CRAY

RESEARCH, INC.

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

I/O SUBSYSTEM (IOS)
OPERATOR'S GUIDE

SG-0051

Revision	Description
	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 messoages.

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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INTRODUCTION 1

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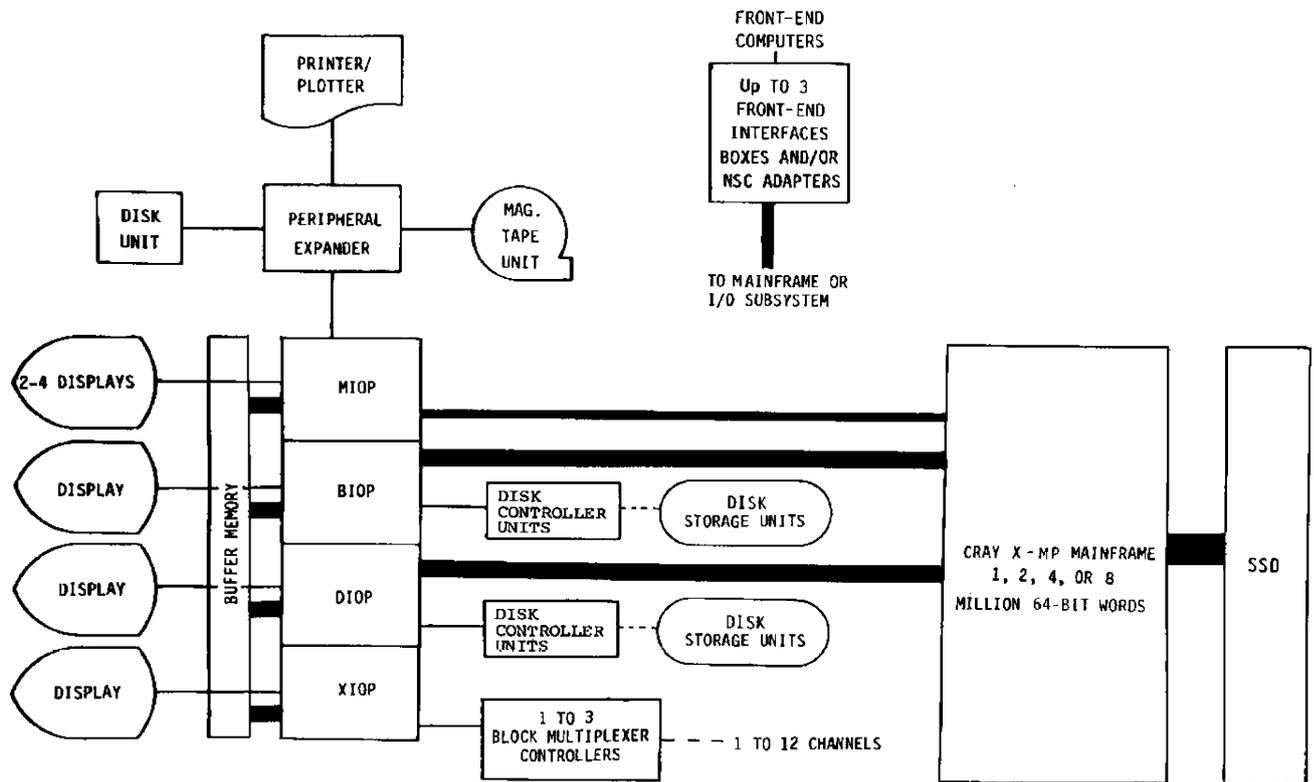
━━ Cray I/O Channel
███ 100 Mbyte Channel
███ 100 or 1250 MByte SSD Channels (depending on mainframe type, two
VHSP channels can be attached)

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
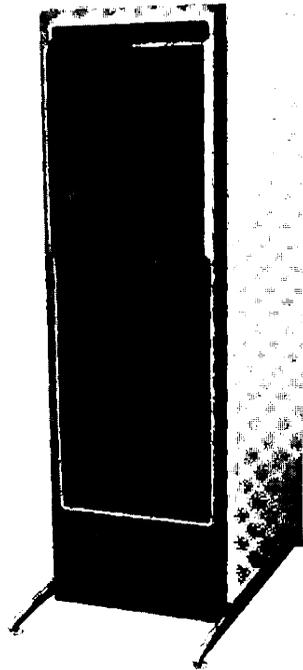
Figure 1-4. Peripheral Expander magnetic tape unit

Figure 1-5. DD-29 Disk Storage Unit
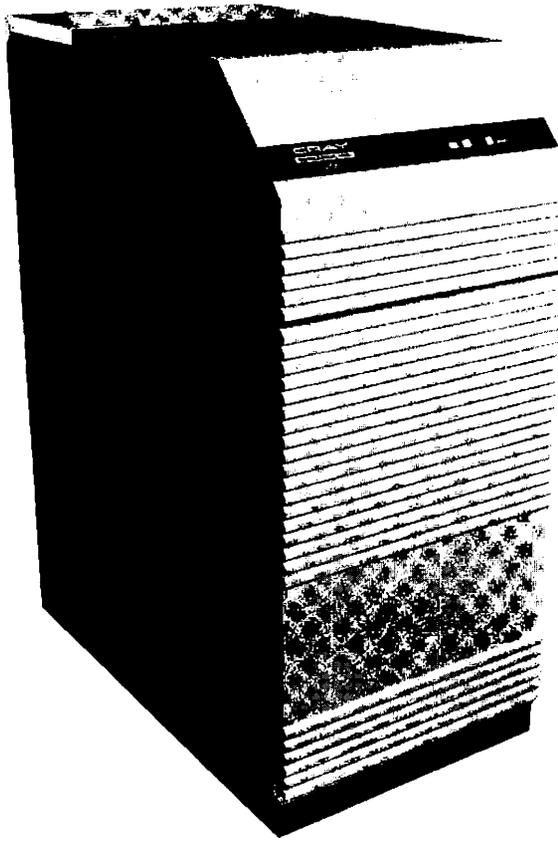
Figure 1-6. DD-49 Disk Storage Unit
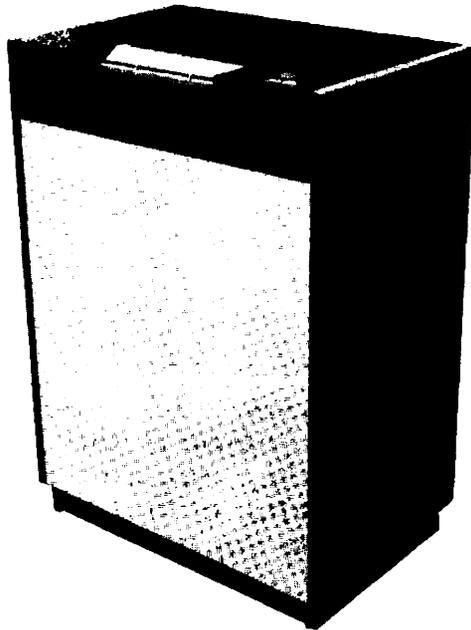
Figure 1-7. Peripheral Expander printer/plotter
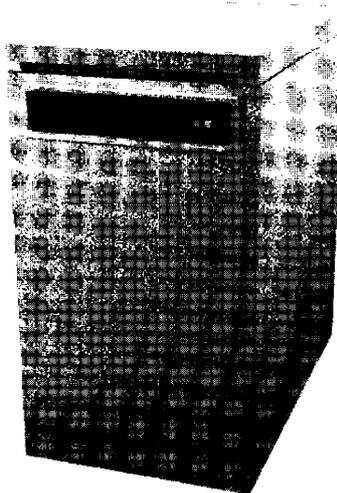
Figure 1-8. Peripheral Expander disk storage unit

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[†]
- 48 DD-29 or DD-49 Disk Storage Units[†]

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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[†] 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.

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 @MTO: 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:
          dir/filename (directory and filename)

Overlays Copied by COPY from the deadstart tape file 4 to some
          directory with a name of the form: *dir/filename*.OV,
          where *dir/filename* 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.xx* SN*sn*, *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, 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* SN*sn*, *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*

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:

```
        ┌ @MTunit:num          ┐ ┌ @MTunit:num                    ┐
START   │                      │ │                                │
        └ [@DKunit:] [dir/]file ┘ │ [@DKunit:] [dir/]file   [,ED] │
                                  │ @TT                            │
                                  └                                ┘
```

Parameters:

@MT	Peripheral Expander tape device
unit	Unit number (0-9)
num	Physical file number on tape (0-9999)
dir	Directory name on disk; maximum of 15 alphanumeric characters
@DK	Peripheral Expander disk device
file	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 @MTO:5 @MTO: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 @DKO:ABC/COS @DKO: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:

    msgnum   *time*   *Problem-specific prompt requiring analyst interaction or* ENTER GO *or* SKIP *or* CONTINUE

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:

<u>REPL</u>Y *magnum* <u>GO</u>

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,[†] 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.

[†] The COS Operational Procedures Reference Manual, CRI publication SM-0043, provides more information about commands necessary for this phase of startup.

KERNEL COMMANDS

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:

```
┌─────────┐
│ CRAY    │
│         │
└─────────┘
```

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

    CPU <-> MIOP CHANNEL INIT

    CPU <-> MIOP LINKAGE COMPLETE

If an error is encountered, the message is issued:

    CPU NOT RESPONDING - RETRY?

                    or

    LOW SPEED CHANNEL DATA ERROR
                DATA EXPECTED: $xxxxxxx$
                DATA RECEIVED: $yyyyyy$
    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:

```
┌─────────────────┐
│ STATION [num]   │
│                 │
└─────────────────┘
```

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:

```
┌─────────────┐
│             │
│ MASTER      │
│             │
└─────────────┘
```

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, amd 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 4000_8-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 discusssion 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.

Character	Description
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:

```
CONC [ch]
```

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:

```
ENDCONC [ch]
```

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 A130 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) A130 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:

```
┌─────────────┐
│             │
│  NSC ord    │
│             │
└─────────────┘
```

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:

```
┌─────────────┐
│             │
│  NSCEND ord │
│             │
└─────────────┘
```

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

Mnemonic	Device
@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:

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

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

@MTO:*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 Subsytem
- 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:

```
┌─────────┐
│         │
│  LISTP  │
│         │
└─────────┘
```

Results:

Code	Meaning
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

Code	Meaning
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:

```
┌───────┐
│       │
│ LISTO │
│       │
└───────┘
```

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

No	Ovl Name	Size	BM-Upr	BM-Lwr	No	Ovl Name	Size	BM-Upr	BM-Lwr	No	Ovl Name	Size	BM-Upr	BM-Lwr
00	AMMP	0468	00	017432	01	ACON	2004	00	017546	02	AMSG	0520	00	020147
03	CALL	1214	00	020273	04	CARD	0240	00	020636	05	CDFM	1104	00	020606
06	CONFIG	1200	00	021007	07	CRAY	0756	00	021303	10	DISK	1604	00	021475
11	DISKIO	0474	00	022036	12	DKIOEX	0174	00	022155	13	ERRECK	1710	04	022214
14	HUPTAG	1024	00	022576	15	HPLOAD	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 (15_8) and new line (12_8) 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:

```
┌──────────┐
│ ERRDMP   │
│          │
└──────────┘
```

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:

```
┌────────────────────┐
│ ERROR  │ ON  │     │
│        │ OFF │     │
└────────────────────┘
```

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:

```
┌──────────┐
│ TIME     │
│          │
└──────────┘
```

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:

```
┌─────────┐
│ CLOCK   │
│         │
└─────────┘
```
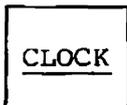
When the following message is displayed, enter the date in the format *mm/dd/yy*:

> 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.

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STATION COMMANDS

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.

```
CRAY STATION    VERSION 1.13, IOS    L S R M            10/06/83   14:43:02




                              Display area





>
>                      Command/response area
>
```
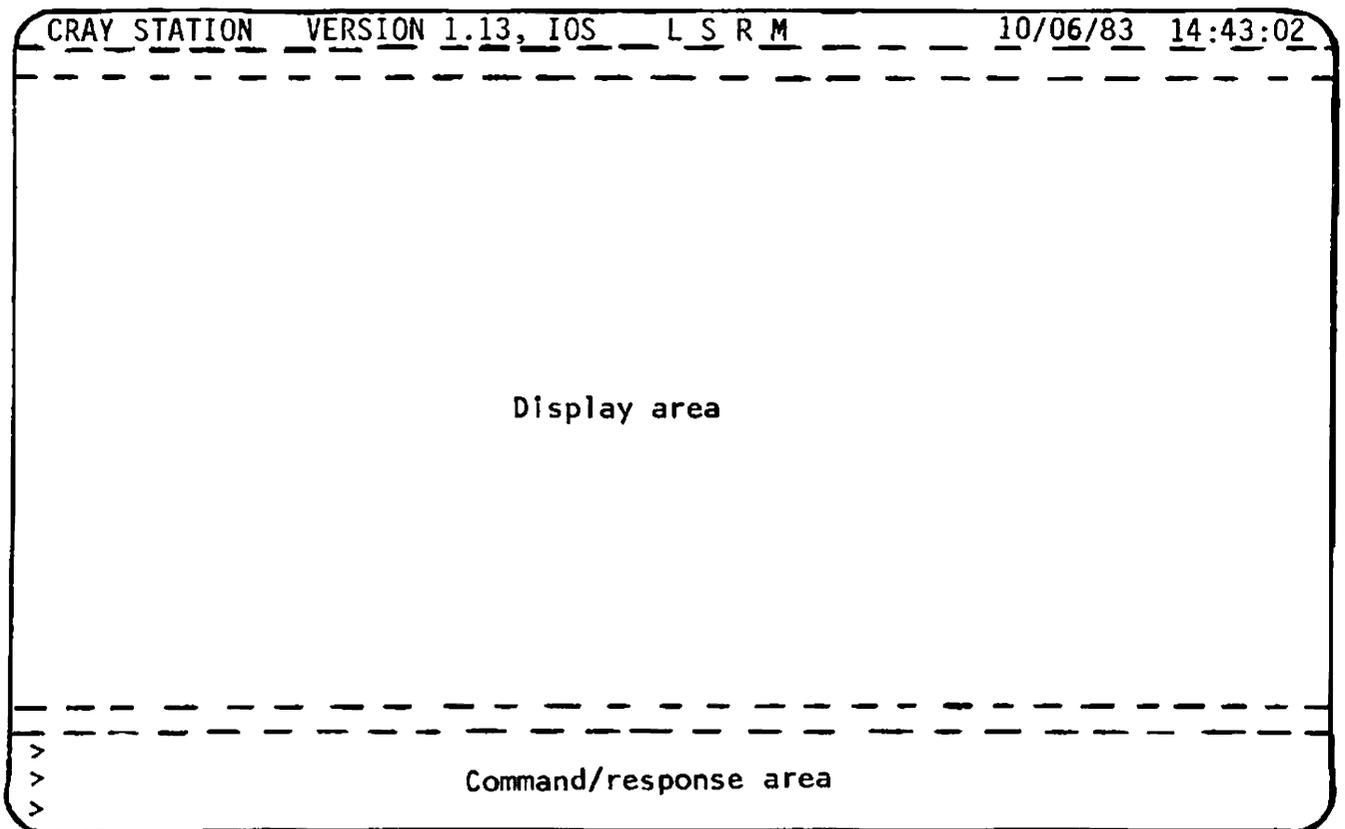
Figure 4-1. Station screen format

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 commmand 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:

$$verb, p_1, p_2 \ldots, p_n$$

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

p_i 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
UNDERLINED UPPERCASE	Specifies the minimum number of characters required for the verb or parameter to be recognized
Italics	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.

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
Job Commencement		
RESUME	MC	Reschedules processing of jobs suspended by SUSPEND or SHUTDOWN commands
Station Messages		
STMSG	ALL	Displays station messages as they are received
REPLY	ALL	Replies to a specific station request message
Logfile Messages		
MESSAGE	ALL	Enters message into job logfile, the system logfile, or both
Display Format		
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
Link and Station Status		
LINK	ALL	Displays status of station link
STATION	AC	Displays status of station

Table 4-3. Station commands (continued)

Command	Availability	Description
Link and Station Status		
STRSTAT	AC	Displays information for individual station streams
DEFAULT	AC	Sets or displays default device attributes used for staging operation by the station
Peripherals Status		
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
Job and Dataset Status		
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
Device Configuration Display		
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
Device Configuration Modification		
CONFIGURE	MC	Alters a device's configuration as specified
Error Log Table Display		
ERROR	AC	Displays information from the Error Log Table when errors are sensed
Operator Aids		
HELP	ALL	Displays helpful information for Station, Kernel, or Interactive commands
Front-end monitoring		
CONC	ALL	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.

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

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*],$\left\{ \frac{ON}{OFF} \right\}$

          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

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: $\underline{\text{CLASS}}, \left\{ \begin{array}{l} \underline{\text{ALL}} \\ jcl \end{array} \right\}, \left\{ \begin{array}{l} \underline{\text{ON}} \\ \underline{\text{OFF}} \end{array} \right\}$

     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

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: $\underline{\text{CONFIGURE}},\underline{\text{DVN}}=dvn\ [\ ,\begin{Bmatrix}\underline{\text{RDONLY}}\\\text{RDWRT}\end{Bmatrix}]\ [\ ,\begin{Bmatrix}\underline{\text{UP}}\\\text{DOWN}\end{Bmatrix}\ ]$

$\underline{\text{CONFIGURE}},\text{ICH1}=ch[:cu]\ ,\ [\text{IOP}=iopid]\ ,\ \begin{Bmatrix}\underline{\text{ON}}\\\text{OFF}\end{Bmatrix}$

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.

ICH1=*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.
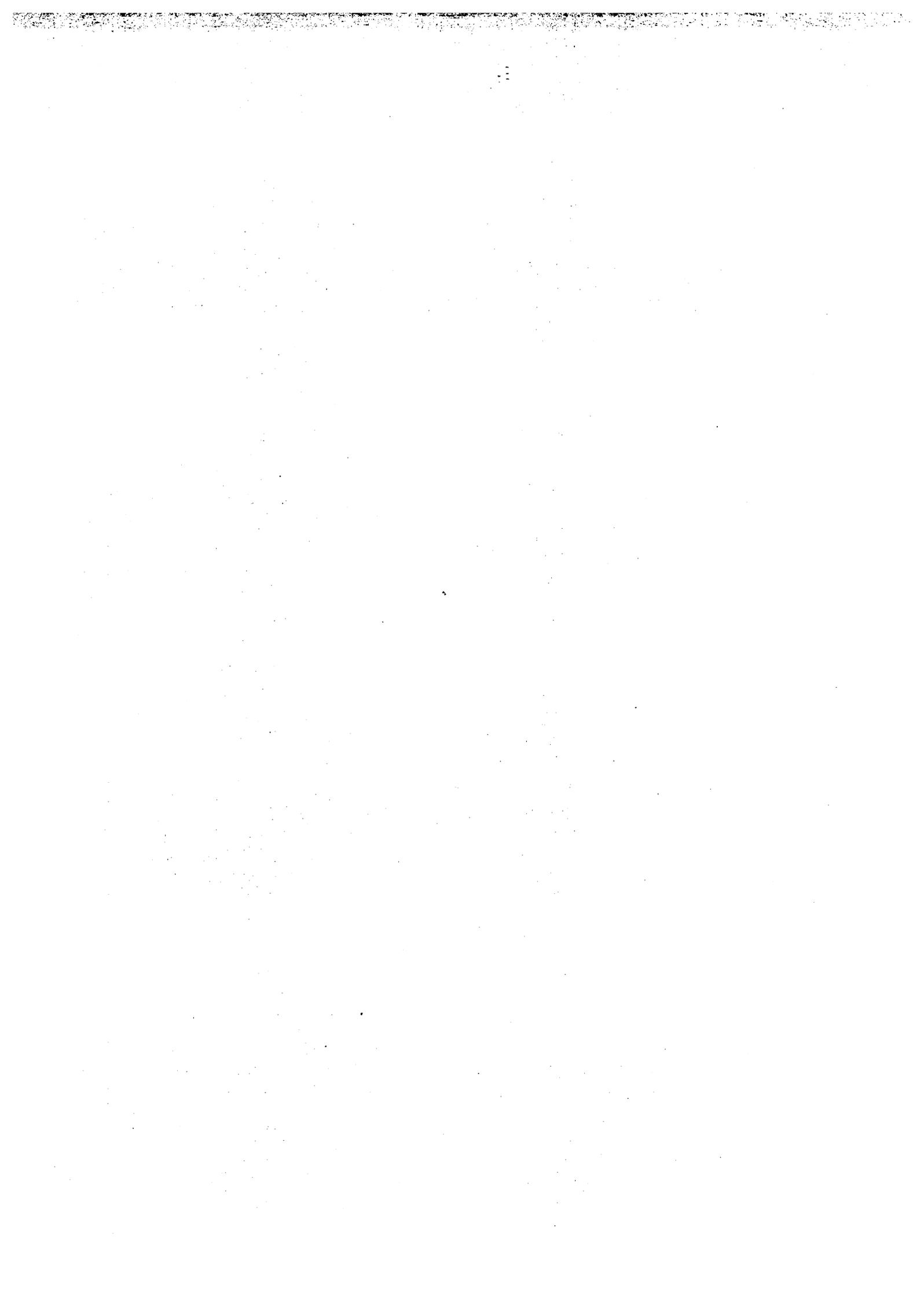
IOP=*iopid*   IOP identifier specifying which IOP the
                 channel is connected to. Must be a single
                 digit, 0-3, with 3 (XIOP) being the default.

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*[,$\left\{\begin{array}{c}\text{AVAIL}\\\text{NAVAIL}\end{array}\right\}$] [,$\left\{\begin{array}{c}\text{RDONLY}\\\text{RDWRT}\end{array}\right\}$] [,RBN=$\left\{\begin{array}{c}Y\\N\end{array}\right\}$] [,SCR=$\left\{\begin{array}{c}Y\\N\end{array}\right\}$]

               [,VOL=N] [,CTL=N] [,WDL=$\left\{\begin{array}{c}Y\\N\end{array}\right\}$]

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

AVAIL   Device is present and can be used.

NAVAIL   Device is not present or is unusable.

RDONLY   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.

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

COS DATASET *pdn* WITH ID=*userid* ED=*ed* AND OWN=*ov* DOES $\begin{Bmatrix} \text{EXIST} \\ \text{NOT EXIST} \end{Bmatrix}$

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, $\left\{ \begin{array}{l} \underline{\text{DEVICE}} \\ \underline{\text{VOLUME}} \text{ [,}vol] \\ \underline{\text{DIRECTORY}} \text{ [,}dir] \end{array} \right\}$

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

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

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

FORMAT: $\underline{\text{DEVICE}},device,\left\{\begin{array}{l}\text{PUBLIC}\\\underline{\text{PR}}\text{IVATE}\\\underline{\text{ON}}\\\underline{\text{OF}}\text{F}\end{array}\right\}$

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[†]

PRIVATE Designates mass storage device as permitting limited access[†]

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

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[†] 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

AVAILIBILITY: No prerequisites

EXAMPLE: DISK

IOP-1 DISK DISPLAY

OUTSTANDING DISK REQS: 3   FRAME   0

CHAN	TYPE	CURRENT STATUS	CURRENT CYL/HD	SECTORS ACCESSED READS	SECTORS ACCESSED WRITES	SECTORS ACCESSED R.A.	ERRORS TOTAL	ERRORS 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

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: $\underline{DROP}, jsq_1, jsq_2, \ldots jsq_n$

$\underline{DROP}, jsq - jsq_n$

jsq_i 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.

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

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

FORMAT:

$$\text{ENTER}, jsq, \begin{Bmatrix} \underline{\text{TIME}}, tl \\ \underline{\text{PRIORITY}}, pri \\ \underline{\text{ID}}, id[, tid] \\ \underline{\text{CLASS}}, jcl \end{Bmatrix}$$

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

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

           tl   New time limit; 0 through 16777215.
                   The time limit is a decimal count of
                   the maximum number of seconds the job
                   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.

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:

Entry	Significance
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

Entry	Significance
SYND	Syndrome bits
CPU MODE	Read Mode:

> SCAL Scalar
> I/O   Input/output
> VECT Vector
> FTCH Instruction fetch

MOS PORT	Buffer Memory port number
ADDRESS	Address of last occurrence
HSPD CODE	100 Mbyte memory channel error code:

> FNCT Function error
> ACTV Active error
> TRNS Transmit address error
> ADDR Address error
> DATA Data error
> BLCK Block length error
> NRDY Data ready timeout

IOP	I/O Subsystem location

> BNK Bank
> SCT Section
> BYT Byte:
>   0 Left byte
>   1 Right byte

COUNT	Total count of errors at location specified

AVAILABILITY: No prerequisites

EXAMPLE: ERROR

ERROR DISPLAY

ERROR CHANNEL: ON

TYPE		SYND	CPU MODE	MOS PORT	ADDRESS	HSPD CODE	BNK	– IOP – SCT	BYT	COUNT
CRAY	SB	277	VECT		407721					1
CRAY	MB	40	SCAL		1567603					18

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

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

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       TASK #   STATUS    CP TIME     TXT        TCB

  CLUSTER:         2      1     WAIT-SYS       14     0067324    00234237
  PRIORITY:     12.0      2     EXEC-CP0    34153     0067376    00235643
  FIELD LENGTH: 7222      3     EXEC-CP1    24312     0071254    00236131
  TIME USED:   58825      4     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
```

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_1,jsq_2,...jsq_n

                   KILL,jsq - jsq_n

                   jsq_i 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.

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

| | QUEUE | ACTIVE | | MAXIMUMS | | | SUBSEGMENT | | |
ID	COUNT	I	O	I	O	AC	#	SIZE	CH,ORD
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

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.

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

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

FORMAT:

$$\underline{\text{MESSAGE}}, \begin{cases} \underline{\text{JOB}}, jobname, jsq \\ \underline{\text{BOTH}}, jobname, jsq, message \\ \underline{\text{SYSTEM}} \end{cases}$$

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.

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.

AVAILABILITY: Available at any initialized IOS station.

EXAMPLE 1:   CRAY-1 S MONITOR CPU display

```
                    Monitor: CPU Utilization
    System  31% *HHHHHHHHHHHHHH
                *HHHHHHHHHHHHHH
                *HHHHHHHHHHHHHH
                *
     User  69% *HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
                *HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
                *HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
                *
     Idle   0% *
                *
                *
                *
  I/O Block  0% *
                *
                *
                *********************************************************
                0       20      40      60      80      100
```

EXAMPLE 2:   CRAY X-MP MONITOR CPU display

```
                    Monitor: CPU Utilization
                *
  System 0   0% *
  System 1   0% *
                *
                *
   User 0    0% *
   User 1    0% *
                *
                *
   Idle 0   99% *HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
   Idle 1  100% *HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
                *
                *
  I/O Blk 0   0% *
  I/O Blk 1   0% *
                *********************************************************
                0       20      40      60      80      100
```

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]

id Station ID of the new master operator station (2 alphanumeric characters). Consult a Cray Research system analyst for station IDs.

tid Terminal ID of the new master operator station (1 through 8 characters). Consult a Cray Research system analyst for terminal IDs.

pw Password; 1 through 8 characters. Consult a Cray Research system analyst for password.

npw 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.

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

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

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 $\left[\begin{array}{c} , \underline{ON} \\ \underline{OFF} \end{array}\right]$ [,*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

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: $\underline{RERUN}, jsq_1, jsq_2, \ldots jsq_n$

$\underline{RERUN}, jsq - jsq_n$

jsq_i 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.

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: $\underline{\text{RESUME}}$, $\left\{ \begin{array}{l} jsq_1, jsq_2, \ldots jsq_n \\ \underline{\text{ALL}} \end{array} \right\}$

     jsq_i 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.

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.

FUNCTION: Returns current information on generic resource
               availability and use.

FORMAT: RSTAT $\left\{ \begin{array}{l} \textit{,queues} \\ \textit{,jsq} \\ \textit{,P} \\ \textit{,GN gn [queues]} \end{array} \right\}$

               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:

          @MT*unit*:*num*[:NR]

             unit   Unit number (0-9)

             num   Tape file number (0-9999)

             NR   Do not rewind the tape after staging is completed.

          [@DK*unit*:] [*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,*userno*
userno   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

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 prerequisties

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

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

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, $\left\{ \begin{array}{l} \underline{ON} \\ \underline{OFF} \end{array} \right\}$

           ON   Resume staging; this is the default.

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

AVAILABILITY: No prerequisites

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

JOBS IN SYSTEM   15   ACTIVE JOBS   15
MAX JXTS (LIMIT)   63   AVAIL POOL JXTS   9
DEFINED CLASSES   17   CLASSES WTG JXTS   0

CLASS	ACTIVE	WAITING	RESERVED	MAXIMUM	STATUS
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

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.

Status	Description
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   MAXIMUM STREAM COUNT: 2   REFRESH RATE: 10 ON
STATION DEV: @DK0   POLL RATE: 10
STATION VOL: IOS
STATION DIR: STATION

			STREAM STATUS					*	LOCAL DEVICE	
						BLOCK		*	STATUS	
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	

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.

        EXECUTION Execution queue
        INPUT   Input queue
        OUTPUT   Output queue
        RECEIVING COS receiving queue
        SENDING   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:

Status	Description
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 USED	LIMIT	FIELD LENGTH	ID	TID
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

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 mesages if the
specified reel of tape is mounted on the specified
device. To mount the tape on a different device, enter
the reply:

     REP *magnum* 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

MN	TIME	MESSAGE
0	22:08	ENTER CONFIGURATION CHANGES OR CONTINUE
		END OF DATA

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

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 used 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.

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

								BLOCKS		
ID	DSQ	DATASET	JSQ	DC	DF	STRM	MBIT/S	CURR	TOTAL	DURATION
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

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:

          @MT*unit*:*num*[:NR]

               unit   Unit number (0-9).

               num   Tape file number (0-9999).

               NR   Do not rewind the tape after staging is completed.

          [@DR*unit*:] [*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: $\underline{SUSPEND}, \left\{ \begin{array}{l} jsq_1, jsq_2, \ldots jsq_n \\ \underline{ALL} \end{array} \right\}$

jsq_i 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.

FUNCTION: Sets or clears a job sense switch

FORMAT: <u>SWI</u>TCH,*jsq*,*ssw*, $\left\{ \begin{array}{l} \text{ON} \\ \overline{\text{OFF}} \end{array} \right\}$

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

Status	Description
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

---

			* TAPE CONFIGURATION *			FRAME 0
DEVICE	JSQ	IOP CH/CU	STATUS	VSN	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[†]

FORMAT: <u>TJOB</u>,*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

Status	Description
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.

[†] 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

				TIME		FIELD				
JSQ	DATASET	STATUS	PRI	USED	LIMIT	LENGTH	ID	DR	DU	RR
7374	LPSDMP	DELAY	9.9	0	8	100	M6	1	0	YES

END OF DATA

APPENDIX SECTION

CHARACTER SET

Character	ASCII Code	Character	ASCII Code
NUL	000	DC3	023
SOH	001	DC4	024
STX	002	NAK	025
ETX	003	SYN	026
EOT	004	ETB	027
ENQ	005	CAN	030
ACK	006	EM	031
BEL	007	SUB	032
BS	010	ESC	033
HT	011	FS	034
LF	012	GS	035
VT	013	RS	036
FF	014	US	037
CR	015	SPACE	040
SO	016	!	041
SI	017	"	042
DLE	020	#	043
DC1	021	$	044
DC2	022	%	045

Character	ASCII Code	Character	ASCII Code
&	046	=	075
'	047	>	076
(	050	?	077
)	051	@	100
*	052	A	101
+	053	B	102
,	054	C	103
—	055	D	104
.	056	E	105
/	057	F	106
0	060	G	107
1	061	H	110
2	062	I	111
3	063	J	112
4	064	K	113
5	065	L	114
6	066	M	115
7	067	N	116
8	070	O	117
9	071	P	120
:	072	Q	121
;	073	R	122
<	074	S	123

Character	ASCII Code	Character	ASCII Code
T	124	k	153
U	125	l	154
V	126	m	155
W	127	n	156
X	130	o	157
Y	131	p	160
Z	132	q	161
[	133	r	162
\	134	s	163
]	135	t	164
⌐ or ↑	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		

IOS DUMP PROGRAMS

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
(CRAYlSYSTEMDUMP). 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.

<div align="center">NOTE</div>

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.
              $range_1;range_2;range_3;range_4$
                      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.

Message	Action/Description
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:

B registers
T registers
V registers
VM registers

The A and S registers are retrieved from the exchange packages that were saved in Central Memory during dump.

Message	Action/Description
CPU TIME OUT...CONTINUE?	MIOP did not receive a response from the mainframe in the alloted 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.

Message	Action/Description
<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.

Message	Action/Description
MORE?	Enter Y if additional areas of this type of memory are desired. Entering Y causes the request for address range to be repeated. For Buffer Memory, entering N causes DMP to advance to the next step. For Central Memory, entering N causes DMP to reinitiate the request sequence, beginning with the MOS request.
MOS?	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.)
-MOS	Informative; displayed while Buffer Memory is being dumped.
MOS MULTIBIT-ADDRESSES *XXXXX*	A Buffer Memory program reference results in an irrecoverable error. DMP displays this message and takes no further action.
NOT READY	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.
-OPERAND REGISTERS	Informative; displayed while operand registers are being dumped. Press LINE FEED to prematurely terminate the dump and advance DMP to the next phase.
PAPER LOW - TYPE C TO CONTINUE	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.

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.

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

<div align="right">

D

</div>

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:

    AC=ST   Acquire a dataset from Peripheral Expander disk. Expander
               disk is the default if AC is not specified.

    vol   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.)

    dir   Directory name; 1 to 15 characters. If not specified, the
               default disk directory will be used. (See station DEFAULT
               command, section 4.)

    file   File name; 1 to 15 characters.

If the TEXT field is invalid, the AQUIRE 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 is 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.

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.

Message	Recommended response
@MT0: NO WRITE RING	Put a write ring in tape.
@MT0: DATA LATE	Call CRI systems analyst.
@MT0: NOT READY[†]	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.

[†] I/O resumes automatically after device is readied.

Message	Recommended response
@PR0: NOT READY[t]	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[t]	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[t]	Write enable unit.
@DK0: ID CHECKSUM ERROR	Reformat disk.
@DK0: FLAGGED SECTOR	Reformat disk.

---

t I/O resumes automatically after device is readied.

STARTUP FILE CREATION AND MAINTENANCE

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
APPEND	Appends text to the file
BYE	Terminates the editor
DELETE	Deletes the lines between and including the lines specified
INSERT	Causes the editor to enter text input mode, displaying the line number following the one entered. Text can then be entered at that location.
PRINT	Prints all text between and including the lines specified
REPLACE	Replaces the lines within the specified range
TYPE	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:

```
APPEND
```

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:

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 alphnumeric
           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.

DELETE command

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

Format:

```
DELETE ln₁  ln₂
```

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 {ln₁  ln₂
       A      }
```

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:

REPLACE 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:

TYPE $\begin{Bmatrix} ln_1 & ln_2 \\ A \end{Bmatrix}$

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:

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

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

Examples:

    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:

```
         ┌─────────────────────────────────────────────────────────┐
         │                                                         │
         │  COPY   ⎧@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:

    vol   Optional disk volume name; maximum of 7 alphanumeric
             characters

    dir   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:

```
DELETE  [@DKunit:] [dir/] [file-list]
```

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-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 @MTO: @DKO:COS
```

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

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

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

```
DLOAD @MTO:
```

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 @DKO:COS
```

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

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

This example displays statisitics 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:

$$\underline{\text{EDIT}} \quad \left\{ \begin{array}{l} \texttt{@TT} \\ \texttt{[@DK}unit\texttt{:]} [dir/]file \end{array} \right\}$$

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 diectory 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:

```
FSTAT  [@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 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 statisitics 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 volumne 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:

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

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

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
vsn	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*(wvsn)*

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

msgnum hh:mm REMOUNT *vsn(lt)* ON *devname*   WRONG LABEL TYPE*(wlt)*

The requested volume and mounted volume have different label types.
Mount tape volume with LABEL TYPE *lt* and a VSN *vsn*. The label
type of the rejected volume *(wlt)* can be one of the following:

```
NL    Unlabeled
AL    ANSI standard labels
SL    IBM standard labels
FRN   Foreign labels or tape of incompatible density
```

msgnum hh:mm REMOUNT *vsn(lt)* ON *devname*   INSERT RING IN VOLUME

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

msgnum hh:mm REMOUNT *vsn(lt)* ON *devname*   TAPE CANNOT BE SCRATCHED − *rjc*

Mount was requested for installation scratch tape (VSN=??????), which
cannot be used for various reasons (see *rjc* below). The different
values for *rjc* in the message correspond to the job abort messages
AB*xxx* 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 HDR1 label (which is needed to determine the
       expiration date of the dataset on that volume).

132   The requested label type prevents use of the volume mounted
       because of its label type.

msgnum hh:mm READY *vsn(lt)* ON *devname*   − RESET HIT

The reset button is activated before the device (*devname*) is
ready. This condition normally arises for run-away tape volumes and
requires mounting another scratch volume.

msgnum hh:mm TAPE *vsn* ON *devname* IS NOT EXPIRED − JOB *jobname(jsq)*
                  REPLY CONTINUE OR UNLOAD

An attempt was made to write to an unexpired volume (*vsn*). 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 (*vsn*) as follows: REPLY
    msgnum vsn.

msgnum hh:mm   JOB *jobname(jsq)*   AWAITING RESOURCE   *gname*
              REPLY 'RETRY' OR 'ABORT'

    An executing job (*jobname*) requested a dedicated resource (*gname*)
    such as a tape device and no drive is available. To attempt device
    access, ensure the device is online and enter REPLY *msgnum* RETRY.
    To abort the job, enter REPLY *msgnum* ABORT.

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

Error	Description
DATA CHECK (*xxxxx*)	An error was detected in the data being read or written to the device on block (*xxxxx*).
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 (*xxxxx*)	The BMC-4 was not ready to accept or provide data for the control unit upon request. *xxxxx* is the tape block position.

Message	Description
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.

Message	Description
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

Command	Description
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 or 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.

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.

Command	Action
ABORT	Sends an abort status to the interactive job
ATTENTION	Sends an attention status to the interactive job. (An attention status can also be sent by pressing the break key.)
BYE	Terminates the interactive console
CHANGE *c*	Changes the command control character. *c*, which can be any character, becomes the new control character.
COMMENT	Allows comments

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

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:

Message	Origin	Description
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=XXXXXXXXXXXXXXXX	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.

Message	Origin	Description
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.

Message	Origin	Description
ERROR DURING INITIALIZATION – STATUS=XXXXXXXXXXXXXXXX	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

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.

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.

System response/action	Operator response/action
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

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:

Software status	Description
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 ermsg ERROR. RETRY? (Y or N)
```

Parameters:

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

ch   IOP disk channel in error

ermsg   Message describing the catastrophic drive status

Message	Description
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

Response	Result
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:

Category	Description
SLCT	Unit select
SEEK	Cylinder select
READ	Read sector process
WRITE	Write sector process
RLSE	Unit release

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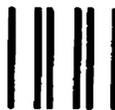
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