to the DSUs attached to the IOS, the Cray mainframe can also have DSUs attached directly to it. Operator commands to mass storage devices affect the disks attached to the IOS as well as those attached to the mainframe. COS tracks the location of each DSU.

1.2.3 DISK I/O PROCESSOR

The Disk I/O Processor (DIOP) also performs disk I/O to and from Cray DSUs attached to its channels. Each DIOP configured on an IOS (a maximum of two) supports up to 16 DSUs.

1.2.4 AUXILIARY I/O PROCESSOR

The Auxiliary I/O Processor (XIOP) controls up to 8 block multiplexer channels to communicate with IBM-compatible magnetic tape units. The XIOP buffers data between the drives and Central Memory and performs error recovery procedures on errors detected while transferring data to or from tape.

1.3 SOFTWARE CONFIGURATION

The IOS software is part of the COS operating system. As the IOS operator, you should be concerned with two parts of the IOS software: *Kernel* software and *station* software.

1.3.1 KERNEL SOFTWARE

The *Kernel* software (the Kernel) controls operations of the IOPs. You control the Kernel software through *Kernel commands* (see section 2 of this manual) that are entered at a *Kernel console*. The Kernel commands and Kernel consoles are so named to distinguish them from *station commands* and *station consoles*, which are described later.

Most Kernel commands can be entered only at a Kernel console attached to the MIOP. Any display console connected to the MIOP is a Kernel console at deadstart. Following deadstart, all MIOP display consoles, other than one Kernel console, may be used as station consoles. All other IOPs have one Kernel console.

You initialize Kernel software at IOS deadstart (see appendix B). Through Kernel commands, you initialize the station software (a program executing under the control of the Kernel software). Also through Kernel commands, you can control the IOS's Peripheral Expander devices and perform maintenance functions. You also control the use of the concentrator software, which allows front-end computers to communicate with the Cray mainframe, and the use of the interactive concentrator, which allows communication with an executing COS job. Section 2 describes the Kernel commands.

1.3.2 STATION SOFTWARE

An *IOS station* is a software package that provides for operator communication with COS. A station provides a vehicle for entering commands and getting information about Cray system status. (See the IACON command in section 3 for information about the interactive station.)

Through the IOS station, you can submit batch jobs to the Cray mainframe from the Peripheral Expander's magnetic tape or disk units and monitor the progress of the jobs submitted. You control the station software from a station console connected to the MIOP. (The MIOP must have at least one station console attached to it, but no more than three.)

Initialize station software at the MIOP Kernel console by entering the Kernel STATION command (see sections 2 and 3). Stations require a unique LOGON ID for communicating with COS. You can establish communication between COS and the station with the LOGON station command (see section 3). More than one station can exist, and each station must be created by the Kernel STATION command.

COS uses an installation parameter to designate a particular station as the *master operator station*. This default parameter can be overridden with the OPERATOR command (see section 3). Only one station can serve as the master operator station of a Cray computer system at any given time. Whether or not the station logging on is the master operator station depends on the current identifier known to COS (which may be changed through the OPERATOR station command).

With the master operator station, you have access to commands that control COS (and manipulate all jobs in the system), control all mass storage, and set COS system parameters. If you are using a station other than the master operator station, you can access only commands that manipulate the jobs and datasets associated with that particular station.

1.4 JOB CONTROL INFORMATION

A *job* is the term used for the unit of work performed by COS. A job enters the Cray computer system as a job input dataset through the IOS or a front-end computer. When a job enters the system, it is scheduled for processing.

A job input dataset begins with a set of control statements defining the job characteristics and the specific steps the operating system is to take while processing the job. Job control statements are described in detail in the COS Reference Manual, CRI publication SR-0011.

When using job control commands, you must identify a job by its job sequence number (JSQ). JSQs are shown in the job queue status display available through the STATUS display command (see section 3).

The group of commands that control jobs can be entered at any station, but restrictions apply when they are not entered at the master operator station. If entered at the master operator station, they can be used to control any job in the Cray computer system. If entered at other stations, the job control commands can be used only to control jobs with the same station ID as the station at which the command is entered. (For example, a job that is submitted at a station with a station ID of DG can be rerun or suspended from the master operator station or from the station with an ID of DG.)

A job usually has the same ID as that of the station at which it was submitted; however, you can reassign a station's default ID with the SET command. Also, you can change station IDs at log-on time with the LOGON command. In addition, with the ENTER and ROUTE commands, you can change the station ID associated with the job.

1.5 CONVENTIONS

In this manual, the Kernel and station commands have the following format:

<i>verb, p₁, p₂ . . . , p_n</i>

verb A set of characters uniquely identifying the command

p_i Parameter requirements. Details are given with the description of each command.

The delimiter between parameters can be either one or more blanks or a comma. A parameter having a default value can be omitted. The position of an omitted parameter must be indicated by the commas that would ordinarily delimit it. For some parameters, a short form (as indicated by underlining) is allowed.

This manual uses the following conventions to illustrate command syntax:

<u>Convention</u>	<u>Description</u>
UPPERCASE	Identifies the command verb or literal parameter
<u>UNDERLINED</u> <u>UPPERCASE</u>	Specifies the acceptable abbreviation of the verb or parameter

<u>Convention</u>	<u>Description</u>
<i>Italics</i>	Defines generic terms that represent the words or symbols to be supplied
Brackets []	Enclose optional portions of a command format
	Separates two possible choices, only one of which you may specify

2. KERNEL COMMANDS

The Kernel program in each I/O Processor (IOP) lets you control the I/O Subsystem (IOS) with the commands you enter at the Kernel console. These commands are called Kernel commands, and they are not recognized by the station software. For an overview of the Kernel software, see section 1.

2.1 KERNEL CONSOLE

The display console at which Kernel commands are entered is called the *Kernel console*. A Kernel command can be entered only at a Kernel console, and most Kernel commands can be entered only at an MIOP Kernel console. All Kernel operator messages, including Peripheral Expander tape mount requests and device error messages, are directed to this console.

All display consoles are Kernel consoles when the IOS is deadstarted; one console is dedicated to the MIOP Kernel by default. This console cannot be dedicated to station software; attempting to assign this console to station software results in the following message:

CRT NOT AVAILABLE FOR ASSIGNMENT

See the CONSOLE command in section 3 for more information about assigning consoles to the station.

Since all MIOP consoles are initially Kernel consoles, use any MIOP console to enter Kernel commands when they are not dedicated to the station. (See appendixes F through H for descriptions of operator messages.)

The special keys described in table 2-1 are recognized by the Kernel command processor.

Table 2-1. Kernel Console Special Keys

Key	Function
CONTROL-A	Repeats the last input line without initiating the command
CONTROL-D	Calls the dump program SYSDUMP (see appendix D)
CONTROL-H	Backspaces one character but does not erase it
CONTROL-U	Deletes the entire entry line
CONTROL-X	Repeats the last input line and initiates the command
RETURN	Initiates the command
RUBOUT or DEL	Backspaces and erases one character on the entry line
→	Moves cursor right one character and recalls a character from the previous input line
←	Moves cursor left one character (CONTROL-H)

2.2 COMMAND TYPES

A Kernel command consists of a unique command verb that can be accompanied by parameters. (Subsection 1.5 describes command syntax conventions.) A Kernel command is executed when you press RETURN on the Kernel console. Some commands are operator responses requested by the Kernel.

This section describes the following types of Kernel commands:

- Initialization (subsection 2.2.1)
- Concentrator (subsection 2.2.2)
- Device (subsection 2.2.3)
- File Utility (subsection 2.2.4)
- Maintenance (subsection 2.2.5)

Table 2-2 summarizes the Kernel commands (in alphabetical order) and gives their command type. Appendix C describes the IOS File Editor commands.

Table 2-2. Kernel Commands

Command	Type	Function
*	Miscellaneous	Allows comments to be included in command files
ABORT	Device	Terminates input or output on expander devices
CLEAR	File Utility	Deletes directory(s) on expander disk
CONC	Concentrator	Initiates FEI concentrator
CONFIG	Maintenance	Displays status of configured peripheral devices
COPY	File Utility	Copies a file from expander tape to expander disk; or from expander disk to expander tape
CRAY	Initialization	Initializes IOS and Cray mainframe link
DDUMP	File Utility	Dumps directories from expander disk to tape
DEF	File Utility	Enables setting of defaults for expander disk file references
DELETE	File Utility	Deletes file(s) within a directory on expander disk
DISABLE	Device	Places expander device off-line
DLOAD	File Utility	Loads directories from expander tape to disk
DSTAT	File Utility	Displays expander disk directories information
EDIT	File Utility	Invokes IOS editor (see appendix C)
ENABLE	Device	Places expander device on-line
ENDCONC	Concentrator	Terminates FEI concentrator
ERRDMP	Maintenance	Dumps error log buffer

Table 2-2. Kernel Commands (continued)

Command	Type	Function
ERROR	Maintenance	Turns MIOP Error Log channel on or off
FDUMP	File Utility	Dumps files from expander disk to tape
FLAW	File Utility	Disables an expander disk cylinder until next INIT is done
FLOAD	File Utility	Loads files from expander tape to disk
FORMAT	File Utility	Formats expander disk
FSTAT	File Utility	Displays information about files within an expander disk directory
GETIME	Maintenance	Displays date and time
HELP	Maintenance	Displays information for all Kernel commands
IACON	Concentrator	Initializes MIOP console for use as an interactive station console
IAIOP	Concentrator	Allows interactive concentrator communication
INIT	File Utility	Initializes expander disk for IOS use
LISTO	Maintenance	Prints list of all overlays in the system
LISTP	Maintenance	Prints list of all currently defined IOS halt codes
MFCLR	Initialization	Writes a pattern to Central Memory
MFINIT	Initialization	Performs mainframe confidence test
NSC	Concentrator	Initiates NSC concentrator
NSCEND	Concentrator	Terminates NSC concentrator
PLOT	File Utility	Prints plot data from expander tape or disk
PROC	File Utility	Executes Kernel console command file from expander disk

Table 2-2. Kernel Commands (continued)

Command	Type	Function
PRTAPE	File Utility	Prints unblocked tape files
RENAME	File Utility	Renames an expander disk file
RESTART	Device	Terminates input or output on expander devices; allows output staging to be postponed and reinitiated later.
RESUME	Device	Resumes input or output on expander device
SETIME	Maintenance	Sets date and time
SSDCLR	Initialization	Writes a pattern to SSD Memory
START	Initialization	Deadstarts the Cray mainframe
STATION	Initialization	Initializes the IOS station software
SYSTEM	Initialization	Identifies the Cray mainframe resident operating system
UBTAPE	File Utility	Unblocks a single, specified, blocked file on expander tape and sends it to the expander printer
VME	Concentrator	Initiates a VMEbus connection
VMEND	Concentrator	Terminates a VMEbus connection

2.2.1 INITIALIZATION COMMANDS

The initialization commands let you initialize the IOS software and prepare the Cray computer system for job processing. The initialization commands are as follows:

- CRAY
- MFCLR
- MFINIT
- SSDCLR
- START
- STATION
- SYSTEM

2.2.1.1 CRAY command

The CRAY command initializes the link between the IOS and the Cray mainframe. This link must be established before messages (station messages and disk I/O requests) can be exchanged.

The link between the IOS and the mainframe is automatically established by the START command described later in this section.

Format:

```
| CRAY |
```

When the link is successfully established, the following messages appear on the Kernel console:

```
CPU <-> MIOP CHANNEL INIT
CPU <-> MIOP LINKAGE COMPLETE
```

If an error is encountered, one of the following messages is displayed:

```
CPU NOT RESPONDING - RETRY?
```

or

```
LOW SPEED CHANNEL DATA ERROR
  DATA EXPECTED:  xxxxxx
  DATA RECEIVED:  yyyyyyy
CONTINUE?
```

Enter Y to attempt initialization again; enter N to terminate. Upon termination, the following message is displayed:

```
CPU <-> MIOP LINKAGE FAILED
```

2.2.1.2 MFCLR command

The MFCLR command writes a pattern to Cray Central Memory. This can be used to zero all of memory or to write zeros or some other pattern to selected areas of memory.

Format:

```
| MFCLR [fwa] [lwa] [pattern] |
```

fwa Address in octal of first word to write; default is 0.

lwa Address in octal of last word to write; default is the last
 word of Central Memory.

pattern Pattern to write; default pattern is 0.

NOTE

If an asterisk (*) is specified as the value for any of
the MFCLR parameters, the default is used.

2.2.1.3 MFINIT command

The MFINIT command performs a confidence test on the mainframe hardware
components prior to deadstarting the operating system in the mainframe.

Format:

MFINIT

2.2.1.4 SSDCLR command[†]

The SSDCLR command writes a pattern to SSD memory through the SSD
backdoor channel, if one is available. This command can be used to zero
all of SSD memory, or to write zeros or some other pattern to selected
areas of the SSD.

Format:

SSDCLR [<i>fwa</i>][<i>lwa</i>][<i>pattern</i>]

fwa Address in octal of the first word to write; default is 0.
 This address must be on a 100₈ word boundary.

[†] Implemented in a future release of the IOS.

lwa Address in octal of the last word to write; default is the last word of SSD memory. The total length to write (**fwa** through **lwa**) must be a multiple of 1008 words.

pattern Pattern to write; default is 0

NOTE

If an asterisk (*) is specified as the value for any of the SSDCLR parameters, the default for that parameter is used.

2.2.1.5 START command

The START command informs the IOS Kernel program where to find the required deadstart files and establishes the link between the IOS and the Cray mainframe. If a device is not specified, the expander disk unit 0 is used. Upon completion of the mainframe startup, the following messages should appear on the MIOP console:

```
CPU <-> MIOP CHANNEL INIT
CPU <-> MIOP LINKAGE COMPLETE
```

START COMPLETE

If mainframe deadstart fails, the system displays error messages instead of the CPU <-> MIOP LINKAGE COMPLETE message.

For more information on the START command, see the Cray Mainframe Startup procedure in appendix B.

Format:

```
| START @MTunit:num|[@DKunit:][dir/]file |
| @MTunit:num[,ED]|[@DKunit:][dir/]file[,ED]|@TT |
|_____|
```

@MT Peripheral Expander tape device (on which binary and/or parameter files exist)

unit: Unit number (0 through 9)

num Physical file number on tape (0 through 9999)

@DK Peripheral Expander disk device (on which the binary and/or parameter files exist)

dir Directory name on disk; maximum of 15 alphanumeric characters. If not specified, the default is used (see the DEF command later in this section).

file File name on disk; maximum of 15 alphanumeric characters.

ED Option to route the parameter file through the IOS File Editor before going to the mainframe. It allows changes to be made to the default system configuration (see appendix C). This option can be specified only with the @MT and @DK parameters.

@TT Designates that the parameter file is to be input from the console

2.2.1.6 STATION command

To initialize the IOS station software, enter the STATION Kernel command.

Format:

<u>STATION</u> [<i>num</i>]

num Number (0 through 2) of a console attached to the MIOP to be assigned for use as a station console. If not specified, a default console is selected. The default at the Kernel console depends on the IOS configuration. Contact a CRI site analyst for the configuration. The Kernel console cannot be assigned as an IOS station software console.

NOTE

The STATION Kernel command described here and the STATION command described in section 3 are not the same; they perform different functions.

To establish communication between COS and a station, see the LOGON station command described in section 3.

2.2.1.7 SYSTEM command

The SYSTEM command tells the IOS software which Cray operating system (COS or UNICOS) is resident in the Cray mainframe. This lets the IOS software make run-time decisions regarding commands and displays based on the specific operating system. For example, the labels displayed on the station MONITOR CPU display differ between COS and UNICOS.

Format:

<u>SYSTEM</u> [<i>os</i>]

os Cray operating system:
 COS (default)
 UNICOS

2.2.2 CONCENTRATOR COMMANDS

Concentrator commands let you control the mainframe/front-end link activities. This subsection describes four types of concentrators:

- Front-end interface
- Network Systems Corporation (NSC) driver
- VMEbus protocol-independent link
- Interactive communication with COS through the console

2.2.2.1 Front-end interface concentrator

The IOS concentrator can communicate with a CRI front-end interface and serve as a link between the Cray mainframe and front-end computer systems (attached to the IOS by 6-Mbyte/s channels). The front-end concentrator Kernel commands are as follows:

- CONC
- ENDCONC

CONC command - The CONC command initiates the concentrator. A concentrator can also be initiated during startup or by the station CHANNEL ON command. Enter the CONC command to reinitiate the concentrator once it has been terminated by the ENDCONC command.

Format:

```
| CONC [cn] |
```

cn Concentrator number that corresponds to a channel pair connecting the IOS to the front-end computer system; default is 0. Contact a CRI site analyst for the IOS configuration.

If the command is successful, initialization is recognized with the following message:

CONCENTRATOR NUMBER *cn* INITIALIZED

ENDCONC command - To terminate the concentrator initiated during startup or with the CONC command, enter the ENDCONC command.

Format:

```
| ENDCONC [cn] |
```

cn Concentrator number that corresponds to a channel pair connecting the IOS to the front-end computer system; default is 0. Contact a CRI site analyst for the IOS configuration.

When all resources are released, the following message appears:

CONCENTRATOR NUMBER *cn* TERMINATED

2.2.2.2 NSC concentrator

The IOS NSC concentrator serves as a link between the Cray mainframe and a front-end computer or computers connected through an NSC A130 adapter. The NSC concentrator Kernel commands are as follows:

- NSC
- NSCEND

NSC command - The NSC command initiates an NSC concentrator or ordinal. An NSC concentrator or ordinal can also be initiated during startup or by the station CHANNEL ON command. Enter the NSC command to reinitiate an NSC activity if it has been terminated.

Format:

```
| NSC [ord] |
```

ord Ordinal that corresponds to a physical IOP channel pair. To determine which ordinal to enter, examine the MIOP CONFIG display (see the CONFIG command later in this section) or the station LINK display. If *ord* is not specified, the lowest configured NSC ordinal is used.

NSCEND command - To terminate an active NSC concentrator or ordinal, use the NSCEND command.

Format:

```
| NSCEND [ord] |
```

ord Ordinal corresponding to a physical IOP channel pair. To determine which ordinal to enter, examine the MIOP CONFIG display or the station LINK display. If *ord* is not specified, the lowest configured NSC ordinal is used.

Either an NCS termination message or an error message appears if an invalid ordinal number is specified. See appendix G for specific NSC activity message descriptions.

2.2.2.3 VMEbus interface commands

The IOS VMEbus driver provides a protocol-independent link between the Cray mainframe and devices or front-end computers attached to a VMEbus. The IOS software drives a 6- or 12-Mbyte channel which is connected to the VMEbus. The VMEbus Kernel commands are as follows:

- VME
- VMEND

VME command - The VME command initiates the VMEbus driver activities for a channel. If a driver has been terminated, it may be reinitiated with this command.

Format:

```
| VME [ch[mode]] |
```

ch Physical input channel number (octal) of the low-speed channel pair connecting the IOS to the VMEbus that is to be initiated. The default is the channel pair with the lowest ordinal configured as a VME connection.

mode Mode of execution. Enter G to enable the driver in graphics mode. This mode uses more Local Memory buffers, but guarantees maximum output transfer rate because output will not have to wait for resources. Entering no mode or entering any character but G, (such as N) will enable the driver in networking mode. This mode requires fewer local memory buffers, but does not guarantee maximum output transfer rate or immediate resource availability.

The success or failure of the initialization command will be relayed in an MIOP Kernel console message. See appendix G for message details.

VMEND command - The VMEND command terminates the VME driver activities for a channel.

Format:

```
| VMEND [ch] |
```

ch Physical input channel number (octal) of the low-speed channel pair connecting the IOS to the VMEbus that is to be terminated. The default is the channel pair with the lowest ordinal configured as a VME connection.

The success or failure of the termination command will be displayed in an MIOP Kernel console message. See appendix G for message details.

2.2.2.4 Interactive concentrator

The interactive concentrator gathers messages from IOS interactive consoles, sends them to the Cray mainframe, receives responses, and distributes them to the console routines. The console routines handle input and output to and from the consoles, and they prepare messages to be sent to COS through the interactive concentrator. (Only the concentrator commands are included in this section; see section 3, IACON command, for more information on the interactive station.)

The interactive concentrator commands, with options, must be entered at the MIOP Kernel console, followed by a RETURN. The interactive concentrator Kernel commands and options are as follows:

- IACON
- IAIOP
- IAIOP END
- IAIOP LOG
- IAIOP LOGOFF
- IAIOP POLL

IACON command - The IACON station command initializes an MIOP console other than the Kernel console for use as an interactive station console. Once a console is initialized as a station console, the interactive station commands can be used. See the IACON station command description in section 3 for a description of the interactive station commands.

IAIOP command - To bring up an interactive console, the interactive concentrator must be initialized with an IAIOP command. No parameters are required.

Format:

IAIOP

The following formats with parameters are used with the IAIOP command to perform; logon, logoff, polling, and to terminate the concentrator.

The IAIOP LOG command logs on the interactive concentrator and initializes it if it is not already initialized.

Format:

```
| IAIOP LOG [id][tid] |
```

id Optional 2-character identifier used by COS to associate messages and data with this console; the default is II.

tid Optional 8-character terminal identifier; the default is null.

Before the interactive concentrator can be terminated, all interactive consoles must be terminated with the IAIOP LOGOFF command. The IAIOP LOGOFF command also logs off the interactive concentrator.

Format:

```
| IAIOP LOGOFF |
```

By default, each console's message buffer is checked every 0.1 second for a line of input that is ready to be transferred to the Cray mainframe. The length of time between checks can be changed with the IAIOP POLL command.

Format:

```
| IAIOP POLL nn |
```

nn Interval, in decimal tenths of a second, between checks for input

The IAIOP END command terminates the interactive concentrator and logs it off if it has not already been logged off.

Format:

```
| IAIOP END |
```

2.2.3 DEVICE COMMANDS

The Kernel device commands described in this subsection let you control device status, or communicate with the program controlling the device. These commands are used most frequently after a request requiring operator action (such as tape mount request) has occurred. This subsection also describes the Peripheral Expander tape and disk commands.

As the operator, you need not be concerned with the initial configuration of Peripheral Expander devices, because the mnemonics for accessing Peripheral Expander devices are associated with the devices at system deadstart.

Device commands allow the altering of device configuration by enabling or disabling devices. They can also restart or abort a process after an error has been encountered. Appendix H contains a list of the Peripheral Expander device error messages and recommended responses.

When a request requiring operator action or an error requiring operator response occurs, the following message appears on the Kernel console:

*** RESPOND *** [RESUME,ABORT,RESTART] ***

I/O is suspended on the device until one of the appropriate device commands is entered.

All of the device commands have the following general format:

<i>command device</i>

command Device command:

ABORT	Terminates input or output
DISABLE	Places the device off-line. A program using the device is allowed to perform I/O and terminate normally.
ENABLE	Places the device on-line
RESTART	Terminates input or output. If the station was performing input or output staging, the transfer is postponed and the dataset staging operation is reinitiated later.
RESUME	Resumes input or output on the designated device

device Local device mnemonic:

<u>Mnemonic</u>	<u>Device</u>
@MT0	Magnetic tape unit
@PR0	Printer/plotter
@DK0	Disk unit
@CK0	Clock unit

2.2.3.1 Peripheral Expander tape mount messages

When the source or destination device for a staged dataset is a Peripheral Expander magnetic tape unit, a tape mount request message appears on the Kernel console. A tape mount request has two forms, depending on the staging direction. (Mount request/response information for magnetic tape devices other than the Peripheral Expander's tape unit is provided in appendix F.)

The mount request for datasets staged from the IOS to the Cray mainframe is:

```
@MT0:num PLEASE MOUNT TAPE FOR READING, ID=vol
```

The mount request for datasets staged from the Cray mainframe to the IOS is:

```
@MT0:num PLEASE MOUNT TAPE FOR WRITING, ID=vol
```

num is the file number of the tape to be read or written. The *vol* does not appear on the screen if the mount request is the result of a SAVE or SUBMIT station command. If the mount request is the result of a COS DISPOSE, FETCH, or ACQUIRE job control statement processed at the Cray mainframe, the *vol* that appears is taken from the first word of the TEXT field of the control statement.

2.2.3.2 Peripheral Expander disk mount message

When the destination device for a staged dataset is a Peripheral Expander disk unit, a disk mount request message appears on the Kernel console if the requested volume is not mounted.

```
@DK0: PLEASE MOUNT DISK FOR IO, ID=vol
```

vol is taken from the first word of the TEXT field of the COS DISPOSE, FETCH, or ACQUIRE control statements. *vol* is compared to the ID field in the disk label created when the disk was initialized (see the INIT File Utility command in subsection 2.2.4).

2.2.4 FILE UTILITY COMMANDS

Enter the File Utility commands at a Kernel console. The File Utility commands are as follows:

CLEAR	EDIT	PLOT
COPY	FDUMP	PROC
DDUMP	FLAW	PRTAPE
DEF	FLOAD	RENAME
DELETE	FORMAT	UBTAPE
DLOAD	FSTAT	
DSTAT	INIT	

The Peripheral Expander disk software supports directories that share space on disk. Directories cannot be explicitly created; they are created automatically as needed. The IOS supports files and directories (groups of files) on the Peripheral Expander disk. Use the File Utility commands described in this subsection to maintain the files within each directory.

Appendix G describes File Utility error messages.

2.2.4.1 CLEAR command

The CLEAR command calls the CLEAR utility to delete all files in one or more directories on Peripheral Expander disk. The directory that contained the files is also removed because it is now empty.

Format:

```
| CLEAR [@DKunit:]dir-list |
```

@DK Designates Peripheral Expander disk device

unit Disk unit number (0 through 9). If a device is not specified, Peripheral Expander disk unit 0 is used.

dir-list Directory name list, separated by commas. At least one directory name must be specified.

Examples:

The following example deletes all files in directory XYZ on disk unit 0.

```
CLEAR @DK0:XYZ
```

The following example deletes all files in directories IOS, COS, and MYDIR on disk unit 0.

```
CLEAR IOS,COS,MYDIR
```

2.2.4.2 COPY command

The COPY command calls the COPY utility to copy a file between Peripheral Expander tape and disk. If the copy is to disk, the file name specified cannot be currently in use. The same device cannot be the source and destination in a COPY command.

Format:

```
COPY @MTunit:num[:NR][@DKunit:][dir/]file
      [@DKunit:][dir/]file|@MTunit:num[:NR]
```

@MT	Designates Peripheral Expander tape device
@DK	Designates Peripheral Expander disk device
unit	Unit number (0 through 9). If a device is not specified, Peripheral Expander disk unit 0 is used.
num	Physical file number on tape (0 through 9999)
NR	Optional no-rewind parameter for tape files. If specified on the destination file, the first file copied must be file 0.
dir	Directory name on disk; maximum of 15 alphanumeric characters. If a directory name is not specified, the default directory (see DEF utility described later in this subsection) is used.
file	File name on disk; maximum of 15 alphanumeric characters.

Examples:

In the following example, tape file 0 is copied to a new file named RESTART in the PAR directory on disk unit 0.

```
COPY @MT0:0 PAR/RESTART
```

In the following example, a file named MYFILE in the ABC directory on disk unit 0 is copied to tape file 0. The tape remains positioned at the end of file 0.

```
COPY @DK0:ABC/MYFILE @MT0:0:NR
```

2.2.4.3 DDUMP command

The DDUMP command calls the DDUMP utility to dump all files in a list of directories from expander disk to expander tape.

Format:

```
| DDUMP [@DKunit:][dir-list] @MTunit: |
```

@DK Designates Peripheral Expander disk device

@MT Designates Peripheral Expander tape device

unit Unit number (0 through 9). If a device is not specified, the expander disk unit 0 is used.

dir-list Optional directory name list, separated by commas. If no directory names are specified, the files in all directories are dumped.

Examples:

The following example dumps all files in directory COS from expander disk to expander tape.

```
DDUMP @DK0:COS @MT0:
```

The following example dumps all files in directories IOS, COS, and PAR from expander disk to expander tape.

```
DDUMP IOS,COS,PAR @MT0:
```

The following example dumps all files in all directories from expander disk to expander tape.

```
DDUMP @MT0:
```


2.2.4.4 DEF command

The DEF command calls the DEF utility to enable the setting of default attributes to be used in subsequent references to expander disk files by Kernel commands. A separate set of defaults are used by the IOS station (see the DEFAULT station command in section 3). If you enter no parameters after the DEF utility command, the current setting of all defaults is displayed.

Format:

<code>DEF DEV VOL [vol] DIR [dir]</code>
--

DEV	Device name; the default is always the expander disk unit and cannot be changed.
vol	Optional disk volume name; maximum of 7 alphanumeric characters.
dir	Optional disk directory name; maximum of 15 alphanumeric characters.

Examples:

The following example displays the current default device name.

```
DEF DEV
```

The following example sets the default Kernel volume name to MYVOL.

```
DEF VOL MYVOL
```

The following example displays the current default directory name (Kernel, not station).

```
DEF DIR
```

The following example displays the current default device name, directory name, and volume name.

```
DEF
```

2.2.4.5 DELETE command

The DELETE command calls the DELETE utility to delete one or more files within a directory on expander disk.

Format:

<code>DELETE [@DKunit:][dir/][file-list]</code>

@DK Designates Peripheral Expander disk device

unit Disk unit number (0 through 9). If a device is not specified, expander disk unit 0 is used.

dir Directory name on disk; maximum of 15 alphanumeric characters. If a directory name is not specified, the default directory (see DEF utility earlier in this subsection) is used.

file-list Optional file name list, separated by commas. If no file names are specified, all files in the directory are deleted.

Examples:

The following example deletes all files in the default directory (as displayed by the DEF DIR command) on disk unit 0.

```
DELETE
```

The following example deletes files COS1 and COS2 in directory COS on disk unit 0.

```
DELETE @DK0: COS/COS1,COS2
```

The following example deletes file KERN1 in directory IOS on disk unit 0.

```
DELETE IOS/KERN1
```

The following example deletes all files in directory MYDIR on disk unit 0.

```
DELETE MYDIR/
```

The following example deletes file MYFILE in default directory on disk unit 0.

```
DELETE MYFILE
```

2.2.4.6 DLOAD command

The DLOAD command calls the DLOAD utility to load all files in a list of directories from expander tape to expander disk. The tape must have been created with the DDUMP or FDUMP utilities. Files that are already present on disk are not loaded.

Format:

<code>DLOAD @MTunit: [@DKunit:][dir-list]</code>
--

@MT Designates Peripheral Expander tape device

@DK Designates Peripheral Expander disk device

unit Unit number (0 through 9). If a device is not specified, the expander disk unit 0 is used.

dir-list Optional directory name list, separated by commas. If no directory names are specified, the files in all directories are loaded.

Examples:

The following example loads all files with directory name COS from expander tape to expander disk.

```
DLOAD @MT0: @DK0: COS
```

The following example loads all files with directory names IOS, COS, and PAR from expander tape to expander disk.

```
DLOAD @MT0: IOS, COS, PAR
```

The following example loads all files with any directory name from expander tape to expander disk.

```
DLOAD @MT0:
```

2.2.4.7 DSTAT command

The DSTAT command calls the DSTAT utility to display the status of one or more directories on expander disk. DSTAT displays the name, date, and time created and the length in words for each directory specified.

Format:

```
| DSTAT [@DKunit:][dir-list] |
```

@DK Designates Peripheral Expander disk device

unit Disk unit number (0 through 9). If a device is not specified, disk unit 0 is used.

dir-list Optional directory name list, separated by commas. If no directory names are specified, the status of all directories is displayed.

Examples:

The following example displays statistics of directory COS on disk unit 0.

```
DSTAT @DK0: COS
```

The following example displays statistics of directories IOS, COS, and PAR on disk unit 0.

```
DSTAT IOS, COS, PAR
```

The following example displays statistics of all directories on disk unit 0.

```
DSTAT
```

2.2.4.8 EDIT command

The EDIT command calls the EDIT utility to enable the IOS File Editor. The IOS File Editor can either create a new file or modify a file already existing on expander disk. Appendix C describes the IOS File Editor.

Format:

```
EDIT @TT|[@DKunit:][dir/]file
```

@TT A new file is to be created at the console.

@DK Designates a file is to be modified on Peripheral Expander disk device

unit Disk unit number (0 through 9). If a device is not specified, expander disk unit 0 is used.

dir Directory name on disk; maximum of 15 alphanumeric characters. If a directory name is not specified, the default directory is used. (See DEF utility earlier in this subsection.)

file File name on disk; maximum of 15 alphanumeric characters.

Examples:

The following example edits file MYFILE in directory XYZ on disk unit 0.

```
EDIT @DK0:XYZ/MYFILE
```

The following example edits file UFILE in directory ABC on disk unit 0.

```
EDIT ABC/UFILE
```

The following example edits file DEADSTART in default directory on disk unit 0.

```
EDIT DEADSTART
```

The following example lets you create a new file from the Kernel console.

```
EDIT @TT
```

2.2.4.9 FDUMP command

The FDUMP command calls the FDUMP utility to dump a list of files from expander disk to expander tape.

Format:

<code>FDUMP</code> [<code>@DKunit:</code>][<code>dir/</code>][<code>file-list</code>] <code>@MTunit:</code>

`@DK` Designates Peripheral Expander disk device

`unit` Disk unit number (0 through 9). If a device is not specified, the expander disk unit 0 is used.

`dir` Directory name on disk; maximum of 15 alphanumeric characters. If a directory name is not specified, the default directory (see DEF command earlier in this section) is used.

`file-list` Optional file name list, separated by commas. If no file names are specified, all files in the directory are dumped.

`@MT` Designates Peripheral Expander tape device

Examples:

The following example dumps all files in directory COS on disk unit 0 to tape unit 0.

```
FDUMP @DK0: COS/ @MT0:
```

The following example dumps files KERN1, KERN2, and KERN3 in directory IOS on disk unit 0 to tape unit 0.

```
FDUMP IOS/KERN1,KERN2,KERN3 @MT0:
```

The following example dumps all files in directory MYDIR on disk unit 0 to tape unit 0.

```
FDUMP MYDIR/ @MT0:
```

The following example dumps file MYFILE in default directory on disk unit 0 to tape unit 0.

```
FDUMP MYFILE @MT0:
```

2.2.4.10 FLAW command

The FLAW command calls the FLAW utility to make a cylinder on the expander disk unavailable for use by the Disk File Manager until the next INIT is done on the disk. All blocks in the requested cylinder are reserved.

Format:

```
| FLAW [@DKunit:]cyl |
```

@DK Designates Peripheral Expander disk device

unit Disk unit number (0 through 9). If a device is not specified, the expander disk unit 0 is used.

cyl Cylinder number (1 through 822)

Examples:

The following example flaws cylinder 100 on disk unit 0.

```
FLAW @DK0:100
```

The following example flaws cylinder 20 on disk unit 0.

```
FLAW 20
```

2.2.4.11 FLOAD command

The FLOAD command calls the FLOAD utility to load a list of files from expander tape to expander disk. The tape must have been created with the DDUMP or FDUMP utilities. Files that are already present on disk are not loaded.

Format:

```
| FLOAD @MTunit: [@DKunit:][dir/][file-list] |
```

@MT Designates Peripheral Expander tape device

@DK Designates Peripheral Expander disk device

unit Unit number (0 through 9). If a device is not specified, the expander disk unit 0 is used.

dir Directory name on disk; maximum of 15 alphanumeric characters. If a directory name is not specified, the default directory (see DEF utility earlier in this subsection) is used.

file-list Optional file name list, separated by commas. If no file names are specified, all files in the directory are loaded.

Examples:

The following example loads all files in directory COS on tape unit 0 to disk unit 0.

```
FLOAD @MT0: @DK0: COS/
```

The following example loads files KERN1, KERN2, and KERN3 in directory IOS on tape unit 0.

```
FLOAD @MT0: IOS/ KERN1, KERN2, KERN3
```

The following example loads all files in directory MYDIR on tape unit 0.

```
FLOAD @MT0: MYDIR/
```

The following example loads file MYFILE in default directory on tape unit 0.

```
FLOAD @MT0: MYFILE
```

2.2.4.12 FORMAT command

To format the Peripheral Expander disk, enter the FORMAT command at the MIOP Kernel console.

Format:

```
|  
| FORMAT |  
|
```


The command calls the FORMAT overlay to format the disk, and the system displays the following message:

```
@DK0: WARNING - DATA WILL BE DESTROYED
*** RESPOND *** [RESUME, ABORT, RESTART] ***
```

Make sure that the proper disk is in the drive and type RESUME @DK0 to start formatting. No formatting is done if ABORT @DK0 or RESTART @DK0 is entered.

The disk is in use for about 4 minutes as the disk pack is formatted. Use the INIT command to initialize the pack for IOS use when formatting is done.

2.2.4.13 FSTAT command

The FSTAT command calls the FSTAT utility to display the status of one or more files within a directory on expander disk. FSTAT displays the name, date, and time created and the length in words for each file specified.

Format:

```
| FSTAT [@DKunit:][dir/][file-list] |
```

@DK Designates Peripheral Expander disk device

unit Unit number (0 through 9). If a device is not specified, the expander disk unit 0 is used.

dir Directory name on disk; maximum of 15 alphanumeric characters. If a directory name is not specified, the default directory (see DEF utility described earlier in this subsection) is used.

file-list Optional file name list, separated by commas. If no file names are specified, the status of all files in the directory is displayed.

Examples:

The following example displays statistics for all files in directory COS on disk unit 0.

```
FSTAT @DK0: COS/
```

The following example displays statistics for files KERN1, KERN2, and KERN3 in directory IOS on disk unit 0.

```
FSTAT IOS/KERN1,KERN2,KERN3
```

The following example displays statistics of all files in directory MYDIR on disk unit 0.

```
FSTAT MYDIR/
```

The following example displays statistics for MYFILE in default directory on disk unit 0.

```
FSTAT MYFILE
```

2.2.4.14 INIT command

The INIT command calls the INIT utility to initialize the expander disk for IOS use. (To format the expander disk, see the FORMAT command.)

Format:

<pre><u>INIT</u> [vol] @MTunit:load-file @MTunit:dump-file.</pre>

@MT Designates Peripheral Expander tape device

vol Optional volume name; (maximum of 7 characters). If volume name is not specified, the default volume name is used (see DEF utility earlier in this subsection).

unit Unit number (0 through 9)

load-file Physical file number on tape for DISKLOAD file

dump-file Physical file number on tape for DMP file

The command calls the INIT utility to initialize the disk, and the system displays the following message:

```
@DK0:  WARNING - DATA WILL BE DESTROYED
*** RESPOND *** [RESUME, ABORT, RESTART] ***
```

Make sure the proper disk is in the drive and a tape containing the DISKLOAD and DMP files is mounted on the Peripheral Expander tape unit. Type RESUME @DK0 to start initializing. No action is taken if you enter ABORT @DK0 or RESTART @DK0. The disk is in use about 10 minutes as the disk pack is initialized. The tape unit is available after the DISKLOAD and DMP files are copied to disk.

Examples:

The following example initializes disk unit 0 from files 1 and 2 on tape unit 0 as volume name APDISK.

```
INIT APDISK @MT0:1 @MT0:2
```

The following example initializes disk unit 0 from files 1 and 2 as default volume name.

```
INIT @MT0:1 @MT0:2
```

2.2.4.15 PLOT command

The PLOT command calls the PLOT utility to transfer a file of plot data from expander disk or tape to the expander plotter.

Format:

```
| PLOT @MTunit:num[:NR][[@DKunit:]][dir/]file |
```

@MT	Designates that the file to be plotted is on a Peripheral Expander tape device
@DK	Designates that the file to be plotted is on a Peripheral Expander disk device
<i>unit</i>	Unit number (0 through 9). If a device is not specified, the expander disk unit 0 is used.
<i>num</i>	Physical file number on tape (0 through 9999)
NR	Optional no-rewind parameter for tape files
<i>dir</i>	Directory name on disk; maximum of 15 alphanumeric characters. If a directory name is not specified, the default directory (see DEF utility earlier in this subsection) is used.
<i>file</i>	File name on disk; maximum of 15 alphanumeric characters.

Examples:

The following example plots data in file number 5 on tape unit 0.

```
PLOT @MT0:5
```

The following example plots data in the file DATA in directory PLOT on disk unit 0.

```
PLOT PLOT/DATA
```

2.2.4.16 PROC command

The PROC command calls the PROC utility to execute a file of Kernel console commands from expander disk.

Format:

<pre><u>PROC</u> [<u>@DKunit:</u>][<u>dir/</u>]<u>file</u></pre>
--

@DK	Designates Peripheral Expander disk device
unit	Unit number (0 through 9). If a device is not specified, the expander disk unit 0 is used.
dir	Directory name on disk; maximum of 15 alphanumeric characters. If a directory name is not specified, the default directory (see DEF utility earlier in this subsection) is used.
file	File name on disk; maximum of 15 alphanumeric characters.

Examples:

The following example executes file COPY in directory MYPROCS on disk unit 0.

```
PROC @DK0:MYPROCS/COPY
```

The following example executes file DUMPTAP in default directory on disk unit 0.

PROC DUMPTAP

2.2.4.17 PRTAPE command

The PRTAPE command prints tape files that are already unblocked. PRTAPE interprets ASCII carriage return (15₈) and new-line (12₈) characters as end-of-line characters. Lines that are too long are wrapped around. Blanks are substituted for unprintable characters.

Format:

```
| PRTAPE ff [lf] |
```

ff Number of the first file to be printed

lf Number of the last file to be printed; the default is *ff*.

2.2.4.18 RENAME command

The RENAME command calls the RENAME utility to rename a file on expander disk.

Format:

```
| RENAME [@DKunit:][dir/]file  [@DKunit:][dir/]file |
```

@DK Designates Peripheral Expander disk device

unit Disk unit number (0 through 9). If a device is not specified, the expander disk unit 0 is used.

dir Directory name on disk; maximum of 15 alphanumeric characters. If a directory name is not specified, the default directory (see DEF utility earlier in this subsection) is used.

file File name on disk; maximum of 15 alphanumeric characters.

Examples:

The following example renames file COS1 in directory COS as COS2 in directory COS on disk unit 0.

```
RENAME @DK0: COS/COS1 COS/COS2
```

The following example renames file KERN1 in default directory as file KERN2 in IOS directory on disk unit 0.

```
RENAME KERN1 @DK0: IOS/KERN2
```

The following example renames MYFILE as file UFILE in default directory on disk unit 0.

```
RENAME MYFILE UFILE
```

2.2.4.19 UBTAPE command

The UBTAPE command unblocks a single, specified, blocked file on expander tape and sends it to the expander printer.

Format:

<pre><u>UBTAPE</u> <i>fn</i> [<i>fb</i> [<i>lb</i>]]</pre>
--

fn File number

fb First block in file to unblock and print; the default is 0, which is the first block in the file.

lb Last block in file to unblock and print; the default is the last block in the file.

2.2.5 MAINTENANCE COMMANDS

The commands described in this subsection are:

- CONFIG
- ERRDMP
- ERROR
- GETIME
- HELP
- LISTO
- LISTP
- SETIME

2.2.5.1 CONFIG command

The CONFIG Kernel command displays the status of configured peripheral devices. Use this command at any time to show which devices have been configured on an IOP.

Format:

<code>CONFIG [<i>iop</i>]</code>

iop Number of the IOP (0 through 3) to be displayed. The default is the number of the IOP attached to the console at which the command is entered.

NOTE

The CONFIG Kernel command described here and the CONFIGURE station command described in section 3 are not the same; they perform different functions.

The CONFIG command displays the following IOP configuration information:

- Identification of the device attached to each channel
- Composition of Local Memory:
 - Number of Disk Activity Links (DALs)
 - Number of 4000_g-parcel I/O buffers
 - Number of parcels allocated for overlays
 - Number of parcels of free memory

- Composition of Buffer Memory:
 - Total amount of Buffer Memory assigned to the IOP (in 512-word blocks)
 - Number of software stacks
- The channel number of the Kernel operator console for the IOP (displayed with an asterisk preceding the number)

2.2.5.2 ERRDMP command

The error log buffer is a circular 512-word buffer maintained in Buffer Memory. Each error logged on the error channel is entered into the error log buffer.

The most recent error of each type is kept in Local Memory along with a count of the total errors. The ERROR station command (section 3) displays the most recent data on the station console. If a more extensive error report is necessary, the error log buffer must be dumped with the ERRDMP command. The error log buffer is dumped to the printer in the same format used by the ERROR station command. The errors are dumped from most recent to least recent.

To dump the error log buffer, enter the ERRDMP command.

Format:

```
|
|  ERRDMP  |
|          |
|          |
```

2.2.5.3 ERROR command

The ERROR Kernel command (as distinguished from the ERROR station command in section 3) turns the Error Log channel in the MIOP on or off. The error channel is automatically turned off by the interrupt software when the number of errors received reaches a predefined limit.

To turn the Error Log channel in the MIOP on or off, enter the ERROR command.

Format:

```
|
|  ERROR ON|OFF  |
|          |
|          |
```


ON Allows interrupts on the Error Log channel

OFF Disables interrupts on the Error Log channel

2.2.5.4 GETIME command

To display the current date and time, enter the GETIME command at the MIOP console.

Format:

```
|  
| GETIME |  
|
```

After you enter the command, the console responds with the date and time in the following format:

mm/dd/yy hh:mm:ss

2.2.5.5 HELP command

The HELP command displays information for all Kernel commands.

Format:

```
|  
| HELP [cmd] |  
|
```

cmd Name of command for which help is desired. If null, all Kernel commands are listed. If not unique, all possible choices are listed.

2.2.5.6 LISTO command

The LISTO command prints a listing of all defined overlays in the system on the expander printer. The listing is helpful when analyzing a dump of the IOS software.

Format:

```
|  
| LISTO |  
|
```

An example of the first five lines of LISTO output follows:

No.	Ovl Name	Size	BM-Upr	BM-Lwr	No.	Ovl Name	Size	BM-Upr	BM-Lwr	No.	Ovl Name	Size	BM-Upr	BM-Lwr
00	AMAP	0460	00	017432	01	ACOM	2004	00	017546	02	AMSG	0520	00	020147
03	CALL	1214	00	020273	04	CARD	0240	00	020536	05	CDEM	1104	00	020606
06	CONFIG	1260	00	021027	07	CRAY	0750	00	021303	10	DISK	1604	00	021475
11	DISKIO	0474	00	022036	12	DKIOEX	0174	00	022155	13	ERRECK	1710	00	022214
14	HORPAG	1024	00	022576	15	HPLOAD	0460	00	023003	16	OBIT	0704	00	023117

2.2.5.7 LISTP command

The LISTP commands prints a list of all currently defined IOS halt codes on the expander printer. If the IOS detects an unrecoverable hardware error or an inconsistency in the software, it stops processing; all processors halt and display the following message at all Kernel consoles:

IOP - *n* HALT error code

n Processor that detected the error (0-3)

error code

Error code number (defined by LISTP)

Normally, dumping the IOS is advisable when an error halt occurs (for information about dumps, see appendix D).

Format:

```
|
|  LISTP
|
```

An example of the LISTP output follows:

<u>Code</u>	<u>Meaning</u>
000	No error code specified on \$PUNTIF macro
001	Local Memory error (always hardware)
002	Buffer Memory error on deadstart (always hardware)
003	Buffer Memory error (always hardware)
004	High-speed channel error (always hardware)
005	Invalid message received from CPU
006	Invalid parameter in disk request from CPU
007	Program was executing at location 0
010	Local Memory location 0 was overwritten
011	Undefined message received on IOP communication channel
012	Overlay does not exist

<u>Code</u>	<u>Meaning</u>
013	Station stack overflow or underflow
014	Local Memory buffer not available
015	Buffer Memory disk buffer not available
016	Invalid local buffer release call
017	Buffer Memory incorrectly configured
020	IOP message channels incorrectly configured
021	SMOD is too large for area in Buffer Memory
022	Invalid Local Memory address
023	Illegal interrupt program sequence code
024	Stop request received from CPU
025	Low-speed channel error (always hardware)
026	Block number validation trap
040	Block multiplexer interrupt processor error
041	Bad CRW address in Device Table
042	Block multiplexer start I/O error
044	Block multiplexer configuration error
050	DD-49 disk software
051	Debugger was not loaded
052	Bad Buffer Memory allocation request
053	Bad Local Memory address on high-speed I/O call
054	Invalid I/O length specified
055	No high-speed channel configured for request
056	Illegal activity activation requested
057	Buffer Memory DAL queue exhausted
060	Illegal Demon call
061	Undefined Kernel service request
062	Illegal Kernel service request
063	Bad Kernel service request parameter
064	Requested device not configured
065	Illegal IOP requested on Kernel service request
066	Requested queue full
067	Illegal I/O address specified
070	SMOD error
071	Local Memory space exhausted
072	Illegal overlay load requested
073	Corrupted Local Memory chain
074	Bad Local Memory release
075	Bad I/O parameter
076	Unexpected interrupt received
077	Disk error
100	AMAP not available for system initialization
101	Illegal overlay number read during initialization
102	IOP initialization error
103	Buffer Memory configuration error
104	Overlay too large for loading
105	Premature tape EOF encountered
106	Exit stack fault
111	Channel or buffer not configured
112	Path to memory not configured
113	Target memory not legal value

2.2.5.8 SETIME command

To set or reset the date and time, enter the SETIME command at the MIOP console.

Format:

<u>SETIME</u>

NOTE

Setting the IOP clock does *not* set the clock for COS unless the Cray mainframe is deadstarted again.

When the command is entered, the system checks whether a Peripheral Expander clock is configured and also checks the type of clock. If the clock is a Chronolog, the system displays the following message:

WARNING! CHRONOLOG MUST MANUALLY BE SET

Physically set the Chronolog using the device's setting controls.

If the clock is a Hayes or there is no clock, the system displays the following message:

ENTER DATE:

Enter the date in the format *mm/dd/yy*.

When the date has been accepted, the system displays the following message:

ENTER TIME:

Enter the time in the format *hh:mm:ss*.

If the write protect enable switch is set on the Hayes clock, the system displays the following message:

@CK0: NOT ENABLED

*** RESPOND *** [RESUME, ABORT, RESTART] ***

Reset the write protect enable switch and type RESUME @CK0 to set the date and time. If ABORT @CK0 or RESTART @CK0 is typed in, no changes are made to the clock setting.

3. STATION COMMANDS

Station commands let you control the station software, which executes under control of the Kernel software as described in section 2. Initialize station software with the STATION Kernel command.

After initializing the station software, you can enter the station commands. Stations require a unique LOGON ID to communicate with COS. Establish communication between COS and the station with the LOGON station command described in this section.

Through the station commands, you can get information about Cray system status, submit batch jobs to the Cray mainframe from the Peripheral Expander magnetic tape and disk units, and monitor the progress of jobs submitted.

Station software is controlled through station commands entered at a station console. See the CONSOLE command in this section for information about CONSOLE assignment to a station. See section 1 for additional information about station consoles.

The first part of this section describes the types of commands and conditions of entry. The second part of this section (on colored paper) contains individual station command descriptions.

3.1 DISPLAY FORMAT

The station software generates a 24-line (80 characters per line) display image on the screen (figure 3-1). The first line identifies the software version and the station flags (L, S, R, and M). The significance of L, S, R, and M is as follows:

- L Logged on
- S Staging on
- R Display refresh on
- M Message waiting

See the STMSG command for a description on how to handle messages waiting (M). Line 2 of the screen displays system messages.

Use the other display lines for displaying commands and system responses (full-screen scroll mode). Each command entered appears on the bottom line of the display. Entries are rolled up to the other lines and eventually disappear off the screen as responses and additional commands appear. The console can accept entries when > appears on the bottom line of the display screen. To clear the full-screen scroll mode, enter the CLEAR command or a status response command. To enable the full-screen scroll mode, enter the SCROLL command.

A set of system debug displays for use by the system analyst is described in the COS Operational Procedures Reference Manual, publication SM-0043. When you enter one of these commands, lines 3 through 20 are used to display the requested information. The fourth line from the bottom is normally unused in this case, and the three bottom lines of the display are available for command entry and response. Scroll mode is in effect only on the bottom three lines.

```

CRAY STATION  VERSION X.XX, IOS  L S R M          10/06/8X  14:43:02
-----
-----
-----

```

Display Area

```

-----
-----
>
>
>

```

Command/Response Area

Figure 3-1. Station Screen Format

3.2 COMMAND ENTRY

Station operation is controlled through station commands entered at the console keyboard. As each character is typed, it is placed in a type-ahead buffer. When the buffer is full, a bell rings. To execute the command, press RETURN. When the system is ready to process the next command, it rolls the response/entry lines up, displaying the current command on the bottom line. To purge the type-ahead buffer of all unprocessed keyboard input, press ESC (escape).

The bell also sounds if you press a character not recognized by the station or if you press DELETE on an empty line. To correct a typographical error, use the special keys editing functions described in table 3-1.

Table 3-1. Station Console Special Keys

Key	Function
+ or >	Rolls display forward one frame if entered as the first character of a line
- or <	Rolls display backward one frame if entered as the first character of a line
CONTROL-A	Recalls previous command, which may be edited by any subsequent keyboard input, and positions the cursor at the end of the command
CONTROL-I	Inserts a space
CONTROL-O	Deletes a character
CONTROL-S	Discards unprocessed keyboard input and interrupts command file processing
CONTROL-U	Deletes the entire entry line
CONTROL-X	Recalls previous command and initiates the command (equivalent to a CONTROL-A and a RETURN)
ESC	Discards unprocessed keyboard input and refreshes the entire screen
RETURN	Initiates the command

Table 3-1. Station Console Special Keys (continued)

Key	Function
RUBOUT or DEL	Backspaces and erases one character on the entry line
←	Moves cursor left one character; nondestructive.
→	Moves cursor right one character; recalls previous command one character at a time.
HOME	Moves cursor to start of line

3.3 STATION COMMAND DESCRIPTIONS

The station commands are described in alphabetical order (one to a page) on the colored pages in this section. Each description includes the function the command performs, its entry format and parameters, and the type of console at which the command is available. (For information on command format and the conventions used, see subsection 1.5.)

Some station commands can be entered at any station, while others can only be entered at the master operator station (see the Station Software description in section 2). All station commands must be followed by a RETURN. Table 3-2 summarizes (by command type) the IOS station commands and the console at which they can be used. In the table, the following abbreviations indicate the type of console to be used for command entry:

- AC Command can be entered at any IOS station console
- MC Command can be entered only if the IOS station is the master operator station
- ALL Command can be entered at any IOS station console, but if the console is the master operator station, the command can control communications between the Cray mainframe and all stations in the Cray computer system, not just between the IOS station and the mainframe.

Table 3-2. Station Commands

Type	Command	Console	Function
Activation	CONSOLE	AC	Adds another MIOP console to the station software
	IACON	MC	Initializes the console as an interactive station console
	LOGON	AC	Establishes communications between an IOS station and COS
Automatic Volume Recognition	TLINK [†]	MC	Links any tape that is already premounted to a user's request for a scratch tape
Command Control	@filename@	AC	Invokes the expander disk drive command file
	DELAY	AC	Suspends processing of a command for a specified time
	PAUSE	AC	Interrupts command-file processing and reads commands from the console keyboard
Dataset Staging	SAVE	AC	Queues a file for staging to Cray mass storage, where the file is made a permanent dataset
	STAGE	AC	Halts or resumes initiation of dataset staging between Cray mass storage and the IOS station
	SUBMIT	AC	Queues a file for staging to Cray mass storage, where the dataset is entered into the job input queue

[†] TLINK is available only on systems using automatic volume recognition (AVR). AVR is a site selectable feature that gives operators control of tape drive selection and tape mounting. See the COS Internal Reference Manual, Volume II: STP, publication SM-0141, for detailed information.

Table 3-2. Station Commands (continued)

Type	Command	Console	Function
Deactivation	END	AC	Terminates console operation (and logs off if there are no other active consoles)
	LOGOFF	AC	Terminates communications between an IOS station and COS
Device Configuration Display	RSTAT	AC	Displays current information on generic resource availability and use
	TAPE	ALL	Displays configuration information for each tape device
Device Configuration Modification	CONFIGURE	MC	Alters the status of a tape device, channel, or control unit
Display Format	CLEAR	AC	Clears status display area of screen
	COMMENT	AC	Allows you to enter comments into the screen display area
	REFRESH	AC	Sets the interval between screen updates
	SCROLL	AC	Changes the entire display area to a command/response area
	SNAP	AC	Copies the display screen image to a line printer
Error Log Table Display	ERROR	AC	Displays information from the error Log Table if errors are sensed
Front-end Monitoring	CONC	ALL	Monitors Concentrator Table information for a specified concentrator
	LPATH	ALL	Displays NSC/FEI/VME logical path

Table 3-2. Station Commands (continued)

Type	Command	Console	Function
Job Commencement	RECOVER	MC	Lifts suspension from jobs suspended by a SHUTDOWN or system interruption
	RELEASE	ALL	Releases a dataset which has been put into the HOLDING state
	RESUME	MC	Reschedules for processing jobs that were suspended by the SUSPEND or SHUTDOWN commands
Job Communication	MSG	MC	Sends unsolicited operator message to a job
Job and Dataset Status	DATASET	AC	Displays dataset status message
	JOB	ALL	Displays job status message
	JSTAT	ALL	Displays extended status information for a job
	STATUS	ALL	Displays status of all jobs in job input queue, datasets in output staging queue, and all executing jobs known to COS
	TJOB	ALL	Displays status of all jobs using generic resources, including those on the input, output, and executing queues
Job Execution	LIMIT	MC	Sets the maximum number of jobs that COS can process at one time
	SWITCH	ALL	Sets or clears a job sense switch
Job Identification	ROUTE	MC	Reroutes datasets intended for disposition at one station to another station by changing the job source ID or dataset destination ID

Table 3-2. Station Commands (continued)

Type	Command	Console	Function
Job Scheduling	CLASS	MC	Turns job class or classes on or off
	DSPL	ALL	Displays a CPU-formatted screen
	ENTER	ALL	Changes parameters associated with a job or queued dataset
	STATCLASS	AC	Displays status of defined job classes for current job class structure
Job Termination	DROP	ALL	Immediately ends processing of job at the Cray mainframe but does not delete output datasets
	KILL	ALL	Depending on the status of the job, either deletes the job input dataset from the input queue (if processing has not yet begun), terminates processing (if processing has begun), or deletes an output dataset from the output queue
	RERUN	ALL	Immediately ends processing of job at the Cray mainframe and reruns the job if it can be rerun; if not rerunnable, command is rejected.
	SHUTDOWN	MC	Idles down job activity as part of the system deactivation process
	SUSPEND	MC	Suspends processing of one or more jobs
	TCLEAR	MC	Resolves an internal deadlock that caused a tape job to become hung
Link Control	CHANNEL	MC	Turns Cray mainframe I/O channel on or off. Also turns IOP channel on or off.

Table 3-2. Station Commands (continued)

Type	Command	Console	Function
Link and Station Status	POLL	AC	Sets the rate at which control messages are exchanged with the Cray mainframe if no staging is in progress
	STREAM	ALL	Changes link activity by changing the number of input and output streams defined for a link
	DEFAULT	AC	Sets or displays default device, volume, and directory attributes for devices used for station staging operations
	LINK	ALL	Displays the status of the link between the station and the mainframe
	STATION	AC	Displays station console status
	STRSTAT	AC	Displays information for individual station streams
Log file Messages	MESSAGE	ALL	Enters message into the job log file, system log file, or both
Operator Aids	HELP	ALL	Displays helpful information for Station, Kernel, or Interactive commands
Peripherals Control	FLUSH	MC	Copies data from a volatile device to a permanent mass storage device
	RESTORE	MC	Places data on preemptable generic resource, or reinstates device availability
	SWEEP	MC	Removes data from preemptable generic resource, or turns off device availability
Peripherals Status	DISK	AC	Initiates the disk statistics display

Table 3-2. Station Commands (continued)

Type	Command	Console	Function
Station Identification	DKERR	AC	Displays detailed disk error status
	STORAGE	AC	Initiates mass storage status display
	SWAP	MC	Displays information on the availability of swap space for preemptable generic resources
	UNLOAD	MC	Unloads a premounted tape from the tape drive and rearms the drive for another mount
	OPERATOR	AC	Changes the ID of the master operator station
Station Messages	SET	AC	Modifies the default value associated with station's ID and TID parameters
	REPLY	ALL	Replies to a specific station message
	STMSG	ALL	Displays station messages
System Status	MONITOR	AC	Monitors specified aspects of COS or IOS
	STP	AC	Displays statistics on the COS System Task Processor (STP)

@filename@ - COMMAND FILE CALL

FUNCTION: Directs the station to read commands from a file on the expander disk drive

The station processes commands from the file specified (as described below) until another command file is invoked, an end-of-file is encountered, or an I/O error has occurred. Command file processing is interrupted if a CONTROL-S is entered at the keyboard, if a PAUSE command is encountered, or if an error is detected while processing a command. To resume command file processing, enter a null line as the next command.

Commands are echoed on the console screen (preceded by a colon) as they are read from the file.

FORMAT:

@[<i>dir</i> /] <i>filename</i> [@]

dir Directory name, maximum of 15 alphanumeric characters. If *dir* is not specified, the current station default directory is used (see DEFAULT command).

filename File name, maximum of 15 alphanumeric characters

AVAILABILITY: No prerequisites

CHANNEL - TURN CHANNEL ON OR OFF

FUNCTION: Enables or disables the specified front-end interface

If the CHANNEL command specifies a mainframe front-end interface channel, the channel is enabled or disabled.

If the CHANNEL command specifies an IOS channel, the ordinal associated with the channel is enabled or disabled. In addition, COS sends a request to the IOS to initiate or terminate an activity associated with the ordinal.

The CHANNEL command is performed automatically during COS startup for at least one channel (typically the maintenance control unit (MCU)), and optionally for other channels.

FORMAT:

```
| CHANNEL,channel,[ordinal],ON|OFF |
```

channel Number of the channel pair; decimal number in the range 1 through 12 (4 through 7 for CRAY X-MP computer systems). Contact a CRI representative for specific channel assignments.

ordinal Ordinal associated with the IOS channel pair; decimal number in the range 0 through 255. If not specified, the default is 0. Contact a CRI site analyst for specific channel ordinal assignments.

ON If the channel is for a front-end interface, it turns on the channel; if it is for an IOS channel, it enables the ordinal and initiates CONC,*ordinal* processing on the IOS.

OFF If the channel is for a front-end interface, it turns off the channel; if it is an IOS channel, it disables the ordinal and initiates ENDCONC,*ordinal* processing on the IOS.

AVAILABILITY: Available only at the logged-on master operator console

CLASS - TURN JOB CLASSES ON OR OFF

FUNCTION: Turns the specified job class or all job classes on or off. Jobs in a class that are turned off do not initiate until that class is turned on.

FORMAT:

<u>CLASS</u> , <u>ALL</u> <i>jcl</i> , <u>ON</u> <u>OFF</u>

ALL Turns all job classes on or off

jcl Name of job class to be turned on or off; 1 through 7 characters.

ON Turns on the job class or classes

OFF Turns off the job class or classes

NOTE

If any classes are OFF when a CLASS,ALL,OFF occurs, a CLASS,ALL,ON turns on all but those classes.

AVAILABILITY: Available only at the logged-on master operator station

CLEAR - CLEAR SCREEN

FUNCTION: Clears status display area of screen

FORMAT:

CLEAR

AVAILABILITY: No prerequisites

COMMENT - COMMAND STREAM COMMENT

FUNCTION: Lets you enter comments (such as information from the command/response area) into the display area so that they can be included in a printed copy of the display. COMMENT is usually used prior to a SNAP command.

FORMAT:

<u>COMMENT</u> [, <i>text</i>]

text Arbitrary character string limited by the line length

AVAILABILITY: No prerequisites

CONC - MONITOR A CONCENTRATOR'S ACTIVITY

FUNCTION: Monitors Concentrator Table information for a specified concentrator. This display provides information relating to the status of the concentrator, associated logical front-end I/O, and current input and output link control package (LCP) information.

FORMAT:

```
|_____|  
| CONC[,ord] |  
|_____|
```

ord Ordinal number

AVAILABILITY: Available at any logged-on station

EXAMPLE 1 (NSC display): CONC 15

IOP NSC Front End Monitor

Ordinal: 15	FET Address: 107044	Errors:	
Station ID: SX	RWP Address: 106650	Read -	0
Status: Waiting For Input	Trunk Address: 13	Write -	1

MN = 58	MC = 11	MSC = 0	MN = 58	MC = 11	MSC = 0
Input SCBs			Output SCBs		
OP			OP		
1	IDL/IDL		1	IDL/IDL	
2	IDL/IDL		1	IDL/IDL	
3	IDL/IDL		1	IDL/IDL	
4	IDL/IDL		1	IDL/IDL	
5	IDL/IDL		1	IDL/IDL	
6	IDL/IDL		1	IDL/IDL	
7	IDL/IDL		1	IDL/IDL	
8	IDL/IDL		1	IDL/IDL	

CONC - MONITOR A CONCENTRATOR'S ACTIVITY (continued)

EXAMPLE 2 (FEI display): CONC,3

IOP Concentrator Monitor

Concentrator Ordinal: 3 Status: Waiting for Input Current Station ID:

Current Input LCP

MN = 0 MC = 0 MSC = 0 ID:

SCBs

OP

1	IDL/IDL
2	IDL/IDL
3	IDL/IDL
4	IDL/IDL
5	IDL/IDL
6	IDL/IDL
7	IDL/IDL
8	IDL/IDL

Current Output LCP

MN = 0 MC = 5 MSC = 0 ID:

SCBs

OP

1	IDL/IDL
1	IDL/IDL
1	IDL/IDL
1	IDL/IDL
1	IDL/IDL
1	IDL/IDL
1	IDL/IDL
1	IDL/IDL

CONFIGURE - ALTER DEVICE CONFIGURATION

The CONFIGURE command is used to alter the status of a device. The devices that can be changed by CONFIGURE are described in the following order:

- Tapes
- Disks
- CPUs
- Stations
- BMX channels and control units
- SSD channels
- User channels
- ISP channel
- SUPERLINK channel
- Automated tape loaders

TAPE

FUNCTION: Alters the status of a tape device.

FORMAT:

```
CONFIGURE,DVN=dvn[,AVAIL|NAVAIL][,RDONLY|RDWRT]
[,UP|DOWN][,KEEP|KEEP=vs|NOKEEP]
```

DVN=dvn	Device name; 1 through 8 ASCII characters.
AVAIL	Device belongs to Cray mainframe and can be used
NAVAIL	Device belongs to another mainframe and cannot be used
RDONLY	Device is in read-only mode.
RDWRT	Device can be written to and read from
UP	Device is logically available to the system
DOWN	Device is logically unavailable to the system. If a tape is premounted, unload the tape before the device is powered down.

CONFIGURE - ALTER DEVICE CONFIGURATION (continued)

FORMAT:
(continued)

KEEP	Keep the volume premounted on this drive after it is released by the user job.
KEEP=<i>vs</i><i>n</i>	Keep the volume specified by the <i>vs</i> <i>n</i> (volume serial number) premounted on this drive after it is released by the user job. Use this command form to specify the <i>vs</i> <i>n</i> on systems not using automatic volume recognition (AVR).
NOKEEP	Clear the Keep status for the device. This status is also cleared by any action that causes the tape to be unloaded by the system, such as an UNLOAD command, a volume switch, or a volume reject due to an error.

DISK

FUNCTION: Alters the status of a disk device by changing the device characteristics as described in the Equipment Table (EQT).

FORMAT:

```

| CONFIGURE, DVN=dvn[ , AVAIL | NAVAIL ] [ , RDONLY | RDWRT ]
|
| [ , RBN=Y | N ] [ , SCR=Y | N ] [ , VOL=N ] [ , CTL=N ] [ , WDL=Y | N ]
|
| [ , SYSTEM | MAINT ] [ , STK=stk, NTK=ntk ]
|

```

DVN=<i>dvn</i>	Device name; 1 through 8 ASCII characters.
AVAIL	Device is present and can be used
NAVAIL	Device is not present or is unusable
RDONLY	Device is in read-only mode; no space is allocated on this device.
RDWRT	Device is in read-write mode; space can be allocated on this device.
RBN=Y	Device must be requested by name; space is allocated on this device only if you specifically request it.
RBN=N	Device need not be requested by name

CONFIGURE - ALTER DEVICE CONFIGURATION (continued)

FORMAT: (continued)	SCR=Y	Device is scratch only; no datasets can be saved on this device.
	SCR=N	Device is not scratch only
	VOL=N	Device is not a volatile device
	CTL=N	Device is not a controlled device
	WDL=Y	Write device label
	WDL=N	Do not write device label
	SYSTEM	Return the device from maintenance mode to system mode
	MAINT	Place the device in maintenance mode. All datasets on the device are moved to other devices.
	STK= <i>stk</i>	Starting track number (in octal) for a logical device. Used when defining more than one logical device on a physical device. The Master Device cannot be defined on a logical device unless that device starts on track zero. Default is to start at physical track 0.
	NTK= <i>ntk</i>	The number of tracks (in octal) present on the logical. Must be specified if STK is specified. The value of STK+NTK cannot exceed the maximum number of tracks available on the device type defined. (To determine the maximum number of tracks, refer to the "Maximum Tracks for Mass Storage Devices" table described in the Equipment Table (EQT) Macro subsection in the COS Operational Procedures Reference Manual, CRI publication SM-0043.)

CONFIGURE - ALTER DEVICE CONFIGURATION (continued)

CPU

FUNCTION: Alters the status of a CPU. When the system is deadstarted, all available CPUs are configured UP. The CONFIG CPU command lets you change the status of each CPU in the system. The system may not be configured so that all CPUs are unavailable; at least one CPU must be in the UP state at all times.

FORMAT:

```
| CONFIGURE, DVN=cdvn, CPU=cpun[, UP|DOWN] |
```

DVN=cdvn The name of the CPU entry in the CNT

CPU=cpun CPU number 0 through n

UP Makes CPU available for scheduling

DOWN Makes CPU unavailable for scheduling

STATIONS

FUNCTION: Determines which stations may communicate with the Cray mainframe and, optionally, where they may come in from (by using the NSC, FEI, or VME parameter). This command is only valid if the I@FIT installation parameter is nonzero. If I@FIT is nonzero, then the front-end connections can be configured ON or OFF in the restart file or by the master operator after startup.

FORMAT:

```
| CONFIGURE, ID=id, [NSC=xyyy|FEI=ch|VME=ch,][ON|OFF] |
```

ID=id Two-character front-end station identifier

NSC=xyyy Configures the station to communicate over the NSC HYPERchannel from the remote adapter address xx and logical path yy (specified in hexadecimal). Valid only when ON is selected.

CONFIGURE - ALTER DEVICE CONFIGURATION (continued)

FORMAT: FEI=*ch* Configures the station to communicate over a Cray FEI connection to the IOS on channel number *ch*. Valid only when ON is selected.

(continued)

VME=*ch* Configures the station to communicate over a VME (FEI-3) connection to the IOS on channel number *ch*. Valid only when ON is selected.

ON Allows the station to communicate with mainframe.

OFF Does not allow the station to communicate with the mainframe.

EXAMPLES: CONF,ID=IC,FEI=10,ON

This example turns on and enables station security for the IC station, and allows it to communicate over FEI channel 10.

CONF,ID=IC,ON

This example turns on the IC station with station security disabled.

CONF,ID=IC,OFF

This example turns off the IC station.

AVAILABILITY: Available only at the logged-on master operator station

BMX CHANNEL AND CONTROL UNIT

FUNCTION: Alters the status of a Block Multiplexor (tape) channel or control unit. It allows the status of the channel or control unit to be changed and may affect all devices connected to that channel or control unit. To configure a control unit, all attached tape devices must be configured DOWN.

CONFIGURE - ALTER DEVICE CONFIGURATION (continued)

FORMAT:

```
| CONFIGURE, ICH1=ch[:cu] [, IOP=iopid] , ON | OFF |
```

ICH1=*ch[:cu]*

IOP channel number descriptor

ch Number of the IOP channel; must be 2 octal digits between 20 and 37.

cu Controller unit connected to the specified IOP channel; must be a single hexadecimal digit 0 through 9 or A through F.

IOP=*iopid* IOP identifier specifying to which IOP the channel is connected. Must be a single digit, 0 through 3, 3 (XIOP) is the default.

ON Channel (if specified alone) or control unit (if both channel and control unit are specified) is logically available to the system

OFF Channel (if specified alone) or control unit (if both channel and control unit are specified) is logically unavailable to the system. The status of any devices connected to the channel or control unit may also be affected.

SSD CHANNEL

FUNCTION: Alters the status of the SSD channels. Channels may be turned on and off at will so long as the SSD is marked AVAIL at deadstart in the EQT. If the SSD is marked NAVAIL in the EQT at deadstart, this command is not accepted.

FORMAT:

```
| CONFIGURE, DVN=sdvn, CH[=ch:ch] [, ON | OFF ]
```

CONFIGURE - ALTER DEVICE CONFIGURATION (continued)

FORMAT: DVN=*sdvn* The name of the SSD device in the EQT
(continued)

CH=*ch:ch* Channel numbers. If CH appears without arguments, all channels to the SSD are affected; otherwise, only the specified channels are affected.

ON Make channel available

OFF Make channel unavailable

USER CHANNELS

FUNCTION: Turns a user channel on or off. User channels are those MIOP channels configured as TYPE=UC. They can be driven by privileged user jobs through the DRIVER system request macro. A user channel (or a pair of them) is identified by a unique ASCII name.

FORMAT:

CONFIGURE,DT=UC,DVN= <i>dvn</i> ,ON OFF

DT=UC Device type; UC indicates a user channel.

DVN=*dvn* Device name; 1 through 7 ASCII characters. Must match the name configured in the User Driver Table (UDT) in STPTAB.

ON Turns channel on

OFF Turns channel off. Once this is accepted, COS prevents any I/O requests for this channel from being sent to the IOP.

CONFIGURE - ALTER DEVICE CONFIGURATION (continued)

ISP

FUNCTION: Turns an ISP channel on or off. Each ISP channel is identified by a unique ASCII name.

NOTE

ISP channels are driven by the COS task IQM using the user channel interface. ISP channels are configured in the MIOP as user channels (TYPE=UC). Therefore, to enable an ISP channel, it must be turned on both as a user channel and as an ISP channel. The recommended practice is to configure ISP channels ON in the UDT entry and use only the DT=ISP command to turn them off or on.

FORMAT:

<code>CONFIGURE,DT=ISP,DVN=dvn,ON OFF</code>
--

DT=ISP	Device type; ISP indicates an ISP channel.
DVN=dvn	Device name; 1 through 7 ASCII characters. Must match the name configured in the UDT and the ISP Link Table (ILT) in STPTAB. (The name must be the same in both tables.)
ON	Turns channel on
OFF	Turns channel off. Once this is accepted, COS stops sending any I/O requests to the IOP for this channel.

CONFIGURE - ALTER DEVICE CONFIGURATION (continued)

SUPERLINK

FUNCTION: Turns a SUPERLINK channel on or off. Each SUPERLINK channel is identified by a unique ASCII name.

FORMAT:

```
| CONFIGURE,DT=SL2,DVN=dvn,ON|OFF |
```

DT=SL2 Device type; SL2 indicates a SUPERLINK channel

DVN=dvn Device name, 1 through 7 ASCII characters

ON Turns channel on

OFF Turns channel off. Once this is accepted, COS prevents any I/O requests for this channel from being sent to the IOP.

AUTOMATED TAPE LOADERS[†]

FUNCTION: Alters the status of an automated tape loading system. This may affect the status of all the tape devices associated with the autoloader.

FORMAT:

```
| CONFIGURE,LDR=ldr [,UP|DOWN|MANUAL] |
```

LDR=ldr Loader name, 1 through 7 ASCII characters.

UP Allows the loader to be used for tape mounts and dismounts.

DOWN Disables the loader and all its associated tape drives.

MANUAL Disables the loader but allows its drives to be used with manual mounts and dismounts.

[†] Implemented in a future release of the IOS.

CONFIGURE - ALTER DEVICE CONFIGURATION (continued)

EXAMPLES: CONF, LDR=ACS0,MANUAL

This example disables the automated loader ACS0, but allows operators to use its tape drives via manual loading and unloading of volumes.

CONSOLE - ALLOCATE ADDITIONAL STATION CONSOLE

FUNCTION: Allocates another console to station software control

The new console shares a LOGON ID with the originating console; therefore, a LOGON or LOGOFF entered at either console initiates or terminates communications with COS for both consoles. An END command at one console, however, releases that console from station control without affecting other consoles.

When you enter the CONSOLE command, the following message displays at the console being added.

CRAY STATION, VERSION 1.xx

xx is the version of the station

FORMAT:

CONSOLE, <i>num</i>

num Console designator (0 through 2). Contact a CRI representative for the console configuration.

AVAILABILITY: Station must be initialized

DATASET - DISPLAY DATASET STATUS

FUNCTION: Returns the following dataset status message in the command/response area:

COS DATASET *pdn* WITH ID=*userid* ED=*ed* AND OWN=*ov*

DOES EXIST|NOT EXIST

FORMAT:

<u>DATASET</u> , <i>pdn</i> [, <i>userid</i>][, <i>ed</i>][, <i>ov</i>]
--

pdn Name of permanent dataset for which status is requested; 1 to 15 characters.

userid User ID of permanent dataset for which status is requested; 1 to 8 alphanumeric characters. If not specified, null is used.

ed Edition number of requested dataset; 1 to 4095. If *ed* is not specified, the status of the current highest edition number is returned. If *ed* is nonzero, the status of the requested edition is returned.

ov Owner of the permanent dataset; 1 to 15 alphanumeric characters. If this parameter is omitted, the default ownership value is selected.

AVAILABILITY: Available at any logged on station

DEFAULT - SET AND/OR DISPLAY STAGING DEVICE DEFAULTS

FUNCTION: Sets or displays the default device, volume, and directory attributes for devices used for station staging operations: ACQUIRE, FETCH, and DISPOSE from the mainframe; SUBMIT and SAVE from the station. To display the current default, enter the command without supplying a value. The current attribute values of the default station device appear on the STATION display.

FORMAT:

```
| _____ |  
| DEFAULT, DEVICE | VOLUME [,vol] | DIRECTORY [,dir] |  
| _____ |
```

DEVICE The default is always the expander disk unit and cannot be changed.

VOLUME [,vol]
 Lets you reference a new default volume name for the expander disk. vol represents the pack ID; 1 to 7 characters.

DIRECTORY [,dir]
 Lets you reference a new default directory name for expander disk; 1 to 15 characters.

AVAILABILITY: Available at any logged on station

NOTE

This station command should not be confused with the DEF utility command (see section 2). The two commands control different environments.

DELAY - SUSPEND COMMAND PROCESSING

FUNCTION: Suspends command processing for the time interval specified

Processing of the next command entered by the operator can be delayed through the DELAY command. For example, a DELAY command issued between STATUS and STORAGE commands allows the STATUS display to be viewed for a period of time before the STORAGE display is initiated.

FORMAT:

<u>DELAY</u> , <i>sec</i>

sec Number of seconds (1 to 60) the processing of the next command is delayed

AVAILABILITY: No prerequisites

DISK - DISPLAY DISK STATISTICS

FUNCTION: Initiates the disk statistics display

FORMAT:

<u>DISK</u> [,iop]

<i>iop</i>	IOP number:
	1 BIOP (default)
	2 IOP 2
	3 IOP 3 Only if DIOPs

In addition to the number of outstanding disk requests in the system, the following information about each disk on the indicated IOP is returned (entries are in decimal unless otherwise specified):

- Channel number (octal)
- Device type:
 - DD19
 - DD29
 - DD39
 - DD40
 - DD49
- Current disk status:

ER-READ	Error recovery on a read
ER-SEEK	Error recovery on a seek
ER-WRT	Error recovery on a write
ERROR	Error recovery scheduled
HEADSEL	Head select taking place
IDLE	Available for use
R.A.	Read ahead taking place
READ	Read from disk taking place
SEEK	Seek taking place
W-BUFF	Waiting for local buffer
W-DATA	Waiting for data
WRITE	Write to disk taking place
- Currently selected unit number (octal)
- Current cylinder and head (octal) or DESELECT if disk is deselected

DISK - DISPLAY DISK STATISTICS (continued)

FORMAT:
(continued)

- Number of sectors read on this device
- Number of sectors written on this device
- Number of read requests satisfied by data in a read-ahead buffer
- Total number of errors on this device
- Number of unrecoverable errors on this device

AVAILABILITY: No prerequisites

EXAMPLE: DISK 2

IOP-1 DISK DISPLAY									
OUTSTANDING DISK REQS:				11		FRAME 0			
CHAN	TYPE	STATUS	CURRENT		SECTORS ACCESSED			ERRORS	
			UNIT	CYL/HD	READS	WRITES	R.A.	TOTAL	UNREC
20	DD40	READ	0	32/15	32303629	153600	0	397	0
21	DD40	READ	0	1764/ 5	32297842	153600	0	0	0
22	DD40	IDLE	0	2066/14	15962972	7748811	0	36	2
23	DD40	READ	0	2036/ 4	16993345	8016000	0	5	0
24	DD39	IDLE	DESELECT		53597	41163	13494	0	0
25	DD49	WRITE		166/ 1	72335	67158	51000	0	0
26	DD49	IDLE		706/ 6	858039	527072	62224	0	0
27	DD49	IDLE		1467/ 1	146765	140399	12357	0	0
30	DD49	IDLE	DESELECT		43	0	0	0	0
31	DD49	IDLE		1337/ 7	525053	885691	15223	2	0
32	DD49	IDLE		1016/ 3	199655	153534	30182	0	0
33	DD49	IDLE	DESELECT		0	0	280	0	0

DKERR - DISPLAY DISK ERRORS

FUNCTION: Initiates the disk error display; will display approximately the last 25 disk error packets sent to be logged in the mainframe. The message formats are described in appendix I.

FORMAT:

```

| DKERR, [iop] |
|               |

```

iop IOP number:
 1 BIOP (default)
 2 IOP 2
 3 IOP 3 Only if DIOPs

AVAILABILITY: No prerequisites

EXAMPLE: DKERR

```

                        Disk error display for IOP 1    Frame 0
OUTSTANDING DISK REQS:        3                                FRAME 0

15:24:32 DD29 CHN 24 IDERR SK REC RTR    1 CYL    0 HED 0 SEC    21
          FLT        0 INL        0

15:29:13 DD39 CHN 33 UNT 0 WRIT WRIT REC RTR 3 CYL    10 HED 2 SEC    1
          CTL       611 GEN       5400 FCT       401 FGE    1400 FFC= *****
          C3M       0 C3O        0 C2M        0 C2O        0 OES= BUSY    FES= OK
          C1M       0 C1O        0 COM        0 C0O        0 EXP        0 ACT        0
          S00    15400       6400       1000    70000        0

15:30:52 DD29 CHN 24 INTLK WR UNR RTR    0 CYL    15 HED 1 SEC    20
          FLT        0 INL        0

15:32:56 DD49 CHN 21 SLCT SLCT REC RTR    1 CYL    0 HED 3 SEC    0
          CTL    52200 GEN 177777 FCT    52003 FGE        0 FFC= ***** VSF        0
          B2M       0 B2O        0 B1M        0 B1O        0 OES= TOUT    FES= OK
          A2M       0 A2O        0 A1M        0 A1O        0 EXP        0 ACT        0
          S00 177777 177777 177777 177777 S04 177777 177777 177777 177777
          S08 177777 177777 177777 177777 S12 177777 177777 177777 177777
          S16 177777 177777 177777 177777 S20 177777 177777 177777 177777

```

End of data

DROP - DROP JOB

FUNCTION: Ends processing of job at the Cray mainframe but saves output dataset associated with the job. DROP causes the job to be aborted. Job execution continues with control statements encountered after the next EXIT control statement, if one exists. To drop a range of jobs, use form 2 (the blanks surrounding the hyphen are required).

FORMATS:

<u>DROP</u> , <i>jsq</i> ₁ , <i>jsq</i> ₂ ... <i>jsq</i> _n	form 1
<u>DROP</u> , <i>jsq</i> ₁ - <i>jsq</i> _n	form 2

*jsq*_n Job sequence number (JSQ) or range of job sequence numbers identifying the jobs or datasets; it is obtained through the STATUS command. The number of parameters that can be entered with this command is limited only by the line length.

AVAILABILITY: Available at any logged on station. You can drop any job running in the Cray computer system at the master operator station. At other stations, you can only drop jobs with the same station ID as the one where the DROP command is entered.

DSPL - DISPLAY A CPU FORMATTED SCREEN

FUNCTION: Initiates the display of a screen that is built by the CPU. Displays are used to monitor Job Scheduler activity levels and general performance. For more information concerning these displays, consult a CRI representative.

FORMAT:

<u>DSPL</u> , <i>ds</i>

ds Two-character display name (ASCII); valid display names are determined by the CPU. If an invalid display name is entered, a help screen is displayed showing the valid display names. A list of valid display names and their descriptions follow:

CS	Configured stations
GC	JSH CPU scheduling
GR	JSH requests
GS	Guest operating system status
GT	JSH tuning parameter values
QC	JSH CPU queue
QE	JSH event queue
QM	JSH memory request queue
QS	JSH Suspend queue
SC	JSH CPU assignments
SI	SUPERLINK IPC connections
SL	SUPERLINK buffer status
SO	SUPERLINK IPC servers
SP	SUPERLINK path display
SQ	SUPERLINK queued transport users
ST	SUPERLINK transport connections
TA	Tape activity
TE	Tape errors
TS	Tape status

AVAILABILITY: Available at any logged-on station

END - END STATION OPERATION

FUNCTION: Terminates operation of the console where the command is entered. If this console is the only console operating under the station software, the station software is logged off and terminated, otherwise only this console is terminated. (See the LOGOFF command.)

FORMAT:

<u>END</u>

AVAILABILITY: No prerequisites

ENTER - CHANGE JOB SCHEDULING PARAMETERS

FUNCTION: Changes parameters associated with a job or its queued dataset

FORMAT:

<code>ENTER, <i>jsq</i>, TIME, <i>tl</i> PRIORITY, <i>pri</i> ID, <i>id</i> [, <i>tid</i>] CLASS, <i>jcl</i></code>

jsq Job sequence number (JSQ) identifying the job to COS; obtained through the STATUS command.

TIME Assigns a new time limit to a job; can cause a change in priority and/or class assignment if the job is in the input queue.

tl New time limit; 0 through 16777215.
The time limit is a decimal count of the maximum number of seconds the job is allowed to execute in the Cray mainframe.

PRIORITY Assigns a new priority to a job or an output dataset (can cause a change in class assignment if the job is in the input queue). If a job is using preemptable generic resources, this command causes the system to attempt to realign a swap space allocation. If the realignment is not possible, an indicator is set on the RSTAT GN *grn* display. (For more information, see the COS Operational Procedures Reference Manual, publication SM-0043.)

pri New priority; decimal number in the range 0 through 15.

ENTER - CHANGE JOB SCHEDULING PARAMETERS (continued)

FORMAT: ID Changes station ID and, optionally, the terminal ID for the job or output dataset; can cause a change in class assignment if the job is in the input queue.
(continued)

id New station ID; 2 alphanumeric characters.

tid New terminal ID; optional; 1 to 8 characters. If *tid* is not specified, null is entered as the new terminal ID. (TID does not serve a function at the IOS station.)

CLASS Assigns a new job class if the job is in the input queue. This action may cause a change in priority.

jcl New job class; 1 to 7 characters.

AVAILABILITY: Available at any logged on station. You can change parameters for any job in the Cray computer system from the master operator station. At other stations, you can only change parameters for jobs with the same station ID as the one where the ENTER command is entered.

ERROR - DISPLAY HARDWARE ERROR INFORMATION

FUNCTION: Displays information from the IOS Error Log Table if errors are sensed

FORMAT:

```
|_____|
|  ERROR  |
|_____|
```

The information is collected through the Error Log channel on the MIOP. The following kinds of errors are displayed:

- Local Memory of each IOP (all uncorrectable errors)
- Buffer Memory (correctable and uncorrectable errors)
- Cray mainframe Central Memory (correctable and uncorrectable errors)
- 100-Mbyte/s channel (input and output errors)

Following is a description of the entries in the error display:

<u>Entry</u>	<u>Significance</u>
ERROR CHANNEL	ON/OFF
	ON Error interruption occurs
	OFF No interruption if errors
TYPE	Type of error. Only the most recent occurrence of an error of each type is displayed:
	IOP-0 MIOP
	IOP-1 BIOP
	IOP-2 DIOP
	IOP-3 DIOP or XIOP
	CRAY SB Mainframe single-bit SECDED error
	CRAY MB Mainframe multibit SECDED error

ERROR - DISPLAY HARDWARE ERROR INFORMATION (continued)

FORMAT: (continued)	<u>Entry</u>	<u>Significance</u>
	MOS SB	Buffer Memory single-bit SECEDED error
	MOS MB	Buffer Memory multibit SECEDED error
	HSPD IN	Input (to IOS) side of 100 Mbyte channel
	HSPD OUT	Output (from IOS) side of 100-Mbyte channel
	SYND	Syndrome bits
	CPU MODE	Read mode:
		FTCH Instruction fetch
		I/O Input/output
		SCAL Scalar
		VECT Vector
	MOS PORT	Buffer Memory port number
	ADDRESS	Address of last occurrence
	HSPD CODE	100-Mbyte memory channel error code:
		ACTV Active error
		ADDR Address error
		BLCK Block length error
		DATA Data error
		FNCT Function error
		NRDY Data ready time-out
		TRNS Transmit address error
	IOP	I/O Subsystem location:
		BNK Bank
		SCT Section
		BYT Byte:
		0 Left byte
		1 Right byte
	COUNT	Total count of errors at location specified
AVAILABILITY:	No prerequisites	

ERROR - DISPLAY HARDWARE ERROR INFORMATION (continued)

EXAMPLE: ERROR

ERROR DISPLAY									
ERROR CHANNEL: ON									
<u>TYPE</u>		<u>SYND</u>	<u>CPU</u> <u>MODE</u>	<u>MOS</u> <u>PORT</u>	<u>ADDRESS</u>	<u>HSPD</u> <u>CODE</u>	- <u>BNK</u> -	<u>IOP</u> <u>SCT</u>	<u>BYT</u> <u>COUNT</u>
CRAY SB		277	VECT		407721				1
CRAY MB		40	SCAL		1567603				18

FLUSH - COPY DATA TO BACK-UP DATASET

FUNCTION: Copies data from a volatile device (device that loses stored information when powered down) to a file on a permanent storage device, in anticipation of a situation in which the data on the device may be lost.

FORMAT:

<code>FLUSH,device</code>

device Name of device to back up. The device must have the volatile (V) attribute.

On a subsequent startup, the data can be restored using the *RESTORE parameter file directive. (See the COS Operational Procedures Reference Manual, publication SM-0043, for information on the *RESTORE parameter file directive.)

You must use a separate FLUSH command for each volatile device. If an I/O error occurs during FLUSH processing, the block is marked bad and the file is lost during a subsequent *RESTORE. An error message is then issued.

AVAILABILITY: Available only at the logged on master station

HELP - DISPLAY HELP FOR COMMANDS

FUNCTION: Displays information on all station, Kernel, or interactive commands

FORMAT:

```
|-----|
|  HELP,[cmd][,type]  |
|-----|
```

cmd Name of command for which help is desired. If null, all commands of the requested type are listed. If not unique, all possible choices are listed.

type INTERACTIVE - help for interactive commands
 KERNEL - help for Kernel commands
 STATION - help for station commands

AVAILABILITY: No prerequisites

EXAMPLE : HELP,JOB,STATION

cmd JOB
 Returns a job status message in the command response area

type STATION

Format:

JOB,*jobname*[,*jsq*]

jobname: Name or job for which status is requested; 1 through 7 characters.

jsq: Job sequence number identifying the job to COS. If null, the first *jobname* encountered is displayed.

IACON - INITIALIZE AN MIOP CONSOLE

FUNCTION: Initializes an MIOP console other than the Kernel console for use as an interactive station console. Interactive station commands (described in table 3-3) can only be entered at such a console.

FORMAT:

<u>IACON</u>

AVAILABILITY: Available only at the logged on master operator station

INTERACTIVE STATION COMMANDS

The interactive station is a set of tasks running in the MIOP that permits communication with COS through the interactive console. A job is created in the Cray mainframe when an interactive console logs on.

The interactive station is composed of two parts: the interactive concentrator and the interactive console. Section 2 describes the interactive concentrator commands.

You must initialize the interactive concentrator (IAIOP LOG Kernel command) to bring up an interactive console. Likewise, you must terminate all interactive consoles before the interactive concentrator can be terminated (IAIOP LOGOFF Kernel command).

The IACON command initializes an MIOP console other than the Kernel console for use as an interactive station console. When an MIOP station console is to be used interactively, IACON is used as an interactive station command (see table 3-3).

Except for IACON, you must precede interactive station commands by the command control character (a slash (/) by default) and follow all commands with a RETURN.

Table 3-3. Interactive Station Commands

Command	Function
<u>ABORT</u>	Sends an abort status to the interactive job
<u>ATTENTION</u>	Sends an attention status to the interactive job. (An attention status can also be sent by pressing BREAK.)
<u>BYE</u>	Terminates the interactive console
<u>CHANGE</u> <i>c</i>	Changes the command control character to <i>c</i> , which can be any character
<u>COMMENT</u>	Allows comments
<u>EOF</u>	Sends an end-of-file on the input dataset
<u>LOGOFF</u> <i>H</i> <i>Q</i>	Logs off the interactive console: <i>H</i> Log off the terminal, but leave the session running on the Cray mainframe <i>Q</i> Log off the terminal and kill the session
<u>LOGON</u>	Logs on the interactive console
<u>STATUS</u>	Requests Cray job status

JOB - DISPLAY JOB STATUS

FUNCTION: Returns a job status message in the command response area

FORMAT:

```
| JOB,jobname[,jsq] |
```

jobname Name of job for which status is requested;
1 to 7 characters.

jsq Job sequence number (JSQ) identifying the job
to COS; obtained through the STATUS command.
If *jsq* is not specified, the status for the
first *jobname* encountered is displayed.

The job status message returned by this command has the
following general format:

```
COS JOB jobname (job status)
      (last logfile message)
```

Where *job status* reports one of the following
conditions:

```
AWAITING CPU
AWAITING MEMORY
DOES NOT EXIST
DORMANT
EXECUTING
LOCKED
QUEUED FOR EXEC
QUEUED FOR RESOURCES
ROLLED OUT
ROLLING IN
ROLLING OUT
SUSPENDED
SUSPENDED BY OPERATOR
WAITING FOR I/O
```

The *last logfile message* is displayed unless the job
status is DOES NOT EXIST or QUEUED FOR EXEC.

AVAILABILITY: Available at any logged-on station. You can request job
status for any job in the Cray computer system at the
master operator station. At other stations, you can
request job status only for jobs with the same station ID
as the one where the JOB command is entered.

JSTAT - JOB STATUS INFORMATION DISPLAY

FUNCTION: Initiates job status information display

FORMAT:

```
| JSTAT, jsq |
```

jsq Job sequence number (JSQ) identifying the job to COS; obtained through the STATUS command.

AVAILABILITY: Available at any logged-on station. You can request job status for any job in the Cray computer system at the master operator station. At other stations, you can request job status only for jobs with the same station ID as the one where the job originated.

EXAMPLE: JSTAT 1372

```

JOB:  FORCAST      CRAY JOB STATUS (JSTAT 1372)
USER:  ECLWF
ID:    ZP
TID:   HOTSHOT      JXT=0064010  JCB=0250000  JTA=0234000
STATUS: RESIDENT
CLASS:  LARGE      TASK #  STATUS  CP TIME  TXT      TCB
CLUSTER:      2      1      WAIT-SYS      14      0067324      00234237
PRIORITY:     12.0    2      EXEC-CP0      34153      0067376      00235643
FIELD LENGTH: 7222    3      EXEC-CP1      24312      0071254      00236131
TIME USED:    58825    4      AIT-I/O        346      0066123      00234447
TIME LIMIT:   69000
TAPES RESERVED:  2
TAPES ASSIGNED:  1
                                     END OF DATA.

$CS:  LDR,MAP.  Load and start executing model.
$LOG: LD000 - BEGIN EXECUTION

```

KILL - KILL JOB

FUNCTION: Depending on the status of the job, the KILL command either deletes the job's input dataset from the input queue (if processing has not yet begun), terminates processing (if processing has begun), or deletes an output dataset from the output queue. KILL (unlike DROP) causes the job to terminate immediately. To kill a range of jobs, use form 2 (the spaces surrounding the hyphen are required).

FORMATS:

<u>KILL</u> , <i>jsq</i> ₁ , <i>jsq</i> ₂ , ... <i>jsq</i> _{<i>n</i>}	form 1
<u>KILL</u> , <i>jsq</i> ₁ - <i>jsq</i> _{<i>n</i>}	form 2

*jsq*_{*n*} Job sequence number (JSQ) or range of job sequence numbers identifying the jobs or datasets; obtained through the STATUS command. The number of parameters that can be entered with this command is limited only by the line length.

AVAILABILITY: Available at any logged on station. You can kill any job running in the Cray computer system at the master operator station. At other stations, you can only kill jobs with the same station ID as the one at which the KILL command is entered.

LIMIT - LIMIT NUMBER OF JOBS ACTIVE

FUNCTION: Sets the maximum number of jobs that COS can process at one time. If the number of jobs is being reduced, jobs currently in process are allowed to finish.

FORMAT:

<u>LIMIT</u> [,n]

n Number of jobs that can be active (multiprogrammed) at the Cray mainframe. The maximum value allowed for *n* is 255. If *n* is 1, jobs are monoprogrammed. If *n* is not provided, the number of jobs that can be active is determined by the job class structure in effect.

AVAILABILITY: Available only at the logged-on master operator station

EXAMPLE: LIMIT,5

No more than five jobs can be processed concurrently.

LINK - LINK STATUS DISPLAY

FUNCTION: Provides information about the link between stations and the mainframe

FORMAT:

```
|  
| LINK |  
|
```

The information provided is as follows:

- Frame count (in the upper right of the display) indicating which frame of status information is being displayed. Frames are numbered from 0 through 99.
- Station ID (defined by LOGON)
- Queue count; number of datasets queued for staging to the station.
- Number of active input streams
- Number of active output streams
- Maximum number of input streams at LOGON
- Maximum number of output streams at LOGON
- Maximum number of active streams at LOGON
- Number of subsegments per message
- Subsegment size in 64-bit words
- Channel number
- Channel ordinal (if associated with IOP)

AVAILABILITY: Available at any logged-on station. Information about all station links is displayed at the master operator station. At other stations, only information concerning the link for that station is displayed unless installation parameter I@ALLST is set to 1. Setting the I@ALLST parameter allows any station to receive information about all stations.

LINK - LINK STATUS DISPLAY (continued)

EXAMPLE: LINK

LINK STATUS							FRAME 0		
<u>ID</u>	<u>QUEUE</u>	<u>ACTIVE</u>		<u>MAXIMUMS</u>			<u>SUBSEGMENT</u>		<u>CH,ORD</u>
	<u>COUNT</u>	<u>I</u>	<u>O</u>	<u>I</u>	<u>O</u>	<u>AC</u>	<u>#</u>	<u>SIZE</u>	
DG	0	0	0	1	1	1	1	128	1
EB	0	0	1	1	1	2	1	128	1
VS	0	1	2	4	4	5	1	512	9
MG	0	0	0	1	2	3	1	1024	10
IC	0	0	0	0	0	0	1	1024	10
AP	0	0	0	1	1	2	1	512	6,1
END OF DATA									

LOGOFF - LOG OFF STATION

FUNCTION: Terminates communications between the station and the Cray mainframe. If more than one console is sharing the station software, all consoles are logged off when LOGOFF is entered at one of the consoles.

FORMAT:

<u>LOGOFF</u>

AVAILABILITY: Available at any logged-on station

NOTE

The station displays the LOGOFF INITIATED message on line 2 of the display. It removes the message when LOGOFF processing is complete.

If you enter the LOGOFF command while an input or output stream is active, the station waits until the stream is terminated. A stream cannot be terminated while a tape mount message is outstanding or while I/O is pausing because of a device error condition. See section 2 for Kernel tape mount and device commands.

The station initiates log-off processing automatically if communication errors are encountered.

LOGON - LOG ON STATION

FUNCTION: Establishes communication between COS and the station. LOGON sets the number of streams allowed and the number of active streams as determined by assembly parameters.

After LOGON is entered, you can issue commands to be processed at the Cray mainframe rather than just locally at the IOS.

If the ID and TID of the operator station logging on is that for the master operator station, commands privileged to the master operator station are available.

FORMAT:

<code>LOGON[,id][,tid]</code>

id Optional identifier (2 alphanumeric characters) used by COS to associate messages and data with this station. The ID is initially AP for the IOS. The default ID is displayed in the STATION display if the station is not logged on.

Each station connected to the Cray mainframe should have a unique ID. Logging on a second station with the same ID on the same channel causes the previously logged on station to be logged off without notification to the logged off station.

tid Optional terminal ID (1 to 8 characters). The TID is initially OPERATOR. The default TID is displayed in the STATION display if the station is not logged on.

AVAILABILITY: No prerequisites

LPATH - DISPLAY LOGICAL PATH

FUNCTION: Displays information on the Network Systems Corporation (NSC), Front-end Interface (FEI), or VMEbus (VME) logical path connection. This command was developed for use with UNICOS/GOS and details protocols other than SCP.

FORMAT:

```
| LPATH, ichn, lp |
```

ichn MIOP input channel number (octal)

lp NSC/FEI/VME logical path number (octal)

AVAILABILITY: No prerequisites

EXAMPLE 1 (NSC display): LPA,34,5

IOP LOGICAL PATH MONITOR - NSC

Input Channel -	34	Local Adapter Address (hex) -	00C1
Logical path -	5	Number of Messages Buffered -	0

Status - Read queued
 Read active

	Read	Write
Number of messages (dec) -	40886	35467
Bytes transferred (dec) -	79489936	1451120
Errors detected (dec) -	0	0
Last error code (oct) -	0	0

NSCIO table address	-	102070
---------------------	---	--------

LPATH - DISPLAY LOGICAL PATH (continued)

EXAMPLE 2 (FEI display): LPA,24,0

IOP LOGICAL PATH MONITOR - FEI

Input Channel - 24
Logical path - 0 Number of Messages Buffered - 0

Status - Read queued
 Read active

	Read	Write
Number of messages (dec) -	0	0
Bytes transferred (dec) -	0	0
Errors detected (dec) -	0	0
Last error code (oct) -	0	0

EXAMPLE 3 (VME display): LPA,30,5

IOP LOGICAL PATH MONITOR - VME

Input Channel - 30
Logical path - 5 Number of Messages Buffered - 0

Status - Read queued
 Read active

	Read	Write
Number of messages (dec) -	0	211
Bytes transferred (dec) -	0	320
Errors detected (dec) -	0	0
Last error code (oct) -	0	0

VMERD table address	-	102414
VMEWT table address	-	102434

MESSAGE - ENTER MESSAGE INTO LOG FILE

FUNCTION: Enters a message into a job log file, the system log file, or both

FORMAT:

```
| MESSAGE, JOB| BOTH| SYSTEM, jobname, jsq, message |
```

JOB	Enters message into the job log file
BOTH	Enters message into the job log file and the system log file
SYSTEM	Enters message into the system log file
<i>jobname</i>	Name of job; 1 to 7 characters.
<i>jsq</i>	Job sequence number (JSQ) identifying the job; obtained through the STATUS display.
<i>message</i>	Character string to be entered into the log file. The message is truncated to 79 characters if necessary.

AVAILABILITY: Available at any logged-on station. You can enter messages for any job in the Cray computer system at the master operator station. At other stations, you can only enter messages for jobs with the same station ID as the one where the MESSAGE command is entered.

MONITOR - MONITOR SYSTEM PARAMETERS

FUNCTION: Generates a display to monitor a particular aspect of the Cray computer system

FORMAT:

<u>MONITOR</u> , <i>display</i>

display Monitored information:

<u>B</u> MEM	Percent of Buffer Memory currently in use by each IOP
<u>B</u> MIO	Percent of maximum I/O to the 100-Mbyte channel connecting the IOP to Buffer Memory
<u>B</u> MX	Percent of maximum data transfer, current device number, and mode on each configured Block Multiplexer channel
<u>C</u> MEM	Percent of Cray Central Memory use by: • System (fixed) • User • System buffers • Unused
<u>C</u> PU	Percent of Cray mainframe time as follows: • System time • Idle time • User time • Time blocked for I/O
<u>D</u> ISK	Percent of maximum data transfer to each disk
<u>D</u> MEM	Percent of disk buffers in use in each IOP
<u>F</u> MEM	Percent of free Local Memory in use by each IOP

10

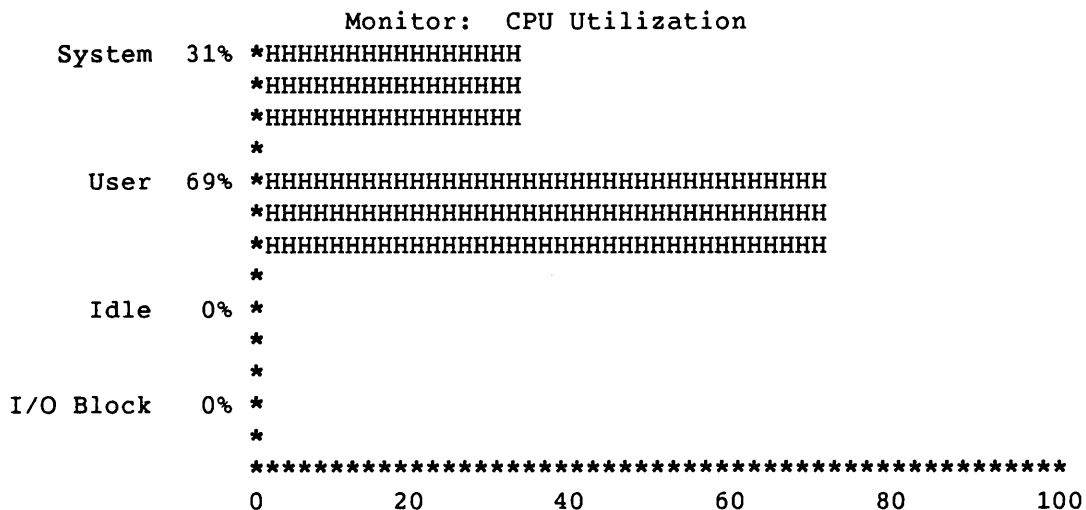
HSPIO Percent of maximum I/O to the
 100-Mbyte/s channel connecting each
 IOP to the mainframe

IOP Percent of IOP central processor time
not idle (for each IOP)

SSDCH Percent of maximum transfer rate realized over the SSD channel and the percentage of time the SSD channel is busy

AVAILABILITY: Available at any initialized IOS station

EXAMPLE 1 (for a CRAY-1 computer system): MON,C



EXAMPLE 2 (for a CRAY X-MP computer system): MON,C

SG-0051 G

MSG - SEND UNSOLICITED OPERATOR MESSAGE

FUNCTION: Sends an unsolicited message to a job

FORMAT:

<code>MSG, <i>jsq</i>, <i>message</i></code>
--

jsq Job sequence number of the job that is to
 receive the message

message ASCII text of message terminated with a
 carriage return

AVAILABILITY: Only available at the logged-on master operator station

OPERATOR - CHANGE MASTER OPERATOR STATION

FUNCTION: Changes the master operator station from the currently designated station to another console. The new master operator station is identified by station ID and terminal ID. To change the master operator station, the current password must be given in the OPERATOR command. If a new password is desired, it is included after the current password.

The default master operator station identifier is a COS installation parameter. The default is the IOS station in a system that includes one.

FORMAT:

```
| _____ |  
| OPERATOR,id,tid,pw[,npw] |  
| _____ |
```

<i>id</i>	Station ID of the new master operator station (2 alphanumeric characters). Contact a CRI site analyst for station IDs.
<i>tid</i>	Terminal ID of the new master operator station (1 to 8 characters). Contact a CRI site analyst for terminal IDs.
<i>pw</i>	Password; 1 to 8 characters. Contact a CRI site analyst for the password.
<i>npw</i>	Optional; enter if a new password is to be required for subsequent OPERATOR commands; 1 to 8 characters.

AVAILABILITY: Available at any logged on station if you know the master operator station password

EXAMPLE: OPERATOR,CD,T3,OLDPW,NEWPW

In the example, the new master operator station is identified by an ID of CD and a terminal ID of T3. The password required to change the master operator station designation is OLDPW. The new password is NEWPW.

PAUSE - INTERRUPT COMMAND FILE PROCESSING

FUNCTION: Interrupts command file processing and reads commands from the console keyboard. Resume command file processing by entering a null line as the next command at the console keyboard. The PAUSE command is treated like the COMMENT command if entered from the console keyboard.

FORMAT:

<u>PAUSE</u> [, <i>text</i>]

text Informational text string

AVAILABILITY: No prerequisites

POLL - SET CONTROL MESSAGE EXCHANGE RATE

FUNCTION: If no staging is in progress, sets the rate at which control messages are exchanged with the Cray mainframe. If you do not enter the POLL command, the system uses an assembly parameter default value (1 second). If staging is taking place, the command does not take effect until all streams return to an idle state.

FORMAT:

POLL, <i>sec</i>

sec Interval between control messages (1 through 60 seconds)

AVAILABILITY: No prerequisites

RECOVER - RECOVER SYSTEM

FUNCTION: Lifts the suspension from all jobs suspended by a SHUTDOWN command or a system interruption; it does not reschedule jobs suspended by a SUSPEND command. The number of active jobs set by the LIMIT command must be reset. (See the SHUTDOWN command.)

FORMAT:

<u>RECOVER</u>

AVAILABILITY: Only available at the logged-on master operator station

REFRESH - SET DISPLAY REFRESH RATE

FUNCTION: Sets the interval between screen updates. If you do not enter the REFRESH command, the system uses an assembly parameter default value which is currently 1 second.

FORMAT:

```
| REFRESH[,ON|OFF][,rate] |
```

ON Enables display refresh; default is on.

OFF Disables display refresh

rate Specifies refresh interval in tenths of a second (1 through 600). If rate is not specified, the rate previously in effect is assumed. The rate is applicable only if ON is specified.

AVAILABILITY: No prerequisites

RELEASE - RELEASE A DATASET IN THE HOLDING STATE

FUNCTION: Releases an output dataset whose status equals "HOLDING", so that the transfer of that dataset may continue. Datasets are put into the HOLDING state by the HOLD command available at front-end stations. (The HOLD command is not available at the IOS station.)

FORMAT:

```
|  
| RELEASE, jsq |  
|
```

jsq Job sequence number (JSQ) of the dataset to be released. The JSQ can be obtained through the STATUS command.

AVAILABILITY: Available at any logged on IOS station. At the master operator station you can release any dataset which is being held in the Cray computer system. At other stations, you can only release datasets with the same station ID as the station where the RELEASE command is entered.

REPLY - REPLY TO STATION REQUEST MESSAGE

FUNCTION: Reply to a specific station message

FORMAT:

<u>REPLY</u> , <i>msgnum</i> , <i>text</i>
--

msgnum Message number as displayed by station STMSG display; message number of message requiring response.

text 1 to 79 ASCII characters

AVAILABILITY: Available at any logged-on station

RERUN - RERUN JOB

FUNCTION: Immediately ends processing of the job (identified by its JSQ). The job input dataset at the Cray mainframe is retained and all output datasets associated with the job are deleted. The job input dataset is then rescheduled so that the job can be rerun. No action is taken if the job has already completed execution or if COS determines that the job cannot be rerun.

To rerun a range of jobs, use form 2.

FORMATS:

<u>RERUN</u> , <i>jsq</i> ₁ , <i>jsq</i> ₂ , ... <i>jsq</i> _{<i>n</i>}	form 1
<u>RERUN</u> , <i>jsq</i> ₁ - <i>jsq</i> _{<i>n</i>}	form 2

*jsq*_{*n*} Job sequence number (JSQ) or range of job sequence numbers identifying the jobs or datasets, obtained through the STATUS command. The number of parameters that can be entered with this command is limited only by the line length line.

AVAILABILITY: Available at any logged-on station. You can rerun any job running in the Cray computer system at the master operator station. At other stations, you can only rerun jobs with the same station ID as the station where the RERUN command is entered.

RESTRICTIONS: Several functions can cause a job to be declared ineligible for a RERUN.

- A RERUN, DISABLE job control statement
- A save of a permanent dataset
- A delete of a permanent dataset
- Any write operation involving a permanent dataset
- An adjustment or modification of a permanent dataset

If any of these events occur and a previous NORERUN, DISABLE job control statement is not in effect, COS issues a FUNCTION REJECT message.

RESTORE - RESTORE PREEMPTABLE GENERIC RESOURCE

FUNCTION: Rescinds the effects of the SWEEP command. (This command functions only for preemptable generic resources; see the COS Operational Procedures Reference Manual, publication SM-0043.) The command has three forms; the first two reinstate resource availability, the third is specific to an individual job and causes the system to move any swapped datasets back to the device where they originated. This command does not affect an outstanding suspend state such as operator suspend or shutdown.

FORMATS:

<code>RESTORE,ALL GN <i>gn</i> jsq</code>

ALL	If specified, each preemptable generic resource is made available for use
GN <i>gn</i>	Specific generic resource name that is to be made available
<i>jsq</i>	Job sequence number. Any swapped datasets associated with the job are moved back to the device where they originated. The RESTORE <i>jsq</i> command is interpreted as a high priority request from the operator. If the generic resources do not have space to accommodate the job's datasets at the time of the request, jobs are swept until space is available, with lowest priority jobs swept first. After <i>jsq</i> is restored, it retains the attribute of "restored by operator" until its thrash lock expires. A job that you restored does not sweep for some other restored job until its thrash lock expires. Automatic device scheduling is disabled while operator-initiated restores are pending.

AVAILABILITY: Only available at the logged-on master operator station

RESUME - RESUME JOB PROCESSING

FUNCTION: Reschedules suspended jobs for processing; use this command to reschedule jobs suspended by the SUSPEND command.

Use RESUME also to reschedule jobs that have been suspended by a SHUTDOWN command or a system interruption (this rescheduling is normally done with a RECOVER). LIMIT must be reset if jobs were suspended by a SUSPEND,ALL command, a SHUTDOWN command, or a system interruption. Jobs in the input queue do not begin execution until LIMIT is reset. See the SUSPEND and SHUTDOWN commands.

FORMAT:

```
| RESUME, jsq1, jsq2, ... jsqn | ALL |
```

jsq_n Job sequence number (JSQ) used to reschedule a specific job that has been suspended; obtained through the STATUS command. The number of JSQs that can be entered with this command is limited only by the line length.

ALL All suspended jobs are rescheduled for processing. If RESUME,ALL is used to recover jobs suspended by a SHUTDOWN command or a system interruption, all jobs, including those suspended by a SUSPEND issued prior to the interruption, are rescheduled for processing.

AVAILABILITY: Only available at the logged-on master operator station. You can reschedule any suspended job in the Cray computer system from the master operator station.

ROUTE - CHANGE STATION ID

FUNCTION: Reroutes datasets intended for disposition at one station to another station by changing the source ID of jobs or the destination ID of output datasets that match the old ID. This command can result in a change in class assignment for jobs in the input queue. Contact a CRI site analyst for station IDs.

FORMAT:

<code>ROUTE,oid,nid</code>

oid Station ID of station where job originated and where output datasets are to be sent; 2 alphanumeric characters.

nid Station ID of station where output datasets are to be sent and with which jobs are now identified; 2 alphanumeric characters.

AVAILABILITY: Available only at the logged on master operator station. Stations for which routing is changed need not be logged on.

EXAMPLE: ROUTE,DG,GD

All jobs that originated at the station identified as DG and all of their output datasets are rerouted to the station having the ID of GD.

RSTAT - DISPLAY GENERIC RESOURCE STATUS

FUNCTION: Returns current information on generic resource availability and use

FORMAT:

```
| RSTAT,queues|jsq|P|GN gn [queues] |
```

queues E (executing) or I (input). If *,queues* is specified without *,GN gn*, use data is displayed that details generic resource for all jobs in the specified queue (one job per frame).

jsq Displays detailed generic resource use for the specified job. Same as preceding display format.

P Displays generic resource profile. The RSTAT command alone is equivalent to RSTAT P.

GN gn Displays profile and cumulative use data for the generic resource name *gn*. If *queues* is specified along with *GN gn*, only jobs in the indicated queue are displayed.

The following information is provided in an RSTAT,*queues* or RSTAT,*jsq* display:

- Job name
- Job sequence number
- Job status
- Job priority
- Name of each generic resource
- Job limit and the number of units assigned for each generic resource used by the job

RSTAT - DISPLAY GENERIC RESOURCE STATUS (continued)

FORMAT: The following information is provided under the RSTAT,P
(continued) (or RSTAT) display:

- Names of all generic resources defined on COS
- Number of units available for each generic resource
- Number of units assigned for each generic resource
- Total number of units requested by jobs in the INPUT queue for each generic resource
- Total amount of swap space allocated for each preemptable generic resource
- Resource status for each preemptable generic resource

The following information is provided under the
RSTAT,GN *gn,queues* display:

- For the generic resource with name *gn*, the number of units allocated and the number of units required by jobs in the INPUT queue. If the resource is a preemptable generic resource, the display also includes FLUSH space availability, resource status, swap units available, swap units allocated, and current oversubscription ratio.
- For each job that is using or waiting for the generic resource with name *gn*, the JSQ, jobname, job status, job priority, job limit, number of units assigned, and swap status. Swap status is a sequence of five characters with the following meaning:

<u>Character</u>	<u>Meaning</u>
S	Job is swapped
L	Job is loading to or from device
R	Job is device resident
I	Job is waiting initial allocation
U	Unaligned swap space allocation

AVAILABILITY: Available at any logged on station

RSTAT - DISPLAY GENERIC RESOURCE STATUS (continued)

EXAMPLE 1: RSTAT, jsq

DETAILED GENERIC RESOURCE UTILIZATION					FRAME 0
JSQ=9123		JOBNAME=TESTJOB	STATUS= Q-EXEC	PRIORITY= 7.0	
RESOURCE	*6250	SSD	BMR	1600	TEST0
JOB LIMIT	5	32000	10000	1	1
ASSIGNED	0	0	0	0	0
TEST1	TEST2	TEST3	TEST4	TEST5	TEST6
1	1	1	1	1	1
0	0	0	0	0	0
TEST7	TEST8	TEST9	TEST10	TEST11	
1	1	1	1	1	
0	0	0	0	0	

EXAMPLE 2: RSTAT,P or RSTAT

GENERIC RESOURCE PROFILE					FRAME 0
GENERIC NAME	UNITS AVAILABLE	UNITS ALLOCATED	PENDING REQUESTS	SWAP SPACE	RESOURCE STATUS
*6250	5	1	6		
SSD	32000	27000	42000	82000	RESTORE
BMR	1000	250	0		
1600	2	1	1		
TEST0	1	0	0		
TEST1	1	0	0		
TEST2	1	0	0		
TEST3	1	0	0		
TEST4	1	0	0		
TEST5	1	0	0		
TEST6	1	0	0		

RSTAT - DISPLAY GENERIC RESOURCE STATUS (continued)

EXAMPLE 3: RSTAT,GN SSD

GENERIC RESOURCE CUMULATIVE UTILIZATION FOR						SSD	QUEUES E I
							FRAME 0
UNITS AVAILABLE		32000	PENDING REQUESTS			42000	
UNITS ALLOCATED		27000	FLUSH			NO	
RESOURCE STATUS		RESTORE	OVERSUBSCRIPTION RATIO			1.38	

JSQ	JOBNAME	STATUS	PRIORITY	JOB LIMIT	ASSIGNED	STATUS
---	-----	-----	-----	-----	-----	-----
213	TESTJOB	Q-RSOURC	7.0	42000	0	-----
2112	SSDJOB1	EXECUTE	7.0	1	1	--R--
1136	SSDJOB1	ROLLED	7.0	55000	55000	S----

END OF DATA

SAVE - STAGE PERMANENT DATASET

FUNCTION: Queues a file for staging to Cray mass storage where it is made a permanent dataset

Initiates staging to the Cray mainframe by using the IOS station SAVE or SUBMIT commands. Staging can proceed only if the station is logged on to the Cray mainframe, an input stream is available, and the input device is not being used by some other process. The data is written to Cray mass storage without reformatting.

If COS permanent dataset privacy is enabled, the dataset is saved with ownership by the system and with an installation-defined public access value.

You can delay or abort staging on a given stream by using the Peripheral Expander tape mount responses or device commands described in section 2.

FORMAT:

```
| SAVE,device,dsn[,pars] |
```

device Input device format:

@MTunit:num[:NR]

unit Unit number (0 through 9)

num Tape file number (0 through 9999)

NR Do not rewind the tape after
 staging is completed

[@DKunit:][dir/]file

unit Unit number (0 through 9)

dir Directory name; maximum of 15
 alphanumeric characters.

file File name; maximum of 15
 alphanumeric characters.

SAVE - STAGE PERMANENT DATASET (continued)

FORMAT: *dsn* Name to be assigned to the permanent dataset
(continued) at the Cray mainframe; maximum of 15
 alphanumeric characters.

pars Any combination of the following keyword-value
 pairs (if a keyword is repeated, the last
 value that was entered is used)

EDITION, *number*
 number Edition number; 0 to 4095. If
 0, a default edition number is
 assigned by COS. If nonzero and a
 dataset with the specified edition
 number already exists, the dataset
 transfer is cancelled.

ID, *userid*
 userid User identification; 1 to 8
 alphanumeric characters.

MAINTENANCE, *pcw*
 pcw Maintenance permission control word;
 1 to 8 alphanumeric characters.

PERIOD, *days*
 days Retention period in days; 0 to 4095.
 The default is an assembly parameter.

READ, *pcw*
 pcw Read permission control word; 1 to 8
 alphanumeric characters.

USER, *userno*
 userno User number; 1 to 15 alphanumeric
 characters.

WRITE, *pcw*
 pcw Write permission control word; 1 to 8
 alphanumeric characters.

AVAILABILITY: Available at any logged-on station

SCROLL - USE DISPLAY FOR COMMAND/RESPONSE SCROLL AREA

FUNCTION: Changes the entire display area (except for the two-line header) to a command/response area. This command is provided so that you can monitor the command entries and responses on all but the top two lines of the display screen. Commands and responses are rolled in a scroll-like fashion before disappearing from the screen. This mode is in effect when the station is initialized and is cleared by issuing any other display command or CLEAR.

FORMAT:

```
|  
| SCROLL |  
|
```

AVAILABILITY: No prerequisites

SET - MODIFY PARAMETERS

FUNCTION: Modifies the default value associated with the IOS station's ID and TID parameters. If the station is currently logged-on, the changes do not take affect until the next logon.

FORMAT:

```
| SET[,ID,id][,TID,tid] |
```

ID,*id* Station identifier to be used if none is specified on the LOGON command (2 alphanumeric characters). The ID is initially AP for the IOS. The default ID is displayed in the STATION display if the station is not logged on.

TID,*tid* Terminal identifier to be used if none is specified on the LOGON command (1 through 8 characters). The TID is initially OPERATOR. The default TID is displayed in the STATION display if the station is not logged on.

AVAILABILITY: No prerequisites

SHUTDOWN - SHUT DOWN THE SYSTEM

FUNCTION: Idles down job activity as a part of the system deactivation procedure. Active jobs are suspended and rolled out; the maximum number of jobs that can be active is set to 0 (see the LIMIT command). Subsequently, jobs can be reactivated at the point at which they left off. However, certain jobs (jobs using tape drives, for example) cannot be recovered across a system startup.

FORMAT:

```
| _____ |  
| SHUTDOWN |  
| _____ |
```

Job activity is idled down, jobs are rolled out, their memory is released, and the maximum number of jobs that can be active is set to 0.

Use the CHANNEL OFF command in this section to prevent additional jobs from entering the system.

Use the FLUSH command to copy data from a volatile device (a device that loses information stored on it at power down) to a file on a permanent storage device.

Flush the system log buffers to disk using an EXTRACT job. (EXTRACT is described in the Operational Aids Reference Manual, CRI publication SM-0044, and system shutdown is also covered in the COS Operational Procedures Reference Manual, publication SM-0043.)

Use the RECOVER or RESUME command to reactivate jobs following a SHUTDOWN. You must reissue the LIMIT command after a SHUTDOWN to allow queued jobs to be scheduled for execution.

AVAILABILITY: Available only at the logged-on master operator station

SNAP - PRINT DISPLAY CONTENTS

FUNCTION: Copies the display screen image to a line printer. This command is useful for providing a printed copy of a problem. For example, you can elect to SNAP a status display.

FORMAT:

<u>SNAP</u> [, <i>comment</i>]

comment An arbitrary character string limited only by
the line length

AVAILABILITY: No prerequisites

STAGE - HALT OR RESUME STAGING

FUNCTION: Halts or resumes initiation of dataset staging between the IOS's Peripheral Expander magnetic tape, disk, or printer and the Cray mainframe. Staging is enabled when the station software begins operation. See additional staging information with the SAVE command.

FORMAT:

STAGE, <u>ON</u> <u>OFF</u>

ON Resume staging (default value)

OFF Halt staging; staging in process is completed,
no new staging is initiated.

AVAILABILITY: No prerequisites

STATCLASS - DISPLAY JOB CLASS STATUS

FUNCTION: Displays the status of the defined job classes for the current job class structure

FORMAT:

```
|  
| STATCLASS |  
|
```

The status display returned by this command provides the following information:

- Job class structure name (CSDN)
- Number of jobs in the system (both in the input and in the executing queues)
- Number of active jobs in the executing queue (JXT)
- Maximum JXTs allowed by the system (LIMIT)
- Number of available pool JXTs
- Number of defined classes
- Number of classes waiting for JXTs

For each defined class, the following information is displayed:

- First 7 characters of the job class name
- Number of active jobs in the executing queue (JXT)
- Number of jobs waiting for JXTs
- Number of reserved JXTs
- Maximum JXTs allowed by class
- Status (ON or OFF)

The frame count provided in the upper right corner of the display indicates which frame of status information is being displayed. Frames are numbered 0 through 99, modulo 100.

AVAILABILITY: Available at any logged-on station

STATCLASS - DISPLAY JOB CLASS STATUS (continued)

EXAMPLE: STATC

CRAY JOB CLASS STATUS					FRAME 0
CSDN = DAY-XMP					
JOBS IN SYSTEM	15	ACTIVE JOBS	15		
MAX JXTS (LIMIT)	63	AVAIL POOL JXTS	9		
DEFINED CLASSES	17	CLASSES WTG JXTS	0		
<u>CLASS</u>	<u>ACTIVE</u>	<u>WAITING</u>	<u>RESERVED</u>	<u>MAXIMUM</u>	<u>STATUS</u>
OPERATOR	0	0	1	5	ON
JOBSERR	0	0	1	5	ON
ORPHAN	0	0	1	1	ON
P0	0	0	0	0	ON
IA	0	0	20	20	ON
LOCK	0	0	3	3	ON
LOCKBAD	0	0	0	0	OFF
NWU	0	0	2	2	OFF

STATION - DISPLAY I/O SUBSYSTEM STATION STATUS

FUNCTION: Displays information about the station console at which the command is entered

FORMAT:

<u>STATION</u>

The information displayed is as follows:

- Station ID and TID (defaults if not logged on)
- Maximum active input and output stream counts
- Refresh state and rate in tenths of a second
- Poll interval (rate of exchange of control messages) in tenths of a second
- Stream status for each defined stream if logged on. The stream status includes stream type (input or output), stream number, job name, disposition code, input/output device, dataset name, dataset format, size, and block number.
- Status of the input/output devices. The status includes the availability and operational mode.

<u>Status</u>	<u>Description</u>
UP	Device in operation
DN	Device not in operation
FREE	Device available for use
RSRVD	Device currently in use
RD	Tape in read mode
WR	Tape in write mode
PT	Printer in plot mode
AL	Printer in character mode
IO	Disk in I/O mode
IN	Disk in initialize mode

AVAILABILITY: No prerequisites

EXAMPLE: STATI

```
STATION ID: AP OPERATOR      MAXIMUM STREAM COUNT:  2      REFRESH RATE: 10 ON
STATION DEV: @DK0            POLL RATE: 10
STATION VOL: IOS
STATION DIR: STATION
```

STREAM STATUS								LOCAL DEVICE STATUS			
BLOCK											
STREAM	JOBNAME	DC	DEVICE	DATASET	FT	SIZE	CURR	DEV	STATUS		OP
1	IN	ST	@MT0:2	TEST	CB	0	38	@PRO	UP	FREE	
1	OUT		-INACTIVE-					@MT0	UP	RSRVD	RD
								@DK0	UP	FREE	
								@CK0	UP	FREE	

STATUS - DISPLAY SYSTEM STATUS

FUNCTION: Returns the status of jobs, and input and output datasets known to COS. Several jobs are reported at a time according to their job sequence numbers (JSQs). Status can be requested for any or all of the COS job queues.

FORMAT:

```
| STATUS[,queues][,int] |
```

queues One or more of the following designators, each specifying a queue's status. All designators must be separated by one or more blanks or a comma. If *queues* is omitted, a comma is not required to replace it in the command; the status of all of the queues is displayed.

<u>EXECUTION</u>	Execution queue
<u>INPUT</u>	Input queue
<u>OUTPUT</u>	Output queue
<u>RECEIVING</u>	COS receiving queue
<u>SENDING</u>	COS sending queue

int Time interval, in seconds, between each frame display. Frames do not automatically advance if *int* is not specified.

The following information is provided in a status display:

- Job class structure dataset name (CSDN)
- Job sequence number
- Disposition code (DC) as follows:

IN Dataset is a job dataset

MT Dataset will be disposed to magnetic tape at the receiving station

PR Dataset will be disposed to a printer at the receiving station

PT Dataset will be disposed to a plotter at the receiving station

STATUS - DISPLAY SYSTEM STATUS (continued)

FORMAT:
(continued)

PU Dataset will be disposed to punched cards at the receiving station

ST Dataset will be made a permanent dataset at the receiving station or at the Cray mainframe. This dataset can be on the way into the mainframe as the result of a SAVE or SUBMIT station command or an ACQUIRE control statement.

- Job name when submitted at originating station
- Job class assignment
- Job or dataset status:

<u>Status</u>	<u>Description</u>
EXECUTE	Executing
LOCK-MEM	Locked by memory
LOCK-SYS	Locked by system
QUEUED	Queued for execution
QUEUED-T	Queued for tape
RESIDENT	Resident in memory (multitasking job)
ROLL-IN	Rolling in
ROLL-OUT	Rolling out
ROLLED	Rolled out
SUSP-OPR	Suspended by operator
SUSP-RCY	Recovery suspended
WAIT-1TH	Suspended to single thread tasks (multitasking job)
WAIT-CPU	Waiting for CPU
WAIT-EVT	Waiting for event
WAIT-I/O	Waiting for I/O
WAIT-MEM	Waiting for memory
WAIT-SYS	System suspended
WAIT-TIM	Waiting for time event
WAIT-TSK	Suspended by task deactivate (multitasking job)
WAIT-XFR	Waiting to transfer
XFER-IN	Transferring into a Cray computer system
XFER-OUT	Transferring out of a Cray computer system

STATUS - DISPLAY SYSTEM STATUS (continued)

FORMAT: (continued)

- Job priority. Initial job priority is determined by the job control statement, class, or operator-assigned priority and job control statement time and memory specifications. (Subsequent job scheduler adjustments are not displayed.) Output dataset priority is determined by dataset size.
- Time used in seconds and time limit in seconds (decimal). If the job's time used or time limit exceeds the display area, the corresponding entry contains *****. If time used or time limit is not applicable for the dataset, the corresponding entry contains -----.
- Field length of job specified as decimal thousands. If field length is not applicable, the entry contains -----.
- Station ID associated with job or dataset
- Terminal ID (TID) associated with job or dataset

The display header line lists the queues being displayed. The frame count at the right of the line shows status information of frame being displayed. Frames are numbered 0 through 99.

AVAILABILITY: Available at any logged on station. If the command is issued at the master operator station, all entries in the queue are displayed. If the station is not the master operator station, normally only entries matching the station ID are displayed. If the I@ALLSDT installation parameter is enabled, all entries in the queue are displayed.

STATUS - DISPLAY SYSTEM STATUS (continued)

EXAMPLE: STATUS, E I O R S

CRAY SYSTEM STATUS										
CSDN = DAY-XMP										
QUEUES E I O R S								FRAME 1		
<u>JSQ</u>	<u>DC</u>	<u>DATASET</u>	<u>CLASS</u>	<u>STATUS</u>	<u>PRI</u>	<u>TIME</u>		<u>FIELD</u>	<u>ID</u>	<u>TID</u>
						<u>USED</u>	<u>LIMIT</u>	<u>LENGTH</u>		
237	IN	JEA	IA	WAIT-SYS	8.0	0	*****	30	DX	20, 42
354	IN	BTK-V3	IA	WAIT-SYS	8.0	0	*****	30	V3	U1715
99	IN	TNG1	IA	WAIT-SYS	8.0	0	*****	30	IC	:UDD:TNG
383	IN	GFJH	IA	WAIT-SYS	8.0	0	*****	30	DX	20, 61
48	IN	EJM	IA	WAIT-SYS	8.0	0	*****	30	V3	U1032
361	IN	U0950	IA	WAIT-SYS	8.0	0	*****	30	V3	U0950
390	IN	IOPTAP	P0	QUEUED	0.0	0	8	74	V3	U1570
387	IN	LCL5807	MEDIUM	EXECUTE	7.0	7	120	57	V3	U1838
393	IN	CISI	MEDIUM	WAIT-SYS	7.0	0	40	30	V3	U1199
392	IN	U1838	IA	WAIT-SYS	8.0	0	*****	34	V3	U1838
0	ST	M08042A		XFER-IN	0.0	----	-----	-----	V3	U1199

STMSG - DISPLAY STATION MESSAGES

FUNCTION: Displays station messages. Messages either require a response or provide information.

FORMAT:

```
| STMSG[,type] |
```

type Either response-required or information-only messages; default is response-required.

REQUEST

Displays only response-required messages, including tape mount requests (see NOTE below). A beeping sound and an M at the top of the STMSG display (see figure 3-1) alerts you that a response-required message is waiting.

INFORMATION

Displays only informative messages. An M appears at the top of the STMSG display without an accompanying beeping sound. This M indicates that no response is required for the message waiting to be viewed. When you change the display, the information is lost.

NOTE

No reply is required for tape mount messages[†] if the specified reel of tape is mounted on the specified device. To mount the tape on a different device, enter the reply: REP *msgnum* RESELECT

The system selects an alternate tape device if one is available. If an alternate device is not available, the selection is delayed until a device is freed by another job. For further information about tape mount messages, see appendix F.

[†] If the automatic volume recognition feature is used, the tape may be mounted on any tape device. RESELECT has no effect.

STMSG - DISPLAY STATION MESSAGES (continued)

AVAILABILITY: Available at any logged on station

EXAMPLE: STMSG,R

CRAY STATION MESSAGES - REPLY REQUESTED			FRAME 0
<u>MN</u>	<u>TIME</u>	<u>MESSAGE</u>	
0	22:08	ENTER CONFIGURATION CHANGES OR CONTINUE END OF DATA	

STORAGE - DISPLAY MASS STORAGE STATUS

FUNCTION: Initiates mass storage status display.

FORMAT:

<u>STORAGE</u>

The display provides you with the following information about each mass storage device:

- Flags to provide information about each device

<u>Flag</u>	<u>Description</u>
C	Controlled device
D	Device down
M	Master device
P	Private; device can be requested by name only.
R	Read only
S	Scratch device; only local datasets are allowed.
V	Volatile; data can be saved on a backup dataset through the FLUSH command.
T	Maintenance mode (diagnostics)

A D entry and an R entry appear together on the display when a device is both down and off. A P entry indicates that the system does not automatically allocate datasets on the device.

A C entry indicates that the device is controlled and that user jobs must declare on the JOB statement the maximum number of units the job uses concurrently on the device.

- Device name known to the operating system
- Percentage of space free (available) and permanent (in use for permanent datasets) on each device. Space not accounted for by these two categories is allocated to local or system datasets and flaws.
- Number of recovered and unrecovered errors on each device
- Location of last error (in octal); gives cylinder (CYL), head (HD), and sector (SC) location.

STORAGE - DISPLAY MASS STORAGE STATUS (continued)

AVAILABILITY: Station must be logged on

EXAMPLE: STORAGE

MASS STORAGE STATUS						FRAME 0		
<u>FLAGS</u>	<u>DEVICE</u>	<u>SPACE</u>		<u>ERRORS</u>		<u>LAST</u>	<u>ERROR</u>	
		<u>FREE</u>	<u>PERM</u>	<u>RECOV</u>	<u>UNREC</u>	<u>CYL</u>	<u>HD</u>	<u>SC</u>
M	DD-A1-20	20%	35%	0	0	0	0	0
	DD-A1-21	51%	10%	0	0	0	0	0
	DD-A1-22	51%	10%	0	0	0	0	0
	DD-A1-23	51%	10%	0	0	0	0	0
	DD-A1-24	51%	10%	0	0	0	0	0
	DD-A1-25	51%	10%	0	0	0	0	0
T	DD-A1-26	51%	10%	0	0	0	0	0
RD	DD-A1-35	100%	0%	0	0	0	0	0
RD	DD-A1-36	100%	0%	0	0	0	0	0
RD	DD-A1-37	100%	0%	0	0	0	0	0
PSVC	SSD-0-20	100%	0%	0	0	0	0	0
RDPSVC	SSD-1-12	100%	0%	0	0	0	0	0
RDPSVC	ASD-1-12	100%	0%	0	0	0	0	0

STP - DISPLAY SYSTEM TASK PROCESSOR STATISTICS

FUNCTION: Provides the CRI site analyst with statistics pertaining to the COS system task processor (STP).

FORMAT:

```
|-----|
|  STP  |
|-----|
```

The information displayed is as follows:

<u>Information</u>	<u>Description</u>
Base	Base address (octal) of STP in memory
Name	ASCII name of the task or display entry
%CPU	Percentage of total CPU time in use by the displayed entry
%System	Percent of system time (CPU time used by the system as opposed to the user) being used by the displayed entry
Requests	Number of system requests made by the displayed task over the last display interval
Readies	Number of times the displayed task was readied by EXEC over the last display interval
Suspend	If YES is displayed, the displayed task is currently suspended; otherwise, NO is displayed.

AVAILABILITY: Available at any initialized IOS station (does not have to be logged on)

STP - DISPLAY SYSTEM TASK PROCESSOR STATISTICS (continued)

EXAMPLE: STP

SYSTEM TASK PROCESSOR			BASE: 27000	FRAME: 0		
NAME	%CPU	%SYS	REQUESTS	READIES	SUSPEND	
EXEC	19.23	47.78				
STP	20.97	52.18	5016	3948		
SCP	0.35	0.88	42	17	YES	
EXP	14.88	36.99	3864	3649	YES	
PDM	0.3	0.8	15	5	YES	
DEC	0.0	0.0	0	0	YES	
DQM	1.40	3.49	549	178	YES	
MSG	0.4	0.11	12	4	YES	
MEP	0.0	0.0	0	0	YES	
SPM	0.0	0.0	0	0	YES	
JSH	4.24	10.54	525	90	YES	
JCM	0.0	0.0	0	0	YES	
TQM	0.0	0.0	0	0	YES	

STREAM - CHANGE STREAM COUNTS

FUNCTION: Changes the activity on the link by changing the total number of input streams and output streams defined for a link and the number of streams that can be active at one time

FORMAT:

```
| _____ |  
| STREAM, id, ni, no, na |  
| _____ |
```

id Station ID of station whose stream count is to be changed

ni Number of input streams allowed; 0 to 8. The maximum allowable values are determined at logon time, and they may differ for each station. You cannot use the STREAM command to specify values greater than those specified at logon time.

no Number of output streams allowed; 0 to 8.

na Number of streams where data can be sent concurrently, that is, active streams (0 to 16)

Stream is the flow of the pieces of information composing a staged dataset. The maximum number of input streams and output streams is defined for the station when a station is assembled. The link control commands let you change this number but not exceed the maximum at any time.

Because streams are defined with relation to the Cray mainframe, an output stream is a data path to the station from the Cray mainframe and an input stream is a data path from the station to the Cray mainframe.

The input stream count defines the maximum number of datasets that can be staged in at any one time. The output stream count defines the maximum number of datasets that can be staged out at any one time. The active stream count defines the maximum number of datasets that can be handled at one time on the link and includes both directions of data flow. For example, if two input streams, one output stream, and three active

STREAM - CHANGE STREAM COUNTS (continued)

FORMAT: streams are defined, staging in occurs with two datasets interleaved and staging out occurs one dataset at a time. However, if three input streams, two output streams, and three active streams are defined, the station can stage a maximum of three datasets at a time. The maximum number of three can consist of three input streams with no output stream, two input streams and one output stream, or one or no input stream and two output streams.

AVAILABILITY: Available at any logged on station. You can change the stream count for any station in the Cray computer system at the master operator station. At other stations, you can only change the stream count for the station at which the STREAM command is entered.

EXAMPLE: STREAM,AP,1,2,2

This example limits station AP to one input stream, two output streams, and two streams that can be active concurrently.

STRSTAT - DISPLAY STATION STREAM STATUS

FUNCTION: Provides an informational display for individual station streams

FORMAT:

```
| STRSTAT[,id] |
```

id The log-on ID of the station for which streams are displayed

The information displayed is as follows:

<u>Information</u>	<u>Description</u>
CURR	Number of the current block being transferred
DATASET	Name of the dataset being transferred
DC	Disposition code for transferring the dataset
DF	Data format of the transferring dataset
DSQ	The dataset sequence number of the dataset currently transferring on the displayed stream
DURATION	Length of time the stream has been active
ID	The log-on ID of the station for the displayed stream
JSQ	Job sequence number of the job for which the stream is active
BIT/S	Rate at which the stream is transferring, in Mbits/s
STRM	Direction in which the stream is transferring
TOTAL	Total size of the transferring dataset in 512-word blocks (if known)

STRSTAT - DISPLAY STATION STREAM STATUS (continued)

FORMAT: If the ID is not specified and the station is the master operator, stream activity for all station ID's is displayed. If the station is not the master operator, stream activity for the IOS station is displayed.

AVAILABILITY: Available at any logged-on station. Only the master operator station can examine other stations' stream activity.

EXAMPLE: STRS

STREAM STATUS DISPLAY								RATE: 0.786 MBIT/S		FRAME: 0	
								BLOCKS			
<u>ID</u>	<u>DSQ</u>	<u>DATASET</u>	<u>JSQ</u>	<u>DC</u>	<u>DF</u>	<u>STRM</u>	<u>MBIT/S</u>	<u>CURR</u>	<u>TOTAL</u>	<u>DURATION</u>	
V3	0	LC6800B	223	ST	CB	1 IN	0.262	44	0	00:00:07	
V3	0	LC6800B	223	ST	CB	2 IN	0.229	32	0	00:00:06	
V3	229	LC6800B	220	PR	CB	1 OUT	0.065	33	60	00:00:30	
V3	230	LC6800B	219	PR	CB	2 OUT	0.229	55	60	00:00:17	
END OF DATA											

SUBMIT - STAGE JOB DATASET

FUNCTION: Queues files for staging to Cray mass storage where the dataset is entered into the job input queue. See the SAVE command for additional staging information.

FORMAT:

<u>SUBMIT</u> , <i>device</i>

device Input device formats:

@MTunit:*num*[:NR]

unit Unit number (0 through 9)

num Tape file number (0 through 9999)

NR Do not rewind the tape after
 staging is completed.

[@DKunit:][*dir*/]*file*

unit Unit number (0 through 9)

dir Directory name; maximum of 15
 alphanumeric characters.

file File name; maximum of 15
 alphanumeric characters.

AVAILABILITY: Station must be logged on

SUSPEND - SUSPEND JOB PROCESSING

FUNCTION: Suspends processing of one or more jobs. The jobs are rolled out and their memory is released. For SUSPEND,ALL the maximum number of jobs that can be active (see the LIMIT command) is set to 0. See the RESUME command.

FORMAT:

```
| SUSPEND, jsq1, jsq2, ... jsqn | ALL |
```

*jsq*_{*n*} Job sequence number (JSQ) identifying a specific job to be suspended; obtained through the STATUS command. The number of JSQs that can be entered with this command is limited only by the line length.

ALL Suspends all jobs in the system

AVAILABILITY: Available only at the logged-on master operator station. You can suspend any job in the Cray computer system from the master operator station.

SWAP - DISPLAY SWAP SPACE STATUS

FUNCTION: Provides a display illustrating how disk space is used to store datasets from preemptable generic resources. This display monitors the availability of swap space and warns you when disk space is getting low. The display includes the following information:

- Swap space partitions; their size as a percentage of total swap space and the number of sectors allocated to each (also as a percentage of total swap space).
- The extent to which space used for local and permanent datasets infringes on swap space; as a percentage of total swap space.
- Current free space available on preferred devices
- Current free space available on all default disk devices that are not preferred
- Current swap space available (the sum of the two preceding items)
- Current amount of space allocated on all preemptable generic resources

Whenever local and permanent datasets grow to an extent that the configured volume of swap space is not available, the system reduces the volume of swap space by the amount of the infringement and issues a warning message to the display. The extent of the infringement is represented by the histograms on the display.

If the infringement is so large that a SWEEP,ALL command cannot be performed, no jobs needing preemptable resources are initiated and device swapping is halted until disk space is available.

The display also warns you when the configured volume of memory pool space, used to house internal system tables for preemptable generic resources, is exhausted. Contact a site analyst if this warning appears.

Whenever a warning condition arises, a mandatory response message is sent to the STATION messages display (STM) instructing you to check the SWAP display. If the condition persists, the warning is issued at 5-minute intervals.

SWAP - DISPLAY SWAP SPACE STATUS (continued)

FORMAT:

```
| SWAP |
```

AVAILABILITY: Available at any logged on station

EXAMPLE: SWAP

SWAP SPACE AVAILABILITY

FRAME 0

KEY: P=PARTITION, >=USER ALLOCATION, <=SYSTEM INFRINGEMENT

```
+P-----P-----P-----+
SSD />>>>>> >>>>>> >>>>>> /
BMR />>>>>>>>>>>>>>>>>> /
+-----+
```

CURRENT PREFERRED SPACE AVAILABLE	156000	
CURRENT DEFAULT SPACE AVAILABLE	1114000	
CURRENT SWAP SPACE AVAILABLE		1272000
CURRENT PREEMPTABLE DEVICE ALLOCATION		59000

*** NO WARNINGS AT THIS TIME

*** JOB INITIATION ENABLED - PREEMPTION ENABLED

SWEEP - CLEAR PREEMPTABLE GENERIC RESOURCE

FUNCTION: Removes user datasets from a preemptable generic resource. This command is specific to either a preemptable generic resource or job. The first two forms of the command cause all user datasets, resident on the indicated resource, to be removed and stored in swap space. The resource(s) is then ineligible for use until it is returned to use by the RESTORE command. The third form of the command causes all datasets belonging to the indicated job, which are associated with any preemptable generic resource, to be removed and stored in swap space. The third form also causes the job to be operator suspended. If you resume the job, it becomes eligible to use the resources. This form does not affect resource availability.

FORMAT:

<code>SWEEP,ALL GN <i>gn</i> <i>jsq</i></code>
--

ALL	If ALL is specified on the command, all preemptable generic resources are swept and made ineligible for use.
GN <i>gn</i>	Generic resource name. This parameter must be the name of a preemptable generic resource. Specifying <i>gn</i> causes the resource to be cleared of user datasets and made ineligible for use.
<i>jsq</i>	Job sequence number. This parameter causes all datasets, belonging to the job, which are residing on any preemptable generic resource to be removed and the job operator suspended.

AVAILABILITY: Available at the master operator console only

SWITCH - MANIPULATE JOB SENSE SWITCHES

FUNCTION: Sets or clears a job sense switch

FORMAT:

<code>SWITCH, <i>jsq</i>, <i>ssw</i>, <u>ON</u> <u>OFF</u></code>

jsq Job sequence number (JSQ) identifying the job;
obtained through the STATUS display.

ssw Sense switch number; 1 through 6.

ON Sets the switch designated by *ssw*

OFF Clears the switch designated by *ssw*

AVAILABILITY: Available at any logged-on station. You can set or clear job sense switches for any job in the Cray computer system at the master operator station. At other stations, you can only change job sense switches for jobs with the same station ID as the one where the SWITCH command is entered.

TAPE - DISPLAY TAPE DEVICE INFORMATION

FUNCTION: Displays configuration information for each tape device

FORMAT:

<u>TAPE</u>

The information provided is as follows:

- Device number
- Associated job sequence number (JSQ), if any assigned
- All access paths
- Assigned volume serial number
- File block count
- Servicing front-end ID
- Device status

<u>Status</u>	<u>Description</u>
DOWN	Device is down; not available for use.
IDLE	Available for use
MAINT.	Maintenance mode; not available for use.
MOUNTED	Premounted tape is on device
OFFLINE	Off-line; not available for use.
OP - DOWN	Downed by operator; not available for use.
RD/WT	Currently assigned to a job; write enabled.
READ	Currently assigned to a job; write disabled.
SYS - DOWN	Downed by the system; not available for use.

TAPE - DISPLAY TAPE DEVICE INFORMATION (continued)

AVAILABILITY: Available at any logged on station

EXAMPLE 1: TAPE (on system without AVR)

DEVICE	JSQ	* TAPE CONFIGURATION *				STATUS	VSN	FBC	FRAME 0	SFE
		IOP	CH/CU							
100		20-0	21-1	22-2	23-3	OP-DOWN				
101		20-0	21-1	22-2	23-3	OP-DOWN				
102		20-0	21-1	22-2	23-3	OP-DOWN				
103		20-0	21-1	22-2	23-3	OP-DOWN				
104		20-0	21-1	22-2	23-3	OP-DOWN				
105		20-0	21-1	22-2	23-3	OP-DOWN				
106		20-0	21-1	22-2	23-3	OP-DOWN				
107	935	20-0	21-1	22-2	23-3	RD/WT	LADDER	979		DG

END OF DATA

EXAMPLE 2: TAPE (on system using AVR)

DEVICE	JSQ	* TAPE CONFIGURATION *				STATUS	VSN	FBC	FRAME 0	SFE
		IOP	CH/CU							
20		20-0	24-0	30-0		IDLE				
21		20-0	24-0	30-0		IDLE				
22		20-0	24-0	30-0		MOUNTED	203139			
23		20-0	24-0	30-0		IDLE				
24		20-0	24-0	30-0		MOUNTED	MERGE			
25	25	20-0	24-0	30-0		RD/WT	203238	6749		II
26	18	20-0	24-0	30-0		RD/WT	203071	4662		II
27		20-0	24-0	30-0		SYS-DOWN				

END OF DATA

TCLEAR - RESOLVE AN INTERNAL DEADLOCK FOR A TAPE DEVICE

FUNCTION: Resolves an internal deadlock that has caused a tape job to become hung in WAIT-EVT, WAIT-SYS, WAIT-TIM, or WAIT-IO. The job using the device will get an error and usually abort.

Before using the TCLEAR command, first attempt to terminate the job with the DROP or KILL commands. If the attempts are unsuccessful, consult the TAPE display to determine which tape devices are being used by the job, and then use TCLEAR on each device.

FORMAT:

	<u>TCLEAR</u> ,dev

dev The 1- to 8-character device name for the tape drive assigned to the hung job.

AVAILABILITY: Available only at the logged-on master operator station.

TJOB - DISPLAY TAPE JOB'S STATUS

FUNCTION: Displays job status information for jobs requiring tape devices†

FORMAT:

<u>TJOB</u> , <i>int</i>

int Time interval in seconds between each frame display. Frames do not automatically advance if *int* is not specified.

The information provided is as follows:

- Job sequence number (JSQ)
- Job name
- Job status

<u>Status</u>	<u>Description</u>
DELAY	Waiting for time event
EXCTNG	Executing
LK-MEM	Locked for memory
LK-SYS	Locked by system
Q-EXEC	Queued for execution
Q-RSOURC	Queued for resource
R-IN	Rolling in
R-OUT	Rolling out
ROLLED	Rolled out
S-CPU	Waiting for CPU
S-EVENT	Waiting for event
S-I/O	Waiting for I/O
S-MEM	Waiting for memory
S-OP	Operator suspended
S-RECV	Recovery suspended (SHUTDOWN)
S-SYS	System suspended
S-XFER	Waiting for transfer
XFERING	Transfer in progress

† If an SSD is installed as a generic resource, jobs that use the SSD are included in the TJOB display.

TJOB - DISPLAY TAPE JOB'S STATUS (continued)

FORMAT: (continued)

- Job priority. Initial job priority is determined by the job control statement, class, or operator-assigned priority and job control statement time and memory specifications. (Subsequent job scheduler adjustments are not displayed.) Output dataset priority is determined by dataset size.
- Time used (in seconds) and time limit (in seconds) in decimal numbers. If the job's time used or time limit exceeds the display area, the corresponding entry contains *****. If time used or time limit is not applicable for the dataset, the corresponding entry contains -----.
- Field length of job specified as decimal thousands. If field length is not applicable, the entry contains -----.
- Station ID associated with job
- Number of tape devices as specified in tape resources parameter on JOB parameter
- Number of tape devices in use
- Job rerun status (YES or NO) indicating whether a job can be rerun

AVAILABILITY: Available at any logged-on station. If the command is issued at the master operator station, all entries are displayed. If the station is not the master operator station, only entries matching the station ID are displayed. If the I@ALLSDT installation parameter is enabled, all entries are displayed.

EXAMPLE: TJOB

CRAY TAPE JOBS STATUS										FRAME 0
<u>JSQ</u>	<u>DATASET</u>	<u>STATUS</u>	<u>PRI</u>	<u>TIME</u>		<u>FIELD</u> <u>LENGTH</u>	<u>ID</u>	<u>DR</u>	<u>DU</u>	<u>RR</u>
				<u>USED</u>	<u>LIMIT</u>					
7374	LPSDMP	DELAY	9.9	0	8	100	M6	1	0	YES
END OF DATA										

TLINK† - LINK TAPE TO REQUEST FOR SCRATCH TAPE

FUNCTION: Links any tape that is already premounted to a user's request for a scratch tape. Premounted tape can be labeled or unlabeled.

FORMAT:

<code>TLINK, DVN, <i>dvn</i>, <i>msgnum</i></code>
--

dvn The 1- to 8-character device name for a tape drive that has a tape mounted on it and is not assigned to a job

msgnum The 1- or 2-digit message number of an outstanding mount tape message requesting a scratch tape. (The mount message in the STM display has '??????' in the VSN field.)

AVAILABILITY: Available only at the logged-on master operator station

† TLINK is available only on systems using automatic volume recognition (AVR). AVR is a site-selectable feature that gives you control of tape drive selection and tape mounting. See the COS Internal Reference Manual, Volume II: STP, publication SM-0141, for detailed information.

UNLOAD - UNLOAD A PREMOUNTED TAPE

FUNCTION: Unloads a premounted tape from a tape drive and rearms the drive for another mount. Used to unload a premounted nonlabeled tape that was given the wrong VSN or to free premounted drives that are now needed for other jobs.

FORMAT:

<u>UNLOAD</u> , dvn

dvn The 1-to 8-character device name for a tape drive that has a tape mounted on it and is not assigned to a job

AVAILABILITY: Available only at the logged-on master operator station

APPENDIX SECTION

A. CHARACTER SET

Character	ASCII Code	Character	ASCII Code
NUL	000	DC3	023
SOH	001	DC4	024
STX	002	NAK	025
ETX	003	SYN	026
EOT	004	ETB	027
ENQ	005	CAN	030
ACK	006	EM	031
BEL	007	SUB	032
BS	010	ESC	033
HT	011	FS	034
LF	012	GS	035
VT	013	RS	036
FF	014	US	037
CR	015	SPACE	040
SO	016	!	041
SI	017	"	042
DLE	020	#	043
DC1	021	\$	044
DC2	022	%	045

Character	ASCII Code	Character	ASCII Code
&	046	=	075
'	047	>	076
(	050	?	077
)	051	@	100
*	052	A	101
+	053	B	102
,	054	C	103
-	055	D	104
.	056	E	105
/	057	F	106
0	060	G	107
1	061	H	110
2	062	I	111
3	063	J	112
4	064	K	113
5	065	L	114
6	066	M	115
7	067	N	116
8	070	O	117
9	071	P	120
:	072	Q	121
;	073	R	122
<	074	S	123

Character	ASCII Code	Character	ASCII Code
T	124	k	153
U	125	l	154
V	126	m	155
W	127	n	156
X	130	o	157
Y	131	p	160
Z	132	q	161
[	133	r	162
\	134	s	163
]	135	t	164
^ or t	136	u	165
~	137	v	166
`	140	w	167
a	141	x	170
b	142	y	171
c	143	z	172
d	144	{	173
e	145		174
f	146	}	175
g	147	~	176
h	150	DEL	177
i	151		
j	152		

B. STARTUP PROCEDURE

Startup is the procedure that brings a Cray computer system to an operational state. Startup consists of three parts: I/O Subsystem (IOS) deadstart or restart, Cray mainframe startup, and IOS station initialization. Startup file creation and maintenance are addressed in appendix C. This appendix describes the procedure for startup.

B.1 IOS STARTUP

There are two types of IOS startup that can be initiated depending on the desired results. The first type is *deadstart*, which is used when you want to start a system from tape, or when you are unable to initiate IOS restart procedures. The second type is *restart*, which is used when you want to start a system from disk.

You can start the IOS from either tape or disk. Use tape startup when you are unable to startup from disk, or you want to start a system other than the one on the Peripheral Expander disk. Use disk startup when you are restarting the system that is currently out on the Peripheral Expander disk. If deadstart fails and hardware is suspect, refer to the information on deadstart diagnostics.

B.1.1 DEADSTART DIAGNOSTIC PROGRAMS

The following IOS deadstart programs are described in the CRAY Y-MP, CRAY X-MP, and CRAY-1 Computer Systems COS On-line Diagnostic Maintenance Manual, publication SMM-1012†:

<u>Program</u>	<u>Description</u>
CLEARIO	IOS deadstart utility. CLEARIO attempts to clear the IOS if the deadstart procedure fails.
DSDIAG	IOS deadstart diagnostic control program. DSDIAG allows the system operator to run deadstart diagnostics from tape or disk.

† SMM-1012 is CRAY PROPRIETARY. Dissemination of this documentation to non-CRI personnel requires approval from the appropriate vice president and a nondisclosure agreement. Export of technical information in this category may require a Letter of Assurance.

B.1.2 DEADSTART

The following procedure describes how to deadstart the IOS from either tape or disk. The deadstart tape and disk contain the following files:

<u>Tape</u>	<u>Disk</u>	<u>Description</u>
FILE 0	TAPELOAD	Tape deadstart program
FILE 1	DISKLOAD	Disk deadstart program
FILE 2	DMP	I/O Processor dump program
FILE 3	KERNEL	The IOS Kernel
FILE 4	KERNEL.OV	IOS overlays
FILE 5	COS	COS
FILE 6	PARAM	Parameter file
FILE 7	CLEARIO	Clear IOS program
FILE 8	DSDIAG	IOS deadstart diagnostic control program
FILE 9	DSDIAG.OV	IOS deadstart diagnostic overlays

Step Procedure

- 1a. Mount the deadstart tape on the Peripheral Expander tape unit.

or
- 1b. Mount the deadstart disk in the Peripheral Expander drive unit.
2. Set IOS maintenance panel toggle switches as follows:

<u>Loading From</u>	<u>Switch Setting</u>	
	<u>Octal</u>	<u>Binary</u>
Tape	22	010 010
AMPEX disk unit	60	110 000
CDC disk unit	27	010 111

3. Depress *IOP-O MC* (or *MASTER CLEAR* on CRAY-1/A) and *DEADSTART* buttons on the Power Distribution Unit or IOS chassis maintenance panel (depending on your site).
4. Respond to the prompt at the MIOP Kernel console as follows. (If the FILE @MTO prompt is not displayed, verify that a tape is mounted on the Peripheral Expander tape unit.)

Step Procedure

4. (continued)

<u>Prompt</u>	<u>Response</u>
FILE @MT0:	Enter 3 and press RETURN (loads Kernel and performs initialization)
FILE @DK0:	Enter either the directory name (<i>dir/</i>) to display a menu of all files in requested directory or enter the Kernel filename (<i>dir/Kernel</i>) to load the Kernel and perform initialization.
	Press RETURN.

NOTE

When starting from disk, the Kernel expects the Kernel overlays to have the same Kernel name and appended with a ".OV" (for example; a Kernel with file name IOS must have the overlays with filename IOS.OV).

The Kernel goes through its initialization sequence and displays the following message on the Kernel console of all IOPs:

IOP-*n* KERNEL, VERSION *x.xx* SN*sn*, *site*. *mm/dd/yy* *hh:mm:ss*

n Number designating the IOP where the console is attached

x.xx Software version number

sn Mainframe serial number

site Installation location

mm/dd/yy Kernel assembly date

hh:mm:ss Kernel assembly time

The following message can appear on the BIOP or DIOP console only:

DISK NOT READY CH *nn*

Step Procedure

4. (continued)

The message indicates that the configured system disk has not responded to attempts to select it. The disk might be disabled at the IOS Power Distribution Unit cabinet, at the IOS deadstart panel, or at the disk unit itself (maintenance mode). This message may not indicate a problem since the operating system being loaded in the mainframe controls which configured devices must be present for successful operation.

5. If your IOS does not have a Peripheral Expander clock, two prompts are issued at the MIOP Kernel console for the current date and time.

NOTE

If your IOS is equipped with a Peripheral Expander clock, you are not asked to enter date and time. See SETIME command (section 2) to set or reset the Peripheral Expander clock.

Proceed to step 6.

After the "ENTER DATE:" prompt, enter the date in the following format:

mm/dd/yy

Once the date has been accepted, the MIOP Kernel console displays the "ENTER TIME:" prompt. Enter the time in the following format:

hh:mm:ss

6. Proceed to the Cray Mainframe Deadstart procedure (subsection B.2).

B.1.3 RESTART

You can restart the IOS from files that were previously saved on a Peripheral Expander disk. To restart the IOS, perform the following procedure.

Step Procedure

1. Type CONTROL-D at the MIOP Kernel console. The screen should display the "SYSDUMP?" prompt. (If the prompt does not appear, a deadstart is required. See subsection B.1.1 to deadstart the IOS.) If a dump is not required, proceed to step 2b; otherwise, continue with step 2a.

- 2a. Perform the following after the prompt to request a system dump. (See appendix D for a description of SYSDUMP.):
 - Enter a Y without a RETURN.
 - Check the SYSDUMP Parameter List and, if needed, change any parameters. Select YES for the Restart parameter indicating that a restart can be done from the MIOP Kernel console upon completion of the dump.
 - Respond to the SYSDUMP messages as needed. When the dump is complete, the system responds with:

 RESTART FILE @DK0:
 - Go to step 3.

- 2b. To restart the IOS without a system dump:
 - Enter N without a RETURN after the "SYSDUMP?" prompt. The system responds with the "RESTART?" prompt.
 - Enter a Y without a RETURN. The system responds with the following message:

 RESTART FILE @DK0:
 - Go to step 3.

3. Enter the directory name and file name (*dir/filename*) of the Kernel binary that was previously saved on the Peripheral Expander disk. If a directory name followed by a slash (*dir/*) is entered, the system displays a list of all of the files in the specified directory.

The following message is displayed on the Kernel console of all IOPs.

IOP-*n* KERNEL, VERSION *x.xx* SNS*n*, *site*. *mm/dd/yy* *hh:mm:ss*

Step Procedure

3. (continued)
- | | |
|-----------------|--|
| <i>n</i> | Number designating the IOP where the console is attached |
| <i>x.xx</i> | Software version number |
| <i>sn</i> | Mainframe serial number |
| <i>site</i> | Installation location |
| <i>mm/dd/yy</i> | Kernel assembly date |
| <i>hh:mm:ss</i> | Kernel assembly time |

The following message can appear only on the BIOP or DIOP console:

DISK NOT READY CH *nn*

It indicates that the configured system disk has not responded to attempts to select it. The disk might be disabled at the IOS Power Distribution Unit cabinet, at the IOS deadstart panel, or at the disk unit itself (maintenance mode). This message may not indicate a problem since the operating system being loaded in the mainframe controls which configured devices must be present for successful operation.

4. If your IOS does not have a Peripheral Expander clock, two prompts are issued at the MIOP Kernel console for the current date and time.

NOTE

If your IOS is equipped with a Peripheral Expander clock, you are not asked to enter date and time. See SETIME command (section 2) to set or reset the Peripheral Expander clock.

Proceed to step 5.

After the "ENTER DATE:" prompt, enter the date in the following format:

mm/dd/yy

Step Procedure

4. (continued)
Once the date has been accepted, the MIOP Kernel console displays the "ENTER TIME:" prompt. Enter the time in the following format:

hh:mm:ss

5. Proceed to the Cray Mainframe Startup procedure (subsection B.2).

B.2 CRAY MAINFRAME DEADSTART

To deadstart the Cray mainframe after deadstarting or restarting the IOS, enter the START Kernel command (with the parameters for the required files) at the MIOP Kernel console. The required files are the COS binary file that contains the operating system code (the first parameter following the START command) and the STARTUP parameter file (the second parameter). (The CRI site analyst creates the parameter file, using the IOS file editor described in appendix C.)

The START command tells the IOS Kernel program where the files required for deadstart are stored and establishes the link between the IOS and the mainframe. As denoted by START command parameters (see the following definitions), both the mainframe startup files can be stored on the Peripheral Expander's tape or disk or both.

The command syntax conventions used in the START command format are summarized in subsection 1.5.

Format:

```
| START @MTunit:num|[@DKunit:][dir/]file |
| @MTunit:num[,ED]|[@DKunit:][dir/]file[,ED]@TT |
|_____|
```

@MT	Peripheral Expander tape device (on which binary and/or parameter files exist)
unit	Unit number (0 through 9)
num	Physical file number on tape (0 through 9999)

@DK Peripheral Expander disk device (on which the binary and/or parameter files exist)

dir Directory name on disk; maximum of 15 alphanumeric characters. If not specified, the default is used (see the DEF command in section C).

file File name on disk; maximum of 15 alphanumeric characters.

ED Option to route the parameter file through the IOS File Editor before going to the mainframe. It lets you make changes to the default system configuration (see appendix C). This option can only be specified with the @MT and @DK parameters.

@TT Designates that the parameter file is to be input from console

If a device is not specified, the expander disk unit 0 is used.

Upon completion of the mainframe startup, the following messages should appear on the MIOP console:

```
CPU <-> MIOP CHANNEL INIT
CPU <-> MIOP LINKAGE COMPLETE
```

```
START COMPLETE
```

If mainframe deadstart fails, the system displays error messages instead of the CPU <-> MIOP LINKAGE COMPLETE message. Although causes for failure are generally site-specific, a standard course of action is to initiate a dump (see appendix D) or to try again.

To continue with the startup procedure, proceed to subsection B.3, Station Initialization.

The following are some examples showing the use of the START command.

Example 1:

In this example, the COS binary file is file number 5 and the parameter file is file number 6. Both are on tape unit 0.

```
START @MT0:5 @MT0:6
```

Example 2:

In this example, the COS binary file is COS in directory ABC, and the parameter file is DEADSTART in directory XYZ. Both files are on disk unit 0.

```
START @DK0:ABC/COS @DK0:XYZ/DEADSTART
```

Example 3:

In this example, the COS binary file is COS in directory ABC, and the parameter file is DEADSTART in the default directory (see the DEF File Utility command in section 2). Both files are on the default device, disk unit 0.

```
START ABC/COS DEADSTART
```

Example 4:

The DEADSTART parameter file that was previously saved in the default directory can be modified by the EDIT File Utility command (described in section 2) as follows:

```
START COS DEADSTART,ED
```

B.3 STATION INITIALIZATION

The final phase in bringing a Cray computer system to an operational state is to bring up the station software. Perform the following steps to initialize the station.

<u>Step</u>	<u>Procedure</u>
-------------	------------------

- | | |
|----|--|
| 1. | Enter the STATION Kernel command at the MIOP Kernel console to initialize the station software. The STATION Kernel command is explained in detail in section 2 and has the following format: |
|----|--|

```
STATION [num]
```

The following message appears at the console specified by the *num* parameter of the STATION command (*num* might be a default value):

```
CRAY STATION, VERSION x.xx
```

<u>Step</u>	<u>Procedure</u>
-------------	------------------

2. Enter the LOGON station command, at the console initialized in step 1, to establish communication between the station and the Cray mainframe. The LOGON station command is explained in detail in section 3 and has the following format:

LOGON[,id][,tid]

3. Enter the STMSG station command (described in section 3) at the master operator station to display the station messages that require your response to continue. The console displays the letter "M" in the center of row 1 and beeps to alert you that a response is required.

The messages that appear at this time have the following general format and content:

<u>MN</u>	<u>TIME</u>	<u>MESSAGE</u>
nn	xx:xx	Problem-specific prompt requiring analyst interaction or enter <i>GO</i> , <i>SKIP</i> , or <i>CONTINUE</i>

To ignore the messages and continue with startup, use the REPLY response with *GO*, *SKIP*, or *CONTINUE*, as indicated by the STMSG display. An example of this type of response is:

REPLY nn GO

If any other response is required, see the CRI site analyst. Because all messages potentially require interaction with the CRI site analyst, they are documented for the analyst in the COS Operational Procedures Reference Manual, publication SM-0043.

4. Enter a Y with a period (Y.), followed by a RETURN, to check for the STARTUP COMPLETE message.

Step Procedure

5. Depending on the site, you typically enter the following station commands†, described in section 3, to complete the procedures that bring the system to an operational state:

STATUS
RECOVER
LIMIT
CHANNEL n ON
CONSOLE 1

As required, enter the CONC, NSC, and IAIOP Kernel concentrator commands (described in section 3) to enable additional channels.

The system is ready for use. Now bring up the appropriate stations from the front-ends.

† The COS Operational Procedures Reference Manual, publication SM-0043, provides more information about commands necessary for this phase of startup.

C. IOS FILE EDITOR

This appendix describes the I/O Subsystem (IOS) File Editor. The IOS File Editor creates text files such as the startup parameter file, or modifies a text file already existing on a Peripheral Expander disk.

To invoke the IOS File Editor, specify ED on the Kernel START command (see section 2), or use the EDIT utility command (also described in section 2). Once you invoke the editor, it operates in one of two modes:

- Command input mode. A > character (ASCII 076) in column 1 identifies the command input mode. Only valid editor commands, described below, are recognized.
- Text input mode. A line number beginning in column 1 identifies text input mode. Input is accepted on a line-by-line basis. A carriage return or line feed terminates each line and displays the next sequential line number. Pressing ESC (escape) causes a return to command mode.

Use the file editor commands described in this appendix while the IOS File Editor is in command input mode. You need to enter only the underlined part of each file editor command for the IOS file editor to recognize the command.

Table C-1 summarizes the file editor commands. The commands are described in detail in alphabetical order following the table.

Table C-1. File Editor Commands

Command	Description
<u>A</u> PPEND	Causes the editor to enter text input mode and appends text to the file
<u>B</u> YE	Terminates the editor
<u>D</u> ELETE	Deletes the lines specified
<u>I</u> NSERT	Causes the editor to enter text input mode, displaying the line number following the one entered. Text can then be entered at that location.

Table C-1. File Editor Commands (continued)

Command	Description
<u>P</u> PRINT	Prints all text in and between the lines specified to the expander printer
<u>R</u> REPLACE	Replaces the lines within the specified range
<u>T</u> TYPE	Displays the lines within the specified range on the console. All lines are preceded by their line numbers.

C.1 APPEND COMMAND

APPEND appends text to the file. The editor enters text input mode displaying the line number following the last line in the file. If the file is empty, the input begins at line 1.

Format:

<u>A</u> PPEND

C.2 BYE COMMAND

BYE terminates the editor.

Format:

<u>B</u> YE

Unless editing a parameter file during mainframe START, the editor responds with an offer to save the edited version of the file as a permanent file by displaying:

SAVE?

If your response is YES (Y), the system displays the following request for a file name:

ENTER FILE NAME:

Enter a file name to be associated with the edited version.

Format:

```
[@DKunit:][dir/]file
```

unit Unit number (0 through 9). If a device is not specified, Peripheral Expander disk unit 0 is used.

dir Directory name on disk; maximum of 15 alphanumeric characters. If a directory name is not specified, the default directory is used. (See the DEF command described in section 2.)

file File name on disk; maximum of 15 alphanumeric characters.

C.3 DELETE COMMAND

DELETE deletes the lines between and including the lines specified.

Format:

```
|
| DELETE  $ln_1$   $ln_2$ 
|
```

ln_1 Number of the first line to delete

ln_2 Number of the last line to delete. If ln_2 is greater than the number of the last line in the file, all lines from ln_1 to the end of the file are deleted, and the message END OF FILE is displayed.

C.4 INSERT COMMAND

When INSERT is entered, the editor enters text input mode, displaying the line number following the one entered. Text can then be entered at this location. Text input mode is exited and the insertion is complete when ESC (escape) is pressed.

Format:

```
|_____|
|  INSERT ln  |
|_____|
```

ln Number of the line after which text is to be inserted. If *ln* is greater than the last line number in the file, the message END OF FILE is displayed.

C.5 PRINT COMMAND

PRINT prints all text between and including the lines specified to the expander printer. All lines are preceded by their line numbers.

Format:

```
|_____|
|  PRINT    ln1 ln2  |
|  A  |
|_____|
```

ln₁ Number of the first line to print

ln₂ Last line to print. If *ln₂* is greater than the number of the last line number in the file, all lines from *ln₁* to the end of the file are printed and the message END OF FILE is displayed.

A The complete file is printed

C.6 REPLACE COMMAND

REPLACE replaces the lines within the specified range (text between and including the specified lines is deleted) and then enters text input mode at the first line specified.

Format:

```
| REPLACE ln1 ln2 |
```

ln₁ Number of the first line to replace

ln₂ Number of the last line to replace

C.7 TYPE COMMAND

TYPE displays the lines specified on the console. All lines are preceded by their line numbers.

Format:

```
|            ln1 ln2  
| TYPE            A  
|
```

ln₁ Number of the first line to display

ln₂ Number of the last line to display. If *ln₂* is greater than the last line number in the file, all lines from *ln₁* through the end of the file are displayed, and the message END OF FILE is displayed.

A The complete file is typed to the screen

D. IOS DUMP PROGRAMS

Two dump programs, SYSDUMP and DMP, can be used with the I/O Subsystem (IOS) Kernel. SYSDUMP is the activity that is invoked to dump selected areas of the system to disk for examination. (For more information on SYSDUMP, see the IOS Software Internal Reference Manual, publication SM-0046.) If COS cannot be run (SYSDUMP will not complete), DMP is the back-up procedure that sends a dump to the expander printer.

D.1 SYSDUMP

Use the SYSDUMP utility to selectively dump areas of a Cray computer system to disk for future examination. The dump is directed to an area on the master device set up by the operating system at install time. When the system is restarted, the dump is relocated as a permanent dataset (CRAY1SYSTEMDUMP). It can then be referenced by the FDUMP utility. SYSDUMP requires the Kernel software to be operational in the IOS; if SYSDUMP does not execute, you will have to use the DMP utility (subsection D.2).

For SYSDUMP, you can select to dump up to four noncontiguous areas of Central Memory, Buffer Memory, and SSD memory, plus selected tables in Central Memory. If the IOS is dumped, all configured I/O Processors (IOPs) are dumped. The dump information includes the following:

- Local Memory
- Operand registers
- Registers A, B, C, E, and the exit stack
- Done and Busy flags for all channels

All dumps also include the B, T, V, and VM registers from the mainframe.

SYSDUMP is initiated automatically by the IOS when the system halts, or you can do it manually by entering CONTROL-D at the Master IOP Kernel console.

Once SYSDUMP is invoked (either by CONTROL-D or a system halt), the system issues the "SYSDUMP?" prompt. After the prompt, enter a Y without a RETURN and the system responds with the SYSDUMP parameter list (see subsection D.1.2).

D.1.1 SYSDUMP FUNCTION

When the CRT Interrupt Handler in the MIOP senses the system dump command, an overlay is loaded into the MIOP at location 0 and given control. The functions of this overlay are to:

1. Master clear and force an exchange to occur in the mainframe so that the current Exchange Package can be recovered from memory
2. Compile a table containing the dump parameters and load the table in Buffer Memory for access from the Buffer I/O Processor (BIOP)
3. Send a message to the BIOP requesting a system dump
4. Scan messages from the BIOP

When the BIOP receives the message requesting a system dump, an overlay is loaded and given control at address 0. The functions of this overlay are to:

1. Acquire the dump parameter table from Buffer Memory
2. Read in the device label from the specified disk and find the system dump area assigned

D.1.2 PARAMETER LIST

After you respond to the SYSDUMP? prompt, the system issues a default list of the required system parameters so that you can change them, if necessary, before processing begins. (Table D-1 defines the parameters.) An example of this list follows.

PARAMETER LIST

DEVICE: DK20-1 DD39
UNIT: 0
SYSTEM: X
PROCESSORS: 1
OS: COS
CRAY: ALL
TABLE MEMORY: YES
BUFFER MEMORY: ALL
SSD: NONE
IOS: YES
RESTART: YES

CHANGE ?

Table D-1. SYSDUMP Parameter Definitions

Parameter	Function
DEVICE: DK <i>ch</i> - <i>x dev</i>	Physical device ID of the designated master device DK Required descriptor <i>ch</i> Physical channel number <i>x</i> IOP number to which device is connected <i>dev</i> Device type (one of the following): DD19 DD-19 Disk Storage Unit DD29 DD-29 Disk Storage Unit DD39 DD-39 Disk Storage Unit DD40 DD-40 Disk Storage Unit DD49 DD-49 Disk Storage Unit
UNIT: <i>x</i>	Physical unit number of the master device. Displayed only if the device type specified is a DD-39 or DD-40. Valid unit numbers (<i>x</i>) are 0 through 2 for the DD-39 and 0 through 1 for the DD-40.
SYSTEM: <i>x</i>	System type (<i>x</i>) being dumped: 1/S CRAY-1 S or CRAY-1 M computer system X CRAY X-MP computer system YX CRAY X-MP EA computer system Y CRAY Y-MP computer system
PROCESSORS: <i>x</i>	Number of central processors (<i>x</i>) attached to the system (not displayed for CRAY-1 computer systems)
OS: <i>name</i>	Operating system name (<i>name</i>): COS
CRAY: <i>addr</i>	Address range (in octal) of Central Memory to be dumped, where <i>addr</i> is one of the following: ALL All of configured Central Memory NONE None of Central Memory <i>range1;range2;range3;range4</i> Up to four noncontiguous address ranges can be specified (for example, 0-100;1000-2000)

Table D-1. SYSDUMP Parameter Definitions (continued)

Parameter	Function
TABLE MEMORY: xxx	Specifies whether selected Central Memory tables are to be dumped. The areas to be dumped are determined by the operating system running on the mainframe. The information is stored in a table in Central Memory and read by the IOS. Options (xxx) are as follows: YES NO
BUFFER MEMORY: addr	Address range (in octal) of IOS Buffer Memory to be dumped. addr options are the same as those for the CRAY parameter.
SSD: addr	SSD solid-state storage device memory address (in octal) to be dumped. addr options are the same as those for the CRAY parameter. (If an SSD is not configured into the system, this parameter is not displayed.)
IOS: xxx	Specifies whether or not the I/O Subsystem registers and Local Memories are to be dumped. Options (xxx) are: YES NO
RESTART: xxx	Specifies whether or not the IOS is to be restarted at the conclusion of the dump. Options (xxx) are: YES NO If the restart is selected (RESTART: YES), the IOS can be restarted from the MIOP Kernel console when the dump is completed. If restart is not selected (RESTART: NO), you must deadstart the system after the dump is completed.

Table D-1. SYSDUMP Parameter Definitions (continued)

Parameter	Function
CHANGE ? xxx	Specifies whether or not you want to change any of the SYSDUMP parameters. Options (xxx) are: NO Dump proceeds according to displayed parameters YES Parameters are displayed one at a time followed by the prompt (>) for a new option. A carriage return advances the display to the next parameter. (If no option is entered, the displayed option is retained.)

The following example shows how to make changes to the parameter list.

Example:

Default listing:

PARAMETER LIST

DEVICE: DK20-1 DD29
 SYSTEM: X
 PROCESSORS: 1
 OS: COS
 CRAY: ALL
 TABLE MEMORY: YES
 BUFFER MEMORY: ALL
 SSD: NONE
 IOS: YES
 RESTART: YES

CHANGE?: YES

Indicates you want to change one or more parameters

Parameter list to change:

DEVICE: DK20-1 DD29	
>	No change to parameter
SYSTEM: X	
>	No change
PROCESSORS: 1	
>2	Change to two central processors
OS: COS	
>	No change
CRAY: ALL	
>	No change
TABLE MEMORY: YES	
>	No change
BUFFER MEMORY: ALL	
>NONE	Change to no dump of Buffer Memory
SSD: NONE	
>0-1000; 10000-20000	Change to specified range of SSD memory
IOS: YES	
>NO	Change to no dump of IOS registers and Local Memory
RESTART: YES	
>	

After "RESTART:", the new parameter list is displayed (allowing for further changes).

New listing:

PARAMETER LIST

DEVICE: DK20-1 DD29
SYSTEM: X
PROCESSORS: 2
OS: COS
CRAY: ALL
TABLE MEMORY: YES
BUFFER MEMORY: NONE
SSD: 0-1000; 10000-20000
IOS: NO
RESTART: YES

CHANGE ?

D.1.3 SYSDUMP MESSAGES

SYSDUMP issues the following messages as it progresses. (The messages are listed in alphabetical order.)

<u>Message</u>	<u>Action/Description</u>
BUFFER MEMORY DONE	Informative; Buffer Memory has been dumped.
CLUSTERS DONE	Informative; the cluster registers have been dumped. Cluster registers only apply to CRAY X-MP computer systems.
CPU MEMORY DONE	Informative; Central Memory has been dumped.
CPU REGISTERS DONE	Registers have been dumped. These include: • B registers • T registers • V registers • VM registers The A and S registers are retrieved from the Exchange Packages that were saved in Central Memory during dump.
CPU TIME OUT...CONTINUE?	MIOP did not receive a response from the mainframe in the allotted time. If the dump is to be continued, type Y and RETURN. Also note the occurrence of this problem with dump in your logbook and inform the CRI site analyst, since dump may no longer be valid.
DISK ERROR - ABORT	Informative; dump aborted.
DUMP COMPLETED	Informative
DUMP TRUNCATED	Informative; dump truncated due to insufficient space allocated on disk for SYSDUMP.
HIGH-SPEED CHANNEL ERROR	Informative; dump continues.

<u>Message</u>	<u>Action/Description</u>
IOP- <i>n</i> NOT RESPONDING - RETRY?	Check the IOP- <i>n</i> (<i>n</i> is 1 or 2) display console to see if the debug display is on the screen. If it is (it will be obvious), type X and RETURN at the IOP- <i>n</i> console; then enter Y and RETURN to the message on the MIOP display console.
IOS DONE	Informative; the IOS has been dumped. Included for each IOP configured are: • Local Memory • Operand registers • Registers A, B, C, E, and exit stack • Channel Done and Busy flags
LABEL NOT FOUND - ABORT	Informative; dump aborted.
MOS ERROR - ABORT	Informative; dump continues.
SSD DONE	Informative; dump of SSD completed.
TABLE MEMORY DONE	Informative; Table memory has been dumped.
TABLE MEMORY ERROR	Informative; Table memory cannot be dumped. Table size is 0 or an invalid address was given for the memory area to dump.

D.2 DMP

DMP is a stand-alone utility program that executes in the IOS, and dumps selected areas of the Cray computer system to the expander printer. DMP is loaded into the IOS from tape or the expander disk and lets you determine the dump contents.

The following memories and registers are available to be dumped by DMP:

- Central Memory
- Buffer Memory
- IOP Local Memory
- IOP operand registers, accumulators, carry bit, and the exit stack

The following items in the display printout are used by DMP and thus, they are not meaningful output for analysis:

- The first 2048 parcels of MIOP (IOP-0)
- The last 64 operand registers of IOP-0
- The first 1024 parcels of IOP-1, IOP-2, and IOP-3

Warning messages appear on the MIOP display/console when the addresses selected contain invalid data. Duplicate lines within the dump are suppressed.

Space limitations allow for only 7 octal digits in addresses printed at the beginning of each line. Therefore, an address bias to be added to the displayed addresses is given at the top of each page for both Central Memory and Buffer Memory.

D.2.1 LOADING DMP

Perform the following procedure to load the DMP program.

<u>Step</u>	<u>Procedure</u>
-------------	------------------

1a.	Mount the deadstart tape on the Peripheral Expander tape unit.
-----	--

or

1b.	Mount the deadstart disk in the Peripheral Expander drive unit.
-----	---

2. Set IOS maintenance panel toggle switches as follows:

<u>Loading From:</u>	<u>Switch Setting (octal)</u>
Tape	22
AMPEX disk unit	60
CDC DISK unit	27

3. Depress *IOP-0 MC* (or *MASTER CLEAR* on CRAY-1 A) and *DEADSTART* buttons on the Power Distribution Unit or IOS chassis maintenance panel (depending on your site).

Step Procedure

4. Respond to the prompt at the MIOP Kernel console as follows:

<u>Prompt</u>	<u>Response</u>
FILE @MT0:	Enter 2 and press RETURN
FILE @DK0:	Enter DUMP and press RETURN

TAPELOAD or DISKLOAD saves the information concerning MIOP in Buffer Memory, loads DMP, and then passes control to DMP.

After DMP has been loaded, it displays the following message:

I/O PROCESSOR DUMP PROGRAM

At this point DMP prompts you to respond to a sequence of requests concerning the dump. Figure D-1 indicates the flow of the DMP program. See subsection D.2.2 for explanations and actions for each DMP message.

D.2.2 DMP MESSAGES

DMP issues a sequence of messages requiring your response. These messages and the required action are summarized below. The list is given in alphabetical rather than chronological sequence. A dash precedes an informative message.

Figure D-1, Message Flow in DMP, shows a flowchart of the messages in the order they appear during the execution of DMP.

In the following sequences, except for the dump of IOP internal registers, you can terminate dumping of the specified area in memory by pressing LINE FEED. This action causes DMP to advance to the next step.

When the last step is reached, DMP automatically starts with the first step again, allowing you to dump more information if needed. To terminate the DMP operation, deadstart again.

Message

Action/Description

ADDRESS RANGE:

Enter range of memory to be dumped and press RETURN. The separator between the octal addresses can be either a space or a comma.

BASE:

Enter octal base address of Cray mainframe Central Memory to which all addresses displayed are relative. Press RETURN.

CRAY MEMORY?

Enter Y if a dump of Central Memory is desired. DMP responds with a request for the range of addresses to be dumped. The address range entered is relative to the specified base. (See BASE: and ADDRESS RANGE: messages.)

For Buffer Memory, entering N causes DMP to advance to the next step. For Central Memory, entering N causes DMP to reinitiate the request sequence, beginning with the MOS request.

-INTERNAL REGISTERS

Informative; displayed while the IOP accumulator, carry bit, B register, exit stack pointer, and exit stack are being dumped to the printer. This dump cannot be interrupted by pressing LINE FEED.

IOP-n?

Enter Y if a dump of the specified IOP is desired, or enter N to advance to the next step.

-IOP-n

Informative; appears while IOP-n is being dumped.

LOCAL MEMORY:

Enter address range of IOP-n Local Memory to be dumped and press RETURN. Addresses can be separated by a space or a comma. If Local Memory for an IOP is dumped, the IOP internal operand registers are automatically included in the dump.

If Local Memory for an IOP is not to be dumped, immediately press RETURN.

<u>Message</u>	<u>Action/Description</u>
-LOCAL MEMORY	Informative; appears while IOP-n Local Memory is being dumped.
MORE?	Enter Y if additional areas of this type of memory are desired. Entering Y causes the request for address range to be repeated. For Buffer Memory, entering N causes DMP to advance to the next step. For Central Memory, entering N causes DMP to reinitiate the request sequence, beginning with the MOS request.
MOS?	Enter Y to dump the IOS Buffer Memory. Enter N to go to next step. (The LISTO Kernel command described in section 3 provides information, including the Buffer Memory address, on all overlays defined in the IOS.)
-MOS	Informative; displayed while Buffer Memory is being dumped.
MOS MULTIBIT-ADDRESSES XXXXX	A Buffer Memory program reference results in an irrecoverable error. DMP displays this message and takes no further action.
@PRO: NOT READY	Printer is not ready for dump output. Perhaps it is not turned on or it is in local mode. When the printer is readied, the dump continues.
-OPERAND REGISTERS	Informative; displayed while IOP-n operand registers are being dumped.
PAPER LOW - TYPE C TO CONTINUE	Printer is low on paper. Enter C to let the current page be printed. Each page fed from this point causes the message to be repeated. Respond with C to each request until the printer is reloaded.

Message

Action/Description

TRACE?

Enter Y if the trace feature in the Kernel was enabled and a dump of trace buffers is desired. This message is followed by a request for IOP number. Each IOP has its own trace buffer. Trace buffers are dumped in parcel format from most recent entry to least recent. You must select which IOPs to dump.

Enter N to advance to the next step.

-TRACE BUFFER

Informative; a trace buffer is being printed.

WARNING: DATA FROM 0 - n
NOT VALID

You have specified an address for Local Memory that begins with 0. The data at this address is not valid because the DMP program has overwritten it. This message is only a warning. No system action is taken.

WARNING: DATA INVALID BELOW
ADDRESS 10000

You have specified an address for local memory that begins with 1 and is five digits long. This message is only a warning. No system action is taken.

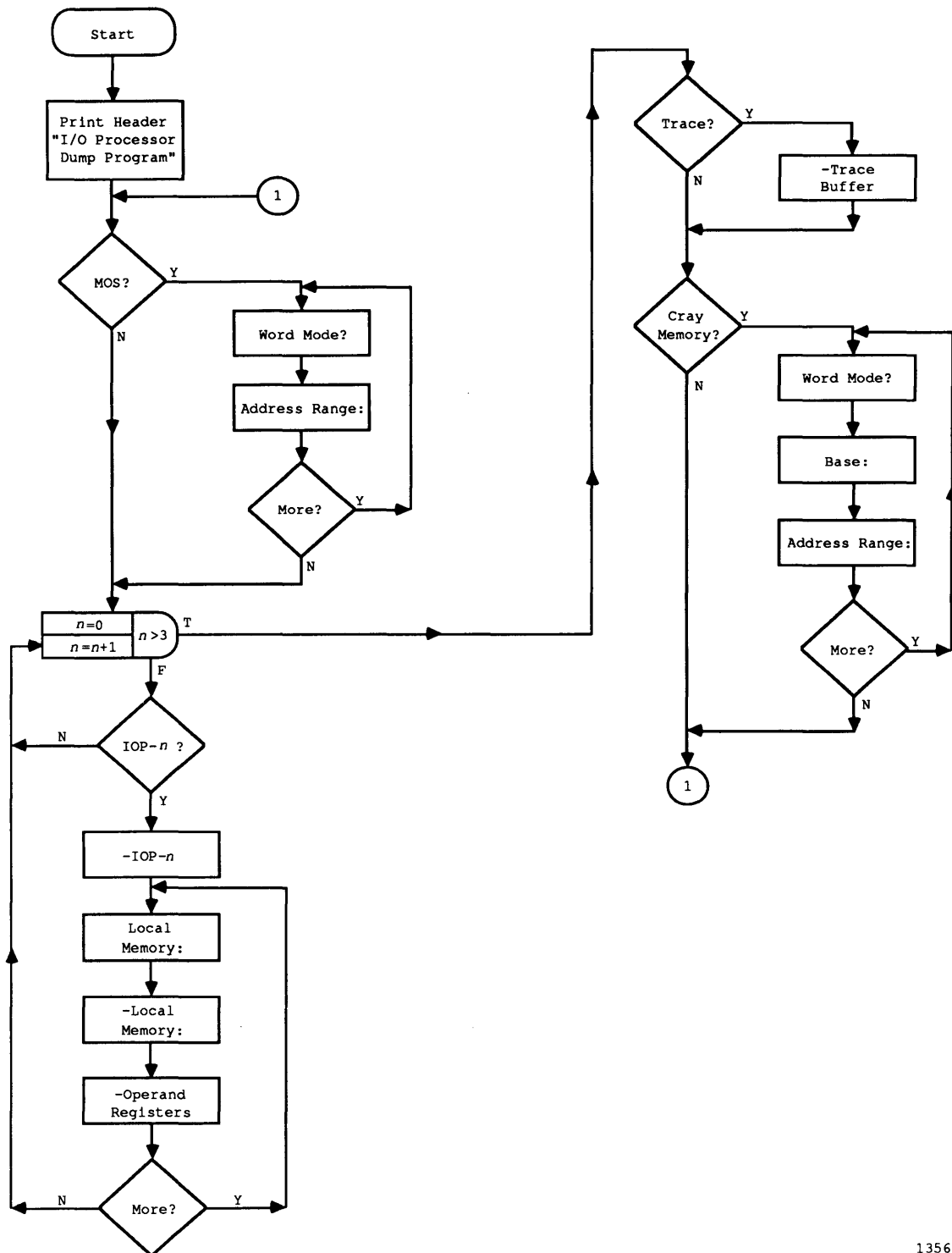
WARNING: DATA NO LONGER VALID
BELOW 1125

You have specified an address in the range 0 to 1125 for IOP1, IOP2, or IOP3. This message is only a warning. No system action is taken.

WORD MODE?

Enter N if the dump is to be in parcel mode consisting of eight 16-bit parcels per line.

Enter Y if the dump is to be in word format consisting of four 64-bit words per line with ASCII interpretations.



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Figure D-1. Message Flow in DMP

E. DATASET TRANSFERS USING PERIPHERAL EXPANDER DEVICES

The I/O Subsystem (IOS) supports acquisition of datasets from and disposition to the Peripheral Expander magnetic tape and disk units. It also supports disposition of datasets to Peripheral Expander printer and plotter units. This appendix describes dataset acquisition from and disposition to the Peripheral Expander devices.

E.1 DATASET ACQUISITION

The IOS station software supports acquisition of datasets with the following acquisition code and TEXT field combinations used in the COS ACQUIRE and FETCH statements. (For descriptions of the ACQUIRE and FETCH statements, see the COS Version 1 Reference Manual, publication SR-0011.) The TEXT parameter must be specified and must have the format described in this section. The dataset may have any format. Data is read from tape in 512-word blocks.

E.1.1 DATASET ACQUISITION FROM MAGNETIC TAPE

Use the following format to acquire a dataset from magnetic tape.

Format:

ACQUIRE,...,AC=MT,TEXT=vol:file[:NR]
FETCH,...,AC=MT,TEXT=vol:file[:NR]

AC=MT Acquire a dataset from magnetic tape

TEXT=vol Volume name; 1 through 7 characters. This identifier appears in the tape mount message at the Master IOP Kernel console.

file File number; 0 through 9999.

NR No rewind. Optional parameter specifying that the tape is to remain reserved for the job for a subsequent transfer.

E.1.2 DATASET ACQUISITION FROM DISK

Use the following format to acquire a dataset from disk.

Format:

```
| ACQUIRE,...,[AC=ST,]TEXT=[vol:][dir/]file |  
| FETCH,...,[AC=ST,]TEXT=[vol:][dir/]file  |  
|_____|
```

AC=ST Acquire a dataset from Peripheral Expander disk. Expander disk is the default if AC is not specified.

vol Volume name; 1 through 7 characters. This identifier appears in the disk mount message posted on the MIOP Kernel console. If not specified, the default volume name is used. (See station DEFAULT command, section 3.)

dir Directory name; 1 through 15 characters. If not specified, the default disk directory is used. (See station DEFAULT command, section 3.)

file File name; 1 through 15 characters.

If the TEXT field is invalid, the ACQUIRE or FETCH request aborts.

E.2 DATASET DISPOSITION

The IOS station software supports disposed datasets with the following disposition code and TEXT field combinations used in the COS DISPOSE statement. You may print or plot disk datasets or write them to magnetic tape or disk.

E.2.1 PRINT DATASET

Use the following format to print a dataset. Printing the dataset is the default for job output. The dataset must be in COS blocked format.

Format:

```
| DISPOSE,...,[DC=PR],[TEXT=DOC:ft,...] |  
|_____|
```

DC=PR Print dataset, which is the default for job output. The first character of each record is treated as a carriage control character unless SF=NC is specified on the COS DISPOSE job control statement. This is an optional parameter. The expander printer is the default device if DC is not specified.

TEXT=DOC: Indicates that the file is to be printed in document format. In this mode, the output is rotated clockwise 90° on the printed page. When the TEXT parameter is omitted, printing is horizontal on the page.

ft Font selection; if *ft* is omitted, an error message for invalid text field appears.

<u>Font</u>	<u>Description</u>
F80	80 characters per line, 66 lines per page
F132	132 characters per line, 75 lines per page

E.2.2 WRITE DATASET TO PLOTTER

Use the following format to write a dataset to a plotter. Data is sent to the plotter transparently, with 1024 bits per raster line. The dataset is assumed to be in unblocked format.

Format:

```
| DISPOSE,...,DC=PT,... |
```

DC=PT Plot dataset; the printer is driven in plot mode.

E.2.3 WRITE DATASET TO MAGNETIC TAPE

Use the following format to write a dataset to magnetic tape. The dataset may have any format. The data is sent to the tape in 512-word blocks.

Format:

```
| DISPOSE,...,DC=MT,TEXT=vol:file[:NR],... |
```

DC=MT	Dataset written to magnetic tape
TEXT=vol	Volume must be specified and have the format described for tape ACQUIRE requests
<i>file</i>	File number; 0 through 9999
NR	No rewind. Optional parameter specifying that the tape is to remain reserved for the job for a subsequent transfer.

E.2.4 WRITE DATASET TO PERIPHERAL EXPANDER DISK

Use the following format to write a dataset to Peripheral Expander disk. The dataset may have any format.

Format:

DISPOSE,...,DC=ST,TEXT=[vol:][<i>dir/</i>] <i>file</i> ,...

DC=ST	Dataset written to expander disk
TEXT=vol	Volume must be specified and have the format described for disk ACQUIRE requests
<i>dir</i>	Directory name
<i>file</i>	File name

F. TAPE MOUNT REQUESTS

The information in this appendix is for magnetic tape units other than the Peripheral Expander Tape Unit. All tape mount/remount requests are preceded with the message number (*msgnum*) and the time at which the message was issued, in hours and minutes (*hh:mm*).

The format of the messages and responses required depends on whether or not your site is using the automatic volume recognition (AVR) feature. See the appropriate section of this appendix for the correct formats and responses. (See the COS Reference Manual, publication SR-0011, for a description of AVR.)

F.1 TAPE MOUNT REQUESTS FOR SYSTEMS NOT USING AVR

This subsection describes the reply responses and message formats for systems not using the AVR feature.

F.1.1 TAPE MOUNT/REMOUNT MESSAGES

The tape mount/remount messages are described in this section. If the message requires a response, see subsection F.1.2.

msgnum hh:mm ENTER VSN MOUNTED ON DEVICE *devname*

The mounted volume does not have a label group providing its volume serial number. Enter volume serial number (*vsn*) as follows:
REPLY *msgnum vsn*.

msgnum hh:mm JOB *jobname(jsq)* AWAITING RESOURCE *gname*
REPLY 'RETRY' OR 'ABORT'

An executing job (*jobname*) requested a dedicated resource (*gname*) such as a tape device and no drive is available. To attempt device access, ensure the device is on line and enter REPLY *msgnum* RETRY. To abort the job, enter REPLY *msgnum* ABORT.

msgnum hh:mm MOUNT TAPE vsn(lt) ON devname - JOB jobname (jsq)

Mount the tape specified by *vsn* (volume serial number) and *lt* (label type) on the specified tape device *devname*. If the specified device is not desired, reply with either the name of the device that the mount should go to or with RESELECT to let the system choose another device. (If a device is not available, the job is delayed until another job frees a device.) *lt* can be one of the following:

NL Unlabeled
AL ANSI standard labels
SL IBM standard labels
FRN Foreign labels or tape of incompatible density

msgnum hh:mm READY vsn(lt) ON devname - RESET HIT

The reset button is activated before the device (*devname*) is ready. This condition normally arises for run-away tape volumes and requires mounting another scratch volume.

msgnum hh:mm REMOUNT vsn(lt) ON devname INSERT RING IN VOLUME

A write was attempted on volume (*vsn*) without write ring present. Place the write ring in the mounted volume and remount.

msgnum hh:mm REMOUNT vsn(lt) ON devname TAPE CANNOT BE SCRATCHED - rjc

Mount was requested for installation scratch tape (*VSN*=??????), but the tape which was mounted cannot be used for various reasons (see *rjc* below). The different values for *rjc* in the message correspond to the job abort messages ABXXX in the COS Message Manual, publication SR-0039).

<u><i>rjc</i></u>	<u>Rejection Code</u>
-------------------	-----------------------

- | | |
|-----|---|
| 112 | The volume mounted is protected against any reads or writes. |
| 113 | The dataset being overwritten is password-protected and cannot be overwritten. |
| 120 | The header label group for the mounted volume does not contain a HDR1 label (which is needed to determine the expiration date of the dataset on that volume). |
| 132 | The requested label type prevents use of the volume mounted because of its label type. |

msgnum hh:mm REMOUNT vsn(lt) ON devname WRONG LABEL TYPE(wlt)

The requested volume and mounted volume have different label types. Mount tape volume with LABEL TYPE *lt* and a VSN *vsn*. The label type of the rejected volume (*wlt*) can be one of the following:

NL Unlabeled
AL ANSI standard labels
SL IBM standard labels
FRN Foreign labels or tape of incompatible density

msgnum hh:mm REMOUNT vsn(lt) ON devname WRONG VSN(wvsn)

The requested volume and mounted volume have different volume serial numbers. Mount the volume that has VSN *vsn*.

msgnum hh:mm TAPE vsn ON devname IS NOT EXPIRED - JOB jobname(jsq)
REPLY 'ABORT' OR 'EXPIRE'

An attempt was made to write to an unexpired volume (*vsn*). The reply options are selected by the operating system based on the Volume Serial Number (*vsn*) that is displayed with the message requesting the tape volume to be mounted. If a specific request is made for this VSN, the reply options are:

ABORT - Unloads the mounted tape and aborts the job

EXPIRE - The mounted tape is accepted by the operating system as an EXPIRED tape (labels and data are overwritten).

msgnum hh:mm TAPE vsn ON devname IS NOT EXPIRED - JOB jobname(jsq)
REPLY 'ABORT', 'EXPIRE' OR 'REMOUNT'

The reply options are selected by the operating system based on the Volume Serial Number (*vsn*) that is displayed with the message requesting the tape volume to be mounted. If a request is made for an installation scratch volume (VSN=??????) the reply options are:

ABORT - Unloads the mounted tape and aborts the job.

EXPIRE - The mounted tape is accepted by the operating system as an EXPIRED tape (labels and data are overwritten)

REMOUNT - Unloads the mounted tape and causes the operating system to display a request to remount a scratch tape.

F.1.2 RESPONDING TO TAPE MOUNT/REMOUNT MESSAGES

When a response is required, enter a **REPLY** response (with the appropriate action) in the following format:

REPLY <i>msgnum action</i>

msgnum Message number

action One of the following:

ABORT	Aborts job
EXPIRE	Unloads the mounted tape; the mounted tape is accepted by the operating system as an EXPIRED tape (labels and data are overwritten).
REMOUNT	Unloads the mounted tape and causes the operating system to display a request to remount a scratch tape
RESELECT	Selects device other than the one specified
<i>vsn</i>	Indicates volume serial number; 1 through 6 characters.
<i>dvn</i>	Indicates the name of the device that the mount should use.

F.2 TAPE MOUNT REQUESTS FOR SYSTEMS USING AVR

This subsection describes the reply responses and message formats for systems using the AVR feature.

F.2.1 TAPE MOUNT/REMOUNT MESSAGES

The tape mount/remount messages are described in this section. If the message requires a response, see subsection F.2.2.

msgnum hh:mm ENTER VSN MOUNTED ON DEVICE *devname*

The mounted volume does not have a label group providing its volume serial number. Enter volume serial number (*vsn*) as shown in subsection F.2.2.

*msgnum hh:mm MOUNT TAPE vsn(lt) ON *TAPE† - JOB jobname (jsq)*
REPLY 'RESELECT', 'ABORT', OR MOUNT TAPE

Mount the tape specified by *vsn* (volume serial number) and *lt* (label type) on a tape device. *lt* can be one of the following:

NL Unlabeled
AL ANSI standard labels
SL IBM standard labels
FRN Foreign labels or tape of incompatible density

msgnum hh:mm READY vsn(lt) ON devname - RESET HIT

The reset button is activated before the device (*devname*) is ready. This condition normally arises for run-away tape volumes and requires mounting another scratch volume.

*msgnum hh:mm REMOUNT vsn(lt) ON *TAPE† INSERT RING IN VOLUME*

A write was attempted on volume (*vsn*) without write ring present. Place the write ring in the mounted volume and remount.

*msgnum hh:mm REMOUNT vsn(lt) ON *TAPE† WRONG LABEL TYPE(wlt)*

The requested volume and mounted volume have different label types. Mount tape volume with LABEL TYPE *lt* and a VSN *vsn*. The label type of the rejected volume (*wlt*) can be one of the following:

NL Unlabeled
AL ANSI standard labels
SL IBM standard labels
FRN Foreign labels or tape of incompatible density

*msgnum hh:mm REMOUNT vsn(lt) ON *TAPE† WRONG VSN(wvsn)*

The requested volume and mounted volume have different volume serial numbers. Mount the volume that has VSN *vsn*.

*msgnum hh:mm REMOUNT vsn(lt) ON *TAPE† TAPE CANNOT BE SCRATCHED - rjc*

Mount was requested for installation scratch tape (VSN=??????), but the tape which was mounted cannot be used for various reasons (see *rjc* below). The different values for *rjc* in the message correspond to the job abort messages ABxxx in the COS Message Manual, publication SR-0039).

† Generic resource name, site dependent

rjc Rejection Code

- 112 The volume mounted is protected against any reads or writes.
- 113 The dataset being overwritten is password-protected and cannot be overwritten.
- 120 The header label group for the mounted volume does not contain a HDR1 label (which is needed to determine the expiration date of the dataset on that volume).
- 132 The requested label type prevents use of the volume mounted because of its label type.

msgnum hh:mm TAPE *vsn* ON *devname* IS NOT EXPIRED - JOB *jobname(jsq)*
REPLY 'ABORT' OR 'EXPIRE'

An attempt was made to write to an unexpired volume (*vsn*). The reply options are selected by the operating system based on the Volume Serial Number (*vsn*) that is displayed with the message requesting the tape volume to be mounted. If a specific request is made for this VSN, the reply options are:

- ABORT Unloads the mounted tape and aborts the job.
- EXPIRE The mounted tape is accepted by the operating system as an EXPIRED tape (labels and data are overwritten).

msgnum hh:mm TAPE *vsn* ON *devname* IS NOT EXPIRED - JOB *jobname(jsq)*
REPLY 'ABORT', 'EXPIRE' OR 'REMOUNT'

The reply options are selected by the operating system based on the Volume Serial Number (*vsn*) that is displayed with the message requesting the tape volume to be mounted. If a request is made for an installation scratch volume (VSN=??????) the reply options are:

- ABORT Unloads the mounted tape and aborts the job.
- EXPIRE The mounted tape is accepted by the operating system as an EXPIRED tape (labels and data are overwritten)
- REMOUNT Unloads the mounted tape and causes the operating system to display a request to remount a scratch tape.

F.2.2 RESPONDING TO TAPE MOUNT/REMOUNT MESSAGES

When a response is required, enter a **REPLY** response (with the appropriate action) in the following format:

<code>REPLY msgnum action</code>

msgnum Message number

action One of the following:

ABORT Aborts job

EXPIRE Unloads the mounted tape; the mounted tape is accepted by the operating system as an EXPIRED tape (labels and data are overwritten).

REMOUNT Unloads the mounted tape and causes the operating system to display a request to remount a scratch tape

vsn Indicates volume serial number; 1 to 6 characters.

NOTE

Drives must be unloaded with the UNLOAD command. Physically unloading the tape from a device is not sufficient. The system responds as if the tape is still mounted, and it will not recognize another mount on that device. If a tape is physically removed without issuing an UNLOAD command, using the command should clear the problem.

F.3 OTHER MESSAGES

This subsection describes the reply responses and message formats for other messages.

msgnum hh:mm TAPE SUBSYSTEM HALTED.
REPLY 'GO' TO RESTART OR 'QUIT' TO LEAVE DOWN.

Indicates TQM caught an error that was fatal to both TQM and any active tape jobs. When this occurs, the following will happen:

- All tape drives currently up will be configured "OP-DOWN"
- All jobs using tape datasets will be rerun. Tape jobs in the input queue will not be initiated.
- Any outstanding tape messages will disappear from the "STMSG" station display (signified by the above message being displayed).

At this point you should run the TDUMP utility (as described in the COS Operational Aids Reference Manual, publication SM-0044). This will create a CRAY1SYSTEMDUMP dataset which can be analyzed using TDI or FDUMP.

After TDUMP has completed, TQM can be restarted by replying to the message with GO and configuring the appropriate devices UP. Replying to the message with QUIT will cause the message to go away, leaving TQM down

NOTE

If TQM is left down, no tape jobs will be initiated and the operator commands that affect tapes (CONFIG, UNLOAD, TLINK, and TCLEAR) will be ignored. Restarting TQM from this state requires that the entire operating system be shut down and restarted.

G. KERNEL CONSOLE MESSAGES

This appendix describes the messages that are displayed at the Kernel console. These messages include: on-line device (tape and disk) error messages, NSC activity messages, and File Utility error messages. Tape mount requests and Peripheral Expander error messages can be found in appendixes F and H, respectively. Appendix I describes station messages.

G.1 ON-LINE DEVICE ERROR MESSAGES

This section describes the error messages associated with either on-line tape or disk devices.

G.1.1 TAPE DEVICE MESSAGES

When errors are detected in the on-line tape units, error messages are displayed on the XIOP Kernel console. The error messages use the following format:

Format:

<i>hh:mm:ss</i>	<i>err</i>	<i>cmd</i>	<i>rtc</i>	<i>chn</i>	<i>dev</i>	<i>sta</i>
-----------------	------------	------------	------------	------------	------------	------------

hh:mm:ss Time when error occurred, in hours, minutes, and seconds

err Type of error:

ADDRESS MISCOMPARE

The Block Multiplexer Controller detected a difference between the address sent to the control unit and the address received

ASSIGNED ELSEWHERE†

Drive is assigned to a different channel path (mainframe)

† Applies only to cartridge tape units

err
(continued)

BACKWARD AT BOT†

While moving the tape backwards, the beginning-of-tape pattern was reached

BLANK TAPE

Blank tape detected

BUS-IN CHECK

An error was detected on the data received from the control unit by the Block Mux interface

BUS OUT CHECK

The control unit detected an error on the data received from the Block Mux interface

BYTE REGISTER

An error was detected in the Byte Count register

CHANNEL ERROR

An undefined error was detected on the channel between the BMC-4 and the control unit

CHANNEL TIMEOUT

In response to a function, an interrupt was not received from the channel within the expected time

COMMAND REJECT

The current command was rejected by the control unit

C.U. ERP FAILURE†

Control unit was unsuccessful in an attempt to recover from a data handling failure

DATA CHECK (xxxxx)

An error was detected in the data being read or written to the device on block (xxxxx)

DATA CHK-RDO (xxxxx)†

Data check read opposite. The control unit has recovered a data check in its buffer, but data is backwards. xxxxx is the tape block position.

DATA REGISTER

An error was detected in one of the two data-address registers

DATA SECURITY ERASE

Data security erase command failed.

† Applies only to cartridge tape units

err
(continued)

DATA STREAM SWITCH†	Data transfer to or from control unit has switched to DC-Interlock mode
DEGRADED MODE†	A condition that can cause degraded subsystem performance was detected
DEVICE OFFLINE†	Command was issued to a drive that is not on-line.
DEVICE NOT FOUND†	Select-in error when addressing device
DEVICE SELECT ERROR	Either disconnect-in or select-in was detected in input tags returned from the control unit during I/O to a device
DEVICE TIMEOUT	A response from a device was not received within the expected time
DRIVE EQUIPMENT CHECK†	Control unit cannot recover from a drive detected error
EQUIPMENT CHECK	A mechanical failure occurred during the execution of the current command
FILE PROTECT†	A write type operation was attempted on a tape cartridge that is file protected
HOST RETRY†	Control unit requests host to retry command
ID BURST CHECK	The device was not able to write an ID burst on the mounted tape
INTERVENTION REQUIRED	A condition requiring manual intervention exists on the device
LOAD ASSISTANCE†	An error caused the drive to lose tape tension
LOAD DISPLAY CHECK†	A load display command is received by a drive while a cartridge is being inserted.

† Applies only to cartridge tape units

err
(continued)

LOAD FAILURE†	Cartridge is not inserted correctly or tape is not threaded correctly
LOAD POINT	Load point was detected during an I/O operation to the device
LOCATE BLOCK FAILURE†	Control unit is unable to find the block preceding the desired block
LOG BUFFER FULL†	A statistical or error counter in the buffered log has overflowed
LOG BUFFER PRESENT†	A rewind unload occurred or a read buffered log command was issued
MANUAL UNLOAD†	The drive cannot maintain tape tension and control tape movement during an unload operation
NOT CAPABLE	The data format of the tape was not readable by the device
OPERATOR RESET†	Drive reset switch was operated and drive is not ready
OUT OF SEQUENCE BLOCK†	Control unit detected an incorrect block ID sequence
HARD OVERRUN (xxxxx)	The Block Mux interface was not ready to accept or provide data for the control unit upon request; xxxxx is the tape block position.
SOFT OVERRUN	The software detected a condition that prevented it from keeping up with the current data transfer
P-ROM ERROR	The Block Mux interface detected an error in its P-ROM
PATH EQUIPMENT CHECK†	Path equipment check caused because drive adapter had an error, control unit could not recover from a buffer error, control unit could not use internal path, or control unit could not recover auto loader error.

† Applies only to cartridge tape units

err
(continued)

PERM. EQUIPMENT CHECK†	Permanent equipment check. The control unit cannot recover error in subsystem hardware or microcode, or control unit recovery action was unsuccessful.
PHYSICAL END OF TAPE†	A read or write operation was processing when the physical end of tape (EOT) pattern was reached
TAPE LENGTH FAILURE†	The tape length in the cartridge is too short
TAPE VOID†	No patterns or data were found on the tape during a read operation.
UNKNOWN ERROR	An error occurred for which no message has been formatted
UNLOAD ERROR†	The rewind/unload switch on the drive has been pressed and the cartridge is unloaded
WRITE ID FAILURE†	The ID mark could not be written successfully at BOT

cmd

Command in effect when error was detected:

BID	Read block ID (cartridge)
BSB	Backspace block
BSF	Backspace file
DSP	Load display (cartridge)
ERS	Erase tape
FSB	Forward space block
FSF	Forward space file
GCR	Set GCR mode (6250 b/i)
LOC	Locate block (cartridge)
NOP	No-op
PHS	Set phase mode (1600 b/i)
RBF	Read buffer (cartridge)
RDB	Read data backward
RDF	Read data forward
RLG	Read log buffer (cartridge)
RWD	Rewind tape

† Applies only to cartridge tape units

<i>cmd</i>	RWU	Rewind and unload tape
(continued)	SNS	Read sense bytes
	TWI	Tape write immediate (cartridge)
	WRT	Write data
	WTM	Write tape mark
<i>rtc</i>		Number of retries issued to recover the error (decimal)
<i>chn</i>		Channel on which the error was detected (octal)
<i>dev</i>		Control-unit/device address at which the error was detected (hexadecimal)
<i>sta</i>		Ending status:
	RCVRD	Error was recovered
	UNRCVRD	Error was not recovered

G.1.2 DISK DEVICE MESSAGES

This section describes the disk error messages associated with DD-19, DD-29, DD-39, DD-40, and DD-49 devices.

G.1.2.1 DD-19 and DD-29 messages

The following error message format is displayed at the I/O Processor (IOP) Kernel console when the I/O Subsystem (IOS) detects an unrecovered DD-19 or DD-29 disk error. You should inform a CRI field engineer to perform the necessary recovery actions.

Format:

CHANNEL <i>chan</i> - DISK ERROR CYL <i>cyl</i> HD <i>hd</i> ST <i>stat</i> hh:mm:ss
--

chan IOP disk channel in error

cyl Cylinder in error

hd Head group in error

stat Hardware fault status, or one of the following software statuses:

INT-LK Disk interlock
TM-OUT Software time-out
BAD-SK ID cylinder number did not compare on seek

hh:mm:ss Time of error in hours, minutes, and seconds

G.1.2.2 DD-39 and DD-40 messages

The following two error message formats are displayed on the IOP Kernel console when the IOS detects a DD-39 or DD-40 recoverable disk error (requires manual intervention), or an unrecoverable disk error. You should inform a CRI field engineer to perform the necessary recovery actions before responding to the messages.

Recoverable error format:

hh:mm:ss DDxx CH *ch* UNT *unit* FATAL *errmsg* ERROR. RETRY? (Y or N)

hh:mm:ss Time of error in hours, minutes, and seconds

xx Disk type:
 39 DD-39
 40 DD-40

ch IOP disk channel in error

unit Device unit number

errmsg Message describing the drive status:

UNIT READY	Unit not ready
DE SEQUENCE CHECK	Device status indicates a device end (DE) sequence check error

Y Disk error recovery executes more retries

N Disk error recovery terminates, reporting the error as unrecovered

Unrecoverable error format:

```
hh:mm:ss DDxx ERROR CH chan UN unit CYL cyl HD hd CTL ctl GEN gen type
```

hh:mm:ss Time of error in hours, minutes, and seconds

xx Disk type:

39 DD-39

40 DD-40

chan IOP disk channel in error

unit Device unit number in error

cyl Cylinder in error

hd Head group in error

ctl DCU-5 Controller status

gen DD-39 or DD-40 Drive general status

type Major error category:

SLCT Unit select

SEEK Cylinder select

READ Read sector process

WRITE Write sector process

RLSE Unit release

G.1.2.3 DD-49 messages

The following two error message formats are displayed on the IOP Kernel console when the IOS detects a DD-49 recoverable disk error (requires manual intervention), or a unrecoverable disk error. You should inform a CRI field engineer to perform the necessary recovery actions before responding to the messages.

Recoverable error format:

```
hh:mm:ss DD49 CH ch FATAL errmsg ERROR. RETRY? (Y or N)
```


hh:mm:ss Time of error in hours, minutes, and seconds

ch IOP disk channel in error

errmsg Message describing the drive status:

BLOWER AIR	No blower air sensed
OVERTEMP	Overtemperature detected
R/W LOGIC POWER	No read/write logic power detected
RUN SWITCH	Run switch disabled
SPINDLE POWER	No spindle power detected
SPINDLE SPEED	Spindle not up to speed
WRITE PROTECT	Write protect indicators prevent writing disk data cylinders

Y Disk error recovery executes more retries

N Disk error recovery terminates, reporting the error as
unrecovered

Unrecoverable error format:

<i>hh:mm:ss</i> DD49 ERROR CH <i>chan</i> CYL <i>cyl</i> HD <i>hd</i> CTL <i>ctl</i> GEN <i>gen</i> <i>type</i>

hh:mm:ss Time of error in hours, minutes, and seconds

chan IOP disk channel in error

cyl Cylinder in error

hd Head group in error

ctl DD-49 Controller status

gen DD-49 Drive general status

type Major error category:

READ	Read sector process
RLSE	Unit release
SEEK	Cylinder select
SLCT	Unit select
WRITE	Write sector process

G.2 NSC ACTIVITY

The NSC adapter-related messages are displayed on the Master I/O Processor (MIOP) Kernel console. The first line of the display identifies the NSC element to which the message applies. The second line contains the message.

Format:

<i>hh:mm:ss</i> NSC: CONCENTRATOR <i>x</i> [ORDINAL <i>y</i>] <i>message</i>
--

hh:mm:ss Time in hours, minutes, and seconds

x NSC concentrator ordinal number, in octal

y Front-end ordinal number, in octal

message One of the messages shown in table G-1

Table G-1. NSC Activity Messages

Message	Description
ADAPTER ERROR DETECTED - STATUS=XXXXXXXXXXXXXXXX	Error was detected on completion of I/O operation. Ending status is presented as a 16-character hexadecimal string.
ADAPTER ERROR DETECTED - STATUS=CHANNEL ERROR	A channel error was detected in the NSC adapter's status buffer upon processing of an NSC I/O interrupt
ADAPTER ERROR DETECTED - STATUS=TIMEOUT	A time-out occurred on an NSC write channel
ALREADY ACTIVE	The NSC concentrator channel ordinal presented for initialization is already active
CHANNEL IS TURNED OFF	The NSC concentrator channel ordinal presented for initialization is not turned on

Table G-1. NSC Activity Messages (continued)

Message	Description
I/O LENGTH ERROR	Data length of the transfer did not match the expected length
INITIALIZATION IN PROGRESS	NSC concentrator ordinal presented for initialization is already undergoing initialization
INITIALIZED	Initialization of the presented NSC concentrator channel ordinal has completed normally
INSUFFICIENT MEMORY FOR CONCENTRATOR	Not enough memory was available to support concentrator routines for the front end currently attempting to log on
NO FRONT-END ORDINALS AVAILABLE FOR ASSIGNMENT	No front-end ordinals are available for the front end currently attempting to log on
NOT NSC CHANNEL TYPE	NSC concentrator channel ordinal presented for initialization is not configured as an NSC channel.
POLL ERROR	The communication through the B-packet mechanism was broken between the IOS and the CPU
TERMINATED	NSC concentrator ordinal presented for termination has completed termination
TERMINATION IN PROGRESS	Front-end or NSC concentrator channel ordinal presented for termination is already terminating
UNASSIGNED CHANNEL ORDINAL	NSC concentrator channel ordinal was presented for initialization or termination does not exist

G.3 VMEBUS ACTIVITY MESSAGES

Messages detailing the status of a VMEbus driver are displayed on the MIOP Kernel console. Each message is prefixed by a time-stamp and includes the physical input channel number (xx) of the connected channel pair.

Format:

<i>hh:mm:ss message - CH. xx</i>

hh:mm:ss Time of error in hours, minutes, and seconds

message One of the messages shown in table G-2.

- CH. xx Input channel number of the channel pair to which the message refers

Table G-2. VMEbus Activity Messages

Message	Description
VME INTERFACE INITIALIZED	The driver was successfully initialized
VME INTERFACE INITIALIZATION FAILED DUE TO FEI TABLE PROBLEM	A problem was encountered in the status bits of the FEI table entry for this channel. Possible problems are that the driver is already initialized; the driver is currently initializing or terminating; the channel is turned off; the channel is not configured for VME; or no FEI table entry exists for this channel.
VME INTERFACE INITIALIZATION FAILED DUE TO RESOURCE PROBLEM	The driver was not able to acquire the memory resources that it needs, or creation of driver activities failed.
VME INTERFACE RESOURCE ERROR: DRIVER TERMINATED	The driver was not able to acquire needed resources during transfer activity. The VME <i>ch</i> command is required to reinitialize the driver.

Table G-2. VMEbus Activity Messages (continued)

Message	Description
VME INTERFACE TERMINATED	The driver was successfully terminated
VME TERMINATION FAILED DUE TO FEI TABLE PROBLEM	Either there is no FEI table entry for this channel or the table entry that specifies this channel is not configured as a VME interface.
VME TERMINATION ALREADY IN PROGRESS	A previous termination request is still processing.

G.4 FILE UTILITY ERROR MESSAGES

The IOS File Utilities (see section 2) display messages to the Kernel console indicating error conditions encountered during processing. These messages are grouped according to their purpose. Most of the messages are self-explanatory. In some cases, a brief explanation of the message is included.

G.4.1 SYNTAX ERROR CORRECTION

The following messages require a syntax error to be corrected.

INPUT ERROR - DUPLICATE MEDIA

A copy was attempted with the source and destination media being the same.

INPUT ERROR - MISSING OR INVALID xxxxx

xxxxx CYLINDER NUMBER
 DEVICE
 DIRECTORY NAME
 FILE NAME
 FILE NUMBER
 FUNCTION
 LINE NUMBER
 OPTION
 UNIT NUMBER
 VOLUME NAME

G.4.2 STATUS INFORMATION

The following messages provide status information.

END OF FILE
FILE EMPTY
FILE FLAWED Hardware error; file contains unreadable blocks
FILE MODIFIED File was not closed after last update

G.4.3 USER-CONTROLLABLE ERROR SITUATIONS

The following messages report user-controllable error situations.

DIRECTORY NOT FOUND
DISK NOT INITIALIZED
DISK SPACE NOT AVAILABLE
END OF TAPE
FILE ALREADY EXISTS
FILE NOT FOUND

G.4.4 RESOURCE AVAILABILITY

The following resource availability messages inform you that a requested resource is in use or an unrecoverable error condition exists.

DISK BLOCK FLAWED
DISK IO ERROR
DISK NOT AVAILABLE
MOS NOT AVAILABLE
OPERATOR ABORTED DISK
OPERATOR ABORTED PRINTER
OPERATOR ABORTED TAPE
PRINTER IO ERROR
PRINTER NOT AVAILABLE
TAPE IO ERROR
TAPE NOT AVAILABLE

G.4.5 ERRORS REQUIRING SYSTEM PARAMETER CHANGES

The following messages report errors that require changes to system parameters.

AVAILABLE MAP OVERFLOW
DATA MAP OVERFLOW
LOCAL DATA STRUCTURE OVERFLOW

G.4.6 PROBLEMS REQUIRING FIELD ENGINEER INTERVENTION

The following messages indicate problems requiring investigation by a customer field engineer.

HIGH SPEED IO ERROR
LOW SPEED IO ERROR
MOS IO ERROR

H. PERIPHERAL EXPANDER ERROR MESSAGES

This appendix describes the error messages issued for the Peripheral Expander devices (tape unit, disk unit, printer/plotter and clock). The messages indicate the device, error encountered, the function in progress (during a write or read), and whether recovery was successful.

The format for the Peripheral Expander devices is as follows:

@dev: message DURING function recovery

dev Device type:

MT0: Tape unit (subsection H.1)
DK0: Disk unit (subsection H.2)
PR0: Printer/plotter (subsection H.3)
CK0: Clock (subsection H.4)

message Error message (as described in the following sections)

function Function in progress when error occurred:

WRITE
READ
POSITION

recovery The recovery status (either RECOVERED or UNRECOVERED)

H.1 TAPE MESSAGES

The following messages describe errors encountered by the Peripheral Expander Tape Unit. The "Recommended Response" is for unrecovered errors only. No action is needed for recoverable errors.

<u>Message</u>	<u>Recommended Response</u>
@MT0: BAD TAPE	Try a different tape
@MT0: CHANNEL TIMEOUT	Call a CRI representative
@MT0: COMMAND REJECT	Call a CRI representative
@MT0: DATA LATE	Call a CRI representative

<u>Message</u>	<u>Recommended Response</u>
@MT0: DATA PARITY ERROR	If read/write heads are dirty, clean them; otherwise, use a different tape.
@MT0: DEVICE TIMEOUT	Ensure that the device is on line; if it is, call CRI site analyst.
@MT0: EOF DETECTED	Remove tape
@MT0: ERROR RECOVERY LEVEL REACHED	The maximum recursive level of error recovery for the tape unit has been reached.
@MT0: LOAD POINT DETECTED	Check tape for extra load-point markers
@MT0: NOT READY†	Bring unit on line
@MT0: NO WRITE RING	Put a write ring in tape
@MT0: POSITION LOST	Restart operation
@MT0: RECORD LENGTH ERROR	Call a CRI representative
@MT0: UNKNOWN ERROR	Call a CRI representative
@MT0: WORD COUNT ERROR	Call a CRI representative

H.2 DISK MESSAGES

The following messages describe errors encountered by the Peripheral Expander Disk Unit. The "Recommended Response" is for unrecovered errors only. No action is needed for recoverable errors.

<u>Message</u>	<u>Recommended Response</u>
@DK0: CHANNEL TIMEOUT	Call a CRI representative
@DK0: DATA ERROR	Call a CRI representative
@DK0: DEVICE TIMEOUT	Ensure that device is on line; if it is, call a CRI representative.
@DK0: DRIVE FAULT	Call a CRI representative

† I/O resumes automatically after device is readied.

<u>Message</u>	<u>Recommended Response</u>
@DK0: DRIVE TIMEOUT	Call a CRI representative
@DK0: FLAGGED SECTOR	Reformat disk
@DK0: ID CHECKSUM ERROR	Reformat disk
@DK0: ID CYLINDER ERROR	Reformat disk
@DK0: ID HEAD ERROR	Reformat disk
@DK0: NOT READY†	Bring unit on line
@DK0: NOT WRITE ENABLED†	Write enable unit
@DK0: SECTOR OVERFLOW	Call a CRI representative
@DK0: SEEK ERROR	Call a CRI representative
@DK0: UNKNOWN ERROR	Call a CRI representative

H.3 PRINTER/PLOTTER MESSAGES

The following messages describe errors encountered by the Peripheral Expander Printer/Plotter Unit. The "Recommended Response" are for unrecovered errors only. No action is needed for recoverable errors.

<u>Message</u>	<u>Recommended Response</u>
@PR0: CHANNEL TIMEOUT	Call a CRI representative
@PR0: DEVICE TIMEOUT	Ensure that device is on line; if it is, call a CRI representative.
@PR0: ERROR RECOVERY LEVEL REACHED	The maximum recursive level of error recovery for the printer/plotter has been reached.
@PR0: NOT READY†	This message appears if the printer is currently busy and another request has been issued, or if the unit needs to be brought on line.

† I/O resumes automatically after device is readied.

Message

Recommended Response

@PRO: PAPER LOW

Add paper (an informative message only; the printer does not pause.)

@PRO: VACUUM FAULT

Call CRI site analyst.

H.4 CLOCK MESSAGES

The following describes a clock warning message encountered by the Peripheral Expander clock. This message will be displayed by the IOS CLKSNC routine if the maximum drift between the expander Hayes clock and the current IOS time is exceeded. This is an informational message and no action is needed. The system will reset the IOS internal clock to the expander clock time. If the message appears repeatedly, ask your CRI representative to check the clock speed of the IOS.

WARNING! SYSTEM AND DAY CLOCK MAXIMUM DRIFT EXCEEDED

SYSTEM CLOCK: *mm/dd/yy hh:mm:ss*

DAY CLOCK: *mm/dd/yy hh:mm:ss*

SYSTEM CLOCK RESET TO DAY CLOCK VALUE

I. STATION MESSAGES

The following messages, displayed at an I/O Subsystem (IOS) console, are associated with inappropriate operator commands or console inputs. The message formats associated with the DKERR station command follow this list of station messages.

I.1 STATION COMMAND ERRORS

The following messages are generated when an inappropriate operator command, parameter, or other input is entered through an IOS station.

ALREADY LOGGED ON

A LOGON command was entered at a station that is already logged on.

COMMAND LINE TOO LONG

A line in an indirect command file is too long. Correct the line and reenter.

CPU NOT RESPONDING

The Cray mainframe is not responding to the station log-on message. Verify that the Kernel command CRAY has been executed, that the proper version of the Cray operating system is executing, and that the IOS is cabled to the Cray mainframe.

CRAY FUNCTION REJECT

COS rejected an operator command. The function may be reserved for the master operator station or may have referenced a job not in the system.

CRAY MESSAGE RETRY COUNT EXCEEDED

The station is not receiving the correct response to a Cray mainframe log-on message. Verify that the proper version of the Cray operating system is executing.

CRT NOT AVAILABLE FOR ASSIGNMENT

A CONSOLE command was entered for a console that cannot be assigned to the station, for example, the Kernel console.

DEFAULT DEVICE: device

The response to the DEFAULT DEVICE station command.

DEFAULT DIRECTORY: directory

The response to the DEFAULT DIRECTORY station command.

DEFAULT VOLUME: volume

The response to the DEFAULT VOLUME station command.

DEVICE I/O ERROR

The Peripheral Expander device used by the station command encountered an unrecovered hardware error. Reenter the command. If the condition persists, request that a CRI Field Engineer examine the Peripheral Expander device for possible hardware malfunction.

DEVICE NOT AVAILABLE

The Peripheral Expander device used by the station command is currently in use. Reenter the command when the device is available.

DIRECTORY NOT FOUND

The directory name for a file used in a station SAVE or SUBMIT command does not exist. Check that the correct disk is mounted and that the directory and file are present. Reenter the command.

DISK NOT INITIALIZED

The disk pack mounted on the Peripheral Expander disk unit is not initialized by the IOS. Mount an initialized disk pack and reenter the command.

END OF FILE

The end of file input was encountered while reading an indirect command file.

FILE EMPTY

The file requested by a SAVE or SUBMIT command is empty.

FILE FLAWED

The file requested by a SAVE or SUBMIT command contains blocks that are not readable by the IOS.

FILE MANAGER ERROR

The file requested by a SAVE or SUBMIT command is not readable due to a software-detected error by the IOS file manager. A typical cause is when internal resource limits are exceeded.

FILE MODIFIED

The file requested by a SAVE or SUBMIT command has been previously corrupted due to a system crash while the file was in an open state.

FILE NOT FOUND

A file used in a station SAVE or SUBMIT command does not exist. Check that the correct disk is mounted and that the file is present. Reenter the command.

FUNCTION RESTRICTED TO OPERATOR

A command available only to the master operator station was entered at another station.

ID IS USED BY ANOTHER FRONT END

The station log-on ID is currently assigned to another front end connected to the IOS. Use an unique ID.

ILLEGAL CHARACTER IN INPUT LINE

An illegal character was encountered in an input line of an indirect command file. Correct the command file line and reenter.

INVALID COMMAND

A command was entered that the station does not recognize. Reenter the command correctly.

INVALID COMMAND KEYWORD: *keyword*

You entered an invalid keyword with a command. Reenter the command correctly.

INVALID PARAMETER: *parameter*

You entered an invalid parameter with a command. Reenter the command correctly.

IOP ID TABLE IS FULL

The maximum number of stations that can be logged on through the IOS has been reached. See a CRI site analyst to see if the number of stations that can be logged on to your system can be increased.

LOCAL MEMORY BUFFER NOT AVAILABLE

The resources required to process a command or a display are not available. Reenter the command or reinitiate the display. If the problem persists, take a dump of the IOS.

LOGOFF ALREADY IN PROGRESS

The IOS station was in the process of logging off when a LOGOFF command was entered. Wait for the logoff to complete.

LOGOFF AWAITING TERMINATION OF ACTIVE STREAM

The IOS station was in the process of logging off while an input or output stream was still active. The logoff will complete when the staging activity for all active streams completes.

MOS BUFFER NOT AVAILABLE

The resources required to process a command or a display are not available. Reenter the command or reinitiate the display. If the problem persists, perform a dump of the IOS.

NO INPUT STREAM ASSIGNABLE

A SAVE or SUBMIT command was entered, but all input streams are active or the maximum number of input and output streams are active. Reenter the command after a staging activity terminates.

NOT LOGGED ON

You entered a command at a console not logged on. Enter the LOGON command to log on the station.

OPERATOR ABORTED DEVICE

You aborted the Peripheral Expander device used by the station command.

OPERATOR BREAK - PAUSED

You suspended execution of the indirect command file by pressing the attention key at a station console. Station commands may now be entered.

REQUIRED PARAMETER MISSING

A required parameter is missing from the command just entered. Reenter the command correctly.

STAGING NOT ENABLED

A SAVE or SUBMIT command was entered, but dataset staging is not enabled. Enable staging with the STAGE command, then reenter the SAVE or SUBMIT command.

I.2 DKERR COMMAND MESSAGE FORMATS

The messages described in this subsection are generated by the DKERR station command described in section 3. There are five formats, depending on which disk error packet is sent (DD-19, DD-29, DD-39, DD-40, or DD-49). The *hh:mm:ss* variable is the same for all formats and gives the time (hour, minutes, and seconds) that the error occurred. Some message variables are specific for a particular Disk Control Unit (DCU), either a DCU-4 (which controls DD-19s and DD-29s) or DCU-5 (which controls DD-39s, DD-40s, and DD-49s).

FORMAT 1 (DD-19):

DD19 CHN *nn* *errty* *ff* *sts* RTR *nnn* CYL *nnnn* HED *n* SEC *nnnn*
FLT *nnnnnn* INL *nnnnnn*

FORMAT 2 (DD-29):

DD29 CHN *nn* *errty* *ff* *sts* RTR *nnn* CYL *nnnn* HED *n* SEC *nnnn*
FLT *nnnnnn* INL *nnnnnn*

FORMAT 3 (DD-39):

DD39 CHN nn UNT n errty efunc sts RTR nnn CYL nnnn HED n SEC nnnn
CTL nnnnnn GEN nnnnnn FCT nnnnnn FGE nnnnnn FFC= xxxxx
C3M nnnnnn C3O nnnnnn C2M nnnnnn C2O nnnnnn OES= xxxxx FES= xxxxx
C1M nnnnnn C1O nnnnnn COM nnnnnn C0O nnnnnn EXP nnnnnn ACT nnnnnn
S00 nnnnnn nnnnnn nnnnnn nnnnnn nnnnnn

FORMAT 4 (DD-40):

DD40 CHN nn UNT n errty efunc fst RTR nnn CYL nnnn HED nn SEC nn
CTL nnnnnn GEN nnnnnn FCT nnnnnn FGE nnnnnn FFC= xxxxx OES= xxxxx
FSA nnn FSB nnn FSC nnn FSD nnn BUF nnnnnn FBF nnnnnn FES= xxxxx
OPA nnn OPB nnn OPC nnn OPD nnn RUA nnn RUB nnn RUC nnn RUD nnn
EFA nnn EFB nnn EFC nnn EFD nnn EOA nnn EOB nnn EOC nnn EOD nnn
EXP nnnnnn ACT nnnnnn MSK nnnnnn OFS nnnnnn PMS nnnnnn POF nnnnnn

FORMAT 5 (DD-49):

DD49 CHN nn errty efunc sts RTR nnn CYL nnnn HED n SEC nnnn
CTL nnnnnn GEN nnnnnn FCT nnnnnn FGE nnnnnn FFC= xxxxx VSF nnnnnn
B2M nnnnnn B2O nnnnnn B1M nnnnnn B1O nnnnnn OES= xxxxx FES= xxxxx
A2M nnnnnn A2O nnnnnn A1M nnnnnn A1O nnnnnn EXP nnnnnn ACT nnnnnn
S00 nnnnnn nnnnnn nnnnnn nnnnnn S04 nnnnnn nnnnnn nnnnnn nnnnnn
S08 nnnnnn nnnnnn nnnnnn nnnnnn S12 nnnnnn nnnnnn nnnnnn nnnnnn
S16 nnnnnn nnnnnn nnnnnn nnnnnn S20 nnnnnn nnnnnn nnnnnn nnnnnn

CHN Channel number

UNT u Unit number (DD-39 and DD-40 only)

errty Error type

For DCU4:

IDERR = ID error
INTLK = interlock error
MISC = all other errors
READ = read error
SEEK = seek error
TMOUT = time-out error
WRITE = write error

For DCU5:

HEAD = head select error
READ = read error
RLSE = error on release
SEEK = seek error
SLCT = error on select
WRIT = write error

ff Function on which error occurred (DCU4):
 RD = read
 SK = seek
 WR = write

efunc Function code on which error occurred (DCU5):
 CAL = recalibrate
 CLEAR = clear faults
 COR = compute correction vectors
 HEAD = head select
 LMA0 = enter LMA register 0
 LMA1 = enter LMA register 1
 RDTK = read track buffer
 RESET = reset
 RLSE = unit release
 RTZ = return to zero
 SEEK = seek
 SLCT = unit select
 SPEC = special mode
 WRIT = write

sts Final recovery status:
 COR = corrected
 OK = no error occurred
 REC = recovered
 UNC = uncorrected
 UNR = unrecovered

RTR n Retry count

CYL n Cylinder number

HED n Head group number

SEC n Sector number

FLT n Original fault status (DCU4)

INL n Interlock status (DCU4)

CTL n Controller status (DCU5)

GEN n General status (DCU5)

FCT n Final controller status (DCU5). This is valid only on
 unrecovered errors.

FGE n Final general status (DCU5). This is only valid on
 unrecovered errors.

FFC n Final function code (DCU5). This is only valid on unrecovered errors.

- CLEAR = Clear faults
- COR = Compute correction vectors
- HEAD = Head select
- LMA0 = Enter LMA register 0
- LMA1 = Enter LMA register 1
- RDTK = Read track buffer
- RESET = Reset
- READ = Read function code
- RLSE = Unit release
- RTZ = Return to zero
- SEEK = Seek
- SLCT = Unit select
- SPEC = Special mode
- WRIT = Write

C3M Channel 3 correction mask (DD-39)

C3O Channel 3 correction offset (DD-39)

C2M Channel 2 correction mask (DD-39)

C2O Channel 2 correction offset (DD-39)

OES Original error symptom (DCU5):

- BUSY = BZ set when not expected
- DONE = DN set when not expected
- FLMA = final LMA register error
- HEAD = head select error
- ILMA = initial LMA register error
- NCLR = unable to clear BZ and DN
- OKAY = OK status
- SEEK = seek error
- STAT0 = status register 0 miscompare
- STAT1 = status register 1 miscompare
- TOUT = time-out

FES Final error symptom (DCU5); same values as those for original error symptom (OES). This is only valid on unrecovered errors.

C1M Channel 1 correction mask (DD-39)

C1O Channel 1 correction offset (DD-39)

C0M Channel 0 correction mask (DD-39)

C0O Channel 0 correction offset (DD-39)

EXP	Expected Local Memory address for address errors
ACT	Actual Local Memory address for address errors
S00	Selected statuses; 0 through 4 (DD-39)
MSK	Correction mask (DD-40)
OFS	Correction offset (DD-40)
PMS	Previous correction mask (DD-40)
POF	Previous correction offset (DD-40)
BUF	Buffer status (DD-40)
DRV	Drive status (DD-40)
FBF	Final buffer status (DD-40)
FDR	Final drive status (DD-40)
VSF	Velocity scale factor (DD-49)
B2M	Channel B2 correction mask (DD-49)
B2O	Channel B2 correction offset (DD-49)
B1M	Channel B1 correction mask (DD-49)
B1O	Channel B1 correction offset (DD-49)
A2M	Channel A2 correction mask (DD-49)
A2O	Channel A2 correction offset (DD-49)
A1M	Channel A1 correction mask (DD-49)
A1O	Channel A1 correction offset (DD-49)
Snn	Selected statuses; nn through nn+3 (DD-49)
FSA	Drive A fault status
FSB	Drive B fault status
FSC	Drive C fault status
FSD	Drive D fault status

OPA	Drive A operating status
OPB	Drive B operating status
OPC	Drive C operating status
OPD	Drive D operating status
RUA	Drive A field replaceable unit code
RUB	Drive B field replaceable unit code
RUC	Drive C field replaceable unit code
RUD	Drive D field replaceable unit code
EFA	Final drive A fault status
EFB	Final drive B fault status
EFC	Final drive C fault status
EFD	Final drive D fault status
EOA	Final drive A operating status
EOB	Final drive B operating status
EOC	Final drive C operating status
EOD	Final drive D operating status

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