



**NOS/BE VERSION 1
OPERATOR'S GUIDE**

**CDC® COMPUTER SYSTEMS:
CYBER 180
CYBER 170
CYBER 70
MODELS 71, 72, 73, 74
6000**

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CDC® COMPUTER SYSTEMS:
CYBER 180
CYBER 170
CYBER 70
MODELS 71, 72, 73, 74
6000

REVISION RECORD

REVISION	DESCRIPTION
A (11-01-75)	Manual released.
B (07-16-76)	Revised to include changes and corrections resulting from text evaluation and incorporation of the following new features: 83 (844 Factory Format Support), 133 (Stack Processor Restructure), 145 (844-41/44 Support) and 169 (844 Expander Support).
C (03-25-77)	Manual revised to support NOS/BE 1.2 at PSR level 447 and to make editorial and technical corrections. New features documented in this manual include: new commands CHECKPOINT., DWN,CHxx., DWN,UNuu., ENGR., RDONLYuu., RESUME, UP,CHxx., and UP,UNuu; IDLE mode and engineering mode; checkpoint recovery deadstart; Advanced Tape Subsystem (ATS); 844 disk drive full/half track recording mode; programmable format control (PFC) for 580 line printers; CCL procedures with restrictions on the previewing feature and ENS command; and support of the CDC CYBER 170 Model 176 including addition of the 819 disk drive with mnemonic AH, new error messages, and deadstart option to dump first level PP memory. References to 604 and 607 tape units are removed.
D (08-19-77)	Manual revised to support NOS/BE 1.2 at PSR level 454 and to make technical corrections. Support of CDC CYBER 170 Model 171 is included.
E (12-12-77)	Manual revised to support NOS/BE 1.2 at PSR corrective code level 461 and to make technical corrections. Procedures for deadstart using a 7152 controller are included.
F (06-13-78)	Manual revised to support NOS/BE 1.3 at PSR level 473 and to make editorial and technical corrections. Procedures for deadstart from a 67x tape unit and procedures for operating the NOS/BE station are added. Station procedures were formerly documented in the NOS/BE Station Operator's Guide/Reference Manual. New features documented in this manual include: new permanent file utilities PFLOG and GENLDPF; new parameters on the ADDSET, DUMPF, LOADPF utilities; support of 677/679 tape units; procedures to prevent mass storage deadlocks; support of INTERCOM 5; new INTERCOM 4 utility LINSTAT. This edition obsoletes all previous editions.
G (10-20-78)	Manual revised to support NOS/BE 1.3 at PSR level 481 and to make editorial and technical corrections. INTERCOM 5 LINEOFF and LINEON commands are added.
H (02-16-79)	Manual revised to support NOS/BE 1.3 at PSR level 488 and to make editorial and technical corrections. New features documented include: FNT thresholds, automatic program sequencer, and ECS commands. Message display for permanent file staging to linked mainframe is improved.
J (07-20-79)	Manual revised to support NOS/BE 1.3 at PSR level 499. Descriptions of EXPORT (remote batch jobs) and GEMINI (improved load leveling) have been added.
K (12-21-79)	Manual revised to support NOS/BE 1.4 at PSR level 508. New features documented in this manual include: Common Testing and Initialization (CTI), CYBERLOG, and the 885 disk drive.
L (05-16-80)	Manual revised to support NOS/BE 1.4 at PSR level 518 and to make editorial and technical corrections. New features documented in this manual include downline load of controlware and enhanced ECS error recovery. Section 2, Deadstart, has been reorganized.
M (11-17-80)	Manual revised to support NOS/BE Version 1.4 at PSR level 530. Revision M incorporates one feature, the relocation of INTERCOM 5 system tables from CM resident to the managed buffer area. In addition to miscellaneous corrections, it also incorporates significant changes to the CTI procedures; a new description of character sets (appendix A); and appendix F, a description of hardware reconfiguration procedures.
Publication No. 60493900	

REVISION LETTERS I, O, Q, S, X AND Z ARE NOT USED.

Address comments concerning this manual to:

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or use Comment Sheet in the back of this manual.

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REVISION RECORD

REVISION	DESCRIPTION
N (04-20-81)	Manual revised to support NOS/BE Version 1.5 at PSR level 538 and to make technical and editorial corrections.
P (11-23-81)	Manual revised to support NOS/BE Version 1.5 at PSR level 552. Revision P includes two new features: dump to line printer and CTI/MSL disk area utility. Also included are various technical and editorial corrections.
R (5-17-82)	Manual revised to support NOS/BE Version 1.5 at PSR level 564. Revision R includes model 825, 835, and 855 support as well as the Remote Maintenance Facility (RMF) and Remote Host Facility (RHF) features. Also included are various technical and editorial corrections. This edition obsoletes all previous editions.
T (11-22-82)	Manual revised to support NOS/BE Version 1.5 at PSR level 577. Revision T includes model 865 and 875 support, changes to CTI procedures, and name change of Remote Maintenance Facility to Remote Diagnostic Facility.
U (02-20-84)	Manual revised to support NOS/BE Version 1.5 at PSR level 604. Material has been deleted and is now in the CYBER Initialization Package (CIP) User's Handbook. This edition obsoletes all previous editions.
V (02-25-85)	Manual revised to support NOS/BE Version 1.5 at PSR level 627. Also included are various technical and editorial corrections.
W (02-21-86)	Manual revised to support NOS/BE Version 1.5 at PSR level 650. Also included are various technical and editorial corrections.
Publication No. 60493900	

LIST OF EFFECTIVE PAGES

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PREFACE

This manual describes procedures to control operation of the CONTROL DATA® Network Operating System/Batch Environment (NOS/BE) Version 1.5.

NOS/BE can operate on these computer systems:

CDC® CYBER 180 Computer Systems Models 810, 830, 835, 840, 845, 850, 855, 860, and 990.

CDC CYBER 170 Computer Systems Models 171, 172, 173, 174, 175, 176, 720, 730, 740, 750, 760, 815, 825, 835, 845, 855, 865, and 875.

CDC CYBER 70 Computer Systems Models 71, 72, 73, and 74.

CDC 6000 Computer Systems.

This manual also provides operating and reference information for the NOS/BE station. The station is a software system that links the NOS/BE operating system with another NOS/BE operating system or with a SCOPE 2 operating system. The NOS/BE to SCOPE 2 link is described in the SCOPE 2 Operator's Guide.

AUDIENCE

It is assumed that you are familiar with the CYBER 180, CYBER 170, CYBER 70, or 6000 Computer Systems and with operating system concepts in general.

ORGANIZATION

If you have limited or no previous NOS/BE experience, review with the following sections of this manual first.

Section 1 Operator/System Communication Principles.

Section 2 Deadstart. This section describes the process by which the NOS/BE system is made operational and ready to process user jobs.

Section 3 Displays Under DSD. This section contains descriptions and examples of the DSD displays that can be brought to the console screens to monitor system operation.

Section 4 Equipment Operation and Control. This section contains descriptions of

the commands that logically control JANUS equipment, magnetic tapes, and rotating mass storage devices.

Section 5 Job Control. This section contains descriptions of commands that control jobs once they are in the system.

Appendix C Peripheral Equipment Operation. This appendix contains information concerning the manual operation of each peripheral device associated with the NOS/BE system.

The remaining sections of this manual, described next, are directed toward an experienced operator.

Section 6 Utility Routines. This section contains descriptions of the utilities that can be submitted with control statements in a job or by direct calls through DIS.

Section 7 Operation Under DIS Control. This section describes console control and keyboard operation under DIS. DIS is used primarily by system analysts in debugging software programs and running system utility programs.

Section 8 Debugging Aids. This section describes routines that aid systems analysts in debugging programs.

Section 9 Station Operation. This section describes the linked NOS/BE system and the procedures, commands, and displays that are used in a multi-mainframe system.

Section 10 GEMINI Operation. This section describes the operation, initiation, control, and termination of the GEMINI load-leveling program.

Section 11 Remote Host Facility (RHF) Operation. This section describes the operation, initiation, control, and termination of the RHF.

Appendix B Summary of Commands.

Since your job requirements may vary from one installation to another, this manual should be used in conjunction with established policies and procedures provided by the installation.

Some deadstart procedures differ if a site has the off-line maintenance system library (MSL). This manual assumes your site does not have the MSL. The MSL is only supplied to the customer engineer assigned responsibility for a site under the contractual requirements of the Control Data maintenance services agreement. The MSL includes all off-line maintenance software available from Control Data and includes the capability of performing a deadstart dump to a printer.

This manual does not contain all operator diagnostic messages. Refer to the NOS/BE Diagnostic Handbook for these messages.

CONVENTIONS

CONTROL STATEMENT FORMATS

Required punctuation is shown; optional punctuation is noted in the text. Terminate commands with a period, except where noted in text.

Numeric values in commands and text are octal unless otherwise noted.

In this manual, the use of n. before a command indicates the octal control point number, and j. indicates the octal job descriptor table (JDT) ordinal.

Any command applicable to both control points and jobs is so identified; otherwise, the command is restricted to the n. or j. format shown.

CYBER 70 COMPUTER SYSTEMS

The term CYBER 70 computer systems is used when referring to models 71, 72, 73, and 74 only.

170-CLASS MAINFRAMES

The term 170-class mainframes is used when referring to CYBER 170 models 171, 172, 173, 174, 175, 176, 720, 730, 740, 750, 760, 865, and 875.

180-CLASS MAINFRAMES

CYBER 170 models 815, 825, 835, 845, and 855 have most of the same functional and architectural attributes as CYBER 180 mainframes. The term 180-class mainframes is used when referring to these related mainframes collectively.

EXTENDED MEMORY

Extended memory for model 176 is large central memory extended (LCME). Extended memory for the 180-class mainframes is unified extended memory (UEM). Extended memory for models 865 and 875 may be UEM or extended core storage (ECS) or extended semiconductor memory (ESM). Extended memory for all other NOS/BE computer systems is ECS or ESM. ECS and ESM are the only forms of extended memory that can be shared in an ECS multimainframe complex and can be accessed by a distributive data path (DDP).

In this manual, extended memory refers to all forms of extended memory unless otherwise noted. However, in the context of a multimainframe environment or distributive data path access, models 176, 825, 835, and 855 are excluded.

RELATED PUBLICATIONS

The NOS/BE Manual Abstracts is a pocket-sized manual containing brief descriptions of the contents and intended audience of all NOS/BE and product manuals. The abstracts can be useful in determining which manuals are of greatest interest to a particular user.

Programming information for the various forms of extended memory can be found in the COMPASS Reference Manual and in the appropriate computer system hardware reference manual. Hardware descriptions of the various forms of extended memory can be found in the following manuals.

Control Data Publication	Publication Number
Extended Semiconductor Memory (ESM) Hardware Reference Manual	60455990
CYBER 70 Computer System 7030 Extended Core Storage Reference Manual	60347100
7030-1xx Extended Core Storage II and 6642-2 Distributive Data Path Hardware Reference Manual	60430000

The following is a list of NOS/BE operating system manuals, product set reference manuals, and other manuals of interest.

Control Data Publication	Publication Number
COMPASS Version 3 Reference Manual	60492600
CTI/OS Interface Specification Manual	60459120
CYBER 70/Model 71 Computer System Hardware Reference Manual	60453300
CYBER 70 Model 72 Computer System Reference Manual	60347000
CYBER 70 Model 73 Computer System Reference Manual	60347200
CYBER 70 Model 74 Computer System Reference Manual	60347400
CYBER 170 Computer Systems Models 171 through 175 (Levels A, B, C) and Model 176 (Level A) Hardware Reference Manual	60420000
CYBER 170 Computer Systems Models 720, 730, 740, 750, and 760 and Model 176 (Level B/C) Hardware Reference Manual	60456100
CYBER 170 Computer System Models 815 and 825 Hardware Operator's Guide	60469370

<u>Control Data Publication</u>	<u>Publication Number</u>
CYBER 170 Computer System Models 815 and 825 Hardware Reference Manual	60469350
CYBER 170 Computer System Models 835, 845, and 855 Hardware Operator's Guide	60458390
CYBER 170 Computer Systems Models 835, 845, and 855 Hardware Reference Manual	60469290
CYBER 170 Computer Systems Models 865 and 875 Hardware Reference Manual	60458920
CYBER Initialization Package (CIP) User's Handbook	60457180
Export High Speed Reference Manual	60456880
INTERCOM Version 5 Multi-User Job Capability Reference Manual	60456070
INTERCOM Version 5 Reference Manual	60455010
NOS/BE Version 1 Diagnostic Handbook	60494400
NOS/BE Version 1 Diagnostic Index	60456490
NOS/BE Version 1 Installation Handbook	60494300
NOS/BE Version 1 Manual Abstracts	84000470
NOS/BE Version 1 Reference Manual	60493800
NOS/BE Version 1 System Programmer's Reference Manual, Volume 1	60494100

<u>Control Data Publication</u>	<u>Publication Number</u>
NOS/BE Version 1 System Programmer's Reference Manual, Volume 2	60457370
NOS/BE On-Line Maintenance Software Reference Manual	60453900
SCOPE Version 2 Operator's Guide	60455090
6000 Series Computer Systems Hardware Reference Manual	60100000

SUBMITTING COMMENTS

The last page of this manual is a comment sheet. Please use this comment sheet to give us your opinion on the manual's usability, to suggest specific improvements, and to report technical or typographical errors. If the comment sheet has already been used, you can mail your comments to:

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Additionally, if you have access to SOLVER, an on-line facility for reporting problems, you can use it to submit comments about the manual. Use NBO as the product identifier.

DISCLAIMER

This product is intended for use only as described in this document. Control Data cannot be responsible for the proper functioning of undescribed features or undefined parameters.

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TABLES

1-1 Special Key Functions

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2-1 System Action Taken When 3.Y Option
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This section:

- Introduces the NOS/BE operating system.
- Contains an overview of various system configurations.
- Tells you how to operate the console keyboard.
- Includes system control information that you must know to use equipment and communicate with jobs.
- Describes STEP mode, IDLE mode, FNT space critical mode, and engineering mode.
- Provides a brief overview of diagnostic testing.

INTRODUCTION

The NOS/BE operating system is used with the CYBER 180, CYBER 170, CYBER 70, and 6000 Computer Systems. It gives you considerable latitude in controlling performance of the overall system, yet it can proceed with very little activity on your part. Efficiency of the entire system can be increased significantly by a knowledgeable operator.

You use the operator console to communicate with the computer system. Both the CYBER 70 and 6000 Computer Systems have a two-screen console. A display appears on each screen. The CYBER 180 and CYBER 170 Computer Systems have a console with one screen on which the two displays appear. Both the operating system and programs running under control of the operating system use the displays to bring information to the attention of the operator. You respond to or instruct the operating system by typing on the console keyboard.

Two system routines, DSD and DIS, provide the software interface between the console hardware and other internal software. Their function is to maintain a current display of system and job status, and to process commands you typed at the keyboard. DSD is the system display routine; information pertaining to all jobs appears on the screens. DIS is the job display routine; the screens show data from a single job only. DSD has control of the console until you initiate DIS.

At all times DSD occupies peripheral processor 1 (PP1), one of the 10 to 20 peripheral processors in the system. Peripheral processor 0 always contains

the system monitor routine (MTR) that oversees all system activities. DIS resides in a peripheral processor assigned by MTR at the time it is called.

Under DSD, the normal operating mode, you can communicate with the system or any of the jobs under system control. Once a particular job begins execution, however, intervention is limited to responding to job requests for equipment assignment or other actions, changing priority or field length, and stopping execution permanently or temporarily.

In contrast, DIS operating mode gives you more control of job execution. You have control of the execution of each control statement in the job. Since you can add control statements from the keyboard, the job need not execute exactly as it entered the system. Commands to DIS include those that allow changes in register contents shown in the exchange jump package, as well as those that control such items as field length or time limit. (The exchange jump package is created and used by the system monitor routine to restart programs in the central processor.)

You can use the DIS capability for entering control statements to perform utility tasks such as copying tapes or dumping permanent files. DIS is used most often by system analysts. Section 7 details procedures for using DIS.

SYSTEM CONFIGURATION

The following sections describe differences in central processors, extended memory additions, and multimainframe systems.

CENTRAL PROCESSOR DIFFERENCES

The 6000, CYBER 70, CYBER 170, and CYBER 180 Computer Systems have two basic types of central processing units (CPUs), the unified processor and the multiple-unit processor. The unified type executes instructions one at a time sequentially. The multiple-unit type can retain eight or ten words of instructions in an instruction stack and process several instructions simultaneously in different functional units.

From your standpoint, all models listed below are virtually identical in operation. In systems with two CPUs, some commands require CPU A or B to be addressed. If the two CPUs have different execution speeds, the faster one is identified as CPU A, the slower one as CPU B.

CPU	6000	CYBER 70	CYBER 170	CYBER 180
1 unified processor	6200 6400	71-1, 72-1, 73-1	171, 172, 173, 720, 730, 815, 825, 835, 855	810, 830, 835, 840, 845, 850, 855, 860, 990
2 unified processors	6500	71-2, 72-2, 73-2	174, 720, 730	
1 multiple-unit processor	6600	74-1	175, 176, 740, 750, 760, 865, 875	
1 multiple-unit processor,	6700	74-2		
1 unified processor				
2 multiple-unit processors			865, 875	

On the display captions, the program registers of the two CPUs appear in the upper left portion of the right display. The CPU A register is displayed above the CPU B register.

The two console models (6602 and 6612) used by the CYBER 70 and 6000 Computer Systems differ slightly in appearance. The deadstart button can be located below and between the two screens or under the left side of the desk top. Otherwise, operation is identical. The CYBER 170 console has only one screen. It is equipped with a switch to view one or two displays.

EXTENDED MEMORY ADDITION

Extended memory can be used at an installation to hold system or user data.

During deadstart, the main deadstart display (section 2) allows you to respond to the question 5.ECS. If you type 5.N, extended memory is not used; therefore, the equipment does not exist to the system. A response of 5.I is needed so that extended memory can be turned on and used during system operation. A response of 5.U is necessary to use extended memory as previously defined.

From your standpoint, systems with extended memory are virtually the same as those without extended memory. Various displays show extended memory data. Memory available appears on the right screen header. Otherwise, the displays remain the same.

MULTIMAINFRAME SYSTEM

A multimainframe system is a network of physically and logically connected NOS/BE computer systems. A multimainframe system can include any of the CYBER 180, CYBER 170, CYBER 70, or 6000 Computer Systems. (Refer to section 9 for a more detailed description.)

Link Interface

NOS/BE supports three optional link interfaces for connecting computer systems. They are Station, Gemini, and the Remote Host Facility (RHF). All three allow input and output queue files to be transferred between two NOS/BE Computer Systems. The concept of logical identifiers is used to identify the system to which a file is to be transferred (refer to Control of Job Initiation/File Disposition in section 5). The three interfaces differ in the link medium they use and additional features.

All three interfaces are logically independent and may be used simultaneously on the same computer system.

Station

Use Station to link NOS/BE systems to one another or to link NOS/BE to the SCOPE 2 operating system. (SCOPE 2 runs on CYBER 176, CYBER 76, and 7600 Computer Systems). Station may simultaneously provide links to more than one mainframe. Mainframes linked by stations allow queue file transfers, permanent file transfers (using GETPF and SAVEPF), and remote system console displays and operator commands. Either 6683 satellite couplers or shared extended core storage (ECS) serve as the link medium. Station operation is described in section 9. In addition to the above features, SCOPE 2 links provide tape staging, remote deadstart support, and interactive access using HELLO7. 6683/7683 satellite couplers are used to link NOS/BE to SCOPE 2. SCOPE 2 station operation is described in the SCOPE 2.1 Operator's Guide listed in the preface.

Gemini

Use Gemini to transfer and/or load-level queue files between two NOS/BE systems. By establishing one or more logical identifiers common to both systems, load-leveling attempts to improve overall performance by transferring jobs to the system with the lesser workload. Gemini uses shared RMS as the link medium requiring that both systems share at least the queue set. Gemini operation is described in section 10.

Remote Host Facility

The NOS/BE Remote Host Facility (RHF) links NOS/BE to a loosely coupled network (LCN) allowing transfer of permanent files and queue files, access to NOS/BE magnetic tape drives from linked systems, communication between NOS/BE INTERCOM users and linked systems, as well as maintenance facilities for LCN hardware. Each system in an LCN configuration is connected to one or more LCN trunks by CDC 380 Network Access Devices (NADs). Several types of NADs are available, allowing the connection of various types of computer systems to an LCN. Each system has a Remote Host Facility that provides some or all of these capabilities. NOS/BE RHF operation is described in section 11.

Shared RMS Interface

The CYBER 180, CYBER 170, CYBER 70, or 6000 Computer Systems can share 844 or 885 disk drives with another CYBER 180, CYBER 170, CYBER 70, or 6000 Computer System. Each mainframe can have access to the 844-21 or 844-4x disk drive through dedicated or shared 7054 or 7154 controllers. Each mainframe can also have access to 844-4x or 885 disk drives through dedicated or shared 7155 controllers. In these configurations, the operating system allows concurrent assignment of permanent files on both mainframes, while allowing coordinated access and record block assignment between mainframes. It is critical that the host ID of each mainframe be unique.

The operating system supports the use of the link interface and shared RMS interface concurrently or separately, provided that the hardware configuration supports it.

KEYBOARD OPERATION

The console keyboard is shown in figure 1-1. Enter all commands to the operating system, display routines, equipment, or jobs at this keyboard.

COMMAND FORMAT

Commands are formed by:

- Letters A through Z
- Numbers 0 through 9
- Special characters = /, . * + - () space

All numerical values quoted in this text, unless otherwise noted, are in octal. Command formats in this text show spaces only where they are required.

As you press each key, DSD accumulates the typed characters in a buffer that is displayed on the bottom of the left screen. (With respect to one-screen consoles, the term left screen in this manual refers to the leftmost display.) Only one command can exist in the buffer at any time. If you decide not to execute the accumulated entry, the left blank key can be used to erase the command from the buffer. A single character can be erased from the buffer with the backspace key.

The last character of most commands must be a period. Exceptions are noted in this manual. No characters can be entered after the period. Once the period is entered, DSD signals that the entry is complete by intensifying the brightness of each character individually. The command remains until it is cleared by execution or deleted.

Execution of the typed command does not occur until you press the carriage return. Until this time, the DSD routine is the only part of the system that is aware of the command. The carriage return clears the command from the buffer and causes the command to be executed.

The right blank key also causes the command to be executed. Since this key does not clear the buffer, the command can be executed repetitively without being retyped.

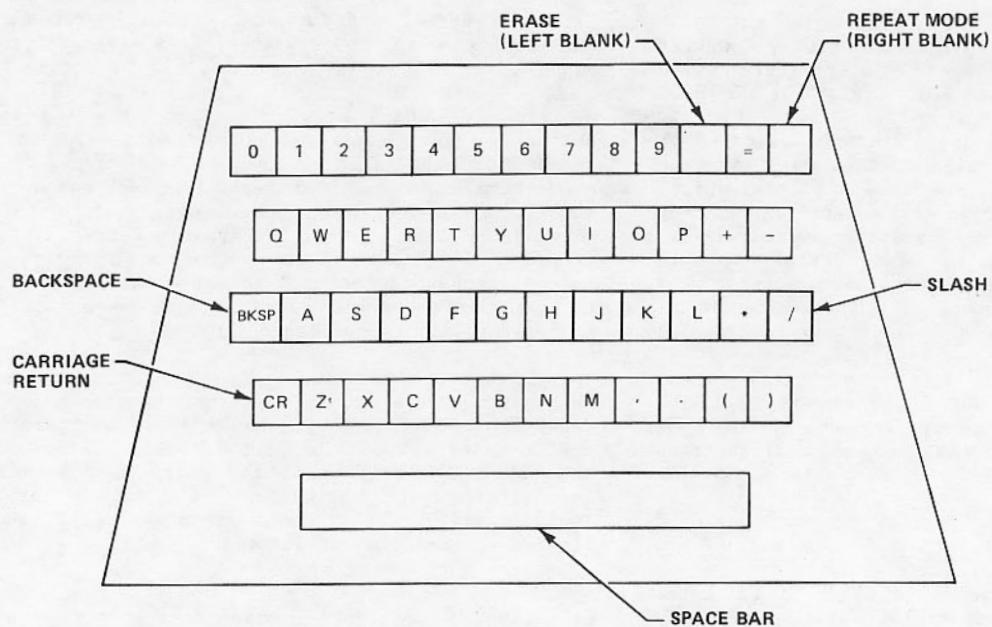


Figure 1-1. Console Keyboard

OPERATING THE KEYBOARD

Under DSD operation, DSD interprets each character as it is typed on the keyboard. DSD compares the accumulated entry with a table of legal entry formats to identify the command.

If the character is not valid at a particular place in an accumulated command, the message ILLEGAL ENTRY flashes above the buffer contents on the left screen. DSD accepts only characters that can result in a valid command; you cannot call for execution of a nonexistent command. Mistakes in parameters identifying files or equipment cannot be detected, but each entry is displayed for you to check prior to execution.

Upon recognition of a unique sequence of characters, DSD displays the remaining constant characters in the command. This feature reduces the number of characters you must type. Often, the remaining characters are simply the punctuation required; consequently, the message ILLEGAL ENTRY appears when you type characters that DSD has already supplied.

For example, DSD recognizes the sequence j.A\$ (where j is the job descriptor table ordinal that uniquely identifies the job) as the command j.ASSIGN. Once you type the S, DSD supplies the characters SIGN, then expects a three-digit number from you to complete the command. ILLEGAL ENTRY flashes if you type the characters SIGN, since octal numbers are the only legal characters allowed after the N. Three typed digits are accepted, but a following period is rejected because DSD supplies it as the only legal character after the digits. On the other hand, if you type a single digit equipment status table ordinal, 6 rather than 006 for instance, the terminating period must be typed also, since DSD considers only three-digit entries to be complete.

USES OF SPECIAL KEYS

Table 1-1 summarizes the functions of the special keys.

PROTECTED COMMAND ACCESS

The following commands are protected in the NOS/BE system.

CHECKPOINT

DEBUG

ENGR

LOCK

MDD

STEP

n.STEP

Channel commands

Memory entry commands

Job control area commands

IDLExxx for devices with SYSTEM or MASTER attributes

OFFxxx when xxx is the EST ordinal of a multiplexer or front end

Table 1-1. Special Key Functions

Key Identifier	Name	Function
CR	carriage return	Executes the contents of the command buffer and clears the buffer. A carriage return is needed after every command except the single character functions in the remainder of this list.
BKSP	backspace	Removes the last character from the accumulated entry in the command buffer.
none	left blank or erase	Deletes the entire entry accumulated in the command buffer.
none	right blank	Changes the display on the left screen according to sequence established by the LEFT command.
		When typed in place of a carriage return, causes the command to be executed but not erased from the command buffer. Thus, a command can be executed repeatedly without being retyped.
+ and -	plus, minus	Selects different information for the left screen display, usually rotating list shown forward or backward.
=	equals	Alternates the left screen display between control point 0 and the specified control point n.
		Alternates the left screen C, D, or G display between absolute and relative addresses. Display for control point 0 shows absolute address contents; for control point n, relative addresses.
*	asterisk	When DIS is at a control point, alternates console between DIS and DSD operation; otherwise, indicates the end of a memory entry command.
none	space bar	Inserts a space into an entry being typed; otherwise, when the system or a control point is in STEP mode, causes execution of a single program step.
.	period	When the system or a control point is in STEP mode, resumes high-speed operation; otherwise, indicates the end of selected command.
/	slash	When typed in the midst of a memory entry, indicates that the following characters are to be interpreted as the opposite mode of the octal or character mode previously entered.
		When typed as the first character of a command, brings command to the attention of the JANUS routine. (JANUS is a group of peripheral processor routines that controls the processing of input and output files.)
		Under DIS operation, indicates a change in mode in a memory entry command.
		Under DIS operation, restores contents of exchange jump package to control point area.
)	right parenthesis	Under DIS operation, stops program execution.
		Under DSD operation, selects different information for the right screen display, usually rotating the information shown backward. (With respect to one-screen consoles, the term right screen in this manual refers to the rightmost display.)
(left parenthesis	Under DIS operation, restarts a stopped program.
		Under DSD operation, selects different information for the right screen display, usually rotating the information shown forward.

To use a protected command, you must first unlock the keyboard using the command:

UNLOCK.

When the keyboard is unlocked, UNLOCKED appears on the left screen above and to the right of the keyboard entry buffer line. Normally, the Y display of system command formats shows unprotected commands only. It expands to include all commands when the keyboard is unlocked.

To return the keyboard to protected mode, type:

LOCK.

An installation can change the list of protected commands through assembly options in the DSD routine.

SYSTEM CONTROL

The following are tasks and commands you can use to control batch jobs.

- You bring the JANUS package to an empty control point with the AUTO or the n.JANUS command, and load and ready the card reader. JANUS reads jobs into the system.
- When the previewing feature of the tape scheduling option is on, you use the P and H,S displays to learn what tape reels are needed and put the associated jobs under scheduler routine control (section 4).
- All job files become part of the input queue and come under scheduler routine control. If necessary, you can direct assignment of a control point to a job by using the n.DIR command. Otherwise, the scheduler initiates such assignments. Commands relevant to jobs in the input queue are concerned with time limits, dependency groups, and deleting files. Each job file is addressed by name or file name table (FNT) ordinal.
- When a job is ready to be assigned to a control point, the system assigns a job descriptor table (JDT) ordinal. Thereafter, the job is addressed by its JDT ordinal in commands dealing with manual equipment assignment, execution interrupt, priority change, switch setting, and control of swapping or rolling.
- The B display shows the status of all control points. You respond to messages by addressing the JDT ordinal of user jobs or the control point number of system jobs. Commands such as GO, RECHECK, and RERUN are relevant, as well as those mentioned in the preceding paragraph.
- You initiate utility routines through DIS (section 7).

- For job output files from the output queue, each job has at least one print file containing the job dayfile. Files in this queue are addressed by FNT ordinals in priority or evict commands. After JANUS processing begins, a file is addressed by the unit on which it is being processed.

CONTROL POINTS

Jobs are not eligible to use the central processor until they have been assigned to control points and given central memory field length. Up to 15 control points, identified by octal numbers 1 through 17, can exist. The number of a control point identifies the logical and physical resources of the system associated with a job assigned to that control point is shown on the B display.

The number of control points, as defined by an installation, is fixed in a system; however, you control their use for system or user jobs. A scheduler routine assigns jobs to control points according to a calculation involving priority, central memory requirements, time since submission, and class of job. The scheduler can assign any control point not preempted by you to a job. The monitor then assigns jobs at control point to the central processor for execution.

A job assigned to a control point does not necessarily remain at that control point until it completes execution. The scheduler can take a job of lower priority from central memory and assign its control point and memory to a higher priority job. To identify a user job between the time it is first assigned to a control point and the time it finishes executing the system uses a job descriptor table ordinal. The command that stops execution of a user job must be in the form of j.DROP., where j specifies the job descriptor table ordinal. The job descriptor table makes it possible to maintain job identity while it is in this swapped-out state.

System jobs are addressed by control point numbers. They are defined as system routines, such as JANUS and DIS, as well as utility routines, such as BLANK. Any job you bring to a control point by giving it a program name is addressed by its control point number.

JOB SWAPPING/ROLLING

When a job is swapped out of central memory, the system copies its field length and other information about the current status to mass storage, then releases the central memory and control point assigned to that job. Another job can then be assigned to that control point or central memory. Job swapping can be initiated either automatically by the scheduler routine or manually by you. (Refer to section 5.)

A rolled out job, in contrast to a swapped out job, does not lose its control point assignment. The field length is reduced to approximately 100 words to hold pertinent job information. The system rolls out a job when the job is waiting for actions such as equipment assignment. Assigned equipment remains attached to the control point. You can roll out a job, also. (Refer to section 5.)

Jobs that are not swapped or rolled out are:

- System jobs you initiate, such as JANUS and BLANK.
- Jobs that you remove from swap consideration by a LOCKIN command.

Jobs that can be rolled out, but not swapped out, are:

- Jobs with assigned nonallocatable equipment, such as tapes.
- Jobs using direct access extended memory (unless extended memory swapping is enabled).

Swapping and roll-out features proceed automatically, with scheduling routines maintaining response that real time and interactive INTERCOM jobs require. You can retain control of swapping for a particular job by using the LOCKIN and LOCKOUT commands. These commands are described in section 5.

DEVICE SETS

All rotating mass storage (RMS) devices are grouped into device sets. Each of these device sets has a setname (SN). An RMS device is a member of only one device set. Within the device set, the device has a unique volume serial number (VSN). The RMS label of the device records the setname and volume serial number.

Device sets are used in one of two ways; as a public set or as a private set. Private sets are device sets which are used by a subset of jobs, therefore, their availability is determined by whether or not they are requested by any jobs. Public sets are defined and maintained throughout the running of the system. The application of public set attributes to the device set qualify the usage of the public sets. Possible attributes are:

System set attribute	Determines that all permanent files of ID=SYSTEM are to be resident within this device set. In addition, this device set contains all the system devices.
Permanent file default set attribute	Determines that default permanent file assignment is to be to the applicable device set.
Queue set attribute	Determines that queue (input and output) file assignment is to be to the applicable device set.
Scratch set attribute	Determines that scratch file assignment is to be to the applicable device set(s).

The scratch set attribute is the only one that can be applied to more than one public set at the same time; otherwise, any combination of device set attributes can be applied to a public set. The maximum number of public sets is four and all attributes must be assigned. A device which is currently a member of a public set is called a public device. A device which is currently a member of a private set is a private device.

Within a public or private device set, certain device attributes can be applied to a specific device. These determine how that particular device is to be used while a member of the device set. Specifically, the device attributes are:

Master device attribute	Specifies the device on which the disk resident tables are to be resident.
Permanent file device attribute	Allows permanent files to be assigned to the specified device.
Queue file device attribute	Allows queue files to be assigned to the specified device. This attribute cannot be assigned to devices within a private set.
System device attribute	Allows system files to be assigned to the specified device. System file is restricted here to the contents of the system routines.

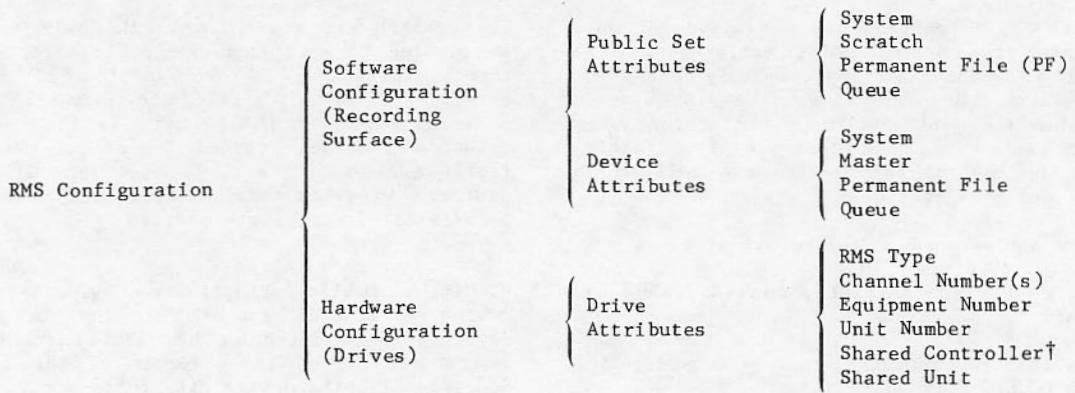
The master device attribute is the only one that can be applied to only one device within the device set. If a file is not a system file and is not meant to be a queue or permanent file, it can be assigned to any device within the device set.

File assignment occurs by first picking the appropriate device set and then picking the appropriate device within the device set. Appropriateness is partly determined by the various assigned attributes.

The device set and device attributes serve as means of performing a software configuration of devices irrespective of the hardware configuration of the drives on which the devices are located. This distinction is most obvious in the case of removable devices such as 844s. In the case of such devices, pack is synonymous with device. To complete the description of the total RMS configuration, drive attributes are used. Drive attributes describe hardware configuration of the drives. Possible attributes are:

RMS type
Channel number
Equipment number
Unit number
Shared unit

Correct specification assures the accessibility of drives by the specifying mainframe. Figure 1-2 shows RMS configuration possibilities.



[†]All controllers are considered to be shared, even if not specifically designated as shared controllers.

Figure 1-2. RMS Configuration

The drive can be in one of the following states:

IDLE	The drive is not being accessed.
OFF	If the device on the drive is mounted, no record block assignment on the mounted device is allowed; otherwise, it declares the drive to be currently not in use by the system executing on this mainframe.
UNAVAILABLE	Declaration that the drive is currently not in use by the system executing on this mainframe.
MOUNTED	The device on the drive is currently in use by the system executing on this mainframe.

Based on the RMS configuration, the system allocates a maximum amount of disk space for the following types of system files.

Public Set	Device Attribute	Type of Files
System	SYS, PF	Dayfile, CE error file
PF	PF	Default permanent files
Q	Q	Queue files
SCR	—	Scratch files; that is, default local files and swap/roll files (more than one scratch set can be defined)

The installation defines two values called thresholds. If the available disk space equals or falls below the first, or upper, threshold, it indicates

that the disk is low on available space, and that a warning message is issued to the system dayfile and the control point 0 message buffer (bottom of right screen). If the available disk space equals or falls below the second threshold, it indicates that the disk is out of space. The system is placed in step mode, and a final warning message is issued to the system dayfile and the control point 0 message buffer.

To clear the message, type:

ACK.

To remove the system from step mode, type a period (.)

To increase available disk space, take the following action:

Space Needed	Operator Action
All	ADDSET another member to set(s) (section 4).
Q	Use DMPQ to dump files to tape (section 6), or use EVICT to evict files (section 5).
PF	Run a DUMPF job in mode 2 or 3 (section 6) or purge the file (refer to the NOS/BE Version 1 Reference Manual listed in the preface.)
SYS	Take a full dump of the dayfile (section 6), or dump the NORMS file (refer to the On-Line Maintenance Software Reference Manual).
SCR	Reduce the number of active control points with the CLEAR command (section 5) or stop nonsystem jobs from being swapped or rolled out with the LOCKIN command (section 5).

The system turns off the thresholds whenever available disk space equals or falls below the threshold value and turns the thresholds back on when available disk space again exceeds the original threshold value. A message indicates when the thresholds are reactivated.

ADDRESSING SYSTEM COMPONENTS

The format of commands typed at the console depends on the part of the system being accessed. A different format identifies the hardware attached to the system, user jobs read into the system, and the system DSD routine.

Addressing Equipment

Equipment status table (EST) ordinals in operator commands identify peripheral equipment (card readers, printers, tape drives, and so on). The equipment status table is an internal table containing a description and the status of all hardware attached to the system. The E display summarizes this table and gives other equipment information for operator use.

You use EST ordinals to assign equipment to individual jobs and to control equipment status. The EST ordinal of an equipment is the location of that equipment's entry in the table. EST ordinal 01 refers to the first equipment listed in the table; 24 refers to the equipment at entry number 24. Ordinals are octal numbers. In this manual, EST ordinals are designated by the abbreviation xx.

Addressing User Jobs

The job descriptor table (JDT) ordinal identifies user jobs entering the system through JANUS, INTERCOM, or a load or dump tape. The JDT ordinal is a one- to three-digit octal number established by the position of the entry for that job in the job descriptor table kept by the system. The first JDT ordinal in a system depends on the number of control points at the installation. JDT ordinals begin with a value one greater than the number of control points.

As long as a user job is not in the input queue of jobs to be run or the output queue of completed files, it is addressed by its JDT ordinal. The JDT ordinals for all jobs are shown in the R display. The name of the job on the R and B displays is the same.

Addressing System Jobs

The control point number identifies system jobs coming to a specific control point at your direction. Control points are numbered 1 through 17 (octal) with the total number an installation option. On the B display, the control point number

of system jobs remains; for user jobs, the JDT ordinal appears.

A command with an initial JDT ordinal addresses the job with that ordinal even if it is not at a control point at that time. A command with an initial control point number addresses the job at that control point; so it is necessary to lock-in a particular job at a control point before issuing commands, such as those that set a display to a single control point.

Commands explained in section 5 apply to system jobs when a control point number, rather than a JDT ordinal, is given.

Addressing DSD

Commands that do not begin with a control point number (n.), or job descriptor table ordinal (j.), or a slash are assumed to be addressed to DSD or to a system routine executing in response to a DSD call or a program call. Included in this category are commands that change characteristics of files in the input and output queues (ENPR, ENDP, EVICT, STAGE, and so on), specify control of equipment or routine controlling equipment (UL, GO, RECHECK, VSN, FC, EC), affect scheduler parameters (AR, BQ), define displays (B = 3), as well as the protected channel function, memory entry, and STEP commands.

Several commands are both DSD/system and user/system job commands. In general, the JDT ordinal or control point number is used when a job is no longer in the input queue, or the job itself generates the need for response. Responses required as a result of system routine manipulation of magnetic tapes should not contain job identification. You should note the different circumstances when GO and RECHECK are needed without a job identifier (section 4).

STEP MODE

The normal high-speed operation of the operating system can be slowed by using STEP mode. During STEP mode operation, monitor delays processing of peripheral processor requests until the space bar is pressed.

Following are the several forms of the STEP command.

STEP. This command inhibits the execution of monitor functions from all PP programs except ISC, IMR, ISQ, IND, IDL, IRN, and LSP, which are critical to system execution.

j.STEP. or
n.STEP. This command inhibits a PP program only when its input register identifies it as executing at control point n.

STEP,pp. This command inhibits a PP program only when the PP program name in the input register is pp.

j.STEP,pp.
or
n.STEP,pp. This command inhibits a PP program only when its input register identifies it as program pp. executing at control point n.

In choosing a STEP mode, try to use the most selective STEP mode that satisfies the current requirements. After a STEP mode has been chosen, to change directly to another mode, enter another STEP mode entry. High-speed operation resumes when a period is entered at the keyboard.

The display caption at the top of the left screen changes when the system is in STEP mode. The header identifying the system is replaced by STEP n to identify the control point, or STEP j to identify the user job in STEP mode. If only program pp is in STEP mode, the word STEP is replaced by pp.

Monitor puts the system in STEP mode when a serious system malfunction occurs. In this case, the PP programs listed as exceptions in the STEP. command description are not exempted from STEP mode. This inhibits normal DSD operation, except for certain commands whose overlays are resident in central memory. Such commands are:

ACK.

Channel commands

IDLExxx.

Memory entries

STEP.

UNLOCK.

If STEP. is entered at this time, the PP programs listed as exceptions in the STEP. command description are again exempted. You must enter ACK. to acknowledge the message that flashes on the lower right screen. The system remains in STEP mode until you enter a period.

Even though IDL is exempted from STEP mode, it is not always possible to execute a DSD command if the command overlay is not central memory resident. There may not be a PP available for IDL because normal operation is inhibited by STEP mode.

IDLE MODE

Upon detection of certain hardware/software malfunctions, it may be desirable to inhibit normal control point activity by setting IDLE mode. While IDLE mode is set, the CPU will not be assigned to any jobs at control points and no jobs will be initiated or swapped into empty control points.

You can initiate IDLE mode by entering the command

CHECKPOINT.

The keyboard must be unlocked to enter the CHECKPOINT. command (refer to Protected Command Access earlier in this section). When IDLE mode is set, the system attempts to swap out all jobs at control points and takes a system checkpoint. (This

activity will complete within 64 seconds.) Only jobs that cannot be swapped out (for example, tape jobs) will be recovered. Taking a checkpoint allows the operating system to be recovered at a later time even though central memory contents may have been lost in the intervening period, for example, following the running of diagnostics.

You can terminate IDLE mode and resume normal operations by entering the command

RESUME.

Entering the RESUME command invalidates the system checkpoint file and makes subsequent checkpoint recoveries illegal.

The system may initiate IDLE mode automatically in response to the following messages:

POWER FAILURE The primary power mains supplying the computer have failed temporarily. Peripheral equipment may have lost power. The operator should verify that power is restored to all peripheral equipment and then enter the RESUME command to continue normal operations.

ENVIRONMENT WARNING Environmental conditions are abnormal and indicate that an emergency power shutdown is imminent. A system checkpoint will be attempted. If the condition clears before an actual power shutdown, you can continue normal operations by entering the RESUME command.

IOU FATAL ERROR or CM FATAL ERROR or CPU FATAL ERROR A failure has been detected that makes it impossible for the system to continue. A system checkpoint will be attempted. If the checkpoint was successful, checkpoint recovery can be performed after the problem has been corrected.

(Applies to 170-class mainframes only) If the error is a fatal error, the quadrant and central storage unit (CSU) where the error occurred are reported to the operator. These values should be noted and, if necessary, memory can be manually degraded to exclude the failing quadrant. In this case, a checkpoint recovery can be performed immediately to allow the system to resume operation in an environment with a degraded memory.

While in IDLE mode, the word IDLE replaces the system label in the display caption at the top of the left screen. If a system checkpoint was completed, IDLE* replaces the system label, and CHECKPOINT COMPLETE appears on the bottom of the right screen after you have used the ACK. command to clear any error messages. On systems with a large amount of extended memory defined, the checkpoint can take up to two minutes to complete.

FNT THRESHOLDS

When the number of free FNT entries falls below the lower threshold (installation modifiable, default value is 40 [octal]), the system enters an FNT space critical mode. The message

1RN - FNT SPACE CRITICAL

appears at the bottom right of the screen. In this mode, the system stops accepting or initiating jobs. To initiate a job to relieve the problem, use either

n.DIR,lfn.

or

n.X name.

or

n.DIS.

When this space-critical situation occurs, you should attempt to free as many FNT entries as possible by dumping the I/O queues or locking out a batch class job containing a large number of files at the control point (refer to Controlling Job Swapping in section 5).

When the number of free FNT entries rises above the upper threshold (installation modifiable, default value is 140 [octal]), the system terminates the FNT space critical mode and resumes normal operation. When this occurs, the flashing message disappears from the screen unless you clear it with the ACK. command.

DEBUG MODE

Debug mode is used to control system action when errors are detected. When debug mode is off, the system will attempt to remove the source of the error and continue to operate. While debug mode is on, the system will be halted when an error is detected. You set debug mode on by entering the command

DEBUG.

Reentry of the command turns debug mode off. This command can be entered only when the keyboard is unlocked (see Protected Command Access earlier in this section).

ENGINEERING MODE

The setting of engineering mode allows the system to run diagnostic routines and to load controlware into buffer controllers. To protect the system from inadvertent interference from these routines, no diagnostic routine can execute unless the system is in engineering mode or the routine is initiated at the console. You can set engineering mode by entering the command

ENGR.

Reentry of the command clears engineering mode. This command can be entered only when the keyboard is unlocked.

NOTE

When engineering mode is set, the diagnostic routines are allowed to write on any disk whose EST entry is in IDLE state. Before turning on engineering mode, remove all packs critical to system operation from IDLE disk drives.

DIAGNOSTIC TESTING

The system can contain a number of programs that test hardware functions. These tests are fully explained in the NOS/BE On-Line Maintenance Software Reference Manual listed in the preface. All the tests described can be run under the operating system, even if you are not familiar with the tests, without interfering with production jobs or destroying existing information.

Deadstart is the process that makes the system operational and ready to process jobs. This is illustrated in figure 2-1. System deadstart requires a certain amount of operator intervention.

This manual assumes that an operating system deadstart file exists and is configured to meet site requirements. The deadstart file is on a reel of magnetic tape or a disk pack and contains the program necessary to establish the operating system and its products (such as BASIC, FORTRAN, COMPASS) on system equipment. The same deadstart file can be used for any supported equipment configuration.

Deadstart from mass storage or from a 667/669 magnetic tape unit is possible after the disk controller or tape controller to be used has been loaded with the proper controlware and the controlware is functioning. Deadstart is always possible from 677/679 tape units.

Deadstart procedures that lead to the Main Deadstart Options Display are included in the CYBER Initialization Package (CIP). Refer to the CYBER Initialization Package (CIP) User's Handbook for these procedures.

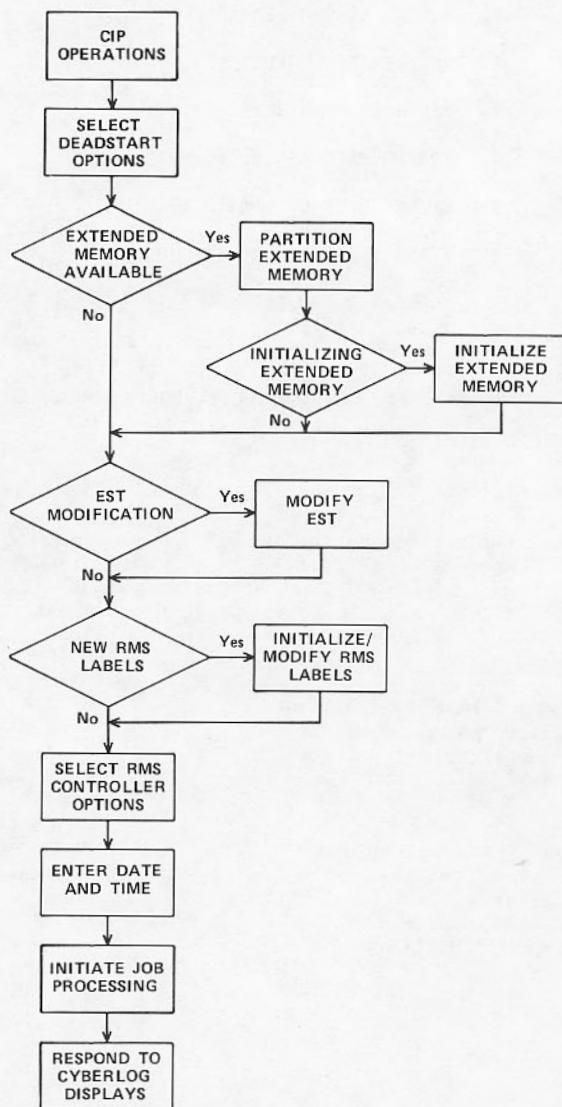


Figure 2-1. Deadstart

MAIN DEADSTART OPTIONS DISPLAY

The main deadstart options display (figure 2-2) allows you to select the optional processing to be done during deadstart. This display appears after CTI has completed its operations. This is explained in the CYBER Initialization Package (CIP) User's Handbook.

Characters in parentheses indicate the legal options; the character to the right indicates the currently selected option.

You can get the system label from words 32 through 35 (octal) of the loaded CMR and verify that the correct CMR is selected on the deadstart panel.

DEADSTART LEVEL is a brief message showing what deadstart level is selected on the deadstart panel. The following messages are displayed:

SYSTEM LOAD - TAPE	(level 0)
SYSTEM LOAD - DISK	(level 1)
CHECKPOINT RECOVERY	(level 2)
MEMORY RECOVERY	(level 3)

Items 5 and 6 appear only if these features are turned on by an installation when the system is installed. If any optional feature is turned off, the numbers of following items are reduced accordingly.

You can respond to any or all items. All default options may be selected by entering a carriage return. It is not necessary to enter the items in the order listed, nor is it necessary to respond to all items. Typing n.x carriage return, where n is the item number and x the option, selects alternatives to the default option. A carriage return alone indicates that option selection is complete and allows the deadstart program to continue.

System Label Deadstart Level		
1.	RELOAD SYSTEM LIBRARIES (Y,N)	N
2.	RECOVER I/O QUEUES (Y,N,I)	Y
3.	VALIDATE USER SETS (Y,N)	N
4.	EQUIPMENT CHANGES (Y,N)	N
5.	EXTENDED MEMORY (I,U,N)	U
6.	FIRST MAINFRAME TO D/S (Y,N)	N
7.	DEDICATED ERR LOGGING (Y,N)	N

Figure 2-2. Main Deadstart Options Display

<u>Item</u>	<u>Description</u>	<u>Item</u>	<u>Description</u>
1.	Reload system libraries. You can remove the effects of previous EDITLIBs on a level 2 or 3 deadstart.	2.	Recover I/O queues. This indicates the processing to be performed on input and output files which have been saved as permanent files. The option is not applicable to a level 2 or 3 deadstart.
<u>Option</u>	<u>Description</u>	<u>Option</u>	<u>Description</u>
N	Use the libraries that currently exist. This option is required if INTERCOM is to be recovered in its active state.	Y	I/O queues are to be retrieved from disk and are available for processing.
Y	Use the libraries from the deadstart file. This option is required on a level 0 or 1 deadstart. On a level 2 or 3 deadstart, this option has the effect of removing all EDITLIBs.	N	I/O queues are not to be retrieved at this time. However, I/O queues can be retrieved by a subsequent deadstart.
		I	I/O queues are to be initialized. Existing I/O files are purged.

<u>Item</u>	<u>Description</u>
3.	Validate user sets. This indicates that the RECOVER routine is to be run for each private/master device. This routine validates disk resident tables. This option is not applicable to a level 2 or 3 deadstart.

<u>Option</u>	<u>Description</u>
Y	Private sets are to be validated. After a level 0 or 1 deadstart, the RECOVER routine runs automatically at postdeadstart for each private device set, in which its master device is on a drive that is logically on. Exceptions are as follows: <ul style="list-style-type: none">• The master device label of the set does not show any mainframes as having the disk mounted.• This is not the first mainframe to deadstart (6.N option) in a multimainframe system, and another mainframe currently has the master device of the private sets mounted.• This is not the first mainframe to deadstart in a multimainframe system, and the shared private set has been mounted on this mainframe. A message is issued to run the RECOVER utility from the other mainframe.• This is not the first mainframe to deadstart in a multimainframe system, and the shared private set is mounted on both mainframes. A message is issued to run RECOVER from the other mainframe. In all other cases, recovery runs automatically at postdeadstart time.
N	Validation is to be bypassed.

Table 2-1 shows the system action taken on level 0 and 1 deadstarts with the 3.Y option selected and the master device on in the EST.

<u>Item</u>	<u>Description</u>
4.	Equipment changes. This alters the equipment configuration of the system. This option is not applicable to a recovery deadstart (level 3).

<u>Option</u>	<u>Description</u>
Y	Equipment is to be changed. Y should be specified if you wish to initialize permanent files, relabel a public device, or perform flaw processing on a public device.
N	Equipment is not to be changed.

5. Extended memory is displayed only if installation is configured for extended memory.

<u>Option</u>	<u>Description</u>
I	Extended memory label is to be initialized.
U	Current extended memory label is to be used if acceptable. This option must be used if this is not the first mainframe to deadstart in a shared extended memory configuration. It is normally used with a level 2 or 3 deadstart if extended memory was in use before recovery.
N	Extended memory is not to be used.

6. First mainframe to D/S. This indicates to deadstart and postdeadstart whether or not this is the initial deadstart for a group of mainframes sharing RMS devices. This option is displayed only if the installation is configured for shared RMS devices.

<u>Option</u>	<u>Description</u>
Y	First mainframe to deadstart.
N	Successive mainframe to deadstart. In general, if there are any other mainframes running, the mainframe deadstarted (for example, as a result of a system failure) is not the first mainframe to deadstart, and this option should be specified.

Table 2-1. System Action Taken When 3.Y Option is Selected at Deadstart

Single Mainframe System			
Mainframe That Had Master Device Mounted	Shared (S) or Unshared (U)	6. Deadstart Option	System Action
Host	U	6.Y	RECOVER runs automatically.
Host	U	6.N	RECOVER runs automatically.
None	U	6.Y	No action.
None	U	6.N	No action.

Multimainframe System			
Mainframe That Had Master Device Mounted	Shared (S) or Unshared (U)	6. Deadstart Option	System Action
Host	S	6.Y	RECOVER runs automatically.
Host	S	6.N	Message to run RECOVER from other mainframe.
None	S	6.Y	No action.
None	S	6.N	No action.
Other	S	6.Y	RECOVER runs automatically.
Other	S	6.N	No action.
Both	S	6.Y	RECOVER runs automatically.
Both	S	6.N	Message issued to run RECOVER from other mainframe.
Other	U	6.Y	RECOVER runs automatically.
Other	U	6.N	RECOVER runs automatically.
Both	U	6.Y	RECOVER runs automatically.
Both	U	6.N	RECOVER runs automatically.

<u>Item</u>	<u>Description</u>
	To deadstart several mainframes in a multimainframe system, designate one mainframe as the first to deadstart and the additional mainframes as successive mainframes to deadstart. All mainframes can normally be deadstarted simultaneously, but do not type the date for any mainframe other than the first until the first mainframe has gone through postdeadstart processing, all control points are clear, and you are ready to type AUTO. The mainframes cannot be deadstarted simultaneously when any of the following conditions exist:
•	A shared public set is being initialized (I device set action parameter specified on the reconfiguration command) or modified (M device set action parameter specified on the reconfiguration command). In these cases, you should initialize the public set on the first mainframe deadstarted, wait until the first mainframe allows an AUTO entry, then deadstart the other mainframe(s), specifying the C device set action parameter in the reconfiguration command for all shared public sets.
•	A member of a shared public set is being deleted. In this case, the parameter C should be specified the reconfiguration command. After deadstarting the first mainframe and entering AUTO for this mainframe, you should run DELSET either from control statements or from the console and then deadstart the other mainframe(s).
•	A TRANSPF on a master device is to be performed on a shared public set. In this case, you should proceed as in the preceding case, running TRANSPF instead of ADDSET or DELSET.
7.	Dedicated error logging. This indicates if a PP will constantly execute a routine to check for hardware errors. The default for most mainframes is N, except for the CYBER 180 model 990, for which the default is Y.
<u>Option</u>	<u>Description</u>
Y	Dedicate a PP for error processing. Dedicated error processing captures error data much faster, which, in the case of an error that does not stop the system, makes that data more helpful in diagnosing the problem. On a model 990, this mode also helps prevent system interrupts by enabling the repair of errors that otherwise would stop the system.
N	Do not dedicate a PP for error processing.

When entries are complete, enter a single carriage return to signal completion of the entries you have made.

On models 865 and 875, if you are using or initializing extended memory, the following display appears on the left screen after the main option matrix.

```
EXTENDED MEMORY DEFINED
AS xxx
DEFINITION CORRECT (Y,N)
```

xxx represents either UEM or ESM, depending on the setting of an installation option. Enter Y (for YES) and a carriage return, or a carriage return only, to signify that extended memory is defined properly. Enter N (for NO) and a carriage return to change the selection to the alternate option. Next, deadstart tests for CEJ/MEJ hardware/ software discrepancies. If the CEJ/MEJ switch is disabled and the CMR is configured for XJ, the situation is catastrophic and the following message appears:

```
CMR/HARDWARE MISMATCH
CMR IS XJ
CEJ/MEJ SWITCH DISABLED

DEADSTART NEW CMR/XJ SELECTION
```

If the CMR is assembled not to use the CEJ/MEJ switch but the option is available, the following message appears:

```
CMR/HARDWARE MISMATCH
CMR IS NON-XJ
CEJ/MEJ SWITCH ENABLED
CARRIAGE RETURN TO CONTINUE
```

For systems equipped with the CEJ/MEJ option but not the enable/disable switch, enter a carriage return to continue. If this enable/disable switch is preset, it must be set to DISABLE and the deadstart repeated. Failure to do this will cause malfunction of the operating system.

If the CMR is configured without the XJ option on 180-class mainframes, the following message appears:

```
CMR IS NON-XJ AND IS NOT
COMPATIBLE WITH THE PROCESSOR TYPE
DEADSTART NEW CMR/XJ SELECTION
```

If the deadstart tape has been incorrectly built, the following message appears:

```
DS DRIVERS OVERFLOWED
CM DRIVER BUFFER.
DEADSTART ABORTED.
```

This condition can be corrected only by building a new deadstart tape with either IRCP assembled (using a large buffer) or deleting one or more controlware decks.

If 1.N is selected on a level 0 or level 1 deadstart, the following message appears:

```
SYSTEM LIBRARIES RELOAD OPTION
INCONSISTENT WITH LEVEL 0 or 1
D/S. RELOAD OPTION ASSUMED
TYPE GO TO CONTINUE
```

When you enter GO, the system library reload option is set to YES (1.Y) automatically and deadstart continues.

MEMORY RECOVERY DEADSTART

When a level 3 deadstart is selected, the right screen displays the following message:

RECOVERY

The level of the system recovered must be identified with a selection from the RELOAD SYSTEM LIBRARIES option.

Changes in equipment configuration cannot be made during a recovery deadstart. Any equipment changes made during a level 0 or level 1 deadstart are recovered.

The extended memory option selected must be the same as that selected during the last level 0 or level 1 deadstart.

Options cannot conflict. If you attempt to change an option that would result in a conflict, the system displays an INPUT ERROR message. In some cases, difficulties with the recovery attempt result in a message asking for operator authorization to continue. The process continues when GO is entered. Alternatively, you can initiate a new deadstart.

The messages that can appear during recovery are documented in the NOS/BE Diagnostic Handbook listed in the preface.

The following messages are issued to the system dayfile at completion of the deadstart recovery.

<u>Message</u>	<u>Description</u>
\$ID jobname IN INPUT QUEUE.	The job named was found in the input queue awaiting execution.
\$ID jobname IN JDT.	The job named was swapped out at the time of the deadstart recovery; when it is swapped in, it will continue execution.
\$ID jobname ENDING SCP.	The job named had system control point status and an outstanding connection to a swapped-out user job at the time of the deadstart recovery. The job named and the connected job are terminated after recovery is complete and the console operator makes a NEXT control point available.

CHECKPOINT RECOVERY DEADSTART

When a level 2 deadstart option is selected, all restrictions imposed by a level 3 option are in effect except for equipment changes, which can be made to allow the system to read the checkpoint file. However, set action options are not allowed for public device sets and the RMS configuration

specified for non-IDLE devices must match that of the CMR contained on the checkpoint file. Only the RMS devices for the system set need to be present in the reconfigured EST.

The extended memory option selected must be U if extended memory was in use at the time of the checkpoint. If extended memory was not in use at the time of the checkpoint, the extended memory option selected must be N.

While extended memory contents are being restored, the current number of words restored and target number (EM size) are displayed on the left screen as shown in figure 2-3.

```

RESTORING EM
CURRENT=005235000
TARGET=006772000

```

Figure 2-3. Extended Memory Restoration Display

CENTRAL MEMORY PARTITIONING

The system will automatically provide NOS/VE with the central memory that remains after satisfying the memory requirements (including UEM) for NOS/BE. If the system determines that the remaining memory is not enough for proper NOS/VE operation, then you will see either the central memory partitioning display shown in figure 2-4, if you are using UEM, or the version shown in figure 2-5. This display gives you the option of continuing with the current memory partition or reducing the NOS/BE requirements to provide more memory for NOS/VE.

```

MINCM = XXXXX000B
MEMSZ = XXXXX000B

THE SPACE REMAINING FOR NOS/VE
IS LESS THAN XXXXX000B

1. USE CURRENT VALUES (DEFAULT)
2. RETURN TO UEM INITIALIZATION

```

Figure 2-4. Central Memory Partitioning Display (Using UEM)

```

MINCM = XXXXX000B
MEMSZ = XXXXX000B

THE SPACE REMAINING FOR NOS/VE
IS LESS THAN XXXXX000B

1. USE CURRENT VALUES (DEFAULT)
2. REDUCE NOS/BE MEM TO 400000B
3. REDUCE NOS/BE MEM TO 600000B

```

Figure 2-5. Central Memory Partitioning Display (Not Using UEM)

In figures 2-4 and 2-5:

- MINCM is the current central memory requirement for NOS/BE.
- MEMSZ is the total central memory available on the mainframe.
- THE SPACE REMAINING FOR NOS/VE IS LESS THAN XXXXX000B specifies XXXXX000B as the minimum amount needed for NOS/VE. The NOS/VE minimum value is set by an installation assembly option.

With the UEM display (figure 2-4), if you enter a 1 or just a carriage return, the system will continue and will use the values shown on the display for partitioning memory. If you enter a 2, you will be returned to the UEM partition display to reduce the UEM size requirements and thus provide more memory for NOS/VE.

With the non-UEM display (figure 2-5), if you enter a 1 or just a carriage return, the system will continue and will use the values shown on the display for partitioning memory. If you decide to reduce NOS/BE central memory, enter either a 2 or 3 to have the system reduce NOS/BE central memory to the value shown.

EXTENDED MEMORY PARTITIONING

Extended memory partitioning determines how extended memory will be used. For installations with several mainframes sharing ECS, extended memory partitioning also determines what part of the extended memory will be used by each mainframe. Partitioning of extended memory is required by the operating system whenever the I option is selected for the extended memory entry in the main deadstart display. Extended memory partitioning is also required when the U option is selected and errors are found when the current label is checked. In this case, the label must be reinitialized. The extended memory partitioning display appears immediately after the main deadstart display. The left screen display is shown in figure

2-6; the right screen display is shown in figure 2-7. Circled numbers in the following subsection correspond to the circled numbers on specific lines in the sample display.

Use the following procedure to respond to the display.

1. If current extended memory label is acceptable, enter a carriage return.
2. If current extended memory label is not acceptable but working label is acceptable, type GO then enter a carriage return.
3. If neither current extended memory label nor the working label is acceptable, enter C or E depending on which label is closer to being acceptable.

C Working label

E Current extended memory label

4. Change parameters according to directions on right screen.

The following display lines appear during deadstart depending on these situations:

- Option U is selected and errors make it impossible to skip partitioning. Lines ③ and ④ appear.
- An extended memory label cannot be found. Lines ④ and ⑤ appear.
- The existing extended memory label is not acceptable because partitions are incorrectly assigned to the CMR-defined ID displayed on the left screen. Lines ③ and ④ appear.
- An attempt is made to write a label. The request is suspended because defined and actual extended memory lengths do not agree. Line 2 appears.

EM PARTITIONING
CMR IDENT SN01

* WORKING ON CMR LABEL * ①
 NUMBER OF PARTITIONS 5B
 ADDRESS OF LABEL 120B
 DEFINED EM 1000000B WORDS
 ACTUAL EM 1730000B WORDS ②

ORD	TYPE	FWA/1000B	FL/1000B	FLAG BITS	IDENT
1	3	1	10	000001	LINK
2	1	11	40	000000	SN58
3	1	51	40	000000	SN01
4	2	111	300	000002	SN58
5	2	411	300	000004	SN01

(NO MATCHING ID OR BAD LABEL) ③
 (OPTION I ASSUMED) ④

Figure 2-6. Extended Memory Partitioning Display (Left Screen)

CURRENT EM LABEL
 NUMBER OF PARTITIONS 3B
 ADDRESS OF LABEL 120B
 DEFINED EM 1000000B WORDS
 INITIALIZED BY SN58

ORD	TYPE	FWA/1000B	FL/1000B	FLAG BITS	IDENT
1	3	1	10	000001	LINK
2	1	11	40	000000	SN58
3	2	51	300	000002	SN58

(EM LABEL NOT FOUND) ⑤

C OR E - WORK BASED ON LABEL FROM CMR OR EM.
 N,XX - CHANGE NO. OF DEFINED PARTITIONS TO XX.
 ID,XXXX - CHANGE COMPUTER ID. (UP TO 10 CHARACTERS)
 LE,XXXX - CHANGE DEFINED EM LENGTH/1000B.
 AD,XXX - SET EM LABEL ADDRESS TO XXX. (NEAREST)
 PARTITION PARAMETERS (P IS PARTITION NUMBER)

- P - DEFINE START OF DISPLAY.
- P, ID,XXX - CHANGE PARTITION ID.
- P, TP,X - CHANGE TYPE CODE.(1-3)
- P, BT,XX - CHANGE NO. OF ASSIGNED FLAG REGISTER BITS.
- P, FW,XXXX - CHANGE FWA/1000B (1 to 4000B).
- P, FL,XXXX - CHANGE FL/1000B.
- CR- ALONE - ACCEPT CURRENT LABEL IN EM.
- GO - WRITE WORKING LABEL TO EM.
- DEL - GO WITH EM OFF.

Figure 2-7. Extended Memory Partitioning Display (Right Screen)

Redefinable items on the left screen include CMR IDENT, the address for the label, and label parameters found in the working area. Parameters in the working area can be reset at any time to CMR-defined values by entering C (the initial default). When E is entered, the working area parameters take the values defined by the current extended memory label. The current working label is displayed on the left screen at line ①. The remaining redefinable items can be modified from the console by using the directory on the right screen. Supplemental descriptions for this directory follow:

A console entry followed by a carriage return displays entries on line ③ of the left screen.

-ERROR appears on line ④ of the left screen when you make an illegal entry or when there is an error in the extended memory working label which prevents further processing. The following are examples of possible errors.

- You entered zero as the partition ordinal, the first word address of a partition, the length of extended memory, or as the number of partitions in extended memory.
- You entered a partition ordinal greater than the number of partitions defined in extended memory.
- You specified a field length for a partition that made the sum of the field lengths of the partitions, plus 1000 (octal), exceed the defined size of extended memory.
- You specified a partition field length of more than 1000K decimal words.
- You specified a first word address of one partition within the field length of another partition.
- You entered an invalid partition type.
- You attempted to define more than 17 flag bits.
- You specified the current extended memory working label, but no label was found.[†]
- You specified an extended memory working label address of greater than 670 (octal).[†]
- You did not define the first partition as type 3 (COMMON) with the extended memory link code turned on.[†]
- You did not define a type 1 (DIRECT ACCESS) partition for this CMR ID, or more than one was defined.
- You did not define a type 2 (ALLOCATABLE DEVICE) partition for this CMR ID, or more than one was defined.

When the condition or entry is corrected, the system clears the -ERROR message.

The range of acceptable number of partitions (N,XX) is from 1 to 11 (octal). All entries are accepted and displayed as octal numbers. When determining the number of partitions, a site will normally need a partition of type 3 (COMMON), and in addition, both a partition of type 1 (DIRECT ACCESS) and a partition of type 2 (ALLOCATABLE DEVICE) for each mainframe that will be accessing extended memory.[†]

Change of defined total length of extended memory (LE,XXXX) is accepted only when this change does not conflict with existing field assignments for partitions.

Valid addresses for extended memory labels are as follows (all are octal mode): 120, 230, 340, 450, 560, or 670. The initial address is the address of the current extended memory label. If a label is not found, the initial value is 1208. A valid address nearest to and not lower than the entered value is used and displayed when the label is written (AD,XXX).

An entry for a partition is accepted when the number is within the defined range of partitions. Either screen is capable of displaying eight partitions. Changing the starting position of the partition display (P command) allows partitions greater than eight to be displayed. This entry affects both screens simultaneously.

Change of flag register bit assignment is accepted when the sum of assigned bits does not overflow the 17 bits available.

Changing the field length (FL) of a partition (P,FL,XXXX) redefines and packs the field assignment of all partitions that follow the specified partition.

The FL of the type 1 partition (DIRECT ACCESS) should be at least as large as the LDCMR segment library. The length is about 40000 (octal).

Changing the FWA of a partition (P,FW,XXXX) redefines and packs the field assignment of all partitions that follow the specified partition.

Change of FWA or FL of a partition is accepted when the change does not conflict with the defined total length of extended memory (LE).

Extended memory partitioning processing is terminated by either a carriage return or by GO, provided the label in extended memory or the working area is acceptable. DEL continues deadstart without extended memory.

[†]For model 176 and 180-class mainframes, which cannot share extended memory, only one type 1 partition and one type 2 partition need to be defined.

A label is acceptable if the first partition is type 3 (COMMON) when ECS LINK code is assembled.^f Only one partition of type 1 (DIRECT ACCESS) may have the same ID as the CMR ID. Only one partition of type 2 (ALLOCATABLE DEVICE or paged area) may have a partition ID the same as the CMR ID with nonzero field length.

After you enter GO, if the label in the working area is acceptable and if an extended memory label exists, a warning appears on the left screen:

**** WARNING ****

EM LABEL WILL BE REWRITTEN
AT ANOTHER GO

EM LABEL PROCESSING WILL BE
RESUMED BY CARRIAGE RETURN

After entry of another GO or the first GO with no existing extended memory label, the extended memory label is written to the specified address if the defined extended memory size is appropriate. Otherwise, if the defined extended memory field length is larger than the available extended memory field length, an error message appears:

**** ERROR ****

DEFINED EM TOO LARGE
EM LABEL PROCESSING WILL BE
RESUMED BY CARRIAGE RETURN

After a carriage return is entered, the label displays are resumed with an additional message. ACTUAL EM SIZE is displayed at line ②. If GO is entered and the defined extended memory is not more than one-half the actual size, this warning message appears:

**** WARNING ****

DEFINED EM TOO SMALL
COMPARED TO ACTUAL EM
TYPE GO TO CONTINUE

EM LABEL PROCESSING WILL BE
RESUMED BY CARRIAGE RETURN

An unsuccessful attempt to write an extended memory label produces the following message on the left screen:

LABEL CAN NOT BE WRITTEN TO
SPECIFIED ADDRESS - XXXB

TYPE -CR- TO WRITE LABEL TO
NEXT ADDRESS - XXXB

TYPE DEL TO GO WITH EM OFF

You can enter a carriage return to attempt to write the label in another area in extended memory. DEL continues deadstart with extended memory off. DEL may be entered at any time during extended memory partition processing.

The following message appears under one of the following conditions:

LABEL INTERLOCK SET
WAITING FOR INTERLOCK TO CLEAR

ENTER -CR- TO WAIT
ENTER OVR TO OVERRIDE

- The previous system was a stranger system and left bit 17 of the ECS flag register set.
- The previous deadstart was interrupted during extended memory partitioning processing.
- Another system is currently performing extended memory partitioning processing.

When you enter a carriage return, the last two lines clear and the system waits until bit 17 clears. If bit 17 is set for more than 1 minute, the message is redisplayed with the same options for your action.

After bit 17 clears, or if you enter OVR as an option, the screens show the extended memory partitioning display, and extended memory partitioning begins.

EXTENDED MEMORY INITIALIZATION

When an installation parameter has been preset to define extended memory and extended memory option I is selected or assumed, the extended memory initialization display (refer to figures 2-8 and 2-9) appears immediately after the extended memory partitioning display. If extended memory option U is selected and accepted, the extended memory initialization displays appear after the main deadstart displays. These displays contain extended memory parameters that you may change. Default values for all options are defined by installation parameters.

DDD 000B and AAA 000B are lengths of type 1 (DIRECT ACCESS) and type 2 (ALLOCATABLE DEVICE) partitions assigned to this computer based on the partition IDENT and CMR IDENT during extended memory partitioning.

^fDo not define a type 3 partition if you are deadstarting on a model 176 or 180-class mainframes. Also, do not define a type 3 partition when deadstarting on a model 865 or 875 with UEM.

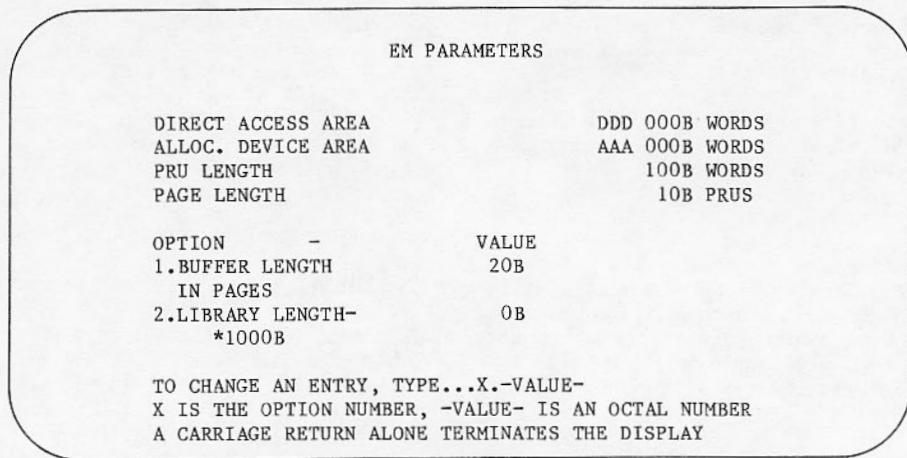


Figure 2-8. Extended Memory Initialization Display (Left Screen)

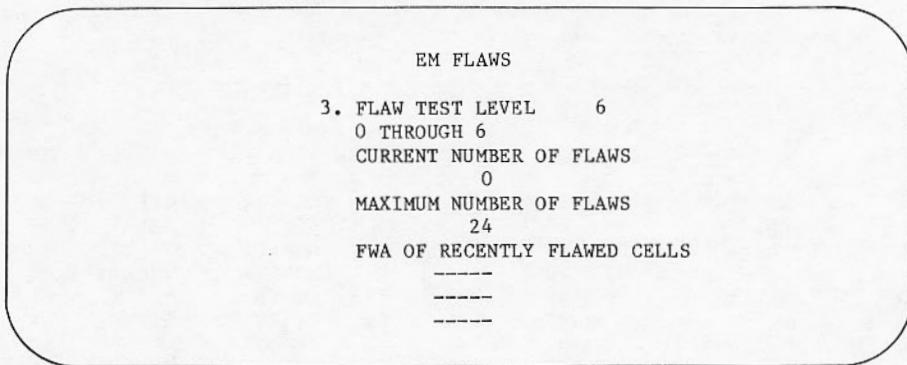


Figure 2-9. Extended Memory Initialization Display (Right Screen)†

To change an entry, type:

x.value

where x is the option number and value is an octal number. A carriage return alone terminates the display and begins extended memory processing.

When you enter a carriage return, the last three lines of the display are replaced with the following message:

TESTING AT LEVEL 1

This number changes as testing progresses. The right screen displays extended memory flaws.

Six patterns, listed next, are used to flaw test extended memory. All six are used against the system area of assigned type 2 partition.

- 5-2 pattern (alternate bits in extended memory word).
- 2-5 pattern (alternate bits in extended memory word).

- Even parity (60 bits).
- Odd parity (59 bits).
- All ones in extended memory.
- All zeros in extended memory.

On non 180-class mainframes, the remainder of assigned type 2 partition is tested according to the flaw test level (n) you specified, where n is the last test pattern to be used in the flaw test. For each flaw found in extended memory (excluding the system area), the address of the block containing the flaw is displayed on the right screen; and the count of flaws, also displayed, is incremented by one. As new errors occur, each is added to the bottom of the list, and the earlier flaws are rolled up and off the top.

After testing extended memory, the system tables, including the list of flaws, are written into extended memory. The buffer area is subdivided into pages (skipping flawed spots), and the list of the addresses of those pages is placed into the empty page stack.

†This display is not used on 180-class mainframes.

The following messages may appear:

ERROR - INPUT IGNORED

Your entry is ill-formed or its value exceeds the size of extended memory. Correct the error by retyping the entry.

ERROR - BUFFER SIZE

Computed buffer size is greater than the size of extended memory. Since the buffer size is based on page size, which can be changed, the testing procedure just described is not performed until you terminate the display. If the buffer size is too large, the display is regenerated.

FLAW IN SYSTEM AREA

Deadstart is stopped if a flaw error is found in the system area of extended memory. Deadstart again and do not use extended memory.

FLAW LIMIT EXCEEDED

If the count of flaw errors in the nonsystem area of extended memory reaches a specified maximum, deadstart is stopped. Deadstart again with extended memory off.

EST DISPLAY

When the yes option of EQUIPMENT CHANGES (4.Y) is selected from the main deadstart display, the equipment status table (EST), as it exists in the CMR routine on the deadstart system tape, is displayed on the left screen. For RMS devices, additional information pertaining to device and set functions is gathered from other system tables and also displayed on the left screen (refer to figure 2-10). The right screen lists parameters that can be entered.

EST ORD	TYPE	STATUS	CHANNELS	EQ	UN	VSN	SETNAME	AT	AC
01	AY	ON MQ	04 24	0	S01	00844A	QSET	QX	C
02	AY	ON Q	04 24	0	S02	00844B	QSET	QX	C
03	AZ-F	ON MP	03 23	0	S03	00844C	PFSET	P	C
04	AZ-F	ON P	03 23	0	S04	00844D	PFSET	P	C
05	AY	ON MS	25	0	05	00844S	SYSTEM	SX	I
06	AY-H	ON PS	27	0	06	00844T	SYSTEM	SX	I
10	AZ	IDL FREE	07	0	00	000000		NO	MST
11	AZ	IDL FREE	07	0	01	000000		NO	MST
12	AZ	IDL FREE	07	0	02	000000		NO	MST
20	AJ-F	ON P	03 23	0	S40	00885E	PFSET	P	C
21	AJ-F	ON P	03 23	0	S41	00885F	PFSET	P	C
22	AJ-F	IDL FREE	03 23	0	S42	000000		NO	MST
23	AJ-F	IDL FREE	03 23	0	S43	000000		NO	MST
30	CR	ON FREE	12 5	00					
31	CP	ON FREE	12 6	00					
32	LT	ON FREE	12 4	00					
33	LR	ON FREE	12 7	00					
34	DS	ON FREE	10 7	00					
40	NTGA	ON FREE	11 33	7 00					
41	NT A	ON FREE	11 33	7 01					
42	MT A	ON FREE	11 33	7 02					
43	MT A	ON FREE	11 33	7 03					

UNUSED DAT ENTRIES = 00
UNUSED DDT ENTRIES = 00
FREE RBR WORDS = 0004

Figure 2-10. EST Display (Left Screen)

The EST display contains the following information.

<u>Heading</u>	<u>Description</u>	<u>Heading</u>	<u>Description</u>
ORD	EST ordinal of equipment. Only RMS-type devices can be entered at EST ordinals of 100 (octal) or greater.		RMS device attributes:
TYPE	Equipment mnemonics refer to the equipment status (E) display in section 3. Magnetic tape mnemonics (MT and NT) are followed by A if the unit is attached to the 67x advanced tape subsystem (ATS) or B if the unit is attached to a controller with block ID.		M Master device S System device P Permanent file device Q Queue device
	844 device mnemonics (AY and AZ) are followed by F to indicate that the unit is connected to at least one controller capable of full-track operations. The mnemonics are followed by H to indicate that the unit is connected only to controllers capable solely of half-track operations. An 885 device mnemonic (AJ) should be followed only by an F since the only controller that can connect to it is one capable of full-track operations. (Refer to the RMS display and the label initialization display in section 2 to change F to H or H to F.)	CHANNELS	Channel numbers.
	The 580 line printer device mnemonics (LR, LS, and LT) are followed by P if the device is equipped with programmable format control (PFC).	EQ	Equipment number.
	The DDP mnemonic (ED) is followed by D if DDP type DCL35 or I if DDP type DCL45.	UN	Unit number; an S preceding the unit number designates a shared disk unit. If an expander is used with 844-21 disk drives, the unit number can be two digits. The unit number can also be two digits for 885 disk drives.
STATUS	Equipment status consists of two parts. The left part can have one of the following entries.		The following information is displayed only for RMS sets.
ON	Equipment is logically ON.	VSN	Volume serial number (one to six alphanumeric characters).
OFF	Equipment is logically OFF; label processing is performed for RMS devices.	SETNAME	Set name (one to seven alphanumeric characters, the first of which is alphabetic).
IDL	RMS device is idled; label processing is not performed.	AT	Set attributes. Each public set may have one or more of the following attributes:
FREE	The right part can have one or more of the following entries.		S System set. (Only one public set may have this set attribute.)
	FREE Non-RMS device or RMS device not belonging to a public device set and having no device set attributes.		P Permanent file default set. (Only one public set may have this set attribute.)
			Q Queue set. (Only one public set may have this set attribute.)
			X Scratch set.
		AC	NO Device does not belong to a MST public device set.
			Deadstart actions to be performed are shown in the following list:
			Device set actions:
			I Initialize set
			C Check set
			M Modify labels (add flaws)
			Device action:
			P Allocate device for CTI package

If the EST table has more entries than the number that can be displayed on the screen at one time, they can be brought to the screen by typing the EST ordinal alone then entering a carriage return:

```
xx carriage return
```

The display changes to show the typed entry and succeeding entries.

MAKING EQUIPMENT CHANGES

Reconfiguration commands are of two types:

- Those that reference an EST entry by starting with an EST ordinal.
- Those that reference rotating mass storage (RMS) set by starting with a device set name.

In both cases, parameters that follow the EST ordinal or device set name must be separated by either commas or periods. The last parameter need not be followed by a period; each entry is terminated by a carriage return. When all reconfiguration commands have been entered, enter an additional carriage return to terminate the display.

The command format for creating or modifying an EST entry is:

```
xx,mn,p1,p2,...,pn
xx      EST ordinal
mn      Hardware mnemonic
pi      Optional parameters
```

mn is required when creating an EST entry and is optional when modifying an EST entry. Changing the hardware mnemonic for an existing EST entry is equivalent to deleting the existing entry (including channel, equipment, and unit number, and so on) and adding a new EST entry. When the hardware mnemonic for an existing EST entry is not changed by a command, existing EST information is preserved unless specifically altered by an optional parameter.

Parameters have the following forms.

Ccc Assigns the channels by which the unit can be accessed. Two digits must be used to specify a given channel (01, 02, and so on). Up to four channels can be specified for tapes, RMS, or distributive data path (DDP). Only one channel can be specified for other equipment. Zero cannot be the last channel specified unless it is the only channel for this entry. When adding a new EST entry (or changing the hardware mnemonic of an existing entry), the **Ccc** parameter is required.

Ee Assigns a one-digit equipment (controller) number. If **e** is not specified, the default is zero.

Uuu Assigns a two-digit unit number, with a leading zero assumed when only one octal digit is typed. If **uu** is not specified, the default is zero.

ON Turns device logically on, making it available for use. After deadstart loading is complete, an operator command can reverse this designation.

OFF Turns device logically off, making it unavailable for use. After deadstart loading is complete, an operator command can reverse this designation. Label processing is performed for RMS devices.

P Indicates that 580 line printer is equipped with programmable format control (PFC). Entry of this parameter toggles the previous setting.

D Indicates DDP type DC135. This parameter deletes the previous DDP type.

I Indicates DDP type DC145. This parameter deletes the previous DDP type.

Additions to the EST might not be possible if the addressed device is an RMS device or a magnetic tape; entries for these devices are constrained by the space available in the system tables, as reported at the bottom of the display. If a DDP is added, it will not be utilized unless there is an extra DDP system circular buffer already configured in the CMR. The amount of space available for system tables can be reduced after completing EST reconfiguration. This might further constrain any entries for a subsequent return to EST reconfiguration.

To delete a device, type the following command:

```
xx,0
```

This command deletes the entire entry for the device and frees DAT and RBR or TAPES table space if applicable.

Multiple Command Format

A multiple command format is allowed to speed entries when creating, modifying, or deleting EST entries. The format is:

```
xx1-xx2,mn,p1,p2,...,pn
```

xx₁ First EST ordinal

xx₂ Last EST ordinal

Using this format, all entries in the range **xx₁** through **xx₂** are altered according to the optional parameters specified. An octal field following a parameter that is suffixed with a plus sign (+) is incremented by 1 each time the EST ordinal is incremented. When **XUuu** is used, the unit number is incremented by 10 each time the EST ordinal is incremented. This is due to vertical ranking of units on expanders.

Examples:

1. 10-17,AY,C04,E0,U0+,PF,V=PACK01+,SN=PFSET

This is equivalent to the following eight commands.

```
10,AY,C04,E0,U0,PF,V=PACK01,SN=PFSET
```

```
11,AY,C04,E0,U1,PF,V=PACK02,SN=PFSET
```

- 12,AY,C04,E0,U2,PF,V=PACK03,SN=PFSET
 13,AY,C04,E0,U3,PF,V=PACK04,SN=PFSET
 14,AY,C04,E0,U4,PF,V=PACK05,SN=PFSET
 15,AY,C04,E0,U5,PF,V=PACK06,SN=PFSET
 16,AY,C04,E0,U6,PF,V=PACK07,SN=PFSET
 17,AY,C04,E0,U7,PF,V=PACK10,SN=PFSET
2. Configure nine-track 679 tape units with EST ordinals 50 through 56 on channel 13, equipment number 0, and unit numbers 0 through 6. Units 0 through 3 have the 6250 capability.
- 50-53,NT,A,G,C13,U0+
 54-56,NT,A,C13,U4+
3. Change the channel number for EST ordinals 30 through 36 to be dual access channels 30 and 31. Channel 30 is now the primary access channel.
- 30-36,C3031
4. Delete EST ordinals 20 through 26.
- 20-26,0.

Tape Reconfiguration Commands

In addition to the general reconfiguration commands, the following commands apply only to tapes. The format is the same as the general reconfiguration commands.

- A Indicates that the magnetic tape unit is attached to a 67x controller. Deletes previous controller type and group coded recording (GCR) flag.
- B Indicates that the magnetic tape unit is attached to a 66x controller with block ID. Deletes previous controller type and GCR flag.
- G Group coded recording (GCR) flag. Indicates nine-track magnetic tape unit is attached to a 67x controller and is capable of GCR (6250 CPI). Deletes previous controller type.

Examples:

1. Configure a nine-track 67x tape unit (not 6250) with EST ordinal 21 on channel 13, equipment number 4, and unit number 07.
- 21,NT,A,C13,E4,U07
2. Configure a nine-track 6250 tape unit with EST ordinal 22 on channel 13, equipment number 5, and unit number 05.
- 22,NT,A,G,C13,E5,U05
3. Configure a seven-track 67x tape unit with EST ordinal 23 on channel 12, equipment number 3, and unit number 06.
- 23,MT,A,C12,E3,U06

4. Configure a nine-track 66x tape unit with EST ordinal 24 on channel 30, equipment number 0, unit number 00, and with block ID.
- 24,NT,B,C30
5. Configure a seven-track 66x tape unit with EST ordinal 25 on channel 30, equipment number 0, unit number 01, and with block ID.
- 25,MT,C30,U01,B

A magnetic tape unit cannot be added unless an unused TAPES table entry is available. Such an entry can be created by deleting or overwriting an entry for an existing magnetic tape unit.

RMS Device Reconfiguration Commands

An EST for an 844/885 device can only be added if:

- There is an unused DDT entry.
- There is an unused DAT entry or existing device with the same mnemonic, equipment, and channel numbers.
- There is a sufficient amount of free RBR words for the device.

NOTE

RMS devices added through EST reconfiguration are assigned the standard allocation parameters (record block size, allocation style, and number of RBR table entries per unit).

RMS Reconfiguration Commands

In addition to the general reconfiguration commands, the following commands apply only to RMS devices and have the same format as the general reconfiguration commands.

IDLE	Idles an RMS device, making it unavailable for use. Label processing is not performed.
MD	Assigns master device attribute.
SYS	Assigns system device attribute.
PF	Assigns permanent file device attribute.
Q	Assigns queue device attribute.
CLR	Clears MD, SYS, PF, and Q device attributes.
SHU	Designates the device to be shared.
NS	Clears SHU designation.

V=vsn	Assigns a volume serial number to an RMS device; vsn can be one to six letters or digits.
SN=setname	Assigns the device to the specified set; setname can be one to seven letters or digits, beginning with a letter.
XUuu	Assigns a two-digit unit number to a unit on an expander element. An expander is a hardware device that adapts an RMS disk controller so that it can communicate with more than eight disk drives.

RMS Device Set Reconfiguration Commands

The command format for creating or modifying an RMS device set is:

setname,p1,p2,...,pn

setname Name of the set to be created or modified.

p1 Optional parameters with the forms listed next:

SYS Assigns system set attribute. (There can be only one public set that has this set attribute.)

PF Assigns permanent file default set attribute. (There can be only one public set that has this set attribute.)

Q Assigns queue set attribute. (There can be only one public set that has this set attribute.)

SCR Assigns scratch set attribute.

CLR Clears SYS, PF, Q, and SCR set attributes.

I Designates public device set to be initialized.

C Designates public device set to be checked.

M Designates public device set to be modified (device label rewriting or flaw processing).

If the device set name matches the name of an existing device set, the set attributes and/or deadstart actions for the device set are modified as specified by the optional parameters.

A new device set is created if a device set with the entered device set name does not already exist, and there is an unused mounted set table (MST) entry available.

A device set can be deleted and an MST entry freed by a command of the following format:

setname,0

Examples:

SYSTEM,SYS,SCR,I

PUBLIC,0

Note that device set attributes can only be applied to public device sets.

PF and Q device attributes are recorded on the device. Device set initialization is the only time during deadstart that it is possible to set these device attributes; otherwise, the DELSET and ADDSET commands should be used after deadstarting.

Device set actions cannot be entered on a checkpoint recovery deadstart level 2.

Devices that are labeled as members of public device sets can only be deleted from a public device set during deadstart if the public device set is initialized; otherwise, it is deleted using DELSET after deadstarting.

Devices that are not labeled as members of a public device set can only be added to a public device set if the public device set is initialized; otherwise, it is added using ADDSET after deadstarting.

If a device is temporarily made unavailable, it should be idled at deadstart time. Even though off status prevents file assignment, an attempt is made to read the device label.

The following action occurs for each of the set action options:

I Initialize device set.

All device labels of members within the corresponding public device set are initialized and flaws can be entered.

All disk resident tables on the master device are initialized.

All information on the master device relating to other mainframes is ignored and erased.

C Check device set.

All device labels of members within the corresponding public device set are verified. Members do not have to be mounted on the same drive.

All disk resident tables on the master device are verified.

Information on the master device relating to other mainframes is handled two different ways: whether the device set is shared or not, and whether 6.Y or 6.N was specified.

If the public device is not shared, the information is ignored and erased regardless of the specification of option 6.

If the public device set is shared and 6.Y was specified, the information is ignored and erased. If the public device set is shared and 6.N was specified, the information is assumed to be valid and it is maintained.

The following information relates to resource assignment of records blocks and attachment of permanent files recorded by mainframe; therefore, the specification on the device set action, C, in conjunction with the 6. deadstart option determines whether resources are recovered from a downed or inactive mainframe. In summary:

Action	Set Shared	6. Option	Resources Recovered
C	No	Y	Yes
C	Yes	Y	Yes
C	No	N	Yes
C	Yes	N	Not†

6.N should always be specified whenever C is selected and the other mainframe is running normally.

It is not possible to change device attributes Q and PF on a checked public device set. It is possible, however, to change the device attribute SYS and any of the device set attributes.

If one set is checked and another set is initialized, it might be necessary to use the M option rather than the C option for the first set. This situation occurs if a device being initialized has an SN in its old label which matches the SN of the checked set.

M Modify device set.

The device label of the master device is checked. The option to rewrite the device label of a member device is provided if and only if the device is not in use by the other mainframe. This should only be necessary if the device label has been destroyed.

All disk resident tables on the master device are verified.

Flaws can be redefined for all member devices including the master device.

Resource recovery is handled as with the C option.

Checklist for RMS Reconfiguration

1. For each EST entry, ensure that all of the following information is correct. The keyword that changes a value is also listed.

EST Descriptor	Keyword
Device type	Hardware mnemonic
Channel number(s)	Ccc dd
Equipment number	En
Unit number	Uuu
Expander unit number	XUuu
VSN	V=vsn
Device set name	SN=setname
Master device	MD
System device attribute	SYS
Queue device attribute	Q
Permanent file device attribute	PF
Shared device attribute	SHU
Device (IDLE)	IDLE
Clear attributes	CLR
Clear SHU designation	NS

Parameters cc, dd, n, uu, vsn, and setname require new values; cc, dd, n, and uu parameters can be any combination of one to six letters and digits, setname can be any combination of one to seven letters and digits, starting with a letter, and vsn can be any combination of one to six letters and digits.

2. For each unique device set name mentioned in the EST display, device set attributes and deadstart device set actions must be specified.

The shared set attribute is implied by all device set members being mounted on shared drives (S precedes unit number in the display).

All RMS EST entries not associated with a public set are treated as reserved for private set usage.

†6.N specified with C might imply that the resources associated by the downed mainframe are recovered by the downed or inactive mainframe.

NOTE

Devices that have never been labeled members of a public set can only be added to a public set if that set is to be initialized; otherwise, it is to be added using LABELMS and ADDSET after deadstarting.

3. To ensure reconfiguration is complete, make the following checks.
 - All drives that are to be accessed by this mainframe are listed in the EST.
 - All public set devices are listed by device set name and volume serial number in the EST.
 - All drives that are to be accessed by more than one mainframe have the shared drive attribute.
 - All device set attributes have been assigned.
 - The system set has at least one system device and at least one permanent file device.
 - The permanent file default set has at least one permanent file device.
 - The queue device set has at least one queue device.
 - Any public set that has a member without a device attribute should be assigned the scratch set attribute.
 - All device set members of a shared set must be mounted on shared devices.
 - The device set with the system set attribute is not a shared device set.
 - Each public set has a master device.
 - Ensure that device set attributes (SYS, PF, Q) are applied only once.

ERROR PROCESSING

Errors are reported on the EST display in the following situations.

- A command is syntactically incorrect. In this case, the command and the message FORMAT ERROR are displayed at the bottom of the left screen. An asterisk is displayed above the bad parameter.
- A command cannot be completely executed due to insufficient space in system tables. In this case, the command and an appropriate error message are displayed at the bottom of the left screen. In some cases, table entries may be deleted or left incomplete. This could cause problems later if the error is not corrected or the EST entry is deleted.

- Deadstart has detected a configuration error (for example, NO SYSTEM SET). The error message is displayed at the bottom of the left screen. (A description of these error messages is given under Rotating Mass Storage Label Processing, later in this section.) Use appropriate reconfiguration commands to correct the problem.

If an error is detected in a command that references a set or a single EST entry, the command is ignored. If an error is detected in a command that references an EST ordinal range, EST entries in the low end of the range may be affected by the command before the error is detected. In this case, you should examine the EST display to determine which, if any, EST entries were affected by the command.

RMS CONTROLLERS DISPLAY

The RMS controllers display (figures 2-11 and 2-12) appears during any level of deadstart.

The left screen displays RMS controller status and options. You can change them by following the instructions on the right screen display. When all changes have been made, a carriage return terminates the display.

Each RMS controller is described by a separate entry and identified by its DST/DAT ordinal. Controllers can be single access to units (one entry) or multiple access (two, three, or four consecutive entries). The 819, 844-21, and 844-41 can have one or two accesses; the 844-44 and 885 disk drive can have from one to four accesses. For multiple access, the first entry describes the channel number, equipment number, number of accesses, controller type, stack request scheduling option, controlware level number, and controller status. Second and subsequent entries will have a dot in the fields for accesses and option.

An RMS controller is one of the following:

- A 7054 controller capable of supporting only 844 disks at half-track interlace.
- A 7154 controller capable of supporting 844 disks at both half-track and full-track interlace.
- A 7155 controller capable of supporting 844-41, 844-44, or 885 disks at both half-track and full-track interlace.

Controller type can be changed by entering the DST ordinal followed by HT (7054 controller), FT (7154 controller), or FM (7155 controller). A particular DST ordinal may not have a 7054, 7154, or 7155 controller associated with it. If the controller type is unknown, an asterisk (*) will be displayed for controller type. This could happen following RMS reconfiguration at the EST display. You must specify the controller type before continuing with deadstart. If the controller type is known but is not a 7054, 7154, or 7155, a device mnemonic will be in the type field. For example, if the DST ordinal is associated with a set of 819 devices, the device mnemonic AH will be displayed as the controller type. In addition, the channel number associated with an 819 device will be followed by an asterisk (*) to further flag the channel as an 819 channel.

RMS CONTROLLERS							
ORD	CHANNEL	EQ	ACCESES	TYPE	OPTION	LEV	STATUS
1	01	0	1	7054	SEL	13	ON
2	02	1	2	7154	SEEK	14	ON
4	04	1	.	7154	.	14	LOCK
5	03	0	1	7155	SEEK	3	ON
6	06*	0	1	AH	SEL		ON

[†]Appears only when an entry is illegal.

Figure 2-11. RMS Controllers Display (Left Screen)

THE COMMAND FORMAT FOR MODIFYING AN RMS CONTROLLER IS AS FOLLOWS --

DD,PAR

DD - DST/DAT ORDINAL OF CONTROLLER
PAR - PARAMETER

NOTE - AN * FOLLOWING THE CHANNEL NUMBER
FLAGS THAT CHANNEL AS AN 819 CHANNEL

STATUS PARAMETERS -- PER CONTROLLER

ON - CONTROLLER IS AUTOLOADED AND USED
OFF - CONTROLLER IS AUTOLOADED AND NOT USED
LOCK - CONTROLLER IS NOT AUTOLOADED AND
CANNOT BE USED
CANNOT OFF/LOCK THE LAST ON CONTROLLER OF AN ACES
GROUP UNTIL ALL UNITS IN GROUP ARE IDLE

OPTION -- PER ACCESS GROUP (FOR OPTIMIZATION)

FIFO - FIRST IN FIRST OUT (NO OPTIMIZATION)
SEL - UNIT SELECTION SCHEDULING ONLY
SEEK - OVERLAP SEEK (FULL OPTIMIZATION)

INTERLACE - - PER CONTROLLER

HT - SPECIFY 7054 CONTROLLER
FT - SPECIFY 7154 CONTROLLER
FM - SPECIFY 7155 CONTROLLER

NOTE - AN * IN THE CONTROLLER TYPE FIELD
INDICATES THAT THE CONTROLLER TYPE
IS UNKNOWN AND MUST BE SPECIFIED

EST -- RETURN TO EST DISPLAY

Figure 2-12. RMS Controllers Display (Right Screen)

The STATUS of a controller can be on, off, or locked. A controller that is on is autoloaded and used. A single access controller, or the last on controller of a multiple access group, cannot be turned off or locked until all devices in the group are idle. A controller that is turned off is autoloaded but not used. During system operation, the DSD CONTROLLER command can be used to turn controllers off and on that were on or off at deadstart time. A controller that is locked will not be autoloaded and cannot be used or changed during system operation until controlware has been reloaded by calling BCPROC as described in section 6.

The controller option is specified for the first controller in a group and applies to all controllers in the group. It specifies the optimization used for the controller as FIFO, SEL, or SEEK. FIFO specifies that stack requests will be sent to the device driver in the order received. SEL specifies that requests will be optimized within each unit and that unit selection scheduling will be done. This is the default for the 819. It should also be used for medium to small configurations of drives shared at the controller level and small configurations shared at the unit level. SEEK specifies that overlap seek optimization is to be done in addition to SEL optimization. This is the default for 844 and 885 device types for which overlap seek is supported.

The column labeled LEV gives the revision level of the 844/885 controlware to be autoloaded.

The left screen can display up to 24 controllers. The display entries are double spaced unless there are more than 12 controllers, in which case single spacing is used.

MTS (66X)/RMS BUFFER CONTROLLER AUTOLOAD

Deadstart autoloads all RMS buffer controller memories and all MTS buffer controller memories, providing their EST entries are logically ON. Refer to figure 2-13.

The autoload is performed on all levels of deadstart. This process is not apparent unless it fails, or an error produces a diagnostic message.

LABEL CHECKING

Label checking occurs for each public device set, even if the I or M action is not selected. It verifies that a standard device label exists on each public RMS device that is not idle. Label checking is not performed for a device that is idle.

AUTOLOADING MTS/RMS
BUFFER CONTROLLERS

Figure 2-13. MTS/RMS Buffer Controller
Memory Display

Information in the central memory system tables is compared to that physically on the RMS devices, and appropriate messages are generated if discrepancies are found. These messages are found in the NOS/BE Diagnostic Handbook.

ROTATING MASS STORAGE LABEL PROCESSING

Selection of the I or M action on the reconfiguration command for a device set indicates a label is to be written on each rotating mass storage device in the device set. The action level for a public set can be specified when the EST is displayed for equipment changes. For example, an entry of PUBLIC, I initializes the device set PUBLIC and writes a new label on each member of the device set.[†] An action level of M modifies the labels of the device set and can be used to add or delete flaw information and rewrite destroyed labels on existing members of the device set.

The label processing routine identifies the device and displays the current flaw information (if any) on the right screen.

The right screen display is shown in figure 2-14.

All RMS devices must have a standard label. The label display, which appears on the left screen, enables you to change the flaw information for the device before it is written in the device label.

The interlace in the label initialization display is obtained from the existing label on the device. If no label is found, an asterisk appears in the interlace field. The desired interlace must be specified before another option is entered.

[†]PUBLIC is a device set name arbitrarily chosen for the example.

PHYSICAL FLAW LIST
CREATED FLAW LIST (FROM CMR) -- INCLUDING UTILITY FLAWS

OCTAL				DECIMAL			
CYLINDER	TRACK	FIRST SECTOR	LAST SECTOR	CYLINDER	TRACK	FIRST SECTOR	LAST SECTOR
0001	001	001	002	0001	001	001	002
0002	001	023		0002	001	019	
0012	022	027		0010	018	023	
0630	000	000		0408	000	000	
0632	000	000	002	0410	000	000	002
END				**END**			

ERROR

THE FOLLOWING TYPE-IN WAS IN ERROR AND WAS IGNORED;

F L A W , C 5 3 4 , T 1 , K 1

ILLEGAL PARAMETER OR BAD VALUE K

Figure 2-14. Physical Flaw List Display

The left screen display is shown in figure 2-15.

The optional commands that can be entered in response to the label display are:

EST Redisplays the EST and restarts processing of all RMS device labels.

FT or HT Specifies recording interlace for device. If an asterisk appears in place of HT or FT in the interlace field of the label display, the interlace must be specified before another option is entered.

FT Full track

HT Half track

FLAW,addr Identifies a flaw at the address specified by addr, which has the following form:

	<u>Device</u>	<u>addr</u>	Limits (Octal)		
			<u>cccc</u>	<u>tt</u>	<u>ss</u>
	844-21	Ccccc,Ttt,Sss	623	22	27
	844-41	Ccccc,Ttt,Sss	1447	22	27
	885	Ccccc,Ttt,Sss	1506	47	0
	819	Ccccc,Ttt,Sss	632	11	0

All flaw values are octal.

L A B E L I N I T I A L I Z A T I O N †

VSN - 000001 SET - PUBLIC MASTER DEVICE - 000000
INTERLACE-*
DEV102 CHO4 EQ0 UN 01 NO LABEL FOUND

FIRST - CHANGE THE FOLLOWING OPTIONS AS DESIRED-

EST REDISPLAY EST AND RESTART RMS LABEL PROCESSING
HT OR FT TO SPECIFY RECORDING INTERLACE SET (OR CLEAR)
FLAW, ADDR FLAW FOR DISK SECTOR. ADDRESS IS SPECIFIED IN
FREE, ADDR CYLINDER, TRACK, SECTOR

LIST,NNNN START RIGHT SCREEN FLAW LIST AS CYLINDER NNNN

+ (OR -) ADVANCE (OR BACK UP) RIGHT SCREEN FLAW LIST

RETAIN DISPLAY FLAW LIST RECORDED ON THE DEVICE

CREATE DISPLAY FLAW LIST PRESET IN CMR

COMBINE DISPLAY COMBINED FLAW LIST FROM CMR AND DEVICE

THEN - ENTER ONE OF THE FOLLOWING OPTIONS

WR WRITE LABEL ON THIS DEVICE

SK†† BYPASS WRITING LABEL ON THIS DEVICE

ALL WRITE LABELS ON ALL REMAINING DEVICES IN THE SET.
THE FLAW LISTS WILL BE BUILT ACCORDING TO THE
-RETAIN, CREATE, OR COMBINE- OPTION ENTERED ABOVE

NONE†† DO NOT WRITE LABELS ON THIS DEVICE OR ANY
REMAINING DEVICES IN THE SET. THE EXISTING
LABELS AND FLAW LISTS WILL BE USED

F L A W , C 1 0 0 D , T 1 8 D , S 1 0 B

†Label modification appears here if the M action is set on the EST.
††SK and NONE appear only if label modification is requested.

Figure 2-15. Label Initialization Display

FREE,addr	Clears flaw information at the address specified by addr.
LIST,nnnn	Causes the right screen flaw list to start at cylinder nnnn. This number is interpreted as decimal if suffixed with a D; it is interpreted as octal if suffixed with a B or if no suffix is entered.
+	Moves the right screen flaw list ahead by 20 flaw entries.
-	Moves the right screen flaw list back by 20 flaw entries.
RETAIN	Clears the right screen flaw list and replaces it with the physical flaw table recorded on the RMS device.
CREATE	Clears the right screen flaw list and replaces it with flaw information assembled with CMR for the device.
COMBINE	Clears the right screen flaw list and replaces it with both the physical flaw list and the assembled CMR flaws.
WR	Causes a new label to be written on the device. The flaw list currently displayed on the right screen is used to build the new physical flaw list.
SK	Bypasses the writing of a new label on the device. This command is valid only if the device is a member of a device set being modified and the device currently has a valid label.
ALL	Causes a new label to be written on this device and also on all remaining devices in the device set. If RETAIN, or CREATE, or COMBINE was entered previously, the flaw lists for the remaining devices are built in the same manner as the list for this device. If there was no such entry, RETAIN is assumed and the existing flaw lists for the remaining devices are used as the new flaw lists. RETAIN is also assumed for the remaining devices if the physical flaw table on the master device is invalid.
NONE	Bypasses the writing of a new label on this device and also on all remaining devices in the device set. This is equivalent to entering SK on all remaining devices in the device set. The NONE command is valid only if the device is a member of a device set being modified and the device currently has a valid label.

Error messages for the LABEL display appear at the bottom of the right screen. Message format consists of a header message, the invalid data, and possibly a trailer message. The header message describes the error and the resultant action. The invalid data is either an illegal entry or an illegal flaw assembled in CMR. The trailer message, if present, gives more information regarding the error.

The following are possible header messages:

THE FOLLOWING TYPE-IN WAS IN ERROR AND WAS IGNORED

THE FOLLOWING PRESET FLAW IS IN ERROR, ENTER ONE OF THE OPTIONS ON THE LEFT SCREEN

UTILITY FLAW MAP MISSING

The last header message, which can appear only for 844-21, 844-4x, or 885 disks, means that the list of disk flaws recorded on the disk pack could not be read correctly.

The following are possible trailer messages:

SPECIFY INTERLACE FIRST

FT OR HT ILLEGAL FOR THIS DEVICE TYPE

NO 2XPPU OR CONTROLLER NOT 7154/7155

TOO MANY FLAWS FOR THIS DEVICE

SK OR NONE INVALID ON DEVICE WITH NO LABEL

The following trailer messages refer to the FLAW and FREE entries and to the assembled CMR flaws:

ILLEGAL SEPARATOR OR TERMINATOR OR PARAM TOO LARGE

TOO MANY PARAMETERS

BAD VALUE

DUPLICATE PARAMETERS

ILLEGAL PARAMETER OR BAD VALUE x

x is a parameter on a flaw card.

PRELOADING

After label writing and/or checking is complete, preloading occurs if level 0 deadstart was selected. This process copies the deadstart tape onto the mass storage devices specified in the EST for holding system information. If the deadstart tape occupies more than one reel, you are informed that the second reel is to be processed when the following message is displayed:

END OF REEL - MOUNT NEXT REEL AND TYPE GO

The second tape can be mounted in place of the first. GO, followed by a carriage return, must then be entered. The second tape is rewound to its load point by the preloading routine. Once preloading is finished, the deadstart tape is rewound by the system, so that it can be unloaded and dismounted.

If the combined capacity of the system devices is less than that required for the system, you are notified that deadstart must be restarted and the EST changed to show more or larger devices for the system when the following message is displayed:

ALL SYSTEM DEVICES SPECIFIED ARE NOT ENOUGH TO HOLD ENTIRE SYSTEM. DEADSTART AGAIN AND SPECIFY MORE UNITS.

The following message signifies that no more than five devices can be used for the system:

SYSTEM OVERFLOWS 5 DEVICES

Larger capacity devices must be indicated during another deadstart if the preceding message appears.

Errors that occur in reading the system from tape or writing onto the system devices will also necessitate a new deadstart. The following messages pertain to these errors:

TAPE PARITY ERROR

TAPE REJECT

DEVICE LOST DATA

DEVICE REJECT

If a shared coupler is reserved by another mainframe during preloading or loading, the following message appears:

COUPLER OR UNIT RESERVED

ESTxxx CHxx
EQxx UNxx

OPTIONS -

REP - TRY AGAIN

OR CONSULT ENGINEER FOR CORRECTIVE PROCEDURES

LOADING

During loading, the system is copied from the system devices to central memory. The CMR directory that identifies all system routines is completed with the addresses of the routines as they are copied to the central memory or mass storage residence specified by a parameter in the table.

An illegal residence parameter requires operator correction.

RESIDENCE ERROR FOR xxxxxxxx
TO PROCEED ENTER NEW RESIDENCE

CM - CM RESIDENCE
DS - RMS DEVICE RESIDENCE

Discrepancies between the loading checksums and those computed during preloading are reported. They indicate trouble with the device and location displayed. The deadstart process is stopped. A new deadstart is required.

CHECKSUM ERROR
RB=rrrr PRU=pppp

Device errors also stop deadstart.

I/O ERROR
RMS DRIVER OVERLAY NOT FOUND

I/O ERROR
PARITY ERROR OR LOST DATA

I/O ERROR
DEVICE REJECT

Programs and library tables residing in central memory are limited to a combined length of 57777 octal words in the released system because the deadstart programs reside in central memory beginning at location 60000. Reduction of the central memory library is required on a new deadstart tape.

THE CM RESIDENT LIBRARY HAS OVERFLOWED THE DEADSTART PROGRAMS

ENTERING DATE AND TIME

When deadstart is complete, the system must perform additional initialization. The following message appears on the lower right corner of the left screen:

WAIT DEADSTART

Left screen displays are shown in figure 2-16.

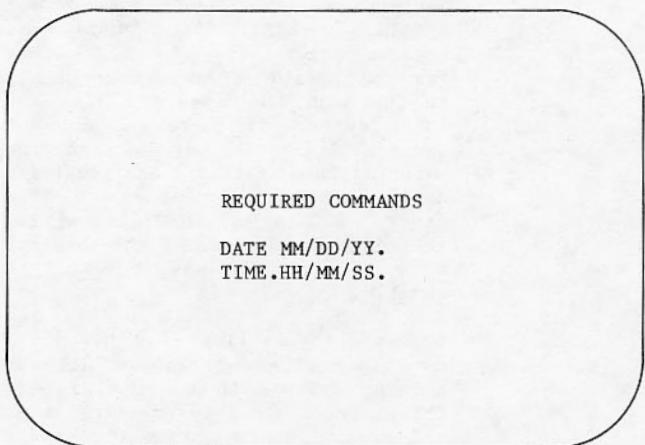


Figure 2-16. Date and Time Display

The installation may have added other commands to the preceding list. You must respond in proper format to each of the commands. Such entries may be made while the WAIT DEADSTART message is displayed.

After you enter the date and time, the B display appears on the right screen. If the system is still initializing, the WAIT DEADSTART message remains on the left screen. In addition, the following message appears on the left screen:

```
COMMAND TABLE  
DATE MM/DD/YY.  
TIME HH/MM/SS.  
ACK.  
N.CFO
```

During this time, it might be necessary for you to respond to further messages on the B display with the n.CFO command to allow deadstart to complete.

The operating system device set routines (LABELMS, ADDSET, RECOVER, RELABEL, and MOUNT) run at various control points. These routines are generated by GENDJ, which is at control point 1. Normally, they run without intervention; however, if any routine encounters difficulties, it will halt. For informative messages, you can enter n.CFO GO to continue. Fatal messages, however, are generally the result of a configuration error and/or hardware malfunction. In these situations, you must deadstart again and reconfigure.

Of special concern is the message from RECOVER when the first mainframe to deadstart option was specified and the set is shared, or if the set is not shared, but is or has been logically mounted by another mainframe. The following message is displayed:

```
1ST MF TO DS BUT ANOTHER MF IS LOGGED IN
```

If there is another mainframe using this set, you must redeadstart it as the second mainframe at this time. If the other mainframe is down, you may type n.CFO GO to complete the deadstart process.

The queue is reconstructed from the PFC entry and if crossed RBs are detected, a message appears on the lower right screen. The message is in the following format:

```
jobname HAS RB CONFLICTS
```

The jobname should be recorded and ACK. typed. After deadstart is completed, these queue files should be processed by DMPQ. This prevents the perpetuation of the RB conflict.

If message appears in lower right corner, continue typing in the date and time.

If the operating system has not been initialized, the WAIT DEADSTART message remains on the left screen after all required command responses have been entered. This message can remain on the screen for 1 or 2 minutes when ECS is used. If the message remains longer than 2 minutes, there is an error in deadstart and a system analyst should be notified.

In some cases, the bottom of the right screen flashes the message:

```
FUTURE RMS D/S NOT POSSIBLE
```

This indicates that a level 1, 2, or 3 deadstart will not be successful if RMS is selected as the deadstart device. However, a level 1, 2, or 3 deadstart can still be performed if the deadstart device is a tape. The only acceptable response to this message is ACK. This clears the message and continues the post-deadstart procedure. Usually, this message appears because CTI was not installed on one of the RMS system set devices that was turned on in the EST. In this case, CTI should be installed on one of the system devices. If CTI has already been installed, either turn on the device or designate it a system device.

The other reason for the appearance of the message is that the first few record blocks of the deadstart file do not all fit on the first system device. This could occur if an existing permanent file device is modified to also be a system device, and the device is so full of permanent files that there is room only for a few record blocks of the system file. In this case, use only those devices which have a minimum of 512 unassigned record blocks. In all cases, another level 0 deadstart must be performed before an RMS deadstart will be possible.

After all required command responses have been properly entered and the operating system is initialized, the Z display appears on the left screen and the B display on the right screen. Normal system operation can proceed, and you have control of all DSD functions and displays.

When the DSD routine is in control of the operator console, it provides information about the entire system for display on the one or two screens. Many types of data can be called by selecting appropriate display names.

DISPLAY SCREEN CAPTIONS

Information shown at the top and bottom of the screens remains constant regardless of the display called.

The top of the left screen shows the following information:

	NOS/BE 1.5 RELEASE	mm/dd/yy	DEBUG ENGR	mm/dd/yy
hh.mm.ss	Time in hours, minutes, and seconds on a 24-hour clock.			
NOS/BE 1.5 RELEASE mm/dd/yy	System label, line 1. System label, line 2 with CMR build date.			
mm/dd/yy	Current date in month, day, and year.			
DEBUG	Debug mode is on (refer to Debug Mode in section 1). When Debug mode is off, this field is blank.			
ENGR	Engineering mode is on (refer to Engineering Mode in section 1). When engineering mode is off, this field is blank.			
STEP 0	Step mode is on (refer to STEP mode in section 1). Displays IDLE when system checkpoint is initiated.			
MFA	Host mainframe identifier.			

Time shown can be changed with the command:

TIME.hh.mm.ss.

When debug mode is on, the word DEBUG appears above the date (refer to Debug Mode in section 1.)

The bottom of the left screen presents the current data you typed and any error messages. An indicator, UNLOCKED, appears when the keyboard is unlocked.

The top of the right screen shows the following information:

pppppa/nna	pppppb/nnb	CM = ccccc EM = xxxxx
------------	------------	--------------------------

For a multimainframe system, the top of the right screen is revised to show the following information:

pppppa/nna	mfb*status	mfc*status	CM = ccccc EM = xxxxx
pppppa	P register for CPU A.		
nna	Active control point or active JDT ordinal in CPU A.		
pppppb	P register for CPU B.		
nnb	Active control point or active JDT ordinal in CPU B.		
mfb	Physical IDs of the linked mainframes.		
mfc			
*	Outstanding operator action if asterisk is present.		
cccc	Available central memory words.		
xxxx	Available extended memory words.		
status	/eee.		
		eee.	Mainframe file transmission status.
		ON	File transmission enable (ONSTAT command).
		OFF	File transmission disabled (OFFSTAT command).

Values change rapidly as jobs execute. Constant values in the P registers often indicate that a program is hung. (The O display contains a message that informs the programmer of the program stop location.)

Under normal conditions, the bottom of the right screen shows the same information for all displays. The EST ordinals of magnetic tape units available for assignment appear on the first line. When the INTER-COM remote terminal processing system is operating, a status line appears as the second line, listing the EST ordinals of active multiplexers. The rightmost 10 characters of the status line show the status of the Remote Diagnostic Facility (RDF) when RDF is operating. Refer to RDF Operation in section 5. The last line is the left screen toggle sequence in the format of the operator command that changes the sequence.

11 12 24 26
INTERCOM 60 61 63 RDF,P,R,I.
LEFT=AJHRP

If a system error or hardware error occurs, the error message appears in place of this information.

BRINGING UP DISPLAYS

The displays show the current status of different parts of the system. They are identified by letters. Displays B and Z appear as soon as the operating system is deadstart loaded and you have entered the correct date and time.

When operating under DSD, the displays show the following information. (The E and H displays have subdisplays. id indicates the primary ID in a linked NOS/BE system.)

- A System dayfile (job dayfile if control point not 0).
- B Status of control points.
- C Contents of central memory, absolute or relative to a control point, in 12-bit bytes.
- D Contents of central memory, absolute or relative to a control point, in 12-bit bytes.
- E Equipment status:
 - E,dt. Status of type dt equipment.
 - E,A. Status of all equipment.
- F File name table.
- G Contents of central memory, absolute or relative to a control point, in 15-bit bytes.
- H Files waiting to be executed or for output processing:
 - H,I. or All input files.
H(id),I.
 - H,D. Input files of dependent jobs.
 - H,S. Input files with tape requirements.
 - H,O. or Printer output files.
H(id)O.
 - H,P. or Punch output files.
H(id)P.
 - H,L. Locked files.
- I Unprocessed REQUEST statements in job control deck.
- J Status of equipment controlled by JANUS.

K	Addresses of system tables or control point area contents.
L	Executing program communication.
M	Communication areas of peripheral processors and hardware channel status.
N	Breakpoint display.
O	Operator messages for job dayfile.
P	Status of tape units and, if previewing feature selected, volume serial numbers of tapes required.
Q	INTERCOM.
R or R(id)	Job descriptor table.
S	Job control area.
T	Status of transfers between mainframes in linked NOS/BE system.
U	Logical ID table.
V	On-line RMS devices.
W	Waiting packs.
X	Extended memory.
Y	Format of operator commands.
Z	Summary of displays available.

Displays are brought to the screens by typing their identifiers. The first display identified appears on the left screen, the second on the right. It is not necessary to address the right screen each time the left screen is changed.

Example:

- AB. Brings up the A and B displays to the left and right screens.
- F. Replaces A display with F display.

To call a subdisplay of the E or H display, a comma and a subdisplay identifier must be appended to the display identifier.

Example:

- H,I. Brings to left screen the input file subdisplay if it is not on the right screen.

When a subdisplay is called, it is equated to the main display identifier until the subdisplay identifier is replaced in another entry. Thus, the subdisplay can be recalled with only a single character identifier, as shown in the following sequence.

- EB. Brings up E and B displays.
E,LR. Displays only status of 580-12 printers on E display.
AB. Brings up A and B displays.
FE. Brings up F and 580-12 printer status E displays.

When the C, D and G displays are called, the central memory addresses to be shown can be specified. Subsequent calls without an address qualifier will return the last qualified subdisplay.

Any subdisplay to be shown on the right screen must be called to the left screen first, since the interpretive keyboard accepts only two letters. To show printer output files only on the right display, for example, the following procedure must be used.

- H,O. Sets H equivalent to H,O. Brings H, O to left screen.
AH. Brings A to left screen and printer output subdisplay of H to right.

A message, stating that the display is undefined, appears if a reserved identifier is entered.

SPECIAL USE OF LEFT SCREEN

Some displays have special properties when they appear on the left screen, although they may be called to either screen in any combination. For instance, the left screen, but not the right, can be changed to the next sequential display with the right blank key.

The A, C through G, and K through M displays can be limited to information about only one control point. The following entry format brings the display to the left screen.

display identifier=control point to be shown

Unless the job at the control point is locked in or a system job, the display may change to show another job at the same control point. A particular job can be displayed by the following command:

display identifier=JDT ordinal to be shown

Unless the job identified by JDT is at a control point, the command has no effect.

When the display is called, the number of the control point or JDT ordinal appears in the upper right corner of the display beside the letter identifying the display. A zero indicates control point 0 with information for all control points displayed. When the display is on the left screen, the = key

alternates the display between information at control point 0 and the control point number of JDT ordinal typed.

The L display, which allows you to write into an area in a job field length, is effective only on the left screen.

AUTOMATIC DISPLAY SEQUENCE

A sequence of up to eight displays can be set to shorten operator time required to change the left screen display. Once this cycle is established, the right blank key can be used to change the display. Each time this key is pressed, the next display in the sequence appears even when the left screen shows a display that is not in the sequence.

The left screen cycle sequence is set by the following command:

LEFT=a₁,a₂,...,a₈.

a is 1 to 8 letters in length and corresponds to display names. Duplicate identifiers may appear in the sequence.

The sequence currently in effect is shown at the bottom of the right screen. It may be changed by repeating the LEFT command with a new sequence.

Example:

- H,O. Brings O subdisplay to left screen and sets H display call equivalent to an H,O. call.
LEFT= Sets left display screen sequence to A,J. and subdisplay H,O. unless the H display is subsequently changed by an entry of H,I.

EXPLANATION OF DISPLAYS

Information shown on each of the displays under DSD control is discussed in the following paragraphs. The A, B, C, and F displays differ under DIS operation.

DAYFILE (A) DISPLAY

The A display (refer to figure 3-1) is a copy of DAYFILE, a system-maintained permanent file that contains a history of system use.

The system dayfile shows intermixed entries pertaining to all jobs. A similar list of messages, called a job dayfile, pertains to a single job. The job dayfile can be displayed by the entry A=n. Subsequently, the = key will alternate a left screen display between control point n and the system dayfile. You cannot display the dayfile of a job that has been rolled/swapped out of execution. The + and - keys change the control point displayed on the left screen; the (and) keys change the control point displayed on the right screen.

```

12.58.27. APF001J. EJ END OF JOB, **
12.58.27. CAT001I. OPERATOR DROP
12.58.29. CAT001I. EXIT,U.
12.58.29. CAT001I. DMP(100000.
12.58.29. DIS001K. MT33 BLOCKS WRITTEN - 000000
12.58.29. CAT001I. DMP-LWA EXCEEDS FL-FL SUBSTITUTED
12.58.30. CAT001I. OP 00003200 WORDS - FILE OUTPUT, DC 40
12.58.30. CAT001I. MS 6784 WORDS( 6784 MAX USED)
12.58.30. CAT001I. CPA 2.898 SEC. 2.898 ADJ.
12.58.30. CAT001I. IO .335 SEC. .335 ADJ.
12.58.30. CAT001I. CM 60.350 KWS. 3.683 ADJ.
12.58.30. CAT001I. SS 6.917
12.58.30. CAT001I. PP 432.046 SEC. DATE 11/21/75
12.58.30. CAT001I. EJ END OF JOB, **
12.58.54. AUTES1E. EXIT
12.58.54. AUTES1E. AUDIT (AC=JCLEE)
12.59.00. JOB201L. UNLOCK.
12.59.05. DIS001K. OP 00000064 WORDS - FILE OUTPUT, DC 40
12.59.05. DIS001K. MS 6784 WORDS( 6784 MAX USED)
12.59.05. DIS001K. CPA 15.674 SEC. 15.674 ADJ.
12.59.05. DIS001K. IO 3.461 SEC. 3.461 ADJ.
12.59.05. DIS001K. CM 283.516 KWS. 17.304 ADJ.
12.59.05. DIS001K. SS 36.441

```

Figure 3-1. Dayfile (A) Display

Entries in the dayfile, called dayfile messages, originate from both system and individual jobs. Messages appear when the following situations occur.

- Control statement in a user job is executed.
- System routine issues an error message.
- User program issues a dayfile message.
- User program or system routine sends message to you.
- You intervene in job execution.
- End of job occurs.

When a job terminates, its dayfile entries are copied to the OUTPUT file and printed at the end of the job listing. The system dayfile can be copied to a tape or printed or punched (refer to DAYFILE utility routine in section 6).

The format of each dayfile entry consists of the following:

time job name message

The time is given in hours.minutes.seconds. The system clock begins with time typed in a TIME command at deadstart. The time at which execution is requested (not necessarily the time at which execution begins) is shown.

The job name is the name on the job statement, or the name initiated at a blank control point, as modified by the system to ensure unique job names.

User-provided names are expanded or truncated to 5 characters, and a 2-character sequence number is appended.

The message consists of 40 characters on each line.

Under DIS operation, the A display shows dayfile messages and file name table entries.

JOB STATUS (B) DISPLAY

The B display (refer to figure 3-2) shows the status of all control points in the system. Messages originating in all parts of the system that require action are centralized in this display.

After deadstart, the B display shows only the control point numbers. You must tell the scheduler which control points it can use. Thereafter, the name NEXT appears at each control point to which a user job can be assigned by the scheduler. Once a user job is assigned, the job name replaces NEXT and the job descriptor table ordinal (JDT) replaces the control point number.

If no name or ordinal appears after a control point number, the control point is considered to be empty, or cleared, or blank. Since the scheduler cannot access empty control points, no activity occurs unless you specify a NEXT name at control point. System utilities such as DMPQ are brought to blank control points.

The following command gives a control point clear status (status at deadstart until n.NEXT or AUTO. is typed).

n.CLEAR.

B

1.	JANUS		RA 626 FL 10
			TL IO
20.	Y REQUEST(TAPE12) XX0331Y	SCRATCH TAPE	MS 153 DP RA 636 FL 20
			TL 100 IO
25.	W COMPILE BFNC1 XX0131E		MS 2150 DP RA 663 FL 550
			TL 756 IO
			MS 521 DP
4.	NEXT		
31.	1X QAQAQ1. XX0171G		RA 1467 FL 300 TL 772 IO MS 3121 DP
6.	NEXT		
33.	X LGO(INPUT, OUTPUT) XX0091A		RA 2141 FL 300 TL 777 IO MS 4721 DP
34.	1X COMPILE LGO XX00809		RA 2716 FL 550 TL 1000 IO 777 MS 1530 DP
44.	1A NON-FATAL LOADER ERRORS - SEE MAP ZOM0010		RA 3500 FL 252 TL 1666 IO 3 MS 3110 DP AA
12.	NEXT		
13.	NEXT		
14.	NEXT		
15.	NEXT		
16.			
17,			
24 26 27 32 33 34 35			
INTERCOM 56			
LEFT=AJHRP			

Figure 3-2. Job Status (B) Display

The job at control point n is swapped out. If the job is locked in or if it is a system job that cannot be swapped, a clear flag is set. When the clear flag is set, NEXT does not return to the control point at the end of the currently running job.

Control points occupied with a user job show the JDT ordinal in place of the control point number. Other status information appears in the following format:

j.cps	Last dayfile message	RA	FL	
jobname	Secondary message	TL	IO	
		MS	DP	
c	n.CLEAR has been entered; the control point becomes empty and is not set to NEXT when the current job ends.			
p	Total number of peripheral processors assigned to job.			

s	Program status:
A	Control point is using central processor A.
B	Control point is using central processor B.
M	Control point is awaiting a storage move.
W	Control point is waiting for central processor.
X	Control point is in recall having released the central processor until a specified time elapses.

Y	Control point is in recall having released the central processor until a specified event occurs.	dayfile messages	Messages to you; those requiring responses are usually intensified or flash. As each control statement in a job is read, it is displayed.
R	Job at control point is rolled out.		
blank	Central processor is not needed.		
jobname	Logical file name of job.		
RA	Reference address of job; absolute central memory address divided by 100 (octal).		
FL	Field length; octal number of words assigned to the control point in central memory divided by 100 (octal).		
TL	Remaining time, in octal seconds, that the job can use the central processor. Calculated by subtracting CPU time used from time requested on job card or changed by ENTL command; 77777 and 0 are infinite time limits.		
IO	Remaining I/O time, in octal seconds, that the job can use tape or disk drives.		
MS	Mass storage, in PRUs, used by the job.		
DP	Dependency group identifier, if any.		

CENTRAL MEMORY (C, D, G) DISPLAYS

The C, D, and G displays (refer to figures 3-3 and 3-4) show central memory contents. They are used most often by systems analysts.

All three displays show four groups of eight central memory words in the following format:

address	octal representation of word	display code equivalent
---------	------------------------------	-------------------------

In the C and D displays, the contents of each central memory word is arranged in 12-bit bytes; in the G display, the contents is shown in 15-bit bytes. Blanks appear in the interpretation of the contents for any character with an octal display code of 00, 53, 55, or greater than 57.

Before the memory contents of any job are displayed, the job should be prevented from being swapped or rolled out; the j.LOCKIN command should be assigned before these displays are called. When these displays are called by a single character identifier, they show memory contents beginning with the address specified in the previous qualified call or the default value for the display (C begins at 0; D begins at 2000; G begins at 400).

D 0						
002000	0003	2534	0215	7600	0000	CU18M
002001	0032	0100	0000	0103	2423	ZA ACTS
002002	0005	0400	0324	2300	0052	ED CTS)
002003	0007	0000	0000	6600	0001	G A
002004	0074	7000	0262	5400	0074	B =
002005	0000	0000	0323	3300	0074	CSO
002006	0000	2000	0000	0100	0077	P A
002007	0000	0000	0323	7500	0001	CS A
002010	7777	7777	7777	7777	7776	
002011	0000	0000	0000	0000	0000	
002012	2203	1400	0000	0000	0000	RCL
002013	4000	0000	0000	0000	0100	5 A
002014	0000	0000	0000	0000	0132	AZ
002015	7777	7777	7777	7777	7776	RCL
002016	2203	1400	0000	0000	0000	A0
002017	0000	0000	0000	0000	0133	
003333	0000	0000	0000	0000	0000	
003334	0000	0000	0000	0000	0000	
003335	0000	0000	0000	0000	0000	
003336	0000	0000	0000	0000	0000	
003337	0000	0000	0000	0000	0000	
003340	0000	0000	0000	0000	0000	
003341	0000	0000	0000	0000	0000	
003342	0000	0000	0000	0000	0000	
007777	0000	0000	0000	0000	0000	
010000	0000	0000	0000	0000	0000	
010001	0000	0000	0000	0000	0000	
010002	0000	0000	0000	0000	0000	
010003	0000	0000	0000	0000	0000	
010004	0000	0000	0000	0000	0000	
010005	0000	0000	0000	0000	0000	
010006	0000	0000	0000	0377	7777	C

Figure 3-3. Storage (C, D) Display

The starting address of each individual eight-word group on the display or of the entire 32 words can be changed by the following entry:

ig, address.

i C, D, or G display name.

g Group identifier 0 through 4; 4 designates all words displayed.

address Octal starting address for the group named.

With the display on the left screen, addresses can be changed by 40 octal locations with the + and - keys.

With the display on the right screen, addresses can be changed by 40 octal locations with the (and) keys.

Addresses displayed can be absolute or relative to the beginning of the field length assigned to a control point. Relative addresses are obtained by typing:

x = j.

x is the C, D, or G display name, and j is the JDT ordinal.

The reference address appears at the top of the display and the relative addresses follow. If x = n. is typed, addresses refer to the job at that control point. Pressing the = key alternates the display between absolute and relative settings when the display is on the left screen.

RA=25400					G O
000000	00000	00000	00000	00000	
000001	00023	52000	05761	73200	B2 P E OZ
000002	00006	77001	43000	64000	A8 F 5
000003	11150	74600	00001	20017	IMG- J 0
000004	43206	45107	37001	00000	8P (G4 H
000005	42104	31001	00015	04100	7H8HA A/6
000006	00130	02400	00652	00000	K T P
000007	02300	02400	03000	30001	PX T C C A
000010	00000	00000	00000	00000	
000011	00000	00000	00000	00000	
000012	00000	00000	00000	00000	
000013	65700	00433	00000	40732	D0 DG7
000014	07660	20007	40001	00733	G R G5 HGO
000015	00200	02000	00000	04310	P P 8H
000016	00007	41000	00000	00044	H 9
000017	00050	00300	20002	46451	E C P T (
000020	00000	00000	42343	44043	7 1 1 5 8
000021	77770	00000	00000	00000	
000022	00000	00000	00000	00000	
000023	00000	00000	00000	00000	
000024	00000	00000	00000	04000	5
000025	55233	12324	05155	55555	SYSTEM
000026	34330	00000	44102	31047	10 9HSH*
000027	00000	00000	00000	00000	
000610	00000	00000	00000	00000	
000611	22031	40000	00000	00000	RCL
000612	40000	00000	00100	16620	5 HA P
000613	00000	00000	00000	21445	BL+
000614	00000	00000	00000	21445	BL+
000615	22031	40000	00000	00000	RCL
000616	22031	40000	00000	00000	RCL
000617	00000	00000	00000	00001	A

Figure 3-4. Storage (G) Display

EQUIPMENT STATUS (E) DISPLAY

The E display (refer to figure 3-5), under DSD control, reflects the equipment status table in central memory resident which shows the status of all hardware devices in the system. The position of the

entry for a particular device, in the EST ordinal table, establishes the device identifier used in operator entries. With the exception of the status and disposition columns, information shown is dependent on that assembled into the system or specified during deadstart and it cannot be changed.

ORD	TYPE	STATUS	CP	CHANNELS	EQ	UNIT	FC	EC
1	AY F	ON		3	6	0		
2	AZ F	ON		3	6	1		
20	MT B	ON	2	13 7	7	0		
21	MT B	ON		13 7	7	1		
22	MT B	ON	6	13 7	7	2		
23	MT B	ON		13 7	7	3		
30	MT A	ON		12	0	0		
31	MT A	ON		12	0	1		
32	NTGA	ON		12	0	2		
33	NT A	ON		12	0	3		
40	LR	OFF		5	0	0	LF	A9
41	LS	ON	1	5	5	0		
50	CR	ON		5	0	0		
51	CP	ON	1	5	2	0		
60	DS	ON		10	7	0		
61	FE	ON		6	0	0		
62	SC	ON		2	0	0		
63	SC	OFF		11	1	0		
70	AY H	ON		4	0	S 0		
71	AY H	ON		4	0	S 1		

Figure 3-5. Equipment Status (E) Display

The display can be restricted to show only devices attached to a given control point by calling it after a user job is locked in with the following command:

E=n.

The display can be restricted to show only devices of a particular type by calling it with the following command:

E,dt.

dt is one of the following hardware device type mnemonics:

Device Type	Equipment
A	Returns full screen
AH	819 disk drive
AJ	885 disk drive
AY	844-21 disk drive
AZ	844-41 disk drive
CC	6683/7683 coupler or 6683/6683 coupler
CP	415 card punch
CR	405 card reader
CX	ECS link medium†
DS	6602 or 6612 console display
FE	255x network processing unit
FM	254-2 microfilm recorder

Device Type	Equipment
GC	252-2 graphics console
HC	253-2 hardcopy recorder
LR	580-12 line printer
LS	580-16 line printer
LT	580-20 line printer
MT	1/2-inch seven-track magnetic tape
NC	380-170 network access device
NT	1/2-inch nine-track magnetic tape
PL	Plotter
RM	Two-port multiplexer (8xx and 990 models only)
SC	6673 or 6674 data set controller
TC	3266 data set controller
TP	3691 paper tape punch
TR	3691 paper tape reader

If an entry includes a device type that does not exist in the EST, only the column heads of the E display appear. Once the display is limited to one hardware type, it remains restricted in any subsequent call until it is returned to showing the entire table by a call with any single letter qualifier, as in E,A. The + and - keys rotate a left screen display; the = key alternates the display between control point 0 and the control point set in a call. The (and) keys rotate a right screen display.

†Do not define or turn on this entry when operating on model 176 and 180-class mainframes, or models 865 and 875 that contain unified extended memory.

The following data is shown under each column in the E display.

ORD	EST ordinal.	IDLE	Applies to RMS devices, and indicates that the device has been idled by IDLE entry.
TYPE	Hardware device type.	DOWN	Applies only to tape devices, and indicates that the unit is unavailable to the system because of hardware malfunctions. Also, the system can make a tape unit unavailable if the unit has reached error threshold limits.
	Either of the following letters can follow a mnemonic for 844 disk drives.	RONLY	Applies only to tape devices and indicates that the unit can be used only for read operations.
	H Indicates half-track access only.	MAINT	Applies only to non-RMS devices and indicates that an on-line maintenance program is using the device.
	F Indicates full- or half-track access is available.	CP	If device is assigned, the control point to which it is assigned.
	The letter F follows the mnemonic for an 885 drive since the 885's controller (7155) is capable of full tracking.	CHANNELS	Indicates channels through which the device can be accessed; up to four for tapes and multiple access mass storage, and one for single access storage. When a minus sign precedes any of the mass storage channel numbers, it indicates that there is no present access through that channel. This condition can be changed with the CONTROLLER, DWN, CHxx, and UP, CHxx commands. The message ALL DOWN may appear for tape units if all controllers with access to the units are unavailable to the system.
	An F following an 844 or 885 device mnemonic merely indicates that the drive can be accessed by a controller capable of full tracking. To actually operate in full-track mode requires a mainframe with 2xPP speed and a pack mounted and labeled as full track, either by deadstart or LABELMS.		An asterisk preceding any of the mass storage channels indicates that the controller for the channel was locked at deadstart time. Locked channels may be used only after downline loading of controlware, then using the CONTROLLER ON command.
	Any of the following letters can follow a mnemonic for magnetic tape equipment.	EQ	Equipment (controller) number.
	A Indicates 677/679 unit.	UNIT	Unit number; an S preceding the unit number indicates a shared RMS unit. If an expander is being used with an 844-21 disk drive, the unit number can consist of two digits.
	B Indicates 667/669 unit with block ID controller.	FC	Forms code assigned by the operator through an FC command.
	GA Indicates 679 unit with group coded recording (GCR) capability (capable of 6250-cpi density).	EC	External characteristic code (print train) assigned through an EC command.
	The letter P following a mnemonic for the 580 line printer indicates the printer is equipped with programmable format control.		Under DIS operation, the E display shows central memory contents.
	Either of the following letters can follow a DDP mnemonic.		
	D Indicates DDP type DC135.		
	I Indicates DDP type DC145.		
STATUS	Current status information:		
ON	Device is logically on.		
OFF	Device is logically off.		
UNAV	Applies to RMS devices only, and indicates that the device is unavailable for assignment.		

FILE NAME TABLE (F) DISPLAY

The F display (refer to figure 3-6) reflects the file name table in central memory resident which summarizes pertinent data about all files in the system. The display is paged so that only files assigned to a specific control point (including control point 0 for system files) are displayed at one time. The control point number is selected using the command

F=nn.

where nn is a control point number or JDT ordinal of an active job.

The = key then alternates the display between control point 0 and the specified control point. When the display is on the left screen, the + and - keys rotate the table entries. When the display is on the right screen, the (and) keys rotate the table entries.

The display is used for information purposes only; entries change as the system processes files; but you do not change information shown except by changing central memory contents.

								F	O
ORD	NAME	ADDR	JDT	DSP	EQ	ST	FET	FIRST	APF
0.	ZZZZZ04	2520			AY				5554
1.	DAYFILE	2523			AY				5550
2.	DFILE01	2526							
3.	DFILE02	2531							
4.	DFILE03	2534							
5.	DFILE04	2537							
6.	DFILE05	2542							
7.	DFILE06	2545							
10.	DFILE07	2550							
11.	DFILE08	2553							
12.	CERFILE	2556			AY				5552
13.	ZZZZZ03	2561			AY				5556
21.	DANDY1A	2603		PR					
24.	DANDY05	2614	1	PR		13	0	0	

Figure 3-6. File Name Table (F) Display

The following data is shown under each column in the F display.

ORD	Ordinal of entry in file name table.
NAME	Logical file name.
ADDR	Absolute address of entry in file name table.
JDT	JDT or control point to which file is attached.
DSP	Output file disposition code.
EQ	Hardware type mnemonic for equipment on which file resides.
ST	Status corresponding to input/output codes defined by internal routine CIO. Even numbers indicate operation in progress; odd numbers show requests complete.
FET	Address of file environment table relative to control point reference address.
FIRST	Address of file buffer relative to control point reference address.
APF	Address of attached permanent file table entry if file is permanent.

ST, FET, and FIRST are displayed only if file is attached to a control point or has a JDT ordinal. FET and FIRST quantities should be interpreted with care, since the running program may be using the space for other purposes when input/output operations are not occurring.

Tape files that a job has requested, but that have not yet been assigned, show only the address of FNT entry.

Under DIS operation, the F display shows program storage.

INPUT/OUTPUT QUEUES (H) DISPLAY

The H display (refer to figures 3-7 and 3-8) consist of sub-displays of the input and output files in the system. Subdisplays are called by appending a one-character qualifier to the H display call. A call without a qualifier brings up the last called subdisplay.

Subdisplays longer than the display area can be examined by using the + and - keys to rotate the lists when the display is on the left screen; the (and) keys rotate the lists when the displays are on the right screen.

Call	Contents of Display
H,I.	All input files.
H,D.	Input files dependent on other jobs.
H,S.	Input files with tape requirements that have not been released for scheduler consideration. (No information appears if the installation did not choose the tape previewing option when the system was installed.)

<u>Call</u>	<u>Contents of Display</u>	ORD	FNT ordinal of the input file.
H,O.	Output files to be printed.	NAME	Logical file name.
H,P.	Output files to be punched.	*	An asterisk indicates that the lock bit is set for the file.
H,L.	Input files with lock bit set. These files are not concerned with the LOCKIN command; rather, they are files with lock bit set to prevent job execution or file use. For instance, jobs under control of the diagnostic sequencer program APR are locked until unlocked by APR.	ID	Source ID/terminal ID.
		Source ID	Identification of main-frame where the job originated.
For input files, the following information is displayed.		Terminal ID	Terminal or user identification if the job originated at a remote site.

PRINT

H

ORD	NAME	ID	PR	DC	SIZE FC
23.	KNORG2Z		1000	PR/	100
25.	AUDIT2M		773	PR/	100
27.	SCOPE20		1000	PR/	100
32.	JOBS01A		1004	PR/	100
33.	STAT02E		1000	PR/	100
34.	SET13PK		773	PR/	100
35.	USER41J		776	PR/	100
41.	XRD11PH	MFB/	773	PR/A9	100
50.	XP00113		776	PR/	100
52.	JOB1026		1000	PR/	100
54.	USERS2R	MFC/XX	772	PR/	100
55.	USERS30		772	PR/	100
56.	USER4RP		772	PR/	100
56.	USER325	/AB	767	PR/	100
60.	USER42D		772	PR/	100
66.	TOZ002X		772	PR/	100

Figure 3-7. Output Queue (H,O) Display

INPUT

H

ORD	NAME	ID	PR	MT	NT	DEP	CM	EC	TL	ST
23.	USER32C		1001	0	0		4500			0
26.	SCOPE2D		4777	0	0		1			1
27.	STAT02E		4777	0	0		1			1
30.	NWAHS09		1023	2	0		0 200	0		77
31.	NWAHS2F		1001	2	0		0 200	0		77
33.	JOBS02G		1001	0	0		0 4500	2		0
36.	XP0021S		1023	0	0	RD	1 4500	0		77
40.	XP0012H		1001	0	0	RD	0 4500	0		77
42.	XP0022I		1001	0	0	RD	1 4500	0		77
44.	XP0032J		1001	0	0	RD	2 4500	0		77
47.	SFI132K		1001	0	0		4500			40
53.	HEATO2L		1001	1	0		0 4500	0		20
55.	AUDIT2M		1001	0	0		4500			777
57.	WATER2N		4777	0	0		1			1
60.	NOVEM20		1000	0	0	0	4500	2		550
61.	USER42P		1000	0	0		4500			77777
63.	USER42Q		1000	0	0		4500			0
64.	USER52R		1000	0	0		4500			0
65.	USER32S		1000	0	0		4500			77777
66.	JOBO02T		4777	0	0		1			1
67.	JOBO02U		4777	0	0		1			1
70.	JOBO02V		4777	0	0		1			1
71.	JOBO02W		4777	0	0		1			1
72.	TOZ002X		1000	2	0		4500			55
73.	KRANS2Y	/BB	4700	0	0		1			1
74.	KNORG2Z	MFB/AA	1000	2	0		4500		400	MFC MFA

Figure 3-8. Input Queue (H,I) Display

PR	Priority of job.	In a multimainframe system, the H display lists input [H(id),I], print [H(id),O], and punch [H(id),P] files currently residing in the linked system input/output queues.				
MT	Number of seven-track tape units required.					
NT	Number of nine-track tape units required.					
DEP	Job dependency identifier and count.					
CM	Central memory field length divided by 100 (octal).	ORD	File ordinal [2 through 7777 (octal)] suffixed with the primary ID.			
EC	Extended memory field length divided by 1000 (octal).	NAME	Name of the file at the file ordinal.			
TL	Time limit for job in octal seconds.	ID	Identifier of station from which file was obtained; originating terminal identifier is shown to the right of the station identifier.			
ST	Mainframe identification where this job executes.	PR	Priority of file [0 through 7777 (octal)].			
For output files, ORD, NAME, ID, and PR are displayed along with the following information.		MT	Maximum number of seven-track magnetic tapes required.			
DC	Disposition code/external characteristic code. (External characteristic code is not displayed for punch files.)	NT	Maximum number of nine-track magnetic tapes required.			
SIZE	Number of mass storage physical record units occupied by print or punch file; SIZE gives a rough measure of file length. (Size in words/1000 [octal].)	DEP	Dependency identification and count.			
FC	Forms code.	ST	Destination ID (three-character physical or logical ID).			

INPUT				H(A)			
ORD	NAME	ID	PR	MT	NT	DEP	ST
0034A	USER32C	MFD/CD	1001	0	0		
0036A	XRDD21C	MFD/**	1023	0	0	RD 1	
0042A	XRDD32J	MFC/AB	1001	0	0	RD 2	
0053A	WATER2N	MFD/AC	4777	2	0		
0112A	HEATO2L	MFC/AA	2022	0	2		

Figure 3-9. Input File Status Display H(A),I

For the print file display [H(id),0] (refer to figure 3-10) and the punch file display [H(id),P] (refer to figure 3-11), ORD, NAME, ID, and PR are displayed along with the following information.

DC Print file disposition codes:

PR	580 line printer
LR	580-12 line printer only
LS	580-16 line printer only
LT	580-20 line printer only

DC

Punch file disposition codes:

PU	026 punch (Hollerith)
PB	NOS/BE binary punch (columns 3 through 77 with control information)

P8 80-column binary punch

SIZE

File length in octal thousands of words. (Local H displays give file size in octal hundreds of words.)

FC

Forms code; two alphabetic characters.

PRINT

H(A)

ORD	NAME	ID	PR	DC	SIZE	FC
0023A	KNORG27	MFC/ES	1000	PR	100	2P
0026A	AUDIT2M	MFB/**	773	PR	100	
0027A	SCOPE2D	MFB/GO	1000	PR	100	
0032A	JOB001A	MFE/**	1004	PR	100	
0033A	STAT02E	MFC/AC	1000	PR	100	
0034A	SET132K	MFB/**	773	PR	100	
0035A	USER41J	MFB/BD	776	PR	100	
0041A	XRDD12H	MFF/**	773	PR	100	
0050A	XRDD11B	MFC/CD	776	PR	100	
0052A	JOB026G	MFC/CD	1000	PR	100	3P
0054A	USER52R	MFB/**	772	PR	100	

Figure 3-10. Print File Status Display H(A),0

PUNCH

H(A)

ORD	NAME	ID	PR	DC	SIZE	FC
0015A	USER32C	MFC/**	772	P8	100	CL
0025A	USER42P	MFB/**	772	P8	100	RG
0044A	USER32S	MFD/**	767	PU	100	
0066A	USER42Q	MFD/BG	772	PU	100	
0103A	TOZ002X	MFB/AC	772	PB	100	

Figure 3-11. Punch File Status Display H(A),P

REQUEST STATEMENT (I) DISPLAY

You can check unprocessed request statements for a job at a control point on the I display (refer to figure 3-12). This display shows the control point number (for system jobs) or the JDT ordinal, job name, and up to the first three unprocessed statements in the control statement buffer for each active control point.

- 1. JANUS
- 23. TEV10CY
- 25. DISOOHO
- 20. DAYFA94
- 37. SOSPL88
- REQUEST.RANDPL,*PF.
- 46. JIN10HM

Figure 3-12. Unprocessed REQUEST Statement (I) Display

JANUS EQUIPMENT (J) DISPLAY

The J display (refer to figure 3-13) shows card readers, card punches, and line printers controlled by the JANUS routine. A status line appears only when a device is currently in use.

Status line information includes this information:

device type	Two-character hardware device type mnemonic followed by the EST ordinal.
LR	580-12 line printer.
LS	580-16 line printer.
LT	580-20 line printer.
CR	405 card reader.
CP	415 card punch.
jobname	Name of job.
status message	Any hardware trouble message from a driver or a PM message requesting operator action. Usually you must intervene to remove the message.
size	Size of print or punch file in PRUs. For card reader files, this is the number of cards read so far.

left	Number of PRUs remaining to be processed for print or punch files.
rep	Number of times the file is rewound and reprinted, or repunched. This count is set initially when the user placed the file in the print or the punch queue. The count can only be increased by the entry /REPxx.

Messages appearing in the status column of the J display also appear on the B display. Actions required in response to hardware messages are explained in the preface of the NOS/BE Diagnostic Handbook. PM messages originate in a user program during construction of a print file. Lines beginning with PM are displayed for operator attention and are not printed in the file. The PM message often requests a new or special ribbon, or special alignment. Printing does not proceed until the operator acknowledges the message with /OKxx. Size, remaining PRUs, and repeat count are not displayed with the PM message.

JANUS DEVICE STATUSES						
EQ	JOB	STATUS	SIZE	LEFT	REP	
CRO7	TEST104	-TRAY EMPTY-	64			
CP06	TEST205		1920	23		
LT10	BUDGT1A	PM PLEASE USE NEW RIBBON				
LT11	IPL1A02		896	49	2	
LR12	CDFDSE8	-NO PAPER-	256	3		

Figure 3-13. JANUS (J) Display

CONTROL POINT (K) DISPLAY

The K display (refer to figure 3-14) shows the status of a single control point or the address of system tables. When the display is called to a control point with K = n, the following control point information appears.

jobname	Name of job.
status	Program status that would appear on B display.
TL	Time limit.
CP	Time central processor has been used.

20. ZOM0004 A TL 1500 CP 200 PP 11 RA 70700 FL K 20
 6500
 2.798 RT SECONDS LOAD TIME
 REWIND, OUTPUT.
 COPYBR, XX, OUTPUT.
 REWIND, TAPE1.
 COPYCF, TAPE1, OUTPUT.
 REWIND, TAPE1.
 COPYCF, TAPE1, PUNCHB.

Figure 3-14. Control Point Area (K=20.) Display

PP Time peripheral processors have been used.

RA Absolute address of control point field length.

FL Field length in central memory.

The current dayfile message appears next.
 Unprocessed control statements follow.

The number of the control point shown can be changed with the + and - keys when the display is on the left screen or the (and) keys when the display is on the right screen. When the K display is recalled to either screen by an unqualified identifier, it shows the last qualified display.

Absolute addresses of some of the system tables in central memory resident are called by K = 0 (refer to figure 3-15). These tables are not usually accessed by you. For each table specified, FWA = first word address of table, LWA + 1 = last word address + 1 of table.

APF Attached permanent file table.

CST Channel status table.

DDT Dismountable device table.

DFB Dayfile buffer.

EST Equipment status table.

	FWA	LWA+1	K 0
APP	6630		
CST	100	150	
DDT	11320		
DFB	12220		
EST	4210	4310	
FNT	4310	6474	
IBUFF	0		
IDT	12200	12240	
ITABL	6510	6572	
JDT	15130	15527	
LIB	30660	64014	
MST	11230		
PCOM	4100		
PPLIB	30720		
RBR	7330		
RQS	7140		
STG	6620		
TAPES	11660	12060	
URT	12061	12461	

Figure 3-15. Control Point Area (K=0.) Display

FNT	File name table.
IBUFF	INTERCOM buffer.
IDT	Logical ID table (only if assembled).
JDT	Job descriptor table.
LIB	Library directory.
MST	Mounted set table.
PCOM	PP communication area.
PPLIB	PP library directory.
RBR	Record block reservation table.
RQS	Request stack.
TAPES	Tapes table.

These table addresses also appear when the control point qualifier in a display call does not have a job at that control point.

CENTRAL PROGRAMMABLE (L) DISPLAY

The L display allows you to directly communicate with an executing program. It is valid only on the left screen.

A program must contain a request for executing program communication before the L display can be called. This request to you to call the L display appears on the B display. You should respond with

j.LOCKIN.
L=j.

to call the display to the appropriate control point after ensuring the job is not swapped out.

In the program mode, DSD accumulates characters you type in the keyboard buffer, and it sends them directly to the program field length when you enter a carriage return. Data is sent to the program beginning at location RA + 101; it is packed 10 characters per word, left-justified. This portion of the field length is displayed for your use. The job can request and accept information from you with great flexibility.

Since the program mode inhibits normal DSD interpretation of entries, commands to other control points or jobs cannot be made. Only the BKSP = and * keys can be used in their normal way in program mode. To address other jobs or equipment, the L display must be returned to control point 0 with the = key.

PP COMMUNICATIONS AREA (M) DISPLAY

The M display (refer to figure 3-16) shows the first two words of the communications area in central memory resident for each active PP. Normally, this display is used by system programmers for debugging purposes.

The first line for each PP is the input register which displays the name of the program executing followed by the control point that made the program request. At the right, the contents of the lower 36 bits of the register are shown in octal mode. If the control point number appears with a value in the 40s or 50s, the program is in recall status, awaiting completion of the request just issued. When the high-order bit is set in this field to indicate recall status, the control point numbers are changed from 1 through 7 to 41 through 47, and numbers 10 through 17 to 51 through 57, respectively.

- 2 6 - - - - 1 - - -						M 0
I F F I I I I I E I I I						
A=0005 Q=000						
PP	1	DSD 00	0000	0000	0000	
		0000 0000	0000	0000	0000	
PP	2	IS5 00	0000	0000	0002	
		0000 0000	0000	0000	0000	M.SPRCL
PP	3	MNT 16	0003	4107	0000	
		0000 0000	0000	0000	0000	
PP	4	IIR 01	0203	1111	2700	
		0000 0000	0000	0000	0000	M.ICE
PP	5	OPE 07	0000	0000	0167	
		0000 0000	0000	0000	0000	M.ICE
PP	6	ISQ 00	3111	0602	0001	
		0012 0002	0000	4000	0012	M.RCH
PP	7	IRN 00	0000	6525	6504	
		0000 0000	0000	0000	0000	
PP	8	IOP 07	0000	0000	0135	
		0000 0000	0000	0000	0000	M.DPP
PP	9	ISO 05	0005	0004	0004	
		0012 0044	0000	0004	0012	M.RCH

Figure 3-16. PP Communications Area (M) Display

The second line shows the octal contents of the output register, the location a PP uses to make monitor requests. The specific monitor function appears to the right of the contents. An illegal monitor request results in the interpretation PP HUNG.

Status of the 12 hardware channels associated with each group of 10 peripheral processors appears at the top of the display. The status indicators are:

- E Channel empty.
- F Channel full.
- I Channel inactive.

Channels are numbered 0 through 13, and 20 through 33 in octal mode from left to right. When a PP is using a channel, its number appears at the appropriate channel identifier. If a channel is assigned to NOS/VE, a V appears in this location.

The pseudo A register and PPs in the delay queue are above PPI.

The display can be limited to showing only those PPs attached to a control point or swapped in user job by the entry M=j; then the = key alternates the display between all PPs and those attached to a single job.

BREAKPOINT (N) DISPLAY

The N display (refer to figure 3-17) gives the breakpoint addresses and an exchange package of the

operating system (central monitor). Normally, this display is used by system programmers for debugging purposes.

The upper half of the display shows the exchange package of the operating system while the system is at a breakpoint. The flashing breakpoint tells the programmer which breakpoint is encountered. Above the exchange package, the executing segments in monitor and user mode are displayed. In STEP mode, the next overlay name with its entry point address is displayed.

The lower half of the display shows the breakpoints set. A breakpoint can be displayed in two formats. If a breakpoint is typed in with the command BKP/OVERLAY NAME/RELATIVE ADDRESS IN THE OVERLAY, the given relative address, followed by a slash, the overlay name represents the breakpoint. If a breakpoint is typed in with the command BKP,ADDRESS, the address represents the breakpoint.

Breakpoints are not allowed in an EXN system.

On a dual CPU system, CPU B must be turned off before breakpoints can be used. When both CPUs are on, breakpoints are not allowed.

An RCP command restarts the CPU by executing the word at the breakpoint address, which is saved in a CMR table. RBKP releases the current breakpoint and restarts the CPU.

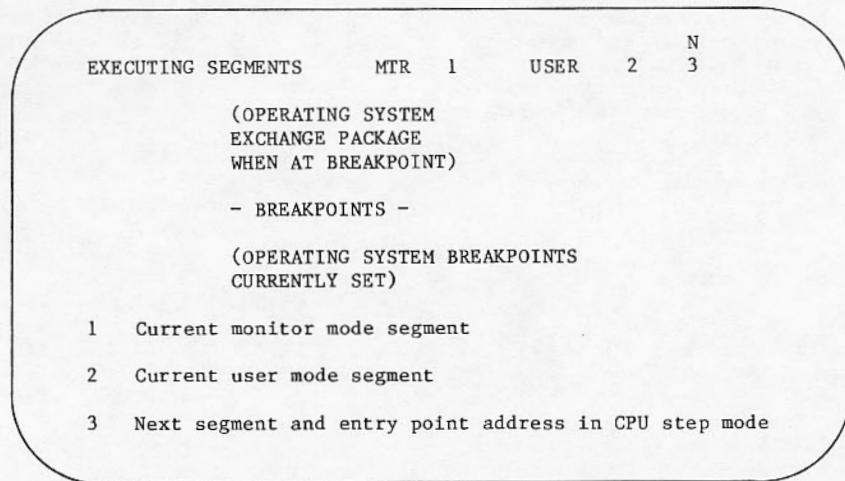


Figure 3-17. Breakpoint (N) Display

OPERATOR MESSAGE (O) DISPLAY

The O display (refer to figure 3-18) allows you to send selected messages to a job dayfile. It is effective on either screen. The following messages are in the release system:

PROGRAM STOPPED AT (address supplied by DSD)

TOO MANY PARITY ERRORS ON YOUR TAPE

COULD NOT FIND YOUR TAPE

NO WRITE ENABLE ON TAPE

An installation can add or delete messages by modifying the DSD routine.



Figure 3-18. Operator Message (O) Display

To send one of the O display messages to the job dayfile, you type the JDT ordinal and the first character of the message.

j*message first character

DSD completes the message. The message appears in the keyboard buffer area on the left screen and you may add any other comments. A total of 45 characters can be accommodated. The entire message remains in the keyboard buffer until the carriage return is pressed.

With the O display on either screen, the entry

j*C

accomplishes the same as the entry

j.COMMENT COULD NOT FIND YOUR TAPES

when other displays are up.

In figure 3-18, the installation has added the message USE VSN CARDS PLEASE to the O display.

TAPE UNIT STATUS AND VSN PREVIEW (P) DISPLAY

The P display (refer to figure 3-19) shows summary information about the status of all magnetic tape units in the system and, if the previewing system is active, shows VSN requirements of tapes for incoming jobs.

The following data is given under each column in the P display.

EQP Drive type (MT for seven-track and NT for nine-track tapes) and EST ordinal of tape unit. The letter G following NT indicates a 679 unit with GCR capability.

JDT JDT ordinal of job to which drive is assigned.

NAME When the unit is assigned to a control point, this field shows the logical file name; otherwise, it shows the status of the tape (if the unit is READY) or the status of the unit (if the unit is not ready) as follows:

SCRATCH Tape mounted is a scratch tape.

SAVE Tape is to be returned to programmer.

UNEXPIRED Tape with write ring inserted has unexpired label.

NOT READY Unit not ready.

OFF Unit has OFF status in EST.

MAINT Unit is being used by an on-line maintenance program.

RING Write enable ring in reel: IN or OUT.

LABEL NAME Label name read from tape label.

VSN Volume serial number of mounted tape. Usually this is VSN read from tape label, but may be vsn that you supplied or changed.

REEL Reel number applicable to multireel files.

P

EQP	JDT	NAME	RING	LABEL	VSN REEL
MT 30			OUT		VSN=
MT 31		NOT READY			
MT 32			OUT	PL1AJAN8	00J701 0001
MT 33		NOT READY			
MT 34		NOT READY			
MT 35		NOT READY			
MT 36		NOT READY			
MT 37		NOT READY			
JOB	PRI	VSN	STAGE=ON		
JOB701E	501	1234 -* R.SCRATCH -* R.	5678=NR.	SCRATCH-*R	
JOB401C	501	123456 -* R.	24563 -*:R.	456789 -*R.	654321 -* R
JOB301A	501	123456 -NR.	234567/24563	-*R.	456789=AAAAA-NR.
JOB9008	501	SCRATCH -* R.	SCRATCH -* R.	SCRATCH -* R.	654321 -* R
JOB8007	501	35453			
JOB7006	501	1234 -* R.	SCRATCH -* R.	5678=NR.	SCRATCH-*R
JOB6005	501	NO VSN CARDS FOUND			
JOB4004	501	123456 -* R.	24563 -*	R.	456789 -* R.
JOB3002	501	123456-NR.	234567/24563	-*	R.
JOB2009	501	123456 -* R	24563 -*	R.	456789 -* R.
JOB801F	501	35453-.-	R	JOB8 .MT4.P777.	T555.
		7122.	7KPB		011C
JOB901G	500	SCRATCH -* R.	SCRATCH -* R.	SCRATCH -* R.	654321 -* R

Figure 3-19. Tape Unit Status (P) Display

When the previewing feature of tape scheduling is on, the lower portion of the display shows VSN and write ring requirements for input files that are not yet under scheduler control for assignment to a control point. This display indicates the following:

JOB	Logical file name of job requesting tape.
PRI	Job priority.
VSN	Volume serial number of tapes required as read from VSN, REQUEST, or LABEL statements. Alternate tape VSN numbers are separated by an equal sign; multireel file VSN numbers are separated by a slash. Write ring information obtained from REQUEST or LABEL statements is suffixed to the last VSN for a given file name. A suffix of *R signifies a write ring is required. A suffix of NR signifies no write ring permitted.
STAGE	Current value of the staging flag; ON for STAGEON and OFF for STAGEOFF.

If the tape on a ready unit does not have a label containing a VSN, the characters VSN = flash. You should assign an identifier or scratch tape status with the following entry.

VSNxx,vsn. or SCRxx.

Subsequently, when a job requests the tape, the system is able to assign it without further action from you.

When the unit is ready, the UNEXPIRED status indicator flashes. The message is informative since no attempt is made yet to use the tape. When a job tries to write on such a tape, a message on the B display requests your authorization to proceed.

The flashing SAVE message indicates the tape has been rewound and unloaded, and can be dismounted at your convenience. System end-of-job processing unloads all tapes the user has requested to be saved. If you dismount the tape prior to job termination, end-of-job processing still attempts an unload. This message is displayed for your action:

MTxx NOT READY TYPE GO UU TO IGNORE

This information could be incomplete or inaccurate if a job does not use the features for reporting VSN and write ring requirements properly. When a user job showing tape requirements does not provide VSN information, NO VSN CARDS FOUND is displayed. Using information from this display, you can release tape jobs for scheduler consideration, as explained in section 4.

INTERCOM (Q) DISPLAY

The Q display (refer to figure 3-20) shows the activity of INTERCOM. The header on the display shows the octal number of users currently logged in. If this value exceeds the number of entries that can be shown at once on the display, the + and - keys can be used

to examine remaining entries on the left screen; the (and) keys are used for the right screen.

The display header also shows the INIDfid suffix for the current and succeeding terminal definition fields) as specified by the TDFILE command (refer to section 5 for related INTERCOM commands).

Q				
LOGIN UNLOCKED CURRENT ID = MFF NEW ID = MFF				
ACTIVE INTERCOM USERS = 10				
USER	EQ/PORT	STATUS	COMMAND	UT ADDR
AQ	51/0	-	C	56620
BJ	51/3	-	GO	55400
AO*	51/5	W-I	Q	55720
BX	51/6	W-I	XEQ	55740
BN	51/7	MUJ	EDITOR	56000
DP*	51/10	W-I	Q	56140
A3	51/11	A-67	Q	56260
B=	51/12	W-I		56300

Figure 3-20. INTERCOM (Q) Display

The following information is shown under each column in the Q display.

W-I Waiting for input.

W-O Waiting for output to complete.

COMMAND Last requested INTERCOM command; appears at installation option.

UT ADDR User table address.

USER Two-character user or terminal identifier. For INTERCOM, an asterisk (*) after the user or terminal identifier indicates that you are disconnected. If the keyboard is unprotected, the user tables for hardwired ports that are not logged in are also shown.

EQ/PORT EST ordinal and port number by which you are connected to central site.

STATUS Job status:

A-j Active with JDT ordinal j.

A-B Active in batch mode.

MUJ Attached to multiuser EDITOR routine.

JOB DESCRIPTOR TABLE (R) DISPLAY

The R display (refer to figure 3-21) reflects the job descriptor table kept by the system in central memory resident. It contains one entry for each job. As jobs complete execution, empty entries appear in the JDT. The entries appear as blank lines on the display until the system inserts other job descriptions.

R									
ORD	NAME	ID	PR	STATUS	CM-FL	EM-FL	TL	CLASS	ST
20.									
21.									
22.	ZOOM099		05	EX 02	5000	0	30	BAT	
23.									
24.	STAGE9A		05	W-MMF	35000	0	20	BAT	MFA
25.									
26.	ECSJOOU			EX 03	35000	3000	100	ECS	
27.									
30.	REMOTE1		70	W-OPR	3000	0	60	DEV	
31.									
32.	MASTRIF	MFB/AA	20	W-CM	5000	0	10	BAT	

Figure 3-21. Job Descriptor Table (R) Display

If the job descriptor table exceeds the number of entries that can be shown at once on the display, the + and - keys may be used to examine remaining entries on the left screen; (and) keys are used for the right screen. The beginning entry may be set with:

R,jjj. Forty consecutive JDT entries beginning with ordinal jjj.

The last group of entries called can be recalled with the following command:

R,0. Return to display R,jjj or subsequent modification with + and - keys.

The following information is shown under each column in the R display.

ORD JDT ordinal.

NAME Logical file name.

* Asterisk following NAME indicates that job is locked in or to be locked in.

- Dash following NAME indicates that job is locked out or to be locked out.

ID Source ID/terminal ID.

Source ID Identification of mainframe where job originated.

Terminal ID Terminal or user identification if job originated at a remote site.

PR Priority.

STATUS Job status:

EX nn Executing at control point nn.

W-CM Waiting for central memory to be assigned.

W-DEV Waiting for device assignment.

W-OPR Waiting for operator action.

W-INT Waiting for action by interactive subsystem.

W-PF Waiting for permanent file.

W-MMF Waiting for mainframe response.

W-PAK Waiting for permanent pack.

CM-FL Central memory field length.

EM-FL Extended memory field length.

TL Time remaining until limit is exceeded.

CLASS Job class type:

BAT Batch job without non-allocatable device requirements.

DEV Batch job with non-allocatable device requirements.

INT INTERCOM job.

MUJ Multiuser job.

EXP Express job.

GRA Graphics job.

ECS Batch job with extended memory.

ST Staging station identifier.

On a multimainframe system, the R(id) display (refer to figure 3-22) lists all jobs being processed in the linked NOS/BE system. The display screen can contain up to 32 jobs.

The following information is shown under each column in the R(id) display.

ORD Job ordinal [2 through 7777 (octal)] suffixed with the primary ID.

NAME Name of job at job ordinal.

ID Identifier of station through which job was entered. The originating terminal identifier is shown to the right of the station identifier.

R(A)				
ORD	NAME	ID	PR	STATUS
20A.	USER33G	MFB/TT	0200	EX 06
23A.	JOB0020	MFA/CC	1017	W-DEV E
33A.	JOB002F	MFB/TI	0300	W-OPR

Figure 3-22. Job Queue R(A) Display

PR	Priority of job [0-7777 (octal)].	JOB CONTROL AREA (S) DISPLAY			
STATUS	Job status as shown in two columns as follows:				
	First Column:				
	EX nn Executing at control point nn.				
	W-QM Waiting for central memory to be assigned.				
	W-DEV Waiting for device assignment.	Class Number	Mnemonic	Job Class Type	
	W-OPR Waiting for operator action.	1	BA	Batch jobs without non-allocatable resources (tape).	
	W-PF Waiting for permanent file.	2	DE	Batch jobs with non-allocatable resources.	
	W-MMF Waiting for mainframe response.	3	IN	INTERCOM jobs.	
	W-PAK Waiting for permanent pack.	4	MU	Multiuser jobs.	
		5	EX	Express jobs.	
	Second Column:	6	GR	Graphics jobs.	
	E Displayed when job error flag is set. The column is blank for all other conditions.	7	EC	Batch jobs with extended memory.	
	The following parameters are shown for each class.				

MINQP	Minimum queue priority.	FREE FNTS	Number of empty entries in FNT.
MAXQP	Maximum queue priority.	ANTICIPATED	Number of central memory words, in FL multiples of 100 (octal), that the scheduler routine attempts to reserve in anticipation of jobs in INTERCOM and higher classes. The value of AFL appears as AFL/100 (octal) in the S display only for ease of comparison with MFL.
AR	Rate at which priority of swapped out jobs is incremented.		
QP	Priority given to job when it is assigned to a control point.		
BQ	Length of time job uses CPU and/or PP before its priority is lowered.	MAX JOB FL	Number of central memory words in multiples of 100 (octal), that is, the maximum field length any job can have.
MAXN	Maximum number of jobs possible in BA and EC or DE class.	MAXE	Total amount of extended memory words, in multiples of 1000 (octal), that can be committed to all jobs using direct access extended memory.
CURR NUMB	Current number of jobs in BA and EC or DE class.	EM BONUS	Extra priority given to any job with extended memory assigned.
READY/RUN BA/EC	Number of jobs in class BA and EC ready to be executed.	MAX EM FL	Maximum extended memory field length, in multiples of 1000 (octal) words, any job can have.
READY/RUN DE	Number of jobs in class DE ready to be executed (jobs not locked, dependent, or in previewing queue).		

For input files that have never been assigned to a control point, QP and BQ are shown.

The following information also appears in the S display.

S							
CLASS	MINQP	MAXQP	AR	QP	BQ	MAXN	CURR NUMB
1 BA	100	1000	4	1400	2000	30	5
2 DE	200	1000	10	1400	2000	10	3
3 IN	1110	2400	1000	2500	200		
4 MU	2410	2510	200	3000	4000		
5 EX	1000	3200	400	3200	400		
6 GR	2000	3500	2000	3500	1000		
7 EC	200	770	4	2000	6000		
0 INPUT QUEUES				2200	2000		
READY/RUN BA/EC		0					
READY/RUN DE		1					
FREE FNTS			477	ANTICIPATED FL 300	MAX JOB FL 1400		
MAXE				4000	EM BONUS	1	MAX EM FL 400

Figure 3-23. Job Control Area (S) Display

TRANSFER STATUS (T) DISPLAY

The transfer status display (refer to figure 3-24) indicates the status of all file transmissions between the host mainframe and the linked mainframes, using a station as a link.

The first line of the T display gives the physical ID of the linked mainframe and the file transmission status, ON/OFF. The first column on the left lists the first seven logical IDs of the host mainframe. The next three columns are associated with the linked mainframe, whose physical ID is given on the first line (MFB/MFC); they represent the function, the maximum number of transfers per function/ the actual number of transfers per function being performed, and the first seven logical IDs.

A function describes the type of file transfer.

PURGE Purges a permanent file (PURGE).

GETPF	Transfers a permanent file from the host mainframe to a linked mainframe (ATTACH/GETPF).
SAVEPF	Catalogs a permanent file on the host mainframe from a linked mainframe (CATALOG/SAVEPF).
WRITETP	Used only for SCOPE 2 tape staging. (Refer to Staged Tape Files in the SCOPE 2 Operator's Guide listed in the preface.)
READTP	Used only for SCOPE 2 tape staging. (Refer to Staged Tape Files in the SCOPE 2 Operator's Guide.)
INPUT	Transfers input files to a linked mainframe.
OUTPUT	Receives output files from a linked mainframe.

T

TRANSFER STATUS

MFB ON			MFC ON		
NAME	CLASS	NAME	CLASS	NAME	CLASS
C70	PURGE	2/0	C76	PURGE	2/1
AAA	GETPF	2/2	C70	GETPF	2/2
BBB	SAVEPF	2/2	ABA	SAVEPF	2/0
CCC	WRITETP	2/4	NFL	WRITETP	2/0
	READTP	2/1	NBA	READTP	2/1
	INPUT	2/0		INPUT	2/1
	OUTPUT	2/1		OUTPUT	2/2
NAME	CLASS	NAME	CLASS	NAME	CLASS
BO1231E	GETPF	BO1506F	GETPF	BO0736E	SAVEPF
BO05230	SAVEPF				
BSTATIO	SPOOL	CO1141A	PURGE	CO122LC	GETPF
CO172AH	GETPF			COTATIO	SPOOL

Figure 3-24. Transfer Status (T) Display

The number of transfers per function is the maximum number of spun off tasks that can be processing requests for PURGE, GETPF, or SAVEPF. For INPUT and OUTPUT, the number of transfers is the number of input and output files that the spun off task idSTATnn is capable of transferring concurrently (id is the primary ID and nn is the job sequence number).

No more than seven transfers can be made per function. You set the number of transferring files by supplying the function name and the function number:

function,n. n = 0 - 7

Examples:

SAVEPF,4. Up to four spun-off tasks will be processing SAVEPF requests.

GETPF,2. Up to two spun-off tasks will be processing GETPF requests.

The lower half of the screen shows the name and class of all spun-off jobs that are currently transferring files. Only tasks being transferred to and from the host mainframe are shown.

NAME	Name of spun off task.
CLASS	Function being performed; SPOOL includes INPUT and OUTPUT.

LOGICAL ID TABLE (U) DISPLAY

The U display (refer to figure 3-25) shows the current logical ID list contained in the ID table (IDT). Up to 58 logical IDs can be displayed.

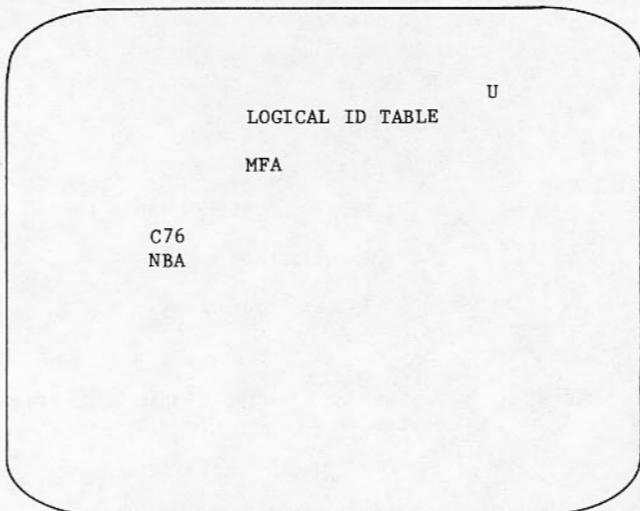


Figure 3-25. Logical ID Table (U) Display

If the ID table is not installed, this display is blank.

In a multimainframe system, the logical ID table display of the host mainframe (refer to figure 3-26) displays its own logical IDs as well as those of the linked mainframe(s) after communications have been established. When the host mainframe initiates communication with a linked mainframe, the logical ID table of each mainframe is exchanged. The U display shows all logical IDs available to it and the mainframe with which the logical IDs are associated. Each mainframe can have up to 58 (decimal) logical IDs displayed.

The top line of the display shows the linked mainframe(s). The EST ordinal of the host mainframe and the communication link are displayed in parentheses.

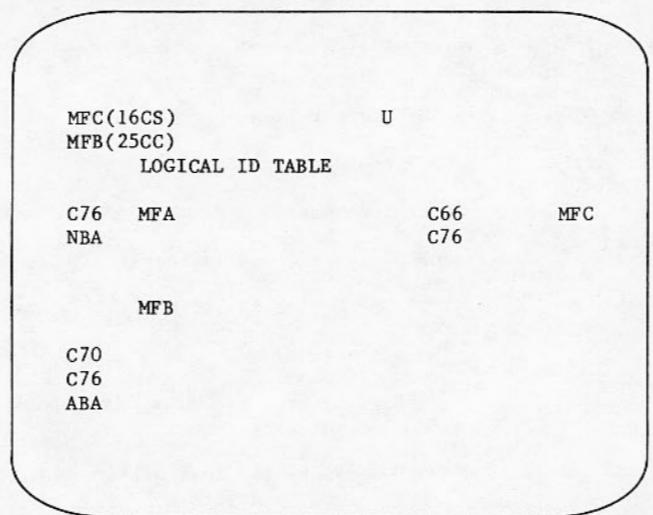


Figure 3-26. Logical ID Table Display in a Multimainframe System

ON-LINE RMS DEVICES (V) DISPLAY

The V display (refer to figure 3-27) shows which RMS devices are on-line.

When more entries are available than fit on the screen, the + and - keys roll a left screen display; the (and) keys roll a right screen display.

ON-LINE DEVICES								
ORD	TYPE	STATUS	VSN	DEVICE	SETNAME	SET	USERS	RBS
1	AY	ON MNTD	00844C	S M	SYSTEM	S X	1	3510
2	AY	ON MNTD	00844D	PQ	SYSTEM	S X	1	3702
3	AY	ON MNTD	00844A	PQM	PFSET	PQ	1	3104
4	AY	ON MNTD	00844B	PQ	PFSET	PQ	1	3356
5	AZ	OFF FREE						
6	AZ	OFF UNAV						
7	AZ	ON MNTD	PACK10	P M	NWAHSND		2	3117
10	AZ	ON MNTD	PACK27	P M	TTOCSMD		1	2643
11	AJ	OFF IDLE	NOS/VE					
12	AJ	OFF IDLE	NOS/VE					

Figure 3-27. RMS Device (V) Display

The following information is shown under each column in the V display.

		DEVICE	Device attribute:
ORD	EST ordinal.		S System.
TYPE	Device mnemonic.		P Permanent file.
STATUS	First column:		Q Input/output queue.
	ON Device is logically ON.		M Set master.
	OFF Device is logically OFF.		
	Second column:	SETNAME	Name of set for which this device is a member.
	FREE Device is free for pack mounting.		
MNTD	Pack is logically mounted on the device.	SET	Set attributes:
DISM	Pack is being logically dismounted.		S System set.
UNAV	Device is unavailable for assignment.		P Permanent file default set.
IDLE	Device has been idled.		Q Input/output queue.
VSN	Volume serial number: xxxxxx VSN on NOS/BE.	USERS	X System scratch set.
	NOS/VE Device is assigned to the NOS/VE system.	RBS	Number of active jobs accessing device set.
			Number of unassigned record blocks.

WAITING PACKS (W) DISPLAY

The W display (refer to figure 3-28) shows outstanding requests for disk packs to be mounted.

WAITING PACKS							
VSN	SET	MAST/MEM	TY	VSN	SET	MAST/MEM	TY
XXXXXX	OFFLINE	MASTER	HT	VSN002	PFPACK	MEMBER	FT

Figure 3-28. Waiting Packs (W) Display

When a job requests a pack that is not mounted, an entry appears on the display. For this reason, you should periodically view this display which shows the following data.

VSN Volume serial number of the pack.
SET Set name.
MAST/MEM Indicates whether the pack is the set master (MASTER) or a member (MEMBER).
TY Indicates recording mode for 844 disk pack.

HT Half track (2:1 interlace).

FT Full track (1:1 interlace).

If there are more requests than fit in the two columns on the screen, the left screen display can be rolled with the + and - keys and the right screen display can be rolled with the (and) keys.

EXTENDED MEMORY (X) DISPLAY

The X display (refer to figure 3-29) shows extended memory. The information is displayed in the following format.

address octal representation display code
 of word equivalent

Each word is shown in 12-bit bytes. Blanks appear in the display code interpretation for any character with an octal display code of 00, 53, 55, or greater than 57. Memory is shown in four groups of eight 60-bit words. The starting address of each individual eight-word group on the display or of the entire 32 words can be changed by the following entry.

Xg,address.

g Group identifier 0 through 4:
 4 designates all groups.

address Octal starting address for the group named.

Addresses can be changed by 40 octal locations on the left screen with the + and - keys, and by adding 40 octal locations on the right screen, with the (and) keys.

COMMAND FORMAT (Y) DISPLAY

The Y display (refer to figure 3-30) lists the formats of all commands available to you. Conventions used in the display are as follows:

- Commands are listed alphabetically, with required punctuation shown.
- Characters or digits separated by a hyphen show an inclusive range of values for the selected item.

00000000	0000	0006	2104	0000	0044	FQD	9	X
00000001	0000	0000	0754	0000	0074	G=		
00000002	0000	0000	0000	0000	0000			
00000003	0000	0000	0000	0000	0000			
00000004	0000	0000	0000	0000	0000			
00000005	0000	0000	0000	0000	0000			
00000006	0000	0000	0000	0000	0000			
00000007	0000	0000	0000	0000	0000			
00000010	0000	0000	0000	0000	0000			
00000011	0000	0000	0000	0000	0000			
00000012	0000	0000	0000	0000	0000			
00000013	0000	0000	0000	0000	0000			
00000014	0000	0000	0000	0000	0000			
00000015	0000	0000	0000	0000	1104	ID		
00000016	0000	0000	0000	0000	0000			
00000017	0000	0000	0000	0000	0000			
00022222	4360	0516	0000	4174	6000	8	EN	6
00022223	5160	0025	6701	0000	5366	[U	A
00022224	0100	0025	6761	0004	6000	A	U	D
00022225	6170	0000	0461	6000	6515		D	M
00022226	0100	0042	0661	0004	6000	A	7F	D
00022227	6170	0000	1361	6000	0416		K	DN
00022230	0100	0042	0661	0004	6000	A	7F	D
00022231	4310	0040	0004	5714	6000	8H	5	D.L
00000030	0000	0000	0000	0000	0000			
00000031	0000	0000	0000	0000	0000			
00000032	0000	0000	0000	0000	0000			
00000033	0000	0000	0000	0000	0000			
00000034	0000	0000	0000	0000	0000			
00000035	0000	0000	0000	0000	0000			
00000036	0000	0000	0000	0000	0000			
00000037	0000	0000	0000	0000	0000			

Figure 3-29. Extended Memory (X) Display

BEGINNING OF TABLE	Y
CDG0-4, 777777.	
AA.	
A(A).	
AA(A).	
A(A)A.	
A(A)A(A).	
A=N.	
A=0.	
AR(A), 7777.	
CX(A)=7777.	
7777A.ASSIGN, 777.	
7777A.COMMENT, ...	
7777A.DROP.	
7777A.ENTL, 777777.	
7777A.GO.	
7777A.KILL.	
7777A.ENPR, 7777.	
7777A.OFFSW, 1-6.	
7777A.ONSW, 1-6.	
7777A.RERUN.	
7777A.RESUME.	
7777A.SUSPEND.	
7777A.VSN, XXXXXX.	

Figure 3-30. System Command Format (Y) Display

<u>Variables</u>	<u>Significance</u>	
N	Control point number or JDT ordinal.	The first set of commands is preceded by the following message: BEGINNING OF TABLE
AA...A	Alphabetic field of same length.	The last set is followed by the following message: END OF TABLE
XX...X	Alphanumeric field of same length.	
77...7	Octal field of same length.	
a-b	Inclusive range of values for one character.	If the display on the opposite screen has unique commands associated with it, they are displayed first, preceded by the following message:
abc	A choice of one character (alternately intensified field).	OTHER SCREEN EXTENSION
...	A free field of any length (alternately intensified field).	Items shown follow the lock and unlocked keyboard mode; protected mode commands appear only when the keyboard is unlocked.

One logical subset of the commands is displayed at a time. For example, all JANUS commands beginning with a slash are displayed together. Different commands may be displayed by using the + and - keys if the display is on the left screen, and by using the (and) keys if the display is the right screen.

DICTIONARY (Z) DISPLAY

The Z display (refer to figure 3-31) names available displays. It appears immediately after deadstart.

DISPLAY DICTIONARY	
NAME	DESCRIPTION
A	SYSTEM OR C.P. DAYFILES
B	C.P. JOB STATUS
C	C.M. 5*04+BCD
D	C.M. 5*04+BCD
E	EQPT STATUS TABLE
F	FILE NAME TABLE
G	C.M. 4*05+BCD
H	I/O QUEUES
I	REQUEST CARDS
J	JANUS EQPT STATUS
K	C.P. AREA OR SYSTEM TABLES
L	CENTRAL PROGRAMMABLE
M	PPU COMMUNICATION AREAS
N	BREAKPOINT
O	OPERATOR MESSAGES
P	TAPE STATUS AND VSN INFO
Q	INTERCOM STATUS
R	JDT TABLE
S	JOB CONTROL AREAS
T	TRANSFER STATUS
U	LOGICAL ID TABLE
V	RMS DEVICES
W	WAITING PACKS
X	EXTENDED MEMORY
Y	COMMAND FORMAT DICTIONARY
Z	DISPLAY DIRECTORY

Figure 3-31. Dictionary (Z) Display

Commands that logically control JANUS equipment, magnetic tapes, and rotating mass storage devices are included in this section. Equipment operation and switch functions are described in appendix C.

The equipment status table shown in the E display summarizes all equipment known to the running system. Any device in the equipment status table can be turned off logically by the command

OFFxx.

where xx is its equipment status table (EST) ordinal.

The console must be in unprotected mode to turn off a communications device (a multiplexer or front-end device).

If the DDP is turned off while it is being used for loading PP overlays, loading continues from disk by default.

If a mass storage device used by many jobs is turned off, no new space is allotted on the device. Any existing files are available for use however. If a tape unit or JANUS-controlled device is turned off, that device can no longer be used by the operating system.

Any device is logically turned on by the command

ONxx.

where xx is its EST ordinal.

If a RMS buffer controller was not autoloaded by deadstart, then the ON command for the controller is not allowed. A device in idled-down status is cleared automatically by the ON command.

The ON command is not allowed for a device whose status is MAINT on the E display.

PROCESSOR COMMANDS

To turn off the designated processor, type

OFFCPUid.

where id is the one-character primary ID of the processor.

Only one processor may be turned off at a time.

To turn on a processor that has been turned off with OFFCPUid., type:

ONCPU.

JANUS EQUIPMENT

The JANUS system routine controls standard job input and output equipment.

- 405 card reader
- 415 card punch
- 580-12, 580-16, and 580-20 line printers optionally equipped with programmable format control (PFC)

Devices controlled by JANUS are identified in commands by EST ordinals listed in the E display. In the command formats which follow, the EST ordinal is indicated as xx. Devices must be on before they can be used by JANUS.

The J display shows the status of all JANUS devices. Messages appearing on this display appear also on the B display at the JANUS control point. When JANUS cannot control a piece of equipment as programmed, a message appears to identify the device mnemonic and EST ordinal:

```
dtxx -NOT READY-
dtxx -NO PAPER-
```

Ensure that the following conditions exist.

- READY switch is lit or STOP switch is not lit.
- The device has ON status in the EST.
- Input paper or card stackers are not empty, or card output stacker is not full.
- Supplies are feeding properly.
- Error conditions have been acknowledged if necessary.

ASSIGNING FORMS CODES

Printed or punched output on a specific equipment type of installation-defined paper or card forms can be requested by the programmer with a ROUTE or DISPOSE control statement. This feature also allows output to begin before the requesting job terminates. Programmer requests that specify a standard code for a particular printer type or punch format do not require operator action. The standard codes for ROUTE or DISPOSE control statements are given in the NOS/BE Version 1 Reference Manual listed in the preface.

When an output file has a specific forms code, JANUS does not output it until a device with an equivalent identifier exists in the EST. An installation defines forms codes equivalent to specific printer forms or card stock. Their definition is not restricted only to installation time; forms code can be changed to suit the supply of printer forms and card stock available.

You are responsible for assigning the appropriate forms code to the device and inserting the proper

forms requested by the programmer. The H,O and H,P subdisplays show output files with special output requirements.

A special forms code is assigned by the command:

FCcc,fc.

Forms code fc may be any two letters or digits. This command turns off unit cc when current file processing is completed, allowing forms to be changed. After the unit is readied, turn it on by entering:

ONxxx.

To cancel the forms code, enter:

FCcc.

Again, this turns off the unit logically after the current file is processed.

The FC command is not allowed for a unit whose status is MAINT on the E display.

ASSIGNING EXTERNAL CHARACTERISTIC CODES

For the print train, assign an external characteristic code by entering:

ECxx,ec.

The external characteristic code ec is one of the following:

- | | |
|----|--|
| B4 | BCD 48-character (596-3) print train |
| B6 | BCD 64-character (596-1) print train |
| A4 | ASCII 48-character (596-2) print train |
| A6 | ASCII 64-character (596-5) print train |
| A9 | ASCII 96-character (596-6) print train |

This command turns off unit uu when current file processing is completed, allowing the print train to be changed. After the unit is readied, turn it on by entering ONxxx.

To cancel the external characteristic code, enter:

ECxxx.

Again, this turns off the unit logically after the current file is processed.

The EC command is not allowed for a unit whose status is MAINT on the E display.

JANUS OPERATION COMMANDS

The JANUS package is a system job running at a control point. It is called to an empty control point by the following command:

n.JANUS.

The package may be initialized by the AUTO entry immediately after deadstart.

Commands to JANUS begin with a slash. Those containing an EST ordinal are effective only when the device is processing a file. Before output files come under JANUS control, they are addressed by their JDT ordinal. Once JANUS begins processing a file, commands such as ENPR have no effect. Improper JANUS commands (issued while JANUS is not at a control point, inappropriate for the specified device, or which address a device not in use) disappear without effect when you enter a carriage return. When a device becomes inoperative during file processing, the following restrictions must be considered.

<u>Device</u>	<u>Restriction</u>
Card reader	Commands do not take effect until the reader is made operational.
Card punch	/REW is the only command that takes effect while the card punch is disabled.
Line printer	/REW and /SW are the only commands that take effect for a disabled line printer. Any commands entered prior to /REW are voided when /REW is entered. If other commands are entered prior to a /SW command, neither the prior commands nor the /SW command are executed until the printer is made operational. In the latter situation, the file can be detached by entering /REW.

If a JANUS command is entered after a file has begun termination, the command does not take effect and the message JANUS COMMAND FOR FILE BEING ENDED appears in the system dayfile.

JANUS accepts commands once every 2 seconds; however, if the JANUS control point is in STEP mode or waiting for additional field length, acceptance may be slower and the message WAIT JANUS may appear temporarily. The message WAIT PFC FULL appears when cards are being read and the permanent file catalog (PFC) cannot currently accept additional input files. As output files complete normally, PFC space becomes available, and the card reader resumes reading.

Two commands applicable to all devices in the system can be used with JANUS devices:

OFFxxx. ONxxx.

OFFxxx turns off the device logically after the current file is processed. Card reader operation continues until the final end-of-file card is read from the input hopper. An ON command is necessary to use devices turned off.

n.DROP. Control point is not dropped until current file processing is complete.

/ABORT. or
n.KILL. JANUS drops the control point immediately, and all files in the process of printing or punching are returned to the queue.

The scheduler considers JANUS to be a system job that may not be rolled out or swapped out. Control point commands that are legal for system jobs, n.KILL and n.DROP, may be used for the JANUS control point.

Files in process can be stopped at several stages using the following commands:

/ENDxx. Stops file at current position; subsequent file contents are lost. Device remains on.

A card reader file is ended the same as if an end-of-file card were read. The interrupted job is not executed, but pre-aborts; its dayfile includes the message OP.DROPPED.

Print files show the message ENDED BY OPERATOR. If a job dayfile is part of the file, it is printed in its entirety after the END command is received.

A large visible E is punched as the last card in a punch file.

Subsequent copies of repeated print and punch files are not affected by /ENDxx. Only one of the copies is incomplete. /ENDxx can be used to suppress unwanted material or to reduce repeat counts.

/REWxx. Output files are stopped, rewound, and returned to the output queue. The device is turned off logically.

Since card reader files cannot be backspaced, /REWxx for a card reader is equivalent to /ENDxx plus OFFxx.

No accounting messages appear for work stopped; repeat counts are not affected.

/REWxx can be used to save the file should overprinting a paper jam occur. An ONxx command is needed before JANUS can assign files to the unit.

/CUTxx. Output files are stopped at current position; file is requeued such that when printed later, printing commences with the PRU being printed when the /CUT command was processed.

/CUT may be used to split long output files when the output becomes backed up with shorter output files.

The following printer commands have no effect on card reader or punch files.

/BSxx,p,c. Backspaces print file p pages using c as a page eject character, counting the current page as 1. P=0 is equivalent to p=1. Maximum value for p is 63; a larger value will be accepted, divided by 64 and the remaining number of pages will be backspaced.

/BSxx may be used to reprint part of a file after paper has been realigned or unjammed, or error conditions have been corrected.

Default values for p and c are 1. /BSxx is equivalent to /BSxx,1,1; /BSxx,p is equivalent to /BSxx,p,1; and /BSxx,,c is equivalent to /BSxx,1,c.

/FSxx,p,c. Forward skip print file. /FSxx can be used to skip part of a print file that is in error or not needed. The current print file pointer is moved forward p pages using c as the character in column 1 that defines a new page and counting the next page as 1. P=0 is equivalent to p=1. Maximum value for p is 63; a larger value will be accepted, divided by 64, and the remainder will be the number of pages to be skipped. Default values for p and c are 1. /FSxx is equivalent to /FSxx,1,1; /FSxx,p is equivalent to /FSxx,p,1; /FSxx,,c is equivalent to /FSxx,1,c.

/SUPxx. Suppresses format control on a print file. FORMAT CONTROL SUPPRESSED is printed. The first character of each remaining print line is ignored, and lines are printed with single spacing.

The following command terminates files that cannot be processed and resumes printing files stopped by certain conditions.

/OKxx. When B and J displays notify you of disk idle-down, the messages are acknowledged and you can terminate processing of card punch, card reader, or line printer files by typing /OKxx.

NOTE

If issued to a line printer equipped with programmable format control (PFC), the /OKxx command may cause the format array in the printer to be reloaded.

Multiple copies of print and punch files can be obtained by the /REPxx command. It should be issued while the first file copy is being processed.

/REPxx. Adds one to the repeat count for the file. To obtain a total of five copies, /REPxx should be executed four times. Files are rewound and reprocessed until the repeat count becomes negative. The count is decremented each time end-of-information is encountered or /ENDxx is typed. The maximum number of copies yet to print may not exceed 37 (octal).

Current repeat count may be observed on the J display.

Print and punch files may be changed from one device to another device having the same hardware type mnemonic.

/SWxx. Current file is flagged for switching the other device when one becomes available. After the file is switched, the device is turned logically off. /SWxx can be used to complete a file when a printer runs out of paper.

NOTE

There is no way to ensure that a print file will be switched to an appropriate 580 line printer (that is, with or without programmable format control). If the file is switched to a printer with format control, the array is not reloaded.

405 CARD READER CONTROL

The 405 card reader reads 80-column cards and, when the stacking mechanisms are adjusted, 51-column (short) cards. Cards pass from right to left on the input hopper across the front of the reader, through the read station at the left of the machine, and emerge in the output stacker passing left to right.

Four boxes of cards can be placed in the input hopper at once. With care, cards may be added or subtracted from the input hopper while cards are being read. Cards should not be removed from the output stacker during operation, however, because stacker tension is required for proper operation.

When a card is read, the information is sent to a buffer in the reader. Data in the buffer causes a status message to be sent to JANUS; and when JANUS is ready to receive data, it causes the buffer contents to be sent to mass storage and the buffer to be refilled by data from the next card. Often a slight pause occurs after the first card is read into the buffer and before JANUS initiates continuous read of the remaining cards. Should the RELOAD MEMORY switch be pressed during this pause, or at any time during operation, buffer contents are lost.

A hardware or software malfunction during operation stops card reading and produces a NOT READ message. If no other error message exists and the hopper is not empty, a circuit breaker inside the left door should be checked. The capstan switch turns off when an overload occurs at the capstan drive. This usually is caused by the card reader trying to feed two cards at once. Remove the last card and turn capstan switch up.

If the NOT READY message persists for no apparent reason, putting through an end-of-partition card (6/7/8/9 punches in column 1) clears a condition arising from an interrupted operation. The job being read should be dropped from the console, then reentered through the card reader.

Other messages on the B display may indicate conditions detected by the card reading routines.

415 CARD PUNCH CONTROL

The 415 card punch produces 80-column binary and Hollerith format cards under JANUS control.

Your responsibility for the punch includes filling the input tray with blank cards and removing punched cards from the output tray. The input tray is at the front of the card punch. Cards pass from the bottom of the input tray, through the punch and check read stations inside the device, and emerge in the output stack at the back of the card punch. Capacity of the input tray is 1200 cards; the output stacker can hold 1500 cards. Chips punched out of the cards fall into a chip box inside the left side door. The punch will not operate if this box is full, or if the output stack is full.

Cards should be placed face down in the input hopper with row 9 facing toward the direction of feed into the machine. Flexing the cards before placing them in the hopper makes them easier to feed properly. Cards may be added to the input hopper when the punch is operating.

In removing cards from the output stacker, take care not to lose the offset cards. The punch offsets all lace cards (the job name appears in large visible letters), all end-of-section cards in the file (7/8/9 multiple punch in column 1), and all end-of-partition cards (6/7/8/9 multiple punch in column 1). All cards between a lace card and an end-of-partition are defined as one user output deck. Additionally, the punch offsets two cards when a compare error exists. You should remove these two cards from the deck before it is returned to the programmer.

After each card is punched, it is read and checked for errors as the next card is punched. If the controller interpretation of the card does not agree with that punched, a compare error exists. A message CPxx COMPARE ERROR appears on the J display. The punch offsets the bad card and then repunches the two cards.

LINE PRINTER CONTROL

The system supports the 580-12, 580-16, and 580-20 line printers. Hardware mnemonics for the 580-12, 580-16, and 580-20 are LR, LS, and LT, respectively, for the EST operator messages and disposition codes.

Messages regarding printer operation show LR, LS, and LT for the 580-12, 580-16, and 580-20, respectively.

If the following message appears when the printer is first accessed after deadstart, compare the equipment controller settings with the E display values. If it appears frequently after deadstart, notify a customer engineer; you cannot take any action at this time:

CANT SELECT 6681

When the following messages appear, you must acknowledge the condition: (If the installation selects the option of overriding printer stops because of parity or transmission errors, no action is required.)

XMSN PARITY ERROR

REJECT

You respond to these messages by rewinding the file or by continuing the printing with the following message:

/OKxx.

This entry also is useful to continue after other error conditions stop output; specifically:

LR/LS/LT**VERIFY FORMS POSITION**

The VERIFY FORMS POSITION message appears when the forms on a 580 PFC line printer could be out of position. After the forms are checked and repositioned, if necessary, the /OKxx command is used to continue.

JANUS CHANNEL MALFUNCTION

If a JANUS channel remains full for an abnormal period of time, the following message appears:

LR/LS/LT
CR
CP } xx JOBNAME -CHAN HUNG FULL-

LR, LS, LT, CR, and CP is the hardware mnemonic of the equipment and xx is its EST ordinal.

The message is repeated if attempts are made to use equipment connected to the affected channel.

You may use the command /OKxx to retry the channel. If the condition persists, current output files must be rewound, current input files ended, and card readers turned off to proceed with other JANUS channels. In any case, a customer engineer should be notified.

If a channel status error occurs, the following message appears:

{ CP } xx CHANNEL STATUS ERROR
| CR }

CP or CR is the hardware mnemonic of the equipment and xx is the EST ordinal. Type /OKxx to resume processing. If the message persists, a customer engineer should be notified.

TAPE CHANNEL COMMANDS

Activate a channel for tape usage with the following command:

UP,CHcc.

where cc is the channel to be activated.

Remove a channel from use by all associated tape EST entries with the following command

DWN,CHcc.

where cc is the channel to be removed.

TAPE UNIT HANDLING

The system supports seven-track units 667/677, and nine-track units 669/679. Procedures for mounting tapes and putting units in the ready status are provided in appendix C.

Magnetic tape reels should be handled with care, as physical abuse can create parity errors that destroy data. In particular, the edges of a reel should not be pressed together.

Information pertinent to tape units or requests for tapes appear on the P and B displays and the H, I subdisplay. On the B display, REQUEST or LABEL card images flash when you are to assign a tape manually. Messages from the system instructing you to mount specified tapes, or indicating tape conditions which must be resolved by you, also appear on the B display.

Tapes to be written are distinguished from read-only tapes by the presence of a plastic ring in the slot near the center back of the reel. Writing cannot occur until this write enable ring is inserted in the reel. Following programmer instruction, you should insert the ring in an output tape; after the tape has been processed, the ring should be removed. The ring is referenced on switches and system messages as WRITE ENABLE, WRITE RING, or RING. When the ring is inserted in a mounted tape on 66x and 67x units, a WRITE DISABLE light goes out.

You can assign read-only status to a tape unit using the following command:

RDONLYxx.

Following entry of the RDONLY command, the tape unit with EST ordinal xx is available only for read operations. The E and P displays indicate the unit as RD ONLY. It is your responsibility to assign the unit for read-only operations since the system considers the unit logically off for any other functions.

The RDONLY command is not allowed for a unit whose status is MAINT on the E display.

If the tape assigned to a read-only tape unit has a write enable ring, the following message flashes at the your control point:

NTxx IS READ-ONLY. TYPE J.NO AND REASSIGN.

Read-only status is cleared by entering the following command:

UP,UNxx.

The unit is still logically off after this command.

The UP command is not allowed for a unit whose status is MAINT on the E display.

The system investigates the condition of all tape units at intervals of approximately 15 seconds and reports the status of each in the upper portion of the P display. A not ready unit is marked as such. For all units with READY status, the display indicates such information as whether a write ring or label is present for a mounted tape. Findings of this investigation are collected in the internal TAPES table and used by the system to assign mounted tapes automatically to requesting jobs. Consequently, action such as mounting a labeled tape can result in assignment without keyboard commands.

The lower portion of the P display shows the volume serial number of tapes required by incoming jobs. This preview information appears only if the installation has selected the option and you have activated the display, as explained in the following paragraphs.

When flashing messages appear on the tape status display, you must usually respond. A flashing SAVE indicates that a tape no longer needed by a job can be dismounted. Any label information appearing in the P display should be copied to a sticker label and should be attached to the reel. If a program contains instructions that cause the tape to be unloaded, the SAVE message may appear while the job is in progress. This message flashes until you turn off the unit or mount another tape. Any new tape is mounted, investigated by the system, and recorded in the TAPES table within a few seconds. At the end of a job, the system unloads all unit tapes that programmer wanted saved. If it finds the tape unit not ready, the following message appears:

MTxx NOT READ TAPE GOxx TO IGNORE

When you enter GOxx, the system stops trying to unload the tape.

A flashing UNEXPIRED indicates that the mounted tape has a write ring inserted, and that the label on the tape shows an unexpired label date. No action is mandatory at this time; however, if the tape

subsequently is assigned to a job and an attempt is made to write on it, an entry is needed to authorize writing, as described under Labeled Tape Messages later in this section.

A flashing VSN= indicates that the mounted tape does not have a label containing volume serial number information. With the following entry, you can equate a VSN with a tape, allowing it to be assigned automatically to the job requesting it by VSN.

VSNxx,vsn.

xx EST ordinal of tape unit.

vsn One- to six-character volume serial number of letters or numbers only.

This command equates the mounted tape with a VSN in the TAPES table only; the value is not written to the tape itself. If the tape is to be a scratch tape, enter the following command:

SCRxx.

Interaction between you and the system in the control of both physical and logical operation of tape units is affected by options selected by the installation for job scheduling and tape assignment. You should consult with the systems analyst since required procedures, as well as optimal operating procedures, follow the options selected.

When tapes are assigned automatically, there is no point at which you can be certain that the system is not issuing a function code to a given tape unit except when the tape unit is logically off. Adherence to the following rules is mandatory.

- Do not push the CLEAR button on a tape unit.
- If the tape reel must be unloaded, type ULuu.
- If the unit is to be made unavailable, type OFFuu.

An exception occurs when a tape has been assigned and NO WRITE ENABLE appears in the unit status field. The unit may be cleared manually and a write ring inserted if the tape is at load point. Otherwise, the situation should be handled by rerunning the job, unloading the unit, inserting a write ring, and reassigning when the job reappears at a control point.

Do not change the unit select dial on any tape unit while the system is running.

Any tape unit that is not to be used during operation should be turned off with an OFFxx or DWN,UNxx command before any jobs are read into the system. A not ready status will not necessarily prevent a tape unit from being assigned automatically.

Similar to the OFFxx command, the command

DWN,UNxx.

logically removes the tape unit with EST ordinal xx from the system. The E and P displays indicate DOWN status as opposed to OFF status.

If an attempt is made to use a tape unit with DOWN status, the message

TRIED TO USE DOWND UNIT

is displayed at the user's control point. The following message is sent to user and system dayfiles.

TAPE I/O ERROR

UNIT uu TYPE 6nn

FILE NAME lfn

FET ADDRESS aaaaaaa

NTxx BLOCK COUNT = nnnnnnnn

TRIED TO USE DOWND UNIT

You cannot turn on a unit with DOWN status. The status must be cleared by entering the following command:

UP,UNxx.

Upon entry of the command, the unit is logically off; it can be turned on with the ONxx command. If the tape unit was placed in DOWN status by the system tape drivers rather than by you, UP,UNxx is a protected command (that is, the keyboard must be unlocked for entry of the command).

TAPE ASSIGNING OPTIONS

The system allows several types of automatic tape assignment. Procedures that you follow for assigning tapes requested by a job depend on the options selected by the installation. Basically, the system can be installed with the following options.

- The system makes no automatic assignment. You must assign all tapes to requesting jobs with the command j.ASSIGNxx.
- The system assigns mounted tapes automatically, using information from the TAPES table. If automatic assignment cannot be made, you must make the assignment.
- The system assigns mounted tapes if possible. If a unit is assigned with not-ready status, you are instructed to mount the required tape.
- The system assigns mounted tapes if possible. If a unit with not-ready status is not available, a mounted tape may be unloaded on a unit with READY status, and you are instructed to mount the required tape.

SCRATCH TAPE DEFINITION

The installation has several options for defining a scratch tape. All tapes meeting the installation definition are used automatically as scratch tapes

when they are mounted on a unit with ON and READY status. A write enable ring must exist in the reel before a tape can become a scratch tape.

Scratch tapes are defined as follows:

- Any tape with a blank label written by the BLANK utility under your control.
- Any labeled tape with an expiration date equal or prior to the current date.
- Any unlabeled tape.
- Any operator-defined scratch tape.

You can designate any mounted tape with a write ring, except those with an unexpired dates on the label, to be a scratch tape by using the following command:

SCRxx.

TAPE MOUNTING AND ASSIGNING

You must assign all tapes manually to the requesting jobs if the installation does not choose the automatic assigning features of the system. Also, manual assignment must be made if the system does not have sufficient information to make an automatic assignment.

A flashing message appears on the B display when you must take action. The message is similar to one of the following messages:

REQUEST(filename,MT,HI,...VSN=vsn)

LABEL(filename,D=density,VSN=vsn,...)

Normally, you mount the tape requested, ready the unit, and assign the unit to the requesting job. You can assign the unit before mounting the reel or before the unit is logically ready. The message

dtxx NOT READY.MAKE IT READY OR REASSIGN.
TYPE J. YES OR J. NO

appears on the B display. (dt can be either MT or NT. J is the JDT ordinal.)

If you type j.NO, the original request reappears on the B display. You may assign a different unit or reassign the same unit. If you type j.YES, the unit will be assigned when it becomes ready. If there is a delay before the unit is ready, the following message appears:

dtxx NOT READY.MAKE IT READY OR
REASSIGN.WAITING FOR ASSIGNED
UNIT uu.

When automatic assigning features are in use, the system can assign a labeled tape on a readied unit before you have a chance to make the manual assignment. Also, if you issue a VSN command for a tape on a readied unit, automatic assignment could occur before manual assignment.

Parameters on the REQUEST and LABEL statements guide you in selecting the proper tape and readying the unit. A seven- or nine-track tape is identified by one of the following parameters or a density parameter implying seven- or nine-track:

MT Seven-track tape unit required (667, 677)
NT Nine-track tape unit required (669, 679)
MN Either seven- or nine-track unit is assigned
US Nine-track required
EB Nine-track required

Follow installation procedures to identify seven- and nine-track physical volumes of tape.

The E and P displays identify tape units by device mnemonics (MT for seven-track tape units; NT for nine-track tape units). The 679 nine-track tape unit, the only unit with 6250-cpi density capability, is identified on both displays by a G immediately following the mnemonic NT.

If necessary, a write ring should be inserted before the tape is mounted. A comment on the flashing message may instruct you; otherwise, follow the installation procedures.

After the tape is mounted and the density switch has been set, the tape should be positioned at its load point. Density settings are not mandatory.

The following parameter densities apply to seven-track tapes:

<u>Parameter</u>	<u>Density</u>
LO	200 bpi
HI	556 bpi
HY	800 bpi

667/677 tape units can read but not write at 200-bpi (LO) density. A 667/677 tape unit cannot be assigned automatically to any LO request. If such an assignment is made manually, the following message appears on the B display:

NO WRITE AT 200 BPI on 667/677 UNIT.
IS FILE READ ONLY
TYPE J.YES OR J.NO

When j.YES is entered, the assignment is made, and a subsequent attempt to write on the unit causes the job to abort. If j.NO is entered, the assignment is rejected and the REQUEST or LABEL message reappears in the B display.

The following parameter densities apply to nine-track tapes:

<u>Parameter</u>	<u>Density</u>
HD	800 bpi
PE	1600 cpi
GE	6250 cpi

If a tape unit with 6250-cpi capability is required and a unit other than a 679 tape unit is assigned, the following message flashes at your control point:

6250 NT REQUESTED, 800 NT xx ASSIGNED.
TYPE J.NO AND REASSIGN.

You must reassigned a 679 tape unit.

If a 679 tape unit is assigned to a request for a nine-track 800-bpi unit, the following message flashes at your control point:

800 NT REQUESTED, GE xx ASSIGNED.TYPE
J.NO AND REASSIGN.

You must reassigned an 800-bpi nine-track tape unit.

When the tape unit has a READY status, and if automatic assignment has not occurred, you should assign the unit to the job requesting the tape by typing in the following command:

j.ASSIGN xx.

The system accepts manual assignments immediately, and manual assignment can take the place of an automatic assignment not yet made. If several jobs have flashing requests and the message continues to flash after you type ASSIGN, the system has refused the assignment because of job scheduling considerations. Under certain conditions involving heavy tape usage, the j.ASSIGN entry is ignored. When this condition arises, the system is protecting itself against a deadlock situation. If other jobs are requesting tapes, you should try to assign the drive to another job. If the new assignment is accepted, the request message disappears. At least one tape drive must be released by another job before a rejected assignment will be accepted.

If the VSN of the tape assigned by you does not agree with the tape requested, you are informed of the discrepancy by a message similar to:

MTxx INCORRECT VSN. SHOULD
ASSIGNMENT BE ALLOWED
TYPE J.YES OR J.NO

To terminate the assignment, type the following command:

j.NO.

This causes the system to reprocess the request, giving you the opportunity to mount the correct tape.

To force the system to accept an assignment that differs from the request, type the following command:

j.YES.

Under other automatic assigning options, a different message appears and different action is required:

TAPE ON MTuu IS WRONG VSN. TYPE
J.GO, THEN REASSIGN

If the preceding message appears after you make an assignment, issue j.GO to cause the system to reprocess the request for the tape you just assigned. Another unit should be assigned when the request reappears on the B display.

When a tape is mounted and assigned to a request specifying either RING or NORING and the write ring status does not agree with the request, the tape is unloaded automatically and one of the following messages flashes on the B display:

MTxx REMOUNT WITH RING

MTxx REMOUNT WITHOUT RING

When the tape has been reloaded with the proper RING status, the job continues automatically.

Tape Reliability Messages

The system attempts to recover all conditions that would make data unreliable. When this attempt is successful, a message with the word RVD or RECOVERED appears in the dayfile. If the condition is not recovered, a similar message with the word ERR or UNRECOVERED appears. You may have to respond to the message, depending on programmer options. Should the programmer choose to process these conditions from within the program, no operator action is possible when ERR messages appear.

When the programmer does not process these conditions, the message on the B display has two lines. The first describes the error; the second requests you to type GO or RECHECK. For some errors, a recheck is not possible, in which case the second line requests you to type GOxx. To continue the job as if no errors existed, the response is:

GOxx.

The GO command allows the job to continue with data that may be unreliable. To cause the system to repeat a recovery attempt, the response is:

RECHECKxx.

If processing after RECHECK does not recover the condition, you should drop the job.

You should follow installation and programmer instructions in responding to these messages.

Labeled Tape Messages

An expiration date field in a labeled tape protects a file from being destroyed prematurely. When a file is opened for writing, label processing routines check the file header label. If an unexpired label date is found, the following message flashes on the B display:

Mtxx UNEXPIRED TYPE GOxx OR
RECHECKxx.

No writing occurs until you type the following command:

GOxx.

If the correct tape is not mounted, mount the correct tape and then continue the job with the following command:

RECHECKxx.

If a tape with an unexpired label is assigned to a file not opened for writing and a write is attempted, the following message flashes on the B display:

MTxx UNEXPIRED. SHOULD WRITING BE
ALLOWED TYPE J.YES OR J.NO

If you type j.YES, control permission is set in the FNT, and the job continues (the tape is overwritten).

If you type j.NO, the job is aborted, and the security of the tape is preserved.

PREVIEWING TAPE REQUIREMENTS

The preview feature of tape scheduling determines which tapes are needed before the job comes under scheduler routine control and is considered for assignment to a control point. The preview feature is installed at installation option. The previewing feature may not determine all the tape requirements for jobs making tape requests from within CCL procedures or CPU programs.

When the previewing feature is activated, the scheduler does not consider jobs with tape requirements until you type a command that releases the job to the scheduler and allows a JDT ordinal to be assigned. You designate whether or not the preview feature is active. It is turned on with the following command:

STAGEON.

It is turned off with the following command:

STAGEOFF.

When previewing is off, all tape jobs come under scheduler control as they enter the system, just as jobs that do not require tapes.

Preview information appears at the bottom of the P display. The job name, priority, VSN, and ring requirements of tapes required are shown for the jobs with the highest priority. You must compare the VSN numbers of tapes on hand with those required for a given job to determine whether it is practical for the system to bring a job to a control point for execution.

Slashes between VSN numbers indicate a multireel file. When = appears between VSN numbers, any one of them is satisfactory. When 0, no number, or the word SCRATCH appears, the system assigns a scratch tape.

The display shows tape requirements for the jobs with highest priority, up to a limit of 20 display lines. Releasing a job to scheduler control removes that job from the display. Using the ENPR command to lower job priority can also free display space. New entries are added to the display after any of the following operator actions:

- STAGE command is given.
- Change of priority in input queue job.
- Call for the P display.

If the tapes for a job are on hand, you release the job from the preview queue with the following command:

STAGE,jobname.

This command makes the named job eligible for execution. It can also release a job shown in the H,S subdisplay that has not yet appeared on the P display.

To release the job with the highest priority on the P display, use the following format:

STAGE.

A job should not be released to the scheduler if the tapes for that job are not on hand. Furthermore, an installation may prefer to have tapes mounted before jobs are released. Releasing the job, writing a message through the O display, and dropping the job produces a job dayfile to inform the programmer that tapes were missing.

Released jobs can be held in the input queue until existing tape jobs complete. The MAX NUM parameter on the S display shows the maximum number of tape jobs that can execute at one time. This maximum can be changed through the MAXN2,nnnn command after the S display is called, where 2 identifies the DE class.

ROTATING MASS STORAGE DEVICES

The rotating mass storage (RMS) devices configured in the system are listed in the V display. Devices must be powered up and operational before you assume control of the system.

Each RMS device belongs to only one device set. A device set can assume only one of two roles, private set or public set.

The public sets can contain the four attributes assigned at deadstart time: system set, permanent file default set, queue set, and scratch set. There may be, at most, four public sets and one system set, one permanent file default set, and one queue set at one time; but more than one scratch set is possible.

Devices within a device set may also have permanent file device, queue device, and system device attributes. Queue device and permanent file device attributes are assigned at creation time; the system device attribute is assigned at deadstart time.

Each device can be turned off or on logically with OFFxxx and ONxxx. If an RMS device is logically off, no space on that device can be allocated to new

files, but existing files are still available for use.

The access mode for both single- and dual-access configured RMS devices can be controlled with the CONTROLLER command:

CONTROLLER,
xxx,cc,ON.

Turns on access to the RMS device having EST ordinal xxx through channel cc. When xxx is zero, access is established to all RMS devices configured for access through channel cc. When xxx is nonzero, access is established only to RMS devices having same channel and equipment numbers as ESTxxx.

CONTROLLER,
xxx,cc,OFF.

Turns off access to the RMS device having EST ordinal xxx through channel cc. When xxx is zero, access is turned off to all RMS devices configured for access through that channel. When xxx is nonzero, access is turned off to RMS devices having same channel and equipment numbers as ESTxxx.

If the buffer controller was not autoloaded for the specified channel, the command is not executed and ILLEGAL ENTRY is displayed. Similarly, an attempt to turn on an access already on, or to turn off an access already off is an illegal entry.

The CONTROLLER command cannot be used to turn off the only currently available channel to a group of devices unless all devices in the group are IDLE. If this is attempted, an error condition occurs, and ILLEGAL ENTRY is displayed. When the zero EST ordinal is specified, the CONTROLLER command attempts to turn on or off all accesses through the specified channel. If there are multiple access groups for the same channel, it is possible that an error can occur for one access group but not for another. In such a case, the command is only executed for the device(s) associated with the access group not in error. The status of the device(s) associated with the access group in error is not affected. The term access group refers to an arrangement of RMS devices having identical channel accesses.

NOTE

The CONTROLLER command can establish dual access only on RMS devices that have been configured for dual access. The command itself does not reconfigure RMS devices.

Software error conditions appear on the dayfile. The following messages indicate potential difficulty that should be reported to the customer engineer:

RECOVERED RMS ERROR

UNCORRECTABLE RMS ERROR

When the following message appears, you can compare the configuration listed in the E display with that of the actual equipment settings. The configuration and settings must match:

EQxx REJECT

RMS ERROR RECOVERY

The following message flashes at the bottom of the B display when a shared coupler or shared drive is reserved by the mainframe with which you are sharing the coupler or drive:

RES35 ESTxxx CHcc

The following message flashes at the bottom of the B display when a hardware error occurs on an RMS device:

ERRec ESTxxx CHcc

cc is the channel number, xxx is the EST ordinal, and ec (octal) is the error code, as follows:

<u>ec</u>	<u>Significance</u>
30	Dual controller reserved.
31	Unit not ready.
32	Unit is ready but positioner is not ready.
33	6681 internal/external reject.
34	Unit busy too long.
36	Full-track unit fault; possibly power is down.
37	Function timeout; channel stays active after a connect or a function request is issued.
40	RAM parity error in controller caused function timeout.
41	Controller stop.
42	Channel found active unexpectedly.
43	Abnormal action on seek.
44	No response to status request.
45	Channel not active after ACN.
46	Address byte not accepted by the controller.
50	No resume on data or control channel.
51	Error during read/write of data (not checkword error).
71	System may lose data on disk pack.

If the error is temporary, the message disappears automatically; otherwise, a customer engineer should be called. If the equipment cannot be idled down successfully, a system analyst should be called.

To clear the error message and terminate jobs on the device reporting the error, enter the following command:

IDLExxx.
ACK.

If the error occurs in a dual-access environment and a controller problem is suspected, any job using that controller can continue to run successfully if the CONTROLLER,xxx,cc,OFF. command is issued to restrict the second controller to single access. ACK. is required to clear the error message.

A rotating mass storage device on which an irrecoverable error has occurred is removed from the system logically by entering the following command:

IDLExxx.

xxx EST ordinal for the device.

An idled device is no longer available for use by the system. DSD disallows IDLExxx. on a system or master device when the keyboard is locked. For system and master RMS devices, the IDLE command is protected and the keyboard must be unlocked before they are idled. However, unlocking and idling either of these devices might severely interfere with the running of the system.

A permanent file device can be idled when no further use is to be made of user permanent files. For shared devices, the IDLE entry affects only the mainframe at which the command was entered and does not affect any other mainframes that share the device.

ONxxx. Restores availability of the device to the system.

When I/O requests are issued for idled-down devices, the following messages flash at the bottom of the B display:

jobname CPnn REQ ON UNUSABLE EQ

The job at control point nn caused an I/O request for an idled-down RMS device; or, because of an RMS hardware malfunction, a change was made from dual to single access, and a request at control point nn could not be completed successfully in single access mode. You should note the jobname and type ACK. to clear the flashing message:

SYSTEM CPO0 ON UNUSABLE EQ

A control point zero I/O request was issued for an idled-down RMS device; or, because of an RMS hardware malfunction, a change was made from dual to single access, and a request at control point zero could not be completed successfully in single access mode. You should type ACK. to clear the message.

When an error occurs on an 844-21 or 844-41 disk drive, you can move the disk pack from the malfunctioning drive to an off, free drive on the same controller. The form of the command is:

SP844,xxx,u.

xxx EST ordinal of the malfunctioning drive.

u Unit number of the new drive.

The following procedure is used for moving a pack from a malfunctioning drive, drive X, to a spare drive, drive Y.

1. Power down drive X and remove the disk pack after it stops spinning.

2. Place pack on drive Y and power up. Place an 844-21 pack only on another 844-21 drive and an 844-4x pack only on another 844-4x drive.
3. Find EST ordinals for drives of E display; ordinals are 43 for drive X and 47 for drive Y.
4. Note unit numbers in each EST entry as 3 for drive X and 7 for drive Y.
5. Logically exchange physical unit numbers in two EST entries by entering following commands:

SP844,43,7.

SP844,47,3.

6. Idle EST that points to malfunctioning drive by entering following command:

IDLE 47.

The E display reflects the new unit number; no other status change occurs.

In multiple access configurations, attempt to switch packs within the same access group. In the example configuration below, the disk drive for EST70, unit 0 malfunctions. If possible, select a free drive from EST71-73 to switch unit numbers, and then move the pack to the new unit 0.

EST	Unit	Channels
70	0	04
.		
.		
73	3	04
74	4	04 24
.		
.		
77	7	04 24
100	0	24
.		
.		
103	3	24

If EST77 has the only free drive to allow switching with a malfunctioning drive for EST70, unit 0, channel 24 access in the EST74-77 access group must be turned off. Enter CONTROLLER,74,24,OFF. This allows EST77 to have unit 0, be accessed on channel 4, and not conflict with EST100, unit 0 on channel 24.

CONTROLWARE RECOVERY

When the system detects a function timeout (error 37) in a 7155 controller, it restarts the controller. Assuming restart is successful, the system then continues the user's job.

As part of restarting the controller, an AUTOL job is run to reload controlware in the hung controller. The system requires a clear control point to run the AUTOL job. If there is no clear control point when the job needs to run, the following message will flash at the bottom of the right screen:

CLR CP FOR AUTO RELOAD CHnn

nn Channel number whose controller is being reloaded.

Respond to this message by clearing a control point with the n.CLEAR command. The message will clear automatically when there is a clear control point.

Job AUTOL dumps the hung controlware and catalogs this controlware with a permanent file name:

CONTROLWARE7155hidCHnn, ID=DMP7155, SN=sys.

hid Host mainframe identifier.

nn Channel number on which the hang occurred.

sys System setname.

If five cycles of the file already exist, the lowest cycle of this file is purged before cataloging the new dump. To interpret the dump, use the following statements:

ATTACH,CRASH,CONTROLWARE7155hidCHnn, ID=DMP7155, SN=sys.
DSDUMP,Z. BC.

When the controlware dump file is no longer needed, it can be purged as follows:

PURGE,CONTROLWARE7155hidCHnn, ID=DMP7155, PW=X, SN=sys.

If a controller reload count exceeds five in a day, the controller is turned off and the following message flashes at the bottom of the right screen:

CNTRLR CHnn OFF - RELOAD LIMIT

Use the command ACK to clear the message. A system analyst or customer engineer should be notified to analyze this hung controller problem. This controller can be returned to the system with the following command:

CONTROLLER,est,chan,ON.

DEVICE SET CONTROL

This subsection describes various control statements and requests available on NOS/BE for the control of device sets.

BLANK LABELING RMS DEVICES

The LABELMS utility is used to blank-label a rotating mass storage device. When LABELMS is executed, the system requests the EST ordinal and volume serial number (VSN); assign them using the j.PACK command.

The j.PACK command is:

j.PACK,E=xxx,V=vsn.

xxx EST ordinal of the disk unit.

vsn Volume serial number.

If a device type (DT) is not specified in the statement parameter list, you can specify the device to be blank-labeled. LABELMS also can be used to specify allocation information for subsequent access to the device, and record known flaws on a device so that such areas are not accessed.

The LABELMS control statement format is:

```
LABELMS(DT=tt,mode,I=lfm)
```

Parameters are optional and may appear in any order. Specification of the device type with the DT parameter is required if I has been specified.

DT=dt Device type to be labeled; device codes for dt are:

AH 819 Disk Drive

AJ 885 Disk Drive

AY 844-21 Disk Drive

AZ 844-4x Disk Drive

If AH is specified, the system ignores the mode parameter.

If DT is omitted, you can assign any device type.

mode Recording mode for an 844 or 885 disk pack. Default is defined at installation time.

FT Full tracking; read/write sequential sectors.

HT Half tracking; read/write alternate sectors.

NOTE

FT cannot be used if there is not full-track controller access to the drive on which the pack resides or if the mainframe being used is a CDC 6000 or CYBER 70.

I=lfm Logical file name for input directives containing allocation and flaw information.

Refer to the NOS/BE Reference Manual listed in the preface for further information on LABELMS.

For 885 (AJ), 844-21 (AY), and 844-41 (AZ) RMS devices, the flaws recorded on the device in the utility flaw map (UFM) are read by LABELMS and are added to the flaws supplied in the input file.

ASSOCIATING A DEVICE SET WITH A JOB (MOUNT)

To access a private device set, the user must issue a MOUNT control statement for the master device. MOUNT is a logical operation; if the device is physically available, no intervention is required. If the device is not physically available, the device name appears in an operator display, and the job is swapped out until the device is mounted.

When the master device is mounted, the device set tables are read into the system and all files and member devices become logically available to the job. When the master is mounted, the system issues a MOUNT for other member devices as needed. The user may also issue a MOUNT for a member device. The format of the MOUNT control statement follows. The MOUNT control statement is applicable to public devices that have not been mounted. The MOUNT control statement format is:

```
MOUNT(VSN=vsn,SN=setname)
```

The VSN and SN parameters are required and may appear in any order.

VSN=vsn Volume serial number of device to be mounted.

SN=setname Name of device set to which this device belongs.

DISASSOCIATING A PRIVATE DEVICE SET FROM A JOB (DSMOUNT)

When a job has finished processing a user device set, the set can be logically disassociated from the job by a DSMOUNT for the master device. If the user does not dismount the set, the system dismounts it at job termination. A dismount is a logical operation; other jobs using the same device set are not affected. DSMOUNT may also be issued for a member device.

When a DSMOUNT specifying the master device of a user device set is executed, a CLOSE UNLOAD is issued for every file in use by the job and residing on the user device set. Each mounted member device is dismounted, and, finally, the master device is logically dismounted. DSMOUNT is inoperative on public device sets.

The DSMOUNT control statement format is:

```
DSMOUNT,VSN=vsn,SN=setname
```

The VSN and SN parameters are required and may appear in any order.

VSN=vsn Volume serial number of the device to be disassociated from the job.

SN=setname Name of the device set to which this device belongs.

DMNT

DMNT is used to remove a device logically from the system so it can be removed physically from the drive. This procedure is necessary in both single and multimainframe systems to lock out jobs attempting to mount the device. You can initiate DMNT through DIS or through an n.X entry, which has two formats:

```
DMNT,SN=setname,VSN=vsn
```

```
DMNT,ES=xx
```

The parameters are required and may appear in any order.

SN=setname Name of device set containing member to be removed.

VSN=vsn Volume serial number of device set member to be removed.
ES=xxx EST ordinal of drive where pack resides. This parameter allows removal of a device that is not a member of any device set.

The requested device is left in off-line status and off. A bit is set on the device set master device (if available) to prevent further use of the device until permitted by you (with RMNT).

DMNT can be executed on both mounted and device set member not mounted, and on devices that are not members of any set. DMNT may be executed on set master devices only if they are not mounted, and if all the member devices of that set have been previously dismounted. DMNT may not be used on public devices (members of system, system default, PF, and queue sets).

The device should not be physically removed until DMNT displays OPERATOR DSMOUNT COMPLETE. A device must be on before the SN=, VSN=format may be used.

In a multimainframe environment, DMNT could find a device always mounted. If this occurs, determine if the device is in use, and if it is not, run RECOVER mode 0 on the device before attempting another DMNT.

RMNT

RMNT is used to make logically available to the system a device previously removed. You can initiate RMNT through DIS or an n.X entry, which has two formats:

RMNT,SN=setname,VSN=vsn.

RMNT,ES=xxx.

The following parameters are required and may appear in any order.

SN=setname Name of device set containing member to be made available.
VSN=vsn Volume serial number of device set member to be made available.
ES=xxx EST ordinal of drive where pack has been physically mounted. This parameter allows introduction of a device that is not a member of a device set, or a drive where a device was previously removed by DMNT.

The requested device is left in FREE status and on. The master device of a set must be made available to the system by RMNT before the members of that device set can be made available. The device must be turned on (ONxxx.) before the SN=, VSN= format may be used.

ADDING NEW MEMBERS TO A DEVICE SET (ADDSET)

The ADDSET control statement can be used to add members to a device set. You are required to assign the requested VSN to the device. ADDSET can be run

only on a previously blank-labeled RMS device. The format of the ADDSET control statement is:

ADDSET(SN=setname,MP=mp,VSN=vsn,UV=uv,UP=up,PB=pb,FR=fff,NF=n,NM=m,RP=ddd,*PF,*Q)

SN=setname Name of device set created or device set to which a member is added; one to seven letters or digits beginning with a letter. Required.

MP=mp Volume serial number of the master device; one to six letters or digits with leading zeros assumed. Required.

VSN=vsn Volume serial number of the member device being added to the set; one to six letters or digits with leading zeros assumed. Required.

If parameters MP and VSN are equal, a private set master device is being created and parameters UV, UP, PB, and FR are required unless the installation specifies defaults.

UV=uv Universal password; one to nine letters or digits. Required if creating a private set master device.

UP=up Universal permission; any non-null combination of characters C, M, E, or R.

C Control permission

M Modify permission

E Extend permission

R Read permission

Required if creating a private set master device.

PB=pb Public password; one to nine letters or digits. Required if creating a private set master device.

FR=fff Permanent file default retention period indicating the number of days the file is to be retained, 0 to 999. Default value is the value that applies to permanent files on this private set. The private set owner determines the future of the file once the retention period expires. Required if creating a private set master device.

The following parameters are optional:

NF=n Maximum number of permanent or queue files that can exist on the device set. The value of n cannot be less than 1 or greater than 16000 (decimal).

NF=n has meaning only for an ADDSET for a master device. Default is 300 (octal).

NM=m Maximum number (decimal) of members allowed in the device set. NM=m is used by ADDSET to preallocate on master device system tables for member devices. For each member RBR, the system needs one PRU if the RBR is less than 62 words long, or two PRUs otherwise. For system tables, ADDSET reserves a number of PRUs equal to double NM. If each member device is to have several RBRs, NM=m should be specified as somewhat larger than the actual number of member devices. NM=m has meaning only for an ADDSET of a master device. The default and maximum value is 50 (decimal).

RP=ddd Retention period for the device set indicating the number of days before the device set expires, 0 to 999. 999 indicates an infinite retention period. RP=ddd has meaning only for an ADDSET of a master device. The default is 31 (decimal) days.

*Q Optional parameter indicating that queue files can reside on the member device being added to the set if the set is the public Q set.

*PF Optional parameter indicating that permanent files can reside on the member device being added to the set.

DELETING MEMBERS FROM A DEVICE SET (DELSET)

The DELSET control statement deletes devices from a device set. The master device must be mounted before the DELSET is issued. All member devices must be deleted before a DELSET is issued for the master device.^f Permanent files, queue files, and local files residing on the device must be purged or returned before the DELSET is issued; if any portion of a local file, queue file, or permanent file resides on the device to be deleted, the DELSET request is ignored. In such a case, use a DMPQ or DUMP to remove the files from the device. Also, DELSET cannot be executed on a device set currently being shared. In the following format of the DELSET control statement, all parameters are required:

DELSET(SN=setname,MP=mpvsn,VSN=vsn)

SN=setname Name of the device set that has the member to be deleted.

MP=mpvsn Volume serial number of master device of this device set.

VSN=vsn Volume serial number of member to be deleted from the device set.

OPERATOR EXAMPLES

The following conventions apply when substituting a new system device for an old system device:

- If the new device is already a member of the system set, at deadstart time you can simply designate the new device as the system device. After deadstart has completed, you can delete the old system device from the set by using DELSET.
- If the new device is not already a member of the system set, two deadstarts are necessary. First, deadstart onto the old system device. After the system is up, use LABELMS and ADDSET on the new system device, then, deadstart again designating the new device as the system device. Following the second deadstart, you may use a DELSET to delete the old system device from the set.

To replace a PF device with an alternate PF device does not require a deadstart; it can be done after the system is up and running. You would first use LABELMS and ADDSET to add the device to the system, then transfer files from the old PF device to the new PF device using a TRANSPF, and finally delete the old PF device using DELSET. System permanent files, such as the DAYFILE, cannot be transferred using TRANSPF. Therefore, this procedure does not work if system permanent files reside on the PF device.

To change a PF device to a non-PF device requires only TRANSPF. (Refer to section 6.)

To change a queue device to a nonqueue device, use a DMPQ to remove the files, DELSET/ADDSET to delete and reintroduce the member without the queue attribute, and RESQ to replace the queues. This DELSET/ADDSET procedure may also be used to give a device an attribute.

ON-LINE DEVICE RECOVERY (RECOVER)

The RECOVER control statement is used to validate a device set and reconstruct critical tables. In a dual-mainframe system, it can also be used to recover space on a device set when one of the mainframes has become inoperative. The format of the RECOVER control statement is:

RECOVER(SN=setname,V=vsn,L=lfn,MO=mode,MF=mfid,Q)

SN=setname Name of the device set to be validated and reconstructed.

V=vsn Volume serial number of the master device of the device set.

L=lfn Logical file name of the file on which any errors encountered in the validation process are listed; default is file OUTPUT.

^fDELSET on a master device on a public set is not allowed.

MO=mode	Specifies mode of RECOVER processing:
0	Validates unmounted device set and reconstructs tables for a nonshared device set in a single or multimainframe system. MO=0 is the default used if the MO parameter is omitted from the RECOVER control statement.
4	Validates mounted or unmounted device set and reconstructs tables for a shared device set when only one mainframe in a multimainframe system is operational.
MF=mfid	Primary logical ID (host ID) of the mainframe that has become inoperative. This parameter need not be specified and is ignored if MO=0.
Q	If specified, Q files will be recovered from the downed mainframe. Meaningful in mode 4 only.

You must enter in RECOVER in two distinct situations:

- The system software has diagnosed errors in the device tables for a device set. You can type RECOVER, MO=0 to reconstruct the tables for device sets that have been used as public sets by temporarily designating them as unmounted private sets through reconfiguration at deadstart time.
- A mainframe has become inoperative; type RECOVER, MO=4 for shared device sets.

The operating system automatically issues RECOVER calls for all public sets as part of the postdeadstart process. If errors in the disk tables are detected on a public set, a second execution of RECOVER takes place with additional table verification in addition to an output file describing the errors. For detailed explanations of the errors and verification algorithms, refer to the NOS/BE System Programmer's Reference Manual listed in the preface.

MOUNT REQUEST

If a public device is designated as off or idle at deadstart time, you must turn the device on and issue a MOUNT request, provided the public device is labeled as a member of a public set. The format of the MOUNT request follows; VSN and SN parameters are required:

n.X MOUNT(VSN=vsn,SN=setname)

VSN=vsn Volume serial number of device to be mounted.

SN=setname Name of device set to which device belongs.

This entry is equivalent to using the MOUNT control statement in a job.

When you or a user executes a MOUNT on a master device, further action might be necessary as follows:

- If the unit is not shared, MOUNT will pause with the following message:

TYPE GO AFTER RUNNING RECOVER
(SN=setname, V=vsn)

You should clear a control point and type:

n.X RECOVER(SN=setname, V=vsn)

After this job terminates, type n.GO for the control point at which MOUNT is pausing.

- If the unit is shared, MOUNT pauses with the following message:

IS (SN=setname, VSN=vsn) MOUNTED
ON OTHER MF - TYPE N.CFO YES
OR N.CFO NO*

You should examine the V display on the other mainframe if it is up. If the specified device appears in the V display of the other mainframe and is logically mounted, type n.CFO YES, where n is the control point number at which MOUNT is pausing. If the device is not logically mounted on the other mainframe, turn off the EST entry in the other mainframe to prevent the device from being mounted and enter n.CFO NO.

In both of these cases, MOUNT advises you to run a certain type of RECOVER. If the message TYPE GO AFTER RUNNING RECOVER(SN=setname, V=vsn) appears, this type of RECOVER should be run on the mainframe at which the message appears.

If the message TYPE GO AFTER RUNNING RECOVER (SN=setname, V=vsn, MO=4, MF=mfid) ON OTHER MAINFRAME appears, this RECOVER(MO=4) control statement should be typed in on the other mainframe exactly as it is displayed by MOUNT on this mainframe; the mainframe ID must be specified as that of the mainframe on which the message is displayed.

After either RECOVER is finished, type n.GO at the control point where MOUNT is running.

The EST on the other mainframe, if turned off, can be turned on again.

DEVICE CONTROL

Several DSD entries that control RMS device usage are available to you. They should be used in the following manner:

- OFFxxx. xxx is the EST ordinal for the device. If the device is mounted, this entry prohibits record block assignment on that device. If the device is dismounted, this entry prohibits device positioning on that device for the mainframe issuing the command.

- IDLExxx. xxx is the EST ordinal for the device. If the device is mounted, it terminates all I/O on that device for the mainframe issuing the command. For this reason, this entry should be used in response to detected hardware malfunctions. If the device is dismounted, it has the same effect as the OFF entry.
- DMNT, This command is required prior to parameters. swapping packs on a drive, or prior to unloading a pack from a drive.
- RMNT, This command is required after parameters. packs have been swapped on a drive or after loading a pack on a drive.
- MOUNT, This command is required to make parameters. a device available for use as a public device after it is designated as off or idle at deadstart time.

PROCEDURES FOR RESOLVING RB CONFLICTS

Deadstart recovery (level 3 under the option matrix) is not allowed if one or more record blocks (RBs) are reserved more than once within the system. This most often occurs after flaws are added to a set through label modification (RELABEL).

When RECOVER is run on the set with RB conflicts (each queue or permanent file which uses an RB used elsewhere), the name of the file and the RBs in question are printed. A flag is also set for each file.

If a permanent file has a conflict, the file can be purged without releasing its RMS space back to the system. This is done by specifying RB=1 as one of the parameters on the PURGE control statement. Unlike a normal PURGE, the file is no longer usable as a local file. The parameter is ignored if the file does not have a conflict.

If queue files have conflicts, all such files should be evicted or DMPQ/RESQ used immediately.

DISTRIBUTIVE DATA PATH[†]

The distributive data path (DDP) is listed in the E display with the mnemonic ED. It is used for ECS buffering and for loading ECS resident PP overlays.

At deadstart, the first DDP entry that is on in the EST is assigned to loading the ECS resident PP overlays.

The DDP may be turned off with the following command:

OFFxxx.

xxx EST ordinal.

If the EST entry that is turned off has multiple DDP channels, all the channels are disabled. Notify a systems analyst to delete a single channel from an EST entry having multiple channels.

A DDP entry is turned on with the following command:

ONxxx.

xxx EST ordinal.

ECS buffering may use any DDP EST entry that is free, including the entry assigned to load ECS resident PP overlays.

If the DDP entry assigned to load ECS resident PP overlays is turned off while in use, the following messages appear in the system dayfile:

```
LOADING OF ppo IN TROUBLE
ppo LOADED FROM DISK
DDP ERROR - DDP SET OFF, cc
```

ppo Represents the PP overlay name.
cc Represents the channel number.

The last message appears every time a DDP error is detected. Until you acknowledge it with ACK., this message appears on the bottom of the right screen. A systems analyst and a customer engineer should be notified if this message appears.

When the DDP entry assigned to loading ECS resident PP overlays is off, loading continues from disk. If ECS buffering is handled solely through DDP and all associated DDP channels are disabled, a job that required ECS buffering is halted. The following message is displayed:

WAITING FOR DDP

You can DROP or KILL the job or continue the job by turning on a DDP entry.

[†]This equipment is not available on models that are using UEM or LCM.

You may exercise several levels of control over jobs in the system. Immediately after deadstart, specify the control points available to the scheduler and those to be used to initiate jobs. Once jobs are in the system, they can be allowed to execute completely under system control; or, under your control, they can be forced or excluded from execution and terminated with various results. You can send messages to jobs and respond to requests originating in a user job.

You should be aware that attempts to correct a system problem often destroy information required to eliminate repetition of the problem. If you have not been instructed about the current trouble, call a member of the installation system staff or one of the local CDC analysts before taking any corrective action.

BATCH PROCESSING

The following subsection describes how you control batch job processing. This includes specifying control point use, interrupting processing, controlling job initiation/file disposition, controlling dependent jobs, taking checkpoints, responding to user program requests, and controlling jobs through protected commands.

SPECIFYING CONTROL POINT USE

You initiate control points after deadstart to specify the control points available for user jobs and for system jobs. A standard allocation of control points can be used; alternatively, each individual control point can be addressed by number.

To use standard allocation of control points, type the following command:

AUTO.

The following distribution is produced. N is the last control point, usually 17.

- 1. JANUS.
- 2. NEXT.
- .
- .
- n-1. NEXT.
- n.

The control points not associated with names may be used to initiate system jobs.

To name control points, type the following command:

n.name.

name can be NEXT or any system job, such as JANUS or DIS or BLANK.

If NEXT is associated with a control point, that control point is available to the scheduling routine. After a user job assigned to control point NEXT is executed, the name NEXT reappears. Whenever NEXT exists, the scheduler can assign another user job.

To prevent NEXT from returning, and to thereby remove the control point from scheduler consideration, enter the following command:

n.CLEAR.

This sets the clear flag, which appears on the B display as the letter C after the JDT ordinal or control point number. When the current job at the control point completes or is swapped out, no name appears. The control point is considered to be empty and can be used to initiate system jobs.

To clear all control points, enter the following command:

CLEAR.

Controlling Priority

Every job enters the system with a priority. The priority can be specified by the user on the job statement or defined by the installation for certain classes of jobs. The higher the job priority, the sooner a job executes. Two-digit priorities on job statements are changed by the system to four-digit numbers, with the last two digits representing a periodic increase in priority as the job awaits execution. Possible priorities for any single job are affected by the classification of the job in the categories listed on the S display.

You can change job priority in several ways. For a job in the input or output queue, priority can be changed with the following command:

ENFP,fileord,pppp.

fileord FNT ordinal of the file.

pppp Priority 0 through 7777.

In a linked NOS/BE system, to change priority of a job residing in the input or output queue of the linked mainframe and originating at this mainframe, type the following command:

ENFP,fileordid,pp.

fileord FNT ordinal of the file.

id Primary ID of the linked system.

pp Priority 0 through 77.

Priority zero is occasionally used to hold a job in the input or output queue. If the job has a JDT ordinal assigned and is not a system job, the first two priority digits are changed by the following command:

j.ENPR,pp.

pp Priority 1 through 77.

In a linked NOS/BE system, to assign a new priority to jobs residing on the linked NOS/BE mainframe which originated at this mainframe, type:

jid.ENPR,pppp.

id Primary ID of the linked system.

pppp Priority 0 through 7777.

The ENPR and ENFP commands give the job a fixed priority when a priority is entered that exceeds the installation-defined fixed priority. Input queue jobs with priority come under scheduler control immediately when they have tape requirements. Priority of fixed jobs is not increased further.

A job can be brought to a control point and made immune to swapping with the following command:

n.DIR,lfn.

This brings the job named to the control point. Once it is executing, the job can be dropped or killed as with any other job. If the job is unlocked, it loses immunity to swapping. The DIR command cannot be used for jobs listed on the P display.

At times, the H display may show a job requiring more memory (CM or EC) than the maximum allowed by the system. Such a job cannot execute even with the DIR command. Depending on installation procedures, the job should be evicted, ignored (if memory is temporarily reduced), or transferred to a larger linked system (provided the job has a mainframe identifier). Refer to the description of the U display in section 3, and sections 9 and 10 for more information about multimainframe operation.

Controlling Time Limit

The amount of time that a job can use a central processor is assigned initially as the job enters the system. On the B display, it is reported as time remaining (time limit minus time used). You can enter a new time remaining with the following command:

j.ENTL,nnnnn.

where nnnnn is 1 through 77777 octal seconds; 77777 is an infinite time remaining value.

For an infinite time limit you enter the following command:

j.ENTL,0.

Controlling Job Swapping

An individual job can be called for swapping or rolling out, or it can be inhibited from swapping or rolling consideration. Whether a user job is swapped or rolled depends on resources assigned to the job. If nonallocatable equipment or extended memory is assigned to the job, it is rolled out; otherwise it is swapped.

Jobs you initiate, such as JANUS, are considered to be system jobs and are not swapped or rolled. They cannot be referenced in the swap commands.

Use the following command to roll or swap an executing job.

j.LOCOUT.

This command also prevents a job not at a control point from being assigned to a control point if swapped, or to the central processor if rolled. Jobs that are locked out are not eligible for execution until you release them with the j.UNLOCK command.

To stop a nonsystem job from being swapped or rolled, it must be locked into its control point assignment. Jobs currently swapped or rolled are locked in the next time they are assigned to the central processor by the following command:

j.LOCIN.

The J.LOCIN. command must be used before several other entries to ensure that the job is not swapped before the command is executed. Specifically, j.LOCIN. should precede:

- Calling DIS to that control point.
- Taking a checkpoint.
- Changing central memory contents.
- Calling a display with a control point number.

The effects of both j.LOCOUT and j.LOCIN are nullified by the following command:

j.UNLOCK.

It is needed before j.LOCIN is changed to j.LOCOUT and vice versa.

When a locked job is unlocked, it can be placed in the higher priority express class by using the UNLOCK command with the following format:

j.UNLOCK,EXP.

Jobs that should never be unlocked are system EDITLIB jobs, which become locked in as soon as EDITLIB begins to change the system library tables.

INTERRUPTING PROCESSING

Jobs in execution can be stopped and restarted from the beginning, stopped so that output is returned, or stopped so that all output is lost. Also, any file in the input or output queue can be deleted before system processing completes.

A user job that has not completed execution can be returned to the input queue and restarted from the beginning if the job is not writing or modifying permanent files, or is not an INTERCOM interactive job. Type the following command to stop execution of a job, save the input file and dayfile, but evict all other related files before rerunning the job:

j.RERUN. message

message An optional comment describing the reason for this action.

In a linked NOS/BE system, to stop execution of a job running on a linked mainframe that originated from this mainframe, type the following command:

jid.RERUN.

id Primary ID of the linked system.

If a job cannot be rerun, CANNOT RERUN appears. Otherwise, you can change the priority of the job by typing the following command:

j.RERUN,pp. message

message An optional comment describing the reason for this action.

Priority pp can be an octal value from 0 to 77. If a value is omitted, the original priority on the job statement holds. Output from the first execution is lost, except the job dayfile, which is saved and printed with the final job dayfile.

To stop execution but allow output to be produced, type the following command:

j.DROP. message

message An optional comment describing the reason for this action.

In a linked NOS/BE system, to stop execution of a job running on a linked mainframe that originated at this mainframe, type the following command:

jid.DROP.

id Primary ID of the linked system.

Execution resumes if the program contains error termination procedures, such as an EXIT statement, RPV reprieve processing (refer to the NOS/BE Reference Manual), or a call to routine RECOVR. Otherwise, the job terminates immediately, and the standard output file is printed. The message OPERATOR DROP appears on the dayfile. DROP is often used when irrecoverable parity errors appear during processing.

Only j.DROP can be used to stop execution of INTERCOM jobs.

To stop execution and suppress output, type the following command:

j.KILL. message

message An optional comment describing the reason for this action.

In a linked NOS/BE system, to stop execution of a job running on a linked mainframe that originated at this mainframe and suppress output, type the following command:

jid.KILL.

id Primary ID of the linked system.

This entry terminates the job immediately; however, as with j.DROP, execution can resume by using RPV reprieve processing. If the job is reprieved, a second KILL command terminates the job. All files except permanent files are lost. However, if KILL is used with the permanent file utilities LOADPF and DUMPF, files could be lost. No job dayfile exists, but the message JOB KILLED appears on the system dayfile. KILL can be used when the system cannot proceed because it is waiting for FNT or RBT space.

Once a user job has been dropped or killed, it cannot be executed until it reenters the system as a new job. To evict unit record files such as card reader input, print output, or punch output, type the following command:

EVICT,fileord.

fileord FNT ordinal of the file (from 2 to 7777).

In a linked NOS/BE system, for files residing on a linked mainframe that originated from this mainframe, type the following command:

EVICT,fileordid.

fileord FNT ordinal of the file (from 2 to 777).

id Primary ID of the linked system.

Mass storage assigned to the file is released.

CONTROL OF JOB INITIATION/FILE DISPOSITION

Job initiation and file disposition may be controlled by logical ID. A logical ID consists of three display code characters, A through Z and 0 through 9.

The logical ID table (IDT) contains the mainframe host ID, associated logical IDs, and any physical IDs of currently linked mainframes. If a job/file has a nonzero logical destination ID, the system must find this ID in the logical ID table to process the job/file. The destination ID is the STlid parameter on the job statement and ST=lid on the RQUOTE control statement, where lid is the logical ID. If the destination ID is not found in the logical ID table, the system ignores the job/file; but the job/file is not cancelled. If later, a logical ID is entered into the logical ID table that matches the destination ID of an ignored job/file, the system processes that job/file.

Logical IDs may be added or deleted, but the host ID cannot be changed. To add a logical ID to the logical ID table, type the following command:

ADDID,lid.

To delete a logical ID from the logical ID table, type the following command:

DELID,lid.

lid Three-character logical ID.

The U display shows the contents of the logical ID table.

If L.IDT is set equal to zero when CMR is assembled, the logical ID table is nonexistent. In such case, the commands ADDID and DELID produce the diagnostic ILLEGAL ENTRY on the display and the U display is otherwise blank.

CONTROL OF DEPENDENT JOBS

The job dependency feature allows a group of inter-related jobs to be submitted in any order with execution to occur only in the order specified by the user. The control statement record for each job in the dependency group has a Dyymm parameter on the job statement and a TRANSF statement, for all except the last job.

The dependency identifier for a job is shown on the B and H displays. On the B display, it follows the characters DP under the field length value. On the H display, it appears under the column titled DEP. The H, D subdisplay shows only jobs in an interdependent group.

The identifier has four characters: two letters naming the group and two numbers showing how many jobs must be executed before the present job one can be processed. A job is not brought to a control point until its dependency count reaches zero. The system decrements this count as TRANSF statements if prerequisite jobs are executed.

This feature inhibits execution of a dependent job until jobs on which it depends execute successfully. If a prerequisite job terminates before the TRANSF statement is executed, subsequent jobs remain in the input queue and are not executed until the operator intervenes.

No message is issued when a job in a dependent string terminates abnormally. It is up to the operator to review the H, D subdisplay or to note a dependency identifier on the A or B display for a job that terminates. Two messages on the B display anticipate problems in an interdependent group: CALLING JOB IS NOT DEPENDENT and ILLEGAL PARAMETER LIST. If the jobs shown on the H, D subdisplay have not been processed after a reasonable time, you should consider overriding the dependency count or evicting the jobs from the input queue.

The dependency count nn of a job in the input queue is changed by the following command:

ENDP,nn,jobname.

To override dependency considerations and to force the job into normal processing, type the following command:

ENDP,00,jobname.

To evict all jobs with a given dependency identifier yy, except those submitted from a remote terminal, type the following command:

EVICTD,Dyy.

To evict all jobs with dependency identifier yy including remote jobs, type the following command:

EVICTD,Dyy,R.

The following messages appear as the command is carried out.

BEGIN EVICTD,Dyy

COMPLETE EVICTD,Dyy

If a TRANSF statement calls for decrementing the dependency count of a job that is not in the input queue, the executing job stops and waits for your action. In response to a message asking for a RECHECK, type the following command:

j.RECHECK.

The job dependency routine searches the input queue once more. If a second check does not find the job named on TRANSF, you should continue or drop the original job with either of the following commands:

j.GO.

or

j.DROP.

CONTROL OF SEQUENCER JOBS

The automatic program sequencer is a program which controls the processing of jobs based on the time interval assigned (for example, running diagnostics every 10 minutes). For more information, refer to the NOS/BE System Programmer's Reference Manual, Volume I listed in the preface.

The sequencer is controlled by operator console commands. To initiate the sequencer, the command

SEQ,ON.

is used, starting the clock timer for all jobs in the sequencer table. The message

APR SEQ IS ON.

appears as the sequencer is initiated. If the sequencer is already running when turned on, the message

APR SEQ IS ALREADY ON.

appears on the screen. When a job's clock interval becomes zero (expires), the job is run. The job's clock is reset to its interval value.

To run a job in the sequencer table before its clock interval has expired, the command

SEQ,RUN,nn.

is used where nn is the entry number of the job in the sequencer table obtained from the originator.

To drop a job from the sequencer table, the command

SEQ,DROP,nn.

is used where nn is the entry number of the job to be dropped obtained from the originator. The job is dropped when its clock interval expires.

To change the clock and the interval for a job from their current values, use the command

SEQ,INT,xxxx,nn.

where nn is the entry number of the job to be changed obtained from the originator and xxxx is the octal value in minutes to which the clock and interval are to be set.

To turn off the sequencer, use the command

SEQ,OFF.

TAKING A CHECKPOINT

The CHECKPOINT/RESTART system capability allows all pertinent information about a job in execution, including all its files and their current positions, to be written to magnetic tape so that the job can resume processing at the point processing was interrupted.

Checkpoints are requested by a user program, operator command under DSD, or operator control statement entry under DIS. Restarting the job requires a RESTART control statement entered through DIS or a RESTART statement in a job deck entered through the card reader.

A checkpoint is taken by the following command:

j.CHECKPT.

A checkpoint cannot be taken of a job you initiated.

A job must be assigned to a control point before a checkpoint can be taken. The job must be removed from swap-out or roll-out consideration by a LOCKIN command. When a job includes REQUEST or LABEL statements for a checkpoint dump tape, a tape must be assigned that meets the requirements. If a tape is not requested, the routine requests a tape and uses it as an unlabeled tape. The command formats are as follows:

j.LOCKIN.

j.CHECKPT.

j.ASSIGN xx.

In response to these commands, the system produces a checkpoint file on the assigned magnetic tape. When multiple checkpoints are taken throughout a job, the routine numbers them in ascending order.

After the dump tape is written, the job resumes execution without further operator action. Use of j.UNLOCK. should be considered.

A CHECKPOINT/RESTART cannot be performed in the following cases.

- Rolled-out jobs
- Random files (except random permanent files)
- Multifile volumes
- Extended memory resident files

An informative message occurs each time a checkpoint is requested or taken: CKP REQUESTED, CHECKPOINT nnn ON lfn. If a checkpoint is not possible, the message is NO CHECKPOINT TAKEN. An input/output error for the file produces the message I/O ERROR (CKP) and the entire job terminates. When a job is using permanent files, file position is saved for use when the job is restarted.

If the job for which a checkpoint is taken has any extended memory resident files, it is continued and the following message is issued:

ECS RESIDENT FILE IS INVOLVED (CKP) NO
CHECKPOINT TAKEN

Restart is accomplished under DIS by a sequence such as the following:

n.DIS.

X.RESTART,lfn,n.

ASSIGN xx.

A REQUEST is not needed if checkpoint requested the tape, as RESTART also requests one; it is needed if the tape is labeled. The checkpoint default file name is CCCCCCCC. The number of the checkpoint to be used, n, must not exceed the number of the last one taken.

The RESTART program requests assignment of mass storage files to the same type of device as they were assigned when the checkpoint was taken. You may choose to assign another device.

When restart attempts encounter error messages such as the following, no corrective action is possible.

CKP TAPE INVALID (RESTART)

LOST FILE

RESTART NUMBER TOO BIG (RESTART)

Jobs entered through DIS can correct the format of the control statement when FILE NAME TOO BIG (RESTART) appears.

Successful RESTART control statements produce the message RESTART COMPLETE.

RESPONDING TO USER PROGRAM REQUESTS

A user program communicates with you through the B display. Messages that appear at the job control point may be informative or call for action, such as setting a sense switch. A flashing message requires response before the program can continue.

Response to Flashing Control Statement Images

The most common flashing messages ask you to assign a particular peripheral device to a job.

The control statement can begin with the word REQUEST or LABEL, followed by a parameter list giving details of the equipment wanted.

A LABEL statement is a request for a single reel of magnetic tape. Response to this request is similar to that for a REQUEST with an MT or NT parameter, as discussed under Tape Unit Handling in section 4.

The REQUEST statement asks that the named file be assigned to a particular device. Programmers can request assignment to any device on which files reside. The general format of the request is:

REQUEST (filename,dt,...)

You can ignore the first parameter, which is always the logical file name. The device type parameter, dt, can appear at any point after the first parameter in the list. You must assign the file to the device with the equivalent mnemonic in the EST table.

Mass storage mnemonics are AH, AJ, AY, and AZ. Any parameter that implies RMS or extended memory forces automatic assignment by the system.

If you assign the file to a device type other than that requested, the following message appears:

EST IS WRONG DEVICE TYPE

Depending on the degree of incompatibility between the request and the assignment, one of two messages appears.

If it is possible for the file to be assigned to a different device type (for example, an 844-21 disk is assigned rather than an 844-41 disk), the following message appears:

SHOULD xx BE ASSIGNED.
TYPE N.YES OR N.NO.

If you type n.YES, the device is assigned. If you type n.NO, the original request reappears on the B display and a different device can be assigned.

If the file cannot be assigned to a different device type (for example, a type file assigned to a card reader), the following message appears:

TYPE N.NO AND REASSIGN

You should type n.NO. The original request reappears on the B display and a different device should be assigned.

Input/output device mnemonics are CR, CP, GC, HC, FM, TR, and TP. In the EST display, printer dispositions appear as LR, LS, or LT for the 580 printer. A REQUEST for LR, LS, or LT printer must be assigned to an EST ordinal with the appropriate mnemonic.

Tape drive mnemonics are: MT, NT, and MN. In their absence, a density parameter or code conversation parameter can define the type of drive: L0, HY, HI (seven-track equivalent to MT); PE, GE, HD, US, EB (nine-track for NT drive). Section 4 includes a discussion of responses to tape requests.

The following command assigns the file to a device with EST ordinal xx:

j.ASSIGN xx.

Sending Messages to Jobs

Commands are available to send messages:

- For recording in the job and system dayfile.
- For recording in the job and system dayfile and displaying on the B display.
- To the field length of a program.

The O display also can be used to transmit messages from a standard set.

Messages are entered in the job and system dayfile with the following command:

j.COMMENT message

They are entered in the job and system dayfile, and the B display with the following command:

j.MSG message

A program that pauses for you to send a response to the program requires a CFO response. The program must first have set the CFO bit (14) in RA + 0. The message is placed in locations RA + 70 through RA + 76 of the program field length.

j.CFO message

DSD supplies the space between the command and the accompanying message. Ending punctuation is not required; if it is typed, it becomes part of the message. No more than 36 characters can be sent in any one message.

Setting Sense Switches

Sense switches are logical switches rather than hardware. Set them in response to requests from the programmers.

Set or clear switches, numbered 1 through 6, with the following commands:

j.ONSWn.

j.OFFSWn.

PAUSE Message Response

Programs written in the FORTRAN language can contain PAUSE statements that halt execution until you take some action. The B display shows the message

PAUSE,comment

where comment is an instruction to you.

The instruction can appear as part of the message. If only a number appears, instructions should be available at the console. A typical use would be a request to set a sense switch.

Acknowledge the PAUSE message by entering a GO, DROP, or KILL command that continues, drops, or aborts the job, respectively.

j.GO.
j.DROP.
j.KILL.

PM Message Response

FORTRAN and COBOL language programs can insert operator messages in output files. They are called PM messages because they begin with the two letters PM.

Processing halts and the message is shown on the J display when JANUS encounters a PM message. A typical use would be a request for a new ribbon.

When you have complied with the message, file processing continues after you type the following command

/OKxx.

where xx is the EST ordinal of the device processing the file.

CONTROL THROUGH PROTECTED COMMANDS

Before these commands can be executed, the keyboard must be unlocked with the following command:

UNLOCK.

Channel Commands

Channel commands are used to function hardware channels, numbered 0 through 13 (octal) in a 10 through PP system and 0 through 13, 20 through 33 in a 20-PP system.

DSD does not reserve the channel requested. If the channel command is executed, the keyboard entry is recorded in the dayfile unless the system is in STEP mode.

<u>Channel Commands</u>	<u>Action Initiated</u>
LDAnnnn.	Load pseudo A register with nnnn (number displayed on the M display).
ACNcc.	Activate channel cc.
DCNcc.	Disconnect channel cc.
FANcc.	Activate channel cc with the value of the pseudo A register.
FCNcc.	Function code 0000 (no activity) on channel cc.

<u>Channel Commands</u>	<u>Action Initiated</u>
FCNcc,ffff.	Perform function code ffff on channel cc.
IANcc.	Input a byte from channel cc to pseudo A register.
MCHcc.	Master clear channel cc, used to clear channels connected to a 6681 or 6684 converter.
OANcc.	Output contents of pseudo A register to channel cc.

If a channel should hang active and full or empty when a driver is reserving it, a DCN command should allow the job to continue. This condition indicates a malfunction, however, and should be reported to a customer engineer.

Changing Memory Contents

Absolute locations or those relative to a control point can be changed in central memory. Character values or numeric data can replace current word contents. Both numeric and character data can be entered in a single command to achieve the final 60-bit word representation. Either one 12-bit byte or 60 bits can be changed. If a control point number or JDT ordinal is given in the command, the word addressed is relative to the control point being used. Jobs should be locked in before memory is changed.

The number of digits or characters typed after the address location depends on the mode: 10 characters or 20 octal digits, or any combination that results in 20 octal digits is possible. Address locations must be within the job field length.

A single byte can be changed by inserting the byte number after the location. Bytes are numbered 0 through 4 from left to right.

Character data is converted to its display code equivalent for storage. Each character is represented as 6 bits. Blanks are significant in a character field; they are converted to display code 55. Characters are assembled left-justified. If fewer than 10 characters are typed, the remainder of the word is zero filled.

aaaaaa,nnn...n.	j. or n.aaaaaa,nnn...n.
aaaaaa,b,nnnn.	j. or n.aaaaaa,b,nnnn.
aaaaaa	Address
nnnn	Numeric string
b	Byte number

Mixed character and octal commands are valid only when absolute addresses are specified. The address must be given in octal, followed by a slash. Thereafter, a slash changes the assembly mode in effect. Character data is assumed after the address. An asterisk terminates the entry.

Examples:

10/*	Clears location 10.
32/NEWSYS HDR*	Stores the display coded equivalent of NEWSYS HDR in location 32.
2416/AFNTNAM/30 7001*	Changes the contents of 2416 to 0106 1624 1601 1530 7001.
3712//307001/AFNTNAM*	Changes the contents of 3712 to 3070 0101 0616 2416 0115.

Memory entry commands are often used by experienced operators or programmers in an attempt to correct a malfunction; however if MTR has a copy of the memory word, the corrected word may not be reread.

Commands beginning with a JDT ordinal or control point number are not accepted for extended memory. Addresses are absolute except when extended memory is partitioned in which case they are relative to the partition RE. In either case, the address of a location to be modified agrees with the address of the location as shown on the X display in section 3.

aaaaaaaaX,nnnnn...n

This command changes the contents of octal location aaaaaaaaa. Mixed character and octal values cannot be specified. Only octal digits are accepted in the extended memory format for the command. If fewer than 20 octal digits are typed, the remainder of the word is zero filled.

Changing Parameters for Scheduler

The scheduling routine brings jobs to control points and subsequently assigns them to the central processor. Following are classes of jobs considered, as identified on the S display.

- Batch jobs with no nonallocatable device assigned
- Batch job with tapes assigned
- INTERCOM jobs
- Multiuser jobs
- Express jobs
- Graphics jobs
- Extended memory jobs

Within each class, jobs are assigned on the basis of priority. The next job to be assigned a control point is selected by the scheduler on the basis of the time a job has waited to be assigned, its class, and its original priority. Different classes of jobs are scheduled using parameters in the job control area shown on the S display. By changing parameters of one class relative to another class, you can guide the scheduler in efficiently processing any particular mix of jobs. For example, heavy swapping can be reduced by increasing the time that each class retains control of the central processor. Suggested values appear in the NOS/BE Installation Handbook.

Job class parameters (refer to S display, section 3) are changed for classes 1 through 7 by the following commands. Class i receives the value nnnn. The new values remain in effect until the system operation is stopped or until the values are changed again.

AFL,nnn.	Sets the number of central memory words, in multiples of 1000 octal, that the scheduler attempts to reserve in anticipation of jobs in INTERCOM or higher classes.
ARI,nnnn.	Sets aging rate 0 through 7777.
BON,nn.	Sets extended memory priority bonus 0 through 77.
BQI,nnnn.	Sets base factor 1 through 7777.
BQO,nnnn.	Sets base factor 1 through 7777 for jobs when they are first initiated from the input queue.
MAXE,nnnnn.	Sets extended memory total commitment in multiples of 1000 (octal) word blocks.
MAXNi,nnnn.	Sets maximum number of jobs in class 1 (BA) or 2 (DE).
MAXQPi,nnnn.	Sets maximum class priority 1 through 7777.
MFL,nnnn.	Sets maximum job field length to nnnn*100 octal central memory words. nnnn cannot exceed 37777. This parameter should be changed only during system initialization. Refer to the NOS/BE Installation Handbook for further information.
MFLE,nnnn.	Sets maximum job extended memory field length to nnnn*1000 octal words.
MINQPi,nnnn.	Sets minimum class priority 1 through 7777.
QPi,nnnn.	Sets job priority when swapped in.
QPO,nnnn.	Sets job priority for a swapped-in job if it was initiated from the input queue.

The S display must be called and the keyboard unlocked before these commands can be used.

REMOTE SYSTEMS CONTROL

The following subsection describes INTERCOM operation, EXPORT operation, and Remote Diagnostic Facility operation.

INTERCOM OPERATION

INTERCOM allows users at remote terminals to submit jobs to run interactively or in batch mode at the central site. INTERCOM supports Teletypes, Teletype-compatible terminals, 200 USER terminals, HASP terminals, and 2780/3780-type terminals.

INTERCOM supports only the 2550-type communication subsystem. The user can specify alternative 2550 configurations with the TDFILE command. To initialize INTERCOM, the user must first create a permanent file with the name INIDfid using the TDFGEN utility (refer to section 6 for more information on TDFGEN). The suffix fid in terminal definition file INIDfid is normally the mainframe (host) identifier but can be changed to any three alphanumeric characters if a different 2550 configuration is required. The Q display header shows the current fid and new fid values. The command

TDFILE,fid.

changes the name of the terminal definition file to be used the next time INTERCOM is initialized. For 180-class mainframes, the changes occur when neither INTERCOM nor RDF is running and one of them is initialized. The command

TDFILE.

resets the name of the terminal definition file to the default or original value. The TDFILE command does not affect INTERCOM if it is already running. On 180-class mainframes, the TDFILE command does not affect INTERCOM if either INTERCOM or RDF is running.

You must activate INTERCOM before users can submit jobs from remote sites. INTERCOM is a subsystem that runs at control point 0. Individual user jobs submitted through INTERCOM appear in the B display, but INTERCOM itself does not.

When bringing up INTERCOM, you can activate all or only selected NPUs in the system. You must ensure that each NPU to be activated is on, as indicated in the EST display.

To bring up all of INTERCOM, enter the command:

INTERCOM.

To bring up a particular NPU, enter the command

INTERCOMxx.

for each channel, where xx is the EST ordinal of the NPU to be activated. If there is more than one NPU on a channel when INTERCOM xx. is entered, a driver capable of driving all NPUs on that channel is brought up. For example, assuming EST 52 and EST 53 are on the same channel, entering INTERCOM 52 brings up a driver for both 52 and 53.

The A display should be on one screen while INTERCOM or RDF is being brought up. Messages reporting any difficulties with system activation appear only on this display. If the following message appears, INTERCOM or RDF cannot be activated:

SYSTEM NOT CONFIGURED FOR INTERCOM/RDF

INTERCOM needs the time of day to calculate user processing time. When the operating system is using elapsed time since deadstart, rather than actual time, an * appears with the time of day on the left screen header, and you must enter a TIME command. On the A display, a message asks for operator action.

PLEASE ENTER TIME

The TIME command is that used at deadstart:

TIME.hh.mm.ss

If EDITLIB is executing INTERCOM or RDF, initialization is delayed. The A display shows the following message:

WAITING FOR EDITLIB

If INTERCOM must wait for central memory to be assigned, the following message appears:

WAITING FOR STORAGE

During operation, the bottom of the right screen shows the INTERCOM processing capabilities activated

INTERCOM xx yy zz

where xx yy zz are the ESTs with an active driver.

Any messages sent to you from remote terminals flash in the line below the TIME command.

To prevent new users from logging in, type the following command:

ILOCK.

As a result, the following message is sent to the user when the INTERCOM or RDF LOGIN command is used:

LOGIN NOT PERMITTED AT THIS TIME.

To rescind ILOCK and allow users to access INTERCOM or RDF again, type the following command:

IUNLOCK.

Clearing INTERCOM

You can remove all or only a part of INTERCOM from the running system. To drop INTERCOM completely, enter the following command:

INTERCOM,DROP.

To drop only one portion of the INTERCOM capabilities, enter the command

OFFxx.

where xx is the EST ordinal of the NPU to be dropped from the system. If a channel has more than one NPU, all NPUs on that channel must be turned off before the driver is dropped. The EST ordinal of the NPUs already turned off is flashed in the INTERCOM display area if another NPU must be turned off before the driver can be dropped.

You should inform users when a NPU is intended to be dropped. For example, M,**, 2550 52 WILL GO DOWN IN 10 MINUTES. Refer to INTERCOM User Message Handling later in this section.

Turning NPU Line On or Off

INTERCOM allows you to turn Network Processing Unit (NPU) lines on or off. To turn a line off, enter the following command:

```
LINEOFF,xx,nnn.
```

where xx is the EST ordinal of the NPU and nnn is the line number.

Use the LINEOFF command to turn off a line that is out of service or to disable a line that is not present but the system is configured for its presence. Entering the LINEOFF command also suppresses the following flashing message that appears on the right screen:

```
| FE xx LINE nnn OFF.
```

where xx is the EST ordinal of the NPU and nnn is the line number.

Turning off a line that is being used causes the user to be disconnected.

To turn a line on, enter the command

```
LINEON,xx,nnn.
```

where xx is the EST ordinal of the NPU and nnn is the line number.

Use the LINEON command to restore service to a line previously turned off.

Logging Out a User

You can log out an INTERCOM user by entering the command

```
ILOGOUT,uu.
```

where uu is the two-character user identifier.

Using the ILOGOUT command to log out an INTERCOM user does not affect the state of the NPU line; another user can log in on the same port.

INTERCOM/NPU Restart

INTERCOM or NPU restart is an internally generated sequence of software functions that performs an idle-down, diagnostic dump, and reinitialization of the INTERCOM subsystem. INTERCOM restart is initiated only when INTERCOM internally detects a recoverable central memory table error or an NPU failure. To an INTERCOM terminal user, INTERCOM restart recovery is equivalent to a full running system deadstart recovery. An NPU restart is initiated only when multiple 2550s on different channels are active and a failure is detected on one 2550. In this case, users on the failing 2550 are disconnected.

When a restart is initiated, the control point zero right-screen display presents a flashing message: INTERCOM RESTART or NPU RESTART. This informative message remains on the right screen until you acknowledge with the ACK. command.

During an INTERCOM restart recovery, a series of temporary messages appear in the INTERCOM display at the bottom of the right screen. The messages are first, DROPPING, and then, INITIATE. After these messages, the running INTERCOM display returns to the bottom of the right screen. After an INTERCOM or NPU restart, all INTERCOM equipment that is logically on is reinitialized.

When an INTERCOM or NPU restart is completed, the system dynamic dump file contains a dump of peripheral processor and central memory at the time of the failure that initiated the restart. To get a listing of the dump, refer to the description of the LISTCID utility (refer to section 6).

Operator-Initiated INTERCOM Restart

If INTERCOM is not functioning properly, consult the site analyst.

If necessary, do an operator-initiated restart by clearing a control point and entering the following command:

```
n.X INTRST.
```

The system responds in the same way as it does to an internal INTERCOM restart as described previously.

A master clear of the failing 2550 will produce a dump of the 2550 as well as a dump of INTERCOM. Consult a site analyst or customer engineer for more details.

Diverting Files

Under standard INTERCOM operation, output from jobs submitted from a remote site is returned to that site. The user at the remote site can divert output to another remote site or the central site. You can also divert output.

The terminal ID is a two-character identifier of a particular remote site. It appears on the H and R displays when a file does not originate from a job submitted at the central site.

To divert all files with a particular disposition code to another mainframe or terminal, type the following command:

DIVERT,dc,idd,ids.

dc Disposition code:

A All files associated with the terminal are affected.

IN Input file. The job's output files carry the identifier of the terminal named in the DIVERT command, rather than the ID of the originating terminal.

PR Any available printer.

LR 580-12 printer.

LS 580-16 printer.

LT 580-20 printer.

PU Card punch.

idd Mainframe ID/terminal ID to which the file is diverted. If the mainframe ID is omitted, the local mainframe is assumed.

ids Mainframe ID/terminal ID of files to be diverted if their disposition code is dc. If the terminal ID is omitted, the central site is assumed. If the mainframe ID is omitted, the local mainframe is assumed.

Example:

To divert all files with dc=PR from terminal AY to terminal AX, type the following command:

DIVERT,PR,/AX,/AY.

To divert a single output file to another mainframe or terminal, type the following command:

ENID,fileord,id.

fileord FNT ordinal of the output file.

id Mainframe ID/terminal ID.

If the mainframe ID is omitted, the local mainframe is assumed.

If the terminal ID is omitted, the terminal ID for the file is changed to local (central site).

Examples:

ENID,23

Changes the destination ID to host mainframe (which appears as blanks) and the terminal ID to central site (which also appears as blanks) for the output file at FNT ordinal 23.

ENID,24/AB

Changes the destination ID to host mainframe and terminal ID to AB for the output file at FNT ordinal 24.

ENID,25,MFA.

Changes the destination to MFA (unless MFA is the host ID) and the terminal ID to central site for the output file at FNT ordinal 25.

To divert a single input file to another mainframe or terminal means that you have the capability to change the source ID and/or terminal ID associated with an input file. Use of this command on input files to change the source ID is not recommended.

Example:

ENID,26,/XX.

Changes the terminal ID to XX for the input file at FNT ordinal 26.

Files with certain characteristics cannot be processed if they are diverted. For example, printer output files with an ASCII internal characteristic are not processed by JANUS unless a printer is available with the appropriate print train; files with an LR, LS, or LT disposition code must be diverted to a location having a 580-12, 580-16, or 580-20 printer, respectively. Similar considerations should be given to files that require special cards or paper forms (FC).

Scheduler Class of Jobs

Individual user jobs submitted through INTERCOM facilities become part of the system along with jobs submitted at the central site. For scheduling and swapping purposes, they are classed as batch, INTERCOM, or multiuser jobs, depending on the commands entered by the user at this terminal.

Batch class jobs are remote jobs submitted for batch processing. One JDT ordinal is retained throughout execution at the central site.

Multiuser class jobs result when the user enters a command for the EDITOR routine of INTERCOM. The job then comes under control of the multiuser job routines in INTERCOM. All such user jobs appear at a single control point with the EDITOR identifier. They are classed as MUJ jobs.

INTERCOM User Message Handling

In messages between the remote and central sites, the user is known by the two-character user identifier that appears in the system dayfile when it is logged in. All messages between these sites are logged in the system dayfile.

A message from a remote user is displayed at the bottom of the right screen in the following format:

id,message

id is the user identification. No other messages from remote users can be received until you acknowledge the message, clearing it from the screen with the following command

M,id

A message can be sent to a user with the following command

M,id,message

To all connected users, the following command applies:

M,**,message

Messages may not exceed 43 characters. Ending punctuation is not required.

EXPORT OPERATION

EXPORT is a system job that allows users to submit batch jobs to a central site computer from batch terminals at remote sites. These are 1700 terminals connected to 6673/74 multiplexers. Since EXPORT is a system job, it must be running at a control point before remote jobs can be submitted. You call it to a control point with the following command:

n.X EHS.

Hardware Error Detection

If the 6673/74 multiplexer is not available, or if it is not properly configured, EXPORT will not be initialized and the following message will appear in the B display for the EXPORT control point:

NO DSC AVAILABLE

If EXPORT has been initialized and no terminals are active, the following message will appear in the B display for the EXPORT control point:

NO ACTIVE LINE

Communication

Once communication is established between EXPORT and at least one user, the NO ACTIVE LINE message is replaced by the following:

0.xxx 1.xxx 2.xxx 3.xxx 4.xxx 5.xxx 6.xxx 7.xxx

where the numbers 0 through 7 are the lines over which messages are sent,[†] and the xxx represents messages that indicate either the status of the terminals connected to these lines or the status of the communication links for these lines. These messages can be informative only or they can require your action.

<u>xxx</u>	<u>Informative Messages</u>
ON	Terminal is in communication mode but data is not being transmitted.
I/O	Terminal is sending or receiving data.
OFF	Terminal is inactive.
blank	Line is not attached.
xxx	Message Requiring Operator Action
STO	Requests you to free memory storage for input from this terminal.
ERR	DSC hardware error. You can drop EXPORT or request customer engineer service.
RXT	Prescribed maximum number of retransmissions was exceeded in an attempt to recover from an error. This was probably due to a hardware malfunction. If the problem persists, the terminal eventually turns off and the user at the remote site must reestablish communication.
PAR	Irrecoverable parity error on mass storage device.
MSG	A message is being sent to you from the terminal user. The message appears on the second line of the EXPORT control point display. No other message from remote EXPORT users can be received until you acknowledge the message. The message is acknowledged by entering the following command: n.GO.

where n is the control point at which EXPORT is running.

[†]If the hardware configuration cannot accommodate more than four terminals, lines 4 through 7 are not represented in the display.

Example:

The following appears on your display screen:

```
0.ON 1.STO 2.ON 3.ERR 4.MSG 5.OFF 6.I/O  
I NEED TAPE REEL 2608
```

The individual entries specify the following conditions:

```
0.ON    Terminals 0 and 2 are communicating but  
2.ON    not transmitting.  
  
1.STO   EXPORT is requesting storage in CM for  
        data from terminal 1.  
  
3.ERR   Terminal 3 has encountered a DSC error.  
  
4.MSG   Terminal 4 is transmitting the message  
        on the second line:  
  
        I NEED TAPE REEL 2608  
  
5.OFF   Terminal 5 is shut down.  
  
6.I/O   Terminal 6 is sending or receiving data.  
  
        Terminal 7 does not exist.
```

You can send a message to a remote EXPORT user with the following command:

```
n.MSG xm...m
```

n Number of the control point at which EXPORT is running. This is required.

x Number of the communication line of the receiving terminal. If this is omitted, the following is displayed:

INVALID LINE NUMBER

mmm...m Message of 1 to 27 alphanumeric characters. If this is either omitted or contains more than 27 characters, the following message is displayed:

COMMENT LENGTH
ERROR

Error Processing

If EXPORT detects an internal error, it initiates a dynamic dump with diagnostics and the following message appears at the EXPORT control point:

EXPORT ABORT.

When this message appears, you should terminate EXPORT by entering either

n.KILL.

or

n.DROP.

KILL cancels all output; DROP does not.

When EXPORT aborts, the dynamic dump file produced gives the memory content of the peripheral processor and central memory at the time of the abort. (To get a listing of the dump, refer to the description of the LISTCID utility in section 6.)

You can resume EXPORT processing by reinitializing it with the following command:

```
n.X EHS.
```

REMOTE DIAGNOSTIC FACILITY OPERATION

The Remote Diagnostic Facility (RDF) allows maintenance personnel to submit on-line maintenance jobs interactively through teletype or teletype-compatible terminals. RDF uses the two-port multiplexer (TPM), which is only built into 180-class mainframes.

RDF shares the same tables and buffers and uses the same initialization routines as INTERCOM. Refer to INTERCOM Operation earlier in this section for a description of this initialization. To successfully bring up RDF, the TPM must be properly defined in the terminal definition file and in the EST with an RM entry.

Start RDF operation and engineering mode (if not already on) with the following command:

```
RDF,P,R,n.
```

The parameters are optional and order-independent.

P Privileged mode. In this mode, control statements of privileged users are not checked to ensure that a maintenance function is being performed. A privileged user's password file entry specifies that validation need not occur. If you omit the P parameter, RDF validates the control statements of all users.

R Resident mode. When in this mode, RDF remains active, regardless of terminal activity, until RDF is dropped or is taken out of resident mode. If you omit R, RDF is in nonresident mode. In nonresident mode, the system drops RDF immediately after a user logs out or if a user does not log in within 15 minutes after initialization or 15 minutes after a phone-line interruption.

n Port number of the two-port multiplexer; n is 0 or 1. If you omit the port number, 1 is assumed. Port number parameters on RDF commands following the initial RDF command are ignored. The standard configuration is a local hardwired terminal connected to port 0 and a dial-up modem connected to port 1.

You can also enter this command while the subsystem is running. In this case, you can only change the state of the P and R parameters; RDF ignores the n parameter. This allows you to change subsystem modes from privileged to unprivileged or resident to nonresident (or vice versa) without interrupting current execution. To change ports, you must drop RDF and restart it.

To drop RDF enter the following command:

RDF,DROP.

The system drops RDF immediately if no user is logged in; otherwise, a terminal message informs the user of the drop. The system gives the user a period of time to log out. If the user does not log out, the system logs out the user before dropping RDF.

NOTE

This command affects the RDF driver only. INTERCOM must be dropped with a separate command.

When running RDF, the last 10 characters of the INTERCOM status line (at the bottom of the right screen) display the status of the RDF subsystem. This field contains the following:

RDF,P,R,n.

n Port number of TPM.

P and R appear only when RDF is running in privileged and resident mode, respectively.

MONITOR DISPLAY DRIVER OPERATION

The Monitor Display Driver (MDD) is a diagnostic tool which enables a customer engineer to read and write the maintenance registers and central memory. MDD uses the two-port multiplexor (TPM), which is only built into 180-class mainframes.

To start MDD operation, first unlock the console using the UNLOCK command and enter the following DSD command:

MDD,D,n.

The parameters are optional and order-independent.

D Dedicated mode. In this mode, MDD stays in a PP until it is terminated by the user at the terminal. Thus, the user has an unlimited amount of time to establish a connection to MDD after either MDD initialization or a broken connection. If you omit D, MDD is in nondedicated mode. In this mode, you must establish a connection within 15 minutes after MDD initialization. If the connection is broken, MDD remains in a PP until it is terminated. (Remember, MDD can only be terminated from the terminal).

n Port number of the two-port multiplexor; n is 0 or 1. If you omit the port number, 1 is assumed. The standard configuration is a local hardwired terminal connected to port 0 and a dial-up modem connected to port 1.

SYSTEM MODIFICATION BY EDITLIB

EDITLIB is a utility program for creating and maintaining library files. When it is used by a programmer to manipulate user library files or to create a deadstart tape, no action is required. EDITLIB cannot make changes to the running system library if the installation deletes a routine essential to EDITLIB operation. Otherwise, any attempt to change the running system requires operator authorization.

Before EDITLIB changes the running system, it displays the following message and waits for a response:

EDITLIB WARNING - GO OR DROP

If the system is to be changed, type the following command:

j.GO.

If the system is not to be changed, type the following command:

j.DROP.

Once the GO is accepted, EDITLIB becomes a locked-in job and proceeds with manipulation of the running system library. You must not unlock the job before the new directory is in place. The EDITLIB job cannot be dropped while directory changes are in progress. If an attempt is made to drop, rerun, or kill the EDITLIB job, the job continues and the following message appears:

NOT ALLOWED TO DROP EDITLIB

While EDITLIB is changing the directory, DSD cannot interpret commands. Any attempt to make keyboard input produces the following message:

WAIT EDITLIB.

Some EDITLIB directives which change the running system are incompatible with INTERCOM and RDF operation. When the following message appears, either the EDITLIB job or INTERCOM and/or RDF must be dropped. Dropping EDITLIB is possible at this point since changes to the system have not been started.

CANNOT RUN EDITLIB WITH INTERCOM/RDF
DROP EDITLIB OR INTERCOM/RDF
(N.GO.)

Dropping INTERCOM or RDF destroys user jobs in process. Follow the installation procedure for notifying users of the impending event. To prevent new users from accessing INTERCOM or RDF, the following entry should be used:

ILOCK.

Once INTERCOM and/or RDF is dropped, the EDITLIB job is authorized to continue when j.GO is typed.

SYSTEM MODIFICATION BY LDCMR

LDCMR is a utility program to load and modify the extended memory copy of CMR. You may also use LDCMR to automatically obtain a load map or to catalog a cycle of ZZZCMR. All attempts to modify the running system or the extended memory copy of the running system require your authorization.

In response to the messages by LDCMR, type j.GO. to alter the new extended memory system, to start the alternate extended memory system, or to replace the old extended memory system with the new system. Otherwise, type j.DROP.

An LDCMR directory move is incompatible with INTERCOM or RDF. LDCMR avoids moving the directory unless necessary. If an INTERCOM/RDF table move is necessary, the following message appears:

DROP INTERCOM/RDF THEN TYPE N.GO

If INTERCOM must stay up, type the following command:

j.DROP.

To drop INTERCOM and/or RDF, follow the installation procedure for notifying users of the event. To prevent new users from accessing INTERCOM or RDF, type the following command:

ILOCK.

To continue LDCMR once INTERCOM is dropped, type the following command:

j.GO.

If the following message appears, you must purge a cycle of ZZZZCMR before LDCMR continues:

PURGE A CYCLE OF ZZZZCMR THEN
TYPE N.GO

The parameters required for PURGE are ID=SYSTEM, TK=ECSSYSTEM, and PW=XNOX. After a cycle of ZZZZCMR, type the following command:

j.GO.

Otherwise, type the following command:

j.DROP.

The system contains a variety of utility routines for your use. Some, such as the BLANK and DMPF routines, are useful only to you and must be entered through the console. Others, such as the copy routines, may be called by control statements in a job or by direct calls for the routines through DIS.

PERMANENT FILE UTILITY ROUTINES

The permanent file system contains the following utility routines:

DUMPF	Dumps files to magnetic tape.
LOADPF	Reloads files dumped by DUMPF.
PFLOG	Dumps the permanent file catalog (PFC) to magnetic tape.
GENLDPF	Reads the tape created by PFLOG and generates LOADPF jobs according to the PFC entries on the tape.
TRANSFP	Processes file transfers between permanent file tables and members of a device set.
AUDIT	Produces statistics about files.
AN additional utility is provided for your use only.	
PFDDUMP	Operator-requested dump of permanent file tables on disk.

These utilities can be called by control statements or through direct calls for the routines under DIS. DSD may be used to call AUDIT for system device sets only. Before the DUMPF, LOADPF, PFLOG, GENLDPF, and TRANSFP utilities can be used with set devices, it is necessary to catalog a dump file on the device set to be dumped. The dump file must have the permanent file name of DUM, an ID of PUBLIC, and permission as follows:

RD=rd	Password corresponds to mode 1 execution of DUMPF.
MD=md	Password corresponds to mode 2 execution of DUMPF.
CN=cn	Password corresponds to mode 3 execution of DUMPF.
EX=ex	Password permits execution of LOADPF.

If a DUM permanent file exists with password TK=DUMPF for earlier systems, it must be purged. Create a new DUM permanent file as described previously.

Job decks should not contain ATTACH statements to access DUM because the attach occurs within the

routine. The proper passwords must appear on the utility control statement. Field length requirements need not be specified since the system provides them.

The required sequence for job deck statements follows:

Example 1:

```
job statement
mount statement for set devices
utility call for TRANSFP or AUDIT
6/7/8/9
```

Example 2:

```
job statement
REQUEST(DUMTAPE,S,N)           for DUMPF
OR PFLOG
or
REQUEST(DUMTAPE,S,E)           for LOADPF
utility call for DUMPF or LOADPF
6/7/8/9
```

The REQUEST statement preceding a DUMPF requires a labeled S tape with 800-bpi (seven-track) or 1600-bpi (nine-track) density to be compatible with archive retrieval processing.

For DUMPF, LOADPF, PFLOG, and GENLDPF, the tape is rewound prior to writing or reading, and unloaded at job termination.

DUMPF UTILITY

The DUMPF utility is used to dump all permanent files from a mass storage device or to selectively maintain a file backup system. A permanent file dumped by the utility may or may not remain available for use in the running system, depending on the mode specified in the call, as well as installation policy. Files must be dumped to a labeled S tape, either seven- or nine-track.

The DUMPF control statement format is:

```
DUMPF(PW=pw,L=lfn1,CL,MO=mode,SN=setname,
VSN=vsn,I=lfn2,DP=dump,ID=owner,PF=pfn,CY=cy,
AC=ac,NB,IN=ddd,JN=yyddd,DA=yyddd,LA=mmddyy,
CD=mmddyy,TI=hhmm)
```

Only PW is required; all other parameters are optional and order independent. Only one CD, DA, JN, LA, or IN parameter may appear.

PW=pw	RD, MD, or CN password for DUM, depending on the mode of the dump.
-------	--

L=lfn1	Output listing file. Default is OUTPUT.
--------	---

CL	Complete list option. All files in the permanent file directory are listed. If CL is omitted, information is listed only for files that are dumped.	in any of the following formats. ID=, PF=, CY=, AC=, and SK are the only parameters allowed on directives. ID should be specified; if PF is specified without the ID parameter, then ID=PUBLIC is assumed.
MO=mode	Dump mode:	
	1 The RD password must be specified in the PW list. All permanent files are dumped as backup, leaving the permanent file tables and all associated mass storage space intact. Default condition.	ID=owner
	2 The MD password must be specified in the PW list. Mass storage space is released, but permanent file tables remain intact, with the files designated to an archive tape.	AC=ac, ID=owner
	3 The CN password must be specified in the PW list. All permanent file tables and mass storage spaces are released as the files are dumped.	ID=owner, PF=pfn
	Before DUMPF executes in mode 2 or 3, you must respond to the following message:	ID=owner, PF=pfn, CY=nnn
	THIS WILL BE A DESTRUCTIVE FILE DUMP TYPE GO OR DROP	When the I parameter is used, the date and time of last dump are not modified.
SN=setname	Names a device set; one to seven letters or digits beginning with a letter. All member files of this set are dumped. The master device in this set must have been previously mounted.	The skip parameter (SK) on the following input directives allows permanent files with specified parameters to be skipped:
VSN=vsn	Dump files from this device of device set specified by SN; one to six letters or digits with leading zeros assumed. VSN is ignored if SN is omitted.	ID=owner, SK
I=lnf2 or I	Names a directive file; one to seven letters or digits beginning with a letter. If omitted, INPUT is assumed.	AC=ac, SK
	If a directive file is used, the following parameters are not allowed on the DUMPF statement: ID, PF, CY, AC, JN, LA, IN, DA, CD, TI, and VSN. The directive file contains one or more directives	ID=owner, PF=pfn, CY=nnn, SK
		Dump type:
		A All files are dumped. Default condition.
		X All files with expiration dates equal or prior to current date are dumped.
		C All files modified, renamed, cataloged, or extended since the last DP=C or DP=A dump are dumped.
		ID=owner All files with the specified identification are dumped.
		PF=pfn Permanent file named is dumped. The ID=parameter also must be specified.
		CY=cy Cycle number of a permanent file. If the PF and ID parameters are not present, the CY parameter is ignored. If the requested cycle of the permanent file cannot be found, a message is issued and DUMPF continues.
		AC=ac All files with the specified account number are dumped.
		NB Only files which are found to be not busy are dumped.

IN=ddd	All files not attached within the number of days given from time 00.00 are dumped. The TI parameter may be used to modify the time.
JN=yyddd	All files last attached before time on this Julian date (five-digit, year and day of year format) are dumped. The TI parameter may be used to modify the time.
DA=yyddd	All files cataloged, modified, renamed, or extended after time hh.mm on this Julian date are dumped. Time may be modified by the TI parameter.
LA=mmddyy	All files last attached before time on this calendar date are dumped. The TI parameter may be used to modify the time.
CD=mmddyy	All files cataloged, modified, renamed, or extended after time on this calendar date are dumped. The TI parameter may be used to modify the time.
TI=hhmm	A four-digit time value. This parameter may be used to modify the CD, DA, JN, LA, or IN parameters. If none of these parameters are given, TI is ignored.

Several copies of this routine can execute simultaneously only if all jobs request the same mode and type of dump.

If one copy of DUMPF aborts prior to completion when multiple copies are run, the files dumped by the aborted DUMPF are not dumped by the remaining copies.

As files are dumped, the following status messages appear on the B display:

```
DUMPING pfn
n FILES DUMPED
DUMP COMPLETE
```

When DUMPF is executed, the following information for each file cycle dumped is listed.

- Permanent file name
- Cycle number
- Owner ID
- Volume serial number (VSN)
- Comments

DUMPF needs exclusive access to a permanent file before it can be copied to tape. If a file to be dumped is in use by another job, DUMPF skips it and places it on a busy file list. After DUMPF has attempted to dump all desired files and has some files on the busy file list, it displays the following on the B display:

WAITING ON ACTIVE FILES

SEE L-DISPLAY

DUMPF continues execution and tries to dump all files on the busy file list until all are dumped. The busy file list may be displayed by assigning the L display to the DUMPF job.

If the dump spans more than one magnetic tape, the VSN of the first and of the last tape is listed, indicating the span of tapes used to contain the dumped files.

Examples of DUMPF decks:

- In this example, the job DAYDMP dumps all files cataloged, modified, renamed, or extended after the Julian date of the 164th day in 1985.

```
DAYDMP,...
REQUEST(DUMTAPE,NT,PE,S,N)
DUMPF(PW=PERM1,DA=85164)
6/7/8/9
```

- Job SELDMP dumps the files specified in the input section of the control statement record. All files with ID DEVCTR are dumped.

```
SELDMP,...
REQUEST(DUMTAPE,MT,HY,S,N)
DUMPF(PW=PERM1)
7/8/9
ID=DEVCTR
PF=FILE1, ID=LER
PF=FICHE, ID=GFS, CY=1
6/7/8/9
```

- The following job illustrates a 10-day archive dump:

```
ARCHIVE, ...
PAUSE. BRING UP P DISPLAY TO
INSURE DUMP TAPE HAS A VSN.
REQUEST(DUMTAPE,MT,HY,S,N)
DUMPF(MO=2,IN=10,PW=PERM2)
6/7/8/9
```

LOADPF UTILITY

The LOADPF utility reloads permanent files dumped by the DUMPF utility on labeled S tape. All files or those files meeting specified conditions are loaded, depending on parameters on the LOADPF control statement.

The LOADPF control statement format is:

```
LOADPF(PW=pw,LP=load,L=lfn1,CL,ID=owner,PF=pfn,
CY=cy,AC=ac,I=lfn2,SN=setname,VSN=vsn,IN=ddd,
JN=yyddd,DA=yyddd,LA=mmddyy,CD=mmddyy,TI=hhmm,OR)
```

Only PW is required; all other parameters are optional and order independent. Only one CD, DA, JN, LA, or IN parameter may appear.

PW=pw LOADPF execution password.

LP=load Load parameter:

- A Loads all files. Default condition. Existing files are replaced if file is not complete or file is not disk resident.
- X Skips files with expiration date prior or equal to current date.
- R Replaces existing files with dumped files. Both X and R parameters may be used in the form LP=X,R.
- P Reloads only files listed in the permanent file directory that are not disk resident (archived).
- O Reloads files from a dump tape in SCOPE 3.2 or 3.3 format. The O option may be used with other LP parameters in the form LP=R,O,X. If X is not specified, default is NOS/BE format.

L=lfn₁ Designates the file to receive the listing: one to seven letters or digits, beginning with a letter. Default is OUTPUT.

CL Lists all files on the dump tape rather than just those that are reloaded by LOADPF. If CL is omitted, only loaded files are listed.

ID=owner All files having the owner identification given with this parameter are loaded.

PF=pfn Only the file with the specified permanent file name is reloaded. The PF parameter must be accompanied by the ID parameter, giving the owner identification of the file. Optionally, it also may be accompanied by the CY parameter.

CY=cy Cycle number of file identified by PF and/or ID parameters.

AC=ac

I=lfn₂

or

I

All files with the specified account number are loaded.

Names a directive file, one to seven letters or digits beginning with a letter. If omitted, INPUT is assumed. If a directive file is used, the following parameters are not allowed on the LOADPF statement: ID, PF, CY, AC, JN, LA, IN, DA, CD, TI, and VSN. The directive file contains one or more directives in any of the following formats. ID=, PF=, CY=, AC=, and SK are the only parameters allowed on directives.

ID=owner

AC=ac

AC=ac, ID=owner

ID=owner, PF=pfn

ID=owner, PF=pfn, CY=cy

The skip parameter (SK) on the following input directives allows permanent files with specified parameters to be skipped.

ID=owner, SK

AC=ac, SK

ID=owner, PF=pfn, CY=cy, SK

SN=setname

Names the device set to which files are to be loaded: one to seven letters or digits beginning with a letter. The master device for the device set must have been mounted previously.

VSN=vsn

Volume serial number of the device set specified in the SN parameter, one to six letters or digits with leading zeros assumed. If VSN is given, the SN parameter must appear.

IN=ddd

All files not attached within the number of days given from time 00.00 are dumped. The TI parameter may be used to modify the time.

JN=yyddd

All files last attached before time on this Julian date (written as five digits in the form yyddd) are loaded. The time value may be modified by the TI parameter.

DA=yyddd	All files cataloged, modified, renamed, or extended after time hh.mm on this Julian date are dumped. The time value may be modified by the TI parameter.	OR	Allows loading of file with device type and/or allocation style different from the type and style defined on the set to which files are loaded. If OR is not specified, a file with differing device type and/or allocation style is not loaded.
LA=mmddyy	All files last attached before time on this calendar date (written as six digits in the form mmddyy) are loaded. The TI parameter may be used to modify the time value.	When LOADPF is executed, the following information for each file cycle loaded is listed:	
CD=mmddyy	All files cataloged, modified, renamed, or extended after time on this calendar date are dumped. The TI parameter may be used to modify the time.	<ul style="list-style-type: none"> • Permanent file name • Cycle number • Owner ID • Volume serial number (VSN) • Comments, which include the following keywords: 	
TI=hhmm	Four-digit value, in the form hhmm, representing time. Expressed in 24-hour notations, where 2:05 PM is written 14.05. This parameter modifies the time associated with the LA or JN parameters. TI is ignored if given when none of the foregoing are present.	ADDED	DUPLICATE CYCLE
		SKIPPED	NO ROOM
		DIRECT SKIP	REPLACED

Several copies of LOADPF can run concurrently. As files are loaded, the following status message appears on the B display:

LOADING pfn

LOADPF may be called by the system when a user program makes a request for an archived permanent file. When a file has been dumped to tape by DUMPF but its identification remains in the permanent file directory, it is considered to be archived. Although the file has not been reloaded, the permanent file system can locate it on a particular dump tape.

When a user requests a permanent file residing on an archive tape, the following message appears:

REQUEST FOR ARCHIVED FILE - GO OR DROP

If the file is to be attached to the job, type the following command:

j.GO.

The system continues by routing a LOADPF job to the input queue to load the requested file. If the archive tape is mounted on a readied unit, the job proceeds without intervention. If the tape is not available for automatic assignment, you are instructed to mount a dump tape with a particular VSN.

While the archive retrieval job is at a control point, you should not bring another LOADPF job at a different control point for loading the same requested file. If you do, the latter LOADPF job waits for the archive retrieval job to complete or be dropped. Dropping of the archive retrieval job causes the user job to abort.

A j.DROP command, rather than j.GO, causes the attach request to be terminated, with a subsequent termination of the job because the file is not available.

Examples of LOADPF decks:

- In this example, job NONEX loads all non-expired permanent files from tape.

```
NONEX,...
```

```
REQUEST(DUMTAPE,HY,S,E)
```

```
LOADPF(LP=X,PW=LOAD)
```

```
6/7/8/9
```

- Job SELLD loads the specified permanent files from tape. All files with ID of CML are loaded, and all files with permanent file name TAPE3 and ID of COL are loaded.

```
SELLD,...
```

```
REQUEST(DUMTAPE,MT,HY,S,N)
```

```
LOADPF(I,PW=LOAD)
```

```
7/8/9
```

```
ID=CML
```

```
PF=TAPE3, ID=COL
```

```
PF=FILE5, ID=COL,CY=1
```

```
6/7/8/9
```

PFLOG UTILITY

The PFLOG utility dumps the permanent file catalog (PFC) and writes one entry for every file present on a magnetic tape. (The name of the tape must be LOGTAPE.)

Before you issue a PFLOG control statement, a REQUEST control statement must define the log tape as a new labeled tape with a logical file name of LOGTAPE.

The PFLOG control statement format is:

```
PFLOG(PW=rd,SN=setname,L=lfn)
```

The following parameters can appear in any order:

PW=rd RD password used to attach the permission file DUM. Required parameter.

SN=setname Device set that contains the permanent file catalog that PFLOG is to dump: one to seven letters or digits beginning with a letter. The master device for this set must have been previously mounted. Optional parameter. The default is the permanent file default set.

L=lfn Name of the file to receive the output listing: one to seven letters or digits beginning with a letter. Optional parameter. The default is the file named OUTPUT. If lfn=0, no listing is generated.

When PFLOG is executed, a listing for each permanent file catalog entry dumped contains the following information:

- Permanent file name
- Cycle number
- Owner ID

Examples of PFLOG decks:

- In this example, JOBA dumps files onto the permanent file default set. The output listing is written to OUTPUT.

```
JOBA(NT01)
```

```
VSN(LOGTAPE=123456)
```

```
REQUEST(LOGTAPE,NT,PE,N,RING)
```

```
PFLOG(PW=READ)
```

```
6/7/8/9
```

- JOBB dumps files onto the file named SETNAME and no listing is generated.

```
JOBB(NT01)
```

```
VSN(LOGTAPE=123456)
```

```
MOUNT(SN=SETNAME,VSN=MASTER)
```

```
REQUEST(LOGTAPE,NT,PE,N,RING)
```

```
PFLOG(SN=SETNAME,PW=READ,LF=0)
```

```
6/7/8/9
```

GENLDPF UTILITY

GENLDPF utility reads a log tape created by the PFLOG utility and generates LOADPF jobs that will load those files that have a permanent file catalog entry. This allows an installation to do a full reload of permanent files without reloading files purged since the last full dump.

Before the operator issues a GENLDPF control statement, a REQUEST control statement must define the log tape as an existing labeled tape with a logical file name of LOGTAPE.

The GENLDPF control statement format is:

```
■ GENLDPF(PW=ex,L=lfn,SN=setname,VSN=vsn)
```

The following parameters are optional and may appear in any order:

PW=ex EX password required for LOADPF jobs that are generated.

L=lfn Name of the file to receive the output listing, one to seven letters or digits beginning with a letter. The default is the file named OUTPUT. If lfn=0, no listing is generated.

SN=setname Device set onto which permanent files are to be reloaded, one to seven letters or digits beginning with a letter. The master device for this set must have been previously mounted. The default is the permanent file default set.

If SN is specified, then VSN must also be specified.

VSN=vsn Volume serial number of the master device of the set onto which permanent files are to be reloaded: one to six letters or digits with leading zeros assumed.

If VSN is specified, SN must also be specified.

When GENLDPF is executed, the following information for each entry read from the log tape is listed:

- Permanent file name
- Owner ID
- Cycle number

Examples of GENLDPF decks:

- In this example, JOBX reloads files onto the default permanent file set. The output listing generated by GENLDPF is written to OUTPUT.

```
JOBX(NT01)
VSN(LOGTAPE=123456)
REQUEST(LOGTAPE,NT,PE,E,NORING)
GENLDPF.
6/7/8/9
```

- JOBY reloads files onto set SETNAME whose master device set VSN is MASTER. No output listing is generated.

```
JOBY(NT01)
VSN(LOGTAPE=246810)
MOUNT(SN=SETNAME,VSN=MASTER)
REQUEST(LOGTAPE,NT,PE,E,NORING)
GENLDPF(SN=SETNAME,VSN=MASTER,L=0)
6/7/8/9
```

NOTE

Files purged between a full DUMPF and several change dumps (DUMPF,DP=C) are reloaded when both the change and full dumps are reloaded. This can be avoided by running PFLOG after each change dump and then running GENLDPF with the last log tape to restore the PFC and to load the files.

TRANSFP UTILITY

TRANSFP utility allows permanent files and tables to be removed from a single mass storage device or to be transferred from one device set to another device set. Single device set TRANSFP is used when a particular device is to be shut down for maintenance. Dual device set TRANSFP allows files and tables to be copied to another device set for backup purposes. TRANSFP cannot execute if permanent files are attached to user jobs; it waits until no files are in use.

The TRANSFP control statement format is:

```
TRANSFP(PW=pw,FS=setname1,TS=setname2,FM=vsn1,
         TM=vsn2,L=lfn)
```

Parameters FS and TS are required; PW is required if passwords have been defined for file DUM. The remaining parameters are optional. All parameters may appear in any order.

PW=pw List of all passwords associated with file DUM. No default exists.

FS=setname1 Name of device set containing device from which permanent file information is to be transferred: one to seven letters or digits beginning with a letter. The master device of the set must be mounted before the TRANSFP request is made. Default is the default permanent file set.

TS=setname2 Name of device set containing device to receive the permanent file information: one to seven letters or digits beginning with a letter. The master device of the set must be mounted before the TRANSFP request is made. Default is the default permanent file set.

- FM=vsn1** Volume serial number of member device containing permanent file information to be transferred: one to six letters or digits with leading zeros assumed. FM is required when permanent file information is transferred between devices that are members of the same device set (the same setname appears on both FS and TS parameters). FM is optional when file information is transferred between different device sets. Default value is all devices. To prevent overflowing or PF assignment, the FM device is changed to a non-PF device prior to data transfer.
- JOB11,...
MOUNT(SN=TEST,VSN=222)
TRANSPF(PW=PERM1,FS=TEST,
TS=TEST,FM=222,TM=111)
6/7/8/9**
- **JOB22** transfers permanent files from the device set DSN1 to the device set DSN2. A permanent file named DUM must be catalogued with the password PERM1 before this job is run.
- JOB22,...
MOUNT(SN=DSN1, VSN=235)
MOUNT(SN=DSN2, VSN=532)
TRANSPF(PW=PERM1,FS=DSN1,TS=DSN2)
6/7/8/9**
- ### AUDIT UTILITY
- The AUDIT utility produces a statistical listing for all or selected permanent files in the system.
- The AUDIT control statement format is:
- ```
AUDIT(L=lnf,MO=mode,ID=owner,PF=pfn,
 SN=setname,VSN=vsn,AI=type,AC=n)
```
- The parameters are optional and may appear in any order.
- |                   |                                                                                                                                                           |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>L=lnf</b>      | Name of file to receive AUDIT output listing: one to seven letters or digits beginning with a letter. Default file name is OUTPUT.                        |
| <b>MO=mode</b>    | AUDIT mode specifying the files to be audited. Only one mode can be selected.                                                                             |
| <b>A</b>          | Audit all permanent files. Default value.                                                                                                                 |
| <b>X</b>          | Audit all expired permanent files.                                                                                                                        |
| <b>D</b>          | Audit all inactive cycles.                                                                                                                                |
| <b>I</b>          | Audit all incomplete files.                                                                                                                               |
| <b>P</b>          | Audit all files having parity errors.                                                                                                                     |
| <b>R</b>          | Audit all archived files.                                                                                                                                 |
| <b>ID=owner</b>   | Audit all files belonging to owner identified.                                                                                                            |
| <b>PF=pfn</b>     | Audit file having the specified permanent file name.                                                                                                      |
| <b>SN=setname</b> | Audit files in the device set named: one to seven letters or digits beginning with a letter. Master device for the set must have been mounted previously. |

Examples of TRANSPF decks:

- In this example, JOB11 transfers all permanent files and permanent file tables from the master device with VSN of 222 to the member device with VSN of 111. Both devices belong to device set TEST. A permanent file named DUM must be catalogued with the password PERM1 before this job is run.

VSN=vsn      Audit all permanent files on designated volume serial number: one to six letters or digits with leading zeros assumed. Master device for the set containing this vsn number must have been mounted previously.

AI=type      Audit listing to be produced:

F Full audit.      Default condition.

P Partial audit.

AC=n      Audit all files with this one-to nine-alphanumeric character account number.

The following information is included in the AUDIT output; items prefaced by P appear on a partial audit. Refer to figure 6-1.

P Account number

P Cycle number

P Creation date

P Expiration date

P File size

Flags†

P Last access date and time

P Last alteration date and time

Number of alters/rewrites made

Number of attaches made

Number of extends made

P Owner ID

P Permanent file name

P Setname

P VSN of first resident RMS device

Messages that appear on the dayfile as a result of AUDIT use indicate system errors that should be reported to a systems analyst.

#### PFDDUMP UTILITY

The PFDDUMP utility, used for debugging permanent file system errors, can be executed only through an operator entry. You can be requested to run this utility program when a permanent file system error is found and disk resident tables are to be dumped to a file.

†Flags are:

A Archived file  
C RB conflict file

E Parity error in file  
N New version file

The PFDDUMP control statement format is:

PFDDUMP(SN=setname,L=lfn,PN=p1,p2,...,pn)

The parameters are optional and can appear in any order.

SN=setname      Name of device set desired: one to seven letters or digits beginning with a letter. Default is system set.

L=lfn      Name of file where tables are to be dumped, one to seven letters or digits beginning with a letter. Default is OUTPUT.

PN=pi      Name of tables to be dumped.

PFD      Permanent file directory. Default value.

PFC      RBT catalog entries. Default value.

LBL      Device label.

SMT      Set member table.

DAM      Device allocation map.

FLW      Logical flaw table.

FWF      Physical flaw table.

ALL      Dump all the tables.

Example:

PFDDUMP(PN=PFD,SMT,DAM,SN=AAA)

When the program is executed, it displays the message:

\*PFDDUMP OR CONVPF REQUEST - GO OR DROP\*

You must acknowledge this request by typing

j.GO.

to allow the job to continue, or

j.DROP.

to terminate the job.

## DUMPING FILES AND MEMORY

### DUMPING CENTRAL MEMORY

Any portion of central memory can be dumped to a printer without interfering with normal system operation. A deadstart is not necessary to dump core.

Dump routine DMP must be entered under DIS operation to produce exchange package, control point area, or relative dumps of address locations. Refer to the NOS/BE Reference Manual listed in the preface for an explanation of DMP.

AUDIT OF PERMANENT FILES FULL

TIME 14.13.46 02/03/84

PAGE NO. 6

SETNAME=R604

| OWNER   | PERMANENT FILE NAME | SUBD | NO. ATTACHES | NO. EXTENDS | CYCLE NO. | ACCOUNT ALTERS/REWRITES | VSN FLAGS | PRUS RBS | CREATION VSN-1 | EXPIRATION VSN-2 | LAST ATT DATE/TIME                                                                    | LAST ALT DATE/TIME |
|---------|---------------------|------|--------------|-------------|-----------|-------------------------|-----------|----------|----------------|------------------|---------------------------------------------------------------------------------------|--------------------|
|         |                     |      |              |             |           |                         |           |          |                |                  | FLAGS-A=ARCHIVED,C=CONFLICT,E=PARITY ERROR,N=NEW VERSION,P=POSITIONED,R=RANDOM,S=SAAM |                    |
| R8B     | PL14A               |      |              |             | 1         | 7KK49100                | OPO354    | 10289    | 02/01/84       | 01/27/85         | 02/01/84                                                                              | 02/01/84           |
| INSTALL | PL2                 | 19   | 6            | 0           | 0         |                         | N         | 181      | *****          | *****            | 16.57.56                                                                              | 15.54.26           |
| INSTALL | PL1K                | 35   | 32           | 0           | 1         | 7KK49100                | OPO354    | 0        | 11/10/83       | INFINITE         | 02/01/84                                                                              | 11/10/83           |
| INSTALL | PL1K                | 35   | 1            | 0           | 0         |                         | RAN       | 0        | 088528         | *****            | 14.41.45                                                                              | 16.49.13           |
| INSTALL | PL1K                | 35   | 1            | 0           | 1         | 7KK49100                | OPO354    | 0        | 11/10/83       | 11/05/84         | 11/10/83                                                                              | 11/10/83           |
| INSTALL | PL1K                | 35   | 1            | 0           | 0         |                         | RAN       | 0        | 088528         | *****            | 16.56.32                                                                              | 16.56.32           |
| INSTALL | PL83                | 35   | 5            | 0           | 3         | 7KK49100                | OPO354    | 0        | 01/24/84       | 01/19/85         | 01/24/84                                                                              | 01/24/84           |
| INSTALL | PL1A                | 35   | 3            | 0           | 0         |                         | RAN       | 0        | 088528         | *****            | 16.56.04                                                                              | 16.56.04           |
| INSTALL | LDRNUC              | 35   | 1            | 0           | 2         | 7KK49100                | OPO354    | 0        | 01/24/84       | 01/19/85         | 01/24/84                                                                              | 01/24/84           |
| INSTALL | PL14                | 35   | 1            | 0           | 0         |                         | RAN       | 0        | 088528         | *****            | 16.52.02                                                                              | 16.52.02           |
| INSTALL | PL1L                | 35   | 3            | 0           | 1         | 7KK49100                | OPO354    | 0        | 11/10/83       | 11/05/84         | 11/11/83                                                                              | 11/10/83           |
| INSTALL | MATH                | 35   | 2            | 0           | 0         |                         | RAN       | 0        | 088528         | *****            | 20.45.45                                                                              | 20.45.45           |
| INSTALL | LCNLIB              | 35   | 3            | 0           | 1         | 7KK49100                | OPO354    | 0        | 01/25/84       | 01/20/85         | 01/25/84                                                                              | 01/25/84           |
| INSTALL | PL1B                | 35   | 7            | 0           | 0         |                         | RAN       | 0        | 088528         | *****            | 16.18.10                                                                              | 16.18.10           |
| C45     | LCS                 | 35   | 1            | 0           | 1         | 7KK49100                | OPO354    | 0        | 11/10/83       | 11/05/84         | 11/11/83                                                                              | 11/10/83           |
| C45     | CBLCOP              | 35   | 1            | 0           | 0         |                         | RAN       | 0        | 088528         | *****            | 14.38.29                                                                              | 20.59.45           |
| C45     | TAPE10              | 35   | 1            | 0           | 0         |                         | RAN       | 0        | 088528         | *****            | 18.33.55                                                                              | 17.17.32           |
| INSTALL | PL77                | 35   | 1            | 0           | 2         | 7KK49100                | OPO354    | 0        | 11/15/83       | 11/10/84         | 11/16/83                                                                              | 11/15/83           |
| INSTALL | PL1D                | 35   | 7            | 0           | 0         |                         | RAN       | 0        | 088528         | *****            | 15.32.40                                                                              | 19.51.24           |
| INSTALL | PL1D                | 35   | 1            | 0           | 2         | 7KK49100                | OPO354    | 0        | 01/25/84       | 01/20/85         | 01/25/84                                                                              | 01/25/84           |
|         |                     |      |              |             | 0         |                         | RAN       | 0        | 088528         | *****            | 15.30.47                                                                              | 15.30.47           |

Figure 6-1. Full AUDIT Output Listing

The ABS routine under DIS operation or the n.X ABS format of DSD produces absolute dumps. Locations to be dumped are specified by one to six octal digits.

ABS,x,y. Dump storage from absolute address x to absolute address y.

When only one parameter appears, it is presumed that the dump starts at address zero; when both addresses are present, the second must be greater than the first. If the value given exceeds memory size, dumping stops at the end of memory.

#### DUMPING NPU MEMORY

All or part of 2550 front-end (FE) network Processing Unit (NPU) macro memory and all of NPU micro memory can be dumped to a printer during normal system operation. A deadstart is not necessary to dump the NPU.

The call to the routine DUMPNPU must be entered by the following command:

n.X DUMPNPU,xx,dt,fwa,lwa

Calls to DUMPNPU can specify the following three dump types (dt):

DUMPNPU,xx,0, fwa,lwa. Dump macro memory from fwa to lwa of the NPU, described by EST entry xx. This call also dumps all micro memory of the NPU and makes the EST entry inactive. (fwa and lwa are hexadecimal values.)

DUMPNPU,xx,1. Dump all micro memory of the NPU and make the EST entry xx inactive.

DUMPNPU,xx,2. Make the EST entry xx inactive.

Any NPU dump stops all NPU activity and disconnects terminals of the dumped NPU. To avoid disconnecting NPU terminal users, an NPU should be dumped only when its EST ordinal does not appear on the B display.

When an NPU is dumped, the control point zero message informs you that the terminals connected to the NPU described by EST xx are no longer being serviced:

EST xx NPU STOPPED

Entering ACK. clears the message. Except for the EST xx NPU, the operating system is not affected. After an NPU has been dumped, its EST entry is made inactive. The NPU can be reloaded by entering the following command:

INTERCOMxx.

#### DUMPING INPUT, PRINT, AND PUNCH QUEUES

##### DMPQ Utility

With the utility program DMPQ, you can copy input, print, and punch files to seven- or nine-track magnetic tapes. The tape contains a three or six word file name table entry and contents for all files of the type dumped. The RESQ utility causes these files to be restored at a later time. The dump utility is brought to a cleared control point by the following entry:

n.X DMPQ(t,S)

t Indicates the type of files to be dumped:

I Input files

O Print files

P Punch files

S Optional flag that indicates that selective dump by file name is to be performed.

The following message pertains to the B display:

REQUEST(QUETAPE,MN,SV,U,RING)

In response, mount a seven- or nine-track tape and type the following command:

n.ASSIGN xx.

The next message is:

MTxx VOLUME SERIAL NUMBER IS

You should respond with:

VSNxx,vsn.

vsn Volume serial number of the tape.

In the nonselective mode (S option omitted), all files of the designated type are copied. DMPQ remains at the control point until the operator drops the program. If the selective (S) option is taken, the B display shows the message

TYPE n.CFO FILENAME OR n.CFO. TO TERMINATE

type:

n.CFO filename

After the file is dumped, the TYPE n.CFO message is repeated so you may continue dumping selected files.

In selective mode, the file must be of the type indicated by the t parameter in the DMPQ request. Also, if more than one file has the same name in the FNT, only the file having the lowest FNT address is dumped in the selective mode.

To terminate selective dumping, type:

n.CFO.

If a tape write parity error occurs, the tape is closed, the read file is rewound, a new tape is requested, and dumping is continued on the new tape.

## RESQ Utility

Files dumped by DMPQ are restored to the system through the RESQ utility, which is called to empty control point n by the entry.

n.X RESQ(t,S)

t      Indicates the type of file to be restored:  
I      Input files.  
O      Output files.  
P      Punch files.  
S      Optional flag indicating selective restoration of files by file name.

The B display will show the following message:

REQUEST(QUETAPE,MN,SV,U)

The tape containing the dumped files should be mounted and assigned by the following command:

n.ASSIGN xx.

In the nonselective mode (S option omitted) when all files on tape have been restored, the following message appears and the job drops from execution:

RESTORE COMPLETED

If the selective (S) option is taken, the B display shows the message:

TYPE n.CFO FILENAME OR n.CFO TO TERMINATE

Type:

n.CFO filename

filename is the name of the specified file to be restored. If more than one file has the same name on the tape, the first file encountered is restored. After the file is restored, the TYPE n.CFO message is repeated so you may continue selective restoration. If no more files are to be restored, type:

n.CFO

to terminate the RESQ job.

If a tape read parity error occurs, the B display shows the following message:

ENTER NEXTFILE OR TERMINATE VIA N.CFO.

Type:

n.CFO NEXTFILE

to stop reading the current file and to continue to the next file or

n.CFO TERMINATE

to stop reading the current file and to terminate the job. The result in either case is a partial file in the restored state.

## TLOAD Utility

TLOAD utility loads jobs from tapes prepared by the operating system. These tapes must contain binary files in SI format. Files on load tapes are defined by double end-of-file marks (empty file). Each file may consist of several individual jobs with single end-of-file terminators. The load call may select individual jobs or entire load files as long as the load tape structure is known.

The utility is called to an empty control point with

n.X TLOAD,x,y.

x      Decimal value, beginning with 1, indicating a load file number defined by a double end-of-file.  
y      Decimal value, beginning with 1, indicating a job file position within the x load file.

The utility can be called to load the entire first load file containing an unspecified number of jobs with

n.X TLOAD.    or    n.X TLOAD,1.

To load an entire page, the TLOAD utility must be repeated for each file group on the tape.

The TLOAD utility requests a seven- or nine-track tape after being called. The B display shows the following message:

REQUEST,TAPE,MN,NORING.

The response is as follows:

n.ASSIGN xx.

To assign an unlabeled tape to be read by TLOAD

## LSTCID Utility

After one or more INTERCOM restarts or EXPORT aborts, you can obtain a listing of the dumps which document the problem. To do this, a clear control point must be selected and system utility LSTCID initiated with the following command:

n.X LSTCID.

LSTCID may also be initiated from a batch job. When this occurs, LSTCID requests an operator LOCKIN or DROP to verify that this is an authorized attempt for access to the system dynamic dump file. The following appears on the B display at the control point:

SYSTEM DUMP LIST REQUESTED/LOCKIN OR DROP

An authorized request should be acknowledged as follows:

n.LOCKIN.

An unauthorized request should be dropped as follows:

n.DROP.

or

n.KILL.

After LISTCID has completed execution, the system dynamic dump file can be evicted with the following command

EVICT,o.

where o is the F display ordinal number for file ZZZZZDD. Until the file is evicted, new dumps will be added to the present contents and each execution of LISTCID will relist any dumps previously listed dumps.

#### DUMPING DAYFILE

The system dayfile shown on the A display is a summary of all jobs processed, as well as selected operator action. This summary can be copied to a magnetic tape, punched cards, or printed listing by the utility program DAYFILE.

A dump of part or all of the dayfile can be made. This utility program is brought to an empty control point for a partial dump with the following call

n.DAYFILE,mn.

For a full dump, the following call is made:

n.DAYFILE,mn,FULL.

- |    |                                                       |
|----|-------------------------------------------------------|
| mn | Defines the device on which the file is to be copied. |
| MT | Magnetic tape.                                        |
| LP | Any printer.                                          |
| CP | Card punch.                                           |

A partial dump copies only that portion of the dayfile created since the last dump. The system permanent file will remain. In contrast, a full dump destroys the dayfile once it is copied. The entire dayfile created since the last full dump or initial deadstart is dumped.

If MT is specified, the B display shows the following message asking for assignment of either a seven- or nine-track tape:

REQUEST,TAPE,MN,SV.

Respond with the following command:

n.ASSIGN xx.

to assign an unlabeled tape to be written at the installation default density. If an input or output error occurs during the dump, you should type n.DROP to cause the utility to issue a request for an alternate tape.

REQUEST,ALT,SV,MN.

If n.DROP is typed at this point, the dayfile dump is forced to a line printer. Otherwise, an alternate tape should be assigned.

When the dayfile is dumped to the printer or punch, the copy is placed in the output queue for processing by JANUS. When the utility completes, it is dropped.

#### DAYFILE DUMPING UTILITIES

The dayfile dumping utilities (AFD,DFD) can be used to write all or selected parts of the system dayfile to a file. AFD only writes accounting messages to the file, while DFD writes both accounting and non-accounting messages. A job using either of these utilities must be a system origin job. The following format is used to call the dayfile dumping utilities.

utility,L=listfile,FR=string,OP=op,PD=pd,PL=pl.

or

utility,listfile,string,op,pd,pl.

| <u>Option</u>  | <u>Description</u>                                                                                                                                                                                                                                                  |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| utility        | Utility called to perform the dayfile dump.                                                                                                                                                                                                                         |
| <u>Utility</u> | <u>Description</u>                                                                                                                                                                                                                                                  |
| AFD            | Dump account.                                                                                                                                                                                                                                                       |
| DFD            | Dump system dayfile.                                                                                                                                                                                                                                                |
| FR=string      | Search string for selective dayfile dumping. The utility searches the dayfile for this string in the starting position of the field specified by the OP=op parameter.                                                                                               |
| L=listfile     | Output file containing the dayfile dump produced by AFD or DFD. The default name of listfile is OUTPUT for AFD and DFD. If L=0 is specified, no file is written. The utility paginates listfile if it is OUTPUT, or if print density and page length are specified. |
| OP=op          | Dump option. If neither FR=string nor the OP dump option is specified, the default is OP=F for nonterminal output files. For terminal output files, the default is OP=I. If FR is specified but OP is not, the default is OP=M.                                     |
| <u>op</u>      | <u>Description</u>                                                                                                                                                                                                                                                  |
| F              | Full dayfile dump is taken.                                                                                                                                                                                                                                         |
| I              | Incremental dump is taken. The dayfile is dumped starting from the point of the last dayfile dump.                                                                                                                                                                  |
| J              | The job name field in the dayfile is searched for the string specified by FR=string. The dump begins from that point.                                                                                                                                               |

| M     | The message field in the dayfile is searched for the string specified by FR=string. The dump begins from that point.                                                                                                                                                                              |    |         |    |   |    |  |   |    |  |   |    |  |   |    |  |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|---------|----|---|----|--|---|----|--|---|----|--|---|----|--|
| P     | Incremental dump is taken. The dayfile is dumped starting from the point of the last dayfile dump with this job name.                                                                                                                                                                             |    |         |    |   |    |  |   |    |  |   |    |  |   |    |  |
| T     | The time field in the dayfile is searched for the string specified by FR=string. The dump begins from that point.                                                                                                                                                                                 |    |         |    |   |    |  |   |    |  |   |    |  |   |    |  |
| PD=pd | Print density in pd lines per inch (3, 4, 6, or 8). Default is the job default.                                                                                                                                                                                                                   |    |         |    |   |    |  |   |    |  |   |    |  |   |    |  |
| PL=pl | Page length in pl lines per page. Default is based on the following print densities:                                                                                                                                                                                                              |    |         |    |   |    |  |   |    |  |   |    |  |   |    |  |
|       | <table border="0"> <thead> <tr> <th>pd</th> <th>Default</th> <th>pl</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>30</td> <td></td> </tr> <tr> <td>4</td> <td>40</td> <td></td> </tr> <tr> <td>6</td> <td>60</td> <td></td> </tr> <tr> <td>8</td> <td>80</td> <td></td> </tr> </tbody> </table> | pd | Default | pl | 3 | 30 |  | 4 | 40 |  | 6 | 60 |  | 8 | 80 |  |
| pd    | Default                                                                                                                                                                                                                                                                                           | pl |         |    |   |    |  |   |    |  |   |    |  |   |    |  |
| 3     | 30                                                                                                                                                                                                                                                                                                |    |         |    |   |    |  |   |    |  |   |    |  |   |    |  |
| 4     | 40                                                                                                                                                                                                                                                                                                |    |         |    |   |    |  |   |    |  |   |    |  |   |    |  |
| 6     | 60                                                                                                                                                                                                                                                                                                |    |         |    |   |    |  |   |    |  |   |    |  |   |    |  |
| 8     | 80                                                                                                                                                                                                                                                                                                |    |         |    |   |    |  |   |    |  |   |    |  |   |    |  |

## INITIATING PROGRAMS ON SYSTEM LIBRARY

Any central processor program in the system library that can be called by a control statement can be brought to an empty control point for execution, initiated by the following command:

n.X program.

The command initiates the program, giving it the field length specified for a program in the system library to use.

The same command format can be used to bring routines such as COPYBR or a compiler to execution. Parameters can be passed to the routine using the following format:

n.X routine,list.

## MANIPULATING TAPE FILES UNDER DIS

### COPYING TAPES

Several utility programs copy and check data from one tape to another. These utility programs are often submitted by programmers as batch jobs. The NOS/BE Reference Manual listed in the preface contains details on special use, selective copying, and file manipulation during a copy operation. The SI tapes referred to in this manual were previously known as SCOPE tapes.

The following material summarizes procedures for performing basic copying tasks under DIS. The same tasks can be accomplished under DSD by calling the copy routines using the following format:

n.X routine(list)

The following copy routines are available:

|         |                                                                                                                                                    |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| COPY    | Copies an entire reel of binary data on SI standard tape.                                                                                          |
| COPYBF  | Copies binary files.                                                                                                                               |
| COPYBR  | Copies binary records.                                                                                                                             |
| COPYCF  | Copies coded files.                                                                                                                                |
| COPYCR  | Copies coded records.                                                                                                                              |
| COPYBCD | Copies packed output files in a format suitable for printing off-line.                                                                             |
| COPYSBF | Shifts each line in a single file of coded information one character to the right so the line begins with a blank, causing single-spaced printing. |
| COPYXS  | Converts binary X tapes to SI standard.                                                                                                            |

Tapes used in these jobs must be requested by the REQUEST control statement. REQUEST should contain all pertinent information to describe file type, format, label, and density. Tapes should be rewound using the REWIND statement.

Example:

REQUEST(FIRST,U,HI)

REQUEST(SECOND,NT)

REWIND(FIRST,SECOND)

The following example shows a sequence of commands that copies a tape, then verifies that it has been copied correctly.

Example:

n.DIS.

REQUEST,MINE,HI,VSN=A.

REQUEST,YOURS,MT,VSN=B,RING.

REWIND,MINE,YOURS.

COPY,MINE,YOURS.

REWIND,MINE,YOURS.

COMPARE,MINE,YOURS.

### **Copying a Reel of Tape**

This utility copies from one file to another until an end-of-information mark is encountered. The correct format follows:

```
COPY(lfn1,lfn2)
```

The input tape must be a binary SI tape. The output tape remains positioned at the last end-of-partition, ready for additional writing.

### **Copying Files**

Binary files are copied with the following command:

```
COPYBF(lfn1,lfn2,num)
```

Coded files are copied with the following command:

```
COPYCF(lfn1,lfn2,num)
```

Data is copied until num files are written, following installation procedures for reel swapping or multireel files.

### **Copying Records**

Binary records are copied with the following command:

```
COPYBR(lfn1,lfn2,num)
```

Coded records are copied with the following command:

```
COPYCR(lfn1,lfn2,num)
```

Labeled or unlabeled tapes may be used. Copying continues until num records are copied or an end-of-partition is encountered. If lfn<sub>1</sub> is a multireel file, installation procedures for reel swapping are followed. The utility might stop at the reel end and ask the you to assign the next reel in the file before it writes or checks the tape label and continues copying. When the number of records in a file is unknown, a large num parameter can be specified to ensure that all records are copied.

### **Copying Files for Off-Line Printing**

Mass storage files of coded information may be copied to magnetic tape for subsequent listing with the following command:

```
COPYBCD(lfn1,lfn2,num)
```

Each line image written to the file becomes a unit record for printing.

### **Copying Files for On-Line Printing**

Files that do not contain print control characters can be copied in a format suitable for printing with the following command:

```
COPYSBF(lfn1,lfn2)
```

The utility program inserts a blank character at the beginning of each line. The resulting file is printed single-spaced.

### **CONVERTING X TAPES TO SI TAPES**

At some installations, binary X tapes exist because some SCOPE systems prior to SCOPE version 3.3 will process them. The COPYXS utility routine converts such tapes, which cannot be processed by later systems, to standard SI tape format.

```
COPYXS(lfn1,lfn2,num)
```

Both tapes assigned for this job must be requested as S tapes, although the output tape is an SI tape.

Example:

```
REQUEST(TAPEX,S)
```

```
REQUEST(TAPES,S)
```

To use the tape in the same job that created it, both the following commands must be issued:

```
UNLOAD(TAPES)
```

```
REQUEST(TAPES,MT)
```

Copying continues until num files are copied or until the tape runs off the reel.

### **COMPARING TAPE CONTENTS**

COMPARE utility program can be used to verify that tapes have been copied correctly. One or more consecutive records on the files named may be compared. This utility is called through DIS with the following command:

```
COMPARE(lfn1,lfn2,numrecs,level,numwords,
numbad,abt)
```

lfn<sub>1</sub>,lfn<sub>2</sub>      Logical file names of files to be compared.

numrecs      Decimal number of records on lfn<sub>1</sub> to be compared to lfn<sub>2</sub>. Default value is 1.

level      Octal level number defining end-of-section. Default value 0, the standard end-of-section.

numwords      Decimal number of non-matching words to be written to the output file.

numbad      Decimal number of non-matching records to be documented on the output file.

abt      A non-null character specifies abort if bad compare. Default is no abort.

Only lfn parameters are required. Comparison begins at the current file positions and continues until the specified number or higher of end-of-section levels have been passed.

Output from the comparison appears on the dayfile. Either GOOD COMPARE or BAD COMPARE appears. When only the file name parameters are used in a utility call, a bad compare produces BAD REC.n on the printed output file; n is the number of records that do not match, counting the first record as record one. When the numwords and numbad parameters are used, part of each nonmatching record is written to the output file.

COMPARE can be used to compare two tape files, or a tape file and a mass storage file, or two mass storage files. The mode of a file need not be specified, as the COMPARE routine can determine binary or coded mode.

The following sequence of operations is effective in copying tapes:

```
n.DIS.
REQUEST(TAPE1,MT,VSN=A)
REQUEST(TAPE2,MT,VSN=B,RING)
COPYBF(TAPE1,TAPE2)
REWIND(TAPE1,TAPE2)
COMPARE(TAPE1,TAPE2, 100, 10, 20)
```

#### DETERMINING MULTIFILE TAPE CONTENTS

The contents of a volume of tape containing more than one file can be determined by LISTMF utility. LISTMF rewinds the multifile reel and positions to the file indicated by the optional position parameter value. It then writes the contents of each label encountered. Output appears on the printed listing.

LISTMF utility is called under DIS by the following command:

```
LISTMF(M=mfn,P=p)
mfn One- to six-character multi-
 file set name.
p Optional position value;
 decimal file number at which
 label listing is to begin.
 Default value is 1.
```

#### FILE MANIPULATION COMMANDS

When you use DIS to enter utility routines that copy, compare, or otherwise use magnetic tapes, it is often necessary to position files. Rewinding and unloading may be performed manually using the controls on the tape unit or by entering the following:

```
REWIND(lfn1,lfn2,...)
UNLOAD(lfn1,lfn2,...)
```

Records may be skipped forward or backward, respectively, using the following commands:

|                              |                                                                                                 |
|------------------------------|-------------------------------------------------------------------------------------------------|
| SKIPF(lfn,number,level,mode) |                                                                                                 |
| SKIPB(lfn,number,level,mode) |                                                                                                 |
| lfn                          | Logical file name.                                                                              |
| number                       | Decimal number of logical records to be skipped. Default value is 1.                            |
| level                        | Octal level number equal to this level or greater indicates end-of-section. Default value is 0. |
| mode                         | B Binary file. Default value is B.<br>C Coded file.                                             |

Backspace is similar to SKIPB.

BKSP(lfn,number)

#### BLANK LABELING MAGNETIC TAPE

The utility routine BLANK writes a blank label, containing only an expired expiration date and a VSN, on seven- or nine-track tapes. It is called to an empty control point with the command:

n.BLANK.

The program displays the following message:

REQUEST,TAPE,MN,RING.

asking you to assign a tape.

Respond with the following command:

n.ASSIGN xx.

where xx is the EST ordinal of the unit on which the tape is mounted. Once a unit has been assigned, the message requesting your response appears as follows.

MTxx VSN IS

Response to this message depends on subsequent use of the tape. If it is to be a scratch tape, type:

SCRxx.

If you receive a specific tape to be used for output, make the following entry:

VSNxx,vsn.

where vsn is one to six letters or numbers corresponding to the external sticker label on the tape reel.

At this point, the original message REQUEST,TAPE... appears and other tapes on other units can be blank labeled. When all tapes have been blank labeled, the operator should drop the utility.

## CREATING INTERCOM TERMINAL DEFINITION FILE

TDFGEN is the utility that creates the terminal definition file INIDfid, which is required to initialize INTERCOM. The port entry and other terminal identification information resides on this file. The TDFGEN control statement uses the following format:

```
TDFGEN(FID=fid,I=input,L=output)
```

|          |                                                                                                                                                                                                              |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FID=fid  | Specifies the suffix of the permanent file INIDfid. The suffix fid can be any three alphanumeric characters. The default is the mainframe host identifier or the identifier specified by the TDFILE command. |
| I=input  | Specifies the input file from which TDFGEN directives are read. INPUT is the default.                                                                                                                        |
| L=output | Specifies the list file for TDFGEN output. OUTPUT is the default.                                                                                                                                            |

All parameters are optional and order independent.

The NOS/BE Installation Handbook listed in the preface describes the TDFGEN input directives.

## DOWNTIME LOADING CONTROLWARE

BCLOAD loads controlware into 7021, 7054, 7152, 7154, and 7155 RMS/tape controllers that were not loaded at deadstart (refer to section 2) or whose controlware is no longer operational due to on-line maintenance activities. BCLOAD also loads controlware into local 380-170 network access devices (NADs) and remote 380-170, 380-370, and 380-110 NADs.

RHF normally loads local NADs during its initiation sequence and automatically after a NAD failure. You should only need to use BCLOAD to load remote NADs, or to load local NADs with special controlware.

The format is:

```
BCLOAD,cc,cw,F=f,LT=lt,ND=nd,AC=ac,TY=ty.
```

Parameter cc must be specified. The other parameters are optional with default values.

|    |                                                                                    |
|----|------------------------------------------------------------------------------------|
| cc | One- or two-digit octal number of the channel through which controlware is loaded. |
| cw | Source of controlware binary. Default is SYSTEM.                                   |

| kw     | Description                                                                   |
|--------|-------------------------------------------------------------------------------|
| BCFILE | Local file name of a tape or sequential mass storage file.                    |
| INPUT  | System input file. Specify INPUT only when BCLOAD is called from a batch job. |

| cw     | <u>Description</u>                                                                                                                                                                                                    |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SYSTEM | Controlware from system file ZZZZZ04 (for 7xxx controlware) or from system library NUCLEUS (for 380 controlware). Controlware for each controller resides on a deck. Deck names and corresponding controllers follow: |

| <u>Deck Name</u> | <u>Controller</u> |
|------------------|-------------------|
| OMT              | 7021              |
| OXY              | 7054              |
| OSZ              | 7154              |
| OSJ              | 7155              |
| NAD-170          | 380-170           |
| NAD-IBM          | 380-370           |
| NAD-MIN          | 380-110           |

|     |                                                                                                                                                                                                                                                                                                          |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| F=f | One or two-digit octal number; specifies the number of files to skip on BCFILE. This parameter is ignored if INPUT or SYSTEM is specified. The default is 0. For example, if F=0, the binary is read from the first file. If F=1, the first file is skipped and the binary is read from the second file. |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Specify the LT, ND, AC, and TY parameters only for loading controlware to a remote NAD; otherwise, omit them.

LT=lt A four-digit binary number; specifies which local trunk control units are enabled. Default is 0000. At least one TCU enable must be enabled for remote NAD loading.

For example, if LT=1010, local NADs TCUs 0 and 2 are enabled.

ND=nd A two-digit hexadecimal number from 00 through FF; specifies logical trunk address of the remote NAD. Default is 0000. Required for remote loads.

AC=ac A four-digit hexadecimal number from 0000 through FFFF; specifies the access code of the remote NAD. Default is 0000. Required for remote loads.

TY=ty Type of controlware to load; default is 170.

| <u>ty</u> | <u>Description</u>                        |
|-----------|-------------------------------------------|
| 170       | CYBER 170 (380-170)                       |
| IBM       | IBM (380-370)                             |
| MIN       | Common minicomputer controlware (380-110) |

The operator calls BCLOAD with the n.X command (specifying an empty control point) or in a batch job. The system must be in engineering mode prior to calling BCLOAD. (Engineering mode is not required when you call BCLOAD to load a NAD.) When loading 380-170 controlware into a local NAD, the EST entry associated with channel cc (equipment type NC) must be OFF or DOWN.

When loading a remote NAD, you must define a local NAD that is not reserved for maintenance in the EST. (The EST entry can be ON, OFF or DOWN.) Controlware must already be loaded and running in the local NAD before you can load the remote NAD. If the remote NAD appears to be unused, BCLOAD displays the message

BCLOAD - LOADING REMOTE NAD nn - GO or DROP

where nn is the remote NAD's logical trunk address.

Ensure that the NAD is not being used. If the NAD is not being used, enter j.GO to load the controlware. If the NAD is being used, enter j.DROP to end the job.

BCLOAD may abort with either NLD ERROR 4 or CVL ERROR 33. While either of these errors usually indicates a failure in the local or remote NAD, a trunk failure, or possibly an incorrect switch setting on the local or remote NAD, there is another possible cause. Under certain conditions, a remote NAD load will fail with NLD ERROR 4 but a second remote load attempt will succeed. This problem can be prevented: always precede a remote load with a remote dump request to ensure that the remote NAD controlware is halted before loading is attempted.

For example, to load the remote NAD with NAD address 7F and access code FOFO connected to TCU 0 of the local NAD on channel 5:

```
DMPNAD(CH=5,ND=7F,AC=FOFO,LT=1000)
BCLOAD(CH=5,ND=7F,AC=FOFO,LT=1000)
```

Remote loading operations can occur concurrently with RHF use of the local NAD. Use extreme care when performing a remote load to ensure that the correct remote NAD is being loaded and that the remote NAD is not being used by the remote mainframe to which it is connected.

Loading of local NAD controlware can be accomplished automatically by RHF when RHF is brought up. Refer to section 11 for further information.

## DUMPING NAD MEMORY (DMPNAD)

DMPNAD is a utility program to dump the memory of a 380 network access device (NAD). The dump can be in the form of a formatted listing or it can be saved as a binary file, which can later be formatted for printing by using the DMPNAD I parameter. The dump listing is formatted with each NAD word printed in both hexadecimal and ASCII representations. DMPNAD is normally called with a channel number to specify which on-line NAD is to be dumped by PP program NLD.

The format is:

```
DMPNAD,I=ilfn,B=blfn,L=lfn,CH=cc,ND=nn,AC=aaaa,
LT=tttt.
```

I=ilfn      Binary input file; if just I is specified, BININ is assumed. The dump is formatted from file ilfn and no access to the NAD is required. The CH, ND, AC, and LT parameters are ignored.

B=blfn      Binary output file; if just B is specified, BINOUT is assumed.

L=lfn      Listing file name; if lfn is omitted, OUTPUT is assumed.

CH=cc      Channel number of local NAD; one- or two-digit octal number.<sup>†</sup>

ND=nn      Remote NAD address; one- or two-digit hexadecimal number.<sup>†</sup>

AC=aaaa      Remote NAD access code; one- to four-digit hexadecimal number.<sup>†</sup>

LT=tttt      Local TCU that is enabled; one- to four-digit binary number.

When the I and L parameters are not specified, local NAD memory is dumped; the ND and AC parameters are ignored.

When the I parameter is not specified and LT is specified nonzero, remote NAD memory is dumped. In this case, specify the CH parameter as the channel of the local NAD through which the remote NAD dump is obtained. Also, specify the ND parameter and the AC parameter (optional).

To execute DMPNAD enter the n.X entry at an empty control point, or a batch job if the system is in engineering mode. For a local NAD dump, you may use DMPNAD to dump either a local NAD (380-170 NAD connected by a channel to the host mainframe and configured in the EST), or a remote NAD (any 380 NAD accessible to a local NAD through a loosely coupled network trunk). The EST entry associated with channel cc (equipment type NC) must be OFF and not in use. When the local dump process stops all NAD activity, NLD puts the EST entry in the DOWN status and you must enter BCLOAD to reload the NAD controlware (refer to Downline Loading Controlware earlier in this section).

Remote dumping operations can occur concurrently with RHF's use of the local NAD. To dump the remote NAD, the local NAD must be loaded and running and its EST entry must be ON. Then specify the remote NAD to be dumped (ND and AC parameters), the channel number of the local NAD that you will use to access the remote NAD (CH parameter), and the trunk that connects the local NAD to the remote (LT parameter) NAD. Use extreme care when performing a remote dump; ensure that the correct remote NAD is being dumped and that the remote NAD is not being used by the remote mainframe to which it is connected. After the remote dump is complete, reload the controlware into the remote NAD before it can be used by software on the remote mainframe again.

<sup>†</sup>Omit this parameter if you specify the I parameter.

## **LISTING NAD DUMPS (LISTNAD)**

When a local NAD fails, RHF automatically calls application MHF to dump the NAD's memory and add the dump as a binary record to the end of permanent file NDFLcc, ID=RHF (where cc is the NAD's channel number). MHF sends a message to the system dayfile indicating the file name and record number:

```
MHF, NAD ON CHANNEL cc DUMPED FILE yyyyyyy
RECORD zz
```

LISTNAD is a utility procedure that extracts records from the NAD binary dump file and produces an output listing showing each NAD word in both hexadecimal and ASCII formats.

The format of the LISTNAD procedure call is:

```
LISTNAD,CH=cc,FREC=zz,NREC=ct,L=llfn,NDF=blfn.
```

**CH=cc** A one or two-digit octal number (0 to 13 or 20 to 33) specifying a local NAD's channel number, as well as characters five and six of the name of the NAD dump permanent file. If parameter NDF specifies an assigned local file, parameter CH is ignored; otherwise, the procedure attaches permanent file NDFLcc, ID=RHF. The default is 0.

**FREC=zz** Specifies the number (1 to 999) of the first binary dump record to be listed. The default is 1.

**NREC=ct** Specifies the number (1 to 999 or ALL) of binary dump records to be listed, starting with record FREC. The default is 1.

**L=llfn** Specifies the name of the local file receiving the NAD dump listing. The default is OUTPUT.

**NDF=blfn** Specifies the name of the local file containing NAD binary dump records. The default is ZZZNDFL. If file blfn is not assigned, the procedure attaches permanent file NDFLcc, ID=RHF.

The following control statements illustrate the use of various LISTNAD parameters:

```
LISTNAD,CH=6.
```

Attaches permanent file NDFL06, ID=RHF and lists the first dump record on OUTPUT.

```
LISTNAD,CH=6,FREC=4,NREC=2.
```

Attaches permanent file NDFL06, ID=RHF, skips the first three records, and lists the fourth and fifth dump records on OUTPUT.

```
LISTNAD,CH=25,NREC=ALL.
```

Attaches permanent file NDFL25, ID=RHF and lists all of the dump records on OUTPUT.

```
LISTNAD,CH=11,FREC=19,NREC=ALL,L=PRINT11.
```

Attaches permanent file NDFL11, ID=RHF, skips the first 18 records, and lists all the remaining dump records on file PRINT11.

```
ATTACH,NADDUMP,NDL01, ID=RHF.
```

```
LISTNAD,NDF=NADDUMP.
```

Lists the first dump record from file NADDUMP on OUTPUT.

The DSD routine normally controls the console keyboard and display screens. It interprets all commands typed in relation to all control points in the system, including control point zero. The DIS routine, in contrast, applies only to the control point to which it was called.

Operators use DIS to run system utility programs such as those that copy tapes. More frequently, DIS is used by system analysts, because its capabilities pertain to debugging software programs.

A job read in through JANUS can request DIS by a control statement in the form DIS. This statement brings DIS to the control point at which the job is executing. A request for DIS in RA + 1 appearing in a program also can be used to call DIS. DIS allows you to type any valid system control statement at the keyboard and have it executed. Other capabilities include allowing the contents of the 24 operating registers and the program address register to be changed in the exchange jump area, the central processor to be requested and dropped, the job field length, time limit, and the jobname to be set.

## CONSOLE CONTROL

Keyboard operation under DIS generally is the same as operation under DSD. DIS does not interpret commands as they are being typed. Therefore, you must enter each command completely before pressing the carriage return. Abbreviated command forms, such as A for ASSIGN, are not valid.

Typed characters are accumulated and displayed at the bottom of the left screen; the entire line can be cleared with the left blank or the rightmost character erased with the backspace. No command is executed until the carriage return is pressed.

After the carriage return is pressed, a message may appear above the accumulated entry if a condition interferes with execution. Messages common to DIS and DSD have the same meaning for both routines.

|              |                                                                                                                                                                             |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AUTO MODE    | Automatic reading of the control statement buffer is in effect. AUTO MODE can be initiated by the AUTO command, or by pressing the . key.                                   |
| FORMAT ERROR | Illegal character entered in command, DIS format not entered (for example, entering REWIND instead of X.REWIND produces this message), or command is not executable by DIS. |
| JOB ACTIVE   | DIS is waiting for all activity at the control point to complete.                                                                                                           |

NOT AVAILABLE      Equipment named in ASSIGN is off, assigned to another control point, or not ready; requested storage (ENFE,ENFL) is not currently available, or a PP overlay is not available.

OUT OF RANGE      EST ordinal in ASSIGN command exceeds highest existing ordinal, or control statement buffer currently cannot accommodate another ELS statement.

WAIT MTR FCN xx      DIS is waiting for the monitor to accept a function issued.

WAIT IDL      DIS is waiting for an overlay to be loaded.

Ending punctuation is not required after commands except for those that are equivalent to a system control statement. Specifically, ELS, ENS, and X commands require a terminating period or right parenthesis. In commands containing octal values, an ending period is accepted, but not necessary.

When octal values are entered, they are assembled right justified with leading zero fill in the register or word concerned. Spaces are not significant; they may be used freely to make the accumulated entry easier to read. If the number of octal digits exceeds the capacity of the field addressed, only the digits that fill the field are accepted.

## DISPLAY DIFFERENCES UNDER DIS

All displays are called with the same calls as used under DSD. They must be on the left screen before the + and - keys can change the items shown. The = key alternates memory displays on the left screen between absolute and relative addresses. The \* key returns control to DSD. The ( and ) keys do not rotate displays. DIS, like DSD, supports the LEFT=command. The LEFT=command defines the displays to be placed on the screen each time the right blank key is pressed when no other characters are in the command buffer.

The A, B, E, and F displays are different under DIS.

The A display (refer to figure 7-1) shows only the dayfile messages and the FNT entries pertaining to the job. FNT data appears with the same headings as the F display under DSD.

The B display (refer to figure 7-2) shows current job status. At the top of the display, the information shown is similar to that on the M display. All of the control statements entered through ENS and ELS statements appear below the status data. When the job displayed is not using the central processor, the contents of the exchange jump package are shown. The display code equivalent appears beside the contents of the X registers.

00.00.58 ASDSD00 FROM  
 00.00.58 IP 00000192 WORDS = FILE INPUT., DC.04  
 00.00.58 ASDSD,CM55000,T100,P20.  
 00.00.58 REQUEST(OLDPL,PE,VSN=44444)  
 00.01.28 NT13 ASSIGNED  
 00.01.29 UPDATE,Q.  
 00.01.37 1 ERRORS IN UPDATE INPUT

| FNT  | NAME   | APFO | EQPT | STATUS | FET | FIRST |
|------|--------|------|------|--------|-----|-------|
| 2276 | INPUT  |      | 02   | 21     | 100 | 5075  |
| 2301 | OLDPL  |      | NT   | 13     | 201 | 14501 |
|      | OUTPUT |      | 02   | 15     | 115 | 6078  |

Figure 7-1. Dayfile (A) Display under DIS

CM= 103400  
 EM= 40000

- - 4 - 7 - - - 1 - 3 -  
 | | F | | | | E | |

20.  
 ZOM0004 A TL 1500 CP 226 PP 17 RA 70700 FL 65000

UPDATE COMPLETE.

REQUEST(BIN,PF)  
 COMPASS(I=COMPILE,S=PPTEXT,B=BIN)

| BKP | O        | EF                         |
|-----|----------|----------------------------|
| P   | 375      | A0 201 B0 0                |
| RA  | 23100    | A1 371 B1 1                |
| FL  | 55000    | A2 202 B2 777776           |
| FM  | 70000    | A3 203 B3 2                |
| RE  | 00000000 | A4 204 B4 75               |
| FE  | 00000000 | A5 1 B5 1756               |
| MA  | 0        | A6 1 B6 3117               |
|     |          | A7 41760 B7 1              |
| X0  | 7777     | 7777 7777 7760 0000        |
| X1  | 0000     | 0000 0004 0000 0442 D D7   |
| X2  | 4000     | 0000 0000 1001 4501 5 HA+A |
| X3  | 0000     | 0000 0000 0002 0437 BD4    |
| X4  | 0000     | 0000 0000 0002 0437 BD4    |
| X5  | 2203     | 1400 0000 0000 0000 RCL    |
| X6  | 2203     | 1400 0000 0000 0000 RCL    |
| X7  | 0000     | 0000 0000 0000 0000        |

Figure 7-2. Job Status (B) Display under DIS

Any error flag set during execution is shown above the package beside the breakpoint address.

The E and F displays become central memory storage displays under DIS. They can be called to the left screen with a particular beginning address set in a group of eight words as with DSD by entering the following command:

xg,nnnnn.

|       |                                                                                                  |
|-------|--------------------------------------------------------------------------------------------------|
| x     | C, D, E, F, G                                                                                    |
| g     | Group number (0 to 3) to set a particular group address, or 4 to set the address for all groups. |
| nnnnn | The relative address at which the display is to begin.                                           |

The E display (refer to figure 7-3), like the C and D displays, is used to examine data. Word contents appear in octal, in five 12-bit bytes. The display code equivalent of the contents appears to the right of each word.

The F display (refer to figure 7-4) is used to examine a program stored in memory. It shows, in octal, four 15-bit bytes for each word. A translation to COMPASS mnemonics appears to the right of each word.

#### DIS EXECUTION

Bring DIS to a blank control point or a control point with a running job, as follows:

n.DIS.

n.LOCKIN must precede n.DIS if a job already exists at the control point. The keyboard must be unlocked before DIS can be brought to a control point with a running system job. If the control point is blank, the system gives programs that follow a dayfile name of DIS00nn, where nn is the two-character sequence assigned by the system to ensure that all job names are unique. The DIS routine then gains control of the channel that accesses the keyboard console and interprets entries in its own context.

The asterisk key subsequently becomes a toggle switch between DIS and DSD access to the console. When DIS is at a control point and DSD is using the console channel, the flashing message REQUEST DISPLAY appears at the DIS control point.

To suspend execution of DIS for a job, the following command is used:

HOLD

To resume execution under DIS, the console must be assigned to the control point of the DIS job:

j.DISPLAY.

| E 0    |      |      |      |      |      |         |
|--------|------|------|------|------|------|---------|
| 004000 | 0003 | 1544 | 0145 | 7400 | 0000 | CM9A+   |
| 004001 | 0000 | 0000 | 0324 | 1500 | 0001 | CTM A   |
| 004002 | 0037 | 7777 | 0002 | 2400 | 0004 | 4 BT D  |
| 004003 | 0000 | 0000 | 0000 | 6100 | 0000 |         |
| 004004 | 0000 | 0000 | 0324 | 5700 | 0000 | CT.     |
| 004005 | 1000 | 0000 | 0000 | 1603 | 2412 | H NCTJ  |
| 004006 | 0000 | 4000 | 0000 | 6177 | 7775 | 5       |
| 004007 | 0000 | 0000 | 0040 | 2400 | 1000 | ST H    |
| 004010 | 7777 | 7777 | 7777 | 7777 | 0000 |         |
| 004011 | 0000 | 0000 | 0000 | 0000 | 0000 |         |
| 004012 | 0000 | 0000 | 0000 | 0000 | 0000 |         |
| 004013 | 0752 | 0000 | 0000 | 0000 | 0000 | G)      |
| 004014 | 0000 | 0000 | 0000 | 0500 | 0000 | E       |
| 004015 | 0752 | 6510 | 0007 | 0470 | 0062 | G) H GD |
| 004016 | 0000 | 0000 | 0000 | 0500 | 0237 | E B4    |
| 004017 | 0000 | 0000 | 0000 | 0000 | 0000 |         |
| 004020 | 0000 | 0020 | 0004 | 0400 | 0000 | P DD    |
| 004021 | 0021 | 0770 | 0000 | 0021 | 0770 | QG QG   |
| 004022 | 0000 | 0000 | 0000 | 0000 | 0000 |         |
| 004023 | 0000 | 0000 | 0006 | 3441 | 5360 | F 16    |
| 004024 | 0000 | 0000 | 0000 | 0000 | 0000 |         |
| 004025 | 0000 | 0000 | 0000 | 0000 | 0000 |         |
| 004026 | 0000 | 0000 | 0000 | 0000 | 0000 |         |
| 004027 | 0000 | 0000 | 0000 | 0000 | 0000 |         |
| 002222 | 0000 | 0000 | 0000 | 0000 | 0000 |         |
| 002223 | 0000 | 0000 | 0000 | 0000 | 0000 |         |
| 002224 | 0000 | 0000 | 0000 | 3727 | 0000 |         |
| 002225 | 1605 | 3024 | 0000 | 0000 | 0011 | NEXT I  |
| 002226 | 0000 | 0000 | 0000 | 0000 | 0000 |         |
| 002227 | 0000 | 0000 | 0000 | 0747 | 0000 | G*      |
| 002230 | 0000 | 0000 | 0000 | 0000 | 0000 |         |
| 002231 | 0000 | 0000 | 0000 | 0000 | 0000 |         |

Figure 7-3. E Display under DIS

RA=23100

F2

|        |       |       |       |       |     |     |        |     |        |        |
|--------|-------|-------|-------|-------|-----|-----|--------|-----|--------|--------|
| 000400 | 03111 | 70000 | 00000 | 00014 | NZ  | Z   |        | PS  |        |        |
| 000401 | 04000 | 00435 | 00000 | 00000 | FO  | BB  |        | PS  |        |        |
| 000402 | 54100 | 71200 | 00021 | 11312 | SA  | A+B | SX     | B+K |        | BX XXX |
| 000405 | 63750 | 54211 | 05710 | 00401 | SB  | X+B | SA     | A+B | NE     | BB     |
| 000404 | 63720 | 54221 | 54321 | 54431 | SB  | X+B | SA     | A+B | NE     | BB     |
| 000404 | 63720 | 54221 | 54321 | 54431 | SB  | X+B | SA     | A+B | SA     | A+B    |
| 000405 | 63640 | 37525 | 77767 | 13650 | SB  | X+B | IX     | X-X | SX     | B-B    |
| 000406 | 23517 | 03260 | 00407 | 36667 | AX  | B X | PL     | X   |        | BX X-X |
| 000407 | 37756 | 03270 | 00401 | 46000 | IX  | X-X | PL     | X   |        | IX X+X |
|        |       |       |       |       |     |     |        |     |        | NO     |
| 000410 | 03300 | 00377 | 01000 | 00366 | NG  | X   |        |     | RJ/RWE |        |
| 000411 | 03111 | 70000 | 00000 | 00010 | NZ  | X   |        |     |        | PS     |
| 000412 | 04000 | 00401 | 46000 | 46000 | FQ  | BB  |        |     | NO     | NO     |
| 000413 | 04000 | 03323 | 00000 | 00000 | FQ  | BB  |        |     | PS     |        |
| 000414 | 64710 | 01000 | 00366 | 46000 | SB  | A+B | RJ/RWE |     |        | NO     |
| 000415 | 03111 | 70000 | 00000 | 00001 | NZ  | X   |        |     | PS     |        |
| 000416 | 56171 | 73610 | 54611 | 54661 | SA  | B+B | SX     | X+B | SA     | A+B    |
| 000417 | 04000 | 00415 | 46000 | 46000 | FQ  | BB  |        |     | NO     | NO     |
| 000420 | 04000 | 00315 | 00000 | 00000 | FQ  | BB  |        |     |        | PS     |
| 000421 | 05303 | 00043 | 56362 | 06373 | ZR  | X   |        |     | SB     | X+B    |
| 000422 | 05700 | 00425 | 71100 | 03571 | NE  | BB  |        |     | SX     | B+K    |
| 000423 | 71200 | 00004 | 01000 | 02531 | SX  | B+K |        |     | RJ/RWE |        |
| 000424 | 04000 | 00672 | 46000 | 46000 | FQ  | BB  |        |     | NO     | NO     |
| 000425 | 54010 | 46000 | 46000 | 46000 | SA  | A+B | NO     |     | NO     | NO     |
| 000426 | 54100 | 54211 | 54321 | 54331 | SA  | A+B | SA     | A+B | SA     | A+B    |
| 000427 | 13734 | 54541 | 53641 | 46000 | BX  | X-X | SA     | A+B | SX     | X+B    |
|        |       |       |       |       |     |     |        |     |        | NO     |
| 000430 | 05070 | 00438 | 73150 | 13716 | ZR  | X   |        |     | SX     | X+B    |
| 000431 | 53440 | 03170 | 00432 | 73620 | SA  | X+B | NZ     | X   |        | SX X+B |
| 000432 | 10732 | 54631 | 67771 | 56760 | RX  |     | SA     | A+B | SB     | B-B    |
| 000433 | 66661 | 05700 | 00426 | 43000 | SB  | B+B | NE     | BB  |        | SA B+B |
| 000434 | 01000 | 00401 | 46000 | 46000 | RJ/ | RWE |        |     |        | MX JK  |
| 000435 | 43100 | 04000 | 00420 | 46000 | MX  | JK  | EQ     | BB  |        | NO     |
| 000436 | 20167 | 03310 | 00420 | 20104 | LX  | JK  | NG     | X   |        | NO     |
| 000437 | 03210 | 00044 | 01000 | 00366 | PL  | X   |        |     | RJ/RWE |        |

Figure 7-4. F Display under DIS

If the job is to continue execution under DSD control, DROP should be entered rather than HOLD.

Multiple copies of DIS can be brought to control points with the n.DIS entry. Each is assigned a unique job name for dayfile and output file purposes. Only the first DIS job called, however, will have channel access to the console until you overtly assign the channel to another DIS job.

For example, when the console channel is held by job DIS0001, the \* key alternates between DIS0001 and DSD. If job DIS0002 is to execute before DIS0001 completes, the console channel access must be given up by a HOLD or DROP and then reassigned to DIS0002 through the j.DISPLAY entry. The \* key alternates access between DSD and DIS0002. To continue job DIS0001, the HOLD and j.DISPLAY commands must be repeated.

#### CAUTION

System performance can be adversely affected by running multiple copies of DIS because each copy resides in a separate PP making the PP unavailable for system use.

When DROP is entered under DIS, only the console channel access is dropped. The job continues under DSD execution. DIS jobs can be dropped before completion only by dropping the control point under DSD.

If more than one console is available, the DIS and DISPLAY commands become the following:

n.DIS,xx.

j.DISPLAY,xx.

xx

EST ordinal of the desired display console.

The mnemonic for the console in the EST display is DS.

#### ENTERING JOBS THROUGH DIS

An entire job can be entered through the DIS commands. Control statements are entered with a DIS command followed by a control statement with the same parameters used in job decks submitted through the card reader. Programs to be assembled, executed, or otherwise manipulated are assumed to be on magnetic tape, private disk pack, or a permanent file; since compiler or assembly language programs cannot be entered directly in the standard system.

Information normally appearing on the job card to define program time limit, field length, and jobname is entered by separate commands. These values are applicable to the job entered through DIS; they are not needed for DIS itself, which executes in a peripheral processor.

Time limit is set by entering

ENTL,nnnnn

where nnnnn represents octal seconds. Entering 77777 gives the job an infinite limit.

Field length is set by entering the following command

ENFL,nnnnn

where nnnnn represents octal field length. Because the system adjusts field length for each program load, this command does not replace X.RFL(nnnnn).

Exit mode is set by entering the following command

ENEM,n

where n specifies an error exit condition (refer to the description of the MODE Statement in the NOS/BE Reference Manual listed in the preface).

The jobname for OUTPUT listings can be changed with the following command:

ENJN,jobnm

where jobnm specifies up to five characters to be used as the new jobname. The 6th and 7th characters (job sequence identifier) from the original jobname are retained.

Commas appearing in the ENTL, ENFL, ENEM, and ENJN commands are optional.

Sense switches (1 through 6) also can be set or cleared at any time by entering

ONSwn

or

OFFSWn

where n is the number (one through six) of the sense switch.

## ENTERING CONTROL STATEMENTS

Any control statement that can be used in the control statement record of a job deck can be entered through DIS. Control statement images are accumulated in the control statement buffer. A statement can be inserted as the last statement in the buffer, as a replacement for all statements in the buffer, or executed without altering the statements in the buffer.

The format of the control statement image is governed by the rules that apply to actual control statements. (Special characters with display code values greater than 57 are accepted as input but are not displayed on the screens.) The parameter list or single control statement keyword must be terminated by a period or right parenthesis. Parentheses and commas are used in the following formats:

Format:

X.control statement image.

or

control statement image.

These formats enter and execute a control statement image with your last entry. The command is equivalent to an ENS followed by an RNS command. These formats often are used by operators to

initiate utility routines. Execution of routines whose names are three characters or less in length must either use a ( as the first separator, or the X. format in order to prevent being interpreted as direct PP requests (see Calling PP Programs). If the control statement begins with a loader verb (CAPSULE, GROUP, LDSET, LIBLOAD, LOAD, SATISFY, SEGLOAD, SLOAD, or TRAP), DIS processes the keyboard entry as if ENS preceded the statement.

When these formats are not used, control statement images are entered by an ENS or ELS command and executed by RNS, as follows:

Format:

ENS.control statement image.

ENS enters the control statement as the next unexecuted statement in the control statement buffer. Existing buffer contents are destroyed.

After entry of this line, DIS automatically formats ELS. in the command buffer in preparation for another command.

Format:

ELS.control statement image.

ELS enters a control statement after the last statement in the buffer. If the buffer is full, the message OUT OF RANGE appears above the accumulated entry. The control statement must be reentered after one statement preceding it in the buffer has been executed.

## NOTE

If you use ENS to enter a control language procedure call, any additional statements entered with ELS are lost when the control language procedure is processed. Wait for the procedure to complete before entering another control statement.

Format:

RNS

Execution of the first statement in the buffer occurs after an RNS command.

Format:

RSS

An RSS command causes the first statement in the buffer to be processed and the appropriate program loaded into central memory but not executed. It is used to load but not to execute a program. After the program has been loaded, an RCP must be issued to start execution.

Format:

AUTO

Automatic execution of all control statements in the control statement buffer is initiated by the AUTO command, or by pressing the . key when no other characters are in the command buffer. Auto mode is

terminated automatically when there are no more statements to execute, or an error is encountered during execution. AUTO mode can be terminated by pressing the left blank key when no other characters are in the command buffer and no outstanding condition message is being displayed.

Format:

BEGIN,params....

The BEGIN command causes AUTO MODE to be set and then proceed to execute a BEGIN control statement with the same parameters provided on the BEGIN command.

Format:

Z.control statement image.

The Z command causes execution of the control statement image without destroying the accumulated (current) control statement buffer.

If a REPRIEVE is pending after a control statement has been executed, you are informed with the following flashing B display message:

REPRIEVE SET

You can initiate normal REPRIEVE processing with the following command:

Format:

RPV

If this command is not entered, the next RNS, RSS, or X. command clears the outstanding REPRIEVE condition.

## CHANGING CENTRAL MEMORY CONTENTS

The contents of any location within DIS field length can be changed with a memory entry command. These commands differ from the DSD commands in that character and octal values cannot be mixed, and a single byte in a word cannot be changed without reinserting the values of remaining bytes.

A word at address x can be given a new octal value y with:

x,y

Leading zeros in both the address and contents may be omitted.

The display code value of a character string can be inserted at word x with:

x/y

Leading zeros may be dropped from the address. Characters in string y are left-justified in x with trailing zero fill.

These commands are often used to correct a program malfunction. If monitor has a copy of the bad word in its memory in PPO, however, the corrected value is not necessarily reread; and the problem situation could remain after central memory has been changed.

## CALLING PP PROGRAMS

Any PP program with a name beginning with a letter may be called to the control point through DIS. Commonly called programs include the dump routine DMP.

Each of the following command formats results in a different input register format. n is the control point number for DIS.

| Command     | Input Register                  |
|-------------|---------------------------------|
| nam         | 18/3Lnam,6/n,36/0               |
| nam,xxx     | 18/3Lnam,6/n,18/0,<br>1 8/xxx   |
| nam,xxx,yyy | 18/3Lnam,6/n,18/xxx,<br>1 8/yyy |

## SETTING BREAKPOINT ADDRESS

A breakpoint can be set in a program to cause the program to stop executing when that address is reached. The address set appears on the B display after the characters BKP above the exchange package contents.

The word at the address set in the breakpoint command is set to all zeros by DIS after the contents of that word are saved. Addresses are relative to the DIS control point reference address. The program stops executing when the contents of the P register show the address.

Breakpoints are set by the following command:

BKP,nnnnnn

where nnnnnn is the desired address.

Breakpoints are cleared by the following command:

BKP,0

which restores the contents of the address to its former value. Only one breakpoint can exist at a given time, but the address can be reset.

## RESETTING EXCHANGE JUMP PACKAGE

The job control point area in central memory resident contains the exchange jump package that monitor uses to initiate jobs in the central processor. The control point area is displayed on the B display under DIS. Values shown can be changed with the commands listed below.

A comma is required between a command and the octal value entered for the operating registers, but not in other commands. Spaces are not needed to set the X registers. Ending punctuation is not required.

The A, B, and X registers are set as follows: i is the register number and n is an octal digit.

ENAi,nnnnnn

ENBi,nnnnnn

ENXi,nnnnn nnnnn nnnnn nnnnn

The P register, which is the next program address to be executed, is set by the following command:

ENP,nnnnnn

Central memory field length is set by the following command:

ENFL,nnnnnn

Storage is moved if necessary to accommodate this length when the program begins execution.

ECS field length is set by the following command:

ENFE, nnn nnnn

Exit mode is set by the following command:

ENEM,n

where n specifies an error exit condition (refer to the description of the MODE Statement in the NOS/BE Reference Manual).

Values entered in the previous commands are stored directly in the control point area and used when the job resumes execution in the central processor.

The current exchange jump package can be saved in DIS memory and restored in the control point area later. The analyst can stop program execution, copy the current package, change a value in the package in central memory, execute with the new values, and return to reexecute with original values.

The current exchange jump package contents are copied into DIS memory with the following command:

SAVE

They are restored in the control point area by pressing the slash key. If the RA or FL of the control point have changed since the package was saved in DIS memory, the control point is updated to the current value when the package is restored.

## CENTRAL PROCESSOR ASSIGNMENT

Program execution can be stopped at any time with the following command:

DCP

The central processor is dropped from the DIS control point. Contents of the exchange jump area are displayed on the B display. At this point, the analyst can change values in the package contents and change central memory. The single character ) is equivalent to DCP.

The following command restarts a program stopped with a DCP:

RCP

Execution begins with the instruction reflected by the P register. Since the DIS job must be assigned to the central processor by the scheduling routine, the speed with which execution resumes depends on the priority of the DIS job in relation to other jobs in the system.

The RCP command is also used to restart a job stopped by a breakpoint. The single character ( is equivalent to RCP.

RCP is not needed after a program stops as the result of a PAUSE statement. Rather, the following command is used:

GO

The program execution can be terminated with the following command:

ERR.

The error flag is set to indicate PP abort and the current program is aborted.

## EQUIPMENT ASSIGNMENT

Equipment can be assigned in response to flashing requests with the following command:

ASSIGN,uuu.

The equipment with EST ordinal uuu is assigned to the file named in the flashing request.

## MISCELLANEOUS

Programs which flash GO or RECHECK can be told to RECHECK by using the following command:

RECHECK.

The GO command can be used to satisfy the other option.

You can enter lines with special characters (\$, or characters above 578 by using the uppercase control characters. The uppercase case control character is set with the following command:

UCC=c

This command sets the uppercase control character to c. If c is omitted, the uppercase control character is cleared. To enter the character which is currently defined as the uppercase control character, enter that character twice. To enter any character not on the keyboard (other than 00), press the uppercase control character followed by the appropriate key to generate the desired two-digit octal display code. Keys and codes generated are as follows:

|      |      |
|------|------|
| S=53 | Q=70 |
| O=60 | W=71 |
| I=61 | E=72 |
| 2=62 | R=73 |
| 3=63 | T=74 |
| 4=64 | Y=75 |
| 5=65 | U=76 |
| 6=66 | I=77 |
| 7-67 |      |

## CONSOLE EDITOR (O26)

An editor is available for creating or editing a file from the console. The editor is initiated by entering the O26 command while under DIS. A central memory buffer is used to store and edit the display code lines before writing the file. Like DSD, O26 is interpretive.

### KEYBOARD INPUT

All entries are displayed on the bottom of the left screen as they are entered.

| <u>Key</u>  | <u>Action</u>                                   |
|-------------|-------------------------------------------------|
| CR          | Must follow all entries before action is taken. |
| BKSP        | Deletes the previous character typed.           |
| LEFT BLANK  | Deletes the current line being entered.         |
| RIGHT BLANK | Is the tab key.                                 |

If one of the following characters is the first for a line, the stated action occurs.

- 0 - Set insert marker at first line.
- 1 - Set insert marker at the 4th/8th† line on the screen.
- 2 - Set insert marker at the 8th/16th† line on the screen.
- 3 - Set insert marker at the 12th/24th† line on the screen.
- 4 - Set insert marker at the 16th/32nd† line on the screen.
- 5 - Set insert marker at the 20th/40th† line on the screen.
- 6 - Set insert marker at the 24th/48th† line on the screen.
- 7 - Set insert marker at the 32nd/64th† line on the screen.
- 8 - Set insert marker 8 at insert line.
- 9 - Set insert marker 9 at insert line.
- + - Display the next page.
- - Display the previous 18 lines.
- \* - Hold display.
- / - Start or stop roll.
- ( - Advance insert marker by 1.
- ) - Decrease insert marker by 1.
- = - Toggle insert flag.
- , - Find insert line.
- . - Delete next line.
- cr - Set REPEAT ENTRY.
- \* \* - Set the characters P. into buffer.

Above the entry display, the following messages may appear.

| <u>Message</u> | <u>Meaning</u>                                               |
|----------------|--------------------------------------------------------------|
| FORMAT ERROR.  | A format error was detected during translation of the entry. |
| OUT OF RANGE.  | Line will not fit in the buffer.                             |
| PPU BUSY.      | Request ignored by system.                                   |

| <u>Message</u>   | <u>Meaning</u>                                         |
|------------------|--------------------------------------------------------|
| DISK BUSY.       | Waiting for O26 overlay.                               |
| NOT IN LINE.     | Character not found by the replace character commands. |
| REPEAT ENTRY.    | Entry will not be cleared after execution.             |
| RECORD TOO LONG. | Record read did not fit into buffer.                   |

The following are commands which are processed by O26.

| <u>Command</u>  | <u>Significance</u>                                                                                                            |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------|
| DIS.            | Write and rewind file, and recall DIS to the control point.                                                                    |
| DROP.           | Write and rewind file, and drop display.                                                                                       |
| ERR.            | Set the control point error flag.                                                                                              |
| XDIS.           | Recall DIS only to the control point without writing the file.                                                                 |
| XDROP.          | Drop the display without writing the file.                                                                                     |
| GO.             | Clear pause flag.                                                                                                              |
| HOLD.           | Drop display and wait for operator assignment.                                                                                 |
| BKSP.cccccc.    | Backspace file ccccccc. If ccccccc is not entered, the previous file name will be used.                                        |
| BKSPRU,x.       | Backspace current file x physical records.                                                                                     |
| BKSPRU.ccccccc. | Backspace file ccccccc one pru. If ccccccc is not entered, the previous file name will be used.                                |
| FILE.ccccccc.   | Set file name = ccccccc.                                                                                                       |
| RC.ccccccc.     | Rewind, read, and rewind file ccccccc. If ccccccc is not entered, file COMPILE will be read.                                   |
| READ.ccccccc.   | Rewind, read, and rewind file ccccccc. If ccccccc is not entered, the previous file name will be used.                         |
| READI.ccccccc.  | Skip to end of information, BKSP, BKSP, and read file ccccccc. If ccccccc is not entered, the previous file name will be used. |

†The first value is used when the display is double spaced (default). The second value is used when the display is single spaced.

| <u>Command</u>  | <u>Significance</u>                                                                                                           | <u>Command</u>  | <u>Significance</u>                                                                                                                  |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------|
| READN.ccccccc.  | Read file ccccccc. No rewind. If ccccccc is not entered, the previous file will be read. Stops on buffer full or EOR.         | WRITE.ccccccc.  | Write buffer to file ccccccc. If ccccccc is not entered, the previous file name will be used.                                        |
| READNS.ccccccc. | Read file ccccccc nonstop. No rewind. If ccccccc is not entered, the previous file will be read. Stops on buffer full or EOF. | WRITEF.ccccccc. | Write buffer to file ccccccc with an EOF mark. If ccccccc is not entered, the previous file name will be used.                       |
| RETURN.ccccccc. | Return file ccccccc. If ccccccc is not entered, the previous file name will be used.                                          | WRITEW.ccccccc. | Write data (from start of buffer up to insert line) to file ccccccc. If ccccccc is not entered, the previous file name will be used. |
| REWIND.ccccccc. | Rewind file ccccccc. If ccccccc is not entered, the previous file name will be used.                                          | A.ccc-ccc       | Merge characters ccc-ccc with the following line, except tabbed or spaced area up to carriage return.                                |
| RFR.ccccccc.    | Rewind and read file ccccccc. If ccccccc is not entered, the previous file name will be used.                                 | C.ccc-ccc       | Enter characters ccc-ccc in buffer. ccc-ccc may consist of up to 90 characters.                                                      |
| RI.ccccccc.     | Rewind, read, and rewind file ccccccc. If ccccccc is not entered, file INPUT will be read.                                    | COPY.           | Copy data from block starting at marker 8 and ending at marker '9' into block at the pointer.                                        |
| RLR.ccccccc.    | Read last record on file ccccccc. If ccccccc is not entered, the previous file name will be used.                             | DEL.            | Delete lines after insert mark.                                                                                                      |
| RNR.ccccccc.    | Read next record on file ccccccc. If ccccccc is not entered, the previous file name will be used.                             | D.*             | Delete from marker 8 through marker 9.                                                                                               |
| RO.ccccccc.     | Rewind, read, and rewind file ccccccc. If ccccccc is not entered, file OUTPUT will be read.                                   | D.ccc-ccc       | Merge ccc-ccc with remainder of characters in dup buffer, except tabbed area up to carriage return.                                  |
| RPR.ccccccc.    | Read previous record on file ccccccc. If ccccccc is not entered, the previous file name will be used.                         | E.ccc-ccc       | Merge ccc-ccc with remainder of characters in dup buffer, except tabbed or spaced area.                                              |
| SKIPEI.ccccccc. | Skip to end of information on file ccccccc. If ccccccc is not entered, the previous file name will be used.                   | L.ccc-ccc       | Merge characters ccc-ccc with remainder of the following line, except tabbed or spaced area.                                         |
| UNLOAD.ccccccc. | Unload file ccccccc. If ccccccc is not entered, the previous file name will be used.                                          | MOVE.           | Move data from block starting at marker 8 and ending at marker 9 into block at the pointer.                                          |
|                 |                                                                                                                               | M.ccc-ccc       | Merge characters ccc-ccc with the remainder of the following line.                                                                   |
|                 |                                                                                                                               | N.ccc-ccc       | Merge characters except tabbed area.                                                                                                 |

| <u>Command</u>        | <u>Significance</u>                                                                                                                                               | <u>Command</u> | <u>Significance</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P.ccc-ccc             | Enter characters ccc-ccc in buffer. ccc-ccc may consist of up to 96 characters.                                                                                   | RWRITE.        | Rewrite record (mass storage only). Notes and cautions:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| DFL.                  | Start display at first line of file and HOLD.                                                                                                                     |                | <ul style="list-style-type: none"> <li>o Number of PRUs cannot change.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| DLL.                  | Display last part of file.                                                                                                                                        |                | <ul style="list-style-type: none"> <li>o REWRITE not allowed if condition exists.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| DS,nnnnn.             | Start display at line nnnnn of file.                                                                                                                              |                | <ul style="list-style-type: none"> <li>o An ** will appear to the right of the RS= field when the command REWRITE cannot be used.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| DS,                   | Count the number of lines from the start of the display up to the pointer or end of file. The program enters the line count after the DS, in the keyboard buffer. |                | <ul style="list-style-type: none"> <li>o Rewrite to another file may cause unpredictable results.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| TAB,x,y,...,z.        | Set tabs to columns x, y, z. If x = 0, clear tabs. Default tabs are 11, 18, 30, 40, 50, 60, 73, and 80.                                                           | ENFL.          | Set field length to buffer size +1000.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| SCAN,x,y,...,z.       | Set word scan to x, y, z. If x = 0, clear scan.                                                                                                                   | ENFL,x.        | Set field length to x.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| F.ccc-ccc             | Search for matching field in line. Search is end around.                                                                                                          | IGNORE.        | Ignore RECORD TOO LONG condition. The record can now be written, but will be truncated.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| S.ccc-ccc             | Starting with the first line displayed, search for a line beginning with the characters ccc-ccc. Search is end around.                                            | KILL.          | Drop display and set kill error flag.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| GET,fffffff.ccccccc.  | Search file ffffffff for record ccccccc. If ffffffff is not entered, the previous file name will be used.                                                         | SINGLE.        | Set single spaced display (display flickering may occur).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| GET.ccccccc.          | Search previous file for record ccccccc.                                                                                                                          | DOUBLE         | Set double spaced display.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| RC,x,c.               | Replace character x of following line with character c.                                                                                                           | UCC=c.         | Sets uppercase control character to c. If c is not entered, the uppercase control character will be cleared. To enter a character that has been previously specified as the uppercase control character, enter that character twice. The uppercase control character is retained unless changed by DIS, and remains in effect during subsequent calls to 026. To enter any character not on the keyboard, first press the uppercase control character, then press the appropriate key to generate the desired two-digit octal display code. Keys and codes generated are as follows: |
| RM/aaa-aaa/bbb-bbb/   | Replace character string aaa-aaa from the following line with character string bbb-bbb. / may be any character. Do not advance insert marker.                     |                | O THRU 7 = 60 THRU 67                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| RS/aaa-aaa/bbb-bbb/   | Replace character string aaa-aaa from the following line with character string bbb-bbb. / may be any character.                                                   |                | QWERTYUI = 70 THRU 77                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| R,x./aaa-aaa/bbb-bbb/ | Replace character string aaa-aaa from the following line starting with character position x with character string bbb-bbb. / may be any character.                |                | S = 53                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                       |                                                                                                                                                                   |                | For 64 character systems, Z = 00.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

With the introduction of CMR segmentation, the system CPU code executes in two different configurations, depending on extended memory availability. When extended memory is not available, all system CPU code is located in central memory. When extended memory is available, most of the CPU code is extended memory resident and loaded as needed in overlay areas. The CMR loader, LDCMR, handles the segment relocation and the creation of the extended memory segment library. The CMR loader is called automatically at deadstart time. Debugging facilities such as segment trace, step, and breakpoint are provided. These aids are applicable to systems with extended memory only.

### OVERLAY TRACE

Overlay trace is intended for use in dumps. The overlay trace allows overlay loading to be tracked for a short period preceding a problem. As an option, all GOTOs in CMR normally changed to simple jumps are left as normal GOTOs by LDCMR to obtain a complete trace. The locations of trace buffers obtained from the LDCMR map. Entry points, MTRACE and UTRACE designate monitor and user mode trace buffers.

### OVERLAY STEP

A step flag in the segment table can be set to permit stepping through overlays. When the flag is set, the CMR segment loader sets the step byte in T.MSP and waits for it to clear to complete the load. DSD zeros the byte to release an overlay.

| <u>Command</u> | <u>Description</u>                        |
|----------------|-------------------------------------------|
| CSTEPA.        | Step in user and monitor mode.            |
| CSTEPU.        | Step in user mode.                        |
| CSTEPM.        | Step in monitor mode.                     |
| CSTEP,SEGMENT. | Step in a particular segment.             |
| UNSTEPA.       | Take all segments out of step mode.       |
| UNSTEPU.       | Take user mode segments out of step mode. |

| <u>Command</u>  | <u>Description</u>                           |
|-----------------|----------------------------------------------|
| UNSTEPM.        | Take monitor mode segments out of step mode. |
| UNSTEP,SEGMENT. | Take a particular segment out of step mode.  |

### RESTART

After deadstart, a DSD command may initiate the extended memory bootstrap program.

| <u>Command</u> | <u>Description</u>          |
|----------------|-----------------------------|
| RESTART.       | Restart the current system. |
| RESTART,ALT.   | Start alternate system.     |

### BREAKPOINTING

A DSD overlay handles breakpointing. DSD replaces the code for the word designated by a breakpoint with a return jump to a breakpoint entry. When the CPU references this address, an EXN exchange jump exchanges to a wait loop. The exchange package and breakpoints are displayed in the N display.

RCP is used to restart the CPU by executing the word at the breakpointed address that is saved in a table in CMR.

RCP does not release a breakpoint; RBKP releases a breakpoint.

The RBKP command must be issued only after the CPU has stopped at a particular breakpoint. Should an erroneous breakpoint be entered, it may be removed through a RESTART command (RESTART removes all breakpoints), or through a RBKP command (RBKP should be issued only after the CPU has reached the particular breakpoint desired).

To enter a breakpoint, use the following commands:

|                                          |                         |
|------------------------------------------|-------------------------|
| BKP/OVERLAY<br>NAME/RELATIVE<br>ADDRESS. | For an overlay segment. |
| BKP,ADDRESS.                             | For resident code.      |

Breakpoints cannot be entered in an EXN system.

On a dual CPU system, CPU B must be turned off before breakpointing. If both CPUs are on, breakpoints cannot be entered.



This section describes the linked NOS/BE system and the procedures for station initiation, login, recovery, logout, and disconnect. Also described, are station commands and displays, linked commands and displays, and job and file control commands used in a multimainframe system. Descriptions in this section are limited to station and do not include the Remote Host Facility.

## MULTIMAINFRAME SYSTEM

A multimainframe system is a network of physically and logically connected NOS/BE computer systems, which can include CYBER 180, CYBER 170, CYBER 70 or CDC 6000 Computer Systems.

The multimainframe environment allows jobs, data files, messages, and displays to be transmitted from one computer system to another. Hardware connections between operating systems are satellite couplers. Extended core storage (ECS) can be used as an alternate hardware connection between two NOS/BE computer systems. Software links between operating systems are packages called stations. The station serves as the directing executive of all linked operations involving its own mainframe.

## LINK INTERFACE

Each mainframe in a multimainframe system considers itself to be the host mainframe and all other mainframes to which it is connected to be linked mainframes. For example, when mainframe A and mainframe B are communicating, mainframe A considers itself to be the host mainframe and mainframe B to be the linked mainframe. However, mainframe B considers itself to be the host mainframe and mainframe A to be the linked mainframe.

A mainframe is identified by a host ID that consists of three display code characters (letters or digits). In a multimainframe system, the third character of each host ID is the primary ID and must be a unique letter. The primary ID is used by the station and the console operator to address a linked mainframe. The host ID of a mainframe is called the physical ID of that mainframe. For example, if the physical ID of a mainframe is MFA, then its primary ID is A.

## STATION ACTIVITIES

The station performs the following functions.

- Provides local batch capability for a linked system, allowing the user to submit job files and receive output files from a linked mainframe.

- Allows a NOS/BE job to use the GETPF, SAVEPF, or PURGE functions on permanent files that reside on a linked NOS/BE mainframe.
- Load levels job files and output files between linked NOS/BE systems.
- Provides operator commands and displays for a linked NOS/BE mainframe.

A staging operation is a permanent file transfer between linked mainframes. A file is staged by the initiation of a spun off task.

A spun-off task (SPOT) is a job initiated by the host mainframe station after it has queried the linked system and found that a staging operation is required. The host mainframe station places the SPOT job in the host mainframe input queue. The SPOT job is processed like other jobs by the host mainframe operating system. When the SPOT job is complete, its dayfile is sent to the linked system to be included in the dayfile of the initiating job. The host mainframe operating system handles error processing and includes any dayfile messages in the task dayfile. The linked mainframe for which the task is being performed is identified by the first character in the job name of the spun off task.

A spooling operation is the transfer of input/output files between the station and the linked system. When the station has an input file for the linked system or finds an output file at the linked system waiting to be transferred, a spun off task (spooling SPOT) transfers or receives the files. After the SPOT job completes the transmissions, it checks for other files. If more files are to be transmitted, the SPOT job continues; otherwise, it is swapped out until it is called again by the station. The SPOT job is not dropped until the station is dropped.

## SYMMETRIC STATION CONFIGURATION

Two mainframes can be connected to each other via 6683/6683 satellite couplers, or ECS. Standard equipment status table (EST) entries describe the specific type of link used for communication, as follows:

|    |                      |
|----|----------------------|
| CC | Link channel coupler |
| CX | ECS                  |

Symmetric station interface functions are shown in figure 9-1.

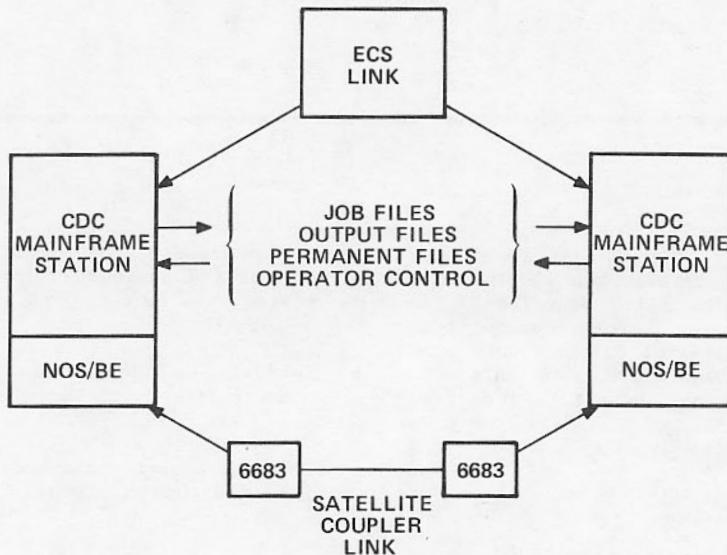


Figure 9-1. Symmetric Station Interface

## STATION INITIATION

The station is initiated when the central processor program MFSTAT is brought to an empty control point for execution. MFSTAT is initiated by the following command:

n.X MFSTAT.

n Control point assigned to the station.

A message then appears on the MFSTAT B display indicating that the station is waiting to log in to the linked mainframe.

## STATION LOGIN

After the station is initiated, it searches the equipment status table (EST) for all link devices that are on and automatically queries them to establish communications. If the station is already executing, the operator can log in to any additional mainframes linked through EST entries that were not on during initiation with the following command:

LOGIN.

If the station was previously logged in to a mainframe and was logged out with the LOGOUT,id. command (described in Station Disconnect and Logout in this section), the following command logs the station into that mainframe again.

LOGIN,id.

id Primary ID of linked system.

If the station is dropped after the LOGOUT,id. command was entered, the system rejects the LOGIN,id. command. Enter a LOGIN. command.

## STATION RECOVERY

Follow the station initiation procedure to recover the station after a system crash of the host mainframe. Station initiation is not necessary to recover the links after the failure of a linked mainframe.

### NOTE

After the initial deadstart of one mainframe, any subsequent deadstarts by any other linked mainframes sharing ECS should use the 5.U option on the main deadstart display to activate ECS.

## STATION DISCONNECT AND LOGOUT

Station disconnect is the logical disconnect of the station and all linked mainframes. All pending requests to linked mainframes (screen refreshes, messages, and acknowledgments) are dropped when the station is dropped.

If the station is connected to one linked mainframe, it can be dropped to disconnect the link. If the station is connected to more than one linked mainframe, the station drop disconnects all linked mainframes. You can disconnect the linked mainframes one at a time by using the station LOGOUT command. Perform the following steps prior to logout or prior to dropping the station control point.

1. Idle down the station file transfers (shown on the T display) with the OFFSTAT command (described in File Transmission Control in this section) to complete all file transfers.
2. Ensure that the operator at the linked mainframe also idles down transfers with the OFFSTAT command.

Drop the station control point by entering one of two commands:

n.DROP. or n.KILL.

n      Control point assigned to the station.

Disconnect the linked mainframe by entering the following command:

LOGOUT,id.

id      Primary ID of linked system.

To log out from all linked mainframes without dropping the station, the following command is used:

LOGOUT.

This command stops activity on all link devices.

Complete disruption of all station communication with a linked mainframe causes an error logout of the station. If the station detects the loss of communication, it drops SPOTS of the linked mainframe and rewinds or deletes the appropriate files, then queries the linked mainframe to reestablish communication.

## FILE TRANSMISSION CONTROL

File transmission between the station and the linked mainframe is controlled by the following commands. If there is more than one linked mainframe, the primary ID, id, must be used to identify the linked mainframe to be affected.

ONSTAT. or      Turns station file transmission on.  
ONSTAT,id.

OFFSTAT. or      Turns station file transmission off. File transmission currently in progress is completed, but no new file transmission is assigned.  
OFFSTAT,id.      This command does not control command, display, or message transmission.

|                              |                                                                                                                                                                                                                 |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PURGE,n. or<br>PURGE,id,n.   | Controls the number of allowed to process similar types of file requests concurrently.                                                                                                                          |
| GETPF,n. or<br>GETPF,id,n.   |                                                                                                                                                                                                                 |
| SAVEPF,n. or<br>SAVEPF,id,n. | n=0-7; default value is 2.                                                                                                                                                                                      |
| INPUT,n. or<br>INPUT,id,n.   |                                                                                                                                                                                                                 |
| OUTPUT,n. or<br>OUTPUT,id,n. | Number of input and/or output files the SPOT idSTATnn can transfer concurrently. (idSTATnn is a system-initiated task, id is the primary ID of the linked system, and nn is the spun off task sequence number.) |
|                              |                                                                                                                                                                                                                 |
|                              | n=0-4 for INPUT.                                                                                                                                                                                                |
|                              | n=0-4 for OUTPUT.                                                                                                                                                                                               |
| KEEP,fileord.                | Prevents the specified input file from being spooled to another mainframe.                                                                                                                                      |
| UNKEEP,<br>fileord.          | Makes the specified input file available for spooling when a KEEP was issued earlier against this file.                                                                                                         |
|                              | fileord      FNT ordinal.                                                                                                                                                                                       |
|                              | fileord      FNT ordinal.                                                                                                                                                                                       |

KEEP and UNKEEP can specify only jobs in the host operating system. They are generally used to distribute the work load between linked NOS/BE systems load-leveling. Input and output files whose requirements are satisfied by the linked system can be load-leveled. This sharing of the work load can improve job turnaround time. Files are load-leveled by type: input, output, punch, and other disposition codes.

When the tape job preview feature initiated by the STAGEON command is used coincident with load leveling, the KEEP command is especially useful. Before any tapes are mounted for a job being previewed, issue a KEEP,fileord. command for the desired job. This command is used to ensure that the job is not load-leveled to another mainframe during the time the tapes are being mounted. The sequence of events when both tape previewing and load-leveling are in effect should be as follows:

1. Preview tape jobs and select one.
2. Issue a KEEP,fileord. command for that job.
3. Mount tapes needed for the selected job.
4. Issue a STAGE,jobname. command to make the job available for scheduling.

## STATION DISPLAY COMMANDS

The following display commands augment the NOS/BE displays.

- T. or  
T=id.      Display the transfer status of all file transmissions between the host mainframe and the linked mainframes. When the primary ID is specified, only the transfer status of the host mainframe and the linked mainframe, id, is shown. This command is available only when the station is executing. (Refer to section 3 for an illustration of this display.)
- U.      Display the logical ID table. When the station is executing, linked mainframe logical IDs are shown along with host mainframe logical IDs. The station need not be executing to display logical IDs of the host mainframe. (Refer to section 3 for an illustration of this display.)

## LINKED MAINFRAME DISPLAY COMMANDS

The linked displays are distinguished from the local displays by inclusion of the primary ID of the linked system in the display command. The linked displays can be called to either or both screens. Refer to section 3 for a description of the multimainframe screen headers. The format of the display command is as follows:

- disL.      Local display on left screen.
- disL(id).      Linked display on left screen.
- disLdisR(id).      Local display on left screen and linked display on right screen.
- disL(id)disR.      Linked display on left screen and local display on right screen.
- disL(id)disR(id).      Linked displays on both screens.
- disLdisR.      Local displays on both screens:  
 disL =Left screen display letter.  
 disR =Right screen display letter.  
 id =Primary ID of linked system.

Link displays may be followed by a JDT ordinal or an FNT ordinal.

In the following examples the linked system has a primary ID of B.

| <u>Display</u> | <u>Explanation</u>                                                                                      |
|----------------|---------------------------------------------------------------------------------------------------------|
| R(B),0016      | Job queue display of the linked system on left screen beginning with job ordinal 16.                    |
| R(B)           | Job queue display request.                                                                              |
| R.             | Calls R display of the host system.                                                                     |
| H(B),I.        | First input display request of the linked system to left screen.                                        |
| FH(B).         | Displays the host system F display on left screen and linked system H(B) input display on right screen. |

The individual displays are described in section 3. Commands for calling the displays are shown in the following paragraphs. A linked NOS/BE system has only linked H and R displays.

| <u>Command</u>   | <u>Action Initiated</u>                                                                                                                                                         |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| H(id),I,fileord. | Calls status of I/O file displays. This display lists input (I), print (O), and punch (P) files currently residing in the linked NOS/BE system I/O queues.                      |
| H(id),O,fileord. |                                                                                                                                                                                 |
| H(id),P,fileord. |                                                                                                                                                                                 |
| H(id).           |                                                                                                                                                                                 |
| id               | Primary ID of the linked system.                                                                                                                                                |
| fileord          | Starting file table ordinal (optional). If omitted, the current file table ordinal and I/O queue designation (I, O, or P) are saved and reused with the next H display command. |
| R(id).           |                                                                                                                                                                                 |
| R(id),j.         | Calls job queue display. This display lists the assigned to job ordinals in the linked system.                                                                                  |
| R(id).           |                                                                                                                                                                                 |
| id               | Primary ID of the linked system.                                                                                                                                                |
| j                | Starting job ordinal (optional). If omitted, the current job ordinal is saved and reused with the next R display command.                                                       |

## **JOB AND FILE CONTROL**

The job and file control commands for a linked NOS/BE system are described in section 5.

jid.DROP.  
jid.KILL.  
jid.RERUN.  
jid.ENPR,pp.  
EVICT,fileordid.  
ENFP,fileordid,pp.

## **DISPLAYS**

All displays of the host operating system are available to the operator of the host mainframe. When the primary ID of the link mainframe is added to a valid display command, any of the link mainframe displays can be shown. The two sets of displays can be shown on either console screen. Except when noted in the display, you can issue commands to either mainframe regardless of what displays are shown at the time. (Refer to section 3 for a description of the displays.)



This section describes the operation, initiation, control and termination of the GEMINI program. GEMINI implements improved load leveling of input and output files between two mainframes. The two mainframes can be any combination of mainframes supporting NOS/BE.

Each mainframe must have its own NOS/BE operating system, console, peripherals, and system set. The two mainframes may, and usually do, share the same default permanent file set. They must share the system queue set and a permanent file device (these are the only requirements for use of GEMINI). Figure 10-1 outlines the basic configuration of two mainframes using the GEMINI program for load-leveling.

## GEMINI SYSTEM

GEMINI is a system program that you first call to an available control point on one mainframe, then call a duplicate of that program to an available control point on a second mainframe. Each GEMINI program has a file associated with it by means of which it communicates with its twin on the other mainframe. These two files are on a shared set (not necessarily the shared queue set). The format of each file includes the following.

- A copy of the logical ID table (IDT) in the mainframe CMR.
- Outgoing messages that initiate transfer of file ownership from the mainframe associated with this file to the other mainframe.
- Incoming messages that initiate transfer of file ownership from the other mainframe to the mainframe associated with this file.
- Queue counts of the LIDs (logical IDs) that are common to both mainframes.

The IDT contains the mainframe ID and the LIDs associated with that mainframe. An LID is a three-character identifier defined by the installation as a job classification parameter. Other job classification parameters (most of which can be specified on the job statement) include the following.

- Time use
- Memory use
- Extended memory use
- Tape use
- RMS use
- I/O use

- Priority level
- Dependency

Jobs are assigned LIDs by the user on the basis of job processing requirements. The user makes this assignment by using STlid on the job statement or ST=lid on the ROUTE control statement. Default LID assignment may be made by system code if the installation elects to do so.

LIDs can be unique or common and are assigned to output as well as input files. If a file is classed under a unique LID, it can be processed only on the mainframe associated with that LID. If a file has a common LID, it is a candidate for load leveling and may be processed on either mainframe, depending on the load-leveling comparison. GEMINI makes separate comparisons of input common LIDs and output common LIDs. This is explained in the Load-Leveling Algorithm subsection.

The job classification parameters previously described could require either unique or common LIDs. Jobs with dependency would require a unique LID. Jobs specifying the tape use parameter might also require a unique LID. The remaining classifications could be unique or common, depending on installation goals.

The messages on the two GEMINI files are pointers to catalog entries for the input and output files whose ownership is being transferred from one mainframe to the other. Only the ownership is transferred since the files themselves are on a shared queue set.

The GEMINI file contains a one-word entry for each LID in the host mainframe that is common to both mainframes (64-word maximum). This word contains an input queue count and an output queue count which indicate how many input and output files are classified under this LID. (Output queue count is the sum of output, punch, and special files.) These counts are used in the load leveling algorithm.

## LOAD-LEVELING ALGORITHM

The GEMINI program makes separate load-leveling decisions for input files and output files. In either case, the queue count of a common LID on one mainframe is compared with the queue count of that same common LID on the other mainframe. If the queue count of the host mainframe is at least the installation-set load-leveling maximum (LL.MAX) and the queue count of the linked mainframe is less than the installation-set load-leveling minimum (LL.MIN), then load-leveling is initiated. This load-leveling transfers a set number of input or output files classified under the specified common LID from the host mainframe to the linked mainframe. The number of files transferred is equal to the installation-set load-leveling minimum (LL.MIN).

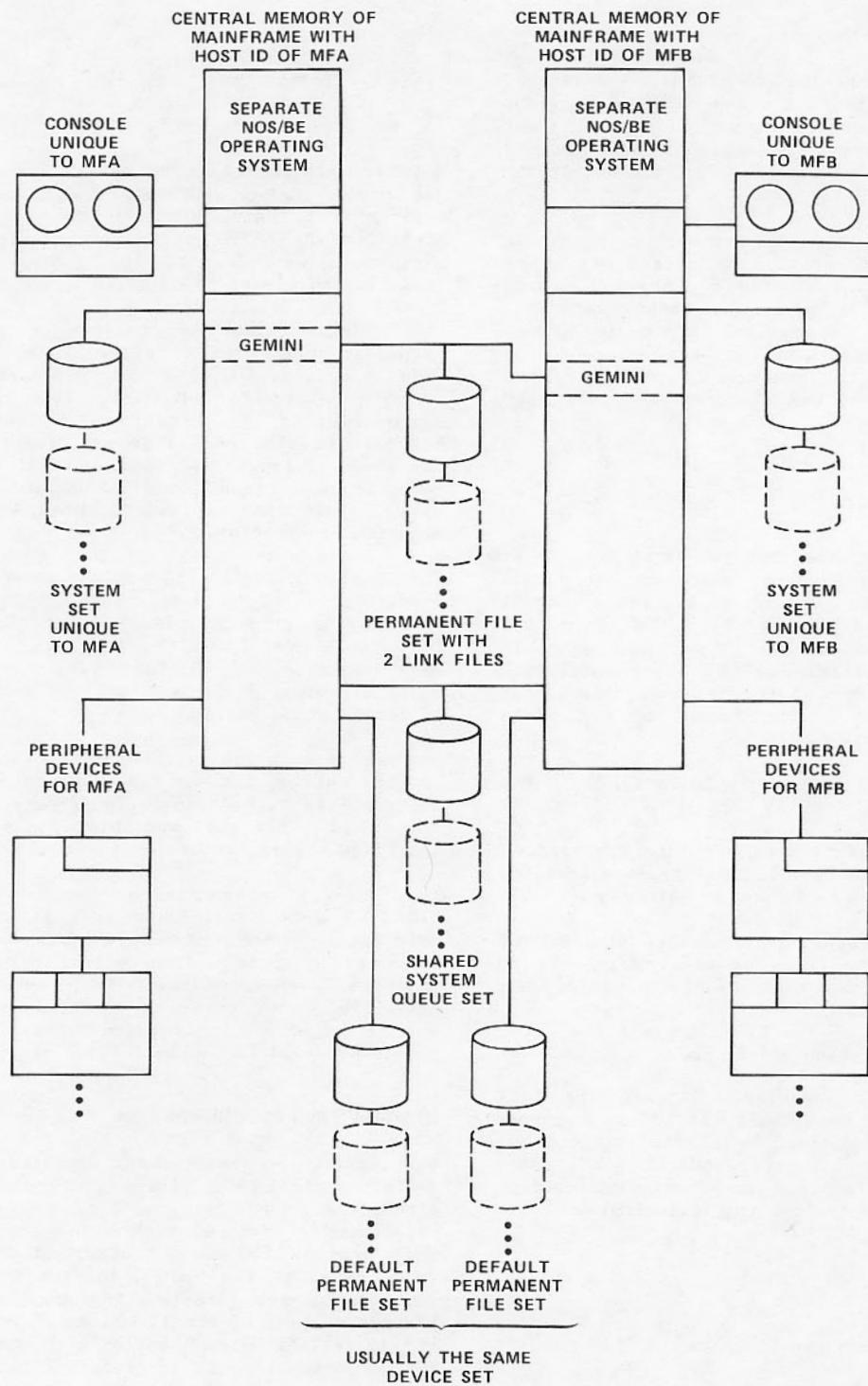


Figure 10-1. Two Mainframes Using GEMINI

If the host queue count is less than LL.MAX but at least two, and the linked mainframe has no files with this LID (queue count = 0), one file with this LID will be transferred from the host mainframe to the linked mainframe. A flowchart of this algorithm is shown in figure 10-2.

## GEMINI INITIATION

Bring the GEMINI program to an available control point in one mainframe by entering the following command on the console for that mainframe:

n.X GEMINI.

When the initiation is completed, the following message is entered in the dayfile for the system on that mainframe.

END QUEUE RECOVERY.

This message remains on the B display until cleared by the next message for this control point.

### NOTE

GEMINI does not clear the last message displayed until there is another message to take its place.

A second GEMINI program is brought to an available control point in the other mainframe by entering the same command on the console for the other mainframe. Again, when initiation is completed, the above message will be entered in the dayfile for the system on the other mainframe.

## GEMINI CONTROL

You can add or delete LIDs on either mainframe with the following commands entered on the appropriate console.

ADDID,lid

or

DELID,lid

where lid is the three-character logical ID.

This gives you a measure of control so you can establish any one of the following procedures by adding or deleting LIDs.

- Files that have an LID not defined on either mainframe are neither transferred nor considered for execution, nor output until the LID is defined.
- Files with an LID defined for one mainframe but not the other are associated only with the mainframe for which they are defined.
- Files with an LID defined on both mainframes are candidates for load-leveling.

## GEMINI TERMINATION

The GEMINI program is terminated in either mainframe by entering one of the following commands on the appropriate console:

n.KILL.

or

n.DROP.

If the KILL command is used, the program terminates without output. If the DROP command is used, the following system output will result.

- A dayfile record of all files transferred
- Usage statistics
- A dump of the GEMINI program

One or two files may be in the process of transfer and may appear lost. These files can be recovered by initiating GEMINI on only one mainframe, then terminating GEMINI after the END QUEUE RECOVERY message.

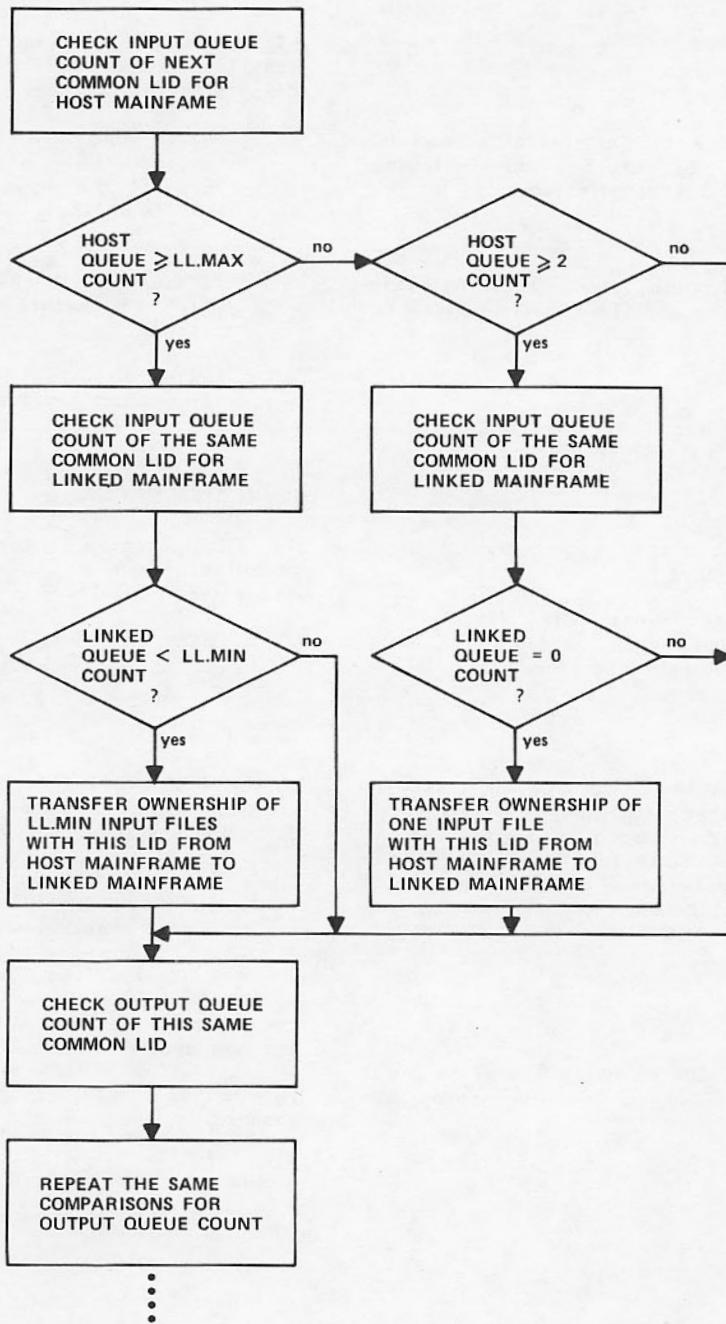


Figure 10-2. Flowchart of Load-Leveling Algorithm

This section describes the operation, initiation, control, and termination of the NOS/BE Remote Host Facility (RHF) software package. RHF links NOS/BE to a loosely coupled network (LCN) through 380-170 network access devices (NADs); RHF allows:

- Transfer of permanent files and queue files between linked mainframes.
- Access to NOS/BE magnetic tape drives.
- Communication between NOS/BE INTERCOM users on linked mainframes which support the Interactive Transfer Facility.

The RHF software package includes a dedicated control point called RHF that contains control tables, an operator interface package, and a network and application code. The RHF software package also includes the PP routines that drive RHF network hardware. The following applications are available as part of the RHF software package.

| <u>Application</u> | <u>Description</u>                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FTF,FTFS           | File Transfer Facility. This facility provides users access to permanent files and magnetic tapes on remote mainframes. A local user activates FTF with the MFLINK control statement. When a user activates FTF, a servicing application on the remote mainframe is activated by the remote RHF. When a remote user enters the MFLINK command, RHF activates an FTFS application to service the remote request. |
| ITF                | Interactive Transfer Facility. This facility provides NOS/BE INTERCOM users access to remote systems. A local user activates ITF with the MFINT control statement.                                                                                                                                                                                                                                              |
| MHF                | Maintenance Host Facility. This facility automatically dumps and loads controlware into local NADs. During initialization, RHF activates MHF to load local NADs. If a local NAD fails while RHF is active, MHF dumps and reloads the NAD.                                                                                                                                                                       |
| MLTF               | Maintenance Log Transfer Facility. This facility provides maintenance logging capabilities for local and remote mainframe NADs. All local NAD errors will be logged. All remote mainframe errors that have error logging enabled (see PATH display) will be logged. This application starts automatically when RHF is initiated.                                                                                |

| <u>Application</u> | <u>Description</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| QTF,QTFS           | Queue File Transfer Facility. This facility allows the user to transfer input and output files to a remote system. When RHF is initiated, the system automatically activates QTF. When QTF has a file to transfer, QTFS is initiated automatically on the remote mainframe to service the file transfer request. When a remote mainframe QTF application has a file to transfer, RHF initiates QTFS to service the remote request. (See QTF L Display later in this section.) |

## RHF INITIATION

Before network operation can begin, you must initiate RHF with the following command:

n.X RHF.

n      Number of a cleared control point.

When RHF is initiated, it activates MHF to load the 380-170 controlware in all local NADs that are defined in RHF's configuration and have an EST status of DOWN and ON.

When RHF is initiated, it starts all enabled applications defined by the network configuration as autostart applications (see RCFGEN in the NOS/BE Installation Handbook). These applications are typically QTF, MHF, and MLTF.

## OPERATOR INTERFACE

Use the DSD L display to communicate with RHF. Bring up this display with the following DSD command:

L=n.

n      Control point number of RHF.

The following commands are available in the L display:

| <u>Command</u> | <u>Function</u>                                                                   |
|----------------|-----------------------------------------------------------------------------------|
| APPL           | Displays the application table. Refer to figure 11-1 for an example APPL display. |
| DISABLE,nn.    | Disables application/ID/path nn on the current display.                           |
| ENABLE,nn.     | Enables application/ID/path on the current display.                               |

| <u>Command</u> | <u>Function</u>                                                                             | <u>Command</u> | <u>Function</u>                                                                                                                                   |
|----------------|---------------------------------------------------------------------------------------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| ID             | Displays the network ID table.<br>Refer to figure 11-2 for an example network ID table.     | -              | Pages the current display backward.                                                                                                               |
| IDLE           | Begins the idle-down process of RHF and all its associated applications.                    | =              | Toggles between the RHF L display and the control point 0 L display. To address other jobs or equipment you must use the control point 0 display. |
| PATH           | Displays the network path status.<br>Refer to figure 11-3 for an example of a PATH display. | .              | Specifies a comment line (anything following a period is ignored).                                                                                |
| +              | Pages the current display forward.                                                          |                |                                                                                                                                                   |

| <u>ORD</u> | <u>APPL</u> | <u>ENABLED</u> | <u>MAX COPIES</u> | <u>ACTIVE COPIES</u> | <u>MAX CONNECTS</u> |
|------------|-------------|----------------|-------------------|----------------------|---------------------|
| 1          | QTF         | YES            | 1                 | 1                    | 4                   |
| 2          | QTFS        | YES            | 4                 | 3                    | 1                   |
| 3          | FTF         | YES            | 4                 | 0                    | 1                   |
| 4          | FTFS        | YES            | 4                 | 0                    | 1                   |
| 5          | USRAP       | YES            | 1                 | 1                    | 6                   |
| 6          | MLTF        | YES            | 1                 | 0                    | 0                   |
| 7          | MHF         | YES            | 1                 | 1                    | 1                   |

ACTIVE APPLICATIONS (NETON PERFORMED)

| <u>JOB NAME</u> | <u>JOBORD</u> | <u>CONNECTS</u> | <u>JOB NAME</u> | <u>JOBORD</u> | <u>CONNECTS</u> |
|-----------------|---------------|-----------------|-----------------|---------------|-----------------|
| QTFOO2Z         | 26            | 3               | QTFSOAB         | 22            | 1               |
| QTFSO3Y         | 31            | 1               | USRAP32         | 33            | 2               |
| QTFSO33         | 24            | 0               | MAFOO3A         | 27            | 0               |

Figure 11-1. Example of an APPL Display

| <u>ORD</u> | <u>PID</u> | <u>LID</u> | <u>ENABLED</u> | <u>MFTYPE</u> |
|------------|------------|------------|----------------|---------------|
| 1          | MFB        | ---        | YES            | CYBER 200     |
| 2          |            | MFB        | YES            | CYBER 200     |
| 3          |            | XYZ        | YES            | CYBER 200     |
| 4          | MFC        | ---        | YES            | NOS/BE        |
| 5          |            | MFC        | YES            | NOS/BE        |
| 6          |            | CCC        | YES            | NOS/BE        |
| 7          |            | BBB        | YES            | NOS/BE        |
| 8          | MFD        | ---        | NO             | NOS/BE        |
| 9          |            | MFD        | NO             | NOS/BE        |
| 10         |            | DDD        | NO             | NOS/BE        |
| 11         |            | EEE        | NO             | NOS/BE        |
| 12         |            | BBB        | YES            | NOS/BE        |

Figure 11-2. Example of the Network ID Display (on Mainframe MFA) for Figure 11-4

| ORD | PID | EST | CH | ENABLED | LOCAL TRUNK ENABLES † | REMOTE TRUNK ENABLES † | REMOTE NAD ADDR | DEST | ACCESS CODE | CON COUNT | LOG ERRS |
|-----|-----|-----|----|---------|-----------------------|------------------------|-----------------|------|-------------|-----------|----------|
| 1   | MFB | 31  | 6  | YES     | 0110                  | 0110                   | 3F              | 0    | FOFO        | 2         | NO       |
| 2   |     | 32  | 7  | YES     | 0001                  | 1000                   | 4A              | 0    | FOFO        | 1         | NO       |
| 3   |     | 33  | 10 | NO      | 0001                  | 0100                   | 3F              | 0    | FOFO        | 0         | NO       |
| 4   |     | 33  | 10 | YES     | 0100                  | 1000                   | 4A              | 0    | FOFO        | 0         | NO       |
| 5   | MFC | 31  | 6  | NO      | 0110                  | 0110                   | 62              | 0    | FOFO        | 0         | NO       |
| 6   |     | 32  | 7  | NO      | 0001                  | 1000                   | 62              | 0    | FOFO        | 0         | NO       |
| 7   |     | 33  | 10 | YES     | 0101                  | 1010                   | 62              | 0    | FOFO        | 2         | NO       |
| 8   |     | 34  | 11 | YES     | 1000                  | 0001                   | 62              | 0    | FOFO        | 0         | NO       |
| 9   | MFD | 31  | 6  | YES     | 0010                  | 0010                   | F1              | 0    | FOFO        | 0         | NO       |
| 10  |     | 33  | 10 | YES     | 0001                  | 0010                   | F1              | 0    | FOFO        | 0         | NO       |

†A one signifies that a TCU is enabled. A zero signifies that a TCU is not enabled. The leftmost digit of these entries corresponds with TCU 0, the next with TCU 1, and so forth. For example, if an NAD has TCUs 0 and 1 enabled, the corresponding entry should be 1100. Refer to figure 11-4.

Figure 11-3. Example of the PATH Display for Figure 11-4

The following text describes the headers as they appear in figure 11-3.

| <u>Header</u> | <u>Description</u>                                                                                                                                                                                                                                                                                                                | <u>Header</u>        | <u>Description</u>                                                                                                                 |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------------------------------------------------------------------------------------------------------------------------------------|
| ORD           | Path display ordinal.                                                                                                                                                                                                                                                                                                             | LOCAL TRUNK ENABLES  | concurrent diagnostics on that trunk without disturbing the operation of RHF.                                                      |
| PID           | Physical identifier of the mainframe to which the path is defined.                                                                                                                                                                                                                                                                | REMOTE TRUNK ENABLES | Bit pattern specifying which TCUs on the local NAD to use for communication with the remote NAD.                                   |
| EST           | EST ordinal of the NAD that defines the local end of the path.                                                                                                                                                                                                                                                                    | REMOTE NAD ADDR      | Bit pattern specifying which TCUs the remote NAD uses in returning communication to the local NAD.                                 |
| CH            | Channel number of the NAD that defines the local end of the path.                                                                                                                                                                                                                                                                 | DEST                 | Hardware address (hexadecimal) of the remote NAD.                                                                                  |
| ENABLED       | Specifies whether RHF uses the path for starting new connections. For example, if a customer engineer wants to run diagnostics on a trunk connecting two NADs (local and remote) in the path display, you would disable the appropriate path. When the connection count on that path falls to zero, the customer engineer can run | ACCESS CODE          | Destination device address (hexadecimal).                                                                                          |
|               |                                                                                                                                                                                                                                                                                                                                   | CON COUNT            | Access code of the remote NAD.                                                                                                     |
|               |                                                                                                                                                                                                                                                                                                                                   | LOG ERRS             | Number of connections currently using this path.                                                                                   |
|               |                                                                                                                                                                                                                                                                                                                                   |                      | Specifies whether RHF logs trunk errors (using the MLTF application) that are detected by the remote NAD in the system error file. |

When the application table, network ID table, or network path status is displayed, you can enter the following commands to enable or disable the application, network identification, or network path.

ENABLE,nn.

or

DISABLE,nn.

nn      Ordinal of the application, network identification, or network path on the current display.

For example, if the application (APPL) display is up, ENABLE,nn enables the application specified by ordinal nn.

If an application is being enabled (whether currently enabled or disabled) and that application is defined as an autostart application, RHF initiates a copy of that application. This feature may be used, for example, if MLTF is normally disabled and you want to start logging NAD errors. It may also be used if the copy of QTF has been accidentally dropped and a new copy of QTF must be started.

When the PATH table is displayed, you can enter the following command. nn is the only required parameter and it must come first. All other parameters are optional and can appear in any order, but at least one, besides nn, must be present.

nn,ND=xx,AC=aaaa,DD=d,RT=rrrr,LT=tttt,LOG=status.

nn      Path ordinal.

xx      New remote NAD hexadecimal address.

aaaa    New remote NAD hexadecimal access code.

d      New remote NAD destination device (hexadecimal).

rrrr    New remote trunk enable bit pattern (nonzero 4-bit binary number).

tttt    New local trunk enable bit pattern (nonzero 4-bit binary number). Note that the same number of bits must be set for both RT and LT, or the command will be rejected.

status   Status of error logging for the remote NAD on path nn. Enter YES to have MLTF periodically copy the trunk errors occurring on the specified remote NAD to the local system engineering file. MLTF does not copy trunk errors when you enter NO.

#### NOTE

Any change to xx, aaaa, d, or status for a given path results in an equivalent change for all paths using that remote NAD. This is because xx, aaaa, d, and status are associated with the remote NAD rather than the path being associated with the remote NAD.

When RHF finds a faulty local NAD, it turns the NADs EST entry off, issues the dayfile message RHF, NAD ON ESTxxx HAS BEEN TURNED OFF, and activates application MHF. MHF dumps and reloads the NAD, and turns its EST entry on.

When RHF finds a path configured to use a faulty or nonexistent local NAD trunk control unit (TCU), it disables the path and notifies you with the following flashing message on the B-display.

RHF,BAD TCU ON PATH xxx, PATH TURNED OFF.

Acknowledge the message by entering:

n.ACK.

n    RHF control point number.

Figure 11-4 illustrates a sample LCN network. The operator displays shown in figures 11-2 and 11-3 reflect this network. In figure 11-4, MFA is the

local NOS/BE mainframe and MFB, MFC, and MFD are the remote NOS/BE mainframes.

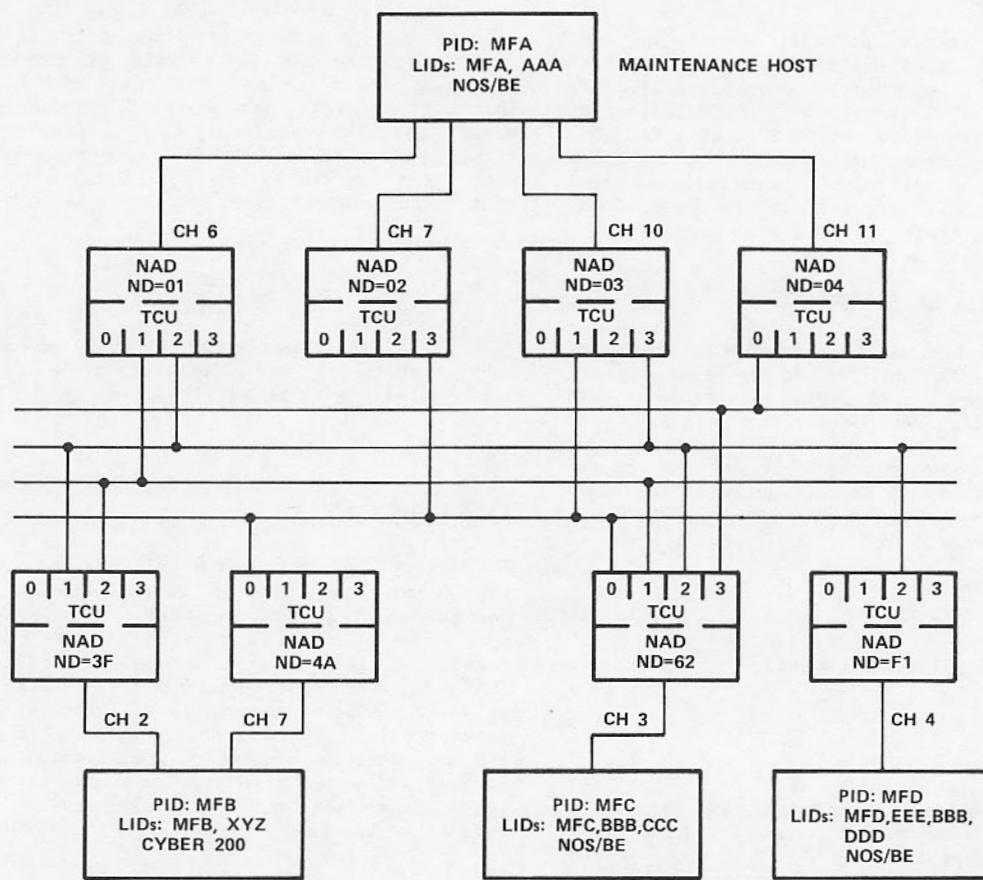


Figure 11-4. Sample LCN Network

## IDLE COMMAND

The format for the IDLE command is:

IDLExxx.

While the system waits for applications to stop, the message IDLE-DOWN IN PROGRESS appears on the B display. When activity stops, the system drops RHF and the message RHF ENDED appears. The IDLE command allows a gradual shutdown of RHF activities by preventing new RHF connection assignments and new application startups. All active applications are notified of the idle-down request and are expected to respond by beginning their own idle-down processes.

## n.DROP AND n.KILL COMMANDS

The n.DROP and n.KILL commands cause RHF to begin a rapid termination. In addition to prohibiting new connections and new application startups, RHF notifies active applications of the RHF shutdown.

If the applications continue processing, RHF forces a NETOFF to ensure that all RHF LCN activity ceases.

The formats of the n.DROP and n.KILL commands are:

n.DROP.  
n.KILL.

n RHF control point number.

## TERMINATION

You can terminate RHF operation with three commands; the IDLE, n.DROP, and n.KILL commands. The IDLE command allows applications to finish their processing. The DROP and KILL commands cause an immediate termination of RHF activity and should not be used for normal shutdown processing.

## QTF REJECTED FILES

Temporary or permanent conditions may prevent QTF from transferring a file to a remote host.

Temporary conditions include such problems as unavailability of the remote host, unavailability of resources on the remote host (for example, no space left), and network errors caused by faulty hardware or software. In these cases, QTF will immediately retry the transfer a number of times and then temporarily disable further transfers to the particular remote host.

Permanent conditions include problems detected by the remote host. These include such things as invalid user number or password, invalid queue type, invalid routing directive (generated by MFQUEUE), and unauthorized user. In these cases, QTF will evict the file from the local queue. To report the problem to the owner of the evicted file, QTF generates a connection logfile (containing status and error messages) and puts it in the local queue, using, if possible, the source LID, owner user name, remote batch terminal ID, and terminal wait queue disposition. If the source mainframe rejects the connection logfile, it will be printed by the local host at the central site.

### NOTE

Systems other than NOS/BE or NOS version 2 have different rules for handling rejected files.

## QTF L DISPLAY

The QTF utility provides a multistreaming capability for transferring queued files between mainframes using connections through RHF. QTF allows you to specify which files are to be transferred. You do this by defining a set of selection classes. You can define or modify values for selection classes using the CLASS command described later in this subsection. You can specify a range of file sizes and the maximum number of simultaneous connections allowed. You can also specify a number of reserved connections that cannot be used by lower-priority selection classes.

## QTF SELECTION CLASSES

Selection classes are designated by a single letter from A to L. Selection class A is the highest priority and L is the lowest priority.

QTF uses selection classes to find files to assign to the physical identifiers (PIIDs) for remote hosts. Associated with each PIID is one or more logical identifiers (LIDs). The RHF PIID/LID table is created by system program RCFGEN from the RHF configuration file input and is viewed and modified using the RHF ID L display (refer to Operator Interface earlier in this section). QTF obtains the PIID/LID table from RHF to determine which PIIDs have RHF connections and which LIDs are associated with each PIID.

### File Selection Process

Each copy of QTF has a fixed number of connection slots available. The goal of the QTF file-scheduling algorithm is to find files for as many of these connection slots as possible within the constraints of the selection class definitions. On each pass through its file selection process, QTF proceeds through all defined selection classes from the highest priority A to the lowest priority L. For each selection class, QTF attempts to find one file for each available PID that does not already have a file assigned. The file selection process continues until one of the following occurs:

- All connection slots are in use, or
- All PID/selection class combinations have been checked and
  - Are in use, or
  - Are unavailable (disabled or the maximum number of connections per selection class has been reached), or
  - No files were found.

- The sum of the reserved connections for higher-priority selection classes is equal to or exceeds the number of free connection slots.

### Visualizing the File Selection Process

To visualize the file selection process, imagine that selection classes and PIDs form a two-dimensional matrix of jacks on a telephone switchboard, with PIDs assigned across the columns and selection classes assigned down the rows. Above each jack is a light. When a light is flashing, a queued file is available for the corresponding PID/selection class combination. The plug cables represent the connection slots. A jack can have only one plug inserted at a time. Inserting a plug into a jack establishes a connection and causes the light to stop flashing and a file transfer to begin. A plug is removed from a jack after one or more files have been transferred or a connection error occurs.

Figure 11-5 shows the connection slot array (plugs) and the PID/selection class matrix (switchboard).

| Connection<br>Slots |   |   |   |   |  |
|---------------------|---|---|---|---|--|
|                     | 1 | 2 | 3 | 4 |  |
|                     | X | X | X | X |  |

| Selection<br>Class | PID<br>1 | PID<br>2 | PID<br>3 | ... | PID<br>n |
|--------------------|----------|----------|----------|-----|----------|
| A                  | o        | o        | o        |     | o        |
| B                  | o        | o        | o        |     | o        |
| C                  | o        | o        | o        |     | o        |
| .                  |          |          |          |     |          |
| .                  |          |          |          |     |          |
| .                  |          |          |          |     |          |
| L                  | o        | o        | o        |     | o        |

Figure 11-5. Connection Slot Array and PID/Selection Class Matrix

On each file selection cycle, QTF looks for a free plug cable (an unused connection slot) and, starting at the upper left corner of the PID/selection class switchboard, searches across each row in turn looking for a flashing light (queued file matching the PID/selection class combination). When the plug is inserted into the jack, that connection is established. If another plug cable is free, the search continues from the current jack until QTF runs out of plugs or reaches the bottom right corner of the switchboard.

For each selection class row for which a reserved number of connections is defined, QTF checks the number of plugs inserted in that row when the rightmost jack for the row is reached. If the number of plugs inserted is less than the number of reserved connections, QTF places enough plugs in unused jacks in that row until the number of reserved jacks is filled, only one free plug remains, or the row is filled whichever occurs first.

For each selection class row for which a maximum number of connections is defined and the maximum is reached, QTF continues searching at the leftmost jack of the next row down.

You can minimize the number of different operating system calls QTF must make to cover all of the switchboard jacks. Do this either by minimizing the number of selection classes (number of rows) or by defining overlapping selection criteria for selection classes. For example, if selection classes A, B, and C all have the same file size index range, and QTF does not find a file for a PID in selection class row A, QTF can consider selection class rows B and C checked as well. If selection class D has a different, nonoverlapping file size index range, QTF must call the operating system to check the jacks in selection class D regardless of the results of the checks for selection classes A and C (assuming that the file selection process has not yet terminated).

#### QUEUED FILE SIZE INDEX

QTF file size selection criteria are specified in terms of a queued file size index. The QTF variables FSI1 through FSI6 allow you to completely and uniquely partition the range of queued file sizes into seven subranges. Each subrange is identified by an integer value from 1 to 7, known as a file size index. The FSIn values define end points for each file size subrange in units of PRUs, rounded to the nearest multiple of 64 PRUs ( $64 \times 640 = 40960$  6-bit characters).

| FSI | File Size Subrange                           |
|-----|----------------------------------------------|
| 1   | $0 < \text{size} \leq \text{FSI1}$           |
| 2   | $\text{FSI1} < \text{size} \leq \text{FSI2}$ |
| 3   | $\text{FSI2} < \text{size} \leq \text{FSI3}$ |
| 4   | $\text{FSI3} < \text{size} \leq \text{FSI4}$ |
| 5   | $\text{FSI4} < \text{size} \leq \text{FSI5}$ |
| 6   | $\text{FSI5} < \text{size} \leq \text{FSI6}$ |
| 7   | $\text{FSI6} < \text{size}$                  |

The size of output queued files is displayed on the DSD H displays. File size selection criteria do not apply for input queued files.

The file size ranges are displayed on the QTF HELP K display. You can use the QTF SCHED command to change the values for FSIn.

#### QTF OPERATION UNDER RHF

Normally, QTF is defined as an autostart application in the RHF configuration file (refer to RHF Configuration Files in the RHF section of the NOS/BE Installation Handbook). That means a QTF job starts automatically when the RHF subsystem is initiated. The RHF application table L display shows how many copies of QTF are defined and how many copies are currently active.

QTF terminates when the IDLE command terminates the RHF subsystem. To manually terminate a copy of QTF, bring up the RHF application table display by entering the commands

L=n.  
APPL.

where n is the control point number of RHF.

When the display appears, enter

DISABLE,ord.

where ord is the ordinal of an active QTF in the RHF application table display.

The message QTF, NETWORK IDLEDOWN IN PROGRESS should then appear in the QTF job dayfile. QTF completes any files in progress and then ends. If QTF does not terminate within a reasonable amount of time, use the DSD DROP command to terminate QTF.

If a fault condition occurs, QTF normally restarts itself. To manually restart QTF, bring up the RHF application table display by entering these commands:

L=n.  
APPL.

When the display appears, enter

ENABLE,ord.

where ord is the QTF ordinal in the RHF application table display.

You can determine the jsn of QTF by using the DSD system status display (B) and the RHF application table display. When QTF is active at a control point, it is indicated on the B display.

Activate the L display for the QTF by entering

L=n.

where n is the control point number of QTF. The QTF transfer display appears on the left screen.

## QTF L DISPLAY COMMANDS

QTF commands have the same general format whether they are entered through the L display or read from an input file using the INCLUDE command.

- Each QTF command must be on one line and only the first 80 columns of a command line are significant.
- A command consists of a command verb followed by 0 to 10 parameters.
- A command verb and parameters are separated by one or more spaces or a comma.
- A command is terminated by a single period.
- Most command verbs and parameters can be abbreviated. The exceptions are IDLE and STOP.

QTF accepts the following L display commands:

| <u>Command</u> | <u>Description</u>                                                                                   |
|----------------|------------------------------------------------------------------------------------------------------|
| CLASS          | Defines or modifies QTF selection class values.                                                      |
| DISABLE        | Changes the status of QTF elements from enabled to disabled.                                         |
| ENABLE         | Changes the status of QTF elements from disabled to enabled.                                         |
| HELP           | Displays information about the available QTF commands.                                               |
| IDLE           | Begins the idle-down process of QTF.                                                                 |
| INCLUDE        | Causes QTF commands to be read from an input file.                                                   |
| SCHED          | Modifies QTF scheduling parameters.                                                                  |
| STATUS         | Displays information about the status of file transfers in progress, PIDs, or QTF selection classes. |
| STOP           | Causes an immediate termination of QTF.                                                              |
| +              | Pages forward to the next screen of a multipage display.                                             |
| -              | Pages backward to the previous screen of a multipage display.                                        |
| .              | Specifies a comment line (anything following a period is ignored).                                   |

### CLASS Command

The CLASS command allows you to define or modify QTF selection class values.

The command format is:

CLASS,SC=selclass,FSI=fsi,MAXIMUM=max,  
RESERVE=res.

selclass Selection class name; specify one character, from A to L. Selection class A is the highest priority class and L is the lowest priority class. This parameter is required.

fsi File size index; specify the file size index or range of indexes using one of the following formats:

fsi File size index, from 1 to 7.

fsil..fsiu File size index range, where fsil < fsiu.

\* Specifies all file sizes. \* is equivalent to entering 1..7. If FSI is omitted, the default is FSI=\*.

max Maximum connections; specify the maximum number of simultaneous connections for files in this selection class, from 0 to the maximum available connections (specified by the MAXCONS parameter in the QTF SCHED command) or specify \*. If you specify 0 or \*, all connections can be used for files in this selection class. However, only one connection per PID per selection class is permitted. Default is 0 or \*.

res Reserved connections; specify the number of connections reserved for files in this selection class, from 0 to the maximum available connections (specified by the MAXCONS parameter in the QTF SCHED command). If you specify zero, no connections are reserved for this selection class. For each selection class, the number of available connections is reduced by the sum of reserved connections for all higher-priority selection classes. To prevent a possible overcommitment of connections, QTF allows only mxcons-1 connections to be reserved. Default is zero.

The following default selection class is defined at QTF initiation:

CLASS,SC=A,FSI=\*,MAXIMUM=\*,RESERVE=0.

It allows one file transfer to any one remote host with no restrictions on file size and no reserved connections. To modify the default selection class or define other classes, use additional CLASS commands.

### **DISABLE Command**

The DISABLE command changes the status of the selected QTF elements from enabled to disabled.

The command format is:

DISABLE,element.

element One of the following:

PID=pid  
SC=selclass  
SC=selclass,PID=pid

pid Physical identifier of a given mainframe. Specify PID=\* to disable all PIDs.

selclass Selection class, from A to L. Specify SC=\* to disable all selection classes.

The command format is:

ENABLE,element.

element One of the following:

PID=pid  
SC=selclass  
SC=selclass,PID=pid

pid Physical identifier of a given mainframe. Specify PID=\* to disable all PIDs.

selclass Selection class, from A to L. Specify SC=\* to disable all selection classes.

### **ENABLE Command**

The ENABLE command changes the status of the selected QTF elements from disabled to enabled.

### **HELP Command**

The HELP command displays the available QTF L display commands, file size ranges in decimal PRUs, and the parameters for the QTF SCHED command.

The command format is:

HELP.

Figure 11-6 shows an example of the QTF HELP L display.

| HELP COMMANDS                            | FSI | PAGE 1 OF 1<br>SIZE RANGE                          |
|------------------------------------------|-----|----------------------------------------------------|
| CLASS,SC=A,FSI=N..N,MAXIMUM=N,RESERVE=N. | 1   | 0.. 63                                             |
| DISABLE,ELEMENT.                         | 2   | 64.. 127                                           |
| ENABLE,ELEMENT.                          | 3   | 128.. 255                                          |
| IDLE.                                    | 4   | 256.. 511                                          |
| INCLUDE,FILE=PFN.                        | 5   | 512.. 1023                                         |
| SCHED,PARAMETERS.                        | 6   | 1024.. 2047                                        |
| STATUS,TYPE. (TYPE=PID,SC,OR TRANSFER)   | 7   | 2048..999999                                       |
| STOP.                                    |     |                                                    |
| + OR -                                   |     | PARAMETERS = (FILE SIZE RANGES<br>IN DECIMAL PRUS) |
| ELEMENT = ONE OF-                        |     | SELSECS=N FSI1=N                                   |
| SC=X OR *                                |     | MAXCONS=N FSI2=N                                   |
| PID=XXX OR *                             |     | TIMEOUT=N FSI3=N                                   |
| SC=X,PID=XXX                             |     | DISABLE=N FSI4=N                                   |
| X=A,B,C,...,L.                           |     | RETRY=N FSI5=N                                     |
|                                          |     | LDTRFSH=N FSI6=N                                   |

Figure 11-6. QTF HELP L Display

### IDLE Command

The IDLE command causes QTF to idle down and terminate. The message QTF, NETWORK IDLEDOWN IN PROGRESS appears in the QTF job dayfile and IDLEDOWN appears on the B display. QTF completes any file transfers in progress and then ends.

The command format is:

IDLE.

QTF does not accept an abbreviation for this command.

### INCLUDE Command

The INCLUDE command causes QTF to rewind the specified input file and begin processing QTF commands from that file.

The command format is:

INCLUDE,FILE=infile.

infile File name from which QTF commands are to be processed. QTF searches for a local file with name infile. If the local file is not found, QTF attempts to ATTACH permanent file infile from ID=RHF. If QTF performs ATTACH, it returns the file after processing all of the commands. This parameter is required.

A file of QTF commands processed by using the INCLUDE command can itself contain another INCLUDE command. Upon executing the second INCLUDE command, QTF switches to the new file and does not read anything following the INCLUDE command in the old file.

### SCHED Command

The SCHED command allows you to modify QTF scheduling parameters.

The command format is:

```
SCHED,SELSECS=selsecs,MAXCONS=mxcons,
TIMEOUT=tmomins,DISABLE=dismins,
RETRY=maxrtry,LDTFRSH=ldtmins,FSI1=fsindex,
FSI2=fsindex,FSI3=fsindex,FSI4=fsindex,
FSI5=fsindex,FSI6=fsindex.
```

selsecs File selection recall period, from 1 to 4095 seconds. Specifies the minimum amount of time between attempts to acquire new queued files. Whenever QTF is unable to fill all connection slots with files, it waits selsecs seconds before again attempting to acquire files for unused slots. Default is 20 seconds.

mxcons Maximum simultaneous connection slots (to all hosts), from 1 to 4. Default 4 connections.

tmomins Timeout period, from 1 to 60 minutes. Specifies the maximum amount of time QTF waits for a reply from a remote host or access method. tmomins also specifies how long QTF waits for NAD code conversion resources when applicable. Default is 2 minutes.

dismins Disable period, from 1 to 60 minutes. Specifies the amount of time for which QTF will not attempt transfers to a PID after an error occurs. You can use the ENABLE command to clear the error disabled condition. Default is 2 minutes.

maxrtry Maximum retries, from 1 to 50. Specifies the maximum number of immediate retries allowed for QTF to attempt completing a file transfer before error disabling the PID. When QTF cannot complete a connection request (the connection is rejected by the local or remote access method or QTFS), QTF disables the PID without any immediate retries. Once the PID is disabled, QTF returns the file to the local queue and does not attempt to acquire any files for LIDs associated with the PID until either dismins minutes have elapsed or you use the ENABLE,PID command to enable the PID. Default is two retries.

ldtmins PID/UD table refresh period, from 1 to 60 minutes. Specifies how often QTF updates its internal tables from the RHF PID/LID table. Default is 2 minutes.

## STATUS Command

The STATUS command displays the status of selected QTF elements or file transfers.

The command format is:

STATUS,display.

| <u>display</u> | <u>Description</u>                                                                                                                                                                                                                                                                                                   |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PID            | Selects the QTF physical identifier L display, which shows the status of PIDs, selection classes for each PID, and the number of queued files transferred.                                                                                                                                                           |
| SC             | Selects the QTF selection class L display, which shows the selection class definitions and the number of files transferred.                                                                                                                                                                                          |
| TRANSFER       | Selects the QTF transfer L display, which shows transfers in progress and the number of files already transferred.                                                                                                                                                                                                   |
| fsindex        | File size index subrange endpoint value, from 1 to 262080 PRUs. File size ranges are shown on the HELP display. Values are rounded to the nearest multiple of 64 PRUs. Refer to Queued File Size Index, earlier in this section, for more information. The FSI <sub>n</sub> values must obey the following relation: |

0<FSI1<FSI2<FSI3<FSI4<FSI5<FSI6

Each QTF status display consists of a two-line display header and a variable number of display items. The lower portion of the screen contains a QTF command and message area. Figure 11-7 shows the general format for the QTF status displays. The display fields are as follows:

| <u>Field</u> | <u>Description</u>                                                                                                                                                                                                                                                                                                  |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| type         | Display type; PID, SC, or TRANSFER.                                                                                                                                                                                                                                                                                 |
| nnnnnn       | Number of queued files transferred.                                                                                                                                                                                                                                                                                 |
| n            | Current page number.                                                                                                                                                                                                                                                                                                |
| m            | Maximum page number.                                                                                                                                                                                                                                                                                                |
| last cmd     | The last QTF command processed. If the command is incorrect, an asterisk (*) appears in the line above the command to show the approximate position of the character or parameter in error. If the error is in the second part of the command (positions 51 to 80), a plus sign (+) appears instead of an asterisk. |
| idledown     | This field contains the message *IDLEDOWN* if QTF is in idle-down mode; otherwise, this field is blank.                                                                                                                                                                                                             |
| opr msg      | This field contains an operator message about the last QTF command processed. Refer to the NOS/BE Diagnostic Handbook for message descriptions.                                                                                                                                                                     |

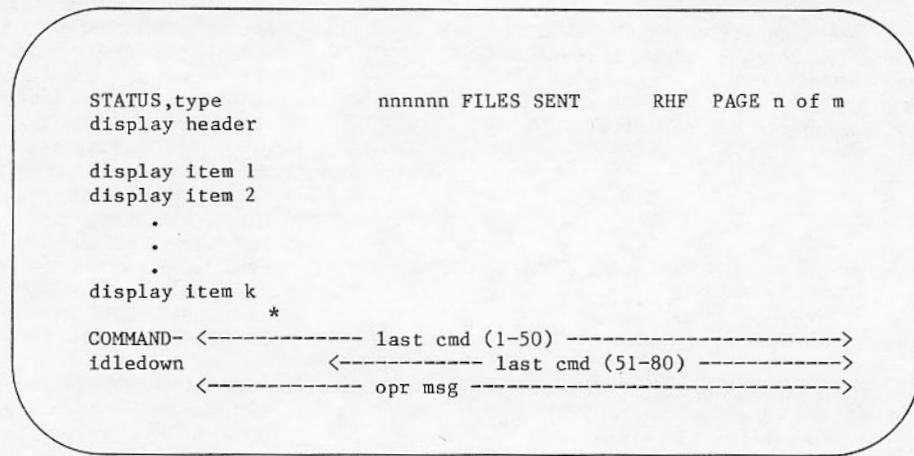


Figure 11-7. General Format of QTF STATUS L Display

QTF Physical Identifier L Display

Figure 11-8 shows a sample QTF STATUS,PID L display.

| STATUS,PID |           | nnnnn FILES SENT RHF | PAGE 1 of 1 |
|------------|-----------|----------------------|-------------|
| PID        | STATUS    | SC DISABLED          | SC IN-USE   |
| M01        | ENABLED   | -----                | AB-----     |
| M02        | DISABLED  | -----                | -----       |
| M03        | NO LIDS   | A-----L              | -----       |
| M04        | NO PATH   | -----                | -----       |
| M05        | REJECTING | -----                | -----       |

Figure 11-8. QTF STATUS,PID L Display

Each entry in the QTF physical identifier display appears in the following format:

pid status sc disabled sc in-use

Header                    Description

pid                        Physical identifier of the remote host specified in the RHF PID/LID table.

status                    Status of the PID; status can be one of the following:

status                    Description

DISABLED                The PID was disabled by the QTF DISABLE command. Use the QTF ENABLE command to change the PID status to ENABLED.

ENABLED                The PID is available for file selection for enabled selection classes.

NO LIDS                No enabled LIDs are associated with this PID in the RHF LID table. Use the RHF ID L display to display and modify the RHF LID table.

NO PATH                The PID is disabled in the RHF PID/LID table. Use the RHF ID L display to display and modify the RHF LID table.

REJECTING            QTF has temporarily disabled file transfers to the PID because QTF was unable to establish a connection to

Header

status

Description

the PID or was unable to successfully transfer a file after the maximum number of retries. QTF returns the PID to ENABLED status after the specified disable period has elapsed. (Refer to the QTF SCHED command for descriptions of the RETRY and DISABLE parameters.) You can use the QTF ENABLE command to immediately return the PID to ENABLED status. If the PID returns to REJECTING status, examine the QTF dayfile to determine whether a connection reject or a particular file is causing the problem.

sc disabled

Selection classes that are unavailable for this PID. They were disabled by the QTF DISABLE command. Use the QTF ENABLE command to enable a particular PID and selection class combination.

sc in-use

Selection classes currently in use for this PID. The QTF transfer display shows the ordinals for connection slots and the selection class associated with each slot.

QTF Selection Class L Display

Figure 11-9 shows a sample QTF STATUS,SC L display.

| STATUS,SC |           | nnnnnn FILES SENT |         |          | RHF    | PAGE 1 OF 1 |  |
|-----------|-----------|-------------------|---------|----------|--------|-------------|--|
| SC        | STATUS    | FSI RANGE         | MAXIMUM | RESERVED | IN-USE | AVAILABLE   |  |
| A         | ENABLED   | 1 .. 6            | ----    | ----     | 1      | 2           |  |
| B         | ENABLED   | 1 .. 6            | ----    | ----     | 1      | 2           |  |
| C         | DISABLED  | 7 .. 7            | 1       | ----     | ----   | ----        |  |
| D         | UNDEFINED |                   |         |          |        |             |  |
| E         | UNDEFINED |                   |         |          |        |             |  |
| F         | UNDEFINED |                   |         |          |        |             |  |
| G         | UNDEFINED |                   |         |          |        |             |  |
| H         | UNDEFINED |                   |         |          |        |             |  |
| I         | UNDEFINED |                   |         |          |        |             |  |
| J         | UNDEFINED |                   |         |          |        |             |  |
| K         | UNDEFINED |                   |         |          |        |             |  |
| L         | UNDEFINED |                   |         |          |        |             |  |

Figure 11-9. QTF STATUS,SC L Display

Each entry in the QTF selection class display appears in the following format:

|    |        |     |       |         |           |
|----|--------|-----|-------|---------|-----------|
| sc | status | fsi | range | maximum | reserved  |
|    |        |     |       | in-use  | available |

| <u>Header</u> | <u>Description</u>                                                                                                                       |  | <u>Header</u> | <u>Description</u>                                                                                                                                             |  |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------|--|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| sc            | Selection class.                                                                                                                         |  | fsi range     | File size index range. This field shows the inclusive range of file size index values that are allowed for this selection class.                               |  |
| status        | Status of the selection class; status can be one of the following:                                                                       |  | maximum       | Maximum number of connection slots allowed for files in this selection class. This field contains dashes (----) if no maximum is specified.                    |  |
| status        | <u>Description</u>                                                                                                                       |  | reserved      | Number of connection slots reserved for files in this selection class. This field contains dashes (----) if no connection slots are reserved.                  |  |
| DISABLED      | The selection class was disabled by the QTF DISABLE command. Use the QTF ENABLE command to change the selection class status to ENABLED. |  | in-use        | Number of connection slots that have been assigned files in this selection class. This field contains dashes (----) if no connection slots are in use.         |  |
| ENABLED       | The selection class is available for file selection for enabled PIDs.                                                                    |  | available     | Number of free connection slots available for assigning files in this selection class. This field contains dashes (----) if no connection slots are available. |  |
| UNDEFINED     | The selection class has not been defined. Use the QTF CLASS command to define or modify a selection class.                               |  |               |                                                                                                                                                                |  |

## QTF Transfer L Display

Figure 11-10 shows a sample QTF STATUS,TRANSFER L display.

```

STATUS,TRANSFER nnnnn FILES SENT RHF PAGE 1 OF 1
ACN SC FILE LID/PID DC DD PRUS STARTED STATUS
1 A ABCD SV6 M03 PR C8 1234 11.03.45 *START XFR
 CONNECTION ESTABLISHED TO M03.

2 A AAED MFF MFF IN US 22 11.10.00 WAIT REM
 ACQUIRED DC=IN, ST=MFF, DO=MA2.

3

4

```

Figure 11-10. QTF STATUS,TRANSFER L Display

Each entry in the QTF transfer display appears in the following format:

|         |    |      |         |    |    |         |
|---------|----|------|---------|----|----|---------|
| acn     | sc | file | lid/pid | dc | dd | prus    |
| started |    |      |         |    |    |         |
|         |    |      |         |    |    | message |

| <u>Header</u> | <u>Description</u>                                                                                                                                                                                                                       | <u>Header</u> | <u>Description</u>                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| acn           | Application connection; this is the ordinal of the connection slot.                                                                                                                                                                      | started       | This field shows the time (hh.mm.ss) at which the connection to the remote host was initiated. The time is updated when the connection is established and at the beginning of each file transfer sequence.                                                                                                                                                                                                                 |
| sc            | Selection class associated with this connection slot.                                                                                                                                                                                    | status        | Status of the connection or file transfer; status can be one of the following:                                                                                                                                                                                                                                                                                                                                             |
| file          | Logical file name associated with the queued file assigned to this connection slot.                                                                                                                                                      |               | ACQ FILE File has been acquired.<br>CONNECT Issuing connect request.<br>END CONN Connection terminating.<br>FILE XFR File transfer in progress.<br>IDLE Connection established.<br>QUEUED File transfer successful.<br>START XFR Initiating file transfer.<br>STOP XFR File transfer completing.<br>WAIT ACQ Waiting for acquire queued file response.<br>WAIT REM Waiting for response from remote host or access method. |
| lid           | Logical identifier of the host associated with this connection slot.                                                                                                                                                                     |               |                                                                                                                                                                                                                                                                                                                                                                                                                            |
| pid           | Physical identifier of the remote host to which this slot is connected or is being connected.                                                                                                                                            |               |                                                                                                                                                                                                                                                                                                                                                                                                                            |
| dc            | Disposition code of the queued file. Refer to the ROUTE command in the NOS/BE Reference Manual for a list of disposition codes and their meanings.                                                                                       | message       | This field contains the last dayfile message issued by QTF for this connection slot. Refer to the NOS/BE Diagnostic Handbook for message descriptions.                                                                                                                                                                                                                                                                     |
| dd            | Data declaration. This field defines the format of the file data during transfer. Values of C6 and C8 indicate that the file is to be sent in code-conversion mode. Values UH, US, and UU indicate that a binary transfer is to be used. |               |                                                                                                                                                                                                                                                                                                                                                                                                                            |
| prus          | Size of the file in physical record units (PRUs) in decimal. One PRU contains the equivalent of 640 6-bit characters.                                                                                                                    |               |                                                                                                                                                                                                                                                                                                                                                                                                                            |

### STOP Command

The STOP command causes QTF to terminate immediately. The message QTF, NETWORK SHUTDOWN appears in the QTF job dayfile. QTF abandons any file transfers in progress, returns files to the system I/O queues, and ends.

The command format is:

STOP

QTF does not accept an abbreviation for this command.



A character set is composed of graphic and/or control characters. A code set is a set of codes used to represent each character within a character set.

A graphic character may be displayed at a terminal or printed by a line printer. Examples are the characters A through Z and the digits 0 through 9. A control character initiates, modifies, or stops a control operation. An example is the backspace character that moves the terminal carriage or cursor back one space. Although a control character is not a graphic character, a terminal may produce a graphic representation when it receives a control character.

All references within this manual to ASCII character sets or ASCII code set refer to the character sets and code set defined in the American National Standard Code for Information Interchange (ASCII, ANSI Standard X3.4-1977).

NOS/BE supports the following character sets.

- CDC graphic 64- (or 63-) character set.
- ASCII 128-character set.
- ASCII graphic 64- (or 63-) character set.
- ASCII graphic 95-character set.

Each installation selects either the 64-character set or the 63-character set. The differences between the two are described in Character Set Anomalies later in this appendix.

NOS/BE supports the following code sets.

- Display code.
- 12-bit ASCII code.

Display code is a set of 6-bit codes from 00 (octal) to 77 (octal).

The 12-bit ASCII code is the ASCII 7-bit code (as defined by ANSI Standard X3.4-1977) right-justified in a 12-bit byte. Assuming that the bits are numbered from the right starting with 0, bits 0 through 6 contain the ASCII code, bits 7 through 10 contain zeros, and bit 11 distinguishes the 12-bit ASCII 00000 (octal) code from the end-of-line byte. The 12-bit codes are 0001 (octal) through 0177 (octal) and 4000 (octal).

## CHARACTER SET ANOMALIES

NOS/BE interprets the codes for the colon and the percent graphic characters differently when the installation selects the 63-character set rather than the 64-character set. In tables A-1 and A-2, the codes for the colon and percent graphic characters in the 64-character set are unshaded; the codes for the colon and percent graphic characters in the

63-character set are shaded. If an installation uses the 63-character set, the colon graphic character is always represented by a 63 (octal) code.

Also, two or more consecutive 00 (octal) codes may be confused with an end-of-line byte and should be avoided.

## CHARACTER SET TABLES

This appendix contains character set tables for INTERCOM users, batch users, and magnetic tape users. Table A-1 is for INTERCOM users, and table A-2 is for batch users. Tables A-3, A-4, and A-5 are for magnetic tape users and list the magnetic tape codes and their display code equivalents.

Character set tables are designed so you can either find the character represented by a code (such as in a dump) or find the code that represents a character. To find the character represented by a code, the look up the code in the column listing the appropriate code set, then read across the table to find the character on that line in the column listing the appropriate character set. To find the code that represents a character, first look up the character, and then read across the table to find the code on the same line in the appropriate code column.

## INTERCOM USERS

Table A-1 shows the character sets and code sets available to an ASCII code terminal user. When communicating with a terminal, NOS/BE displays by default the ASCII graphic 64- or 63-character set and interprets all input and output as display code. COMPASS and FORTRAN users can elect to use 12-bit ASCII code if the terminal in use will support the code set selected. Refer to the INTERCOM 5 Reference Manual listed in the preface.

## BATCH USERS

Table A-2 lists the CDC graphic 64- or 63-character set, the ASCII graphic 64- or 63-character set, and the ASCII graphic 95-character set. It also lists the code sets and card punch codes (026 and 029) that represent the characters.

The 64- or 63-character sets use display code as their code set; the 95-character set uses 12-bit ASCII code. The 95-character set is composed of all the characters in the ASCII 128-character set that can be printed at a line printer (refer to Line Printer Use later in this appendix). Only 12-bit ASCII code files can be printed using the ASCII graphic 95-character set.

## LINE PRINTER USE

The print train used determines which batch character set is printed (refer to the ROUTE Control Statement in section 4). Following is a list of the print trains and their corresponding batch character sets:

| Character Set                         | Print Train |
|---------------------------------------|-------------|
| CDC graphic 64- or 63-character set   | 596-1       |
| ASCII graphic 64- or 63-character set | 596-5       |
| ASCII graphic 95-character set        | 596-6       |

The characters of the default 596-1 print train are listed in table A-2 in the column labeled CDC Graphic (64 or 63 Characters); the 596-5 print train characters are listed in table A-2 in the column labeled ASCII Graphic (64 or 63 Characters); and 596-6 print train characters are listed in table A-2 in the column labeled ASCII Graphic (95 Characters).

If a transmission error occurs when printing a line, the system stops printing and alerts you. You usually rewind the print file and return it to the print queue. An installation option is available which allows print errors to be overridden automatically.

If an unprintable character exists in a line (that is, a 12-bit ASCII code outside the range 0040 (octal) through 0176 (octal)), the number sign (#) appears in the first printable column of a print line, and a space replaces the unprintable character.

## PUNCHED CARD INPUT AND OUTPUT

Punched card data falls into two categories.

- Coded data
- Binary data

Coded data is data converted from (or to) a punched card code to (or from) a character set code recognizable by a software product as representing a conventional character. Binary data does not require such conversion. Binary data in this context is usually manipulated in off-line operations involving card-to-tape or tape-to-card transmissions, storage of relocated programs, and so forth.

In NOS/BE, alternative card keypunch codes are available for input of the CDC characters v and < or their ASCII equivalents ! and < .

Depending on which (if any) installation option is selected, the system assumes that an input deck has been punched either in 026 or in 029 keypunch mode (regardless of the character set in use). The alternative mode can be specified by a 26 or 29

punched in columns 79 and 80 of the job card or any 7/8/9 card. The mode remains in effect throughout the job unless it is changed by a mode specified on a subsequent 7/8/9 card.

## MAGNETIC TAPE USERS

Coded data to be copied from mass storage to magnetic tape is assumed to be represented in display code. NOS/BE converts the data to external BCD code when writing a coded seven-track tape and to ASCII or EBCDIC code (as specified on the tape assignment statement) when writing a coded nine-track tape.

Because only 63 characters can be represented in seven-track even parity, one of the 64 display codes is lost in conversion to and from external BCD code. The following shows the difference in conversion depending on the character set (63 or 64 characters) which the system uses. The ASCII character for the specified character code is shown in parentheses. The output arrow shows how the display code changes when it is written on tape in external BCD. The input arrow shows how the external BCD code changes when the tape is read and converted to display code.

| 63-Character Set |              |              |
|------------------|--------------|--------------|
| Display Code     | External BCD | Display Code |
| 00               | 16 (%)       | 00           |
| 33 (0) Output    | 12 (0)       | Input 33 (0) |
| 63 (:)           | 12 (0)       | 33 (0)       |

| 64-Character Set |              |              |
|------------------|--------------|--------------|
| Display Code     | External BCD | Display Code |
| 00 (:)           | 12 (0)       | 33 (0)       |
| 33 (0) Output    | 12 (0)       | Input 33 (0) |
| 63 (%)           | 16 (%)       | 63 (%)       |

If lowercase ASCII or EBCDIC code is read from a nine-track coded tape, it is converted to its uppercase 6-bit display code equivalent. To read and write lowercase ASCII or EBCDIC characters, user's must assign the tape in binary mode and perform their own conversions of binary data.

Tables A-3 and A-4 show the character set conversions for nine-track tapes. Table A-3 lists the conversions to and from the ASCII character code and display code. Table A-4 lists the conversions between the EBCDIC character code and the display code. Table A-5 shows the character set conversions between external BCD and display code for seven-track tapes.

Table A-1. Intercom Character Sets (Sheet 1 of 2)

| ASCII Graphic<br>(64 Char)                                               | ASCII Character<br>(128 Char) | Display Code | 12-Bit ASCII Code | ASCII Graphic<br>(64 Char) | ASCII Character<br>(128 Char) | Display Code | 12-Bit ASCII Code |
|--------------------------------------------------------------------------|-------------------------------|--------------|-------------------|----------------------------|-------------------------------|--------------|-------------------|
| : colon†                                                                 |                               | 00†          |                   | # num. sign                | # num. sign                   | 60           | 0043              |
| <b>Display code 00 is undefined at sites using the 63-character set.</b> |                               |              |                   | [ l. bracket               | [ l. bracket                  | 61           | 0133              |
| A                                                                        | A                             | 01           | 0101              | ] r. bracket               | ] r. bracket                  | 62           | 0135              |
| B                                                                        | B                             | 02           | 0102              | % †                        | % †                           | 63†          | 0045              |
| C                                                                        | C                             | 03           | 0103              | : colon                    | : colon                       | 63           | 0072              |
| D                                                                        | D                             | 04           | 0104              | " quote                    | " quote                       | 64           | 0042              |
| E                                                                        | E                             | 05           | 0105              | _ underline                | _ underline                   | 65           | 0137              |
| F                                                                        | F                             | 06           | 0106              | ! †                        | ! †                           | 66           | 0041              |
| G                                                                        | G                             | 07           | 0107              | & ampersand                | & ampersand                   | 67           | 0046              |
|                                                                          |                               |              |                   | ' apostrophe               | ' apostrophe                  | 70           | 0047              |
| H                                                                        | H                             | 10           | 0110              | ?                          | ?                             | 71           | 0077              |
| I                                                                        | I                             | 11           | 0111              | <                          | <                             | 72           | 0074              |
| J                                                                        | J                             | 12           | 0112              | >                          | >                             | 73           | 0076              |
| K                                                                        | K                             | 13           | 0113              | \ rev. slant               | \ rev. slant                  | 75           | 0134              |
| L                                                                        | L                             | 14           | 0114              | ` circumflex               | ` circumflex                  | 76           |                   |
| M                                                                        | M                             | 15           | 0115              | ; semicolon                | ; semicolon                   | 77           | 0073              |
| N                                                                        | N                             | 16           | 0116              |                            |                               |              |                   |
| O                                                                        | O                             | 17           | 0117              | @                          |                               |              | 0100              |
|                                                                          |                               |              |                   | ' circumflex               |                               |              | 0136              |
| P                                                                        | P                             | 20           | 0120              | : colon†                   |                               |              | 0072              |
| Q                                                                        | Q                             | 21           | 0121              | X                          |                               |              | 0045              |
| R                                                                        | R                             | 22           | 0122              |                            |                               |              | 0140              |
| S                                                                        | S                             | 23           | 0123              |                            |                               |              |                   |
| T                                                                        | T                             | 24           | 0124              | a                          |                               |              | 0141              |
| U                                                                        | U                             | 25           | 0125              | b                          |                               |              | 0142              |
| V                                                                        | V                             | 26           | 0126              | c                          |                               |              | 0143              |
| W                                                                        | W                             | 27           | 0127              | d                          |                               |              | 0144              |
|                                                                          |                               |              |                   | e                          |                               |              | 0145              |
| X                                                                        | X                             | 30           | 0130              | f                          |                               |              | 0146              |
| Y                                                                        | Y                             | 31           | 0131              | g                          |                               |              | 0147              |
| Z                                                                        | Z                             | 32           | 0132              |                            |                               |              |                   |
| 0                                                                        | 0                             | 33           | 0060              | h                          |                               |              | 0150              |
| 1                                                                        | 1                             | 34           | 0061              | i                          |                               |              | 0151              |
| 2                                                                        | 2                             | 35           | 0062              | j                          |                               |              | 0152              |
| 3                                                                        | 3                             | 36           | 0063              | k                          |                               |              | 0153              |
| 4                                                                        | 4                             | 37           | 0064              | l                          |                               |              | 0154              |
|                                                                          |                               |              |                   | m                          |                               |              | 0155              |
| 5                                                                        | 5                             | 40           | 0065              | n                          |                               |              | 0156              |
| 6                                                                        | 6                             | 41           | 0066              | o                          |                               |              | 0157              |
| 7                                                                        | 7                             | 42           | 0067              |                            |                               |              |                   |
| 8                                                                        | 8                             | 43           | 0070              | p                          |                               |              | 0160              |
| 9                                                                        | 9                             | 44           | 0071              | q                          |                               |              | 0161              |
| +                                                                        | +                             | 45           | 0053              | r                          |                               |              | 0162              |
| -                                                                        | -                             | 46           | 0055              | s                          |                               |              | 0163              |
| *                                                                        | *                             | 47           | 0052              | t                          |                               |              | 0164              |
|                                                                          |                               |              |                   | u                          |                               |              | 0165              |
| /                                                                        | /                             | 50           | 0057              | v                          |                               |              | 0166              |
| (                                                                        | (                             | 51           | 0050              | w                          |                               |              | 0167              |
| )                                                                        | )                             | 52           | 0051              |                            |                               |              |                   |
| \$                                                                       | \$                            | 53           | 0044              | x                          |                               |              |                   |
| =                                                                        | =                             | 54           | 0075              | y                          |                               |              |                   |
| space                                                                    | space                         | 55           | 0040              | z                          |                               |              |                   |
| ,                                                                        | comma                         | 56           | 0054              | { left brace               |                               |              |                   |
| .                                                                        | period                        | 57           | 0056              | vert. line                 |                               |              |                   |
|                                                                          |                               |              |                   | } right brace              |                               |              |                   |
|                                                                          |                               |              |                   | ~ tilde                    |                               |              |                   |
|                                                                          |                               |              |                   | DEL                        |                               |              |                   |
|                                                                          |                               |              |                   |                            |                               |              |                   |

†The interpretation of this character or code may depend on its context. Refer to Character Set Anomalies elsewhere in this appendix.

Table A-1. Intercom Character Sets (Sheet 2 of 2)

| ASCII Graphic<br>(64 Char) | ASCII Character<br>(128 Char) | Display Code | 12-Bit ASCII Code | ASCII Graphic<br>(64 Char) | ASCII Character<br>(128 Char) | Display Code | 12-Bit ASCII Code |
|----------------------------|-------------------------------|--------------|-------------------|----------------------------|-------------------------------|--------------|-------------------|
|                            | NUL                           |              | 4000              |                            | DLE                           |              | 0020              |
|                            | SOH                           |              | 0001              |                            | DC1                           |              | 0021              |
|                            | STX                           |              | 0002              |                            | DC2                           |              | 0022              |
|                            | ETX                           |              | 0003              |                            | DC3                           |              | 0023              |
|                            | EOT                           |              | 0004              |                            | DC4                           |              | 0024              |
|                            | ENQ                           |              | 0005              |                            | NAK                           |              | 0025              |
|                            | ACK                           |              | 0006              |                            | SYN                           |              | 0026              |
|                            | BEL                           |              | 0007              |                            | ETB                           |              | 0027              |
|                            | BS                            |              | 0010              |                            | CAN                           |              | 0030              |
|                            | HT                            |              | 0011              |                            | EM                            |              | 0031              |
|                            | LF                            |              | 0012              |                            | SUB                           |              | 0032              |
|                            | VT                            |              | 0013              |                            | ESC                           |              | 0033              |
|                            | FF                            |              | 0014              |                            | FS                            |              | 0034              |
|                            | CR                            |              | 0015              |                            | GS                            |              | 0035              |
|                            | SO                            |              | 0016              |                            | RS                            |              | 0036              |
|                            | SI                            |              | 0017              |                            | US                            |              | 0037              |

Table A-2. Batch Character Sets (Sheet 1 of 3)

| CDC<br>Graphic<br>(64 Char)                                              | ASCII<br>Graphic<br>(64 Char) | ASCII<br>Graphic<br>(95 Char) | Display<br>Code | 12-Bit<br>ASCII<br>Code | Punch Code |        |
|--------------------------------------------------------------------------|-------------------------------|-------------------------------|-----------------|-------------------------|------------|--------|
|                                                                          |                               |                               |                 |                         | 026        | 029    |
| :                                                                        | :                             | colon†                        | 00†             |                         | 8-2        | 8-2    |
| <b>Display code 00 is undefined at sites using the 63-character set.</b> |                               |                               |                 |                         |            |        |
| A                                                                        | A                             | A                             | 01              | 0101                    | 12-1       | 12-1   |
| B                                                                        | B                             | B                             | 02              | 0102                    | 12-2       | 12-2   |
| C                                                                        | C                             | C                             | 03              | 0103                    | 12-3       | 12-3   |
| D                                                                        | D                             | D                             | 04              | 0104                    | 12-4       | 12-4   |
| E                                                                        | E                             | E                             | 05              | 0105                    | 12-5       | 12-5   |
| F                                                                        | F                             | F                             | 06              | 0106                    | 12-6       | 12-6   |
| G                                                                        | G                             | G                             | 07              | 0107                    | 12-7       | 12-7   |
| H                                                                        | H                             | H                             | 10              | 0110                    | 12-8       | 12-8   |
| I                                                                        | I                             | I                             | 11              | 0111                    | 12-9       | 12-9   |
| J                                                                        | J                             | J                             | 12              | 0112                    | 11-1       | 11-1   |
| K                                                                        | K                             | K                             | 13              | 0113                    | 11-2       | 11-2   |
| L                                                                        | L                             | L                             | 14              | 0114                    | 11-3       | 11-3   |
| M                                                                        | M                             | M                             | 15              | 0115                    | 11-4       | 11-4   |
| N                                                                        | N                             | N                             | 16              | 0116                    | 11-5       | 11-5   |
| O                                                                        | O                             | O                             | 17              | 0117                    | 11-6       | 11-6   |
| P                                                                        | P                             | P                             | 20              | 0120                    | 11-7       | 11-7   |
| Q                                                                        | Q                             | Q                             | 21              | 0121                    | 11-8       | 11-8   |
| R                                                                        | R                             | R                             | 22              | 0122                    | 11-9       | 11-9   |
| S                                                                        | S                             | S                             | 23              | 0123                    | 0-2        | 0-2    |
| T                                                                        | T                             | T                             | 24              | 0124                    | 0-3        | 0-3    |
| U                                                                        | U                             | U                             | 25              | 0125                    | 0-4        | 0-4    |
| V                                                                        | V                             | V                             | 26              | 0126                    | 0-5        | 0-5    |
| W                                                                        | W                             | W                             | 27              | 0127                    | 0-6        | 0-6    |
| X                                                                        | X                             | X                             | 30              | 0130                    | 0-7        | 0-7    |
| Y                                                                        | Y                             | Y                             | 31              | 0131                    | 0-8        | 0-8    |
| Z                                                                        | Z                             | Z                             | 32              | 0132                    | 0-9        | 0-9    |
| 0                                                                        | 0                             | 0                             | 33              | 0060                    | 0          | 0      |
| 1                                                                        | 1                             | 1                             | 34              | 0061                    | 1          | 1      |
| 2                                                                        | 2                             | 2                             | 35              | 0062                    | 2          | 2      |
| 3                                                                        | 3                             | 3                             | 36              | 0063                    | 3          | 3      |
| 4                                                                        | 4                             | 4                             | 37              | 0064                    | 4          | 4      |
| 5                                                                        | 5                             | 5                             | 40              | 0065                    | 5          | 5      |
| 6                                                                        | 6                             | 6                             | 41              | 0066                    | 6          | 6      |
| 7                                                                        | 7                             | 7                             | 42              | 0067                    | 7          | 7      |
| 8                                                                        | 8                             | 8                             | 43              | 0070                    | 8          | 8      |
| 9                                                                        | 9                             | 9                             | 44              | 0071                    | 9          | 9      |
| +                                                                        | +                             | +                             | 45              | 0053                    | 12         | 12-8-6 |
| -                                                                        | -                             | -                             | 46              | 0055                    | 11         | 11     |
| *                                                                        | *                             | *                             | 47              | 0052                    | 11-8-4     | 11-8-4 |

† The interpretation of this character or code may depend on its context.  
Refer to Character Set Anomalies elsewhere in this appendix.

Table A-2. Batch Character Sets (Sheet 2 of 3)

| CDC<br>Graphic<br>(64 Char) | ASCII<br>Graphic<br>(64 Char) | ASCII<br>Graphic<br>(95 Char) | Display<br>Code | 12-Bit<br>ASCII<br>Code | Punch Code |          |
|-----------------------------|-------------------------------|-------------------------------|-----------------|-------------------------|------------|----------|
|                             |                               |                               |                 |                         | 026        | 029      |
| /                           | /                             | /                             | 50              | 0057                    | 0-1        | 0-1      |
| (                           | (                             | (                             | 51              | 0050                    | 0-8-4      | 12-8-5   |
| )                           | )                             | )                             | 52              | 0051                    | 12-8-4     | 11-8-5   |
| \$                          | \$                            | \$                            | 53              | 0044                    | 11-8-3     | 11-8-3   |
| =                           | =                             | =                             | 54              | 0075                    | 8-3        | 8-6      |
| space                       | space                         | space                         | 55              | 0040                    | no punch   | no punch |
| , comma                     | , comma                       | , comma                       | 56              | 0054                    | 0-8-3      | 0-8-3    |
| . period                    | . period                      | . period                      | 57              | 0056                    | 12-8-3     | 12-8-3   |
| ≡ equiv.                    | # num. sign                   | # num. sign                   | 60              | 0043                    | 0-8-6      | 8-3      |
| [ l. bracket                | [ l. bracket                  | [ l. bracket                  | 61              | 0133                    | 8-7        | 12-8-2   |
| ] r. bracket                | ] r. bracket                  | ] r. bracket                  | 62              | 0135                    | 0-8-2      | 11-8-2   |
| % †                         | % †                           | % †                           | 63†             | 0045                    | 8-6        | 0-8-4    |
| : colon                     | : colon                       | : colon                       | 63              | 0072                    | 8-2        | 8-2      |
| ≠                           | " quote                       | " quote                       | 64              | 0042                    | 8-4        | 8-7      |
| →                           | underline                     | underline                     | 65              | 0137                    | 0-8-5      | 0-8-5    |
| ∨                           | !                             | !                             | 66              | 0041                    | 11-0       | 12-8-7   |
| ^                           | & ampersand                   | & ampersand                   | 67              | 0046                    | 0-8-7      | 12       |
| ↑                           | ' apostrophe                  | ' apostrophe                  | 70              | 0047                    | 11-8-5     | 8-5      |
| ↓                           | ?                             | ?                             | 71              | 0077                    | 11-8-6     | 0-8-7    |
| <                           | <                             | <                             | 72              | 0074                    | 12-0       | 12-8-4   |
| >                           | >                             | >                             | 73              | 0076                    | 11-8-7     | 0-8-6    |
| ≤                           | @                             |                               | 74              |                         | 8-5        | 8-4      |
| ≥                           | \ rev. slant                  | \ rev. slant                  | 75              | 0134                    | 12-8-5     | 0-8-2    |
| ¬                           | ^ circumflex                  |                               | 76              |                         | 12-8-6     | 11-8-7   |
| ;                           | semicolon                     | semicolon                     | 77              | 0073                    | 12-8-7     | 11-8-6   |
|                             |                               |                               |                 | 0100                    |            |          |
|                             |                               |                               |                 | 0136                    |            |          |
|                             |                               |                               |                 | 0072                    |            |          |
|                             |                               |                               |                 | 0045                    |            |          |
|                             |                               |                               |                 | 0140                    |            |          |
|                             |                               |                               |                 | a                       | 0141       |          |
|                             |                               |                               |                 | b                       | 0142       |          |
|                             |                               |                               |                 | c                       | 0143       |          |
|                             |                               |                               |                 | d                       | 0144       |          |
|                             |                               |                               |                 | e                       | 0145       |          |
|                             |                               |                               |                 | f                       | 0146       |          |
|                             |                               |                               |                 | g                       | 0147       |          |

† The interpretation of this character or code may depend on its context.  
Refer to Character Set Anomalies elsewhere in this appendix.

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Table A-2. Batch Character Sets (Sheet 3 of 3)

| CDC<br>Graphic<br>(64 Char) | ASCII<br>Graphic<br>(64 Char) | ASCII<br>Graphic<br>(95 Char) | Display<br>Code | 12-Bit<br>ASCII<br>Code | Punch Code |     |
|-----------------------------|-------------------------------|-------------------------------|-----------------|-------------------------|------------|-----|
|                             |                               |                               |                 |                         | 026        | 029 |
|                             | h                             |                               |                 | 0150                    |            |     |
|                             | i                             |                               |                 | 0151                    |            |     |
|                             | j                             |                               |                 | 0152                    |            |     |
|                             | k                             |                               |                 | 0153                    |            |     |
|                             | l                             |                               |                 | 0154                    |            |     |
|                             | m                             |                               |                 | 0155                    |            |     |
|                             | n                             |                               |                 | 0156                    |            |     |
|                             | o                             |                               |                 | 0157                    |            |     |
|                             | p                             |                               |                 | 0160                    |            |     |
|                             | q                             |                               |                 | 0161                    |            |     |
|                             | r                             |                               |                 | 0162                    |            |     |
|                             | s                             |                               |                 | 0163                    |            |     |
|                             | t                             |                               |                 | 0164                    |            |     |
|                             | u                             |                               |                 | 0165                    |            |     |
|                             | v                             |                               |                 | 0166                    |            |     |
|                             | w                             |                               |                 | 0167                    |            |     |
|                             | x                             |                               |                 | 0170                    |            |     |
|                             | y                             |                               |                 | 0171                    |            |     |
|                             | z                             |                               |                 | 0172                    |            |     |
|                             | { left brace                  |                               |                 | 0173                    |            |     |
|                             | vert. line                    |                               |                 | 0174                    |            |     |
|                             | } right brace                 |                               |                 | 0175                    |            |     |
|                             | ~ tilde                       |                               |                 | 0176                    |            |     |

Table A-3. ASCII Nine-Track Coded Tape Conversion

| ASCII                                                                                                                                                                                                                                                                                                                                  |                                 |            | Display Code |            | ASCII            |                                 |      |            | Display Code |            |              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|------------|--------------|------------|------------------|---------------------------------|------|------------|--------------|------------|--------------|
| Code Conversion†                                                                                                                                                                                                                                                                                                                       | Character and Code Conversion†† |            |              |            | Code Conversion† | Character and Code Conversion†† |      |            |              |            |              |
| Code (Hex)                                                                                                                                                                                                                                                                                                                             | Char                            | Code (Hex) | Char         | ASCII Char | Code (Octal)     | Code (Hex)                      | Char | Code (Hex) | Char         | ASCII Char | Code (Octal) |
| 20                                                                                                                                                                                                                                                                                                                                     | space                           | 00         | NUL          | space      | 55               | 3E                              | >    | 1E         | RS           | >          | 73           |
| 21                                                                                                                                                                                                                                                                                                                                     | !                               | 7D         | ]            | !          | 66               | 3F                              | ?    | 1F         | US           | ?          | 71           |
| 22                                                                                                                                                                                                                                                                                                                                     | "                               | 02         | STX          | "          | 64               | 40                              | @    | 60         | @            | @          | 74           |
| 23                                                                                                                                                                                                                                                                                                                                     | #                               | 03         | ETX          | #          | 60               | 41                              | A    | 61         | a            | A          | 01           |
| 24                                                                                                                                                                                                                                                                                                                                     | \$                              | 04         | EOT          | \$         | 53               | 42                              | B    | 62         | b            | B          | 02           |
| 25                                                                                                                                                                                                                                                                                                                                     | %                               | 05         | ENQ          | %          | 63               | 43                              | C    | 63         | c            | C          | 03           |
| 25                                                                                                                                                                                                                                                                                                                                     | %                               | 05         | ENQ          | space††††† | 55               | 44                              | D    | 64         | d            | D          | 04           |
| 26                                                                                                                                                                                                                                                                                                                                     | &                               | 06         | ACK          | &          | 67               | 45                              | E    | 65         | e            | E          | 05           |
| 27                                                                                                                                                                                                                                                                                                                                     | '                               | 07         | BEL          | '          | 70               | 46                              | F    | 66         | f            | F          | 06           |
| 28                                                                                                                                                                                                                                                                                                                                     | (                               | 08         | BS           | (          | 51               | 47                              | G    | 67         | g            | G          | 07           |
| 29                                                                                                                                                                                                                                                                                                                                     | )                               | 09         | HT           | )          | 52               | 48                              | H    | 68         | h            | H          | 10           |
| 2A                                                                                                                                                                                                                                                                                                                                     | *                               | 0A         | LF           | *          | 47               | 49                              | I    | 69         | i            | I          | 11           |
| 2B                                                                                                                                                                                                                                                                                                                                     | +                               | 0B         | VT           | +          | 45               | 4A                              | J    | 6A         | j            | J          | 12           |
| 2C                                                                                                                                                                                                                                                                                                                                     | ,                               | 0C         | FF           | ,          | 56               | 4B                              | K    | 6B         | k            | K          | 13           |
| 2D                                                                                                                                                                                                                                                                                                                                     | -                               | 0D         | CR           | -          | 46               | 4C                              | L    | 6C         | l            | L          | 14           |
| 2E                                                                                                                                                                                                                                                                                                                                     | .                               | 0E         | SO           | .          | 57               | 4D                              | M    | 6D         | m            | M          | 15           |
| 2F                                                                                                                                                                                                                                                                                                                                     | /                               | 0F         | SI           | /          | 50               | 4E                              | N    | 6E         | n            | N          | 16           |
| 30                                                                                                                                                                                                                                                                                                                                     | 0                               | 10         | DLE          | 0          | 33               | 4F                              | O    | 6F         | o            | O          | 17           |
| 31                                                                                                                                                                                                                                                                                                                                     | 1                               | 11         | DC1          | 1          | 34               | 50                              | P    | 70         | p            | P          | 20           |
| 32                                                                                                                                                                                                                                                                                                                                     | 2                               | 12         | DC2          | 2          | 35               | 51                              | Q    | 71         | q            | Q          | 21           |
| 33                                                                                                                                                                                                                                                                                                                                     | 3                               | 13         | DC3          | 3          | 36               | 52                              | R    | 72         | r            | R          | 22           |
| 34                                                                                                                                                                                                                                                                                                                                     | 4                               | 14         | DC4          | 4          | 37               | 53                              | S    | 73         | s            | S          | 23           |
| 35                                                                                                                                                                                                                                                                                                                                     | 5                               | 15         | NAK          | 5          | 40               | 54                              | T    | 74         | t            | T          | 24           |
| 36                                                                                                                                                                                                                                                                                                                                     | 6                               | 16         | SYN          | 6          | 41               | 55                              | U    | 75         | u            | U          | 25           |
| 37                                                                                                                                                                                                                                                                                                                                     | 7                               | 17         | ETB          | 7          | 42               | 56                              | V    | 76         | v            | V          | 26           |
| 38                                                                                                                                                                                                                                                                                                                                     | 8                               | 18         | CAN          | 8          | 43               | 57                              | W    | 77         | w            | W          | 27           |
| 39                                                                                                                                                                                                                                                                                                                                     | 9                               | 19         | EM           | 9          | 44               | 58                              | X    | 78         | x            | X          | 30           |
| 3A                                                                                                                                                                                                                                                                                                                                     | :                               | 1A         | SUB          | :          | 00               | 59                              | Y    | 79         | y            | Y          | 31           |
| Display code 00 is undefined at sites using the 63-character set.                                                                                                                                                                                                                                                                      |                                 |            |              |            |                  |                                 |      |            |              |            |              |
| 3A                                                                                                                                                                                                                                                                                                                                     | :                               | 1A         | SUB          | :          | 63               | 5A                              | Z    | 7A         | z            | Z          | 32           |
| 3B                                                                                                                                                                                                                                                                                                                                     | ;                               | 1B         | ESC          | ;          | 77               | 5B                              | [    | 1C         | FS           | [          | 61           |
| 3C                                                                                                                                                                                                                                                                                                                                     | <                               | 7B         | €            | <          | 72               | 5D                              | ]    | 01         | SOH          | ]          | 62           |
| 3D                                                                                                                                                                                                                                                                                                                                     | =                               | 1D         | GS           | =          | 54               | 5E                              | -    | 7E         | -            | -          | 76           |
|                                                                                                                                                                                                                                                                                                                                        |                                 |            |              |            |                  | 5F                              | -    | 7F         | DEL          | -          | 65           |
| † When these characters are copied from/to a tape, the characters remain the same and the code changes from/to ASCII to/from display code.                                                                                                                                                                                             |                                 |            |              |            |                  |                                 |      |            |              |            |              |
| †† These characters do not exist in display code. Therefore, when the characters are copied from a tape, each ASCII character is changed to an alternate display code character. The corresponding codes are also changed. Example: When the system copies a lowercase a, 61 <sub>16</sub> , from tape, it writes an uppercase A, 018. |                                 |            |              |            |                  |                                 |      |            |              |            |              |
| ††† A display code space always translates to an ASCII space.                                                                                                                                                                                                                                                                          |                                 |            |              |            |                  |                                 |      |            |              |            |              |

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Table A-4. EBCDIC Nine-Track Coded Tape Conversion

| EBCDIC                                                            |       |                                 |      | Display Code |              | EBCDIC           |      |                                 |      | Display Code |              |
|-------------------------------------------------------------------|-------|---------------------------------|------|--------------|--------------|------------------|------|---------------------------------|------|--------------|--------------|
| Code Conversion†                                                  |       | Character and Code Conversion†† |      |              |              | Code Conversion† |      | Character and Code Conversion†† |      |              |              |
| Code (Hex)                                                        | Char  | Code (Hex)                      | Char | ASCII Char   | Code (Octal) | Code (Hex)       | Char | Code (Hex)                      | Char | ASCII Char   | Code (Octal) |
| 40                                                                | space | 00                              | NUL  | space        | 55           | C4               | D    | 84                              | d    | D            | 04           |
| 4A                                                                | c     | 1C                              | IFS  | [            | 61           | C5               | E    | 85                              | e    | E            | 05           |
| 4B                                                                | .     | 0E                              | SO   | .            | 57           | C6               | F    | 86                              | f    | F            | 06           |
| 4C                                                                | <     | CO                              | {    | <            | 72           | C7               | G    | 87                              | g    | G            | 07           |
| 4D                                                                | (     | 16                              | BS   | (            | 51           | C8               | H    | 88                              | h    | H            | 10           |
| 4E                                                                | +     | 0B                              | VT   | +            | 45           | C9               | I    | 89                              | i    | I            | 11           |
| 4F                                                                |       | D0                              | }    | !            | 66           | D1               | J    | 91                              | j    | J            | 12           |
| 50                                                                | &     | 2E                              | ACK  | &            | 67           | D2               | K    | 92                              | k    | K            | 13           |
| 5A                                                                | !     | 01                              | SOH  | ]            | 62           | D3               | L    | 93                              | l    | L            | 14           |
| 5B                                                                | \$    | 37                              | EOT  | \$           | 53           | D4               | M    | 94                              | m    | M            | 15           |
| 5C                                                                | *     | 25                              | LF   | *            | 47           | D5               | N    | 95                              | n    | N            | 16           |
| 5D                                                                | )     | 05                              | HT   | )            | 52           | D6               | O    | 96                              | o    | O            | 17           |
| 5E                                                                | :     | 27                              | ESC  | ;            | 77           | D7               | P    | 97                              | p    | P            | 20           |
| 5F                                                                | ~     | A1                              | -    | ~            | 76           | D8               | Q    | 98                              | q    | Q            | 21           |
| 60                                                                | -     | 0D                              | CR   | -            | 46           | D9               | R    | 99                              | r    | R            | 22           |
| 61                                                                | /     | 0F                              | SI   | /            | 50           | E0               | \    | 6A                              | \    | \            | 75           |
| 6B                                                                | ,     | 0C                              | FF   | ,            | 56           | E2               | S    | A2                              | s    | S            | 23           |
| 6C                                                                | %     | 2D                              | ENQ  | %            | 63           | E3               | T    | A3                              | t    | T            | 24           |
| 6C                                                                | %     | 2D                              | ENQ  | space†††     | 55           | E4               | U    | A4                              | u    | U            | 25           |
| 6D                                                                | -     | 07                              | DEL  | -            | 65           | E5               | V    | A5                              | v    | V            | 26           |
| 6E                                                                | >     | 1E                              | IRS  | >            | 73           | E6               | W    | A6                              | w    | W            | 27           |
| 6F                                                                | ?     | 1F                              | IUS  | ?            | 71           | E7               | X    | A7                              | x    | X            | 30           |
| 7A                                                                | :     | 3F                              | SUB  | :            | 00           | E8               | Y    | A8                              | y    | Y            | 31           |
| Display code 00 is undefined at sites using the 63-character set. |       |                                 |      |              |              |                  |      |                                 |      |              |              |
| 7A                                                                | :     | 3F                              | SUB  | :            | 63           | F1               | 1    | 11                              | DC1  | 1            | 34           |
| 7B                                                                | #     | 03                              | ETX  | #            | 60           | F2               | 2    | 12                              | DC2  | 2            | 35           |
| 7C                                                                | @     | 79                              | \    | @            | 74           | F3               | 3    | 13                              | TM   | 3            | 36           |
| 7D                                                                | '     | 2F                              | BEL  | '            | 70           | F4               | 4    | 3C                              | DC4  | 4            | 37           |
| 7E                                                                | =     | 1D                              | IGS  | =            | 54           | F5               | 5    | 3D                              | NAK  | 5            | 40           |
| 7F                                                                | "     | 02                              | STX  | "            | 64           | F6               | 6    | 32                              | SYN  | 6            | 41           |
| C1                                                                | A     | 81                              | a    | A            | 01           | F7               | 7    | 26                              | ETB  | 7            | 42           |
| C2                                                                | B     | 82                              | b    | B            | 02           | F8               | 8    | 18                              | CAN  | 8            | 43           |
| C3                                                                | C     | 83                              | c    | C            | 03           | F9               | 9    | 19                              | EM   | 9            | 44           |

† When these characters are copied from/to a tape, the characters remain the same (except EBCDIC codes 4A, 4F, 5A, and 5F) and the code changes from/to EBCDIC to/from display code.

†† These characters do not exist in display code. Therefore, when the characters are copied from a tape, each EBCDIC character is changed to an alternate display code character. The corresponding codes are also changed. Example: When the system copies a lowercase a, 81<sub>16</sub>, from tape, it writes an uppercase A, 01<sub>8</sub>.

††† All EBCDIC codes not listed translate to display code 55g (space). A display code space always translates to an EBCDIC space.

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Table A-5. Seven-Track Coded Tape Conversion

| External<br>BCD | ASCII<br>Character | Octal<br>Display<br>Code | External<br>BCD | ASCII<br>Character | Octal<br>Display<br>Code |
|-----------------|--------------------|--------------------------|-----------------|--------------------|--------------------------|
| 01              | 1                  | 34                       | 40              | -                  | 46                       |
| 02              | 2                  | 35                       | 41              | J                  | 12                       |
| 03              | 3                  | 36                       | 42              | K                  | 13                       |
| 04              | 4                  | 37                       | 43              | L                  | 14                       |
| 05              | 5                  | 40                       | 44              | M                  | 15                       |
| 06              | 6                  | 41                       | 45              | N                  | 16                       |
| 07              | 7                  | 42                       | 46              | O                  | 17                       |
| 10              | 8                  | 43                       | 47              | P                  | 20                       |
| 11              | 9                  | 44                       | 50              | Q                  | 21                       |
| 12†             | 0                  | 33                       | 51              | R                  | 22                       |
| 13              | =                  | 54                       | 52              | !                  | 66                       |
| 14              | "                  | 64                       | 53              | \$                 | 53                       |
| 15              | ¤                  | 74                       | 54              | *                  | 47                       |
| 16†             | %                  | 63                       | 55              | :                  | 70                       |
| 17              | [                  | 61                       | 56              | ?                  | 71                       |
| 20              | space              | 55                       | 57              | >                  | 73                       |
| 21              | /                  | 50                       | 60              | +                  | 45                       |
| 22              | S                  | 23                       | 61              | A                  | 01                       |
| 23              | T                  | 24                       | 62              | B                  | 02                       |
| 24              | U                  | 25                       | 63              | C                  | 03                       |
| 25              | V                  | 26                       | 64              | D                  | 04                       |
| 26              | W                  | 27                       | 65              | E                  | 05                       |
| 27              | X                  | 30                       | 66              | F                  | 06                       |
| 30              | Y                  | 31                       | 67              | G                  | 07                       |
| 31              | Z                  | 32                       | 70              | H                  | 10                       |
| 32              | ]                  | 62                       | 71              | I                  | 11                       |
| 33              | ,                  | 56                       | 72              | <                  | 72                       |
| 34              | (                  | 51                       | 73              | .                  | 57                       |
| 35              |                    | 65                       | 74              | )                  | 52                       |
| 36              | #                  | 60                       | 75              | \                  | 75                       |
| 37              | &                  | 67                       | 76              | -                  | 76                       |
|                 |                    |                          | 77              | ;                  | 77                       |

†As explained previously in this section,  
conversion of these codes depends on whether the  
tape is being read or written.

## SUMMARY OF COMMANDS

B

### JANUS COMMANDS

Detailed explanation of the use of the following commands appears in section 4.

|            | <u>Command Format</u>                                                                                         | <u>Function</u>                                                                                                                                                                                                                                                  |
|------------|---------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| /ABORT.    | n.ACK.                                                                                                        | Sets operator acknowledge flag (bit 16) in RA+0 of control point n.                                                                                                                                                                                              |
| /BSxx,p,c. | ACNcc.                                                                                                        | Activates channel cc.                                                                                                                                                                                                                                            |
|            | ADDID,lid.                                                                                                    | Adds three-character logical ID to IDT.                                                                                                                                                                                                                          |
| /CUTxx.    | ADDSET,SN=setname,<br>MP=mpvsn,VSN=vsn,<br>UV=uv,UP=up,PB=pb,<br>FR=fff,NF=n,NM=m,<br>RP=ddd,*PF,*Q,<br>mode. | Adds new members to a device set.                                                                                                                                                                                                                                |
| /ENDxx.    | AFD,L=listfile,<br>FR=string,OP=op,<br>PD=pd,PL=pl.                                                           | Dumps accounting messages from system dayfile.                                                                                                                                                                                                                   |
| /FSxx,p,c. | AFL,nnn.                                                                                                      | Sets the number of central memory words, in multiples of 1000 (octal), that the scheduler will attempt to re-reserve in anticipation of jobs in INTERCOM or higher classes. The S display must be called. The value appears as AFL/100 (octal) in the S display. |
| /OKxx.     |                                                                                                               |                                                                                                                                                                                                                                                                  |
| /REPxx.    |                                                                                                               |                                                                                                                                                                                                                                                                  |
| /REWxx.    |                                                                                                               |                                                                                                                                                                                                                                                                  |
| /SUPxx.    | ARI,nnnn.                                                                                                     | Sets relative rate nnnn at which scheduler will age jobs in classes 1 through 5. The S display must be called.                                                                                                                                                   |
| /SWxx.     | j.ASSIGN xx.                                                                                                  | Assigns equipment to job by EST ordinal.                                                                                                                                                                                                                         |
|            | AUDIT,LF=lfn,<br>MO=mode,ID=owner<br>PF=pfn,SN=setname<br>VSN=vsn,AI=type<br>AC=n.                            | Produces a statistical listing for all or selected permanent files in the system.                                                                                                                                                                                |

### SYSTEM AND JOB COMMANDS

| <u>Command Format</u> | <u>Function</u>                                                                                                               |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------|
| ABS,addr1,addr2.      | Dumps storage from absolute address addr1 to absolute address addr2. This command will handle addresses above 131K (377777B). |
| ACK.                  | Clears control point zero message.                                                                                            |
|                       | AUTO.                                                                                                                         |
|                       | BCPROC,cc,cw,F=ff,<br>LT=ttt,ND=nn,<br>AC=aaaa,TY=ccc.                                                                        |
|                       | n.X BKSP,lfn,number.                                                                                                          |

| <u>Command Format</u>                                                            | <u>Function</u>                                                                                                                                                   | <u>Command Format</u>                                                                 | <u>Function</u>                                                                                                                                                                                                                                                          |
|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n.BLANK                                                                          | Writes blank label on tape.                                                                                                                                       | n.DAYFILE,dt,FULL.                                                                    | Dumps full system dayfile.                                                                                                                                                                                                                                               |
| BQi,nnnn.                                                                        | Sets scheduler factor related to amount of time jobs in classes 1 through 5 can use processors before priority is reduced to MINQP. The S display must be called. | DCNcc.                                                                                | Disconnects channel cc.                                                                                                                                                                                                                                                  |
|                                                                                  |                                                                                                                                                                   | DEBUG.                                                                                | Toggles debug mode on.                                                                                                                                                                                                                                                   |
|                                                                                  |                                                                                                                                                                   | DELID,lid.                                                                            | Deletes specified 3-character logical ID from the IDT.                                                                                                                                                                                                                   |
| j.CFO message                                                                    | Sends comment to stopped program.                                                                                                                                 | DELSET,SN=setname, MP=mpvsn, VSN=vsn                                                  | Deletes devices from a device set.                                                                                                                                                                                                                                       |
| CHECKPOINT.                                                                      | Initiates a system checkpoint.                                                                                                                                    | DFD,L=listfile, FR=string,OP=op, PD=pd,PL=pl.                                         | Dumps system dayfile.                                                                                                                                                                                                                                                    |
| j.CHECKPT.                                                                       | Takes checkpoint dump.                                                                                                                                            | n.DIR,lfn.                                                                            | Directs job in input queue to a control point.                                                                                                                                                                                                                           |
| CLEAR.                                                                           | Clears all control points.                                                                                                                                        | n.DIS.                                                                                | Assigns DIS package.                                                                                                                                                                                                                                                     |
| n.CLEAR.                                                                         | Clears control point after current job terminates or is swapped out.                                                                                              | j.DISPLAY.                                                                            | Assigns console to DIS job.                                                                                                                                                                                                                                              |
| j.COMMENT message                                                                | Enters message in system dayfile.                                                                                                                                 | DIVERT,dc,idd,ids.                                                                    | Diverts files with disposition code dc from the second mainframe/terminal ID specified to the first mainframe/ terminal ID.                                                                                                                                              |
| n.X COMPARE,lfn <sub>1</sub> , lfn <sub>2</sub> ,numrecs,level, numwords,numbad. | Verifies that tapes have been copied correctly.                                                                                                                   | n.X DMNT,ES=xxx.                                                                      | Dismounts a device set member by EST ordinal.                                                                                                                                                                                                                            |
| CONTROLLER,xxx,cc, OFF.                                                          | Turns off access to a disk device or access group through channel cc.                                                                                             | n.X DMNT, SN=setname, VSN=vsn.                                                        | Dismounts device set member.                                                                                                                                                                                                                                             |
| CONTROLLER,xxx,cc, ON.                                                           | Turns on access to a disk device or access group through channel cc.                                                                                              | DMP,addr <sub>1</sub> ,addr <sub>2</sub> .                                            | Dumps memory from absolute storage address addr <sub>1</sub> to absolute address addr <sub>2</sub> . This command will only handle addresses up to 377777B. Any larger address will be considered to be relative to the control point RA and 400000B will be subtracted. |
| n.X COPY,lfn <sub>1</sub> ,lfn <sub>2</sub>                                      | Copies a reel of tape.                                                                                                                                            | n.X DMPNAD,CH=cc, ND=nd,LT=ttt,AC=aaaa L=lfn,B=lfn <sub>2</sub> ,I=lfn <sub>3</sub> . | Dumps 380 network access device memory to a printer or file.                                                                                                                                                                                                             |
| n.X COPYBCD,lfn <sub>1</sub> , lfn <sub>2</sub> ,num.                            | Copies files of coded information to magnetic tape.                                                                                                               | n.X DMPQ,t,S.                                                                         | Dumps queue I, O, or P to tape.                                                                                                                                                                                                                                          |
| n.X COPYBF,lfn <sub>1</sub> , lfn <sub>2</sub> ,num.                             | Copies binary files.                                                                                                                                              | j.DROP.message                                                                        | Stops current execution, maintaining output.                                                                                                                                                                                                                             |
| n.X COPYBR,lfn <sub>1</sub> , lfn <sub>2</sub> ,num.                             | Copies binary records.                                                                                                                                            | n.DROP.message                                                                        | Stops current execution at control point; used especially with JANUS and MFSTAT.                                                                                                                                                                                         |
| n.X COPYCF,lfn <sub>1</sub> , lfn <sub>2</sub> ,num.                             | Copies coded files.                                                                                                                                               | DSMOUNT,VSN=vsn, SN=setname.                                                          | Disassociates a user device set from a job.                                                                                                                                                                                                                              |
| n.X COPYCR,lfn <sub>1</sub> , lfn <sub>2</sub> ,num.                             | Copies coded records.                                                                                                                                             |                                                                                       |                                                                                                                                                                                                                                                                          |
| n.X COPYSBF,lfn <sub>1</sub> , lfn <sub>2</sub> ,num.                            | Copies files for on-line printing.                                                                                                                                |                                                                                       |                                                                                                                                                                                                                                                                          |
| n.X COPYXS,lfn <sub>1</sub> , lfn <sub>2</sub> ,num.                             | Converts binary X tapes to standard SI format.                                                                                                                    |                                                                                       |                                                                                                                                                                                                                                                                          |
| DATE mm/dd/yy.                                                                   | Enters date.                                                                                                                                                      |                                                                                       |                                                                                                                                                                                                                                                                          |
| n.DAYFILE,dt.                                                                    | Dumps partial system dayfile to MT, LP, or CP.                                                                                                                    |                                                                                       |                                                                                                                                                                                                                                                                          |

| <u>Command Format</u>                                                                                                                                                                                                      | <u>Function</u>                                                                                                                                               | <u>Command Format</u>                                     | <u>Function</u>                                                                                                                               |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| DUMPF,PW=pw,<br>LF=lfn <sub>1</sub> ,CL,<br>MO=mode,<br>SN=setname,<br>VSN=vsn,I=lfn <sub>2</sub> ,<br>DP=a, ID=name,<br>PF=pfn,CY=cy,<br>AC=ac,NB,<br>IN=ddd,JN=yyddd,<br>DA=yyddd,<br>LA=mmdyy,<br>CD=mmdyy,<br>TI=hhmm. | Dumps all permanent files from a mass storage device.                                                                                                         | FANcc.                                                    | Activates channel cc with value of pseudo A register.                                                                                         |
| n.X DUMPNPU,xx,dt,<br>fwa,lwa.                                                                                                                                                                                             | Dumps all or part of 2550 Front-End (FE) Network Processing Unit (NPU) macro memory, and all of NPU micro memory to a printer during normal system operation. | FCcc,fc.                                                  | Assigns forms code fc to device xx.                                                                                                           |
| DWN,CHcc.                                                                                                                                                                                                                  | Removes channel cc from use by all associated tape EST entries.                                                                                               | FCNcc,ffff.                                               | Performs function code ffff on channel cc.                                                                                                    |
| DWN,UNuu.                                                                                                                                                                                                                  | Removes tape unit from system usage. The tape unit can be accessed by on-line diagnostics.                                                                    | GENLDPF,PW=pw,<br>LF=lfn,SN=setname<br>VSN=vsn.           | Reads a log tape created by the PFLOG utility and generates LOADPF jobs which will load those files that have a permanent file catalog entry. |
| ECxx,ec.                                                                                                                                                                                                                   | Assigns external characteristic code ec to device xx.                                                                                                         | j.GO.                                                     | Continues job after PAUSE or halt for operator decision.                                                                                      |
| n.X EHS                                                                                                                                                                                                                    | Calls EXPORT to a control point.                                                                                                                              | GOxx.                                                     | Continues job after device driver stopped for operator decision.                                                                              |
| ENDP,nn,jobname.                                                                                                                                                                                                           | Sets dependency count 01 through 77. Count is cleared by 00.                                                                                                  | IANcc.                                                    | Inputs byte from channel cc to pseudo A register.                                                                                             |
| ENFP,fileord,pppp.                                                                                                                                                                                                         | Enters file priority 0 through 7777 for I, O, or P queue.                                                                                                     | IDLExxx.                                                  | Idles down an RMS unit.                                                                                                                       |
| ENGR.                                                                                                                                                                                                                      | Reverses current setting of engineering mode.                                                                                                                 | ILOCK.                                                    | Prevents users from logging into INTERCOM.                                                                                                    |
| ENID,fileord,id.                                                                                                                                                                                                           | Diverts a single output file to another mainframe or terminal.                                                                                                | ILOGOUT,uu.                                               | Logs out an INTERCOM user.                                                                                                                    |
| j.ENPR,pp.                                                                                                                                                                                                                 | Changes job priority 1 through 77.                                                                                                                            | INTERCOM.                                                 | Activates INTERCOM.                                                                                                                           |
| j.ENTL,nnnn.                                                                                                                                                                                                               | Enters time limit of 1 through 77777 seconds.                                                                                                                 | INTERCOM,DROP.                                            | Drops INTERCOM.                                                                                                                               |
| EVICT,fileord.                                                                                                                                                                                                             | Releases mass storage assigned to file of type I, O, or P.                                                                                                    | INTERCOMxx.                                               | Activates one INTERCOM driver.                                                                                                                |
| EVICTD,Dyy.                                                                                                                                                                                                                | Releases mass storage assigned to jobs in dependency group yy from input queue.                                                                               | n.X INTRST.                                               | Initiates INTERCOM restart.                                                                                                                   |
| EVICTD,Dyy,R.                                                                                                                                                                                                              | Releases mass storage of dependency group yy, including remote jobs, from input queue.                                                                        | IUNLOCK.                                                  | Cancels ILOCK condition.                                                                                                                      |
|                                                                                                                                                                                                                            |                                                                                                                                                               | n.JANUS.                                                  | Calls routine that controls card readers, line printers, card punches.                                                                        |
|                                                                                                                                                                                                                            |                                                                                                                                                               | j.KILL. message                                           | Stops execution, inhibiting all output.                                                                                                       |
|                                                                                                                                                                                                                            |                                                                                                                                                               | LABELMS,DT=dt,<br>NPR,DS,mode,<br>EST=xx,I=lfn.           | Blank labels a rotating mass storage device.                                                                                                  |
|                                                                                                                                                                                                                            |                                                                                                                                                               | LDAnnnn.                                                  | Loads pseudo A register with nnnn.                                                                                                            |
|                                                                                                                                                                                                                            |                                                                                                                                                               | LEFT=a <sub>1</sub> ,a <sub>2</sub> ,...,a <sub>8</sub> . | Sets left screen display sequence.                                                                                                            |
|                                                                                                                                                                                                                            |                                                                                                                                                               | LINEOFF,xx,nnn.                                           | Turns off NPU line nnn for EST ordinal xx.                                                                                                    |
|                                                                                                                                                                                                                            |                                                                                                                                                               | LINEON,xx,nnn.                                            | Turns on NPU line nnn for EST ordinal xx.                                                                                                     |

| <u>Command Format</u>                                                                                                                                                          | <u>Function</u>                                                                              | <u>Command Format</u>                                         | <u>Function</u>                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| n.X LISTCID.                                                                                                                                                                   | Lists dynamic dump file.                                                                     | j.NO.                                                         | Answers equipment assignment conflict question.                                                                |
| n.X LISTMF,M=mfn,<br>P=p.                                                                                                                                                      | Determines the contents of a multifile tape.                                                 | OANcc.                                                        | Outputs contents of pseudo A register on channel cc.                                                           |
| LOADPF,PW=pw,<br>LP=x,LF=lfn1,CL,<br>ID=owner,PF=pfn<br>CY=cy,I=lfn2<br>AC=ac,<br>SN=setname,VSN=vsn,<br>IN=ddd,JN=yyddd,<br>DA=yyddd,<br>LA=mmddyy,<br>CD=mmddyy,<br>TI=hhmm. | Reloads permanent files dumped by the DUMPF utility on labeled S tape.                       | OFFxxx.                                                       | Turns equipment off logically.                                                                                 |
| LOCK.                                                                                                                                                                          | Limits access to protected commands to those submitting password.                            | OFFCPUid.                                                     | Turns off CPU.                                                                                                 |
| j.LOCKIN.                                                                                                                                                                      | Prevents job from being rolled or swapped out.                                               | j.OFFSWn.                                                     | Turns off sense switches 1 through 6.                                                                          |
| j.LOCKOUT.                                                                                                                                                                     | Initiates swap or roll-out and prevents swap or roll-in.                                     | ONxxx.                                                        | Turns equipment on logically.                                                                                  |
| M,id                                                                                                                                                                           | Acknowledges message from terminal.                                                          | ONCPU.                                                        | Turns on CPU.                                                                                                  |
| M,id,message                                                                                                                                                                   | Sends message to INTERCOM user ID.                                                           | j.ONSWn.                                                      | Turns on sense switches 1 through 6.                                                                           |
| M,**,message                                                                                                                                                                   | Sends message to all logged in INTERCOM users.                                               | j.PACK,E=xxx,V=vsn.                                           | Assigns pack with one through six letters or numbers for volume serial number. Used for device set assignment. |
| MAXNi,nnnn.                                                                                                                                                                    | Sets maximum number of jobs in class 1 or 2. The S display must be called.                   | PFDDUMP,SN=setname,<br>LN=ln,PN=pn.                           | Dumps disk resident tables to a file.                                                                          |
| MAXQPi,nnnn.                                                                                                                                                                   | Sets maximum class priority for scheduler control. The S display must be called.             | PFLOG,PW=rd,<br>SN=setname,LF=lfn.                            | Dumps the Permanent File Catalog (PFC) to magnetic tape.                                                       |
| MCHcc.                                                                                                                                                                         | Master clears channel cc.                                                                    | QPi,nnnn.                                                     | Sets class i priority for jobs swapped in. The S display must be called.                                       |
| MDD,D,n.                                                                                                                                                                       | Starts Monitor Display Driver (MDD) operation.                                               | RDF,P,R,n.                                                    | Activates the Remote Diagnostic Facility driver.                                                               |
| MFL,nnnn.                                                                                                                                                                      | Sets the maximum job field length in multiples of 100 (octal). The S display must be called. | RDF,DROP.                                                     | Terminates Remote diagnostic Facility operation.                                                               |
| MINQPi,nnnn.                                                                                                                                                                   | Sets minimum class priority for scheduler control. The S display must be called.             | RDONLYxx.                                                     | Sets read-only status for a tape unit and inhibits assignment of that unit for write operations.               |
| MOUNT,VSN=vsn,<br>SN=setname,mode.                                                                                                                                             | Associates a device set with a job.                                                          | j.RECHECK.                                                    | Rechecks input queue for job in dependency group.                                                              |
| j.MSG message                                                                                                                                                                  | Sends message to system and job dayfiles.                                                    | RECHECKxx.                                                    | Causes tape driver to retry error correction, or reprocess tape request.                                       |
| n.NEXT.                                                                                                                                                                        | Makes control point available to scheduler.                                                  | RECOVER,SN=setname,<br>V=vsn,L=lfn<br>MO=mode,<br>MF=mfid,*Q. | Validates and reconstructs a device set.                                                                       |
|                                                                                                                                                                                |                                                                                              | j.RERUN. message                                              | Reruns job with original priority.                                                                             |

| <u>Command Format</u>                      | <u>Function</u>                                                                     | <u>Command Format</u>                                                        | <u>Function</u>                                                                                                                                                                                                                                        |
|--------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| j.RERUN,pp. message                        | Reruns job with priority 0 through 77.                                              | TDFGEN,FID=fid,<br>I=input,L=output.                                         | Generates new terminal definition file for INTERCOM.                                                                                                                                                                                                   |
| n.X RESQ,t,S.                              | Restores files of type I, O, or P dumped by DMPQ.                                   | TDFILE,fid.                                                                  | Specifies alternative terminal definition file for INTERCOM.                                                                                                                                                                                           |
| RESTART.                                   | Initiates the extended memory bootstrap program.                                    | TIME.hh.mm.ss.                                                               | Enters time in hours, minutes, seconds.                                                                                                                                                                                                                |
| RESTART,ALT.                               | Initiates the extended memory bootstrap program.                                    | n.X TLOAD,x,y.                                                               | Loads job number y in file number x on load tape.                                                                                                                                                                                                      |
| RESUME.                                    | Invalidates system checkpoint file and resumes normal operations.                   | TRANSF,PW=pw,<br>FS=setname1,<br>TS=setname2,<br>FM=vsn1,TM=vsn2,<br>LF=lfn. | Transfers permanent files and tables from one device set to another.                                                                                                                                                                                   |
| n.X REWIND,lfn,<br>lfn <sub>2</sub> ,... . | Rewinds files.                                                                      | ULuu.                                                                        | Physically unloads tape on unit.                                                                                                                                                                                                                       |
| n.X RMNT,<br>SN=setname,VSN=vsn.           | Restores a device available to the system for assignment.                           | n.X UNLOAD,lfn <sub>1</sub> ,<br>lfn <sub>2</sub> ,... .                     | Unloads files.                                                                                                                                                                                                                                         |
| n.X RMNT,ES=xxx.                           | Restores a device by EST ordinal.                                                   | j.UNLOCK.                                                                    | Reverses LOCKIN or LOCKOUT command.                                                                                                                                                                                                                    |
| SCRxx.                                     | Gives mounted tape scratch status.                                                  | j.UNLOCK,EXP.                                                                | Reverses LOCKIN or LOCKOUT command and puts job in express class.                                                                                                                                                                                      |
| n.X SKIPB,lfn,<br>number,level,mode.       | Skips records backward.                                                             | UNLOCK.                                                                      | Makes protected commands available.                                                                                                                                                                                                                    |
| n.X SKIPF,lfn,<br>number,level,mode.       | Skips records forward.                                                              | UP,CHcc.                                                                     | Activates channel cc for tape usage.                                                                                                                                                                                                                   |
| SP844,xxx,uuu.                             | Designates new unit number, uuu for 844 with EST ordinal xx.                        | UP,UNxx.                                                                     | Overrides your commands DWN, UNxx and RDONLYxx. If the tape unit was placed in DOWN status by the system tape drivers rather than by you, UP,UNxx is a protected command. Entry of ONxx command after this command restores tape unit to full service. |
| STAGE.                                     | Releases job with highest priority on tape scheduling preview display to scheduler. | j.VSN,vsn.                                                                   | Identifies specific volume of a multivolume tape file. System searches tape units to locate and attempt automatic assignment of volume.                                                                                                                |
| STAGE,jobname.                             | Releases named job from preview queue to scheduler.                                 | j.VSN.                                                                       | Used to terminate tape operation if specific volume of multivolume tape file is unknown. If read operation, EOF is forced; if write operation, job is aborted.                                                                                         |
| STAGEOFF.                                  | Turns off previewing feature of tape scheduling.                                    |                                                                              |                                                                                                                                                                                                                                                        |
| STAGEON.                                   | Turns on previewing feature of tape scheduling.                                     |                                                                              |                                                                                                                                                                                                                                                        |
| j.STEP.                                    | Puts control point or job in STEP mode.                                             |                                                                              |                                                                                                                                                                                                                                                        |
| j.STEP,pp.                                 | Puts PP routine pp in STEP mode at control point.                                   |                                                                              |                                                                                                                                                                                                                                                        |
| STEP.                                      | Puts system in STEP mode.                                                           | VSNxx,vsn.                                                                   | Identifies tape mounted on unit with volume serial number of one through six letters or numbers.                                                                                                                                                       |
| STEP,pp.                                   | Puts PP routine pp in STEP mode (all control points).                               |                                                                              |                                                                                                                                                                                                                                                        |

| <u>Command Format</u> | <u>Function</u>                                                                                        | <u>Command Format</u>        | <u>Function</u>                                                                                                 |
|-----------------------|--------------------------------------------------------------------------------------------------------|------------------------------|-----------------------------------------------------------------------------------------------------------------|
| n.X name,list.        | Initializes program (name) from system library with parameters in list.                                | LOGOUT,id.                   | Disconnects the specified linked mainframe.                                                                     |
| j.YES.                | Answers equipment assignment conflict question.                                                        | OFFSTAT, or<br>OFFSTAT,id.   | Turns station file transmission off.                                                                            |
| aaaa,nn...n.          | Changes contents of central memory absolute location aaaa to 20 characters nn...n.                     | ONSTAT, or<br>ONSTAT,id.     | Turns station file transmission on.                                                                             |
| aaaa,b,nnnn.          | Changes contents of byte 0 through 4 at central memory absolute location aaaa to 20 characters b,nnnn. | OUTPUT,n. or<br>OUTPUT,id,n. | Specifies the maximum number of output files received concurrently by the spooling SPOT.                        |
| j.aaaa,nn...n.        | Changes contents of central memory relative location aaaa to 20 characters nn...n.                     | PURGE,n. or<br>PURGE,id,n.   | Controls the number of spun-off tasks allowed to process PURGE requests concurrently.                           |
| j.aaaa,b,nnnn.        | Changes contents of byte 0 through 4 in central memory relative location aaaa to 20 characters b,nnnn. | SAVEPF,n. or<br>SAVEPF,id,n. | Controls the number of spun-off tasks allowed to process SAVEPF requests concurrently.                          |
| aaaaaaX,nnnnn.        | Changes contents of ECS absolute locatin aaaaaa to octal nnnnn.                                        | UNKEEP,fileord.              | Makes the specified input file available for spooling when a KEEP command was issued earlier against this file. |

## STATION COMMANDS

For commands showing optional format, if there is more than one linked mainframe, the primary ID, id, must be used to identify the linked mainframe to be affected.

| <u>Command Format</u>      | <u>Function</u>                                                                                            |
|----------------------------|------------------------------------------------------------------------------------------------------------|
| GETPF,n. or<br>GETPF,id,n. | Controls the number of spun-off tasks allowed to process GETPF requests concurrently.                      |
| INPUT,n. or<br>INPUT,id,n. | Specifies the maximum number of input files sent concurrently by the spooling SPOT.                        |
| KEEP,fileord.              | Prevents the specified input file from being spooled to another mainframe.                                 |
| LOGIN.                     | If the station is already executing, LOGIN.logs in to all additional mainframes which are not logged in.   |
| LOGIN,id.                  | Logs in the station to the mainframe if the station was logged out previously with the LOGOUT,id. command. |
| LOGOUT.                    | Disconnects all linked mainframes without dropping the station.                                            |

## GEMINI COMMANDS

| <u>Command Format</u> | <u>Function</u>                      |
|-----------------------|--------------------------------------|
| n.X GEMINI.           | Initiates GEMINI at a control point. |

## REMOTE HOST FACILITY (RHF) COMMANDS

| <u>Command Format</u>                                                            | <u>Function</u>                                          |
|----------------------------------------------------------------------------------|----------------------------------------------------------|
| n.X RHF.                                                                         | Initiates RHF at a control point.                        |
| You may enter the following RHF commands while the L display is assigned to RHF. |                                                          |
| APPL                                                                             | Displays the application table.                          |
| DISABLE,nn.                                                                      | Disables application/ID/ path nn on the current display. |
| ENABLE,nn.                                                                       | Enables application/ID/ path on the current display.     |
| ID                                                                               | Displays the network ID table.                           |
| IDLE                                                                             | Begins RHF idle-down process.                            |
| PATH                                                                             | Displays the network path status.                        |
| +                                                                                | Pages current display forward.                           |

| <u>Command Format</u>                                 | <u>Function</u>                                                           | <u>Command Format</u>                                                                                                                                                                                              | <u>Function</u>                                                                                      |
|-------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| -                                                     | Pages current display backward.                                           | IDLE.                                                                                                                                                                                                              | Begins the idle-down process of QTF.                                                                 |
| .                                                     | Specifies a comment line (anything following a period is ignored).        | INCLUDE,FILE=infile.                                                                                                                                                                                               | Causes QTF commands to be read from an input file.                                                   |
| =                                                     | Toggles between RHF L display and control point O L display.              | SCHED,SELSECS=selsecs,<br>MAXCONS=mxcons,<br>TIMEOUT=tmomins,<br>DISABLE=dismins,<br>RETRY=maxrtry,<br>LDTRFSH=lutmmins,FSI1=fsindex,<br>FSI2=fsindex,FSI3=fsindex,<br>FSI4=fsindex,FSI5=fsindex,<br>FSI6=fsindex. | Modifies QTF scheduling parameters.                                                                  |
| nn,ND=nd,AC=aaaa,<br>DD=dd,RT=rrrr,<br>LT=tttt,LOG=NO | Modifies entries associated with path ordinal nn when path display is up. | STATUS,display.                                                                                                                                                                                                    | Displays information about the status of file transfers in progress, PIDs, or QTF selection classes. |

## QUEUE FILE TRANSFER FACILITY (QTF)

### COMMANDS

You may enter the following QTF commands while the QTF L display is assigned to QTF.

| <u>Command Format</u>                                      | <u>Function</u>                                              | <u>Command Format</u> | <u>Function</u>                                                    |
|------------------------------------------------------------|--------------------------------------------------------------|-----------------------|--------------------------------------------------------------------|
| CLASS,SC=selclass,<br>FSI=fsi,MAXIMUM=max,<br>RESERVE=res. | Defines or modifies QTF selection class.                     | STOP.                 | Causes an immediate termination of QTF.                            |
| DISABLE,element.                                           | Changes the status of QTF elements from enabled to disabled. | +                     | Pages forward to the next screen of a multipage display.           |
| ENABLE,element.                                            | Changes the status of QTF elements from disabled to enabled. | -                     | Pages backward to the previous screen of a multipage display.      |
| HELP.                                                      | Displays information about available QTF commands.           | .                     | Specifies a comment line (anything following a period is ignored). |



**405 CARD READER OPERATION**

Once the MAIN POWER switch on the card reader is lit, the reader can be loaded and started as follows:

1. Set guide edge of input feed hopper and output stacker for length of card. Narrow half of each tray may be removed, turned end-for-end, and reassembled as necessary.
2. Load cards into hopper, placing column one at right as cards face entrance of read station.
3. Check input wall of secondary and main output stackers. If standard cards are used, hinged card-stopping blocks should be positioned to form a flush surface at each input wall. If short cards are used, the hinged block assemblies must be pivoted to protrude from the wall surfaces of each stacker.
4. At feed hopper, set card-stopping pin to protrude from the face plate if short cards are used; turn pin in clockwise direction to form flush wall if long cards are used.
5. If short cards are to be read, press the 51 COLUMN switch until it lights.
6. To check operation:

If MAN is not lit on the AUTO/MAN switch, press the switch to place the equipment in the manual mode.

If STOP is not lit on the RUN/STOP switch, press the switch so that STOP lights.

Press the MOTOR POWER switch. Light should turn on and the input hopper begins vibrating.

Press RELOAD MEMORY switch to clear the internal card buffer. No light exists.

Press READY switch until it lights.

Press SINGLE PICK switch to cause the first card to be read and transferred to the output stacker. No light exists. If the card does not move properly, check the read station for an obstruction.

Press MOTOR POWER to stop the vibrators and replace card in the input hopper.

7. To allow cards to be read by JANUS:

Press RUN/STOP so that STOP lights, if necessary.

Press AUTO/MAN so that AUTO lights.

Press MOTOR POWER so that it lights.

Press RELOAD MEMORY. It does not light.

Press READY until it lights.

Press RUN/STOP switch so that RUN lights.

(Used With 3649 Controller)

|               |                  |                 |              |                  |                |                |     |      |
|---------------|------------------|-----------------|--------------|------------------|----------------|----------------|-----|------|
| MAIN<br>POWER | MOTOR<br>POWER   | AUTO            | MAN          | READY            | END OF<br>FILE | SINGLE<br>PICK | RUN | STOP |
|               | RESERVE<br>A   B | PARITY<br>A   B | 51<br>COLUMN | RELOAD<br>MEMORY |                |                |     |      |

(Used With 3447 Controller)

|               |                |      |              |                  |                |                |     |      |
|---------------|----------------|------|--------------|------------------|----------------|----------------|-----|------|
| MAIN<br>POWER | MOTOR<br>POWER | AUTO | MAN          | READY            | END OF<br>FILE | SINGLE<br>PICK | RUN | STOP |
|               | PAR            | CONN | 51<br>COLUMN | RELOAD<br>MEMORY |                |                |     |      |

Figure C-1. 405 Card Reader Switches

The switches and indicators, on the reader (figure C-1) are explained as follows. They differ slightly depending upon the type of controller (3649 or 3447). The controllers are an integral part of the card reader equipment.

**MAIN POWER** Controls all primary power and turns on the photocell light source. It is lighted when power is on. It must be on before subsequent operations are effective.

**MOTOR POWER** Controls power to the drive motors, the vacuum-pressure system, and the hopper-stacker vibrators. It must be on before the READY status is effective. It is lighted when on.

**AUTO/MAN** Selects manual or program controlled modes of operation. The switch must be in the AUTO position when the reader is to be controlled by JANUS. Changing switch position to MAN stops JANUS control, allowing you to manually cycle cards.

**READY** Lights to indicate the ready condition. When the switch is pressed, the first card is read into buffer memory. Thereafter, the reader is under JANUS control. If the input hopper is empty, error conditions exist on the device, the output stacker is not closed or it is full, a NOT READY condition exists. A message appears on the J display and at the JANUS control point on the B display.

**END OF FILE** Causes the reader to generate an end-of-file status bit after the last card in the input tray is read. It lights when set. If the last card in the input tray is not the last card in the file being read into the system, this switch should be off.

**SINGLE PICK** Cycles a single card through the reader when the AUTO/MAN switch is in MAN position. It does not light.

**RUN/STOP** The card feed may be controlled manually when the AUTO/MAN switch is in MAN position. The set side is lighted.

**RESERVE A/B  
(3649 Controller only)** One side lights as one of the two converters attached to the controller reserves reader access.

**PARITY A/B  
(3649 Controller only)**

This light appears only when a parity error occurs during the transmission of a connect or function code. An error message appears on the console screen.

**PAR/CONN  
(3447 Controller only)**

Similar to the RESERVE and PARITY switches of the 3649 controller in that one side lights for a parity error and the other when the reader is connected to the controller channel.

**51 COLUMN**

Allows short (51-column) cards to be read. It is lighted when set.

**RELOAD MEMORY**

Feeds data from a new card into card reader memory buffer when pressed, providing AUTO/MAN is in AUTO. It does not light. It should be pressed prior to each READY. Inside the right front door are several lights that indicate malfunction. If FEED/FAIL is lit, a card is not acceptable or a card jam exists. Lifting the read station panel will expose the card guides.

The PRE-READ and COMPARE lights indicate that the pre-read and read stations do not interpret a card identically. An attempt should be made to reread the card.

## 415 CARD PUNCH OPERATION

The controller for the card punch, 3644 or 3446, is in a separate cabinet. It has the equipment number switch that establishes the equipment number for the punch in the EST display. With the exception of the lights mentioned below, controller switches are the responsibility of the customer engineer.

Once the MAIN POWER and MOTOR POWER switches on the card punch are lit, operation is initiated as follows:

1. Place cards face down in input hopper with row 9 toward rear.
2. Check that chip box and output stacker are not full.
3. Advance two cards into punch and read stations by pressing SINGLE PICK switch twice.
4. Check controller equipment. If either NOT READY or FAIL TO FEED light is on, cards have not advanced into punch and read stations.

Card punch is then ready for operation under JANUS control.

Switches on the card punch (refer to figure C-2) have the following functions.

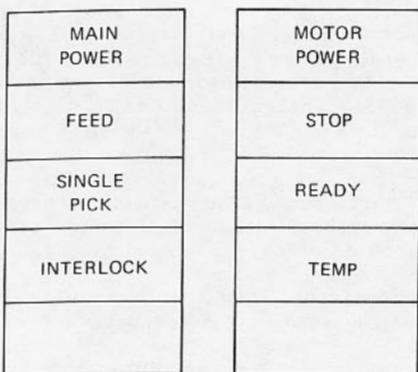


Figure C-2. 415 Card Punch Switches

#### STACKER FULL

Lights when the output stacker is filled. It resets automatically when cards are removed from the stacker.

### 580 LINE PRINTER OPERATION

Operation of the 580-12, 580-16, and 580-20 line printers is essentially identical from the operator's point of view. The front control panel of the 580 printer (refer to figure C-3) is the primary printer control station containing switches and indicators with which you can control printer functions and determine printer status.

|           |        |        |            |      |
|-----------|--------|--------|------------|------|
| POWER OFF | 6 LINE | 8 LINE | PAGE EJECT | STOP |
|-----------|--------|--------|------------|------|

|          |                |           |       |
|----------|----------------|-----------|-------|
| POWER ON | ERROR OVERRIDE | LAMP TEST | START |
|----------|----------------|-----------|-------|

|            |          |      |           |             |             |
|------------|----------|------|-----------|-------------|-------------|
| FILL IMAGE | CONT PWR | CONN | TRANS PAR | PRINT ERROR | MEMORY BUSY |
|------------|----------|------|-----------|-------------|-------------|

|          |               |               |              |
|----------|---------------|---------------|--------------|
| DC POWER | IMAGE PARITY  | SYNC CHECK    | HAMMER CHECK |
| THERMAL  | BUFFER PARITY | COMPARE CHECK | PAPER CHECK  |

Figure C-3. 580 Line Printer Control Panel

- MAIN POWER      Applies power to the cooling fans and the power supplies. It is lighted when power is on.
- MOTOR POWER      Applies power to the punch motor. It is lighted when power is on.
- FEED      Lights when a card jam exists. A message CPuu NOT READY appears at the console. A customer engineer should be called to remove the jammed card.
- STOP      Causes the punch to become not ready. It lights when pressed to stop JANUS control.
- SINGLE PICK      Advances cards one station in the input hopper-punch-read-output cycle. It lights until the advance is complete.
- READY      Clears punch logic and puts it in automatic mode for JANUS control. It lights when the punch is in a ready condition. If it does not light when pressed, conditions such as feed failure and full output stack should be examined and corrected.
- INTERLOCK      Lights if the head panel, hood panel, or right door is open. All should be closed during operation.
- TEMPERATURE      Lights if the temperature of the punch exceeds operation requirements. A customer engineer should be consulted.

Indicators on the bottom row light to pinpoint conditions that make the printer inoperative. Only the PAPER CHECK condition can be dealt with by the operator. Check the forms along the entire path for jams or improper loading. Press START to continue.

When the POWER ON switch is lit, indicating power to the printer, the printer is manually controlled by:

6 LINE/8 LINE      Indicates number of lines printed per inch. To change, press STOP, press 6 LINE/8 LINE switch, press PAGE EJECT, press START. If the format tape is not punched for the operation selected, it may be necessary to change the format tape.

PAGE EJECT      Advances paper to top of the form under manual control.

|                |                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                      |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| STOP           | Makes printer not ready.                                                                                                                                                                                                                                                                                                 | 5. Place forms in lower right paper tractor and close tractor door.                                                                                                                                                  |
| ERROR OVERRIDE | Used by customer engineering only.                                                                                                                                                                                                                                                                                       | 6. Slide two right-hand tractors to adjust horizontal paper tension. Forms should not buckle (too loose) and tractor pins should not deform holes (too tight). Tighten tractor locking knobs on right-hand tractors. |
| LAMP TEST      | Checks all lamps on panel.                                                                                                                                                                                                                                                                                               | 7. Close forms alignment scale against paper. Scale indicates print column location and top of ribbon shield indicates bottom of next line of print.                                                                 |
| START          | Readies printer, also resets error conditions which have been corrected. (The POWER ON switch also performs this function.) During a paper out condition, only one line is printed each time the START button is pressed, thereby allowing the operator to print all lines on the current form before loading new forms. | 8. Adjust horizontal position control to align forms with proper print columns.                                                                                                                                      |
|                |                                                                                                                                                                                                                                                                                                                          | 9. Place forms lock control in manual position and adjust manual forms advance control to align forms vertically to top of forms position.                                                                           |

## PAPER LOADING

To load paper into 580 printer:

1. Press POWER HOOD switch on left side of cabinet to raise hood.
2. Remove old paper supply with PAGE EJECT switch.
3. Open front printer gate.
4. Open pressure plate on upper and lower left and right tractors.
5. Raise paper vertically from supply box and place into upper and lower paper tractors. Close all four pressure plates.
6. Close front panel securely.
7. Press PAGE EJECT three times and manually feed forms over paper bail and into stacker exit rollers.
8. Behind printer, press PLATFORM DOWN switch to lower forms platform.
9. Press PAGE EJECT to observe that forms fold properly and are correctly aligned.
10. Press PLATFORM UP switch and observe that forms fold and fit properly as platform rises.

To load forms of different widths or thicknesses:

1. Move tractors to approximate position by loosening tractor locking knob and sliding tractors until aligned. Tighten locking knob.
2. Place forms in upper left paper tractor and close tractor door.
3. Place forms in lower left paper tractor and close tractor door.
4. Place forms in upper right paper tractor and close tractor door.

5. Place forms in lower right paper tractor and close tractor door.
6. Slide two right-hand tractors to adjust horizontal paper tension. Forms should not buckle (too loose) and tractor pins should not deform holes (too tight). Tighten tractor locking knobs on right-hand tractors.
7. Close forms alignment scale against paper. Scale indicates print column location and top of ribbon shield indicates bottom of next line of print.
8. Adjust horizontal position control to align forms with proper print columns.
9. Place forms lock control in manual position and adjust manual forms advance control to align forms vertically to top of forms position.
10. Place forms lock control in auto position, relatch forms alignment scale to print gate, and print gate to print head.
11. Press PAGE EJECT three times and manually feed forms over paper bail and into stacker exit rollers.
12. Press PLATFORM DOWN switch to lower forms platform.
13. Press PAGE EJECT to observe that forms fold as originally folded, that multipart forms do not separate and that forms are properly aligned to forms scales.
14. Press PLATFORM UP switch and observe that forms fold properly as platform rises and that forms fit properly between paper guides.

## RIBBON CHANGE

1. Press POWER HOOD switch on left side of cabinet to raise hood.
2. Press POWER OFF switch.
3. Unlatch print gate and swing away from print head.
4. Unlatch ribbon cover and swing away from print gate.
5. Unlatch line finder and swing away from print gate.
6. Grasp ribbon rolls with left hand on upper roll and right hand on lower roll.
7. Push rolls toward hinged end of print gate; lift upper roll up and off spool and lower roll down and off spool.
8. Pass left hand over, behind, then under print gate and remove ribbon.
9. After new ribbon is unwrapped, grasp one roll in left hand and other roll in right hand.

10. Approaching print gate from latch end, hold right hand in front of lower ribbon spools. Pass ribbon roll in left hand under, behind, and over print gate bringing it to upper ribbon spools.
11. Press ribbon roll in left hand against upper ribbon spool on hinged end of print gate and press roll in right hand against lower ribbon spool.
12. Ease ribbon rolls into place against ribbon spools on latch end of print gate ensuring that drive keys on ribbon spools fit into slots in ribbon rolls.
13. Rotate upper ribbon roll to take up slack.
14. Latch linefinder and ribbon cover to print gate and close print gate.
15. Press POWER ON switch.

#### **FORMAT TAPE LOADING**

1. Press POWER HOOD switch to raise hood.
2. Loosen tape spool and slide it toward drive hub.
3. Place format tape on drive hub and in space between reader and lamp housing. Coincidence lines on format tape must be aligned with scribe lines on drive hub and arrows on tape must point toward back of printer.
4. Place format tape over tape spool, slide tape spool down slot until there is 3.18 mm (1/8-in) slack in format tape loop.
5. Tighten tape spool.

#### **580 PROGRAMMABLE FORMAT CONTROL LINE PRINTER INITIALIZATION**

1. Press POWER ON switch.
2. Press PAGE EJECT switch. Printer controller advances to next 6/8 LPI coincident point. Tractors physically advance accordingly.
3. Press POWER HOOD switch on left side of cabinet to raise hood.
4. Open front printer gate.
5. Open pressure plate on upper and lower left and right tractors.
6. Raise paper vertically from supply box and place into upper and lower paper tractors. Close all four pressure plates.
7. Close front panel securely.
8. Align paper to top of form by pressing PAGE EJECT switch, causing paper to advance to subsequent 6/8 lines per inch (LPI) coincident points as required.

9. Close forms alignment scale against paper. Scale indicates print column location and top of ribbon shield indicates bottom of next line of print.
10. Adjust horizontal position control to align forms with proper print columns.
11. Place forms lock control in manual position and adjust manual forms advance control to align forms vertically to top of forms position.
12. Place forms lock control in auto position, relatch forms alignment scale to print gate, and print gate to print head. Paper thus positioned will be at top of form when system loads a programmable format control (PFC) array before a job is printed.
13. Press START switch.

#### **NOTE**

This initialization procedure assumes that the first code loaded into the programmable format array buffer will be top of forms (format level 1).

The processor must load the array buffers initially. Any paper motion commands initiated by the processor cause paper to advance to the next 6/8 LPI coincident point until the selected buffer is loaded.

#### **TAPE UNIT OPERATION**

This operating system supports unit models 667 and 677 for 12.7 mm (1/2-inch), seven-track magnetic tape and models 669 and 679 for 12.7 mm (1/2-inch), nine-track tape.

All models have a unit select switch at the top of the cabinet. This switch has positions 0 to 7 and is used to identify the unit. Each unit that is on should have a unique number. At an installation with more than eight tape units, they are attached to more than one controller; the selection for each controller group must be unique. Once this switch is set, it can be ignored during operation. It lights red when the unit is reserved on a data channel.

The system and you identify a unit by its EST ordinal as shown in the E display. Installations usually configure the system so the last digit of an ordinal for a tape drive is the same as the unit select switch setting, making it easier to equate the two.

#### **667/669 TAPE UNITS**

On-line operation of the 667 and 669 tape units is controlled and synchronized with system demands by an associated tape control unit. Power-up and autothread/autoload operations are facilitated by

front panel controls and indicators located at the top front of the tape unit. The functions of these switches and indicators (refer to figure C-4) are described below. Alternate action switch functions are described in terms of (1) first action and (2) second action.

|                    |                                                                                                                                                                                                        |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| POWER              | (1) Activates power circuits, places tape unit in a power-up status, and lights indicator.<br>(2) Deactivates power circuits, places tape unit in a power-down status, turns off indicator light.      | HI DEN/LO DEN        | No switch function. HI DEN illuminates in phase mode for nine-track tapes or in 800 bpi NRZI mode for seven-track tapes. LO DEN illuminates in 800 bpi NRZI mode for either nine- or seven-track tapes or for 556 bpi NRZI mode for seven-track tapes.                                                                                                                                                                                                                                                                                                                                                          |
| LOAD REWIND        | (1) Initiates load operation (reel-to-reel contact, thread and set loops). (2) When unit is offline initiates rewind to loadpoint operation.                                                           | UNIT ADDRESS READOUT | Shows tape unit system address in octal numbers, 00 to 17.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| UNLOAD WINDOW DOWN | Initiates unload operation by rewinding leader length onto right-hand reel.                                                                                                                            | UNIT NO/HOLD REL     | Two-position rocker switch used to assign tape unit system address. Pressing UNIT NO causes that portion of the switch to light, indicating that a hold status is being sent to the tape controller unit. Numbers shown on the unit number display advance until UNIT NO is released. Pressing HOLD REL removes the hold status on the tape unit; the indicator light turns off.                                                                                                                                                                                                                                |
| READY              | Places tape unit under system control via tape control unit. Light indicates unit is in ready status awaiting system activity. Light extinguishes when a fault condition is detected.                  |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| CLEAR WINDOW UP    | When tape unit is on-line, negates READY condition and stops tape motion. When unit is off-line, stops tape motion and clears fault condition. Light comes on when loop fault is detected.             |                      | The 667/669 tape unit can handle cartridge-contained tape reels or standard 266.7 mm (10-1/2-in) supply reels. Smaller noncartridge reels can be used, but they must be threaded manually. The take-up reel on left-hand side is a vacuum hub assembly permanently attached to the tape unit.                                                                                                                                                                                                                                                                                                                   |
| SELECT             | No switch function. Light comes on when tape unit is selected by tape control unit.                                                                                                                    |                      | When a load sequence is initiated, the cartridge-contained tape reel programs the tape unit to thread tape and load loops into the vacuum columns automatically. Internal delays control the timing of the load/thread operation. If a fault is detected during a load attempt or if a successful load is not achieved, one automatic retry is executed. At the expiration of the automatic load attempt, the tape unit automatically unloads, closes the tape cartridge mechanism and lowers the power window. When standard reels are used, the automatic retry is inhibited and operator action is required. |
| LOAD POINT         | No switch function. Illuminates when loadpoint marker or end-of-tape marker is detected, depending upon tape motion direction.                                                                         |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| LOAD FAULT         | No switch function. Indicates a fault occurred during load procedure.                                                                                                                                  |                      | The power window of the tape unit is activated by control logic circuits and is raised or lowered in response to LOAD and UNLOAD commands initiated by the operator. Initially, when the POWER switch is pressed, the window lowers, allowing access to the tape deck. An interlock protection switch prevents power window operation when the front access door is open.                                                                                                                                                                                                                                       |
| WRITE DISABLE      | No switch function. Illuminated, it indicates the absence of a write enable ring in the right-hand tape reel. Disables the write circuitry and conditions the tape unit to accept only read functions. |                      | Prior to operating the tape unit, you should review thoroughly the description of control switches and indicators.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

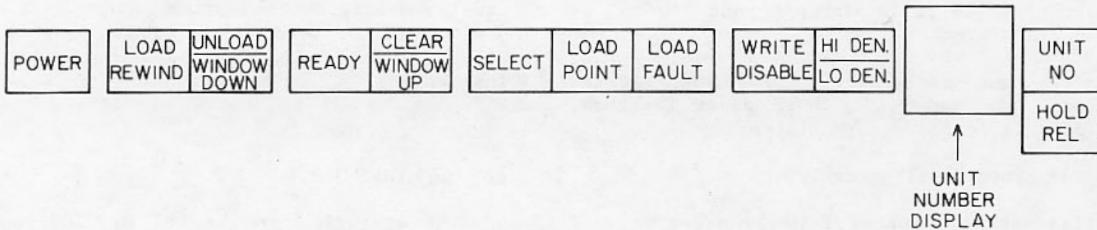


Figure C-4. 667/669 Tape Unit Operator Control Panel

## 677/679 TAPE UNITS

The functions of the switches and indicators on the 677/679 tape unit (refer to figure C-5) are described in the following paragraphs. Switches with alternate actions are described in terms of (1) first and (2) second action.

**POWER ON/OFF** (1) Activates power circuits, places tape unit in a power-up status, and lights indicator. (2) Deactivates power circuits, places tape unit in a power-down status, and turns off indicator light.

**LOAD/REWIND** (1) Initiates load operation (reel-to-reel contact, thread and set loops). (2) When unit is loaded but not ready, initiates rewind to loadpoint operation.

**START/READY** Places tape unit under system control via tape control unit. Light indicates unit is in ready status awaiting system activity. Light extinguishes when a fault condition is detected.

**REWIND UNLOAD** If the unit is loaded but not ready, the tape is rewound to BOT and the tape unit is unloaded. If present, the cartridge closes. The reel latch and window open.

If the unit is not loaded or a fault has been detected, the window lowers.

**CLEAR/WINDOW UP** When tape unit is on-line, negates READY condition and stops tape motion. If window is down, it is raised. Load check is reset if applicable.

**POWER FAULT/ LOAD FAULT** No switch function. Indicates a power fault occurred or a fault occurred during the load procedure.

**SELECT** No switch function. Light comes on when tape unit is selected by tape control unit.

**BOT/EOT** No switch function. Illuminates when loadpoint marker or end-of-tape marker is detected, depending upon tape motion direction.

**WRITE DISABLE** No switch function. Illuminated, it indicates the absence of a write enable ring in the right-hand tape reel. Disables the write circuitry and conditions the tape unit to accept only read functions.

### Reel Installation on

Refer to figure C-6.

### Standard (Noncartridge) Reel

1. Power-up unit by pressing POWER switch. POWER light illuminates and the window lowers.
2. Install write-enable ring within inner surface cutout of reel if write operation is to be performed. The write-enable ring is to be installed only if a write operation is to be performed. Valuable data stored on the tape must be protected by removing the write ring when read only operation is to be performed.
3. Place reel into right-hand hub. Ensure that reel is fully seated against hub face.
4. Manually rotate reel hub clockwise until several inches of tape leader extend along inner surface of tape chute.

### Cartridge-Loaded Reel

1. Perform steps 1 and 2 as for standard reel.
2. Orient cartridge reel on hub so that locating notches in cartridge retainer and chute assembly align with keys on outer rim of cartridge. Ensure that actuator rod fits into recess of cartridge latch.
3. Press cartridge into place on hub; seat firmly against hub face.

### Load/Thread

By pressing LOAD/REWIND switch you initiate a load/thread operation. The cartridge actuator rotates clockwise until the cartridge is brought to the full open position. Observe the following points for either cartridge or standard reels.

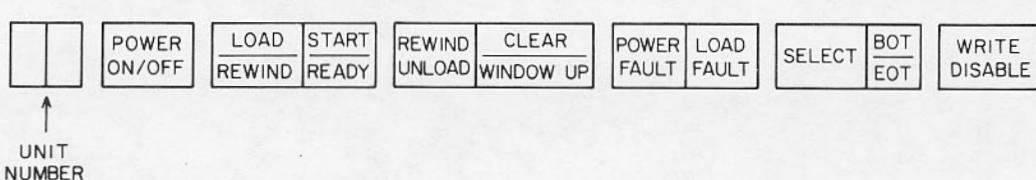
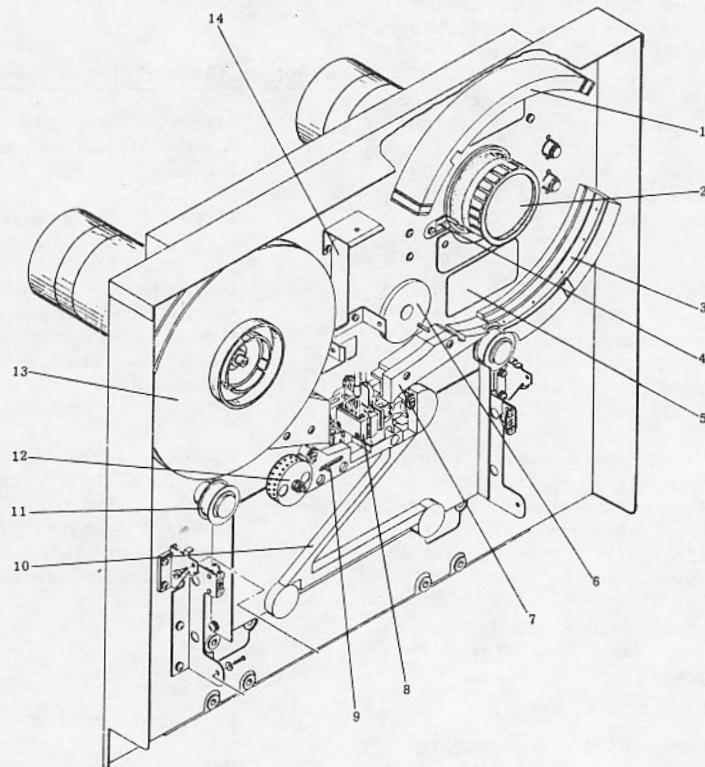


Figure C-5. 677/679 Tape Unit Operator Control Panel



| INDEX | ITEM                   | INDEX | ITEM                   |
|-------|------------------------|-------|------------------------|
| 1.    | CARTRIDGE RETAINER     | 8.    | MAGNETIC HEAD ASSEMBLY |
| 2.    | HUB LATCH              | 9.    | HEAD SHIELD LATCH      |
| 3.    | CARTRIDGE CHUTE        | 10.   | PUCKER POCKET AREA     |
| 4.    | WRITE ENABLE SWITCH    | 11.   | AIR BEARINGS (5)       |
| 5.    | CLEANING LABELS (2)    | 12.   | CAPSTAN WHEEL          |
| 6.    | CARTRIDGE OPENING DISC | 13.   | VACUUM REEL            |
| 7.    | AUTO THREAD MANIFOLD   | 14.   | READ PRE-AMP           |

Figure C-6. Reel Installation

- Tape proceeds along tape feed path and enters the left-hand vacuum reel enclosure.
- Left reel rotates clockwise until load point marker is detected. Reel motion then ceases.
- Tape is drawn immediately into loop columns and drops below AR and AL sensors.
- Motion stops when load point marker is correctly positioned.

activation terminates the rewind operation and causes the tape movement to stop.

#### Reflective Markers

The load point and end-of-tape markers are placed near the beginning and end of the tape to enable sensing of the usable portion of the tape by the photocells. Adhesive material on one side of reflective material secures the markers to the tape. Vaporized aluminum deposited on the material creates a highly reflective surface.

#### Ready Status

At completion of load/thread sequence, the tape unit is placed in ready status if the READY (667/669) or START READY (677/679) switch on the front panel of the tape unit has been pressed. The indicator illuminates, followed by the SELECT light, indicating receipt of an on-line callup by the system.

#### Rewind

A tape rewind to load point, when operation is in off-line mode, is initiated by pressing the LOAD/REWIND switch. When the tape unit is under system control, it first must be placed in off-line mode by pressing the CLEAR switch. Rewind operation can be initiated through system programming in the on-line mode. Rewind operation terminates when the load point marker is encountered.

With the unit off-line, (667/669) or not ready (667/679), the operator can select a rewind/unload sequence. Pressing the UNLOAD switch initiates a rewind to load point, if load point has not been detected, and continues to unwind the tape loader from the left-hand reel onto the right-hand reel.

The markers, approximately 30.5mm (1.2 in) long and 5.1 mm (0.2 in) wide, are placed on the uncoated side of the tape. The uncoated side is the underside of the tape when mounted on the tape deck. The end-of-tape marker is placed on the edge of the tape nearest the tape deck; the load point is placed on the outer edge of the tape. Proper location of the markers on the tape is shown in figure C-7. The 667/669 tape unit is capable of loading tapes with load point markers located up to 3.05 m (40 ft) from the beginning of the tape. The 677/679 tape unit is capable of loading tapes with load point markers located up to 7.92 m (26 ft) from the beginning of the tape. The recommended distance is 3.05 m to 5.49 m (10 to 18 ft).

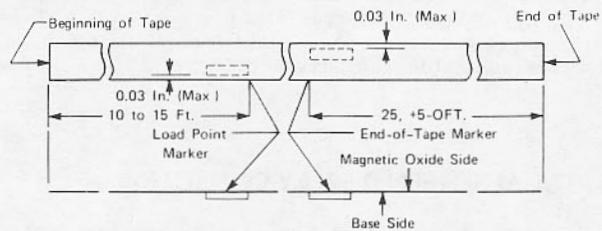


Figure C-7. Reflective Tape Markers

#### Unload and Reel Removal

The sequences of the unload operation parallels the REWIND procedure in that the tape unit must be placed off-line (667/669) or in not ready condition (667/679). System programming can effect an unload procedure when the tape unit is on-line.

After unload is initiated, the tape rewinds at high speed until the load point marker is detected. A downshift to normal operating speed occurs at load point detection. The leader length unwinds completely from the left onto the right-hand reel and simultaneously, the cartridge closes and the power window lowers. The automatic hub, if applicable, releases the right-hand tape reel for removal from the tape deck area.

#### Emergency Stop

Operator action of the CLEAR switch terminates the operation in progress. Switch activation is effective in either off line or on line mode. Pressing the CLEAR switch one time, while in rewind mode, causes the unit to downshift to normal tape speed; 200, 150, or 100 inches per second. A second

#### 844-21 AND 844-41 DISK DRIVE OPERATION

Only an 881 disk pack can be mounted on an 844-21 disk drive and only an 883 disk pack can be mounted on an 844-41 disk drive.

To ready the disk pack after power is on:

1. Lift the disk drive unit cover as far as possible to provide maximum loading clearance.
2. Place the pack on the spindle and turn the cover handle clockwise to a full stop position. The pack should be tight on the spindle so that its protective cover lifts off easily.
3. Close the disk drive unit cover and press the START switch on the front of the drive unit. This switch causes the unit to perform an initial seek operation, which positions and loads the read/write heads and brings the unit to the ready state in approximately 30 seconds.

#### To unload:

1. Press START switch. Lights in START switch and READY indicator will go off. Wait until pack stops spinning.
2. Lift disk drive unit cover.
3. If necessary, wait until pack stops spinning.
4. Engage protective cover over disk pack and rotate cover three times in a counterclockwise direction to release pack from the spindle. Pack can then be lifted from drive unit.

Controls to the left affect both screens as follows:

|           |                                                           |
|-----------|-----------------------------------------------------------|
| GAIN      | Varies width (HORIZ) or height (VERT) or area of display. |
| CENTERING | Varies horizontal and vertical position of display.       |
| INTEN     | Varies brightness of display.                             |
| FOCUS     | Changes clarity in center areas of display.               |
| ASTIG     | Changes clarity at edges of display.                      |

The sets of three knobs affect the right and left screens individually.

## 885 DISK DRIVE OPERATION

The 885 drive has a disk which is nonremovable. The operator ordinarily needs only to ready the disk drive after the power is on. To do that, press the START switch on the front of the drive. The START button should light, and power is applied to the drive motor. After about 20 seconds, the light on the READY button lights, indicating that the drive is ready for operation.

To remove an 885 disk drive from operation, press the START switch so the light goes out. This removes power from the disk drive motor and effectively disables the drive.

## 6612 DUALSCREEN DISPLAY CONSOLE

Controls on a panel below the display screens (refer to figure C-8) allow the operator to change the characteristics of displayed characters.

## CC545 DISPLAY CONSOLE

The console panel (refer to figure C-9) contains the DEAD START button and controls affecting the appearance of displayed information.

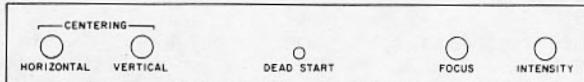


Figure C-9. Console Panel

The following controls allow you to change the characteristics of displayed characters.

|           |                                                     |
|-----------|-----------------------------------------------------|
| CENTERING | Varies horizontal and vertical position of display. |
| FOCUS     | Changes clarity in center areas of display.         |
| INTENSITY | Varies brightness of display.                       |

Located on the lower right-hand side of the console keyboard is the PRESENTATION CONTROL rocker switch. It is labeled LEFT, RIGHT, AND MAINTENANCE to allow you to specify a single left screen display (LEFT), a single right screen display (RIGHT), or a split screen display containing a left and a right display (MAINTENANCE).

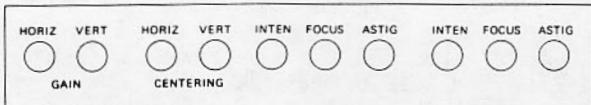


Figure C-8. Display Controls

## GLOSSARY

D

|                                         |                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Allocatable Device                      | A storage device that can be shared by more than one job.                                                                                                                                                                                                                                                                                                       | control point before it can execute; control point zero is used for system functions. When a job is in central memory, the control point area to which it is assigned includes job name, length, starting address in central memory, time used so far, I/O equipment assigned to job and its control statements.                                                                                       |
| Attribute                               | A logical designation applied to the RMS device organization. The three types are device set, device, and drive.                                                                                                                                                                                                                                                | Control point zero is a pseudo control point used for system functions. Messages from control point zero inform you of system failure. The messages are not logged in the dayfile and they are erased when you acknowledge them.                                                                                                                                                                       |
| Beginning-of-Information (BOI)          | A file boundary that marks the beginning of a file. You can reference the BOI by name. For a single-volume labeled tape file, the HDR1 label represents BOI. If the file is a multifile tape file, BOI is the HDR1 label of the first volume. If the tape file is an ANSI multifile file, BOI is the HDR1 label associated with the beginning of the multifile. | They are issued by the system monitor routine which puts the system in STEP mode when it detects an error.                                                                                                                                                                                                                                                                                             |
| Blank Labeled Device                    | A device with a standard label, but which is not yet associated with a device set.                                                                                                                                                                                                                                                                              | Controlware                                                                                                                                                                                                                                                                                                                                                                                            |
| BOI                                     | Refer to Beginning-of-Information.                                                                                                                                                                                                                                                                                                                              | Special type of software that resides in a peripheral controller. The controlware defines the functional characteristics of the controller.                                                                                                                                                                                                                                                            |
| Central Memory Resident (CMR)           | Central memory low core, reserved for system tables and programs. It is never accessible to a user's central processor program. The remainder of central memory is allocated by monitor to jobs as they are selected on a priority basis for execution.                                                                                                         | CYBER Initialization Package (CIP)                                                                                                                                                                                                                                                                                                                                                                     |
| Central Storage Unit (CSU)              | Unit of memory.                                                                                                                                                                                                                                                                                                                                                 | CYBERLOG                                                                                                                                                                                                                                                                                                                                                                                               |
| Channel Number                          | The number of the data channel on which a peripheral device controller can be accessed.                                                                                                                                                                                                                                                                         | Data Channel                                                                                                                                                                                                                                                                                                                                                                                           |
| CIP                                     | CYBER Initialization Package used to deadstart the machine.                                                                                                                                                                                                                                                                                                     | Dayfile                                                                                                                                                                                                                                                                                                                                                                                                |
| Coldstart                               | Procedure used to deadstart if the tape controller has not yet been loaded with controlware or the controlware is not running.                                                                                                                                                                                                                                  | A chronological file, maintained on a public device, which forms a permanent accounting and job history file. Dayfile messages are generated by operator action or by the system when control statements are processed or other significant action occurs. A portion of the most recent system dayfile is displayed at the console; a copy of the job dayfile is printed with the output for each job. |
| Common Testing and Initialization (CTI) | Deadstart process common to both NOS/BE and NOS that resides on the deadstart file and the maintenance system library.                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                        |
| Control Point                           | A number to which jobs are assigned during execution. In this manual, the control point is shown as n. The actual number of control points is an installation parameter. Every central processor program must be assigned to a                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                        |

|                      |                                                                                                                                                                                                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                         |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Deadstart            | The process of initializing the system by loading the system library programs and any of the product set from magnetic tape or a public device. Deadstart recovery is reinitialization after system failure.                                                                                                                                                                                                            | End-of-Information (EOI) | The end of information on a file. Information appearing after this point is not considered part of file data. In card decks, EOI is a card with a 6/7/8/9 multiple punch in column one. On mass storage devices, EOI is the position of the last written data. On labeled tapes, EOI is the EOF1 label. |
| Dependency Count     | A number established by the user and decremented by other jobs in the dependency string. When the count reaches zero, the job runs. A job which depends on the execution of other jobs before it can be run. It cannot be run until its dependency count is zero.                                                                                                                                                       | End-of-Record (EOR)      | An indicator that marks the end of a logical record.                                                                                                                                                                                                                                                    |
| Dependent Job        |                                                                                                                                                                                                                                                                                                                                                                                                                         | EOF                      | Refer to End-of-File.                                                                                                                                                                                                                                                                                   |
| Device               | The physical recording medium of random mass storage, such as a disk pack.                                                                                                                                                                                                                                                                                                                                              | EOI                      | Refer to End-of-Information.                                                                                                                                                                                                                                                                            |
| Device Sets          | Mutually exclusive groups of devices; the device labels of the devices reflect the device set to which they belong.                                                                                                                                                                                                                                                                                                     | EOR                      | Refer to End-of-Record.                                                                                                                                                                                                                                                                                 |
| DIS (Job Display)    | A system peripheral processor program similar to system display (DSD) that provides communication between a job in central memory and the user at the console, and permits you to control execution of the program through the keyboard.                                                                                                                                                                                | Equipment Number         | A number from zero to seven which identifies the setting on a peripheral device controller.                                                                                                                                                                                                             |
| Displays             | Two console screens used to display system and job information, operator messages, and contents of central memory. Through the console keyboard, you can control the operation of the running system. The displays are identified by alphabetic characters. The operator can request various displays; those most frequently used are job status (B), system files (H), dayfile messages (A), and tape unit status (P). | EST Ordinal              | The number designating the position of an entry within the equipment status table established at each installation. Devices are identified in operator commands by these ordinals, ranging from 1 to 777 octal.                                                                                         |
| Drive                | The unit on which a device is mounted.                                                                                                                                                                                                                                                                                                                                                                                  | External Characteristic  | A code assigned by you to a printer denoting the type of print train. ECuu,aa. turns off the printer so print train aa can be mounted on unit uu. The code appears on the E display after assignment.                                                                                                   |
| DSD (System Display) | The operating system program that provides communication between you and the system by accepting control information typed on the console keyboard and by displaying information pertinent to all jobs known to the system. DSD is permanently assigned to peripheral processor 1.                                                                                                                                      | FE Processor             | 255x communication processor. The FE processor resides at the host mainframe and is a direct communication link to the terminal.                                                                                                                                                                        |
| ECS                  | Extended core storage containing 60-bit words. ECS has a large amount of storage and fast transfer rates.                                                                                                                                                                                                                                                                                                               | Field Length (FL and FE) | FL is the number of central memory words a job requires. FE is the number of words in the direct access area of extended core storage that a job requires. Within central memory or extended core storage, the field length added to the reference address defines the upper address limit of a job.    |
| End-of-File (EOF)    | A boundary within a sequential file but not necessarily the end of a file that can be referenced by name. The actual end of a named file is defined by EOI.                                                                                                                                                                                                                                                             | Forms Code               | A code assigned by you to a hardware device with the FCx,aa. command. This command effectively turns off the device and allows you to take action (such as loading special forms into a printer). The code appears on the E display after assignment.                                                   |
|                      |                                                                                                                                                                                                                                                                                                                                                                                                                         | Full Track               | An RMS recording method in which data is stored on physically sequential sectors.                                                                                                                                                                                                                       |
|                      |                                                                                                                                                                                                                                                                                                                                                                                                                         | GEMINI                   | The improved load-leveling control point program.                                                                                                                                                                                                                                                       |

|                                 |                                                                                                                                                                                           |                                  |                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Half Track                      | An RMS recording method in which data is stored on alternate sectors.                                                                                                                     |                                  | operation (including deadstart), and they are protected by the system from unauthorized access according to privacy controls specified when they are created.                                                                                                                                                                          |
| IDT                             | The logical ID table containing the mainframe host ID (HID), associated logical IDs (LID), and the physical (link) ID (PID) of all currently linked mainframes.                           | Permanent File Default Set       | The device set to which default permanent file assignment is made.                                                                                                                                                                                                                                                                     |
| JANUS                           | A group of system routines that run at a control point and control operation of card readers, card punches, and line printers.                                                            | Permanent File Director (PFD)    | A mass storage resident directory of all permanent files with their passwords and other pertinent information. It cannot be accessed by any central processor program.                                                                                                                                                                 |
| JDT Ordinal                     | The number designating the position of an entry within the job descriptor table (R display). Each job ready to be run has a JDT ordinal that it retains throughout execution.             | PM Message                       | A line in a print file which is displayed but not printed. It usually calls for action.                                                                                                                                                                                                                                                |
| Job Control Area                | An area in CMR containing information pertinent to job swapping.                                                                                                                          | Private Device                   | A member of a private device set. Private devices are available to jobs only if they specifically reference them. Private devices can be dismounted.                                                                                                                                                                                   |
| Load-Leveling                   | Distributing the work load among linked NOS/BE systems.                                                                                                                                   | Private Device Set               | A device set defined by a user which can be introduced and withdrawn as needed to satisfy CM I/O. A device set can be used as a private device set or as a public device set.                                                                                                                                                          |
| Master Device                   | The member of a device set designated to contain the critical tables of the device set.                                                                                                   | PRU Device                       | A mass storage device or tape in SI format.                                                                                                                                                                                                                                                                                            |
| Member Device                   | A device in a device set.                                                                                                                                                                 | Pseudo A Register                | A software register used to function channels and to manipulate peripheral hardware devices. The value entered into the pseudo A register (by the LDA and LAN commands) appears in the first line of the M display.                                                                                                                    |
| Monitor (MTR)                   | The routines residing in central memory and peripheral processor 0 which control all system activities.                                                                                   | Public Device                    | A member of a public device set. Public devices are available to all jobs and cannot be dismounted.                                                                                                                                                                                                                                    |
| Multimainframe System           | Network of physically and logically connected NOS/BE computer systems.                                                                                                                    | Public Device Set                | A device set used by the system for default allocation. The system set, permanent file default set, scratch set, and queue set are public device sets.                                                                                                                                                                                 |
| Network Access Device (NAD)     | Controller used by the Remote Host Facility to link computer systems via a loosely coupled network.                                                                                       | Public Set                       | Same as public device set.                                                                                                                                                                                                                                                                                                             |
| Nonallocatable Device           | A device such as a magnetic tape which can be used by only one job at a given time.                                                                                                       | Queue Device Set                 | The device set to which I/O file residence is restricted.                                                                                                                                                                                                                                                                              |
| NPU                             | Network processing unit. (Refer to FE processor).                                                                                                                                         | Remote Diagnostic Facility (RDF) | Allows maintenance personnel to submit on-line maintenance jobs interactively using teletype-compatible terminals and a two-port multiplexer built into 8xx models.                                                                                                                                                                    |
| Peripheral Processor (PP)       | The hardware unit that performs input and output through the data channels.                                                                                                               | Remote Host Facility (RHF)       | Links NOS/BE to a loosely coupled network (LCN) via the 380-170 network access devices (NADs) to allow transfer of permanent files and queue files between linked computer systems, access to NOS/BE magnetic tape drives, and communication between NOS/BE INTERCOM users and the linked computer systems having an ITFS application. |
| Peripheral Processor Unit (PPU) | First level peripheral processor. A PPU is contained in the mainframe in a multimainframe environment and operates synchronously with the mainframe. Sometimes referred to as FLPP.       |                                  |                                                                                                                                                                                                                                                                                                                                        |
| Permanent File                  | A mass storage file cataloged by the system so that its location and identification are always known to the system. Permanent files cannot be destroyed accidentally during normal system |                                  |                                                                                                                                                                                                                                                                                                                                        |

|                       |                                                                                                                                                                                                                                              |                |                                                                                                                                                                                                                                                           |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Roll Out              | The act of removing a job from central memory before execution is complete so memory can be assigned to another job. A rolled-out job does not lose its control point assignment.                                                            | System Job     | A job brought to a control point by the operator. It does not have a JDT ordinal assigned.                                                                                                                                                                |
| Scheduler             | A system routine that oversees assignment of JDT ordinals, control points, and central memory.                                                                                                                                               | System Library | The collection of tables and object language programs residing in central memory or on mass storage which are necessary for running the operating system and its product set.                                                                             |
| Scratch Set           | The device set to which scratch files are assigned. Scratch files are files for which no residence specifications are supplied.                                                                                                              | System Set     | The device set which contains system files such as the library, system dayfile, and customer engineer error file.                                                                                                                                         |
| Spooling              | The transfer of input/output files between the station and the linked system.                                                                                                                                                                | Unit Number    | The setting of a hardware device. Used when more than one hardware unit is connected to a controller.                                                                                                                                                     |
| Spun Off Task (SPOT)  | Task that the host mainframe station initiates after it has queried the linked system and found that a staging operation is required.                                                                                                        | Unlabeled Tape | A magnetic tape that does not have a header label. Unlabeled tapes generated by the operating system contain a trailer label similar to the trailer for a standard labeled tape.                                                                          |
| Standard Labeled Tape | A tape with labels conforming to American National Standard Magnetic Tape Labels for Information Interchange X3.27-1969. Also called a system labeled tape.                                                                                  | User Job       | A job submitted through JANUS or a remote terminal. It is assigned a JDT ordinal and brought to a control point by the scheduler.                                                                                                                         |
| Station               | Software system that links the NOS/BE operating system with another NOS/BE operating system or with a SCOPE 2 operating system.                                                                                                              | Warmstart      | Procedure used to deadstart if the tape controller is loaded and the controlware is running.                                                                                                                                                              |
| STEP Mode             | Protected mode for the operating system monitor. The keyboard space key must be pressed to process each request from other PPs. When the system is in STEP mode, DSD cannot load overlays from disk and, therefore, cannot execute commands. | 1 x PP         | Peripheral processor speed is 1 microsecond.                                                                                                                                                                                                              |
| Swap Out              | The act of removing a job from central memory before execution is complete, so control point and memory can be assigned to another job that is not waiting for an external event or has a higher priority.                                   | 2 x PP         | Peripheral processor speed is 0.5 microsecond. 2 x PP is only available on a CYBER 170 or CYBER 180. On a CYBER 170, the operator can set the memory speed by changing the status and control register or the maintenance register on models 865 and 875. |
|                       |                                                                                                                                                                                                                                              | 4 x PP         | Peripheral processor speed is 0.25 microsecond. 4 x PP is available only on CYBER 170 models 835 and 855, and CYBER 180 models 835, 840, 845, 850, 855 and 860.                                                                                           |

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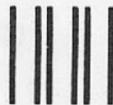
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