

PREFACE

This manual describes the Network Operating System (NOS) Version 2. NOS can operate on the following computer systems:

CDC CYBER 180 Computer Systems
Models 810, 830, 835, 840, 845, 850, 855, 860, 870, 990, and 995

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

6000 Computer Systems

AUDIENCE

Volume 1, Introduction to Interactive Usage (60459660), is written for the novice.

Volume 2, Guide to System Usage (60459670), is written for the applications or systems programmer who is unfamiliar with NOS.

Volume 3, System Commands (60459680), is written for all NOS users.

Volume 4, Program Interface (60459690), is written for the experienced COMPASS applications programmer or systems programmer.

The reader of each volume should have a knowledge of the material contained in the previous volumes.

ORGANIZATION

The NOS reference set describes the external features of NOS 2. This reference set comprises four separate volumes.

Volume 1, Introduction to Interactive Usage, shows a user at an interactive terminal how to enter, run, and correct programs, and how to create, retrieve, and maintain permanent files. Other topics covered include physical terminal connection, and login/logout procedures.

Volume 2, Guide to System Usage, describes the general concepts of NOS and some of the utilities used with NOS. Topics included are job processing, file concepts, procedures, magnetic tape processing, Modify, and file loading. This volume is a learning tool and does not contain comprehensive descriptions of all NOS commands.

Volume 3, System Commands, describes the system commands that form the user interface to NOS.

Volume 4, Program Interface, describes the COMPASS program interface to NOS. Detailed descriptions of function processors and macros available to COMPASS user programs are included.

SUBMITTING COMMENTS

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

Control Data
Technology and Publications Division ARH219
4201 Lexington Avenue North
St. Paul, MN 55126-6198

Additionally, if you have access to SOLVER, an online facility for reporting problems, you can use it to submit comments about the manual. Declare your problem type as DOC and use NS2 as the product identifier.

Address questions about physical packaging and/or distribution of printed materials to Literature and Distribution Services at the following address:

Control Data
Literature and Distribution Services
308 North Dale Street
St. Paul, MN 55103

or you can call (612) 292-2101. If you are a Control Data employee, call (612) 292-2100.

CYBER SOFTWARE SUPPORT HOTLINE

Control Data's CYBER Software Support maintains a hotline to assist you if you have trouble using our products. If you need help beyond that provided in the documentation or find that the product does not perform as described, call us at one of the following numbers and a support analyst will work with you.

From USA and Canada: (800) 345-9903

From other countries: (612) 851-4131

CONVENTIONS

REFERENCES TO OTHER MANUALS IN THE NOS REFERENCE SET

Throughout this manual, references to Volumes 1, 2, and 4 of the NOS Reference Set are in the form: refer to section n, (volume name). If a volume number is not specified, the reference is to Volume 3.

180-CLASS MAINFRAMES

Some of the CYBER 170 Computer Systems share many of the functional and architectural attributes of the CYBER 180 Computer Systems. Specifically, CYBER 170 Models 815, 825, 835, 845, and 855 fall into this category. It is sometimes convenient to refer to the CYBER 180 models and these CYBER 170 models collectively. This manual uses the term 180-class mainframes to refer to this collection.

EXTENDED MEMORY

Extended memory for the CYBER 180-class machines and models 865 and 875 is unified extended memory (UEM) and may also include extended core storage (ECS), extended semiconductor memory (ESM), or STORNET. Extended memory for model 176 is large central memory extended (LCME) and may include ECS, ESM, or STORNET.

In this manual, ECS refers to both ECS, ESM, and STORNET. Extended memory refers to all forms of extended memory unless otherwise noted. However, when referencing extended memory in the context of an ECS multimainframe complex, distributive data path (DDP), or low-speed port (LSP) access, UEM and LCME are excluded. Extended memory for all other NOS computer systems is either ECS, ESM, or STORNET. ECS, ESM, and STORNET are the only forms of extended memory that can be shared in ECS multimainframe complex and can be accessed by a DDP or LSP.

Programming information for the various forms of extended memory can be found in the COMPASS Version 3 Reference Manual and in the appropriate computer system hardware reference manual.

CYBER 70 COMPUTER SYSTEMS REFERENCES

References to the CYBER 70 Computer Systems pertain only to models 71, 72, 73, and 74.

CONTROL STATEMENT

The manuals of many NOS products use the term control statement instead of the term command. This manual uses the term command almost exclusively. You can consider the two synonymous.

EXAMPLES

The following conventions apply to examples that appear in this manual:

- Examples of actual terminal sessions that appear in this manual were produced on a display terminal in NORMAL character mode unless otherwise specified. Uppercase characters represent terminal output; lowercase characters represent user input unless otherwise noted. (However, user input that is displayed within the text of this manual is shown in uppercase characters). The vertical spacing in examples does not necessarily coincide with the spacing that appears on your terminal.
- Program examples are written either in FORTRAN 5 or BASIC 3 (hereafter referred to as just BASIC).
- This manual uses commas to delimit command parameters and periods to terminate commands. For clarity, however, commands that appear in text use an opening parenthesis for their initial delimiter and a closing parenthesis for their terminator.

COMMAND FORMAT

Interpret uppercase characters within command formats literally. Lowercase characters are variables and are described immediately following the line that shows the command format.

SPECIAL KEYBOARD ENTRIES

This manual uses special notation to represent certain keyboard entries:

- $\text{\textcircled{R}}$ denotes the message transmission key on the keyboard. Depending on the terminal class, this key may be the RETURN, CR, CARRIAGE RETURN, NEW LINE, SEND, or ETX key. For some terminal classes, the RETURN or NEW LINE key also denotes a message terminator, but the message is kept in the terminal buffer until the corresponding SEND or ETX key is pressed, sending all messages in the buffer to IAF. Appendix K supplies more information. IAF and the network respond to the $\text{\textcircled{R}}$ by positioning the carriage to the first character position on the next line.
- ← designates the backspace character.
- The notation CTRL/x directs you to press the control key (which is labeled CTRL, CNTL, CNTRL, or similar characters) on the terminal and, while holding this key down, press the key specified by x. For example, CTRL/H means press and hold the control key while you press the H key.

RELATED PUBLICATIONS

You may want to consult the following Control Data manuals for information related to topics discussed in this manual. For your convenience, these manuals are listed by category: CDCNET manuals, hardware manuals, NOS 2 manuals, and optional product manuals.

If you need a brief description of the NOS product commands and their parameters, refer to the NOS Version 2 Applications Programmer's Instant (60459370). In addition, brief descriptions of all NOS operating system and NOS product set manuals are available in the NOS System Information manual. You access this online manual by logging into NOS and entering the EXPLAIN command.

Control Data manuals are available through Control Data sales offices or through Literature Distribution Services:

Control Data
Literature and Distribution Services
308 North Dale Street
St. Paul, MN 55103

CDCNET MANUALS

The following manuals describe the Control Data Distributed Communications Network (CDCNET).

<u>Control Data Publication</u>	<u>Publication Number</u>
CDCNET Batch Device User Guide	60463863
CDCNET Conceptual Overview	60461540
CDCNET Configuration and Site Administration	60461550
CDCNET Terminal Interface Usage	60463850

HARDWARE MANUALS

The following manuals describe Control Data computer systems and related equipment.

<u>Control Data Publication</u>	<u>Publication Number</u>
CYBER 70 Model 71 Computer System Hardware Reference Manual	60453300
CYBER 70 Model 72 Computer System Hardware Reference Manual	60347000
CYBER 170 Computer Systems Models 171 through 175 (Levels A, B, C) Model 176 (Level A, B, C) Hardware Reference Manual	60420000
CYBER 170 Computer Systems Models 720, 730, 740, 750, and 760 Model 176 (Level B/C) Hardware Reference Manual	60456100
CYBER 170 Computer Systems Models 815 and 825 Hardware Reference Manual	60469350
CYBER 170 Computer Systems Models 835, 845, and 855 CYBER 180 Computer Systems Models 835, 840, 845, 850, 855, 860, and 990 CYBER 990E and 995E Computer Systems CYBER 170 State Hardware Reference Manual	60469290
CYBER 170 Computer Systems Models 835, 845, and 855 CYBER 180 Computer Systems Models 835, 845, and 855 Hardware Operator's Guide	60458390
CYBER 170 Computer Systems Models 865 and 875 Hardware Reference Manual	60458920
CYBER 180 Models 810 and 830 Computer Systems Hardware Reference Manual	60469420
CYBER 840A, 850A, 860A, and 870A Computer Systems Hardware Reference Manual	60463560
5870 Printer User's Reference Manual	60462720

NOS 2 MANUALS

The following manuals describe NOS 2.

<u>Control Data Publication</u>	<u>Publication Number</u>
Common Memory Manager Version 1 Reference Manual	60499200
COMPASS Version 3 Reference Manual	60492600
CYBER Loader Version 1 Reference Manual	60429800
CYBER Record Manager Advanced Access Methods Version 2 Reference Manual	60499300
CYBER Record Manager Basic Access Methods Version 1.5 Reference Manual	60495700
FORM Version 1 Reference Manual	60496200
Modify Version 1 Reference Manual	60450100
NOS Online Maintenance Software Reference Manual	60454200
NOS Version 2 Administration Handbook	60459840
NOS Version 2 Analysis Handbook	60459300
NOS Version 2 Applications Programmer's Instant	60459360
NOS Version 2 Diagnostic Index	60459390
NOS Version 2 Full Screen Editor User's Guide	60460420
NOS Version 2 Installation Handbook	60459320
NOS Version 2 Operations Handbook	60459310
NOS Version 2 Reference Set, Volume 1 Introduction to Interactive Usage	60459660
NOS Version 2 Reference Set, Volume 2, Guide to System Usage	60459670
NOS Version 2 Reference Set, Volume 4, Program Interface	60459690
NOS Version 2 Screen Formatting Reference Manual	60460430
NOS Version 2 Security Administrator's Handbook	60460410
NOS Version 2 System Overview	60459270
NOS Version 2 Systems Programmer's Instant	60459370
SYMPL Version 1 Reference Manual	60496400

OPTIONAL PRODUCT MANUALS

The following manuals describe optional products.

<u>Control Data Publication</u>	<u>Publication Number</u>
APEX IV Reference Manual	84002550
APL Version 2 Reference Manual	60454000
Automatically Programmed Tooling System (APT IV) Version 2 Reference Manual	17326900
BASIC Version 3 Reference Manual	19983900
COBOL Version 5 Reference Manual	60497100
CYBER Database Control System 2 Database Administrator Reference Manual	60485200
CYBER Database Control System 2 Database Application Programming Reference Manual	60485300
CYBER Interactive Debug Version 1 Reference Manual	60481400
Data Catalogue 2 Version 1 Reference Manual	60483200
Data Catalogue 2 Version 2 Reference Manual	60483350
DDL Version 3 Reference Manual, Volume 1	60481900
DDL Version 3 Reference Manual, Volume 2	60482000
DDL Version 3 Reference Manual, Volume 3	60482100
FORTTRAN DataBase Facility Version 1 Reference Manual	60482200
FORTTRAN Extended Version 4 Common Library Mathematical Routines Reference Manual	60498200
FORTTRAN Extended Version 4 Reference Manual	60497800
FORTTRAN Extended Version 4 to FORTRAN Version 5 Conversion Aids Program Version 1 Reference Manual	60483000
FORTTRAN Version 5 Common Library Mathematical Routines Reference Manual	60483100
FORTTRAN Version 5 Reference Manual	60481300
General Purpose Simulation System V (GPSS) General Information Manual	84003900

Optional Product Manuals (Continued)

<u>Control Data Publication</u>	<u>Publication Number</u>
Information Management Facility Version 1 Application Programming Reference Manual	60484500
Message Control System Version 1 Reference Manual	60480300
Network Access Method Version 1 Host Application Programming Reference Manual	60499500
Network Access Method Version 1 Network Definition Language Reference Manual	60480000
Network Access Method Version 1/Communications Control Program Version 3 Terminal Interfaces Reference Manual	60480600
NOS Version 2 Tape Management System (TMS) Site Operations Manual	60463350
NOS Version 2 Tape Management System (TMS) User Reference Manual	60463110
Pascal Version 1.1 Reference Manual	60497700
PERT/Time Version 2 Reference Manual	60456030
Query Update Version 3 Reference Manual	60498300
Remote Batch Facility Version 1 Reference Manual	60499600
Remote Host Facility Access Method Reference Manual	60459990
Remote Host Facility Usage	60460620
Sort/Merge Version 5 Reference Manual	60497500
TAF Version 1 Reference Manual	60459500
TAF Version 1 User's Guide	60459520
TAF/CRM Data Manager Version 1 Reference Manual	60459510
TOTAL-CDC Version 2 Reference Manual	76070300
Update Version 1 Reference Manual	60449900
XEDIT Version 3 Reference Manual	60455730
8-Bit Subroutines Version 1 Reference Manual	60495500

CONTENTS

<p>1. SYSTEM DESCRIPTION 1-1</p> <p>System Hardware 1-1</p> <p style="padding-left: 20px;">Central Processor Unit 1-2</p> <p style="padding-left: 20px;">Central Memory 1-2</p> <p style="padding-left: 40px;">Job Field Length 1-2</p> <p style="padding-left: 20px;">Central Memory Resident 1-3</p> <p style="padding-left: 20px;">Extended Memory 1-3</p> <p style="padding-left: 20px;">Peripheral Processors 1-4</p> <p style="padding-left: 20px;">Peripheral Equipment 1-4</p> <p>System Software 1-5</p> <p style="padding-left: 20px;">User Programs 1-5</p> <p style="padding-left: 20px;">Operating System 1-5</p> <p style="padding-left: 40px;">CYBER Loader 1-6</p> <p style="padding-left: 40px;">CYBER Record Manager 1-6</p> <p>2. FILES 2-1</p> <p>File Names 2-1</p> <p>File Structure 2-1</p> <p style="padding-left: 20px;">CYBER Record Manager File Structure 2-3</p> <p style="padding-left: 20px;">NOS File Structure 2-3</p> <p style="padding-left: 20px;">Physical File Structure 2-4</p> <p style="padding-left: 40px;">Card Files 2-6</p> <p style="padding-left: 40px;">Mass Storage Files 2-6</p> <p style="padding-left: 40px;">Magnetic Tape Files 2-7</p> <p>File Types 2-11</p> <p style="padding-left: 20px;">Input Files 2-11</p> <p style="padding-left: 20px;">Queued Files 2-11</p> <p style="padding-left: 20px;">Local Files 2-12</p> <p style="padding-left: 20px;">Primary Files 2-13</p> <p style="padding-left: 20px;">Direct Access Files 2-13</p> <p style="padding-left: 20px;">Library Files 2-13</p> <p>Permanent Files 2-13</p> <p style="padding-left: 20px;">Indirect Access Permanent Files 2-14</p> <p style="padding-left: 20px;">Direct Access Permanent Files 2-14</p> <p>Mass Storage File Residence 2-15</p> <p>Family Devices 2-15</p> <p>Auxiliary Devices 2-16</p> <p>Alternate Storage 2-16</p> <p>Libraries 2-17</p> <p style="padding-left: 20px;">User Name Library 2-17</p> <p style="padding-left: 20px;">Program Libraries 2-17</p> <p style="padding-left: 20px;">User Libraries 2-17</p> <p>3. JOB FLOW AND EXECUTION 3-1</p> <p>Job Initiation and Termination 3-1</p>	<p>1-1</p> <p>1-1</p> <p>1-2</p> <p>1-2</p> <p>1-2</p> <p>1-3</p> <p>1-3</p> <p>1-4</p> <p>1-4</p> <p>1-4</p> <p>1-5</p> <p>1-5</p> <p>1-5</p> <p>1-6</p> <p>1-6</p> <p>2-1</p> <p>2-1</p> <p>2-1</p> <p>2-3</p> <p>2-3</p> <p>2-4</p> <p>2-6</p> <p>2-6</p> <p>2-7</p> <p>2-11</p> <p>2-11</p> <p>2-11</p> <p>2-12</p> <p>2-13</p> <p>2-13</p> <p>2-13</p> <p>2-13</p> <p>2-14</p> <p>2-14</p> <p>2-15</p> <p>2-15</p> <p>2-16</p> <p>2-16</p> <p>2-17</p> <p>2-17</p> <p>2-17</p> <p>2-17</p> <p>3-1</p> <p>3-1</p>	<p>Batch Jobs 3-1</p> <p>Interactive Jobs 3-2</p> <p style="padding-left: 20px;">Login 3-2</p> <p style="padding-left: 40px;">Logout and Application Switching Procedure 3-4</p> <p>Submitting Jobs to Remote Hosts 3-6</p> <p>Job Origin Types 3-6.2</p> <p>Job Service Classes 3-6.2</p> <p>Job Names 3-7</p> <p style="padding-left: 20px;">Job Sequence Name (JSN) 3-7</p> <p style="padding-left: 20px;">User Job Name (UJN) 3-8</p> <p>Validation 3-8</p> <p>Accounting 3-8</p> <p>Job Scheduling 3-9</p> <p>Job Control 3-9</p> <p style="padding-left: 20px;">Field Length Control 3-9</p> <p style="padding-left: 20px;">Input File Control 3-11</p> <p style="padding-left: 20px;">Time Limit Control 3-11</p> <p style="padding-left: 20px;">SRU Limit Control 3-11</p> <p style="padding-left: 20px;">Command Limit Control 3-11</p> <p style="padding-left: 20px;">Rollout Control 3-12</p> <p style="padding-left: 20px;">Error Control 3-12</p> <p>Security Features 3-13</p> <p style="padding-left: 20px;">Memory Protection 3-13</p> <p style="padding-left: 20px;">System and File Access Controls 3-13</p> <p style="padding-left: 20px;">Security Access Levels 3-14</p> <p style="padding-left: 20px;">Security Access Categories 3-16</p> <p style="padding-left: 20px;">Responsibilities for Data Security 3-16</p> <p style="padding-left: 20px;">Security Conflict Processing 3-17</p> <p>Job Completion 3-17</p> <p>4. PROCEDURES 4-1</p> <p>Procedure File Residence and Search Order 4-2</p> <p>Procedure Structure 4-2</p> <p>Procedure Processing 4-3</p> <p style="padding-left: 20px;">Interactive Parameter Entry 4-4</p> <p style="padding-left: 20px;">Procedure Expansion 4-4</p> <p style="padding-left: 40px;">.EXPAND Directive 4-6</p> <p style="padding-left: 40px;">Inhibit Character 4-6</p> <p style="padding-left: 40px;">Concatenation Character 4-8</p> <p style="padding-left: 40px;">.EX Directive 4-9</p> <p style="padding-left: 20px;">Execution of the Command Record 4-9</p> <p>Procedure Directives 4-9</p> <p style="padding-left: 20px;">Procedure Header (.PROC) Directive 4-11</p> <p style="padding-left: 40px;">Interactive Format 4-11</p> <p>Checklist Entries 4-13</p> <p style="padding-left: 20px;">Special Values 4-14</p>
--	---	---

Checklist Patterns	4-16	FILE Function	6-12
Menu Format	4-22	DT Function	6-14
Formatting and Help Directives	4-23	LEN Function	6-16
.CORRECT Directive	4-23	LVL Function	6-16
.ENDHELP Directive	4-24	NUM Function	6-16.1
.ENTER Directive	4-24	STR Function	6-16.1
.Fn Directive	4-24.1	STRB Function	6-16.2
.F7 Directive	4-24.1	STRD Function	6-16.3
.HELP Directive	4-25	Command Descriptions	6-16.3
.NOCLR Directive	4-31	BEGIN Command	6-16.3
.NOTE Directive	4-31	DISPLAY Command	6-16.4
.PAGE Directive	4-32	ELSE Command	6-17
.PROMPT Directive	4-32	ENDIF Command	6-18
Expansion Control Directives	4-33	ENDW Command	6-19
.CC Directive	4-33	EXIT Command	6-19
.EXPAND Directive	4-33	IF (or IFE) Command	6-20
.IC Directive	4-34	MODE Command	6-22
.SET Directive	4-34	NOEXIT Command	6-24
File Directives	4-34.1	ONEXIT Command	6-24
.DATA Directive	4-34.2	REVERT Command	6-24
.EOF (or .EOP) Directive	4-38	SET Command	6-25
.EOR (or .EOS) Directive	4-38	SKIP Command	6-30
Branching Directives	4-38	WHILE Command	6-31
.ELSE Directive	4-38		
.ENDIF Directive	4-39		
.EX Directive	4-39	7. JOB CONTROL COMMANDS	7-1
.IF (or .IFE) Directive	4-40		
.COMMENT (.*) Directive	4-40.1	BLOCK Command	7-2
Calling a Procedure (BEGIN Command)	4-41	CFO Command	7-3
Requesting Help on Procedure Calls	4-46	CHARGE Command	7-4
Ending a Procedure (REVERT Command)	4-51	CHVAL Command	7-5
Parameter Matching Modes	4-53	CLASS Command	7-7
Order-Dependent Mode	4-53	COMMENT Command	7-9
Order-Independent Mode	4-53	CTIME Command	7-10
		DAYFILE Command	7-10
5. COMMAND PROCESSING	5-1	DROP Command	7-12.1
Command Format	5-2	ENQUIRE Command	7-13
Command Processing Flow	5-5	ENTER Command	7-21
Exit Processing	5-7	ERRMSG Command	7-22
		GO Command	7-22
		HTIME Command	7-22.1
		Job Command	7-23
		LDI Command	7-26
6. FLOW CONTROL COMMANDS	6-1	LENGTH Command	7-27
Command Syntax	6-2	LIMITS Command	7-28
Operators	6-2	Resource Limits	7-29
Arithmetic Operators	6-2	Other Characteristics	7-30
Relational Operators	6-3	User Permissions	7-31
Logical Operators	6-4	Network Applications	7-32
String Operators	6-4	Local Applications	7-32
Order of Evaluation	6-5	Privileged Network Applications	7-32
Operands	6-5	Shell Permissions	7-32
Constants	6-5	Security Permissions	7-33
Numeric Strings	6-5	Security Access Categories	7-33
Literals	6-5	Security Access Levels	7-33
Symbolic Names	6-7	Service Classes	7-33
Functions	6-12	Default Service Classes	7-33
		LISTLID Command	7-36

MACHINE Command	7-39	BASIC Command	8-12
MFL Command	7-39	BATCH Command	8-13
NORERUN Command	7-40	EXECUTE Command	8-13
NOTE Command	7-40	FORTRAN Command	8-14
OFFSW Command	7-41	FTNFS Command	8-15
ONSW Command	7-42	NULL Command	8-15
PASSWOR Command	7-42	Interactive Status Commands	8-16
PAUSE Command	7-44	Detach Command (ctD)	8-16
PROTECT Command	7-44	Immediate Job Status	
QGET Command	7-45	Command (ctE)	8-17
QUEUE7 Command	7-46	Abbreviated Job Status	
REDO Command	7-50	Command (ctS)	8-17
RERUN Command	7-50.1	Job Processing Commands	8-18
RESOURC Command	7-50.1	APPSW Command	8-18
Deadlock Prevention	7-52	BYE Command	8-19
Single Resource Use	7-54	DIAL Command	8-20.1
Tape Units	7-54	EXPLAIN Command	8-20.1
Resource Overcommitment	7-55	GOODBYE Command	8-21
Altering Resource Requirements	7-56	HELLO Command	8-21
Unit Assignment	7-57	HELLO7 Command	8-22
RFL Command	7-57	HELLO7 Directives	8-22
ROLLOUT Command	7-58	HELP Command	8-26
RTIME Command	7-58	HELPME Command	8-26
SETASL Command	7-59	LIB Command	8-26
SETCORE Command	7-60	LIST Command	8-28
SETJAL Command	7-61	LOGIN Command	8-28
SETJOB Command	7-62	LOGOUT Command	8-29
SETJSL Command	7-63	NOSORT Command	8-29
SETPR Command	7-64	RECOVER Command	8-30
SETTL Command	7-64	RUN Command	8-35
SHELL Command	7-66	Secure Login Command	8-36
STIME Command	7-67	SHOW Command	8-36
SUBMIT Command	7-68	TEXT Command	8-37
SWITCH Command	7-73	WHATJSN Command	8-37
UPROC Command	7-73	X Command	8-38
USECPU Command	7-74	XMODEM Command	8-38
USER Command	7-74	Primary File Editing Commands	8-39
		Parameter Format	8-40
		Suppressing Editing Responses	8-41
		Line Number Overlap	8-41
		Inserting Lines	8-42
		ALTER Command	8-42
		DELETE Command	8-44
		DUP Command	8-45
		LIST Command	8-46
		MOVE Command	8-48
		READ Command	8-49
		RESEQ Command	8-51
		WRITE Command	8-51
		WRITEN Command	8-52
8. COMMANDS FOR INTERACTIVE JOBS	8-1		
Terminal Control Commands	8-2		
ASCII Command	8-2		
AUTO Command	8-3		
BRIEF Command	8-4		
CSET Command	8-4		
EFFECT Command	8-4		
KEY Command	8-5		
LINE Command	8-6.1		
NORMAL Command	8-7		
SCREEN Command	8-7		
TDU Command	8-8.1		
TIMEOUT Command	8-9		
TRMDEF Command	8-9		
Using TRMDEF with NAM/CDCNET	8-10		
Examples	8-11		
Subsystem Selection Commands	8-11		
ACCESS Command	8-12		
		9. FILE MANAGEMENT COMMANDS	9-1
		ASSIGN Command	9-2
		BRSP Command	9-4

CLEAR Command	9-5	DEFINE Command	10-17
COPY Command	9-5	DROPDS Command	10-20
Copy Termination	9-10	GET Command	10-21
Block Sizes	9-10	MFLINK Command	10-22
Processing Options	9-10	MFLINK Directives	10-23
COPYBF Command	9-11	APPEND Directive	10-24
COPYBR Command	9-12	ATTACH Directive	10-24
COPYCF Command	9-13	CHANGE Directive	10-24
COPYCR Command	9-15	CHARGE Directive	10-25
COPYEI Command	9-16	DEFINE Directive	10-25
COPYSBF Command	9-17	DROPDS Directive	10-25
COPYX Command	9-18	GET Directive	10-25
DOCUMENT Command	9-20	PACKNAM Directive	10-25
EVICT Command	9-22	PERMIT Directive	10-26
FCOPY Command	9-23	PURGE Directive	10-26
LIST80 Command	9-26	REPLACE Directive	10-26
LOCK Command	9-26	SAVE Directive	10-26
LO72 Command	9-27	USER Directive	10-26
MFQUEUE Command	9-31	Interactive Use of MFLINK	10-27
Parameter Descriptions	9-31	OLD Command	10-28
The Routing Directive	9-33	PACKNAM Command	10-29
NEW Command	9-34	PERMIT Command	10-30
OUT Command	9-35	PURGALL Command	10-31
OVWRITE Command	9-35	PURGE Command	10-32
PACK Command	9-36	RECLAIM Command	10-33
PRIMARY Command	9-37	Magnetic Tapes	10-34
RENAME Command	9-37	Command Format	10-35
REQUEST Command	9-38	RECLAIM Output	10-44
RESEQ Command	9-40	REPLACE Command	10-45
RETURN Command	9-42	SAVE Command	10-46
REWIND Command	9-43	SETPFAC Command	10-48
ROUTE Command	9-44	SETPFAL Command	10-49
Parameter Descriptions	9-44		
Implicit Routing	9-50		
SCOPY Command	9-51		
SECHDR Command	9-54	11. LOAD/DUMP MEMORY COMMANDS	11-1
SETFAL Command	9-55		
SETFS Command	9-56	DMB Command	11-1
SKIPEI Command	9-56	DMD Command	11-5
SKIPF Command	9-57	DMDECS Command	11-6
SKIPFB Command	9-57	DMP Command	11-6.1
SKIPR Command	9-58	DMPECS Command	11-7
SORT Command	9-58	LBC Command	11-8
TCOPY Command	9-59	LOC Command	11-8
TDUMP Command	9-62	PBC Command	11-9
UNLOAD Command	9-64	RBR Command	11-9
UNLOCK Command	9-65	WBR Command	11-10
VERIFY Command	9-65		
WRITEF Command	9-68		
WRITER Command	9-68	12. TAPE MANAGEMENT	12-1
10. PERMANENT FILE COMMANDS	10-1	Tape Assignment	12-1
Common Parameters	10-2	Command Rules	12-2
APPEND Command	10-7	Processing Options	12-3
ATTACH Command	10-8	ASSIGN Command	12-5
CATLIST Command	10-10	BLANK Command	12-9
CHANGE Command	10-15	LABEL Command	12-11
COMMON Command	10-16	LISTLB Command	12-19
		REQUEST Command	12-21
		VSN Command	12-25

13. CHECKPOINT/RESTART	13-1	NEW Directive	15-28
CKP Command	13-1	NOINS Directive	15-28
RESTART Command	13-2	NOREP Directive	15-29
		NOREW Directive	15-29
		OLD Directive	15-29
		RENAME Directive	15-29
14. SYSTEM UTILITY COMMANDS	14-1	REPLACE Directive	15-30
EDIT Command	14-1	REWIND Directive	15-30
FSE Command	14-2	TYPE or NAME Directive	15-30
KRONREF Command	14-4	VFYLIB Directive	15-31
MODIFY Command	14-5	*/ Directive	
OPLEDIT Command	14-8	(Comment Directive)	15-31
PDU Command	14-10	LIBEDIT Output	15-31
PROFILE Command	14-11	LIBGEN Command	15-32
UPDATE Command	14-14	ULIB Command	15-34
XEDIT Command	14-18	VFYLIB Command	15-35
		Library Processing Examples	15-37
		LIBRARY Command	15-43
		Maximum Size of Global Library	
15. LIBRARY MAINTENANCE	15-1	Set	15-43
Library File Access Methods	15-1	Library Search Order	15-44
Library Record Types	15-2	Examples	15-44
CATALOG Command	15-5		
COPYL and COPYLM Commands	15-7	16. TERMINAL INPUT/OUTPUT	16-1
GTR Command	15-11	Terminals	16-1
ITEMIZE Command	15-14	Input/Output Conventions	16-2
LIBEDIT Command	15-17	Input From Terminal	16-2
Command Format	15-18	Length of Output/Input Lines	16-3
LIBEDIT Directives	15-20	Terminating Input Line	16-3
ADD Directive	15-23	Correcting Input Line	16-3
BEFORE Directive	15-24	Deleting Input Line	16-4
BUILD Directive	15-24	Entering Input Before Prompts	16-4
COMMENT Directive	15-25	Page Wait	16-5
COPY Directive	15-25	Suspending Output	16-5
DATE Directive	15-25	Aborting Output Block	16-5
DELETE Directive	15-26	Interrupting Job Step	16-6
FILE Directive	15-26	Terminating Job Step	16-6
IGNORE Directive	15-27	Continuing a Suspended Job	16-7
INSERT or AFTER Directive	15-27	Using ATTN on IBM 2741 Terminals	16-8
LIBGEN Directive	15-28	Control Bytes	16-9
LIST Directive	15-28		

APPENDIXES

A. CHARACTER SETS	A-1	D. SAMPLE JOB OUTPUT	D-1
Character Set Anomalies	A-2		
Character Set Tables	A-2	E. TERMINAL CHARACTER CONVERSION	E-1
Interactive Jobs	A-3	Data Input	E-1
Batch Jobs	A-3	Data Output	E-2
Jobs Using Line Printers	A-3		
Jobs Using Magnetic Tapes	A-12	F. CARD FILE DATA CONVERSION	F-1
B. DIAGNOSTIC MESSAGES	B-1	Input Card File Formats	F-2
		Coded Cards	F-3
C. GLOSSARY	C-1	Conversion Modes	F-3

Literal Input	F-3	(AB) - Abort Output Block	
Binary Cards	F-5	Character	J-5
Summary	F-5	(AR) - Automatic Character	
Punch File Formats	F-5	Recognition	J-5
Coded Cards (Punch)	F-6	(BF) - Blocking Factor	J-6
Binary Cards (Punch B)	F-6	(BR) - Break Key as User Break 1	J-6
Absolute Binary Cards (P8)	F-7	(BS) - Backspace Character	J-7
		(Bl) - Interruption or	
		User Break 1 Character	J-7
G. ANSI TAPE LABEL FORMATS	G-1	(B2) - Termination or	
		User Break 2 Character	J-8
Required Labels	G-1	(CH) - Display Terminal	
VOL 1 - Volume Header Label	G-2	Characteristics	J-8
HDR1 - First File Header Label	G-4	(CI) - Carriage Return Idle Count	J-9
EOF1 - First End-Of-File Label	G-8	(CN) - Cancel Character	J-9
EOV1 - First End-Of-Volume Label	G-9	(CP) - Cursor Positioning after	
Optional Labels	G-10	Input	J-10
HDR2 through HDR9 - Additional		(CT) - Network Control Character	J-10
File Header Labels	G-10	(DL) - Delimiters for Single-	
EOF2 through EOF9 - Additional		Message Transparent Input Mode	J-11
End-Of-File Labels	G-10	(EB) - End-of-Block Character	J-12
EOV2 through EOV9 - Additional		(EL) - End-of-Line Character	J-13
End-Of-Volume Labels	G-10	(EP) - Echoplex Mode	J-14
User Labels G-11		(FA) - Full-ASCII Input Mode	J-14
		(HC) - Host Connection	J-15
		(HD) - Display of Host Nodes	J-15
H. LINE PRINTER CARRIAGE CONTROL	H-1	(HN) - Host Node Selection	J-17
		(HS) - Host Selection	J-17
Printed Data	H-1	(IC) - Flow Control for Input	
Paper Length	H-1	Devices	J-18
580 Line Printers	H-1	(IN) - Input Device and	
533/536, 537, and 585 Printers	H-2	Transmission Mode	J-18
Carriage Control	H-2	(LI) - Line Feed Idle Count	J-20
Format Channel Selection on		(LK) - Lockout of Unsolicited	
Non-PFC Printers	H-4.2	Messages	J-20
Format Channel Selection on		(MS) - Message to Network	
533/536, 537, and 585 Printers	H-4.2	Operator	J-21
Carriage Control Arrays	H-7	(OC) - Flow Control for Output	
Array Syntax	H-7	Devices	J-21
Reserved Format Channels for		(OP) - Output Device Selection	J-21
VFU Processing	H-9	(PA) - Parity Processing	J-22
Example	H-9	(PG) - Page Waiting	J-23
		(PL) - Page Length	J-23
		(PW) - Page Width	J-24
I. OBSOLETE TAPE FORMATS	I-1	(RC) - Reset Terminal	
		Characteristics	J-24
B (Blocked) Format	I-1	(SE) - Special Editing Mode	J-24
E (Line Image) Format	I-2	(TC) - Terminal Class Command	J-25
X (External) Format	I-3	(TM) - Terminating a Terminal-	
End-of-Tape/End-of-Reel Conditions	I-3	Host Connection	J-26
		(XL) - Multimessage Transparent	
		Mode	J-27
J. NAM/CCP TERMINAL DEFINITION			
COMMANDS	J-1		
Introduction	J-1	K. DELIMITING AND TRANSMITTING	
Terminal Definition Command Format	J-3	TERMINAL INPUT	K-1
Restrictions	J-4		
Terminal Definition Commands	J-4	Physical End-of-Line (Line Feed)	K-1
		Logical End-of-Line (Carriage Return)	K-1
		Message Transmission	K-1

L. PASSIVE PROCEDURES	L-1	O. INTERACTIVE TRANSFER FACILITY (ITF)	O-1
.PROC Directive	L-1	Selecting the ITF Application	O-1
Procedure and Parameter Descriptions	L-2	Selecting a Remote CYBER 200 System	O-1
Parameter Matching	L-2	Processing Your Job on the Remote CYBER 200	O-2
Order-Dependent Parameter Matching Mode	L-2	Terminating Your ITF Session	O-2
Order-Independent Parameter Matching Mode	L-6		
M. PAPER TAPE OPERATIONS	M-1	P. FILE TRANSFERS USING XMODEM	P-1
General Description	M-1	XMODEM Command	P-1
Teletypewriter	M-1	Using XMODEM in Prompting Mode	P-3
Control Characters	M-2	Sending a File from a CYBER	P-3
Input Lines	M-2	Receiving a File from a Micro	P-4
Punching Tape Off-Line	M-3	Configuration File	P-4
Tape Mode	M-3	File Transfer Notes	P-6
Punching a Tape On-Line	M-4	Text Files	P-6
Corrections	M-4	CYBER Binary	P-6
		Micro Binary	P-6
		Limitations and Considerations	P-7
N. MASS STORAGE DEVICE STATISTICS	N-1		

INDEX

FIGURES

1-1 Central Memory Allocation	1-3	7-4 Resource Commitment Processing (Simplified)	7-53
2-1 Logical Structure of Files	2-2	15-1 Random Access File Structure	15-2
2-2 NOS and CRM File Terminology	2-3	15-2 LIBEDIT Input and Output	15-18
2-3 Sample Card File Structure	2-6	15-3 User Library Structure	15-33
2-4 Use of ANSI Labels	2-8	15-4 Maximum Size of Global Library Set	15-43
3-1 FORTRAN Compile and Execute Deck	3-2	F-1 Examples of Coded Card Conversion	F-4
3-2 Submitting Jobs to Remote Hosts	3-6.1	H-1 Carriage Control Tape Format (Standard Paper Length; 6LPI)	H-5
4-1 Procedure File Structure	4-3	H-2 Carriage Control Tape Format (Short Paper Length; 8LPI)	H-6
4-2 TESTPN with Valid Entry	4-5	L-1 Keyword Substitution in Two Procedures	L-5
4-3 TESTPN with Invalid Entry	4-5	L-2 Keyword Substitution in Nested Procedures	L-9
4-4 Summary of Checklist Entries	4-15		
4-5 Calling a Procedure	4-41		
5-1 NOS Command Processing Flow	5-6		
7-1 QUEUE7 Execute Queue Sample Listing	7-47		
7-2 QUEUE7 Input Queue Sample Listing	7-48		
7-3 QUEUE7 Output Queue Sample Listing	7-49		

TABLES

2-1 Physical File Structure on Different Devices	2-5	A-3 ASCII to 6/12-Bit Display Code Conversion	A-10
2-2 Data Representation on Magnetic Tape	2-7	A-4 Nine-Track ASCII Coded Tape Conversion	A-13
3-1 User Job Access Levels	3-15	A-5 Nine-Track EBCDIC Coded Tape Conversion	A-14
4-1 Procedure Directives	4-10	A-6 Seven-Track Coded Tape Conversions	A-15
4-2 Programmable Function Keys for Procedures	4-25	H-1 Carriage Control Characters for 512/580 and 5870 Printers	H-3
4-3 Help on Procedure Calls	4-48	H-2 Carriage Control Characters for 585 Printers	H-4
9-1 Range of Permissible Formats for the COPY Command	9-6	J-1 Default Terminal Definitions	J-28
9-2 Code Set-Line Terminator Reference Chart	9-24	J-2 Parameter Ranges for Terminal Definition Commands	J-29
9-3 Compatible File Structures for the VERIFY Command	9-67	K-1 Default Message Delimiters and Transmission Keys	K-2
10-1 Access Mode Granted When Attaching a Currently Attached Direct Access File	10-9	L-1 Parameter Substitution in Order-Dependent Mode	L-4
A-1 Character Sets for Interactive Jobs	A-5	L-2 Parameter Substitution in Order-Independent Mode	L-8
A-2 Character Sets for Batch Jobs	A-7		