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# **CRAY**

## **RESEARCH, INC.**

### **CRAY X-MP AND CRAY-1® COMPUTER SYSTEMS**

**I/O SUBSYSTEM (IOS)  
OPERATOR'S GUIDE**

**SG-0051**

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<u>Revision</u>	<u>Description</u>
	November, 1980 - Original printing.
A	June, 1981 - This printing represents a major rewrite and reorganization. It 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 conformity of terminology among station manuals, the term master operator station replaces system operator station. Changes are not noted by change bars. All previous printings are obsolete.
B	June, 1982 - Rewrite. This printing supports the 1.11 version of the station and includes online tape information and new Kernel commands. It also includes new station command and message display information. Appendixes G (Kernel halt error codes), H (interactive station commands), and I (tape mount request operation) 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 80 Mbyte disk on 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. All previous printings are obsolete.



- 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. All previous printings are obsolete.
- 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.



# PREFACE

This publication describes the operational features of a Cray Research, Inc., I/O Subsystem and is for use by computer operators using a CRAY-1 Computer, Models S/1200 through S/4400, all CRAY-1 M models, and all CRAY X-MP models.

Section 1 presents an overview of the hardware and software system configurations. Section 2 provides the Cray Computer System startup procedures. Section 3 describes the Kernel commands. Section 4 summarizes station commands in general and then presents them in detail in alphabetical order. Appendixes include information about error messages, IOS dump programs, shutdown procedures, file utilities, disk formatting, and online disk device error messages.

A description of the I/O Subsystem equipment is available in the I/O Subsystem Reference Manual, CRI publication HR-0030. Detailed information on the I/O Subsystem software is reported in the IOS Software Internal Reference Manual, CRI publication SM-0046, and in the IOS Table Descriptions Internal Reference Manual, CRI publication SM-0007.



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## INDEX



The Cray Research, Inc., I/O Subsystem is an integral part of all models of the CRAY X-MP and CRAY-1 M Series, and models S/1200 through S/4400 of the CRAY-1 S Series Computer Systems. This manual describes the operational features of a Cray Research I/O Subsystem running under the Cray Operating System (COS). Figure 1-1 shows a typical hardware configuration for a Cray Computer System with a 4-processor I/O Subsystem.

The I/O Subsystem (IOS) handles disk and tape drive activity and provides operator control of COS and its resources. Specifically, the I/O Subsystem is used to:

- Transmit data between the Cray mainframe and I/O Subsystem peripherals such as disk units
- Communicate with front-end computers
- Facilitate system maintenance
- Submit jobs through the station (collect and present data to the Cray mainframe for processing and receive output from the mainframe for distribution to slower peripheral devices)
- Transfer jobs and data as COS datasets from the I/O Subsystem tape or disks to Cray mass storage or from Cray mass storage to I/O Subsystem tapes, disks, or printers
- Access interactive COS jobs

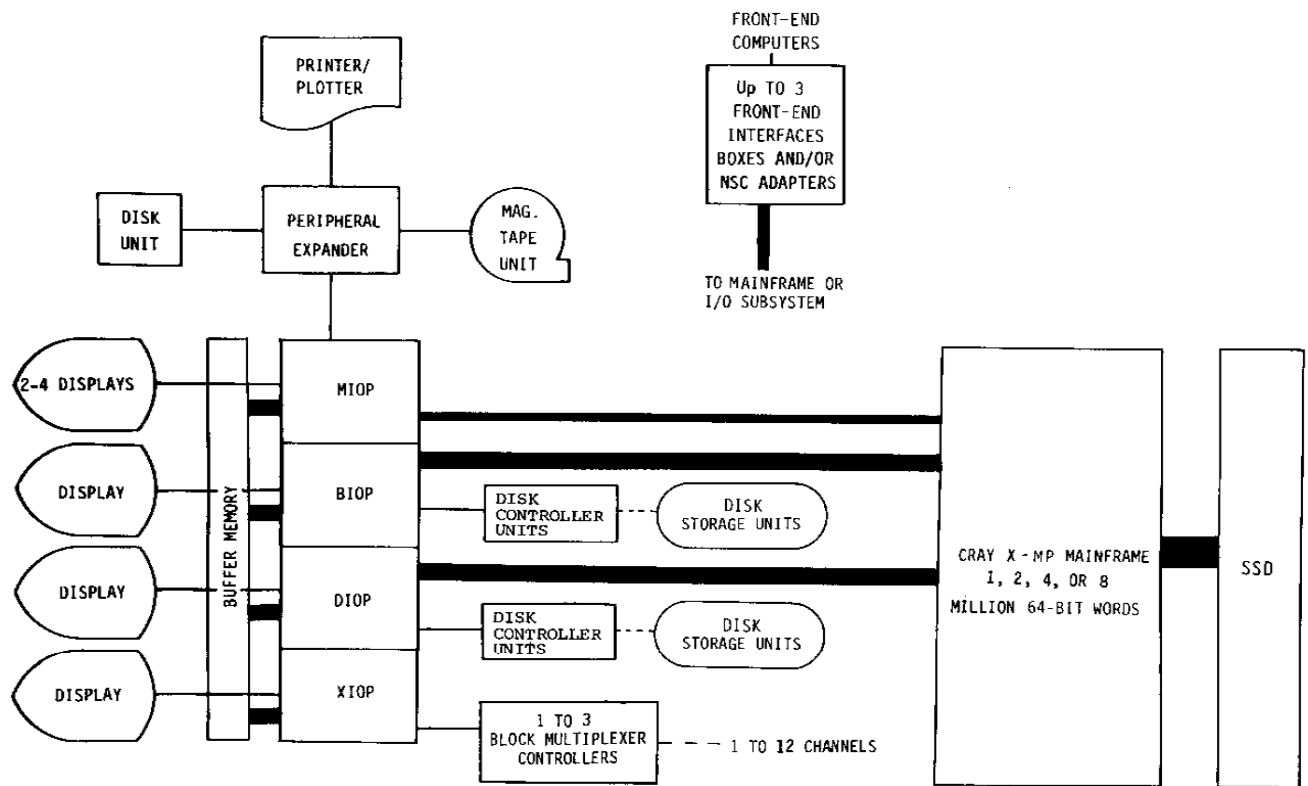
Operator maintenance functions (deadstarting the Cray mainframe and dead dumping) are available at the I/O Subsystem when it is linked to the channel providing maintenance control of the Cray mainframe.

## HARDWARE CONFIGURATION

An I/O Subsystem consists of a chassis (see figure 1-2) housing from two to four I/O Processors (IOPs) and at least one-half million 64-bit words of Buffer Memory. The four types of IOPs are:

- 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)



- Cray I/O Channel
- 100 Mbyte Channel
- 100 or 1250 MByte SSD Channels (depending on mainframe type, two VHSP channels can be attached)

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

In addition to the chassis, the I/O Subsystem consists of the following devices, shown in figures 1-3 through 1-7, respectively.

- Two to four Ampex display/consoles attached to the MIOP and one to four display/consoles attached to any of the other IOPs
- A 9-track, 800 bpi magnetic tape unit housing the Peripheral Expander attached to the MIOP

- Two DD-29 or DD-49 Disk Storage Units attached to the BIOP or DIOP
- A Gould 5000 (or Calcomp 5000) printer/plotter (Peripheral Expander device) attached to the MIOP
- A disk storage unit with a capacity of 80 megabytes (Peripheral Expander device) attached to the MIOP



Figure 1-2. I/O Subsystem chassis



Figure 1-3. Display/console

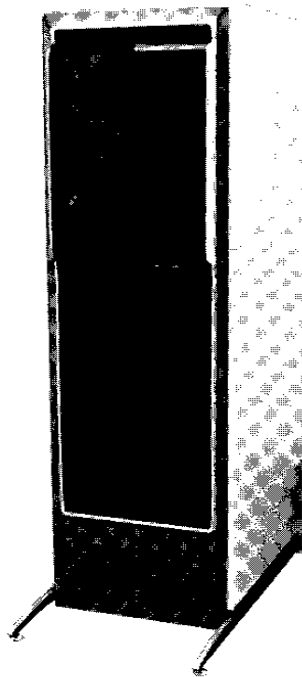


Figure 1-4. Peripheral Expander magnetic tape unit



Figure 1-5. DD-29 Disk Storage Unit

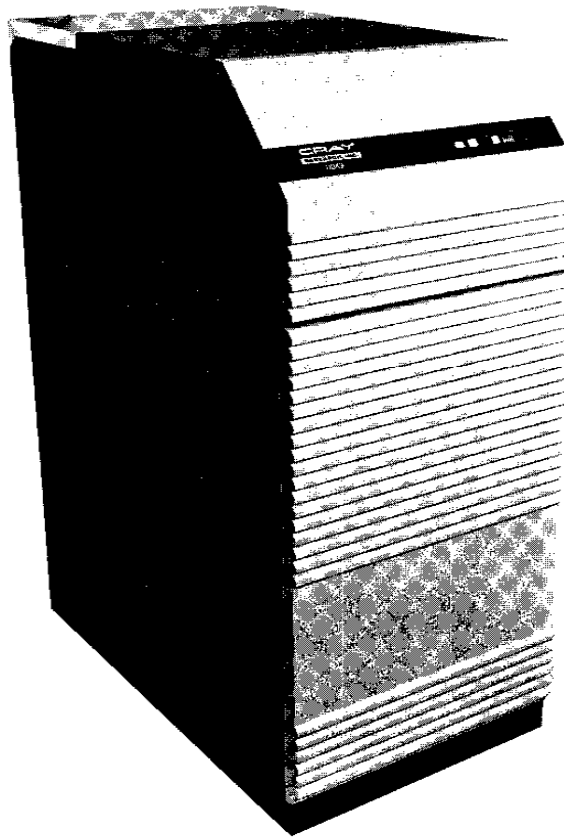


Figure 1-6. DD-49 Disk Storage Unit

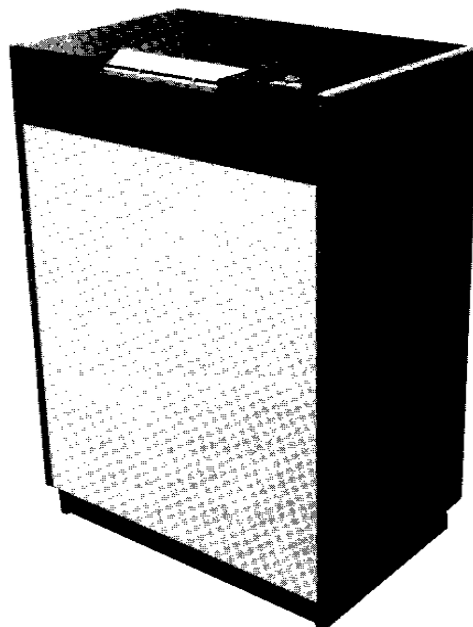


Figure 1-7. Peripheral Expander printer/plotter

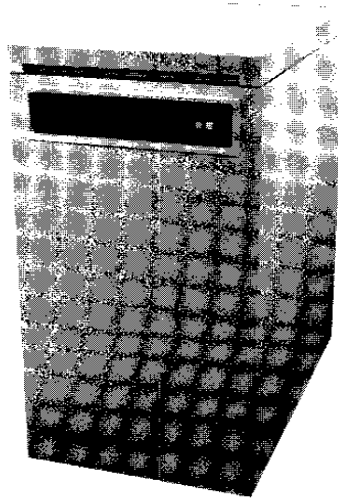


Figure 1-8. Peripheral Expander disk storage unit

The I/O Subsystem can support a maximum of:

- Three front-end computer interfaces
- Four display/consoles per processor
- 12 DCU-4 or DCU-5 Disk Controller Units<sup>†</sup>
- 48 DD-29 or DD-49 Disk Storage Units<sup>†</sup>

If one IOP is dedicated to magnetic tapes (other than Peripheral Expander tapes), the I/O Subsystem can support a maximum of:

- Three Block Multiplexer controllers
- 12 Block Multiplexer channels

#### I/O PROCESSORS

The MIOP (Master I/O Processor) is required. The MIOP communicates with the Cray mainframe and with the other IOPs. The MIOP supports at least two display/consoles, a printer, a magnetic tape unit, and a disk storage unit through the Peripheral Expander. The MIOP can support two additional display/consoles operating as station consoles, and up to three front-end computer interfaces for Cray mainframe/front-end

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<sup>†</sup> Inclusion of the XIOP reduces disk maximums.



communication: up to three CRI interfaces, or up to three NSC (Network Systems Corporation) interfaces, which can replace any or all of the CRI front-end interfaces.

See section 3 of this manual or the IOS Software Internal Reference Manual, CRI publication SM-0046, for more information on the NSC adapter.

The BIOP (Buffer I/O Processor) is also required. The BIOP connects to a 100 Mbyte channel and transfers data between the Cray mainframe and the I/O Subsystem.

The third and fourth I/O Processors are optional. On a system with four IOPs, both the third and fourth can be DIOPs, for driving additional disk storage units, or the third can be a DIOP and the fourth an XIOP, for controlling magnetic tape devices. On a system with three IOPs, the third can be either a DIOP or an XIOP. A second 100 Mbyte channel can be configured between the DIOP and the Cray mainframe to improve data streaming rates.

The BIOP and each DIOP include one to four Disk Controller Units, each of which controls up to four Disk Storage Units. The Disk Controller Units may be any combination of DCU-4 and DCU-5 controllers. The DCU-4 controller supports DD-29 Disk Storage Units while the DCU-5 supports DD-49 Disk Storage Units. Similarly, an XIOP includes one to three Block Multiplexer controllers, each of which includes up to four Block Multiplexer channels.

The magnetic tape devices attach to the XIOP. The tape units supported are IBM-compatible 9-track, 200 ips, 1600/6250 bpi devices.

A Cray Computer System can include disk storage units attached directly to the Cray mainframe in addition to those attached to the I/O Subsystem. Operator commands applying to mass storage devices affect equally disks attached to the Cray mainframe and the I/O Subsystem. The Cray Operating System (COS) tracks the location of each disk storage unit.

The IOPs are connected to each other via an accumulator channel and to Buffer Memory via a 100 Mbyte channel.

#### SOFTWARE CONFIGURATION

The I/O Subsystem software is part of the Cray Operating System (COS). As the IOS operator, you are concerned with two parts of the IOS software: *Kernel* software and *station* software.

## KERNEL SOFTWARE

The *Kernel* software (the Kernel) controls operations of the I/O Processors. You control the Kernel software via *Kernel commands* entered at a *Kernel console*. Kernel commands and Kernel consoles are so named to distinguish them from *station commands* and *station consoles*, which are described next, under Station Software.

You can only enter Kernel commands (see section 3) at a Kernel console, and 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 can be used as station consoles. Each of the other IOPs has one Kernel console.

You initialize Kernel software at I/O Subsystem deadstart (see section 2). Through Kernel commands, you initiate the station software (a program executing under the control of the Kernel software). Through Kernel commands, you also control the I/O Subsystem's Peripheral Expander devices and perform maintenance functions. You control the use of the concentrator software that allows front-end computers to communicate with the Cray mainframe and use of the interactive concentrator, which allows communication with an executing COS job. See section 3 for specific information about Kernel commands.

## I/O SUBSYSTEM STATION SOFTWARE

An I/O Subsystem *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 Appendix I for information about the interactive station.)

Through I/O Subsystem station software, you can submit batch jobs to the Cray mainframe from the Peripheral Expander magnetic tape or disk units and monitor the progress of the jobs submitted.

You control station software from a station console. At least one station console must be connected to the MIOP, and the MIOP can have up to two more station consoles attached to it.

You 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 establish communication between COS and the station with the LOGON station command (see sections 2 and 4).

More than one station can exist. Each station is created via the Kernel STATION command (see section 3).

COS designates a station as the *master operator station* via an installation parameter. This parameter is a default, which can be overridden with the OPERATOR command described in section 4 of this manual.

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 its LOGON ID and TID parameters. (See the LOGON operator command in section 4.)

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 have access only to commands that manipulate the jobs and datasets associated with that particular station.



# STARTING A CRAY COMPUTER SYSTEM WITH AN I/O SUBSYSTEM

2

Startup is the procedure that brings a Cray Computer System with an I/O Subsystem (IOS) to an operational state. The startup procedure consists of three parts: IOS deadstart or restart, Cray mainframe startup, and IOS station initialization. Startup file creation and maintenance is addressed in Appendix F.

The following summaries are quick reference guides to starting the system. The first summary describes startup beginning with IOS deadstart; the second summary describes startup beginning with IOS restart.

## CRAY COMPUTER SYSTEM DEADSTART SUMMARY

The following summary is a quick-reference guide to the procedure for 1) deadstarting the IOS, 2) deadstarting the mainframe, and 3) initializing the station. This summary is followed by a summary of the IOS restart process. Details follow the summaries.

### 1. IOS tape or disk deadstart

- a. Set toggle switches on IOS maintenance panel to select unit.
- b. Mount tape or disk.
- c. Press only the IOP-0 MC (MASTER CLEAR on Model A) and DEADSTART buttons on the IOS Power Distribution Unit or the IOS chassis.

*Do the next steps at the MIOP Kernel console.*

- d. When the message FILE @MT0: (for tape) or FILE @DK0 (for disk) appears on the screen, respond by entering 3 followed by a RETURN for tape or *dir/filename* followed by a RETURN for disk.
- e. Enter date and time in response to prompts on screen.

### 2. Mainframe deadstart

- a. At MIOP Kernel console, type START followed by the binary file name and the parameter-file parameters.

- b. Wait for CPU <--> MIOP CHANNEL INIT and CPU <--> MIOP LINKAGE COMPLETE messages.
3. Station initialization
  - a. At MIOP Kernel console, type STATION.
  - b. At station console, type LOGON.
  - c. Do station message/response portion of startup if appropriate.
  - d. Enter Y followed by a period and press RETURN to check for STARTUP COMPLETE message.
  - e. Enter station commands such as RECOVER and CONSOLE, depending on site, and enable additional channels with concentrator commands such as NSC and IAIOP, as required.

#### STARTUP WITH IOS RESTART SUMMARY

The following summary is a quick-reference guide to the procedure for 1) restarting the IOS, 2) deadstarting the mainframe, and 3) initializing the station. Details on both deadstart and restart follow this summary.

Two methods are available for the IOS restart portion of startup. Try method A first; if it does not work, try method B.

##### 1. IOS restart

###### a. Try method A:

Type CONTROL D at the MIOP Kernel console. If method A works, the following message appears:

SYSDUMP?

To respond to this message, skip method B and continue. If SYSDUMP? does not appear, try method B.

###### b. Try method B:

- Ensure that no tape is ready on the Peripheral Expander tape drive.

- Press only the IOP-0 MC (MASTER CLEAR on Model A) and DEADSTART buttons on the IOS Power Distribution Unit or the IOS chassis (depending on your site). The following message appears:

SYSDUMP?

If method B is also unsuccessful, an IOS tape or disk deadstart is necessary. Go to the beginning of the first summary (Cray Computer System Deadstart Summary).

- c. Respond to the SYSDUMP? message by requesting a dump as follows, if one is required; if not, skip to the next procedure, 1,d below.

- Enter Y without a RETURN.
- If applicable, select the restart parameter YES to indicate that a restart can be done from the MIOP Kernel console. (See Appendix B in this manual for a description of SYSDUMP.)

- d. If a dump is not required, proceed as follows:

- Enter N without a RETURN.
- Enter Y without a RETURN in response to RESTART message.
- Enter the directory name and file name of the Kernel binary previously saved on the Peripheral Expander disk as *dir/filename*. If a directory name followed by a slash is entered, a list of all files in the requested directory will be displayed.
- Enter date.
- Enter time.

## 2. Mainframe deadstart

- a. At MIOP Kernel console, type START followed by the binary file name and the parameter file parameters.
- b. Wait for CPU <--> MIOP CHANNEL INIT and CPU <--> MIOP LINKAGE COMPLETE messages.

## 3. Station initialization

- a. At MIOP Kernel console, type STATION.
- b. At station console, type LOGON.
- c. Do station message/response portion of startup if appropriate.

- d. Enter Y followed by a period and press RETURN to check for STARTUP COMPLETE message.
- e. Enter station commands such as RECOVER and CONSOLE, depending on site, and enable additional channels with concentrator commands such as NSC, and IAIOP, as required.

#### IOS DEADSTART DETAILED PROCEDURE

The IOS is deadstarted when the Kernel software is read from tape or disk into the Master I/O Processor (MIOP). To deadstart the IOS, use one of two procedures: tape or disk deadstart.

#### IOS DEADSTART FROM TAPE

The I/O Subsystem is deadstarted from a previously created file on tape or disk. The following paragraphs describe deadstart from tape.

#### Setting the toggle switches

To deadstart from tape, you must set the toggle switches on the IOS maintenance panel to 22 (octal) to select the IOS Peripheral Expander tape unit.

#### Mounting the tape

The deadstart tape contains the following first five files:

FILE 0	TAPELOAD, the tape deadstart program
FILE 1	DISKLOAD, the disk deadstart program
FILE 2	DMP, the I/O Processor dump program
FILE 3	The Kernel
FILE 4	Overlays for the Kernel and the station

Mount the deadstart tape on the IOS Peripheral Expander tape unit (figure 1-4).

#### Loading the deadstart program

Load file 0, the deadstart program TAPELOAD, into the MIOP by pressing only the IOP-0 MC (MASTER CLEAR on Model A) and DEADSTART buttons on the Power Distribution Unit or IOS chassis maintenance panel (depending on your site).



## Loading the Kernel

Respond to the prompt FILE @MT0: at the MIOP Kernel console by entering 3 (for file 3) and pressing RETURN, so that TAPELOAD can read the Kernel software into the MIOP.

The Kernel goes through its initialization sequence, reads the overlays from file 4, and displays the following message on the Kernel console of each I/O Processor (IOP):

```
IOP-n KERNEL, VERSION x.xx SNsn, site. mm/dd/yy hh:mm:ss
```

*n*                Number designating the I/O Processor 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 display only, indicating 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 or at the disk unit itself (maintenance mode).

```
DISK NOT READY CH nn
```

## Entering the date and time

Next, a prompt is issued at the MIOP Kernel console for the current date:

```
ENTER DATE:
```

Enter the date in the following format:

```
mm/dd/yy
```

If the year entered does not match the year configured in the system, the following warning message is displayed:

```
WARNING! Entered year does not match system-configured year.
```

Reenter the date. This time the year will be accepted even if it still disagrees with the system configuration.

To change the system-configured year, use the I@YEAR installation parameter described in the COS Operational Procedures Reference Manual, CRI publication SM-0043.

The following display then appears at the MIOP Kernel console:

ENTER TIME:

Enter the time in the following format:

*hh:mm:ss*

To start the mainframe, go to the mainframe startup description (START command) in this section.

## IOS DEADSTART FROM PERIPHERAL EXPANDER DISK

The deadstart disk is readied by a CRI systems analyst. The formatting routine for the 80 Mbyte disk, F80M, is described in Appendix L; initializing and copy routines are described in Appendix F of this manual.

### Setting the toggle switches

To deadstart from disk, you must set the toggle switches on the IOS maintenance panel to 60 (octal) to select the IOS Peripheral Expander disk unit.

### Mounting the disk

The disk contains the following files:

DISKLOAD	Copied by INIT (Appendix F) from the deadstart tape file 1
DMP	Copied by INIT from the deadstart tape file 2
Kernel	Copied by COPY (Appendix F) from the deadstart tape file 3 to some directory with a 2-part name of the form: <i>dir/filename</i> (directory and filename)
Overlays	Copied by COPY from the deadstart tape file 4 to some directory with a name of the form: <i>dir/filename.OV</i> , where <i>dir/filename</i> is the Kernel filename.

Mount the deadstart disk on the IOS Peripheral Expander disk unit (figure 1-5).

### Loading the deadstart program

Load the disk deadstart program, DISKLOAD, into the MIOP by pressing only the IOP-0 MC (MASTER CLEAR on Model A) and DEADSTART buttons on the Power Distribution Unit or IOS chassis maintenance panel (depending on your site).

### Loading the Kernel

Respond to the prompt FILE @DK0: at the MIOP Kernel console by entering either the directory name (*dir*) to get a menu display of all files in the requested directory or the Kernel filename (*dir/filename*) to load the Kernel, and press RETURN. DISKLOAD reads the Kernel software into the MIOP from *dir/filename*.

The Kernel goes through its initialization sequence, reads the overlays, and displays the following message on the Kernel console of each I/O Processor (IOP):

IOP-*n* KERNEL, VERSION *x.xxx* SN*sn*, *site*. *mm/dd/yy* *hh:mm:ss*

*n*                    Number designating the I/O Processor where the console is attached

*x.xxx*               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 display only, indicating 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 or at the disk unit itself (maintenance mode).

DISK NOT READY CH *nn*

### Entering the date and time

Next, a prompt is issued at the MIOP Kernel console for the current date:

ENTER DATE:

Enter the date in the following format:

*mm/dd/yy*

If the year entered does not match the year configured in the system, the following warning message is displayed:

WARNING! Entered year does not match system-configured year.

Reenter the date. This time the year will be accepted even if it still disagrees with the system configuration.

To change the system-configured year, use the I@YEAR installation parameter described in the COS Operational Procedures Reference Manual, publication SM-0043.

The following display then appears at the MIOP Kernel console:

ENTER TIME:

Enter the time in the following format:

*hh:mm:ss*

To start the mainframe, go to the mainframe startup description (START command) in this section.

#### STARTUP WITH IOS RESTART DETAILED PROCEDURE

You can restart the I/O Subsystem from files that were restarted from previously saved on an expander disk. Begin restart from disk in one of two ways, depending on whether or not the system is accepting interrupts. First try method A: type CONTROL D. (If typing CONTROL D does not work, skip to method B.)

##### USING CONTROL D (METHOD A)

If the system is accepting interrupts, typing CONTROL D at the MIOP Kernel console causes the SYSDUMP? message to appear. Use method B, which follows, if typing CONTROL D does not work. If method A is successful, skip method B and continue.

##### USING THE IOP-0 MC AND DEADSTART BUTTONS (METHOD B)

First, ensure that no tape is ready on the Peripheral Expander tape drive and that no disk is ready on the Peripheral Expander disk drive. Then press only the IOP-0 MC (MASTER CLEAR on Model A) and DEADSTART buttons on the IOS Power Distribution Unit or the I/O Subsystem chassis to cause the SYSDUMP? message to appear.

If both methods are unsuccessful, a tape or Peripheral Expander disk deadstart is necessary. Use the IOS deadstart procedure followed by the mainframe startup and station initialization procedures (see the Cray Computer System deadstart summary or detailed discussions in this section).

#### RESPONDING TO THE SYSDUMP? MESSAGE

If a system dump is required, continue with this procedure; if a dump is not required, skip this procedure.

#### Requesting a dump

To request a system dump:

1. Enter Y without a RETURN.
2. If applicable, select the restart parameter YES to indicate that a restart can be done from the MIOP Kernel console. (See Appendix B in this manual for a description of SYSDUMP.)

#### Continuing IOS restart without a dump

If a dump is not required, proceed as follows:

1. Enter N without a RETURN.

The following message appears:

RESTART?

2. Enter Y without a RETURN. The next message is:

RESTART FILE @DK0:

3. Enter the directory name and file name of the Kernel binary previously saved on the Peripheral Expander disk as *dir/filename*. If a directory name followed by a slash is entered, a list of all files in the requested directory will be displayed.

The following message is displayed on the Kernel console of each I/O Processor (IOP):

IOP-*n* KERNEL, VERSION *x.xx* S*Nsn*, *site*. *mm/dd/yy* *hh:mm:ss*

*n*                      Number designating the I/O Processor 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 on the BIOP or DIOP display only, indicating 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 or at the disk unit itself (maintenance mode).

DISK NOT READY CH *nn*

The MIOP Kernel console displays:

ENTER DATE:

Enter the current date in the following format:

*mm/dd/yy*

If the year entered does not match the year configured in the system, the following warning message is displayed:

WARNING! Entered year does not match system-configured year.

Reenter the date. This time the year will be accepted even if it still disagrees with the system configuration.

To change the system-configured year, use the I@YEAR installation parameter described in the COS Operational Procedures Reference Manual, publication SM-0043.

The console then displays:

ENTER TIME:

Enter the time in the following format:

*hh:mm:ss*

To start the mainframe, see the START command described next under mainframe startup.

## MAINFRAME DEADSTART

To deadstart the Cray mainframe after deadstarting or restarting the I/O Subsystem, enter the START Kernel command with its parameters for the two required files at the MIOP Kernel console. The two required files are:

- Binary file containing the operating system code
- Parameter file

The CRI systems analyst creates the parameter file, using procedures defined in Appendix F of this manual.

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 reflected by the START command parameters (see the following definitions), each of the two mainframe startup files can be stored on either magnetic tape or expander disk.

The command syntax conventions used in the START command format below are summarized in table 4-2.

Format:

<u>START</u>	$\left\{ \begin{array}{l} @MTunit:num \\ [ @DKunit: ] [ dir/ ] file \end{array} \right\}$	$\left\{ \begin{array}{l} @MTunit:num \\ [ @DKunit: ] [ dir/ ] file \quad [,ED] \\ @TT \end{array} \right\}$
--------------	---	--

Parameters:

@MT	Peripheral Expander tape device
<i>unit</i>	Unit number (0-9)
<i>num</i>	Physical file number on tape (0-9999)
<i>dir</i>	Directory name on disk; maximum of 15 alphanumeric characters
@DK	Peripheral Expander disk device
<i>file</i>	File name on disk; maximum of 15 alphanumeric characters
@TT	Parameter file is to be input from console

ED           Option to route the parameter file through the editor before going to the mainframe. This option cannot be specified with the @TT parameter.

If a device is not specified, the expander disk unit 0 is used. If a directory name is not specified, the default directory (see the DEF utility in Appendix F) is used.

Examples:

START @MT0:5 @MT0:6

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 @DK0:ABC/COS @DK0:XYZ/DEADSTART

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 ABC/COS DEADSTART

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 utility in Appendix F). Both files are on the default device, disk unit 0.

A parameter file that was saved previously can be modified by the EDIT utility (described in Appendix F) as follows:

START COS DEADSTART,ED

After you enter the START command, a CPU <-> MIOP CHANNEL INIT message appears on the MIOP display/console. Then wait for the CPU <-> MIOP LINKAGE COMPLETE message to appear. If mainframe deadstart is not successful, error messages are displayed instead of the CPU <-> MIOP LINKAGE COMPLETE message. Although causes for failure are generally site-specific, feasible courses of action are to initiate a dump (see Appendix B) or to try again.



## STATION INITIALIZATION

The next phase in bringing a Cray Computer System to an operational state is to bring up the station software.

1. Initialize the station software by entering the STATION Kernel command at an MIOP Kernel console:

```
STATION [ num]
```

(The STATION Kernel command is explained in detail in section 3 of this manual.)

The following information appears at the console specified by the *num* parameter of the STATION command (*num* might be a default value):

```
CRAY STATION, VERSION x.xx
```

2. Establish communication between the station and the Cray mainframe by entering the LOGON station command at the initialized station console:

```
LOGON[,id][,tid]
```

(The LOGON station command is explained in detail in section 4 of this manual.)

3. At the master operator station (described in section 1), respond to all messages that occur during startup. The display/console responds to LOGON by beeping and displaying an M (as shown in figure 4-1) at the top of the screen to indicate that a response-required message is waiting. Display the station messages by entering the STMSG station command (section 4):

### STMSG

The messages that appear at this time have the following general format and content:

<i>msgnum</i>	<i>time</i>	<i>Problem-specific prompt requiring analyst interaction or ENTER GO or SKIP or 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 msgnum GO

If any other response is required, see the CRI systems analyst. Because all messages potentially require interaction with the CRI systems analyst, they are documented for the analyst in the COS Operational Procedures Reference Manual, CRI publication SM-0043.

4. Check for the **STARTUP COMPLETE** message by entering the following:

Y.  
RETURN

5. Depending on the site,<sup>\*</sup> you typically enter the following station commands, described in section 4, to complete the procedures that bring the system to an operational state:

STATUS  
RECOVER  
LIMIT  
CHANNEL *n* ON  
CONSOLE 1

As required, also enter the **NSC** and **IAIOP** concentrator commands (described in section 3) to enable additional channels.

---

<sup>\*</sup> The COS Operational Procedures Reference Manual, CRI publication SM-0043, provides more information about commands necessary for this phase of startup.

The Kernel program in the Master I/O Processor (MIOP) allows you to control the I/O Subsystem (IOS) via the commands you enter at a dedicated console (the Kernel console). These commands are called Kernel commands. Kernel commands are not recognized by the station software.

For an overview of the Kernel software, see section 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 display/consoles are Kernel consoles when the I/O Subsystem 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 4 for more information about console assignment to a station.

Since all MIOP consoles are initially Kernel consoles, any MIOP console can be used to enter Kernel commands when not dedicated to the station.

All Kernel operator messages, including Peripheral Expander tape mount requests and device error messages, are directed to this console.

The following special keys on the Kernel console are recognized by the Kernel command processor.

RETURN	Initiates the command
RUBOUT or DEL	Backspaces and erases one character on the entry line
CONTROL-A	Repeats the last input line
CONTROL-D	Calls SYSDUMP. (See Appendix B of this manual.)

CONTROL-H	Backspaces one character but does not erase
CONTROL-U	Deletes the entire entry line
CONTROL-X	Repeats the last input line and initiates the command
Right arrow	Moves cursor right one character (CONTROL-L)
Left arrow	Moves cursor left one character (CONTROL-H)

### TYPES OF KERNEL COMMANDS

A Kernel command consists of a unique command verb that can be accompanied by parameters. Table 4-2 describes command syntax conventions. A Kernel command is executed when you press the RETURN key on the Kernel console.

Some commands are operator responses requested by the Kernel.

The following types of Kernel commands are described in this section.

- Initialization
- Concentrator
- Device
- Peripheral Expander tape and disk mount responses
- Miscellaneous maintenance

The following types of Kernel commands are described in other sections of this publication:

- START command to deadstart the Cray mainframe (section 2)
- I/O Subsystem file editor commands (Appendix F)
- File utility commands (Appendix F)

### INITIALIZATION COMMANDS

Initialization commands allow you to initialize software and prepare the Cray Computer System for job processing.

#### 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.

Typically, the link between the IOS and the mainframe is established via the START command described in section 2. However, you can enter the CRAY command at the Kernel console when you have restarted the IOS but not the mainframe.

Format:

<u>CRAY</u>
-------------

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, the message is issued:

CPU NOT RESPONDING - RETRY?

or

LOW SPEED CHANNEL DATA ERROR

DATA EXPECTED: *xxxxxxx*

DATA RECEIVED: *yyyyyyy*

CONTINUE?

Enter Y (yes) to attempt initialization again; enter N (no) to terminate. Upon termination, the following message is issued:

CPU <-> MIOP LINKAGE FAILED

#### STATION command

To initialize the I/O Subsystem station software, enter the STATION Kernel command (also described in section 2).

Format:

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

*num*            Number (0-3) of the console attached to the MIOP. If not specified, a default console is selected. The default

at any console other than the Kernel console is the console at which the command is entered. The default at the Kernel console depends on the I/O Subsystem configuration. Consult a Cray Research systems analyst for the I/O Subsystem 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 4 are not the same; they perform different functions.

---

To establish communication between COS and a station, see the LOGON station command described in sections 2 and 4.

#### MASTER command

The I/O Subsystem must know the ID of the master disk device, which contains the startup files and is normally set up at installation time. The master disk device ID is the channel number and the I/O Processor to which the master disk device is connected, and is also the device type. The master device ID is set to channel 20, IOP-1, DD29 by default during IOS deadstart. The MASTER command is used to verify or change the master device ID.

To verify the master device ID, enter the MASTER command without parameters.

Format:

<u>MASTER</u>
---------------

The console displays the channel, IOP number, and device type, respectively, as follows:

MASTER 20-1 DD29

At the direction of the CRI systems analyst, use the MASTER command to change the master device ID when the master disk device is not at that location. To change the master device ID, enter the MASTER command, with the new ID as the parameter.

Format:

MASTER *chan-iop* [*type*]

*chan*        New channel number

*iop*        New IOP number, as follows:

- 1    BIOP
- 2    IOP-2 (if it is a DIOP)
- 3    IOP-3 (if it is a DIOP)

*type*       Optional device type. If *type* is not specified, the master device type remains unchanged. Options are:

- DD19   DD-19 Disk
- DD29   DD-29 Disk
- DD49   DD-49 Disk

The new channel number, IOP number, and device type are displayed.

#### CONFIG command

The CONFIG Kernel command displays the status of configured peripheral devices. Use this command at any time to determine the availability of a configured device.

Format:

CONFIG [*iop*]

The CONFIG command displays the following IOP configuration information.

- Identification of the device attached to each channel
- Operational status of each device
- Composition of Local (MIOP) Memory:
  - Number of Disk Activity Links (DALs)
  - Number of 4000g-parcel I/O buffers
  - Number of software stacks in Buffer Memory
  - Number of parcels allocated for overlays
- Amount of Buffer Memory assigned to the I/O Processor (in 512-word blocks)

- The Kernel operator console channel number for the I/O Processor (displayed with an asterisk preceding the number)

*iop*            Number of the IOP (0-3) 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 CONFIG command described in section 4 are not the same; they perform different functions.

---

#### HELP command

The HELP command displays helpful information on 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.

#### TTY command

The TTY command allows you to assign an MIOP console other than the kernel console for use as a special-purpose terminal. This special-purpose terminal permits communication with the Cray mainframe in an operating system environment that is unique to certain sites. The TTY command is used only in selected Cray sites that use the special-purpose terminal. The TTY command is not used with the Cray Operating System (COS).

---

#### NOTE

The TTY command should not be invoked when the Cray Operating System is active and should be used only at Cray sites which use the special-purpose terminal.

---



Format:

`TTY dev [func]`

*dev*            Octal device address of terminal; for example, 40.

*func*           Specifies start of terminal session. Determines how the special purpose terminal and the mainframe interpret, echo, and process all characters. Omitting this parameter starts the terminal session in cooked-input mode. (A discussion of cooked- and raw-input modes follows the parameter descriptions.)

          END        Stop terminal session

          TABS      Change tab stops, up to 10 decimal integers (default is 1, 9, 17, 25, 33, 41, 49, 57, 65, and 73)

During input mode, the following conditions apply.

- Your use of the carriage return or newline on the special-purpose terminal sends a line to the mainframe
- Tab characters sent from the mainframe are interpreted at the terminal

Use the following characters to edit your text. These characters are not sent to the mainframe.

<u>Character</u>	<u>Description</u>
CONTROL-a	Recall last line
CONTROL-e	Toggle insert mode
CONTROL-u	Erase current line
CONTROL-x	Recall and execute last line
DEL	Delete character to left of cursor (rubout)
<-	Cursor left (left arrow)
->	Cursor right (right arrow)

Non-printable or control characters are interpreted depending on the terminal being used.

#### CONCENTRATOR COMMANDS

Concentrator commands allow you to control the mainframe/front-end link activities. This subsection describes three types of concentrators: one type is for communication with a CRI front-end interface; another

communicates with an NSC (Network Systems Corporation) adapter; and a third supports interactive communication with COS through the display/console.

#### Communication with CRI front-end interface

The I/O Subsystem concentrator communicates with a CRI front-end interface. The concentrator serves as a link between the Cray mainframe and front-end computer systems attached to the I/O Subsystem via 6 Mbyte channels.

CONC command - The CONC command initiates the concentrator. A concentrator can be implicitly initiated during startup or can be initiated by the station CHANNEL ON command. If the concentrator is terminated (see the ENDCONC command following), the CONC command must be used to re-initiate it.

Format:

<u>CONC</u> [ <i>ch</i> ]
---------------------------

*ch*            Number pair (0-2), which maps to a channel pair connecting the I/O Subsystem to the front-end computer system. The default is 0. Consult a Cray Research system analyst for the I/O Subsystem configuration.

If successful, initialization is recognized with the following message:

CONCENTRATOR NUMBER *ch* INITIALIZED

ENDCONC command - To terminate the concentrator, which is implicitly initiated by the START command or explicitly via the CONC command, enter the ENDCONC command.

Format:

<u>ENDCONC</u> [ <i>ch</i> ]
------------------------------

*ch*            Number assigned in CONC statement when CONC was used to initiate the concentrator

When all resources are released, the following message appears:

CONCENTRATOR NUMBER *ch* TERMINATED

#### Communication with an NSC Al30 adapter

The I/O Subsystem NSC driver serves as a link between an IOS concentrator and a front-end computer or computers through an NSC (Network Systems Corporation) Al30 adapter. (See the NSC messages section, Appendix J of this manual, for specific NSC message descriptions.)

NSC command - The NSC command initiates the NSC driver. The NSC driver can be implicitly initiated during startup or can be initiated by the station CHANNEL ON command. Enter the NSC command to re-initiate the NSC activity if it has been terminated.

Format:

<u>NSC</u> <i>ord</i>
-----------------------

*ord*            Ordinal that corresponds to a physical IOP channel pair. To determine which ordinal to enter, examine the MIOP CONFIG display.

NSCEND command - To terminate an active NSC driver, use the NSCEND command.

Format:

<u>NSCEND</u> <i>ord</i>
--------------------------

*ord*            Ordinal corresponding to a physical IOP channel pair. To determine which ordinal to enter, examine the MIOP CONFIG display (see the CONFIG command in section 4).

Termination messages appear for each ID terminated and an error message appears if an invalid ordinal number is specified. See Appendix J for specific error message descriptions.

#### Interactive communication with COS

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

Interactive concentrator commands must be entered at the MIOP Kernel console and followed by a RETURN.

IAIOP command - The IAIOP command initializes the interactive concentrator. The interactive concentrator must be initialized to bring up an interactive console.

Format:

IAIOP

IAIOP LOG command - 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 operator station identifier; this parameter has a default of 0.

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

Format:

IAIOP POLL *nn*

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

IAIOP LOGOFF command - Before the interactive concentrator can be terminated, all interactive consoles must be terminated with the IAIOP LOGOFF command. This command must be followed by a RETURN.

The IAIOP LOGOFF command logs off the interactive concentrator.

Format:

IAIOP LOGOFF

IAIOP END command - The IAIOP END command terminates the interactive concentrator and logs it off if it has not already been logged off. This command must be followed by a RETURN.

Format:

IAIOP END

IACON command - The IACON command initializes an MIOP console other than the Kernel console for use as an interactive station console. Interactive station commands can only be entered at such a console. Interactive station commands are described in Appendix I.

Format:

IACON

#### DEVICE COMMANDS

The Kernel device commands summarized in table 3-1 allow you to 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.

As the operator, you need not be concerned with the initial configuration of Peripheral Expander devices. Mnemonics for accessing Peripheral Expander devices are associated with the devices at system deadstart. However, these commands allow you to alter the device configuration by enabling or disabling devices.

Through these commands you can also restart or abort a process after an error has been encountered. Appendix E 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 and I/O is suspended on the device until you enter one of the commands in table 3-1:

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

Table 3-1. Device commands

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

A device command has the following general format:

*command device*

*command* One of the commands listed in table 3-1

*device* One of the following local device mnemonics:

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

## 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 is provided in Appendix G.)

The mount request for datasets staged from the I/O Subsystem to the Cray mainframe is:

@MT0:*num* PLEASE MOUNT TAPE FOR READING, ID=*id*

The mount request for datasets staged from the Cray mainframe to the I/O Subsystem is:

@MT0:*num* PLEASE MOUNT TAPE FOR WRITING, ID=*id*

*num* is the file number of the tape to be read or written. The *id* 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 *id* that appears is taken from the first word of the TEXT field of the COS DISPOSE, FETCH, or ACQUIRE control statement.

If the following prompt message is displayed on the MIOP console, the response must be one of the device commands described in table 3-1.

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

#### 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 disk is not mounted.

@DKO: PLEASE MOUNT DISK FOR IO, ID=*id*

*id* is taken from the first word of the TEXT field of the COS DISPOSE control statement. *id* is compared to the ID field in the disk label created when the disk was initialized (see the INIT utility in Appendix F).

#### MISCELLANEOUS MAINTENANCE COMMANDS

Miscellaneous maintenance commands are used by the CRI systems analyst.

- LISTP Lists all defined Kernel halt codes
- LISTO Lists all defined overlays in the I/O Subsystem
- UBTAPE Prints tape files after unblocking
- PRTAPE Prints tape files that are unblocked
- ERRDMP Dumps the error log buffer
- ERROR Turns the error log channel on or off
- TIME Displays the date and time
- CLOCK Sets and displays the date and time



## LISTP command

LISTP prints a list of all currently defined Kernel halt codes.

If the I/O Subsystem detects an irrecoverable 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

*error code* Error code number

MIOP consoles display a current log of memory errors detected by the Error Log channel. For a description of the display format, see the ERROR station command in section 4.

Normally, dumping the I/O Subsystem is advisable when an error halt occurs (for information about dumps, see Appendix B of this manual).

The format and results of the LISTP command are as follows.

Format:

<u>LISTP</u>
--------------

Results:

<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	100 Mbyte 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
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

<u>Code</u>	<u>Meaning</u>
017	Buffer Memory incorrectly configured
020	IOP message channels incorrectly configured
021	SMOD is too large for area on Buffer Memory
022	Invalid local memory address
023	Illegal interrupt program sequence code
024	Stop request received from CPU
025	6 Mbyte channel error (always hardware)
026	Block number validation trap
040	Block Mux interrupt processor error
041	Bad CRW address in device table
042	Block Mux start I/O error
044	Block Mux configuration error

#### LISTO command

This command provides a listing of all defined overlays in the system. The listing is helpful when analyzing a dump of the I/O Subsystem software.

Format:



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

No.	Out Name	Size	BM-Upr	BM-Lwr	No.	Out Name	Size	BM-Upr	BM-Lwr	No.	Out Name	Size	BM-Upr	BM-Lwr
00	AMAP	0450	00	017432	01	ACON	2004	00	017546	02	AMSG	0520	00	020147
03	CALL	1214	00	020273	04	CARD	0240	00	020536	05	CODEM	1104	00	020606
06	CONFIG	1260	00	021027	07	CRAY	0750	00	021303	10	DISK	1604	00	021475
11	DISKIO	0474	00	022036	12	DRIOEX	0174	00	022155	13	ERRECK	1710	00	022214
14	HURFAG	1024	00	022576	15	HPLOND	0460	00	023003	16	OBIT	0704	00	023117

### UBTAPE command

The UBTAPE command unblocks a single, specified blocked file on I/O Subsystem tape and sends it to the I/O Subsystem printer.

Format:

UBTAPE *fn* [ *fb* [ *lb* ] ]

*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.

### PRTAPE command

To print tape files that are already unblocked, enter the PRTAPE command.

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*.

PRTAPE interprets ASCII carriage return (15g) and new line (12g) characters as end-of-line characters. Lines that are too long are wrapped around. Blanks are substituted for unprintable characters.

### 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 4 of this manual) 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:

<u>ERRDMP</u>
---------------

#### ERROR command

This Kernel command (as distinguished from the ERROR station command discussed above and in section 4) 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:

<u>ERROR</u>	$\left\{ \begin{array}{c} \text{ON} \\ \text{OFF} \end{array} \right\}$
--------------	---

ON            Allows interrupts on the Error Log channel

OFF           Disables interrupts on the Error Log channel

#### TIME command

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

Format:

<u>TIME</u>
-------------

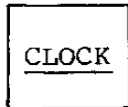
After you enter the command, the console response is the date and time in the following format.

*mm/dd/yy hh:mm:ss*

#### CLOCK command

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

Format:



When the following message is displayed, enter the date in the format *mm/dd/yy*:

ENTER DATE:

If the year entered does not match the year configured in the system, the following warning message is displayed:

WARNING! Entered year does not match system-configured year.

You are then requested to reenter the date. This time the year will be accepted even if it still disagrees with the system configuration.

To change the system-configured year, use the I@YEAR installation parameter described in the COS Operational Procedures Reference Manual, publication SM-0043.

When the date has been accepted, the message displayed is:

ENTER TIME:

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

---

#### NOTE

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

---



Station commands allow you to control the station software, which executes under control of the Kernel software. You initialize station software with a Kernel command. Kernel commands, which control Kernel software, are described in section 3.

After you initialize the station software, you can enter the station commands. Stations require a unique LOGON ID for communicating with COS. You 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 unit, and monitor the progress of jobs submitted.

You control station software from a station console. A display/console is shown in figure 1-3. Station commands are entered only 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 color paper, contains individual station command descriptions.

See Appendix I for information about the interactive station.

## DISPLAY FORMAT

The station software generates a 24-line display image (80 characters per line) on the screen (figure 4-1). The first line identifies the version of the software. The significance of L, S, R, and M in the first display line is as follows:

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

See the STMSG command in section 4 for a complete description of the messages waiting, as indicated by an M at the top of the screen.

System messages are displayed on the second line of the screen.

The other display lines are used 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 a CLEAR command or a status response 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 one of these commands is entered, 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.

The full-screen scroll mode can be returned with the SCROLL command.

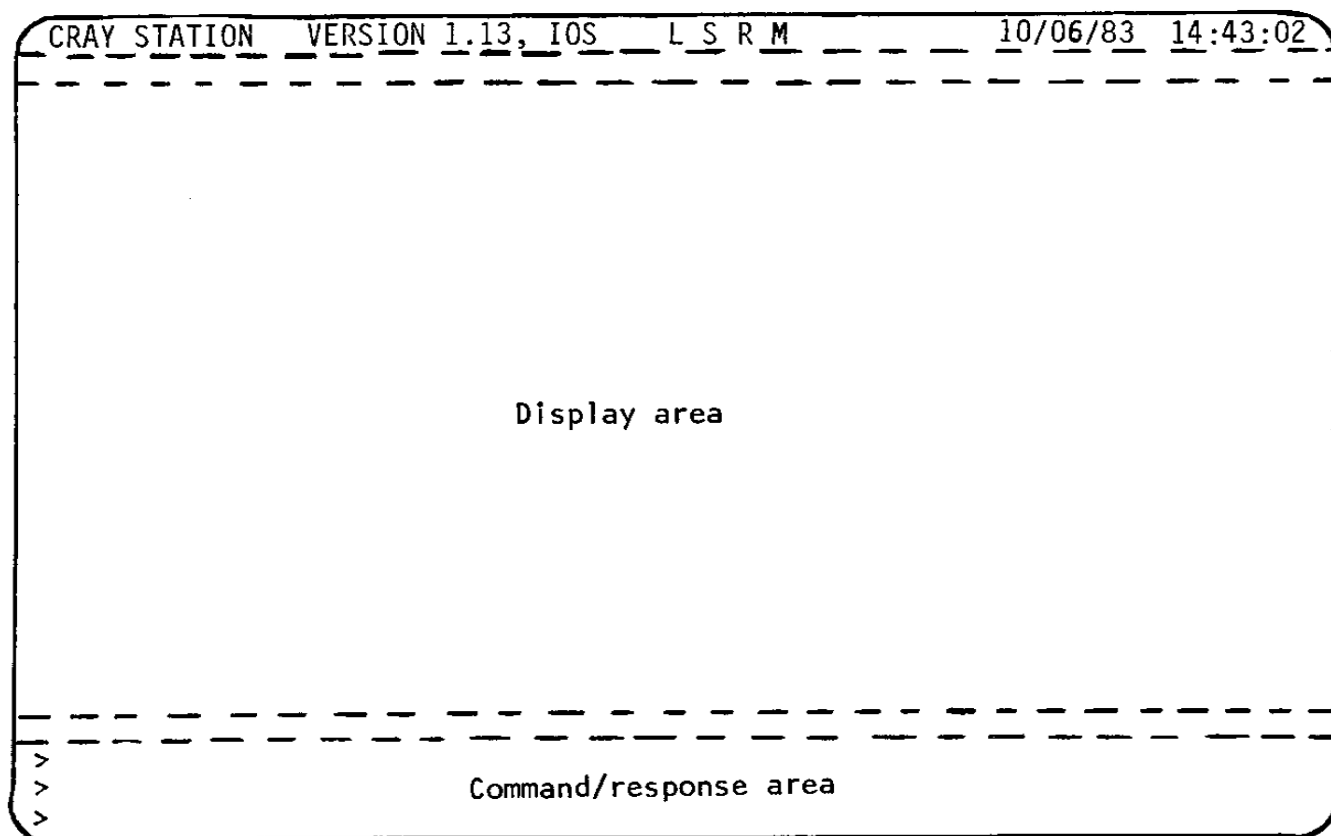


Figure 4-1. Station screen format



## COMMAND ENTRY

Station operation is controlled through station commands entered at the console keyboard. To execute the command, press RETURN. As each character is typed, it is placed in a type-ahead buffer. When the buffer is full, a bell rings. 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 the ESC key. The bell also rings if you press a character not recognized by the station or if you press the DELETE key on an empty line. To correct a typographical error, use the editing functions described in table 4-1.

Table 4-1. 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, 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 4-1. 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

#### STATION COMMAND DESCRIPTIONS

Each station command is described in detail in the color pages in this section. For each command, the information provided includes entry format and station at which the command is available.

#### COMMAND FORMATS

Station commands have the following general form:

$verb, p_1, p_2, \dots, p_n$

*verb* A set of characters uniquely identifying the command to the station software

*p<sub>i</sub>* Parameter requirements. Details are given with the description of each command later in this section.

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 is allowed.

Command formats use the conventions shown in table 4-2.

Table 4-2. Command syntax conventions

Command Syntax	Function
UPPERCASE	Identifies the command verb or literal parameter
<u>UNDERLINED UPPERCASE</u>	Specifies the minimum number of characters required for the verb or parameter to be recognized
<i>Italics</i>	Define generic terms that represent the words or symbols to be supplied by the operator
[] Brackets	Enclose optional portions of a command format
{ } Braces	Enclose two or more parameters when one of the parameters must be used

#### STATION COMMAND SUMMARY

Some commands can be entered at any station; others can be entered only at the master operator station. Table 4-3 summarizes the I/O Subsystem station commands described in detail in the color pages of this manual. In the table, the following abbreviations indicate the type of console to be used for command entry.

- MC Command can be entered only if the IOS station is the master operator station.
- AC Command can be entered at any IOS station console.
- 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 4-3. Station commands

Command	Availability	Description
Activation		
LOGON	AC	Establishes communications between an I/O Subsystem station and COS. (See section 2.)
CONSOLE	AC	Adds another MIOP console to the station software
Deactivation		
END	AC	Terminates console operation (and logs off if no additional consoles are active)
LOGOFF	AC	Terminates communications between an I/O Subsystem station and COS
Command Control		
DELAY	AC	Suspends processing of a command for a specified time
@filename@	AC	Invokes command file
PAUSE	AC	Interrupts command file processing
Link Control		
CHANNEL	MC	Turns Cray mainframe I/O channel on or off. Also turns IOP channel on or off.
POLL	AC	Sets the rate at which control messages are exchanged with the Cray mainframe
STREAM	ALL	Changes the input, output, and active stream counts for the specified station
Station Identification		
OPERATOR	AC	Changes the ID of the master operator station

Table 4-3. Station commands (continued)

Command	Availability	Description
Station Identification		
SET	AC	Modifies the default value associated with station's ID and TID parameters
Peripherals Control		
DEVICE	MC	Sets or clears read-only mode for any Cray mass storage device
FLUSH	MC	Copies data to a permanent mass storage device
Dataset Staging		
SAVE	AC	Queues a file from the IOS station to Cray mass storage, where file is made a permanent dataset
STAGE	AC	Halts or resumes staging of datasets between Cray mass storage and the I/O Subsystem station
SUBMIT	AC	Queues file for staging from the IOS station to Cray mass storage, where dataset is entered into job input queue
Job Identification		
ENTER	ALL	Changes station and terminal ID associated with a job or an output dataset
ROUTE	MC	Changes the station ID for all jobs and output datasets having a specific ID to a new ID
Job Scheduling		
CLASS	MC	Turns job class or classes on or off
ENTER	ALL	Assigns a new time limit, priority, or station ID to a job (or its output dataset); assigns a new job class if job is in the input queue.

Table 4-3. Station commands (continued)

Command	Availability	Description
Job Scheduling		
STATCLASS	AC	Displays status of defined job classes
Job Execution		
LIMIT	MC	Sets maximum number of jobs that COS can process at one time
SWITCH	ALL	Sets or clears a job sense switch
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 its 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.
SUSPEND	MC	Suspends processing of one or all jobs
SHUTDOWN	MC	Idles down job activity in preparation for a system interruption
Job Commencement		
RECOVER	MC	Lifts suspension from jobs suspended by a SHUTDOWN or system interruption
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.

Table 4-3. Station commands (continued)

Command	Availability	Description
<b>Job Commencement</b>		
RESUME	MC	Reschedules processing of jobs suspended by SUSPEND or SHUTDOWN commands
<b>Station Messages</b>		
STMSG	ALL	Displays station messages as they are received
REPLY	ALL	Replies to a specific station request message
<b>Logfile Messages</b>		
MESSAGE	ALL	Enters message into job logfile, the system logfile, or both
<b>Display Format</b>		
CLEAR	AC	Clears screen display area
COMMENT	AC	Inserts comment in command stream
MONITOR	AC	Monitors specified aspects of COS or IOS
REFRESH	AC	Sets display refresh rate
SCROLL	AC	Causes entire display area to be used as command/response area
SNAP	AC	Copies display screen image to a line printer
STP	AC	Displays COS task statistics
<b>Link and Station Status</b>		
LINK	ALL	Displays status of station link
STATION	AC	Displays status of station



Table 4-3. Station commands (continued)

Command	Availability	Description
<b>Link and Station Status</b>		
STRSTAT	AC	Displays information for individual station streams
DEFAULT	AC	Sets or displays default device attributes used for staging operation by the station
<b>Peripherals Status</b>		
DISK	AC	Displays statistics from disk control block of each disk on a specified I/O processor
STORAGE	AC	Displays status of mass storage devices
<b>Job and Dataset Status</b>		
DATASET	AC	Responds with status of specific dataset
JOB	ALL	Displays status of a specific job
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
TJOB	ALL	Displays status of all jobs using generic resources, including those on the input, output, and executing queues
<b>Device Configuration Display</b>		
TAPE	ALL	Displays tape device configuration information, including device status, access paths, job assignment, and various device characteristics
RSTAT	AC	Displays controlled device availability and current use



Table 4-3. Station commands (continued)

Command	Availability	Description
<b>Device Configuration Modification</b>		
<b>CONFIGURE</b>	<b>MC</b>	Alters a device's configuration as specified
<b>Error Log Table Display</b>		
<b>ERROR</b>	<b>AC</b>	Displays information from the Error Log Table when errors are sensed
<b>Operator Aids</b>		
<b>HELP</b>	<b>ALL</b>	Displays helpful information for Station, Kernel, or Interactive commands
<b>Front-end monitoring</b>		
<b>CONC</b>	<b>ALL</b>	Monitors concentrator activity

The command descriptions following are in alphabetic order according to verb. Entry of a command is terminated by pressing the RETURN key.



@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, end of file is encountered, or an I/O error occurs. 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 at the console keyboard.

As commands are read from the file, they are echoed on the console screen (preceded by a colon).

**FORMAT:** @*dir*/*filename*@

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

*filename* 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 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 (1-4 for CRAY X-MP). Consult a Cray Research system analyst for specific channel assignments.

*ordinal*      Ordinal associated with IOS channel pair; decimal number in range 0 through 255. If not specified, default is 0. Consult a Cray Research system analyst for specific channel ordinal assignments.

ON            If a front-end interface, turns on channel; if an IOS channel, enables ordinal and initiates CONC,*ordinal* processing on the I/O Subsystem.

OFF          If a front-end interface, turns off channel; if an IOS channel, disables ordinal and initiates ENDCONC,*ordinal* processing on the I/O Subsystem.

**AVAILABILITY:** Available only at the master operator station, which must be logged on

## 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 is off do not initiate until that class is turned on.

**FORMAT:** CLASS, (ALL), (ON)  
jcl (OFF)

ALL	Turns on or off all job classes
jcl	Name of job class to be turned on or off; 1 through 7 characters.
ON	Turns on job class or classes
OFF	Turns off job class or classes

---

### NOTE

If any classes are OFF when a CLASS,ALL,OFF occurs, the next 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:** Allows comments (such as information from the command/response area) to be entered 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:** COMMENT[,*text*]

*text* Arbitrary character string limited by the length of the line

**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 LCP information.

**FORMAT:** CONC[,*ord*]  
*ord* ordinal number

**EXAMPLE:**

---

### IOP Concentrator Monitor

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

Current Input LCP				Current Output LCP			
MN = 0	MC = 0	MSC = 0	ID:	MN = 0	MC = 5	MSC = 0	ID:
SCBs				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		

---

**AVAILABILITY:** Available at any station that is logged on



## CONFIGURE - ALTERS TAPE OR DISK DEVICE CONFIGURATION

### TAPE

**FUNCTION:** Alters the status of a tape device or channel or control unit. The CONFIG tape command has two formats. The first allows the status of a device to be changed; the second allows the status of the channel or control unit to be changed and may affect all devices connected to that channel or control unit.

**FORMATS:** CONFIGURE, DVN=*dvn*[, { RDONLY / RDWRT } ] [, { UP / DOWN } ]

CONFIGURE, ICHL=*ch[:cu]*, [IOP=*iopid*], { ON / OFF }

DVN=*dvn* Device name; 1-8 ASCII characters.

RDONLY Device is in read-only mode.

RDWRT Device can be written to and read from.

UP Device is logically available to system.

DOWN Device is logically unavailable to system.

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.

ICHL=*ch[:cu]*

IOP channel number descriptor.

*ch* Number of the IOP channel. Must be two octal digits between 20 and 37.

*cu* Controller unit connected to the specified IOP channel. Must be a single hexadecimal digit 0-9 or A-F.



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

## DISK

**FUNCTION:** Alters the status of a disk device by changing the device characteristics as described in the Equipment Table (EQT). This command is operational only if tapes are configured in the system.

**FORMAT:** CONFIGURE, DVN=*dvn* [,  $\left\{ \frac{\text{AVAIL}}{\text{NAVAIL}} \right\}$ ] [,  $\left\{ \frac{\text{RONLY}}{\text{RDWRT}} \right\}$ ] [, RBN= $\left\{ \frac{\text{Y}}{\text{N}} \right\}$ ] [, SCR= $\left\{ \frac{\text{Y}}{\text{N}} \right\}$ ] [, VOL=N] [, CTL=N] [, WDL= $\left\{ \frac{\text{Y}}{\text{N}} \right\}$ ]

DVN=*dvn* Device name; 1-8 ASCII characters.

AVAIL Device is present and can be used.

NAVAIL Device is not present or is unusable.

RONLY Device is in read-only mode; no space will be allocated on this device.

RDWRT Device is in read-write mode; space can be allocated on this device.

RBN=Y Device is designated request by name; space is allocated on this device only if specifically requested by user.

RBN=N Device is not request by name.

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.

**AVAILABILITY:** Available only at the master operator station, which must be logged on

## CONSOLE - ALLOCATE ADDITIONAL STATION CONSOLE

**FUNCTION:** Allocates another console to station software control.

The new console shares a LOGON ID with the originating console. Hence, 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 the CONSOLE command is entered, the following message is displayed at the console being added. (*xx* gives the current version of the station.)

CRAY STATION, VERSION 1.*xx*

**FORMAT:** CONSOLE, *num*

*num* Console designator (0 through 3). Consult a Cray Research system analyst 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:** DATASET, *pdn* [, *userid*] [, *ed*] [, *ov*]

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

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

*ed* Edition number of requested dataset; 1 through 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 through 15 alphanumeric characters. If this parameter is omitted, the default ownership value is selected.

**AVAILABILITY:** Available at any station that is logged on

## 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]** Allows you to reference a new default volume name for the expander disk. *vol* represents the pack ID; can be from 1 through 7 characters.

**DIRECTORY [,dir]** Allows you to reference a new default directory name for expander disk; can be from 1 through 15 characters.

**AVAILABILITY:** Available at any station that is logged on



## 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:** DELAY, *sec*

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

**AVAILABILITY:** No prerequisites





## DEVICE - CHANGE READ-ONLY STATUS ON MASS STORAGE DEVICE

**FUNCTION:** Prevents additional space allocation for any Cray mass storage device

**FORMAT:** DEVICE, *device*,  $\left\{ \begin{array}{l} \text{PUBLIC} \\ \text{PRIVATE} \\ \text{ON} \\ \text{OFF} \end{array} \right\}$

*device* Name of device; 1 through 8 characters.  
Consult a Cray Research system analyst for specific device names.

**ON** Designates mass storage device available for read and write operations

**OFF** Designates mass storage device available only for read operations

**PUBLIC** Designates mass storage device as accessible to all users<sup>†</sup>

**PRIVATE** Designates mass storage device as permitting limited access<sup>†</sup>

**AVAILABILITY:** Available only at the master operator station, which must be logged on

<sup>†</sup> See the CRAY-OS Version 1 Reference Manual, publication SR-0011 for a detailed discussion of public versus private.

## DISK - DISPLAY DISK STATISTICS

**FUNCTION:** Initiates the disk statistics display

**FORMAT:** DISK,*iop*

*iop*            IOP number:  
                 1 BIOP (default)  
                 2 IOP 2  
                 3 IOP 3

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

- Channel number (octal)

- Device type:

DD-19  
DD-29  
DD-49

- Current disk status:

IDLE	Available for use
READ	Read from disk taking place
WRITE	Write to disk taking place
R.A.	Read ahead taking place
HEADSEL	Head select taking place
SEEK	Seek taking place
ER-READ	Error recovery on a read
ER-WRT	Error recovery on a write
ER-SEEK	Error recovery on a seek
W-BUFF	Waiting for local buffer
W-DATA	Waiting for data
ERROR	Error recovery scheduled

- Current cylinder and head (octal)

The following may also appear in this column:

DESELECT - disk is deselected

- Number of sectors read on this device
- Number of sectors written on this device

- Total number of errors on this device
- Number of irrecoverable errors on this device

AVAILABILITY: No prerequisites

EXAMPLE: DISK

IOP-1 DISK DISPLAY								
OUTSTANDING DISK REQS:			3					
								FRAME 0
CHAN	TYPE	CURRENT		SECTORS ACCESSED			ERRORS	
		STATUS	CYL/HD	READS	WRITES	R.A.	TOTAL	UNREC
20	DD19	READ	62/ 0	50665	18943	23548	0	0
21	DD29	IDLE	DESELECT	18241	8555	3921	1	0
22	DD19	IDLE	DESELECT	17555	11026	1559	0	0
23	DD19	IDLE	413/ 4	76555	60089	43962	0	0
24	DD19	IDLE	DESELECT	6562	5110	1120	0	0
25	DD19	WRITE	324/11	28836	23028	10974	0	0
26	DD19	R.A.	155/ 6	101167	106656	1931	0	0
27	DD19	IDLE	DESELECT	1722	2781	280	0	0
32	DD19	IDLE	DESELECT	0	0	0	0	0
33	DD29	IDLE	DESELECT	52544	29926	4099	0	0
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 the second format.

**FORMATS:** DROP, jsq<sub>1</sub>, jsq<sub>2</sub>, ..., jsq<sub>n</sub>

DROP, jsq - jsq<sub>n</sub>

*jsq<sub>i</sub>* 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 length of the line.

**AVAILABILITY:** Available at any station that is logged on. The operator can drop any job running in the Cray Computer System at the master operator station. At other stations, the operator can only drop jobs with the same station ID as the one where the DROP command is entered.

## 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. (See the LOGOFF command.)

**FORMAT:** END

**AVAILABILITY:** No prerequisites



## ENTER - CHANGE JOB SCHEDULING PARAMETERS

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

**FORMAT:**

ENTER, *jsq*,  $\left\{ \begin{array}{l} \underline{\text{TIME}}, t1 \\ \underline{\text{PRIORITY}}, pri \\ \underline{\text{ID}}, id[, tid] \\ \underline{\text{CLASS}}, jcl \end{array} \right\}$

*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.

*t1* New time limit; 0 through 16777215. The time limit is a decimal count of the maximum number of seconds the job will be 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.

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

**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.

*id* New station ID; 2 alphanumeric characters.

*tid* New terminal ID; optional; 1 through 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 through 7 characters.

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

**EXAMPLES:** ENTER,10,TIME,10

The job having the job sequence number of 10 is allowed to execute a maximum of 10 seconds before the job is aborted with job time limit.

ENTER,12,PRI,5

The priority for the job or dataset having the job sequence number of 12 is changed to 5.

## ERROR - DISPLAY HARDWARE ERROR INFORMATION

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

**FORMAT:** ERROR

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

- Local Memory of the MIOP and up to three other processors (all uncorrectable errors)
- Buffer Memory (correctable and uncorrectable errors)
- Cray mainframe Central Memory (correctable and uncorrectable errors)
- 100 Mbyte memory 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 Master I/O Processor IOP-1 Buffer I/O Processor IOP-2 Disk I/O Processor IOP-3 Disk I/O Processor or Block Multiplexer Processor CRAY SB Mainframe single-bit SECDED error CRAY MB Mainframe multibit SECDED error MOS SB Buffer Memory single-bit SECDED error MOS MB Buffer Memory multibit SECDED error HSPD IN Input (to IOS) side of 100 Mbyte channel HSPD OUT Output (from IOS) side of 100 Mbyte channel



<u>Entry</u>	<u>Significance</u>
SYND	Syndrome bits
CPU MODE	Read Mode: <ul style="list-style-type: none"> <li>SCAL Scalar</li> <li>I/O Input/output</li> <li>VECT Vector</li> <li>FTCH Instruction fetch</li> </ul>
MOS PORT	Buffer Memory port number
ADDRESS	Address of last occurrence
HSPD CODE	100 Mbyte memory channel error code: <ul style="list-style-type: none"> <li>FNCT Function error</li> <li>ACTV Active error</li> <li>TRNS Transmit address error</li> <li>ADDR Address error</li> <li>DATA Data error</li> <li>BLCK Block length error</li> <li>NRDY Data ready timeout</li> </ul>
IOP	I/O Subsystem location <ul style="list-style-type: none"> <li>BNK Bank</li> <li>SCT Section</li> <li>BYT Byte:               <ul style="list-style-type: none"> <li>0 Left byte</li> <li>1 Right byte</li> </ul> </li> </ul>
COUNT	Total count of errors at location specified

AVAILABILITY: No prerequisites

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>- IOP -</u>	<u>COUNT</u>
						<u>BNK</u> <u>SCT</u> <u>BYT</u>	
CRAY SB	277	VECT		407721			1
CRAY MB	40	SCAL		1567603			18

## FLUSH - COPY DATA TO BACKUP DATASET

**FUNCTION:** Copies data from a volatile device (device that loses information stored on it at power 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:** FLUSH, *device*

*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 COS Operational Procedures Reference Manual, CRI publication SM-0043, for information on the \*RESTORE parameter file directive.)

A separate FLUSH command must be used 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 issued to the operator.

**AVAILABILITY:** Available only at the master station, which must be logged on

## HELP - DISPLAY HELP FOR COMMANDS

**FUNCTION:** Displays helpful 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* STATION - help for Station commands  
KERNEL - help for Kernel commands  
INTERACTIVE - help for interactive commands

**EXAMPLE 1:** HELP,, STATION

### IOS STATION HELP FACILITY - STATION COMMANDS

FRAME 0

+	-	.	<	=
>	@	ALTER	ASSIGN	BREAKPOINT
CHANNEL	CLASS	CLEAR	COMMENT	CONFIGURE
CONSOLE	DATASET	DEBUG	DELAY	DEVICE
DISCONNECT	DISK	DISPLAY	DROP	END
ENTER	ERROR	FLUSH	HELP	IACON
INITIATE	JOB	JSTAT	KILL	LIMIT
LINK	LOGOFF	LOGON	MESSAGE	MODE
MONITOR	OPERATOR	PAUSE	POLL	RECOVER
REFRESH	REMOVE	REPLY	RERUN	RESUME
ROUTE	RSTAT	RUN	SAVE	SCROLL
SET	SHUTDOWN	SNAP	STAGE	STATCLASS
STATION	STATUS	STMSG	STOP	STORAGE
STP	STREAM	STRSTAT	SUBMIT	SUMMARY
SUSPEND	SWITCH	TAPE	TJOB	

(See also commands in the COS Operational Procedures Manual, CRI publication SM-0043.)

**EXAMPLE 2:** HELP, PATCH, KERNEL

*cmd* PATCH  
Make temporary changes to IOS overlays

*type* KERNEL

**Format:**

**PATCH** *ovly* *addr* [*val*]

*ovly*: Overlay name (or KERN) to modify  
*addr*: Parcel address of modification  
*val*: Value to patch into address. If null, displays current value)

**AVAILABILITY:** No prerequisites

## JOB - DISPLAY JOB STATUS

**FUNCTION:** Returns job status message in command response area

**FORMAT:** JOB,*jobname*[,*jsq*]

*jobname* Name of job for which status is requested; 1 through 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 form:

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. The operator can request job status for any job in the Cray Computer System at the master operator station. At other stations, the operator can request job status for only 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. The operator can request job status for any job in the Cray Computer System at the master operator station. At other stations, the operator can request job status for only 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					FRAME 0	
ID: ZP						
TID: HOTSHOT	JXT=0064010	JCB=0250000	JTA=0234000			
STATUS: RESIDENT						
CLASS: LARGE	<u>TASK #</u>	<u>STATUS</u>	<u>CP TIME</u>	<u>TXT</u>	<u>TCB</u>	
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	WAIT-I/O	346	0066123	00234447	
TIME LIMIT: 69000	END OF DATA.					
TAPES RESERVED: 2						
TAPES ASSIGNED: 1						

\$CS: LDR,MAP. Load and start executing model.

\$LOG: LD000 - BEGIN EXECUTION

---



## KILL - KILL JOB

**FUNCTION:** Depending on the status of the job, 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 the second format.

**FORMATS:** KILL, *jsq*<sub>1</sub>, *jsq*<sub>2</sub>, ..., *jsq*<sub>*n*</sub>

KILL, *jsq* - *jsq*<sub>*n*</sub>

*jsq*<sub>*i*</sub> 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 length of the line.

**AVAILABILITY:** Available at any logged on station. The operator can kill any job running in the Cray Computer System at the master operator station. At other stations, the operator 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 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:** LIMIT [, *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 master operator station, which must be logged on

**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 station that is logged on. 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.

EXAMPLE:

LINK

LINK STATUS							FRAME 0		
<u>ID</u>	<u>QUEUE</u> <u>COUNT</u>	<u>ACTIVE</u>		<u>MAXIMUMS</u>			<u>SUBSEGMENT</u> <u>#</u>	<u>SIZE</u>	<u>CH,ORD</u>
		<u>I</u>	<u>O</u>	<u>I</u>	<u>O</u>	<u>AC</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 are logged off when LOGOFF is entered at one of the consoles.

**FORMAT:** LOGOFF

**AVAILABILITY:** Available at any station that is logged on

---

### NOTE

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

If an operator enters 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:** The LOGON command 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, the operator can issue commands to be processed at the Cray mainframe rather than just locally at the I/O Subsystem.

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:** LOGON[,*id*][,*tid*]

*id* Optional identifier (2 alphanumeric characters) used by COS to associate messages and data with this station. The ID is initially AP for the I/O Subsystem. 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 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

## MESSAGE - ENTER MESSAGE INTO LOGFILE

**FUNCTION:** Enters a message into a job logfile, the system logfile, or both

**FORMAT:** MESSAGE, { JOB, *jobname*, *jsq*  
BOTH, *jobname*, *jsq* , *message* }  
SYSTEM

**JOB** Enters message into the job logfile

**BOTH** Enters message into the job logfile and the system logfile

**SYSTEM** Enters message into the system logfile

*jobname* Name of job; 1 through 7 characters.

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

*message* Character string to be entered into the logfile. The message is truncated to 79 characters if necessary.

**AVAILABILITY:** Available at any station that is logged on. The operator can enter messages for any job in the Cray Computer System at the master operator station. At other stations, the operator 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:** MONITOR, *display*

display      Information monitored

BMEM      Percentage of Buffer Memory currently in use by each I/O Processor

BMIO      Percentage of maximum I/O to the 100 Mbyte channel connecting the IOP to Buffer Memory

BMX      Percentage of maximum data transfer, current device number, and mode on each configured Block Multiplexer channel

CMEM      Percentage of Cray Central Memory use as follows:

- System (fixed)
- User
- System buffers
- Unused

CPU      Percentage of Cray mainframe time as follows:

- System time
- Idle time
- User time
- Time blocked for I/O

DISK      Percentage of maximum data transfer to each disk

DMEM      Percentage of disk buffers in use in each I/O Processor

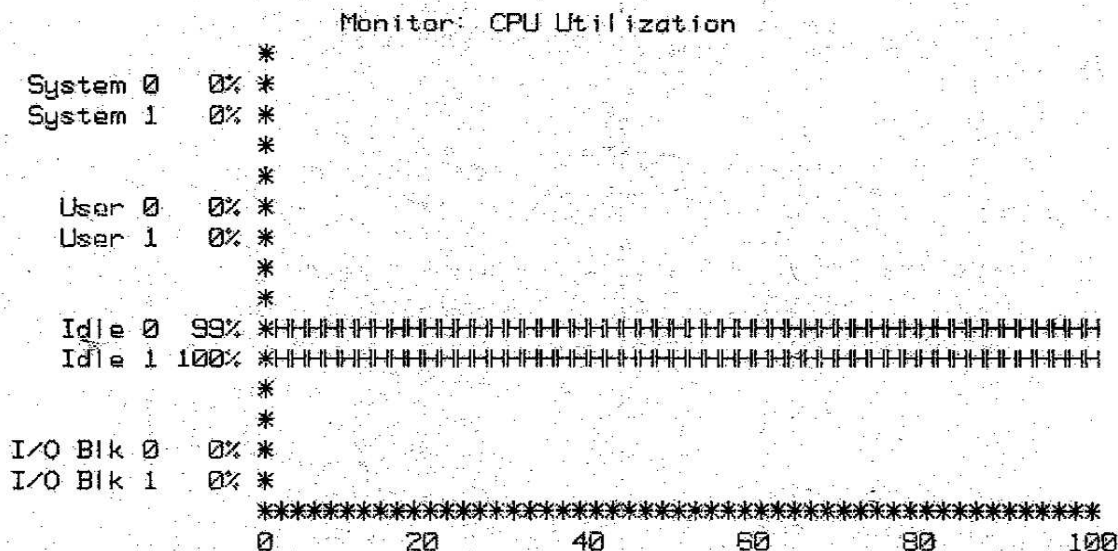
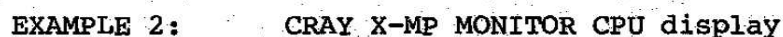
FMEM      Percentage of free Local Memory in use by each I/O Processor

HSPIO      Percentage of maximum I/O to the 100 Mbyte channel connecting the IOP to the mainframe

IOP      Percentage of IOP central processor time not idle for each I/O Processor

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

EXAMPLE 1: CRAY-1 S MONITOR CPU display



## OPERATOR - CHANGE MASTER OPERATOR STATION

**FUNCTION:** Changes master operator station from currently designated station to another. 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). Consult a Cray Research system analyst for station IDs.
<i>tid</i>	Terminal ID of the new master operator station (1 through 8 characters). Consult a Cray Research system analyst for terminal IDs.
<i>pw</i>	Password; 1 through 8 characters. Consult a Cray Research system analyst for password.
<i>npw</i>	Optional; enter if a new password is to be required for subsequent OPERATOR commands; 1 through 8 characters.

**AVAILABILITY:** Available at any logged on station if the operator knows the master operator station password

**EXAMPLE:** OPERATOR,CD,T3,OLDPW,NEWPW

In the example, the new master operator station is identified by ID CD and terminal ID 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:** PAUSE[,*text*]  
*text* Informational text string

**AVAILABILITY:** No prerequisites

## POLL - SET CONTROL MESSAGE EXCHANGE RATE

**FUNCTION:** If no staging is in progress, sets rate at which control messages are exchanged with the Cray mainframe. If the operator does 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,*sec*

*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. Also see the SHUTDOWN command.

**FORMAT:** RECOVER

**AVAILABILITY:** Only available at the master operator station, which must be logged on

## REFRESH - SET DISPLAY REFRESH RATE

**FUNCTION:** Sets the interval between screen updates. If the operator does 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

## REPLY - REPLY TO STATION REQUEST MESSAGE

FUNCTION: Replies to a specific station message

FORMAT: REPLY *msgnum text*

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

*text* 1 through 79 ASCII characters

AVAILABILITY: Available at any logged on station

## RERUN - RERUN JOB

**FUNCTION:** Immediately ends processing of job identified by its job sequence number. 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 the second format below.

**FORMATS:** RERUN, *jsq*<sub>1</sub>, *jsq*<sub>2</sub>, ..., *jsq*<sub>*n*</sub>

RERUN, *jsq* - *jsq*<sub>*n*</sub>

*jsq*<sub>*i*</sub> 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 length of the line.

**AVAILABILITY:** Available at any logged on station. The operator can rerun any job running in the Cray Computer System at the master operator station. At other stations, the operator 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 adjust or modify 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.

## RESUME - RESUME JOB PROCESSING

**FUNCTION:** Reschedules suspended jobs for processing; this command is normally used to reschedule jobs suspended by the SUSPEND command.

RESUME can also be used to reschedule jobs that have been suspended by a SHUTDOWN command or a system interruption, although 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. See the SUSPEND and SHUTDOWN commands.

**FORMAT:** RESUME, { jsq<sub>1</sub>, jsq<sub>2</sub>, ... jsq<sub>n</sub> }

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

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 master operator station. The operator 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. Consult a Cray Research analyst for station IDs.

**FORMAT:** ROUTE,*oid*,*nid*

*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 will be 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  $\left\{ \begin{array}{l} , queues \\ , jsq \\ , P \\ , GN gn [queues] \end{array} \right\}$

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

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

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

*GN gn* Displays profile and cumulative utilization 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

The following information is provided under the RSTAT,*P* (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

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
- For each job which is using or waiting for the generic resource with name *gn*, the job sequence number, job name, job status, job priority, job limit, and number of units assigned

AVAILABILITY: Available at any logged on station

EXAMPLE (RSTAT):

---

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 (RSTAT,P) or RSTAT:

GENERIC RESOURCE PROFILE				FRAME 0
GENERIC NAME	UNITS AVAILABLE	UNITS ALLOCATED	PENDING REQUESTS	
*6250	5	1	6	
SSD	32000	27000	42000	
BMR	1000	250	250	
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	

EXAMPLE (RSTAT,GN \*6250):

GENERIC RESOURCE CUMULATIVE UTILIZATION FOR *6250						QUEUES E I
UNITS AVAILABLE 5		UNITS ALLOCATED 1		PENDING REQUESTS 3		FRAME 0
JSQ	JOBNAME	STATUS	PRIORITY	JOB LIMIT	ASSIGNED	
213	TESTJOB	Q-RSOURC	7.0	3	0	
2112	TAPTEST	S-SYS	1.0	1	1	
*END OF DATA*						

## SAVE - STAGE PERMANENT DATASET

**FUNCTION:** Queues a file for staging to Cray mass storage, where it will be made a permanent dataset.

The operator initiates staging to the Cray mainframe by using the IOS station SAVE or SUBMIT commands. Staging can proceed only if the station is logged onto 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.

The operator can delay or abort staging on a given stream by using the Peripheral Expander tape mount responses or device commands described in section 3.

**FORMAT:** SAVE,*device*,*dsn*[,*pars*]

*device* Input device format:

@MTunit:*num*[:NR]

*unit* Unit number (0-9)

*num* Tape file number (0-9999)

NR Do not rewind the tape after staging is completed.

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

*unit* Unit number (0-9)

*dir* Directory name; maximum of 15 alphanumeric characters

*file* File name; maximum of 15 alphanumeric characters

*dsn* Name to be assigned to the permanent dataset at the Cray mainframe; 1 through 15 alphanumeric characters.

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

EDITION,*number*

**FORMAT:**  
(continued)

number Edition number; 0 through 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 will be canceled.

ID,userid

userid User identification; 1 through 8 alphanumeric characters.

MAINTENANCE,pcw

pcw Maintenance permission control word; 1 through 8 alphanumeric characters.

PERIOD,days

days Retention period in days; 0 through 4095. The default is an assembly parameter.

READ,pcw

pcw Read permission control word; 1 through 8 alphanumeric characters.

USER,verno

verno User number; 1 through 15 alphanumeric characters.

WRITE,pcw

pcw Write permission control word; 1 through 8 alphanumeric characters.

**AVAILABILITY:** Available at any station that is logged on

## SCROLL - USE DISPLAY FOR COMMAND/RESPONSE SCROLL AREA

**FUNCTION:** Changes the entire display area (except for the 2-line header) to a command/response area. This command is provided so that the operator 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

**FORMAT:** SET[,ID,*id*][,TID,*tid*]

ID,*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 I/O Subsystem. The default ID is displayed in the STATION display if the station is not logged on.

TID,*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 zero (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.

The CHANNEL OFF command in this section can be used to prevent additional jobs from entering the system.

The FLUSH command can be used 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.

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

The RECOVER or RESUME command must be used to reactivate jobs following a SHUTDOWN. The LIMIT command must be re-issued after a SHUTDOWN to allow queued jobs to be scheduled for execution.

**AVAILABILITY:** Available only at the master operator station, which must be logged on



## SNAP - PRINT DISPLAY CONTENTS

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

**FORMAT:** SNAP[,*comment*]

*comment* An arbitrary character string limited only by the length of the input line

**AVAILABILITY:** No prerequisites

## STAGE - HALT OR RESUME STAGING

**FUNCTION:** Halts or resumes initiation of dataset staging between the I/O Subsystem magnetic tape 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, { ON }  
                                  { OFF }

ON               Resume staging; this is the default.

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

**AVAILABILITY:** No prerequisites

## STATCLASS - DISPLAY JOB CLASS STATUS

**FUNCTION:** Displays status of 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 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 seven 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 header line for the display specifies the frame count at the right of the line and indicates which frame of status information is being displayed. Frames are numbered 0 through 99, modulo 100.

**AVAILABILITY:** Available at any station that is logged on

EXAMPLE: CLASS STATUS

---

CRAY JOB CLASS STATUS						FRAME 0
CSDN = DAY-XMP						
JOB 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>	
OPERATR	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:** STATION

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:

STATION

# STATION STATUS DISPLAY

STATION ID: AP OPERATOR  
STATION DEV: @DK0  
STATION VOL: IOS  
STATION DIR: STATION

MAXIMUM STREAM COUNT: 2

REFRESH RATE: 10 ON  
POLL RATE: 10

## 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		@PR0	UP FREE	
1	OUT		-INACTIVE-						@MT0	UP RSRVD	RD
									@DK0	UP FREE	
									@CK0	UP FREE	



## STATUS - DISPLAY SYSTEM STATUS

**FUNCTION:** Returns status of jobs, input datasets, and output datasets known to COS. Several jobs are reported at a time according to their job sequence (JSQ) numbers. 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 for which status is requested. 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 is to be disposed to magnetic tape at the receiving station.

PR Dataset is to be disposed to a printer at the receiving station.

PT Dataset is to be disposed to a plotter at the receiving station.

PU Dataset is to be disposed to punched cards at the receiving station.

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

- 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 to 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.

**EXAMPLE:** STATUS

---

#### CRAY SYSTEM STATUS

CSDN = DAY-XMP

QUEUES E I O R S

FRAME 1

JSQ	DC	DATASET	CLASS	STATUS	PRI	TIME		FIELD		ID	TID
						USED	LIMIT	LENGTH			
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 4-1) alert the operator 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 the operator changes 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 G.

---

AVAILABILITY: Available at any logged on station

EXAMPLE: STMSG

---

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: STORAGE

The display provides the operator with the following information:

- Flags, giving special information about each device

- M Master device
- R Read only
- D Device down
- P Private; device can be requested by name only.
- S Scratch device; only local datasets are allowed.
- C Controlled device
- V Volatile; data can be saved on a backup dataset via the FLUSH command.

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.

AVAILABILITY: Station must be logged on.

EXAMPLE:

STORAGE

MASS STORAGE STATUS

FRAME 0

FLAGS	DEVICE	SPACE		ERRORS		LAST	ERROR	
		FREE	PERM	RECOV	UNREC	CYL	HD	SC
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
	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 systems analyst with statistics pertaining to the COS system task processor (STP). The command initiates a display of the statistics.

**FORMAT:** STP

The information displayed is as follows:

- **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)

## EXAMPLE:

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 through 8. The maximum allowable values are determined at logon time, and may differ for each station. The operator can not use the STREAM command to specify values greater than those specified at logon time.

*no* Number of output streams allowed; 0 through 8.

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

*Stream* is the flow of the pieces of information comprising a dataset being staged. The maximum number of input streams and output streams is defined for the station when a station is assembled. The link control commands allow the operator to change this number but not to 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 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. The operator can change the stream count for any station in the Cray Computer System at the master operator station. At other stations, the operator 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 a display of information for individual station streams

**FORMAT:** STRSTAT, [*id*]

*id* Log-on ID of station for which streams are displayed.

The information displayed is as follows:

- ID Log-on ID of station for displayed stream
- DSQ Dataset sequence number of dataset currently transferring on displayed stream
- DATASET Name of dataset being transferred
- JSQ Job sequence number of job for which stream is active
- DC Disposition code for transferring dataset
- DF Data format of transferring dataset
- STRM Direction in which stream is transferring
- MBIT/S Rate at which stream is transferring in megabits per second
- TOTAL Total size of transferring dataset in 512-word blocks (if known)
- CURR Number of current block being transferred
- DURATION Length of time stream has been active

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:

STREAM STATUS DISPLAY      RATE: 0.786 MBIT/S

FRAME: 0

ID	DSQ	DATASET	JSQ	DC	DF	STRM	MBIT/S	BLOCKS		DURATION
								CURR	TOTAL	
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 will be entered into the job input queue. See additional staging information in the SAVE command description.

**FORMAT:** SUBMIT, *device*

*device* Input device formats:

@MTunit:num[:NR]

*unit* Unit number (0-9).

*num* Tape file number (0-9999).

NR Do not rewind the tape after staging is completed.

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

*unit* Unit number (0-9).

*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 RESUME.

**FORMAT:** SUSPEND, { jsq<sub>1</sub>, jsq<sub>2</sub>, ..., jsq<sub>n</sub> }

jsq<sub>i</sub> Job sequence number (JSQ) identifying a specific job to be suspended; obtained through the STATUS command. The number of job sequence numbers that can be entered with this command is limited only by the length of the line.

ALL Suspends all jobs in the system

**AVAILABILITY:** Available only at the master operator station, which must be logged on. The operator can suspend any job in the Cray Computer System from the master operator station.

SWITCH - MANIPULATE JOB SENSE SWITCHES

**FUNCTION:** Sets or clears a job sense switch

FORMAT: SWITCH, jsq, ssw, 

ON
OFF

*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 station that is logged on. The operator can set or clear job sense switches for any job in the Cray Computer System at the master operator station. At other stations, the operator 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:** TAPE

The information provided is as follows:

- Device number
- Associated job sequence number (JSQ), if any assigned
- All access paths
- Device status

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

- Assigned volume serial number
- File block count
- Servicing front-end ID

**AVAILABILITY:** Available at any logged on station

EXAMPLE:

TAPE

---

DEVICE	JSQ	* TAPE CONFIGURATION *					VSN	FRAME 0	
		IOP	CH/CU	STATUS				FBC	SFE
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									

---

## TJOB - DISPLAY TAPE JOB'S STATUS

**FUNCTION:** Displays job status information for jobs requiring tape devices<sup>\*</sup>

**FORMAT:** TJOB, *int*

*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-SYS	Locked by system
LK-MEM	Locked for memory
Q-EXEC	Queued for execution
Q-RSOURC	Queued for resource
R-IN	Rolling in
ROLLED	Rolled out
R-OUT	Rolling 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

- 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.

<sup>\*</sup> If SSD is installed as a generic resource, jobs which use SSD are included in the TJOB display.



- 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
- 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>ID</u>	<u>DR</u>	<u>DU</u>	<u>RR</u>
				<u>USED</u>	<u>LIMIT</u>	<u>LENGTH</u>				
7374	LPSDMP	DELAY	9.9	0	8	100	M6	1	0	YES
END OF DATA										

---



## **APPENDIX SECTION**



# CHARACTER SET

A

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 ↑	136	u	165
└ or ←	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		





Two dump programs can be used with the I/O Subsystem station: SYSDUMP and DMP. When SYSDUMP is completed, the message DUMP COMPLETE appears. If SYSDUMP does not complete, DMP must be used.

## SYSDUMP

SYSDUMP is a utility used to selectively dump areas of a Cray system to disk for future examination. The dump is directed to an area on the master device set up by COS 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. (For a detailed description of FDUMP, see the COS Operational Aids Reference Manual, publication SM-0044.)

For SYSDUMP, you can select to dump up to four noncontiguous areas of Central Memory and Buffer Memory. If the I/O Subsystem is dumped, all I/O Processors configured are dumped. Included in the dump are:

- Local memory
- Operand registers
- A, B, C, E, and exit stack
- Done and busy flags for all channels

All dumps also include the B, T, V, and VM registers from the mainframe.

SYSDUMP can be initiated automatically by the I/O Subsystem when the system halts, or manually by the operator entering CONTROL D at the MIOP Kernel console.

---

#### NOTE

If the MIOP is not accepting input from the console, SYSDUMP can be invoked by pushing the IOP-0 MC and DEADSTART buttons with the deadstart device offline. This action causes an IOS halt and automatically invokes SYSDUMP.

---

When SYSDUMP is invoked, the system issues a message requiring you to respond according to the following procedure. Each response you make must be followed by a RETURN.

SYSDUMP?

Enter:

Y, if a dump is desired. The system responds with a default list of system options. See the SYSDUMP parameter list following.

N, if a dump is not desired.

If N is selected, the system responds with:

RESTART?

Enter:

Y, if a restart is desired. The system then requests a file name. (Normal restart procedure is indicated; see section 2.)

N, if a restart is not desired.

#### SYSDUMP PARAMETER LIST

If SYSDUMP is selected, a default list of the required system parameters is issued so that parameters can be changed, if necessary, before processing begins. An example of this list follows.

## PARAMETER LIST

DEVICE: DK20-1 DD29  
SYSTEM: 1/S  
PROCESSORS: 1  
CRAY: ALL  
MOS: ALL  
SSD: NONE  
IOS: YES  
RESTART: YES

CHANGE ?

The parameter definitions are:

DEVICE	Physical device ID of the COS-designated master device
	DK Required descriptor
	20 Physical unit number
	- Required separator
	1 IOP number to which device is connected
	DD29 Device type; may be one of the following:
	DD19 DD-19 Disk
	DD29 DD-29 Disk
	DD49 DD-49 Disk
SYSTEM	System type being dumped
	1/S CRAY-1 S or CRAY-1 M
	X CRAY X-MP
PROCESSORS	Number of central processors attached to the system. Parameters are displayed only for the CRAY X-MP.
CRAY	Address range of Central Memory to be dumped.
	ALL All of configured Central Memory
	NONE None of Central Memory is to be dumped.
	<i>range<sub>1</sub>;range<sub>2</sub>;range<sub>3</sub>;range<sub>4</sub></i>
	Up to four noncontiguous address ranges can be specified. Ranges are specified as ADDR1;ADDR2. Each range is separated by a semicolon.
MOS	Buffer Memory in the I/O Subsystem. Options are the same as for the CRAY parameter.
SSD	Secondary storage device memory to be dumped. If an SSD is not configured into the system, this parameter is not displayed. Options are the same as for the CRAY parameter.

IOS Specifies whether or not the I/O Subsystem registers and local memories are to be dumped. Options are:

YES  
NO

RESTART Specifies whether or not the I/O Subsystem is to be restarted at the conclusion of the dump. Options are:

YES  
NO

If the restart is selected (RESTART: YES), the I/O Subsystem can be restarted from the MIOP Kernel console when the dump is completed. If restart is not selected (RESTART: NO), then the operator must deadstart the system after the dump is completed.

CHANGE? Specifies whether or not the operator wants to change any of the above parameters. Options are:

NO Dump proceeds according to displayed parameters

YES Parameters are displayed one at a time followed by a 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.

To request that the system use the default parameter, enter N followed by a RETURN or press only the RETURN key. The dump proceeds with the displayed parameters.

To change one or more of the default parameters, enter Y followed by a RETURN.

The following example shows how to make changes to the parameter list.

#### PARAMETER LIST

DEVICE: DK20-1 DD29  
SYSTEM: 1/S  
PROCESSORS: 1  
CRAY: ALL  
MOS: ALL  
SSD: NONE  
IOS: YES  
RESTART: YES

CHANGE?: Y            Indicates you want to change one or more parameters

DEVICE: DK20-1 DD29

>            Read > on a line by itself as the word "change".

SYSTEM: 1/S

>X            Read > as "to".

PROCESSORS: 1

>2

CRAY: ALL

>

MOS: ALL

>NONE

SSD: NONE

>0-1000; 10000-20000

IOS: YES

>NO

RESTART: YES

>

The new parameter list is then displayed, allowing for further changes.

#### PARAMETER LIST

DEVICE: DK20-1 DD29

SYSTEM: X

PROCESSORS: 2

CRAY: ALL

MOS: NONE

SSD: 0-1000; 10000-20000

IOS: NO

RESTART: YES

CHANGE?

#### SYSDUMP CODE FUNCTIONS

The following information is included here (instead of in the IOS Internal Reference Manual) so that access to this information is convenient when SYSDUMP is being used.

- 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 code 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 code are to:
    1. Acquire the dump parameter table from Buffer Memory, and
    2. Read in the device label from the specified disk and find the system dump area assigned.

#### SYSDUMP MESSAGES

SYSDUMP issues the following messages.

<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 the CRAY X-MP Computer System.
CPU MEMORY DONE	Informative. Central Memory has been dumped.
CPU REGISTERS DONE	Registers have been dumped. These include: <ul style="list-style-type: none"> <li>B registers</li> <li>T registers</li> <li>V registers</li> <li>VM registers</li> </ul> <p>The A and S registers are retrieved from the exchange packages that were saved in Central Memory during dump.</p>

MessageAction/Description

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 systems 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.

IOP-1 NOT RESPONDING - RETRY?

Check the BIOP 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 BIOP console; then respond Y and RETURN to the message on the MIOP display/console.

IOS DONE

Informative. The I/O Subsystem has been dumped. Included for each IOP configured are:

Local Memory  
Operand registers  
A, B, C, E, and the exit stack  
Channel Done and Busy flags

LABEL NOT FOUND - ABORT

Informative. Dump aborted.

MOS ERROR

Informative. Dump continues.

SSD DONE

Informative. Dump completed.

DMP

DMP can be loaded from Peripheral Expander tape or disk. It provides a comprehensive display printout of the contents of the following memories and registers in the Cray Computer System.

- Central Memory
- Buffer Memory
- IOP Local Memory
- IOP operand registers, accumulators, carry bits, operand pointers, and exit stacks

The following items in the display printout are used by DMP and thus are not meaningful output for analysis:

- The first 2048 parcels of the MIOP (IOP-0)
- The last 64 operand registers of IOP-0
- The first 1024 parcels of IOP-0, -1, and -2 (on successive dumps)

Warning messages appear on the MIOP display/console when addresses selected contain invalid data. Duplicate lines within the dump are suppressed.

Space limitations allow for only seven 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 and Buffer Memories.

#### LOAD DMP FROM PERIPHERAL EXPANDER TAPE

Perform the following sequence to load the DMP program from tape.

1. Set the toggle switches on the I/O Subsystem maintenance panel to 22 (octal) to select the I/O Subsystem Peripheral Expander magnetic tape unit.
2. Mount the deadstart tape on the I/O Subsystem Peripheral Expander magnetic tape unit.
3. Press the IOP-0 MC and DEADSTART buttons.
4. TAPELOAD prompts with the request FILE @MT0:. Respond by typing a 2 and pressing the RETURN key.

TAPELOAD saves the information concerning MIOP in Buffer Memory, loads DMP from file 2, and passes control to DMP.

After DMP has been loaded, it displays the message:

I/O PROCESSOR DUMP PROGRAM



At this point DMP prompts you to respond to a sequence of requests concerning the dump. Refer to the following section describing DMP messages.

#### LOAD DMP FROM PERIPHERAL EXPANDER DISK

Perform the following sequence to load the DMP program from disk.

1. Set the toggle switches on the I/O Subsystem maintenance panel to 60 (octal) to select the I/O Subsystem Peripheral Expander disk unit.
2. Mount the deadstart disk on the I/O Subsystem Peripheral Expander disk unit.
3. Press the IOP-0 MC and DEADSTART buttons.
4. DISKLOAD prompts with the request FILE @DK0:. Respond by typing DUMP and pressing the RETURN key.

DISKLOAD saves the information concerning MIOP in Buffer Memory, loads DMP from disk, and passes control to DMP.

After DMP has been loaded, it displays the message:

I/O PROCESSOR DUMP PROGRAM

At this point DMP prompts you to respond to a sequence of requests concerning the dump. Refer to the following section describing DMP messages.

#### DMP MESSAGES

DMP issues a sequence of messages requiring operator responses. These messages and the required operator action are summarized below. The list is given in alphabetical rather than chronological sequence. A dash precedes an informative message.

In the following sequences, except for the dump of IOP internal registers, the operator can terminate dumping of the specified area in memory by pressing LINE FEED. This action causes DMP to advance to the next step.

To terminate the DMP operation, deadstart again.

<u>Message</u>	<u>Action/Description</u>
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 base address of Cray mainframe where all addresses displayed will be relative and press RETURN.
CRAY?	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: message.)  Enter N to advance to the next step.
-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?	Answer Y if a dump of the specified IOP is desired. Answer N to advance to the next step.
-IOP-n	Informative; appears while IOP-n is being dumped.
LOCAL MEMORY?	Enter address range of 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 operand registers are automatically included in the dump.  If Local Memory for an IOP is not to be dumped, immediately press RETURN.
-LOCAL MEMORY	Informative; appears while Local Memory is being dumped.

<u>Message</u>	<u>Action/Description</u>
MORE?	<p>Enter Y if additional areas of this type of memory are desired. Entering Y causes the request for address range to be repeated.</p> <p>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.</p>
MOS?	<p>Answer Y to dump the IOS Buffer Memory. Answer 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 I/O Subsystem.)</p>
-MOS	<p>Informative; displayed while Buffer Memory is being dumped.</p>
MOS MULTIBIT-ADDRESSES XXXXX	<p>A Buffer Memory program reference results in an irrecoverable error. DMP displays this message and takes no further action.</p>
NOT READY	<p>Printer is not ready for dump output. Perhaps it is not turned on or is in local mode. When the printer is readied, the dump continues.</p>
-OPERAND REGISTERS	<p>Informative; displayed while operand registers are being dumped. Press LINE FEED to prematurely terminate the dump and advance DMP to the next phase.</p>
PAPER LOW - TYPE C TO CONTINUE	<p>Printer is low on paper. Enter C to allow the current page to 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.</p>

Message

Action/Description

TRACE?

Enter Y if the trace feature in 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. The operator must select which buffers to dump.

Enter N to advance to the next step.

-TRACE BUFFER

Informative; a trace buffer is being printed.

WORD MODE?

Answer N if dump is to be parcel mode consisting of eight 16-bit parcels per line.

Answer Y if dump is to be word format consisting of four 64-bit words per line.

# STATION MESSAGES

C

The following messages displayed at an I/O Subsystem console are associated with inappropriate operator commands or input to the console.

## 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 I/O Subsystem 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 log-on message from the Cray mainframe. 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 which 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 Cray Research 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 I/O Subsystem. 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 I/O Subsystem.

#### FILE MANAGER ERROR

The file requested by a SAVE or SUBMIT command is not readable due to a software detected error by the I/O Subsystem file manager. Typical cause is internal resource limits 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 I/O Subsystem. Use a 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 command correctly.

#### INVALID COMMAND KEYWORD: *keyword*

The operator entered an invalid keyword with a command. Reenter command correctly.

#### INVALID PARAMETER: *parameter*

The operator entered an invalid parameter with a command. Reenter command correctly.

#### IOP ID TABLE IS FULL

The maximum number of stations that can be logged on via the I/O Subsystem has been reached. See a Cray Research systems analyst to increase the number of stations that can be logged on if it is possible for your system.

#### 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 I/O Subsystem.

#### LOGOFF ALREADY IN PROGRESS

The I/O Subsystem station was in the process of logging off when a LOGOFF command was entered. Wait for logoff to complete.

#### LOGOFF AWAITING TERMINATION OF ACTIVE STREAM

The I/O Subsystem station was in the process of logging off while an input or output stream was still active. The log off 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 I/O Subsystem.

#### NO INPUT STREAM ASSIGNABLE

The operator entered a SAVE or SUBMIT command, 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

The console at which the operator attempted to enter information is not logged on. Enter the LOGON command to logon the station.

#### OPERATOR ABORTED DEVICE

The peripheral expander device used by the station command was aborted by the operator. Reenter the command.

#### OPERATOR BREAK - PAUSED

The operator 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 enter SAVE or SUBMIT command again.



# DATASET TRANSFERS USING THE PERIPHERAL EXPANDER DEVICES

D

The I/O Subsystem supports acquisition of datasets from and disposition to magnetic tape and disk. It also supports disposition of datasets to printer and plotter. This section describes dataset acquisition from and disposition to the Peripheral Expander devices.

## DATASET ACQUISITION

The I/O Subsystem 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 CRAY-OS Version 1 Reference Manual, publication SR-0011.) The TEXT parameter must be specified and must have the format described in this section. The dataset, however, may have any format. Data is read from tape in 512-word blocks.

### DATASET ACQUISITION FROM MAGNETIC TAPE

Use the following format if you wish to acquire a dataset from magnetic tape.

Format:

```
ACQUIRE,...,AC=MT,TEXT=vol:file[:NR]
FETCH,...,AC=MT,TEXT=vol:file[:NR]
```

Parameters:

AC=MT	Acquire a dataset from magnetic tape.
vol	Volume name; 1 to 7 characters. This identifier appears in the tape mount message at the MIOP 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.

## DATASET ACQUISITION FROM DISK

Use the following format if you wish to acquire a dataset from Peripheral Expander disk.

### Format:

```
ACQUIRE,...,AC=ST,TEXT=[vol:][dir/]file
FETCH,...,AC=ST,TEXT=[vol:][dir/]file
```

### Parameters:

<b>AC=ST</b>	Acquire a dataset from Peripheral Expander disk. Expander disk is the default if AC is not specified.
<i>vol</i>	Volume name; 1 to 7 characters. This identifier appears in the disk mount message posted on the MIOP Kernel console. If not specified, the default volume name will be used. (See station DEFAULT command, section 4.)
<i>dir</i>	Directory name; 1 to 15 characters. If not specified, the default disk directory will be used. (See station DEFAULT command, section 4.)
<i>file</i>	File name; 1 to 15 characters.

If the TEXT field is invalid, the ACQUIRE or FETCH request aborts.

## DATASET DISPOSITION

The I/O Subsystem 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.

### PRINT DATASET

Use the following format if you wish 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],...
```

Parameters:

- 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.
- DOC        Indicates that the file is to be printed in document format. In this mode, the output is rotated clockwise 90 degrees 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

WRITE DATASET TO PLOTTER

Use the following format if you wish 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,...

Parameters:

- DC=PT      Plot dataset. The printer is driven in plot mode.

WRITE DATASET TO MAGNETIC TAPE

Use the following format if you wish 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],...

Parameters:

DC=MT	Dataset written to magnetic tape.
TEXT	Must be specified and must have the format described for tape ACQUIRE requests.
NR	No rewind. Optional parameter specifying that the tape is to remain reserved for the job for a subsequent transfer.

WRITE DATASET TO PERIPHERAL EXPANDER DISK

Use the following format if you wish to write a dataset to Peripheral Expander disk. The dataset may have any format.

Format:

DISPOSE,...,DC=ST,TEXT=[vol:] [dir/]file,...

Parameters:

DC=ST	Dataset written to expander disk.
TEXT	Must be specified and must have the format described for disk ACQUIRE requests.

# PERIPHERAL EXPANDER ERROR MESSAGES

E

The following information is provided by the Peripheral Expander error messages: what error was encountered, what function was in progress (DURING READ, DURING WRITE), and whether recovery was successful or not (RECOVERED, UNRECOVERED).

The following list of error messages includes action to take for unrecovered errors only.

<u>Message</u>	<u>Recommended response</u>
@MT0: NO WRITE RING	Put a write ring in tape.
@MT0: DATA LATE	Call CRI systems analyst.
@MT0: NOT READY <sup>†</sup>	Bring unit online.
@MT0: WORD COUNT ERROR	Call CRI systems analyst.
@MT0: RECORD LENGTH ERROR	Call CRI systems analyst.
@MT0: DATA PARITY ERROR	If read/write heads are dirty, clean them; otherwise, use a different tape.
@MT0: LOAD POINT DETECTED	Check tape for extra load point markers.
@MT0: POSITION LOST	Restart operation.
@MT0: BAD TAPE	Try a different tape.
@MT0: UNKNOWN ERROR	Call CRI systems analyst.
@MT0: COMMAND REJECT	Call CRI systems analyst.
@MT0: DEVICE TIMEOUT	Ensure that device is online; if it is, call CRI systems analyst.
@MT0: CHANNEL TIMEOUT	Call CRI systems analyst.
@MT0: EOF DETECTED	Remove tape.

---

<sup>†</sup> I/O resumes automatically after device is readied.

<u>Message</u>	<u>Recommended response</u>
@PR0: NOT READY <sup>†</sup>	Bring unit online.
@PR0: DEVICE TIMEOUT	Ensure that device is online; if it is, call CRI systems analyst.
@PR0: VACUUM FAULT	Call CRI systems analyst.
@PR0: CHANNEL TIMEOUT	Call CRI systems analyst.
@PR0: PAPER LOW	Add paper. (This is an informative message only. The printer does not pause.)
@DK0: NOT READY <sup>†</sup>	Bring unit online.
@DK0: DEVICE TIMEOUT	Ensure that device is online; if it is, call CRI systems analyst.
@DK0: CHANNEL TIMEOUT	Call CRI systems analyst.
@DK0: DRIVE FAULT	Call CRI systems analyst.
@DK0: DRIVE TIMEOUT	Call CRI systems analyst.
@DK0: SEEK ERROR	Call CRI systems analyst.
@DK0: SECTOR OVERFLOW	Call CRI systems analyst.
@DK0: ID HEAD ERROR	Reformat disk.
@DK0: ID CYLINDER ERROR	Reformat disk.
@DK0: DATA ERROR	Call CRI systems analyst.
@DK0: UNKNOWN ERROR	Call CRI systems analyst.
@DK0: NOT WRITE ENABLED <sup>†</sup>	Write enable unit.
@DK0: ID CHECKSUM ERROR	Reformat disk.
@DK0: FLAGGED SECTOR	Reformat disk.

---

<sup>†</sup> I/O resumes automatically after device is readied.

# STARTUP FILE CREATION AND MAINTENANCE

F

This appendix describes:

- The IOS file editor, which is used to create text files such as the startup parameter file or to modify a file already existing on a Peripheral Expander disk, and
- File utilities, which are used to maintain files on Peripheral Expander tape and disk.

## IOS FILE EDITOR

To invoke the IOS file editor, specify ED on the Kernel START command (see section 2), or use the EDIT utility command (described later in this section). Once the editor is invoked, 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 the ESC (escape) key any time causes a return to command mode.

## FILE EDITOR COMMANDS

Use the file editor commands described in this subsection 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 F-1 lists and summarizes the file editor commands. The file editor commands are described in detail following table F-1 and are listed alphabetically.

Table F-1. File editor commands

File editor command	Description
<u>A</u> PPEND	Appends text to the file
<u>B</u> YE	Terminates the editor
<u>D</u> ELETE	Deletes the lines between and including 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.
<u>P</u> rint	Prints all text between and including the lines specified
<u>R</u> EPLACE	Replaces the lines within the specified range
<u>T</u> YPE	Displays the lines within the specified range on the console. All lines are preceded by their line numbers.

#### APPEND command

The APPEND command 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
----------------

#### BYE command

The BYE command terminates the editor.



Format:

**BYE**

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, the following request for a file name is displayed:

ENTER FILE NAME:

Enter a file name to be associated with the edited version.

Format:

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

Parameters:

<i>unit</i>	Unit number (0-9). If a device is not specified, the Peripheral Expander disk unit 0 is used.
<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 described later in this section) is used.
<i>file</i>	File name on disk; maximum of 15 alphanumeric characters.

#### DELETE command

The DELETE command deletes the lines between and including the lines specified.

Format:

DELETE  $ln_1$   $ln_2$

Parameters:

$ln_1$       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.

INSERT command

When the INSERT command is entered, the editor enters text input mode, displaying the line number following the one entered. Text can then be entered at that location. Text input mode is exited and the insertion is complete when the ESC (escape) key is pressed.

Format:

INSERT  $ln$

Parameter:

$ln$       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.

PRINT command

The PRINT command prints all text between and including the lines specified. All lines are preceded by their line numbers.

Format:

PRINT  $\left\{ \begin{matrix} ln_1 & ln_2 \\ A \end{matrix} \right\}$

Parameters:

- $ln_1$       Number of the first line to print
- $ln_2$       Last line to print. If  $ln_2$  is greater than the number of the last line number in the file, all lines from  $ln_1$  to the end of the file are printed, and the message END OF FILE is displayed.
- A          The complete file is printed.

REPLACE command

The REPLACE command replaces the lines within the specified range. First the text between and including the specified lines is deleted, then text input mode is entered at the first line specified.

Format:

<u>REPLACE</u> $ln_1$ $ln_2$
------------------------------

Parameters:

- $ln_1$       Number of the first line to replace
- $ln_2$       Number of the last line to replace

TYPE command

The TYPE command displays the lines within the specified range on the console. All lines are preceded by their line numbers.

Format:

<u>TYPE</u> $\left\{ \begin{array}{l} ln_1 \quad ln_2 \\ A \end{array} \right\}$
--

Parameters:

- $ln_1$       Number of the first line to display

$ln_2$       Number of the last line to display. If  $ln_2$  is greater than the last line number in the file, all lines from  $ln_1$  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.

## FILE UTILITIES

The I/O Subsystem supports files and directories (groups of files) on Peripheral Expander disk. Use the file utilities described in this subsection to maintain the files within each directory.

### PERIPHERAL EXPANDER DISK DIRECTORIES

The Peripheral Expander disk software supports user-definable directories that share space on disk. The space need not be preallocated, since new directories are created dynamically when references to them are made in various commands.

### FILE UTILITY COMMANDS

You can use the file utilities described in this subsection by entering file utility commands at a Kernel console. Table F-1 lists the file utilities and summarizes their function. The file utility commands are described in detail following table F-1 and are listed alphabetically.

Table F-1. File utilities

File utility	Description
CLEAR	Deletes all files in one or more directories on Peripheral Expander disk
COPY	Copies a file from a tape to disk or from a disk to tape
DDUMP	Dumps all files in a list of directories from expander disk to expander tape starting at file number 0

Table F-1. File utilities (continued)

File utility	Description
DEF	Enables the setting of default attributes to be used in subsequent references to Peripheral Expander disk files
DELETE	Deletes one or more files within a directory on expander disk
DLOAD	Loads all files in a list of directories from expander tape to Peripheral Expander disk starting at file number 0. The tape must have been created with the DDUMP or FDUMP utilities.
DSTAT	Displays the status of one or more directories on expander disk
EDIT	Invokes the I/O Subsystem editor
FDUMP	Dumps a list of files from expander disk to expander tape starting at file number 0
FLAW	Makes a cylinder on the Peripheral Expander disk unavailable for use by the Disk File Manager until the next INIT is done on the disk
FLOAD	Loads a list of files from expander tape to expander disk. The tape must have been created with the DDUMP or FDUMP utilities
FSTAT	Displays the status of one or more files within a directory on expander disk
INIT	Initializes the Peripheral Expander disk for I/O Subsystem use
PROC	Executes a file of Kernel console commands from expander disk
RENAME	Renames a file on expander disk

The following descriptions of the file utility commands are arranged in alphabetical order.

#### CLEAR utility command

The CLEAR utility command calls the CLEAR utility which deletes all files in one or more directories on Peripheral Expander disk.

##### Format:

CLEAR [*@DKunit:*]*dir-list*

##### Parameters:

<i>unit</i>	Disk unit number (0-9). If a device is not specified, Peripheral Expander disk unit 0 is used.
<i>dir-list</i>	Directory name list, separated by commas. At least one directory name must be specified.

##### Examples:

CLEAR @DK0:XYZ

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

CLEAR IOS,COS,MYDIR

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

#### COPY utility command

The COPY utility command calls the COPY utility which copies 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 both the source and destination in a COPY.

**Format:**

<u>COPY</u>	{@MTunit:num[:NR]	{@DKunit:}[dir/]file}
	{[@DKunit:][dir/]file	@MTunit:num[:NR]

**Parameters:**

*unit*      Unit number (0-9). If a device is not specified, Peripheral Expander disk unit 0 is used.

*num*        Physical file number on tape (0-9999)

*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 section) is used.

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

*NR*        Optional no-rewind parameter for tape files. If specified on destination file, the first file copied must be file 0.

**Examples:**

COPY @MT0:0 PAR/RESTART

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

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

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

**DDUMP utility command**

The DDUMP utility command calls the DDUMP utility which dumps all files in a list of directories from expander disk to expander tape starting at file number 0.

Format:

DDUMP [*@DKunit:*][*dir-list*] *@MTunit:*

Parameters:

*unit*            Unit number (0-9). 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:

DDUMP @DK0:COS @MT0:

This example dumps all files in directory COS from Peripheral Expander disk to Peripheral Expander tape.

DDUMP IOS,COS,PAR @MT0:

This example dumps all files in directories IOS, COS, and PAR from Peripheral Expander disk to Peripheral Expander tape.

DDUMP @MT0:

This example dumps all files in all directories from Peripheral Expander disk to Peripheral Expander tape.

DEF utility command

The DEF utility command calls the DEF utility which enables the setting of default attributes to be used in subsequent references to Peripheral Expander disk files. If you enter no parameters after the DEF utility command, the current setting of all defaults is displayed.

Format:

DEF {  
  DEV  
  VOL [*vol*]  
  DIR [*dir*]  
}



Parameters:

<i>vol</i>	Optional disk volume name; maximum of 7 alphanumeric characters
<i>dir</i>	Optional disk directory name; maximum of 15 alphanumeric characters

Examples:

DEF DEV

This example displays the current default device name.

DEF VOL MYVOL

This example sets the default volume name to MYVOL.

DEF DIR

This example displays the current default directory name.

DEF

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

DELETE utility command

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

Format:

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

Parameters:

<i>unit</i>	Disk unit number (0-9). If a device is not specified, the Peripheral Expander disk unit 0 is used.
<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 section) 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:

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

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

```
DELETE IOS/KERN1
```

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

```
DELETE MYDIR/
```

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

```
DELETE MYFILE/
```

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

DLOAD utility command

The DLOAD utility command calls the DLOAD utility which loads all files in a list of directories from expander tape to expander disk starting at file number 0. The tape must have been created with the DDUMP or FDUMP utilities. Files that are already present on disk are not loaded.

Format:

```
DLOAD @MTunit: [@DKunit:] [dir-list]
```

Parameters:

*unit* Unit number (0-9). 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:

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

This example loads all files with directory name COS from Peripheral Expander tape to Peripheral Expander disk.

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

This example loads all files with directory names IOS, COS, and PAR from Peripheral Expander tape to Peripheral Expander disk.

```
DLOAD @MT0:
```

This example loads all files with any directory name from Peripheral Expander tape to Peripheral Expander disk.

#### DSTAT utility command

The DSTAT utility calls the DSTAT utility which displays 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]
```

#### Parameters:

*unit*            Disk unit number (0-9). 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:

```
DSTAT @DK0: COS
```

This example displays statistics of directory COS on disk unit 0.

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

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

## DSTAT

This example displays statistics of all directories on disk unit 0.

### EDIT utility command

The EDIT utility command calls the EDIT utility which enables the I/O Subsystem editor. The I/O Subsystem editor can either create a new file or modify a file already existing on Peripheral Expander disk.

#### Format:

<u>EDIT</u> { @TT [ @DKunit: ] [ dir/ ] file }
---

#### Parameters:

@TT	A new file is to be created at the console.
unit	Disk unit number (0-9). 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 (see DEF utility earlier in this section) is used.
file	File name on disk; maximum of 15 alphanumeric characters.

#### Examples:

EDIT @DK0:XYZ/MYFILE

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

EDIT ABC/UFILE

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

EDIT DEADSTART

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

EDIT @TT

This example allows you to create a new file from the Kernel console.

### FDUMP utility command

The FDUMP utility command calls the FDUMP utility which dumps a list of files from Peripheral Expander disk to Peripheral Expander tape starting at file number 0.

#### Format:

FDUMP [*@DKunit:*][*dir/*][*file-list*] @MTunit:

#### Parameters:

- unit*            Disk unit number (0-9). 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 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.

#### Examples:

FDUMP @DK0: COS/ @MT0:

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

FDUMP IOS/KERN1,KERN2,KERN3 @MT0:

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

FDUMP MYDIR/ @MT0:

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

FDUMP MYFILE @MT0:

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

### FLAW utility command

The FLAW utility command calls the FLAW utility which makes a cylinder on the Peripheral 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*

#### Parameters:

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

*cyl*         Cylinder number (2-823)

#### Examples:

FLAW @DK0:100

This example flaws cylinder 100 on disk unit 0.

FLAW 20

This example flaws cylinder 20 on disk unit 0.

### FLOAD utility command

The FLOAD utility command calls the FLOAD utility which loads a list of files from Peripheral Expander tape to Peripheral 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*]

**Parameters:**

*unit* Unit number (0-9). If a device is not specified, the 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 (see DEF utility 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 loaded.

**Examples:**

FLOAD @MT0: @DK0: COS/

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

FLOAD @MT0: IOS/KERN1,KERN2,KERN3

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

FLOAD @MT0: MYDIR/

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

FLOAD @MT0: MYFILE

This example dumps file MYFILE in default directory on tape unit 0.

**FSTAT utility command**

The FSTAT utility command calls the FSTAT utility which displays 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:**

<b><u>FSTAT</u></b> [ <i>@DKunit:</i> ] [ <i>dir/</i> ] [ <i>file-list</i> ]
--

## Parameters:

- unit* Unit number (0-9). If a device is not specified, the 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 (see DEF utility described earlier in this section) 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:

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

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

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

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

```
FSTAT MYDIR/
```

This example displays statistics of all files in directory MYDIR on disk unit 0

```
FSTAT MYFILE
```

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

## INIT utility command

The INIT utility command calls the INIT utility which initializes the Peripheral Expander disk for I/O Subsystem use. (To format the 80 Mbyte disk, see Appendix L of this manual.)

Before entering the file utility command, make sure that a tape containing the DISKLOAD and DMP files is mounted on the Peripheral Expander tape unit. Initializing the 80 Mbyte disk requires approximately 30 minutes of processing time, after entering the INIT command.



**Format:**

INIT [*vol*] @MTunit:*load-file* @MTunit:*dump-file*

**Parameters:**

*vol*            Optional volume name; (maximum of 7 characters). If volume name is not specified, the default volume name is used (see DEF utility, Appendix F).

*unit*          Unit number (0-9)

*load-file*    Physical file number on tape for DISKLOAD file

*dump-file*    Physical file number on tape for DMP file

**Examples:**

INIT APDISK @MT0:1 @MT0:2

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

INIT @MT0:1 @MT0:2

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

PROC utility command

The PROC utility commands calls the PROC utility which executes a file of Kernel console commands from expander disk.

**Format:**

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

**Parameters:**

*unit*            Unit number (0-9). If a device is not specified, the 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 (see DEF utility earlier in this section) is used.

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

**Examples:**

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

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

```
PROC DUMPTAP
```

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

**RENAME utility command**

The RENAME utility command calls the RENAME utility which renames a file on expander disk.

**Format:**

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

**Parameters:**

*unit* Disk unit number (0-9). If a device is not specified, the 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 (see DEF utility earlier in this section) is used.

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

**Examples:**

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

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

RENAME KERN1 @DK0:IOS/KERN2

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

RENAME MYFILE UFILE

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

#### FILE UTILITY ERROR MESSAGES

The I/O Subsystem file utilities 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.

The following messages require syntax error correction:

- INPUT ERROR - MISSING OR INVALID DEVICE
- INPUT ERROR - MISSING OR INVALID OPTION
- INPUT ERROR - MISSING OR INVALID VOLUME NAME
- INPUT ERROR - MISSING OR INVALID UNIT NUMBER
- INPUT ERROR - MISSING OR INVALID FILE NUMBER
- INPUT ERROR - MISSING OR INVALID DIRECTORY NAME
- INPUT ERROR - MISSING OR INVALID FILE NAME
- INPUT ERROR - MISSING OR INVALID FUNCTION
- INPUT ERROR - MISSING OR INVALID LINE NUMBER
- INPUT ERROR - MISSING OR INVALID CYLINDER NUMBER
- INPUT ERROR - DUPLICATE MEDIA (Copy was attempted with source and destination media the same.)

The following messages provide status information:

- FILE MODIFIED (File was not closed after last update.)
- FILE FLAWED (Hardware error; file contains unreadable blocks.)
- FILE EMPTY
- END OF FILE

The following messages report user-controllable error situations:

- END OF TAPE
- DISK NOT INITIALIZED
- DISK SPACE NOT AVAILABLE
- DIRECTORY NOT FOUND
- FILE NOT FOUND
- FILE ALREADY EXISTS

The following resource availability messages inform the user a requested resource is in use or an unrecoverable error condition exists:

PRINTER NOT AVAILABLE  
TAPE NOT AVAILABLE  
DISK NOT AVAILABLE  
PRINTER IO ERROR  
TAPE IO ERROR  
DISK IO ERROR  
OPERATOR ABORTED PRINTER  
OPERATOR ABORTED TAPE  
OPERATOR ABORTED DISK  
DISK BLOCK FLAWED  
LOW SPEED CHANNEL IO ERROR

The following messages report errors that require changes to system parameters:

LOCAL DATA STRUCTURE OVERFLOW  
DATA MAP OVERFLOW  
AVAILABLE MAP OVERFLOW

The following messages indicate problems requiring investigation by a customer engineer:

LOW SPEED IO ERROR  
HIGH SPEED IO ERROR  
MOS IO ERROR

# TAPE MOUNT REQUESTS

G

The information in this section is for magnetic tape units other than the Peripheral Expander. All tape mount requests are preceded with the message number *msgnum* and time in hours and minutes *hh:mm*. Enter a REPLY response in the following format when a response is required:

REPLY *msgnum action*

*msgnum*      Message number

*action*      One of the following:

ABORT	Cancels job
CONTINUE	Continues operation
RETRY	Reattempts device access
RESELECT	Selects device other than the one specified
UNLOAD	Unloads mounted tape
<i>vsn</i>	Indicates volume serial number; 1 to 6 characters.

*msgnum hh:mm MOUNT TAPE vsn(lt) ON devname - JOB jobname (jsq)*

Mount the tape specified by *vsn* (serial number of volume) and *lt* (label type) on the specified tape device *devname*. If the specified device is not desired, enter REPLY followed by RESELECT. (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 REMOUNT vsn(lt) ON devname WRONG VSN(wvs)*

The requested volume and mounted volume have different volume serial numbers. Mount the volume that has VSN *vs*.

*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 *vs*. 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 *vsu(1t)* ON *devname* INSERT RING IN VOLUME

A write was attempted on volume (*vsu*) without write ring present.  
Place the write ring in the mounted volume and remount.

*msgnum hh:mm* REMOUNT *vsu(1t)* ON *devname* TAPE CANNOT BE SCRATCHED - *rjc*

Mount was requested for installation scratch tape (VSN=??????), which cannot be used for various reasons (see *rjc* below). The different values for *rjc* in the message correspond to the job abort messages ABxxxx in the CRAY-OS Messages Manual, publication SR-0039).

*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 HDRL 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* READY *vsu(1t)* 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* TAPE *vsu* ON *devname* IS NOT EXPIRED - JOB *jobname(jsq)*  
REPLY CONTINUE OR UNLOAD

An attempt was made to write to an unexpired volume (*vsu*). Either substitute a different tape or enter REPLY *msgnum* CONTINUE. The volume is rejected even if the write is allowed when other reject conditions exist. To unload the mounted tape and reissue the mount message, enter REPLY *msgnum* UNLOAD.

*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 (*vsr*) as follows: REPLY *msgnum vsr*.

*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 online and enter REPLY *msgnum* RETRY. To abort the job, enter REPLY *msgnum* ABORT.





# ONLINE TAPE DEVICE ERROR MESSAGES/COMMANDS

H

Error messages are displayed on the XIOP Kernel console by the online tape part of the I/O Subsystem when error conditions are detected.

Format:

*hh:mm:ss*      *err*      *cmd*      *rtc*      *chn*      *dev*      *sta*

Parameters:

*hh:mm:ss*      Time in hours, minutes, and seconds when error occurred

*err*              Type of error

<u>Error</u>	<u>Description</u>
DATA CHECK      (xxxxxx)	An error was detected in the data being read or written to the device on block (xxxxxx).
BUS OUT CHECK	The control unit detected an error on the data received from the BMC-4.
COMMAND REJECT	The current command was rejected by the control unit.
EQUIPMENT CHECK	A mechanical failure occurred during the execution of the current command.
INTERVENTION REQUIRED	A condition requiring manual intervention exists on the device.
OVERRUN              (xxxxxx)	The BMC-4 was not ready to accept or provide data for the control unit upon request.      xxxxxx is the tape block position.

<u>Message</u>	<u>Description</u>
NOT CAPABLE	The data format of the tape was not readable by the device.
DATA CONVERTER	The control unit detected an error in its data converter.
LOAD POINT	Load point was detected during a read or a write.
ID BURST CHECK	The device was not able to write an ID burst on the mounted tape.
CHANNEL ERROR	An undefined error was detected on the channel between the BMC-4 and the control unit.
BUS-IN CHECK	An error was detected on the data received from the control unit by the BMC-4.
OVERRUN (SOFT)	The software detected a condition that prevented it from keeping up with the current data transfer.
P-ROM ERROR	The BMC-4 detected an error in its P-ROM.
ADDRESS MISCOMPARE	The BMC-4 detected a difference between the address sent to the control unit and the address received.
CONTROL UNIT ERROR	Either disconnect-in or select-in was detected in input tags returned from the control unit during I/O to a device.
CHANNEL TIMEOUT	An interrupt was not received from the channel in response to a function within the expected time.
DEVICE TIMEOUT	A response from a device was not received within the expected time.
UNKNOWN ERROR	An error occurred for which no message has been formatted.

<u>Message</u>	<u>Description</u>
DATA REGISTER	An error was detected in one of the two data-address registers.
BYTE REGISTER	An error was detected in the byte count register.

*cmd* Command in effect when error was detected

<u>Command</u>	<u>Description</u>
WRT	Write data
RDF	Read data forward
SNS	Read sense byte
WTM	Write tape mark
BSB	Backspace block
FSB	Forward space block
ERS	Erase tape
GCR	Set GCR mode (6250 bpi)
PHS	Set phase mode (1600 bpi)
RWD	Rewind tape
RWU	Rewind and unload tape
ROB	Read data backward
NOP	No-op

*rtc* Number of retries issued to recover the error

*chn* Channel on which the error was detected

*dev* Control-unit/device address at which the error was detected

*sta* Ending status:  
 RECOVERED Error was recovered.  
 UNRECOVERED Error was not recovered.



# INTERACTIVE STATION COMMANDS

I

The interactive station is a set of tasks running in the Master I/O Processor 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. Interactive concentrator commands are described in section 3.

The interactive concentrator must be initialized (IAIOP LOG command, section 3) to bring up an interactive console. Likewise, all interactive consoles must be terminated before the interactive console can be terminated (IAIOP LOGOFF Kernel command, section 3).

The Kernel command IACON, described in section 3, initializes the MIOP 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 the following commands).

Except for IACON, interactive station commands must be preceded by the command control character, which is a slash by default. All commands must be followed by a RETURN. The minimum character sequence required for entry is underscored.

The following interactive station commands are available.

<u>Command</u>	<u>Action</u>
<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 the break key.)
<u>BYE</u>	Terminates the interactive console
<u>CHANGE</u> <i>c</i>	Changes the command control character. <i>c</i> , which can be any character, becomes the new control character.
<u>COMMENT</u>	Allows comments

<u>Command</u>	<u>Action</u>
<u>EOF</u>	Sends an end of file on the input dataset
<u>LOGOFF</u>	Logs off the interactive console
<u>LOGON</u>	Logs on the interactive console
<u>STATUS</u>	Requests Cray job status

# NSC ACTIVITY MESSAGES

J

NSC-related messages are displayed on the 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:

*hh:mm:ss* NSC: CONCENTRATOR *x* [ORDINAL *y*] [ID *z*]  
*message*

## Parameters:

*x* NSC concentrator ordinal number in octal  
*y* Front-end ordinal number in octal  
*z* Front-end ID, which is displayed as a 2-character alphanumeric  
*message* One of the following:

<u>Message</u>	<u>Origin</u>	<u>Description</u>
LOGGED ON	NSCID	Specified front end just logged on
LOGGED OFF	NSCID	Specified front end just logged off or was terminated
ADAPTER ERROR DETECTED - STATUS=XXXXXXXXXXXXXXXXXX	NSCIO	Error was detected on completion of I/O operation. Ending status is presented as a 16-character hex string.
UNASSIGNED CHANNEL ORDINAL	NSC/NSCEND	NSC concentrator channel ordinal was presented for initialization or termination does not exist.

<u>Message</u>	<u>Origin</u>	<u>Description</u>
UNASSIGNED FRONT-END ORDINAL	NIDEND	Front-end ordinal presented for termination does not exist.
TERMINATION IN PROGRESS	NSCEND/NIDEND	Front-end or NSC concentrator channel ordinal presented for termination is already terminating.
INITIALIZED	NSC	Initialization of the presented NSC concentrator channel ordinal has completed normally.
INITIALIZATION IN PROGRESS	NSC	NSC concentrator ordinal presented for initialization is already undergoing initialization.
TERMINATED	NSCEND	NSC concentrator ordinal presented for termination has completed termination.
NO FRONT-END ORDINALS AVAILABLE FOR ASSIGNMENT	NSCID	No front-end ordinals are available for the front end currently attempting to log on.
INSUFFICIENT MEMORY FOR CONCENTRATOR	NSCID	Not enough memory was available to support concentrator routines for the front end currently attempting to log on.
ALREADY ACTIVE	NSC	NSC concentrator channel ordinal presented for initialization is already active.
NOT NSC CHANNEL TYPE	NSC	NSC concentrator channel ordinal presented for initialization is not configured as an NSC channel.



<u>Message</u>	<u>Origin</u>	<u>Description</u>
ERROR DURING INITIALIZATION - STATUS=XXXXXXXXXXXXXXXXXX	NSC	NSC concentrator channel ordinals cannot be initialized due to an error detected on the adapter. Status is presented as a 16-character hex string.
NOT LOGGED ON	NSCID	LCP for the front end was not preceded by a log on and cannot be assigned to an ordinal.
I/O LENGTH ERROR	NSCIO	Data length of the transfer did not match the expected length.



# JOB CONTROL INFORMATION

K

A job is the unit of work described for the Cray Operating System. A job enters the Cray Computer System as a job input dataset via an I/O Subsystem tape unit 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 characteristics of the job and the specific steps the operating system is to take while processing the job. Job control statements are described in the CRAY-OS Version 1 Reference Manual, publication SR-0011.

When using job control commands, the operator identifies a job by its job sequence number (JSQ). Job sequence numbers are shown in the job queue status display available through the STATUS display command.

The group of commands used to 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 only be used 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.)

The job usually has the same ID as the station at which it was submitted. However, a station's default ID can be reassigned with the SET command. Also, stations can change IDs at log-on time with the LOGON command. Finally, with the ENTER and ROUTE commands, the operator can change the station ID associated with the job.



# FORMATTING THE 80 MBYTE DISK

L

To format the 80 Mbyte disk, use routine F80M. System responses are displayed at the MIOP Kernel console. Keyboard entries must be followed by a carriage return.

<u>System response/action</u>	<u>Operator response/action</u>
1.	Load DOM (see the IOS Software Internal Reference Manual, CRI publication SM-0046).
2. Displays:  DIAGNOSTIC ONLINE MONITOR ACTIVE  LOAD WHAT?	Enter: F80M
3. Displays:  OPTIONS ARE:  LOCL = BEGINNING CYLINDER (0-1466) - DEFAULT = 0 LOHD = BEGINNING HEAD (0-4) - DEFAULT = 0. HICL = HIGH CYLINDER (0-1466) - DEFAULT = 1466. HIHD = HIGH HEAD (0-4) - DEFAULT 4. NPAT = NUMBER OF DATA PATTERNS (1-7) - DEFAULT = 2. DPAT = USER DATA PATTERN (0-177777) - DEFAULT = NOT USED.	Enter: SECT=16
4. Displays:  ENTER PARAMETERS	Enter: GO
5. Displays:  WARNING - DATA WILL BE DESTROYED. CONTINUE (Y OR N)	Enter: Y
6. Displays:  Various information messages.	No response required

System response/action

Operator response/action

7. Displays:

F80M STOPPED AT END OF SEC/TEST

Enter: TERM

# ONLINE DISK DEVICE ERROR MESSAGES

M

## DD-19 AND DD-29 DISK MESSAGES

The following error message is displayed at the IOP Kernel console when the I/O Subsystem detects an unrecovered DD-19 or DD-29 disk error. The operator should inform a Cray Research customer engineer to perform any necessary recovery actions before responding to the message.

Format:

CHANNEL *chan* - DISK ERROR CYL *cyl* HD *hd* ST *stat* *hh:mm:ss*

Parameters:

*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:

<u>Software status</u>	<u>Description</u>
INT-LK	Disk interlock
TM-OUT	Software timeout
BAD-SK	ID cylinder number miscompare on seek

*hh:mm:ss*   Time of error in hours, minutes, and seconds

## DD-49 DISK MESSAGES

The following message is displayed on the IOP Kernel console when the I/O Subsystem detects a DD-49 disk error that requires manual intervention in

order to recover. The operator should inform a Cray Research customer engineer to perform any necessary recovery actions before responding to the message.

**Format:**

*hh:mm:ss* DD49 CH *ch* FATAL *errmsg* ERROR. RETRY? (Y or N)

**Parameters:**

*hh:mm:ss* Time of error in hours, minutes, and seconds

*ch* IOP disk channel in error

*errmsg* Message describing the catastrophic drive status

<u>Message</u>	<u>Description</u>
SPINDLE POWER	No spindle power detected
R/W LOGIC POWER	No read/write logic power detected
OVERTEMP	Overtemperature detected
RUN SWITCH	Run switch disabled
WRITE PROTECT	Write protect indicators prevent writing disk data cylinders
BLOWER AIR	No blower air sensed
SPINDLE SPEED	Spindle not up to speed

<u>Response</u>	<u>Result</u>
Y	Disk error recovery executes more retries
N	Disk error recovery terminates, reporting the error as unrecovered

The following error message is displayed at the IOP Kernel console when the I/O Subsystem detects an unrecovered DD-49 disk error. The operator should inform a Cray Research customer engineer to perform any necessary recovery actions before responding to the message.

**Format:**

*hh:mm:ss* DD49 ERROR CH *chan* CYL *cyl* HD *hd* CTL *ctl* GEN *gen* type



Parameters:

*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:

<u>Category</u>	<u>Description</u>
SLCT	Unit select
SEEK	Cylinder select
READ	Read sector process
WRITE	Write sector process
RLSE	Unit release



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