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TOPS-20
Operator's Guide
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This manual gives the operator a task oriented reference for using the TOPS-20 operating system and briefly describes the hardware supported by the TOPS-20 operating system.

Change bars in margins indicate material that has been added or changed since the previous printing of this manual.

This version of the guide revises the document having the order number AA-FP80B-TM for KL10 Model B information only.

OPERATING SYSTEM: TOPS-20 Version 7.0

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PREFACE

This guide gives you, the operator, an overview of the TOPS-20 operating system and serves as a task-oriented reference for operating the various hardware components that support the TOPS-20 software. The following paragraphs give a brief description of the type of information contained in each chapter.

Chapter 1 provides a brief description of the operator's responsibilities and the documentation supplied either by DIGITAL or by personnel at your installation.

Chapter 2 describes the various CPUs, memory types, front-end responsibilities, and the peripherals that are handled by the front-end processor.

Chapter 3 briefly describes the major TOPS-20 software components.

Chapter 4 describes the various ways of loading the system, loading the monitor using the various media, and readying the system for timesharing.

Chapter 5 introduces the operator interface command language, OPR.

Chapter 6 describes all software tasks for the TOPS-20 (GALAXY) batch system.

Chapter 7 describes those tasks that are generally done on an infrequent schedule and those tasks that are performed only when requested.

Chapter 8 describes the tasks that are usually included in a daily schedule.

Chapter 9 describes the error recovery procedures.

Although various installations may run their systems differently, this guide describes a general set of procedures for running the TOPS-20 software on the various hardware systems. Each installation should tailor these procedures to suit its needs and add procedures for specific applications.

This guide assumes that you have read, understood, and used the TOPS-20 User's Guide. In some cases this guide refers to another manual for additional information, or your installation may have purchased some software in addition to the standard TOPS-20 software. For example, this manual does not include the operating procedures for ARPANET and DECnet. Therefore, you should have the latest editions of the following documents available:

1. TOPS-20 Command Reference Manual
2. TOPS-20 User's Guide
3. TOPS-20 Operator's Command Language Reference Manual
4. TOPS-20 Software Installation Guide
5. TOPS-20 KL10 Model B Installation Guide
6. TOPS-10/20 USAGE File Specification
7. TOPS-10 and TOPS-20 SPEAR Manual
8. TOPS-20 DECnet-20 Manuals
(if your installation has DECnet-20 software)
9. IBM Emulation/Termination Manual
(if your installation has DN64/DN65 software)
10. BUGHLT Document
11. RSX-20F System Reference Manual
12. TOPS-10/TOPS-20 Operator's Hardware Device and Maintenance Guide

You may also want to have available the error messages listed in Appendix A of the TOPS-20 Monitor Calls Reference Manual when you see an error message not documented in this guide.

This guide uses the following conventions:

CTY	means console terminal.
PTY	means pseudo-terminal.
<RET>	indicates that you press the RETURN key.
CTRL/character	indicates that you hold the CTRL key down while typing the character.
^character	is the output from typing CTRL/character or, if otherwise noted, indicates that you should first type the up-arrow and then type the character.
underlining	indicates the information that you must type at your terminal.
n-	refers to the latest version of a particular file, for example, 7-CONFIG.CMD.

RESPONSIBILITIES OF THE OPERATOR

DIGITAL also supplies some text files on the magnetic tapes used for software distribution. These files can be identified by their file types: .HLP, .MEM, .BWR, or .DOC. These files are usually in a disk directory from which you can have them printed or have them typed out on a hard-copy terminal.

CHAPTER 1

RESPONSIBILITIES OF THE OPERATOR

As the TOPS-20 operator, you are responsible for keeping the system running and providing the user with the best possible service. To do this, you must be aware of all the system resources available to you, know how to interact with the system and with users, and be able to recognize and solve problems before they become serious.

Your first task in starting the system is to load the front-end and main processor monitors. After that, the system starts a series of programs to support batch and timesharing users. Once the system is started, you must check the status of jobs, respond to user requests, and perform routine tasks such as replenishing the paper supply for a line printer or cleaning magnetic tape drives.

Because the system is complex, sometimes a monitor ceases to function and crashes. A crash may result from software (programming), hardware, or environmental problems. When a crash occurs, you must recognize the symptoms, take the appropriate corrective steps to get the system back up as quickly as possible, and save important information about the crash.

1.1 DOCUMENTATION

To keep informed of your responsibilities and to perform the necessary operator tasks, you should read and have available for reference all documentation relevant to an operator. Documentation is supplied by DIGITAL, your installation, and other operators. The next three sections describe the documentation available from these sources.

1.1.1 Documentation Supplied by DIGITAL

DIGITAL supplies many manuals for the TOPS-20 operating system. Those helpful to you as an operator, in addition to this manual, are mentioned in the Preface.

1.1.2 Documentation Written at Your Installation

Your installation personnel may add some text files to the system that can be printed or typed.

You should also have a list of specific duties for each operator shift. This list should be written by the system manager and operations staff, using this manual as a guide. Your installation personnel can also tailor this manual to their needs. For example, installation-specific instructions, such as locking computer room doors, finding paper, and running application programs, can be added.

1.1.3 Documentation Written by Operators

Your system manager should give you an operator's notebook and a system logbook that contain pages you must fill out to record what happens systemwide.

The operator's notebook is used to record shift-to-shift communication among operators, and between operators and the system manager. Always read it before you begin your shift. Notebook entries might include scheduled system downtime, new software to install or try, problems met on preceding shifts, and specific instructions not in the normal schedule.

The system logbook is used to note important events relative to the system availability. The entries should include system downtime, hardware problems, and system shutdown time. To identify the items easily, separate hardware and software entries, perhaps listing hardware entries on left-hand pages and software entries on right-hand pages. Check this log when you start work; be sure to keep it current throughout your shift.

You should also save the output from the CTY. Your system manager should determine how long to keep it and where to file it. It can be a useful reference when there are system problems.

RESPONSIBILITIES OF THE OPERATOR

1.2 OPERATOR'S TASKS

To keep a system running efficiently, you must perform certain hardware and software tasks. These tasks may be performed on a daily or weekly basis, or performed as they are required. Chapters 6, 7, and 8 describe the batch tasks and scheduled and unscheduled tasks.

1.2.1 Hardware Tasks

Hardware tasks include performing preventative maintenance on peripheral devices, replenishing paper for input/output devices, operating the hardware components of the system, and keeping the computer room clean. Chapter 2 describes these devices. Refer to the TOPS-10/TOPS-20 Operator's Hardware Device and Maintenance Guide for a full description of these tasks.

1.2.2 Software Tasks

Software tasks include loading and starting the system, interacting with users, and performing error recovery procedures. Chapter 4 describes loading and starting the system, Chapters 6, 7, and 8 describe the batch tasks and scheduled and unscheduled software tasks, and Chapter 9 describes the error recovery procedures.

1.3 UNPRIVILEGED OPERATOR TASKS

Your system manager may have granted the SEMI-OPERATOR privilege to some users. When enabled, this privilege limits operator-related activity to accessing system status information and controlling certain devices specified at installation for semi-operator access.

The SEMI-OPERATOR privilege provides unprivileged users with valuable information and device control that was available only to privileged operators in older versions of TOPS-20.

You can enable and disable the SEMI-OPERATOR privilege systemwide, as described in Section 5.6.

CHAPTER 2

HARDWARE

2.1 OVERVIEW

To improve your understanding of the system, this chapter briefly describes the -20 series hardware.

You can use the TOPS-20 operating system with the 2040S and 2060 series hardware models. The 2040S and the 2060 are identical except that the 2060 has cache memory.

Configurations for the 2040S system are:

- o 20-128 jobs
- o 768K-4Mw MOS memory
- o 8-128 local command terminals on RSX20F
- o 2-8 RH20 channels
- o 1-64 RP04 or RP06 disk drives
- o 1-4 RP20 disk drives
- o 1-4 RP07 disk drives
- o 5 RP20 spindles (disk units) per structure
- o 1 RP07 disk pack per structure
- o 1-6 RP04 disk packs per structure
- o 1-3 RP06 disk packs per structure
- o 1-4 TM02 or TM03 tape controllers
- o 1-2 TM78 tape controllers
- o 1-16 TU45, TU77, or TU78/79 tape drives

HARDWARE

- o 1-2 DX20 tape or disk controllers
- o 1-2 TX02 (1 per DX20) with TX03 and TX05 switch features
- o 1-16 TU70, TU71, or TU78/79 tape drives (at least one 9-track tape drive)
- o 1-2 line printers
- o 0-1 card reader

Configurations for the 2060 system are:

- o 20-128 jobs
- o 768K-4Mw MOS memory
- o 8-128 local-command terminals on RSX20F and/or LATs
- o 2-8 RH20 channels
- o 1-64 RP04 or RP06 disk drives
- o 1-4 RP20 disk drives
- o 1-4 RP07 disk drives
- o 5 RP20 spindles (disk units) per structure
- o 1 RP07 disk pack per structure
- o 1-6 RP04 disk packs per structure
- o 1-3 RP06 disk packs per structure
- o 1 NI20 per KL10 processor
- o 1 CI20 per KL10 processor
- o 1-3 HSC50 disk controllers per CI20
- o 1-20 RA60 disk drives per HSC50
- o 1-20 RA81 disk drives per HSC50
- o 1-5 RA81 spindles per structure
- o 1-6 RA60 spindles per structure
- o 1-4 TM02 or TM03 tape controllers
- o 1-2 TM78 tape controllers

HARDWARE

- o 1-16 TU45, TU77, or TU78/79 tape drives
- o 1-2 DX20 tape or disk controllers
- o 1-2 TX02 (1 per DX20) with TX03 and TX05 switch features
- o 1-16 TU70, TU71, or TU72 tape drives (at least one 9-track tape drive)
- o 1-2 line printers
- o 0-1 card reader

In addition to the configurations listed above for the 2060 system, the Common File System (CFS-20) configuration requires the following:

- o 2 to 4 2060 systems
- o 1-4Mw Memory per system
- o 1 CI20 per system
- o 1 Star Coupler

NOTE

Each CFS-20 system requires an RP04 or RP06 disk drive for the front end file system. The system structure can reside on this disk or on another RP04, RP06, or RP07 disk; or be a supported multi-disk RP04 or RP06 structure. The system structure cannot reside on an RP20 disk or on a disk controlled by an HSC-50 controller.

2.2 CENTRAL PROCESSORS

The KL10 central processor, which directs the entire operation of 2040S and 2060 systems, contains:

1. A microcoded instruction set (383 instructions)
2. Fast integrated-circuit general-purpose registers
3. Interrupt and trap facilities

The central processor, memory, and mass-storage controllers are contained in two cabinets.

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2.3 MEMORY

There are four types of memory storage units available for the -20 series hardware: MA20 or MB20 internal memory, and MF20 or MG10 memory.

The size of memory storage ranges from 768K to 4 megawords (K=1024). Internal memory can be 1-, 2-, or 4-way interleaved. You cannot specify interleaving for MOS memory; however, it is implicitly interleaved. Each word of memory has 36 bits of data.

2.4 DATA CHANNELS AND CONTROLLERS

The data channels and controllers provide the interface between mass storage devices (disk and magnetic tape) and main memory. The controllers are units that control the operation of one or more disk drives or tape drives. The channels in conjunction with the controllers transfer information to memory at the request of the CPU. The channel that interfaces the DECSYSTEM-20 memory to massbus disks and tapes is the RH20. The channel that interfaces the DECSYSTEM-20 memory to the CI is the CI20. In a CFS configuration, another DECSYSTEM-20 can be connected to the same CI by means of its own CI20.

A DX20 tape controller with the TX02 controller and channel can support a maximum of eight TU70, 71, or 72 tape drives. With the TX03/TX05 tape switch options, a system can address and use up to 16 tape drives on a single controller by switching the access of tape drives from one controller to another.

A DX20 disk controller can support up to eight RP20 disks. Each RP20 disk unit has two spindles. An HSC50 disk controller can support a maximum of 24 RA60 or RA81 disk drives.

2.5 CONSOLE FRONT-END PROCESSOR (2040S, 2060)

The console front-end processor is a PDP-11 computer and is included in 2040S and 2060 systems. The console front-end handles:

1. Line printers
2. Card reader
3. Floppy disks
4. Terminals
5. Console functions

HARDWARE

6. Microcode loading
7. Memory configuration
8. System startup
9. Diagnostics

The console front-end processor is in the cabinet to the left of the two cabinets containing the central processor, internal memory, and mass-storage controllers. The console front-end processor communicates with the central processor through the DTE20 interface. The front-end memory consists of 28K of 18-bit words (16 data bits and 2 parity bits). The floppy disks are used for initial system loading.

2.6 FLOPPY DISKS

Three floppy disks are distributed with each new version of the TOPS-20 front-end software. They are small, about the size and appearance of a 45 rpm record, very flexible, magnetic-storage media. Their main functions include loading and starting the PDP-11 and the KL10. They are also used to run diagnostics that pertain to the front-end processor.

2.7 PERIPHERALS

On the 2040S and 2060 systems, the UNIBUS (unipath bus) handles all the communication lines between the front-end processor and all the devices that are attached to the front-end.

The standard -20 series hardware peripherals are described below.

2.7.1 Line Printers

A maximum of two physical line printers is allowed on 2040S and 2060 systems.

The following is a partial list of the supported line printers. If you have a line printer that is not mentioned in this section, refer to the appropriate line-printer documentation for its characteristics.

1. The LP05-V with a 64-character print set, a speed of 300 lines per minute, and a direct access, vertical format unit. This printer is included in the LP20A line printer system (printer and controller).

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2. The LP05-W with a 96-character print set, a speed of 230 lines per minute, and a direct access, vertical format unit. This printer is included in the LP20B line printer system (printer and controller).
3. The LP07 impact printer with a quick-change, dual character set Charaband (64/96 characters), dual speed of 1200/900 lines per minute, and direct access, vertical format unit. This line printer is included in the LP200 line printer system (printer and controller).
4. The LP10-J with a 64-character print set, a speed of 1250 lines per minute, and a standard sprocketed carriage tape for the vertical format unit. This printer is included in the LP20F line printer system (printer and controller).
5. The LP10-K with a 96-character print set, a speed of 925 lines per minute, and a standard sprocketed carriage tape for the vertical format unit. This printer is included in the LP20H line printer system (printer and controller).
6. The LP14-V with a 64-character print set, a speed of 890 lines per minute, and a direct access, vertical format unit. This printer is included in the LP20C line printer system (printer and controller).
7. The LP14-W with a 96-character print set, a speed of 650 lines per minute, and a direct access, vertical format unit. This printer is included in the LP20D line printer system (printer and controller).

Table 2-1: Line Printer Identification

Type	Description	Control Panel
LP05 LP14	Small size; control panel on top right.	Six error-indicator lights, four push- button switch-indicator lights, and two toggle switches.
LP10	Large size; control panel on top left.	Five (two-position) switches, four white indicator lights, four red error lights, and two dial knobs.

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LP07 Large size; control panel on top left; metal plate that can be lifted covers part of control panel.

Five (two-position) switches, four white indicator lights, four red error lights, and two dial knobs.

Refer to the TOPS-10/TOPS-20 Operator's Hardware Device and Maintenance Guide for pictures of various line printers.

All the line printers are 132-column devices. Those with the 96-character print set have uppercase and lowercase characters. Each printer has a Vertical Format Unit, or VFU, which consists of a carriage control tape depending on the model. The VFU is used to control paper motion in the printer. The preceding information is summarized in Table 2-2 below.

Table 2-2: LP20 Printer Models

Model	Character Set	Print Speed	Characters Per Drum	VFU	System
LP05-V	UPPER	300 l/m	64	PROGRAMMABLE	LP20A
LP05-W	UPPER/LOWER	230 l/m	96	PROGRAMMABLE	LP20B
LP07	UPPER and UPPER/LOWER	1200/900 l/m	64/96	PROGRAMMABLE/TAPE	LP200
LP10-J	UPPER	1250 l/m	64	TAPE	LP20F
LP10-K	UPPER/LOWER	925 l/m	96	TAPE	LP20H
LP14-V	UPPER	890 l/m	64	PROGRAMMABLE	LP20C
LP14-W	UPPER/LOWER	650 l/m	96	PROGRAMMABLE	LP20D

2.7.2 Card Readers

Card readers are mainly used in batch processing. The card reader is an input device only. The card reader can be a table model CR10-E

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(Model M200) that processes 285 cards per minute, or the console model CR10-F (Model RS1200) that processes 1200 cards per minute. Only the RS1200 has a mechanical EOF button. Model M200 is included in a CD20A card-reader system, and Model RS1200 is included in a CD20C system.

The CD11 card-reader controller is included in CD20 card-reader system (controller and reader).

Table 2-3: CD20 Card-Reader Models

Type	Model	System	Speed
CR10-E	Table-M200	CD20A	285 cpm
CR10-F	Console-RS1200	CD20C	1200 cpm

2.7.3 Disk Packs

Disk storage allows rapid transfer of data in and out of main memory. The 2040S and 2060 systems require at least one disk be dual-ported so that the front-end computer and the central processor can both access the data on the disk.

The disk packs that the 2040S and 2060 systems support are:

1. The RP04 removable disk pack, which has a 20-million word (36-bit word) capacity
2. The RP06 removable disk pack, which has a 40-million word (36-bit word) capacity
3. The RP07 non-removable disk pack, which has a 112 million word (36-bit word) capacity.
4. The RP20 non-removable disk pack, which has a 120 million word (36-bit word) capacity.

In addition, the 2060 systems support the following:

1. The RA60 removable disk pack, which has a 46-million word (36-bit word) capacity.
2. The RA81 non-removable disk pack, which has a 102 million word (36-bit word) capacity.

HARDWARE

The drives for these packs provide error detection and correction hardware as well as high-speed access and transfer rates.

On the 2040S and 2060 systems, the disk drives have an RH20 integrated controller and data channel for access by the central processor. If the drive has the dual-port option, the console front-end processor accesses a disk drive through an RH11 disk controller. In addition to the massbus devices that are handled by the RH20 integrated controller, the 2060 system can have the HSC50 controller for access by the central processor.

2.7.4 Magnetic Tape

The magnetic tape drives currently available on 2040S and 2060 systems are:

1. The TU45, which is a 9-track drive with recording densities of 800 bits/inch (31 rows/mm) or 1600 bits/inch (63 rows/mm). The recording speed is 75 inches per second (1905 mm/s). The TU45 is interfaced to an RH20 integrated controller and data channel through a TM02 or TM03 controller.
2. The TU70, which is a 9-track drive with recording densities of 800 bits/inch (31 rows/mm) or 1600 bits/inch (63 rows/mm). The recording speed is 200 inches per second (5080 mm/s). The TU70 is interfaced to an RH20 integrated controller and data channel through a DX20 programmed data adapter and a TX02 controller.
3. The TU71, which is a 7-track drive with recording densities of 200 bits/inch (8 rows/mm), 556 bits/inch (22 rows/mm), or 800 bits/inch (31 rows/mm). The recording speed is 200 inches per second (5080 mm/s). The TU71 is interfaced to the same hardware as the TU70.
4. The TU72, which is a 9-track drive with recording densities of 1600 bits/inch (63 rows/mm) or 6250 bits/inch (246 rows/mm). The recording speed is 200 inches per second (5080 mm/s). The TU72 is interfaced to the same hardware as the TU70.
5. The TU77, which is a 9-track drive with recording densities of 800 bits/inch (31 rows/mm) or 1600 bits/inch (63 rows/mm). The recording speed is 120 inches per second (3048 mm/s). The TU77 is interfaced to an RH20 integrated controller and data channel through a TM03 controller.
6. The TU78/79, which is a 9-track drive with recording densities of 1600 bits/inch (63 rows/mm) or 6250 bits/inch (246 rows/mm). The recording speed is 120 inches per second

HARDWARE

(3048 mm/s). The TU78/79 is interfaced to an RH20 integrated controller and data channel through a TM78 controller.

The parameters for the magnetic tapes are summarized in Table 2-4 below.

Table 2-4: Magnetic Tape Drives

Model	Tracks	Recording Densities	Interface	Controller
TU45	9-track	800 b/i or 1600 b/i	RH20	TM02 or TM03
TU70	9-track	800 b/i or 1600 b/i (31rows/mm) (63rows/mm)	RH20	DX20 and TX02
TU71	7-track	200 b/i, 556 b/i (8rows/mm) (22rows/mm) or 800 b/i (31rows/mm)	RH20	DX20 and TX02
TU72	9-track	1600 b/i or 6250 b/i (63rows/mm) (246rows/mm)	RH20	DX20 and TX02
TU77	9-track	800 b/i or 1600 b/i (31rows/mm) (63rows/mm)	RH20	TM03
TU78	9-track	1600 b/i or 6250 b/i (63 rows/mm) (246 rows/mm)	RH20	TM78
TU79	9-track	1600 b/i or 6250 b/i (63 rows/mm) (246 rows/mm)	RH20	TM78

2.7.5 Terminals

You (the operator) and each timesharing user interacts with the system through a terminal. Generally, you use a hard-copy terminal: for example, an LA36, to start, stop, load, and continue the system and user programs. Using a hard-copy terminal allows you to save the printed output of all interactions with users and the system. This output is especially useful if you have a problem with your system. Users interact with the system with either a hard-copy or video terminal.

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Table 2-5 contains a partial list of the terminals that the -20 series hardware supports. If you have a terminal not described in the list refer to the appropriate terminal documentation for its specific characteristics.

Table 2-5: Terminals

Terminal Type	Description
LA36	DECwriter II hard-copy terminal, 30 cps, 132 columns
LA37	LA36 with dual APL/ASCII character set
LA38	DECwriter IV hard-copy table top (or stand) model terminal
LA120	DECwriter III, 180 cps, hard copy with numeric pad
VT50	Uppercase video terminal
VT52	Uppercase/lowercase video terminal with numeric pad
VT62	Microprocessor-driven (video) terminal designed for transaction processing
VT100/VT125	Uppercase/lowercase video terminal with numeric pad and detached keyboard
VK100	Uppercase/lowercase video terminal with graphic display capability

CHAPTER 3

SOFTWARE

3.1 OPERATING SYSTEMS AND OTHER MAJOR SOFTWARE COMPONENTS

The operating system for the -20 series hardware is called TOPS-20. If the 2040S and 2060 is on the ARPANET (Advanced Research Projects Agency Network), the operating system is called TOPS-20AN. Both operating systems support concurrent timesharing and batch processing.

The TOPS-20 command language or command processor is also called the EXEC.

On the 2040S and 2060 systems, the RSX-20F console front-end operating system aids the central processor and TOPS-20 by doing such tasks as handling the console, terminal communications, peripherals, and diagnostics.

3.2 LANGUAGES

The following languages are available with TOPS-20:

ALGOL	DATATRIEVE
APL	CPL
BASIC-PLUS-2	FORTRAN
COBOL-68	IQL
COBOL-74	MACRO
PASCAL	BLISS-36

These languages can be used under batch or timesharing. Debugging programs are available for programs written in these languages.

SOFTWARE

3.3 UTILITIES

Many utilities are available for TOPS-20 users. Some of the more important ones are:

DDT	- A debugging utility
DUMPER	- A utility for backing up disk files
EDIT	- A line-oriented editor for creating and modifying programs and data files
EDT-20	- A line- or character-oriented editor for creating and modifying programs and data files
LINK	- The TOPS-20 Linking Loader program
PLEASE	- A utility for providing nonconflicting communication between an operator and system users through a terminal
PTYCON	- A system program that gives you multiple job control, allowing you to perform all software-oriented tasks from a single terminal
SORT/MERGE	- A utility for sorting records of one or more files according to a user-specified sequence
TV	- A character-oriented editor for creating and modifying programs and data files
WATCH	- A utility that allows you to periodically output TOPS-20 monitor statistics and/or a job summary

STARTING THE HARDWARE SYSTEM

CHAPTER 4

STARTING THE HARDWARE SYSTEM

Before you start the system, you should become familiar with a few switches and lights on the processor.

The four load switches and two power switches are on the leftmost cabinet, to the right of the DECSYSTEM-20 label. Just above them are the fault and power lights. The switch register is located behind the door below the load and power switches.

The purposes of the four white load switches are from left to right:

LOAD SWITCH	PURPOSE
1.	Loads the system according to the contents of the switch register (Section 4.2.3).
2.	Loads the system from a disk pack (Section 4.2.1).
3.	Loads the system from floppy disks (Section 4.2.2).
4.	Enables loading when pushed simultaneously with SW REG, DISK, or FLOPPY switches.

The black power switch, labeled SYSTEM ON and SYSTEM OFF, normally supplies power to the system. The red SYSTEM LOCK switch should be used only in emergencies, such as in a fire, when you must turn off the power as quickly as possible.

CAUTION

After you press the SYSTEM LOCK switch, you must call your DIGITAL Field Service Representative to restore power.

The switch register contains 18 switches (or bits) which are used to set certain values when you load via the switch register.

When the power light is red, it indicates that power is on. If it blinks, a DIGITAL Field Service Representative at your site has previously set OVERRIDE. You should not run the system with OVERRIDE set, unless instructed to do so by your DIGITAL Field Service Representative, because the system does not power down if it overheats.

The fault light should normally be off. If it glows, notify your DIGITAL Field Service Representative. A glowing fault light indicates a malfunction, such as overheating, which stops the system.

4.1 POWERING UP THE SYSTEM

In most cases you should only have to check to see that the power light over the black SYSTEM ON/SYSTEM OFF switch is glowing red. If the light is not glowing red, place the switch in the SYSTEM ON position.

Be sure that the system is completely powered on:

1. Check the disk drives. If power is off, remove the back cover and make sure that the breakers labeled CB1 and CB2 are both on. For HSC-50 disk subsystems, refer to the HSC-50 User's Guide.
2. Check the magnetic tape drives. If power is off, press the rocker switch, that is, the white switch containing the ON/OFF light on the front panel. If power is still off, open the front cabinet and reset the breaker.
3. Check the line printers. If power is off on an LP20A or LP20B printer (which has four buttons on the right of the top panel), reset the knee-level breaker on the lower panel. The TAPE light will be on. This means you must reload the Direct Access Vertical Format Unit (VFU) when the line printer is up and running. If you have an LP20F or LP20H printer (which has four rocker switches on the left of the top panel), lift the cover just above the lights and reset the breaker. Be sure that the printer has paper.
4. Turn on the console terminal. Be sure that it is on-line and has paper.

STARTING THE HARDWARE SYSTEM

4.2 LOADING THE SYSTEM

After powering up the system or deciding you must reload, you have some system loading alternatives. You can load from a disk pack or floppy disks, and you can specify nondefault parameters via the switch register. In most cases, you should load from a disk pack. However, if you do not have a disk drive available on the RH20, or if your system manager wants you to use software from a floppy disk, load the system using floppy disks. If you use the switch register to load, you also enter the KL initialization operator dialog (KLINIT). KLINIT lets you take nondefault loading paths; that is, you can load from a unit other than disk drive 0, configure memory yourself, load a bootstrap from any file, or specify a monitor other than the default monitor.

NOTE

The following examples use the name BS: for the name of the system structure. The name of your system structure would appear in the place of BS.

LOADING FROM DISK PACK

Sample Output

RSX-20F VB16-00 1:00 5-MAR-88
[SY0: REDIRECTED TO DB0:]
[DB0: MOUNTED]
KLI -- VERSION VB1600 RUNNING
KLI -- KL10 S/N: 2136., MODEL B, 60 HERTZ
KLI -- KL10 HARDWARE ENVIRONMENT:
MOS MASTER OSCILLATOR
EXTENDED ADDRESSING
INTERNAL CHANNELS
CACHE
KLI -- MICROCODE VERSION 2.1[442] LOADED
KLI -- ALL CACHES ENABLED
LOGICAL MEMORY CONFIGURATION:
ADDRESS SIZE INT TYPE CONTROLLER
00000000 768K 4 MF20 11
03000000 768K 4 MF20 12
KLI -- CONFIGURATION FILE ALTERED
KLI -- BOOTSTRAP LOADED AND STARTED
BOOT V11.0(315)
[BOOT: STARTING CHN:4 DX20A:0 MICROCODE V10(74)] [OK]
[BOOT: LOADING] [OK]

STARTING THE HARDWARE SYSTEM

[BS MOUNTED]
SYSTEM RESTARTING, WAIT...
ENTER CURRENT DATE AND TIME: 5-MAR-88 1300<RET>
YOU HAVE ENTERED SATURDAY, 5-MARCH-1988
IS THIS CORRECT (Y,N) Y<RET>
WHY RELOAD? SCH<RET>
RUN CHECKD? Y<RET>
[CHECKING FILE CONSISTENCY]
[WORKING ON STRUCTURE - BS:]
LOCAL COUNT OF FILE PAGES: 6691
LOCAL COUNT OF OVERHEAD PAGES: 2671
LOCAL COUNT OF USED PAGES: 9362
SYSTEM COUNT BEFORE CHECKD: 9362
SYSTEM COUNT AFTER CHECKD: 9362
THERE ARE NO LOST PAGES.
RUNNING DDMP

5-MAR-88 13:07:30 - TGHA 4.2(31) IN OPERATION

SYSJOB 7(78) STARTED AT 5-MAR-88 1057
[KNILDR: LOADING MICROCODE VERSION 1(11) INTO ETHERNET CHANNEL 0]
RUN SYS:INFO
RUN SYS:ORION
RUN SYS:QUASAR
RUN SYS:MOUNTR
RUN SYS:MAILER
RUN SYS:MAPPER
RUN SYS:LPTSPL
RUN SYS:CDRIVE
RUN SYS:SPRINT
JOB 0 /LOG OPERATOR XX OPERATOR
ENA
^ESET LOGIN PSEUDO
^ESET LOGIN CONSOLE
^ESET OPERATOR
PTYCON
GET SYSTEM:7-PTYCON.ATO
SILENCE
LOG
DEFINE ^\$OPR
CONN OPR
LOG OPERATOR FOO OPERATOR

STARTING THE HARDWARE SYSTEM

```
ENA
!OPERATOR INTERFACE PARSER
OPR
DISABLE OUTPUT-DISPLAY BUGINF-MESSAGES
DISABLE OUTPUT-DISPLAY BUGCHK-MESSAGES
DISABLE OUTPUT-DISPLAY SYSTEM-MESSAGES
TAKE SYSTEM:SYSTEM.COMD
PUSH
ENA
^ESET LOGIN ANY
^ESEND * SYSTEM IN OPERATION
POP
^X
NO SILENCE
W ALL
CONN OPR
```

4.2.1 Loading from Disk Pack

Loading from disk pack is the most common way to load the system. Be sure that system power is ON, that all hardware and software have been correctly installed, and that the disk packs have been mounted properly. Also, be sure the formatted disk pack containing the RSX-20F files is on a dual-ported drive (CONTROLLER SELECT switch points to A/B), and the drive is unit 0 on the RH11.

Next, do the following:

1. Press the DISK and ENABLE load switches simultaneously.
2. Type the current date and time and confirm it.
3. Type the reason for reloading.
4. Type YES or NO response to the RUN CHECKD question.

These steps load the front-end software, load the TOPS-20 monitor, and start the system for timesharing.

Now, a more detailed explanation of the above steps:

1. Press the upper halves of the DISK and ENABLE load switches simultaneously. The following is an example of what is then printed on the CTY:

STARTING THE HARDWARE SYSTEM

```
RSX-20F VB16-00 1:00 5-MAR-88
[SY0: REDIRECTED TO DB0:]
[DB0: MOUNTED]
KLI -- VERSION VB1600 RUNNING
KLI -- KL10 S/N: 2136., MODEL B, 60 HERTZ
KLI -- KL10 HARDWARE ENVIRONMENT:
        MOS MASTER OSCILLATOR
        EXTENDED ADDRESSING
        INTERNAL CHANNELS
        CACHE
KLI -- MICROCODE VERSION 2.1[442]LOADED
KLI -- ALL CACHES ENABLED
LOGICAL MEMORY CONFIGURATION:
ADDRESS  SIZE  INT  TYPE CONTROLLER
00000000 768K  4   MF20    11
KLI -- CONFIGURATION FILE ALTERED
KLI -- BOOTSTRAP LOADED AND STARTED
```

```
BOOT V11.0(315)
[BOOT: LOADING] [OK]
```

```
[BS MOUNTED]
```

System restarting, wait...

The first line of output tells you the version and creation time and date of RSX-20F. The next two lines tell you that DB0: (the disk pack on drive 0) is the system device (SY0:) for the front-end tasks and that it is mounted. All lines beginning with KLI and the text between those lines contain output from KLINIT. The line BOOT V11.0 (315) notifies you that the BOOT program is running, and the line following this output tells you what the BOOT program is doing. The line [BS MOUNTED] is output by the TOPS-20 monitor and means that the system structure has been mounted and the line following this output tells you what the BOOT program is doing. TOPS-20 then outputs the next line to all terminals to indicate the system is being restarted and is soon to be available.

STARTING THE HARDWARE SYSTEM

If you have a DX20 magnetic tape system or a DX20 disk system, you also see a message(s) similar to the following before [BS MOUNTED]:

```
[BOOT: STARTING CHN:1 DX20A:0 MICROCODE V74(10)] [OK]
```

```
[BOOT: STARTING CHN:2 DX20B:0 MICROCODE V16(3)] [OK]
```

If "?" precedes CHN., see Section 9.4.5.

NOTE

DX20:A specifies a DX20 tape system
DX20:B specifies a DX20 disk system

WARNING

If a power-fail occurs, you must reload the DX20 microcode manually. Refer to Section 9.4.5.

NOTE

The above example assumes you have the monitor in BS:<SYSTEM>MONITR.EXE and all BS: packs are on-line. To boot the system from a structure other than BS: or from a different file, see Section 4.2.3 for this procedure.

2. Continue at Section 4.4, Answering Monitor Start-up Question

LOADING FROM FLOPPY DISKS

Sample Output

```
RSX-20F VB16-00 8:55 5-MAR-88
```

```
[SY0: REDIRECTED TO DX0:]
```

```
[DX0: MOUNTED]
```

```
[DX1: MOUNTED]
```

```
KLI -- VERSION VB1600 RUNNING
```

```
KLI -- KL10 S/N: 2136., MODEL B, 60 HERTZ
```

```
KLI -- KL10 HARDWARE ENVIRONMENT:
```

```
  MOS MASTER OSCILLATOR
```

```
  EXTENDED ADDRESSING
```

```
  INTERNAL CHANNELS
```

```
  CACHE
```

```
KLI -- MICROCODE VERSION 2.1[442] LOADED
```

```
KLI -- ALL CACHES ENABLED
```

```
LOGICAL MEMORY CONFIGURATION:
```

STARTING THE HARDWARE SYSTEM

```
ADDRESS      SIZE INT  TYPE CONTROLLER
00000000     768K  4   MF20    11
03000000     768K  4   MF20    12
CONFIGURATION FILE WRITTEN
KL1 -- BOOTSTRAP LOADED AND STARTED
```

```
BOOT V11.0(315)
```

```
[BOOT: LOADING] [OK]
```

```
[BS MOUNTED]
```

```
System restarting, wait...
```

```
ENTER CURRENT DATE AND TIME: 5-MAR-88 1032<RET>
```

```
YOU HAVE ENTERED WEDNESDAY, 5-MARCH-1988 10:32AM,
```

```
IS THIS CORRECT (Y,N) Y<RET>
```

```
WHY RELOAD? SCH<RET>
```

```
RUN CHECKD? Y<RET>
```

```
[CHECKING FILE CONSISTENCY]
```

```
[WORKING ON STRUCTURE - BS:]
```

```
LOCAL COUNT OF FILE PAGES: 6692
```

```
LOCAL COUNT OF OVERHEAD PAGES: 2671
```

```
LOCAL COUNT OF USED PAGES: 9363
```

```
SYSTEM COUNT BEFORE CHECKD: 9363
```

```
SYSTEM COUNT AFTER CHECKD: 9363
```

```
THERE ARE NO LOST PAGES.
```

```
RUNNING DDMP
```

```
*****
```

```
5-MAR-88 13:07:30 - TGHA V4.2(31) IN OPERATION
```

```
*****
```

```
SYSJOB 7(78) STARTED AT 5-MAR-88 1032
```

```
[KNILDR: LOADING MICROCODE VERSION 1(11) INTO ETHERNET CHANNEL 0]
```

```
RUN SYS:INFO
```

```
RUN SYS:ORION
```

```
RUN SYS:QUASAR
```

```
RUN SYS:MOUNTR
```

```
RUN SYS:MAILER
```

```
RUN SYS:MAPPER
```

```
RUN SYS:LPTSPL
```

```
RUN SYS:CDRIVE
```

```
RUN SYS:SPRINT
```

```
JOB 0 /LOG OPERATOR XX OPERATOR
```

```
ENA
```

STARTING THE HARDWARE SYSTEM

```
^ESET LOGIN PSEUDO
^ESET LOGIN CONSOLE
^ESET OPERATOR
PTYCON
GET SYSTEM:7-PTYCON.ATO
SILENCE
LOG
LOG
DEFINE ^$OPR
CONN OPR
LOG OPERATOR FOO OPERATOR
ENA
!OPERATOR INTERFACE PARSER
OPR
DISABLE OUTPUT-DISPLAY BUGINF-MESSAGES
DISABLE OUTPUT-DISPLAY BUGCHK-MESSAGES
DISABLE OUTPUT-DISPLAY SYSTEM-MESSAGES
TAKE SYSTEM:SYSTEM.CMD
PUSH
ENA
^ESET LOGIN ANY
^ESEND * SYSTEM IN OPERATION
POP
^X
NO SILENCE
W ALL
CONN OPR

SJ 0:
SJ 0: INSTALLATION-TEST SYSTEM, TOPS-20 MONITOR 7(21017)
SJ 0: @LOG OPERATOR OPERATOR
SJ 0: JOB 1 ON TTY106 5-MAR-88 10:32:46
[FROM OPERATOR: SYSTEM IN OPERATION]
```

4.2.2 Loading from Floppy Disks

Load from floppy disks if problems prevent you from loading from a disk pack, or if you need a version of the front-end software that is only on floppy disks. Be sure that system power is ON and the proper software exists on the disk packs and the floppy disks (as on System Floppy A and System Floppy B). Mount the floppy containing the BOOT program (System Floppy A) on unit 0, the left unit. Mount System Floppy B on unit 1, the right unit. Leave the floppy disks mounted while the system is running.

Next, do the following:

1. Press the FLOPPY and ENABLE load switches simultaneously.
2. Type the current date and time and confirm it.

STARTING THE HARDWARE SYSTEM

3. Type the reason for reloading.
4. Type a YES or NO response to the RUN CHECKD question.

These steps load the front-end software, load the TOPS-20 monitor, and start the system for timesharing.

Now, a more detailed explanation of the above steps:

1. Press the upper halves of the FLOPPY and ENABLE load switches simultaneously. The following is an example of what is then printed on the CTY:

```
RSX-20F VB16-00 8:55 5-MAR-88

[SY0: REDIRECTED TO DX0:]
[DX0: MOUNTED]
[DX1: MOUNTED]
KLI -- VERSION VB1600 RUNNING
KLI -- KL10 S/N: 2136., MODEL B, 60 HERTZ
KLI -- KL10 HARDWARE ENVIRONMENT:
        MOS MASTER OSCILLATOR
        EXTENDED ADDRESSING
        INTERNAL CHANNELS
        CACHE

KLI -- MICROCODE VERSION 2.1[442] LOADED
KLI -- ALL CACHES ENABLED
LOGICAL MEMORY CONFIGURATION:
  ADDRESS      SIZE INT  TYPE CONTROLLER
00000000      768K  4   MF20    11
03000000       768  4   MF20    12
CONFIGURATION FILE WRITTEN
KLI -- BOOTSTRAP LOADED AND STARTED
```

```
BOOT V11.0(315)
[BOOT: LOADING] [OK]
```

```
[BS MOUNTED]
```

```
System restarting, wait...
```

The first line of output tells you the version and creation time and date of RSX-20F. The next line indicates that DX0: (the floppy disk on unit 0) is the system device (SY0:) for the front-end tasks. The next two lines tell you that floppy units 0 and 1 have been mounted. All lines beginning with KLI and all text between those lines contain output from KLINIT. The line BOOT V11.0(315) notifies that the BOOT program is running and the line following this output tells

STARTING THE HARDWARE SYSTEM

you what the BOOT program is doing. The line [BS MOUNTED] is output by TOPS-20 and means that the system structure has been mounted and the line following this output tells you what the BOOT program is doing. TOPS-20 then outputs the next line of text to all terminals to indicate the system is being restarted and is soon to be available.

If you have a DX20 magnetic tape system or a DX20 disk system, you also see a message similar to the following before [BS MOUNTED]:

```
[BOOT: STARTING CHN:1 DX20A:0 MICROCODE V74(10)] [OK]
[BOOT: STARTING CHN:2 DX20B:0 MICROCODE V16(3)] [OK]
```

NOTE

DX20:A specifies a DX20 tape system
DX20:B specifies a DX20 disk system

If "?" precedes CHN, see Section 9.4.5.

WARNING

If a power-fail occurs, you must reload the DX20 microcode manually. Refer to Section 9.4.5.

NOTE

The above example assumes you have the monitor in BS:<SYSTEM>MONITR.EXE and all BS: packs are on-line. To boot the system from a structure other than BS: or from a different file, see Section 4.2.3. for this procedure.

2. Continue at Section 4.4, Answering Monitor Start-up Questions.

STARTING THE HARDWARE SYSTEM

LOADING VIA THE SWITCH REGISTER
(bits 0, 1, 2, and 7 set)

Sample Output

RSX-20F VB16-00 6:28 5-MAR-88

```
[SY0: REDIRECTED TO DB0:]
[DB0: MOUNTED]
KLI -- VERSION VB1600 RUNNING
KLI -- ENTER DIALOG [NO,YES,EXIT,BOOT]?
KLI>YES
KLI -- KL10 S/N: 2136., MODEL B, 60 HERTZ
KLI -- KL10 HARDWARE ENVIRONMENT:
        MOS MASTER OSCILLATOR
        EXTENDED ADDRESSING
        INTERNAL CHANNELS
        CACHE
KLI -- RELOAD MICROCODE [YES,VERIFY,FIX,NO]?
KLI>YES
KLI -- MICROCODE VERSION 2.1[442] LOADED
KLI -- RECONFIGURE CACHE [FILE,ALL,YES,NO]?
KLI>ALL
KLI -- ALL CACHES ENABLED
KLI -- CONFIGURE KL MEMORY [FILE,ALL,REVERSE,FORCE,YES,NO]?
KLI>ALL
```

```
LOGICAL MEMORY CONFIGURATION.
ADDRESS  SIZE  INT  TYPE  CONTROLLER
00000000 768K   4  MA20   0 & 1
00400000 768K   4  MF20   11
```

```
KLI -- LOAD KL BOOTSTRAP [YES,NO,FILENAME]?
KLI>YES
KLI -- WRITE CONFIGURATION FILE [YES,NO]?
KLI>NO
KLI -- BOOTSTRAP LOADED AND STARTED
```

BOOT V11.0(315)

```
BOOT><RET>
[BOOT: LOADING] [OK]
```

[BS MOUNTED]

System restarting, wait...
ENTER CURRENT DATE AND TIME: 5-MAR-88 1057<RET>

```
YOU HAVE ENTERED WEDNESDAY, 5-MARCH-1988 10:57AM,
IS THIS CORRECT (Y,N) Y<RET>
WHY RELOAD? SCH<RET>
RUN CHECKD? N<RET>
```

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RUNNING DDMP

```
*****
5-MAR-88      13:07:30 - TGHA 4.2(31) IN OPERATION
*****

SYSJOB 7(78) STARTED AT 5-MAR-88 1057
[KNILDR: LOADING MICROCODE VERSION 1(11) INTO ETHERNET CHANNEL 0]
RUN SYS:INFO
RUN SYS:ORION
RUN SYS:QUASAR
RUN SYS:MOUNTR
RUN SYS:MAILER
RUN SYS:MAPPER
RUN SYS:LPTSPL
RUN SYS:CDRIVE
RUN SYS:SPRINT
JOB 0 /LOG OPERATOR XX OPERATOR
ENA
^ESET LOGIN PSEUDO
^ESET LOGIN CONSOLE
^ESET OPERATOR
PTYCON
GET SYSTEM:7-PTYCON.ATO
SILENCE
LOG
DEFINE ^$OPR
CONN OPR
LOG OPERATOR FOO OPERATOR
ENA
!OPERATOR INTERFACE PARSER
OPR
DISABLE OUTPUT-DISPLAY BUGINF-MESSAGES
DISABLE OUTPUT-DISPLAY BUGCHK-MESSAGES
DISABLE OUTPUT-DISPLAY SYSTEM-MESSAGES
TAKE SYSTEM:SYSTEM.CMD
PUSH
ENA
^ESET LOGIN ANY
^SEND * SYSTEM IN OPERATION
POP
^X
NO SILENCE
W ALL
CONN OPR
SJ 0:
SJ 0:  INSTALLATION-TEST SYSTEM, TOPS-20 MONITOR 7(21017)
SJ 0:  @LOG OPERATOR OPERATOR
SJ 0:  JOB 1 ON TTY106 5-MAR-88 10:57:18
[FROM OPERATOR: SYSTEM IN OPERATION]
```

STARTING THE HARDWARE SYSTEM

4.2.3 Loading Via the Switch Register

Load the system using the switch register if you have to do any of the following:

1. Configure cache or memory yourself, because you cannot use the default configuration.
2. Load a bootstrap with a name other than BOOT.EXB, for example, MTBOOT.EXB, which loads a monitor from magnetic tape.
3. Load a TOPS-20 monitor other than BS:<SYSTEM>MONITR.EXE, for example, a monitor on magnetic tape or a monitor with a different name on disk.
4. Load from a disk pack that is not on unit 0.
5. Dump the TOPS-20 monitor after a crash.

To begin the loading procedure you must use a disk pack or floppy disk to load the software for the front end. If you are going to use a disk pack, it must contain the appropriate software and be mounted on a dual-ported drive (CONTROLLER SELECT switch is set to A/B). If you are going to use floppy disks, you must have the appropriate floppy disks mounted (System Floppy A and System Floppy B).

Next, do the following:

1. Set the proper switches (or bits) in the switch register. Usually, you want to set switches 0, 1, and 2 to enter the KLINIT dialog. If you are going to use a disk pack on unit 0 to get the front-end software, also set switch 7.
2. Press the load switches SW REG and ENABLE simultaneously.
3. Answer the questions to the KLINIT dialog (Section 9.6).
4. Type the current date and time and confirm it.
5. Type the reason for reloading.
6. Type a YES or NO response to the RUN CHECKD question.

These steps load the front-end software, load the TOPS-20 monitor, and start the system for timesharing.

Now, a more detailed explanation of the above steps:

1. Set the appropriate switches (or bits) in the switch register by raising them. The bits and the meaning for those used are listed in Table 4-1.

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Table 4-1: Switch Register Bit Definitions

Switch Register													
17	16	15	14	11	10	9	8	7	6	3	2	1	0
Bit	Meaning												
0	If this is set, the remaining bits are interpreted. You must set this to load via the switch register.												
1,2	If both are set, the KL initialization operator dialog (KLINIT) is loaded and started. If either one is set, only the front-end monitor, RSX-20F, is started; there is no communication between the KL and console front-end processors. If neither is set, the system is loaded in the same way as by the DISK or FLOPPY load switch. However, because other bits are interpreted, you can specify the unit number of the bootstrap device in bits 8-10. The default path is taken by KLINIT until the bootstrap prompts with BOOT>. Then you can specify a monitor other than the default (which is BS:<SYSTEM>MONITR.EXE) or give a switch, for example, /D to dump KL memory.												
3-6	These bits are used to set the speed of the DH11 that is used as the CTY (see bits 11-14). If any of these are set, bits 8-10 are read as the DH11 unit number, and bits 11-14 are read as the number of the DH11 line that is to be the CTY. If none are set, bits 8-10 are read as the unit number of the disk from which to boot. If you want to redirect the CTY line using the switch register, you can boot only from a unit 0 disk.												
7	If this is set, the bootstrap device is a disk pack on an RP04 or RP06 disk drive attached to the RH11 disk channel. Front-end files on a disk pack are used for system loading. If this is not set, the bootstrap devices are the floppy disks. Front-end files on floppy disks are used for system loading.												

STARTING THE HARDWARE SYSTEM

- 8-10 These three bits allow you to specify in binary the unit number of the bootstrap device (0 to 7). For example, no bits set indicate unit 0; bit 8 set indicates unit 1, bit 9 set indicates unit 2, bits 8 and 9 set indicate unit 3, bit 10 indicates unit 4, bits 10 and 8 set indicate unit 5, and bits 10 and 9 set indicate unit 6.
 - 11-14 These bits are used to select the DH11 line number within the selected DH11 unit that will be the CTY. They are valid only if bits 3-6 are set.
 - 15 This bit indicates what is done when an I/O error occurs during bootstrapping. When this bit is set, the operation is retried indefinitely if an error occurs. If this bit is not set (the normal case) a halt occurs after ten unsuccessful retries.
 - 16-17 Currently not used and must not be set.
2. Press the upper halves of the SW REG and ENABLE load switches simultaneously.

The following is an example of what is printed on the CTY when bits 0, 1, and 2 are set, that is, when 7 is entered in the switch register.

```
RSX-20F VB16-00 8:55 5-MAR-88
[SYO: REDIRECTED TO DX0:]
[DX0: MOUNTED]
[DX1: MOUNTED]
KLI -- VERSION VB1600 RUNNING
KLI -- ENTER DIALOG [NO,YES,EXIT,BOOT]?
KLI>
```

The first line of output tells you the version and creation time and date of RSX-20F. The next line indicates that DX0: (the floppy disk on unit 0) is the system device (SYO:) for the front-end tasks. The next two lines tell you that floppy units 0 and 1 have been mounted. If bit 7 had been set, the system would have gone to disk drive 0 for a disk pack and the line with DX1 would have been omitted. If any of bits 8-10 had been set, the unit number would have been something other than 0.

The lines beginning with KLI are printed by KLINIT, the KL initialization operator dialog.

STARTING THE HARDWARE SYSTEM

The following is an example of the CTY output when bit 0 is set with bits 1 and 2 not set. Bits 7, 8, and 9 are set to specify a different bootstrap device and unit.

```
RSX-20F VB16-00 8:55 5-MAR-88

[SY0: REDIRECTED TO DB3:]
[DB3: MOUNTED]
KLI -- VERSION VB1600 RUNNING
KLI -- KL10 S/N: 2136., MODEL B, 60 HERTZ
KLI -- KL10 HARDWARE ENVIRONMENT:
        EXTENDED ADDRESSING
        INTERNAL CHANNELS
        CACHE

KLI -- MICROCODE VERSION 2.[442] LOADED
KLI -- ALL CACHES ENABLED
LOGICAL MEMORY CONFIGURATION:
  ADDRESS      SIZE  INT  TYPE CONTROLLER
00000000      768K  4    MF20      11
03000000      768K  4    MF20      12

CONFIGURATION FILE WRITTEN
KLI -- BOOTSTRAP LOADED AND STARTED

BOOT V11.0(315)
```

BOOT>

All lines beginning with KLI and all text between those lines contain output from KLINIT. In this case KLINIT takes the default path up to and including the loading and starting of the KL bootstrap. Then, instead of loading the default monitor, BS:<SYSTEM>MONITR.EXE, the bootstrap prompts with BOOT> and lets you type in the name of the monitor that you want to load. For example:

```
BOOT><SUBSYS>TEST01.EXE
```

If you press RETURN after BOOT>, you get the default monitor.

Once you specify the monitor, it is loaded and started; the system prints:

```
[BS MOUNTED]
```

```
SYSTEM RESTARTING, WAIT...
```

The first line means that the system structure has been mounted. The next line of text is output to all terminals to indicate the system is being restarted and is soon to be available.

STARTING THE HARDWARE SYSTEM

If you have a DX20 magnetic tape system, you also see a message like the following before [BS MOUNTED].

```
[BOOT:  STARTING CHN:1 DX20A:0 MICROCODE V74(10)] [OK]
```

```
[BOOT:  STARTING CHN:2 DX20B:0 MICROCODE V16(3)] [OK]
```

NOTE

```
DX20:A specifies a DX20 tape system
DX20:B specifies a DX20 disk system
```

If "?" precedes CHN, see Section 9.4.5.

Because the bit settings in the latter example cause much of the dialog to take a default path, continue reading at Step 4 for that example. For the former example, continue at Step 3.

3. After the output:

```
KLI -- ENTER DIALOG [NO,YES,EXIT,BOOT]?
KLI>
```

you are in the KL initialization operator dialog, KLINIT, and you must answer the questions asked.

Once the KL bootstrap has been loaded and started via KLINIT, and you have responded successfully to the BOOT> prompt, the TOPS-20 monitor prints:

```
[BS MOUNTED]
```

```
SYSTEM RESTARTING, WAIT...
```

The first line means that the system structure has been mounted. The next line of text is output to all terminals to indicate the system is being restarted and is soon to be available.

Continue at Section 4.4, Answering Monitor Start-up Questions.

STARTING THE HARDWARE SYSTEM

4.3 LOADING THE TOPS-20 MONITOR

The TOPS-20 monitor is loaded during the procedure for loading the system, which was discussed in the previous three sections. The next two sections give additional information on loading the TOPS-20 monitor to emphasize where the monitor can be loaded from.

4.3.1 Loading TOPS-20 from a Disk Pack with BOOT

When you load the system using the DISK or FLOPPY load switch, TOPS-20 is loaded and started from BS:<SYSTEM>MONITR.EXE.

When you load the system via the switch register, the bootstrap program issues a prompt and you can either press RETURN for the default monitor (BS:<SYSTEM>MONITR.EXE) or type a file specification for a different monitor. If you omit a field in the file specification, that field is defaulted to what it is in the default monitor.

----- Example -----

```
BOOT><TESTSY>MON002.EXE<RET>
```

If you set bits 1 and 2 in the switch register and receive the KLINIT question:

```
KLI -- LOAD KL BOOTSTRAP [YES,NO,FILENAME]?
```

you can specify a bootstrap other than the default, BOOT.EXB. However, the file you specify must reside on the bootstrap device.

In this example the KL bootstrap is VBORP4.EXB and the TOPS-20 monitor is BS:<SYSTEM>MON002.EXE.

```
KLI -- LOAD KL BOOTSTRAP [YES,NO,FILENAME]?
KLI>VBORP4<RET>
KLI -- BOOTSTRAP LOADED AND STARTED
```

```
BOOT V11.0(315)<RET>
BOOT><SYSTEM>MON002.EXE<RET>
```

----- Hint -----

Entering the KLINIT dialog to get the question LOAD KL BOOTSTRAP or to get the BOOT> prompt is useful for testing new bootstrap programs or new TOPS-20 monitors.

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4.3.2 Loading TOPS-20 from Magnetic Tape with MTBOOT

If you need to load a TOPS-20 monitor from magnetic tape, do the following:

1. Mount the magnetic tape containing the monitor on any available tape drive.
2. Load the system via the switch register with bits 0, 1, and 2 set.
3. Enter the KLINIT dialog.
4. After LOAD KL BOOTSTRAP, type MTBOOT.
5. After MTBOOT>, type MT: and press RETURN to load and start the monitor on the magnetic tape.

----- Example -----

```
KLI -- LOAD KL BOOTSTRAP [YES,NO,FILENAME]?
KLI>MTBOOT<RET>
KLI -- BOOTSTRAP LOADED AND STARTED

MTBOOT>MT:<RET>
```

----- Hint -----

If you cannot use drive 0 for Step 1, mount the magnetic tape on any available drive, but be sure to put all other drives OFF-LINE.

STARTING THE HARDWARE SYSTEM

NOTE

Once the monitor has started, it automatically starts the TGHA program. At this time it is possible to receive one of the following error messages.

```
*****
* 5-MAR-88 13:07:30
* THE FOLLOWING BLOCKS ARE MARKED AS BAD
* AND ARE NOT ON LINE:
* CONTROLLER      GROUP  BLOCK
* 10              2      3
* THIS CONSISTS OF 64K OF MEMORY THAT IS OFF LINE.
*** CALL FIELD SERVICE TO REPORT THIS CONDITION ***
*****
```

OR

```
*****
* 5-MAR-88 13:07:30
* TGHA HAS TEMPORARILY CORRECTED A SERIOUS MOS MEMORY FAILURE.
*** CALL FIELD SERVICE TO REPORT THIS CONDITION ***
*****
```

Both the above messages are informing you that there is a problem with MOS memory and that you should notify your DIGITAL Field Service Representative about the problem.

STARTING THE HARDWARE SYSTEM

4.4 ANSWERING MONITOR START-UP QUESTIONS

After the system has configured memory and loaded the bootstrap program into memory, you are asked the following questions:

Question: ENTER CURRENT DATE AND TIME:

Reply: Type the current date and time in the format

dd-mmm-yy hhmm

where

dd = day of the month
mmm = first three letters of the month
yy = last two digits of the year
hhmm = time, between 0 and 2359

NOTE

You can use spaces instead of hyphens. Other date formats are accepted but they are not recommended.

The system then prints a line telling you the day, date, and time you typed and asks you if the information is correct. If you entered the correct information, type Y for YES; otherwise, type N for NO and enter the correct information.

STARTING THE HARDWARE SYSTEM

----- Example -----

ENTER CURRENT DATE AND TIME:5-MAR-88 1300<RET>

YOU HAVE ENTERED WEDNESDAY, 5-MARCH-1988 1:00 PM
IS THIS CORRECT (Y,N) Y <RET>

Question: WHY RELOAD?

Reply: Type one of the following abbreviations that gives the reason for reloading the system.

OP (OPR)	PM (Prevent Maint.)
PA (Parity)	CM (Corrective Maint.)
PO (Power)	SA (Stand-Alone)
ST (Static)	NE (New)
HAR (Hardware)	SCH (Scheduled)
HA (Halt)	OT (Other)
HU (Hung)	

The answer you type to this question is stored in the system error file and is printed in the SPEAR report.

If the question isn't answered within one minute, the system redisplayes the question and supplies a default answer: "OTHER - Question timeout".

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----- Example -----

WHY RELOAD? SCH<RET>

NOTE

At this time the system may automatically run the CHECKD program if certain problems were previously found; otherwise, it asks the following question.

Question: RUN CHECKD?

Reply: You must answer Y for YES or N for NO. If you have a daily scheduled reload or experienced a hardware failure, you should answer Y. Otherwise, you should normally answer N.

If the question isn't answered within one minute, the system redisplayes the question and supplies a default answer: "NO".

If you answer Y, CHECKD performs a bit-table and consistency check for the system structure. It then lists any problems it found with bad pages or files. Next it prints a summary of page counts and the number of lost pages. Any lost pages are allocated to the file BS:<OPERATOR>BS-LOST-PAGES.BIN.n (where "n" is the generation number of the file).

Depending on the size of the structure and the number of files it contains, CHECKD can take between five and thirty minutes to perform its checking. When the CHECKD program starts, it prints:

[CHECKING FILE CONSISTENCY]

[WORKING ON STRUCTURE - BS:]

NOTE

If CHECKD lists any problems before the summary of page counts, or if it says there are lost pages after the summary, refer to Section 9.7.1 to determine what action to take.

STARTING THE HARDWARE SYSTEM

----- Example -----

```
RUN CHECKD? Y<RET>
[CHECKING FILE CONSISTENCY]
[WORKING ON STRUCTURE-BS:]
LOCAL COUNT OF FILE PAGES: 6692
LOCAL COUNT OF OVERHEAD PAGES: 2671
LOCAL COUNT OF USED PAGES: 9363
SYSTEM COUNT BEFORE CHECKD: 9363
SYSTEM COUNT AFTER CHECKD: 9363
THERE ARE NO LOST PAGES.
```

NOTE

The structure name reported by CHECKD will be the actual name of the system structure.

After CHECKD is done, TOPS-20 runs the n-SETSPD.EXE program. This program reads the n-CONFIG.CMD file that was created during installation and executes the commands therein. If there are no errors, there is no output from the n-SETSPD.EXE program.

NOTE

You can also run the n-SETSPD program interactively during timesharing. Some features cannot be enabled interactively, however. The following example shows a quick interactive SETSPD session:

```
$R SETSPD<RET>
Process SYSTEM:7-CONFIG.CMD (Y or N)? N<RET>
7-SETSPD$? one of the following:
ALLOW          ARCHIVE-TAPE-RECYCLE-PERIOD
BATCH-BACKGROUND BATCH-CLASS
BIAS            CHANGE
CREATE          DAYLIGHT
DECNET          DEFINE
DISABLE         DONTCARE
ENABLE          ETHERNET
EXIT            HOST
LAT-STATE      MAGTAPE
NODE            PRINTER
RESTRICT        TAPE-RECOGNITION-ERRORS
TAPE-RECYCLE-PERIOD TERMINAL
TIMEZONE
7-SETSPD$EXIT<RET>
$
```

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After CHECKD has finished running, it prints the following message:

```
RUNNING DDMP
```

DDMP is a TOPS-20 background job that moves pages from the disk swapping area to the disk file area. After the DDMP program is finished, the monitor starts the SYSJOB program and prints a message similar to the following:

```
SYSJOB 7(78) STARTED AT 5-MAR-88 11:00
```

The SYSJOB program reads the file PS:<SYSTEM>n-SYSJOB.RUN. This file contains commands that start various system programs. The last command in the n-SYSJOB.RUN file is GET SYSTEM:n-PTYCON.ATO. The PTYCON.ATO file starts various jobs as subjobs. (Refer to the TOPS-20 Operator's Command Language Reference Manual for more information on the PTYCON program.)

Once the PTYCON.ATO file is processed, the system is ready for timesharing. (Refer to Section 4.5.1 if you are going to have operator coverage, or Section 4.5.2 if you are not going to have operator coverage.)

NOTE

During system initialization, TOPS-20 defines the logical name BS: to be the physical name of the structure from which TOPS-20 was booted, that is, the boot structure, also known as the system structure.

The logical name PS: (public structure) is also defined to be this structure. If your system manager later enables the "login structure" facility, however, PS: refers to the login structure, not the boot structure.

4.5 READYING THE SYSTEM FOR TIMESHARING

As you saw in previous sections, once RSX-20F and TOPS-20 are loaded and started, SYSJOB starts running under job 0. SYSJOB then reads and prints on the CTY the file <SYSTEM>n-SYSJOB.RUN and performs the commands in that file. These commands start certain programs and issue some commands which aid you and the system in providing an efficient timesharing facility.

To see what commands SYSJOB actually performs, look at the file PS:<SYSTEM>n-SYSJOB.RUN. The following example illustrates a file that is similar to the one distributed with the software:

```
RUN SYS:INFO
RUN SYS:ORION
RUN SYS:QUASAR
```

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```
RUN SYS:MOUNTR
RUN SYS:MAILER
RUN SYS:MAPPER
RUN SYS:LPTSPL
RUN SYS:CDRIVE
RUN SYS:SPRINT
JOB 0 /LOG OPERATOR XX OPERATOR
ENA
^ESET LOGIN PSEUDO
^ESET LOGIN CONSOLE
^ESET OPERATOR
PTYCON
GET SYSTEM:7-PTYCON.ATO
/
JOB 1 /LOG OPERATOR XX OPERATOR
ENA
RUN SYS:BATCON
/
JOB 2 /LOG OPERATOR XX OPERATOR
ENA
RUN SYS:NETCON
/
```

This file causes SYSJOB to:

1. Run ORION, the program that handles the operator interface.
2. Run INFO, the program that passes message identifications for any process that requires IPCF communications.
3. Run QUASAR, the program that handles the system queues for batch jobs and print requests.
4. Run MOUNTR, the program that handles all tape and disk mounting procedures.
5. Run MAILER, the program that handles messages sent via MAIL.
6. Run MAPPER, the program that sets up the program cache.
7. Run LPTSPL, the program that handles the line printer.
8. Run CDRIVE, the program that handles the card reader.
9. Run SPRINT, the program that handles the conversion of card images to ASCII and the interpretation of control cards.
10. Create a job on the system and log it in under OPERATOR. All text between the slashes is passed to the job. Any input and output for the job is printed on the CTY and preceded by SJ 0: until you attach to that job (Section 4.5.1). SYSJOB identifies the job as job 0, but the system job number is one.

STARTING THE HARDWARE SYSTEM

(See the TOPS-20 Operator's Command Language Reference Manual under ^ESPEAK for details on SYSJOB commands. Remember that <SYSTEM>n-SYSJOB.RUN must contain only SYSJOB commands.)

The n-SYSJOB.RUN file causes the job under OPERATOR to do the following:

1. Enables capabilities. This enables the OPERATOR capability, normally granted to the OPERATOR directory.
2. Does a ^ESET LOGINS ANY to allow LOGINs from all terminals.
3. Does a ^ESEND to send the message SYSTEM IN OPERATION followed by a bell to all terminals.
4. Runs PTYCON.
5. Starts various programs under PTYCON by using the contents of the file SYSTEM:7-PTYCON.ATO.

The PTYCON.ATO file causes PTYCON to do the following:

1. Silence output to the CTY from PTYCON until PTYCON processes a NO SILENCE command. This eliminates unnecessary output. Therefore, you do not see many of the following PTYCON actions printed on the CTY.
2. Create a LOG file (PTYCON.LOG) under <OPERATOR>. This contains a record of everything that happens under PTYCON.
3. Connect to subjob 0 and log it in under OPERATOR. A fictitious password of FOO is acceptable in this case, because the job running PTYCON is already logged in under OPERATOR.
4. Print the status of all subjobs (WHAT ALL). Because PTYCON continues processing PTYCON commands while it passes off commands to subjobs, the WHAT ALL output may appear before the subjobs have finished processing their commands.

NOTE

See the TOPS-20 Operator's Command Language Reference Manual for details on PTYCON.

When output to the CTY has stopped, you are at OPR command level and the system is ready for timesharing. The front-end and TOPS-20 monitors are running, and SYSJOB and the programs under it are running. However, the CTY is not attached to any of these jobs. If you are going to have operator coverage, you should attach to the PTYCON job running OPR (Section 4.5.1). Otherwise, you should set up the system for no operator coverage (Section 4.5.2).

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WARNING

Whenever you type CTRL/\ (control backslash) at the CTY, you enter the console processor command. To exit from this command language, type QUIT or CTRL/Z.

If your system manager wants SYSJOB to perform functions other than those above, you can edit the SYSTEM:n-SYSJOB.RUN file to reflect what is needed. Remember that SYSJOB commands, documented under ^ESPEAK in the TOPS-20 Operator's Command Language Reference Manual, must be used in the n-SYSJOB.RUN file.

Improving Performance of Special System Jobs

If you need to improve system performance, you can start up the GALAXY components under PTYCON rather than under SYSJOB. Then there will be fewer competing subjobs running under job 0. The following is a sample PTYCON.ATO file:

```
SILENCE
LOG
DEFINE ^$GAL
CONN GAL
LOG OPERATOR FOO OPERATOR
ENABLE
GET SYS:ORION
START/STAY
GET SYS:QUASAR
START/STAY
GET SYS:MOUNTR
START/STAY
GET SYS:LPTSPL
START/STAY
GET SYS:LPTSPL
START/STAY
GET SYS:CDRIVE
START/STAY
GET SYS:SPRINT
START/STAY
^X
DEFINE ^$BAT
CONN BAT
LOG OPERATOR FOO OPERATOR
ENABLE
RUN SYS:BATCON
^X
DEFINE ^$NEB
CONN NEB
LOG OPERATOR FOO OPERATOR
ENABLE
RUN SYS:NEBULA
^X
DEFINE ^$OPR
CONN OPR
```

STARTING THE HARDWARE SYSTEM

```
LOG OPERATOR FOO OPERATOR
ENABLE
OPR
TAKE SYSTEM:SYSTEM.CMD
^X
```

4.5.1 Timesharing with Operator Coverage

If you are going to have operator coverage, you should send a message stating that the system has operator coverage. To send this message perform the following steps:

1. Type CTRL/C to get the system identification message.
2. Type ATTACH OPERATOR 1 and press the RETURN key.
3. After the message [ATTACHED TO TTYn, CONFIRM], press the RETURN key.
4. After the PASSWORD prompt, type your password and press the RETURN key twice.
5. Type PUSH to OPR.
6. ENABLE your capabilities.
7. Type ^ESET OPERATOR-IN-ATTENDANCE.
8. Type POP to return to OPR command level.

----- Example -----

```
<CTRL/C>
INSTALLATION-TEST SYSTEM, TOPS-20 MONITOR 7(21017)
@ATTACH OPERATOR 1<RET>
[ATTACHED TO TTY102, CONFIRM]<RET>
PASSWORD: your password<RET>
<RET>
OPR>PUSH<RET>
TOPS-20 COMMAND PROCESSOR 7(4143)
@ENABLE<RET>
$^ESET OPERATOR-IN-ATTENDANCE<RET>
$POP<RET>
OPR>
```

STARTING THE HARDWARE SYSTEM

4.5.2 Timesharing without Operator Coverage

To continue timesharing, but without operator coverage, do the following:

1. Type CTRL/C to get the system identification message.
2. Type ATTACH OPERATOR 1 and press the RETURN key.
3. After the message [ATTACHED TO TTYn, CONFIRM], press the RETURN key.
4. After the PASSWORD prompt, type your password and press the RETURN key twice.
5. Type PUSH to OPR.
6. ENABLE your capabilities.
7. Type ^ESEND * NO OPERATOR COVERAGE AFTER time.
8. Type POP to return to OPR command level.

Just before you end operator coverage, type to OPR:

1. PUSH.
2. ENABLE your capabilities.
3. Type ^ESET NO OPERATOR and press the RETURN key.

NOTE

In the following steps, the ^C has to be typed as up-arrow C, not CTRL/C, and the ^E and ^Z must be typed as CTRL/E and CTRL/Z.

4. ^ESPEAK
JOB 0/
^C
/Z
5. ^ESPEAK
JOB 0/
ATTACH OPERATOR 1

POP

/^Z

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After you type the above, the commands given to ^ESPEAK are printed on the CTY. Then the actual processing of the commands is indicated by output preceded by SJ 0:. If any messages are output by PTYCON subjobs, they are also printed on the CTY preceded by SJ 0:.

----- Hint -----

The ^E commands are documented in detail in the TOPS-20 Operator's Command Language Reference Manual.

----- Example -----

```
<CTRL/C>
INSTALLATION-TEST SYSTEM, TOPS-20 MONITOR 7(21017)
@ATTACH OPERATOR 1<RET>
[ATTACHED TO TTY102 CONFIRM]<RET>
PASSWORD: your password<RET>
<RET>
OPR>PUSH<RET>
TOPS-20 COMMAND PROCESSOR 7(4103)
@ENABLE<RET>
$^ESEND * NO OPERATOR COVERAGE AFTER hh:mm<RET>
$POP<RET>
OPR>
```

4.6 STARTING UP A SYSTEM IN A CFS-20 CLUSTER

It is important that TOPS-20 systems clustered on a CI be able to communicate with each other and with HSC disk subsystems. Therefore, when a CFS system initializes, it makes sure that it has: (1) an open virtual circuit to the CI nodes that are already running and (2) a CFS connection to the TOPS-20 nodes among them. If there are problems in either area, the system sends a message to the CTY and then suspends the initialization process. The system appears to hang.

4.6.1 Virtual Circuits

The CI20 creates a "system block" for each node that has responded to its start-up request for recognition. This block allows a virtual circuit to be established between the starting system and another node. (A virtual circuit is a software mechanism that allows inter-system communication and data transmission over the CI.) When the CI20 is unable to create the block, the following message is sent to the CTY:

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%CANNOT JOIN CLUSTER WITH NODE nn BECAUSE: No System Block created

where: nn is the decimal number assigned to the other CFS node at installation

This situation is often the result of a problem at the remote node's CI20. You can usually correct the problem by shutting down that node and restarting it. But first, examine CI-related BUGINFs and BUGCHKs on each system's CTY to get a clue to the problem.

If the CI20 is unable to create a virtual circuit, the following message is printed:

%CANNOT JOIN CLUSTER WITH NODE nn BECAUSE: No open Virtual Circuit

At least one KLPOVC BUGINF appears on the CTY for every successful open virtual circuit.

4.6.2 CFS Connections

After a virtual circuit has been established, the starting system tries to make a "CFS connection," by way of the circuit, to every TOPS-20 system that is already running. When the system cannot make a CFS connection, the following message is sent to the CTY:

%CANNOT JOIN CLUSTER WITH NODE nn BECAUSE: No CFS connection

where: nn is the decimal number assigned to the other CFS node at installation

As with virtual circuit problems, you should look at CI-related problems on each system's CTY.

A CFCONN BUGINF appears on the starting system's CTY for every successful CFS connection.

After a starting system has been successfully connected to all nodes, the following message appears on the CTY:

[Successfully joined CFS cluster]

THE OPERATOR INTERFACE, OPR

CHAPTER 5

THE OPERATOR INTERFACE, OPR

5.1 INTRODUCTION TO THE OPERATOR INTERFACE

The Operator Command Language (OPR) provides you, the operator, with one command language to communicate with various components of the TOPS-20 operating system. These components are:

1. QUASAR, the Batch System Nucleus
2. BATCON, the Batch Controller
3. LPTSPL, the Line-Printer Spooler
4. CDRIVE, the Card-Reader Spooler
5. SPRINT, the Reader Interpreter
6. SPROUT, the Card-Punch and Paper-Tape-Punch Spooler
7. MOUNTR, the Tape-Drive and Disk-Drive Controller
8. NEBULA, the cluster GALAXY inter-system message router
9. LISSPL, the cluster printer server for remote-node cluster print requests

In addition, you can use this same command language to interface with any program requesting operator action to be taken, such as the PLEASE program, and with any user on the system. The program that receives the OPR commands and communicates with all the other system programs is ORION.

5.2 RUNNING OPR

To start OPR, you must have WHEEL, OPERATOR, or SEMI-OPERATOR privileges. (See your system manager to obtain these privileges if you do not already have them.)

To handle all batch software tasks and all PLEASE, MOUNT, and DISMOUNT requests, you must have OPR running. Normally, commands in the PTYCON.ATO file start OPR automatically as a PTYCON subjob. An example of the PTYCON.ATO file is shown below.

```
SILENCE
LOG
DEFINE ^$OPR
CONNECT OPR
LOG OPERATOR FOO OPERATOR
ENABLE
OPR
TAKE SYS:SYSTEM.CMD
PUSH
ENABLE
^ESET LOGIN ANY
^ESEND * SYSTEM IN OPERATION
POP
WHAT ALL
CONNECT OPR
```

The command TAKE SYS:SYSTEM.CMD in the above command file executes any number of OPR commands to set and start devices and streams automatically. An example of the SYSTEM.CMD file is shown below.

```
SET BATCH-STREAM 0 TIME-LIMIT 5
SET BATCH-STREAM 1 TIME-LIMIT 10
SET BATCH-STREAM 2:3 TIME-LIMIT 11000
SET BATCH-STREAM 3 PRIORITY-LIMITS 20:63
SET BATCH-STREAM 0:1 PRIORITY-LIMITS 1:19
START BATCH-STREAM 0:3
SET PRINTER 0 PAGE-LIMIT 20000
SET PRINTER 1 PAGE-LIMIT 500
START PRINTER 0:1
START READER 0
START CARD-PUNCH 0
```

These commands are described in the TOPS-20 Operator's Command Language Reference Manual.

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NOTE

It is the responsibility of your system manager to determine whether OPR is to run as subjob 0 of PTYCON or as another subjob. In addition, your system manager should determine whether any other program or utility should be started as a PTYCON subjob.

The tasks in this part and the following parts assume that you, the operator, have only one terminal available to perform the various tasks. If there is more than one terminal available to you, you may want to dedicate one terminal to run only OPR and use another terminal for the various tasks, for example DUMPER. One reason you would use two terminals is that while you were running a program like DUMPER, you could not receive any messages sent to or from OPR on the terminal running DUMPER. However, you could receive the OPR messages on the terminal running OPR.

To start OPR yourself under a job with OPERATOR capability, type ENABLE and then type OPR.

@ENABLE<RET>
\$OPR<RET>
OPR>

If possible, you should have one hard-copy terminal dedicated to OPR. The reason for this is that OPR is your primary interface with the operating system and its devices. You can dedicate the CTY to running OPR and logging system messages by simply not using it for any other work. You need not log in a job or ATTACH to any of the subjobs of SYSJOB. In the following example your password is FOO and your account is OPERATOR:

If you choose to dedicate a hard-copy terminal to OPR, you can ATTACH the job running PTYCON to the CTY.

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<CTRL/C>
KL2102 Development ALL System, TOPS-20 Monitor 7(21211)
@ENABLE<RET>
\$SYSTAT OPERATOR<RET>
0 DET SYSJOB OPERATOR
1 205 PTYCON OPERATOR
2 207 BATCON OPERATOR
3 210 EXEC OPERATOR
4 211 OPR OPERATOR
.
\$ATTACH OPERATOR 1<RET>
[Attached to TTY205, CONFIRM]<RET>
Password: FOO<RET>
<RET>
OPR>

If your installation has more than one terminal assigned to its operators, you can run multiple copies of OPR from different terminals. (See Section 5.2.2.) Thus, OPR can run as a subjob under PTYCON at one terminal and as a job by itself at another terminal. All OPRs have the same functionality as the OPR running as a subjob of PTYCON and connected to the CTY. ORION, OPR's controlling program, can handle an unlimited number of OPRs running.

When you issue a command to OPR, it checks the command for format, syntax, and the placement of switches and values. If the command is correct, OPR passes the command to ORION. If the command is incorrect, OPR outputs an error message. If you receive an error message, you can retype the entire OPR command, or press CTRL/H to reprint the command up to the point where the error occurred. (Refer to Section 5.3.3.)

To exit from OPR at any time, type the EXIT command. You immediately return to TOPS-20 command level and are prompted by the dollar sign (\$). For example:

OPR>EXIT<RET>
\$

If OPR is a subjob of PTYCON, you can type CTRL/X to return to PTYCON command level. For example:

OPR>^X
PTYCON>

In addition, you can also give the PUSH command to OPR to return to TOPS-20 command level. You can execute any program or task and then give the POP command to return to OPR. When you give the PUSH command to OPR, any messages sent to OPR will be displayed on the CTY.

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```
OPR>PUSH<RET>
TOPS-20 Command processor 7(4404)
@ENABLE<RET>
$DUMPER<RET>
DUMPER>
.
.
.
$DISABLE<RET>
@POP<RET>
OPR>
```

All OPR commands described in this manual are shown as they relate to the tasks involved. For a complete description of all OPR commands, their arguments, keywords, and switches, refer to the TOPS-20 Operator's Command Language Reference Manual.

5.2.1 Remote Operator Control

5.2.1.1 DECnet and IBM Networks - If your system is part of a network, you can have a TOPS-20 host with up to three communication front-ends. These communication front-ends can control DECnet-20 or IBM communications software. OPR provides you with the facilities to communicate with IBM-type termination stations, and to communicate in a minimal fashion with an IBM* host.

The /NODE: switch is available with many of the OPR commands described in this manual. The /NODE: switch allows you to specify the logical identifier (name) optionally followed by two colons (::) of a remote station in your system network. This switch is valid only if your installation has installed the TOPS-20 DECnet software package. If DECnet is present, there can be remote station operators in the network.

If you are a remote station operator, the OPR processing at your station can only control the devices at your remote station. All commands you specify default to your node in the messages passed to ORION. Therefore, you need not specify the /NODE: switch with any OPR command for your node. However, when you want to refer to another node on the system, you must specify the /NODE: switch in the OPR command.

In addition, you have complete control over all jobs located and/or queued for your node, as compared with the Central Site operator who has control of all jobs and devices at all nodes on the system.

* IBM is a registered trademark of International Business Machines Corporation.

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A DECnet network will also enable you to start, stop, and otherwise manipulate printers connected to remote nodes in a CFS-20 cluster, as well as obtain information on them. In addition, print requests can be queued to printers connected to VMS systems. These printers are Distributed Queue Service (DQS) devices or CFS-20 cluster printers.

Table 5-1 shows the commands that you can use from your local terminal for remote control in various types of networks.

5.2.1.2 Local Area Networks - Your system may be part of a local area network, with systems and output devices interconnected on the NI. Here, users can send output requests to printers connected to LAT servers. As an operator, you can start, stop, and otherwise manipulate these Local Area Transport (LAT) printers, as well as obtain information on them.

You can perform these tasks from an OPR terminal on your local system.

5.2.1.3 CFS-20 Clusters - There may be up to four systems in a CFS-20 cluster sharing disk resources at your site. In this type of network, if the cluster GALAXY facility is enabled, OPR lets you send messages to users on remote systems, get remote-system status information, mount/dismount remote structures, and control printers on all the systems.

Table 5-1 shows the commands you can use from a local terminal in various types of networks. The /CLUSTER-NODE: and /NODE: switches, as well as the CFS, DQS, and LAT keywords, available with many of the OPR commands, provide the means for you to accomplish many of these remote activities.

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----- Example -----

Show the status of printer queues on all queues in a CFS-20 cluster:

OPR>SHOW OPERATORS /CLUSTER-NODE:*<RET>

```
OPR>
16:01:16  -- Operators --

Node      Type      Terminal  Job      User
-----
SYSA      system    236       133     OPERATOR
SYSA      system    453       163     HILL
```

**** SEMI-OPR is enabled ****

16:01:17 Received message from SYSB::

```
16:01:21  -- Operators --

Node      Type      Terminal  Job      User
-----
SYSB      system    236       69      OPERATOR
```

**** SEMI-OPR is enabled ****

16:01:17 Received message from SYSC::

```
16:01:07  -- Operators --

Node      Type      Terminal  Job      User
-----
SYSC      system    236       197     OPERATOR
```

**** SEMI-OPR is enabled ****

16:01:17 Received message from SYSD::

```
16:01:17  -- Operators --

Node      Type      Terminal  Job      User
-----
SYSD      system    236       5       OPERATOR
```

**** SEMI-OPR is enabled ****

^G

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Table 5-1: Remote Operator Commands Given from Your Local Terminal

COMMANDS	NETWORKS		CFS-20 CLUSTER
	DQS	LAT	
ALL OPR commands except ENTER, EXIT, HELP, PUSH, TAKE, WAIT			X
ALL LCP commands			X
ABORT	X	X	X
ALIGN		X	X
BACKSPACE		X	X
CONTINUE PRINTER	X	X	X
DEFINE ALIAS	X	X	X
FORWARDSpace		X	X
NEXT	X	X	X
REQUEUE	X	X	X
ROUTE	X	X	X
SEND ALL			X
SET PRINTER FORMS-TYPE		X	X
SET PRINTER LIMIT-EXCEEDED-ACTION	X	X	X
SET PRINTER PAGE-LIMITS	X	X	X
SET PRINTER PRIORITY-LIMITS	X	X	X
SHOW ALIAS	X	X	X
SHOW PARAMETERS PRINTER	X	X	X
SHOW QUEUES PRINTER	X	X	X
SHOW STATUS PRINTER	X	X	X
SHUTDOWN PRINTER	X	X	X

Table 5-1: Remote Operator Commands Given from Your Local Terminal (Cont.)

COMMANDS	NETWORKS		
	DQS	LAT	CFS-20 CLUSTER
START PRINTER	X	X	X
STOP PRINTER	X	X	X
SUPPRESS		X	X

5.2.2 Multiple Operators on the System

You can have more than one job running OPR on the same operating system. ORION keeps track of each OPR and sends the appropriate acknowledgement messages to the OPR that sent the command.

Each OPR that is processing can be set to enable or disable the types of messages that are displayed at that OPR console. Refer to Section 5.4.1 for descriptions of the DISABLE and ENABLE commands.

5.3 OPR COMMAND FEATURES

The OPR command language has three command features that allow you to do the following:

1. List available commands - ?
2. Use recognition - <ESC>
3. Reprint faulty commands - <CTRL/H>

The command features are described in detail in the following sections of this manual.

If you are a remote station operator, you cannot use the above features. However, you can obtain help with the HELP command at OPR command level. See Section 5.3.4.

Other CTRL/character commands such as CTRL/R and CTRL/U function at OPR command level as they do at TOPS-20 command level.

5.3.1 ? (Question Mark) - Listing Available Commands

The question mark feature lists all available commands to OPR. If you are in the process of entering a command, the question mark lists any command keywords, arguments, or switches for the command and then retypes your OPR command up to the point where you typed the question mark.

When you type a ? to OPR, it lists the available commands. When you type a ? after an OPR command, OPR lists the available keywords to that command. When you type a ? after the keyword, OPR lists the available values, arguments, and/or switches to that keyword. If you type a ? after an entire OPR command, OPR responds with the message "confirm with carriage return", retypes your entire command, and waits for you to press the carriage return key.

Only the OPR commands EXIT and PUSH do not have any keywords, arguments, or switches.

After you have started OPR and the system prompts you with OPR>, type a ?.

```
@ENABLE<RET>
$OPR<RET>
OPR>? one of the following:
  ABORT      ALIGN      BACKSPACE  CANCEL      CLOSE
  CONTINUE   DEFINE     DISABLE    DISMOUNT    ENABLE
  ENTER      EXIT       FORWARDSPACE  HELP        HOLD
  IDENTIFY   MODIFY     MOUNT      NEXT        PUSH
  RELEASE    REPORT     REQUEUE    RESPOND     ROUTE
  SEND       SET        SHOW       SHUTDOWN    START
  STOP      SUPPRESS   SWITCH     TAKE        UNDEFINE
  WAIT
  or one of the following:
  LCP      NCP
OPR>
```

NOTE

The DEFINE command appears in the above example if your installation has DN60 software. The DEFINE command is described in the TOPS-20 IBM Emulation/Termination Manual.

5.3.2 ESCape - Using Recognition

The ESCape key allows recognition input and guide words to appear on your console when you give an OPR command.

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NOTE

All OPR commands accept recognition input when you press the ESCape key and most OPR commands provide guide words within parenthesis. However, this is the only section of this manual that describes this feature of the OPR command language.

Type the OPR command ABORT with the use of the ESCape key for recognition and guide words.

```
<ESC>           <ESC>
!               !
OPR>ABORT (Current Job on) BATCH-STREAM (Stream Number) 1-<RET>

<ESC>           <ESC>
!               !
/REQUEST-ID:127/NOERROR-PROCESSING<RET>
OPR>
10:23:02      Batch-stream 1 --Aborted--
              Job TBUILD Req #127 for HURLEY
              No Reason Given with NOERROR-PROCESSING

OPR>
10:23:17      Batch-stream 1 --End--
              Job TBUILD Req #127 for HURLEY
              -- Job Aborted by Operator --

OPR>
```

NOTE

If the terminal makes a bell-like sound, it is because the character you typed is not unique. If this happens, type in another character and press the ESCAPE key. Continue to do this until the characters you typed are unique to the specific command.

5.3.3 CTRL/H - Reprinting Faulty Commands

The CTRL/H command causes OPR to retype your last command up to the point where the error occurred. An OPR error message occurs when a command does not have the correct format, syntax, switch, or value.

Specify the OPR command FORWARDSPACE, in its abbreviated form, but mistype the numeric value for the /PAGES: switch. After you press CTRL/H, enter the correct numeric value.

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```
OPR>FORWARDSPACE PRINTER 0 /PAGES:3)<RET>
? Not confirmed: ""
OPR><CTRL/H>
OPR>FORWARDSPACE PRINTER 0 /PAGES:30<RET>

OPR>
13:25:04      Printer 0 --Forwardspaced 30 Pages--
OPR>
```

5.3.4 Getting Help from OPR

Instead of using the question mark feature to list available commands, their keywords, and their arguments or switches, you can give the HELP command to OPR.

The keyword to the HELP command is any of the OPR commands. When you give the HELP command in this format, OPR prints on your terminal the function of the command you specify with its format, keywords, arguments, and switches.

Specify HELP RELEASE and OPR prints the function, format, keywords, and arguments of the RELEASE command.

```
OPR>HELP RELEASE<RET>
--- Help for RELEASE command ---
The RELEASE command allows you to release a job request
that was held with the HOLD command.
```

The format is:

RELEASE keyword

where keyword must be one of the following:

- BATCH-JOBS
CARD-PUNCH-JOBS
PAPER-TAPE-PUNCH-JOBS
PLOTTER-JOBS
PRINTER-JOBS

followed by one of these arguments:

- <request-id-number> (for a single job)
User name (for all jobs of a user)
* (for all job requests)

OPR>

5.4 ORION TO OPR MESSAGES

There are two types of messages that can appear at your OPR terminal.

1. OPR error messages (see Section 5.5.)
2. ORION to OPR messages

The types of ORION messages that can appear are:

1. Errors generated when ORION accepts an OPR command, but does not have the appropriate devices, streams, nodes, or jobs
2. Messages from jobs that start processing within a stream or on a device
3. Messages from jobs that end processing within a stream or on a device
4. Messages specifying actions that you must perform for various devices, streams, or jobs
5. Messages to which you must RESPOND
6. Results from TAKE command files
7. Messages from NEBULA, in a CFS-20 configuration with cluster GALAXY enabled, related to structure MOUNTS/DISMOUNTS that involve remote systems in the cluster, SENDS to remote nodes in the cluster, status of remote nodes in the cluster, and other cluster-GALAXY activity

Each OPR command that is sent to ORION is time stamped by ORION when the command is accepted and executed. The acceptance and execution of the command is then returned to the OPR terminal in the form of a message with the time stamp as the first eight characters of the message. ORION to OPR error messages are also time-stamped and displayed at the OPR terminal in the same format. For example, the OPR command:

```
OPR>SET PRINTER 0 FORMS-TYPE NARROW<RET>
```

prints on your terminal an ORION message in the format:

```
hh:mm:ss Printer 0 --Set Accepted--
```

where hh is the hour, mm is the minutes, and ss is the seconds that the command was accepted and executed. Likewise, when ORION accepts an OPR command, but returns a message, that message will also contain a time stamp. For example, the OPR command:

```
OPR>SHOW MESSAGES<RET>
```

displays the following information message when there are no outstanding messages to respond to:

```
hh:mm:ss --No Outstanding Messages--
```

When a particular job starts to process within a batch stream or on a device, ORION displays a message at your OPR terminal to notify you that the stream or device is active. For example:

```
hh:mm:ss Batch-stream 0 -Begin--
Job TEST Req #274 for ZINA
```

```
OPR>
```

appears on your terminal when a job named TEST begins to process in batch stream 0 for user ZINA. The hh:mm:ss at the beginning of this message is the time that the job started to process.

Likewise, when a particular job ends its processing within a batch stream or on a device, ORION displays a message at your OPR terminal to notify you that the stream or device is not active and the job has completed. For example:

```
hh:mm:ss Batch-stream 0 -ENDED--
Job TEST Req #274 for ZINA
```

```
OPR>
```

appears on your terminal when a job named TEST ends the processing in batch stream 0 for user ZINA. The hh:mm:ss at the beginning of this message is the time that the job ended the processing (hours, minutes, seconds).

5.4.1 Controlling OPR Message Output

You can control the types of messages that appear at your terminal with the use of the OPR commands ENABLE and DISABLE. When you give either of these commands specify the OUTPUT-DISPLAY keyword with one or more of the arguments described below.

The ENABLE OUTPUT-DISPLAY command and the DISABLE OUTPUT-DISPLAY command provide the mechanism so that each terminal running OPR at your installation can have its own set of messages appearing on its terminal. Below are the descriptions of available arguments to the OUTPUT-DISPLAY keyword.

```
ALL-MESSAGES prints all messages. These messages
include the messages described by
the remaining arguments. When you
ENABLE (or DISABLE) the
```

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OUTPUT-DISPLAY of all messages, then all operator, system, device, user, and error messages do (or do not) appear at the OPR terminal.

BATCH-MESSAGES prints all the messages generated when batch job requests are entered into and processed by the system.

BUGCHK-MESSAGES prints all BUGCHK messages generated by the system.

BUGINF-MESSAGES prints all BUGINF messages generated by the system.

CARD-PUNCH-MESSAGES prints all the messages generated when users request cards to be punched as output from the system.

CARD-READER-INTERPRETER-MESSAGES prints all messages generated when cards are read and interpreted through the card reader or when a batch job was submitted with the /READER switch specified.

DECNET-EVENT-MESSAGES prints all DECNET events messages generated by NMLT20.

DECNET-LINK-MESSAGES prints all messages generated when an attempt to establish a link to another node fails.

FILE-RETRIEVAL-MESSAGES prints all messages generated when users request a retrieval of a file that has been archived or migrated to tape.

LCP-MESSAGES prints all messages generated by LCP for LAT events.

MOUNT-MESSAGES prints all messages generated when users request tape or structure mounts.

NCP-MESSAGES prints all messages generated when users start and shutdown network nodes. (Valid only if your installation has DECnet software.)

NODE nodename enables and disables messages generated on the specified CFS cluster node from appearing on your

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terminal. (Refer to Section 5.4.2 for related information.) The node name can be abbreviated.

PAPER-TAPE-PUNCH-MESSAGES prints all messages generated when users request paper-tape-punch output from the system.

PLOTTER-MESSAGES prints all messages generated when users request plotter output from the system.

PRINTER-MESSAGES prints all messages generated when users request line printer output.

READER-MESSAGES prints all messages generated when jobs are entered into the system through the card reader. Card reader jobs become batch requests.

SYSTEM-MESSAGES prints system messages concerning system space and operation.

USER-MESSAGES prints all messages generated when users make requests to you using the PLEASE program. These are WTO (Write-to-Operator) messages, WTOR (Write-to-Operator-with-Response) messages, or other messages as defined by the switches below.

All above arguments with the exception of BUGCHK, BUGINF, and SYSTEM have three optional switches. If you do not specify one of these switches with one of the above arguments, the system assumes all three that are described below.

/INFORMATION-MESSAGES messages that are informational, such as errors that occur due to an application problem. Also, WTO messages are considered information messages from users, because no response is necessary from you.

/JOB-MESSAGES messages that notify you when a device or stream has begun to process a job request and when the job request has ended its processing.

/OPR-ACTION-MESSAGES messages that notify you of some action to be performed as requested by a user or a job. Also included

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are messages that require action to be taken, but are not job or WTOR related. All operator action messages must be answered with the RESPOND command.

----- Examples -----

1. You have OPR at a terminal for file retrievals and mount requests only. Since all messages are enabled when you start OPR, you can DISABLE the output display of all messages and then ENABLE the output display of the file retrievals and mount requests.

```
OPR>>DISABLE OUTPUT-DISPLAY ALL-MESSAGES<RET>
OPR>
9:32:14      --Output Display for OPR Modified--
OPR>>ENABLE OUTPUT-DISPLAY FILE-RETRIEVAL-MESSAGES<RET>
OPR>
9:32:25      --Output Display for OPR Modified--
OPR>>ENABLE OUTPUT-DISPLAY MOUNT-MESSAGES<RET>
OPR>
9:32:37      --Output Display for OPR Modified--
OPR>
```

2. You have OPR at a terminal for operator action messages only.

```
OPR>>DISABLE OUTPUT-DISPLAY ALL-MESSAGES/INFORMATION-MESSAGES
/JOB-MESSAGES<RET>
OPR>
10:45:09     --Output Display for OPR Modified--
OPR>
```

5.4.2 Controlling OPR Message Output in a CFS-20 Cluster

You can give a command that is processed on a remote cluster node and that may result in an ORION message. The message is displayed to all the operators on the remote system, and then it is sent to your local node where it is displayed to local operators who have ENABLED OUTPUT-DISPLAY for that message type from the remote node.

You can use the following commands to control ORION output in a CFS-20 cluster:

- o ENABLE/DISABLE BROADCAST-MESSAGES

The ENABLE BROADCAST-MESSAGES command allows ORION messages generated on the local node to be sent to one or more remote cluster nodes. Furthermore, it allows the selective sending of these messages. For instance, you may want all except

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BUGCHK messages sent if you know that the local node is generating an excessive amount of BUGCHKs.

The following illustrates this command:

```
OPR>>ENABLE BROADCAST-MESSAGES ? one of the following:
ALL-MESSAGES          BATCH-MESSAGES
BUGCHK-MESSAGES       BUGINF-MESSAGES
CARD-PUNCH-MESSAGES   CARD-READER-INTERPRETER-MESSAGES
DECNET-EVENT-MESSAGES DECNET-LINK-MESSAGES
FILE-RETRIEVAL-MESSAGES MOUNT-MESSAGES
PAPER-TAPE-PUNCH-MESSAGES PLOTTER-MESSAGES
PRINTER-MESSAGES      READER-MESSAGES
SYSTEM-MESSAGES       USER-MESSAGES
or one of the following:
LCP-MESSAGES          NCP-MESSAGES
```

```
OPR>>ENABLE BROADCAST-MESSAGES ALL-MESSAGES NODE SYSAL
/CLUSTER-NODE:SYSB20<RET>
```

- o ENABLE/DISABLE OUTPUT-DISPLAY

The NODE keyword to the ENABLE/DISABLE OUTPUT-DISPLAY commands (described in Section 5.4.1) allows you to select which ORION messages from remote nodes are displayed on your terminal.

- o SHOW BROADCAST-MESSAGES

This command shows whether or not remote broadcasting of ORION messages is enabled or disabled to particular nodes. For example:

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```
OPR>SHOW BROADCAST-MESSAGES<RET>
14:42:28 -- Broadcast Messages --
```

SYSA1	SYSB20	SYSC1	Message Type
Ena	Dis	Ena	All-messages
Ena	Ena	Dis	Batch-messages
Ena	Ena	Ena	Bugchk-messages
Dis	Dis	Dis	Buginf-messages
Ena	Dis	Dis	Card-punch-messages
Dis	Ena	Dis	Card-reader-interpretor-messages
Dis	Ena	Dis	DECnet-event-messages
Ena	Ena	Ena	DECnet-link-messages
Ena	Ena	Ena	File-retrieval-messages
Dis	Dis	Dis	Mount-messages
Dis	Ena	Dis	Paper-tape-punch-messages
Ena	Ena	Dis	Plotter-messages
Ena	Ena	Ena	Printer-messages
Dis	Dis	Dis	Reader-messages
Ena	Ena	Ena	System-messages
Dis	Dis	Ena	User-messages
Ena	Ena	Ena	LCP-messages
Ena	Dis	Dis	NCP-messages

o SHOW OPERATORS

If the /ALL switch is included in this command, the display shows whether or not particular messages are to be received by the different operators. For example:

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```
OPR>SHOW OPERATORS/ALL<RET>
OPR>
14:03:00 -- Operators --
```

Node	Type	Terminal	Job	User
SYS1	system	435	76	HILL
SYSA1	SYSB20	SYSC1	Message Type	
Ena	Dis	Ena	All-messages	
Ena	Ena	Dis	Batch-messages	
Ena	Ena	Ena	Bugchk-messages	
Dis	Dis	Dis	Buginf-messages	
Ena	Dis	Dis	Card-punch-messages	
Dis	Ena	Dis	Card-reader-interpretor-messages	
Dis	Ena	Dis	DECnet-event-messages	
Ena	Ena	Ena	DECnet-link-messages	
Ena	Ena	Ena	File-retrieval-messages	
Dis	Dis	Dis	Mount-messages	
Dis	Ena	Dis	Paper-tape-punch-messages	
Ena	Ena	Dis	Plotter-messages	
Ena	Ena	Ena	Printer-messages	
Dis	Dis	Dis	Reader-messages	
Ena	Ena	Ena	System-messages	
Dis	Dis	Ena	User-messages	
Ena	Ena	Ena	LCP-messages	
Ena	Dis	Dis	NCP-messages	

**** SEMI-OPR is enabled ****

5.5 OPR ERROR MESSAGE DESCRIPTIONS

When OPR is running, it may print various error messages. All OPR error messages begin with a ? and are followed by the message explaining the error. In addition, the ? does not represent a fatal error in OPR as it does in some other system programs.

When you receive an error message, you can press CTRL/H (to retype your OPR command up to the point where you entered the incorrect keyword, switch, or value) and specify the correct input to the command. As with all OPR commands, if you do not know the command format or you have forgotten the keywords, switches, or values, type a ? and OPR lists the command arguments that you can specify.

Refer to the TOPS-20 Operator's Command Language Reference Manual for a complete description of all OPR error messages.

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5.6 UNPRIVILEGED OPR

You can enable and disable operator-related activity for users who have been granted the SEMI-OPERATOR privilege. For example:

```
OPR><u>ENABLE SEMI-OPR</u><RET>
```

```
09:06:03          --SEMI-OPERATOR enable--  
OPR>
```

```
OPR><u>DISABLE SEMI-OPR</u><RET>
```

```
09:05:59          --SEMI-OPERATOR disable--  
OPR>
```

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OPR allows you to communicate with the various batch system components and with the job requests that process jobs on the devices controlled by these components. This chapter describes the OPR commands to accomplish these various batch software tasks.

ORION is the interface between OPR and all other batch components. ORION logs each OPR command it receives and then passes the command to the appropriate program.

QUASAR, the system queue manager, is the heart of the batch system. It is responsible for scheduling all batch jobs entered into and processed from the system queues by the components in the batch system. BATCON, the batch controller, is the system program that initiates and controls the processing of batch jobs. QUASAR selects jobs from the batch input queue and gives them to BATCON for processing. The OPR commands that have BATCH-STREAM as an argument are the commands that allow you to control batch job processing.

LPTSPL, the line-printer spooler, is a program that handles a specific printer and all the print requests for the system including those submitted through the PRINT command, spooled requests generated by user programs, and batch job log files. QUASAR selects jobs to be printed according to a variety of parameters. The OPR commands that have PRINTER as an argument are the commands that allow you to control line printer processing.

CDRIVE and SPRINT are responsible for the card-reader input. CDRIVE reads cards from the card reader(s), places the data on the cards on disk, and queues a request for SPRINT. SPRINT reads the data, interprets the \$JOB card and other control cards, and then creates and submits the user's batch job to BATCON. The OPR commands that have READER as an argument or keyword are the commands that allow you to control card reader processing.

SPROUT, the card punch, paper-tape punch, and plotter spooler, is the program that handles all the output requests other than line printer requests. QUASAR selects data to be output on these devices according to a variety of parameters. The OPR commands that have CARD-PUNCH, PAPER-TAPE-PUNCH, and PLOTTER as arguments are the commands that allow you to control the output processing on these devices.

NEBULA routes messages from the local ORION and QUASAR to NEBULAs on the remote systems in the same CFS-20 cluster. It routes messages to remote nodes in the cluster when you mount a structure on a remote system or dismount a structure that has been mounted on a remote system, request queue or other system information for remote nodes, or set a structure EXCLUSIVE.

LISSPL "listens" for print requests from users on remote CFS-20 systems in the cluster and routes them to the local QUASAR for service.

CHAPTER 6

BATCH SOFTWARE TASKS

The batch system operates under the control of the TOPS-20 operating system and increases the efficiency of the system by processing jobs that do not require human interaction. These types of jobs are those that are large and long-running, jobs that require large amounts of data, jobs that are frequently run for production, and jobs that require no interaction with the user.

6.1 BATCH SYSTEM COMPONENTS

The batch system consists of the following programs:

1. OPR
2. ORION
3. QUASAR
4. BATCON
5. LPTSPL
6. CDRIVE
7. SPRINT
8. SPROUT
9. NEBULA*
10. LISSPL*

* If your system installer enabled the cluster GALAXY option.

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6.2 BATCH RESPONSIBILITIES

The batch software handles many tasks for you. However, there are still many operations for you to perform in order to keep the batch system running efficiently. These operations are important because the user is absent and dependent on you to see that his jobs are completed.

In the batch operating environment, your responsibilities are to:

1. Set batch-stream and peripheral parameters.
2. Adjust the parameters if necessary.
3. Service action requests from user jobs.
4. Maintain peripheral devices.
5. Get the cards read through the card reader when there are a large number of batch jobs being submitted on cards.

If users are submitting batch jobs on card decks, your system manager should establish for you:

1. Where the decks must be placed for submission
2. When the decks are read
3. Where and when the decks and output are returned to users

In addition to the above tasks, you should periodically examine the queues and be able to modify the requests if necessary.

6.3 CONTROLLING BATCH STREAMS

Before any batch request can be processed by the TOPS-20 batch system, batch streams must be started so that the jobs can run. In addition, you must have QUEUE-REQUESTS enabled so that all users can issue the SUBMIT and PRINT commands. If QUEUE-REQUESTS is disabled, and you give a SUBMIT or PRINT command, you receive a message specifying that QUEUE-REQUESTS is disabled, then give the ENABLE QUEUE-REQUESTS command from OPR command level.

```
OPR>ENABLE QUEUE-REQUESTS<RET>
OPR>
```

The following are the OPR commands that allow you to control batch streams:

1. SET BATCH-STREAM

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2. START BATCH-STREAM
3. STOP BATCH-STREAM
4. CONTINUE BATCH-STREAM
5. SHUTDOWN BATCH-STREAM
6. SEND BATCH-STREAM
7. SHOW PARAMETERS BATCH-STREAM
8. SHOW STATUS BATCH-STREAM

The following sub-sections describe each of the commands above. You can use the /CLUSTER-NODE: switch with each command to control batch streams on specified nodes in a CFS-20 cluster.

6.3.1 Setting Batch Stream Parameters

Normally, a defined number of batch streams are started automatically at system start-up by the SYSTEM.CMD file. This number is determined by your system manager. However, you might start an additional batch stream when there are more batch jobs than there are timesharing users on the system. The parameters on any batch stream are used to limit the use of that stream to requests that meet a particular set of criteria. Before you start the batch stream, set the parameters for the stream. The default parameters for a batch stream are:

1. OPR-INTERVENTION
2. PRIORITY-LIMITS 1:63
3. TIME-LIMITS 0:600

The OPR-INTERVENTION parameter specifies that the user can pass messages to you through the batch job and you can perform the actions requested, such as a tape mount or a structure dismount. If you do not want OPR-INTERVENTION to be in effect, set the batch stream for NO-OPR-INTERVENTION. Then, any batch request that executes in the stream and requests operator intervention is logged out automatically by the system.

The PRIORITY-LIMITS parameter allows you to specify the priority (numeric importance) of a batch stream or a range of batch streams. The default limits are from 1 to 63. The greater the number is, the higher the priority. If you set a batch stream to have a priority limit of 31:41, only those batch requests submitted with a priority limit of 31 to 41 are allowed to execute in that batch stream.

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The TIME-LIMITS parameter allows you to specify the maximum execution time (in minutes) for a batch request to execute in the specified stream. The default is from 0 to 3600 minutes. If a job exceeds the time limit, it receives an additional 10% of the allotted time before the job is canceled automatically by the system. If you set a batch stream to have a time limit from 0 to 5 minutes, only those batch requests that are submitted with a time limit of 5 minutes or less are allowed to execute in that batch stream.

----- Example -----

Set a batch stream for NO-OPR-INTERVENTION with a priority limit of 50 and a time limit of 90 minutes.

```
OPR>SET BATCH-STREAM 7 NOOPR-INTERVENTION<RET>
9:20:55 Batch-stream 7 --Set Accepted--
OPR>SET BATCH-STREAM 7 PRIORITY-LIMITS 50<RET>
9:21:15 Batch-stream 7 --Set Accepted--
OPR>SET BATCH-STREAM 7 TIME-LIMITS 90<RET>
9:21:40 Batch-stream 7 --Set Accepted--
OPR>
```

6.3.2 Starting Batch Streams

Once you have set the parameters for a particular batch stream or a range of batch streams, you can then start the stream(s) so that batch requests can be scheduled. If you do not set any parameters for the stream, the stream takes the default values described in the previous section.

You can start one or more batch streams at a time.

To stop the scheduling of batch job requests in a batch stream after you have started it, use the SHUTDOWN command.

----- Example -----

Issue the START BATCH-STREAM command to start up streams 6 and 7.

```
OPR>START BATCH-STREAM 6:7 <RET>
OPR>
10:00:15 Batch-stream 6 --Startup Scheduled--
OPR>
10:00:17 Batch-stream 6 --Started--
OPR>
10:00:20 Batch-stream 7 --Startup Scheduled--
OPR>
10:00:22 Batch-stream 7 --Started--
OPR>
```

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6.3.3 Stopping Batch Streams Temporarily

If you ever need to temporarily stop a batch stream or a range of batch streams, use the STOP command. The STOP BATCH-STREAM command temporarily stops a batch stream from processing a job. You must use the CONTINUE command to resume the batch stream. However, in some instances the job cannot be continued, depending upon the point when you issued the STOP command.

The STOP command has three optional arguments. They are:

1. AFTER CURRENT-REQUEST
2. AFTER EVERY-REQUEST
3. IMMEDIATELY

The IMMEDIATELY argument is the default for the STOP command. Refer to the TOPS-20 Operator's Command Language Reference Manual for a complete description of these commands.

----- Example -----

Stop the processing of a job in batch stream 4 temporarily because it is taking too much CPU time.

```
OPR>STOP BATCH-STREAM 4<RET>
OPR>
11:23:09 Batch-stream 4 --Stopped--
OPR>
```

6.3.4 Continuing Batch Streams

You can give the CONTINUE command to continue the processing of a job (or jobs) in a batch stream or a range of batch streams that were temporarily stopped with the STOP command.

----- Example -----

Continue the processing of a job in batch stream 4.

```
OPR>CONTINUE BATCH-STREAM 4<RET>
OPR>
11:41:18 Batch-stream 4 --Continued--
OPR>
```

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6.3.5 Shutting Down Batch Streams

If at any time you need to permanently stop a batch stream or a range of batch streams, use the SHUTDOWN command. If a job is currently processing in the batch stream, the shutdown is first scheduled and when that job has been completed, the batch stream is shutdown.

You must issue the START command to start a batch stream after it has been SHUTDOWN.

----- Example -----

Shutdown batch stream 5 while a job is still processing in it.

```
OPR>SHUTDOWN BATCH-STREAM 5<RET>
OPR>
13:34:45      Batch-stream 5 --Shutdown Scheduled--
OPR>
```

When the job in the batch stream has completed its processing, the following message appears:

```
OPR>
13:38:25      Batch-stream 5 --Shutdown--
OPR>
```

6.3.6 Sending Messages to Batch Streams

When you need to send a message to a job in a batch stream, give the SEND BATCH-STREAM command. You can specify a single-line message with the SEND command or press RETURN immediately after the batch stream number and enter as many lines as you need to. You must then press CTRL/Z to terminate the SEND command. You cannot specify batch streams in the SEND command.

----- Restriction -----

The batch stream to which you send the message must be active. If the batch stream is not active, you receive the following message:

```
hh:mm:ss      Batch-stream n --Not Active--
```

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----- Example -----

Give the SEND command to notify the job in batch stream 2 that the requested tape volume cannot be found.

```
OPR>SEND BATCH-STREAM 2<RET>
Enter text and terminate with ^Z
TAPE VOLUME PAY001 CANNOT BE FOUND IN OPERATIONS<RET>
BATCH JOB WILL BE CANCELED<RET>
<CTRL/Z>
```

```
OPR>ABORT BATCH-STREAM 2<RET>
OPR>
14:32:09      Batch-stream 2 --Aborted--
Job PAY090 Req #159 for ACCOUNTING
No Reason Given with ERROR-PROCESSING

OPR>
14:32:14      Batch-stream 2 --End--
Job PAY090 Req #159 for ACCOUNTING
-- Job Aborted by Operator --

OPR>
```

6.3.7 Displaying Batch Stream Parameters

At any time you can display the current batch stream parameters with the SHOW PARAMETERS BATCH-STREAM command for one or more batch streams. If you do not specify a single stream number or a range of stream numbers, the SHOW command defaults to all the batch streams in the system.

The output from the SHOW command displays for each batch stream:

1. the number of the batch stream
2. the range of processing minutes set for the batch stream
3. the priority range set for the batch stream
4. whether or not operator intervention has been set for the batch stream

The display also includes the name of the CFS-20 node where the batch stream resides and the times that the remote node processed the command and the local system received the information, if you used the /CLUSTER-NODE: switch.

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----- Example -----

Give the SHOW PARAMETERS BATCH-STREAM command to display the parameters of all current batch streams in the system.

```
OPR>SHOW PARAMETERS BATCH-STREAM<RET>
OPR>
12:09:33      -- System Device Parameters--
```

```
Batch-stream Parameters:
  Strm   Minutes   Prio   Opr-Intvn
  ----   -
  0      0:10      1:19   Yes
  1      0:10      1:19   Yes
  2      0:11000   1:19   Yes
  3      0:11000   20:63  Yes
```

OPR>

6.3.8 Displaying Batch Stream Status

At any time, you can display the status of one or more batch streams with the SHOW STATUS BATCH-STREAM command. If you do not specify a batch stream number or a range of numbers, the command defaults to all batch streams in the system.

The output from the SHOW command displays for each batch stream:

1. the number of the batch stream
2. the current status of the batch stream
3. the name of the job currently active in the batch stream
4. the request-id of the job
5. the name of the user who made the job request

The display also includes the name of the CFS-20 node where the batch stream resides and the times that the remote node processed the command and the local system received the information, if you used the /CLUSTER-NODE: switch.

If the batch stream is not active, the word "Idle" appears in the Status column with no job name, request-id, or user name. If none of the batch streams are active, only the stream number and status appear in the display.

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If a stream is active, the display also shows the job number, the label which the job last encountered, and the run time used. If you do not need this additional information with the display of the SHOW STATUS BATCH-STREAM command, specify the /SHORT switch before you press RETURN to confirm the command.

----- Example -----

Give the SHOW STATUS BATCH-STREAM command to display the current status of all batch streams in the system.

```
OPR>SHOW STATUS BATCH-STREAM<RET>
OPR>
19:19:57      -- System Device Status --
```

```
Batch-stream Status:
  Strm   Status   Jobname   Req#   User
  ----   -
  0      Idle
  1      Active   FDLBLD    59    E.BROWN
        Job# 18 Running MACRO Last Label: MACRO Runtime 0:00:42
  2      Idle
  3      Active   PHYCAL    41    MANUFACTURING
        Job# 31 Running COBOL Runtime 2:31:27
```

OPR>

6.4 CONTROLLING BATCH JOBS

The following are the OPR commands that allow you to control batch jobs that users submit with the TOPS-20 SUBMIT command:

1. SHOW QUEUES BATCH-JOBS
2. HOLD BATCH-JOBS
3. RELEASE BATCH-JOBS
4. ABORT (current job on) BATCH-STREAM
5. REQUEUE (current job on) BATCH-STREAM
6. MODIFY BATCH-REQUEST
7. CANCEL BATCH-REQUEST
8. NEXT (job on) BATCH-STREAM

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The following sub-sections describe how to use each of these commands to control batch jobs. You can use the /CLUSTER-NODE: switch with each command to control batch jobs on specified nodes in a CFS-20 cluster.

6.4.1 Examining Batch Jobs in the Queues

Whenever a user submits a batch job, the job is placed in a queue where it waits for selection by the batch system for execution. To examine the queues for batch jobs at any time, give the OPR command SHOW QUEUES BATCH-JOBS.

The output of the SHOW QUEUES BATCH-JOBS command displays the following information for each job that is waiting or running:

1. the name of the batch job
2. the request-id number of the batch job
3. the scheduled run time of the batch job
4. the name of the user who submitted the batch job

These four columns of the display appear whether the batch job is currently running (active) or not running (not active).

If the batch job is active in the batch stream, the display shows in which stream the job is active, the job number, the last control file label encountered by the job, and the run time used.

The display also includes the name of the CFS-20 node where the batch stream resides and the times that the remote node processed the command and the local system received the information, if you used the /CLUSTER-NODE: switch.

The SHOW QUEUES BATCH-JOBS command has five optional switches:

1. /NODE:name displays the batch queue of a remote system whose jobs are to be processed on the local system.
2. /ALL adds to the display the switches that the user specified with the SUBMIT command. If no switches were specified, the /ALL switch displays the default switches. In addition, the /ALL switch displays any switches that you specified, for example, /HOLD.

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3. /SHORT displays only the job name, the request number, the scheduled run time, and the user name.
4. /USER:name displays only the batch jobs of a specified user.
5. /CLUSTER-NODE:name displays the batch queue of the specified remote CFS-20 node. If * is specified, the batch queues of all systems in the cluster are displayed.

----- Hint -----

The asterisk (*) before the batch job name column (see examples) indicates that the job is currently active.

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----- Examples -----

1. Give the SHOW QUEUES BATCH-JOBS command with the /ALL switch to display the batch jobs in the queue with all their switches.

```
OPR>SHOW QUEUES BATCH-JOBS /ALL <RET>
OPR>
15:02:58          -- System Queues Listing --
```

```
Batch Queue:
Job Name   Req#    Run Time      User
-----
* CHKFIM      9  00:05:00  NELSON          In Stream:0
  /Uniq:Yes /Restart:No /Assist:Yes /Output:Nolog
  /Batlog:Append /Seq:2041
  Job 18 Running DIRECT Last label: DIRECT Runtime 0:01:24
* CISRV      13  00:15:00  CDUNN           In Stream:3
  /Uniq:No  /Restart:Yes /Assist:Yes /Output:Nolog
  /Batlog:Super /Prio:20 /Seq:2039
  Job 33 Running MACRO Last label: CONT Runtime 0:02:05
* BLDMM       5  00:20:00  MCINTEE         In Stream:2
  /Uniq:Yes /Restart:Yes /Assist:Yes /Output:Nolog
  /Batlog:Super /Prio:20 /Seq:2436
  Job 21 Running MACRO Runtime 0:00:54
  DBLDEV     14  01:00:00  MURPHY         /After: 1-Sep-82 0:00
  /Uniq:Yes /Restart:Yes /Assist:Yes /Output:Nolog
  /Batlog:Super /Prio:20 /Seq:2023
```

There are 4 jobs in the Queue (3 in Progress)

OPR>

2. Give the SHOW QUEUES BATCH-JOBS command with the /SHORT switch.

```
OPR>SHOW QUEUES BATCH-JOBS /SHORT<RET>
OPR>
19:44:17          -- System Queues Listing --
```

```
Batch Queue:
* GENSCH     21  00:05:00  FRIES
  SBUILD     29  01:00:00  KIRSCHEN
  WEEKLY     37  00:05:00  OPERATOR
  SPEAR      39  00:05:00  OPERATOR
```

OPR>

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6.4.2 Holding Batch Jobs

Whenever you need to prevent a batch job from processing, give the HOLD BATCH-JOBS command. When you give this command, the current job(s) in the queue (as specified by one of the arguments listed below) is kept from being processed. Any batch jobs submitted after the HOLD command are not held and are processed when a batch stream is available. You must specify one of the following arguments with this command:

1. The request-id number, which holds a single batch job
2. The user name, which holds all batch jobs submitted by that user
3. An asterisk (*), which holds all batch jobs submitted by all users

----- Hints -----

You cannot HOLD a batch job that is currently active in a batch stream.

----- Example -----

Give the HOLD BATCH-JOBS command to hold all batch requests for user PURRETTA.

```
OPR>HOLD BATCH-JOBS PURRETTA<RET>
OPR>
9:01:54          --6 Jobs Held--
OPR>
```

6.4.3 Releasing Batch Jobs

You can give the RELEASE command to release a batch job that has been previously held with the HOLD command. You can specify a single request-id number, the user name for all jobs by that user, or an asterisk (*) for all batch jobs in the system. The RELEASE command reschedules the job(s) for processing.

----- Hint -----

You must have one or more batch streams started or in the Idle state to get a batch job processed.

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----- Example -----

Give the RELEASE command to reschedule all batch jobs that were previously held.

```
OPR>RELEASE BATCH-JOBS *<RET>
OPR>
10:38:09      --6 Jobs Released--
OPR>
```

6.4.4 Canceling Batch Jobs

At various times, you might have to cancel a batch job while it is executing in a batch stream. You can give the ABORT command with the batch stream number and one or more of the following switches:

1. /REQUEST-ID:
2. /ERROR-PROCESSING, /NOERROR-PROCESSING, or /PURGE
3. /REASON:

The /REQUEST-ID: switch uniquely identifies the job to be canceled.

The /ERROR-PROCESSING, /NOERROR-PROCESSING, and /PURGE switches specify if there are error recovery procedures provided by the user or if the system is to flush the entire job from the system when it is canceled. You can specify only one of these switches. The default is /ERROR-PROCESSING.

The /REASON: switch allows you to enter one or more lines of text to explain why the batch job is being canceled.

----- Example -----

Give the ABORT command to cancel a batch job that requested a structure that does not exist.

```
OPR>ABORT BATCH-STREAM 0 /REASON:NO SUCH STRUCTURE<RET>
OPR>
11:32:08      BATCH-STREAM 0      JOB #45      --ABORTED--
              Job TEST01 Req #35 for JONES
              NO SUCH STRUCTURE with ERROR-PROCESSING

OPR>
11:32:12      Batch-stream 0  --End--
              Job TEST01 Req #35 for JONES
              -- Job Aborted by Operator --

OPR>
```

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6.4.5 Requeuing Batch Jobs

At various times you might want to cancel a batch job that is being processed and then reschedule it to be processed at a later time. You can give the REQUEUE command to HOLD the batch job in its entirety and to ABORT its current processing.

For example, you might want to REQUEUE a batch job that requires additional structures for its processing, but you do not have any available disk drives. Thus, you REQUEUE the job in its entirety for processing when the disk drives become available.

You can specify the /REASON switch to explain why the job is being requeued.

----- Example -----

Give the REQUEUE command to hold a batch job that requests four tape drives that are not available.

```
OPR>REQUEUE BATCH-STREAM 2 /REASON:<RET>
Enter text and terminate with ^Z
JOB WILL BE RELEASED LATER WHEN TAPE DRIVES ARE AVAILABLE <CTRL/Z>

OPR>
13:21:03      BATCH-STREAM 2  --REQUEUED--
              JOB TAPE01 Req #27 for HACHE

OPR>
13:21:05      Batch-stream 2  --End--
              Job TAPE01 Req #27 for HACHE
              -- Job Requeued by Operator--

OPR>
```

6.4.6 Modifying Batch Requests

Whenever you need to change the priority of a batch job request in the queue, give the MODIFY BATCH-REQUEST command. You can specify a single batch request-id number, a user name for all requests by that user, or an asterisk (*) for all batch requests in the queue.

You must specify a new PRIORITY number from 1 to 63. The higher the number, the greater the priority.

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----- Example -----

Give the modify command to change the priority of batch request 135 to have a priority of 63. This causes the request to be the next job to be processed.

```
OPR>MODIFY BATCH-REQUEST 135 PRIORITY 63<RET>
OPR>
8:51:21      --1 Request Modified--
OPR>
```

6.4.7 Deleting Batch Requests

Whenever you need to cancel a batch request from the batch queue, give the CANCEL BATCH-REQUEST command. You can specify a single request-id number, a user name for all jobs by that user, or an asterisk (*) for all batch requests in the queue.

If you CANCEL a batch request that is active in a batch stream, the batch job is deleted immediately from the batch stream. In this way the CANCEL command is the same as the ABORT command. The log file shows a message indicating that the job was deleted by the operator.

----- Example -----

Give the CANCEL command to batch request 168 from the batch input queue.

```
OPR>CANCEL BATCH-REQUEST 168<RET>
OPR>
10:25:11     --1 Job Canceled--
OPR>
```

6.4.8 Scheduling the Next Batch Request

Whenever a user requests that his batch job run next in a batch stream, give the next BATCH-STREAM command.

----- Hint -----

This command requires that you specify a batch stream number. The criteria for selecting a batch stream are dependent on your site and the immediate status of the batch streams. If you look at the active jobs in the batch streams, you might recognize a long running job, and thus avoid that stream. Or the user may simply request that his job run in a certain stream.

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----- Example -----

Give the NEXT command to make request 66 the next job to run in batch stream 0.

```
OPR>NEXT BATCH-STREAM 0 REQUEST-ID 66<RET>
OPR>
10:43:11 Batch-Stream 0 -- NEXT request #66 scheduled --
OPR>
```

6.5 CONTROLLING THE LINE PRINTER

To handle users' requests to have files printed, you must have one or more line printers set for the parameters of the users' requests and the line printer(s) must be started. Normally, the line printer(s) are automatically started at system start-up when the SYSTEM.CMD file is executed.

After several listings have been printed, you must remove them from the line printer, separate them, and distribute them. Your system manager should set up the distribution method which includes:

1. Where you must put the listings so that users can pick them up
2. When you must distribute them

The following are the OPR commands that allow you to control printers:

1. SET PRINTER
2. START PRINTER
3. STOP PRINTER
4. CONTINUE PRINTER
5. SHUTDOWN PRINTER
6. SHOW PARAMETERS PRINTER
7. SHOW STATUS PRINTER
8. DEFINE/SHOW ALIAS

The following sub-sections describe each of the commands above. The commands let you control local printers, attached to the system on which you are working, as well as remote printers.

Note that local printers can include those attached to terminal lines:

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Letterwriter 100 (LA100), LA50, or DECprinter III (LA120-RA and -RB). They are called terminal printers.

You specify a remote printer with one of the following keywords to the commands above with the appropriate arguments:

CLUSTER -- a printer connected to another TOPS-20 system in the CFS-20 cluster.

DQS -- a printer connected to a VMS system in the DECnet network.

LAT -- a printer connected to a LAT server in the local area network.

You can use the /CLUSTER-NODE: switch with each command to control printers on specified nodes in a CFS-20 cluster.

Refer to Table 5-1 for the complete list of remote-operator commands.

6.5.1 Setting the Line Printer

Normally, a defined number of line printers are started automatically at system start-up by the SYSTEM.CMD file. However, you might have to start a line printer, for example, when a user requests a printer for his own use. Before you start a line printer, you can optionally set the parameters for the line printer with the SET PRINTER command. The parameters for this command are:

1. FORMS-TYPE
2. LIMIT-EXCEEDED-ACTION
3. PAGE-LIMITS
4. PRIORITY-LIMITS

These parameters are set by your system manager at GALGEN time. (Refer to the TOPS-20 KL Model B Installation Guide for the GALGEN procedures.) When you change the FORMS-TYPE, LIMIT-EXCEEDED-ACTION, PAGE-LIMITS, or PRIORITY-LIMITS for a printer, the change remains in effect until you make another change.

The FORMS-TYPE parameter specifies the name of the form or the name of the form type. The name of the form should be the same as the form name in the LPFORM.INI file. Refer to Section 6.6.1 for the description and use of the LPFORM.INI file. This parameter applies only to local and LAT printers.

The LIMIT-EXCEEDED-ACTION parameter specifies what action, if any, should be taken if a printer job exceeds the output limit set by the user. You can set this parameter to:

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1. RESPOND with either IGNORE (to continue the print job) or ABORT (to cancel the print job)
2. Always ABORT the print job when the limit has been exceeded
3. Always IGNORE the output page limit of the line printer

The PAGE-LIMITS parameter specifies the minimum-to-maximum range of pages allowed to print per job on the line printer.

The PRIORITY-LIMITS parameter specifies the range of print job priorities that the printer accepts. For example, if a print job is queued with a priority of 19 and there are no line printers that have been set to accept a priority of 19, the print request is queued but not printed. The request remains in the print queue until a line printer has been set to accept that priority. However, you can change the priority number of a print request with the MODIFY PRINT-REQUESTS command. (Refer to Section 6.7.6.)

----- Example -----

Set line printer 0 to print requests with a priority from 1 to 21 and a page limit from 1 to 1000.

```
OPR>SET PRINTER 0 PRIORITY LIMIT 21<RET>
OPR>
12:01:21 Printer 0 --Set Accepted--
OPR>SET PRINTER 0 PAGE-LIMITS 1000<RET>
OPR>
12:01:40 Printer 0 --Set Accepted--
OPR>
```

6.5.2 Starting the Line Printer

Once you have set the parameters for one or more line printers, you can then start the printer(s) so that print requests can be processed. If you do not set any parameters for the printer, the parameters are the parameters set by your system manager at GALGEN time.

You can start one or more (local only) line printers at a time.

Refer to the TOPS-20 Operator's Command Language Reference Manual for complete information on starting DQS, LAT, cluster, and terminal printers.

To stop the scheduling of jobs on a line printer, use the SHUTDOWN command.

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----- Example -----

1. Issue the START PRINTER command to start line printer 0.

```
OPR>START PRINTER 0<RET>
OPR>
10:11:15      Printer 0  --Startup Scheduled--
OPR>
10:11:17      Printer 0  --Started--
OPR>
```

2. Issue the START PRINTER command to start an LA120 terminal printer on terminal line 14.

```
OPR>START PRINTER 3/DEVICE:TTY14:-<RET>
/TERMINAL-CHARACTERISTIC:LA120<RET> OPR>
```

The argument for the /TERMINAL-CHARACTERISTIC: switch must be a value established by your system manager.

6.5.3 Stopping the Line Printer Temporarily

If you need to stop one or more line printers, use the STOP PRINTER command. The STOP PRINTER command temporarily stops the line printer from printing its current job. You must give the CONTINUE command to allow the line printer to continue printing the job.

The STOP command has three optional arguments. They are:

1. AFTER CURRENT-REQUEST
2. AFTER EVERY-REQUEST
3. IMMEDIATELY

The IMMEDIATELY argument is the default for the STOP command. Refer to the TOPS-20 Operator's Command Language Reference Manual for a complete description of these commands.

----- Example -----

Stop the current job on line printer 2 temporarily in order to change the printer's ribbon.

```
OPR>STOP PRINTER 2<RET>
OPR>
18:24:09      Printer 2  --Stopped--
OPR>
```

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6.5.4 Continuing the Line Printer

You can give the CONTINUE command to continue the processing of a print request on one or more line printers that were temporarily stopped with the STOP command.

----- Example -----

After stopping the line printer to change the printer's ribbon, continue the processing of the current print job.

```
OPR>CONTINUE PRINTER 2<RET>
OPR>
18:30:41      Printer 2  --Continued--
OPR>
```

6.5.5 Shutting Down the Line Printer

If at any time you need to shut down the scheduling of print requests for one or more line printers, use the SHUTDOWN command. If a print request is currently printing on the line printer, the request is completed before the line printer is shut down.

To start the scheduling of jobs on the line printer, use the START command.

----- Example -----

Shutdown line printer 2 while a request is still printing on it.

```
OPR>SHUTDOWN PRINTER 2<RET>
OPR>
19:21:03      Printer 2  --Shutdown at EOJ Scheduled--
OPR>
```

When the request on the line printer has been completed, the following message appears:

```
OPR>
19:22:54      Printer 2  --Shutdown--
OPR>
```

6.5.6 Displaying Line Printer Parameters

At any time you can display the current line printer parameters for one or more line printers with the SHOW PARAMETERS PRINTER command. If you do not specify a single line printer unit number, a range of unit numbers, a remote-printer keyword, or the /CLUSTER-NODE: switch, the SHOW command displays information for all line printers.

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The output from the SHOW PARAMETERS PRINTER command displays for each printer:

1. The aliases for local, cluster, DQS, and LAT printers
2. The printer unit number
3. The page limits set for the line printer
4. The type of forms set for the line printer
5. The priority range set for the line printer
6. The limit-exceeded-action set for the line printer
7. The character device type set for the line printer (uppercase or lowercase)
8. The queue and node names associated with DQS printers
9. The port (or service) and server names associated with LAT printers
10. The name of the node where the print requests are routed if the printer is a cluster printer

In addition, the display includes the name of the CFS-20 node where the printer was started and the times that the remote node processed the command and the local system received the information, if you specified /CLUSTER-NODE: on the command line.

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----- Example -----

Give the SHOW PARAMETERS PRINTER command to display the parameters of all line printers.

```
OPR>SHOW PARAMETERS PRINTER <RET>
OPR>
```

```
14:34:30 -- System Device Parameters --
```

Printer Parameters:

Local printers

Alias	Unit	Page Limits	Form	Prio	Lim-Ex	Chars	Dev-Chars
HARLI	0	0:1000	NORMAL	1:63	Ask		Lower
BAR	2	0:250	LQP02	1:63	Ask	LQP02	Lower TTY2:

Cluster printers

Alias	Unit	Node	Page Limits	Prio	Lim-Ex
FOO	0	SYSA	0:1000000	1:63	Ask
BINN	1	SYSB	1:500	1:63	Ask

DQS printers

Alias	DQS queue name	Node	Page Limits	Prio	Lim-Ex
LARRY	TOPS\$LN03	CREM	0:250	1:63	Ask
	SI\$8700	ZORA	0:10000	1:63	Proceed
JOE	LVD\$LN03	BCT	0:250	1:63	Proceed
	SI\$87PLOT	WORD	0:10000	1:63	Proceed
SHEMP	SI\$BENSON	WORD	0:10000	1:63	Proceed

LAT PORT printers

Alias	Port name	Server	Page Limits	Form	Prio	Lim-Ex
LAT1	24004_LN03A	LAT1	0:250	NORMAL	1:63	Proceed
LAT2	24004_LN03B	LAT70	0:250	NORMAL	1:63	Proceed
LAT3	LN03	LAT71	0:250	NORMAL	1:63	Proceed

```
OPR>
```

6.5.7 Displaying Line Printer Status

At any time you can display the status of one or more line printers with the SHOW STATUS PRINTER command. If you do not specify a line printer unit number or a range of unit numbers, the command displays information for all line printers on the system.

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The output from the SHOW STATUS PRINTER command displays:

1. The aliases for local, cluster, DQS, and LAT printers
2. The printer unit number
3. The current status of the printer
4. The name of the job currently active on the printer
5. The request-id number for the job
6. The name of the user who made the print request
7. The queue and node names associated with DQS printers
8. The port (or service) and server names associated with LAT printers
9. The name of the node where the print request was routed if the printer is a cluster printer

In addition, the display includes the name of the CFS-20 node where the printer was started and the times that the remote node processed the command and the local system received the information, if you specified /CLUSTER-NODE: on the command line.

If the line printer is not active, the word "Idle" appears in the Status column with no job name, request-id, or user name. If none of the line printers are active, only the stream number and status appear in the display.

If a printer is active, the display also shows the time that the print request started to print and the number of pages printed thus far. If you do not need this information with the display of the SHOW STATUS PRINTER command, specify the /SHORT switch before you press RETURN to confirm the command.

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----- Example -----

Give the SHOW STATUS PRINTER command to display the current status of printers.

OPR>SHOW STATUS PRINTER <RET>

```

14:34:40                -- System Device Status --

Local printers
Alias  Unit      Status      Jobname  Req#      User
-----
HARLI   0  Active      G         144      LESTER
        Started at 12:55:00
FOO     2  Idle

Cluster printers
Alias  Unit  Node      Status      Jobname  Req#  User
-----
FOO    0  SYSA  Active      GERRY     139  LESTER
        Started at 13:12:38, printed 1 of 3 pages
BINN   1  SYSB  Idle

DQS printers
Alias      DQS queue name      Node      Status      Jobname
-----
FOO        Req#39  User:LESTER      TOPS$LN03  CREM      Active      FUN-SPC
                                     Started at 16:06:55
                                     SI$8700    ZORA      Idle
                                     LVD$LN03  SYSA      Idle
BAR        SI$87PLOT  WORD      Idle
                                     SI$BENSON  WORD      Idle

LAT PORT printers
Alias      Port name      Server  Status      Jobname  Req#  User
-----
L1         24004_LN03A   LAT1    Active      TRIP     40   OPERATOR
        Started at 16:07:30
L2         24004_LN03B   LAT70   Idle
L3         LN03          LAT71   Idle
    
```


6.5.8 Assigning Aliases to Printers

Assigning aliases is especially useful with DQS, LAT, and cluster printers. Without aliases, the operator must supply printer-identification details to commands that control these printers. For example, to start a printer with the command, OPR>START PRINTER LAT PORT LN03 SERVER LAT1, the operator must know the LAT port and server names associated with the printer.

With aliases, the operator can refer to printers by unique names that appear in OPR displays and in the operator log file.

Major Characteristics

- o An alias can be up to six characters long.
- o An alias cannot begin with the letter C, D, or L.
- o Only one alias can be defined for a printer.
- o Aliases are recognized only by the OPR> commands, not by the EXEC user and privileged commands.

Refer to the TOPS-20 Operator's Command Language Reference Manual for a complete description of the printer alias feature.

----- Examples -----

1. Assign the alias PRI1 to cluster printer 1 on node ZORA.
 OPR>DEFINE ALIAS PRI1 CLUSTER 1 NODE ZORA::
2. Change aliases so that the name for cluster printer 1 on ZORA is now PRINT1, and the PRI1 alias is removed.
 OPR>DEFINE ALIAS PRINT1 PRI1
3. Remove an alias.
 OPR>DEFINE ALIAS PRINT1

6.5.9 Displaying Printer Aliases

The SHOW ALIAS command displays aliases and associated printer specifications in several ways:

- o For all local and remote printers
- o For a specific printer type -- cluster, DQS, or LAT
- o For a specific printer

----- Example -----

Display aliases and file specifications for all printers.

```
OPR>SHOW ALIAS<RET>
14:34:30 -- Printer Alias Names --
Printer Alias:
```

```
Local printers
Alias Unit
-----
HARLI 0
FOO 2
```

```
DQS printers
Alias DQS queue name Node
-----
LARRY TOPS$LN03 SYSA
JOE LVD$LN03 SYSB
SHEMP SI$BENSON WORD
```

```
LAT PORT printers
Alias Port name Server
-----
LAT1 24004_LN03A LAT1
LAT2 24004_LN03B LAT70
LAT3 LN03 LAT71
```

```
LAT SERVER printers
Alias Service name Server
-----
FOO LN03_4 LAT_1
```

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6.6 CONTROLLING FORMS ON THE LINE PRINTER

The following are the OPR commands that allow you to control the forms on local line printers:

1. ALIGN PRINTER
2. BACKSPACE PRINTER
3. FORWARDSPACE PRINTER
4. SUPPRESS PRINTER

You can give the above commands either while the line printer is printing the job or after you have pressed the ONLINE/OFFLINE key on the line printer. When you put the line printer off-line, OPR sends the following message to the CTY.

```
hh:mm:ss      Printer n  --Offline--
```

When you put the line printer on-line, the line printer resumes printing.

In addition, the SET PRINTER n or LAT FORMS-TYPE name command permits you to change the type of forms on the line printer. If you specify a forms type that does not have an entry in the LPFORM.INI file, the forms characteristics default to:

1. /BANNER:2
2. /HEADER:2
3. /LINES:60
4. /VFU:NORMAL
5. /WIDTH:132
6. /TRAILER:2

Refer to Section 6.6.1 for a complete description of the SYS:LPFORM.INI file and its available switches.

To allow yourself or a user to change the forms on a line printer, be sure you have OPERATOR-IN-ATTENDANCE set. (See Section 8.1.)

Note that the LP05 and LP14 line printers have a direct access, vertical format unit. (Refer to MAKVFU.DOC and MAKVFU.HLP.) However, the LP10 line printer uses a standard sprocketed carriage tape for the vertical format unit.

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When the first job request starts to print, the following message appears, indicating the forms type being loaded into the printer's vertical format unit (VFU):

```
hh:mm:ss      Print n  --Loading VFU with 'forms-type'--
```

This is strictly an informational message that appears because the system reads the LPFORM.INI file when you start a line printer.

The following sub-sections describe how to use the LPFORM.INI file and how to use each of the commands listed above. You can use the /CLUSTER-NODE: switch with each command to control forms on specified nodes in a CFS-20 cluster.

6.6.1 The LPFORM.INI File

The LPFORM.INI file allows you to set various printer parameters on the basis of form names:

Each line in the LPFORM.INI file is written in the following format:

```
formname:locator/switch1/switch2/switch3...
```

where:

formname	is a 1- to 6-character form name. The system manager should specify form names that are descriptive of the types of forms used at your installation.
:locator	is an optional locator field containing: ALL all devices (the default). LAT all LAT printers LOC all local line printers. LPTnnn a specific line-printer, where nn is the printer number. REM line printers at remote stations.
/switch1...	are one or more switches available to you to describe the manner in which the forms are to be used. Refer to Table 6-1 for a description of the available switches.

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Table 6-1: LPFORM.INI Switches

Switch	Meaning
/ALIGN:filespec	The filespec specifies the file with the extension .ALP, which is used to align the forms on the line printer. If no filespec is specified, the system uses the file whose filespec is the name of the form. For example, /ALIGN for NARROW uses SYS:NARROW.ALP by default. The alignment occurs before the requested file is printed and is not repeated if multiple requests for the same forms occur for the same line printer.
/BANNER:nn	The value of nn specifies the number of banner pages (job header pages) desired. The default is 2 pages and may be changed with GALGEN.
/CHAIN:xxx or /DRUM:xxx	The xxx represents a 1- to 6-character ASCII string that specifies the chain or drum to be used on the printer. The system types the switch name and argument on your terminal when the forms are scheduled. If you specify both the /CHAIN and /DRUM switches for the same entry in the LPFORM.INI file, OPR prints only the last one it encounters.
/HEADER:nn	The value of nn specifies the number of file header pages desired. The default is 2 pages and may be changed with GALGEN.
/LINES:nn	The value of nn specifies the number of lines that can be printed on each page. The default is 60. This switch should be included whenever a form type is longer or shorter than the normal 60 lines.
/NOTE:text	The text represents text of up to 50 characters that is typed on your OPR terminal at the time the forms and/or print request are scheduled.

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/RAM:name	The name represents a 1- to 6-character ASCII string that specifies the name of the control RAM to be used. The /RAM switch loads a special program that allows character translation on the line printer. If the line printer has a program loaded RAM (DARAM), the system automatically loads it from the file SYS:name.RAM. For example, if your line printer doesn't print left and right angle brackets, you could specify a RAM file that would convert angle brackets to square brackets on the line-printer output.
/RIBBON:name	The name represents a 1- to 6-character ASCII string that specifies the type of ribbon to be used on the line printer. The system types the switch name and argument on your terminal at the time that the forms are scheduled.
/TAPE:name or /VFU:name	The name represents a 1- to 6-character ASCII string that specifies the name of the vertical forms control tape to be used. If the line printer has a program loaded VFU (DAVFU), the system automatically loads it from the file SYS:name.VFU. If the line printer does not have a DAVFU, the system notifies you of the need to change the VFU tape. The default VFU name is NORMAL.
/TRAILER:nn	The value of nn specifies the number of job trailer pages desired. The default is 2 pages and may be changed with GALGEN.
/WIDTH:nn	The value of nn specifies the number of characters per line for the form. The default width is 132 if the /WIDTH switch is not specified. The /WIDTH switch should be included whenever a form is narrower than the standard 14-inch wide paper.

The form name in LPFORM.INI need not be the name of a physical form; however, it ought to specify the type of form (such as NORMAL forms, NARROW forms, and so forth). When a print request is made, LPTSPL compares the form name associated with the request with the form name of the form currently mounted on the line printer. If the first four characters of the name are not the same, then LPTSPL requests you to change the forms on the line printer. If the first four characters of the name are the same, then LPTSPL checks the switches associated with the requested form name and uses those values when printing the job.

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If the forms type specified by the user is not the same as the form that is currently in the printer, the system uses the first four characters to check against the LPFORM.INI file. (This four-character uniqueness can be changed by GALGEN; the default is four.) If the forms type matches one in the file, a request is made for you to supply the appropriate form. If the forms type is not in the LPFORM.INI file, you receive an error.

For example, note the following LPFORM.INI file:

```
NARROW/HEADER:1/BANNER:1/TRAILER:1
NARR01/HEADER:0/BANNER:1/TRAILER:1
NARR02/HEADER:0/BANNER:0/TRAILER:0/NOTE:SPECIAL
```

Now, suppose that NARR01 forms are currently mounted on the line printer and a user makes a print request that requires NARR02 forms. The system compares the first four characters of the requested form name (NARR02) with the first four characters of the form name for the form that is currently mounted on the line printer (NARR01). Because they are the same, the system takes the switch values associated with NARR01 and applies them to the user's print request. Therefore, the LPFORM.INI file should contain unique form names for each different type or form. This ensures that the correct forms are mounted when a user submits a print request.

Each line in LPFORM.INI can also contain a locator field, which specifies the parameters a form should have when it is mounted on specific line printers. For example:

```
NORMAL:LPT001/HEADER:1/BANNER:1/TRAILER:0
NORMAL:ALL/HEADER:2/BANNER:2/TRAILER:2
```

If form NORMAL is printed on line printer LPT001, it takes the forms parameters given in the first entry of the LPFORM.INI file shown above. If form NORMAL is printed on any other line printer, then it takes the forms parameters given in the second entry of the file.

Note that entries in LPFORM.INI having identical form names but having different locators must be listed from specific locator to more general locator. In the example above, the entry specifying device LPT001 for form NORMAL appears before the entry specifying locator ALL for the same form name. This order is important because LPTSPL uses the first entry in LPFORM.INI that can be applied to the device on which the request is printed.

Also, note that ALL is the default locator value. For example,

```
NORMAL/switches
```

is equivalent to:

```
NORMAL:ALL/switches
```

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6.6.2 Aligning Forms on the Line Printer

At various times during your daily system operation, you might have to align special forms for a particular line printer job. For example, you might have to load payroll checks on the line printer for your scheduled payroll process. The ALIGN command allows you to adjust the forms on the line printer as many times as necessary to print the job correctly.

When you give the ALIGN PRINTER command, the system uses an alignment file that is specified as "formsname.ALP" for the print request, where formsname is the name of the form that was specified in the user's print request. The "formsname.ALP" file contains a pattern applicable to the special forms being mounted. If you do not want the default .ALP file used, you can specify another alignment file in the ALIGN PRINTER command. For example, the file for NORMAL forms at your installation could be:

```
SYS:<SPOOL>NORMAL-ALIGN.ALP
```

In addition, the ALIGN PRINTER command has three optional switches that you can specify to:

1. Change the number of seconds between the repeat printing of the .ALP file (/PAUSE: switch)
2. Change the number of printing repeats of the .ALP file (/REPEAT-COUNT: switch)
3. Resume normal printing and stop aligning special forms (/STOP switch)

When you specify either of these switches, you are changing the default for the current job on the printer. When you specify the /STOP switch, the printer stops printing the contents of the .ALP file and resumes printing the print request.

----- Examples -----

1. Give the ALIGN PRINTER command to align forms for a print request for payroll checks. At your installation, the /PAUSE: switch was set for 10 seconds and the /REPEAT-COUNT: switch was set for 25 repeats. Change the /REPEAT-COUNT: to 15.

```
OPR>ALIGN PRINTER 0 /REPEAT-COUNT:15<RET>
OPR>
12:46:02      Printer 0 --Alignment--
              Job PAYROL Req #32 for ACCOUNTING
OPR>
```

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2. Give the ALIGN PRINTER command again after you have correctly aligned the form for the checks. Specify the /STOP switch to resume the normal printing of the payroll checks.

```
OPR>ALIGN PRINTER 0 /STOP<RET>
OPR>
12:52:43      Printer 0  --Alignment Stopped--
              Job PAYROL Req #32 for ACCOUNTING
OPR>
```

6.6.3 Backspacing Forms on the Line Printer

At various times, you might have to backspace a particular file that is being printed on the line printer, such as when the forms become jammed in the printing mechanism. The BACKSPACE command allows you to backspace the print file so that the pages of the file that were jammed or incorrectly printed can be reprinted.

With the BACKSPACE PRINTER command, you must specify one of the following switches:

1. /COPIES: - specifies the number of copies of the print request to backspace.
2. /FILE - specifies to backspace 1 file so that it is printed again.
3. /PAGES: - specifies the number of pages to be backspaced and printed again.

When you give a BACKSPACE PRINTER command, the system first clears the printer buffer by printing its contents, and then executes your command. The number of pages that are printed to clear the buffer are included with the number of pages you specify in the BACKSPACE PRINTER command. Therefore, when you specify the /PAGES: switch, you should add two or three pages to the total number given as the /PAGES: value.

----- Example -----

Printer 1 has just had a paper jam which has put the printer off-line. The following messages appear at your console:

```
OPR>
9:38:18      Printer 1  --Offline--

9:39:39 <12> Printer 1  --VFU error--
              Re-align forms and put on-line
              Type 'Respond <number> CONTINUE' when ready
OPR>
```

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Clear the printer of the jammed pages and re-align the forms. Before you put the printer on-line, give the BACKSPACE PRINTER command to repeat the number of pages that were jammed and add a couple of pages for the printer buffer (the following example describes backspacing printer 1 by 25 pages). Then RESPOND to message <12>.

```
OPR>BACKSPACE PRINTER 1 /PAGES:25<RET>
OPR>
9:45:06      Printer 1  --Backspaced 25 Pages--

OPR>RESPOND 12 CONTINUE<RET>
OPR>
```

At this point, the line printer prints the remaining contents of the printer buffer and then backspaces 25 pages to reprint what was jammed or incorrectly printed.

6.6.4 Forwardspacing Forms on the Line Printer

At various times, you might have to forwardspace a particular file that is being printed on the line printer, such as when a user requests only a portion of some file to be printed. The FORWARDSpace command allows you to forwardspace the file so that you can save paper and print only what is needed.

With the FORWARDSpace PRINTER command, you must specify one of the following switches:

1. /COPIES: - specifies the number of copies of the print request to forwardspace.
2. /FILE - specifies to forwardspace 1 file in the print queue so that the file is not printed.
3. /PAGES: - specifies the number of pages of the print request that are not printed.

When you give a FORWARDSpace PRINTER command, the system first clears the printer buffer by printing its contents and then executes your command. The number of pages that are printed to clear the buffer is included with the number of pages you specify in the FORWARDSpace PRINTER command. Therefore, when you specify the /PAGES: SWITCH, YOU SHOULD SUBTRACT TWO OR THREE PAGES TO THE TOTAL NUMBER GIVEN AS THE /PAGES: value.

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----- Example -----

A user issued the command @PRINT A.TXT,B.TXT,C.TXT,D.TXT and has requested you to forward space line printer 2, so that the B.TXT file is printed before the A.TXT file is printed. After the print job has printed the header and banner pages, you put the printer off-line, give the FORWARDSPACE PRINTER command for 1 file, and then put the printer on-line.

```
OPR>
9:38:28      Printer 2  --Offline--

OPR>FORWARDSPACE PRINTER 2 /FILE<RET>
OPR>
9:45:26      Printer 2  --Forwardspaced 1 File--

OPR>
```

At this point, the line printer prints the remaining contents of the printer buffer and then forward spaces 1 file of the print job.

6.6.5 Suppressing Carriage Control on the Line Printer

At various times, you might have to suppress the carriage control on the line printer for a particular job, such as when a user's program causes a print loop that makes the forms in the line printer pass through with one line written on each form. The SUPPRESS command allows you to suppress the carriage control.

The SUPPRESS PRINTER command suppresses all blank lines and form feeds. For example, if you had a 25-page file with one line of text per page, the SUPPRESS PRINTER command would cause all the lines of text to print on one page.

With the SUPPRESS PRINTER command, you can specify one of the following switches.

1. /FILE - suppresses blank lines and form feeds for the current file printing.
2. /JOB - suppresses blank lines and form feeds for the entire job printing.
3. /STOP - stops the suppression of printing and resumes normal printing with blank lines and form feeds.

The /JOB switch is the default if you do not specify any of the above switches.

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----- Example -----

A user's program has caused a print loop. Give the SUPPRESS PRINTER command to stop the form feeds, thus saving paper.

```
OPR>SUPPRESS PRINTER 1<RET>
OPR>
10:43:47      Printer 1  --Carriage control suppressed--
                Job TEST01 Req #55 for PTAYLOR

OPR>
```

6.7 CONTROLLING LINE PRINTER JOBS

The following OPR commands allow you to control line printer jobs that a user queues either with the processing of a batch job or with the TOPS-20 PRINT command:

1. SHOW QUEUES PRINTER-JOBS
2. HOLD PRINTER-JOBS
3. RELEASE PRINTER-JOBS
4. ABORT (current job on) PRINTER
5. REQUEUE (current job on) PRINTER
6. MODIFY PRINTER-REQUEST
7. CANCEL PRINTER-REQUEST
8. NEXT (job on) PRINTER

The following sub-sections describe how to use each of these commands to control line printer jobs. You can use the /CLUSTER-NODE: switch with each command to control line printer jobs on specified nodes in a CFS-20 cluster.

6.7.1 Examining Printer Jobs in the Queues

Whenever a user issues a request for the line printer, the request is placed in a queue where it waits for selection by the system for printing. To examine the queues for print jobs, give the OPR command SHOW QUEUES PRINTER-JOBS.

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The output of the SHOW QUEUES PRINTER-JOBS command displays for each job:

1. The name of the print job
2. The request-id number of the print job
3. The page limit of the print job
4. The name of the user who requested the print job

These four columns of the display appear whether the print job is currently printing (active) or is not printing (inactive). In addition to the above, if the job is active on the line printer, the display also shows the line printer unit number on which the job is printing, the time that the print job started, and the total number of pages printed.

The display also includes the name of the CFS-20 node where the printer was started and the times that the remote node processed the command and the local system received the information, if you specified /CLUSTER-NODE: on the command line.

The SHOW QUEUES PRINTER-JOBS command has five optional switches:

1. /NODE:name displays the printer queue of a remote system whose jobs are to be processed on the local node.
2. /ALL adds to the display the switches that the user specified with the PRINT command. If no switches were specified, the /ALL switch displays the default switches. In addition, the /ALL switch displays any switches that you specified, for example, /HOLD.
3. /SHORT displays only the job name, the request number, the scheduled run time, and the user name.
4. /USER:name displays only the printer job of a specified user.
5. /CLUSTER-NODE: name displays printer queue information from the specified remote CFS-20 node. If * is specified, the printer names of all nodes in the cluster are displayed.

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----- Example -----

1. Give the SHOW QUEUES PRINTER-JOBS command to display printer jobs in the queues.

```
OPR>SHOW QUEUES PRINTER-JOBS <RET>
OPR>
14:38:09 -- System Queues Listing --

Printer Queue:
Job Name Req# Limit User Alias
-----
G 161 3 LESTER LAT3
/Remote-name:LN03 /Dest:LAT71
There is 1 job in the queue (one in progress)
```

OPR>

2. Give the SHOW QUEUES PRINTER-JOBS command with the /SHORT switch.

```
OPR>SHOW QUEUES PRINTER-JOBS /SHORT<RET>
OPR>
10:49:07 -- System Queues Listing --

Printer Queue:
* DAILY 11 24 OPERATOR
* TRAP79 12 161 BELANGER
MF20 13 23 SROBINSON
WEEKLY 14 17 OPERATOR
SPEAR 15 10 OPERATOR
```

OPR>

6.7.2 Holding Printer Jobs

Whenever you need to prevent print requests from processing, give the HOLD PRINTER-JOBS command. When you give this command, current print requests in the queue are held. Any requests for the line printer queued after the HOLD command has been issued are not held and are processed as soon as a line printer becomes available. You must specify one of the following with this command:

1. The request-id number, which holds a single printer job
2. The user name, which holds all printer jobs queued by that user, or
3. An asterisk (*), which holds all printer jobs queued by all users.

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----- Hints -----

You cannot HOLD a printer job that is currently active on a line printer.

----- Example -----

Give the HOLD PRINTER-JOBS command to hold all printer requests for user SMITH.

```
OPR>HOLD PRINTER-JOBS SMITH <RET>
OPR>
8:37:26          -- 2 Jobs Held --
OPR>
```

6.7.3 Releasing Printer Jobs

You can give the RELEASE command to allow the printing of a job that has been previously held with the HOLD command or requeued with the REQUEUE command. You can specify a single request-id number, the user name for all jobs by that user, or an asterisk (*) for all printer jobs in the system. The RELEASE command reschedules the job(s) for processing.

----- Hint -----

You must have one or more line printers started or in the idle state to get a printer job processed.

----- Example -----

Give the RELEASE command to reschedule all printer jobs that were previously held.

```
OPR>RELEASE PRINTER-JOBS * <RET>
OPR>
8:37:52          -- 2 Jobs Released --
OPR>EX
```

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6.7.4 Canceling Printer Jobs

At various times, you might have to cancel a printer job while it is printing. You can give the ABORT command with the printer unit number and one or more of the following switches:

1. /REQUEST-ID:
2. /PURGE
3. /REASON:

The /REQUEST-ID: switch uniquely identifies the job to be canceled.

The /PURGE switch flushes the entire job from the system when it is canceled. There are no header, banner, or trailer pages printed when the print request is purged.

The /REASON: switch allows you to enter one or more lines of text to explain why the printer job was canceled.

You can also specify remote-printer command keywords to cancel print jobs requested on DQS, LAT, or cluster printers.

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----- Example -----

Give the ABORT command to cancel a printer job because a user has requested that you do so.

```
OPR>ABORT PRINTER 1 /REASON:USER REQUEST<RET>
OPR>
11:32:08      PRINTER 1  --ABORTING--
              JOB TEST01 Req #35 for JONES
              REASON:USER REQUEST
OPR>
11:32:12      Printer 1  --End--
              Job TEST01 Req #35 for JONES
OPR>
```

6.7.5 Requeuing Printer Jobs

At various times, you might want to cancel a printer job and then reschedule it to be printed at a later time. You can give the REQUEUE command to HOLD the printer job in its entirety and ABORT its current printing. This command can only be used when the job is active.

For example, you might want to REQUEUE a printer job that requires multiple boxes of forms so that it prints at a later time when fewer users are requesting printer jobs. Thus, you REQUEUE the job in its entirety for printing when the time becomes available.

In order to have the job start again after it has been requeued, you must give the OPR command RELEASE.

You can specify the /REASON switch to explain why the job is being requeued.

You can requeue remote DQS, LAT, and cluster printer jobs as well as local printer jobs.

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----- Example -----

Give the REQUEUE command to hold a printer job that requires four hours to print.

```
OPR>REQUEUE PRINTER 2 /REASON:<RET>
Enter text and terminate with ^Z
JOB REQUIRES FOUR HOURS TO PRINT.<RET>
JOB WILL BE RELEASED FOR PRINT ON 2ND SHIFT. <CTRL/Z>
OPR>
13:21:03      PRINTER 2  --REQUEUED--
              JOB ARFORM Req #37 for AR.OFFICE
              Reason:JOB REQUIRES FOUR HOURS TO PRINT.
              JOB WILL BE RELEASED FOR PRINT ON 2ND SHIFT.^Z
OPR>
13:21:25      Printer 2  --End--
              Job ARFORM Req #37 for AR.OFFICE
OPR>
```

6.7.6 Modifying Printer Requests

Whenever you need to change the priority of a printer job request in the queue, give the MODIFY PRINTER-REQUEST command. You can specify a single printer request-id number, the user name for all requests by that user, or an asterisk (*) for all printer requests in the queue.

You must specify a new PRIORITY number from 1 to 63. The higher the number, the greater the priority.

----- Example -----

Give the MODIFY command to change the priority of batch request 135 to have a priority of 63. This causes the request to be the next job processed.

```
OPR>MODIFY PRINTER-REQUEST 135 PRIORITY 63<RET>
OPR>
8:51:21      --1 Job Modified--
OPR>
```

6.7.7 Deleting Printer Requests

Whenever you need to delete a printer request from the printer queue, give the CANCEL PRINTER-REQUEST command. You can specify a single request-id number, the user name for all jobs by that user, or an asterisk (*) for all printer requests in the system.

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When you delete a print request that is currently printing on the printer, the printer stops printing the data, prints the trailer pages, and starts printing the next job in the queue.

----- Example -----

Give the CANCEL command to delete print request 168 from the queue.

```
OPR>CANCEL PRINTER-REQUEST 168<RET>
OPR>
10:25:11      --1 Job Canceled--
OPR>
```

6.7.8 Sending Line Printer Output to Tape

You can send output to a magnetic tape instead of a line printer with the OPR command, START PRINTER nn /DEVICE:MTAn:.

The advantages for doing this are:

1. When your line printers are down due to a hardware problem, you can spool the output to tape and then copy this output on another system where the printer(s) is not down.
2. When it is desired to microfiche the output, you can send the output to tape instead of printing it on the line printer.
3. When you want to transfer the output from one site to another or to another system, you can put it on tape. Transferring a tape is easier than mailing or carrying the printed output.

To perform this task, do the following:

1. Type to OPR:

```
SET TAPE-DRIVE MTAn: UNAVAILABLE<RET>
```

where n is the tape drive unit number. (Refer to Section 7.5.7 for additional information on the SET TAPE-DRIVE command.)

2. Physically mount and bring on-line a tape on the tape drive that has been made UNAVAILABLE. Make sure that the write-ring has been inserted in the tape (WRITE-ENABLED).

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3. Type to OPR:

```
HOLD PRINTER-JOBS *<RET>
```

to hold all printer job requests in the printer(s) queue. You can specify the user's name for all requests by a specific user or a request-id number for a single print request.

4. Type to OPR:

```
START PRINTER nn /DEVICE:MTAn:<RET>
```

where nn is a line printer unit number other than those already in use and n is the tape drive unit number.

5. If you are to print a type of form other than the type when a printer is started (the default) at your installation, type to OPR:

```
SET PRINTER nn FORMS-TYPE forms-name<RET>
```

where forms-name is the desired type of form to be spooled to the tape.

6. Type to OPR:

```
RELEASE PRINTER-JOBS *<RET>
```

to release those printer job requests that were held.

7. When the printer requests have completed being output to the tape, type to OPR:

```
SHUTDOWN PRINTER nn<RET>
```

to rewind and unload the tape automatically.

8. Type to OPR:

```
SET TAPE-DRIVE MTAn: AVAILABLE<RET>
```

to make the tape drive available for user tape mount requests.

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----- Example -----

Start printer 2 on MTA0: to output all printer requests in the printer queue for NARROW forms because there are no NARROW forms at your site.

```
OPR>SET TAPE-DRIVE MTA0: UNAVAILABLE<RET>
Enter Text and Terminate with ^Z
ALL NARROW FORMS WILL BE PRINTED AT ANOTHER SITE.<RET>
THERE ARE NO NARROW FORMS IN STOCK.<CTRL/Z>
OPR>
7:52:19          --Tape Drive Set Unavailable--
                MTA0: SET UNAVAILABLE FOR ASSIGNMENT BY MOUNTR
OPR>HOLD PRINTER-JOBS *<RET>
7:53:45          --10 Jobs Held--
OPR>START PRINTER 2 /DEVICE:MTA0:<RET>
7:55:34          Printer 2 --Startup Scheduled--
OPR>SET PRINTER 2 FORMS-TYPE NARROW<RET>
7:56:15          Printer 2 --Set Accepted--
OPR>RELEASE PRINTER-JOBS *<RET>
7:57:23          --10 Jobs Released--
OPR>
7:57:37          Printer 2 --Started--
OPR>
7:57:38          Printer 2 --Begin--
                Job DAILY Req #11 for PAYROLL
OPR>
7:58:29          Printer 2 --End--
                Job DAILY Req #11 for PAYROLL
7:59:01          Printer 2 --Begin--
                Job WEEKLY Req #12 for PAYROLL
OPR>
.
.
.
OPR>
8:09:10          Printer 2 --End--
                Job YEARLY Req #20 for PAYROLL
OPR>SHUTDOWN PRINTER 2<RET>
OPR>
8:10:12          Printer 2 --Shutdown--
OPR>SET TAPE-DRIVE MTA0: AVAILABLE<RET>
OPR>
8:12:30          --Tape Drive Set Available--
                MTA0: set available for assignment by MOUNTR
OPR>
```

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NOTE

If all copies of the line printer spooler (LPTSPL) are active, you may have to start an additional copy of LPTSPL as a process under SYSJOB or if your GALAXY components are running as a process in a PTYCON subjob, then under that PTYCON subjob, to output a print file to tape.

6.7.9 Printing Log and Spool Files on Designated Local Printers

Normally, batch log files and spooled files are printed on the first available local printer. However, it is possible to specify particular local printers for these files. To enable this feature, give the following command:

```
OPR>ENABLE LOGFILES-TO-SPECIFIC-PRINTERS<RET>
```

After this command is given, you must indicate which local printer(s) will be allowed to print log and spooled files:

```
OPR>ENABLE PRINT-LOGFILES local printer number or range of
numbers<RET>
```

You can later disable this feature with DISABLE commands.

Refer to the Operator's Command Language Reference Manual for complete details on this feature.

6.8 CONTROLLING THE CARD READER

To handle a user's request to have card decks read into the system for batch processing, you must have started one (or possibly more) card reader(s) at your installation. Normally, the card reader is automatically started at system start-up when the SYSTEM.CMD file is executed.

Your system manager should establish the following when you have batch users submitting their jobs as card input:

1. Where the users place the card decks for submission
2. When you load the card decks into the card reader for reading
3. Where and when you place the card decks and output from the batch jobs to return to the users

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The following are the OPR commands that allow you to control the card reader(s) at your installation:

1. START READER
2. STOP READER
3. CONTINUE READER
4. SHUTDOWN READER
5. SHOW STATUS READER

The following sub-sections describe each of the above commands to assist you in the control of card reader(s). You can use the /CLUSTER-NODE: switch with each command to control card readers on specified nodes in a CFS-20 cluster.

6.8.1 Starting the Card Reader

In order for you to load and read cards through the card reader, you must start the card reader with the START READER command. Starting the card reader allows batch card jobs to be scheduled for processing in the TOPS-20 batch system. You can specify one or more unit numbers with the START command.

To stop the scheduling of card batch jobs on a card reader, use the SHUTDOWN command.

----- Example -----

Issue the START READER command to start up card reader 0.

```
OPR>>START READER 0<RET>
OPR>
10:11:15      Reader 0 --Startup Scheduled--
OPR>
10:11:17      Reader 0 --Started--
OPR>
```

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6.8.2 Stopping the Card Reader

If you need to stop one or more card readers, use the STOP command. The STOP READER command temporarily stops the card reader from processing its current job. You must give the CONTINUE command to allow the card reader to continue reading the input job.

The STOP command has three optional arguments. They are:

1. AFTER CURRENT-REQUEST
2. AFTER EVERY-REQUEST
3. IMMEDIATELY

The IMMEDIATELY argument is the default for the STOP command. Refer to the TOPS-20 Operator's Command Language Reference Manual for a complete description of these commands.

----- Example -----

Stop the current job on card reader 0 temporarily to fix a card in the deck that was accidentally folded.

```
OPR>>STOP READER 0<RET>
OPR>
18:24:09      Reader 0 -- Shutdown at EOJ Scheduled --
OPR>
```

6.8.3 Continuing the Card Reader

You can give the CONTINUE command to continue one or more card readers that were temporarily stopped with the STOP command.

----- Example -----

After stopping the card reader to fix a folded card, continue the current card reader job.

```
OPR>>CONTINUE READER 0<RET>
OPR>
18:30:41      Reader 0 --Continued--
OPR>
```

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6.8.4 Shutting Down the Card Reader

If at any time you need to shutdown the scheduling of card reader requests, use the SHUTDOWN command. If a card reader job is currently being read from the card reader, the request is completed before the card reader is shutdown.

To start the scheduling of jobs on the card reader, use the SHUTDOWN command.

----- Example -----

Shutdown card reader 0 while a request is still being read into the system.

```
OPR>>SHUTDOWN READER 0<RET>
OPR>
19:21:01      Reader 0 --Shutdown at EOJ Scheduled--
OPR>
```

When the batch card job has completed being read into the system, the following message appears:

```
OPR>
19:22:44      Reader 0 --Shutdown--
OPR>
```

6.8.5 Displaying Card Reader Status

At any time you can display the status of one or more card readers with the SHOW STATUS READER command. If you do not specify a number or a range of unit numbers, the default is all card readers on the system.

The output from the SHOW STATUS READER command displays:

1. The card reader unit number
2. The current status of the card reader (either idle or active)

If you specified the /CLUSTER-NODE: switch, the display also includes the name of the remote CFS-20 node and the times that the remote node processed the command and the local node received the information. If the card reader is active, there is currently a deck of cards being read into the system. The system does not recognize a job name, request-id, or user name until the last card of the deck has been read and the card reader is idle. At this time, the card deck has become a job request with a request-id number and can be displayed with the SHOW QUEUES BATCH-JOBS command.

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----- Example -----

Give the SHOW STATUS READER command to display the current status of the card reader at your installation.

```
OPR>>SHOW STATUS READER<RET>
OPR>
13:51:39      -- System Device Status --

Reader Status:
  Unit      Status
-----
  0      Active
OPR>
```

6.9 CONTROLLING CARD READER JOBS

Because a card reader job becomes a batch input queue request when the last card of the job (EOJ card) is read, you can only abort the card job while it is being read into the system.

At various times you might have to cancel the card job being read, such as when a card jam occurs in the card reader. You can give the ABORT READER command by specifying the reader unit number to cancel the job before it becomes a job request in the batch input queue.

In addition, you can specify a reason with the /REASON: switch as to why the job was canceled. You can also specify the /CLUSTER-NODE: switch to control card reader jobs on specified nodes in a CFS-20 cluster.

----- Example -----

Give the ABORT to cancel a card reader job because of a massive card reader jam.

```
OPR>>ABORT READER 0 /REASON:CARD JAM<RET>
OPR>
12:32:09      Reader 0 --Aborting--
              REASON:CARD JAM
OPR>
```

6.10 CONTROLLING OTHER OUTPUT DEVICES

The commands and descriptions in this section are applicable only if you have the hardware available at your installation site.

Other output devices available to users are:

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1. CARD-PUNCH
2. PAPER-TAPE-PUNCH
3. PLOTTER

If your installation has one or more of these output devices, you must have the parameters set so that the user(s) requests can be processed. Normally, if your installation has these devices, they are automatically started at system start-up when the SYSTEM.CMD file is executed.

When the output from the card punch, paper-tape punch, and plotter has been completed, you must remove the output and distribute it. Your system manager should set up the distribution method which includes:

1. Where you must put the output so that users can pick it up
2. When you must distribute the output

The following commands are the OPR commands that allow you to control the card punch, paper-tape punch, and plotter at your installation:

1. SET output device
2. START output device
3. STOP output device
4. CONTINUE output device
5. SHUTDOWN output device
6. SHOW PARAMETERS output device
7. SHOW STATUS output device

where output device can be CARD-PUNCH, PAPER-TAPE-PUNCH, or PLOTTER.

The following sub-sections describe each of the above commands to assist you in the control of these output devices. You can use the /CLUSTER-NODE: switch with each command to control output devices on specified nodes in a CFS-20 cluster.

6.10.1 Setting Output Devices

Normally, a defined number of output devices are started at system start-up by the SYSTEM.CMD file. However, you might have to start an output device (for example, the card punch) when a user requests a card punch job. Before you start an output device (CARD-PUNCH,

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PAPER-TAPE-PUNCH, or PLOTTER), you can set the parameters for that device. The parameters for these three devices are:

1. FORMS-TYPE name
2. LIMIT-EXCEEDED-ACTION word
3. OUTPUT-LIMIT number
4. PRIORITY-LIMITS range

Where "name" is the name of the output device form. The default is NORMAL and is defined in the SPFORM.INI file for each device type. (Refer to Section 6.10.2.)

The "word" of the LIMIT-EXCEEDED-ACTION parameter refers to what action, if any, should be taken if the device that is currently processing the job request exceeds the output limit. You can set this parameter to:

1. RESPOND with either IGNORE the limit for the output job or ABORT to cancel the output job
2. Always ABORT the output job when the limit has been exceeded
3. Always IGNORE the set output limit of the device

The "number" of the OUTPUT-LIMIT parameter refers to the following:

1. Number of cards for the CARD-PUNCH
2. Number of folds for the PAPER-TAPE-PUNCH
3. Number of units for the PLOTTER

These parameters default to the following if they are not included in the SYSTEM.CMD file at system start-up:

1. 500 cards for the CARD-PUNCH
2. 500 units for the PAPER-TAPE-PUNCH
3. 500 units for the PLOTTER

The "range" of the PRIORITY-LIMITS parameter refers to a range of job priority numbers the output device accepts. The default priority range is 1:63. For example, if an output job is queued with a priority of 19 and there are no devices for the request that have been set to accept a priority of 19, the request is not output until you change the priority range for the device. You can change the priority number of the job request with the MODIFY command (refer to Section 6.11.6). When you set an output device to change the FORMS-TYPE,

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LIMIT-EXCEEDED-ACTION, OUTPUT-LIMIT, or PRIORITY-LIMITS, the change remains in effect until you make another change.

----- Examples -----

1. Set the priority limits for the paper-tape punch to be a range of 20:63.

```
OPR>SET PAPER-TAPE-PUNCH 0 PRIORITY-LIMITS 20:63<RET>
OPR>
11:34:09      Paper-tape-punch --Set Accepted--
OPR>
```

2. Set the limit exceeded action for the job currently on the card punch to be ignored.

```
OPR>SET CARD-PUNCH 0 LIMIT-EXCEEDED-ACTION IGNORE<RET>
OPR>
12:23:18      Card-punch 0 --Set Accepted--
OPR>
```

6.10.2 The SPFORM.INI File

The forms handler for the output devices CARD-PUNCH, PAPER-TAPE-PUNCH, and PLOTTER allows you to automatically set various forms parameters on the basis of form names. To accomplish this, you or your system manager must set up a file on SYS: called SPFORM.INI which contains a list of form names and switch settings for those forms.

Each line in the SPFORM.INI file is written in the following format:

```
devtyp formname:locator/switch1/switch2/switch3...
```

where:

```
devtyp      the device type for which this line applies.
             The allowable types are as follows:

             CDP for the card punch
             PTP for the paper-tape punch
             PLT for the plotter

formname    a 1- to 6-character form name. You or your
             system manager should specify unique form
             names that are descriptive of the types of
             forms used at your installation.

:locator    an optional locator field containing:

             ALL      all devices (the default)
```

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```
LOC      all devices at the local site
REM      all devices at remote stations
```

/switch1...

one or more switches available to you to describe the manner in which the forms are to be used. Refer to Tables 6-2 and 6-3 for a description of switches. Table 6-2 describes the four switches that can be used for all the output device types. Table 6-3 describes the three switches that can be used only for the plotter (PLT:).

Table 6-2: SPFORM.INI Switches for All Device Types

Switch	Meaning
/BANNER	specifies whether banner units will be output.
/HEADER	specifies whether header units will be output.
/NOTE:xxx	The xxx represents a text of up to 50 characters that are printed on the OPR terminal at the time the forms are scheduled. There is no default.
/TRAILER	specifies whether trailer units will be output.

Table 6-3: SPFORM.INI Switches for Plotter Devices Only

Switch	Meaning
/MAXIMUM:xx:yy	specifies the maximum form size in the horizontal (xx) and vertical (yy) axis. The values of xx and yy are measured in units; the unit size is defined by the /SPU switch. The plotter, when mounted with the specified type of form, will accept plots no larger than the values of xx and yy indicate.

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`/MINIMUM:xx:yy` specifies the minimum form size in the horizontal (xx) and vertical (yy) axis. The values of xx and yy are measured in units; the unit size is defined by the /SPU switch. The plotter, when mounted with the specified type of form, will accept plots no smaller than the values of xx and yy indicate.

`/SPU:nnn` specifies the Steps Per Unit. A step is a measurement length as defined in the hardware manual for the device at your installation. The value of nnn should be step-size/nnn=one unit. For example, to define an inch as the unit if the plotter step is .01 inches, use /SPU:100.

NOTE

Refer to the hardware owner's manual for the plotter device at your installation before entering a line in the SPFORM.INI file for the plotter because there are many different types of plotters.

The form name in SPFORM.INI need not be the actual name of a physical form; however, it usually is close to the type of form (such as normal forms, narrow forms, and so forth). When a device request is made, SPROUT compares the form name associated with the request with the form name of the form currently mounted on the output device. If the first four characters of the name are not the same, then the system requests you to change the forms on the output device. If the first four characters are the same, then the system simply checks the switches associated with the requested form name and uses those values when processing the output job. The number of characters that the system uses to compare the form name can be changed by running GALGEN; the default is four characters.

For example, note the following SPFORM.INI file:

```
CDP NORMAL/HEADER/BANNER/TRAILER
CDP NORM01/HEADER/BANNER/TRAILER
CDP NORM02/HEADER/BANNER/TRAILER/NOTE:SPECIAL
```

Now, suppose that NORM01 forms are currently mounted on the card punch and a user makes a punch request that requires NORM02 forms. SPROUT compares the first four characters of the requested form name (NORM02) with the first four characters of the form name for the form that is currently mounted in the card punch (NORM02). Because they are the same, SPROUT takes the switch values associated with NORM01 and applies them to the user's punch request. Therefore, the SPFORM.INI

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file should have a unique name for each type of form.

Each line in SPFORM.INI can also contain a locator field that specifies the location of the output device. The locator ALL (the default) refers to all of the devices as specified by the device type. The locators LOCAL and REMOTE are applicable only if your installation has TOPS-20 network software.

6.10.3 Starting Output Devices

Once you have set the parameters for the particular output devices, you must start the device so that output requests can be processed on them. If you do not set any parameters for the device, the device uses the default parameters set by your system manager at GALGEN time.

You can start one output device at a time or a range of devices.

To stop the scheduling of jobs on an output device, use the SHUTDOWN command.

----- Example -----

Issue the START CARD-PUNCH command to start up card punch 0.

```
OPR>START CARD-PUNCH 0<RET>
OPR>
10:23:21      Card-punch 0  --Startup Scheduled--
OPR>
10:23:25      Card-punch 0  --Started--
OPR>
```

6.10.4 Stopping Output Devices

If you ever need or want to stop one or more output devices, use the STOP command. The STOP command temporarily stops an output device from processing its current job. You must use the CONTINUE command to resume the output to the device.

The STOP command has three optional arguments. They are:

1. AFTER CURRENT-REQUEST
2. AFTER EVERY-REQUEST
3. IMMEDIATELY

The IMMEDIATELY argument is the default for the STOP command. Refer to the TOPS-20 Operator's Command Language Reference Manual for a

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complete description of these commands.

----- Example -----

Stop the current job on card punch 0 temporarily to load more card forms and empty its hopper.

```
OPR>>STOP CARD-PUNCH 0<RET>
OPR>
18:24:09      Card-punch 0  --Stopped--
OPR>
```

6.10.5 Continuing Output Devices

You can give the CONTINUE command to continue processing an output device request that was temporarily stopped with the STOP command.

----- Example -----

After stopping the card punch to load more cards and empty the hopper, continue the output of the current punch job.

```
OPR>>CONTINUE CARD-PUNCH 0<RET>
OPR>
18:35:41      Card-punch 0  --Continued--
OPR>
```

6.10.6 Shutting Down Output Devices

If at any time you need to shutdown the scheduling of output requests on an output device or on a range of output devices, use the SHUTDOWN command. If an output request is currently being processed on the device, the request is completed before the output device is shutdown.

To start the scheduling of jobs on the output device, use the START command.

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----- Example -----

Shutdown paper-tape punch 0 while a request is still being output on it.

```
OPR>>SHUTDOWN PAPER-TAPE-PUNCH 0<RET>
OPR>
19:21:03      Paper-tape-punch 0  --Shutdown Scheduled--
OPR>
```

When the request on the paper-tape punch has completed its output, the following message appears:

```
OPR>
19:23:55      Paper-tape-punch 0  --Shutdown--
OPR>
```

6.10.7 Displaying Output Device Parameters

You can display the current output device parameters with the SHOW PARAMETERS device command, where device can be:

1. CARD-PUNCH unit-number
2. PAPER-TAPE-PUNCH unit-number
3. PLOTTER unit-number

If you do not specify a unit number with the device name, the SHOW command defaults to all units of the device that you specified.

The output from the SHOW PARAMETERS device command displays the following for each of the three devices listed above:

1. The unit number for the output device
2. The output limits for the output device
3. The type of forms for the output device
4. The priority range for the output device
5. The limit-exceeded-action for the output device
6. The character device type for the output device

In addition, the display shows the remote CFS-20 node name and the times that the remote node processed the command and the local node received the information, if you specified the /CLUSTER-NODE: switch.

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----- Example -----

Give the SHOW PARAMETERS PAPER-TAPE-PUNCH command to display the parameters of paper-tape punch 0 on the system.

```
OPR>SHOW PARAMETERS PAPER-TAPE-PUNCH<RET>
OPR>
13:09:42          -- System Device Parameters--

Papertape Parameters:
  Unit  Min:Max Unit   Form   Prio  Lim-Ex  Dev-Chars
-----
    0    1:500  NORMAL  1:63   Ask
OPR>
```

6.10.8 Displaying Output Device Status

You can display the status of an output device or a range of output devices with the SHOW STATUS device command. If you do not specify a unit number or a range of unit numbers, the command displays information for all of the specified devices on the system.

The output from the SHOW STATUS device command displays the following for each device:

1. The unit number of the output device
2. The current status of the output device
3. The job name currently active on the output device
4. The request-id number of the job
5. The name of the user who made the output request

If the output device is not active, the word "Idle" appears in the Status column with no jobname, request-id, or user name. If none of the devices are active, only the unit number and status appears in the display.

If an output device is active, the output also shows the time that the output request started and the number of output cards or units thus far. If you do not need this information with the display of the SHOW STATUS device command, specify the /SHORT switch before you press RETURN to confirm the command.

If you specified the /CLUSTER-NODE: switch, the display also includes the remote CFS-20 node name and the times that the remote node processed the command and the local system received the information.

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----- Example -----

Give the SHOW STATUS CARD-PUNCH command to display the current status of card punch 0 on the system.

```
OPR>SHOW STATUS CARD-PUNCH 0<RET>
OPR>
13:51:39          -- System Device Status --

Card-Punch Status:
  Unit   Status   Jobname  Req#   User
-----
    0  Active   PUNCH9   137  HEISER
      Started at 13:35:23, punched 687 of 2000 cards
OPR>
```

6.11 CONTROLLING JOBS ON OUTPUT DEVICES

The following are the OPR commands that allow you to control output device jobs that a user queues either with the processing of a batch job or with the TOPS-20 PUNCH or PLOT command:

1. SHOW QUEUES device-JOBS
2. HOLD device-JOBS
3. RELEASE device-JOBS
4. ABORT (Current Job on) device
5. REQUEUE (Current Job on) device
6. MODIFY device-REQUEST
7. CANCEL device-REQUEST

Where "device" can be CARD-PUNCH, PAPER-TAPE-PUNCH, or PLOTTER.

The following sub-sections describe how to use each of these commands to control output device jobs. You can use the /CLUSTER-NODE: switch with each command to control output device jobs on specified nodes in a CFS-20 cluster.

6.11.1 Examining Output Device Jobs in the Queues

Whenever a user issues a request to an output device job, the request is placed in a queue where it waits for selection by the system for processing. To examine the queues for output device requests, give

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the OPR command SHOW QUEUES device-JOBS.

The output of the SHOW QUEUES device-JOBS command displays:

1. The name of the output job
2. The request-id number of the output job
3. The output limit of the job
4. The name of the user who requested the output job

These four columns of the display appear whether the output job is currently being processed (active) or is not being processed (inactive).

In addition to the above, if the output is active on the device, the display shows the device unit number on which the job is to be processed, the time that the output started, and the total number of cards or units processed.

If you specified the /CLUSTER-NODE: switch, the display also includes the remote CFS-20 node name and the times that the remote node processed the command and the local received the information.

The SHOW QUEUES device-JOBS command has five optional switches:

1. /NODE:name displays the device queue of a remote system.
2. /ALL adds to the display the switches that the user specified with the PUNCH or PLOT command. If no switches were specified, the /ALL switch displays the default switches. In addition, the /ALL switch displays any switches that you specified, for example, /HOLD.
3. /SHORT displays only the job name, the request number, the scheduled run time, and the user name.
4. /USER:name displays only the device jobs of a specified user.
5. /CLUSTER-NODE:name displays device queue information from the specified remote CFS-20 system. If * is specified, the output queues of all nodes in the cluster are displayed.

----- Hint -----

The asterisk (*) before the job name column (see examples) indicates that the job is currently being processed.

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----- Examples -----

1. Give the SHOW QUEUES PLOTTER-JOBS command with the /ALL switch to display the plotter jobs in the queue with all their switches.

```
OPR>SHOW QUEUES PLOTTER-JOBS /ALL<RET>
OPR>
10:49:07          -- System Queues Listing --
```

```
Plotter Queue:
Job Name  Req#  Limit          User
-----  ---  ----  -----
* GRAPH   17   100 OPERATOR
  On Unit:0 /Seq#:3320
  Started at 10:47, plotted 25 of 100 units
  MF20    19   200 P.TAYLOR
  /Unit:0 /Seq#:3341
  MF21    27   590 P.TAYLOR
  /Unit:0 /Seq#:3349
  MF22    31   300 P.TAYLOR
  /Unit:0 /Seq#:3355
```

There are 4 jobs in the Queue (1 in Progress)

OPR>

2. Give the SHOW QUEUES PLOTTER-JOBS command with the /SHORT switch.

```
OPR>SHOW QUEUES PLOTTER-JOBS /SHORT<RET>
OPR>
10:49:07          -- System Queues Listing --
```

```
Plotter Queue:
* GRAPH   17   100 OPERATOR
  MF20    19   200 P.TAYLOR
  MF21    27   590 P.TAYLOR
  MF22    31   300 P.TAYLOR
```

OPR>

6.11.2 Holding Output Device Jobs

Whenever you need to prevent output jobs from being processed, give the HOLD device-JOBS command, where device can be CARD-PUNCH, PAPER-TAPE-PUNCH, or PLOTTER. When you give this command, current jobs in the queue are held. Any output jobs queued after the HOLD command has been issued are not held and are processed when the device becomes available. You must specify one of the following with this

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command:

1. The request-id number, which holds a single output job
2. The user name, which holds all output jobs queued by that user
3. An asterisk (*), which holds all output jobs queued by all users

----- Hints -----

You cannot HOLD an output job that is currently active on an output device.

----- Example -----

Give the HOLD CARD-PUNCH-JOBS command to hold all card punch requests for user BROWN.

```
OPR>HOLD CARD-PUNCH-JOBS BROWN<RET>
OPR>
9:01:54      --3 Jobs Held--
OPR>
```

6.11.3 Releasing Output Device Jobs

You can give the RELEASE command to release an output job that has been previously held with the HOLD command. You can specify a single request-id number, the user name for all jobs by that user, or an asterisk (*) for all output jobs in the system. The RELEASE command reschedules the job(s) to be processed.

----- Hint -----

You must have one or more output devices started or in the idle state to get an output job processed.

----- Example -----

Give the RELEASE command to reschedule all output jobs that were previously held.

```
OPR>RELEASE CARD-PUNCH-JOBS *<RET>
OPR>
10:38:09     --3 Jobs Released--
OPR>
```

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6.11.4 Canceling Output Device Jobs

At various times, you might have to cancel an output job while it is processing on a device. You can give the ABORT command with the output unit number and one or more of the following switches:

1. /REQUEST-ID:
2. /PURGE
3. /REASON:

The /REQUEST-ID: switch uniquely identifies the job to be canceled.

The /PURGE switch flushes the entire job from the system when it is canceled. There are no header, banner, or trailer pages printed when the output request is purged.

The /REASON: switch allows you to enter one or more lines of text to explain why the output job was canceled.

----- Example -----

Give the ABORT command to cancel an output job because a user had requested that you do so.

```
OPR>ABORT PLOTTER 0 /REASON:USER REQUEST<RET>
OPR>
11:40:09      PLOTTER 0  --ABORTING--
                JOB TEST01 Req #35 for JONES
                REASON:USER REQUEST
OPR>
11:40:21      Plotter 0  --End--
                Job TEST01 Req #35 for JONES
OPR>
```

6.11.5 Requeuing Output Device Jobs

At various times, you might want to cancel an output job currently being processed and at the same time, reschedule the same job to be processed at a later time. You can give the REQUEUE command to HOLD the output job in its entirety and ABORT its current output.

For example, you might want to REQUEUE an output job that requires more forms (cards, paper tape, or plotter paper) than what is currently available at your site. Thus, you REQUEUE the job in its entirety for output to be processed when the forms become available.

You can specify the /REASON: switch to explain why the job is being requeued.

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----- Example -----

Give the REQUEUE command to hold and cancel an output job that requires four hours to punch.

```
OPR><u>REQUEUE CARD-PUNCH 0 /REASON:<RET></u>
Enter text and terminate with ^Z
JOB REQUIRES FOUR HOURS TO PUNCH.<RET>
JOB WILL BE RELEASED FOR PUNCH ON 2ND SHIFT. <CTRL/Z>
OPR>
13:21:03      CARD-PUNCH 0  --REQUEUED--
              JOB ARFORM Req #47 for AR.OFFICE
              Reason:JOB REQUIRES FOUR HOURS TO PUNCH.
              JOB WILL BE RELEASED FOR PUNCH ON 2ND SHIFT.^Z

OPR>
13:21:25      Card-punch 0  --End--
              Job ARFORM Req #47 for AR.OFFICE

OPR>
```

6.11.6 Modifying Output Device Requests

Whenever you need to change the priority of an output job request in the queue, give the MODIFY device-REQUEST command, where device can be CARD-PUNCH, PAPER-TAPE-PUNCH, or PLOTTER. You can specify a single output request-id number, the user name for all requests by that user, or an asterisk (*) for all output requests in the queue.

You must specify a new PRIORITY number from 1 to 63. The higher the number, the greater the priority.

----- Example -----

Give the MODIFY command to change the priority of batch request 135 to have a priority of 63. This causes the request to be the next job processed.

```
OPR><u>MODIFY PAPER-TAPE-PUNCH 135 PRIORITY 63<RET></u>
OPR>
8:51:21      --1 Job Modified--

OPR>
```

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6.11.7 Deleting Output Device Requests

Whenever you need to delete an output request from the output queue, give the CANCEL device-REQUEST command, where device can be CARD-PUNCH, PAPER-TAPE-PUNCH, or PLOTTER. You can specify a single request-id number, the user name for all jobs by that user, or an asterisk (*) for all output requests in the system.

If you CANCEL an output request that is active on an output unit, the output job is immediately deleted from the output unit.

----- Example -----

Give the CANCEL command to cancel output request 186 from the card punch output queue.

```
OPR><u>CANCEL CARD-PUNCH 186<RET></u>
OPR>
10:25:11      --1 Job Canceled--

OPR>
```

6.11.8 Scheduling the Next Output Device Request

You can force an output queue to schedule a particular request to be processed immediately by using the NEXT command with BATCH-STREAM, CARD-PUNCH, PAPER-TAPE-PUNCH, PLOTTER or PRINTER as the keyword. This command starts the job immediately after the current request is finished. The NEXT command does not alter the sequence of other requests in the queue.

----- Example -----

Give the NEXT command to make request 230 the next job to be printed on printer 0.

```
OPR><u>NEXT PRINTER 0 REQUEST-ID 230</u>
OPR>
8:53:37      Printer 0  -- NEXT request #230 scheduled --

OPR>
```

CHAPTER 7

UNSCHEDULED SOFTWARE TASKS

This chapter describes various tasks that you can perform when requested or needed. Therefore, these tasks are considered as unscheduled software tasks. If any of these tasks are performed on a regular basis at your installation, decide upon a schedule for them with your system manager.

Note that you can use the /CLUSTER-NODE: switch with the commands described in this chapter to affect jobs on specified nodes in a CFS-20 cluster.

7.1 CONTROLLING THE SCHEDULER

As the operator of the TOPS-20 operating system, you may be instructed by your system manager to change the scheduling scheme that your system is currently using. The following sub-sections describe the ways of temporarily changing the various scheduling schemes.

7.1.1 Changing Class Scheduling

If your system is using class scheduling, you may override whatever has been set in the n-CONFIG.COMD file for a specific class by giving the following OPR command:

```
OPR>SET SCHEDULER CLASS n nn<RET>
```

The first argument specifies the class number and the second argument specifies the percentage of CPU time given to that class. The percentage of CPU time allocated cannot exceed 100%. Whatever percentage of CPU time is not allocated becomes part of the system windfall. (Refer to the TOPS-20 System Manager's Guide for more information on class scheduling.)

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7.1.1.1 Changing a Job's Scheduling Class - If your system has class scheduling controlled by a policy program, you may change a job's scheduling class by giving the following OPR command:

```
OPR>SET JOB n SCHEDULER-CLASS y<RET>
```

The first argument specifies the job number and the second argument specifies the class you want the job to run in. When you issue this command, it temporarily places the job in the specified class.

----- Example -----

Change job 24 to run in scheduler class 3.

```
OPR>SET JOB 24 SCHEDULER-CLASS 3<RET>
```

7.1.2 Changing Batch-Class Scheduling

If your system manager has specified a special class for all batch jobs, you may change the class number or the percentage of CPU time allocated in the n-CONFIG.COMD file by giving the following OPR command:

```
OPR>SET SCHEDULER BATCH-CLASS n<RET>
```

The argument can be either a class number, the word BACKGROUND, or the word NONE. If you enter a class number, the percentage of CPU time specified in the n-CONFIG.COMD file for that class will be given to batch jobs. For example, if you change the batch class to a class that has been set up with 50% of the CPU time, then batch jobs for that class receive 50% of the CPU time. If this is the case and you do not want batch jobs to have that percentage of CPU time, you should first give the SET SCHEDULER CLASS command to change the percentage of CPU time for that class, and then give the SET SCHEDULER BATCH-CLASS command.

You can change the percentage of CPU time for the batch-class specified in the n-CONFIG.COMD file by giving the BACKGROUND or NONE argument. When you give the BACKGROUND argument, batch jobs for that class receive the percentage of CPU time that has not been allocated to the other classes. When you give the NONE argument, batch jobs for that class receive no CPU time. (Refer to the TOPS-20 System Manager's Guide for more information on batch class scheduling.)

If you are not using the class scheduler, the BACKGROUND argument causes batch jobs to run in the lowest priority queue.

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7.1.3 Changing Bias-Control Scheduling

If your system is using bias-control scheduling, you may override whatever has been set in the n-CONFIG.CMD file by giving the following OPR command:

```
OPR>SET SCHEDULER BIAS-CONTROL n<RET>
```

The argument is a integer from 1 to 20. To allocate higher priority to interactive jobs, you would set n in a range between 1 to 10, with 1 being the highest priority. To allocate higher priority to compute-bound jobs, you would set n to be in a range between 11 to 20, with 20 being the highest priority.

NOTE

Remember these commands only temporarily change the scheduling scheme. If the system has to be restarted for any reason, the scheduling scheme reverts to what has been set up in the n-CONFIG.CMD file.

7.1.4 Displaying Scheduler Status

At any time, you can display the status of the scheduler by giving the following OPR command:

```
OPR>SHOW SCHEDULER<RET>
```

When you issue this command the system prints the following information:

- o The class scheduling status
- o The bias-control setting
- o The batch class
- o The class number
- o The percentage of CPU time allocated to each class
- o The percentage of CPU time being used by each class
- o The load averages for each class
- o The windfall allocation status
- o The accounting mechanism (by accounts or by the policy program)

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The display also includes the name of the remote CFS-20 node and the times that the remote node processed the command and the local system received the information, if you specified the /CLUSTER-NODE: switch.

Refer to the TOPS-20 System Manager's Guide for more information on scheduling.

The SHOW SCHEDULER command has one optional switch:

1. /CLUSTER-NODE:name displays scheduler information from the specified CFS-20 system. If * is specified, the scheduler information from all nodes in the cluster are displayed.

----- Example -----

```
OPR>SHOW SCHEDULER<RET>
```

```
OPR>
```

```
11:29:00
```

```
-- System Scheduler Information --
```

```
Class Scheduler: On          Bias Control: 11
                             Batch Class: 1
```

```
-----Load Averages-----
```

CLASS	SHARE(%)	USE(%)	1-MIN	5-MIN	15-MIN
0	80	73	5.19	4.31	4.07
1	15	27	9.80	5.23	3.29
2	5	0	0.00	0.00	0.00

```
Windfall: Allocated          Classes by Account
```

```
OPR>
```

7.2 SETTING DEVICES ON-LINE

If you have a DX20 channel controller installed and on-line at your installation, you can bring one of the devices listed below on-line with OPR after the device has been newly installed at your site. This function allows the system to accept the hardware address of a device that is not known to the monitor but is available for use. You do not need to reload the TOPS-20 monitor.

The devices that are interfaced through the DX20 are:

1. TX02 - tape controller
2. TX03 - channel selector

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3. TX05 - tape drive selector
4. TU70 - tape drive
5. TU71 - tape drive
6. TU72 - tape drive
7. RP20 - disk drive

In addition, when your DIGITAL Field Service Representative takes one of these devices off-line for repair of a hardware problem and then returns the device back to you for your control, you can give the OPR command:

```
SET ONLINE channel,unit,controller number<RET>
```

to cause the system to recognize the device as on-line and ready for use by the system. The address (ch,unit,cntrlr) separated by commas is:

1. Channel number (ch)
2. Device unit number (unit)
3. Controller number (cntrlr)

The controller number can be omitted if the device is interfaced directly to the channel bus.

----- Hint -----

If the TOPS-20 monitor is reloaded, such as after a system crash, you do not need to set the device on-line again. The device is automatically recognized by the monitor as being on-line.

----- Examples -----

1. Set the TX02 hardware device on-line after it has been installed during timesharing. Specify the argument of channel 1, unit 1, controller 1.

```
OPR>SET ONLINE 1,1,1<RET>
OPR>
8:32:13      --Set Online Accepted--
OPR>
```

2. Set the hardware device on-line after your DIGITAL Field Service Representative has repaired the tape unit.

```
OPR>SET ONLINE 1,2,1<RET>
OPR>
```

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```
14:43:09      --Set Online Accepted--
OPR>
```

7.3 CONTROLLING THE ORION LOG BUFFER FILE

ORION maintains a log of all messages sent through it. ORION timestamps and identifies the type of message and provides any additional information available. This function of ORION is referred to as a Centralized Logging Facility.

The ORION log buffer file contains all OPR-to-ORION commands and transactions performed at the operator's console. The OPR commands that control this logging facility are:

1. ENABLE LOGGING
2. DISABLE LOGGING
3. CLOSE LOG

The Centralized Logging Facility is on by default at system startup, but can be disabled by placing the DISABLE LOGGING command in the SYSTEM.CMD file or by giving this command at OPR command level.

To enable the Centralized Logging Facility again, give the ENABLE LOGGING command at OPR command level or place this command in the SYSTEM.CMD file.

The CLOSE LOG command closes the current log buffer file and automatically creates a new log buffer file. When the CLOSE LOG command is issued, the commands and transactions recorded in the log buffer file are copied to the ORION-SYSTEM.LOG file and the buffer file is cleared. You can then print the ORION-SYSTEM.LOG file on the line printer to obtain a hard copy of all the operating processes for a given period.

The name of the log file is determined by your system manager at GALGEN time. (Refer to the TOPS-20 Software Installation Guide for the GALGEN procedures.) The default name is ORION-SYSTEM-LOG.mnn.

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----- Examples -----

1. Disable the logging facility for a period of time when the system is operating stand-alone.

```
OPR>DISABLE LOGGING<RET>
OPR>
8:52:12      --ORION Logging Disabled by JOB 6 OPERATOR
              at terminal 14--
OPR>
```

2. Close the current log buffer file and automatically create a new log buffer file.

```
OPR>CLOSE LOG<RET>
OPR>
```

7.4 INITIALIZING TAPES

At various times, you are asked to initialize and/or re-initialize a magnetic tape. When you initialize a tape, the system writes specific information on the tape pertaining to the identification of the tape. When you initialize a tape specifying a TOPS-20, ANSI, or EBCDIC standard label, the system writes the following information on the tape:

1. A standard volume label that contains the volume identification (volid) of the tape.
2. Standard header and trailer labels. Later, when a file is written on the tape, these labels contain specific information pertaining to the file.

When you initialize a tape as unlabeled, the system writes a record of 80 null characters followed by two tapemarks on the tape. This prevents the tape from running off the end of the reel when MOUNTR inspects it for a volume label.

To initialize one or more tapes, give the following OPR command:

```
OPR>SET TAPE-DRIVE MTAN: INITIALIZE /switch:./switch:./...<RET>
```

where "n" is the unit number of the tape drive.

The following table describes the valid switches for the SET INITIALIZE command:

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Table 7-1: SET INITIALIZE Switches

Switch	Meaning
/COUNT:nn	specifies the number (nn) of tapes to be initialized. This switch allows you to initialize multiple tapes with the same attributes. Every time you initialize a tape, the system asks you to type a volume identifier unless the tape has only numeric characters, with no leading zeroes, in the VOLUME-ID. If it has only numeric characters, then the next label is equal to the present volume-ID plus the value of the /INCREMENT switch. When the initialization process is complete, the system unloads the tape from the drive. When the specified number of tapes have been initialized, you can use the tape drive to satisfy user mount requests.
/DENSITY:nnnn	specifies the density of the tape(s) being initialized. The "nnnn" can be 200, 556, 800, 1600, or 6250. If you do not give this switch, the system uses 1600 bits/in as the default.
/INCREMENT:nn	specifies the numeric value (nn) that is used to increment the volume identifiers. This switch is valid only when specified with the /VOLUME-ID switch. If you do not give this switch, the system uses 1 as the default.
/LABEL-TYPE:type	specifies the type of standard volume label to be written on the tape. The "type" can be TOPS-20, ANSI, EBCDIC, or UNLABELED. If you do not specify a label type, the system uses TOPS-20 as the default.

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`/OVERRIDE-EXPIRATION:(YES or NO)` specifies whether to ignore the expiration date of the data on the tape. If you specify NO, the system does not allow you to initialize a tape whose expiration date has not yet expired. (The expiration date of the tape is defined as the expiration date of the first file on the tape.) If you specify YES, the system initializes the tape even if the expiration date has not been reached. When you are initializing new tapes, you should always specify YES to prevent the tape from running away. If you do not give this switch, the system uses NO as the default.

`/OWNER:name` specifies the name of the owner of the tape(s) being initialized. This switch is valid only if the label type is TOPS-20. If you do not give this switch, the tape is initialized as a scratch tape.

`/PROTECTION:nnnnnn` specifies a six-digit octal number as the protection code of the tape. The number (nnnnnn) can be from 000000 (no one except the owner can use the tape) through 777777 (anyone can use the tape). This switch is valid only if the label type is TOPS-20. If you do not give this switch, the system uses the protection code of 777777 as the default.

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`/TAPE-DISPOSITION:condition` specifies what is to be done with the tape after it has been initialized. The "condition" can be either HOLD or UNLOAD. If you specify HOLD, the tape remains mounted on the drive after it has been initialized. If you specify UNLOAD, the tape is unloaded from the drive after it has been initialized. If you give the `/COUNT:` switch with a value greater than 1, the `/TAPE-DISPOSITION` is ignored and UNLOAD is assumed. If this switch is not given, the system uses UNLOAD as the default.

`/VOLUME-ID:volid` specifies the volume identifier for the tape. The volid can be from 1 to 6 characters. If the volid contains non-alphanumeric characters, you must enclose the volid in double quotes ("").

When you use a tape drive for initializing tapes, the tape drive is not available for user mount requests. When the initialization process is completed, the tape drive automatically becomes available for user mount requests. To force a tape drive out of initialize mode prematurely, refer to Section 7.5.7.

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----- Examples -----

1. A user (J.JONES) has requested a tape mount of an ANSI tape with a valid of FOOBAR and has requested that you initialize the tape first. The volume is initialized with ANSI labels and a valid of FOOBAR. The system default for density (1600 BPI) is used. When the tape is mounted on the drive, the tape is initialized and the drive becomes available to the user (/TAPE-DISPOSITION:HOLD). Automatic Volume Recognition (AVR - See Section 7.5.2) takes over and satisfies the mount request for FOOBAR.

```

OPR>
12:11:34 --Tape Mount Request # 31--
Mount ANSI volume FOOBAR, 9-track, 1600 BPI, WRITE-ENABLED
      User J.JONES, Job 39, Terminal 13
      User remarks: PLEASE INITIALIZE TAPE FIRST
OPR>SET TAPE-DRIVE MTA3: INITIALIZE /LABEL-TYPE:ANSI-<RET>
/TAPE-DISPOSITION:HOLD/VOLUME-ID:FOOBAR<RET>
OPR>
12:12:01 --Mount Tape To Be Initialized--
      Mount tape volume FOOBAR for initialization on MTA3:
OPR>
When the initializing is completed, the system issues the
following message:

12:13:14 --MTA3: Volume FOOBAR Initialized--
      Label Type: ANSI          Density:          1600
OPR>
12:13:19 --INITIALIZE Completed--
      MTA3: available for user tape requests
OPR>
12:13:30 --MTA3: Volume FOOBAR, ANSI labeled tape mounted--
OPR>
12:13:33 --Tape Drive Given To Request 31--
      MTA3: Volume FOOBAR now in use by
      User J.JONES, Job 39, Terminal 13
OPR>

```

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2. You initialize multiple tapes on the same drive with numeric volume identifications. This sets up the drive MTA0: to initialize all tapes mounted on it with volume-ids starting at 100000 and incremented by one for each tape mounted. As each tape is mounted, you are informed of the volume information.

```

OPR>SET TAPE-DRIVE MTA0: INITIALIZE /COUNT:10-<RET>
/OWNER:OPERATOR/VOLUME-ID:100000<RET>
OPR>
13:20:05 --Mount Tape To Be Initialized--
      Mount tape volume 100000 for initialization on MTA0:
OPR>
13:21:10 --MTA0: Volume 100000 Initialized--
      Label type: TOPS-20 Density: 1600
      Owner: OPERATOR Protection: 777777
OPR>
13:21:35 --Mount Tape To Be Initialized--
      Mount tape volume 100001 for initialization on MTA0:
OPR>
13:23:01 --MTA0: Volume 100001 Initialized--
      Label type: TOPS-20 Density: 1600
      Owner: OPERATOR Protection: 777777
OPR>
.
.
.
13:40:23 --MTA0: Volume 100009 Initialized--
      Label Type: TOPS-20 Density:          1600
      Owner: OPERATOR          Protection:    777777
OPR>
After you initialized the number of tapes, release the tape
drive so that it can be used for user MOUNT requests.

OPR>SET TAPE-DRIVE MTA0 AVAILABLE<RET>
OPR>
13:47:37 --INITIALIZE Complete--
      MTA0: available for user tape requests
OPR>

```

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3. You initialize two tapes with non-numeric labels.

```
OPR>SET TAPE-DRIVE MTAl: INITIALIZE //COUNT:2/DENSITY:800-<RET>
/LABEL-TYPE:ANSI/PROTECTION:770077/VOLUME-ID:PAYMAS<RET>
OPR>
15:07:47 --Mount Tape To Be Initialized--
          Mount tape volume PAYMAS for initialization on MTAl:
OPR>
15:09:43 --MTAl: Volume PAYMAS Initialized--
          Label type:ANSI          Density: 800
OPR>
15:10:12 <18> --Key In Volume Identifier--
          What is the volume-id of the next tape to be
          initialized on drive MTAl:
          RESPOND n valid
OPR>RESPOND 18 PAYMA1<RET>
OPR>
15:10:56 --Mount Tape To Be Initialized--
          Mount Tape volume PAYMA1 for initialization on MTAl:
OPR>
15:13:34 --MTAl: Volume PAYMA1 Initialized--
          Label type: ANSI          Density: 800
OPR>
15:14:27 --INITIALIZE Complete--
          MTAl: available for user tape requests
OPR>
```

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7.5 HANDLING USER MOUNT REQUESTS

There are two types of tapes you may be requested to mount: labeled tapes and unlabeled tapes. The differences in handling the two types of tape requests are explained in the following sections. If your system has tape drive allocation enabled, the user must issue a MOUNT command to request that a tape be mounted. When the system receives this request, OPR prints the following message:

```
hh:mm:ss          -- TAPE MOUNT REQUEST#nn--
MOUNTlabel-typeVOLUMEvalid,n-track,nnnnBPI,mode
USER:username,JOBnn,TERMINALnn
VOLUMES IN SET setname:valid1,valid2,...
USER REMARK: text
```

where:

hh:mm:ss	specifies the time the operator received the message.
REQUEST#nn	specifies the request number assigned to the mount request.
label-type	specifies the type of label, either TOPS-20,ANSI,EBCDIC, or UNLABELED.
VOLUME valid	specifies the internal and/or external name of the tape.
n-track	specifies the channel structure of the tape, i.e., 9-track.
nnnnBPI	specifies the density at which the data was recorded on the tape. The valid densities are 200,556,800,1600, and 6250. If the user does not specify a density, the system uses 1600 as the default.
mode	specifies whether the tape is write-enabled or read-only.
username	specifies the name of the user who issued the MOUNT command.
JOBnn	specifies the job number the user was assigned when he logged onto the system.
TERMINALnn	specifies the line number of the terminal from which the user issued the MOUNT request.

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setname:valid1, specifies the name the user assigned to a multi-volume tape set and the volume identifiers for each tape in the set. This information appears only if the user has requested that a multi-volume tape set be mounted.

USER'S REMARK:text specifies any remarks the user gave with the MOUNT command. This information appears only if the user gave a remark with the MOUNT command.

If tape drive allocation is not enabled, the user issues an ASSIGN command to assign a tape drive to his job. In this case, you do not receive a mount request message on the terminal running OPR.

7.5.1 Displaying Tape Drive Status

If you need to find out the status of one or all of the tape drives on the local system or on a remote CFS-20 system, give the following OPR command:

OPR>SHOW STATUS TAPE-DRIVE MTAn: or /switch<RET>

The switches for this command are:

Switch	Meaning
/ALL	displays the status of all the tape drives on the system. This switch causes the system to print the following information: <ul style="list-style-type: none"> o The unit number of the tape drive (MTAn:) o The current state of the tape drive (In Use, Loaded, or Unloaded) o The valid of the tape on the drive o The request number assigned to the request o The job number assigned to the user o The name of the user who has the tape mounted o The status of AVR on the drive (Yes=enabled or No=disabled)

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- o The mode of the tape (WRITE-ENABLED or read-only)
- o The label-type of the tape (TOPS-20, ANSI, EBCDIC, or Unlabeled)
- o The density at which the data was written on the tape

/FREE displays the tape drives that are available to you for mounting tapes. This switch displays, for all available drives, the same information as the /ALL switch. In addition, you are told if the tape is a scratch tape.

/CHARACTERISTICS displays the following information:

- o The physical unit number of the tape, for example, MTA0:
- o The type of drive (9-track or 7-track)
- o The densities the drive supports

/CLUSTER-NODE:name displays tape-drive information for the specified remote CFS-20 system. If * is specified, the tape-drive information for all nodes in the cluster is displayed.

If you do not give a physical device or one the above switches, the display you see is similar to the following:

```
OPR>
10:19:51      --Tape Drive Status--
DRIVE  STATE  VOLID  REQ#  JOB#  USER
-----  -----  -----  -----  -----  -----
MTA0:   In Use  DIST   145   8     LATTA
MTA1:   In Use  DBL01  148   8     LATTA
MTA3:   In Use  KEVINM 164   56    MCELMOYLE
MTA4:   Unloaded
MTA5:   Unloaded
```

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----- Examples -----

1. Give the SHOW STATUS TAPE-DRIVE command for tape drive MTA0:.

```
OPR>SHOW STATUS TAPE-DRIVE MTA0:<RET>
OPR>
12:26:45 --Tape Drive Status--
DRIVE STATE VOLID REQ# JOB# USER
-----
MTA0: In Use RICK2 212 56 R.ACE
```

This example illustrates that drive MTA0: is being used by user R.ACE. If the STATE of the drive had been "Loaded", it would mean that there is a tape on the drive, but that the tape was not being used at the time. If this were the case, there would not be a number under the heading REQ#. If the STATE of the drive had been "Unloaded", it would mean there is no tape on the drive and the drive could be used to mount a tape.

2. Give the SHOW STATUS TAPE DRIVE command with the /ALL switch.

```
OPR>SHOW STATUS TAPE-DRIVE/ALL<RET>
OPR>
11:20:02 --Tape Drive Status--
DRIVE STATE VOLID REQ# JOB# USER
-----
MTA0: Unloaded
AVR: Yes
MTA1: In Use A 100 10 R.ACE
AVR: YES, WRITE: YES, TOPS-20 labels, 1600 BPI
MTA2: Unloaded
AVR: Yes
MTA3: Unloaded
AVR: Yes
MTA4: Unloaded
AVR: No
MTA5: Loaded
AVR: Yes, Write: Yes, Unlabeled
OPR>
```

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3. Give the SHOW STATUS TAPE DRIVE command with the /FREE switch.

```
OPR>SHOW STATUS TAPE-DRIVE /FREE<RET>
OPR>
11:18:56 --Tape Drive Status--
DRIVE STATE AVR WRITE VOLID SCR LBL TYPE DENSITY
-----
MTA0: Unloaded Yes
MTA2: Unloaded Yes
MTA3: Unloaded Yes
MTA4: Unloaded No
MTA5: Loaded Yes Yes No Unlabeled
OPR>
```

4. Give the SHOW STATUS TAPE DRIVE command with the /CHARACTERISTICS switch.

```
OPR>SHOW STATUS TAPE-DRIVE /CHARACTERISTICS<RET>
OPR>
11:20:39 --Tape Drive Status--
DRIVE TYPE SUPPORTED DENSITIES
-----
MTA0: 9-TRACK 800, 1600
MTA1: 9-TRACK 800, 1600
MTA2: 9-TRACK 1600, 6250
MTA3: 9-TRACK 1600, 6250
MTA4: 7-TRACK 200, 556, 800
MTA5: 9-TRACK 800, 1600
OPR>
```

7.5.2 Controlling Automatic Volume Recognition (AVR)

Automatic Volume Recognition (referred to as AVR) allows you to mount a labeled tape without telling the system the volume identification of the tape. When you mount a labeled tape on a drive that has AVR enabled, the system automatically reads the volume identifier from the volume label when the tape drive is brought on-line.

If tape drive allocation is being used on your system, then it is likely that AVR has been enabled in the n-CONFIG.CMD file. If, for some reason, you need to disable AVR for one or all tape drives, give the following OPR command:

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```
OPR>DISABLE AUTOMATIC-VOLUME-RECOGNITION argument<RET>
```

where the argument can be:

```
MTAn: (for a specific tape drive)
or
TAPE-DRIVES (for all tape drives)
```

One reason for disabling AVR on a tape drive is to avoid runaway tapes when you are initializing tapes. When you disable AVR, OPR does not print any message confirming that AVR has been disabled. To check the status of the tape drive, give the OPR command SHOW STATUS TAPE-DRIVE /ALL.

You can enable AVR for one or more of the tape drives on your system by giving the following OPR command:

```
OPR>ENABLE AUTOMATIC-VOLUME-RECOGNITION argument<RET>
```

----- Restriction -----

You cannot ENABLE or DISABLE AVR for 7-track tape drives. If you attempt to do so, the system will ignore the command. All tapes mounted on 7-track tape drives are regarded as unlabeled tapes.

----- Example -----

Disable AVR for tape drive 0.

```
OPR>DISABLE AUTOMATIC-VOLUME-RECOGNITION MTA0:<RET>
```

7.5.3 Mounting Labeled Tapes with AVR Enabled

When a user issues a MOUNT command for a labeled tape, you receive a message similar to the following:

```
OPR>
10:15:43      --Tape Mount Request # 12--
              Mount Volume 001234, Read-Only
              User HOVSEPIAN, Job 25,Terminal 2
```

If the user has not already given you the tape, the first thing you must do is physically locate the tape he requested. When you locate the tape, mount the tape on a drive that supports the density the user requested in the MOUNT command. When the tape is brought on-line, the system automatically reads the label and prints a message similar to the following on your terminal:

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```
OPR>
10:15:43      --MTA0: Volume 001234 TOPS-20 labeled tape mounted--
OPR>
10:15:45      --MTA0: Given To Request 12--
              Volume 001234 now in use by
              User HOVSEPIAN, Job 25, Terminal 2
```

When the user finishes using the tape drive, he issues a DISMOUNT TAPE command to release the tape drive. When he gives this command, the system prints a message similar to the following on your terminal:

```
OPR>
11:20:33      --Tape Drive Released by USER--
              MTA0: Volume 001234 being Unloaded
OPR>
```

If a tape has been mounted for a long period without being used, it is possible that the user forgot to give the DISMOUNT TAPE command to release the tape drive. If this is the case, check with the user to see if he is finished using the tape. If he is, give the OPR command DISMOUNT TAPE. When you give this command, the system prints a message similar to the following on your terminal:

```
OPR>
11:45:20      --MTA0: Unloaded--
```

NOTE

Tape handling error messages are explained in Section 9.4.7.

7.5.4 Mounting Labeled Tapes With AVR Disabled

When a user issues a MOUNT command, you see the same mount request as explained in the previous section. However, because AVR is disabled, the system does not automatically read the label. Therefore, you must give the OPR command IDENTIFY to inform the system of the label information.

For example, a user requests a labeled tape whose valid is 112233 to be mounted on a tape drive. You mount the tape on a tape drive that has AVR disabled, for example, MTA0:. After you bring the tape on-line, give the following command:

```
OPR>IDENTIFY MTA0: VOLUME-ID 112233<RET>
```

The above command tells the system that a labeled tape with the valid of 112233 is mounted on tape drive MTA0:.

If the user requests that a labeled tape be mounted as a scratch tape, give the following command:

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```
OPR>IDENTIFY MTA0: SCRATCH<RET>
```

NOTE

When a user requests that a labeled tape be mounted as a scratch tape, the valid in the mount request is replaced by the word SCRATCH.

7.5.5 Mounting Unlabeled Tapes

When a user requests that an unlabeled tape be mounted on a tape drive, the mount request you see is the same as the ones in the previous sections with the exception that the "label-type" is shown as unlabeled. To inform the system that you are mounting an unlabeled tape, use the OPR command IDENTIFY.

After you have physically located the tape and mounted it on a free tape drive, give the IDENTIFY command to have the system associate the tape with the mount request.

For example, a user requests that an unlabeled tape be mounted with a valid of TEST01. When the mount request is processed, the system prints the following message on your terminal:

```
OPR>
10:20:10      --Tape Mount Request #12--
              Mount Unlabeled Volume TEST01
              User Hovsepian, Job 21, Terminal 7
OPR>
```

When you receive this request, locate and mount the tape on an available tape drive and then give the following command.

```
OPR>IDENTIFY MTAn: VOLUME-ID TEST01<RET>
```

where "n" is the unit number of the tape drive.

You can also satisfy the mount request by giving the IDENTIFY command with the request number in place of the valid. Using the above mount request, give the following command:

```
OPR>IDENTIFY MTAn: REQUEST-ID 12<RET>
```

If the user requests that an unlabeled scratch tape be mounted, give the following command:

```
OPR>IDENTIFY MTAn: SCRATCH<RET>
```

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----- Example -----

A user requests that you mount an unlabeled scratch tape and you comply, as there is a tape drive available.

```
OPR>
12:25:09      --Tape Mount Request #57--
              Mount Unlabeled scratch tape, WRITE-ENABLED
              User SMITH, Job 43, Terminal 18
              User's remark: PLEASE SEND VALID TO JOB 43
OPR>
```

You now mount and ready an unlabeled scratch tape on tape drive MTA2:.

```
12:27:32      --MTA2: Unlabeled tape mounted--
OPR>
```

Then reply to OPR with:

```
OPR>IDENTIFY MTA2: SCRATCH<RET>
OPR>
12:27:33      --MTA2: Given To Request 57--
              Volume SCRATCH tape now in use by
              User SMITH, Job 43, Terminal 18
OPR>
```

You can now SEND the physical volume identification to job 43 as the user requested.

```
OPR>SEND JOB 43 VALID IS SCR123<RET>
OPR>
```

7.5.6 Canceling Mount Requests

If you are unable to satisfy a user's mount request, you can cancel the mount request by giving the OPR command CANCEL MOUNT-REQUEST nn. You should also notify the user why you could not satisfy the request by giving the /REASON: switch with the command.

For example, you cancel a mount request because you could not find the requested tape. To do this, give the following command:

```
OPR>CANCEL MOUNT-REQUEST nn/REASON:I COULD NOT FIND THE TAPE<RET>
```

where "nn" is the request number assigned to the mount request.

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----- Examples -----

Cancel mount request 204.

```
OPR><CANCEL MOUNT-REQUEST 204/REASON:I COULD NOT FIND THE
TAPE<RET>
OPR>
11:49:19      --Mount Request 204 Canceled--
```

7.5.7 Setting Tape Drives Available or Unavailable

If tape drive allocation is enabled every time you start the system, all tape drives are under control of the MOUNTR program. However, there may be times you want to release MOUNTR's control of the tape drive. To do this, you would give the following command:

```
OPR>SET TAPE-DRIVE MTAn: UNAVAILABLE<RET>
```

where "n" is the unit number of the tape drive.

The system prints:

```
ENTER TEXT AND TERMINATE WITH ^Z
```

This allows you to enter a comment giving a reason why you are setting the tape drive unavailable.

When you give this command, MOUNTR releases control of the tape drive and users can assign the drive to their jobs by using the ASSIGN command. To return control of the tape drive to MOUNTR, give the following command:

```
OPR><SET TAPE DRIVE MTAn: AVAILABLE<RET>
```

----- Example -----

Set MTA0: unavailable because of a hardware problem.

```
OPR><SET TAPE-DRIVE MTA0: UNAVAILABLE<RET>
ENTER TEXT AND TERMINATE WITH ^Z
TAPE DRIVE MTA0: IS LOSING VACUUM <CTRL/Z>
```

```
OPR>
```

7.6 ARCHIVING FILES WITH DUMPER

If your installation is using the archive/virtual disk system for off-line storage of files, you could be requested at various times to

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run the DUMPER program to copy files marked for archiving onto two tapes. These requests do not appear at OPR command level. However, you can give the TOPS-20 command INFORMATION ARCHIVE-STATUS <*>*.*. to display the files that users have requested to be archived.

```
$INFORMATION ARCHIVE-STATUS <*>*.*.<RET>
<ACE>TEST01.TST Archive requested
<BROWN>FOO.BAR Archive requested
<HOVSEPIAN>OPR.TXT Archive requested
<LATTA>COBOL.EXE Archive requested
<SARTINI>CONTINT.EXE Archive requested
<WOLFE>ABCD.LST Archive requested
.
.
$
```

NOTE

This command shows files for your connected structure only. To show those files for another structure, you must include the structure name in the command (str:<*>*.*.).

You can archive each file separately using the DUMPER program with the following command format:

```
DUMPER>ARCHIVE str:<directory>filespec<RET>
```

However, it is recommended that you wait until you have more than just one archive request to run DUMPER and archive files.

If no filespec is given in the DUMPER command, all files marked for archiving on the connected structure are copied to tape. Thus the DUMPER command defaults to the following:

```
DUMPER>ARCHIVE str:<*>*.*.<RET>
```

You must use two tapes when you are archiving files. With two tapes, the archive provides a backup system in case one of the tapes is bad or if one of the tapes gets misplaced. Your system manager should set up the procedures and the tapes that are to be used for archiving files.

Archiving requires that DUMPER make two runs on the connected structure. When the files have been successfully copied to two tapes, DUMPER then deletes the contents of the files from the disk. The following are the steps you must take to archive one or more files:

1. Physically mount and ready a tape that has been assigned for archiving.

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2. Type PUSH to OPR.
3. Type ENABLE.
4. Type MOUNT TAPE setname: (setname is the name you assigned to your tape) with the /WRITE-ENABLED switch, the /LABEL-TYPE: switch, the /VOLIDS: switch, the /NOWAIT switch, and any additional switches desired to the MOUNT command.
5. When MOUNTR replies with the Tape Mount Request and the acknowledgment of the unlabeled tape being mounted, type POP to return to OPR.
6. If you are using an unlabeled tape, give the IDENTIFY command to OPR to identify the tape drive to the mount request.
7. When MOUNTR replies with Tape Drive Given To Request number, type PUSH to OPR.
8. After the system has assigned a tape drive, type DUMPER.
9. Type to DUMPER:
 TAPE MTn:<RET>
 ARCHIVE str:<dir>filespec<RET>
10. DUMPER asks you two questions. If the tape has never been used before for archiving, you should answer YES to both questions. If the tape has been used before for archiving, you should answer NO to the first question and the second question does not appear (see the example below).
11. When DUMPER replies with the two Total lines, type EXIT to DUMPER.
12. Type DISMOUNT MTn:.
13. Physically remove the tape from the tape drive.
14. Mount and ready the second tape for the archive and repeat Steps 4 through 13.
15. Type POP to return to OPR.

----- Example -----

The following is an example of the DUMPER program when used to archive files. It is assumed that you have already mounted an unlabeled tape on MTA1: and the tape has never been used before for archiving.

OPR>PUSH<RET>

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```

TOPS-20 Command processor 7(31)
@ENABLE<RET>
$MOUNT TAPE ARCHVE: /WRITE-ENABLED/LABEL-TYPE:UNLABELED-<RET>
/VOLIDS:500100/NOWAIT<RET>
[Waiting for Tape/Structure Mount]
OPR prints on the CTY:

14:43:18          --Tape Mount Request # 57--
                  Mount Unlabeled volume 500100, WRITE-ENABLED
                  User OPERATOR, Job 6, Terminal 1

14:43:46          --MTA1: Unlabeled tape mounted--
$POP<RET>
OPR>IDENTIFY MTA1: REQUEST-ID 57<RET>
OPR>
14:43:50          --MTA1: Given To Request 57--
                  Volume 500100 now in use by
                  User OPERATOR, Job 6, Terminal 1

OPR>PUSH<RET>
[Tape set ARCHVE, volume 500100 mounted]
[ARCHVE: defined as MT0:]
$DUMPER<RET>
DUMPER>TAPE MT0:<RET>
DUMPER>FILES<RET>
DUMPER>ARCHIVE PS:<TODAY>*. *.<RET>
$Is this a new tape? YES<RET>
$Are you sure? YES<RET>

DUMPER tape # 1, Fri 27-July-84 1354. ARCHIVE, valid T2

PS:<TODAY>
PS:<TODAY>QE5.LIB.1
PS:<TODAY>QE5.TEC.1

Pass 2 started.
Pass 2 completed.

Total files dumped:    2
Total pages dumped:   4
CPU time, seconds:    0
DUMPER>EXIT<RET>
$DISMOUNT MT0:<RET>
[Tape dismounted]
$
15:21:09          --Tape Drive Released By User--
                  MTA1: Volume 500100 Being unloaded

```

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NOTE

If you are using the terminal that OPR is running on, it is possible to receive OPR messages while you are running the DUMPER program.

You can now mount and ready another tape for the archive. When you PUSH from OPR after IDENTIFYING the mount request, you can type CONTINUE to return to DUMPER.

NOTE

When a file has been archived, the user who requested the archive receives a message in his MAIL.TXT file specifying that the file is archived.

7.7 RUNNING THE REAPER PROGRAM

The REAPER program is used to increase free disk space on the system. REAPER frees this disk space by performing the following functions:

1. By marking files that have not been referenced within a specified period for involuntary migration
2. By deleting disk contents pertaining to archived or migrated files that have not been referenced within a specified period
3. By trimming directories that are over their permanent disk allocations

In most cases to use the REAPER program, you would give a number of commands, one for each operation to be performed. When all desired operations have been specified, you can give the BEGIN command and specify the path of files to be considered.

Table 7-2 below and on the following pages describe the commands you can give to the REAPER program and what the REAPER program does when it is run.

Table 7-2: REAPER Commands

BEGIN (Processing Files)

specifies which files to process in the file system. Normally, you can specify PS:<*>*. *.* , but you can also specify other paths, such as PS:<*>*.REL.* or FOO:<TST*>*. *.* . This command should only be given after all desired options have been specified.

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After the specified files have been processed, REAPER prints the total number of pages reclaimed and then exits.

DELETE-CONTENTS (of old offline files)

specifies that files, existing on both disk and on an archive tape, that have not been referenced within a specified period are to have their contents deleted from disk. The period is specified by the PERIOD command (described below in this table). If the DELETE command is not given, the disk contents of the file(s) remain on the disk(s).

EXIT (to monitor)

specifies to exit from the REAPER program, without processing any files.

LIST (output to file)

specifies an output filespec for the listing produced by REAPER. This listing consists of the names of the files that were marked for migration and a list of tapes that have archived or migrated files. If a tape that was listed on a previous listing is not listed on the current listing, it means that the contents of the tape have expired and can be released for other purposes. If this command is not given, the listing produced by REAPER is written to the file DSK:REAPER.LIST.

MIGRATE (old files to offline storage)

specifies that files not referenced within the specified period are to be marked for involuntary migration. The period is specified by the PERIOD command. If the MIGRATE command is not given, files are not marked for migration and remain on disk.

Files that are marked for migration have the disk contents deleted from disk when you run the DUMPER program with the /MIGRATE switch. (Refer to next section in this chapter.)

ORDER (For trimming)

specifies the order in which files that are marked for migration are to be taken when trimming a directory that is over its permanent allocation. This order list is made up of file specifications, such as: *.TMP.*, *.LST.*, and *.REL.*. REAPER only uses the ORDER list if the TRIM command is given.

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Most users have their own MIGRATION ORDER file in their own directory. However, you should always include this command when performing trimming operations.

PERIOD (For migration)

specifies a time limit in days within which files should not be migrated or have their disk contents deleted. Your system manager should inform you of the number of days to be entered in this command. For example, if PERIOD is 60 days, it means that all files older than 60 days are involuntarily migrated if the MIGRATE command was given or files older than 60 days have their disk contents deleted if you gave the the DELETE command.

If you do not give a PERIOD command, a default period of 60 days is assumed.

POLICY (does a TAKE on SYSTEM:REAPER.CMD)

executes REAPER commands contained in the file SYSTEM:REAPER.CMD.

PURGE (Expired FDBs from disk)

specifies to delete and expunge the File Descriptor Block (FDB) of a file which is off-line and the file's expiration date has arrived (or passed). Sometime before the off-line expiration date is reached, a message is sent to the user who owns the file indicating that the expiration of the file is approaching. This message is sent only once.

SCAN (Only)

specifies that no files are actually DELETED, MIGRATED, or TRIMMED. Only a listing of the files and directories that would be deleted, migrated, and trimmed is produced if you were to run REAPER at this time.

SKIP (Directories)

specifies the directories that are not to be considered when performing deletion, migration, or trimming operations. Your system manager should inform you of the directories that should be skipped. If the SKIP command is not given, all directories on the structure are processed.

TAKE (Commands from file)

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specifies a command file of REAPER commands that REAPER executes automatically. This file should be created when the software is installed. The command file should contain your installation's policies toward involuntary migration. If you do not specify a filespec with the TAKE command, REAPER defaults to SYSTEM:REAPER.CMD as a filespec. (See below for an example of a REAPER.CMD file.)

TAPE (Check of tapes in use)

specifies that the output listing containing a summary of the tape information for the files considered in the REAPER process. The listing shows all tapes referenced and the number of valid (unexpired) files each tape has. There is no distinction made between archive and migration tapes.

TRIM (Directories over allocation)

specifies that directories over their permanent allocation will be trimmed down to the size specified in their directory. The user can specify the order in which the files should be trimmed by entering an order list in a file named MIGRATION.ORDER in the user's directory. If the MIGRATION.ORDER file does not exist in the user's directory, then the order of files for trimming is taken from the ORDER command you specify.

The following is an example of a REAPER.CMD file with comments added to clarify the commands:

```
! Sample REAPER policy file - Created 17 Sept 79,
! Directories not to consider:
SKIP PS:< *SUBSYS>, PS:< *SYSTEM>, PS:< UNSUPPORTED>
PERIOD 60      !Specify date limit on files
MIGRATE       !Files older than PERIOD days
DELETE        !Delete unreferenced file contents older
              !than PERIOD with tape backup
TRIM          !Directories over permanent allocation
ORDER *.TMP.* *.LST.* !IN WHICH TO TAKE FILES WITH TRIM
```

When REAPER completes its processing, four lines of text are printed on your terminal. These lines specify the number of:

1. files and pages marked for migration
2. archived files and pages deleted from disk
3. temporary files and pages deleted

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4. expired files and pages purged

If REAPER does not mark any files for migration, it prints the following information:

```
0 files marked for migration, 0 pages
0 archive files deleted from disk, 0 pages
0 temporary files deleted, 0 pages
0 expired files purged, 0 pages
```

----- Examples -----

1. The following is an example of the REAPER program. You specify the SCAN and BEGIN commands. REAPER defaults to the SYSTEM:REAPER.CMD file automatically for your installation's migration policies. Within the BEGIN command, you can press CTRL/A and REAPER prints the current directory it is working on.

```
OPR>PUSH<RET>
```

```
TOPS-20 Command processor 7(31)
@ENABLE<RET>
$REAPER<RET>
REAPER>SCAN<RET>
REAPER>BEGIN<RET>
```

```
Working on PS:<WORK.DIRECTORY>
<CTRL/A>
Working on PS:<LATTA.SNARK>
<CTRL/A>
Working on PS:<XYZ.INP>
<CTRL/A>
```

```
169 files marked for migration, 3040 pages
0 archive files deleted from disk, 0 pages
0 temporary files deleted, 0 pages
0 expired files purged, 0 pages
$POP<RET>
OPR>
```

At this time, you can PRINT the file REAPER.LIST which was written in your directory while REAPER was running.

2. The following is an example using the REAPER.CMD file shown above to migrate and trim files on the connected structure:

```
OPR>PUSH<RET>
```

```
TOPS-20 Command processor 7(31)
@ENABLE<RET>
$REAPER<RET>
REAPER>TAKE REAPER.CMD<RET>
```

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While REAPER is running, you cannot type POP to return to OPR. If you are running REAPER as a subjob of PTYCON, you can type <CTRL/X> to return to PTYCON and CONNECT back to OPR. It is recommended that you run REAPER either as a subjob of PTYCON or as a batch job because of the length of time it takes to process.

When REAPER has completed its processing, REAPER lists the number of files and pages marked for migration, the number of files deleted, and the number of files purged. You can then EXIT from REAPER and run DUMPER (explained in the next section). For example:

```
169 files marked for migration, 3040 pages
12 archive files deleted from disk, 102 pages
13 temporary files deleted, 236 pages
2 expired files purged, 27 pages
```

```
$POP<RET>
OPR>
```

7.8 MIGRATING FILES WITH DUMPER

Once a file has been marked for migration you should run DUMPER to dump the marked files to tape and delete (using the DELETE command in REAPER) the files from disk. The contents of the files are deleted after the second tape has been used for migration.

Like archiving files, migration requires two tapes. Two tapes are used to provide a back-up system in case one of the tapes is bad or gets misplaced. Your system manager should set up the procedure and assign the tapes to be used for migrating files.

You must do the following to migrate files with DUMPER:

1. Physically mount and ready a tape that has been assigned for migrating files.
2. Type PUSH to OPR.
3. Type ENABLE.
4. Type MOUNT TAPE setname: with the /WRITE-ENABLED switch, the /LABEL-TYPE: switch, the /VOLIDS: switch, and any additional switches desired to the MOUNT command.
5. When MOUNTR replies with the Tape Mount Request and the acknowledgement of the unlabeled tape being mounted, press <RET> and type POP to return to OPR.
6. If you are using an unlabeled tape, give the IDENTIFY command to OPR to identify the tape drive for the mount request.

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7. When MOUNTR replies with Tape Drive Given To Request number, type PUSH to OPR.
8. After the system has displayed the defined tape drive for the setname:, type DUMPER.
9. Type to DUMPER:
 TAPE Mtn:<RET>

 LIST/MAIL filespec
 MIGRATE str:<directory>filespec (for Migration)
 MAIL filespec
10. DUMPER asks you two questions. If the tape has never been used before for migration, you should answer YES to both questions. If the tape has been used before for migration, you should answer NO to the first question and the second question does not appear (see the example below).
11. When DUMPER replies with the following messages:

 TOTAL FILES dumped = nn
 TOTAL Pages dumped = nn

 Type EXIT to DUMPER.
12. Type DISMOUNT Mtn:
13. Physically remove the tape from the tape drive.
14. Mount and ready the second tape for the migration and repeat Steps 4 through 12. The migration of files is now complete, and those users who had files migrated receive a message in their MAIL.TXT files indicating the files that were migrated. If files in your directory were migrated, you receive the same message.
15. Type POP to return to OPR.

----- Example -----

The following is an example of the DUMPER program that was used to migrate files. It is assumed that you have already mounted a unlabeled tape on MTAl: and the tape(s) have never been used before for migration.

```
OPR>PUSH<RET>
TOPS-20 Command processor 7(31)
@ENABLE<RET>
$MOUNT TAPE T1: /WRITE-ENABLED/LABEL-TYPE:UNLABELED-<RET>
```

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```
13:43:18          --Tape Mount Request # 57--
                  Mount Unlabeled volume 500100, WRITE-ENABLED
                  User OPERATOR, Job 6, Terminal 1

13:43:46          --MTAl: Unlabeled tape mounted--
<RET>
$POP<RET>
OPR>IDENTIFY MTAl: REQUEST-ID 57<RET>
OPR>
13:43:50          --MTAl: Given To Request 57--
                  Volume 500100 now in use by
                  User OPERATOR, Job 6, Terminal 1

OPR>PUSH<RET>
[Tape set T1:, volume 500100 mounted]
[T1: defined as MT3:]
$DUMPER<RET>
DUMPER>TAPE T1:<RET>
DUMPER>REWIND<RET>
DUMPER>FILES<RET>
DUMPER>LIST/MAIL TODAY.LST<RET>
DUMPER>MIGRATE (DISK FILES) PS:<TODAY>*. *.*<RET>
Is this a new tape? YES<RET>
Are you sure? YES<RET>

DUMPER tape #1, Fri 27-Jul-87 1413. MIGRATION , valid T1

PS:<TODAY>
PS:<TODAY>FTS.INIT.1
PS:<TODAY>INIT.CMD.1
PS:<TODAY>INT.MAC.1
PS:<TODAY>MS.INIT.1
PS:<TODAY>NFT.INIT.1
PS:<TODAY>SED.INIT.1
PS:<TODAY>TV.EXE.1
PS:<TODAY>TV.INI.1
PS:<TODAY>TV2.INI.1
PS:<TODAY>TVSM.INI.1

Pass 2 started.
Pass 2 completed.

Total files dumped: 10
Total pages dumped: 38
CPU time, seconds: 1
DUMPER>MAIL TODAY.LST <RET>
DUMPER>EXIT<RET>

$DISMOUNT T1:
[Tape dismounted, logical name T1: deleted]
```

You can now mount and ready another tape for the migration. When you

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PUSH from OPR after identifying the mount request, you can type CONTINUE to return to DUMPER.

```
$MOUNT TAPE T2: /WRITE-ENABLED/LABEL-TYPE:UNLABELED-<RET>
/VOLIDS:500200/NOWAIT<RET>
[Mount request T2 queued, request #154]
```

```
15:25:09 --Tape Mount Request # 154--
Mount Unlabeled volume 500200, WRITE-ENABLED
User OPERATOR, Job 6, Terminal 1
```

```
15:25:13 --MTAL: Unlabeled tape mounted--
<RET>
```

```
$POP<RET>
OPR>IDENTIFY MTAL: REQUEST-ID 154<RET>
OPR>
```

```
15:27:12 --MTAL: Given To Request 154--
Volume 500200 now in use by
User OPERATOR, Job 6, Terminal 1
```

```
OPR>PUSH<RET>
[Tape set T2:, volume 500200 mounted]
[T2: defined as MT3:]
$CONTINUE<RET>
DUMPER>TAPE T2:<RET>
DUMPER>MIGRATE PS:<TODAY>*. *.*<RET>
Is this a new tape? YES<RET>
Are you sure? YES<RET>
```

DUMPER tape #1, Fri 27-Jul-87 1417. MIGRATION , valid T2

```
PS:<TODAY>
PS:<TODAY>FTS.INIT.1
PS:<TODAY>INIT.CMD.1
PS:<TODAY>INT.MAC.1
PS:<TODAY>MS.INIT.1
PS:<TODAY>NFT.INIT.1
PS:<TODAY>SED.INIT.1
PS:<TODAY>TV.EXE.1
PS:<TODAY>TV.INI.1
PS:<TODAY>TV2.INI.1
PS:<TODAY>TVSM.INI.1
```

```
Pass 2 started.
Pass 2 completed.
```

```
Total files dumped: 10
Total pages dumped: 38
CPU time, seconds: 2
```

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7.9 RETRIEVING FILES WITH DUMPER

Once a file is migrated or archived, the user cannot modify that file unless he retrieves the file with the TOPS-20 RETRIEVE command. If the user wants to modify an archived file, he must first retrieve the file and then discard the tape archive status from the FDB. When the user gives the RETRIEVE command, OPR responds with the following message:

```
hh:mm:ss File Retrieval n --Retrieval Request--
str:<directory>filespec
```

where n is the processor number processing the request, str: is the requested structure name, <directory> is the requested user's directory name, and filespec is the file specification.

When a retrieval request is initially queued by a user, the request is stored in a request queue maintained by the system. All retrieval requests are kept in the queue in order by the archived or migrated tape information. This information consists of the volume identification, the tape saveset number, and the tape file number. When each additional request is received by the system, the request is inserted in the proper sorted position within the queue. Ordering the retrieval requests in this way reduces the amount of tape mounting and dismounting that must be performed by you when you run DUMPER to retrieve the requested files.

To retrieve requested files with DUMPER, you must do the following:

1. Type PUSH to OPR.
2. Type ENABLE.
3. Run DUMPER and type:

```
RETRIEVE str:<directory>filespec
```
4. When MOUNTR replies with a Tape Mount Request, you must physically locate, mount, and ready the tape for the retrieval. MOUNTR obtains the tape valid from the file descriptor block (FDB) of each file requested for retrieval.
5. When MOUNTR replies that the tape is mounted, press CTRL/C twice and then type POP to return to OPR.
6. If the label type is UNLABELED, give the IDENTIFY command to OPR to identify the tape to MOUNTR.
7. After MOUNTR has displayed that the tape has been given to the request number, type PUSH to OPR.

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8. Type CONTINUE to return to the DUMPER program.
9. DUMPER then retrieves the files automatically and lists them on your console.
10. When the retrievals are completed, DUMPER automatically unloads the tape. If the retrievals require more than one tape, DUMPER unloads and requests the additional tapes automatically. Each tape mount request has to be given the IDENTIFY command at OPR command level. You have to physically remove and mount each tape.
11. Type EXIT to DUMPER.
12. Type POP to return to OPR.

The filespec (str:<directory>filespec) in the RETRIEVE command is referred to as the "file group descriptor". This is because the file group descriptor can be one file specification or a group of file specifications with or without the use of wildcard characters.

When DUMPER retrieves file(s), retrieval requests in the request queue can be requeued for one of two reasons:

1. The request does not fall within the path (str:<directory>filespec) specified by you in the DUMPER RETRIEVE command.
2. The request called for a tape that had data errors on it or could not be mounted.

Requests that are requeued have their time stamp zeroed out, so that DUMPER reconsiders the request during the same retrieval operation. When all requests have been retrieved and there are no new requests to be considered, the system informs DUMPER that the request queue has been exhausted.

WARNING

If there are no files in the retrieval queue and you give the RETRIEVE command to DUMPER, DUMPER waits for approximately 5 minutes. DUMPER then aborts the RETRIEVAL request and sends the message:

?Assuming no requests in the retrieval queue.

Before running DUMPER to retrieve files, you should give the SHOW QUEUES RETRIEVAL-REQUESTS/ALL command to OPR to see if any retrievals have been requested. The /ALL switch allows you to see the entire file specification.

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If you are unable to locate the requested tape volume or the tape volume is bad, perform the following steps:

1. Type CTRL/C twice and type POP to return to OPR.
2. Type CANCEL MOUNT-REQUEST nn (where nn is the mount request number).
3. Type PUSH and then type CONTINUE to return to DUMPER.
4. DUMPER displays the following message:
?Cannot mount tape, Mount refused by operator
Try again?
5. Type NO, and DUMPER replies with:
Should I ask about this tape anymore during this run?

If you answer no, other requests for the tape are ignored.
If you answer yes, additional requests for the tape are processed.
6. DUMPER then requests the next retrieval tape to be mounted.
7. You can then follow Steps 5 through 12 on the previous pages.

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----- Examples -----

1. Run DUMPER to retrieve the file SCHEDULE.TXT.34 as requested by your system manager.

```
OPR>SHOW QUEUES RETRIEVAL-REQUESTS/ALL<RET>
OPR>
13:20:30          -- System Queues Listing --
```

```
Retrieval Queue:
  Name  Req#   Tape 1  Tape 2  User
-----
SCHEDU  27    400030  400040  MANAGER
FILE:KL2102:<MANAGER>SCHEDULE.TXT.34
There is 1 job in the Queue (None in Progress)
```

```
OPR>PUSH<RET>

TOPS-20 Command processor 7(31)
@ENABLE<RET>
$DUMPER<RET>
DUMPER>RETRIEVE PS:<MANAGER>SCHEDULE.TXT.34<RET>
[Mounting tape volume 400040]
```

```
13:22:00          --Tape Mount Request # 79--
Mount volume 400040, 9-TRACK, 1600 BPI, READ-ONLY
User OPERATOR, Job 6, Terminal 1
User's remark: RETRIEVAL TAPE
```

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Now physically locate tape volume 400040, mount the tape, and ready it on an available tape drive.

13:25:00 --MTA1: Unlabeled tape mounted--

```
<CTRL/C><CTRL/C>
$POP<RET>
OPR>IDENTIFY MTA1: REQUEST-ID 79<RET>
OPR>
13:26:34          --MTA1: Given to Request 79--
Volume 400040 now in use by
User OPERATOR, Job 6, Terminal 1
OPR>PUSH<RET>
$CONTINUE<RET>
[Volume 400040 mounted]
```

```
PS:<MANAGER>SCHEDULE.TXT.34;P777700;A341 (TO)
PS:<MANAGER>SCHEDULE.TXT.34 [OK]
```

```
12:40:54          --Tape Drive Released By User--
MTA1: Volume 400040 Being unloaded
DUMPER>EXIT<RET>
$POP<RET>
OPR>
```

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2. Run DUMPER to retrieve all requests in the retrieval queue. In addition, two tape volumes are requested for the retrievals.

OPR>PUSH<RET>

TOPS-20 Command processor 7(31)
 @ENABLE<RET>
 \$DUMPER<RET>
 DUMPER>RETRIEVE PS:<*>*. *.<RET>
 [Mounting tape volume 23401]

16:30:04 --Tape Mount Request # 97--
 Mount volume 23401, 9-TRACK, 1600 BPI, READ-ONLY
 User OPERATOR, Job 6, Terminal 1

16:31:12 --MTA0: Unlabeled tape mounted--

<CTRL/C><CTRL/C>
 \$POP<RET>
 OPR>IDENTIFY MTA0: REQUEST-ID 97<RET>
 OPR>
 16:33:30 --MTA0: Given To Request 97--
 Volume 23401 now in use by
 User OPERATOR, Job 6, Terminal 1
 OPR>PUSH<RET>
 \$CONTINUE<RET>
 [Volume 23401 mounted]

PS:<SARTINI>CHAP01.RNO.1;P777700;A341 (TO) PS:<SARTINI>CHAP01.RNO.1 [OK]
 PS:<BROWN>YEARLY.CBL.3;P777700;A341 (TO) PS:<BROWN>YEARLY.CBL.3 [OK]
 PS:<HOVSEPIAN>OPR.TXT.5;P777700;A341 (TO) PS:<HOVSEPIAN>OPR.TXT.5 [OK]
 PS:<HURLEY>DECSPC.MEM.4;P777700;A341 (TO) PS:<HURLEY>DECSPC.MEM.4 [OK]

PS:<TEEGARDEN>FORTRA.EXE.1;P777700;A341(TO)PS:<TEEGARDEN>FORTRA.EXE.1 [OK]

16:45:00 --Tape Drive Released By User--
 MTA0: Volume 23401 Being unloaded

16:45:03 -- Tape Mount Request # 98--
 Mount volume 23402, 9-TRACK, 1600 BPI, READ-ONLY
 User OPERATOR, Job 6, Terminal 1
 User's remark: RETRIEVAL TAPE

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16:47:32 --MTA0: Unlabeled tape mounted--
 <CTRL/C><CTRL/C>

\$POP<RET>
 OPR>IDENTIFY MTA0: REQUEST-ID 98<RET>
 OPR>

16:49:09 --MTA0: Given To Request 98--
 Volume 23402 now in use by
 User OPERATOR, Job 6, Terminal 1

OPR>PUSH<RET>
 \$CONTINUE<RET>
 [Volume 23402 mounted]

PS:<J.JONES>SAMPLE.MEM.2;P777700;A341(TO)PS:<J.JONES>SAMPLE.MEM.2 [OK]

PS:<ANDERSON>EXAM01.TST.5;P777700;A341(TO)PS:<ANDERSON>EXAM01.TST.5 [OK]

16:57:45 --Tape Drive Released By User--
 MTA0: Volume 23402 Being unloaded

DUMPER>EXIT<RET>
 \$POP<RET>
 OPR>

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7.10 RESTORING DISK FILES WITH DUMPER

If a user requests that you restore some files for him from a magnetic tape, be sure to find out:

1. What magnetic tape(s) to use. You might have to use a tape containing a complete SAVE and some tapes from an INCREMENTAL SAVE. You or the user should look through the terminal output kept for each DUMPER SAVE and determine which tapes to use.
2. What files to restore and what directory they are in.
3. What directory to put them into.
4. What special DUMPER status commands to use, if any. (See the TOPS-20 User Utilities Guide for details on DUMPER status commands.)
5. What version of DUMPER is being used. Dumper may not restore passwords correctly if you use an incorrect version of DUMPER (see the TOPS-20 User Utilities Manual for details on password encryption.)

NOTE

DUMPER does not work on a 7-track magnetic tape drive (TU71).

Then do the following:

1. Type PUSH to OPR.
2. Type ENABLE.
3. Type MOUNT TAPE setname: with the /LABEL TYPE: switch, the /VOLIDS: switch, and the /NOWAIT switch. The default mode is READ-ONLY.
4. If you are connected to another structure, CONNECT to the structure for the restore.
5. When MOUNTR replies with the Tape Mount Request and the acknowledgement of the unlabeled tape being mounted, press <RET> and type POP to return to OPR.
6. If the label type is unlabeled, give the IDENTIFY command to OPR to identify the tape drive to the mount request.
7. If the desired structure is not mounted for the restore, type PUSH to OPR, then give the command MOUNT STRUCTURE str:.

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8. When the system replies with Tape Drive Given To Request number (and the structure is mounted), and after the system has displayed the message that defines the tape drive for the setname:, type DUMPER.
9. Type the following DUMPER commands.
TAPe MTn:<RET>
RESTORE str:<directory>filespec<RET>

(See argument types for filespecs below or refer to the RESTORE command in the TOPS-20 User Utilities Guide.)
10. When DUMPER prompts again, type EXIT.
11. Type DISMOUNT TAPE MTn:.
12. Type DISABLE.
13. Type POP to return to OPR.
14. Remove the magnetic tape from the drive.

Argument types for RESTORE:

1. To restore an entire user area, for example, to copy all the files of directory PS:<DIR> on tape to directory PS:<DIR> on disk:
RESTORE PS:<DIR><RET>
2. To restore certain files on directory PS:<DIR> on tape to directory PS:<DIR> on disk:
RESTORE PS:<DIR>file1,PS:<DIR>file2,...<RET>
3. To restore PS:<A>A.MAC to PS:<SOURCE>A.MAS and PS:X.MAC to PS:<SOURCE>X.MAS:<RET>
RESTORE <A>A.MAC <SOURCE>A.MAS,X.MAC <SOURCE>X.MAS<RET>
4. To copy all files from PS:<SOURCES> on tape to OLD:<SOURCES> on disk:

(Be sure to MOUNT STRUCTURE OLD: before you run DUMPER, and DISMOUNT STRUCTURE OLD: after you run DUMPER.)
RESTORE PS:<SOURCES> OLD:<SOURCES><RET>

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In addition, you can specify either of two optional switches before the file group descriptor. These switches are as follows:

1. /NOTAPE-INFORMATION - specifies that no archive or migration tape information is restored with the file(s). This switch can be used when a user wishes to transfer a file from another system to his disk area on your system. The /NOTAPE-INFORMATION switch avoids bringing tape information from another system.
2. /TAPE-INFORMATION - specifies that tape information is restored with the file(s). This switch can be used when a user wishes to restore a file that was migrated or archived and then inadvertently deleted and expunged from his disk area.

If you do not specify either switch, /TAPE-INFORMATION is the default. (For more information on DUMPER, refer to the TOPS-20 User Utilities Guide.)

----- Hint -----

If the user's files on the DUMPER tape(s) have accounts not in the installed ACCOUNTS-TABLE.BIN file, do the following:

1. Log in as the user who requested the file restoration and specify a valid account for that user.
2. Follow Steps 3 through 9 in the procedure above, and type the DUMPER command:

```
ACCOUNT SYSTEM-DEFAULT<RET>
```

before the RESTORE command to DUMPER.

3. Type LOGOUT.

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----- Example -----

A user has requested a restore of all his files on structure MISC:.

```
OPR>PUSH<RET>
TOPS-20 Command processor 7(31)
@ENABLE<RET>
$MOUNT STRUCTURE MISC:<RET>

18:13:12          --STRUCTURE MOUNTED--
                  Structure MISC mounted

$MOU TAPE DUMP09: /LABEL-TYPE:UNLABELED/VOLIDS:DUMP09/NOWAIT<RET>

18:15:01          --Tape Mount Request # 115--
                  Mount Unlabeled volume DUMP09, READ-ONLY
                  User OPERATOR, Job 6, Terminal 1

18:16:56          --MTA3: Unlabeled tape mounted--
<RET>
$POP<RET>
OPR>IDENTIFY MTA3: REQUEST-ID 115<RET>
OPR>
18:19:20          --MTA3: Given To Request 115--
                  Volume DUMP09 now in use by
                  User OPERATOR, Job 6, Terminal 1

OPR>PUSH<RET>
[Tape set DUMP09, volume DUMP09 mounted]
[DUMP09: defined as MT1:]
$DUMPER<RET>
DUMPER>TAPE MT1:<RET>
DUMPER>RESTORE MISC:<SARTINI>*.*.<RET>

DUMPER tape # 1  Volid DUMP09, , Saturday, 14-Apr-79 1206
MISC:<SARTINI>

End of saveset
DUMPER>EXIT<RET>
$DISMOUNT TAPE MT1:<RET>
[Tape dismounted]

18:27:34          --Tape Drive Released By User--
                  MTA3: Volume DUMP09 Being unloaded

$POP<RET>
OPR>
```

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7.11 ANSWERING STRUCTURE MOUNT REQUESTS WITH OPR

When a user issues a request to mount or dismount a structure with the TOPS-20 MOUNT or DISMOUNT command, ORION passes a message to OPR to inform you of the request. You can then respond by physically mounting or dismounting the structure. When the system receives this request, it has OPR print the following message on the terminal running OPR:

```
OPR>
hh:mm:ss      --Structure Mount Request #nn--
Mount str: (alias ptr:)
User username, job nn, Terminal nn
```

FREE DRIVES

DISK DRIVE INFORMATION			DISK PACK INFORMATION		
Type	Chan-Cont Drive	Disk Status	Mount Status	Count	Name Usage Options
-----	-----	-----	-----	-----	-----

(List of available drives)

where:

```
hh:mm:ss      specifies the time the operator received the
              message.

Request#nn    specifies the request number assigned to the
              mount request.

Mount str:    specifies the physical name of the structure.

User username specifies the name of the user who issued the
              MOUNT request.

Job nn,       specifies the job number the user was assigned
              when he logged onto the system.

Terminal nn   specifies the line number of the terminal from
              which the user issued the MOUNT request.

FREE DRIVES   specifies the disk drives that are available.
```

The list of available disk drives contains those drives that meet one of the following conditions:

1. The drive is off-line.
2. The drive has a nonrecognizable structure on it.

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3. The drive is on-line, it has a recognizable structure on it, no user has MOUNTed it, no user has CONNECTed to it, and no user has a file open on it.

The list also provides the following information:

1. The type of drive (RP04, RP06, RP07, RP20, RA60, or RA81).
2. The channel number of the drive.
3. The controller number of the drive.
4. The physical unit number of the drive.
5. The state of the drive (available/unavailable).
6. The mount status of the drive.
7. The mount count.
8. The structure name on the drive.
9. The attributes of the structure.

You reply to a MOUNT request by doing the following:

1. Mount all the packs of the structure requested on any of the available drives in the list. MOUNT then makes the structure known to the system and cancels the outstanding message.

Once the structure is known by the system, OPR prints a message similar to:

```
OPR>
hh:mm:ss      --STRUCTURE MOUNTED--
              Structure str: (Alias:name) mounted
OPR>
```

But if the request was for a structure to be mounted on a remote CFS-20 node, OPR prints the following:

```
12:01:10     Received Message From (remote system name)::
11:59:00     -- Mount request by operator completed --
              Structure (structure name): mounted as alias (alias name):
```

OPR prints the preceding messages only after you have physically mounted all the packs in the structure.

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----- Hints -----

OPR continues to handle other requests from other users, if you do not respond to a MOUNT request with some action. For example, if five separate users request five different structure MOUNTs at the same time, you can respond individually to each request in any order.

Sometimes you see a message similar to:

```
OPR>
13:02:15      --STRUCTURE MOUNTED--
              Structure PS: (Alias:DIAG) mounted
OPR>
```

without seeing a MOUNT request. This happens when a user does a MOUNT for a structure that the system found on-line. This is just an informational message for you; it requires no action.

----- Examples -----

1. In this example, a user wanted to MOUNT a structure that is unavailable. When this message appears on your console, CANCEL the MOUNT-REQUEST and give a reason.

```
13:35:55      --MOUNT PROBLEM--
              Problem with structure ASDF: structure is set
              unavailable
              User Konen, Job 32, Terminal 11

13:36:01      --Structure Mount Request # 12--
              Mount ASDF: (alias ASDF:)
              User Konen, Job 32, Terminal 11
```

FREE DRIVES

DISK DRIVE INFORMATION				DISK PACK INFORMATION		
Type	Chan-Cont	Disk Status	Mount Status	Mount Count	Name	Usage Options
*RP06	0, ,1	Avail	Offline			
*RP07	1, ,0	Avail	Free		FIAT	(1/1)
RP06	7,01,1	Avail	Free		CHIP	(1/1)
RA60	7,07,254	Avail	Free			
RA81	7,08,18	Avail	Free		DRV18	(1/1)

```
OPR>CANCEL MOUNT-REQUEST 12/REASON:ASDF IS UNAVAILABLE<RET>
OPR>
13:40:00      --Mount Request 12 Canceled--
OPR>
```

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2. In this example, a user has requested that structure JACK: be MOUNTed.

```
OPR>
12:40:15      --Structure Mount Request # 4--
Mount JACK: (alias JACK:)
User KOVALCIN, Job 2, Terminal 1
```

FREE DRIVES

DISK DRIVE INFORMATION				DISK PACK INFORMATION		
Type	Chan-Cont	Disk Status	Mount Status	Mount Count	Name	Usage Options
*RP06	0, ,1	Avail	Offline			
*RP07	1, ,0	Avail	Free		FIAT	(1/1)
RP06	7,01,1	Avail	Free		CHIP	(1/1)
RA60	7,07,254	Avail	Free			
RA81	7,08,18	Avail	Free		DRV18	(1/1)

OPR>

You can now physically mount JACK: and make the system recognize the structure as being on-line. Request 4 is completed automatically and the user will be notified.

```
OPR>
12:43:33      --STRUCTURE MOUNTED--
              Structure JACK: (Alias:JACK) mounted
OPR>
```

7.11.1 Mounting a Structure with MOUNT

If you need to mount a structure, other than the structures that are normally mounted at system start-up, you can give either the MOUNT command at TOPS-20 command level or give the MOUNT command at OPR command level. For example, to mount a structure called SNARK, you would give the following command:

```
@MOUNT STRUCTURE SNARK:<RET>
```

In a CFS-20 cluster that has cluster GALAXY enabled, you can mount a structure on a system by issuing the MOUNT command from any terminal in the cluster. You do not have to use a terminal on the system where the structure is to be mounted. For example, you can issue a command from node SYSA: that will cause a structure to be mounted on node SYSB:.. To do this, you would give the following command from SYSA:

```
OPR>MOUNT STRUCTURE DATA:/CLUSTER-NODE:SYSB:;<RET>
```

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If the structure you want to mount has the same physical name as a structure that is already mounted, you must assign an alias name for the structure you want to mount. The alias name is placed after the word STRUCTURE followed by the /STRUCTURE-ID switch and actual name of the structure. You must have WHEEL or OPERATOR privileges enabled to perform this task. For example, to specify an alias name for the structure SNARK: you would give the following command:

```
$MOUNT STRUCTURE CHECK: /STRUCTURE-ID SNARK:<RET>
```

In the above command you have mounted a structure with the physical name SNARK: and the alias name CHECK:. Any user wishing to use this structure has to refer to it by the structure name CHECK:.

If a disk drive containing a structure, other than BS: or PS:, starts to have hardware problems, you can remove the structure from the disk drive. You must move the structure to an available drive of the same type but you do not have to give a DISMOUNT command. If there are no available disk drives, and the structure you are moving is necessary for normal system operation, you must first DISMOUNT a structure on another disk drive of the same type and then MOUNT the necessary structure on that drive.

NOTE

When you assign an alias name to a structure, the physical name of the structure (which is written in the home blocks of the structure) does not change. Refer to the TOPS-20 System Manager's Guide for more information on alias names.

----- Example -----

A user from another installation wants to mount his public structure on your system. Because you already have a public structure on your system, you must assign his structure an alias.

```
OPR>PUSH<RET>
TOPS-20 Command Processor 7(31)
@ENABLE<RET>
$MOUNT STRUCTURE CHECK: /STRUCTURE-ID:PS:<RET>
[Mount Request CHECK: QUEUED, Request-id 57]
```

The terminal running OPR displays the following message:

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```
10:11:40 --Structure Mount Request # 57--
Mount PS: (alias CHECK:)
User OPERATOR, Job 6, Terminal 1
```

FREE DRIVES

DISK DRIVE INFORMATION				DISK PACK INFORMATION		
Type	Chan-Cont	Disk Drive	Status	Mount Status	Mount Count	Usage Name Options
*RP06	0, ,1		Avail	Offline		
*RP07	1, ,1		Avail	Free		FIAT (1/1)
RP06	7,01,1		Avail	Free		CHIP (1/1)
RA60	7,07,254		Avail	Offline		
RA81	7,08,18		Avail	Free		DRV18 (1/1)

Whether you mount the structure before or after the MOUNT command, when the system recognizes the structure as mounted and on-line, the following message appears on your terminal:

```
Structure CHECK: mounted
```

On the terminal running OPR, the following message is displayed.

```
10:12:35 --STRUCTURE MOUNTED--
Structure PS: (Alias:CHECK) mounted
```

WARNING

If the system goes down while a structure with an alias name is mounted, you should put the disk drive that the structure with the alias name is mounted off-line prior to restarting the system. The reason for this is that when the system is restarted, the monitor looks at the physical name of the structure rather than the alias name and reports errors of duplicate structures mounted. After the system has restarted, bring the disk drive back on-line and mount the structure again with an alias name.

----- Error Message -----

```
OPR>
10:30:11 --MOUNT PROBLEM--
Problem with structure : Invalid structure name
User OPERATOR, Job 6, Terminal 1
```

```
OPR>
```

You have specified a structure name that is invalid and/or the system cannot recognize the name specified. You might have typed one or more non-alphanumeric characters in the name, the name exceeds six alphanumeric characters, or the structure name has the name of a

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system logical name. Issue the MOUNT command again, specifying a structure name that is valid and/or can be recognized by the system.

7.11.2 Answering Structure DISMOUNT Requests with OPR

When a user gives a valid DISMOUNT STRUCTURE str: command, OPR prints:

```
OPR>
hh:mm:ss      --STRUCTURE DISMOUNTED--
              Structure PH4 dismounted

              --DISMOUNT STRUCTURE--
              Remove PH4:
              User HOVSEPIAN, Job 21, Terminal 25
```

MOUNTED DRIVES

DISK DRIVE INFORMATION			DISK PACK INFORMATION			
Type	Chan-Cont Drive	Disk Status	Mount Status	Mount Count	Name	Usage Options
RP06	0, ,3	Avail	Free	1	PH4	(1/1)

The status display prints the following:

1. The type of disk. An asterisk (*) to the left of the disk drive type indicates a disk drive has an external port.
2. The channel, controller, and drive number.
3. The state of the disk drive (available/unavailable).
4. The mount status of the disk drive.
5. The count of the number of users who requested a mount of the structure.
6. The name of the structure.
7. The attributes of the structure.

You must answer a DISMOUNT request by doing one of the following:

1. If the following DISMOUNT message appears at your console, a user has issued a DISMOUNT STRUCTURE str: command. However, other users are still using the structure.

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```
OPR>
16:52:13 <19>      --DISMOUNT QUERY--
                    Removal of structure AHPA: (Alias AHPA:)
                    requested.
                    Other jobs are currently using it. Should
                    removal request be processed (YES or NO)?
                    User KONEN, Job 39, Terminal 11
```

OPR>

If you are to honor the DISMOUNT in this case, you should SEND a message to all other users that the structure is being dismounted. Otherwise, answer the DISMOUNT QUERY with NO. If you say "NO", the DISMOUNT request is deleted.

Once all users have DISMOUNTed the structure, you can then complete the DISMOUNT by removing all packs of the structure from their drives after seeing the following message:

```
OPR>
14:36:06          -- STRUCTURE DISMOUNTED --
                  Structure AP20 dismounted
```

```
OPR>
14:36:07          -- DISMOUNTED STRUCTURE --
                  Remove AP20: (alias AP20:)
                  User OPERATOR, Job 2, Terminal 233
```

DISK DRIVE INFORMATION			DISK PACK INFORMATION			
Type	Chan-Cont Drive	Disk Status	Mount Status	Mount Count	Name	Usage Options
*RP06	0, ,1	Avail	Mounted			

2. If there is a list of free drives and the structure to be removed appears in the list, remove all packs in the structure from their drives.
3. Do not do anything if you see the message:

```
OPR>
hh:mm:ss          --Message n ABORTED--
OPR>
hh:mm:ss          --STRUCTURE DISMOUNT ABORTED--
                  User name, Job number, Terminal number
```

OPR>

In this case, the user has canceled his own request.

4. If you need to MOUNT a structure that has been DISMOUNTed but not removed from the drive, use the MOUNT command in OPR>. Type:

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```
OPR>MOUNT STRUCTURE alias /Structure-Id:xx<RET>
OPR>MOUNT STRUCTURE AP20://Structure-Id:AP20:<RET>
OPR>
11:50:16          -- Mount request by operator completed --
                  Structure AP20: mounted as alias AP20
```

Responding to Canceled Dismount Requests

If a user issues a CANCEL command for a pending dismount request, you receive a message similar to the following:

```
12:01:00 -- Message n canceled
```

where n is the message number associated with the dismount.

In a CFS-20 configuration, if the original request was for the structure to be dismounted with REMOVAL, it may already have been dismounted from remote systems in the cluster with NO-REMOVAL (see Section 7.11.3). If the dismount has proceeded beyond a certain point, you are informed of any structure status changes on remote nodes, in a message such as:

```
12:01:00      -- Dismount Status --
Dismount request has been canceled.
However, structure FOO: has been dismounted from
nodes SYSA::, SYSB::
Please mount structure FOO: on the above systems.
```

Otherwise, you receive a message such as:

```
12:01:00      -- Message 1 canceled --
Dismount request canceled by user ROSSELL
```

7.11.3 Removing a Structure with DISMOUNT

If you need to remove a structure from the system (perhaps to have maintenance done on a drive, to run CHECKD on a structure, or to mount another structure), perform the following procedures in the order given below:

1. Whenever OPR outputs a list of packs for removal, check if the structure you want to remove is in the list. If it is, you can remove all the packs in the structure before you respond to the current OPR request. If it is not in the list, go to Step 2.

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2. If the structure does not appear in the available list, do the following with OPR commands:
 - a. Type a SET STRUCTURE str: UNAVAILABLE, so that no user can MOUNT the structure and no batch or print request can be scheduled for that structure.
 - b. If you intend to run CHECKD on the structure, also type SET STRUCTURE str: IGNORED.
 - c. Type a SEND ALL message to notify all users to DISMOUNT the structure by a certain time.
 - d. If you want to remove the structure from the drive(s) after the time is up, type DISMOUNT STRUCTURE str: (with) REMOVAL. However, to run CHECKD on the structure, follow Step 3, a. through d. and then type CHECKD.
 - e. If OPR outputs the structure name in the list of packs available for removal, immediately set one pack of the structure off-line. Otherwise, go to Step 3.
 - f. Remove the packs of the structure from the drives you need.
3. If the structure does not appear in the list (item 1. above), you can forcibly dismount the structure by taking the following steps.
 - a. Type SHOW STATUS STRUCTURE str name:.
 - b. Type SEND ALL to give those users of the structure a last warning to DISMOUNT the structure.
 - c. Type SET STRUCTURE str: UNAVAILABLE.
 - d. Type DISMOUNT STRUCTURE str: (with) REMOVAL.
 - e. Because the structure now appears in the OPR output of packs available for removal, remove the packs of the structure from the drives you need.

When you want OPR to mount a structure that has been set IGNORED, set the structure to be ACKNOWLEDGED.

----- Example -----

For example, if you want to remove a structure XYZ from the system by 4 P.M., and there are currently users of the structure, declare the structure UNAVAILABLE about ten minutes before 4 P.M. Then warn users to DISMOUNT XYZ.

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```
OPR>SET STRUCTURE XYZ: UNAVAILABLE<RET>
OPR>
15:48:03      --STRUCTURE STATUS SET--
              XYZ: set UNAVAILABLE for use by system

OPR>SEND ALL FINISH USING XYZ AND DISMOUNT IT IN 10 MIN.<RET>
OPR>
15:48:15
From Operator Terminal 1: FINISH USING XYZ AND DISMOUNT IT IN 10 MIN.
OPR>
```

At 4 P.M., type the DISMOUNT command.

```
OPR>DISMOUNT STRUCTURE XYZ:<ESC> (with)REMOVAL<RET>
16:00:34      --STRUCTURE DISMOUNTED--
              Structure XYZ: dismantled
```

OPR>

CFS-20 Configurations

In a CFS-20 configuration, structures can be set EXCLUSIVE for use by one system or SHARED for use by all systems. You do this by typing the following OPR> commands:

```
SET STRUCTURE str name: EXCLUSIVE<RET>
```

or

```
SET STRUCTURE str name: SHARED<RET>
```

If you then need to dismount and remove a structure from a CFS-20 configuration, perform the following steps in the order given below:

1. If the structure is set EXCLUSIVE, perform steps 1 to 3 listed above and add REMOVAL to the DISMOUNT STRUCTURE str: command.
2. If the structure is set SHARED, perform the following steps:
 - a. Type the SEND ALL /CLUSTER-NODE:* command to notify all users on all nodes in the cluster to DISMOUNT the structure by a certain time.
 - b. Type DISMOUNT STRUCTURE str: (with) REMOVAL on your system.
 - c. Remove the structure from the system.

Refer to Example 3 for details on the Step 2 procedure.

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NOTE

If the optional argument, REMOVAL or NOREMOVAL, is omitted, the structure will default to removal on a non-CFS-20 system and non-removal on a CFS-20 system.

Step 2 above ensures that the structure is set for exclusive use by one system before it can be removed. If there are problems during this automatic procedure, you may receive any one of the following messages:

1. 12:01:00 -- Dismount error --
Unable to lock structure FOO: for dismount.
Structure FOO: is locked by node GIDNEY:
Dismount request failed.

This error occurs if MOUNTR cannot obtain a lock on the structure through the ENQ% monitor call. (See your system programmer or manager for details.)

2. 12:00:00 <4> -- DISMOUNT QUERY --
Unable to set structure FOO: EXCLUSIVE
The following nodes are inaccessible to this system:
CLOYD:;, GIDNEY:;
Dismount structure with NO-REMOVAL from the above nodes.
If successful, respond PROCEED
If not successful, respond ABORT

This message indicates that the structure is mounted on the indicated nodes, but the nodes are not accessible to cluster GALAXY or do not have the cluster GALAXY option enabled. Therefore, the DISMOUNT (with) REMOVAL command cannot automatically dismount the structure remotely. So you must log into the nodes indicated and dismount the structure yourself with NO-REMOVAL.

3. 12:01:00 <4> -- DISMOUNT QUERY --
Unable to set structure FOO: EXCLUSIVE
due to (monitor error text)
Dismount request failed. Please correct the problem.
If successful, respond PROCEED
If not successful, respond ABORT

This message indicates that there was a monitor error in setting the structure exclusive. You are notified of the error and given a chance to correct it so that the process can continue.

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4. 12:01:00 <4> -- Dismount QUERY --
 AP20: dismantled from SYSA::, SYSB::
 AP20: failed to be dismantled from SYSC::
 error - (monitor error text)
 Correct the problem indicated on SYSC::
 If successful, respond PROCEED
 If not successful, respond ABORT

This message indicates that the structure was not dismantled successfully from a remote system. You are notified of the error and given a chance to correct it so that the process can continue.

----- Examples -----

1. Give the DISMOUNT STRUCTURE AP20: (with) NO-REMOVAL command.

OPR>DISMOUNT STR AP20:<ESC> (with) NO-REMOVAL<RET>
 OPR>

11:49:35 <2> -- DISMOUNT QUERY --
 Dismount of structure AP20: (Alias AP20:) requested.
 Other jobs are currently using it. Should
 dismantment request be processed (Yes or No)?
 User WONG, Job 37, Terminal 10
 OPR>RES 2 YES<RET>

OPR>[Structure AP20 has been dismantled]

11:49:41 -- STRUCTURE DISMOUNTED --
 Structure AP20 dismantled

11:49:41 -- DISMOUNT STRUCTURE --
 Do not remove AP20: (alias AP20:)
 Structure is set unavailable for mounting
 User WONG, Job 37, Terminal 10
 DISK DRIVE INFORMATION DISK PACK INFORMATION

Type	Drive	Status	Mount Status	Mount Count	Name	Usage Options
*RP06	0, ,4	Avail	Free		AP20	(1/1)

Structure cannot be mounted unless MOUNTed via OPR

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2. Give the DISMOUNT STRUCTURE AP20: (with) REMOVAL command.

OPR>DISMOUNT STRUCTURE AP20:<ESC>(with) REMOVAL<RET>
 OPR>

11:48:30 <1> -- DISMOUNT QUERY --
 Dismount of structure AP20: (Alias AP20:) requested.
 Other jobs are currently using it. Should
 dismantment request be processed (Yes or No)?
 User WONG, Job 37, Terminal 10

OPR>RES 1 YES<RET>
 OPR>[Structure AP20 has been dismantled]

11:48:36 -- STRUCTURE DISMOUNTED --
 Structure AP20 dismantled

11:48:36 -- DISMOUNT STRUCTURE --
 Remove AP20: (alias AP20:)
 User WONG, Job 37, Terminal 10
 DISK DRIVE INFORMATION DISK PACK INFORMATION

Type	Drive	Status	Mount Status	Mount Count	Name	Usage Options
*RP06	0, ,4	Avail	Free		AP20	(1/1)

Structure cannot be mounted again unless MOUNTed via OPR or until removed

3. Give the DISMOUNT STRUCTURE AP20: (with) REMOVAL command from a terminal on SYZ:: in a CFS-20 cluster.

OPR>DISMOUNT STRUCTURE AP20:<ESC> (WITH) REMOVAL<RET>

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```

12:00:00 <2>          -- DISMOUNT QUERY --

Dismount of structure AP20: (Alias AP20:) requested.
Other jobs are currently using it. Should
dismount request be processed (Yes or No)?
User OPERATOR, Job 1, Terminal 232
OPR>RESPOND 2 YES<RET>
12:00:50 <3>          -- DISMOUNT QUERY --
Structure AP20: (Alias AP20:) is in use by:
SYSA::, SYSB::, SYSC::
and can't be removed from the cluster unless it is dismounted
with NO-REMOVAL from the other systems.
Respond with PROCEED to continue with the dismount or
Respond with ABORT to terminate the dismount request.
OPR>RESPOND 3 PROCEED<RET>

12:01:00          -- REMOTE DISMOUNT STATUS --
AP20: dismounted from SYSA::, SYSB::, SYSC::

12:01:20          -- DISMOUNT STRUCTURE --
Remove AP20: (alias AP20:)
User OPERATOR, Job 2, Terminal 233
DISK DRIVE INFORMATION          DISK PACK INFORMATION
Chan-Cont  Disk  Mount  Mount  233          Usage
Type  Drive  Status  Status  Count  Name          Options
-----
RP06 7,04,3  Avail  Free          GALAXY (1/1)
Structure cannot be mounted unless MOUNTed via OPR
The operators on SYSA::, SYSB::, and SYSC:: receive the
following message:

12:01:00          -- DISMOUNT STRUCTURE --
Do not remove AP20: (alias AP20:)
AP20: (Alias AP20) being dismounted from SYSZ::

DISK DRIVE INFORMATION          DISK PACK INFORMATION
Chan-Cont  Disk  Mount  Mount          Usage
Type  Drive  Status  Status  Count  Name          Options
-----
RP06 7,04,3  Avail  Free          AP20 (1/1)
Structure cannot be mounted unless MOUNTed via OPR

```

7.11.4 Canceling Mount Requests

If you are unable to satisfy a user's mount request, you can delete the mount request by giving the OPR command CANCEL MOUNT REQUEST nn. You should give a reason why you are canceling the mount request. You can do this by giving the /REASON switch with the CANCEL command.

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For example, you cancel a mount request because there is not a free drive.

```
OPR>CANCEL MOUNT-REQUEST nn /REASON:THERE ARE NO FREE DRIVES<RET>
```

where "nn" is the request number assigned to the mount request.

----- Example -----

Cancel mount request 204.

```
OPR>
OPR>CANCEL MOUNT-REQUEST 204/REASON:There are no disk drives available
OPR>
11:49:15          --Mount Request 204 Canceled--
```

7.11.5 Setting Disk Drives Available or Unavailable

You can set a disk drive UNAVAILABLE for assignment by the system by giving the following OPR command:

```
OPR>SET DISK-DRIVE CHANNEL n CONTROLLER n DRIVE n UNAVAILABLE<RET>
```

where:

- CHANNEL n specifies the channel number of the disk drive.
- CONTROLLER n specifies the controller for the disk drive.
- DRIVE n specifies the physical unit number of the drive.

When you give this command, the system prints:

```
ENTER TEXT AND TERMINATE WITH ^Z
```

The system now waits for you to type a reason explaining why you are setting the drive unavailable. A reason you would set a disk drive unavailable is that there was a hardware problem with the disk drive. It is also recommended that you set the structures on the disk drive UNAVAILABLE when you set the disk drive UNAVAILABLE.

To set a disk drive AVAILABLE for assignment by the system, give the following command:

```
OPR>SET DISK-DRIVE CHANNEL n DRIVE n AVAILABLE<RET>
```

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----- Examples -----

1. Set disk drive 4 on channel 1 UNAVAILABLE because of a hardware problem.

```
OPR>SET DISK-DRIVE CHANNEL 1 DRIVE 4 UNAVAILABLE<RET>
ENTER TEXT AND TERMINATE WITH ^Z
DISK DRIVE 4 HAS A HARDWARE PROBLEM<CTRL/Z>
```

OPR prints:

```
OPR>
17:30:39 --Disk Drive Set Unavailable--
Chan 1 Drive 4 set unavailable for mounting by MOUNTR
OPR>
```

2. Set disk drive 4 on channel 1 AVAILABLE after the hardware problem has been corrected.

```
OPR>SET DISK DRIVE CHANNEL 1 DRIVE 4 AVAILABLE<RET>
```

OPR prints:

```
17:32:43 --Disk Drive Set Available--
Chan 1 Drive 4 set available for mounting by MOUNTR
OPR>
```

7.12 SETTING THE PORT CI AVAILABLE/UNAVAILABLE

If your installation uses the CI for HSC50 disks or CFS, the CI port is AVAILABLE by default. There may be times, however, when the system manager determines that the CI port must be set UNAVAILABLE. Setting the CI port UNAVAILABLE ends the system's use of the CI and any disks that use the CI.

Most often, the CI port is set UNAVAILABLE when there is a serious hardware problem and it is necessary to run CI diagnostics. Setting the CI port UNAVAILABLE is not a standard procedure and should not be performed without approval from the system manager.

To set the CI port UNAVAILABLE, perform the following steps:

1. Type SET PORT CI UNAVAILABLE <RET>.
2. Once you see the message that indicates which structures are affected, send a system message telling users when you plan to set the CI port UNAVAILABLE and which structures are affected.

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3. Respond to the message indicating which structures are affected by typing RESPOND <RESPONSE NUMBER> and one of the following:

PROCEED - The PROCEED response begins the SET PORT CI UNAVAILABLE procedure. PROCEED is the standard response for setting the CI port UNAVAILABLE.

FORCE - The FORCE response dismounts all structures and sets the CI UNAVAILABLE with no further operator action. Structures are dismounted whether or not they are in use.

ABORT - The ABORT response cancels the SET PORT CI UNAVAILABLE procedure. If the SET PORT CI UNAVAILABLE procedure is aborted at this time, system operation is not changed.

Each structure and disk-drive is now handled on an individual basis. Depending on the message you see, do one of the following:

4. If a structure is on a dual-ported disk-drive:
 - a. You receive a message indicating that the drive is dual-ported. Respond to the message by setting the port switch to a single port following procedures listed below and then type one of the following:
 1. Spin down the pack.
 2. Set the port switch to either A or B appropriately.
 3. Spin up the pack.

PROCEED - The PROCEED response indicates that the port switch is set to one system and is no longer dual-ported. The process of setting the CI port UNAVAILABLE continues. You DISMOUNT any mounted structure by responding to the request for DISMOUNT.

FORCE - The FORCE response indicates that the status of the disk drive should be ignored. The port switch is not changed but the process of setting the CI UNAVAILABLE continues. Use caution with this response. CFS may disallow use of a dual-ported disk if the FORCE response is given. Any MOUNTed structure is DISMOUNTed.

ABORT - The ABORT response terminates the process of setting the CI port UNAVAILABLE. All previous actions remain, but the CI port remains AVAILABLE.

5. If the structure is mounted on a disk drive connected to the CI:

You have to DISMOUNT the structure. DISMOUNT the structure

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by responding to the request for DISMOUNT.

6. If the structure is not connected to a drive on the CI and is not dual-ported:

The structure is set EXCLUSIVE to your system. If the structure cannot be set EXCLUSIVE by the system, you are prompted for an action. You have to DISMOUNT the structure (with) NO REMOVAL from the other systems before the structure is set EXCLUSIVE to your system.

7. When all structures mounted on CI disks are dismantled, all dual-ported disk drives set, and necessary structures are set EXCLUSIVE, you see a message indicating that the CI port is set UNAVAILABLE.
8. The CI port remains UNAVAILABLE until you set the port AVAILABLE.
9. If at any point during the process, you refuse to dismantle a structure or handle a dual-ported disk drive, the SET PORT CI UNAVAILABLE procedure is aborted. All previously dismantled structures remain dismantled but the CI port remains AVAILABLE.

NOTES

1. At any point during the procedure, you can dismantle all structures at one time using the DISMOUNT procedures in Section 7.11.3. In this case, when you type PROCEED during the CI port procedure, you are prompted only for structures that have been overlooked.
2. At any point during the procedure, you can set all drives that are dual-ported to a single port. When you type PROCEED during the CI port procedure, you are only prompted for drives that have been overlooked.
3. If you type the SET PORT CI UNAVAILABLE command and your installation does not have a CI, you receive an error message.

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----- Examples -----

1. Set the PORT CI Unavailable using the Proceed response.

```
OPR>SET PORT CI UNAVAILABLE <RET>
OPR>
12:14:48 <1>      -- Port Unavailable Procedure Notice --
Setting CI Port 7 UNAVAILABLE
```

The following structure(s) need to be dismantled or removed.

DISK DRIVE INFORMATION				DISK PACK INFORMATION		
Type	Drive	Disk Status	Mount Status	Mount Count	Name	Usage Options
*RP06	0, ,2	Avail	Mounted	1	AP20	(1/1)
RP06	7,00,1	Avail	Mounted	1	DALE	(1/1)
RA81	7,07,5	Avail	Mounted	1	EXODUS	(1/1)
RA60	7,07,254	Avail	Mounted	1	DRV354	(1/1)
RA81	7,07,18	Avail	Mounted	0	DRV18	(1/1)

NOTE: Channel 7 indicates CI channel
 (*) indicates potential external port
 Type 'RESPOND <number> option' where 'option' is one of the following:

- ABORT To cancel Port Unavailable Procedure.
- PROCEED To follow normal port unavailable procedure verifying each structure change.
- FORCE To proceed with no further notification. Use this option with extreme caution.

```
OPR>RESPOND 1 PROCEED <RET>
OPR>
12:15:33      -- Port Unavailable Procedure Notice --
                Structure CHIP set exclusive due to port
                unavailable operation
```

```
OPR>
12:15:34 <2>      -- Port Unavailable Procedure Notice --
```

The following dual ported disk drive must be resolved to continue SET PORT CI UNAVAILABLE:

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DISK DRIVE INFORMATION				DISK PACK INFORMATION		
Chan-Cont	Disk	Mount	Mount	Usage		
Type	Drive	Status	Status	Count	Name	Options
*RP06	0, ,2	Avail	Mounted	1	AP20	(1/1)

(*) indicates potential external port

After the dual-ported disk has been resolved Type 'RESPOND <number> option' where 'option' is one of the following:

- ABORT To cancel Port Unavailable Procedure.
- PROCEED The drive has been single ported to this system.
- FORCE To proceed and ignore the porting of this drive. The drive will be set unavailable.

OPR>RESPOND 2 PROCEED <RET>

OPR>
12:17:49 <3> -- Port Unavailable Procedure Notice --

The following dual-ported disk drive must be resolved to continue SET PORT CI UNAVAILABLE:

DISK DRIVE INFORMATION				DISK PACK INFORMATION		
Chan-Cont	Disk	Mount	Mount	Usage		
Type	Drive	Status	Status	Count	Name	Options
*RP07	1, ,0	Avail	Offline			

(*) indicates potential external port

After the dual ported disk has been resolved Type 'RESPOND <number> option' where 'option' is one of the following:

- ABORT To cancel Port Unavailable Procedure.
- PROCEED The drive has been single ported to this system.
- FORCE To proceed and ignore the porting of this drive. The drive will be set unavailable.

OPR>RESPOND 4 FORCE

OPR>
12:19:22 -- Disk Drive Set Unavailable --
Channel 1 Drive 0 set unavailable for mounting by MOUNTR

OPR>
12:19:23 -- Disk Drive Set Unavailable --

Channel 7 Controller 0 Drive 1 set unavailable for mounting by MOUNTR

12:19:23 <5> -- Port Unavailable Procedure Notice --

Dismount of structure DALE: (Alias DALE:) requested.
Other jobs are currently using it.
Should dismount request be processed (Yes or No)?

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User WONG, Job 3, Terminal 1

OPR>RESPOND 5 YES
OPR>

12:20:00 -- DISMOUNT STRUCTURE SUCCEEDED AS PART OF PORT OPERATION --
Structure DALE: (alias DALE:) dismounted
User WONG, Job 3, Terminal 1

12:20:01 -- Disk Drive Set Unavailable --
Channel 7 Controller 7 Drive 5 set unavailable for mounting by MOUNTR

12:20:01 <6> -- Port Unavailable Procedure Notice --
.
.
.

12:21:24 -- Port Unavailable Operation Completed --
Port Set Unavailable

2. Set the PORT CI AVAILABLE

OPR>SET PORT CI AVAILABLE <RET>

Is there any other DECSYSTEM-20 using the CI?

OPR>
02:22:10 -- Port Available Operation Completed --
The following disk drive(s) have been returned to available:
Channel 1 Drive 0 set to available
Channel 7 Controller 0 Drive 1 set available
Channel 7 Controller 7 Drive 5 set available
Channel 7 Controller 7 Drive 376 set available
Channel 7 Controller 7 Drive 22 set available
Port set available

7.12.1 Displaying Disk Drive Status

You can display the status of the disk drives with the SHOW STATUS DISK-DRIVES command. With this command, you can specify one of the following:

1. The /ALL switch, to display both FREE and MOUNTED disk drives and their current status

OPR>SHOW STATUS DISK-DRIVES /ALL

2. The /FREE switch, to display all disk drives that are FREE for mounting

OPR>SHOW STATUS DISK-DRIVES /FREE

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- The /MOUNTED switch, to display those disk drives that are currently mounted and being accessed

```
OPR>SHOW STATUS DISK-DRIVES /MOUNTED
```

- The /CLUSTER-NODE: switch, to display the status of disk drives on the specified remote CFS-20 node. If * is specified, the disk-drive status of all nodes in the cluster is displayed.

```
OPR>SHOW STATUS DISK-DRIVES /CLUSTER-NODE:node
```

If you do not specify any switch, the SHOW STATUS DISK-DRIVES command defaults to /ALL.

The output from the SHOW STATUS DISK-DRIVES command with the /ALL switch specified displays:

- The type of disk drive (RP04, RP06, RP07, RP20, RA60, or RA81). An asterisk (*) next to the type of drive indicates that the disk drive is potentially dual-ported.
- The channel, controller, and drive number.
- The state of the disk-drive (Available/Unavailable).
- The mount status of the disk drive.
- The count number of users who have requested a mount of the structure.
- The name of the structure on the drive and the number of packs in the structure.
- Any usage options, if these are specified.

Information for both FREE and MOUNTED DISK-DRIVES is shown with the /ALL switch specified.

The OUTPUT from the SHOW STATUS DISK-DRIVES command with the /FREE switch specified, displays information about drives that are free for mounting. There may be a structure on the drive but the structure has not been mounted with the MOUNT command.

The output from the SHOW STATUS DISK-DRIVES command with the /MOUNTED switch specified displays information about drives that are currently mounted. The output from the SHOW STATUS DISK-DRIVES command with the /CLUSTER-NODE: switch specified displays information about drives on the specified remote CFS-20 node. The output includes the name of the remote node and the times that the remote node processed the command and the local node received the information.

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----- Examples -----

- Specify the SHOW STATUS DISK-DRIVES command with the /FREE switch.

```
OPR>SHOW STATUS DISK-DRIVE /FREE<RET>
OPR>
```

```
12:11:15 -- Disk Drive Status --
```

FREE DRIVES

DISK DRIVE INFORMATION				DISK PACK INFORMATION			
Type	Chan-Cont Drive	Disk Status	Mount Status	Mount Count	Mount Name	Usage	Options
*RP06	0, ,1	Avail	Offline				
*RP07	1, ,0	Avail	Free		FIAT	(1/1)	
RP06	7,01,1	Avail	Free		CHIP	(1/1)	
RA60	7,07,254	Avail	Offline				
RA81	7,08,18	Avail	Free		DRV18	(1/1)	
RA81	7,08,5	Avail	Offline				

NOTE: Channel 7 indicates CI channel
(*) indicates potential external port

- Specify the SHOW STATUS DISK-DRIVES command with the /MOUNTED switch.

```
OPR>SHOW STATUS DISK-DRIVE /MOUNTED<RET>
```

```
OPR>
12:11:28 -- Disk Drive Status --
```

MOUNTED DRIVES

DISK DRIVE INFORMATION				DISK PACK INFORMATION			
Type	Chan-Cont Drive	Disk Status	Mount Status	Mount Count	Mount Name	Usage	Options
RP06	0, ,0	Avail	Mounted	0	DALE	(1/1)	
*RP06	0, ,2	Avail	Mounted	1	AP20	(1/1)	
RA81	7,07,5	Avail	Mounted	1	EXODUS	(1/1)	

NOTE: Channel 7 indicates CI channel
(*) indicates potential external port

7.12.2 Displaying Disk Drive Serial Numbers

If you want to add a disk to the group of disks being served by the MSCP server, you need to know the serial number of the disk drive. To find the serial number of a disk drive, give the OPR command SHOW CONFIGURATION DISK-DRIVE. This command will display information similar to that of the SHOW STATUS DISK-DRIVE command as well as the

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serial numbers of each disk drive. The SHOW CONFIGURATION command also takes the /FREE, /ALL, /MOUNTED, and /CLUSTER-NODE: switches.

```
OPR>SHOW CONFIGURATION (of) DISK-DRIVE /ALL
OPR>
10:35:57 -- Disk Drive Configuration --
```

Type	Chan-Cont Drive	Drive Serial Number	Mount Status	Name
RP06	0, ,0	17170432 2369	Mounted	GIDNEY (1/1)
RP06	0, ,1	17170432 1156	Mounted	REL61 (1/1)
RP06	0, ,2	17170432 8576	Offline	
RP06	0, ,4	17170432 293	Mounted	PERF (1/1)
RP07	1, ,0	17235968 10337	Mounted	RANDOM (1/1)
RP07	1, ,1	17235968 9271	Mounted	GALAXY (1/1)
RP07	1, ,2	17235968 8965	Mounted	LOTUS (1/1)
*RP07	1, ,5	17235968 9501	Mounted	DICE (1/1)
RA81	7,14,15	33882112 4002	Mounted	SNARK (1/2)
RP07	7,11,3	17235968 14374	Mounted	SLICE (1/1)
RA81	7,03,6	33882112 4009	Mounted	PEBBLE (1/1)
RA81	7,03,14	33882112 4258	Offline	
RA60	7,03,16	33816576 1037	Mounted	PUBLIC (1/1)

NOTE: Channel 7 indicates CI channel
 (*) indicates potential external port

7.12.3 Displaying Structure Status

You can display the status of structures with the SHOW STATUS STRUCTURE command. With this command, you can specify one of the following:

1. The /ALL switch to display both MOUNTED and UNMOUNTED structures and their current status.

```
OPR>SHOW STATUS STRUCTURE /ALL
```

2. The /MOUNTED switch to display all structures that are currently mounted.

```
OPR>SHOW STATUS STRUCTURE /MOUNTED
```

3. The /UNMOUNTED switch to display all structures that are free for mounting.

```
OPR>SHOW STATUS STRUCTURE /UNMOUNTED
```

4. The /CLUSTER-NODE: switch to display the status of structures on the specified remote CFS-20 node. If * is specified, the structure of all nodes in the cluster is

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displayed.

```
OPR>SHOW STATUS STRUCTURE /CLUSTER-NODE:node
```

5. The str: name argument to display information about a single structure.

```
OPR>SHOW STATUS STRUCTURE str:
```

If you do not specify any switch or argument, the SHOW STATUS STRUCTURE command defaults to /ALL.

The output from the SHOW STATUS STRUCTURE command with the /ALL switch specified displays:

1. The Alias name for the structure.
2. The physical name of the structure, if there is one.
3. The mount status of the structure (mounted or unmounted).
4. The count of the number of users who have requested a mount of the structure.
5. The availability of the structure.
6. The file count of the structure.
7. The access to the structure (SHARED/EXCLUSIVE, DOMESTIC/FOREIGN).
8. The accounting status of the structure (REGULATED/UNREGULATED).
9. The "dumpable" designation for structures that were specified in a SET STRUCTURE str: DUMPABLE command.
10. Offline information, where applicable, if your system manager has enabled the "offline structures" facility.

In addition, the output indicates the boot and login structures. If your system manager has not enabled the "login structure" facility, the structures are the same.

The output from the SHOW STATUS STRUCTURE command with the /UNMOUNTED switch specified, displays information about structures that are free for mounting.

The output from the SHOW STATUS STRUCTURE command with the /MOUNTED switch specified, displays information about structures that are currently mounted.

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The output from the SHOW STATUS STRUCTURE command with the /CLUSTER-NODE: switch specified, displays information about structures on the specified remote CFS-20 node. The output includes the name of the remote node and the times that the remote node processed the command and the local system received the information. The output from the SHOW STATUS STRUCTURE command with the str: name argument specified, displays:

1. Structure information about the single structure, including alias, name, mount status, mount count, file count, availability, access, and accounting.
2. Disk drive information for the drive(s) on which the structure is mounted. This includes type of drive, channel-controller-drive, availability of the drive, mount status, mount count, name of structure and number of packs in the structure, and usage options.
3. A list of users who have mounted the structure.
4. A list of users who are accessing the structure.
5. A list of users who are connected to the structure.

NOTE

If you are requested to remove information about a structure from the structure tables, use the UNDEFINE STRUCTURE command. For information on the UNDEFINE STRUCTURE command, refer to the TOPS-20 Operator's Command Language Reference Manual.

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----- Examples -----

1. Specify the SHOW STATUS STRUCTURE command with the /MOUNTED switch.

```
OPR>SHOW STATUS STRUCTURE /MOUNTED <RET>
OPR>
16:13:26                -- Structure Status --
                        MOUNTED STRUCTURES

Alias Name      Mount State  Mount File
-----|-----|-----|-----|-----|-----|-----|-----|-----|
THEP  THEP      Mounted 0      62   Avail  Shared  ## Boot Structure ##
APATCH APATCH      Mounted 0      0     Avail  Shared  Domestic Regulated
DBMS20 DBMS20      Mounted 1      0     Avail  Shared  Domestic Unregulated
DICE   DICE        Mounted 2      0     Avail  Shared  Domestic Unregulated
COMMON COMMON      Mounted 1      7     Avail  Shared  Domestic Unregulated
PUBLIC PUBLIC      Mounted 5      68   Avail  Shared  ## Login Structure ##
WORK   WORK        Mounted 4      9     Avail  Shared  Domestic Unregulated
EXODUS EXODUS      Mounted 2      1     Avail  Shared  Domestic Unregulated
```

2. Specify the SHOW STATUS STRUCTURE command with the /UNMOUNTED switch.

```
OPR>SHOW STATUS STRUCTURE /UNMOUNTED <RET>
OPR>
16:13:55                -- Structure Status --
                        UNMOUNTED STRUCTURES

Alias Name      Mount State  Mount File
-----|-----|-----|-----|-----|-----|-----|-----|
JULIE                                     Avail  Shared  Domestic Regulated
NETPKG                                     Avail  Shared  Domestic Regulated
CG60                                       Avail  Shared  Domestic Regulated
WHEEL                                     Avail  Shared  Domestic Regulated
ARK                                        Avail  Shared  Domestic Regulated
DMLPS                                     Avail  Shared  Domestic Regulated
GALKL                                     Avail  Shared  Domestic Regulated
GINSU                                     Avail  Shared  Foreign  Regulated
WONG                                       Avail  Shared  Foreign  Regulated
Structure is Dumpable
```

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- Specify the SHOW STATUS STRUCTURE command with the structure name argument.

```
OPR>SHOW STATUS STRUCTURE GALAXY: <RET>
OPR>
```

17:48:07 -- Structure Status --

Alias	Name	Mount State	Mount Count	File Count	Status	Access	Accounting
GALAXY	GALAXY	Mounted	4	5	Avail	Shared Domestic	Unregulated
Can't use structure GALAXY: - structure is offline							

```
          Disk information pertaining to mounted structure
DISK DRIVE INFORMATION          DISK PACK INFORMATION
  Chan-Cont  Disk  Mount  Mount  Usage
  Type  Drive  Status  Status  Count  Name  Options
-----
RA81 7,00,36 Avail  Mounted 4  GALAXY (1/1)
NOTE: Channel 7 indicates CI channel
```

Users who have MOUNTed this structure:
WONG, RASPUZZI, JROSSELL.

Users who are ACCESSing this structure:
WONG, DUSSEAULT, GSCOTT.

Users who are CONNECTed to this structure:
WONG, JROSSELL.

OPR>

7.12.4 Setting the NI PORT AVAILABLE/UNAVAILABLE

If your installation is using the NI port for the DECnet-20 connection, the NI is set available by default. However, there may be times when you need to diagnose the NI or use the system in stand-alone mode. Setting the NI port UNAVAILABLE disables the DECNET connection.

To set the NI port UNAVAILABLE, perform the following procedure.

```
@ENABLE<RET>
$OPR<RET>
OPR>SET PORT NI UNAVAILABLE<RET>
```

OPR will display a message specifying that the NI is off-line. Once the NI is off-line, all connections to local area transports are terminated.

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To set the NI available, give the following OPR command.

```
OPR>SET PORT NI AVAILABLE<RET>
```

7.13 EXAMINING MOUNT-REQUESTS IN THE QUEUE

Whenever a user submits a request for a tape or disk mount, the request is placed in a queue where it waits for your response to either mount the tape or disk or delete the mount request. To examine the tape and disk mount queue at any time, give the OPR command SHOW QUEUES MOUNT-REQUESTS.

The output of the SHOW QUEUES MOUNT-REQUESTS command displays:

- The name of the tape or disk volume
- The status of the request
- The type of request (Tape or Disk)
- The density of the request
- The write access requested
- The number of the request
- The number of the user's job who made the request
- The name of the user
- The label status of a tape (labeled or unlabeled)

The status column displays the following:

- Waiting, if a tape or disk request is waiting to be satisfied
- A tape drive name (for example, MTA3:), if the request is currently for a tape drive
- Dismount, if a tape or disk is being dismantled
- Aborted, if a tape mount request has been deleted or aborted and the user has not yet given a dismant command to release the logical tape drive (MTn:)

If you specified the /CLUSTER-NODE: switch, the display also includes the name of the remote CFS-20 node and the times that the remote node processed the command and the local system received the information.

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----- Example -----

Give the SHOW QUEUES MOUNT-REQUESTS command to display the current tape and disk requests in the queue.

OPR>SHOW QUEUES MOUNT-REQUESTS<RET>

```
OPR>
11:37:10          -- System Queues Listing --

Volume  Status  Type  Dens  Write  Req#  Job#  User
-----  -
JCR     Waiting  Tape  Defa  Locked   1   143  JROSSELL
Volume-set: JCR  Tape is unlabeled
JCR     Waiting  Tape  Defa  Locked   2   143  JROSSELL
Volume-set: JCR  Tape is labeled
There are 2 requests in the queue
```

OPR>

7.14 CREATING A STRUCTURE DURING TIMESHARING

During timesharing, you can create a structure by doing the following:

1. Obtain the number of formatted disk packs needed for the structure.
2. Place the packs on any available disk drives and put the drives on-line.
3. Type PUSH to OPR.
4. Run CHECKD.
5. Type CREATE structure name to CHECKD.
6. Answer the questions from CHECKD.
7. Type EXIT to CHECKD.
8. MOUNT STRUCTURE str:

If this structure is to be used on a system other than a KL10 Model B, perform steps 9 through 11. Otherwise, proceed at step 12.

9. Run CHECKD.
10. Type DISABLE LARGE-DIRECTORIES

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11. Type EXIT to CHECKD.
12. Type DISABLE.
13. Type POP to return to OPR command level.

If CHECKD is a subjob of PTYCON at your installation, you need only to CONNECT to the CHECKD subjob and perform Steps 5 through 8 above. If your installation is part of a CFS-20 configuration, CHECKD may not be able to set the structure exclusive. If this happens, you must dismount the structure from the other systems using it. Use the dismount procedures for CFS-20 systems in Section 7.11.3. Then reissue the CHECKD command.

NOTE

When you create a structure, you destroy any information that was previously on the disk packs in the structure. If you want to save any information from an old structure, run DUMPER to save the files before you create the new structure on the same disk packs.

When you are running CHECKD to create a structure, first type the CREATE command and specify the name of the structure you want to create. This name is a physical identification written on the structure by CHECKD.

CHECKD then asks a series of questions. For each question you can type ? to get a help message. The questions are:

ENTER ALIAS:

Type a 1- to 6-character alphanumeric name for the alias. If you do not type a number, or if a structure has the same name as the structure you are creating, type the structure name as the alias. If another structure of the same name is mounted, press RETURN to get the default alias, CHECKD. If another structure is mounted with the name CHECKD, use another name. The alias is a temporary name that the system uses for your structure.

HOW MANY UNITS IN THIS STRUCTURE?

Type the number of disk packs that will be in the structure.

DECIMAL channel, CONTROLLER AND UNIT numbers FOR LOGICAL UNIT n:

This question is asked for each unit n in the structure. Type in a decimal channel number, followed by a comma, the controller number followed by a comma, and a unit (or drive) number to indicate where unit n is mounted.

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The help message for this question is similar to:

Triple of decimal numbers from one of the following:

TYPE	CHANNEL	CONTROLLER	UNIT	STRUCTURE NAME	LOGICAL UNIT
RP06	1	-1	0	OFF-LINE	
RP06	1	-1	1	OFF-LINE	
RP04	1	-1	2	STR2	0 (1 OF 1)
RP06	1	-1	5	OFF-LINE	

This output lists each drive that is available. Thus, each disk pack for the structure you are creating must be on some drive in the list. A structure name appears in the list if a disk pack is on-line and was formerly part of a structure. Do not specify the drive for that pack if you still want data from that structure.

If the help message does not eliminate confusion over channel and drive correspondence, consult your DIGITAL Field Service Representative.

NUMBER OF PAGES TO ALLOCATE FOR SWAPPING?

Type 0 if the structure is never going to be used as the system structure, BS:. Press ESCape to set the default value. Type a decimal number between 2000 and 40000 to specify a number.

If you have any question about the amount of swapping space, see your system manager. Note that swapping space is necessary on a system structure, but the default value is usually sufficient. If past experience has shown many SWAPPING SPACE LOW messages, you may need more swapping space. Increasing the swapping space here, however, may not be sufficient, because the maximum swapping space allocated within the monitor takes precedence. Thus, you might need a larger monitor or a tailored monitor.

NUMBER OF PAGES TO ALLOCATE FOR THE FRONT END FILE SYSTEM?

Type 0 if the structure is never to be used as the system structure, BS:. Press ESCape to get the default; the default should always be sufficient for the front-end file system.

OWNER NAME?

Type a 1- to 12-character alphanumeric name for the owner of the structure.

IS THIS A SYSTEM STRUCTURE FOR STARTUP?

If this structure is to be used for system startup, type YES. Otherwise, type NO.

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NOTE

The following question only appears if you answered YES to the above question.

SERIAL NUMBER OF CPU STARTED FROM THIS STRUCTURE?

Enter the serial number of the system this structure will be used on.

When CHECKD finishes the CREATE function, it prompts again. When you are finished with CHECKD, type EXIT.

----- Example -----

In the following example, structure QWERTY is created as a 1-pack structure. An ESCape was pressed to get the defaults for the swapping space allocation and the front-end file system. Therefore, QWERTY can be used as a system structure.

OPR>PUSH<RET>

TOPS-20 Command Processor 7(31)

@ENABLE<RET>

\$CHECKD<RET>

CHECKD>CREATE (NEW FILE SYSTEM FOR) QWERTY<RET>

ENTER ALIAS: QWERTY<RET>

HOW MANY UNITS IN THIS STRUCTURE? 1<RET>

CHANNEL , CONTROLLER, AND UNIT NUMBER FOR LOGICAL UNIT 0: ?

TRIPLE OF DECIMAL NUMBERS FROM ONE OF THE FOLLOWING:

TYPE	CHANNEL	CONTROLLER	UNIT	STRUCTURE NAME	LOGICAL UNIT
RP06	1	-1	2	STR2	0 (1 OF 1)

CHANNEL , CONTROLLER AND UNIT NUMBER FOR LOGICAL UNIT 0: 1,-1,2<RET>

NUMBER OF PAGES TO ALLOCATE FOR SWAPPING? <ESC>3050<RET>

NUMBER OF PAGES TO ALLOCATE FOR THE FRONT END FILE SYSTEM? <ESC>950<RET>

OWNER NAME? KIRSCHEN<RET>

IS THIS A SYSTEM STRUCTURE FOR STARTUP? NO<RET>

[QWERTY: MOUNTED AS QWERTY:]

[DISMOUNTING STRUCTURE - QWERTY:]

CHECKD>EXIT<RET>

\$DISABLE<RET>

@POP<RET>

OPR>

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----- Error Messages -----

?INVALID CONFIRMATION

You typed an invalid character within or after an argument.

? INVALID DECIMAL NUMBER

You did not type a valid decimal number for the argument.

? NAME STRING GREATER THAN 12. CHARACTERS

You typed more than 12 decimal characters for the owner name.

?WHEEL OR OPERATOR CAPABILITY REQUIRED

You must have WHEEL or OPERATOR capability enabled. Use a job logged in under OPERATOR, which should have OPERATOR capability, and type ENABLE before you run CHECKD.

7.15 COMMUNICATING WITH USERS

Timesharing and batch users often need to communicate with you to perform various tasks, to obtain help, or to send messages. The following sections tell you how to:

1. Respond to PLEASE requests with OPR
2. Help another user with SEND
3. Mail a message to a user with MAIL
4. Read any messages sent to you with RDMAIL

Refer also to the TOPS-10/TOPS-20 DECmail/MS Manual for information on the DECmail/MS system. You can use it in place of MAIL and RDMAIL for sending and receiving mail.

7.15.1 Answering PLEASE Requests with OPR

When a user sends a message with PLEASE, you receive from OPR a message at the console terminal that is time-stamped and has a message number enclosed in angle brackets. You should then answer the request with the RESPOND command in OPR. If you are not at OPR command level, you must connect to the subjob running OPR in PTYCON to issue the RESPOND command.

If the user requested some form of physical action, such as changing

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the forms on the line printer, you can make the change and then respond to let the user know that the change has been made. You can type any response to this message. However, you should pay attention to what the user said in the line of text and try to do what the user requested. If further communication is necessary, you can use the TALK command, the MAIL program, or issue the SEND command in OPR. If the request cannot be satisfied, you can respond with a refusal and/or text to explain why the request cannot be satisfied.

The format of the request from the user appears as follows:

```
hh:mm:ss <n> --Message from Timesharing User--
Job number User at Terminal nnn
one or more lines of text (or)
PLEASE line of text
```

This request contains the word PLEASE if the user sent a one-line message with the PLEASE program, or the line contains one or more lines of text ending with a ^Z (Control Z). This message can be a request for action, a question, or a comment. The user who sends you a PLEASE message should include a word or two for you to include in the RESPOND command to indicate that the request or question has been completed. If the user does not include any word(s) for the RESPOND command, you can RESPOND in any way desired to answer the message. With some requests, this line might be repeated to allow you to respond with different words for different circumstances.

----- Examples -----

1. A user might ask when timesharing ends. The message appears as follows:

```
OPR>
12:32:09 <3> --Message from Timesharing User--
JOB 32 BROWN at Terminal 114
PLEASE WHEN WILL TIMESHARING END?
RESPOND HH:MM:SS
```

OPR>

And, you can respond as follows:

```
OPR>RESPOND 3 18:00:00<RET>
OPR>
```

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2. The following example shows what appears on the terminal, running OPR as a subjob of PTYCON after a user sends a multi-line message with PLEASE.

```
OPR>
14:54:01 <13> --Message from Timesharing User--
                JOB 12 LATTA at Terminal 21
                LOAD NARROW FORMS ON PRINTER 2
                IF YOU ARE UNABLE, ABORT BATCH REQUEST 198
                RESPOND OK WHEN DONE
                RESPOND REFUSE IF CAN'T BE DONE
                ^Z
OPR>
OPR>RESPOND 13 REFUSE<RET>
OPR>ABORT BATCH-STREAM 1 /REQUEST-ID:198<RET>
OPR>
14:56:50      Batch-stream 1      JOB #66      --ABORTED--
                Job TEST Req #198 for LATTA
                No Reason Given with ERROR-PROCESSING
OPR>
```

7.15.2 Talking to Another User Immediately with SEND

If a user indicates that help is needed from you to use some system feature, you can help the user with the OPR command SEND. Connect to OPR from PTYCON and then give either of the following commands:

```
OPR>SEND JOB n message<RET>
```

or

```
OPR>SEND TERMINAL n message<RET>
```

where n is the number of the timesharing or batch job in the first command above, or the number of the user's terminal line in the second command above.

The SEND command allows you the option of including the message either in the SEND command string or as multiple lines terminated by a CTRL/Z.

The SEND command does not link your job or terminal to the user's job or terminal. If the user is waiting for input to a program, the message sent appears on the user's terminal, but it does not affect the program he is running.

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----- Examples -----

1. Tell a user that a task he requested is now complete.

```
OPR>SEND JOB 27<RET>
ENTER TEXT AND TERMINATE WITH ^Z
THE UPDATED FORTRAN SOURCE LIBRARY IS NOW ONLINE<RET>
YOU MUST CONNECT TO MISC:<CTRL/Z>
OPR>
```

2. Send a message to terminal 15 to notify the user that his batch requests are being held.

```
OPR>SEND TERMINAL 15 YOUR BATCH REQUESTS ARE BEING HELD<RET>
```

```
OPR>
```

----- Hints -----

Refer to the TOPS-20 Operator Command Language Reference Manual for a complete description of the SEND command.

If you need to link your terminal with the user's terminal, use the TOPS-20 ADVISE or TALK command. Refer to the TOPS-20 Commands Reference Manual for a description of these two commands.

7.15.3 Mailing a Message for a User to Read Later

You can send a message to one or more users by doing the following:

1. Type MAIL.
2. After TO: type the names of the users to whom you are mailing the message.
3. After CC: type the names of the users to whom you want copies of the message sent, or simply press RETURN if you do not want copies sent to anyone.
4. After SUBJECT: type a few words to indicate the subject of the message.
5. After the line beginning with MESSAGE, type the message, which can be several lines of text, and terminate it with ESCape or CTRL/Z.

----- Example -----

This example shows how to send a message to user JONES. If you are going to do this from the terminal that is running OPR, first type

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PUSH to OPR.

OPR>PUSH<RET>

TOPS-20 Command processor 7(31)
@MAIL<RET>

TO: JONES<RET>
CC: <RET>
SUBJECT: USER'S GUIDE<RET>
MESSAGE (TERMINATE WITH ESC OR CTRL/Z):

WE NOW HAVE MORE COPIES AVAILABLE AT THE COMPUTER CENTER<RET>
STOP BY IF YOU NEED ONE<RET>
\$
<ESC>

PROCESSING MAIL...
NO ERRORS.
-DONE-
@POP<RET>
OPR>

If you want to follow TO: or CC: with a list of users, separate their names with commas. You can also specify one indirect file which contains a list of names separated by commas. Precede the file name with "@", but be sure you put it last in the list. For example:

TO: SMITH,JONES,@LISTA.USR<RET>

sends a message to SMITH, JONES, and all the users in the file LISTA.USR. You can use recognition input on the user names and the filename.

You can also use one indirect file for the message itself. Precede the filename which contains the message with "@" and follow it with CTRL/Z or <RET>. You can use recognition on the filename.

The following example shows the use of an indirect file for the message:

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OPR>PUSH<RET>

TOPS-20 Command processor 7(31)
@MAIL<RET>

TO: SMITH<RET>
CC: MULLEN<RET>
SUBJECT: TEST<RET>
MESSAGE (TERMINATE WITH ESC OR CTRL/Z):

@A.TST<RET>

PROCESSING MAIL...
NO ERRORS.
-DONE-
@POP<RET>
OPR>

Once you have sent the message, all users in the TO: or CC: list who are logged in are notified immediately that they have a message. If they are not logged in, they are notified the next time they log in. The users must read the message by running RDMAIL. Consequently, the time when the message is actually read is up to the user.

(Refer to the TOPS-20 User Utilities Guide for all error messages from MAIL.)

7.15.4 Reading Your Messages with RDMAIL

If someone sends you a message with MAIL, you are notified, either when you log in or when the message is sent, that you have a message. You should read the message with RDMAIL. To do this:

1. Type PUSH to OPR.
2. Run RDMAIL.
3. Press RETURN after DATE AND TIME (/H FOR HELP).
4. Type POP to return to OPR.

Once you press RETURN after DATE AND TIME, any messages that you have not read before are printed on your terminal. If you want to read old messages, specify a date and time after the DATE AND TIME prompt. The format for the date and time is explained when you type /H for HELP.

(Refer to the TOPS-20 User Utilities Guide for more information on RDMAIL.)

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----- Example -----

OPR>PUSH<RET>

TOPS-20 Command processor 7(31)
@RDMAIL<RET>
DATE AND TIME (/H FOR HELP)<RET>

DATE: 5-MAR-82 15:39
FROM: WELLS
TO: OPERATOR

SUBJECT: FILES-ONLY DIRECTORY

WHERE CAN I GET A FORM TO APPLY FOR A FILES-ONLY DIRECTORY?

=====
@POP<RET>
OPR>

7.16 HELPING A USER WITH TERMINAL PROBLEMS

If you are notified by a user that his terminal is not responding, try the following:

1. Check the terminal speed. Ask the user for his terminal number, or if the user is logged in, do a SYSTAT user to determine the terminal number. Then type the file SYSTEM:n-CONFIG.CMD, where n is the TOPS-20 version number. Find the line referring to the terminal number and see what its initial speed should be. If the terminal is designated for autobaud detection, the speed is 110, 150, 300, or 1200. Have the user manually set the terminal for the proper speed and then try again. (Refer to the TOPS-20 Software Installation Guide for more information on n-CONFIG.CMD and setting terminal speeds.)
2. If Step 1 does not work, be sure the user leaves the terminal set at the speed specified in the n-CONFIG.CMD file. Then type to OPR:

```
OPR>PUSH<RET>
@ENABLE<RET>
$^ESET TERMINAL t SPEED s<RET>
$POP<RET>
OPR>
```

where t is the terminal number and s is the speed in the n-CONFIG.CMD file. If there is a different input and output speed, you must enter both the input and output speeds. Then

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have the user try again.

3. If Step 2 does not succeed because the user can not set the terminal for the speed in the n-CONFIG.CMD file, give a ^ESET TERMINAL command as above for a speed which the user can manually set for the terminal. Then have the user try again. If that succeeds and the terminal is going to be used permanently, you should also edit the file SYSTEM:n-CONFIG.CMD to change the speed for that terminal.
4. If none of the above works, the terminal is broken or the job is hung. Notify the user of his options, given below. Then notify your system manager and software specialist.

If a terminal is not functioning correctly or a job is hung, the user has the following options:

1. If he is not logged in, the user can simply look for another terminal and log in.
2. If the user is logged in and wants the same job, try to unattach the user's job. Type to OPR:

```
OPR>PUSH<RET>
@ENABLE<RET>
$UNATTACH (USER) name (JOB #) n<RET>
[ATTACHED TO TTYxxx, CONFIRM]<RET>
$POP<RET>
OPR>
```

where name is the user's name and n is the user's job number.

The user should then try to attach to job n at another terminal. If the user is still unsuccessful, go to Step 3.

3. If the user is logged in, try to log the job out by typing to OPR:

```
OPR>PUSH<RET>
@ENABLE<RET>
$LOGOUT n<RET>
[CONFIRM]
$<RET>
$POP<RET>
OPR>
```

where n is the user's job number. (Section 7.17 has more detail on logging out a job.) If LOGOUT succeeds within ten seconds and the terminal is functioning correctly, the user should then be able to log in at the same terminal. If it does not succeed, go to Step 4 and report the problem to your software specialist.

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OPR>PUSH<RET>

```
TOPS-20 Command processor 7(31)
@ENABLE<RET>
$LOGOUT 28<RET>
User TUCKER on TTY32, running EXEC
[Confirm]<RET>
$POP<RET>
OPR>
```

4. If the user is logged in and LOGOUT in Step 3 did not work because of system software problems, you can unattach the user by typing to OPR:

```
OPR>PUSH<RET>
@ENABLE<RET>
$UNATTACH (USER) name (JOB #) n<RET>
$POP<RET>
OPR>
```

where name is the user's name and n is the user's job number.

The user should then be able to log in at the same terminal. If the user cannot, there is a problem with the terminal, the terminal line, or the system. Report the situation to your system manager. The user must try another terminal or terminal line.

```
OPR>PUSH<RET>
TOPS-20 Command processor 7(31)
@ENABLE<RET>
$UNATTACH (USER) PORADA (JOB #) 23<RET>
[ATTACHED TO TTY105, CONFIRM]<RET>
$SYSTAT 23<RET>
 23 DET EXEC PORADA
$POP<RET>
OPR>
```

5. If the user cannot find another terminal, he can request that you perform some task for him. If this is within the rules of your installation, perform the task. You might do the entire task from the subjob 0, you might ADVISE the job to do the task, or you might attach to the user's job from the subjob 0, perform the task, log out, and attach back to the subjob. Be sure to give the correct password.

To attach to a user's job, type to OPR:

```
PUSH
ENABLE
ATTACH user n
```

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where user is the user's name and n is the user's job number.

OPR>PUSH<RET>

```
TOPS-20 Command processor 7(31)
@ENABLE<RET>
$ATTACH (USER) POR (JOB #) 23<RET>
DETACHING JOB # 3
$ !Perform task for user
```

```
.
.
$LOGO<RET>
KILLED JOB 23, USER POR, ACCOUNT 104, TTY 101,
AT 5-OCT-87 08:55:16, USED 0:0:6 IN 0:5:1
```

```
$ATTACH OPERATOR 3<RET>
$POP<RET>
OPR>
```

----- Hints -----

More information on the ^ESET TERMINAL command is in the TOPS-20 Operator's Command Language Reference Manual.

Once a user establishes terminal communication, he can use the TERMINAL SPEED command (in the TOPS-20 User's Guide) to specify a different speed and then manually set the terminal for that speed. This procedure, however, does not change the default speed of the line. You must edit SYSTEM:n-CONFIG.CMD to change the default speed.

7.17 LOGGING OUT A USER WITH LOGOUT

To delete unwanted jobs from the system, type the command:

```
LOGOUT n
```

where n is the number of the job you want to delete. You must first enable your operator privileges. Also, be absolutely sure that a job is unwanted before you log it out. The types of unwanted jobs should be listed for you by the system manager. Then you can periodically give the SYSTAT command and check the output against the list to find any unwanted jobs. A possible list of unwanted jobs and ways of identifying them in the SYSTAT output are:

1. Jobs that have not used any runtime over a certain time period. Periodically, use the command SYSTAT TIME or SYSTAT n TIME, where n is a job number, to see if the job's runtime has increased.

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2. All jobs that have been detached longer than five minutes, provided your system manager has decided not to allow any detached jobs and has sufficiently warned all users of this. This means you should log out all users whose line designation in the output from SYSTAT is DET, which means detached. However, you are never able to log out SYSJOB.
3. A job that a user has requested you to log out due to a problem. Be sure the request is valid. Then check that the job number the user wants you to log out belongs to that user. Do this by typing PUSH to OPR and then type SYSTAT n. For example:

```
OPR>>PUSH<RET>
TOPS-20 Command processor 7(31)
@SYSTAT n<RET>
.
@POP<RET>
OPR>
```

where n is the job number, and check that the user name is correct. If the name is correct, you can log out the job.

----- Example -----

If you want to log out job 7 and you do not have any subjobs defined other than OPR, type:

```
OPR>>PUSH<RET>
TOPS-20 Command processor 7(31)
@ENABLE<RET>
$LOGOUT 7<RET>
User TUCKER on TTY32, running EXEC
[Confirm]<RET>
$DISABLE<RET>
@POP<RET>
OPR>
```

----- Hints -----

Because there is no message printed on your terminal to indicate that you have successfully logged out another job, you can use SYSTAT to verify that the job is gone. However, keep in mind that by the time you give the SYSTAT command a user could already have that job number again.

If you log out a job that was a subjob of PTYCON, PTYCON prints a message about the subjob being killed.

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----- Error Messages -----

?ILLEGAL TO LOGOUT JOB 0

You are not allowed to log out job 0 under which SYSJOB runs.

?THAT JOB DOES NOT EXIST

You typed the wrong job number, or the job you intended to log out is already logged out.

?WHEEL OR OPERATOR CAPABILITY REQUIRED TO LOGOUT ANOTHER JOB

You must have WHEEL or OPERATOR capability.

7.18 GENERATING ACCOUNTING REPORTS

The USAG20 and USAH20 programs allow you to produce accounting reports from system accounting data. The CHPNT program enables you to include disk usage in these reports and makes the accounting data available to USAG20 and USAH20. In addition, the CHPNT program allows you to change the accounting periods during normal operation.

These accounting functions are discussed briefly in the following sub-sections. You can find more information in the TOPS-10/TOPS-20 USAGE File Specification.

You must discuss with your system manager the schedule (if any) for performing these tasks.

7.18.1 Getting Disk and System Usage with CHPNT

To include disk usage in the accounting reports and then make the disk and system usage available for reports, type to OPR:

1. PUSH
2. ENABLE
3. CHPNT
4. DISK-STATISTICS structure:

Repeat this command for each structure for which you want disk usage. If you omit the argument structure:, your currently connected structure is used.

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5. COPY (SYSTEM DATA TO) output file

The output file can contain up to six characters for the filename and three characters for the file type. It can later be used as the input file for USAG20. The default filename is USAGE.OUT in your connected directory.

6. EXPUNGE (PROCESSED SYSTEM DATA)

7. EXIT

8. DISABLE

9. POP to return to OPR

----- Example -----

OPR>PUSH<RET>

```
TOPS-20 Command processor 7(31)
@ENABLE<RET>
$CHKPNT<RET>
CHKPNT>DISK-STATISTICS (FOR STRUCTURE) PS:<RET>
CHKPNT>DISK-STATISTICS (FOR STRUCTURE) AK:<RET>
CHKPNT>COPY (SYSTEM DATA TO) USAGE.OUT<RET>
CHKPNT>EXPUNGE (PROCESSED SYSTEM DATA)<RET>
      [123 PAGES FREED]
CHKPNT>EXIT (TO MONITOR)<RET>
$DISABLE<RET>
@POP<RET>
OPR>
```

If you do not want any reports on disk usage, omit Step 4 above.

The EXPUNGE command to CHKPNT in Step 6 deletes and expunges all system accounting data files already processed by the COPY command to CHKPNT. If you want to save these files, you should rename them, copy them, or save them with DUMPER before you expunge them. The file is called SYSTEM-DATA.BIN in BS:<ACCOUNTS>. If you do not expunge these files, the next COPY command to CHKPNT reprocesses them and makes them available to USAG20 or USAH20 again.

If your system manager wants to change the accounting period between shifts to bill users at a different rate for the next shift, you can give the following command to the CHKPNT program:

CHANGE (ACCOUNTING SHIFT NOW)<RET>

This command causes a session end entry followed by a session-start entry for every active job in the system. There is no visible indication to the user that an accounting shift change has occurred.

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----- Error Messages -----

?CHKPNT: COULD NOT FIND SYSTEM-DATA FILE
? JSYS ERROR: DIRECTORY ACCESS PRIVILEGES REQUIRED

You typed the COPY command, but you do not have privileges to read the SYSTEM-DATA files. Be sure you are connected to the subjob OPR, logged in under OPERATOR, and ENABLED.

? CHKPNT: GARBAGE AT END-OF-COMMAND

You did not press RETURN or LINE FEED after a command.

? CHKPNT: INVALID FILENAME SPECIFIED

Your file specification contained an invalid filename or an unmounted structure.

? CHKPNT: INVALID STRUCTURE NAME GIVEN

You specified an unmounted structure, you forgot the colon after the structure name, or you omitted the structure name.

? CHKPNT: NO SUCH CHKPNT COMMAND AS "xxx"

You typed an invalid CHKPNT command.

7.18.2 Reporting Usage with USAG20

To get various cost summaries reported in a disk file, which can later be printed on the line printer and distributed, take the following steps. First, be sure that you processed system accounting data with the COPY command to CHKPNT. You might or might not have included disk usage. Second, be sure you have USAG20.CHG in your connected directory. Your system manager should have created USAG20.CHG by using the information in the TOPS-10/TOPS-20 USAGE File Specification. Then, type to OPR:

1. PUSH
2. ENABLE
3. USAG20
4. input file specification

This is the file output by the COPY command to CHKPNT in the previous section. The default is USAGE.OUT in your currently connected directory.

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5. S or D

S gives a report of system usage, and D gives a report of disk usage. Press RETURN to get system usage, the default.

6. N or A

N sorts the report by directory name, and A sorts the report by account. Press RETURN to get name, the default.

7. output file specification

This is the file that contains the report. The default is USAGE.RPT in your currently connected directory.

8. EXIT

9. PRINT output file specification/REPORT:argument

The argument must correspond to the type of report requested. The type of report and arguments are:

Report	Argument
System usage by name	NAME
System usage by account	ACCOUNT
Disk usage by name	DNAME
Disk usage by account	DACCOUNT

10. DISABLE

11. POP to return to OPR

If you want to produce different reports, after Step 5, go back to Step 2.

For easy identification you might use an output file specification that indicates the day or week of the report.

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----- Example -----

```
OPR>PUSH<RET>
TOPS-20 Command processor 7(31)
@ENABLE<RET>
$USAG20<RET>
TOPS20 ACCOUNTING SYSTEM
READ USAGE FILE: USAGE.OUT<RET>
  INPUT FILE NAME: USAGE .OUT
REPORT BY [SYSTEM USAGE (S) OR DISK USAGE (D)]: S<RET>
SORT BY [NAME (N) OR ACCOUNT (A)]: N<RET>
WRITE TO FILE: USAGE.RPT<RET>
  OUTPUT FILE NAME: USAGE .RPT
READ USAGE FILE: EXIT<RET>

EXIT

$PRINT USAGE.RPT/REPORT:NAME<RET>
[LPT:USAGE=/SEQ:105/LIMIT:100, 1 FILE]
$DISABLE<RET>
@POP<RET>
OPR>
```

----- Hint -----

Refer to the TOPS10/TOPS20 USAGE File Specification for additional accounting information.

----- Error Messages -----

FILE CHARGE-FILE [USAG20.CHG] CANNOT BE OPENED ON DEVICE DSK

When you run USAG20, you must have the file USAG20.CHG in your connected directory. This file, which is created by your system manager, contains billing rates.

FILE IN-FILE [inputfile] CANNOT BE OPENED ON DEVICE DSK

The file that you want USAG20 to read must be in your connected directory. Inputfile is the filename and file type that USAG20 interpreted from what you typed after READ USAGE FILE: prompt.

INCOMPLETE INPUT SPOOLER ENTRY

USAG20 did not find all three records of an input-spooler entry. Therefore, the other records of the entry are ignored.

INCOMPLETE OUTPUT SPOOLER ENTRY

USAG20 did not find all three records of an output-spooler entry. Therefore, the other records of the entry are ignored.

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INCOMPLETE SESSION ENTRY

USAG20 did not find all three records of a session entry.
Therefore, the other records of the entry are ignored.

INPUT FILE ERROR: inputfile

You typed input file after the READ USAGE FILE: prompt, but
inputfile was not a valid filename and file type.

OUTPUT FILE ERROR: outputfile

You typed outputfile after WRITE TO FILE: prompt, but outputfile
was not a valid filename and file type.

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CHAPTER 8

SCHEDULED SOFTWARE TASKS

As the operator, there are several software tasks involving both system programs and commands that you need to perform. Some of them must be done on a daily basis and in a particular order. Others can be done less frequently or only on request. Your system manager or operations staff should establish a daily schedule, (perhaps divided into by operator shifts, and weekly, monthly, or yearly schedules, if appropriate).

The following sections in Chapter 8 discuss in chronological order possible scheduled software tasks. These tasks are the tasks you do after you ready the system for timesharing. You should follow the schedule given to you by your system manager or operations staff to determine when you need to perform a task.

NOTE

For you to perform any scheduled software task described in Chapter 8, you must have WHEEL or OPERATOR capability. If either capability is not needed to perform the task, it is mentioned in the description of the task.

Note that you can use the /CLUSTER-NODE: switch with the commands described in this chapter to affect jobs on specified nodes in a CFS-20 cluster.

8.1 SETTING LOGINS-ALLOWED AND OPERATOR-IN-ATTENDANCE

When the system is started, you must allow LOGINS on the appropriate terminals and indicate that you are present. To do this, take the following steps:

1. Type PUSH to OPR.

2. Type ENABLE.
3. Give the INFORMATION (ABOUT) SYSTEM-STATUS command.
4. Use ^ESET LOGINS-ALLOWED if you need to change the set of terminals for LOGINS.
5. Use ^ESET OPERATOR-IN-ATTENDANCE, if necessary, to indicate that you are present.
6. Type POP to return to OPR.

You can also use this procedure later to change the set of terminals from which LOGINS are allowed, or to indicate that there is not any operator present. (Details on ^ESET LOGINS-ALLOWED and ^ESET OPERATOR-IN-ATTENDANCE are given in the TOPS-20 Operator's Command Language Reference Manual.)

----- Example -----

OPR>PUSH<RET>

```
TOPS-20 Command processor 7(4430)
@INFORMATION (ABOUT) SYSTEM-STATUS<RET>
Operator is in attendance
Remote logins allowed
Local logins allowed
Pseudo-terminal logins allowed
Internet TCP/IP terminal logins are not allowed
DECnet terminal logins allowed
LAT terminal logins allowed
Console terminal login allowed
Accounting is being done
Account validation is enabled
Working set preloading is disabled
Sending of system level zero messages is enabled
Sending of system level one messages is enabled
Job zero CTY output is enabled
Tape-drive allocation is enabled
Automatic file-retrieval-waits allowed
Maximum offline-expiration is 90 days
Scheduler bias-control setting is 11
Class scheduling is disabled, batch jobs being run on dregs
queue
Offline structures timeout interval is 0 minutes and 5 seconds
Cluster information is enabled
Cluster sendalls are enabled
Minimum password length is 8 characters
Password expiration is 45 days
Password dictionary is enabled
@
```

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Then to allow LOGINS on all terminals and indicate that an operator is present:

```
@ENABLE<RET>
$^ESET LOGINS-ALLOWED (ON) ANY-TERMINAL<RET>
$^ESET OPERATOR-IN-ATTENDANCE<RET>
$POP<RET>
OPR>
```

----- Hint -----

You can put the initial ^ESET LOGINS-ALLOWED and ^ESET OPERATOR-IN-ATTENDANCE commands in the file SYSTEM:n-SYSJOB.RUN. Decide with your system manager what ^ESET commands, if any, need to be in the n-SYSJOB.RUN file, and when you should manually change a ^ESET parameter. It might be wise to put ^ESET LOGINS-ALLOWED ANY in the n-SYSJOB.RUN file, but to make the operator on duty do the ^ESET OPERATOR-IN-ATTENDANCE. Thus, if there is no operator on duty, the status is NO OPERATOR-IN-ATTENDANCE. The defaults, before the n-SYSJOB.RUN file is read, are LOGINS ALLOWED from the CONSOLE TERMINAL and PSEUDO-TERMINALS with NO OPERATOR-IN-ATTENDANCE.

8.2 CREATING THE MESSAGE OF THE DAY WITH MAIL

To send a message to all users of the system, do the following:

1. Type PUSH to OPR.
2. Enable capabilities.
3. Run MAIL.
4. After the TO:, type SYSTEM.
5. After the CC:, press RETURN.
6. Give the subject.
7. Type the message.
8. End the message with ESCape or CTRL/Z.
9. Type POP to return to OPR command level.

The message is put into the file MAIL.TXT in PS:<SYSTEM>. Then when a user logs in to the system, the user receives on his terminal the messages that he has not seen before. Also, as soon as you finish sending mail to SYSTEM, all on-line terminals receive the message:

```
[NEW MESSAGE-OF-THE-DAY AVAILABLE]
```

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Users already logged in can then read the new message by running RDMAIL with the /M switch.

----- Example -----

```
OPR>PUSH<RET>

TOPS-20 Command processor 7(31)
@ENABLE<RET>
$MAIL<RET>

TO: SYSTEM<RET>
CC:<RET>
SUBJECT:CHRISTMAS<RET>
MESSAGE (TERMINATE WITH ESC OR CTRL/Z):

THE SYSTEM WILL BE UP FOR TIMESHARING ON CHRISTMAS DAY,<RET>
BUT THERE WILL BE NO OPERATOR COVERAGE.<RET>
<CTRL/Z>
PROCESSING MAIL...
NO ERRORS.
-DONE-
$POP<RET>
OPR>
```

----- Hints -----

Never change the file PS:<SYSTEM>MAIL.TXT with an editor. Always use MAIL.

If you receive a message from SYSJOB before or while trying to run MAIL, and the message indicates a problem with MAILER or INFO, restart MAILER or INFO (refer to Section 9.8). Then type DIRECTORY MAIL.CPY. If the file is not found, type UNDELETE MAIL.CPY. Then do the following:

1. Type GET SYS:MAIL.
2. Type REENTER.
3. After FILE NAME OF MESSAGE FILE:, type MAIL.CPY.
4. After -DONE-, type DISABLE.

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----- Example -----

OPR>PUSH<RET>

TOPS-20 Command processor 7(31)
@ENABLE<RET>
\$GET SYS:MAIL<RET>
\$REENTER<RET>

FILE NAME OF MESSAGE FILE:MAIL.CPY<RET>

PROCESSING MAIL...
NO ERRORS.
-DONE-
\$DISABLE<RET>
@POP<RET>
OPR>

----- Error Messages -----

?COULD NOT SEND TO MAILER

MAILER is hung or not running. Restart it.

?MAILER DIED, MESSAGES NOT SENT

Restart MAILER.

PROCESSING MAIL...SYSTEM NOT SENT BECAUSE: reason

The reason indicates why you could not send the mail. Often, the reason is WHEEL OR OPERATOR CAPABILITY REQUIRED. If so, be sure that you are logged in under OPERATOR, which should have OPERATOR capability, and that you have typed ENABLE.

PROCESSING MAIL...SYSTEM NOT SENT QUOTA EXCEEDED

You cannot send the mail because the directory PS:<SYSTEM> has exceeded its disk storage limit.

8.3 ENTERING ACCOUNT VALIDATION DATA WITH EDIT

To initially create and later update account validation data, use EDIT. Create or modify account entries as you are directed by your system manager. Your system manager must also tell you the file specification of the base account validation file, if one exists.

Type to OPR>:

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1. PUSH
2. ENABLE
3. CONNECT STR:<directory containing file>
4. EDIT file
5. Commands to EDIT to add or modify entries in the file
6. EU
7. CONNECT
8. DISABLE
9. POP

The base account validation file contains entries for each base account in the system. The format of the entries for each base account is:

ACCOUNT name/SUBACCOUNT:file specification
USER user name, user name,...
DIRECTORY structure:<directory>
GROUP (ON STRUCTURE) structure:/USER:user group number
GROUP (ON STRUCTURE) structure:/DIRECTORY:directory group number

Part of the format is optional, and some entries can be given more than once.

Each entry can also specify an expiration date with:

/EXPIRES:dd-mm-yy hh:mm

When you place /EXPIRES: after an account name, user name, directory, or group number, the expiration date applies to that item only. When you place /EXPIRES: immediately after USER, the expiration date applies to all user names.

The various entries are briefly described below.

ACCOUNT Specifies the name of the base account.

/SUBACCOUNT: Specifies the file containing additional data for the base account. The ACCOUNT entry allows only one /SUBACCOUNT:.

USER Specifies users who are allowed to use the account. An argument of * means all users of the system.

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DIRECTORY Specifies a directory. Anyone with write access to the directory can use the account. A * can be used for the structure or directory to mean all structures or directories.

GROUP Specifies that the account can be used by certain user or directory groups on a structure.

/CLASS:n Specifies the numeric (n) class an account is in.

/USER: Modifies GROUP and specifies that the account can be used by this user group.

/DIRECTORY: Modifies GROUP and specifies that the account can be used by this directory group.

----- Example -----

To add a new base account to PS:<ACCOUNTS>ACCOUNTS.TXT, type:

```
OPR>PUSH<RET>
TOPS-20 Command processor 7(31)
@ENABLE<RET>
$CONNECT <ACCOUNTS><RET>
$EDIT ACCOUNTS.TXT<RET>
Edit: ACCOUNTS.TXT.3
*!10;10<RET>
00010 ACCOUNT LUMBER/SUBACCOUNT:<FORESTRY>ACCTS.TXT<RET>
00020 USER MILLER,JACK,HACKSAW<RET>
00030<ESC>
*EU<RET>

[ACCOUNTS.TXT.4]
$CONNECT<RET>
$DISABLE<RET>
@POP<RET>
OPR>
```

----- Hint -----

Refer to the TOPS-20 User's Guide for more information on the EDIT program.

8.4 UPDATING THE ACCOUNT VALIDATION DATA BASE WITH ACTGEN

After you change account validation data with EDIT or after a project administrator changes a subaccount file, you must run ACTGEN before the new data is effective.

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Type to OPR>:

1. PUSH
2. ENABLE
3. CONNECT PS:<ACCOUNTS>
4. ACTGEN
5. TAKE file specification
Specify the base account validation file used in the previous section.
6. INSTALL
7. EXIT
8. DELETE ACCOUNTS-TABLE.BIN,
9. KEEP 1
10. <RET>
11. CONNECT
12. DISABLE
13. POP

----- Example -----

```
OPR>PUSH<RET>
TOPS-20 Command Processor 7(31)
@ENABLE<RET>
$CONNECT PS:<ACCOUNTS><RET>
$ACTGEN<RET>
ACTGEN>TAKE (COMMANDS FROM) ACCOUNTS.TXT<RET>
ACTGEN>INSTALL (NEW ACCOUNT VALIDATION DATA BASE)<RET>
ACTGEN>EXIT (TO MONITOR)<RET>
$DELETE ACCOUNTS-TABLE.BIN,<RET>
$KEEP 1<RET>
$<RET>
ACCOUNTS-TABLE.BIN.2 [OK]
$CONNECT<RET>
$DISABLE<RET>
@POP<RET>
OPR>
```

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----- Error Messages -----

? ACTGEN: GARBAGE AT END-OF-COMMAND

Press RETURN at the end of a command.

? ACTGEN: INVALID FILE SPECIFICATION, FILE NOT FOUND

The file you specified was not found. Check the directory of the file.

? ACTGEN: NO SUCH ACTGEN COMMAND AS "xxx"

You typed the command "xxx" to ACTGEN and it was not a valid command, or in the file you specified for the TAKE command to ACTGEN there is an invalid entry beginning with "xxx".

? INCORRECT FIELD: xxx IN ENTRY: aaa
IN FILE: file specification

In the file you specified for the TAKE command to ACTGEN, the field xxx was incorrect in entry aaa. If the field is a file specification, check that the file exists in the appropriate directory.

8.5 ADDING, CHANGING, AND DELETING DIRECTORIES WITH ^ECREATE

If you need to add a directory or user name to the system, or to change some directory parameters, or delete a directory from the system, use the ^ECREATE command.

8.5.1 Adding Directories for Users

To give users the ability to log in to the system, you must create directories for them on PS:, the public structure. Use the name approved by your system manager for the directory name for a user.

NOTE

By default, the public structure is the boot structure (BS:), also known as the system structure. However, if your system manager has enabled the "login structure" facility, PS: points to the login structure.

If the directory name contains a ".", for example, <C.SMITH>, the directory is actually a subdirectory. Before you create a subdirectory, you must first have created its superior directory, in

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this case <C>. You can determine the superior directory for a subdirectory by using the name of the subdirectory and eliminating the last "." and the characters after it. For example, the superior directory for <AL.BROWN> is <AL>, and the superior directory for <B.BLACK.1> is <B.BLACK>.

To create a directory with default parameters, type to OPR>:

1. PUSH
2. ENABLE
3. ^ECREATE PS:<directory> password
4. <RET> to finish
5. DISABLE
6. POP

NOTE

If you are connected to structure PS: when you are creating a directory to allow a user to log in, you can omit PS: in the ^ECREATE command.

----- Example -----

```
OPR>PUSH<RET>
TOPS-20 Command processor 7(31)
@ENABLE<RET>
$^ECREATE PS:<NATHANIEL> MATTHEW<RET>
[NEW]
$$<RET>
$DISABLE<RET>
@POP<RET>
OPR>
```

To create a directory with some nondefault values, type to OPR>:

1. PUSH
2. ENABLE
3. ^ECREATE PS:<directory>
4. PASSWORD password
5. Other nondefault parameters and arguments, if any

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6. <RET> to finish
7. DISABLE
8. POP

(Refer to the TOPS-20 Operator's Command Language Reference Manual for a description of ^ECREATE commands to set directory parameters.)

----- Example -----

In this example, assume that subjob 0 is connected to structure PS: and that <G> already exists and allows subdirectories.

```
OPR>PUSH<RET>

TOPS-20 Command processor 7(31)
@ENABLE<RET>
$^ECREATE PS:<G.PLAZA><RET>
[NEW]
$$PASSWORD STACHIA<RET>
$$ACCOUNT-DEFAULT TEXTILES<RET>
$$WORKING (DISK STORAGE PAGE LIMIT) 900<RET>
$$PERMANENT (DISK STORAGE PAGE LIMIT) 600<RET>
$$<RET>
$DISABLE<RET>
@POP<RET>
OPR>
```

8.5.2 Adding Directories on Mountable Structures

To create a directory which a user can CONNECT to or ACCESS a directory on a structure other than PS: or BS:, type to OPR>:

1. PUSH
2. ENABLE
3. MOUNT STRUCTURE STR:
4. ^ECREATE str:<directory>
5. Any nondefault parameters
6. <RET> to finish
7. DISMOUNT STRUCTURE STR:
8. DISABLE

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9. POP

----- Example -----

```
OPR>PUSH<RET>

TOPS-20 Command Processor 7(31)
@ENABLE<RET>
$MOUNT STRUCTURE 4SQM:<RET>
STRUCTURE 4SQM: mounted
$^ECREATE 4SQM:<TESTQ><RET>
[NEW]
$$PASSWORD KITS<RET>
$$<RET>
$DISMOUNT STRUCTURE 4SQM:<RET>
STRUCTURE 4SQM: dismantled
$DISABLE<RET>
@POP<RET>
OPR>
```

8.5.3 Adding Files-Only Directories

To create a directory that no one can log in to but that is used only to store files, type to OPR>:

1. PUSH
2. ENABLE
3. ^ECREATE structure:<directory>
4. FILES-ONLY
5. Other nondefault parameters and arguments, if any
6. <RET> to finish
7. DISABLE
8. POP

You can specify the structure name in Step 3 or omit it to indicate your currently connected structure.

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----- Example -----

```
OPR>PUSH<RET>

TOPS-20 Command processor 7(31)
@ENABLE<RET>
$^ECREATE <FORTRAN-DATA><RET>
[NEW]
$$FILES-ONLY<RET>
$$WORKING (DISK STORAGE PAGE LIMIT) 2000<RET>
$$PERMANENT (DISK STORAGE PAGE LIMIT) 2000<RET>
$$DIRECTORY-GROUP 17<RET>
$$<RET>
$DISABLE<RET>
@POP<RET>
OPR>
```

----- Hint -----

A password is optional for a FILES-ONLY directory. (Refer to the TOPS-20 Operator's Command Language Reference Manual for additional information on the FILES-ONLY subcommand of the ^ECREATE command.)

8.5.4 Changing Directory Parameters

To simply change a password, type to OPR>:

1. PUSH
2. ENABLE
3. ^ECREATE structure:<directory> new-password
4. DISABLE
5. POP

You can omit the structure name in Step 3 if you are connected to the structure containing the directory.

----- Example -----

```
OPR>PUSH<RET>

TOPS-20 Command processor 7(31)
@ENABLE<RET>
$^ECREATE <MCKIE> PQXY<RET>
[OLD]
$$<RET>
$DISABLE<RET>
@POP<RET>
OPR>
```

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To change other directory parameters, type to OPR>:

1. PUSH
2. ENABLE
3. ^ECREATE structure:<directory>
4. Parameters and new values
5. <RET> to finish
6. DISABLE
7. POP

----- Example -----

```
OPR>PUSH<RET>

TOPS-20 Command processor 7(31)
@ENABLE<RET>
$^ECREATE QAT:<GOLDSTEIN><RET>
[OLD]
$$IPCF<RET>
$$WORKING (DISK STORAGE PAGE LIMIT) 1000<RET>
$$<RET>
$DISABLE<RET>
@POP<RET>
OPR>
```

8.5.5 Changing Directory Names

To change a directory name, create a temporary directory, rename the user's files into it, list the parameters of the directory that you are changing, and then kill it. Then create a new directory with the correct name and parameters, rename the user's files into it from the temporary directory, and kill the temporary directory.

The procedure for changing a directory name is given below. The structure argument must be the name of the structure containing the directory you want to change. You can omit Steps 3 and 24 if the structure is PS: or BS:.

Type to OPR>:

1. PUSH
2. ENABLE
3. MOUNT STRUCTURE structure name:

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4. CONNECT structure:
5. ^ECREATE <temporary-directory>
6. FILES-ONLY
7. Other directory parameters; be sure that the disk storage page limits are large enough to accommodate the files from the old directory that you are changing
8. <RET> to finish creating the directory
9. RENAME
<old-directory>*. *.* (TO BE) <temporary-directory>*. *.*
10. ^ECREATE <old-directory>
11. LIST
12. KILL
13. <RET> to [CONFIRM]
14. <RET> to finish killing the directory
15. ^ECREATE <new-directory>
16. Directory parameters output by LIST in Step 11
17. <RET> to finish creating the directory
18. RENAME<temporary-directory>*. *.* (TO BE) <new-directory>*. *.*
19. ^ECREATE <temporary-directory>
20. KILL
21. <RET> to [CONFIRM]
22. <RET> to finish killing the directory
23. CONNECT
24. DISMOUNT STRUCTURE str:
25. DISABLE
26. POP

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----- Example -----

This example shows how to change a directory on TST: from RINKO to HRINKO.

```

OPR>PUSH<RET>
TOPS-20 Command processor 7(31)
@ENABLE<RET>
$MOUNT STRUCTURE TST:<RET>
$CONNECT TST:<RET>
$^ECREATE <TMPDIR><RET>
[NEW]
$$FILES-ONLY<RET>
$$WORKING (DISK STORAGE PAGE LIMIT) 500<RET>
$$PERMANENT (DISK STORAGE PAGE LIMIT)500<RET>
$$<RET>
$RENAME (EXISTING FILE) <RINKO>*. *.* (TO BE) <TMPDIR>*. *.*<RET>
<RINKO>A..2 => <TMPDIR>A..2 [OK]
<RINKO>SORT.MAC.1 => <TMPDIR>SORT.MAC.1 [OK]
<RINKO>TEST..1 => <TMPDIR>TEST..1 [OK]
$^ECREATE <RINKO><RET>
[OLD]
$$LIST<RET>
NAME <RINKO>
WORKING DISK STORAGE PAGE LIMIT 350
PERMANENT DISK STORAGE PAGE LIMIT 350
NUMBER OF DIRECTORY 24
LAST LOGIN 5-MAR-87 16:03:25

$$KILL<RET>
[CONFIRM]<RET>
$$<RET>
$^ECREATE <HRINKO><RET>
[NEW]
$$PASSWORD HELEN<RET>
$$WORKING (DISK STORAGE PAGE LIMIT) 350<RET>
$$PERMANENT (DISK STORAGE PAGE LIMIT) 350<RET>
$$NUMBER (OF DIRECTORY) 24<RET>
$$<RET>
$RENAME (EXISTING FILE) <TMPDIR>*. *.* (TO BE) <HRINKO>*. *.*<RET>
<TMPDIR>A..2 => <HRINKO>A..2 [OK]
<TMPDIR>SORT.MAC.1 => <HRINKO>SORT.MAC.1 [OK]
<TMPDIR>TEST..1 => <HRINKO>TEST..1 [OK]

```

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```
^ECREATE <TMPDIR><RET>
[OLD]
$$KILL<RET>
[CONFIRM]<RET>
$$<RET>
CONNECT<RET>
DISMOUNT TST:<RET>
DISABLE<RET>
POP<RET>
OPR>
1:02:23      -- Structure TST: Dismounted --
OPR>
```

8.5.6 Deleting User Names or Directories

To delete a user name or directory from the system, type to OPR>:

1. PUSH
2. ENABLE
3. ^ECREATE structure:<directory>
4. KILL
5. <RET> to [CONFIRM]
6. <RET> to finish
7. POP

You can omit the structure name in Step 3 if you are connected to the structure containing the directory.

----- Example -----

```
OPR>PUSH<RET>
TOPS-20 Command processor 7(31)
@ENABLE<RET>
^ECREATE BASIC:<HJOHN><RET>
[OLD]
$$KILL<RET>
[CONFIRM]<RET>
$$<RET>
POP<RET>
OPR>
```

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NOTE

When you kill a directory, you delete the files in that directory. Do not kill a user's directory if the user is logged in, because you would not be able to free his job number until you reload TOPS-20. If you need to log out the user, use the LOGOUT command, and then KILL the directory. If you cannot kill a directory, see the KILL subcommand to the ^ECREATE command in the TOPS-20 Operator's Command Language Reference Manual.

Your system manager should have a form that new users can complete to request access to the system. A sample form is printed on the next page.

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USER ACCOUNT REQUEST

REQUESTOR'S NAME: DATE:

SUPERVISOR: -----

NAME OF DIRECTORY: PASSWORD:

PERMANENT STORAGE ALLOCATION (PAGES): ACCOUNT:

WORKING STORAGE ALLOCATION (PAGES): -----

OPTIONAL ATTRIBUTES

NUMBER OF GENERATIONS TO KEEP (DEFAULT IS 1):

STANDARD FILE PROTECTION (DEFAULT IS 777700):

PROTECTION OF DIRECTORY (DEFAULT IS 777700):

DIRECTORY GROUPS:

USER-OF-GROUPS:

MAXIMUM SUBDIRECTORIES ALLOWED:

SUBDIRECTORY USER GROUPS ALLOWED:

FILES-ONLY?

CONFIDENTIAL INFORMATION ACCESS CAPABILITY?

MAINTENANCE CAPABILITY?

OPERATOR CAPABILITY?

WHEEL CAPABILITY?

IPCF CAPABILITY?

ENQ-DEQ CAPABILITY?

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DO NOT WRITE BELOW THIS LINE

APPROVED BY: DATE:

IMPLEMENTED BY: DATE:

DIRECTORY NUMBER ASSIGNED:

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8.6 DUMPING DIRECTORY PARAMETERS WITH DLUSER

Once you add, change, or delete a directory, you should run DLUSER to get a backup copy of the directory parameters defined with ^ECREATE. Also, if your installation allows users to change directory parameters with SET DIRECTORY or to create subdirectories with BUILD, you should get this backup copy periodically at a time scheduled by your system manager. The backup copy can be used to restore directory parameters when you are recovering part of the file system.

The following three sections explain how to dump directory parameters:

1. Dump directory parameters for the system structure, BS:, and create a system backup tape. This tape is helpful for restoring directories. (See Section 8.6.1)
2. Dump directory parameters for structures other than BS:. Section 8.6.2
3. Use DLUSER. (See Section 8.6.3)

8.6.1 Dumping Directory Parameters for BS:

You should put a backup copy of directory parameters for BS: onto magnetic tape. For ease in restoring the directories after re-creating the file system, you should also have the following critical system programs on the same tape as the directory parameters.

1. BS:<SYSTEM>MONITR.EXE
2. SYSTEM:EXEC.EXE
3. SYS:DLUSER.EXE
4. SYS:DUMPER.EXE
5. All files from BS:<NEW-SYSTEM> and BS:<SYSTEM>
6. All files from BS:<NEW-SUBSYS> and BS:<SUBSYS>
7. All files from BS:UETP.LIB

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To dump user directories from BS: with DLUSER and put them on magnetic tape along with the files listed above, type PUSH to OPR>. Then:

1. Type SUBMIT SYS:SYSTAP.CTL.
2. Wait until SYSTAP.LOG and SYSTAP.LPT are printed on the line printer.
3. Look at the two printed files. If there are errors, try the SUBMIT command again or notify your system manager.
4. Once the control file runs without error, file the backup tape along with the two listings.

----- Example -----

```
OPR>PUSH<RET>
TOPS-20 Command processor 7(31)
@SUBMIT SYS:SYSTAP.CTL<RET>
[JOB SYSTAP QUEUED, REQUEST-ID 2745, LIMIT 0:05:00]
@POP<RET>
OPR>
```

8.6.2 Dumping Directory Parameters for Other Structures

If there are other structures in addition to BS: on your system, put a backup copy of the directory parameters for each of those structures into files SYSTEM:str.TXT, where str: is the relevant structure name. If it is not the system structure, you can also use OPR to MOUNT and DISMOUNT the structure.

For each structure, type to OPR>:

1. PUSH
2. ENABLE
3. MOUNT STRUCTURE str:
4. DLUSER
5. STRUCTURE str:
6. DUMP SYSTEM:str.TXT

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7. EXIT
8. DISMOUNT STRUCTURE str:
9. DISABLE
10. POP

----- Example -----

To get a backup copy of the directory parameters for SNARK:

```
OPR>PUSH<RET>
TOPS-20 Command Processor 7(31)
@ENABLE<RET>
$MOUNT STRUCTURE SNARK:<RET>
$DLUSER<RET>
DLUSER>STRUCTURE SNARK:<RET>
DLUSER>DUMP BS:<SYSTEM>SNARK.TXT<RET>

DONE.
DLUSER>EXIT<RET>
$DISMOUNT STRUCTURE SNARK:<RET>
STRUCTURE SNARK: dismantled
$DISABLE<RET>
@POP<RET>
OPR>
```

8.6.3 Using DLUSER

The following discussion gives more detail on DLUSER if you want to run it from your terminal.

Once DLUSER is running, it outputs DLUSER> as its prompt. Then, after it finishes a command, it outputs the prompt again. You can type ? after the prompt to get a list of the DLUSER commands. While DLUSER is processing a DUMP or LOAD command, you can find out what directory it is currently working on by typing CTRL/A. When you type CTRL/A you receive the message:

```
WORKING ON DIRECTORY structure:<directory>
```

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The commands to DLUSER are:

DUMP filespec	specifies to dump directory parameters into a file specification (filespec). The default file specification is DSK:USERS.TXT.
EXIT	specifies to exit from DLUSER and return to the monitor.
HELP	specifies to display a help message summarizing the functions and commands of DLUSER.
LOAD filespec	specifies to load directory parameters from a file specification (filespec).
STRUCTURE name	specifies the structure name (name) that is used for the DUMP or LOAD command. The default is your connected structure.

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----- Error Messages -----

? GROUP BLOCK IS TOO SMALL, ABORTING ...

If this error occurs, notify the person responsible for system software at your installation.

? INVALID COMMAND CONFIRMATION

You pressed a key other than RETURN or LINE FEED after a command.

? INVALID STRUCTURE NAME GIVEN

You specified a structure that is not mounted, or you forgot the colon after the structure name.

? NOT A DLUSER COMMAND

The command that you typed is not a valid DLUSER command.

? UNABLE TO GET FIRST DIRECTORY

There is a problem on the structure for which you are running DLUSER. The file you are dumping is not complete. Run CHECKD with the CHECK BITTABLE command to determine the problems on the structure.

? UNABLE TO GET NEXT DIRECTORY

There is a problem on the structure for which you are running DLUSER. The file you are dumping is not complete. Run CHECKD with the CHECK BITTABLE command to determine the problems on the structure.

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8.7 GETTING INFORMATION ABOUT DIRECTORIES

To check various directory parameters or to provide your system manager with certain directory information, you can use the ^ECREATE command, the ^EPRINT command, or the ULIST program. The following three sections show what each one can list for you.

If you decide to change any parameters after you have listed them, be sure to run DLUSER (Section 8.6.3) and dump the directories.

8.7.1 Listing Directory Parameters with ^ECREATE

If you expect to change some directory parameters, this method is useful.

To list all the parameters of one directory, use the LIST VERBOSE command to ^ECREATE. To list only nondefaulted parameters for the directory, use the LIST command to ^ECREATE. Type to OPR>:

1. PUSH
2. ENABLE
3. ^ECREATE structure:<directory>
4. LIST VERBOSE or LIST
5. DISABLE
6. POP

You can omit the structure name in Step 3 if you are connected to the structure containing the directory. You can also change some parameters after listing them. (See the TOPS-20 Operator's Command Language Reference Manual for details on the ^ECREATE command.)

The LIST VERBOSE subcommand to ^ECREATE outputs the same information as ^EPRINT directory VERBOSE, and LIST to ^ECREATE is equivalent to ^EPRINT directory. The advantage of using the LIST subcommand to ^ECREATE, instead of ^EPRINT, is that you can immediately give another subcommand to ^ECREATE.

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----- Examples -----

1. To list all parameters:

```
OPR>PUSH<RET>
TOPS-20 Command processor 7(4430)
@ENABLE<RET>
$^ECREATE <HESS><RET>
[OLD]
$$LIST VERBOSE<RET>
NAME <HESS>
Working disk storage page limit 1540
Permanent disk storage page limit 1540
not WHEEL
not OPERATOR
not CONFIDENTIAL INFORMATION ACCESS
not MAINTENANCE
not IPCF
not ENQ-DEQ
not FILES-ONLY
not SECURE
Number of directory 154
Default file protection 777700
Account default for LOGIN - none set
Protection of directory 777700
Generations to keep 1
Maximum subdirectories allowed 15
Never logged in interactively
Never logged in non-interactively
Password expiration date not set
No interactive login failures
No non-interactive login failures
User of groups - none set
Directory groups - none set
Subdirectory user groups allowed - none set
Online expiration default 60 Days
Offline expiration default 90 Days
TOPS10 project-programmer number - none set
```

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2. To list nondefaulted parameters:

```
$^ECREATE (DIRECTORY NAME) ARCH:<MURPHY><RET>
[OLD]
$$LIST<RET>
NAME ARCH:<MURPHY>
Working disk storage page limit 1540
Permanent disk storage page limit 1540
Number of directory 154
Account default for LOGIN - none set
Maximum subdirectories allowed 15
TOPS10 project-programmer number - none set

$$<RET>
```

8.7.2 Listing Directory Parameters with ^EPRINT

To list all the parameters of one directory, use the ^EPRINT command with the VERBOSE subcommand. To list only nondefaulted parameters, use ^EPRINT with no subcommands. Type to OPR>:

1. PUSH
2. ENABLE
3. ^EPRINT structure:<directory>,
VERBOSE
<RET>

or

^EPRINT structure:<directory>
4. POP

You can omit the structure name in Step 3 if you are connected to the structure containing the directory.

After you get the list of parameters with ^EPRINT, you must then use ^ECREATE to change any of them.

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----- Examples -----

1. To list the nondefaulted parameters of a directory:

```
OPR>PUSH<RET>
```

```
TOPS-20 Command processor 7(4430)
@ENABLE<RET>
$^EPRINT <N.ROSEN><RET>
NAME PS:<N.ROSEN>
Working disk storage page limit 1540
Permanent disk storage page limit 1540
Number of directory 154
Account default for LOGIN - none set
Maximum subdirectories allowed 15
TOPS10 project-programmer number - none set
```

2. To list all the parameters of a directory:

```
OPR>PUSH<RET>
```

```
TOPS-20 Command processor 7(4430)
$^EPRINT <CPERLMAN>,<RET>
$$VERBOSE<RET>
$$<RET>
Name GIDNEY:<CPERLMAN>
Working disk storage page limit 1540
Permanent disk storage page limit 1540
not WHEEL
not OPERATOR
not CONFIDENTIAL INFORMATION ACCESS
not MAINTENANCE
not IPCF
not ENQ-DEQ
not FILES-ONLY
not SECURE
Number of directory 154
Default file protection 777700
Account default for LOGIN - none set
Protection of directory 777700
Generations to keep 1
Maximum subdirectories allowed 15
Never logged in interactively
Never logged in non-interactively
Password expiration date not set
No interactive login failures
No non-interactive login failures
User of groups - none set
Directory groups - none set
Subdirectory user groups allowed - none set
Online expiration default 60 Days
Offline expiration default 90 Days
```

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TOPS10 project-programmer number - none set

```
$DISABLE<RET>
@POP<RET>
OPR>
```

8.7.3 Listing Directory Parameters with ULIST

The ULIST program can give you four types of listings:

1. An alphabetic list of all directories on a structure and all the directory parameters
2. A numeric list of directories on a structure according to directory numbers and all the directory parameters
3. A mini-listing containing only directory numbers and names on a structure
4. A directory group listing giving groups used, highest directory in use, first free directory, the directories in each group, the users having access to each group, the users with special capabilities, and directories that are files-only.

To run ULIST, you must have OPERATOR or WHEEL capability, but you do not need to type ENABLE. Type PUSH to OPR> and type:

1. ULIST
2. ULIST commands, separated by <RET>, to select the desired type and format of listing
3. BEGIN to start the listing
4. EXIT to return to TOPS-20 command level

When ULIST is running, it prompts with ULIST> for each command. Follow each command with <RET>. To see the commands to ULIST, type HELP as the command. For example:

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OPR>PUSH<RET>

TOPS-20 Command processor 7(31)
 @ULIST<RET>
 ULIST>HELP<RET>

COMMANDS ARE:

ALPHABETIC (LIST OF USERS)
 BEGIN (LISTING) [Starts outputting the listing]
 DIRECTORY (GROUP LISTING)
 EXIT (TO MONITOR)
 HELP
 MINI (LISTING FORMAT) [Name & directory number only]
 NARROW (PAPER FORMAT)
 NUMERIC (LIST OF USERS)
 OUTPUT (TO FILE) FILE-SPEC
 PRINT (LISTING ON PRINTER)
 STRUCTURE (TO USE) STR-NAME
 WIDE (PAPER FORMAT)

ASSUMED ARE: NUMERIC, WIDE, OMIT, AND OUTPUT TO TTY:
 ULIST>

The different types of lists are obtained with the commands ALPHABETIC, NUMERIC, MINI, and DIRECTORY. These commands correspond to the explanations at the beginning of this section. If you do not specify the type of list, NUMERIC is assumed. Each of these commands produces a different listing.

If you want the output on narrow paper (80 columns), give the NARROW command because WIDE (132 columns) is the default.

The listing is printed on your terminal, because output to TTY: is the default, unless you give the OUTPUT or PRINT command. The PRINT command gives you a listing on the line printer. OUTPUT followed by a file specification puts the listing into the file given. The default file for the OUTPUT command is USERS.TXT.

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----- Examples -----

1. To produce a numeric list of directories on structure SNARK on the printer with narrow paper, give the following commands.

OPR>PUSH<RET>

TOPS-20 Command processor 7(31)
 @ULIST<RET>
 ULIST>PRINT<RET>
 ULIST>STRUCTURE SNARK:<RET>
 ULIST>NARROW<RET>
 ULIST>BEGIN<RET>
 DONE

ULIST>EXIT<RET>
 @POP<RET>
 OPR>

The line printer listing starts as follows:

NAME,ACCOUNT	(STRUCTURE: SNARK)	WED 5-MAR-87	PAGE 1
DIR#	PRIVILEGES LOGIN-QUOTA LOGOUT-QUOTA USER-OF-GROUPS DIR-GROUPS		
(MODES DEF-FILE-PRO DIR-PROT DEF-FILE-RET)		
SNARK:<ROOT-DIRECTORY>			
1	0 4700 4700		
(600000000000 500000777700 500000777700			1)
SNARK:<SYSTEM>			
2	0 7000 7000		
(600000000000 500000777752 500000777740			0)
SNARK:<SUBSYS>			
3	0 10000 4800		1
(600000000000 500000777752 500000770000			1)
SNARK:<ACCOUNTS>			
4	0 10000 10000		
(600000000000 500000777700 500000777700			0)
SNARK:<OPERATOR>,390			
5	300000 2000 2000 2479,2480		
SNARK:<SPOOL>			
6	0 2000 150		
(600000000000 500000777700 500000777777			0)
SNARK:<TES>,QA			
20	0 250 250 5,4,7 2,4		
(200000000000 500000777700 500000777740			1)

Thus, the listing is in ascending order according to directory number. The line beginning and ending with parentheses is omitted if the values for the parameters in that line are system defaults.

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For each directory the following values are given:

NAME

This is the directory name.

ACCOUNT

This is the default account for a user logging into the directory.

DIR-#

This is the number of the directory.

PRIVILEGES

This is the right half of the capability word (bits 18-35).

Bit 18=1 allows WHEEL capability
Bit 19=1 allows OPERATOR capability
Bit 20=1 allows CONFIDENTIAL INFORMATION ACCESS capability
Bit 21=1 allows MAINTENANCE capability
Bit 22=1 allows IPCF capability
Bit 23=1 allows ENQ-DEQ capability
Bit 24=1 allows NET-WIZARD privileges
Bit 25=1 allows NETWORK ABSOLUTE SOCKET privileges
Bit 26=1 allows DECnet access
Bit 27=1 allows ARPANET access

LOGIN-QUOTA

This is the number of pages for working disk storage page limit.

LOGOUT-QUOTA

This is the number of pages for permanent disk storage page limit.

USER-OF-GROUPS

This indicates which directory groups the user can access.

DIR-GROUPS

This indicates which directory groups this directory is in.

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MODES

This is the mode word of the directory (bits 0 to 35).

Bit 0=1 allows a FILES-ONLY directory Bit 1=1 allows ALPHANUMERIC ACCOUNTS Bit 2=1 allows REPEATED LOGIN MESSAGES

DEF-FILE-PRO

This is the default file protection. Only the rightmost six octal digits are significant.

DIR-PROT

This is the default protection for the directory. Only the rightmost six octal digits are significant.

DEF-FILE-RET

This is the default number of generations of a file to keep.

- To produce an alphabetic list of directories on structure SNARK on your terminal, on narrow paper, type the following commands:

OPR>PUSH<RET>

TOPS-20 Command processor 7(31)

@ULIST<RET>

ULIST>NARROW (PAPER FORMAT)<RET>

ULIST>STRUCTURE (TO USE) SNARK:<RET>

ULIST>ALPHABETIC (LIST OF USERS)<RET>

ULIST>BEGIN<RET>

DONE

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The listing on your terminal starts to appear as follows:

```

^LNAME,ACCOUNT (STRUCTURE: SNARK)      WED 5-MAR-87  PAGE 1
DIR-# PRIVILEGES LOGIN-QUOTA LOGOUT-QUOTA USER-OF-GROUPS DIR-GROUPS
(  MODES      DEF-FILE-PRO  DIR-PROT  DEF-FILE-RET )

SNARK:<1A>,
   65          0          250          250
SNARK:<BEN>
   611        400000      2500         2000
(600000000000 500000777752 500000777740      1 )
SNARK:<FIELD-IMAGE>,
   315          0          2000         250          1          1
(600000000000 500000777752 500000777740      1 )
.
.
.

```

The output is alphabetical by directory name. The information for each directory is identical to that in a numeric list. The line beginning and ending with parentheses is omitted if the values for the parameters in that line are system defaults.

- To get a mini-listing on your terminal on narrow paper of the directories on the public structure, type the following commands:

```

@ULIST<RET>
ULIST>MINI<RET>
ULIST>NARROW<RET>
ULIST>BEGIN<RET>
DONE

```

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The listing appears on your terminal as follows:

```

List of structure: PS      Wednesday, 5 March 87

1 PS:<ROOT-DIRECTORY>
2 PS:<SYSTEM>
3 PS:<SUBSYS>
4 PS:<ACCOUNTS>
5 PS:<OPERATOR>
6 PS:<SPOOL>
7
10
11
12
13
14
15
16
17
20 PS:<FINER>

72 PS:<BROWN>
73 PS:<MULLEN.C>
74 PS:<MAINTENANCE>
75 PS:<TWAITS>
76 PS:<DIPACE.1>
77 PS:<CALABI>
100 PS:<SKOGLUND>
101 PS:<2BOSACK>
102 PS:<BEERS>
103 PS:<LEACHE>
104 PS:<MILLER>
105 PS:<HOLLAND>
106 PS:<SAMBERG>
107 PS:<FREE4>
110 PS:<VANDERHOOF>

```

The output is given in order of directory numbers, going down the page in columns. Each entry has a directory number and a structure name:directory name, which may be blank if no directory has been created for that number.

- To get a directory group listing for the public structure on your terminal on narrow paper, type the following commands:

```

@ULIST<RET>
ULIST>DIRECTORY<RET>
ULIST>NARROW<RET>
ULIST>BEGIN<RET>
DONE

```

The listing appears on your terminal as follows:

```

USER AND DIRECTORY GROUPS ON STRUCTURE: PS

WEDNESDAY, 5 March 87

```

THE FOLLOWING GROUPS ARE IN USE:

```

1      2      3      2393

```

THE HIGHEST DIRECTORY IN USE IS NUMBER: 605

THE FIRST FREE DIRECTORY NUMBER IS: 60

THE FOLLOWING DIRECTORIES ARE IN GROUP 1

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PS:<1FIELD-IMAGE>, PS:<1HURLEY>, PS:<1KIRSCHEN>,
PS:<1MILLER>,
PS:<1MONITOR>, PS:<1SOURCES>

THE FOLLOWING USERS HAVE ACCESS TO GROUP 1

PS:<BOSACK>, PS:<HALL>, PS:<HELLIWELL>, PS:<HESS>,
PS:<HURLEY>,
PS:<KIRSCHEN>

THE FOLLOWING DIRECTORIES ARE IN GROUP 2

PS:<ABEL>, PS:<EXERCISER>

THE FOLLOWING USERS HAVE ACCESS TO GROUP 2

PS:<ALUSIC>

.
.
.

THE FOLLOWING USERS ARE WHEELS:

PS:<HALL>, PS:<HURLEY>, PS:<KIRSCHEN>, PS:<MCLEAN>,
PS:<MILLER>,
PS:<SNYDER>

THE FOLLOWING USERS ARE OPERATORS:

PS:<OPERATOR>

THE FOLLOWING USERS HAVE CONFIDENTIAL INFORMATION ACCESS:

PS:<MCLEAN>

THE FOLLOWING DIRECTORIES ARE FILES-ONLY:

PS:<1-UTILITIES>, PS:<1A-EXEC>, PS:<1A-MONITOR>,
PS:<1A-UTILITIES>,
PS:<ROOT-DIRECTORY>, PS:<SPOOL>, PS:<SUBSYS>, PS:<SYSTEM>,
PS:<V-SOURCES>

.
.
.

ULIST>EXIT<RET>
@POP<RET>
OPR>

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----- Error Messages -----

? INVALID STRUCTURE NAME GIVEN

You specified a structure that is not mounted or you omitted the colon after the structure name.

? ULIST: CANNOT OPEN SPECIFIED FILE

The file access protection is such that you can not write into the file.

? ULIST: GARBAGE AT END-OF-COMMAND

You typed an illegal character within the command or at the end of the command.

? ULIST: INVALID FILE SPECIFICATION

The file specification that you typed is not valid.

? ULIST: NO SUCH ULIST COMMAND AS "command typed"

You typed something that is not a ULIST command. Type HELP after the prompt to get a list of commands.

? ULIST: NOT PRIVILEGED TO READ SYSTEM FILES

You need OPERATOR or WHEEL capability to read the directory information.

8.8 CHECKING SYSTEM STATUS

While the system is running, you may have to check on the status of certain jobs, system statistics, or devices. The following three sections discuss various ways of doing these tasks.

8.8.1 Determining the Status of Jobs with SYSTAT

To get a summary of the jobs being used on the system, use the SYSTAT command. It tells you the job number, the terminal line number connected to that job, the program being run, and the user. The SYSTAT command can also be followed by an argument to get a more detailed summary or a specific part of the summary or a summary for another node in a CFS-20 cluster. For example:

@SYSTAT n

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where n is a job number, prints out information for job n only.

@SYSTAT user

where user is a user's name, prints out information for the jobs logged in by that user only.

@SYSTAT NODE node

where node is the name of a remote CFS-20 node.

See the TOPS-20 User's Guide for more details on the SYSTAT command.

----- Examples -----

1. To get a summary of all jobs, type PUSH to OPR> and then type SYSTAT.

OPR>PUSH<RET>

```
TOPS-20 Command processor 7(4430)
@SYSTAT<RET>
Thu 8-Mar-90 17:07:11 Up 18:12:29
13+10 Jobs Load av 0.14 0.13 0.14
```

Job	Line	Program	User	Origin
199	435	MS	BRAITHWAITE	LAT74:2400674(LAT)
200	DET	DTRSRV	Not logged in	
201	DET	RMSFAL	Not logged in	
202	DET	RMSFAL	Not logged in	
203	DET	RMSFAL	Not logged in	
204	DET	RMSFAL	Not logged in	
207	434	EXEC	MULDOON	LAT175:LAT1757(LAT)
209	364	EXEC	WADDINGTON	PMAP::RBW(CTM)
210*	437	SYSTAT	TUCKER	LAT473:24112473(LAT)
211	440	MS	EKLUND	LAT75:2405275(LAT)
212	441	EMACS	PUCHRIK	LAT423:240812423(LAT)
213	DET	DETACH	GSCOTT	
214	DET	DETACH	GSCOTT	
215	365	EXEC	PUCHRIK	WURST::PUCHRIK(CTM)
217	445	OPR	JROSSELL	LAT1:240851(LAT)
220	443	EXEC	MULDOON	LAT408:LAT4084(LAT)
221	451	EXEC	MULDOON	LAT175:LAT1757(LAT)
222	452	EXEC	MULDOON	LAT408:LAT4087(LAT)
193	232	PTYCON	OPERATOR	
194	233	GALAXY	OPERATOR	
195	234	NEBULA	OPERATOR	
196	235	UNIVER	OPERATOR	
197	236	EXEC	OPERATOR	
198	237	MX	OPERATOR	
205	240	DTR	OPERATOR	
206	241	DIU	OPERATOR	

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```
208 243 MOUNT OPERATOR
216 244 MOUNT OPERATOR
@POP<RET>
OPR>
```

2. To get a SYSTAT of job 10, type PUSH to OPR> and SYSTAT 10.

OPR>PUSH<RET>

```
TOPS-20 Command processor 7(4430)
@SYSTAT 10<RET>
217 445 OPR ROSEL LAT1:240851(LAT)
@POP<RET>
OPR>
```

3. To find out what jobs are running under OPERATOR, type PUSH to OPR> and SYSTAT OPERATOR.

OPR>PUSH<RET>

```
TOPS-20 Command processor 7(31)
@SYSTAT OPERATOR<RET>
```

```
0 DET SYSJOB OPERATOR
1 101 PTYCON OPERATOR
4 217 OPR OPERATOR
7 103 LPTSPL OPERATOR
8 104 BATCON OPERATOR
@POP<RET>
OPR>
```

8.8.2 Watching System and Job Statistics with WATCH

The WATCH program allows you to periodically print TOPS-20 system statistics and/or a job summary. Under any job, type the following:

1. ENABLE
2. WATCH
3. After OUTPUT TO FILE:, type the name of the file to contain the output; it can be TTY: if you want the output on your terminal. If you type /H after OUTPUT TO FILE:, you get an explanation of the WATCH output and another prompt for the output file.
4. Type YES or NO to the questions PRINT MONITOR STATISTICS and PRINT JOB SUMMARY. If you answer NO to both questions, you get the output for load averages only.

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5. After TUNE MODE?, type YES or NO. If you type YES, only users with WHEEL or OPERATOR privileges may request a display which includes Tune Mode statistics lines with column headings on every page. If you answer NO, all users can request a display which include headings and load averages.
6. For the TIME PERIOD (MM:SS), type the number of minutes (mm) and seconds (ss) to specify a fixed time period. Press RETURN for a variable time period. Type ? for a help text on time periods. If you requested a variable time period, you must press RETURN again whenever you want more output. Statistics are gathered over every fixed or variable time period and then output.

NOTE

The length of the time period actually used may not be exactly what you specified, because the printing of information may delay the next sampling period. Do not make the time period too small, because WATCH itself uses a considerable amount of time. A time period of two minutes is reasonable.

To stop WATCH from reporting the statistics, type two CTRL/Cs. To stop the WATCH program and the reporting of statistics, type RESET and press the RETURN key. Then, if your output was to a disk file, you can PRINT it on the line printer.

For additional information on the WATCH program, refer to the TOPS-20 WATCH document.

----- Example -----

This example shows the output for one time period of two minutes. Note that you must type CTRL/C twice to exit from WATCH. Otherwise, for this example, WATCH would print a report every two minutes.

```
OPR>PUSH<RET>
```

```
TOPS-20 Command processor 7(31)
@ENABLE<RET>
$WATCH<RET>
```

```
WATCH 4(3), /H for help.
Output to file:/H<RET>
```

For a detailed description of the WATCH program, refer to the TOPS-20 WATCH document.

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8.8.3 Getting Other Information

The system command INFORMATION (ABOUT) has several different arguments to give you information on various system and job parameters. For arguments useful to you as an operator, refer to the TOPS-20 User's Guide.

----- Examples -----

1. To get information about the current system-status:

```
OPR>PUSH<RET>
```

```
@INFORMATION (ABOUT) SYSTEM-STATUS<RET>
```

```
Operator is in attendance
Remote logins allowed
Local logins allowed
Pseudo-terminal logins allowed
Internet TCP/IP terminal logins are not allowed
DECnet terminal logins allowed
LAT terminal logins allowed
Console terminal login allowed
Accounting is being done
Account validation is enabled
Working set preloading is disabled
Sending of system level zero messages is enabled
Sending of system level one messages is enabled
Job zero CTY output is enabled
Tape-drive allocation is enabled
Automatic file-retrieval-waits allowed
Maximum offline-expiration is 90 days
Scheduler bias-control setting is 11
Class scheduling is disabled, batch jobs being run on dregs
queue
Offline structures timeout interval is 0 minutes and 5
seconds
Cluster information is enabled
Cluster sendalls are enabled
Minimum password length is 8 characters
Password expiration is 45 days
Password dictionary is enabled
@
```

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2. To get information about the structure named SNARK: :

```
@INFORMATION (ABOUT) STRUCTURE (NAME) SNARK:<RET>
STATUS OF STRUCTURE SNARK:
MOUNT COUNT: 1, OPEN FILE COUNT: 0, UNITS IN STRUCTURE: 1
DOMESTIC
USERS WHO HAVE MOUNTED SNARK: HESS
USERS ACCESSING SNARK: HESS
NO USERS CONNECTED TO SNARK:
@
```

8.9 LISTING USER REMARKS WITH RDMAIL

To list users' comments that have been mailed to REMARKS, type the following commands:

1. PUSH to OPR>.
2. ENABLE capabilities.
3. Run RDMAIL.
4. Type Y to SPECIAL USER.
5. Type REMARKS to USER NAME.
6. Press RETURN to DATE AND TIME.
7. DISABLE capabilities.
8. POP to return to OPR>.

All remarks that have not been read before from PS:<REMARKS>MAIL.TXT will be output on your terminal.

NOTE

If some other privileged user has run RDMAIL on PS:<REMARKS> before you, in Step 5 above type the date and time you last did this task.

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----- Example -----

```
OPR>PUSH<RET>
TOPS-20 Command processor 7(31)
@ENABLE<RET>
$RDMAIL<RET>
SPECIAL USER (Y OR N)? Y<RET>
USER NAME: REMARKS<RET>
DATE AND TIME ( /H FOR HELP)
:
:
$DISABLE<RET>
@POP<RET>
OPR>
```

The comments printed on your terminal should be distributed and answered according to a method established by your system manager.

Sometimes you might need to perform other functions with RDMAIL. If you need to read all the remarks from PS:<REMARKS>MAIL.TXT, even those that you have listed before, type /A after DATE AND TIME. If you need to read only those remarks created after a certain date and time, type after DATE AND TIME:

```
mmm dd,yyyy hh:mm
where:
```

mmm = the first three letters of the month

dd = the number for the day of the month

yyyy = the year

hh:mm = hour:minute (equal to 00:01 if omitted after the date)

Other date formats can be accepted, but they are not recommended.

To list the headings but not the text of the remarks, type date and time, and then /P. For example:

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OPR>PUSH<RET>

TOPS-20 Command processor 7(31)
@ENABLE<RET>
\$RDMAIL<RET>

SPECIAL USER (Y OR N)? Y<RET>

USER NAME: REMARKS<RET>
DATE AND TIME (/H FOR HELP) SEP 20,1987/P

DATE: 20-SEP-87 20:39
FROM: MCKIE
TO: HELLIWELL
CC: LEWINE,WERME,HESS,REMARKS

SUBJECT: The EXECs printing of EDIT files.

DATE: 22-SEP-87 10:23
FROM: OSMAN
TO: MILLER,REMARKS,OSMAN

SUBJECT: ALLOWING USERS TO STOP SPENDING MONEY

\$DISABLE<RET>
@POP<RET>
OPR>

To list remarks and pause between each one, type date and time followed by /S. You are asked to press RETURN to get the next remark. You can stop the program with CTRL/C.

To get help with RDMAIL, type /H after DATE AND TIME. For example:

OPR>PUSH<RET>

TOPS-20 Command processor 7(31)
@ENABLE<RET>
\$RDMAIL<RET>

SPECIAL USER (Y OR N)? Y<RET>

USER NAME: REMARKS
DATE AND TIME (/H FOR HELP) /H<RET>

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TYPE IN A DATE AND TIME IN TOPS-20 FORMAT AS FOLLOWS:

OR
MMM DD,YYYY HH:MM
OR
MMM DD,YYYY

THE LATTER CASE WILL ASSUME TIME 00:01.
(FOR EXAMPLE, A VALID DATE AND TIME IS MAR 16,1987 15:30)

OR
TYPE AN EMPTY LINE AND GET ALL MESSAGES SINCE THE LAST READING OF THE MESSAGE FILE.

/H PRINT THIS TEXT
/A TYPES ALL MESSAGES IN THE FILE
/P FOR PERUSING MESSAGES ONLY
/S WILL CAUSE RDMAIL TO PAUSE AFTER EACH MESSAGE TYPED
/M WILL USE THE MESSAGE OF THE DAY FILE FOR MESSAGE TYPE OUT
/L WILL OUTPUT MESSAGES TO THE LINE PRINTER
DATE AND TIME (/H FOR HELP)

----- Hint -----

Because the file PS:<REMARKS>MAIL.TXT continues to get bigger as users MAIL their remarks, you should periodically RENAME it and save the renamed file on magnetic tape with DUMPER.

8.10 REPORTING SYSTEM ERRORS WITH SPEAR

SPEAR is a program that selectively lists and formats parts of the system error file <SYSTEM-ERROR>ERROR.SYS on the system structure. You should run it daily for summary information (see Example 1 below) and file it for later reference by your DIGITAL Field Service Representative. Then, whenever a piece of hardware seems to be failing, run SPEAR again and request a detailed report for that device.

To enter reports on users and/or devices into ERROR.SYS, use the REPORT command at OPR command level. Refer to the TOPS-20 Operator's Command Language Reference Manual for a complete description of the OPR REPORT command.

To run SPEAR, type the following to OPR>.

1. PUSH
2. SPEAR
3. Command lines to SPEAR

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4. EXIT
5. POP

When SPEAR is started, it prompts with the SPEAR prompt. At that time you can type a command line to SPEAR. When SPEAR has finished processing one command line, it prompts again with the SPEAR prompt, so you can give another command line. Type EXIT to leave SPEAR command level.

To see the SPEAR help file on your terminal, type a "?" to the SPEAR prompt.

SPEAR can also process commands from a disk file as well as from your terminal. This disk file, an indirect command file, is useful if you have a command line that you often use. To make an indirect command file, create a file with the same command line that you would normally type to SPEAR from your terminal. Then type the following to SPEAR:

```
@dev:name.typ
```

where dev: is the location of the file (default is DSK:) and name.typ is the name of the indirect command file.

EXAMPLE

```
@SPEAR<RET>
Welcome to SPEAR for TOPS-20. Version 2(1114)
Type "?" for help.
```

```
SPEAR> SUMMARIZE<RET>
```

SUMMARIZE mode

```
Event file (SERR:ERROR.SYS):<RET>
```

```
Time from (EARLIEST):<RET>
```

```
Time to (LATEST): LATEST<RET>
```

```
Report to (DSK:SUMMAR.RPT):<RET>
```

```
Type <cr> to confirm (/GO):<RET>
INFO - Summarizing SERR:ERROR.SYS
INFO - Now sending summary to DSK:SUMMAR.RPT
INFO - Summary output finished
```

```
SPEAR>EXIT<RET>
```

Refer to the TOPS-10/TOPS-20 SPEAR Manual for more information on SPEAR.

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NOTE

The arguments in parenthesis are the default to the SPEAR program.

8.11 BACKING UP DISK FILES WITH DUMPER

To minimize loss of disk files, you should put backup copies of files on magnetic tape with DUMPER. This should be done on a daily basis. You have the option of saving either all disk files or only those that have not been saved before (called an incremental save). It is advisable to save all files once a week and to do an incremental save the other days. An incremental save includes those files which have not been saved since the last incremental save or full save. Check with your system manager to make sure that the correct version of DUMPER is used to back up files.

If your installation has structures other than PS:, the public structure, be sure to back up files on those structures too. Use different magnetic tapes for different structures, and follow the procedure for a full save or incremental save for each structure. (Refer to the TOPS-20 User Utilities Guide for details on the DUMPER utility program.) If your installation is part of CFS, you must run DUMPER on the processor that has a direct connection to the required tape drive.

WARNING

When you are backing up the system structure never use a labeled tape. The reason for this is if the backup tape is the only method you have to BOOT the system, the software components you need to read the tape label are not running.

The following steps explain the DUMPER procedure with OPR and DUMPER commands.

NOTE

DUMPER does not work on a 7-track magnetic tape drive (TU71).

To save all disk files of a structure, do the following:

1. Type PUSH to OPR.
2. Type ENABLE.
3. Type MOUNT TAPE setname: with the /WRITE-ENABLED switch, the /LABEL-TYPE: switch, and the /VOLIDS: switch, the /NOWAIT

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switch, and any additional switches desired for the MOUNT command. It is important to give as many volids as you think you need to backup all the files you want to save.

4. Physically mount and ready a tape that has been assigned for DUMPER backups.
5. When MOUNTR replies with the Tape Mount Request and with the acknowledgement of the tape being mounted, press <RET> and type POP to return to OPR.
6. If it is an unlabeled tape, give the IDENTIFY command to OPR to identify the tape drive to the mount request.
7. When MOUNTR replies with Tape Drive Given To Request number, type PUSH to OPR.
8. If you want to save files from a structure other than PS: or BS:, type MOUNT STRUCTURE str:.
9. After the system has displayed the defined tape drive for the setname:, type DUMPER.

10. Type the following DUMPER commands:

```
TAPE MTn:      or      TAPE setname:
SAVE /FULL-INCREMENTAL str:
```

Structure is the name of the structure for which you did the MOUNT above, or it is omitted along with the colon to indicate your currently connected structure.

As DUMPER starts to save files for each directory on the structure, it prints the structure and directory name.

11. If you receive the message:

```
[Mounting next tape volume]
```

mount another tape as specified in the MOUNT TAPE command on MTn or any available tape drive. Then press CTRL/C twice, POP to OPR, and IDENTIFY the tape drive to the mount request.

12. When MOUNTR replies the acknowledgment that the tape is mounted, type PUSH to OPR, and type CONTINUE to continue the DUMPER backup process.
13. After DUMPER has finished the SAVE, DUMPER prints two total lines, and you are prompted with the DUMPER> prompt.
14. Type EXIT to DUMPER.

15. Type DISMOUNT TAPE MTn: to rewind and unload the tape. You can also type DISMOUNT TAPE setname: to rewind and unload the tape.
16. If you did a MOUNT STRUCTURE above, type DISMOUNT STRUCTURE str:.
17. Type DISABLE.
18. Type POP to return to OPR.
19. Physically remove the tape(s) from the drive(s).
20. Store the magnetic tapes and DUMPER's output to your terminal in the place decided upon by your system manager.

----- Hints -----

If you do not specify enough volids to backup the mounted structure, the system prompts you with the following when DUMPER reaches the end of the last reel specified in the MOUNT command:

```
hh:mm:ss <n>      --Key In Next Volume Identifier--
                  Supply next volume-id for tape set setname:
                  User username, Job n, Line n
                  Respond with either of:
                  VOLUME volid
                  REFUSE reason
```

You must then press <RET>, type POP to return to OPR, and supply another volid by giving the OPR command RESPOND nn VOLUME volid. Another Tape Mount Request now appears. You must then mount and ready the tape and IDENTIFY the tape drive to the mount request. Then PUSH and CONTINUE to return to DUMPER and the backup process.

To save space due to inter-record gaps on the DUMPER tapes, you can specify the following DUMPER command before you give the SAVE command:

```
SET BLOCKING-FACTOR nn
```

This command sets the number of logical records that are blocked into a single physical record. The number (nn) must be in a range of 1 to 15. The default is 1. The limits for the densities (BPI) are as follows:

1. Density 200 - 1
2. Density 556 - 3
3. Density 800 - 4

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- 4. Density 1600 - 10
- 5. Density 6250 - 15

----- Example -----

Run DUMPER to save all files on structure PS: on an unlabeled tape.

```

OPR>PUSH<RET>

TOPS-20 Command processor 7(31)
@ENABLE<RET>
$MOUNT TAPE DUMPER: /LABEL-TYPE:UNLABELED/WRITE-ENABLED-<RET>
/VOLIDS:DUMP01,DUMP02/NOWAIT<RET>
[Waiting for Tape/Structure Mount]

16:30:00      --Tape Mount Request # 102--
              Mount Unlabeled volume DUMP01, WRITE-ENABLED
              User OPERATOR, Job 6, Terminal 1

16:30:03      --MTA0: Unlabeled tape mounted--
<RET>
$POP<RET>
OPR>IDENTIFY MTA0: REQUEST-ID 102<RET>
OPR>
16:32:01      --MTA0: Given To Request 102--
              Volume DUMP01 now in use by
              User OPERATOR, Job 6, Terminal 1

OPR>PUSH<RET>
[Tape set DUMPER, volume DUMP01 mounted]
[DUMPER: defined as MT0:]
$DUMPER<RET>
DUMPER>TAPE MT0:<RET>
DUMPER>SET BLOCKING-FACTOR 10<RET>
DUMPER>SAVE /FULL-INCREMENTAL PS:<RET>
DUMPER tape # 1, Saturday, 14-Apr-87 1452. , Valid DUMP01
PS:<ACARLSON>
PS:<ACCOUNTS>
PS:<BAKER>
.
.
PS:<BLISS>
[Mounting next tape volume]
16:50:45      --Tape Drive Released By User--
              MTA0: Volume DUMP01 Being unloaded

16:51:01      --Tape Mount Request # 103--
              Mount Unlabeled volume DUMP02, 9-TRACK,
              WRITE-ENABLED
              User OPERATOR, Job 6, Terminal 1
    
```

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```

16:51:21      --MTA0: Unlabeled tape mounted--

^C
^
<CTRL/C><CTRL/C>
$POP<RET>
OPR>IDENTIFY MTA0: REQUEST-ID 103<RET>
OPR>
16:52:45      --MTA0: Given to Request 103--
              Volume DUMP02 now in use by
              User OPERATOR, Job 6, Terminal 1

OPR>PUSH<RET>
$CONTINUE<RET>

DUMPER tape # 2, Saturday, 14-Apr-87 1401. Valid DUMP02
PS:<COX>
PS:<DENNY>
PS:<ELFSTROM>
.
.
PS:<ZINA>

Total files dumped = 604
Total pages dumped = 8835
DUMPER>EXIT<RET>
$DISMOUNT TAPE DUMPER:<RET>
[Tape dismounted, logical name DUMPER: deleted]
17:15:07      --Tape Drive Released By User--
              MTA0: Volume DUMP02 Being unloaded

$POP<RET>
OPR>
    
```

To do an incremental save of a structure, follow the same steps as described previously for a full save of a structure with the following exception: at DUMPER command level, type

SAVE /INCREMENTAL:1 str:

where str: is the structure name for the incremental save.

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----- Example -----

Run DUMPER to do an incremental save on structure MISC: on an unlabeled tape.

```

OPR>PUSH<RET>

TOPS-20 Command processor 7(31)
@ENABLE
$MOUNT TAPE INCRMT: /WRITE-ENABLED/LABEL-TYPE:UNLABELED-<RET>
/VOLIDS:DUMP09/NOWAIT<RET>
[Waiting for Tape/Structure Mount]

17:18:00      --Tape Mount Request # 112--
              Mount Unlabeled volume DUMP09, WRITE-ENABLED
              User OPERATOR, Job 6, Terminal 1

17:18:25      --MTA2: Unlabeled tape mounted--
<RET>
$POP<RET>
OPR>IDENTIFY MTA2: REQUEST-ID 112<RET>
OPR>
17:20:03      --MTA2: Given To Request 112--
              Volume DUMP09 now in use by
              User OPERATOR, Job 6, Terminal 1

OPR>PUSH<RET>

$mount structure misc<RET>
[Tape set INCRMT, volume DUMP09 mounted]
[INCRMT: defined as MT1:]
$DUMPER<RET>
DUMPER>TAPE MT1:<RET>
DUMPER>SAVE/INCREMENTAL:1 MISC:<RET>

DUMPER tape # 1, Saturday, 14-Apr-87 1206. , Valid DUMP09

MISC:<ACCOUNTS>
MISC:<BARON>
MISC:<BROWN>
MISC:<HOVSEPIAN>
MISC:<OPERATOR>
.
.
MISC:<PALL>
MISC:<ROLAND>

Total files dumped = 467
Total pages dumped = 7721
DUMPER>EXIT<RET>
$DISMOUNT TAPE MT1:<RET>
[Tape dismounted]
    
```

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```

17:31:52      --Tape Drive Released By User--
              MTA2: Volume DUMP09 Being unloaded

$DISMOUNT STRUCTURE MISC:<RET>

17:32:31      --STRUCTURE DISMOUNTED--
              Structure MISC: (Alias: MISC) dismounted

$POP<RET>
OPR>
    
```

----- Hints -----

If you are saving disk files with DUMPER and the system crashes, you do not have to start from the beginning after the system is started again. Do the following:

1. Leave the tape positioned where it is.
2. Type PUSH to OPR>.
3. Type ENABLE.
4. Type MOUNT TAPE setname: and specify the same switches that were specified for the tape mount before the system crash, but specify new tape volids.
5. Type POP to return to OPR and give the IDENTIFY command to identify the tape drive to the mount request. Then type PUSH to return to TOPS-20 command level.
6. If you are saving files from a structure other than PS: or BS:, type MOUNT STRUCTURE STR:.
7. Type DUMPER.
8. Type the following DUMPER commands:


```

TAPe MTn:
INIT <directory>
SAVE/FULL-INCREMENTAL str: or SAVE /INCREMENTAL:n str:
            
```

where directory is the last directory name output by DUMPER before the system crashed and structure is the name of the structure for which you did the MOUNT above. You can omit str: to indicate your currently connected structure.
9. Follow Steps 11 through 20 above.

If you are restoring files with DUMPER and the system crashes, you can use the same technique stated above. Simply replace the SAVE command and switches with RESTORE and appropriate switches.

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8.12 ENDING TIMESHARING WITH ^ECEASE

As soon as you know the next scheduled time to end timesharing, use the ^ECEASE command. Type to OPR>:

1. PUSH
2. ENABLE
3. ^ECEASE (TIMESHARING AT) date time (RESUMING AT) date time
4. <RET> to confirm the shutdown
5. POP

----- Examples -----

1. OPR>PUSH<RET>

```
TOPS-20 Command processor 7(31)
@ENABLE<RET>
$^ECEASE 8-Feb-87 1900 8-Feb-87 2000<RET>
CLOYD shut down scheduled for 8-Feb-87 17:05:24
[Confirm]
$<RET>
$POP<RET>
OPR>
```

2. To cancel a ^ECEASE command, type ^ECEASE and press RETURN.

```
OPR>PUSH<RET>
TOPS-20 Command processor 7(31)
@ENABLE<RET>
$^ECEASE<RET>
[SHUTDOWN CANCELLED]
$POP<RET>
OPR>
```

In a CFS-20 cluster, a shutdown on one system causes "system going down" messages to be transmitted to all systems in the cluster at the sixty-minute, five-minute, and one-minute marks. For example, if SYSA is shutting down, the following messages appear clusterwide:

```
[System SYSA going down in 60 minutes at 1-Dec-87 16:29:22]
```

```
[System SYSA going down in 5 minutes at 1-Dec-87 16:29:22]
```

```
[System SYSA going down in one minute!!]
```

Any time you give a ^ECEASE command while other systems in the cluster are accessing your disks by means of the MSCP server, the following

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message is printed on the CTY, as well as any terminal running the OPR program, every time the message "System going down in 'n' minutes" has a time of 60 minutes or less.

Check other cluster systems for structure dismount instructions

Every time you receive this message, any other system accessing your disks will receive one of the following two messages.

```
NODE-NAME going down at 11-Mar-87 08:34:37.
Before it is shutdown, this system should dismount
the following structures
```

```
structure-name structure-name
```

or

```
NODE-NAME going down at 11-Mar-87 08:34:37.
No structure dismounting is needed on this system.
```

When the time has expired, the operator on the system being shutdown will receive the following message.

```
[Timesharing is over]
```

```
OPERATOR-WAIT FOR THE MESSAGE 'Shutdown Complete' BEFORE
ENTERING COMMANDS TO PARSER.
```

```
ALSO, MAKE SURE OTHER SYSTEMS IN THE CLUSTER HAVE
COMPLETED ALL NECESSARY STRUCTURE DISMOUNTS BEFORE THIS
SYSTEM IS SHUTDOWN.
```

At this time, any other system accessing your disks will receive one of the following two messages on the CTY as well as any terminal running the OPR program.

```
NODE-NAME has ceased timesharing
Before it is shutdown this system should dismount the
following structures:
```

```
structure-name structure-name
```

or

```
NODE-NAME has ceased timesharing
No structure dismounting is needed on this system.
```

If there are users accessing disk structures on the system being shutdown, they should be notified to dismount those structures using the DISMOUNT STRUCTURE command.

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If at any time the operator cancels the shutdown, any user accessing disks on that system will receive the following message.

```
NODE-NAME has canceled its shutdown. It is no longer
necessary for this system to dismount structures
```

```
structure-name structure-name
```

It should be noted that if no other system is accessing disks on the system being shutdown, no messages will be printed and the shutdown procedures would be the same as a single system shutdown.

If you also need to power down the hardware after timesharing has finished, do the following:

1. Wait until SHUTDOWN COMPLETE is output on the CTY.
2. Type CTRL/\ (control backslash) to enter the console processor command language.
3. Give the SHUTDOWN command and wait for the **HALTED** message.
4. Unload all tape drives.
5. Power down the tape drives.
6. Stop all disk drives by setting the START/STOP switch to STOP.
7. Turn off system power by setting the black power switch to POWER OFF.

ERROR RECOVERY PROCEDURES

CHAPTER 9

ERROR RECOVERY PROCEDURES

While the system is running, unexpected errors may occur. Sometimes the system tries to recover, but other times you may have to take corrective action. This chapter describes some of the errors that you may encounter and how to correct them.

9.1 AUTOMATICALLY RELOADING AND DUMPING THE SYSTEM

Because there is one monitor (TOPS-20) for the main processor and another (RSX-20F) for the console front-end processor, it is possible for either one to crash (halt or hang) and for either one to restart the other.

When TOPS-20 halts because of a BUGHLT (Section 9.4.2), it is usually reloaded and started by RSX-20F. During automatic reloading, RSX-20F writes a KLERR entry containing information about the central processor at the time of the crash. Once TOPS-20 is running, this KLERR entry is appended to the ERROR.SYS file (Section 8.10). The automatic reloading process also dumps KL memory to the file <SYSTEM>DUMP.EXE on the system structure or on DMP: if your system manager has defined this logical name. Once TOPS-20 is running again, that file is automatically copied to DUMP-version-name.CPY, where name is the name of the error and version is the edit number of the monitor that was running at the time of the crash. This file is given a new generation number so that successive memory dumps do not destroy any previous ones.

A message similar to the following is sent to the CTY when the copy is done:

```
Copying system dump
from: STR:<SYSTEM>DUMP.EXE.1
to: PS60:<DUMPS>DUMP-12345-KPALVH.CPY.1
```

When RSX-20F halts, it is usually reloaded by TOPS-20. However, some output for the CTY might not get printed. This output includes a BUGCHK or BUGINF, PTYCON output, and PROBLEM ON DEVICE messages. During a reload, the front-end memory is dumped to the file BS:<SYSTEM>0DUMP11.BIN.n, where n is the file generation number. On successive dumps, the generation number is increased so that previous dumps are not overwritten. The filename, including the generation number, is placed into ERROR.SYS (Section 8.10).

For automatic reload of TOPS-20, the front end assumes the last used bootstrap device and BOOT.EXB as the KL bootstrap. BOOT.EXB then reads in the default monitor, BS:<SYSTEM>MONITR.EXE.

When a reload occurs, write as much information as possible about the crash in the installation logbook. Include the following:

1. Date and time of the crash
2. TOPS-20 or RSX-20F reload
3. Name of the BUGHLT, job number, and user name
4. Names of the files containing the TOPS-20 monitor before it was run and the memory dump

If your system manager or software specialist decides to report the crash to DIGITAL, you must provide:

1. The information for the crash from the logbook
2. A copy of the memory dump and the TOPS-20 monitor before it was run. Use DUMPER -- NOT in interchange mode -- on a 9-track tape at 1600 bits/inch (63 rows/mm)
3. The CTY output when the crash occurred
4. For TOPS-20 crashes, the output from SPEAR containing the KLERR information

----- Hint -----

As soon as possible, memory dump files should be put on magnetic tape with DUMPER and deleted from disk to free some space.

ERROR RECOVERY PROCEDURES

9.1.1 Dumping the System for "Continuable" Errors

In the configuration file, your system manager may have arranged for BUGINF and BUGCHK errors to generate memory dumps also. (This feature is called "DUMP-ON-BUGCHK.") Dumps for these types of errors take place in a very similar way as for BUGHLTs: memory is dumped to DUMP.EXE and then copied to a .CPY file. However, with these continuable errors, the DUMP.EXE file is written to one of any number of structures you designate as "dumpable," not necessarily the system structure (which is always dumpable).

To mark a structure as dumpable, give the following command:

```
OPR>SET STRUCTURE str: DUMPABLE
```

where: str is the name of a structure that is to be considered dumpable.

Later, DUMP.EXE is copied to a .CPY file on DMP: if that logical name is defined or on a different area of the same dumpable structure.

9.2 MANUALLY RELOADING AND DUMPING THE SYSTEM

You must manually reload the system when it is time for a scheduled reload or when the system is hung or looping, for example, not responding to users.

9.2.1 Scheduled Reloads

For scheduled reloads, you can use the procedure given in Sections 4.2.1, 4.2.2, or 4.2.3. However, if the system is running at the time you want to reload, you must:

1. Give a ^ECEASE command (Section 8.12) and wait until the system is down. At that time, SHUTDOWN COMPLETE is printed on the CTY.
2. Type CTRL/\ (control backslash) to enter the console processor command language.
3. Give the SHUTDOWN command.
4. After the **HALTED** message, reload the system.

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9.2.2 Reloads and Dumps for a Hung or Looping System

Determining whether it is TOPS-20 or RSX-20F that is hung or looping might be difficult. If you are able to get to the console processor command language by typing CTRL/\, RSX-20F is probably okay. Assuming that TOPS-20 is looping, try the following steps:

1. Type CTRL/\ to enter the console processor command language. If you do not get to the PARSER, assume the front end is hung and proceed with the steps below for a hung front end. If you get the PARSER prompt(PAR>), proceed with Step 2.
2. Type REPEAT 5;EXAMINE KL to print the current program counter (PC) and the current state of the priority interrupt (PI) system five times. Save this output.
3. Type SHUTDOWN. If you do not get the message **HALTED**, type CTRL/\ ABORT and press the RETURN key.
4. Reload via the switch register (Section 4.2.3) to enter the dialog, and answer BOOT to the first question.
5. When BOOT prompts, type /D<RET> to dump KL memory to the file BS:<SYSTEM>DUMP.EXE. Later the file is automatically copied to another name. When the copy is done, note the filename printed on the CTY.
6. Press RETURN to load BS:<SYSTEM>MONITR.EXE, or type the name of the monitor to be loaded.
7. Answer questions in the loading procedure (Section 4.2).

Assuming the front end is hung, try the following:

Manually halt the front end by pressing and then raising the HALT switch which is to the right of the switch register. Wait 10 to 15 seconds; TOPS-20 may try to reload the front end. Then consider the following three cases.

1. If RSX-20F reloaded successfully, and everything now seems okay, report the situation to your system manager and software specialist. A dump of front-end memory is automatically placed into the file BS:<SYSTEM>0DUMP11.BIN.n, where n is the file generation number. The filename, along with the generation number, is entered in ERROR.SYS.
2. If RSX-20F is reloaded, but the system still seems to be hung, try the procedure above for TOPS-20 looping.

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3. If RSX-20F does not reload, for example, you do not get the following messages:

```
RSX-20F VB16-00 7:40 5-OCT-88
```

```
[SY0: REDIRECTED TO dev:]  
[dev: MOUNTED]
```

and the console light is on, TOPS-20 is probably looping. You should then follow the procedure above for TOPS-20 looping. You could also wait about five minutes to let TOPS-20 get a BUGHLT, so that the front end automatically reloads it. However, if RSX-20F does not successfully reload, you lose the EXAMINE KL output. If you let the front end reload TOPS-20, once the system is up, be sure to run SPEAR to get KLERR information.

----- Hint -----

Be sure to log any reloads in your installation's system logbook. Include the following:

1. Any information about the reason for reloading
2. When and how the reload was done
3. Attachment of EXAMINE KL output, if any
4. Whether KL or front-end memory was dumped and to which files they were dumped

To report the crash to DIGITAL, supply the above information, a copy of the TOPS-20 monitor before it was run, any memory dumps on magnetic tape, and any SPEAR output containing KLERR information.

9.3 SETTING THE CORRECT DATE AND TIME

If you notice that the date and time printed by the system is incorrect, immediately notify your system manager. For accounting purposes, he may want you to reload the system. However, he may want you to correct only the date and time. You can change the date and time with ^ESET DATE-AND-TIME. If you need to change the date, be sure you first warn all users via ^ESEND that you are going to change the date, because that action may affect their work.

To correct the date and time, type the following commands:

1. PUSH to OPR

ERROR RECOVERY PROCEDURES

2. ENABLE your capabilities
3. ^ESEND * DATE AND TIME WILL BE SET BACK TO MAKE THEM CORRECT
4. ^ESET DATE-AND-TIME date time
5. DAYTIME
6. POP

(For valid date and time formats, see the ^ECEASE command in the TOPS-20 Operator's Command Language Reference Manual. Also, see the same manual for more detail on ^ESET and ^ESEND.)

----- Example -----

```
OPR>PUSH<RET>
```

```
TOPS-20 Command Processor 7(31)
```

```
@ENABLE (CAPABILITIES)<RET>
```

```
$^ESEND * DATE AND TIME WILL BE SET BACK TO MAKE THEM CORRECT<RET>
```

```
[FROM OPERATOR: DATE AND TIME WILL BE SET BACK TO MAKE THEM CORRECT]
```

```
$^ESET DATE-AND-TIME (TO) 3-MAR-87 1047<RET>
```

```
$DAYTIME<RET>
```

```
$POP<RET>
```

```
OPR>
```

9.4 ERROR MESSAGES AND ACTION TO TAKE

Error messages come from many different sources. Those from programs are usually documented with the task involving that program. The next eight sections discuss device error messages, BUGCHKs, BUGINFs, and BUGHLTs from TOPS-20, HOME and BAT block messages from the KL bootstrap and from TOPS-20, TOPS-20 parity errors, DX20 error messages, REAPER error messages, tape handling error messages, and bootstrap error messages.

9.4.1 Device Error Messages

When problems occur on various devices, you receive on the CTY a message beginning with %PROBLEM ON DEVICE. The message continues printing every minute until you correct the problem. The specific messages and their corrective actions are given below.

ERROR RECOVERY PROCEDURES

%PROBLEM ON DEVICE: MTAn, S.N.=s, ACCESS PATH: CHN=c, cont=t, UNI=u

n = logical unit number
s = serial number
c = channel number
cont = TM02, TM03, or DX20
t = number of the TM02, TM03, or DX20
u = physical unit number on the controller

There is a problem with the magnetic tape drive, logical unit n. Check if the drive has lost vacuum, if the tape has run off the reel, or if the drive is not on-line. Warn the user if vacuum was lost.

%PROBLEM ON DEVICE PCDR0

There is a problem with the card reader. Check if one of the following error indicator lights is lit:

1. READ CHECK

A card edge is torn, column 0 or 81 is punched, or two cards were picked at the same time. To correct the problem for a faulty card, remove the card and press RESET to restart the reader. If no cards are faulty, reread the last two cards in the output stacker. If READ CHECK occurs for every card, notify your DIGITAL Field Service Representative.

2. PICK CHECK

A card edge is damaged, webs are torn, or cards are stapled together. If a card is damaged, remove it and restart the reader by pressing RESET. If no cards are damaged, check for excessive warpage of the card deck or a buildup of ink glaze on the picker face. If webs are torn, notify your DIGITAL Field Service Representative.

3. STACK CHECK

Either there is a badly mutilated card or there is a jam in the card track. To fix the problem, remove the bad card or correct the jam and restart the reader by pressing RESET.

4. HOPPER CHECK

Either the input hopper is empty or the output stacker is full. To correct the problem, load the input hopper or unload the output stacker.

%PROBLEM ON DEVICE PLPTn

There is a problem with line printer unit n. Check if the

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printer is on-line, has paper, or has any error lights on.

%PROBLEM ON DEVICE: RP0n, STR=t, S.N.=s, ACCESS PATH: CHN=c, UNI=u

n = 4, 6, 7, 20, 60 or 81 for the type of disk drive
t = structure name
s = serial number
c = channel number
u = unit number

There is a problem with a disk drive. Check if it is READY or if any error lights are on. If STANDBY is lit, turn the drive power OFF and then ON. If UNSAFE is lit, you should contact your DIGITAL Field Service Representative, as there could be a hardware problem.

----- Example -----

%PROBLEM ON DEVICE: MTAl, S.N=0024, ACCESS PATH: CHN=0, TM02=5, UNI=2

NOTE

If the disk drive is on the CI or is served by MSCP, the output will also show what node the disk was connected to.

9.4.2 BUGCHKs, BUGINFs, and BUGHLTs

When TOPS-20 encounters certain questionable situations, it generates a BUGCHK or BUGINF. Then, some informational messages are output on the CTY, and TOPS-20 continues. BUGINFs are strictly informational messages. BUGCHKs indicate a problem. However, they do not halt the system. When TOPS-20 encounters a situation from which it is not advisable to continue, it generates a BUGHLT. TOPS-20 is then reloaded and restarted by the front end.

When a BUGCHK is encountered, the following is output on the CTY:

```
*****  
*BUGCHK "name" AT dd-mmm-yy hh:mm:ss  
*message  
*JOB: n, USER: user-name  
*ADDITIONAL DATA: data, data, data, data  
*****
```

The lines beginning with JOB: or ADDITIONAL DATA: may not appear. The system then continues.

The output is similar for BUGINFs.

ERROR RECOVERY PROCEDURES

----- Example -----

```
*****
*BUGCHK "P2RAE1" AT 3-MAR-79 13:26:32
*PHYH2 - RH20 REGISTER ACCESS ERROR READING REGISTER
*ADDITIONAL DATA: 10005210602, 407415
*****
```

NOTE

After a power-fail restart, the system prints BUGCHK "PWRRES", the system continues, but all jobs that were attached to a terminal are detached. If the detached jobs are not attached to within five minutes, they are logged out.

When a BUGHLT occurs, the following is output on the CTY.

```
%DECSYSTEM-20 NOT RUNNING
```

```
*****
*BUGHLT "name" at date and time
*JOB number, User: User name
*****
```

You can find the message corresponding to the BUGHLT "name" in the document, BUGHLT Documentation. The message pertaining to the BUGHLT is not printed on the CTY. The front-end then reloads and starts the TOPS-20 monitor.

----- Example -----

```
%DECSYSTEM-20 NOT RUNNING
```

```
*****
*BUGHLT "ILLUO" AT 11-Dec-87 11:03
*JOB: 000000000004, USER: JBREWER
*ADDITIONAL DATA: 304000000003, 000006516407, 000001000000
*****
```

```
KL HALTED
```

```
KLE>TAKE HALT
KLE>EX KL
PC/ 1 043145
VMA/ 1 043145
PI ACTIVE: OFF, PI ON: 177, PI HOLD: 000, PI GEN: 000
OVF CY0 CY1 FOV BIS USR UIO LIP AFI AT1 AT0 FUF NDV
  X      X
```

ERROR RECOVERY PROCEDURES

```
KLE> <EOF>
KLE> <END OF SNAPSHOT>
KLI -- VERSION VB15-50 RUNNING
KLI -- PAGE TABLE SELECTED: BOTH
KLI -- %MOS MEMORY IS ALREADY CONFIGURED
```

```
LOGICAL MEMORY CONFIGURATION.
ADDRESS SIZE INT TYPE CONTROLLER
00000000 768K 4 MF20 10
03000000 768K 4 MF20 11
```

```
KLI -- ALL CACHES ENABLED
KLI -- CONFIGURATION FILE WRITTEN
KLI -- BOOTSTRAP LOADED AND STARTED
```

```
BOOT V11.0(315)
[BOOT: DUMPING] [OK]
```

```
Number of pages written: 5734
Number of I/O requests: 324
[BOOT: LOADING] [OK]
```

```
[CHIP MOUNTED]
```

```
[IPALOD: LOADING CI20 MICROCODE VERSION 1.1(733)] [OK]
```

```
System restarting, wait...
Date and time is: Friday, 11-December-1987 11:09AM
11:09:01 ***BUGINF KLPL0A*** PHYKLP - CI20 ucode loaded Job: 0, User:
OPERATOR Additional Data:733
11:09:01 ***BUGINF KLPSTR*** PHYKLP - CI20 started Job: 0, User:
OPERATOR
11:09:02 ***BUGINF KLPOVC*** PHYKLP - Opened virtual circuit
Additional Data: 14
11:09:02 ***BUGINF CFCONN*** CFSSRV - CFS connection Additional Data:
14, 27777667660, 5664
11:09:03 ***BUGINF CFDISC*** CFSSRV - CFS disconnect Additional Data:
14, 27777667660, 5664
11:09:04 ***BUGINF CFCONN*** CFSSRV - CFS connection Additional Data:
14, 17777727720, 5664
11:09:05 ***BUGINF KLPOVC*** PHYKLP - Opened virtual circuit
Additional Data: 10
Running DDMP
```

```
Copying system dump
from: CHIP:<SYSTEM>DUMP.EXE.1
to: SA25:<DUMPS.CHIP>1646-DUMP.CPY.1
```

This printout is followed by other messages as in normal system loading.

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When a crash is reported to DIGITAL, the CTY output similar to that in the above example should be saved and sent with the report.

Whenever the system encounters a BUGCHK beginning with DIR, it prints a directory number after ADDITIONAL DATA. You should then try to rebuild that directory's symbol table (Section 9.5.1). If the rebuild fails to correct the problem, proceed with the instructions at the end of Section 9.5.1. It is important to take corrective action in this case so that files do not get lost.

ERROR RECOVERY PROCEDURES

NOTE

When the console front end crashes, it is reloaded automatically and the message [DECSYSTEM-20 CONTINUED] is printed. You do not get a BUGHLT, but you may have to retype some of your last input.

9.4.3 HOME Block or BAT Block Inconsistencies

When the KL bootstrap is loaded and started, it checks the primary HOME blocks on the disk packs for certain information. It checks if the system structure has been mounted and if the system structure contains all the proper units for the structure.

If the system structure has not been properly mounted, you may get the following error messages from the bootstrap:

ERROR: ?DUPL STR UNI

Reason: There are two mounted disk packs claiming to have the same logical unit number.

Recovery: Check to see if you have the proper disk packs mounted. If the proper disk packs are mounted and the error still continues to occur, contact your software specialist or DIGITAL Field Service Representative.

ERROR: ?HOME BLKS BAD

Reason: The logical unit number is out of range.

Recovery: Check to see if you have the proper disk packs mounted. If the proper disk packs are mounted and the error still continues to occur, contact your software specialist or DIGITAL Field Service Representative.

ERROR: ?MISSING UNIT

Reason: One or more logical units are missing from the structure.

Recovery: Check to see if all the proper disk packs are mounted. If all the proper disk packs are mounted and the error continues to occur, contact your software specialist or DIGITAL Field Service Representative.

After any of the above errors, BOOT prompts again. To load a TOPS-20 monitor, type the monitor filename or press RETURN to get the default. If the proper packs are mounted and an error still occurs, consult your software specialist or Field Service Representative.

ERROR RECOVERY PROCEDURES

9.4.3.1 HOME Block Message - Once the bootstrap is loaded and started, TOPS-20 also checks the HOME blocks on the disk packs. The following messages may occur.

----- Warning Messages -----

% BACKUP HOME BLOCK ON "BS" LOGICAL UNIT n IS INCORRECT

TOPS-20 continues to run using the other HOME block.

%COPYING PRIMARY HOME BLOCK TO SECONDARY ON BS UNIT n

Because the secondary HOME block is incorrect, TOPS-20 copies the primary HOME block to the secondary HOME block.

%COPYING SECONDARY HOME BLOCK TO PRIMARY ON BS UNIT n

Because the primary HOME block is incorrect, TOPS-20 copies the secondary HOME block to the primary HOME block.

% PRIMARY HOME BLOCK ON "BS" LOGICAL UNIT n IS INCORRECT

TOPS-20 continues to run using the other HOME block.

----- Error Messages -----

ERROR: ?INCONSISTENT SET OF PACKS COMPOSING STRUCTURE BS.

Reason: A logical unit number is out of range.

Recovery: Be sure you have the proper disk packs mounted. If the proper disk packs are mounted and the error continues to occur, contact your software specialist or DIGITAL Field Service Representative.

ERROR: ?LOGICAL UNIT n MISSING FROM STRUCTURE BS.

Reason: One or more logical units are missing from the structure BS.

Recovery: This error could be caused by a hardware problem. Be sure you have the proper disk packs mounted. If the proper disk packs are mounted and the error continues to occur, contact your software specialist or DIGITAL Field Service Representative.

ERROR: ?LOGICAL UNIT n OF STRUCTURE BS IS WRITE LOCKED.

Reason: The switch on the disk drive is in the WRITE LOCKED position.

Recovery: Be sure the proper disk pack is mounted, then position the

ERROR RECOVERY PROCEDURES

switch to the WRITE ENABLED position.

ERROR: ?MORE THAN 1 LOGICAL UNIT n IN STRUCTURE BS.

Reason: There are two disk packs mounted claiming to have the same logical unit number.

Recovery: This error could be caused by a hardware problem. Be sure you have the proper disk packs mounted. If the proper disk packs are mounted and the error continues to occur, contact your software specialist or DIGITAL Field Service Representative.

After any of the above errors, you get the message HAVE THE PROBLEMS MENTIONED ABOVE BEEN CORRECTED YET:. If you believe you have corrected them, type Y to continue.

Once the system succeeds in the HOME block check, it prints:

[BS MOUNTED]

9.4.3.2 BAT Block Messages - Then TOPS-20 checks the BAT (bad allocation table) blocks on the disk packs. The BAT blocks indicate what areas of the disk have been found to be bad. The following messages may occur.

----- Warning Messages -----

%BAT BLOCK FULL ON BS UNIT n

The monitor continues to run with no space in the BAT block to mark bad areas of the disk. Inform your DIGITAL Field Service Representative so that he can correct the problem. You then should reformat the pack and re-create the file system.

%BAT BLOCKS DO NOT COMPARE ON BS UNIT n

The BAT blocks on unit n look valid, but they are not the same. When BAT blocks are updated, the primary one is done first. Therefore, if the system crashes before the secondary one is updated, they are different. In this case, the primary BAT block is copied into the secondary one.

%COPYING PRIMARY BAT BLOCKS TO SECONDARY ON BS UNIT n

See explanation above.

%COPYING SECONDARY BAT BLOCK TO PRIMARY ON BS UNIT n

If the primary BAT block is not valid, the secondary one is copied to it.

ERROR RECOVERY PROCEDURES

?BS UNIT n HAS NO CONSISTENT BAT BLOCKS

The monitor continues and assumes that the structure was built not to have BAT blocks.

9.4.4 Parity Errors

When TOPS-20 encounters a parity error, it prints out a message beginning with:

AR OR ARX PARITY ERROR

or

MPE DETECTED BY x, PC=n, y

where x is a device or APR, n is the PC value, and y is either MONITOR or USER.

Other applicable information for each message is then printed on the CTY. The same information is also entered in ERROR.SYS.

If any of these parity errors occurs, save the CTY output from the errors and notify your DIGITAL Field Service Representative.

NOTE

As memory parity errors occur, the system may decide not to use the affected memory pages.

----- Examples -----

The following output shows the information from both types of parity errors:

MPE DETECTED BY APR , PC=000000,,023247, MONITOR
ERA = 002001,,437564

SBUS DIAGS

CNTRLR FNC 0 FNC 1
000000 006000,,000000 036300,,036012
000001 006000,,000000 036300,,036005
000002 006000,,000000 036301,,036012
000003 006000,,000000 036301,,036005

LOC CONTENTS
01000002 000000,,020120
01000004 000000,,354140

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01000006 000000,,073302
01000010 000000,,537122
01000014 000000,,451660
01000016 000000,,066330
01000020 000000,,062313
01000032 000000,,044730
01000036 000000,,062500
01000044 000000,,564734

122 ERRORS FOUND.

LOGAND ADR = 000001,,000000
LOGOR ADR = 000001,,777776
LOGAND DATA = 000000,,000000
LOGOR DATA = 777777,,777777

AR OR ARX PARITY ERROR

PFW= 773000,,401564 MAP WORD= 503001,,437564
BAD DATA= 000000,,000000
CORE PAGE 001437 DISABLED

9.4.5 DX20 Error Messages

If there is a problem in loading the DX20 at system start-up time, you see a message similar to one of the following on the CTY:

?CHN:n DX20:m CRAM VERIFY
GOOD data BAD data XOR data

?CHN:n DX20:m WORK MEM VER
GOOD data BAD data XOR data

n = the number of the RH20 to which the DX20 is connected
m = the number of the DX20
data = an octal number

If you see a message similar to one of the above, save the message and call your DIGITAL Field Service Representative. The information in the message can help him solve the problem. You can continue running the system, but do not use the DX20.

9.4.6 Reaper Error Messages

The following is a list of the error messages that can occur when you run the REAPER program, along with their recovery procedures:

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----- Error Messages -----

ERROR: BAD PERIOD
Reason: There was an non-numeric character in the PERIOD command.
Recovery: Correct the PERIOD command and continue with the REAPER program.

ERROR: BAD DIRECTORY NAME IN SKIP LIST
Reason: A non-existent or incorrect directory name was specified in the SKIP command.
Recovery: Remove or correct the directory name and continue with the REAPER program.

ERROR: SKIP SPACE FULL
Reason: You have more than 75 directories in the SKIP list.
Recovery: Check to see if you can remove any of the directories that are currently in the SKIP list. If you cannot, the directory you were trying to add cannot be entered into the SKIP list.

ERROR: BAD FILESPEC IN ORDER LIST
Reason: An incorrect file specification or separator was entered into the ORDER command.
Recovery: Correct the invalid file specification and continue with the REAPER program.

ERROR: BAD FILESPEC IN LIST COMMAND
Reason: An invalid or incorrect file specification was entered into the list command.
Recovery: Correct the invalid file specification and continue with the REAPER program.

ERROR: TAKE FILE NOT FOUND
Reason: The file you gave in the TAKE command does not exist.
Recovery: First, be sure you are connected to the correct structure. Then make sure you gave the correct filename.

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If both of the above are correct, then the file you gave in the TAKE command must have been deleted. Recreate the TAKE file and continue with the REAPER program.

9.4.7 Tape Handling Error Messages

This section describes the recovery procedures for the various error messages that can appear when you are using tapes. The following list of the error messages, the reason for the error message and the recovery procedure.

----- Error Messages -----

ERROR: --TAPE WRITE PROTECT ERROR--
MTAn: VOLUME VOLID
order WRITE RING AND REMOUNT TAPE
where "order" is either INSERT or REMOVE
Reason: A user requested a volume to be write-enabled and the volume was mounted write-protected, or vice versa.
Recovery: If the volume should be write-protected, remove the write ring and physically remount the tape. If the volume should be write-enabled, insert the write ring and physically remount the tape.

ERROR: --NO RING IN SCRATCH TAPE--
UNLOADING DRIVE MTAn: VOLUME VOLID
REMOUNT SCRATCH TAPE WITH WRITE RING
Reason: A scratch tape was mounted without a write ring.
Recovery: Insert a write ring and physically remount the tape.

ERROR: --REMOUNT TAPE VOLUME--
MTAn: VOLUME VOLID BEING UNLOADED
REMOUNT VOLUME valid ON density BPI DRIVE
Reason: A user requested an unlabeled tape to be mounted at a specific density, and the drive it was mounted on does not support that density.
Recovery: Remove the tape from the current drive and mount it on a drive that supports the specified density.

ERROR: --TAPE DRIVE TIMED OUT--
MTAn: OPERATION TIMED OUT
Reason: A tape input/output request issued by MOUNTR took too long

ERROR RECOVERY PROCEDURES

to execute. This is an informational message that could indicate a problem with a tape drive or a problem with the software.

Recovery: Retry the operation. If the error still persists, call your DIGITAL Field Service Representative.

ERROR: --TAPE POSITIONING ERROR--
MTAn: POSITIONING OPERATION FAILED

Reason: While trying to position a volume to a specific file, the monitor reported an error to MOUNTR. This error message could indicate a bad tape or a bad tape drive.

Recovery: Retry the operation. If the error still persists, call your DIGITAL Field Service Representative.

ERROR: --TAPE ERROR WRITING LABELS--
ERROR WRITING LABELS ON MTAn: VOLUME VOLID

Reason: The software encountered an error while trying to write volume header labels on a tape. A bad tape drive or a bad tape could cause this error.

Recovery: There are two recovery procedures for this type of error. (1) Mount the tape on another drive and try again. (2) Initialize another volume at the same density, label-type, and VOLID; then use this volume instead of the one that had the error.

ERROR: --MOUNTR SYSTEM TASK ERROR--
BAD IPCF MESSAGE RECEIVED FROM component
(component = ORION or QUASAR)

Reason: MOUNTR received an unrecognized or incorrectly formatted IPCF message from either ORION or QUASAR.

Recovery: Call your software specialist.

ERROR: ?MOUNTR CRASHING, PC=n
SAVING MOUNTR CORE IMAGE ON FILE <SPOOL> MOUNTR-CRASH.EXE.n

Reason: MOUNTR detected an internal error that it could not handle. A copy of the MOUNTR program at the time of the error has been saved in the directory BS:<SPOOL> for analysis.

Recovery: Call your software specialist.

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9.4.8 Bootstrap Error Messages

This section describes the error recovery procedures for the various error messages that can appear when you are trying to boot the system from disk or tape. The following are the error messages, the reason for the error message, and the recovery procedure. All of the following error messages are preceded by ?BOOT:.

----- Error Messages -----

ERROR: HALT

Reason: BOOT or MTBOOT halts only if it is unable to determine how much physical KL10 memory is present. This message indicates incorrect memory configuration or interleaving, or memory hardware problems. This situation should not ordinarily occur.

Recovery: Reconfigure memory and check that memory interleaving is correct. If the error recurs, call your DIGITAL Field Service Representative.

ERROR: ?NO READY TAPE DRIVE AVAILABLE

Reason: MTBOOT was not able to find any magnetic tape drives on-line and ready. This commonly occurs when the operator forgets to press the on-line switch on the drive after mounting the tape.

Recovery: Check that the magnetic tape drive is on-line. If the error recurs when the drive is on-line, it indicates a hardware malfunction. Call your DIGITAL Field Service Representative if the problem persists.

ERROR: ?HARD DISK ERROR

Reason: A disk hardware error occurred during a disk input/output transfer.

Recovery: Call your DIGITAL Field Service Representative.

ERROR: ?HARD TAPE ERROR

Reason: A hardware error occurred while MTBOOT tried to read from magnetic tape. MTBOOT attempts the read operation 100 times before reporting the error. Any of the following three reasons can cause this error:

1. A dirty read head on the magnetic tape drive

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2. A corrupted or damaged magnetic tape
3. Hardware problems, probably with the magnetic tape drive

Recovery: Read the magnetic tape on another tape drive to help determine if the tape or the tape drive is the problem. If the magnetic tape drive is causing the error, clean the tape drive heads. Refer to the instructions in the tape drive operator's guide. If the tape drive still causes the error, it probably indicates a hardware malfunction. Call your DIGITAL Field Service Representative.

If the magnetic tape is causing the error, use another copy of the monitor tape to reload the system.

ERROR: ?BAD HOME BLOCK

Reason: The Home block on the structure that BOOT is currently using is damaged. This usually indicates severe structure damage.

Recovery: Use another copy of the structure, if available, rebuild the structure, or reinstall the system.

ERROR: ?MORE THAN 1 BOOTABLE STRUCTURE FOUND

Reason: BOOT found duplicate bootable structures online.

Recovery: Place drives with duplicate bootable structures offline until after system startup.

ERROR: ?STRUCTURE NOT FOUND:STR:

Reason: BOOT failed to find a structure, on line, with the structure name you specified, or hardware problems prevented BOOT from finding the structure you specified.

Recovery: Make sure the disk drive the structure is mounted on is on-line. If it is on-line, use another copy of BOOT or the monitor. If the problem still occurs, call your DIGITAL Field Service Representative.

ERROR: ?COMMAND ERROR

Reason: BOOT or MTBOOT was not able to decipher the command. This is generally the result of a typing mistake.

Recovery: Retype the command.

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ERROR: ?FILE NOT FOUND:FILESPEC

Reason: BOOT failed to find the file you specified. The file name was incorrectly entered, the file does not exist, or root-directory or the directory you specified to BOOT does not contain the expected format.

Recovery: Retype the file name, if that was incorrectly typed. If that is not the problem, check to make sure the file has not been deleted, or that the directory the file resides in is not damaged.

ERROR: ?MEMORY REFERENCE FAILED

Reason: BOOT or MTBOOT encountered an illegal address. This usually indicates a hardware problem.

Recovery: Run the BOOT program again. If the problem still occurs, call your DIGITAL Field Service Representative.

ERROR: ?FILE NOT IN .EXE FORMAT

Reason: BOOT or MTBOOT is currently attempting to load a file that is in an incorrect format. This message could be caused by several reasons. They are:

- o the wrong filename was specified
- o the file could be damaged
- o the file was generated by CSAVE
- o the file is not an executable file

Recovery: Use another copy of the monitor file.

ERROR: ?FILE'S .EXE DIRECTORY IS LONGER THAN 1 PAGE

Reason: BOOT found that the .EXE directory was larger than one page while dumping.

Recovery: Use another copy of the .EXE file.

ERROR: IO ERROR - TEXT

Reason: A hardware error occurred during an I/O transfer.

Recovery: Run the BOOT program again. If the error still occurs call

ERROR RECOVERY PROCEDURES

ERROR: your DIGITAL Field Service Representative.
?UNKNOWN SWITCH

Reason: You specified an invalid switch.

Recovery: Retype the command with the correct switch.

ERROR: ?INVALID NUMERIC VALUE

Reason: You specified a non-numeric argument to a switch expecting a numeric argument.

Recovery: Retype the command with the correct numeric argument.

ERROR: ?CANNOT FIND BOOTABLE STRUCTURE

Reason: There is no valid bootable structure on-line or hardware problems have prevented BOOT from finding a bootable structure.

Recovery: Make sure the door on the disk drive is closed, and correct disk pack is mounted and on-line. Try running BOOT several times. If problem still occurs, call your DIGITAL Field Service Representative.

ERROR: ?NO STRUCTURE ID

Reason: The structure you specified is missing its structure ID from its HOME blocks.

Recovery: Notify your system manager. If no person at your site has the expertise to correct this problem, call your DIGITAL Software Specialist.

ERROR: ?DUMP ERROR - DUMP.EXE IS TOO SMALL: RECONFIGURE WITH MAKDMP

Reason: The pre-allocated file DUMP.EXE is not large enough to hold all of the memory pages that the BOOT program is attempting to dump. Either someone has recently run MAKDMP and specified a file size that is too small, or new memory has recently been added to the system and DUMP.EXE has not been configured to accommodate the new memory.

The dump you receive could be missing pages.

Recovery: Run the MAKDMP program to reconfigure DUMP.EXE.

ERROR RECOVERY PROCEDURES

NOTE

If none of the above error messages appear on the CTY and there is a problem with the bootstrap program, refer to Section 9.13.

9.5 RECOVERING THE FILE SYSTEM

Problems of different degrees of severity can occur in the file system. The following sections discuss the simple cases of rebuilding a directory symbol table (Section 9.5.1) and reconstructing a directory (Section 9.5.2), the more complex cases of reconstructing the ROOT-DIRECTORY (Section 9.5.3) and re-creating a structure (Section 9.5.4), and the most complex case of re-creating the entire file system (Section 9.5.4).

9.5.1 Rebuilding a Directory Symbol Table with EXPUNGE

When TOPS-20 processes a BUGCHK, BUGINF, or BUGHLT beginning with DIR, and outputs the number of the directory and its structure in SIXBIT after ADDITIONAL DATA, try to rebuild the directory symbol table.

NOTE

For rebuilding directory number 1 (ROOT-DIRECTORY), refer to Section 9.5.3.

To rebuild a directory symbol table, do the following:

1. Look at the two numbers after ADDITIONAL DATA. Use the second number to determine the structure for the following procedure. If you are at OPR> command level, type PUSH to OPR and type the following commands:

```
RESET<RET>  
DDT<RET>  
DDT  
second number<ESC>6T; PS <CTRL/C>
```

After \$6T;, DDT outputs the name of the structure.

2. Find the directory name corresponding to the directory number, that is, the first number after ADDITIONAL DATA. Do this by looking at a numeric ULIST listing for the proper structure.

ERROR RECOVERY PROCEDURES

3. Type PUSH to OPR, then type:

```
ENABLE<RET>  
EXPUNGE str:<directory>,<RET>  
REBUILD<RET>  
<RET>  
POP<RET>
```

where structure and directory are names, not numbers.

Rebuilding the symbol table should eliminate any further BUGs for that directory. If it does not, reconstruct the directory (Section 9.5.2).

9.5.2 Reconstructing a Directory

If there was a problem with a directory and the procedures in Section 9.5.1 did not eliminate the problem, you must reconstruct the directory by doing the following:

1. Try to save the directory's files with DUMPER.

NOTE

If the directory is a critical one, for which there is no acceptable backup, and you cannot save the files with DUMPER, notify a DIGITAL software specialist. He might be able to recover most or all of the directory's contents.

2. Kill the directory with ^ECREATE and the KILL subcommand. If that fails, see Section 9.5.2.1 to delete the directory with the DELETE command.
3. Continue with Section 9.5.2.2 to re-create the directory and restore its files.

9.5.2.1 Deleting a Directory - If you must reconstruct a bad directory and you cannot kill it with ^ECREATE, type the following commands:

1. PUSH to OPR
2. ENABLE your capabilities
3. DELETE structure:file specification,

ERROR RECOVERY PROCEDURES

NOTE

Do not forget the "," (comma) after the file specification if you want to enter subcommand level.

4. DIRECTORY
5. <RET>
6. POP

Structure is the name of the structure containing the bad directory. Determine the file specification by doing the following on a piece of paper.

1. Write the name of the bad directory. Some examples might be:

```
<MUMBLE.FOO>  
<COT>  
<A.YOW.1>
```

2. If the name of the bad directory does not contain a ".", use "ROOT-DIRECTORY." as a prefix for the name. For example:

```
<COT> becomes <ROOT-DIRECTORY.COT>
```

3. The name now contains a "." either because it did originally or because of Step 2. Scan the name until you find the last ".". Replace the "." with ">". For example:

```
<MUMBLE.FOO> becomes <MUMBLE>FOO>  
<ROOT-DIRECTORY.COT> becomes <ROOT-DIRECTORY>COT>  
<A.YOW.1> becomes <A.YOW>1>
```

4. Replace the final ">" with ".DIRECTORY". For example:

```
<MUMBLE>FOO> becomes <MUMBLE>FOO.DIRECTORY  
<ROOT-DIRECTORY>COT> becomes <ROOT-DIRECTORY>COT.DIRECTORY  
<A.YOW>1> becomes <A.YOW>1.DIRECTORY
```

Then type the file specification you obtained at the end of Step 4 in the procedure for deleting a directory.

If you typed the DELETE command and got the message:

```
name.DIRECTORY FILE CANNOT BE EXPUNGED BECAUSE IT IS CURRENTLY OPEN
```

plan to stop timesharing by doing a ^ECEASE. After the downtime you specified in ^ECEASE occurs, type PUSH to OPR. Then type:

1. DELETE str:file specification,

ERROR RECOVERY PROCEDURES

2. DIRECTORY
3. <RET>
4. ^ESET LOGINS ANY
5. ^ESET OPERATOR-IN-ATTENDANCE
6. PTYCON
7. GET SYSTEM:PTYCON.ATO

----- Example -----

To delete the bad directory <MUMBLE.FOO> on structure PS:.

```
OPR>PUSH<RET>
TOPS-20 Command Processor 7(31)
@ENABLE (CAPABILITIES)<RET>
$DELETE PS:<MUMBLE>FOO.DIRECTORY,<RET>
$$DIRECTORY<RET>
$$<RET>
@POP<RET>
OPR>
```

9.5.2.2 Re-Creating a Directory and Restoring Its Files - After you have killed or deleted a directory that needs reconstruction, do the following:

1. To re-create the directory, run DLUSER to load the latest file you dumped with DLUSER for the structure involved.
2. To restore the files of the directory you killed or deleted, use the DUMPER save you just did in Section 9.5.2, Step 1, or the most recent DUMPER magnetic tape containing those files and run DUMPER to restore them.
3. If you deleted the directory, run CHECKD with the CHECK BITTABLE command and then with the RELEASE command to release lost pages.

NOTE

Never run CHECKD with the RELEASE command if a directory needs reconstruction. First, reconstruct the directory.

ERROR RECOVERY PROCEDURES

9.5.3 Reconstructing the ROOT-DIRECTORY

When you get a BUGCHK or BUGHLT beginning with DIR that involves directory number 1, or when you get the BUGHLTS BADROT, BADXT1, FILIRD, or FILMAP, try reconstructing <ROOT-DIRECTORY>. Notify your system manager and software specialist of this before you do anything.

To determine the structure involved, see step 1 of Section 9.5.1. If the structure is not BS:, run CHECKD with the RECONSTRUCT ROOT-DIRECTORY command (Section 9.7) and specify the proper structure. If the structure is BS:, you must tell the system to use the backup <ROOT-DIRECTORY> and rebuild <ROOT-DIRECTORY> by doing the following:

1. Type CTRL/\ to enter the PARSER.
2. Type SHUTDOWN to the PARSER. (If SHUTDOWN does not succeed, type ABORT.)
3. Mount system floppy A in drive 0.
4. Mount system floppy B in drive 1.
5. Mount your most recent system backup tape on MTA0. If you do not have a system backup tape, use your TOPS-20 Software Installation Tape.
6. Be sure the front-end HALT switch is in the ENABLE position.
7. Set switches 0, 1, and 2 in the switch register.
8. Press the switches SW REG and ENABLE simultaneously.
9. Type YES to ENTER DIALOG.
10. Type YES to RELOAD MICROCODE.
11. If your system has cache, you will see RECONFIGURE CACHE; type ALL.
12. Type ALL to CONFIGURE KL MEMORY.
13. Type MTBOOT to LOAD KL BOOTSTRAP.
14. Type NO to WRITE CONFIGURATION FILE.
15. Type /L after MTBOOT>.
16. Type /G143 after MTBOOT>.
17. Type N to DO YOU WANT TO REPLACE THE FILE SYSTEM ON THE SYSTEM STRUCTURE.

ERROR RECOVERY PROCEDURES

18. TYPE Y to RECONSTRUCT ROOT-DIRECTORY.
19. Type the current date and time after ENTER CURRENT DATE AND TIME.
20. Type Y to IS THIS CORRECT if you entered the correct date and time. Otherwise, type N and enter the date and time again.
21. Type OTHER after WHY RELOAD.

Then CHECKD runs and outputs:

```
[REBUILDING BIT TABLE]
[WORKING ON STRUCTURE - BS:]
```

The remaining steps and output are the same as in any system reload.

----- Example -----

```
PAR>SHUTDOWN
**HALTED**

%DECSYSTEM-20 NOT RUNNING

RSX-20F VB16-00 8:55 5-MAR-88

[SY0: REDIRECTED TO DX0:]
[DX0: MOUNTED]
[DX1: MOUNTED]
KLI -- VERSION YB15-12 RUNNING
KLI>YES
KLI -- KL10 S/N: 2123., MODEL B, 60 HERTZ
KLI -- KL10 HARDWARE ENVIRONMENT:
      MOS MASTER OSCILLATOR
      EXTENDED ADDRESSING
      INTERNAL CHANNELS
      CACHE
KLI -- ENTER DIALOG [NO,YES,EXIT,BOOT]?
KLI>YES<RET>
KLI -- RELOAD MICROCODE [YES,VERIFY,NO]?
KLI>YES<RET>
KLI -- MICROCODE VERSION 2.0 [407] LOADED
KLI -- RECONFIGURE CACHE [FILE,ALL,YES,NO]?
KLI>ALL<RET>
KLI -- CONFIGURE KL MEMORY [FILE,ALL,REVERSE,FORCE,YES,NO]?
KLI>ALL<RET>
LOGICAL MEMORY CONFIGURATION
ADDRESS      SIZE  INT  TYPE  CONTROLLER
00000000     768K   4   MF20    11
KLI -- LOAD KL BOOTSTRAP [YES,NO,FILENAME]?>
KLI>MTBOOT<RET>
```

ERROR RECOVERY PROCEDURES

```
KLI--WRITE CONFIGURATION FILE [YES,NO]
KLI>NO<RET>
KLI -- BOOTSTRAP LOADED AND STARTED
```

```
MTBOOT>/L<RET>
```

```
MTBOOT>/G143<RET>
```

```
[FOR ADDITIONAL INFORMATION TYPE "?" TO ANY OF THE FOLLOWING
QUESTIONS.]
```

```
DO YOU WANT TO REPLACE THE FILE SYSTEM ON THE SYSTEM STRUCTURE?N<RET>
```

```
[BOOT:LOADING] [OK]
```

```
[BS MOUNTED]
RECONSTRUCT ROOT-DIRECTORY?Y<RET>
```

```
[RECONSTRUCTION PHASE 1 COMPLETED]
```

```
SYSTEM RESTARTING, WAIT...
ENTER CURRENT DATE AND TIME: 5-MAR-88 10:25<RET>
```

```
YOU HAVE ENTERED MONDAY, 5-MAR-88 10:25AM,
IS THIS CORRECT (Y,N) Y<RET>
WHY RELOAD? OTHER<RET>
[REBUILDING BIT TABLE]
```

```
[WORKING ON STRUCTURE - BS:]
```

```
.
```

9.5.4 Re-Creating the File System or a Structure

You should re-create the file system or a structure only when:

1. You have tried reconstructing BS:<ROOT-DIRECTORY>, but the file system or structure is still in such bad shape that the system or structure cannot be used, and
2. Your system manager has agreed that you should re-create the file system or structure.

If reconstructing BS:<ROOT-DIRECTORY> did not solve the problem, you must re-create the file system, that is, both the system structure and front-end file system. (Refer to Section 9.5.4.1.) If reconstruction of a ROOT-DIRECTORY on any other structure did not succeed in solving the problem, just re-create that structure. (Refer to Section 9.5.4.2.)

ERROR RECOVERY PROCEDURES

9.5.4.1 Re-Creating the System Structure and Front-End File System - You should re-create the file system on the system structure only at your system manager's request or approval. This request usually comes if the file system is in such bad shape that the system cannot be used and reconstruction of the <ROOT-DIRECTORY> failed to correct the problem.

To re-create the file system on the system structure, you need:

1. The disk packs your system manager chooses for the new file system
2. The latest system backup tape
3. The latest DUMPER magnetic tapes (full and incremental save sets) of the system structure
4. The TOPS-20 Installation Guide
5. System floppies A, B, and C

Then do the following:

1. Type CTRL/\.
2. Type SHUTDOWN. (If SHUTDOWN doesn't succeed, type ABORT.)
3. Mount system floppy A in drive 0.
4. Mount system floppy B in drive 1.
5. Mount your latest system backup tape on MTA0. If you do not have a backup tape, use your TOPS-20 Software Installation Tape.
6. Follow Steps 11 (Set the Switch Register to 7) through 18 (Type MTBOOT) in the TOPS-20 Software Installation Guide and Step 36 (Type /L) through 63 (Give the DUMPER Command: TAPE MTA0:) of Chapter 2 in the TOPS-20 KL10 Model B Installation Guide.
7. After the DUMPER> prompt, type RESTORE (TAPE FILES) BS:<*>*. *.* (TO) <RET>.
8. Again, after the DUMPER> prompt, type RESTORE (TAPE FILES) BS:<*>*. *.* (TO) <RET>.
9. After the DUMPER> prompt, type REWIND <RET>.
10. Remove the tape on MTA0, and mount the first tape of your latest full DUMPER save set.

ERROR RECOVERY PROCEDURES

11. After the DUMPER> prompt, type CREATE <RET>.

NOTE

The DUMPER CREATE command obtains its attributes from tape information stored on the backup tape.

12. After the DUMPER> prompt, type RESTORE (TAPE FILES) BS:<*>*. *.* (TO) <RET>.
13. If there are additional tapes, mount the next tape of the save set. Then type TAPE MTAn:, where n is the number of the drive on which you mounted the next tape to be read. Repeat this step until all tapes of the save set have been read.
14. If there are incremental save sets, you must restore them too. For each save set, repeat Steps 11, 12, and 13.
15. Re-create the front-end file system by following the directions in Chapter 4 of the TOPS-20 KL10 Model B Installation Guide.
16. Reload the system using the DISK and ENABLE load switches (Section 4.2.1).

9.5.4.2 Re-Creating Other Structures - If a structure other than BS: had problems and <ROOT-DIRECTORY> reconstruction did not fix them, at your system manager's request or approval, you must re-create that structure. Then restore its directories and files. This entire procedure can be done during timesharing. First, be sure you have:

1. The disk packs your system manager chooses for the new structure
2. The latest DUMPER magnetic tapes (full and incremental save sets) for that structure

Then, do the following:

1. Type SET STRUCTURE str: UNAVAILABLE to OPR to prevent other users from MOUNTing the structure.
2. Type PUSH to OPR.
3. ENABLE your capabilities.
4. Follow the procedures in Section 7.14 to create the structure.

ERROR RECOVERY PROCEDURES

5. Type MOUNT STRUCTURE str: to mount the structure.
6. Type DLUSER<RET>.
7. Type LOAD SYSTEM:str.TXT to restore directory parameters. You should have previously saved these parameters (Section 8.6).
8. If tape drive allocation is enabled, you must use the MOUNT command to have the system assign you a tape drive. If tape drive allocation is disabled, or if the SET TAPE DRIVE MTAn: UNAVAILABLE command is used, you can assign a tape drive with the ASSIGN command.
9. Mount the first tape of your latest full DUMPER save set for this structure on MTAn.
10. Type DUMPER<RET>.

NOTE

See Hint below.

11. After the DUMPER> prompt, type TAPE MTAn: (or MTn:, if the tape drive is under MOUNTR control) where n is the number of the drive you assigned.
12. After the DUMPER> prompt, type CREATE<RET>.

NOTE

The DUMPER CREATE command obtains its attributes from tape information stored on the backup tape.
13. After the DUMPER> prompt, type RESTORE (TAPE FILES) str:<*>*. *.* (TO)<RET>.
14. If there are additional tapes, mount the next tape of the save set. Then, type TAPE MTAn:, where n is the number of the drive on which you mounted the next tape to be read. Repeat this step until all tapes of the save set have been read.
15. If there are incremental save sets, you must restore them too. For each save set, repeat Steps 12, 13, and 14.
16. Type POP<RET>.
17. Type SET STRUCTURE str: AVAILABLE to OPR to allow other users to MOUNT the structure.

ERROR RECOVERY PROCEDURES

----- Hint -----

If the DUMPER tapes have files with accounts not in the installed ACCOUNTS-TABLE.BIN file, you must restore the tapes while account validation is disabled. To do this:

1. Type PUSH to OPR.
2. ENABLE your capabilities.
3. Stop timesharing with ^ECEASE.
4. Edit n-CONFIG.COMD to have the command DISABLE ACCOUNT-VALIDATION. (See the TOPS-20 KL10 Model B Installation Guide to edit n-CONFIG.COMD.)
5. Type CTRL/\ and SHUTDOWN.
6. Reload the system.
7. ATTACH to the operator job 1.
8. Type PUSH to OPR.
9. Type ENABLE and ^ESET NO LOGINS-ALLOWED ANY.
10. Follow Steps 10 through 15 above.
11. Edit n-CONFIG.COMD to have the command ENABLE ACCOUNT-VALIDATION.
12. Type CTRL/\ and SHUTDOWN.
13. Reload the system.

Alternatively, you may restore the files by using your current account, that is, the account set in your last LOGIN or SET ACCOUNT command. However, all files on the structure have that account. To restore the files, continue with Step 11 at the beginning of this section (... type TAPE MTAn: ...), but type ACCOUNT SYSTEM-DEFAULT before the RESTORE command in Step 13.

9.6 DIAGNOSING YOUR SYSTEM FROM A REMOTE LOCATION VIA KLINIK

To allow a DIGITAL Field Service Representative or a software specialist to diagnose a problem in your system from a remote location, you must allow access via the KLINIK link. First, determine with the person doing the diagnosis, the following conditions:

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1. Usage of the link -- a timesharing terminal or remote CTY
2. Password, if use is a remote CTY
3. Time period to access the KLINIK link
4. Highest console mode, if usage is a remote CTY.

Then type:

1. <CTRL/\>
2. SET KLINIK
3. USER or REMOTE
4. Password, if you typed REMOTE above
5. Access window open date
6. Access window open time
7. Access window close date
8. Access window close time
9. Highest console mode, if you typed REMOTE above
10. QUIT

----- Example -----

This example shows the SET KLINIK command used to allow the KLINIK link to be used as a remote CTY, to establish the password FGH for gaining access, to allow access between the current time and 24 hours later, and to allow MAINTENANCE as the highest console mode.

```
<CTRL/\>
PAR>SET KLINIK<RET>
KLINIK MODE: REMOTE<RET>
PASSWORD: FGH<RET>
ACCESS WINDOW OPEN DATE: <RET>
ACCESS WINDOW OPEN TIME: <RET>
ACCESS WINDOW CLOSE DATE: <RET>
ACCESS WINDOW CLOSE TIME: <RET>
HIGHEST CONSOLE MODE: MAINTENANCE
KLINIK INACTIVE
ACCESS WINDOW OPEN: 5-MAR-88 12:47
ACCESS WINDOW CLOSED: 6-MAR-88 12:47
KLINIK MODE: REMOTE
HIGHEST CONSOLE MODE: MAINTENANCE
PAR>QUIT<RET>
```

ERROR RECOVERY PROCEDURES

To terminate an active KLINIK link, type:

1. <CTRL/\>
2. CLEAR KLINIK
3. DISCONNECT
4. QUIT

----- Example -----

```
<CTRL/\>
PAR>CLEAR KLINIK<RET>
KLINIK DISABLED

KLD -- KLINIK ACCESS TERMINATED BY OPERATOR

PAR>DISCONNECT<RET>

KLD -- KLINIK LINE DISCONNECTED

PAR>QUIT<RET>
```

----- Hints -----

To find out what KLINIK parameters have been set, type WHAT KLINIK to the PARSER.

See the PARSER COMMANDS section of the RSX-20F System Reference Manual for more information on CLEAR KLINIK, DISCONNECT, SET KLINIK, and WHAT KLINIK.

----- Error Messages -----

See the PARSER ERROR MESSAGES section of the RSX-20F System Reference Manual.

----- KLINIK Messages -----

KLD -- KLINIK ACCESS TERMINATED BY OPERATOR

If the KLINIK link is active and the CLEAR KLINIK command is given, this message is output on the CTY and the remote KLINIK terminal. This indicates that the KLINIK access window has been closed, the KLINIK link has been terminated, and the KLINIK parameters have been cleared.

KLD -- KLINIK DISCONNECT

This message is output on the CTY and the remote KLINIK

ERROR RECOVERY PROCEDURES

terminal after you give the DISCONNECT command to the PARSER to terminate KLINIK access and hang up the modem.

KLR -- KLINIK LINE CONNECTED TO RSX-20F MODE LIMIT c

This message is output on the CTY and on the remote KLINIK terminal when the remote KLINIK user specifies REMOTE KLINIK MODE during the KLINIK link access procedure. The MODE LIMIT c is MAINTENANCE, PROGRAMMER, or OPERATOR as you specified for HIGHEST CONSOLE MODE in the SET KLINIK command.

KLR -- KLINIK LINE CONNECTED TO TOPS-20

This message is output on the CTY and on the remote KLINIK terminal when a remote KLINIK user is trying to gain access to the KLINIK link in USER KLINIK MODE. You can then use the remote KLINIK terminal for timesharing on TOPS-20.

KLR -- KLINIK LOGON TIMEOUT -- LOGON ABORTED

KLD -- KLINIK LINE DISCONNECTED

If you specified REMOTE KLINIK MODE in the last SET KLINIK command and the remote KLINIK user can not supply the correct password in five attempts within two minutes, this message is output on the CTY and the remote KLINIK terminal. The remote KLINIK user must dial again and go through the validation sequence again to try to gain KLINIK access.

KLR -- KLINIK RING - KLINIK WINDOW CLOSED

This message is printed on the CTY and the remote KLINIK terminal when a remote user tries to gain access to the KLINIK link but the access window is closed or not defined.

KLR -- KLINIK RING -- VALIDATING ACCESS

If you specified REMOTE KLINIK MODE in the last SET KLINIK command and a remote user has just dialed to try to gain access to the KLINIK link, this message is printed on the CTY.

SAV -- *DIAG* -- KLINIK LINE ACTIVE IN USER MODE

This message is printed on the CTY and on the remote KLINIK terminal if RSX-20F is reloaded and the KLINIK link is active in user mode.

SAV -- *DIAG* -- KLINIK LINE ACTIVE IN REMOTE MODE

SAV -- *DIAG* -- KLINIK LINE CONNECTED TO SYSTEM CONSOLE

This message is printed on the CTY and the remote KLINIK terminal if RSX-20F is reloaded and the KLINIK link is active in remote mode.

ERROR RECOVERY PROCEDURES

SAV -- *FATAL* -- PROTOCOLS NOT RUNNING

There may be a serious software or hardware problem. However, first try to reload the system.

9.7 CORRECTING DISK SPACE WITH CHECKD

CHECKD is run automatically at system load time when certain problems are found on the system structure. CHECKD is also run when you answer YES to the RUN CHECKD question at system STARTUP time.

Type the following commands to run the CHECKD program during regular timesharing.

1. PUSH to OPR
2. ENABLE your capabilities
3. CHECKD
4. Commands to CHECKD terminated by a <RET>
5. EXIT command to CHECKD
6. POP

CAUTION

Before you run CHECKD on BS:, be sure that you have only one structure named BS: on the disk drives. Otherwise, there can be confusion over which structure is used.

If your system has two structures named BS: on-line, where one is just spinning and the other is already recognized by the system, (that is mounted as the system structure) and you want to run CHECKD on BS:, CHECKD chooses the structure that is just spinning. If CHECKD does not find a BS: that is just spinning, it uses the already recognized system structure.

Some CHECKD commands should not be used if there are other users using the structure. These commands are:

1. CHECK BITTABLE
2. REBUILD
3. RECONSTRUCT INDEX-TABLE

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4. RECONSTRUCT ROOT-DIRECTORY
5. SCAN

If there are other users on the structure and the structure is BS:, do a ^ECEASE and wait for the message SHUTDOWN COMPLETE before running CHECKD. If the structure is other than BS:, turn to Section 7.11.3 before running CHECKD.

If you do not specify a structure in a CHECKD command, CHECKD uses your connected structure. Note that at any time while CHECKD is processing directories, you can type CTRL/A to find out the name of the directory currently being checked.

The following commands can be given to CHECKD.

CHECK BITTABLE (CONSISTENCY OF) str:

NOTE

Perform CHECK BITTABLE on BS: at system startup time by answering YES to CHECKD. Never issue the CHECK BITTABLE command during regular timesharing.

This command causes the structure's bit table, which indicates what disk space is used, to be checked against the disk space that each file on the structure claims to have used. Any discrepancies are listed on your terminal, and the addresses of lost pages are written into the file str:<dir>str-LOST-PAGES.BIN, where str and dir are your connected structure and directory. This command also executes the CHECK DIRECTORY command to CHECKD. (See Section 9.7.1 for more detail on CHECK BITTABLE.)

NOTE

If you see in the error report any messages with MULTIPLY ASSIGNED DISK ADDRESS (meaning the address is used by more than one file), take immediate action. Refer to the SCAN command in CHECKD (later in this section), and perform the steps discussed there.

CHECK DIRECTORY (CONSISTENCY OF) str:

This command checks the validity of certain information in each directory on the structure. If an error occurs, the monitor rebuilds the symbol table on the specified structure and recomputes the amount of disk space used for directories needing such action. If a symbol table is being rebuilt, CHECKD outputs:

```
% REBUILDING SYMBOL TABLE FOR structure:<directory>
```

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If the rebuild is successful, CHECKD then outputs [OK] at the end of the message. Otherwise, it outputs [FAILED].

CREATE (NEW FILE SYSTEM FOR) str:

This command creates the file structure according to parameters that you specify to the questions asked by CHECKD.

DISABLE

ENABLE Enables or disables one of the following features.

AUTOMATIC STARTUP

Marks the structure as the primary public structure at system startup time. The serial number of the CPU for which this is the primary public structure is requested.

BAT-BLOCK-DELETE

Allows a verification pass of the disk to delete entries from the BAT BLOCKS. If this feature is disabled, entries will only be added.

ECC-ERROR-MAPPING

Controls whether ECC errors will be added to the BAT blocks during a verification pass on the disk. This includes pages for which the first attempt to read the page with error correction enabled failed, but one of the following 7 retries was successful. It is strongly suggested that this switch be ENABLED.

LARGE DIRECTORIES

Controls whether directories may contain huge amounts of files or not. Use DISABLE to guarantee that a particular structure can be used on small and large systems. Use ENABLE to allow directories to grow large on a structure. Note that if a directory grows large, the structure will no longer be usable on a small system.

SOFT-ERROR-MAPPING

Controls whether soft errors will be added to the BAT blocks during a verification pass on the disk. Soft errors are defined as failure to read the disk without ECC correction or system error recovery (reading with offset).

WRITE-VERIFICATION (OF) DATA

Controls read after write verification of pages written to the data space on a disk. Note that using this feature may cause serious performance problems.

WRITE-VERIFICATION (OF) SWAPPING

Controls read after write verification of pages written to the swapping space on a disk. Note that using this feature

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may cause serious performance problems.

PASSWORD-ENCRYPTION

Controls whether passwords are encrypted or not.

EXIT (TO MONITOR)

This command returns you to system command level.

HELP

This command prints out a help text.

LIMIT (NUMBER OF FILES PER DIRECTORY ON) str:

This command limits the number of directories and files on a structure. It also guarantees that if the structure is used on a 2040S or 2060, it can later be used on a 2040 or 2050. However, the command disallows the 2040S or 2060 feature of adding more directories and files than a 2040 or 2050 can support.

REBUILD (BIT TABLE OF) str:

This command is for use by your software specialist. It is not recommended for operator use. It causes the bit table on the specified structure to be completely rebuilt.

NOTE

No one should be using the structure when REBUILD is used. Also, if a directory needs reconstruction, it should be reconstructed before REBUILD is used.

RECONSTRUCT INDEX-TABLE (OF) str:

This command is for use by your software specialist. It is not recommended for operator use. This command repairs a damaged index table file (str:<ROOT-DIRECTORY>INDEX-TABLE.BIN). This command cannot be used during timesharing and should never be used on your system structure.

RECONSTRUCT ROOT-DIRECTORY (OF) str:

This command reconstructs <ROOT-DIRECTORY> on the specified

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structure.

NOTE

Do not use this command to reconstruct <ROOT-DIRECTORY> on the system structure. (See Section 9.5.3.)

RELEASE (LOST PAGES FROM) file specification (FOR) str:

This command allows you to free lost pages while other users are on the system. When CHECKD reports lost pages, you should first resolve any errors indicated by CHECKD (Section 9.7.1) and run CHECKD again with CHECK BITTABLE to see if errors are gone. Then, run CHECKD under <OPERATOR> and use this command. Press RETURN for the file specification to indicate the file str:<dir>str-LOST-PAGES.BIN.n, where str and dir are your connected structure and directory, and n is the latest generation of the file. You may also type the name of the file.

Then, after you EXIT from CHECKD, type:

EXPUNGE

to expunge all generations of the file.

NOTE

If a directory needs reconstruction, reconstruct it and issue the CHECK BITTABLE command before you ever use RELEASE.

Use the RELEASE command with only the most current generation of the lost pages file.

SCAN (FOR DISK ADDRESSES IN) file specification (FOR) str:

This command scans the structure for addresses listed in the specified file. Instead of specifying a file containing the addresses, you can type TTY:<RET>, type addresses separated by <RET>, and end with CTRL/Z. The output from the command indicates which files contain the disk addresses specified. This command is especially important if the CHECK BITTABLE command outputs a message indicating that an address is multiply assigned.

Use the SCAN command when there are no other users on the structure involved. Therefore, whenever CHECKD finds a multiply

ERROR RECOVERY PROCEDURES

assigned address on BS:, you should do the following as soon as possible. (If the structure is not BS:, remove the structure and then follow Steps 4 through 6 below.)

1. Type PUSH to OPR.
2. ENABLE your capabilities.
3. Give the ^ECEASE command to stop timesharing as soon as possible.
4. Run CHECKD.
5. Give the SCAN command to CHECKD and specify the multiply assigned address/addresses as indicated above. When CHECKD finds an address for which it is searching, it outputs a message like the error report at the beginning of Section 9.7.1. The error field contains FOUND DISK ADDRESS. For each file in which CHECKD found an address, it outputs a summary line of the form:

```
n SEARCH ADDRESSES FOUND.
```

6. After CHECKD outputs the names of the files containing the multiply assigned address/addresses, try to copy each of the files involved to another directory (perhaps PS:<OPERATOR>). (Do not use RENAME on the original files.) Then, delete the original files, using the FORGET subcommand to DELETE. For example:

```
$DELETE filespec1,filespec2,<RET>
$$FORGET<RET>
$$<RET>
$
```

7. Type ^ESET LOGINS ANY.
8. Run PTYCON.
9. Type GET SYSTEM:PTYCON.ATO.
10. Using MAIL or SEND, notify the owners of the deleted files and discuss salvaging their files either from the copy, if it was successful, or from a DUMPER tape.

UNLIMIT (NUMBER OF FILES PER DIRECTORY ON) str:

This command allows a 2040S or 2060 to create on a structure more directories and files than a non-2060 can support. The command is used to allow this feature on a structure that was previously limited (the LIMIT command was given for the structure).

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----- Hints -----

When CHECKD is run automatically at system load time because of disk problems or when you answer YES to the RUN CHECKD question, CHECKD performs the CHECK BITTABLE and CHECK DIRECTORY functions. You should answer YES to the RUN CHECKD question periodically, perhaps once a day, and always after a disastrous hardware failure. When the standard PTYCON.ATO file is used, one of the operator jobs runs the CHECK DIRECTORY function of CHECKD immediately after the system is reloaded.

----- Requirement -----

OPERATOR or WHEEL capability must be enabled and the CTRL/C capability set.

----- Error Messages -----

ERROR: ?CHECKD: STRUCTURE NOT FOUND

Reason: CHECKD could not find the structure you specified.

Recovery: Be sure you have the proper disk packs mounted and reissue the command.

ERROR: ?INVALID COMMAND CONFIRMATION

Reason: You pressed a character other than the RETURN key at the end of the command.

Recovery: Reissue the command and execute the command by pressing the RETURN key.

ERROR: ?JSYS ERROR: message

Reason: A JSYS that CHECKD was executing failed.

Recovery: Refer to the TOPS-20 Monitor Calls Reference Manual for the message.

ERROR: ?NOT A CHECKD COMMAND

Reason: The command that you typed to CHECKD is not a valid CHECKD command.

Recovery: Reissue the correct command.

ERROR: WHEEL OR OPERATOR CAPABILITY REQUIRED

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Reason: You tried to run the CHECKD program without OPERATOR or WHEEL capability.

Recovery: If you are a privileged user, enable your capabilities; otherwise, use a job logged in under OPERATOR, (which should have operator capability) type ENABLE, and rerun the CHECKD program.

9.7.1 Reports from CHECK BITTABLE

When CHECKD finds errors during the CHECK BITTABLE function, it outputs error reports in the format:

```
error(including address n): page type
SUMMARY FOR FILE file
m error type
- - - - -
```

Pay close attention to the error portion of the report, and take any action indicated in the explanation for that error. The page-type and error-type information is for your software specialist, system manager, or owner of the file.

CHECKD first checks special system blocks, then swapping space, and finally file pages. If an error occurs in checking the first two types of disk usage, the error report includes for each disk address in error only the first line of the error report format.

The possible errors output in a report are discussed first. The following conventions are used in the list of those errors and their explanations below:

n = the number of a sector; the sector is a location on a disk pack relative to the beginning of a structure (also the number to use in the SCAN command to CHECKD)

page = four consecutive sectors or the minimum allocation unit for disk space

----- Error Messages -----

ERROR: DISK ADDRESS n MARKED IN BAT BLOCKS

Reason: A page used by the TOPS-20 file system is marked in the BAT (bad allocation table) blocks. This means a hard error occurred on this page.

Recovery: Try to copy the file. Then delete the file using the

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DELETE command with the FORGET subcommand. Notify your system manager or the owner of the file that the data in a page may have been in error. If the copy was successful, try recovering the file. Otherwise, recover the file from the most recent backup tape.

ERROR: DISK ADDRESS n NOT IN BIT TABLE

Reason: A page used by the file system was not assigned in the bit table.

Recovery: CHECKD corrects this error automatically.

ERROR: ILLEGAL DISK ADDRESS n

Reason: CHECKD found a disk address too large for the size of the structure.

Recovery: Try to copy the file. Then type ENABLE and press the RETURN key. Delete the file using the DELETE command with the FORGET subcommand. Notify your system manager or the owner of the file that data in the file may have contained errors. If the copy was successful, try recovering the file. Otherwise, recover the file from the most recent backup tape.

ERROR: MULTIPLY ASSIGNED DISK ADDRESS n

Reason: CHECKD found a page that was already assigned. This means two or more files are using the same disk address or a file is using a disk address previously assigned to a special file system block or to the swapping space.

Recovery: Use the CHECKD command SCAN to indicate which files contain the disk address specified. (Refer to the SCAN command Section 9.7 to resolve this problem.)

If any of the preceding errors occur, CHECKD also outputs a page type. This indicates the usage of the page containing the disk address in error. The page types are:

```
FILE PAGE n
LONG FILE PAGE TABLE
PAGE TABLE
SPECIAL SYSTEM BLOCKS
SWAPPING SPACE
```

If CHECKD has reported errors for a file, it then outputs:

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SUMMARY FOR FILE file

where file is a complete file specification. CHECKD follows this with summary lines containing each type of error that has occurred for the file, and how many times the error occurred. Note that one error can sometimes cause two summary lines. The error types in the summary are:

```
ASSIGNED PAGES MARKED IN BAT BLOCKS
DISK READ ERRORS
FAULTY ADDRESSES IN LONG FILE PAGE TABLE
FAULTY ADDRESSES IN PAGE TABLE
FAULTY LONG FILE PAGE TABLE ADDRESSES IN FDB
FAULTY PAGE TABLE ADDRESSES IN FDB
FILE ADDRESSES NOT IN BIT TABLE
ILLEGAL ADDRESSES
LONG FILE PAGE TABLES UNREADABLE
MULTIPLY ASSIGNED ADDRESSES
PAGE TABLES UNREADABLE
```

The last summary line for a file is followed by line of dashes. Then other error reports may follow.

Once CHECKD has finished checking all the files, it outputs a final summary of page counts as follows:

```
LOCAL COUNT OF FILE PAGES: i
LOCAL COUNT OF OVERHEAD PAGES: j
LOCAL COUNT OF USED PAGES: k

SYSTEM COUNT BEFORE CHECKD: l
SYSTEM COUNT AFTER CHECKD: m
```

In the above final summary:

```
i = number of pages used for data
j = number of pages used for overhead for the structure; includes
special system blocks, swapping pages, and overhead pages for
files
k = number of pages that CHECKD found to be used
l = number of pages that the system indicated as used before
CHECKD was run
m = number of pages that the system indicated as used after
CHECKD was run
```

If there are no errors, i plus j should equal k, and m minus k should equal lost pages (discussed later in this section). If m is greater than l, CHECKD found one or more pages that were used but not assigned in the system bit table. CHECKD assigns them, and m reflects the count. During the last part of the CHECK BITTABLE function, CHECKD compares a bit table it created with the system bit table for the appropriate structure. CHECKD then compares information in the two

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tables. If page counts disagree, or if the system bit table says a page is not used but CHECKD says it is used, CHECKD outputs:

```
?BIT TABLES INCONSISTENT AT CYLINDER n
```

Cylinder n is an area on a disk pack. This message indicates either an error in CHECKD or the monitor or that someone else is running CHECKD which they should not be.

If the system bit table says that a page is used but CHECKD says it is not used, CHECKD counts the page as a lost page. It then outputs:

```
THERE ARE n LOST PAGES
ADDRESSES ARE IN FILE file
```

where n is the number of lost pages found and file is the name of the file containing the addresses of those pages. The file name is of the form str:<dir>str-LOST-PAGES.BIN.n, where str and dir are your currently connected structure and directory. If the file is written at system load time, it is BS:<OPERATOR>BS-LOST-PAGES.BIN.n.

If CHECKD reported an illegal disk address or a multiply assigned disk address, it does not write the lost page addresses in a file. It outputs:

```
%SUPPRESSED WRITING OF LOST PAGES FILE , TOO MANY ERRORS
```

If you get this message, correct the errors and run CHECKD with the CHECK BITTABLE function again to get a lost-pages file. It should be noted that the structure remains mounted with the alias name of CHECKD even though the SHOW STATUS DISK-DRIVES command will show the structure mounted with its actual name and no indication that it is still mounted as CHECKD.

To regain disk space counted as lost pages, see the RELEASE command to CHECKD (Section 9.7).

If there are no lost pages, CHECKD outputs:

```
THERE ARE NO LOST PAGES
```

If CHECKD finds certain directory inconsistencies which cause it to try rebuilding a directory symbol table, it outputs:

```
% REBUILDING SYMBOL TABLE FOR str:<directory>
```

If the rebuild is successful, CHECKD outputs [OK]. Otherwise, it outputs [FAILED]. It is normal for CHECKD to occasionally rebuild the symbol table for <ROOT-DIRECTORY> to account for the space used when a directory expands by a page.

If the rebuild fails, you should try to save, with DUMPER, all the

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files in the directory involved. Then follow the procedures in Sections 9.5.2.1 and 9.5.2.2. After that, discuss salvaging the files with their owners.

If you get any of the following messages from CHECKD, perform the same procedure as when a rebuild fails. In the messages, str:<dir> is the structure and directory name of the inconsistent directory.

```
ACTBAD: ILLEGAL FORMAT FOR ACCOUNT BLOCK IN DIRECTORY str:<dir>
DROCHK: ILLEGAL FORMAT FOR PAGE 0 IN DIRECTORY str:<dir>
EXTBAD: ILLEGAL FORMAT FOR EXTENSION BLOCK IN DIRECTORY str:<dir>
FDBBAD: ILLEGAL FORMAT FDB IN DIRECTORY str:<dir>
NAMBAD: ILLEGAL FORMAT FOR NAME BLOCK IN DIRECTORY str:<dir>
OPENF FAILED ON DIRECTORY str:<dir> - SKIPPED
RCDIR FAILED ON DIRECTORY str:<dir> - SKIPPED
UNSBAD: ILLEGAL FORMAT FOR ACCOUNT BLOCK IN DIRECTORY str:<dir>
```

----- Examples -----

```
1. RUN CHECKD? Y<RET>
[CHECKING FILE CONSISTENCY]

[WORKING ON STRUCTURE - BS:]

DISK ADDRESS 4 MARKED IN BAT BLOCKS: SPECIAL SYSTEM BLOCKS
-----
DISK ADDRESS 443264 MARKED IN BAT BLOCKS: SWAPPING SPACE
DISK ADDRESS 444574 MARKED IN BAT BLOCKS: SWAPPING SPACE
-----
DISK ADDRESS 220754 MARKED IN BAT BLOCKS: FILE PAGE 50
SUMMARY FOR FILE BS:<FIELD-IMAGE>COBOL.EXE.4
1   ASSIGNED PAGES MARKED IN BAT BLOCKS
-----
% REBUILDING SYMBOL TABLE FOR BS:<ROOT-DIRECTORY> [OK]
DISK ADDRESS 1350340 MARKED IN BAT BLOCKS: FILE PAGE 1
SUMMARY FOR FILE BS:<TOTTON>XPL.PAT.1
1   ASSIGNED PAGES MARKED IN BAT BLOCKS
-----
LOCAL COUNT OF FILE PAGES: 129711
LOCAL COUNT OF OVERHEAD PAGES: 15858
LOCAL COUNT OF USED PAGES: 145569

SYSTEM COUNT BEFORE CHECKD: 146671
SYSTEM COUNT AFTER CHECKD: 146671
```

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THERE ARE 1086 LOST PAGES
ADDRESSES ARE IN FILE PS:<OPERATOR>PS-LOST-PAGES.BIN.1

```
2. DISK ADDRESS 220754 MARKED IN BAT BLOCKS: FILE PAGE 50
SUMMARY FOR FILE PS:<FIELD-IMAGE>COBOL.EXE.4
1   ASSIGNED PAGES MARKED IN BAT BLOCKS
-----
MULTIPLY ASSIGNED DISK ADDRESS 1403114: FILE PAGE 2762
SUMMARY FOR FILE PS:<RMSQA-TEST>FOOREL1..4
1   FAULTY ADDRESSES IN PAGE TABLE
1   MULTIPLY ASSIGNED ADDRESSES
-----
MULTIPLY ASSIGNED DISK ADDRESS 261534: FILE PAGE 52

SUMMARY FOR FILE PS:<RMSQA-TEST>RMSSYM.UNV.14
1   FAULTY ADDRESSES IN PAGE TABLE
1   MULTIPLY ASSIGNED ADDRESSES
-----
% REBUILDING SYMBOL TABLE FOR PS:<ROOT-DIRECTORY> [OK]
DISK ADDRESS 1350340 MARKED IN BAT BLOCKS: FILE PAGE 1
SUMMARY FOR FILE PS:<UNSUPPORTED>TV.EXE.7
1   ASSIGNED PAGES MARKED IN BAT BLOCKS
-----

LOCAL COUNT OF FILE PAGES: 125793
LOCAL COUNT OF OVERHEAD PAGES: 15216
LOCAL COUNT OF USED PAGES: 141007

SYSTEM COUNT BEFORE CHECKD: 141149
SYSTEM COUNT AFTER CHECKD: 141149

THERE ARE 137 LOST PAGES
% SUPPRESSED WRITING OF LOST PAGES FILE , TOO MANY ERRORS
```

9.8 RESTARTING PROGRAMS UNDER SYSJOB

When you receive a fatal error message on the CTY from a program running under SYSJOB, you must restart it by giving commands to SYSJOB via the ^ESPEAK command. The format of the message follows:

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```
** SYSJOB: SUBJOB CRASHED, DATA FOLLOWS: **
n process state AT m date time
Jsys error:message
FORK ACS: a b c d
```

n = number of the process
process = name of the process, e.g., INFO
state = CRASHED or HALTED
m = PC value
abcd = content of accumulators 1 to 4

Also, if you type the SYSJOB STATUS command via ^ESPEAK (see the TOPS-20 Operator's Command Language Reference Manual) and there is no entry for a program normally run under SYSJOB, you must restart that program.

The following programs run as processes under SYSJOB:

1. INFO
2. ORION
3. QUASAR
4. MOUNTR
5. MAILER
6. MAPPER
7. LPTSPL
8. CDRIVE
9. SPRINT

To restart a program under SYSJOB, type the following commands:

1. PUSH to OPR
2. ENABLE your capabilities
3. ^ESPEAK
4. RUN SYS:program
5. CTRL/Z
6. POP

NOTE

Programs running under SYSJOB must be restarted in the same order as they are in the SYSJOB.RUN file.

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ERROR RECOVERY PROCEDURES

----- Example -----

```
OPR>PUSH<RET>
TOPS-20 Command Processor 7(31)
@ENABLE<RET>
$^ESPEAK<RET>
[PLEASE TYPE SYSJOB COMMANDS - END WITH ^Z]
RUN SYS:INFO
<CTRL/Z>
$POP<RET>
OPR>
```

----- Hints -----

If you restart QUASAR, you must also restart all spoolers, for example, MOUNTR, CDRIVE, LPTSPL, BATCON, and SPRINT (if they were previously running). To restart ORION, you must restart all OPRs. To do this simply run OPR and type any OPR command.

9.8.1 GALAXY Crash Recovery Procedures

GALAXY programs may stop performing useful work for one of the reasons listed below. When a program stops processing, this stoppage is referred to as a "crash". This section describes how you can recover from a GALAXY program crash.

Reasons for program crashes are:

1. A monitor call (JSYS) that should not fail takes the error return and an error occurs.
2. An error is detected by the built-in consistency checks within the various components of GALAXY and an error occurs.
3. An undetected error eventually causes an illegal memory reference and an error occurs.

You should take one of the following steps should a GALAXY component (program) crash. It is assumed that GALAXY is running as multiple forks under SYSJOB. When a GALAXY component crashes, the core image of the component is written in the SPOOL: area. The filename is XXXXXX-YYY-CRASH.EXE where:

XXXXXX - is the name of the component that crashed, such as BATCON or ORION.

YYY - the 3-character error name.

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Table 9-1: GALAXY Component Crash Recovery Procedures

Component	Recovery
LPTSPL	<p>If LPTSPL crashes, it will automatically restart the jobs which were being processed at the time of the crash from the page number recorded in the last checkpoint. At the CTY, issue the following commands:</p> <pre> ^ESPEAK STATUS ^Z </pre> <p>Now, using the process number specified for LPTSPL in the STATUS display, kill off all the LPTSPL processes using the SYSJOB PURGE command. There is one PURGE command required for each LPTSPL process running under SYSJOB.</p> <pre> ^ESPEAK PURGE <fork number> PURGE <fork number> ^Z </pre> <p>Now, restart all the LPTSPL jobs under SYSJOB using the SYSJOB RUN command. There is one RUN command required for each line printer you want to start.</p> <pre> ^ESPEAK RUN SYS:LPTSPL RUN SYS:LPTSPL ^Z </pre> <p>The line printer spooler(s) is now ready to process user requests again. If required, re-issue the OPR START commands to restart the LPT processing.</p>
CDRIVE	<p>If CDRIVE crashes, all jobs currently being read from the card reader will be lost and will have to be restarted. To restart CDRIVE, issue the following commands:</p> <pre> ^ESPEAK KILL CDRIVE RUN SYS:CDRIVE </pre>

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SPRINT	<p>^Z</p> <p>The card reader spooler is now ready to read cards again. If required, re-issue the OPR START commands to restart the CDR processing.</p> <p>If SPRINT crashes, it can be restarted without loss of data. To restart SPRINT, issue the following commands:</p> <pre> ^ESPEAK KILL SPRINT RUN SYS:SPRINT ^Z </pre> <p>The card reader interpreter is now ready to start processing spooled card decks again. No OPR commands are necessary (or available) for controlling SPRINT.</p>
SPROUT	<p>If SPROUT crashes, all jobs currently being processed are restarted from the beginning of the current file. To restart SPROUT, issue the following commands:</p> <pre> ^ESPEAK KILL SPROUT RUN SYS:SPROUT ^Z </pre> <p>The card punch/plot spooler is now ready to start processing user requests again. If required, re-issue the OPR START commands to restart the CDP/PLT processing.</p>
ORION	<p>If ORION crashes, the only indication of the crash will be the dump which gets printed on the CTY. After ORION is restarted, all OPR programs running at that time will automatically reset the OPR/ORION link with the first command typed to the OPRs. The first command that re-establishes the OPR/ORION link will be lost.</p> <p>Any DN60 termination remote stations should be shut down and restarted. To restart ORION, issue the following commands:</p> <pre> ^ESPEAK KILL ORION RUN SYS:ORION </pre>

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^Z

The operator controller program is now ready to process OPR commands and route messages to the appropriate processors.

OPR

If OPR crashes, just restart it (\$R OPR).

BATCON

If BATCON crashes, first display the batch stream status from OPR. For all active batch streams, issue a LOGOUT command for each job running under batch. Logging the jobs off will not delete the queue entry. The batch job will be restarted when BATCON is restarted. When all active batch jobs have been logged out, issue the following commands to restart it:

```
^ESPEAK
KILL BATCON
RUN SYS:BATCON
^Z
```

The batch controller is now ready to process user requests again. If required, re-issue the OPR START commands to restart the batch processing.

QUASAR

If QUASAR crashes, user requests for queue services will not be lost. QUASAR maintains a queue on BS:<SPOOL> which contains copies of all outstanding user requests. Restarting QUASAR is a problem, however. QUASAR also maintains a list of all running GALAXY processors. If QUASAR is restarted, it no longer knows about the rest of the GALAXY spoolers. To restart QUASAR, first determine what batch jobs were running at the time of the crash and log them out. Next, issue the following commands to restart QUASAR:

```
^ESPEAK
KILL QUASAR
RUN SYS:QUASAR
^Z
```

The request controller is now ready to process user requests again. However, since QUASAR does not know about any running spoolers, ALL the spoolers must also be restarted. In addition, you must restart MOUNTR, the mountable device

ERROR RECOVERY PROCEDURES

processor. Follow the instructions above for restarting the following spoolers: LPTSPL, BATCON, CDRIVE, SPRINT, SPROUT.

Assuming that MOUNTR is also running under SYSJOB, issue the following commands to restart it:

```
^ESPEAK
KILL MOUNTR
RUN SYS:MOUNTR
^Z
```

After the spoolers and MOUNTR are restarted, you must run OPR and give the TAKE command using the SYSTEM.CMD file and any other command files used for system startup. This will restart normal GALAXY processing.

NEBULA

If NEBULA crashes, cluster GALAXY activities such as remote SHOWS and DISMOUNTS will be disallowed. Issue the following commands to restart NEBULA:

```
^ESPEAK
KILL NEBULA
RUN SYS:NEBULA ^Z
```

LISSPL

If LISSPL crashes, remote cluster printing will be disallowed. Issue the following commands to restart LISSPL:

```
^ESPEAK
KILL LISSPL
RUN SYS:LISSPL ^Z
```

If you were trying to run MAIL and you received a message from SYSJOB indicating a problem with MAILER or INFO, restart MAILER or INFO.

9.9 HUNG CONSOLE TERMINAL

If you are trying to type at the CTY and no characters are printing, do the following:

1. Be sure the terminal is plugged in.

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2. Be sure the CTY has paper. If it does not, replenish the paper supply. If you still get no characters printed, switch the terminal to LOCAL and then back to line.
3. Check the fuse on the vertical panel under the keyboard.
4. Try the terminal in LOCAL.
5. Be sure it is ON LINE and set for the correct speed.
6. See if CTRL/\ (control backslash) gets you into the console processor command language. If it does, type QUIT or CTRL/Z to return to TOPS-20.
7. Check to see if other terminals are working.

If you continue to still have problems, notify your DIGITAL Field Service Representative.

9.10 MEMORY CONFIGURATION FAILED

When memory is being configured, it is possible to receive a fatal error message in the form of:

```
KLI--?FATAL MEMORY CONFIGURATION ERROR-CODE "XXX"  
where "xxx" = the diagnostic error code
```

If this error occurs, KLI asks you if you want to configure memory again. Type FORCE and press the RETURN key. If the error still persists, call your DIGITAL Field Service Representative.

9.11 TOPS-20 MONITOR NOT FOUND

If you are loading the system using the KL bootstrap that reads TOPS-20 from disk and, after the message KLI -- BOOTSTRAP LOADED AND STARTED, you get:

```
?FIL NOT FND
```

the bootstrap was not able to find on disk the TOPS-20 monitor that you specified. Unless you specified a name after a BOOT> prompt, the file not found was BS:<SYSTEM>MONITR.EXE.

Consider the following:

1. If you specified a nondefault monitor name, be sure you typed the correct directory name and filename.

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2. Be sure you have loaded a bootstrap that loads a monitor from disk.
3. Be sure the appropriate disk packs are mounted and that the drives are on-line.
4. If you wanted the default monitor, you must try to load it from magnetic tape (Section 4.3.2) using your most recent system backup tape (Section 4.1.6.1). Either the file BS:<SYSTEM>MONITR.EXE has been destroyed on the disk or some other problem possibly a hardware error, has affected the file system.
5. If the system comes up for timesharing after you load the monitor from magnetic tape, chances are that only the monitor file on disk was bad. You should restore a good copy of the monitor from a DUMPER tape to BS:<SYSTEM>.
6. If the system does not come up for timesharing, it is likely that there are problems with the file system. First consult your software specialist. He may want to investigate the situation before recommending reconstructing the ROOT-DIRECTORY or the lengthy procedure of re-creating the file system.

9.12 PS NOT FOUND

During a system reload, if you see the message:

```
PS NOT FOUND. WHAT IS THE NAME OF THE SYSTEM STRUCTURE?
```

the system was not able to find a structure named PS:. You must then type the name of the structure that is going to be the system structure. As long as the TOPS-20 monitor continues to run, that structure will be known as PS:. It will not be recognized by its original name that you typed in answer to the question. Note that the system structure must have swapping space, usually a front-end file system, an appropriately installed <SYSTEM> and <SUBSYS>, and directories to allow users to log in.

```
----- Example -----
```

To designate the structure 2136: as the system structure when PS: was not found:

```
PS NOT FOUND. WHAT IS THE NAME OF THE SYSTEM STRUCTURE? 2136  
[2136 MOUNTED AS PS]
```


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9.13 BOOTSTRAP LOAD FAILED

If the bootstrap failed to load during a system reload, you should zero memory and then try to reload again. This is sometimes necessary after a power failure but should occur infrequently. If the problem continues, call your DIGITAL Field Service Representative.

To zero or clear memory, type the following at the CTY.

1. <CTRL/\>
2. ABORT
3. SET CONSOLE PROGRAMMER
4. ZERO 0>address

where address is the maximum memory address on your system

----- Example -----

```
<CTRL/\>
PAR>ABORT<RET>
PAR%SET CONSOLE PROGRAMMER<RET>
  CONSOLE MODE: PROGRAMMER
PAR%ZERO 0>777777<RET>
PAR%
```

9.14 MANUALLY RELOADING THE DX20

The DX20 is usually started when you load the system. At that time the BOOT or MTBOOT program loads and starts the microcode in the DX20. However, in the following situations, you must reload the DX20 manually:

1. If the DX20 has been taken off-line for maintenance and you do not want to reload the entire system to reload the DX20
2. If you are told to load a specific DX20 microcode file that is different from the one BOOT or MTBOOT would load
3. If you have users complaining that none of the TU70 series magnetic tape drives or RP20 disk drives on a DX20 are working
4. If the DX20 loses power

To manually reload the DX20, type the following commands:

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1. PUSH to OPR
2. ENABLE your capabilities
3. DX20LD
4. SYS:DXMCA (for tape) or SYS:DXMCE (for RP20 disks)
5. /E
6. POP

The above steps reset the DX20, load the microcode file SYS:DXMCA.ADX or SYS:DXMCE.ADX, verify the microcode, start it, and exit from DX20LD.

----- Example -----

```
OPR>PUSH<RET>
  TOPS-20 Command Processor 7(31)
@ENABLE<RET>
$DX20LD<RET>
FILE: SYS:DXMCA<RET>

DX20 SELECTED:  RH20=2  DX20=0
                MICROCODE LOADED
                MICROCODE VERIFIED
                MICROCODE VERSION 1 (0)
                DX20 STARTED AT ADDRESS 1

FILE: /E<RET>
$POP<RET>
OPR>
```

The preceding steps and example show the most common use of DX20LD. However, there are switches in DX20LD for specific functions. After FILE:, the DX20LD prompt, you can type a command line in the form of a file specification followed by switches and <RET>.

The file specification for the DX20 microcode is SYS:DXMCA.ADX. The default directory is your connected directory. Note that neither recognition nor the help facility (typing ?) is available in DX20LD.

After a command line is processed or an error occurs, DX20LD prompts again for another command line.

The DX20LD switches and their functions are:

```
/C      If you specify a DX20 microcode file before /C, the
        DX20 memory is cleared and the microcode is loaded,
        verified, and started. If you do not specify a file,
        only DX20 memory is cleared.

/D:CD   The functions specified are done on RH20 controller c,
```

ERROR RECOVERY PROCEDURES

DX20 d, where c and d are octal numbers. If you omit /D, DX20LD looks for a DX20. If only one is found, it is used. However, if more than one is found, DX20LD outputs an error message which says to use /D.

- /E DX20LD exits to TOPS-20 command level.
- /L The file specified is loaded into the DX20.
- /R Specifies DX20 for RP20 disk drives.
- /S:N The DX20 is started at location n in the microcode, where n is an octal number. The default starting address is 1.
- /T Specifies DX20 for TU70 tape drives.
- /V The DX20 memory is verified against the file specified. Do this verification only after loading and before starting the DX20.

You can use the switches in combination. However, if you use /L or /V, the functions of only the specified switches are performed. If you specify a file and /C or /S without /L or /V, the file is loaded into the DX20 and verified, and the functions of the specified switches are performed. If you do not use any switches, the DX20 is reset and the file you specified is loaded, verified, and started.

----- Requirement -----

OPERATOR, WHEEL, or MAINTENANCE capability must be enabled

----- Error Messages -----

- ERROR: ?1ST CHARACTER IN DATALINE WRONG
- Reason: The first character in the line of data DX20LD reads from SYS:DXMCA.ADX must be a semicolon, a W, or a C. You probably entered the wrong filename. If the filename was entered correctly, the file is probably corrupted.
- Recovery: Retype the filename correctly. If the error recurs, use another copy of SYS:DXMCA.ADX.
- ERROR: ?2ND CHARACTER IN DATALINE WRONG
- Reason: The character which follows a C or W in the first position in the line of data DX20LD reads from SYS:DXMCS.ADX must be a space. If the file name was entered correctly, the file is probably corrupted.

ERROR RECOVERY PROCEDURES

Recovery: Retype the file name. If the error recurs, use another copy of SYS:DXMCA.ADX.

- ERROR: ?CHECKSUM ERROR IN DATALINE
- Reason: The checksum DX20LD computed on the line of data in SYS:DXMCA.ADX does not match the checksum in SYS:DXMCA.ADX for that line of data. The .ADX file is probably corrupted.
- Recovery: Use another copy of SYS:DXMCA.ADX.
- ERROR: ?COLON ILLEGAL FOR SWITCH
- Reason: The switch you specified does not accept a colon.
- Recovery: Retype the command or file name and switches correctly.

- ERROR: ?COMMAND STRING TOO LONG
- Reason: The command line you typed is too long. It must be less than 100 characters.
- Recovery: Type a command line that is less than 100 characters long.

- ERROR: ?CRAM PARITY ERROR DURING VERIFICATION
- Reason: You specified the switch /V and a parity error occurred in the DX-20 during the verification procedure.
- Recovery: Call your DIGITAL Field Service Representative.

- ERROR: ?CRAM VERIFICATION - NO MATCH
- Reason: You specified the /V switch, and the disk file you specified did not match the file in the DX20 CRAM memory. The filename specified was wrong, or the data in the DX20 is incorrect.
- Recovery: Retype the correct filename and switches. If the error recurs, use another copy of SYS:DXMCA.ADX.

- ERROR: ?/D SWITCH REQUIRES AN OCTAL NUMBER
- Reason: You did not use octal numbers after the /D switch.

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Recovery: Retype the file name, the /D switch, and the octal numbers of the RH controller and the DX20 you want to use.

ERROR: ?FORMAT ERROR IN DATALINE

Reason: The data words in the file you specified are delimited by carriage returns; they should be delimited by commas.

Recovery: Retype the file name. If the error recurs, use another copy of SYS:DXMCA.ADX.

ERROR: ?ILLEGAL SWITCH

Reason: The switch you specified is not a valid switch for DX20LD.

Recovery: Retype the file name and correct switch.

ERROR: ?INVALID SWITCH (2ND CHARACTER MUST BE A SPACE OR A COLON)

Reason: You must type a space or a colon after typing the first letter of the switch. For example, you cannot use /VE to verify; you must use /V.

Recovery: Retype the file name and the correct switch.

ERROR: ? JSYS ERROR: FILE DOES NOT EXIST

Reason: The file you specified does not exist. Perhaps you typed the wrong file name. The standard file specification to use is SYS:DXMCA.ADX. If you do not specify a file type, the default is .ADX.

Recovery: Retype the correct file name.

ERROR: ? JSYS ERROR: WHEEL, OPERATOR, OR MAINTENANCE CAPABILITY REQUIRED

Reason: You must have WHEEL, OPERATOR, or MAINTENANCE capability enabled to run DX20LD.

Recovery: Log in to <OPERATOR>, which should have OPERATOR capability. Type ENABLE, then run DX20LD.

ERROR: ?MORE THAN ONE DX20 FOUND - USE /D SWITCH

Reason: If your system has more than one DX20, you must use the /D

ERROR RECOVERY PROCEDURES

switch to specify the DX20 number.

Recovery: Retype the file name, the /D switch, and the octal numbers of the RH controller and the DX20 you want to use.

ERROR: ?NO DX20 WAS FOUND

Reason: DX20LD could not find a DX20. Either the hardware is not connected to the system, or hardware problems exist in the DX20 or the RH20.

Recovery: If the error recurs, call your DIGITAL Field Service Representative.

ERROR: ?SPECIFIED DEVICE IS NOT A DX20

Reason: The RH20 you specified does not have a DX20. Perhaps you typed the wrong controller (RH20) number.

Recovery: Retype the file name and the /D switch with the octal numbers of the RH controller and DX20 you want to use.

ERROR: ?SPECIFIED RH20 DOES NOT EXIST

Reason: The RH20 you specified in the /D switch does not exist. Perhaps you typed the wrong controller number.

Recovery: Retype the file name and the /D switch with the octal numbers of the RH controller and the DX20 you want to use. If the error recurs, call your DIGITAL Field Service Representative.

ERROR: ?TOO MANY WORDS IN DATALINE

Reason: The data in the .ADX file you specified contains more than 32 words. You typed the wrong file name, or the file is corrupted.

Recovery: Retype the file name. If the error recurs, use another copy of SYS:DXMCA.ADX.

ERROR: ?/V OR /L SWITCH WITH NO FILE NAME SPECIFIED

Reason: You used a /V or a /L switch and did not specify the name of a file. You must specify the name of an .ADX file when you use the /V or /L switches.

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Recovery: Type the file name and the /V or /L switch.

ERROR: ?WORKING MEMORY VERIFICATION - NO MATCH

Reason: You used the /V switch and the file you specified did not match what was in the working section of DX20 memory. This could happen if you verify the contents of the DX20 after you load the .ADX file and start to execute it.

Recovery: Verify the contents of the DX20 after loading the .ADX file but before executing it.

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