

VAX/VMS

Mini-Reference

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VAX/VMS

Mini-Reference

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This manual provides quick-reference information on VAX/VMS DCL commands and lexical functions, utilities, text editors and formatters, and callable system routines.

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Preface

Intended Audience

This manual is intended for all system users. In most cases, this manual provides only selected and abbreviated information; thus, it assumes that you are familiar with the basic concepts and conventions associated with any information you look up.

Structure of This Document

This manual consists of sections documenting major parts of the system. The progression is roughly from general interest information, to programmer-oriented information, to system management and other information. The sections are organized as follows:

General Information: GEN

DCL Commands, Utilities, Lexical Functions: DCL

Text Editors and Formatters:

- EDT (EDT Editor)
- VAXTPU (VAX Text Processing Utility)
- DSR (DIGITAL Standard Runoff)

Programming Information:

- SYS (System Services)
- RTL (Run-Time Library)
- UTIL (Callable Utility Routines)
- RMS (VAX Record Management Services)

System Management, Operations, Programming Tools:

- MISC (includes utilities without their own DCL commands)

Associated Documents

Complete documentation on the features included in this manual, including conceptual background information, is in the appropriate reference manuals in the complete VAX/VMS document set. The following manuals are particularly useful:

- *Introduction to the VAX/VMS Document Set*
- *VAX/VMS DCL Concepts Manual*
- *VAX/VMS DCL Dictionary*
- *VAX EDT Reference Manual*
- *VAX DIGITAL Standard Runoff (DSR) Reference Manual*
- *VAX Text Processing Utility Reference Manual*
- *Introduction to VAX/VMS System Routines*
- *VAX/VMS System Services Reference Manual*
- *VAX/VMS Run-Time Library Routines Reference Manual*
- *VAX/VMS Utility Routines Reference Manual*
- *VAX Record Management Services Reference Manual*
- Manuals documenting VAX/VMS utilities that have interactive commands (Mail, Monitor, etc.)

This comprehensive Mini-Reference supersedes the following quick-reference booklets:

- *VAX/VMS DCL Commands and Lexical Functions*
- *VAX EDT Quick Reference Guide*
- *VAX DSR Quick Reference Guide*
- *VAX/VMS System Services and Run-Time Library Routines*

Conventions Used in This Document

The following conventions are observed in this manual:

Convention	Meaning
<code>RET</code>	A symbol with a one- to six-character abbreviation indicates that you press a key on the terminal, for example, <code>RET</code> .
<code>CTRL/x</code>	The phrase CTRL/x indicates that you must press the key labeled CTRL while you simultaneously press another key, for example, CTRL/C, CTRL/Y, CTRL/O.
\$ SHOW TIME 05-JUN-1986 11:55:22	Command examples show all output lines or prompting characters that the system prints or displays in black letters. All user-entered commands are shown in red letters.
\$ TYPE MYFILE.DAT . . .	Vertical series of periods, or ellipsis, mean either that not all the data that the system would display in response to the particular command is shown or that not all the data a user would enter is shown.
file-spec, . . .	Horizontal ellipsis indicates that additional parameters, values, or information can be entered.
[logical-name]	Square brackets indicate that the enclosed item is optional. (Square brackets are not, however, optional in the syntax of a directory name in a file specification or in the syntax of a substring specification in an assignment statement.)
quotation marks	Refer to double quotation marks ("). The term apostrophe (') is used to refer to a single quotation mark.

General

General

General Information

GEN.1 Getting Help

You can get help at the DCL level (dollar sign (\$) prompt) on a variety of topics. For example:

Command	Display
HELP	List of topics about which you can request help.
HELP COPY	Information about the DCL command COPY.
HELP COPY/LOG	Information about the /LOG qualifier of the COPY command.
HELP SYSTEM	List of system services about which you can request help.
HELP RTL	List of classes of Run-Time Library routines; you can request more detailed information.

You can also type HELP at the prompt for many interactive utilities (for example, MAIL and PHONE).

GEN-2 General Information

Terminal Function Keys

GEN.2 Terminal Function Keys

Table GEN-1 Terminal Function Keys

Key	Function
RETURN	Transmits the current line to the system for processing. (On some terminals, the RETURN key is labeled CR.) Before a terminal session, initiates login sequence.
CTRL/B or Up arrow	Displays the last command line issued. If pressed again, displays the previous command in the recall buffer. The recall buffer stores the 20 most recently issued commands.
CTRL/C or F6 ¹	During command entry, cancels command processing. CTRL/C is displayed as "Cancel". Certain applications enable CTRL/C as the cancel key. For these applications, CTRL/C cancels the operation in progress. If CTRL/C is not enabled, then the action is changed to an interrupt (CTRL/Y).
CTRL/I	Duplicates the function of the TAB key.
CTRL/K	Advances the current line to the next vertical tab stop.
CTRL/L	Causes the terminal to go to the beginning of the next page. This use of CTRL/L is ignored when the line editing characteristic is enabled.
CTRL/O	Alternately suppresses and continues display of output to the terminal. CTRL/O is displayed as "Output off" and "Output on".
CTRL/Q	Resumes terminal output that was suspended by CTRL/S.
CTRL/R	Retypes the current input line and leaves the cursor positioned at the end of the line.
CTRL/S	Suspends terminal output until CTRL/Q is pressed.
CTRL/T	Momentarily interrupts terminal output to display a line of statistical information about the current process. SET CONTROL=T must be specified in the systemwide login command file, or by the user (in LOGIN.COM or interactively). The display includes your node and user name, the time, the name of the image you are running, and information about system resources you have used during your current terminal session.
CTRL/U	Discards from start of line to (but not including) current position on the current input line.

¹This key is available only on an LK201 keyboard.

Table GEN-1 (Cont.) Terminal Function Keys

Key	Function
CTRL/X	Discards from start of line to (but not including) the current position on the current line, and deletes data in the type-ahead buffer.
CTRL/Y	During command entry, interrupts command processing. CTRL/Y echoes as "Interrupt". You can disable CTRL/Y with the command SET NOCONTROL=Y. Under most conditions, CTRL/Y will return the user to the DCL prompt. The program running will still be active. You can enter any of the commands performed within the command interpreter (see table in the <i>VAX/VMS DCL Concepts Manual</i>), and then continue the program by entering the CONTINUE command.
CTRL/Z or F10 ¹	Signals the end of the file for data entered from the terminal. CTRL/Z is displayed as "Exit".
DELETE	Deletes the last character entered at the terminal. (On some terminals, the DELETE key is labeled DEL or RUBOUT.)
TAB	Moves the printing element or cursor on the terminal to the next tab stop on the terminal. The system provides tab stops at every eighth character position on a line. Tab settings are hardware terminal characteristics that can generally be modified by the user.
Down arrow	Displays the next line in the recall buffer.

¹This key is available only on an LK201 keyboard.

GEN.3 Line Editing Terminal Function Keys

Table GEN-2 Line Editing Terminal Function Keys

Key	Function
CTRL/A or F14 ¹	Switches between overstrike mode and insert mode. The default mode (as set with SET TERMINAL/LINE_EDIT) is reset at the beginning of each line.
CTRL/D or Left arrow	Moves the cursor one character to the left.

¹This key is available only on an LK201 keyboard.

GEN-4 General Information

Line Editing Terminal Function Keys

Table GEN-2 (Cont.) Line Editing Terminal Function Keys

Key	Function
CTRL/E	Moves the cursor to the end of the line.
CTRL/F or Right arrow	Moves the cursor one character to the right.
CTRL/H or BACKSPACE or F12 ¹	Moves the cursor to the beginning of the line.
CTRL/J or LINEFEED or F13 ¹	Deletes the word to the left of the cursor.
CTRL/U	Deletes characters from the beginning of the line to the cursor. (This overrides the standard CTRL/U function, which discards the current input line.)
CTRL/V	Allows you to enter one of the line editing function keys without the key performing its line editing function. CTRL/V acts as a quote character, allowing you to input a control character without having the terminal interpret the character.
F7,F8,F9,F11	Reserved to DIGITAL

¹This key is available only on an LK201 keyboard.

GEN.4 File Specification Format

node::device:[directory]file-name.type;version

Example:

BOSTON : :WORK3 : [SMITH]VERIFY_INPUT_DATA.FOR;7

GEN.4.1 File Specification Defaults

Table GEN-3 File Specification Defaults

Field	Defaults
node	The system assumes that the device is on the local system.
device	The system uses the device (usually a disk) established at login or by the SET DEFAULT command. Devices are usually identified by logical names. If a physical device name is used and a controller designation is omitted, the controller designation defaults to A. If a unit number is omitted, the unit number defaults to 0. (The ALLOCATE, MOUNT, and SHOW DEVICES commands, however, treat a device name that does not contain controller and/or unit numbers as a generic device name.) For more details, see the discussions of these commands in the <i>VAX/VMS DCL Dictionary</i>.
directory	The system uses the directory name established at login or by the SET DEFAULT command.
file-name	No defaults are applied to the first file name in an input file specification. Most commands apply default output file names based on the file name of an input file.
type	Various commands apply defaults for file types, based on the standard file type conventions summarized in Table GEN-4.
version	For input files, the system assumes the highest version number. For output files, if no file with the specified file name and file type exists in the current directory, the file is created with a version number of 1. However, if one or more versions do exist, the new file's version number is one higher than the current highest version number.

GEN.4.2 Default File Types

Table GEN-4 Default File Types

File Type	Contents
ANL	Output file for the ANALYZE command
BJL	BACKUP journal file
CLD	Command description file

GEN-6 General Information

File Specification Format

Table GEN-4 (Cont.) Default File Types

File Type	Contents
COM	Command procedure file to be executed with the @ (Execute Procedure) command, or to be submitted for batch execution with the SUBMIT command
DAT	Input or output data file
DIF	Output listing created by the DIFFERENCES command
DIR	Directory file
DIS	Distribution list file for the MAIL command
DMP	Output listing created by the DUMP command
EDT	Initialization command input file for the EDT Editor
EXE	Image file created by the VAX/VMS Linker
FDL	File definition language file
HLB	Help text library file
HLP	Input source file for help libraries
INI	Initialization file
JNL	Journal file created by the VAX/VMS Patch Utility
JOU	Journal file created by the EDT Editor
LIS	Listing file created by a language compiler or assembler; default input file type for PRINT and TYPE commands
LOG	Batch job output file
MAI	Mail message file
MAP	Memory allocation map created by the VAX/VMS Linker
MAR	Input source file for the VAX MACRO assembler
MEM	Output file for DIGITAL Standard Runoff
MLB	Macro library for the VAX MACRO assembler
MSG	Source file that specifies the text of messages
OBJ	Object file created by a language compiler or assembler
OLB	Object module library
OPT	Options file for input to the LINK command
PAR	SYSGEN parameter file
RNO	Input source file for DIGITAL Standard Runoff
STB	Symbol table file created by the VAX/VMS Linker
SYS	System image
TEC	TECO indirect command file
TJL	Journal file created by the VAXTPU and ACL editors

Table GEN-4 (Cont.) Default File Types

File Type	Contents
TLB	Text library
TMP	Temporary file
TPU	Command file for the VAXTPU Editor
TXT	Input file for text libraries or MAIL command output
UPD	Update file of changes for a VAX MACRO source program; also input to the SUMSLP Editor

GEN.5 Device Names

Table GEN-5 Device Types

Code	Device Type
CR	Card reader
CS	Console storage device
DA	RC25 cartridge disk
DB	RP05, RP06 disk
DD	TU58 cartridge tape
DJ	RA60 Disk
DL	RL02 cartridge disk
DM	RK06, RK07 cartridge disk
DQ	RL02 cartridge disk, R80 disk (730 IDC only)
DR	RM03, RM05, RM80, RP07 disk
DU	RA80, RA81 disk
DX	RX01 floppy diskette
DY	RX02 floppy diskette
LA	LPA11-K laboratory peripheral accelerator
LC	Line printer on DMF32
LP	Line printer on LP11
LT	Local area terminal
MB	Mailbox
MF	TU78 magnetic tape

GEN-8 General Information

Device Names

Table GEN-5 (Cont.) Device Types

Code	Device Type
MS	TS11 magnetic tape
MT	TE16, TU45, TU77 magnetic tape
MU	TA78, TA81, TK50, TU81 magnetic tape
NET	Network communications logical device
NL	System "null" device
OP	Operator's console
RT	Remote terminal
TT	Interactive terminal
TX	Interactive terminal
VT	Virtual terminal
XA	DR11-W general purpose DMA interface
XD	DMP11 synchronous communications line
XE	DEUNA synchronous communications line
XF	DR32 interface adapter
XG	DMF32 synchronous communications line
XJ	DUP11 synchronous communications line
XM	DMC11 synchronous communications line
XQ	DEQNA synchronous communications line

GEN.6 Process Privileges

Table GEN-6 Process Privileges

Privilege	Allows [Disallows] Process to
[NO]ACNT	Create processes for which no accounting messages are written
[NO]ALL	Have all process privileges
[NO]ALLSPOOL	Allocate spooled devices
[NO]ALTPRI	Set priority values
[NO]BUGCHK	Make bugcheck error log entries
[NO]BYPASS	Bypass UIC protection

Table GEN-6 (Cont.) Process Privileges

Privilege	Allows [Disallows] Process to
[NO]CMEXEC	Change its mode to executive
[NO]CMKRNL	Change its mode to kernel
[NO]DETACH	Create detached processes
[NO]DIAGNOSE	Issue diagnostic I/O requests
[NO]EXQUOTA	Exceed its quotas
[NO]GROUP	Control other processes in the same group
[NO]GRPNAM	Place names in the group logical name table
[NO]GRPPRV	Access files in its own group with all the access rights granted to the system category of user for those files
[NO]LOG_IO	Issue logical I/O requests to a device
[NO]MOUNT	Issue a mount volume QIO request
[NO]NETMBX	Create a network device
[NO]OPER	Perform operator functions
[NO]PFNMAP	Create or delete sections mapped by page frame number
[NO]PHY_IO	Issue physical I/O requests to a device
[NO]PRMCEB	Create permanent common event flag clusters
[NO]PRMGBL	Create permanent global sections
[NO]PRMMBX	Create permanent mailboxes
[NO]PSWAPM	Alter its swap mode
[NO]READALL	Bypass existing restrictions that would otherwise prevent the process from reading a file
[NO]SECURITY	Perform security-related functions such as enabling or disabling security audits or setting the system password
[NO]SETPRV	Give higher privileges to other processes
[NO]SHARE	Assign a channel to a device, even if the channel is allocated to another process or subprocess
[NO]SHMEM	Create or delete data structures in shared memory
[NO]SYSGBL	Create system global sections
[NO]SYSLCK	Request locks on systemwide resources
[NO]SYSNAM	Place names in the system logical name table
[NO]SYSPRV	Access files and other resources as if the user has a system UIC
[NO]TMPMBX	Create temporary mailboxes
[NO]VOLPRO	Override volume protection
[NO]WORLD	Affect processes outside the user's group

GEN-10 General Information
Resource Quotas

GEN.7 Resource Quotas

Table GEN-7 Resource Quotas

Name	Quota
ASTLM	AST (asynchronous system trap) limit
BIOLM	Buffered I/O limit
BYTLM	Buffered I/O byte count (buffer space) quota
CPUTIME	CPU time limit
DIOLM	Direct I/O limit
ENQLM	Enqueue limit
FILLM	Open file quota
JTQUOTA	Initial byte quota for job logical name table
MAXACCTJOBS	Maximum active processes for an account
MAXDETACH	Maximum detached processes for a user name
MAXJOBS	Maximum active processes for a user name
PGFLQUOTA	Paging file quota
PRCLM	Subprocess quota
SHRFILLM	Maximum number of open shared files
TQELM	Timer queue entry quota
WSDEFAULT	Default working set size
WSEXTENT	Working set extent quota
WSQUOTA	Working set size quota

DCL Commands, Utilities, and Lexical Functions

This section lists DCL commands, with their parameters and qualifiers. For those DCL commands invoking utilities that have their own interactive commands (for example, MAIL), the utility's commands are listed also. For certain commands, other information is provided.

Lexical functions are listed as F\$... entries.

Utilities that do not have their own DCL commands, but are instead invoked by the RUN command (for example, SYSGEN), are listed in the last section of this manual, "System Management, Operations, and Programming Tools."

symbol-name [=] expression
symbol-name[bit-position,size] [=] replacement-expression

symbol-name :[=] string
symbol-name[offset,size] :[=] replacement-string

@file-spec [p1 [p2 [... p8]]]

/OUTPUT=file-spec

ACCOUNTING file-spec[,...]

/ACCOUNT=(["-",]account-name[,...]) /NOACCOUNT (default)
/ADDRESS=(["-",]node-address[,...]) /NOADDRESS (default)
/BEFORE=[time] /NOBEFORE (default)
/BINARY /NOBINARY (default)
/ENTRY=(["-",]queue-entry[,...]) /NOENTRY (default)
/FULL /NOFULL (default)
/IDENTIFICATION=(["-",]process-id[,...]) /NOIDENTIFICATION (default)
/IMAGE=(["-",]image-name[,...]) /NOIMAGE (default)
/JOB=(["-",]job-name[,...]) /NOJOB (default)
/LOG /NOLOG (default)
/NODE=(["-",]node-name[,...]) /NONODE (default)

DCL-2 DCL Commands, Utilities, and Lexical Functions

/OUTPUT[=file-spec] /NOOUTPUT
/OWNER=(["-",]owner-process-id[,...]) /NOOWNER (default)
/PRIORITY=(["-",]priority[,...]) /NOPRIORITY (default)
/PROCESS=(["-",]process-type[,...]) /NOPROCESS (default)
/QUEUE=(["-",]queue-name[,...]) /NOQUEUE (default)
/REJECTED[=file-spec] /NOREJECTED (default)
/REMOTE_ID=(["-",]remote-id[,...]) /NOREMOTE_ID (default)
/REPORT[(report-item[,...])] /NOREPORT (default)
/SINCE[=time] /NOSINCE (default)
/SORT=[(-[sort-item[,...]])] /NOSORT (default)
/STATUS=(["-",]exit-status[,...]) /NOSTATUS (default)
/SUMMARY=(summary-item[,...]) /NOSUMMARY (default)
/TERMINAL=(["-",]terminal-name[,...]) /NOTERMINAL (default)
/TITLE=title /NOTITLE (default)
/TYPE=(["-",]record-type[,...]) /NOTYPE (default)
/UIC=(["-",]uic[,...]) /NOUIC (default)
/USER=(["-",]user-name[,...]) /NOUSER (default)

ALLOCATE device-name[:][,...] [logical-name[:]]

/GENERIC /NOGENERIC (default)
/LOG (default) /NOLOG

ANALYZE/CRASH_DUMP file-spec

/CRASH_DUMP
/RELEASE
/SYSTEM
/SYMBOL[=file-spec]

Interactive Commands: See ANALYZE/SYSTEM for SDA commands.

ANALYZE/DISK_STRUCTURE device-name:

/CONFIRM /NOCONFIRM (default)
/LIST[=file-spec] /NOLIST (default)
/READ_CHECK /NOREAD_CHECK (default)
/REPAIR /NOREPAIR (default)
/USAGE[=file-spec]

ANALYZE/ERROR_LOG [file-spec[,...]]

/BEFORE[=time]
/BINARY[=file-spec] /NOBINARY
/BRIEF
/ENTRY[(start:decimal-value[,end:decimal-value])]
/EXCLUDE=(device or entry-type[,...])
/FULL /NOFULL

```
/INCLUDE=(device or entry-type[,...])  
/INTERACTIVE_MODE    /NOINTERACTIVE_MODE  
/LOG    /NOLOG  
/OUTPUT[=file-spec]  
/PAGE    /NOPAGE  
/REGISTER_DUMP  
/REJECTED[=file-spec]  
/SID_REGISTER[=%Xhexadecimal-value]  
/SINCE[=time]  
/STATISTICS  
/SUMMARY[=summary-type[,...]]  
/UNKNOWN
```

ANALYZE/IMAGE file-spec [,...]

```
/FIXUP_SECTION  
/GST  
/HEADER  
/INTERACTIVE    /NOINTERACTIVE (default)  
/OUTPUT=file-spec  
/PATCH_TEXT
```

ANALYZE/MEDIA device

```
/BAD_BLOCKS=[list]  
/EXERCISE=(FULL,[NO]KEEP,PATTERN)    /NOEXERCISE (default)  
/LOG    /NOLOG (default)  
/OUTPUT[=file-spec]  
/RETRY    /NORETRY (default)  
/SHOW
```

ANALYZE/OBJECT file-spec[,...]

```
/DBG  
/EOM  
/GSD  
/INCLUDE[=(module[,...])]  
/INTERACTIVE    /NOINTERACTIVE (default)  
/LNK  
/MHD  
/OUTPUT[=file-spec]  
/TBT  
/TIR
```

ANALYZE/PROCESS_DUMP dump-file

```
/FULL  
/IMAGE=image-name    /NOIMAGE
```

DCL-4 DCL Commands, Utilities, and Lexical Functions

/INTERACTIVE /NOINTERACTIVE (default)
/MISCELLANEOUS
/OUTPUT=file-spec
/RELOCATION

ANALYZE/RMS_FILE file-spec[...]

/CHECK
/FDL
/INTERACTIVE
/OUTPUT=file-spec /NOOUTPUT
/STATISTICS
/SUMMARY

Interactive Commands:

AGAIN
BACK [n]
DOWN [branch]
DUMP n
EXIT
FIRST
HELP [keyword...]
NEXT [n]
POSITION/BUCKET bucket-vbn [/INDEX=n]
POSITION/RECORD record-offset
REST
TOP
UP

ANALYZE/SYSTEM

Interactive Commands:

@ (Execute Procedure)
ATTACH
/PARENT
COPY
DEFINE
/ECHO
/IF_STATE
/KEY
/SET_STATE=state_name
/TERMINATE

EVALUATE
 /CONDITION_VALUE
 /PSL
 /PTE
 /SYMBOLS
EXAMINE
 /ALL
 /CONDITION_VALUE
 /INSTRUCTION
 /NOSKIP
 /NOSUPPRESS
 /P0
 /P1
 /PSL
 /PTE
 /SYSTEM
 /TIME
EXIT
FORMAT
 /TYPE=block_type
HELP
READ
 /RELOCATE=expression
REPEAT
SEARCH
 /LENGTH=length_specifier
 /STEPS=step_factor
SET LOG
SET OUTPUT
SET PROCESS
 /INDEX=index_value
 /SYSTEM
SET RMS
SHOW CLUSTER
 /CSID=n
 /SCS
SHOW CONNECTIONS
 /ADDRESS=n
SHOW CRASH
SHOW DEVICE
 /ADDRESS=n
SHOW HEADER
SHOW LOCK
 /ALL

DCL-6 DCL Commands, Utilities, and Lexical Functions

SHOW PAGE_TABLE

/GLOBAL

/SYSTEM

/ALL

SHOW PFN_DATA

/ALL

/BAD

/FREE

/MODIFIED

/SYSTEM

SHOW POOL

/ALL

/FREE

/HEADER

/IRP

/LRP

/NONPAGED

/PAGED

/SRP

/SUMMARY

/TYPE=block_type

SHOW PORTS

/ADDRESS=n

SHOW PROCESS

/ALL

/CHANNEL

/INDEX=nn

/LOCKS

/P0

/P1

/PAGE_TABLES

/PCB

/PHD

/PROCESS_SECTION_TABLE

/REGISTERS

/RMS=option

/SYSTEM

/WORKING_SET

SHOW RESOURCE

/ALL

/LOCKID=nn

SHOW RMS

SHOW RSPID

/CONNECTION=n

```

SHOW STACK
  /ALL
  /EXECUTIVE
  /INTERRUPT
  /KERNEL
  /SUPERVISOR
  /USER
SHOW SUMMARY
  /IMAGE
SHOW SYMBOL
  /ALL
SPAWN
  /INPUT=filespec
  /NOLOGICAL_NAMES
  /NOSYMBOLS
  /NOTIFY
  /NOWAIT
  /OUTPUT=filespec
  /PROCESS=process_name
VALIDATE QUEUE
  /SELF_RELATIVE

```

APPEND input-file-spec[...] output-file-spec

```

  /ALLOCATION=n
  /BACKUP
  /BEFORE[=time]
  /BY_OWNER[=uic]
  /CONFIRM    /NOCONFIRM (default)
  /CONTIGUOUS /NOCONTIGUOUS
  /CREATED (default)
  /EXCLUDE=(file-spec[,...])
  /EXPIRED
  /EXTENSION=n
  /LOG    /NOLOG (default)
  /MODIFIED
  /NEW_VERSION    /NONEW_VERSION (default)
  /PROTECTION=(code)
  /READ_CHECK    /NOREAD_CHECK (default)
  /SINCE[=time]
  /WRITE_CHECK    /NOWRITE_CHECK (default)

```

ASSIGN equivalence-name[...] logical-name[:]

```

  /EXECUTIVE_MODE
  /GROUP

```

DCL-8 DCL Commands, Utilities, and Lexical Functions

```
/JOB  
/LOG (default) /NOLOG  
/NAME__ATTRIBUTES[=(keyword[,...])]  
/PROCESS (default)  
/SUPERVISOR__MODE (default)  
/SYSTEM  
/TABLE=name  
/TRANSLATION__ATTRIBUTES[=(keyword[,...])]  
/USER__MODE
```

ASSIGN/MERGE target-queue[:] source-queue[:]

ASSIGN/QUEUE queue-name[:] logical-queue-name[:]

ATTACH [process-name]

```
/IDENTIFICATION=pid
```

BACKUP input-specifier output-specifier

```
/BACKUP  
/BEFORE=time  
/BLOCK__SIZE=n  
/BRIEF  
/BUFFER__COUNT=n  
/COMMENT=string  
/COMPARE  
/CONFIRM  
/CRC (default) /NOCRC  
/CREATED  
/DELETE  
/DENSITY=n  
/EXCLUDE=(file-spec[,...])  
/EXPIRED  
/FAST  
/FULL  
/GROUP__SIZE=n  
/IGNORE=option  
/IMAGE  
/INCREMENTAL  
/INITIALIZE /NOINITIALIZE (default)  
/INTERCHANGE  
/JOURNAL[=file-spec]  
/LABEL=(string[,...])  
/LIST[=file-spec]  
/LOG /NOLOG (default)  
/MODIFIED
```

```

/NEW_VERSION
/OVERLAY
/OWNER_UIC=[uic]
/PHYSICAL
/PROTECTION=[(code)]
/RECORD
/REPLACE
/REWIND      /NOREWIND (default)
/SAVE_SET
/SELECT=(file-spec[...])
/SINCE=time
/TRUNCATE    /NOTRUNCATE (default)
/VERIFY
/VOLUME=n

CALL label [p1[p2[... p8]]]
    /OUTPUT=file-spec

CANCEL [process-name]
    /IDENTIFICATION=pid

CLOSE logical-name[:]
    /ERROR=label
    /LOG (default)    /NOLOG

CONNECT virtual-terminal-name
    /CONTINUE    /NOCONTINUE (default)
    /LOGOUT (default)    /NOLOGOUT

CONTINUE

CONVERT input-file-spec[,...] output-file-spec
    /APPEND      /NOAPPEND
    /CREATE      /NOCREATE
    /EXCEPTIONS_FILE=[file-spec]    /NOEXCEPTIONS_FILE
    /EXIT        /NOEXIT
    /FAST_LOAD    /NOFAST_LOAD
    /FDL=file-spec
    /FILL_BUCKETS    /NOFILL_BUCKETS
    /FIXED_CONTROL    /NOFIXED_CONTROL
    /KEY[=n]
    /MERGE
    /PAD[=[%b]x]    /NOPAD
    /PROLOG=n

```


DCL-10 DCL Commands, Utilities, and Lexical Functions

/READ_CHECK /NOREAD_CHECK
/SHARE /NOSHARE
/SORT /NOSORT
/STATISTICS /NOSTATISTICS
/TRUNCATE /NOTRUNCATE
/WORK_FILES=n
/WRITE_CHECK /NOWRITE_CHECK

CONVERT/RECLAIM file-spec

/STATISTICS /NOSTATISTICS

COPY input-file-spec[,...] output-file-spec

/ALLOCATION=n
/BACKUP
/BEFORE[=time]
/BY_OWNER[=uic]
/CONCATENATE (default) /NOCONCATENATE
/CONFIRM /NOCONFIRM (default)
/CONTIGUOUS /NOCONTIGUOUS
/CREATED (default)
/EXCLUDE=(file-spec[,...])
/EXPIRED
/EXTENSION=n
/LOG /NOLOG (default)
/MODIFIED
/OVERLAY /NOOVERLAY (default)
/PROTECTION=(code)
/READ_CHECK /NOREAD_CHECK (default)
/REPLACE /NOREPLACE (default)
/SINCE[=time]
/TRUNCATE /NOTRUNCATE (default)
/VOLUME=n
/WRITE_CHECK /NOWRITE_CHECK (default)

CREATE file-spec[,...]

/LOG /NOLOG (default)
/OWNER_UIC=uic
/PROTECTION=(code)
/VOLUME=n

CREATE/DIRECTORY directory-spec[,...]

/LOG /NOLOG (default)
/OWNER_UIC[=option]
/PROTECTION=(code)

```

/VERSION_LIMIT=n
/VOLUME=n
CREATE/FDL=fdl-file-spec [file-spec]
/LOG /NOLOG
CREATE/NAME_TABLE table-name
/ATTRIBUTES[=(keyword[,...])]
/EXECUTIVE_MODE
/LOG /NOLOG (default)
/PARENT_TABLE=table
/PROTECTION
/QUOTA=bytes
/SUPERVISOR_MODE (default)
/USER_MODE
DEALLOCATE device-name[:]
/ALL
DEASSIGN [logical-name[:]]
/ALL
/EXECUTIVE_MODE
/GROUP
/JOB
/PROCESS (default)
/SUPERVISOR_MODE (default)
/SYSTEM
/TABLE=name
/USER_MODE
DEASSIGN/QUEUE logical-queue-name[:]
DEBUG

```

Interactive Commands:

```

ALLOCATE
@filespec
ATTACH
CALL
/[NO]AST
CANCEL ALL

```

DCL-12 DCL Commands, Utilities, and Lexical Functions

CANCEL BREAK
/ALL
/BRANCH
/CALL
/EVENT=event-name
/EXCEPTION
/INSTRUCTION
/LINE
CANCEL DISPLAY
/ALL
CANCEL EXCEPTION BREAK
CANCEL IMAGE
/ALL
CANCEL MODE
CANCEL MODULE
/ALL
/[NO]RELATED
CANCEL RADIX
/OVERRIDE
CANCEL SCOPE
CANCEL SOURCE
/EDIT
/MODULE=module-name
CANCEL TRACE
/ALL
/BRANCH
/CALL
/EVENT=event-name
/EXCEPTION
/INSTRUCTION
/LINE
CANCEL TYPE/OVERRIDE
CANCEL WATCH
/ALL
CANCEL WINDOW
/ALL

CTRL/C

CTRL/W

CTRL/Y

CTRL/Z

DECLARE

```
DEFINE
  /ADDRESS
  /COMMAND
  /LOCAL
  /VALUE
DEFINE/KEY
  /[NO]ECHO
  /[NO]IF_STATE=(state-name[,...])
  /[NO]LOCK_STATE
  /[NO]LOG
  /[NO]SET_STATE=state-name
  /[NO]TERMINATE
DELETE
  /ALL
  /LOCAL
DELETE/KEY
  /ALL
  /[NO]LOG
  /[NO]STATE=(state-name[,...])
DEPOSIT
  /ASCIC
  /ASCID
  /ASCII:n
  /ASCIW
  /ASCIZ
  /BYTE
  /D_FLOAT
  /DATE_TIME
  /FLOAT
  /G_FLOAT
  /H_FLOAT
  /INSTRUCTION
  /LONGWORD
  /OCTAWORD
  /PACKED:n
  /QUADWORD
  /TASK
  /TYPE=type-expression
  /WORD
DISABLE AST
```

DCL-14 DCL Commands, Utilities, and Lexical Functions

DISPLAY
/CLEAR
/[NO]DYNAMIC
/GENERATE
/HIDE
/[NO]MARK_CHANGE
/[NO]POP
/[NO]PUSH
/REFRESH
/REMOVE
/SIZE:n

EDIT
/[NO]EXIT
ENABLE AST
EVALUATE
/BINARY
/CONDITION_VALUE
/DECIMAL
/HEXADECIMAL
/OCTAL

EVALUATE/ADDRESS
/BINARY
/DECIMAL
/HEXADECIMAL
/OCTAL

EXAMINE
/ASCIC
/ASCID
/ASCII:n
/ASCIW
/ASCIZ
/BINARY
/BYTE
/CONDITION_VALUE
/D_FLOAT
/DATE_TIME
/DECIMAL
/DEFAULT
/FLOAT
/G_FLOAT
/H_FLOAT
/HEXADECIMAL
/INSTRUCTION
/[NO]LINE

```
/LONGWORD
/OCTAL
/OCTAWORD
/PACKED:n
/PSL
/PSW
/QUADWORD
/SOURCE
/[NO]SYMBOL
/TASK
/TYPE=type-expression
/WORD
EXIT
EXITLOOP
EXPAND
  /DOWN:n
  /LEFT:n
  /RIGHT:n
  /UP:n
EXTRACT
  /ALL
  /APPEND
  /SCREEN_LAYOUT
FOR
GO
HELP
IF
MOVE
  /DOWN:n
  /LEFT:n
  /RIGHT:n
  /UP:n
QUIT
REPEAT
SAVE
SCROLL
  /BOTTOM
  /DOWN:n
  /LEFT:n
  /RIGHT:n
  /TOP
  /UP:n
```

DCL-16 DCL Commands, Utilities, and Lexical Functions

SEARCH

/ALL

/IDENTIFIER

/NEXT

/STRING

SELECT

/ERROR

/INPUT

/INSTRUCTION

/OUTPUT

/PROGRAM

/PROMPT

/SCROLL

/SOURCE

SET ATSIGN

SET BREAK [WHEN] [DO]

/AFTER:n

/BRANCH

/CALL

/EVENT=event-name

/EXCEPTION

/INSTRUCTION[=(op-code[,...])]

/INTO

/[NO]JSB

/LINE

/MODIFY

/OVER

/RETURN

/[NO]SHARE

/[NO]SILENT

/[NO]SOURCE

/[NO]SYSTEM

/TEMPORARY

SET DEFINE

SET DISPLAY

/[NO]DYNAMIC

/HIDE

/MARK_CHANGE

/POP

/PUSH

/REMOVE

/SIZE:n

SET EDITOR
 /CALLABLE_EDT
 /CALLABLE_LSEDIT
 /CALLABLE_TPU
 /[NO]START_POSITION
SET EVENT_FACILITY
SET EXCEPTION BREAK
SET IMAGE
 /ALL
SET KEY
 /[NO]LOG
 /[NO]STATE=state-name
SET LANGUAGE
SET LOG
SET MARGINS
SET MAX_SOURCE_FILES
SET MODE
SET MODULE
 /ALL
 /ALLOCATE
 /[NO]RELATED
SET OUTPUT
SET PROMPT
SET RADIX
 /INPUT
 /OUTPUT
 /OVERRIDE
SET SCOPE
 /MODULE
SET SEARCH
SET SOURCE
 /EDIT
 /MODULE=module-name
SET STEP
SET TASK
 /ABORT
 /ACTIVE
 /ALL
 /[NO]HOLD
 /PRIORITY=n
 /RESTORE
 /TIME_SLICE=t
 /VISIBLE

DCL-18 DCL Commands, Utilities, and Lexical Functions

SET TERMINAL

/PAGE:n

/WIDTH:n

SET TRACE

/AFTER:n

/BRANCH

/CALL

/EVENT=event-name

/EXCEPTION

/INSTRUCTION[=(op-code[,...])]

/INTO

/[NO]JSB

/LINE

/MODIFY

/OVER

/RETURN

/[NO]SILENT

/[NO]SOURCE

/[NO]SYSTEM

/TEMPORARY

SET TYPE

/OVERRIDE

SET WATCH

/AFTER:n

/[NO]SILENT

/[NO]SOURCE

/TEMPORARY

SET WINDOW

SHOW AST

SHOW ATSIGN

SHOW BREAK

SHOW CALLS

SHOW DEFINE

SHOW DISPLAY

/ALL

SHOW EDITOR

SHOW EVENT_FACILITY

SHOW EXIT_HANDLERS

SHOW IMAGE

SHOW KEY

/ALL

/BRIEF

/DIRECTORY

/[NO]STATE=(state-name[,...])

SHOW LANGUAGE
SHOW LOG
SHOW MARGINS
SHOW MAX_SOURCE_FILES
SHOW MODE
SHOW MODULE
 /[NO]RELATED
 /[NO]SHARE
SHOW OUTPUT
SHOW RADIX
 /OVERRIDE
SHOW SCOPE
SHOW SEARCH
SHOW SELECT
SHOW SOURCE
 /EDIT
SHOW STACK
SHOW STEP
SHOW SYMBOL
 /ADDRESS
 /DEFINED
 /DIRECT
 /LOCAL
 /TYPE
 /USE_CLAUSE
SHOW TASK
 /ALL
 /CALLS[=n]
 /FULL
 /[NO]HOLD
 /PRIORITY=(n[,...])
 /STATE=(state[,...])
 /STATISTICS
 /TIME_SLICE
SHOW TERMINAL
SHOW TRACE
SHOW TYPE
 /OVERRIDE
SHOW WATCH
SHOW WINDOW
 /ALL
SPAWN
 /NOWAIT

DCL-20 DCL Commands, Utilities, and Lexical Functions

STEP

/BRANCH

/CALL

/EXCEPTION

/INSTRUCTION[=(op-code[,...])]

/INTO

/[NO]JSB

/LINE

/OVER

/RETURN

/[NO]SHARE

/[NO]SILENT

/[NO]SOURCE

/[NO]SYSTEM

SYMBOLIZE

TYPE

UNDEFINE

/ALL

/LOCAL

UNDEFINE/KEY

/ALL

/[NO]LOG

/[NO]STATE=(state-name[,...])

WHILE

\$ DECK

/DOLLARS[=string]

DEFINE logical-name equivalence-name[,...]

/EXECUTIVE_MODE

/GROUP

/JOB

/LOG (default) /NOLOG

/NAME_ATTRIBUTES[=(keyword[,...])]

/PROCESS (default)

/SUPERVISOR_MODE (default)

/SYSTEM

/TABLE=name

/TRANSLATION_ATTRIBUTES[=(keyword[,...])]

/USER_MODE

DEFINE/CHARACTERISTIC characteristic-name characteristic-number

DEFINE/FORM form-name form-number

```

/DESCRIPTION=string
/LENGTH=n
/MARGIN=(option[,...])
/PAGE_SETUP=(module[,...]) /NOPAGE_SETUP (default)
/SETUP=(module[,...])
/SHEET_FEED /NOSHEET_FEED (default)
/STOCK=string
/TRUNCATE (default) /NOTRUNCATE
/WRAP /NOWRAP (default)
/WIDTH=n

```

DEFINE/KEY key-name equivalence-string

```

/ECHO (default) /NOECHO
/ERASE /NOERASE (default)
/IF_STATE=(state-name,...) /NOIF_STATE
/LOCK_STATE /NOLOCK_STATE (default)
/LOG (default) /NOLOG
/SET_STATE=state-name /NOSET_STATE (default)
/TERMINATE /NOTERMINATE (default)

```

DELETE file-spec[,...]

```

/BACKUP
/BEFORE[=time]
/BY_OWNER[=uic]
/CONFIRM /NOCONFIRM (default)
/CREATED (default)
/ERASE /NOERASE (default)
/EXCLUDE=(file-spec[,...])
/EXPIRED
/LOG /NOLOG (default)
/MODIFIED
/SINCE[=time]

```

DELETE/CHARACTERISTIC characteristic-name

DELETE/ENTRY=(entry-number[,...]) queue-name[:]

DELETE/FORM form-name

DELETE/INTRUSION_RECORD source

DCL-22 DCL Commands, Utilities, and Lexical Functions

DELETE/KEY [key-name]

/ALL
/LOG (default) /NOLOG
/STATE=(state-name[,...]) /NOSTATE (default)

DELETE/QUEUE queue-name[:]

DELETE/SYMBOL [symbol-name]

/ALL
/GLOBAL
/LOCAL (default)
/LOG /NOLOG (default)

DEPOSIT location=data[,...]

/ASCII
/BYTE
/DECIMAL
/HEXADECIMAL
/LONGWORD
/OCTAL
/WORD

DIFFERENCES master-file-spec [revision-file-spec]

/CHANGE_BAR[=(format[,...])]
/COMMENT_DELIMITER[=(delimiter[,...])]
/IGNORE=(option[,...])
/MATCH=size
/MAXIMUM_DIFFERENCES=n
/MERGED[=n]
/MODE=(radix[,...])
/NUMBER (default) /NONUMBER
/OUTPUT[=file-spec]
/PARALLEL[=n]
/SEPARATED[=(input-file[,...])]
/SLP
/WIDTH=n
/WINDOW=size

DIRECTORY [file-spec[,...]]

/ACL
/BACKUP
/BEFORE[=time]
/BRIEF (default)
/BY_OWNER[=uic]

```

/COLUMNS=n
/CREATED (default)
/DATE[=option] /NODATE
/EXCLUDE=(file-spec[,...])
/EXPIRED
/FILE_ID
/FULL
/GRAND_TOTAL
/HEADING /NOHEADING
/MODIFIED
/OUTPUT[=file-spec] /NOOUTPUT
/OWNER /NOOWNER (default)
/PRINTER
/PROTECTION /NOPROTECTION (default)
/SECURITY
/SELECT=(keyword[,...])
/SINCE[=time]
/SIZE[=option] /NOSIZE (default)
/TOTAL
/TRAILING /NOTRAILING
/VERSIONS=n
/WIDTH=(keyword[,...])

```

DISCONNECT

```

/CONTINUE /NOCONTINUE (default)

```

DISMOUNT device-name[:]

```

/ABORT
/CLUSTER
/UNIT
/UNLOAD (default) /NOUNLOAD

```

DUMP file-spec [...]

```

/ALLOCATED
/BLOCKS[=(option[,...])]
/BYTE
/DECIMAL
/FILE_HEADER
/FORMATTED (default) /NOFORMATTED
/HEADER
/HEXADECIMAL (default)
/LONGWORD (default)
/NUMBER[=n]
/OCTAL

```

DCL-24 DCL Commands, Utilities, and Lexical Functions

```
/OUTPUT[=file-spec]  
/PRINTER  
/RECORDS[=(option[,...])]  
/WORD
```

EDIT/ACL file-spec

```
/JOURNAL[=file-spec] /NOJOURNAL  
/KEEP=(option[,...])  
/MODE=option  
/OBJECT=type /OBJECT=file  
/RECOVER[=file-spec] /NORECOVER
```

EDIT file-spec

```
/COMMAND[=file-spec] /NOCOMMAND  
/CREATE (default) /NOCREATE  
/JOURNAL[=journal-file] /NOJOURNAL  
/OUTPUT=output-file /NOOUTPUT  
/READ_ONLY /NOREAD_ONLY (default)  
/RECOVER /NORECOVER (default)
```

See also EDT section, under "Text Editors and Formatters."

EDIT/FDL file-spec

```
/ANALYSIS=fdl-file-spec  
/CREATE  
/DISPLAY=graph-option  
/EMPHASIS=tuning-bias  
/GRANULARITY=n  
/NOINTERACTIVE  
/NUMBER_KEYS=n  
/OUTPUT=fdl-file-spec  
/PROMPTING=prompt-option  
/RESPONSES=response-option  
/SCRIPT=script-title /NOSCRIPT
```

Interactive Commands:

```
ADD  
DELETE  
EXIT  
HELP  
INVOKE  
MODIFY  
QUIT
```

SET
VIEW

EDIT/SUM input-file

/HEADER
/LISTING[=file-spec]
/OUTPUT[=file-spec] /NOOUTPUT
/UPDATE[=(update-file-spec[,...])]

EDIT/TECO [file-spec]

EDIT/TECO/EXECUTE=command-file [argument]

/COMMAND[=file-spec] /NOCOMMAND
/CREATE (default) /NOCREATE
/EXECUTE=command-file [argument]
/MEMORY (default) /NOMEMORY
/OUTPUT=output-file /NOOUTPUT (default)
/READ_ONLY /NOREAD_ONLY (default)

EDIT/TPU [file-spec]

/COMMAND[=command-file] (default) /NOCOMMAND
/CREATE (default) /NOCREATE
/DISPLAY[=file-spec] (default) /NODISPLAY
/JOURNAL[=journal-file] (default) /NOJOURNAL
/OUTPUT=output-file (default) /NOOUTPUT
/READ_ONLY /NOREAD_ONLY (default)
/RECOVER /NORECOVER (default)
/SECTION[=file-spec] (default) /NOSECTION

See also VAXTPU section under "Text Editors and Formatters."

\$ EOD

\$ EOJ

EXAMINE location[:location]

/ASCII
/BYTE
/DECIMAL
/HEXADECIMAL
/LONGWORD
/OCTAL
/WORD

EXCHANGE [subcommand] [file-spec] [file-spec]

EXIT [status-code]

DCL-26 DCL Commands, Utilities, and Lexical Functions

F\$CVSI(bit-position,width,string)

F\$CVTIME([input_time] [,output_time] [,field])

F\$CVUI(bit-position,width,string)

F\$DIRECTORY()

F\$EDIT(string,edit-list)

F\$ELEMENT(element-number,delimiter,string)

F\$ENVIRONMENT(item)

F\$EXTRACT(offset,length,string)

F\$FAO(control-string[,arg1,arg2...arg15])

F\$FILE_ATTRIBUTES(file-spec,item)

F\$GETDVI(device-name,item)

F\$GETJPI(pid,item)

F\$GETSYI(item [,node])

F\$IDENTIFIER(identifier,conversion-type)

F\$INTEGER(expression)

F\$LENGTH(string)

F\$LOCATE(substring,string)

F\$LOGICAL(logical-name)

F\$MESSAGE(status-code)

F\$MODE()

F\$PARSE(file-spec [,default-spec] [,related-spec] [,field] [,parse-type])

F\$PID(context-symbol)

F\$PRIVILEGE(priv-states)

F\$PROCESS()

F\$SEARCH(file-spec[,stream-id])

F\$SETPRV(priv-states)

F\$STRING(expression)

F\$TIME()

F\$TRNLNM(logical-name [,table] [,index] [,mode] [,case] [,item])

F\$TYPE(symbol-name)

F\$USER()

F\$VERIFY[[procedure-value] [image-value]]

GOSUB label

GOTO label

HELP [keyword ...]

```

    /INSTRUCTIONS (default)    /NOINSTRUCTIONS
    /LIBLIST (default)        /NOLIBLIST
    /LIBRARY=file-spec        /NOLIBRARY
    /OUTPUT[=file-spec]      /NOOUTPUT
    /PAGE (default)          /NOPAGE
    /PROMPT (default)         /NOPROMPT
    /USERLIBRARY=(table[,...]) /NOUSERLIBRARY

```

IF expression **THEN** [\$] command

INITIALIZE device-name[:] volume-label

```

    /ACCESSED=n
    /BADBLOCKS=(area[,...])
    /CLUSTER_SIZE=n
    /DATA_CHECK[=(option[,...])]
    /DENSITY=density-value
    /DIRECTORIES=n
    /ERASE    /NOERASE (default)
    /EXTENSION=n
    /FILE_PROTECTION=code
    /GROUP
    /HEADERS=n
    /HIGHWATER (default)    /NOHIGHWATER
    /INDEX=position
    /LABEL=option
    /MAXIMUM_FILES=n
    /OVERRIDE=(option[,...])
    /OWNER_UIC=uic
    /PROTECTION=code
    /SHARE (default)    /NOSHARE
    /STRUCTURE=level
    /SYSTEM
    /USER_NAME=string
    /VERIFIED    /NOVERIFIED
    /WINDOWS=n

```

INITIALIZE/QUEUE queue-name[:]

```

/BASE_PRIORITY=n
/BATCH    /NOBATCH (default)
/BLOCK_LIMIT=(lowlim,uplim)    /NOBLOCK_LIMIT (default)
/CHARACTERISTICS=(characteristic[,...])    /NOCHARACTERISTICS (default)
/CPUDEFAULT=time
/CPUMAXIMUM=time
/DEFAULT=(option[,...])    /NODEFAULT
/DISABLE_SWAPPING    /NODISABLE_SWAPPING (default)
/ENABLE_GENERIC (default)    /NOENABLE_GENERIC
/FORM_MOUNTED=type
/GENERIC[(queue-name[,...])]    /NOGENERIC (default)
/JOB_LIMIT=n
/LIBRARY=file-name    /NOLIBRARY
/ON=[node::]device[:] (printer, terminal, server queue)
/OWNER_UIC=uic
/PROCESSOR=file-name    /NOPROCESSOR
/PROTECTION=(codes)
/RECORD_BLOCKING (default)    /NORECORD_BLOCKING
/RETAIN[=option]    /NORETAIN (default)
/SCHEDULE=[NO]SIZE
/SEPARATE=(option[,...])    /NOSEPARATE (default)
/START    /NOSTART (default)
/TERMINAL    /NOTERMINAL (default)
/WSDEFAULT=n
/WSEXTENT=n
/WSQUOTA=n

```

INQUIRE symbol-name [prompt-string]

```

/GLOBAL
/LOCAL (default)
/PUNCTUATION (default)    /NOPUNCTUATION

```

\$ JOB user-name

```

/AFTER=time
/CHARACTERISTICS=(characteristic[,...])
/CLI=file-name
/CPUTIME=n
/DELETE (default)    /NODELETE
/HOLD    /NOHOLD (default)
/KEEP    /NOKEEP (default)
/LOG_FILE=file-spec    /NOLOG_FILE
/NAME=job-name

```

```

/NOTIFY    /NONOTIFY (default)
/PARAMETERS=(parameter[,...])
/PRINTER=queue-name    /NOPRINTER
/PRIORITY=n
/QUEUE=queue-name[:]
/RESTART    /NORESTART (default)
/TRAILING _BLANKS (default)    /NOTRAILING _BLANKS
/WSDEFAULT=n
/WSEXTENT=n
/WSQUOTA=n

```

Lexical Functions See **F\$...** entries.

LIBRARY library-file-spec [input-file-spec[,...]]

```

/BEFORE[=time]
/COMPRESS[=(option[,...])]
/CREATE[=(option[,...])]
/CROSS_REFERENCE[=(option[,...])]
/DATA=option
/DELETE=(module[,...])
/EXTRACT=(module[,...])
/FULL
/GLOBALS    /NOGLOBALS
/HELP
/HISTORY
/INSERT
/LIST[=file-spec]    /NOLIST
/LOG    /NOLOG
/MACRO
/NAMES    /NONAMES
/OBJECT
/ONLY=(module[,...])
/OUTPUT=file-spec
/REMOVE=(symbol[,...])
/REPLACE
/SELECTIVE _SEARCH
/SHARE
/SINCE[=time]
/SQUEEZE    /NOSQUEEZE
/TEXT
/WIDTH=n
/MODULE=module-name

```

DCL-30 DCL Commands, Utilities, and Lexical Functions

LINK file-spec[,...]

/BRIEF
/CONTIGUOUS /NOCONTIGUOUS (default)
/CROSS_REFERENCE /NOCROSS_REFERENCE
/DEBUG[=file-spec] /NODEBUG
/EXECUTABLE[=file-spec] /NOEXECUTABLE
/FULL
/HEADER
/MAP[=file-spec] /NOMAP
/P0IMAGE
/PROTECT
/SHAREABLE[=file-spec] /NOSHAREABLE
/SYMBOL_TABLE[=file-spec] /NOSYMBOL_TABLE
/SYSLIB /NOSYSLIB
/SYSSHR /NOSYSSHR
/SYSTEM[=base-address] /NOSYSTEM
/TRACEBACK (default) /NOTRACEBACK
/USERLIBRARY[=(table[,...])] /NOUSERLIBRARY
/INCLUDE=(module-name[,...])
/LIBRARY
/OPTIONS
/SELECTIVE_SEARCH
/SHAREABLE /SHAREABLE=NOCOPY

CTRL/C **CTRL/Y** <RETURN> (Login procedure)

/CLI=command-language-interpreter
/COMMAND[=file-spec] /NOCOMMAND
/DISK=device-name[:]
/TABLES=(command-table[,...])

LOGOUT

/BRIEF
/FULL
/HANGUP /NOHANGUP

MACRO file-spec[,...]

/CROSS_REFERENCE[=(function[,...])] /NOCROSS_REFERENCE (default)
/DEBUG[=option] /NODEBUG (default)
/DISABLE=(function[,...]) /NODISABLE
/ENABLE=(function[,...]) /NOENABLE
/LIBRARY /NOLIBRARY
/LIST[=file-spec] /NOLIST
/OBJECT[=file-spec] /NOOBJECT

/SHOW[=(function[,...])] /NOSHOW[=(function[,...])]
/UPDATE[=(update-file-spec[,...])] /NOUPDATE

MAIL [file-spec] [recipient-name]

/SUBJECT="text"
/EDIT=[(send,reply[=extract],forward)]
/SELF

Interactive Commands:

ANSWER [file-spec]
/[NO]EDIT
/EXTRACT
/LAST
/[NO]SELF
ATTACH [process-name]
/PARENT
BACK
/[NO]EDIT
COMPRESS [file-spec]
/OUTPUT=out-file-spec
COPY foldername [filename]
/ALL
/[NO]CONFIRM
CURRENT
/[NO]EDIT
DEFINE/KEY key-name string
/[NO]ECHO
/[NO]IF_STATE=state-list
/[NO]LOCK_STATE
/[NO]LOG
/[NO]SET_STATE=state
/[NO]TERMINATE
DELETE [message-number]
/ALL
DIRECTORY [foldername]
/BEFORE=date
/FOLDER
/FULL
/NEW
/SINCE=date
/START=start-point

DCL-32 DCL Commands, Utilities, and Lexical Functions

EDIT [filename]
/COMMAND=ini-file-spec
/CREATE
/JOURNAL=jou-file-spec
/OUTPUT=out-file-spec
/READ
/RECOVER

ERASE

EXIT

EXTRACT file-spec

/ALL
/APPEND
/MAIL
/NOHEADER

FILE foldername [filename]

/ALL
/[NO]CONFIRM

FIRST

/[NO]EDIT

FORWARD

/[NO]EDIT
/NOHEADER

HELP [topic]

LAST

/[NO]EDIT

MAIL [file-spec]

/[NO]EDIT
/LAST
/[NO]SELF
/SUBJECT="text"

MOVE foldername [filename]

/ALL
/[NO]CONFIRM

NEXT

/[NO]EDIT

PRINT

/ALL
/COPIES=n
/NOTIFY
/PRINT
/QUEUE=queue-name

PURGE

/RECLAIM
/STATISTICS

QUIT
READ [foldername] [message-number]
 /BEFORE=date
 /[NO]EDIT
 /NEW
 /SINCE=date
REPLY [file-spec]
 /[NO]EDIT
 /EXTRACT
 /LAST
 /[NO]SELF
SEARCH [search-string]
SELECT [foldername]
 /BEFORE=date
 /NEW
 /SINCE=date
SEND [file-spec]
 /[NO]EDIT
 /LAST
 /[NO]SELF
 /SUBJECT="text"
SET [NO]AUTO_PURGE
SET COPY_SELF command, [command]
SET FILE filename
SET FOLDER
 /BEFORE=date
 /NEW
 /SINCE=date
SET [NO]FORWARD [_user-name],address
 /USER=user-name
SET [NO]MAIL_DIRECTORY [.subdirectory-name]
 /LOG
SET [NO]PERSONAL_NAME "text-string"
SET WASTEBASKET_NAME foldername
SHOW ALL
SHOW AUTO_PURGE
SHOW COPY_SELF
SHOW DELETED
SHOW FILE
SHOW FOLDER
SHOW FORWARD

DCL-34 DCL Commands, Utilities, and Lexical Functions

```
SHOW KEY [key-name]
  /ALL
  /BRIEF
  /DIRECTORY
  /STATE(=state,state,...)
SHOW MAIL _DIRECTORY
SHOW NEW_MAIL _COUNT
SHOW PERSONAL _NAME
SHOW WASTEBASKET_NAME
SPAWN [command]
  /INPUT=file-spec
  /[NO]LOGICAL _NAMES
  /OUTPUT=file-spec
  /PROCESS=subprocess-name
  /[NO]SYMBOLS
  /[NO]WAIT
```

Figure DCL-1 Mail Utility Default Keypad Definitions

PF1 GOLD	PF2 HELP DIR/FOLDER	PF3 EXTRACT/MAIL EXTRACT	PF4 ERASE SELECT MAIL
7 SEND SEND/EDIT	8 REPLY REPLY/EDIT/EXT	9 FORWARD FORWARD/EDIT	— READ/NEW SHOW NEW
4 CURRENT CURRENT/EDIT	5 FIRST FIRST/EDIT	6 LAST LAST/EDIT	, DIR/NEW DIR MAIL
1 BACK BACK/EDIT	2 PRINT PRINT/PR/NOTIF	3 DIR DIR/STAR 99999	ENTER SELECT:
0 NEXT NEXT/EDIT		FILE DELETE	

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MERGE input-file-spec1,input-file-spec2[,...] output-file-spec

```

/CHECK_SEQUENCE    /NOCHECK_SEQUENCE
/COLLATING_SEQUENCE=sequence
/DUPLICATES        /NODUPLICATES
/KEY=(field[,...])
/SPECIFICATION[=file-spec]
/STABLE            /NOSTABLE
/STATISTICS        /NOSTATISTICS
/FORMAT=(file-attribute[,...])
/ALLOCATION=n
/BUCKET_SIZE=n
/CONTIGUOUS
/FORMAT=(record-format[,...])
/INDEXED_SEQUENTIAL
/OVERLAY
/RELATIVE
/SEQUENTIAL

```

MESSAGE file-spec[,...]

```

/FILE_NAME=file-spec    /NOFILE_NAME
/LIST[=file-spec]       /NOLIST
/OBJECT[=file-spec]     /NOOBJECT
/SYMBOLS                /NOSYMBOLS
/TEXT                   /NOTEXT

```

Message Source File Statements:

```

Facility directive .FACILITY
Severity directive .SEVERITY
Base message number directive .BASE
Message definition message-name
END directive .END
Literal directive .LITERAL
Identification directive .IDENT
Listing directives

    Title directive .TITLE
    Page directive .PAGE

```

MONITOR [class-name[,...]]

Interactive Commands:

```

CONVERT file-spec
EXECUTE (@) file-spec
EXIT

```

HELP [command]
INITIALIZE
MONITOR classname[,...]
SET DEFAULT classname[,...]
SHOW DEFAULT

Monitor Class Names:

ALL_CLASSES — Statistics for all classes
CLUSTER — Clusterwide performance statistics
DECNET — DECnet-VAX statistics
DISK — Disk I/O statistics
DLOCK — Distributed lock management statistics
FCP — File control primitive statistics
FILE_SYSTEM_CACHE — File system cache statistics
IO — System I/O statistics
LOCK — Lock management statistics
MODES — Time spent in each of the processor modes
PAGE — Page management statistics
POOL — Statistics on space allocation in the nonpaged dynamic pool
PROCESSES — Statistics on all processes
SCS — System communications services statistics
STATES — Number of processes in each of the scheduler states
SYSTEM — Summary of statistics from other classes

MOUNT device-name[:][,...] [volume-label[,...]] [logical-name[:]]

/ASSIST (default) /NOASSIST
/ACCESSED=n
/AUTOMATIC (default) /NOAUTOMATIC
/BIND=volume-set-name
/BLOCKSIZE=n
/CACHE=(option[,...]) /NOCACHE
/CLUSTER
/COMMENT="string"
/CONFIRM /NOCONFIRM (default)
/COPY (default) /NOCOPY
/DATA_CHECK=(option[,...])
/DENSITY=n
/EXTENSION=n
/FOREIGN
/GROUP
/HDR3 (default) /NOHDR3
/INITIALIZE=CONTINUATION
/JOURNAL (default) /NOJOURNAL
/LABEL (default) /NOLABEL

DCL-38 DCL Commands, Utilities, and Lexical Functions

/MESSAGE (default) /NOMESSAGE
/MOUNT_VERIFICATION (default) /NOMOUNT_VERIFICATION
/OVERRIDE=(option[,...])
/OWNER_UIC=uic
/PROCESSOR=option
/PROTECTION=code
/QUOTA (default) /NOQUOTA
/REBUILD (default) NOREBUILD
/RECORDSIZE=n
/SHADOW=(physical-device-name[:][,...])
/SHARE /NOSHARE (default)
/SYSTEM
/UNLOAD (default) /NOUNLOAD
/WINDOWS=n
/WRITE (default) /NOWRITE

ON condition THEN [\$] command

OPEN logical-name[:] file-spec

/APPEND
/ERROR=label
/READ
/SHARE[=option]
/WRITE

\$ PASSWORD [password]

PATCH file-spec

/ABSOLUTE
/JOURNAL[=file-spec]
/NEW_VERSION (default) /NONEW_VERSION
/OUTPUT[=file-spec]
/UPDATE[=(eco-level[,...])]
/VOLUME[=n]

Interactive Commands:

ALIGN
/BYTE
/WORD
/LONG
/QUAD
/PAGE
CANCEL MODE
CANCEL MODULE
/ALL

CANCEL PATCH_AREA
CANCEL SCOPE
CHECK ECO
CHECK NOT ECO
CREATE
DEFINE
DELETE
 /BYTE
 /WORD
 /LONG
 /OCTAL
 /DECIMAL
 /HEXADECIMAL
 /[NO]ASCII
 /[NO]INSTRUCTION
 /[NO]SYMBOLS
 /[NO]GLOBALS
 /[NO]SCOPE
DEPOSIT
 /BYTE
 /WORD
 /LONG
 /OCTAL
 /DECIMAL
 /HEXADECIMAL
 /[NO]ASCII
 /[NO]INSTRUCTION
 /[NO]SYMBOLS
 /[NO]GLOBALS
 /[NO]SCOPE
 /PATCH_AREA
EVALUATE
 /BYTE
 /WORD
 /LONG
 /OCTAL
 /DECIMAL
 /HEXADECIMAL
 /[NO]ASCII
 /[NO]INSTRUCTION
 /[NO]SYMBOLS
 /[NO]GLOBALS
 /[NO]SCOPE

DCL-40 DCL Commands, Utilities, and Lexical Functions

EXAMINE

- /BYTE
- /WORD
- /LONG
- /OCTAL
- /DECIMAL
- /HEXADECIMAL
- /[NO]ASCII
- /[NO]INSTRUCTION
- /[NO]SYMBOLS
- /[NO]GLOBALS
- /[NO]SCOPE

EXIT

HELP

INSERT

- /OCTAL
- /DECIMAL
- /HEXADECIMAL
- /[NO]INSTRUCTION
- /[NO]SYMBOLS
- /[NO]GLOBALS
- /[NO]SCOPE

REPLACE

- /BYTE
- /WORD
- /LONG
- /OCTAL
- /DECIMAL
- /HEXADECIMAL
- /[NO]ASCII
- /[NO]INSTRUCTION
- /[NO]SYMBOLS
- /[NO]GLOBALS
- /[NO]SCOPE

SET ECO

SET MODE

SET MODULE

- /ALL

SET PATCH_AREA

- /INITIALIZE=size-expression

SET SCOPE

SHOW MODE

SHOW MODULE

SHOW PATCH_AREA

SHOW SCOPE
 UPDATE
 VERIFY
 /BYTE
 /WORD
 /LONG
 /OCTAL
 /DECIMAL
 /HEXADECIMAL
 /[NO]ASCII
 /[NO]INSTRUCTION
 /[NO]SYMBOLS
 /[NO]GLOBALS
 /[NO]SCOPE

PHONE [phone-command]

 /SCROLL /NO_SCROLL
 /SWITCH_HOOK="character"
 /VIEWPORT_SIZE=n

Interactive Commands:

ANSWER
 DIAL
 DIRECTORY
 EXIT
 FACSIMILE
 HANGUP
 HELP
 HOLD
 MAIL
 PHONE
 REJECT
 UNHOLD

PRINT file-spec[,...]

 /AFTER=time /NOAFTER
 /BACKUP /NOBACKUP
 /BEFORE[=time] /NOBEFORE
 /BURST[=keyword] /NOBURST
 /BY_OWNER[=uic] /NOBY_OWNER
 /CHARACTERISTICS=(characteristic[,...])
 /CONFIRM /NOCONFIRM (default)
 /COPIES=n
 /CREATED (default) /NOCREATED

DCL-42 DCL Commands, Utilities, and Lexical Functions

/DELETE /NODELETE (default)
/DEVICE=queue-name[:]
/EXCLUDE=(file-spec[,...]) /NOEXCLUDE
/EXPIRED /NOEXPIRED
/FEED (default) /NOFEED
/FLAG=[keyword] /NOFLAG
/FORM=type
/HEADER /NOHEADER (default)
/HOLD /NOHOLD (default)
/IDENTIFY (default) /NOIDENTIFY
/JOB_COUNT=n
/LOWERCASE /NOLOWERCASE (default)
/MODIFIED /NOMODIFIED
/NAME=job-name
/NOTE=string
/NOTIFY /NONOTIFY (default)
/OPERATOR=string
/PAGES=(lowlim,uplim)
/PARAMETERS=(parameter[,...])
/PASSALL /NOPASSALL (default)
/PRIORITY=n
/QUEUE=queue-name[:]
/REMOTE
/RESTART (default) /NORESTART
/SETUP=module[,...]
/SINCE=[time] /NOSINCE
/SPACE /NOSPACE (default)
/TRAILER=[keyword] /NOTRAILER
/USER=username

PURGE [file-spec[,...]]

/BACKUP
/BEFORE=[time]
/BY_OWNER=[uic]
/CONFIRM /NOCONFIRM (default)
/CREATED (default)
/ERASE /NOERASE (default)
/EXCLUDE=(file-spec[,...])
/EXPIRED
/KEEP=n
/LOG /NOLOG (default)
/MODIFIED
/SINCE=[time]

READ logical-name[:] symbol-name

/DELETE
 /END_OF_FILE=label
 /ERROR=label
 /INDEX=n
 /KEY=string
 /MATCH=option
 /NOLOCK
 /PROMPT=string
 /TIME_OUT=n /NOTIME_OUT (default)

RECALL [command-specifier]

/ALL

RENAME input-file-spec[...] output-file-spec

/BACKUP
 /BEFORE[=time]
 /BY_OWNER[=uic]
 /CONFIRM /NOCONFIRM (default)
 /CREATED (default)
 /EXCLUDE=(file-spec[,...])
 /EXPIRED
 /LOG /NOLOG (default)
 /MODIFIED
 /NEW_VERSION (default) /NONEW_VERSION
 /SINCE[=time]

REPLY ["message-text"]

/ABORT=identification-number
 /ALL
 /BELL
 /BLANK_TAPE=identification-number
 /DISABLE[=(keyword[,...])]
 /ENABLE[=(keyword[,...])]
 /INITIALIZE_TAPE=identification-number
 /LOG /NOLOG
 /NODE[=(node-name[,...])]
 /NOTIFY (default) /NONOTIFY
 /PENDING=identification-number
 /SHUTDOWN
 /STATUS
 /TEMPORARY
 /TERMINAL=(terminal-name[,...])

DCL-44 DCL Commands, Utilities, and Lexical Functions

```
/TO=identification-number  
/URGENT  
/USERNAME[=(username[,...])]  
/WAIT
```

REQUEST "message-text"

```
/REPLY  
/TO[=(operator[,...])]
```

RETURN [status-code]

RUN file-spec

```
/DEBUG    /NODEBUG
```

RUN file-spec

```
/ACCOUNTING (default)    /NOACCOUNTING  
/AST_LIMIT=quota  
/AUTHORIZE    /NOAUTHORIZE (default)  
/BUFFER_LIMIT=quota  
/DELAY=delta-time  
/DETACHED    /NODETACHED  
/DUMP    /NODUMP (default)  
/ENQUEUE_LIMIT=quota  
/ERROR=file-spec  
/EXTENT=quota  
/FILE_LIMIT=quota  
/INPUT=file-spec  
/INTERVAL=delta-time  
/IO_BUFFERED=quota  
/IO_DIRECT=quota  
/JOB_TABLE_QUOTA=quota  
/MAILBOX=unit  
/MAXIMUM_WORKING_SET=quota  
/OUTPUT=file-spec  
/PAGE_FILE=quota  
/PRIORITY=n  
/PRIVILEGES=(privilege[,...])  
/PROCESS_NAME=process-name  
/QUEUE_LIMIT=quota  
/RESOURCE_WAIT (default)    /NORESOURCE_WAIT  
/SCHEDULE=absolute-time  
/SERVICE_FAILURE    /NOSERVICE_FAILURE (default)  
/SUBPROCESS_LIMIT=quota  
/SWAPPING (default)    /NOSWAPPING
```

```
/TIME_LIMIT=limit  
/UIC=uic  
/WORKING_SET=default
```

RUNOFF file-spec[,...]

```
/BACKSPACE  
/BOLD[=n] /NOBOLD  
/CHANGE_BARS[="character"] /NOCHANGE_BARS  
/DEBUG[=(option[,...])] /NODEBUG (default)  
/DEVICE=(option[,...])  
/DOWN[=n] /NODOWN (default)  
/FORM_SIZE=n  
/INTERMEDIATE[=file-spec] /NOINTERMEDIATE (default)  
/LOG /NOLOG (default)  
/MESSAGES=(option[,...])  
/OUTPUT[=file-spec] /NOOUTPUT  
/PAGES=string  
/PAUSE /NOPAUSE (default)  
/REVERSE_EMPHASIS  
RIGHT[=n] /NORIGHT (default except for LN01)  
/SEPARATE_UNDERLINE[="character"]  
/SEQUENCE /NOSEQUENCE (default)  
/SIMULATE /NOSIMULATE (default)  
/UNDERLINE_CHARACTER[="character"] /NOUNDERLINE_CHARACTER  
/VARIANT=string
```

RUNOFF/CONTENTS file-spec[,...] or file-spec[+...]

```
/BOLD  
/DEEPEST_HEADER=n  
/IDENTIFICATION /NOIDENTIFICATION (default)  
/INDENT /NOINDENT (default)  
/LOG /NOLOG (default)  
/OUTPUT[=file-spec] /NOOUTPUT  
/PAGE_NUMBERS=(option[,...])  
/REQUIRE=file-spec /NOREQUIRE (default)  
/SECTION_NUMBERS (default) /NOSECTION_NUMBERS  
/UNDERLINE /NOUNDERLINE (default)
```

RUNOFF/INDEX file-spec[,...] or file-spec[+...]

```
/IDENTIFICATION  
/LINES_PER_PAGE=n  
/LOG  
/OUTPUT[=file-spec] /NOOUTPUT  
/PAGE_NUMBERS=option
```

DCL-46 DCL Commands, Utilities, and Lexical Functions

/REQUIRE=file-spec
/RESERVE=n

SEARCH file-spec[,...] search-string[,...]

/EXACT /NOEXACT (default)
/EXCLUDE=(file-spec[,...])
/FORMAT=option
/HEADING (default) /NOHEADING
/LOG /NOLOG (default)
/MATCH=option
/NUMBERS /NONUMBERS (default)
/OUTPUT=[file-spec] /NOOUTPUT
/REMAINING /NOREMAINING (default)
/STATISTICS /NOSTATISTICS (default)
/WINDOW=[(n1,n2)] /NOWINDOW (default)

SET option

SET ACCOUNTING

/DISABLE=[(keyword[,...])]
/ENABLE=[(keyword[,...])]
/NEW_FILE

SET ACL object-name

/ACL=[(ace[,...])]
/AFTER=ace
/BEFORE=[time]
/BY_OWNER=[uic]
/CONFIRM /NOCONFIRM (default)
/CREATED
/DEFAULT
/DELETE
/EDIT
/EXCLUDE=(file-spec[,...])
/JOURNAL=[file-spec] /NOJOURNAL
/KEEP=(option[,...])
/LIKE=(OBJECT_TYPE=type,OBJECT_NAME=name)
/LOG /NOLOG (default)
/MODE=[NO]PROMPT
/NEW
/OBJECT_TYPE=type
/RECOVER=[file-spec] /NORECOVER (default)
/REPLACE=(ace[,...])
/SINCE=[time]

SET AUDIT

/ALARM
/DEVICE=dev-name[:]
/DISABLE=(keyword[,...])
/ENABLE=(keyword[,...])
/JOURNAL
/NEW_VERSION

SET BROADCAST=(class-name[,...])

SET CARD_READER device-name[:]

/026
/029
/LOG /NOLOG (default)

SET CLUSTER/QUORUM[=quorum-value]

SET COMMAND [file-spec[,...]]

/DELETE=(verb[,...])
/LISTING[=file-spec] /NOLISTING
/OBJECT[=file-spec]
/OUTPUT[=file-spec] /NOOUTPUT
/REPLACE
/TABLE=[file-spec]

Command Definition Utility Statements and Clauses:

Statements

DEFINE SYNTAX syntax-name [verb-clause[,...]]
DEFINE TYPE type-name [type-clause[,...]]
DEFINE VERB verb-name [verb-clause[,...]]
IDENT ident-string
MODULE module-name

The clauses that can be specified with various statements are summarized as follows.

Verb Clauses for DEFINE SYNTAX

DISALLOW expression
IMAGE image-string
NODISALLOWS
NOPARAMETERS
NOQUALIFIERS
PARAMETER param-name [,param-clause[,...]]

DCL-48 DCL Commands, Utilities, and Lexical Functions

param-clause entries:

DEFAULT

LABEL = label-name

PROMPT = prompt-string

VALUE[(param-value-clause[,...])]

param-value-clause entries:

CONCATENATE

DEFAULT = default-string

LIST

NOCONCATENATE

REQUIRED

TYPE = type-name

QUALIFIER qual-name [,qual-clause[,...]]

qual-clause entries:

BATCH

DEFAULT

LABEL = label-name

NEGATABLE

NONNEGATABLE

PLACEMENT = placement-clause

GLOBAL

LOCAL

POSITIONAL

SYNTAX = syntax-name

VALUE[(qual-value-clause[,...])]

ROUTINE routine-name

Parameter and Qualifier Value Clauses

DEFAULT = default-string

LIST

REQUIRED

TYPE = type-name

Type Clause for DEFINE TYPE

KEYWORD keyword-name [,keyword-clause[,...]]

keyword-clause entries:

DEFAULT

LABEL = label-name

NEGATABLE

NONNEGATABLE

SYNTAX = syntax-name

VALUE[(key-value-clause[,...])]

Verb Clauses for DEFINE VERB

DISALLOW expression
 IMAGE image-string
 NODISALLOWS
 NOPARAMETERS
 NOQUALIFIERS
 PARAMETER param-name [,param-clause[,...]]
 QUALIFIER qual-name [,qual-clause[,...]]
 ROUTINE routine-name
 SYNONYM synonym-name

SET [NO]CONTROL[(=T,Y)]

SET DAY

/DEFAULT
 /LOG /NOLOG (default)
 /PRIMARY
 /SECONDARY

SET DEFAULT device-name[:]

SET DEVICE device-name[:]

/ACL
 /AVAILABLE /NOAVAILABLE
 /DUAL_PORT /NODUAL_PORT
 /ERROR_LOGGING /NOERROR_LOGGING
 /LOG /NOLOG (default)
 /SPOOLED[(queue-name[:],intermediate-disk-name[:])] /NOSPOOLED

SET DEVICE/ACL[(=ace[,...])] device-name

/AFTER=ace
 /DELETE
 /EDIT
 /JOURNAL[=file-spec] /NOJOURNAL
 /KEEP=(option[,...])
 /LIKE=object-spec
 /LOG /NOLOG (default)
 /MODE=[NO]PROMPT
 /NEW
 /RECOVER[=file-spec] /NORECOVER (default)
 /REPLACE=(ace[,...])

SET DEVICE/SERVED node-name\$DDcu:

SET DIRECTORY directory-spec[,...]

/ACL
/BACKUP
/BEFORE[=time]
/BY_OWNER[=uic]
/CONFIRM /NOCONFIRM (default)
/CREATED (default)
/EXCLUDE=(directory-spec[,...])
/EXPIRED
/LOG /NOLOG (default)
/MODIFIED
/OWNER_UIC[=uic]
/SINCE[=time]
/VERSION_LIMIT[=n]

SET DIRECTORY/ACL[(=ace[,...])] directory-spec[,...]

/AFTER=ace
/BEFORE[=time]
/BY_OWNER[=uic]
/CONFIRM /NOCONFIRM (default)
/CREATED
/DEFAULT
/DELETE
/EDIT
/EXCLUDE=(directory-spec[,...])
/JOURNAL[=file-spec] /NOJOURNAL
/KEEP=(option[,...])
/LIKE=object-spec
/LOG /NOLOG (default)
/MODE=[NO]PROMPT
/NEW
/RECOVER[=file-spec] /NORECOVER (default)
/REPLACE=(ace[,...])
/SINCE[=time]

SET FILE file-spec[,...]

/ACL
/BACKUP /NOBACKUP (default)
/BEFORE[=time]
/BY_OWNER[=uic]
/CONFIRM /NOCONFIRM (default)
/CREATED
/DATA_CHECK=[([NO]READ,[NO]WRITE)]

```

/END_OF_FILE
/ENTER=new-file-spec
/ERASE_ON_DELETE
/EXCLUDE=(file-spec[,...])
/EXPIRATION_DATE=date    /NOEXPIRATION_DATE
/EXTENSION[=n]
/GLOBAL_BUFFER=n
/JOURNAL=(keyword[,...])
/LOG    /NOLOG (default)
/NODIRECTORY
/OWNER_UIC[=uic]
/PROTECTION[=(code)]
/REMOVE
/SINCE[=time]
/UNLOCK
/TRUNCATE
/VERSION_LIMIT[=n]

```

SET FILE/ACL[=(ace[,...])] file-spec[,...]

```

/AFTER=ace
/BEFORE[=time]
/BY_OWNER[=uic]
/CONFIRM    /NOCONFIRM (default)
/CREATED
/DEFAULT
/DELETE
/EDIT
/EXCLUDE=(file-spec[,...])
/JOURNAL[=file-spec]    /NOJOURNAL
/KEEP=(option[,...])
/LIKE=file-spec
/LOG    /NOLOG (default)
/MODE=[NO]PROMPT
/NEW
/RECOVER[=file-spec]    /NORECOVER (default)
/REPLACE=(ace[,...])
/SINCE[=time]

```

SET HOST node-name

```

/LOG[=file-spec]    /NOLOG (default)

```

SET HOST/DTE terminal-name

/DIAL=(NUMBER:number[,MODEM_TYPE:modem-type])

/LOG[=file-spec] /NOLOG

SET HOST/HSC node-name

/LOG[=file-spec] /NOLOG (default)

SET KEY

/LOG (default) /NOLOG

/STATE=state-name /NOSTATE

SET LOGINS

/INTERACTIVE[=n]

SET MAGTAPE device-name[:]

/DENSITY=density

/END_OF_FILE

/LOG /NOLOG

/LOGSOFT (default) /NOLOGSOFT

/REWIND

/SKIP=option

/UNLOAD

SET MESSAGE [file-spec]

/DELETE

/FACILITY /NOFACILITY

/IDENTIFICATION /NOIDENTIFICATION

/SEVERITY /NOSEVERITY

/TEXT /NOTEXT

SET [NO]ON

SET OUTPUT_RATE[=delta-time]

SET PASSWORD

/GENERATE[=value]

/SECONDARY

/SYSTEM

SET PRINTER printer-name[:]

/CR /NOCR (default)

/FALLBACK /NOFALLBACK (default)

/FF (default) /NOFF

/LA11

```

/LA180
/LOWERCASE /NOLOWERCASE (default)
/LOG /NOLOG (default)
/LP11 (default)
/PAGE=n
/PASSALL /NOPASSALL (default)
/PRINTALL /NOPRINTALL (default)
/TAB /NOTAB (default)
/TRUNCATE (default) /NOTRUNCATE
/UNKNOWN
/UPPERCASE (default) /NOUPPERCASE
/WIDTH=n
/WRAP /NOWRAP (default)

```

SET PROCESS [process-name]

```

/CPU=[NO]ATTACHED
/DUMP /NODUMP (default)
/IDENTIFICATION=pid
/NAME=string
/PRIORITY=n
/PRIVILEGES=(privilege[,...])
/RESOURCE_WAIT /NORESOURCE_WAIT
/RESUME
/SUSPEND /NOSUSPEND
/SWAPPING (default) /NOSWAPPING

```

SET PROMPT[=string]

```

/CARRIAGE_CONTROL (default) /NOCARRIAGE_CONTROL

```

SET PROTECTION[=(code)] file-spec[,...]

```

/CONFIRM /NOCONFIRM (default)
/LOG /NOLOG (default)
/PROTECTION=(code)

```

SET PROTECTION[=(code)]/DEFAULT**SET PROTECTION**[=(code)]/DEVICE device-name[:]

```

/OWNER_UIC=uic

```

SET QUEUE queue-name[:]

```

/BASE_PRIORITY=n
/BLOCK_LIMIT=([lowlim,]uplim) /NOBLOCK_LIMIT
/CHARACTERISTICS=(characteristic[,...]) /NOCHARACTERISTICS
/CPUDEFAULT=time

```

DCL-54 DCL Commands, Utilities, and Lexical Functions

```
/CPUMAXIMUM=time  
/DEFAULT=(option[,...]) /NODEFAULT  
/DISABLE_SWAPPING /NODISABLE_SWAPPING  
/ENABLE_GENERIC /NOENABLE_GENERIC  
/FORM_MOUNTED=type  
/JOB_LIMIT=n  
/OWNER_UIC=uic  
/PROTECTION=(ownership[:access],...)  
/RECORD_BLOCKING /NORECORD_BLOCKING  
/RETAIN[=option] /NORETAIN  
/SCHEDULE=[NO]SIZE  
/SEPARATE=(option[,...]) /NOSEPARATE  
/WSDEFAULT=n  
/WSEXTENT=n  
/WSQUOTA=n
```

SET QUEUE/ENTRY=entry-number queue-name[:]

```
/AFTER=time /NOAFTER  
/BURST[=keyword] /NOBURST  
/CHARACTERISTICS=(characteristic[,...]) /NOCHARACTERISTICS  
/CLI=filename  
/COPIES=n  
/CPUTIME=option  
/FEED /NOFEED  
/FLAG[=keyword] /NOFLAG  
/FORM=type  
/HEADER /NOHEADER  
/HOLD /NOHOLD  
/JOB_COUNT=n  
/KEEP /NOKEEP  
/LOG_FILE=file-spec /NOLOG_FILE  
/LOWERCASE /NOLOWERCASE  
/NAME=job-name  
/NOCHECKPOINT  
/NODELETE  
/NOTE=string  
/NOTIFY /NONOTIFY  
/OPERATOR=string  
/PAGES=([l,u])  
/PARAMETERS=(parameter[,...])  
/PASSALL /NOPASSALL  
/PRINTER[=queue-name] /NOPRINTER  
/PRIORITY=n  
/RELEASE
```

```
/REQUEUE=queue-name[:]  
/RESTART /NORESTART  
/SETUP=module[,...]  
/SPACE /NOSPACE  
/TRAILER[=keyword] /NOTRAILER  
/WSDEFAULT=n  
/WSEXTENT=n  
/WSQUOTA=n
```

SET RESTART_VALUE=string

SET RIGHTS_LIST id-name[,...]

```
/ATTRIBUTES=(keyword[,...])  
/DISABLE  
/ENABLE  
/IDENTIFICATION=pid  
/PROCESS[=process-name]  
/SYSTEM
```

SET RMS_DEFAULT

```
/BLOCK_COUNT=count  
/BUFFER_COUNT=count  
/DISK  
/EXTEND_QUANTITY=n  
/INDEXED  
/MAGTAPE  
/NETWORK_BLOCK_COUNT=count  
/PROLOG=n  
/RELATIVE  
/SEQUENTIAL (default)  
/SYSTEM  
/UNIT_RECORD
```

SET SYMBOL

```
/SCOPE=(keyword,...)
```

SET TERMINAL [device-name[:]]

```
/ADVANCED_VIDEO /NOADVANCED_VIDEO  
/ALTYPEAHD /NOALTYPEAHD  
/ANSI_CRT /NOANSI_CRT  
/APPLICATION_KEYPAD  
/AUTOBAUD /NOAUTOBAUD  
/BLOCK_MODE /NOBLOCK_MODE  
/BRDCSTMBX /NOBRDCSTMBX
```

DCL-56 DCL Commands, Utilities, and Lexical Functions

/BROADCAST (default) /NOBROADCAST
/CRFILL[=formula]
/DEC_CRT[=(value1,value2)] /NODEC_CRT[=(value1,value2)]
/DEVICE_TYPE=terminal-type
/DIALUP /NODIALUP (default)
/DISCONNECT /NODISCONNECT (default)
/DISMISS /NODISMISS (default)
/DMA /NODMA
/ECHO (default) /NOECHO
/EDIT_MODE /NOEDIT_MODE
/EIGHT_BIT /NOEIGHT_BIT
/ESCAPE /NOESCAPE (default)
/FALLBACK /NOFALLBACK
/FRAME=n
/FORM /NOFORM
/FULLDUP /NOFULLDUP (default)
/HALFDUP (default) /NOHALFDUP
/HANGUP /NOHANGUP (default)
/HARDCOPY /NOHARDCOPY
/HOSTSYNC /NOHOSTSYNC (default)
/INQUIRE
/INSERT
/LFFILL[=formula]
/LINE_EDITING /NOLINE_EDITING
/LOCAL_ECHO /NOLOCAL_ECHO (default)
/LOWERCASE /NOLOWERCASE
/MANUAL
/MODEM /NOMODEM
/NUMERIC_KEYPAD (default)
/OVERSTRIKE (default)
/PAGE[=n]
/PARITY[=option] /NOPARITY (default)
/PASTHRU /NOPASTHRU (default)
/PERMANENT
/PRINTER_PORT /NOPRINTER_PORT
/PROTOCOL=DDCMP /PROTOCOL=NONE (default)
/READSYNC /NOREADSYNC (default)
/REGIS /NOREGIS
/SCOPE /NOSCOPE
/SET_SPEED /NOSET_SPEED
/SECURE_SERVER /NOSECURE_SERVER (default)
/SIXEL_GRAPHICS /NOSIXEL_GRAPHICS
/SOFT_CHARACTERS /NOSOFT_CHARACTERS
/SPEED=rate

/SWITCH=DECNET
/SYSPASSWORD /NOSYSPASSWORD (default)
/TAB /NOTAB
/TTSYNC (default) /NOTTSYNC
/TYPE_AHEAD (default) /NOTYPE_AHEAD
/UNKNOWN
/UPPERCASE /NOUPPERCASE
/WIDTH=n
/WRAP (default) /NOWRAP

SET TIME[=time]

SET UIC uic

SET [NO]VERIFY=[([NO]PROCEDURE, [NO]IMAGE)]

SET VOLUME device-spec[:][,...]

/ACCESSED[=n]
/DATA_CHECK[=(option[,...])]
/ERASE_ON_DELETE /NOERASE_ON_DELETE (default)
/EXTENSION[=n]
/FILE_PROTECTION=(code)
/HIGHWATER_MARKING /NOHIGHWATER_MARKING
/LABEL=volume-label
/LOG /NOLOG (default)
/MOUNT_VERIFICATION /NOMOUNT_VERIFICATION
/OWNER_UIC[=uic]
/PROTECTION=(code)
/REBUILD
/RETENTION=(min[,max])
/UNLOAD (default) /NOUNLOAD
/USER_NAME[=user-name]
/WINDOWS[=n]

SET WORKING_SET

/ADJUST (default) /NOADJUST
/EXTENT=n
/LIMIT=n
/LOG /NOLOG (default)
/QUOTA=n

SHOW option

SHOW ACCOUNTING

SHOW ACL

/OBJECT_TYPE=type

SHOW AUDIT

/OUTPUT[=file-spec] /NOOUTPUT

SHOW BROADCAST

/OUTPUT[=file-spec] /NOOUTPUT

SHOW CLUSTER

/BEGINNING=time

/CONTINUOUS

/ENDING=time

/INTERVAL=seconds /INTERVAL=15 (default)

/OUTPUT[=file-spec] /NOOUTPUT

Interactive Commands:

@ (Execute Procedure)

ADD CIRCUITS

/ALL

/TYPE=ALL

/TYPE=[NO]OPEN

ADD CLUSTER

/ALL

ADD CONNECTIONS

/ALL

/TYPE=ALL

/TYPE=[NO]OPEN

ADD COUNTERS

/ALL

ADD CREDITS

/ALL

ADD ERRORS

/ALL

ADD (Field)

ADD LOCAL_PORTS

/ALL

ADD MEMBERS

/ALL

ADD SYSTEMS
 /ALL
 /ID=system-id
 /NODE=node-name
 /TYPE=hardware-type
DEFINE/KEY
 /[NO]ECHO
 /[NO]ERASE
 /[NO]IF_STATE
 /[NO]LOCK_STATE
 /[NO]LOG
 /[NO]SET_STATE
 /[NO]TERMINATE
DESELECT
EXIT
HELP
INITIALIZE
MOVE direction value
PAN direction value
REFRESH
REMOVE CIRCUITS
 /TYPE=ALL
 /TYPE=[NO]OPEN
REMOVE CLUSTER
REMOVE CONNECTIONS
 /TYPE=ALL
 /TYPE=[NO]OPEN
REMOVE COUNTERS
REMOVE CREDITS
REMOVE ERRORS
REMOVE (Field)
REMOVE LOCAL _PORTS
REMOVE MEMBERS
REMOVE SYSTEMS
 /ID=system-id
 /NODE=node-name
 /TYPE=hardware-type
SAVE [file-spec]
SCROLL direction value
SELECT [window-name]
SET AUTO_POSITIONING (ON,OFF)
SET (Field)
 /WIDTH=field-name-width
 /FORMAT=radix

DCL-60 DCL Commands, Utilities, and Lexical Functions

SET FUNCTION function-name
SET INTERVAL
SET SCREEN
WRITE [file-spec]
 /ALL

SHOW CPU

SHOW DEFAULT

SHOW DEVICES [device-name[:]]

 /ALLOCATED
 /BRIEF (default)
 /FILES
 /FULL
 /MOUNTED
 /OUTPUT[=file-spec] /NOOUTPUT
 /SYSTEM /NOSYSTEM
 /WINDOWS

SHOW DEVICES/SERVED

 /ALL
 /COUNT
 /HOST
 /OUTPUT=[filespec]
 /RESOURCE

SHOW ERROR

 /FULL
 /OUTPUT[=file-spec] /OUTPUT=SYS\$OUTPUT (default)

SHOW INTRUSION

 /OUTPUT[=file-spec]
 /TYPE=keyword

SHOW KEY [key-name]

 /ALL
 /BRIEF (default) /NOBRIEF
 /DIRECTORY
 /FULL /NOFULL (default)
 /STATE=(state-name[,...]) /NOSTATE

SHOW LOGICAL [logical-name[:],[...]]

 /ACCESS_MODE=mode
 /ALL (default)

/DESCENDANTS /NODESCENDANTS (default)
/FULL
/GROUP
/JOB
/LITERAL /NOLITERAL
/OUTPUT[=file-spec] /NOOUTPUT
/PROCESS
/RESIDENCE /NORESIDENCE
/STRUCTURE /NOSTRUCTURE (default)
/SYSTEM
/TABLE=(name[,...])

SHOW MAGTAPE device-name[:]

/OUTPUT[=file-spec] /NOOUTPUT

SHOW MEMORY

/ALL (default)
/FILES
/FULL
/OUTPUT[=file-spec] /NOOUTPUT
/PHYSICAL _PAGES
/POOL
/SLOTS

SHOW NETWORK

/OUTPUT[=file-spec] /NOOUTPUT

SHOW PRINTER device-name[:]

/OUTPUT[=file-spec] /NOOUTPUT

SHOW PROCESS [process-name]

/ACCOUNTING
/ALL
/CONTINUOUS
/IDENTIFICATION=pid
/MEMORY
/OUTPUT[=file-spec] /NOOUTPUT
/PRIVILEGES
/QUOTAS
/SUBPROCESSES

SHOW PROTECTION

SHOW QUEUE [queue-name]

/ALL
/BATCH
/BRIEF (default)
/DEVICE
/FILES
/FULL
/OUTPUT[=file-spec] /NOOUTPUT

SHOW QUEUE/CHARACTERISTICS [characteristic-name]

/OUTPUT[=file-spec] /NOOUTPUT

SHOW QUEUE/FORM [form-name]

/BRIEF (default)
/FULL
/OUTPUT[=file-spec] /NOOUTPUT

SHOW QUOTA

/DISK[=device-name[:]]
/USER=uic

SHOW RMS_DEFAULT

/OUTPUT[=file-spec] /NOOUTPUT

SHOW STATUS

SHOW SYMBOL [symbol-name]

/ALL
/GLOBAL
/LOCAL
/LOG (default) /NOLOG

SHOW SYSTEM

/BATCH
/FULL
/NETWORK
/OUTPUT[=file-spec] /NOOUTPUT
/PROCESS (default)
/SUBPROCESS

SHOW TERMINAL [device-name[:]]

/OUTPUT[=file-spec] /NOOUTPUT
/PERMANENT

SHOW [DAY]TIME

SHOW TRANSLATION logical-name

/GROUP
/PROCESS
/SYSTEM
/TABLE=name

SHOW USERS [username]

/OUTPUT[=file-spec] /NOOUTPUT

SHOW WORKIN _SET

/OUTPUT[=file-spec] /NOOUTPUT

SORT input-file-spec[,...] output-file-spec

/COLLATING _SEQUENCE=sequence
/DUPLICATES /NODUPLICATES
/KEY=(field[,...])
/PROCESS=type
/SPECIFICATION[=file-spec]
/STABLE /NOSTABLE
/STATISTICS /NOSTATISTICS
/WORK _FILES=n
/FORMAT=(file-attribute[,...])
/ALLOCATION=n
/BUCKET _SIZE=n
/CONTIGUOUS
/FORMAT=(record-format[,...])
/INDEXED _SEQUENTIAL
/OVERLAY
/RELATIVE
/SEQUENTIAL

SPAWN [command-string]

/CARRIAGE _CONTROL /NOCARRIAGE _CONTROL
/CLI=cli /NOCLI
/INPUT=file-spec
/KEYPAD (default) /NOKEYPAD
/LOG (default) /NOLOG
/LOGICAL _NAMES (default) /NOLOGICAL _NAMES
/NOTIFY /NONOTIFY (default)
/OUTPUT=file-spec
/PROCESS=subprocess-name
/PROMPT[=string]

```

/SYMBOLS (default)    /NOSYMBOLS
/TABLE=command-table
/WAIT (default)    /NOWAIT

```

START/CPU**START/QUEUE** queue-name[:]

```

/ALIGN[=(option[,...])]
/BACKWARD=n
/BASE_PRIORITY=n
/BATCH    /NOBATCH (default)
/BLOCK_LIMIT=[(lowlim,]uplim)    /NOBLOCK_LIMIT
/CHARACTERISTICS=(characteristic[,...])    /NOCHARACTERISTICS
/CPUDEFAULT=time
/CPUMAXIMUM=time
/DEFAULT=(option[,...])    /NODEFAULT
/DISABLE_SWAPPING    /NODISABLE_SWAPPING (default)
/ENABLE_GENERIC (default)    /NOENABLE_GENERIC
/FORM_MOUNTED=type
/FORWARD=n
/GENERIC[=(queue-name[,...])]    /NOGENERIC (default)
/JOB_LIMIT=n
/LIBRARY=file-name    /NOLIBRARY
/NEXT
/ON=[node::]device[:] (printer, terminal, server queue)
/OWNER_UIC=uic
/PROCESSOR=file-name    /NOPROCESSOR
/PROTECTION=(codes)
/RECORD_BLOCKING (default)    /NORECORD_BLOCKING
/RETAIN=[option]    /NORETAIN
/SCHEDULE=[NO]SIZE
/SEARCH="search-string"
/SEPARATE=(option[,...])    /NOSEPARATE
/TERMINAL    /NOTERMINAL
/TOP_OF_FILE
/WSDEFAULT=n
/WSEXTENT=n
/WSQUOTA=n

```

START/QUEUE/MANAGER [file-spec]

```

/BUFFER_COUNT=n
/EXTEND_QUANTITY=n
/NEW_VERSION    /NONEW_VERSION (default)
/RESTART    /NORESTART (default)

```

STOP [process-name]

/IDENTIFICATION=pid

STOP/CPU

STOP/QUEUE queue-name[:]

STOP/QUEUE/ABORT queue-name[:]

STOP/QUEUE/ENTRY=entry-number queue-name[:]

STOP/QUEUE/MANAGER

STOP/QUEUE/NEXT queue-name[:]

STOP/QUEUE/REQUEUE[=queue-name] queue-name[:]

STOP/QUEUE/ENTRY=entry-number/**REQUEUE**[=queue-name] queue-name[:]

/ENTRY=entry-number

/HOLD

/PRIORITY=n

STOP/QUEUE/RESET queue-name[:]

SUBMIT file-spec[,...]

/AFTER=time /NOAFTER

/BACKUP /NOBACKUP

/BEFORE[=time] /NOBEFORE

/BY_OWNER=[uic] /NOBY_OWNER

/CHARACTERISTICS=(characteristic[,...])

/CLI=filename

/CONFIRM /NOCONFIRM (default)

/CPUTIME=option

/CREATED (default) /NOCREATED

/DELETE /NODELETE (default)

/EXCLUDE=(file-spec[,...]) /NOEXCLUDE

/EXPIRED /NOEXPIRED

/HOLD /NOHOLD (default)

/IDENTIFY (default) /NOIDENTIFY

/KEEP /NOKEEP

/LOG_FILE=[file-spec] /NOLOG_FILE

/MODIFIED /NOMODIFIED

/NAME=job-name

/NOTIFY /NONOTIFY (default)

/PARAMETERS=(parameter[,...])

/PRINTER=[queue-name] /NOPRINTER

/PRIORITY=n

DCL-66 DCL Commands, Utilities, and Lexical Functions

```
/QUEUE=queue-name[:]  
/REMOTE  
/RESTART /NORESTART (default)  
/SINCE[=time] /NOSINCE  
/USER=username  
/WSDEFAULT=n  
/WSEXTENT=n  
/WSQUOTA=n
```

SYNCHRONIZE [job-name]

```
/ENTRY=entry-number  
/QUEUE=queue-name[:]
```

TYPE file-spec[,...]

```
/BACKUP  
/BEFORE[=time]  
/BY_OWNER[=uic]  
/CONFIRM /NOCONFIRM (default)  
/CREATED (default)  
/EXCLUDE=(file-spec[,...])  
/EXPIRED  
/MODIFIED  
/OUTPUT[=file-spec] /NOOUTPUT  
/PAGE /NOPAGE (default)  
/SINCE[=time]
```

UNLOCK file-spec[,...]

```
/CONFIRM /NOCONFIRM (default)  
/LOG /NOLOG (default)
```

WAIT delta-time

WRITE logical-name expression[,...]

```
/ERROR=label  
/SYMBOL  
/UPDATE
```

EDT Editor

The material presented here is a supplement to the *Introduction to the EDT Editor* and the *VAX EDT Reference Manual*. It is intended as a summary and memory refresher for the commands and functions covered in the EDT manuals. You should have the *VAX EDT Reference Manual* available for further information on the topics covered.

Included is a summary of all EDT functions, commands, specifiers, and qualifiers. There is also a brief description of these special EDT features:

- Journal Files
- Startup Command Files
- Keypad Key Definitions
- EDT Macros

EDT.1 Summary of EDT

EDT is an interactive text editor that has three distinct editing modes: keypad, line, and nokeypad. Both the keypad and nokeypad modes are screen editors. Line mode can be used on any type of terminal—hardcopy or screen.

With the EDT editor you can create and edit almost all types of text files. When you are editing a file, you can add or delete text, move or copy text from one place to another, save or discard your editing work.

To call up the EDT editor, you must use a system command: EDIT. Include the name of the file you want to edit on the command line. For example:

```
$ EDIT LETTER.DAT
```

If a file named LETTER.DAT exists in the current directory, EDT puts a copy of that file into the MAIN buffer in your EDT session. Then EDT displays the first line from the file on your screen or paper, followed by the line mode asterisk prompt (*). You are now ready to begin your EDT session.

EDT-2 EDT Editor

Summary of EDT

If you are using EDT to create a new file called LETTER.DAT, your session starts off like this:

```
$    EDIT LETTER.DAT
Input file does not exist
[EOB]
*
```

The message "Input file does not exist" tells you that no text was copied to the MAIN buffer. The end-of-buffer mark ([EOB]) is printed in place of the first line, since there is no text to display. The next step is to insert some text in the buffer, using one of the three editing modes.

When you start your editing session, EDT's default mode is line mode. To shift to keypad mode, use the line mode CHANGE command. To shift back to line mode from keypad mode, use CTRL/Z.

To go from line mode to nokeypad mode, you must first give the SET NOKEYPAD command and then the CHANGE command. The nokeypad EX command shifts EDT from nokeypad editing back to line mode.

You can use EDT's online HELP facility any time during your editing session. The line mode HELP command supplies general information on EDT as well as details on line mode and nokeypad mode commands. The HELP command by itself provides information on using the HELP facility and a list of topics that you can get help on. For help on a specific topic, type the HELP command followed by the topic name, for example, HELP EXIT.

When you are in keypad mode, press the HELP key (HELP on VT200-type terminals; PF2 on VT100-type terminals; red on VT52s). EDT displays a diagram of the keypad, a list of other keypad editing keys, and tells you to press the key you want help on.

You must use the line mode HELP command to get information on nokeypad editing. The relevant topics are HELP CHANGE, HELP CHANGE SCREEN, HELP CHANGE ENTITIES, and HELP CHANGE SUBCOMMANDS. Nokeypad command descriptions are found under the SUBCOMMANDS topic. Thus, if you want information on the BELL command, you must type HELP CHANGE SUBCOMMANDS BELL.

EDT.2 Keypad Mode

Keypad mode uses the numeric keypad located to the right of the main keyboard on VT100-type and VT52 terminals. On terminals with LK201 keyboards, there are two keypads to the right of the main keyboard. The numeric keypad at the right edge of the keyboard corresponds to the VT100 keypad.

The arrow keys on VT100-type terminals are considered to be part of the keypad. On terminals with LK201 keyboards, the arrow keys are located at the bottom of the second keypad.

Four keyboard keys have special editing functions: BACKSPACE, DELETE, LINEFEED, and TAB. On the LK201 keyboard, the BACKSPACE and LINEFEED keys are located in the row of function keys across the top of the keyboard. (BACKSPACE is key F12; LINEFEED is key F13.)

In addition EDT has preset functions for several control key sequences:

A*	I	R*
C	J	T*
D*	K	U*
E*	L	W*
F (VT52 only)	M	Z*
H		

* These letters have preset functions with GOLD as well as with CTRL.

Most keypad keys have two editing functions associated with them. To use the upper (or primary) function (for example, FNDNXT) simply press the indicated key. To use the lower (or alternate) function (for example, FIND), first press the GOLD key (PF1 on VT100; blue on VT52) and then the keypad key. Figure EDT-1 shows the default keypad editing keys for popular terminal types. (At the bottom of each key representation is the keypad key number, for use with the DEFINE KEY and SHOW KEY commands.)

EDT-4 EDT Editor
Keypad Mode

Figure EDT-1 EDT Default Keypad Editing Keys

Keypad Editing Keys - VT100 Terminals

↑ UP 12	↓ DOWN 13	← LEFT 15	→ RIGHT 14
---------------	-----------------	-----------------	------------------

PF1 GOLD 20	PF2 HELP 10	PF3 FNDNXT FIND 11	PF4 DEL L UND L 17
7 PAGE COMMAND 7	8 SECT FILL 8	9 APPEND REPLACE 9	— DEL W UND W 18
4 ADVANCE BOTTOM 4	5 BACKUP TOP 5	6 CUT PASTE 6	, DEL C UND C 19
1 WORD CHNGCASE 1	2 EOL DEL EOL 2	3 CHAR SPECINS 3	ENTER ENTER 15
0 LINE OPEN LINE 0	• SELECT RESET 16	SUBS 21	

VT100

Keypad Editing Keys - VT52 Terminals

GOLD 20	HELP 10	DEL L UND L 11	↑ UP REPLACE 12
7 PAGE COMMAND 7	8 FNDNXT FIND 8	9 DEL W UND W 9	↓ DOWN SECT 13
4 ADVANCE BOTTOM 4	5 BACKUP TOP 5	6 DEL C UND C 6	→ RIGHT SPECINS 14
1 WORD CHNGCASE 1	2 EOL DEL EOL 2	3 CUT PASTE 3	← LEFT APPEND 15
0 LINE OPEN LINE 0	• SELECT RESET 16	ENTER ENTER SUBS 21	

VT52

Keypad Editing Keys - LK201 Keyboard

Help Function 28	Do Function 29
---------------------	-------------------

Find Function 1	Insert Here Function 2	Re- move Function 3
Select Function 4	Prev Screen Function 5	Next Screen Function 6

←	↑	→
---	---	---

VT200 Series

PF1 GOLD 20	PF2 HELP 10	PF3 FNDNXT FIND 11	PF4 DEL L UND L 17
7 PAGE COMMAND 7	8 SECT FILL 8	9 APPEND REPLACE 9	— DEL W UND W 18
4 ADVANCE BOTTOM 4	5 BACKUP TOP 5	6 CUT PASTE 6	, DEL C UND C 19
1 WORD CHNGCASE 1	2 EOL DEL EOL 2	3 CHAR SPECINS 3	ENTER ENTER 15
0 LINE OPEN LINE 0	• SELECT RESET 16	SUBS 21	

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EDT.2.1 EDT Keypad Functions

ADVANCE

Sets the editing direction to forward: to the right and toward the bottom of the buffer.

APPEND

Deletes the select range from the current buffer; appends it to the end of the PASTE buffer.

BACKSPACE (CTRL/H)

Moves the cursor to the beginning of the current line or the previous line.

BACKUP

Sets the editing direction to backward: to the left and toward the top of the buffer.

[GOLD] BOTTOM

Moves the cursor to the end of the current buffer.

CHAR (VT100 only)

Moves the cursor one character in the current direction.

[GOLD] CHNGCASE (change case)

Changes the case of all letters in the select range or current search string, or the case of the current letter.

CTRL/A (tab compute) (**[GOLD]** A)

Resets the tab indentation level to the current cursor position if that position is a multiple of the current SET TAB value.

CTRL/C (abort operation)

Aborts certain EDT operations, such as searches.

CTRL/D (tab decrement) (**[GOLD]** D)

Reduces the current tab level count by one.

CTRL/E (tab increment) (**[GOLD]** E)

Increases the current tab level count by one.

CTRL/H (same as BACKSPACE)

CTRL/I (same as TAB)

CTRL/J (same as LINEFEED)

EDT-6 EDT Editor

Keypad Mode

CTRL/K (define key)

Activates EDT's define key facility. See the section on key definitions.

CTRL/L (form feed)

Inserts a form feed character in your text.

CTRL/M (same as RETURN)

CTRL/R (GOLD R)

Refreshes the screen.

CTRL/T (tab adjust) (GOLD T)

Indents each line in the select range.

CTRL/U (GOLD U)

Deletes text from the current cursor position to the beginning of the line. Generally, does not delete the line terminator. The deleted text replaces the contents of the delete line buffer. Cancels the FIND, COMMAND, and CTRL/K functions.

CTRL/W (GOLD W)

Refreshes the screen.

CTRL/Z (GOLD Z)

Shifts from keypad mode to line mode.

CUT

Deletes the select range and places it in the PASTE buffer. The previous contents of the PASTE buffer are deleted.

DEL C (delete character)

Deletes the character that the cursor is on. The deleted character replaces the contents of the delete character buffer.

GOLD DEL EOL (delete to end of line)

Deletes text from the current cursor position to the end of the line. Generally, does not delete the line terminator. The deleted text replaces the contents of the delete line buffer.

DELETE

Deletes the character to the left of the current cursor position. The deleted character replaces the contents of the delete character buffer.

DEL L (delete line)

Deletes text from the current cursor position to the beginning of the next line, deleting the line terminator. The deleted line replaces the contents of the delete line buffer.

DEL W (delete word)

Deletes characters from the current cursor position to the beginning of the next word. The deleted word replaces the contents of the delete word buffer.

DO (LK201 only)

Sends a command or search string to EDT for processing.

DOWN (down arrow)

Moves the cursor down to the position on the next line that corresponds to the current cursor position.

ENTER

Sends a command or search string to EDT for processing. Completes the CTRL/K key definition process.

EOL (end of line)

Moves the cursor to the next line terminator in the current EDT direction.

GOLD FILL (VT52 = CTRL/F)

Reformats the text in the select range so that as many whole words as possible are included within the current EDT SET SCREEN width (80 or 132) or SET WRAP value. If SET WRAP is in effect, EDT uses that value rather than the SET SCREEN width.

GOLD FIND

Locates the search string that you type when EDT displays the "Search for:" prompt.

FNDNXT (find next)

Locates the next occurrence of the current search string in the current direction.

GOLD

Accesses alternate keypad functions. Also used with keyboard digits to repeat keypad functions. Used with keyboard keys and control keys to form key sequences for defining. (See Defining Keys.)

HELP

Provides information on keypad mode editing keys.

EDT-8 EDT Editor

Keypad Mode

LEFT (left arrow)

Moves the cursor one character to the left.

LINE

Moves the cursor to the beginning of the next line in the current EDT direction.

LINEFEED (CTRL/J)

Deletes characters from the current cursor position to the beginning of the word that the cursor is in. If the cursor is at the beginning of a word, the previous word is deleted. The deleted word replaces the contents of the delete word buffer.

GOLD OPEN LINE

Adds a line terminator to the right of the current cursor position. The cursor does not move.

PAGE

Moves the cursor to the next EDT page boundary in the current EDT direction. <FF> is the default page boundary. Moves the cursor to the top or bottom of the buffer if there are no page markers in the text.

GOLD PASTE

Inserts the contents of the PASTE buffer to the left of the cursor.

GOLD REPLACE

Deletes the select range and replaces it with the contents of the PASTE buffer.

GOLD RESET

Cancels the select range and sets EDT's direction to forward. Can be used after CTRL/K to cancel the text that you have entered on the definition line.

RETURN

Inserts a line terminator in the text. The cursor moves to the beginning of the new line.

RIGHT (right arrow)

Moves the cursor one character to the right.

SECT (section)

Moves the cursor 16 lines in the current EDT direction.

+SECT (LK201 only)

Moves the cursor 16 lines forward.

-SECT (LK201 only)

Moves the cursor 16 lines backward.

SELECT

Marks one end of a select range. When you move the cursor again, the characters that the cursor passes over become the select range.

[GOLD] SPECINS (special insert)

Allows you to insert any character from the DEC multinational character set into your text by entering the decimal equivalent value for that character.

[GOLD] SUBS (substitute)

Replaces the next occurrence of the current search string in your text with the contents of the PASTE buffer.

TAB (CTRL/I)

Moves the text that is to the right of the cursor (including the cursor character) to the right to the nearest preset EDT tab stop. If the cursor is at the first column position of a line and SET TAB is in effect, indents the line to the current tab level.

[GOLD] TOP

Moves the cursor to the beginning of the current buffer.

[GOLD] UND C (undelete character)

Inserts the contents of the delete character buffer to the left of the cursor.

[GOLD] UND L

Inserts the contents of the delete line buffer to the left of the cursor.

[GOLD] UND W

Inserts the contents of the delete word buffer to the left of the cursor.

UP (up arrow)

Moves the cursor up to the position on the previous line that corresponds to the current cursor position.

WORD

Moves the cursor to the beginning of the next word in the current EDT direction.

EDT.3 Line Mode

Line editing can be used on any interactive terminal. This mode focuses on the line as the unit of text. Whenever you see the line mode asterisk prompt (*), you can type a line mode command. The italicized letters in the line mode syntax statements that follow indicate the minimum abbreviation for both command words and qualifiers.

Line mode commands use qualifiers and specifiers in addition to commands. Qualifiers, which modify the way EDT processes the command, are always optional. You must precede a qualifier with a slash (for example, /QUERY).

Specifiers tell EDT which part of the text to act on. Optional specifiers are enclosed in square brackets (for example, [=buffer]). The main specifier is **range**, which refers to the line or lines affected by the command. Table EDT-1 shows various ways to specify ranges.

This section contains brief descriptions of the line mode commands, then the qualifiers, and finally the specifiers.

EDT.3.1 Line Mode Commands

CHANGE [=buffer] [range] [;nokeypad-command(s)]

Shifts EDT to keypad or nokeypad mode. To shift to keypad mode simply use CHANGE. To shift to nokeypad mode, precede the CHANGE command with the SET NOKEYPAD command. Whenever SET NOKEYPAD is in effect, you must issue the SET KEYPAD command before typing CHANGE to shift to keypad mode.

CLEAR buffer

Deletes the entire buffer from your EDT session. The name of the cleared buffer no longer appears in the SHOW BUFFER list unless the cleared buffer is MAIN or PASTE. Do not precede the buffer name with either an equal sign or the word BUFFER.

COPY [=buffer-1] [range-1] TO [=buffer-2] [range-2] [/QUERY] [/DUPLICATE:n]

Makes a copy of the text specified by location-1 and puts the copy in location-2. The text remains in location-1 as well. The default for location-1 and location-2 is the current line.

CTRL/C

Aborts certain EDT operations such as WRITE, PRINT, and TYPE. If the operation is aborted, EDT displays "Aborted by CTRL/C." If the operation is not aborted, EDT displays "CTRL/C ignored."

CTRL/R

Refreshes the current line, leaving EDT at the end of the line, enabling you to type additional characters on that line.

CTRL/Z

Causes EDT to exit from the insert state. Use after INSERT and REPLACE.

DEFINE KEY key-name AS "string"

Defines a keypad editing key. You must use the line mode DEFINE KEY command in startup command files and EDT macros. Key name is the spelled-out version which uses CONTROL for the CTRL key and the special keypad numbers for keypad keys. (See Figure EDT-1 for EDT's special keypad numbers.) The **string** parameter is one or more nokeypad commands, enclosed in quotation marks. (See Defining Keys.)

DEFINE MACRO macro-name

Defines the name of an EDT buffer containing the macro to be a new line mode command for the duration of your EDT session. (See EDT Macros.)

DELETE [=buffer] [range] [/QUERY]

Deletes the specified text. If you supply no specifiers, EDT deletes the current line.

EXIT [file-spec] [/SEQUENCE[:initial[:increment]]] [/SAVE]

Ends the EDT session, saving a copy of the MAIN buffer text in an external file. If you supply a file specification, EDT creates a file with that name and copies the contents of the MAIN buffer into that file.

FILL [=buffer] [range]

Reformats lines of text so as many whole words as possible are included within the current EDT SET SCREEN width or SET WRAP value. If SET WRAP is in effect, FILL uses that value rather than the SET SCREEN width. If you supply no specifiers, EDT assumes that a screen mode select range is active.

FIND [=buffer] [range]

Moves EDT to the specified buffer or range. No text is displayed. If you supply no specifiers, EDT remains at the current line.

HELP [topic [subtopic ...]]

Displays information on various EDT topics at your terminal. If you supply no topic, HELP gives information on how to use the EDT HELP facility.

INCLUDE file-spec [=buffer] [range]

Copies the specified file into the current EDT session. If you give no location specifiers, the copy is placed above the current line.

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INSERT [=buffer] [range] [RETURN] text [CTRL/Z]

INSERT [=buffer] [range] ;line-to-be-inserted

Inserts text at the specified location. If you give no location, EDT inserts the text above the current line. The first form enables you to insert as many lines as you need. The second form can accommodate only one line of text at a time.

MOVE [=buffer-1] [range-1] TO [=buffer-2] [range-2] [/QUERY]

Deletes the text from location-1 and inserts it at location-2. The default for location-1 and location-2 is the current line.

<null> (implied TYPE) [=buffer] [range]

The <null> command consists simply of one or both location specifiers. EDT displays the lines that are specified as the command. When a range that consists of an English word (such as BEGIN, END, REST) is the first element of the <null> command, that word must be preceded by a percent sign (%), for example %BEGIN, %END, %REST.

PRINT file-spec [=buffer] [range]

Creates a file that contains a copy of the text you specify. Adds a form feed and two blank lines to the top of the file and every 60 lines. Changes the EDT line numbers into elements of text. If you give no location specifiers, EDT copies the entire current buffer.

QUIT [/SAVE]

Ends your EDT session without saving a copy of your editing work. The /SAVE qualifier saves only a copy of the journal file, not the edited text.

REPLACE [=buffer] [range] [RETURN] text [CTRL/Z]

REPLACE [=buffer] [range] ;line-to-be-inserted

Deletes the text specified by **buffer** or **range** and shifts to the insert state. If you give no location specifiers, EDT deletes the current line. The first form enables you to insert as many lines as you need. The second form can accommodate only one line of text at a time.

RESEQUENCE [=buffer] [range] [/SEQUENCE [:initial [:increment]]]

Renumbers the EDT line numbers for the specified location. If you supply no location, EDT renumbers the entire current buffer. The default values for **initial** and **increment** are 1. If you omit the /SEQUENCE qualifier, EDT uses those default values.

SUBSTITUTE[/[string-1]/string-2/ [=buffer] [range] [/BRIEF[:n]] [/QUERY] [/NOTYPE]

Replaces **string-1** with **string-2**. If you omit **string-1**, EDT uses the current search string. If you supply no location specifiers, the substitution takes place on the current line. You can replace the slashes surrounding the strings with

any punctuation mark (except % and _) that does not occur in either string. You must always use the slash to indicate any qualifiers in the command line.

[SUBSTITUTE] NEXT[/[string-1]/string-2/]

Replaces the next occurrence of **string-1** with **string-2**. If the string to be deleted is the current search string and the replacement string is the current substitute string, you do not have to include either the strings or the delimiters with the command. If you choose to use the word or abbreviation for SUBSTITUTE, you must separate it from NEXT (or N) with a space. You can replace the slashes surrounding the strings with any punctuation mark (except % or _) that does not occur in either string.

TAB ADJUST [-]n [=buffer] [range]

Indents the specified line(s) by the current SET TAB value multiplied by the level count **n**. Use the minus sign to move indented text back toward the left margin. If you supply no location specifiers, EDT assumes that a screen mode select range is active.

TYPE [=buffer] [range] [/BRIEF[:n]] [/STAY]

Displays the specified lines at your terminal. If you supply no location specifiers, EDT displays the current line. If you specify a buffer without a range, EDT displays the entire buffer.

WRITE file-spec [=buffer] [range] [/SEQUENCE [:initial [:increment]]]

Puts a copy of the lines specified into the specified file. If you supply no location specifiers, EDT copies the entire current buffer.

EDT.3.2 Line Mode Qualifiers

Line mode qualifiers affect the way EDT processes a command. You can only use certain qualifiers with certain commands. Whenever you use a qualifier, you must type the slash before the qualifier name to signal EDT that the following letters refer to a qualifier, not a command word or string. Qualifiers are always the last elements in a line mode command line.

/BRIEF[:n]

EDT displays only the first **n** characters of a line or lines. The default value for **n** is 10. Use with SUBSTITUTE and TYPE.

/DUPLICATE:n

EDT copies the text **n** times in the same location. Use with COPY.

/NOTYPE

EDT displays only the substitution message, not the lines in which substitutions took place. Use with SUBSTITUTE.

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Line Mode

/QUERY

EDT prompts with a question mark to verify if you want the operation performed on the particular line it has just displayed. Use with COPY, DELETE, MOVE, and SUBSTITUTE. The responses are:

- | | |
|----------|--|
| Y (YES) | Perform the command on this line. |
| N (NO) | Do not perform the command on this line. |
| A (ALL) | Perform the command on all remaining lines. |
| Q (QUIT) | Do not perform the command on any remaining lines. |

/SAVE

EDT saves a copy of the journal file in the current directory. Use with EXIT and QUIT.

/SEQUENCE [:increment [:initial]]

With RESEQUENCE, assigns new line numbers to the specified lines. The default values for **initial** and **increment** are 1.

With EXIT and WRITE, /SEQUENCE causes the EDT line numbers to be retained as sequence numbers in the external file. EDT uses these sequence numbers as EDT line numbers when you next edit the file. If **initial** and **increment** are omitted, EDT uses the EDT line numbers as the sequence numbers.

/STAY

Maintains EDT's current position in the text regardless of which lines you have asked EDT to display. Use with TYPE.

EDT.3.3 Line Mode Specifiers

Line mode specifiers refer to information that you supply to EDT. In place of the specifier name, type the name of a buffer, key, or macro (for example, CLEAR PASTE). See Table EDT-1 for details on the range specifier.

buffer

The name of an EDT buffer (text storage area). When you use **buffer** with the CLEAR command, do not precede it with a buffer signal. With all other commands, use either the equal sign (=) immediately before the buffer name (for example, =MAIN) or the word BUFFER followed by a space before the buffer name (for example, BUFFER MAIN). If the buffer does not exist, EDT creates one, except in the case of CLEAR. EDT moves to the named buffer, except for CLEAR, WRITE, and PRINT.

file-spec

The specification for an external file. Can include a directory specification. With *INCLUDE*, tells EDT which file to copy into your editing session. With EXIT, PRINT, and WRITE, tells EDT which file to create to hold text from your editing

session. If you include directory information, the directory must exist and you must have access to it.

key-name

The name of the key you want to define with your DEFINE KEY command. Use the special EDT key name, (for example, CONTROL B for CTRL/B) or keypad key number to designate the key. (See Figure EDT-1.)

macro-name

The name of the macro you are defining, which must be the name of the buffer containing the macro.

nokeypad-command(s)

One or more nokeypad commands joined on a single line. Separate the nokeypad command(s) from the CHANGE command with a semicolon (;).

range

One or more lines of text. See Table EDT-1.

string

A group of contiguous characters. In line mode, the string specifier is the nokeypad definition used with DEFINE KEY.

string-1, string-2

String-1 is always the search string; **string-2** is always the substitute string. In substitute commands, EDT always replaces **string-1** with **string-2**.

Table EDT-1 The Range Specifier

Range Type or Symbol	Description
.	The current line
number	The EDT line number
"string" or 'string'	The next line containing the quoted string
BEGIN	The first line of the buffer
END	The last line of the buffer
WHOLE	The entire buffer
BEFORE	All lines from the top of the buffer to the current line
REST	All lines from the current line to the end of the buffer
LAST	The last line worked on in the previous buffer

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Line Mode

Table EDT-1 (Cont.) The Range Specifier

Range Type or Symbol	Description
SELECT	A select range created in a screen mode (Can include only whole lines.)
, or AND	Joins noncontiguous ranges in a list.
: or THRU	Indicates a group of contiguous lines (for example, TYPE 10 THRU 20 or TYPE 10:20).
n	Indicates n lines from the current line (for example TYPE +10).
#n or FOR n	Tells EDT to operate on the next n lines.
+	Indicates that the range specifier is toward the bottom of the buffer.
-	Indicates that the range specifier is toward the top of the buffer.
ALL	Refers to all lines containing the quoted string.
%	Signals EDT that the following characters indicate a range specifier. Needed only when a <null> command line begins with a letter.

Here are some sample line mode commands with various ranges:

CHANGE 38	COPY 4 THRU 10 TO.
DELETE ALL "1983"	FILL . THRU +10
FIND -2	INCLUDE XFILE.DAT END
INSERT 256.3	MOVE REST TO 27
%BEGIN	PRINT SUBPROG.DAT BEFORE
REPLACE 7:11	RESEQUENCE 1 THRU 150
SUBSTITUTE/DEC/DIGITAL/WHOLE	TAB ADJUST 1, 3, 5, 7, 9
TYPE "July"	WRITE OUTFILE.DAT SELECT

EDT.4 Nokeypad Mode

Nokeypad mode is a screen editor for use with VT100-type and VT52 terminals. Text appears on the upper lines of the screen. As you type commands, they are displayed at the bottom of the screen. When you press RETURN, EDT processes the commands.

Nokeypad commands are the basis for keypad mode key definitions. Nokeypad commands consist of English words and abbreviations. A number of commands take the **entity** specifier to determine which part of the text will be affected by the command. Table EDT-2 lists the entity specifiers. Nokeypad specifiers are described after the nokeypad commands.

Nokeypad commands cannot have spaces. For example, to delete two paragraphs and put the text in a buffer named EXTRA, type CUT2PAR=EXTRA. You can put several nokeypad commands on the same line. Spaces between commands are allowed, but not required. You can repeat a series of commands by preceding the commands with the repeat count and enclosing them in parentheses: for example, 3(V D+EL).

EDT.4.1 Nokeypad Commands

ADV (advance)

Sets EDT's current direction to forward.

APPEND

[+/-][count]APPEND[+/-][count]entity[=buffer]

Deletes the specified entity from the current buffer and places it at the end of either the PASTE buffer or the specified buffer.

ASC (ASCII)

[number]ASC

Uses a character's decimal equivalent value to insert that character into the text. Valid decimal values range from 0 to 255. If you supply no number, EDT inserts the null character (decimal 0).

BACK (backup)

Sets EDT's current direction to backward.

BELL

Sounds the terminal bell.

CHGC (change case)

[+/-][count]CHGC[+/-][count]entity

Changes the case of all letters in the specified entity. All uppercase letters are changed to lowercase and all lowercase letters become uppercase.

CHGL (change case lower)

[+/-][count]CHGL[+/-][count]entity

Changes all uppercase letters in the specified entity to lowercase.

CHGU (change case upper)

[+/-][count]CHGU[+/-][count]entity

Changes all lowercase letters in the specified entity to uppercase.

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Nokeypad Mode

^ (circumflex)

[count]^ [character]

Allows you to insert ASCII control characters (decimal values 0 through 31) in text or command lines. If you supply no character, EDT inserts the null character (decimal 0).

CLSS (clear search string)

Deletes the contents of the search buffer.

CTRL/C

Aborts certain EDT operations, such as searches.

CTRL/Z

Causes EDT to exit from the insert state. Use with I (insert) and R (replace).

CUT

[+/-][count]CUT[+/-][count]entity[=buffer]

Deletes the specified entity from the current buffer and places it in either the PASTE buffer or the specified buffer.

D (delete)

[+/-][count]D[+/-][count]entity

Deletes the specified entity. If the entity is a character, word or part of a word, or line or part of a line, the text is stored in one of EDT's special buffers: delete character buffer, delete word buffer, or delete line buffer.

DATE

Inserts the current date and time into your text.

DEFK (define key)

Used only to define a keypad editing key to perform the key definition process.

DESEL (deactivate select)

Cancels the select range.

DLWC (default lowercase)

Changes EDT's default move state so that wherever the cursor moves, all uppercase letters are changed to lowercase.

DMOV (default move)

Changes EDT's default move state from either DLWC or DUPC back to the normal state, in which the case of letters is unaffected by cursor movement.

***Down Arrow Key**

Moves the cursor down to the corresponding column position on the line below the current line.

*Not a nokeypad *command*.

DUPC (default uppercase)

Changes EDT's default move state so that wherever the cursor moves, all lowercase letters are changed to uppercase.

EX (exit to line mode)

Shifts EDT from nokeypad mode to line mode.

EXT (extend)

EXT line mode command

Enables you to use a line mode command without leaving nokeypad mode. Cannot be used with parentheses and a repeat count.

FILL

[+/-][count]FILL[+/-][count]entity

Reformats text so that as many whole words as possible are fitted within the current EDT SET SCREEN width (80, 132) or SET WRAP value. If SET WRAP is in effect, FILL uses that value rather than the SET SCREEN width.

HELP

Used only to define a keypad editing key to access keypad mode HELP information.

I (insert)

Itext^Z

I [RETURN] text [CTRL/Z]

Allows you to insert text at the current cursor location. The first form inserts the text that is typed on the command line. Use the second form to insert more than one line. EDT shifts the cursor back to its former position in the text displayed on your screen. When you finish inserting the text, press CTRL/Z to exit from the insert state.

KS (KED substitute)

Used directly after the PASTE command to have EDT position the cursor on the last character of the inserted text if EDT's direction is forward, or the first character in the inserted text if EDT's direction is backward.

***Left Arrow Key**

Moves the cursor one character to the left.

*Not a nokeypad *command*.

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Nokeypad Mode

“move”

[+/-][count]entity

The “move” command consists simply of the entity specifier with or without a sign or count specifier. Moves the cursor by the specified entity. If you specify a string, EDT moves the cursor to that string.

PASTE

[count]PASTE[=buffer]

Inserts the entire contents of the PASTE buffer or the specified buffer into the text to the left of the cursor.

QUIT

Ends your EDT session without saving a copy of any editing work.

R (replace)

[+/-][count]R[+/-][count]entity

Deletes the specified entity and shifts to the insert state. EDT returns the cursor to the screen so you can enter new text. Use CTRL/Z to exit from the insert state.

REF (refresh)

Refreshes the screen.

***Right Arrow Key**

Moves the cursor one character to the right.

*Not a nokeypad *command*.

S (substitute)

[+/-][count]S/[string-1]/string-2/

Moves to the next occurrence of **string-1** and replaces it with **string-2**. The slashes surrounding the strings can be replaced by any other punctuation mark that does not occur in either string, but all three delimiters must be identical.

If **string-1** is omitted, the current search string is used.

SEL (select)

Marks one end of a select range. When you move the cursor again, the characters that the cursor passes over become an active select range.

SHL (shift left)

[count]SHL

Shifts the screen image one tab stop (eight columns) to the left. Has no effect on the text.

SHR (shift right)

[count]SHR

Shifts the screen image one tab stop (eight columns) to the right if the text has already been shifted to the left. Has no effect on the text.

SN (substitute next)

[+/-][count]SN

Using the current search and substitute strings, locates the next occurrence of the search string and replaces it with the substitute string.

SSEL (search and select)

[+/-]SSEL[+/-]"string"

Locates the quoted string and makes it an active select range.

TAB

[count]TAB

Moves the text to the right of the cursor (including the cursor character) over to the nearest preset EDT tab stop. If SET TAB is in effect and the cursor is in column one of a line, EDT indents the line by the current SET TAB value multiplied by the current tab level count.

TADJ (tab adjust)

[+/-][level-count]TADJ[+/-][entity-count]entity

Indents lines of text using the current SET TAB value. Use L, PAR, or PAGE for entity.

TC (tab compute)

Resets the indentation level to the current cursor position if that position is a multiple of the current SET TAB value.

TD (tab decrement)

[count]TD

Decreases the current tab level count by one or **count**.

TGSEL (toggle select)

If a select range is active, TGSEL cancels it. If no select range is active, TGSEL sets one end of the new select range.

TI (tab increment)

[count]TI

Increases the current tab level count by one or **count**.

EDT-22 EDT Editor Nokeypad Mode

TOP

Moves the current cursor line to the top of the screen if there are more than 22 lines between the cursor line and the end of the buffer. If there are less than 22 lines to the end of the buffer, TOP has no effect on the screen image.

UNDC (undelete character)

[count]UNDC

Inserts the contents of the delete character buffer to the left of the cursor.

UNDL (undelete line)

[count]UNDL

Inserts the contents of the delete line buffer to the left of the cursor.

UNDW (undelete word)

[count]UNDW

Inserts the contents of the delete word buffer to the left of the cursor.

*Up Arrow Key

Moves the cursor up to the corresponding column position on the line above the current line.

*Not a nokeypad *command*.

XLATEstring^Z

Used with VAX/VMS callable EDT to pass a string to the calling program.

EDT.4.2 Nokeypad Specifiers

Nokeypad specifiers refer to information that you supply to EDT. In place of **buffer** and **entity**, for example, you type the name of the buffer or entity. See Table EDT-2 for a list of nokeypad entities. Note the difference between the string entity and the string specifier used with commands such as S, SN, and SSEL.

+/-

Determines the direction for the individual command, but does not change EDT's current direction. + is to the right, toward the bottom of the buffer;—is to the left, toward the top of the buffer.

=buffer

When used with CUT or APPEND, determines which storage area to use for the deleted text. With PASTE, tells EDT where to find the text to insert in the current buffer.

count

When **count** precedes the command, it determines how many times to repeat the command. When **count** precedes the entity, it determines how many entities the command affects. Generally, a repeat count has the same effect as an entity count (for example, 2DC is the same as D2C).

entity

The portion of text which the command affects. See Table EDT-2.

line mode command

The line mode command line that you type with EXT. EDT performs the line mode command(s) without leaving nokeypad mode.

string

A search string with SSEL. Information for EDT to send to a program when used with XLATE.

string-1, string-2

String-1 is always the search string; **string-2** is always the substitute string. In substitute commands, EDT always replaces **string-1** with **string-2**.

Table EDT-2 The Entity Specifier

Entity	Description
C	Character
W	Word
BW	Beginning of word
EW	End of word
L	Line
BL	Beginning of line
EL	End of line
NL	Next line
SEN	Sentence
BSEN	Beginning of sentence
ESEN	End of sentence
PAR	Paragraph
BPAR	Beginning of paragraph
EPAR *	End of paragraph
PAGE	Page

Table EDT-2 (Cont.) The Entity Specifier

Entity	Description
BPAGE	Beginning of page
EPAGE *	End of page
SR	Select range
"string" or 'string'	All the text between the current cursor position and the quoted string
BR	Beginning of buffer
ER	End of buffer
V	Vertical

* Cannot be used twice in succession or with a repeat count.

EDT.5 The SET and SHOW Commands

SET commands modify the way EDT behaves during your editing session. They have no effect on the text you are editing. You can use SET commands to customize your editing session. SHOW commands tell which SET commands are in effect. Four SHOW commands (SHOW BUFFER, SHOW FILES, SHOW KEY, and SHOW VERSION) have no corresponding SET commands.

SET AUTOREPEAT **SET NOAUTOREPEAT** **SHOW AUTOREPEAT**

Enables EDT's use of the DECARM VT100 control sequence to prevent keypad keys from repeating faster than EDT can update the screen. Default: SET AUTOREPEAT for most terminals.

SHOW BUFFER

Lists all buffers currently in use during your EDT session. Also lists the number of lines in each buffer. An equal sign (=) indicates the current buffer. An asterisk (*) next to MAIN indicates that there are more lines in the MAIN buffer, but EDT has not yet seen them.

SET CASE UPPER **SET CASE LOWER** **SET CASE NONE** **SHOW CASE**

Flags upper- or lowercase letters on single-case terminals. Default: SET CASE NONE.

SET COMMAND file-spec
SHOW COMMAND

Enables use of an additional startup command file. Default: operating system dependent. You can only use these commands in startup command files.

SET CURSOR top:bottom
SHOW CURSOR

Controls scrolling of the screen relative to the distance of the cursor from the screen top or bottom. Values for **top** and **bottom** can range from 1 to 21. Default: SET CURSOR 7:14.

SET ENTITY WORD "string"
SET ENTITY SENTENCE "string"
SET ENTITY PARAGRAPH "string"
SET ENTITY PAGE "string"
SHOW ENTITY WORD
SHOW ENTITY SENTENCE

Defines boundary delimiters for the specified entity. Defaults:

```
SET ENTITY WORD "          <LF><VT><FF><CR>"
SET ENTITY SENTENCE ". ! ?"
SET ENTITY PARAGRAPH "<CR><CR>"
SET ENTITY PAGE "<FF>"
```

SHOW FILES

Displays the name of the input file and the output file for your EDT session.

SET FNF
SET NOFNF
SHOW FNF

NOFNF suppresses the message: "Input file does not exist." Use in a startup command file. Default: SET FNF

SET HELP file-spec
SHOW HELP

Determines which HELP file is current.

SHOW KEY key-name

Prints the definition of the specified keypad editing key. **Key-name** must use the special line mode conventions and keypad key numbers. (See Figure EDT-1 for the keypad key numbers.)

EDT-26 EDT Editor

The SET and SHOW Commands

SET KEYPAD

SET NOKEYPAD

SHOW KEYPAD

Sets the screen mode to either keypad or nokeypad. Does not shift to either screen mode. Default: SET KEYPAD.

SET LINES *number*

SHOW LINES

Sets the number of text lines displayed on the screen. The value for **number** can range from 1 through 22. Use in a startup command file. Default: SET LINES 22.

SET MODE LINE

SET MODE CHANGE

SHOW MODE

Sets the operating mode for EDT. Default: SET MODE LINE. Use in a startup command file.

SET NUMBERS

SET NONUMBERS

SHOW NUMBERS

Determines if EDT line numbers are visible in line mode. With SET NONUMBERS, EDT does not indent lines when displaying them in line mode or display the line numbers. Default: SET NUMBERS.

SET PARAGRAPH WPS

SET PARAGRAPH NOWPS

SHOW PARAGRAPH

Determines where EDT puts the cursor after moving to a new paragraph. Default: SET PARAGRAPH NOWPS.

SET PROMPT *prompt-type* "string"

SHOW PROMPT *prompt-type*

Determines various prompt characters to use when simulating an EDT session for test purposes.

SET QUIET

SET NOQUIET

SHOW QUIET

Determines whether the terminal bell sounds when an EDT error message is displayed in a screen mode. Default: SET NOQUIET.

SET REPEAT
SET NOREPEAT
SHOW REPEAT

Determines whether you can use the GOLD repeat feature or SPECINS in keypad mode. Default: SET REPEAT.

SET SCREEN width
SHOW SCREEN

Sets the maximum number of characters that EDT displays on a line of text. The possible widths for VT100-type terminals with advanced video option are 80 and 132. The width for VT100 terminals without AVO and for VT52 terminals is 80. For hardcopy terminals you can specify any width from 1 to 132. Default: set by operating system.

SET SEARCH (GENERAL, EXACT, WPS, CASE INSENSITIVE, DIACRITICAL INSENSITIVE)
SET SEARCH (BEGIN, END)
SET SEARCH (BOUNDED, UNBOUNDED)
SHOW SEARCH

Determines how EDT performs searches. Defaults: SET SEARCH GENERAL, SET SEARCH BEGIN, SET SEARCH UNBOUNDED.

SET SUMMARY
SET NOSUMMARY
SHOW SUMMARY

Determines whether EDT displays summary information when you end your EDT session with the EXIT command. Default: SET SUMMARY.

SET TAB number
SET NOTAB
SHOW TAB

Sets the tab value for various tabbing functions. Default: SET NOTAB.

SET TERMINAL (HCPY, VT52, VT100)
SET TERMINAL (SCROLL, NOSCROLL)
SET TERMINAL (EIGHTBIT, NOEIGHTBIT)
SET TERMINAL (EDIT, NOEDIT)
SHOW TERMINAL

Determines how EDT interprets your terminal. Default: the terminal information supplied to EDT by the operating system.

EDT-28 EDT Editor

The SET and SHOW Commands

SET TEXT END "string"
SET TEXT PAGE "string"
SHOW TEXT END
SHOW TEXT PAGE

Determines the text that EDT displays for the end of buffer marker or the page marker. Has no effect on your text. Defaults: SET TEXT END "[EOB]", SET TEXT PAGE "<FF>".

SET TRUNCATE
SET NOTRUNCATE
SHOW TRUNCATE

Determines whether EDT truncates lines that exceed the current screen width. Default: SET TRUNCATE.

SET VERIFY
SET NOVERIFY
SHOW VERIFY

Determines whether EDT displays the commands in a startup command file or EDT macro as they are being processed. Default: SET NOVERIFY.

SHOW VERSION

Displays the current EDT version number and the EDT copyright information.

SET WORD DELIMITER
SET WORD NODELIMITER
SHOW WORD

Determines whether EDT interprets word boundaries (except for space) as separate words. Default: SET WORD DELIMITER.

SET WRAP number
SET NOWRAP
SHOW WRAP

Determines whether EDT wraps text being inserted in keypad mode. Also determines the maximum line length for filling text in all three modes. Default: SET NOWRAP.

EDT.6 The Journal Facility

EDT's journal facility keeps track of each keystroke you make during your EDT session in a special file called the journal file. When you finish your editing session by typing either EXIT or QUIT, EDT normally discards the journal file. If your editing session ends abruptly due to a system interruption, the journal file is saved, even though your editing work has been lost. Using the journal file, EDT can restore

almost all of your editing work. Sometimes the last few commands you typed or the last few keypad editing keys you pressed have not been recorded in the journal file at the time the interruption occurs.

The journal file is normally stored in the current directory and has .JOU for the file type. The file name is the same as the name of the file you were editing when the interruption took place. For example, if you are editing the file LETTER.DAT, the journal file name is LETTER.JOU. (It is possible to instruct EDT to use a different name or file type for the journal file by using the /JOURNAL qualifier.)

Include the /RECOVER qualifier in your EDIT/EDT command line in order to have EDT use the journal file to restore your editing work. Even when you use EDT to create a new file, you can use the /RECOVER qualifier to have EDT restore your editing work after a system interruption.

As soon as EDT has processed all the command information and keystrokes stored in the journal file, it continues to use that journal file to store the new information that results from any further editing work you do during the recovery session. If you are able to end your editing session with EXIT or QUIT, EDT discards the journal file from the directory. However, if you find journal files in your directory that you do not plan to use, simply delete them.

You can use the /SAVE qualifier with the line mode EXIT or QUIT command to save the journal file even when there is no system interruption.

EDT.7 Startup Command Files

Startup command files establish various settings and key definitions at the start of your EDT session. These files can contain only line mode commands. SET and DEFINE KEY commands are the ones most frequently found in startup command files.

Generally, EDT reads a systemwide startup command file at the beginning of your editing session. If no systemwide startup command file exists on your system, EDT looks for a file named EDTINI.EDT in your default directory and processes the commands in that file.

If you want EDT to use a startup command file with another name, you must include that command file specification in the /COMMAND qualifier when you invoke EDT.

You can use EDT to create a startup command file. There are very few restrictions to organizing such a file. If you need to use the carriage return character (CTRL/M) in a SET or DEFINE KEY command, you must enter it from a change mode.

EDT-30 EDT Editor

Startup Command Files

Here are some typical commands that might be put in a startup command file:

```
SET QUIET
SET WRAP 60
SET SEARCH BOUNDED
SET TAB 5
SET MODE CHANGE
DEFINE KEY GOLD P AS "PAR."
```

You can include all the necessary commands to set up an EDT macro in your startup command file. The sample macro, called EXACT, resets the search parameter to **exact** when you type the macro name as a line mode command. The following commands can be put in the startup command file to create the EXACT macro:

```
DEFINE MACRO EXACT
FIND =EXACT
INSERT; SET SEARCH EXACT
FIND =MAIN
```

EDT.8 Defining Keys

You can redefine or relocate any preset keypad editing key. You can also create definitions for editing keys that have none. These key definitions enable you to perform a variety of editing tasks in keypad mode.

There are five types of keys or key sequences that can be defined.

Key or Key Sequence	Cannot Define
Keypad keys	
Control keys or GOLD control key	C, O, Q, S, and any others prohibited by your operating system
GOLD keyboard key	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, - (When you use !, %, ', or " in the DEFINE KEY command, you must enclose the character in quotation marks, for example: "!".)
DELETE or GOLD DELETE	
FUNCTION key or GOLD FUNCTION key	LK201 keyboard only. F1, F2, F3, F4, and F5 with or without GOLD.

In EDT the following special keyboard keys and control keys are linked. When you redefine one, you have redefined the other.

VT100\VT52		LK201	
BACKSPACE	<--->	CTRL/H	<--->
TAB	<--->	CTRL/I	<--->
LINEFEED	<--->	CTRL/J	<--->
RETURN	<--->	CTRL/M	<--->
		F12	
		Tab	
		F13	
		Return	

NOTE: The LK201 F12 and F13 keys are linked to CTRL/H and CTRL/J when the terminal is in VT100 compatibility mode. When the terminal is operating in VT200 mode, F12 and F13 are *not* linked to CTRL/H and CTRL/J. They have the same preset definitions, but can be defined independently, just as CTRL/A and GOLD A can be defined independently.

Keypad key definitions use nokeypad command syntax. Nokeypad mode enables you to put several commands on a single line. Thus, you can create key definitions to do several commands in succession. If you want EDT to process the command as soon as you press the key or key sequence, place a period at the end of the definition. This corresponds to pressing the ENTER key in keypad mode.

You can use the SHOW KEY command to find out the existing definitions for all EDT editing keys. However, you must use special terms to tell EDT which key or key sequence you want information about. Figure EDT-1 gives the special keypad key numbers to use with the SHOW KEY command for VT100 and VT52 terminals. For control keys, type SHOW KEY CONTROL character (for example, SHOW KEY CONTROL A). To find out the definition of a GOLD key sequence, type SHOW KEY GOLD keyboard key or SHOW KEY GOLD CONTROL keyboard key (for example, SHOW KEY GOLD * or SHOW KEY GOLD CONTROL J). To see the definition for the DELETE key, spell out the word (for example, SHOW KEY GOLD DELETE). To see the definition for a key on the second keypad or in the function key row of the LK201 keyboard, spell out the word FUNCTION and use the EDT FUNCTION number designation, not the F number that appears on the keyboard (for example, SHOW KEY FUNCTION 24 for the F12 key).

By enclosing all parts of the definition except for the ending period in parentheses, you can use the keypad GOLD repeat feature to process the command(s) several times in succession.

There are two ways to define/redefine keypad editing keys. From keypad mode you can use the CTRL/K function. The line mode DEFINE key command can be accessed from any mode.

Using CTRL/K, you can press the key(s) you are defining. Whenever you want to include a preset keypad editing key in your definition, you can press that key as part of the definition process. EDT prompts you for both the key you are defining and the definition. For example, suppose you wanted to define CTRL/P to move a paragraph at a time:

CTRL/K

Press the key you wish to define:

CTRL/P

Now enter the definition terminated by ENTER:

PAR. ENTER

EDT-32 EDT Editor

Defining Keys

The DEFINE KEY command in line mode uses the typed out version of the key name and requires that the definition be enclosed in quotation marks. The same definition using line mode is:

```
DEFINE KEY CONTROL P AS "PAR."
```

To redefine keypad keys with the DEFINE KEY command, you must know their special EDT numbers. Figure EDT-1 shows these numbers for both VT100-type and VT52 terminals, as well as the FUNCTION key numbers for the LK201 keyboard.

To redefine the PAGE function to be "(-W).", type:

```
DEFINE KEY 7 AS "(-W)."
```

To redefine GOLD Left Arrow to be "SHL.", type:

```
DEFINE KEY GOLD 15 AS "SHL."
```

Here are some sample DEFINE KEY commands:

```
DEFINE KEY GOLD CONTROL B AS "CHGUW."  
DEFINE KEY GOLD DELETE AS "-DW."  
DEFINE KEY CONTROL V AS "(+V D-CI [Z])."  
DEFINE KEY CONTROL N AS "'?Nokeypad Command: '."  
DEFINE KEY GOLD 21 AS "S^@?'Find: '^@?' Substitute: '^@."  
DEFINE KEY FUNCTION 17 AS "IWashington, DC^Z."
```

EDT.9 EDT Macros

EDT macros allow you to extend the line mode command language. A macro is a group of one or more line mode commands that is processed when you type the macro name as a line mode command word. For instance, you can create a macro called XT to be the command SET SEARCH EXACT, and another macro called GEN to be the command SET SEARCH GENERAL.

To create a macro, use a line mode command to move to a new buffer. That buffer must have the same name as the macro. Using EDT, enter the line mode command or commands that you want to be processed when you type the macro name. Then issue the command

```
DEFINE MACRO macro-name
```

EDT now adds the macro name to its list of valid line mode commands. You are ready to use that command any time during your editing session. If you plan to use the macro in repeated EDT sessions, you can put it in a startup command file or simply store it in an external file to be included in later EDT sessions.

If you put a DEFINE MACRO command in a startup command file, you must include commands to enter the macro text into a buffer with the same name as the macro. If you store a macro in an external file, use the INCLUDE command to put the macro in a buffer with the same name and issue the DEFINE MACRO command to establish the name as a line mode command.

The following example creates a macro called SINCY, which inserts the closing of a letter above the current line when you type the newly created line mode command SINCY.

```
*FIND =SINCY
*INSERT
                                INSERT ;Sincerely yours,
                                INSERT ;
                                INSERT ;
                                INSERT ;
                                INSERT ;
                                INSERT ;
                                INSERT ;James T. Cortland
                                INSERT ;President
```

CTRL/Z

```
*DEFINE MACRO SINCY
*FIND =MAIN
```

To close a letter from Mr. Cortland, type SINCY as a line mode command.

```
*SINCY
*TYPE "sincerely" THRU END
132                                Sincerely yours,
133
134
135
136
137
138                                James T. Cortland
139                                President
[EOB]
```


VAX Text Processing Utility

The following information is provided on VAXTPU:

- Data types
- Built-in procedures
- Global variables used with built-in procedures
- Information obtainable using the built-in procedure GET_INFO

Complete information can be found in the *VAX Text Processing Utility Reference Manual*.

VAXTPU has two editing interfaces: the Extensible VAX Editor (EVE) and the EDT Keypad Emulator. The *Guide to Text Processing on VAX/VMS* and the *VAX Text Processing Utility Reference Manual* have information on using these interfaces.

Information on callable VAXTPU routines is in the MISC section; complete descriptions are in the *VAX/VMS Utility Routines Reference Manual*.

VAXTPU.1 Data Types

Data Type	Description
BUFFER	A work space, used to hold text for manipulation
INTEGER	A 32-bit signed whole number quantity (commas and decimal points are not permitted)
LEARN	A series of keystrokes to be replayed at some future time
MARKER	A reference point associated with a character position within a text buffer, used to mark locations for positioning or creating ranges
PATTERN	A structure representing a sequence of characters within a buffer

VAXTPU-2 VAX Text Processing Utility

Data Types

Data Type	Description
PROCESS	A VAX/VMS subprocess (VAXTPU can create, delete, and communicate with these subprocesses)
PROGRAM	Internal representation of VAXTPU statements (programs are what VAXTPU executes)
RANGE	A contiguous sequence of characters between (and including) two specified markers within a text buffer
STRING	A string of characters from the DEC multinational character set
UNSPECIFIED	The initial value of a variable after it has been compiled
WINDOW	An area of the screen for displaying buffers

VAXTPU.2 Built-In Procedures

ADD_KEY_MAP (string1, string2, string3 [...])

Adds one or more key maps to a key-map list.

ADJUST_WINDOW (window, integer1, integer2)

Changes the size and/or screen location of a window and makes the window that you specify the current window.

ANCHOR

Disables seek search or incremental search pattern matching and ties a search for a matching string to the current character position.

pattern := ANY (string)

Returns a pattern that matches any single character in the string used as a parameter.

APPEND_LINE

Places the current line at the end of the previous line.

pattern := ARB (integer)

Returns a pattern that matches an arbitrary sequence of characters starting at the current character position and extending for the length you specify.

string := ASCII (integer)

Converts an integer to a string.

ATTACH [{integer|string}]

Deassigns the terminal and enables you to switch control from your current process to another process that you have previously created.

marker := BEGINNING_OF ({buffer|range})

Returns a marker that points to the first position of a buffer or a range.

string2 := CALL_USER (integer, string1)

Calls a program written in another language from within VAXTPU. The CALL_USER parameters are passed to the external routine exactly as you enter them; VAXTPU does not process the parameters in any way. The integer is passed by reference, and *string* is passed by descriptor; **string2** is the value returned by the external program.

CHANGE_CASE ({buffer|range|string}, keyword)

Modifies the case of all the alphabetic characters in the specified unit of text according to the keyword that you supply.

[program :=] COMPILE ({string|range|buffer})

Converts VAXTPU procedures and statements into an internal, compiled format. Valid items for compilation can be represented by a string, a range, or a buffer. COMPILE optionally returns a program.

COPY_TEXT ({string|range|buffer})

Makes a copy of the text you specify and places it in the current buffer.

[buffer :=] CREATE_BUFFER (string1 [,string2])

Defines a new work space for editing text. You can create an empty buffer or you can associate an input file name with the buffer. CREATE_BUFFER optionally returns a buffer.

[string2:=] CREATE_KEY_MAP (string1)

Creates and names a key map. Optionally returns a string that is the name of the key map created.

[string1:=] CREATE_KEY_MAP_LIST (string1, string2, [...])

Creates and names a key-map list. Also specifies the initial key maps in the key-map list it creates. Optionally returns a string that is the name of the key-map list created.

process := CREATE_PROCESS (buffer [,string])

Starts a subprocess and associates a buffer with it. You can optionally specify an initial command to send to the subprocess. CREATE_PROCESS returns a process.

range := CREATE_RANGE (marker1, marker2, keyword)

Returns a range that includes two markers and all the characters between them. You must specify how the characters in the range are to be displayed when they

VAXTPU-4 VAX Text Processing Utility

Built-In Procedures

are visible on the screen (no special video, reverse video, bolding, blinking, or underlining).

[window :=] CREATE_WINDOW (integer1, integer2, keyword)

Defines a screen area called a window. You must specify the screen line number at which the window starts, the length of the window, and if the status line is displayed. CREATE_WINDOW optionally returns a window.

buffer := CURRENT_BUFFER

Returns the buffer in which you are currently positioned.

string := CURRENT_CHARACTER

Returns a string one character long for the character at the current character position in the current buffer.

integer := CURRENT_COLUMN

Returns an integer that is the current column number of the cursor on the screen.

keyword := CURRENT_DIRECTION

Returns a keyword that indicates the current direction of the current buffer. The valid keywords are FORWARD and REVERSE.

string := CURRENT_LINE

Returns a string that represents the current line. The current line is the line that contains the current character position.

integer := CURRENT_OFFSET

Returns an integer for the offset of the current character position within the current line.

integer := CURRENT_ROW

Returns an integer that is the screen line on which the cursor is located.

window := CURRENT_WINDOW

Returns the window in which the cursor is visible.

CURSOR_HORIZONTAL (integer)

Moves the cursor position across the screen the number of screen columns that you specify.

CURSOR_VERTICAL (integer)

Moves the cursor position up or down the screen by the number of screen lines that you specify.

DEFINE_KEY ({string1|buffer |range|program|learn}, keyword [,string2
[,string3]])

Associates executable VAXTPU code with a key or a combination of keys.

DELETE ({buffer|marker|process|program| range|window})

Removes VAXTPU structures from your editing context. When you delete a structure, (for example, a range), all variables that refer to that structure are reset to UNSPECIFIED. If the deleted structure had any associated resources, these resources are returned to the editor.

EDIT (string, keyword1[,...] [,keyword2])

Modifies a string according to the keywords you specify. EDIT is similar (but not identical) to the DCL lexical function F\$EDIT.

marker := END_OF ({buffer|range})

Returns a marker that points to the last character position in a buffer or a range.

ERASE ({range|buffer})

Removes the contents of the range or buffer that you specify.

[string :=] ERASE_CHARACTER (integer)

Deletes the number of characters you specify and optionally returns a string that represents the characters you deleted.

[string :=] ERASE_LINE

Removes the current line from the current buffer. ERASE_LINE optionally returns the line you remove in a string data type.

EXECUTE ({program|buffer|range|string|learn})

Does one of the following:

- Executes programs that you have previously compiled.
- Compiles and then executes any executable statements in a buffer, a range, or a string.
- replays or executes a learn sequence.

EXIT

Terminates the editing session and writes out any modified buffers that have associated files. VAXTPU queries you for a file name for any buffer that you have modified that does not already have an associated file.

Buffers that have the NO_WRITE attribute are not written out. See SET (NO_WRITE, buffer).

VAXTPU-6 VAX Text Processing Utility

Built-In Procedures

string2 := EXPAND_NAME (string1, keyword)

Returns a string that contains the name or names of any VAXTPU variables, keywords, or procedures (built-in or user-written) that begin with the string that you specify. VAXTPU searches its internal symbol tables to find a match, using your input string as the initial substring for the match.

string2 := FAO (string1 [,FAO parameters])

Invokes the Formatted ASCII Output (FAO) system service to convert a control string to a formatted ASCII output string. By specifying arguments for FAO directives in the control string, you can control the processing performed by the \$FAO system service. The FAO built-in procedure returns a string that contains the formatted ASCII output.

string4 := FILE_PARSE (string1 [,string2 [,string3 [,keyword]]])

Performs the equivalent of the DCL F\$PARSE lexical function. That is, it calls the VAX RMS service \$PARSE to parse a file specification and to return either an expanded file specification or the file specification field that you request.

FILE_PARSE returns a string that contains the expanded file specification or the field you specify. If you do not provide a complete file specification, FILE_PARSE supplies defaults in the return string.

If an error occurs during the parse, FILE_PARSE returns a null string.

string2 := FILE_SEARCH (string1)

Calls the RMS service \$SEARCH to search a directory file and return the full file specification for the file that you name.

FILE_SEARCH returns a string containing the resulting file specification. If the file is not found in the directory, FILE_SEARCH returns a null string and signals an error.

FILL ({buffer|range}, string [,integer1 [,integer2]])

Reformats the text in the specified buffer or range so that the lines of text are approximately the same length.

return_value := GET_INFO ({parameter1, parameter2| parameter1, parameter2, parameter3})

Provides information about the current status of your editing context. See Tables VAXTPU-1 and VAXTPU-2 at the end of this section for a list of the information that GET_INFO returns.

HELP_TEXT (string1, string2, keyword, buffer)

Invokes the VAX/VMS HELP facility. You must specify the help library to be used for help information, the initial library topic, the prompting mode for the HELP facility, and the buffer to which the help information is written.

VAX Text Processing Utility VAXTPU-7

Built-In Procedures

integer := INDEX (string1, string2)

Locates a character or a substring within a string and returns its location within the string.

integer := INT (string)

Converts a string that consists of numeric characters into an integer.

JOURNAL_CLOSE

Closes an open journal file (if one exists for your session) and saves the journal file.

[string2 :=] JOURNAL_OPEN (string)

Opens a journal file and starts making a copy of your editing session by recording every keystroke and command that you execute. Optionally returns a string containing the file specification of the file journaled. This procedure is not valid for batch mode.

keyword2 := KEY_NAME ({string|keyword1} [,SHIFT_KEY])

Returns a VAXTPU keyword for a key or a combination of keys.

keyword := LAST_KEY

Returns a VAXTPU keyword for the last key you entered. If you are replaying a learn sequence, it returns a keyword for the last key you replayed.

LEARN_BEGIN (keyword)

.

.

.

learn := LEARN_END

Saves all keystrokes typed between LEARN_BEGIN and LEARN_END. LEARN_BEGIN starts saving all keystrokes that you type. LEARN_END stops the "learn mode" of VAXTPU and returns a learn sequence that consists of all the keystrokes that you entered.

integer := LENGTH ({string|range})

Returns an integer that is the number of character positions in a string or a range.

pattern := LINE_BEGIN

Returns a pattern that matches the beginning-of-line condition.

VAXTPU-8 VAX Text Processing Utility

Built-In Procedures

pattern := LINE_END

Returns a pattern that matches the end-of-line condition.

{program|learn|integer|string2} := LOOKUP_KEY (keyword1, keyword2 [,string1])

Returns the executable code or the comment that is associated with the key you specify. The code can be returned as a program or as a learn sequence. The comment is returned as a string.

MAP (window, buffer)

Associates a buffer with a window and causes the window to become visible on the screen. Before using MAP you must already have created the buffer and the window that you specify as parameters. See CREATE_BUFFER and CREATE_WINDOW.

marker := MARK (keyword)

Returns a marker for the current character position in the current buffer. You must specify how the marker is to be displayed on the screen (no special video, reverse video, bolding, blinking, or underlining).

pattern := MATCH (string)

Returns a pattern that matches a sequence of characters starting at the current character position and continuing up to and including all the characters specified in **string**.

MESSAGE ({string|range})

Inserts the characters in the string or range that you specify into the message buffer, if one exists (by default, VAXTPU looks for a buffer that is named MESSAGE_BUFFER). If there is no MESSAGE_BUFFER, VAXTPU displays the message at the current location on the device pointed to by SYS\$OUTPUT (usually your terminal).

MOVE_HORIZONTAL (integer)

Changes the current character position in the current buffer by the number of characters you specify.

MOVE_TEXT ({string|range|buffer})

Moves the text you specify and places it in front of the current character position in the current buffer. When you move text with range and buffer parameters, you remove it from its original location.

MOVE_VERTICAL (integer)

Modifies the current character position in the current buffer by the number of lines you specify.

VAX Text Processing Utility

Built-In Procedures

VAXTPU-9

pattern := NOTANY (string)

Returns a pattern that matches any single character not in the string that is used as a parameter.

POSITION ({buffer|marker|range|window})

Establishes the current character position in the editing context. You can position to a range, a marker, a buffer, or a window.

QUIT

Leaves the editor without writing to a file.

string := READ_CHAR

Stores the next character entered from the keyboard in a string variable.

[string2 :=] READ_FILE (string1)

Reads a file and adds the contents of the file immediately before the current line in the current buffer. Optionally returns a string containing the file specification of the file read.

keyword := READ_KEY

Waits for you to press a key and then returns the keyword for that key.

string2 := READ_LINE [(string1 [,integer])]

Displays the text that you specify as a prompt for input and reads the information entered in response to the prompt. You can optionally specify the maximum number of characters to be read. READ_LINE returns a string that holds the data that is entered in response to the prompt.

REFRESH

Repaints the whole screen. It erases any extraneous characters, such as those caused by noise on a communication line, and repositions the text so that the screen represents the last known state of the editing context.

pattern := REMAIN

Returns a pattern that matches any string starting at the current character position and continuing to the end of the current line.

REMOVE_KEY_MAP (string1, string2 [,ALL])

Removes key maps from key-map lists.

SAVE (string)

Writes the binary form of all currently defined procedures, variables, and key definitions to the section file you specify.

VAXTPU-10 VAX Text Processing Utility

Built-In Procedures

pattern := SCAN (string)

Returns a pattern that matches the longest string of characters that does not contain any of the characters included in the parameter string.

pattern := SCANL (string)

Returns a pattern that matches the longest string of characters that does not contain any of the characters included in the parameter string. SCANL crosses record (line) boundaries.

[integer2:=] SCROLL (window [, {+|-}integer1])

Moves the lines of text in the buffer up or down on the screen by the number of lines you specify. The cursor does not move but stays positioned at the same relative screen location. The current character position is different from the character position that was current before you issued the scroll command. SCROLL optionally returns an integer that indicates the number and direction (negative number = upward, positive number = downward) of lines actually scrolled.

range := SEARCH ({string|pattern}, keyword1 [,keyword2])

Looks for a particular arrangement of characters and returns a range that contains the matching characters in the current buffer.

marker := SELECT (keyword)

Returns a marker for the current character position in the current buffer. You must specify how the marker is to be displayed on the screen (no special video, reverse video, bolding, blinking, or underlining).

The marker returned by SELECT indicates the first character position in a select range. The video attribute that you specify for the marker applies to all the characters in a select range. For information on creating a select range, see SELECT_RANGE.

range := SELECT_RANGE

Returns a range that contains all the characters between the marker established with the SELECT built-in and the current character position. SELECT_RANGE does not include the character at the end position in the selected range.

SEND ({buffer|range|string}, process)

Passes data to a subprocess.

SEND_EOF (process)

Uses features of the VAX/VMS mailbox driver to send an end-of-file message (IO\$_WRITEOF) to a subprocess.

SET (keyword, parameter [...])

Allows you to establish or to change certain features of a VAXTPU session. SET requires a keyword as its first parameter. The keyword indicates which feature of the editor is being set. You can set the mode for entering text, the text that is to be displayed on certain parts of the screen, the direction of a buffer, the status of a buffer, and so on.

Valid keywords: AUTO_REPEAT, BELL, DEBUG, EOB_TEXT, FACILITY_NAME, FORWARD, INFORMATIONAL, INSERT, JOURNALING, KEY_MAP_LIST, MARGINS, MAX_LINES, MESSAGE_FLAGS, NO_WRITE, OUTPUT_FILE, OVERSTRIKE, PAD, PERMANENT, PROMPT_AREA, REVERSE, SCREEN_UPDATE, SCROLLING, SELF_INSERT, SHIFT_KEY, STATUS_LINE, SUCCESS, SYSTEM, TAB_STOPS, TEXT, TIMER, UNDEFINED_KEY VIDEO, WIDTH.

[integer2 :=] SHIFT (window, integer1)

Changes the relative position of text that is displayed in a window on the screen. The text in the window is shifted to the right or to the left. The shift applies to any buffer associated with the window that you specify. SHIFT optionally returns an integer.

SHOW ({keyword|data type})

Displays information about VAXTPU data types and the current settings of attributes that can be applied to certain data types.

pattern := SPAN (string)

Returns a pattern that matches the longest string of characters that contains only characters appearing in **string**. (SPAN does not cross record (line) boundaries; contrast with SPANL.)

pattern := SPANL (string)

Returns a pattern that matches the longest string of characters that contains only characters appearing in **string**. (SPANL continues pattern matching across end of line; contrast with SPAN.)

SPAWN [string]

Deassigns the terminal and then creates a VAX/VMS subprocess.

SPLIT_LINE

Breaks the current line before the current character position and creates two lines.

string := STR (integer)

Converts an integer to a string.

string2 := SUBSTR ({string1|range}, integer1, integer2)

Returns a string that represents a substring of a string or a range.

VAXTPU-12 VAX Text Processing Utility

Built-In Procedures

TRANSLATE ({string1|range|buffer}, string2 , string3)

Invokes the VAX/VMS Run-Time Library procedure STR\$TRANSLATE. The VAXTPU procedure takes three parameters. Some of the characters in the first parameter are replaced by the characters in the second parameter. The third parameter is used as a match string to determine which characters from the first parameter are replaced.

UNDEFINE_KEY (keyword [,string])

Removes the current binding from the key that you specify.

UNMAP (window)

Disassociates a window from its buffer and removes the window from the screen.

UPDATE (window)

Causes the screen manager to make a window reflect the current internal state of the buffer that is associated with the window.

[string2 :=] WRITE_FILE ({buffer|range} [,string1])

Writes data to the file that you specify. Optionally returns a string that is the file specification of the file created.

VAXTPU.3 Global Variables for Built-In Procedures

Variable	Information Held
ERROR	Keyword that specifies an error or warning status
ERROR_LINE	Line number at which an error or warning occurred
DEBUG_LINE	Line number at which a breakpoint occurred

VAXTPU.4 Information Returned with Built-In Procedure GET_INFO

Table VAXTPU-1 GET_INFO - Using a Variable as Parameter1

Parameter1	Parameter2	Return Value	Description of Return Value
Any VAXTPU variable	"type"	Keyword	Data type of item
A buffer variable	"character"	String	Character at the current character position
	"file_name"	String	Name of a file given as the second parameter to CREATE_BUFFER; null if none was specified
	"first_marker"	Marker or Integer 0	First marker in VAXTPU's internal list of markers, 0 if none
	"first_range"	Range or Integer 0	First range in VAXTPU's internal list of ranges, 0 if none
	"line"	String	Line of text at current character position
	"map_count"	Integer	Number of windows associated with the buffer
	"modified"	Integer (1 or 0) ¹	Value that indicates whether the buffer has been modified
	"name"	String	Name given buffer when it was created
	"next_marker"	Marker or Integer 0	Next marker in VAXTPU's internal list of markers, 0 if no more
	"next_range"	Range or Integer 0	Next range in VAXTPU's internal list of ranges, 0 if no more
	"offset"	Integer	Offset of current character position from the beginning of the line

¹ An integer value of 1 indicates True and an integer value of 0 indicates False.

VAXTPU-14 VAX Text Processing Utility
Information Returned with Built-In Procedure GET_INFO

Table VAXTPU-1 (Cont.) GET_INFO - Using a Variable as Parameter¹

Parameter1	Parameter2	Return Value	Description of Return Value
	"offset_column"	Integer	Screen column that the current character position would occupy if it were on the screen, unshifted
	"record_count"	Integer	Number of records (lines) in the buffer
	"record_size"	Integer	Maximum length for records (lines) in the buffer
The following items are established or changed with the built-in procedure SET.			
	"direction"	Keyword	FORWARD or REVERSE
	"eob_text"	String	String representing the end-of-buffer text
	"key_map_list"	String	Key-map list that is bound to the buffer.
	"left_margin"	Integer	Current left margin setting
	"max_lines"	Integer	Maximum number of records (lines) in the buffer
	"mode"	Keyword	INSERT or OVERSTRIKE
	"no_write"	Integer (1 or 0) ¹	Value that indicates whether the buffer (if modified) should be output to a file upon exit
	"output_file"	String or Integer 0	The name of the file used with the built-in procedure SET (OUTPUT_FILE,...)
	"permanent"	Integer (1 or 0) ¹	Value that indicates whether the buffer is permanent or if it can be deleted
	"right_margin"	Integer	Current right margin setting
	"system"	Integer (1 or 0) ¹	Value that indicates whether the buffer is a system buffer

¹An integer value of 1 indicates True and an integer value of 0 indicates False.

VAX Text Processing Utility VAXTPU-15

Information Returned with Built-In Procedure GET_INFO

Table VAXTPU-1 (Cont.) GET_INFO - Using a Variable as Parameter1

Parameter1	Parameter2	Return Value	Description of Return Value
A marker variable	"tab_stops"	String or Integer	String that represents the values (each separated by a single space) of tab stops for SET (TAB_STOPS, buffer, string); integer that is the interval between tab stops for SET (TAB_STOPS, buffer, integer)
	"buffer"	Buffer	Buffer in which the marker is located
	"offset"	Integer	Offset of the marker from the beginning of the line
	"offset_column"	Integer	Screen column that the marker would occupy if it were on the screen - does not account for shifting of text within a window
A process variable	"video"	Keyword	Video attribute of the marker
	"pid"	Integer	Process identification number
A range variable	"buffer"	Buffer	The buffer in which the range is located
	"video"	Keyword	Video attribute of the range
The following items are established or changed with the built-in procedure SET.			
A string variable ³	"self_insert"	Integer (1 or 0) ¹	Value that indicates whether printable characters are to be inserted into the buffer if they are not defined
	"shift_key"	Keyword	Keyword for the key currently used as the shift key
	"undefined_key"	Any VAXTPU variable or Integer 0	Program called when an undefined character is entered; 0 if the program issues the default message

¹ An integer value of 1 indicates True and an integer value of 0 indicates False.

³ The string must identify the name of either a key map or a key-map list.

VAXTPU-16 VAX Text Processing Utility

Information Returned with Built-In Procedure GET_INFO

Table VAXTPU-1 (Cont.) GET_INFO - Using a Variable as Parameter1

Parameter1	Parameter2	Return Value	Description of Return Value
A window variable	"beyond_eol"	Integer (1 or 0) ¹	Value that indicates whether the cursor is beyond the end of the current line
	"buffer"	Buffer or Integer 0	The buffer that is associated with the window, 0 if none
	"current_column"	Integer	Column in which the cursor was most recently located
	"current_row"	Integer	Row in which the cursor was most recently located
	"next"	Window or Integer 0	Next window in VAXTPU's internal list of windows, 0 if last ²
	"original_bottom"	Integer	Screen line number of the bottom of the window when it was created (does not include status line)
	"original_length"	Integer	Number of lines in the window (includes status line)
	"original_top"	Integer	Screen line number of the top of the window when it was created
	"previous"	Window or Integer 0	Previous window in VAXTPU's internal list of windows, 0 if first ²
	"shift_amount"	Integer	Number of columns the window is shifted to the left
	"visible"	Integer (1 or 0) ¹	Value that indicates whether window is mapped to the screen and is not occluded
	"visible_bottom"	Integer	Screen line number of the visible bottom of the window (does not include status line)
	"visible_length"	Integer	Visible length of the window (includes status line)

¹ An integer value of 1 indicates True and an integer value of 0 indicates False.

² VAXTPU orders windows according to their "original top" line number. If multiple windows have the same top line number, the most recently created window comes first in VAXTPU's list of windows.

VAX Text Processing Utility VAXTPU-17

Information Returned with Built-In Procedure GET_INFO

Table VAXTPU-1 (Cont.) GET_INFO - Using a Variable as Parameter1

Parameter1	Parameter2	Return Value	Description of Return Value
	"visible_top"	Integer	Screen line number of the visible top of the window
The following items are established or changed with the built-in procedure SET.			
	"blink_status"	Integer (1 or 0) ¹	Value that indicates whether BLINK is one of the video attributes of the window's status line
	"blink_video"	Integer (1 or 0) ¹	Value that indicates whether BLINK is one of the video attributes of the window
	"bold_status"	Integer (1 or 0) ¹	Value that indicates whether BOLD is one of the video attributes of the window's status line
	"bold_video"	Integer (1 or 0) ¹	Value that indicates whether BOLD is one of the video attributes of the window
	"no_video"	Integer (1 or 0) ¹	Value that indicates whether the video attribute of the window is NONE
	"no_video_status"	Integer (1 or 0) ¹	Value that indicates whether the video attribute of the window's status line is NONE
	"pad"	Integer (1 or 0) ¹	Value that indicates whether the window is blank padded at the right
	"reverse_video"	Integer (1 or 0) ¹	Value that indicates whether REVERSE is one of the video attributes of the window
	"reverse_status"	Integer (1 or 0) ¹	Value that indicates whether REVERSE is one of the video attributes of the window's status line
	"scroll_amount"	Integer	Number of lines to scroll

¹An integer value of 1 indicates True and an integer value of 0 indicates False.

VAXTPU-18 VAX Text Processing Utility

Information Returned with Built-In Procedure GET_INFO

Table VAXTPU-1 (Cont.) GET_INFO - Using a Variable as Parameter1

Parameter1	Parameter2	Return Value	Description of Return Value
	"scroll_bottom"	Integer	Bottom of the scrolling area - this is an offset from the bottom screen line
	"scroll_top"	Integer	Top of the scrolling area - this is an offset from the top screen line
	"status_line"	String or Integer 0	Text of status line, 0 if none
	"status_video"	Keyword or Integer	If there is no video attribute or only one video attribute for the window's status line, the appropriate video keyword (NONE, BLINK, BOLD, REVERSE, UNDERLINE or SPECIAL_GRAPHICS) is returned; if there are multiple video attributes for the window's status line, the integer 1 is returned. (If there is no status line for the window, the integer 0 is returned.)
	"text"	Keyword	Value that indicates which keyword was used with SET (TEXT, window, keyword)
	"underline_status"	Integer (1 or 0) ¹	Value that indicates whether UNDERLINE is one of the video attributes of the window's status line
	"underline_video"	Integer (1 or 0) ¹	Value that indicates whether UNDERLINE is one of the video attributes of the window

¹An integer value of 1 indicates True and an integer value of 0 indicates False.

VAX Text Processing Utility VAXTPU-19

Information Returned with Built-In Procedure GET_INFO

Table VAXTPU-1 (Cont.) GET_INFO - Using a Variable as Parameter1

Parameter1	Parameter2	Return Value	Description of Return Value
	"video"	Keyword or Integer	If there is no video attribute or only one video attribute for the window, the appropriate video keyword (NONE, BLINK, BOLD, REVERSE, or UNDERLINE) is returned; if there are multiple video attributes for the window, the integer 1 is returned.
	"width"	Integer	Width of the window

Table VAXTPU-2 GET_INFO - Using a Keyword as Parameter1

Parameter1	Parameter2	Return Value	Description of Return Value
BUFFER[S]	"current"	Buffer or Integer 0	Current buffer, 0 if none
	"first"	Buffer or Integer 0	First buffer in VAXTPU's internal list of buffers, 0 if none ¹
	"last"	Buffer or Integer 0	Last buffer in VAXTPU's internal list of buffers, 0 if none ¹
	"next" ²	Buffer or Integer 0	Next buffer in VAXTPU's internal list of buffers, 0 if last ¹
	"previous" ²	Buffer or Integer 0	Preceding buffer in VAXTPU's internal list of buffers, 0 if first ¹
COMMAND_ LINE	"command"	Integer (1 or 0) ³	Value that indicates whether /COMMAND was specified when VAXTPU was invoked
	"command_file"	String	File specification for /COMMAND=

¹VAXTPU orders buffers and processes according to the order in which they are created; the first ones created are the first in the list.

²Use string constants "current" or "first" before using "next". Use "current" or "last" before using "previous".

³An integer value of 1 indicates True and an integer value of 0 indicates False.

VAXTPU-20 VAX Text Processing Utility
Information Returned with Built-In Procedure GET_INFO

Table VAXTPU-2 (Cont.) GET_INFO - Using a Keyword as Parameter¹

Parameter1	Parameter2	Return Value	Description of Return Value
	"create"	Integer (1 or 0) ³	Value that indicates whether /CREATE is active (either by default or because /CREATE was specified when VAXTPU was invoked)
	"display"	Integer (1 or 0) ³	Value that indicates whether /DISPLAY is active (either by default or because /DISPLAY was specified when VAXTPU was invoked)
	"file_name"	String	File specification used as a parameter when VAXTPU was invoked
	"journal"	Integer (1 or 0) ³	Value that indicates whether /JOURNAL is active (either by default or because /JOURNAL was specified when VAXTPU was invoked)
	"journal_file"	String	File specification for /JOURNAL=
	"output"	Integer (1 or 0) ³	Value that indicates whether /OUTPUT is active (either by default or because /OUTPUT was specified when VAXTPU was invoked)
	"output_file"	String	File specification for /OUTPUT=
	"read_only"	Integer (1 or 0) ³	Value that indicates whether /READ_ONLY was specified when VAXTPU was invoked
	"recover"	Integer (1 or 0) ³	Value that indicates whether /RECOVER was specified when VAXTPU was invoked
	"section"	Integer (1 or 0) ³	Value that indicates whether /SECTION is active (either by default or because /SECTION was specified when VAXTPU was invoked)

³ An integer value of 1 indicates True and an integer value of 0 indicates False.

VAX Text Processing Utility VAXTPU-21

Information Returned with Built-In Procedure GET_INFO

Table VAXTPU-2 (Cont.) GET_INFO - Using a Keyword as Parameter1

Parameter1	Parameter2	Return Value	Description of Return Value
DEBUG	"section_file"	String	File specification for /SECTION=
	"local"	Variable	First local variable in the previous procedure, 0 if there are no more local variables. When the return value is 0, TPU\$_FAILURE is returned. When you set the debugging context to local, and use the GET_INFO parameter DEBUG, the parameters "next" and "previous" refer to local variables.
	"next"	Parameter or variable	Next parameter (or 0 if there are no more parameters) when the context is set to parameter; next local variable (or 0 if there are no more local variables) when the context is set to local. When the return value is 0, TPU\$_FAILURE is returned.
	"parameter"	Parameter	First parameter of the previous procedure, 0 if there are no more parameters. When the return value is 0, TPU\$_FAILURE is returned. When you set the debugging context to parameter and use the GET_INFO parameter DEBUG, the parameters "next" and "previous" refer to parameters.
	"previous"	Parameter or variable	Previous parameter (or 0 if there are no more parameters) when the context is set to parameter; previous local variable (or 0 if there are no more local variables) when the context is set to local. When the return value is 0, TPU\$_FAILURE is returned.

VAXTPU-22 VAX Text Processing Utility

Information Returned with Built-In Procedure GET_INFO

Table VAXTPU-2 (Cont.) GET_INFO - Using a Keyword as Parameter1

Parameter1	Parameter2	Return Value	Description of Return Value
DEFINED_KEY ⁴	"first"	Keyword	Keyword of the first key in the specified key map or key-map list.
	"last"	Keyword	Keyword of the last key in the specified key map or key-map list.
	"next" ⁵	Keyword	Keyword of the next key in the specified key map or key-map list.
	"previous" ⁵	Keyword	Keyword of the previous key in the specified key map or key-map list.
KEY_MAP ⁶	"first"	String	Name of the first key map in the key-map list.
	"last"	String	Name of the last key map in the key-map list.
	"next" ⁵	String	Name of the next key map in the key-map list.
	"previous" ⁵	String	Name of the previous key map in the key-map list.
KEY_MAP_LIST	"current"	String	Name of the current key-map list.
	"first"	String	Name of the first key-map list.
	"last"	String	Name of the last key-map list.
	"next" ²	String	Name of the next key-map list.
	"previous" ²	String	Name of the previous key-map list.

²Use string constants "current" or "first" before using "next". Use "current" or "last" before using "previous".

⁴When Parameter1 is DEFINED_KEY the built-in procedure takes a string as a third parameter. The string specifies the name of either the key map or key-map list to be searched.

⁵Use string constant "first" before using "next". Use "last" before using "previous". Note that "current" is not valid when Parameter1 is DEFINED_KEY or KEY_MAP, although it is valid when Parameter1 is KEY_MAP_LIST.

⁶When Parameter1 is KEY_MAP, the built-in procedure takes a string as a third parameter. The string specifies the name of the key-map list to be searched.

VAX Text Processing Utility VAXTPU-23

Information Returned with Built-In Procedure GET_INFO

Table VAXTPU-2 (Cont.) GET_INFO - Using a Keyword as Parameter1

Parameter1	Parameter2	Return Value	Description of Return Value
PROCESS	"first"	Process or Integer 0	First process in VAXTPU's internal list of processes, 0 if none ³
	"last"	Process or Integer 0	Last process in VAXTPU's internal list of processes, 0 if none ³
	"next" ²	Process or Integer 0	Next in VAXTPU's internal list of processes, 0 if last ³
	"previous" ²	Process or Integer 0	Preceding process in VAXTPU's internal list of processes, 0 if first ³
SCREEN	"ansi_crt"	Integer (1 or 0) ³	Value that indicates whether the terminal is an ANSI_CRT
	"current_column"	Integer	Column number of the current column
	"current_row"	Integer	Screen line number of the current row
	"dec_crt"	Integer (1 or 0) ³	Value that indicates whether the terminal is a DEC_CRT
	"dec_crt2"	Integer (1 or 0) ³	Value that indicates whether the terminal is a DEC_CRT2
	"edit_mode"	Integer (1 or 0) ³	Value that indicates whether the terminal is set to edit mode
	"eightbit"	Integer (1 or 0) ³	Value that indicates whether the terminal uses eight-bit characters
	"line_editing"	Keyword or Integer 0	Current method of line editing (Insert or Overstrike), 0 if none.
	"original_width"	Integer	Physical width of the screen when you invoked VAXTPU
	"scroll"	Integer (1 or 0) ³	Value that indicates whether the terminal has scrolling regions, DEC_CRT
	"visible_length"	Integer	Page length of the terminal

²Use string constants "current" or "first" before using "next". Use "current" or "last" before using "previous".

³An integer value of 1 indicates True and an integer value of 0 indicates False.

VAXTPU-24 VAX Text Processing Utility

Information Returned with Built-In Procedure GET_INFO

Table VAXTPU-2 (Cont.) GET_INFO - Using a Keyword as Parameter1

Parameter1	Parameter2	Return Value	Description of Return Value
	"width"	Integer	Current physical width of the screen
	"vk100"	Integer (1 or 0) ³	Value that indicates whether the terminal is a GIGI
	"vt100"	Integer (1 or 0) ³	Value that indicates whether the terminal is in the VT100 series
	"vt200"	Integer (1 or 0) ³	Value that indicates whether the terminal is in the VT200 series; returns true only on VAX/VMS Version 4.0 or higher
	The following items are established or changed with the built-in procedure SET.		
	"auto_repeat"	Integer (1 or 0) ³	Value that indicates whether the terminal's auto repeat feature is on
	"prompt_length"	Integer	Number of lines in the prompt area
	"prompt_row"	Integer	Screen line number at which the prompt area begins
	"screen_update"	Integer (1 or 0) ³	Value that indicates whether screen updating is turned on
SYSTEM	"display"	Integer (1 or 0) ³	Value that indicates whether the supported input device is a terminal; if the VAXTPU session is running in batch mode, 0 is returned.
	"journal_file"	String	Name of the journal file
	"section_file"	String	Name of section file used when VAXTPU was invoked
	"update"	Integer	Update number of this version of VAXTPU
	"version"	Integer	Version number of VAXTPU
	The following items are established or changed with the built-in procedure SET.		

³An integer value of 1 indicates True and an integer value of 0 indicates False.

VAX Text Processing Utility VAXTPU-25

Information Returned with Built-In Procedure GET_INFO

Table VAXTPU-2 (Cont.) GET_INFO - Using a Keyword as Parameter¹

Parameter1	Parameter2	Return Value	Description of Return Value
	"bell"	Keyword or Integer 0	ALL if bell is on for all messages, BROADCAST if bell is on for broadcast messages only, 0 if SET (BELL,...) feature is off
	"facility_name"	String	Current facility name
	"informational"	Integer (1 or 0) ³	Value that indicates whether SET (INFORMATIONAL,...) is on
	"journaling—frequency"	Integer	The number that indicates how frequently records are written to the journal file
	"message_flags"	Integer	Current value of message flag setting
	"shift_key"	Keyword	Value of the key set with SET (SHIFT_KEY) for the current buffer
	"success"	Integer (1 or 0) ³	Value that indicates whether SET (SUCCESS,...) is on
	"timed_message"	String or Integer 0	Text that VAXTPU displays at one-second intervals in the prompt area
WINDOW[S]	"current"	Window or Integer 0	Current window on the screen, 0 if none
	"first"	Window or Integer 0	First window in VAXTPU's internal list of windows, 0 if none ⁷
	"last"	Window or Integer 0	Last window in VAXTPU's internal list of windows, 0 if none ⁷
	"next" ²	Window or Integer 0	Next window in VAXTPU's internal list of windows, 0 if last ⁷

²Use string constants "current" or "first" before using "next". Use "current" or "last" before using "previous".

³An integer value of 1 indicates True and an integer value of 0 indicates False.

⁷VAXTPU orders windows according to their "original top" line number. If multiple windows have the same top line number, the most recently created window comes first in VAXTPU's list of windows.

VAXTPU-26 VAX Text Processing Utility
Information Returned with Built-In Procedure GET_INFO

Table VAXTPU-2 (Cont.) GET_INFO - Using a Keyword as Parameter1

Parameter1	Parameter2	Return Value	Description of Return Value
	"previous" ²	Window or Integer 0	Preceding window in VAXTPU's internal list of windows, 0 if first ⁷

²Use string constants "current" or "first" before using "next". Use "current" or "last" before using "previous".

⁷VAXTPU orders windows according to their "original top" line number. If multiple windows have the same top line number, the most recently created window comes first in VAXTPU's list of windows.

DIGITAL Standard Runoff

The information on the DIGITAL Standard Runoff (DSR) text formatter consists of the following sections:

1. DSR commands
2. DSR flags
3. RUNOFF command line format
4. RUNOFF/INDEX command qualifiers
5. RUNOFF/CONTENTS command qualifiers
6. How to produce an index
7. How to produce a table of contents

For further information, see the *VAX DIGITAL Standard Runoff (DSR) Reference Manual* and the *VAX/VMS Guide to Text Processing*.

Online help about the command format is available on your VAX/VMS system by typing:

\$ HELP RUNOFF

NOTE: A dagger (†) is used to indicate that a command starts by issuing a .BREAK command. The dagger is not part of the command.

DSR.1 DSR Commands

DSR commands, with default values and standard abbreviations.

DSR-2 **DIGITAL Standard Runoff**

DSR Commands

.APPENDIX† [appendix-title] (.AX)

Starts a new appendix on a new page.

.AUTOJUSTIFY (.AJ) (default)

.NO AUTOJUSTIFY (.NAJ)

Turns on justification and filling at the start of each header level, chapter, appendix, note, and footnote.

.AUTOPARAGRAPH (.AP)

.NO AUTOPARAGRAPH (.NAP) (default)

Starts a new paragraph each time a blank line or a line that begins with a space or tab is encountered. (See .AUTOTABLE and .SET PARAGRAPH.)

AUTOSUBTITLE [[+/-] header-level-number] (.AST) (default)

.NO AUTOSUBTITLE (.NAST)

Outputs as a subtitle the title of the latest header at or below the level specified. This is effective only when .SUBTITLE is enabled.

Default: If no parameter is specified, the output header level 1 title becomes the subtitle.

.AUTOTABLE (.AT)

.NO AUTOTABLE (.NAT) (default)

Starts a new paragraph at any line that does not begin with a space or tab. (See .AUTOPARAGRAPH.)

.BEGIN BAR (.BB)

.END BAR (.EB)

Inserts change bars at the start of all output lines for text between .BEGIN BAR and .END BAR. This is effective only when the .ENABLE BAR command has been issued. (See also /CHANGE_BARS qualifier description.)

.BLANK† [[-]n] (.B)

Outputs **n** blank lines. If **n** is negative, outputs blank lines until **n** lines are left on the page. Terminates output of blank lines at a page break.

Default: .BLANK 1

.BREAK (.BR)

Ends current line immediately without filling or justifying.

.CENTER† [[+/-]n];text (.C)

.CENTRE† [[+/-]n];text (.C)

Centers **text** around column **n**/2 on the next line.

Default: Centers **text** between left and right margins.

.CHAPTER† [title] (.CH)

Starts a new chapter on a new page.

.CONTROL CHARACTERS (.CC)

.NO CONTROL CHARACTERS (.NCC) (Default)

Enables (disables) recognition of control characters as normal text to be processed and output. If disabled, all control characters in the input stream are ignored.

.DATE (.D)

.NO DATE (.ND) (Default)

Prints date (DD MMM YY) under the page number at the top of each page, when .SUBTITLE is enabled and .LAYOUT 0 or 3 is in effect. (See .SET DATE.)

.DISABLE BAR (.DBB) (Default)

.DISABLE BOLDING (.DBO)

.DISABLE HYPHENATION (.DHY)

.DISABLE INDEXING (.DIX)

.DISABLE OVERSTRIKING (.DOV)

.DISABLE TOC (.DTC)

See .ENABLE BAR, .ENABLE BOLDING, .ENABLE HYPHENATION, .ENABLE INDEXING, .ENABLE OVERSTRIKING, .ENABLE TOC, and .ENABLE UNDERLINING.

.DISPLAY APPENDIX† appendix-number-format-code (.DAX)

.DISPLAY CHAPTER† chapter-number-format-code (.DCH)

.DISPLAY ELEMENTS† [“l”,]list-number-format-code[“r”] (.DLE)

.DISPLAY LEVELS† [hl1],[hl2],[hl3],[hl4],[hl5],[hl6] (.DHL)

.DISPLAY NUMBER† page-number-format-code (.DNM)

.DISPLAY SUBPAGE† subpage-number-format-code (.DSP)

Changes the numbering format of appendixes, chapters, list elements, header levels, pages, and subpages.

In .DISPLAY ELEMENTS, the first and third parameters are single (or null) quoted characters to be used to the left (“l”) and right (“r”) of the element number or letter in each list entry.

DSR-4 DIGITAL Standard Runoff

DSR Commands

Format Code	Description
D	decimal numbers
O	octal numbers
H	hexadecimal numbers
RU	roman uppercase numerals
RL	roman lowercase numerals
RM	roman mixed case numerals (only first character is uppercase)
LU	letters, uppercase
LL	letters, lowercase
LM	letters, mixed case (only first letter is uppercase)

Defaults:

.DISPLAY APPENDIX LU (letters, uppercase)
.DISPLAY CHAPTER D (decimal numbers)
.DISPLAY ELEMENTS " ",D,"." (decimal numbers)
.DISPLAY LEVELS D,D,D,D,D (decimal numbers)
.DISPLAY NUMBER D (decimal numbers)
.DISPLAY SUBPAGE LU (letters, uppercase)

.ELSE variant-name

Use after .IF or .IFNOT and before .ENDIF. Processes text between .ELSE and .ENDIF as input only if **variant-name** is (is NOT for .IFNOT) specified by a /VARIANT switch (qualifier) in the command line.

.ENABLE BAR (.EBB)

.DISABLE BAR (.DBB) (Default)

Enables (disables) generation of change bars for text between .BEGIN BAR and .END BAR. (Once change bars are enabled, the entire text is shifted three columns to the right.)

.ENABLE BOLDING (.EBO) (Default)

.DISABLE BOLDING (.DBO)

Enables (disables) bolding by means of the Bold flag (*), if .FLAGS BOLD is in effect.

.ENABLE HYPHENATION (.EHY) (Default)

.DISABLE HYPHENATION (.DHY)

Enables (disables) hyphenation by means of the Hyphenate flag (=), if .FLAGS HYPHENATE is in effect.

.ENABLE INDEXING (.EIX)

.DISABLE INDEXING (.DIX)

Enables (disables) collecting and printing of index entries.

.ENABLE OVERSTRIKING (.EOV) (Default)

.DISABLE OVERSTRIKING (.DOV)

Enables (disables) overstriking by means of the Overstrike flag (%), if .FLAGS OVERSTRIKE is in effect.

.ENABLE TOC (.ETC) (Default)

.DISABLE TOC (.DTC)

Enables (disables) the collection of information for the table of contents.

.ENABLE UNDERLINING (.EUN) (Default)

.DISABLE UNDERLINING (.DUL)

Enables (disables) underlining by means of the Underline flag (&), if .FLAGS UNDERLINE is in effect.

.END BAR (.EB)

.END FOOTNOTE (.EFN)

.END LIST [n] (.ELS)

.END LITERAL (.EL)

.END NOTE [n] (.EN)

.END SUBPAGE (.ES)

See .BEGIN BAR, .FOOTNOTE, .LIST, .LITERAL, .NOTE, and .SUBPAGE.

.ENDIF variant-name (.EI)

Terminates .IF or .IFNOT conditional.

.ENTRY topic[> subtopic1> ...> subtopicn] (.Y)

Creates an index entry with no page number reference.

.FIGURE† [n] (.FG)

Outputs **n** blank lines. If there are not **n** lines left on the current page, outputs **n** blank lines at the top of the next page.

Default: .FIGURE 1

.FIGURE DEFERRED† [n] (.FGD)

Similar to .FIGURE, but if there are not **n** lines left on the current page, continues to output text on the current page and outputs **n** blank lines at the top of the next page.

Default: .FIGURE DEFERRED 1

DSR-6 DIGITAL Standard Runoff
DSR Commands

.FILL↑ (.F) (Default)

.NO FILL↑ (.NF)

Adds words to each output line until the addition of one more word would cross the right margin. (See .JUSTIFY.)

.FIRST TITLE (.FT)

Outputs the page number, title, and subtitle on the first page of the document. .FIRST TITLE must precede any text.

Default: No title information on the first page.

.FLAGS ACCEPT (.FL ACCEPT) (Default)

.NO FLAGS ACCEPT (.NFL ACCEPT)

.FLAGS BOLD [new-bold-flag] (.FL BOLD)

.NO FLAGS BOLD (.NFL BOLD) (Default)

.FLAGS BREAK [new-break-flag] (.FL BREAK)

.NO FLAGS BREAK (.NFL BREAK) (Default)

.FLAGS CAPITALIZE [new-capitalize-flag] (.FL CAPITALIZE)

.NO FLAGS CAPITALIZE (.NFL CAPITALIZE) (Default)

.FLAGS COMMENT [new-comment-flag] (.FL COMMENT) (Default)

.NO FLAGS COMMENT (.NFL COMMENT)

.FLAGS CONTROL [new-control-flag] (.FL CONTROL) (Default)

.NO FLAGS CONTROL (.NFL CONTROL)

.FLAGS HYPHENATE [new-hyphenate-flag] (.FL HYPHENATE)

.NO FLAGS HYPHENATE (.NFL HYPHENATE) (Default)

.FLAGS INDEX [new-index-flag] (.FL INDEX)

.NO FLAGS INDEX (.NFL INDEX) (Default)

.FLAGS LOWERCASE [new-lowercase-flag] (.FL LOWERCASE) (Default)

.NO FLAGS LOWERCASE (.NFL LOWERCASE)

.FLAGS OVERSTRIKE [new-overstrike-flag] (.FL OVERSTRIKE)

.NO FLAGS OVERSTRIKE (.NFL OVERSTRIKE) (Default)

.FLAGS PERIOD [new-period-flag] (.FL PERIOD)

.NO FLAGS PERIOD (.NFL PERIOD) (Default)

.FLAGS SPACE [new-space-flag] (.FL SPACE) (Default)
.NO FLAGS SPACE (.NFL SPACE)

.FLAGS SUBINDEX [new-subindex-flag] (.FL SUBINDEX) (Default)
.NO FLAGS SUBINDEX (.NFL SUBINDEX)

.FLAGS SUBSTITUTE [new-substitute-flag] (.FL SUBSTITUTE)
.NO FLAGS SUBSTITUTE (.NFL SUBSTITUTE) (Default)

.FLAGS UNDERLINE [new-underline-flag] (.FL UNDERLINE) (Default)
.NO FLAGS UNDERLINE (.NFL UNDERLINE)

.FLAGS UPPERCASE [new-uppercase-flag] (.FL UPPERCASE) (Default)
.NO FLAGS UPPERCASE (.NFL UPPERCASE)

The .FLAGS commands turn on/off recognition of the specified flags. For all flags except Bold, Hyphenate, Overstrike, and Underline, these commands also enable/disable the function as well as recognition of the flag. (See .ENABLE BOLDING, .ENABLE HYPHENATION, .ENABLE OVERSTRIKING, .ENABLE UNDERLINING, and Section DSR.2, DSR Flags.)

Exception: The Control flag cannot be reenabled after the .NO FLAGS CONTROL command has disabled it.

.FLAGS [ALL] (.FL [ALL]) (Default)
.NO FLAGS [ALL] (.NFL [ALL])

The .NO FLAGS ALL command unconditionally disables recognition of all flags except the Control and Comment flags. After a .NO FLAGS ALL (and before a .FLAGS ALL) command, no other flag commands take effect. Execution of a .FLAGS ALL command reinstates flags that were active before the .NO FLAGS ALL command as well as flags set after the .NO FLAGS ALL command.

.FOOTNOTE (.FN)
.END FOOTNOTE (.EFN)

Places the text between the .FOOTNOTE and .END FOOTNOTE commands in a footnote at the bottom of the current page.

.HEADER LEVEL† [[_]level-number] [title] (.HL)
Starts a new header.

Default: Same level as current header.

.HEADERS LOWER
.HEADERS MIXED (Default)
.HEADERS UPPER

Changes case of 'Page' and 'Index' header words.

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DSR Commands

.HEADERS [ON] (.HD [ON]) (Default)

.NO HEADERS[ON] (.NHD)

Enables (disables) printing of running heads (title and subtitle information) on the top three or four lines of each page.

.IF variant-name

If **variant-name** is specified by a /VARIANT switch (qualifier) in the command line, processes as input all text between .IF and the corresponding .ELSE (or .ENDIF, if there is no .ELSE). Conditionals (.IFENDIF and .IFNOTENDIF) can be embedded within other conditionals.

.IFNOT variant-name (.IN)

Similar to .IF, but processes input text if **variant-name** is NOT specified by a /VARIANT switch (qualifier).

.INDENT† [[+/-]n] (.I)

Indents the next line **n** columns to the right (or left, if the parameter is negative) of the left margin.

Default: Paragraph indent (initially five columns).

.INDEX topic[> subtopic1> ...> subtopicn] (.X)

Creates an index entry with a page number reference.

.JUSTIFY (.J) (Default)

.NO JUSTIFY (.NJ)

Inserts enough additional space between words on a line so that the last word reaches the right margin. .NO JUSTIFY inserts no additional spacing and creates a ragged right margin. (See .FILL.)

.KEEP (.K)

.NO KEEP (.NK) (Default)

Outputs all blank input lines as blank lines (when in .NO FILL mode). .NO KEEP causes blank lines to be discarded.

.LAYOUT† layout-code[,bottom-of-page-spacing] (.LO)

Specifies page layouts:

Code	Page Layout
0	Title/subtitle flush left, page number and date flush right
1	Title/subtitle centered, page number centered at the bottom
2	Title/subtitle flush left odd page, flush right even page, page number centered at the bottom
3	Title/subtitle flush left, running page numbers centered at the bottom

The second parameter (vertical spacing between text and page number) is required for codes 1 to 3 and not allowed for code 0.

Default: .LAYOUT 0

.LEFT MARGIN† [+/-]column (.LM)

Sets left margin.

Default: .LEFT MARGIN 0

.LIST† [spacing-between-items,][“character”] (.LS)

.END LIST† [[-]spacing-after-last-item] (.ELS)

Starts (ends) an itemized list. The second parameter allows a bullet character to be used to replace the numbers that begin each list entry. Lists can be embedded within other lists. If the .END LIST parameter is negative, outputs blank lines after the list until the designated number of lines is left on the page.

Default: Single spacing, decimal numbering.

.LIST ELEMENT†;text (.LE;)

Begins new list entry. (Place between .LIST and .END LIST.)

.LITERAL (.LT)

.END LITERAL (.EL)

Outputs block of text between .LITERAL and .END LITERAL exactly as input. Flags and commands are not recognized within the literal (except for .END LITERAL), but underlining, bolding, and spacing in effect at the beginning of the literal continue throughout. Tabs are expanded with spaces, and the left margin applies to the literal.

.NO AUTOJUSTIFY (.NAJ)

.NO AUTOPARAGRAPH (.NAP) (Default)

.NO AUTOSUBTITLE (.NAST)

.NO CONTROL CHARACTERS (.NCC) (Default)

.NO DATE (.ND) (Default)

.NO FILL† (.NF)

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DSR Commands

.NO HEADERS [ON] (.NHD [ON])

.NO JUSTIFY (.NJ)

.NO PAGING (.NPA)

.NO PERIOD (.NPR)

.NO SUBTITLE (.NST) (Default)

See .AUTOJUSTIFY, .AUTOPARAGRAPH, .AUTOSUBTITLE, CONTROL CHARACTERS, .DATE, .FILL, .FLAGS flag-name, .FLAGS [ALL], .HEADERS [ON], .JUSTIFY, .FOOTNOTE, .PAGING, .PERIOD, or .SUBTITLE.

.NO NUMBER (.NNM)

Disables listing (but not counting) of page numbers. (See .NUMBER PAGE.)

.NO SPACE (.NSP)

Inserts no space between the last character on the previous input line and the first character on the next input line (when in .FILL mode).

.NOTE [title] (.NT)

.END NOTE [[-]spacing-after-note] (.EN)

Indents text between .NOTE and .END NOTE from both margins and separates it from the rest of the text by blank lines. Prints NOTE or **title** centered above the text of the note. Notes can be embedded within other notes. If the .END NOTE parameter is negative, outputs blank lines after the note until the designated number of lines is left on the page.

Default: **title** = NOTE, **spacing-after-note** = .SKIP 2

.NUMBER APPENDIX [+/-]new-letter-or-page-number (.NMAX)

.NUMBER CHAPTER [+/-]new-letter-or-page-number (.NMCH)

.NUMBER LEVEL [[+/-]n1],...,[+/-]n6] (.NMLV)

.NUMBER LIST [+/-]new-element-number (.NMLS)

.NUMBER PAGE [[+/-]new-letter-or-page-number] (.NMPG)

.NUMBER RUNNING [+/-]new-letter-or-page-number (.NMR)

Alters the sequence of numbering for an appendix, chapter, header level, list element, page, running page, or subpage. In all cases, sequential numbering resumes.

.NUMBER PAGE and .NUMBER SUBPAGE enable paging and subpaging, respectively. (See .NO NUMBER.)

.PAGE† (.PG)

Starts a new page.

.PAGE SIZE† [[+/-]length],[+/-]width] (.PS)

Sets column width (3 to 150) and number of lines per page (13 to 9999).

Default: .PAGE SIZE 58,70

.PAGING (.PA) (Default)

.NO PAGING (.NPA)

Enables (disables) paging. If disabled, text becomes one page.

.PARAGRAPH† [spaces-indented],[vertical-spacing],[test-page-lines] (.P)

Starts a new paragraph and resets paragraph characteristics.

Default: .PARAGRAPH 5,1,2

.PERIOD (.PR) (Default)

.NO PERIOD (.NPR)

Enables (disables) automatic output of two spaces after a period (.), colon (:), question mark (?), or exclamation point (!) (when .FILL is in effect).

.REPEAT number-of-occurrences “string” (.RPT)

Repeats **string** of up to 150 text characters. When .NO FILL is in effect, places each replication on a separate line.

.REQUIRE “file-spec” (.REQ)

Takes input text from a specified file. The .REQUIRE command can be embedded within files that have been required. The default file type is .RNO.

.RIGHT† [[+/-]columns-from-right-margin];text (.R)

Places **text** flush with the right margin (no parameter), or flush with a point to the left (positive parameter), or right (negative parameter) of the right margin.

.RIGHT MARGIN† [+/-]last-column (.RM)

Sets right margin.

Default: .RIGHT MARGIN 70

.SET DATE† [[+/-]day],[+/-]month],[+/-]year] (.SDT)

Resets date (\$\$day,\$\$month,\$\$year). Use decimal digits (dd,mm,yyyy) to set the date. (See .FLAGS SUBSTITUTE and .DATE.)

Default: Current system date

.SET LEVEL [+/-]level-number (.SL)

Presets the level of the next section head without issuing a .HEADER LEVEL command.

.SET PARAGRAPH [spaces-indented],[vertical-spacing],[test-page-lines] (.SPR)

Sets paragraph characteristics. (Similar to .PARAGRAPH, but does not start a new paragraph.)

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DSR Commands

.SET TIME [[+/-]hours],[[+/-]minutes],[[+/-]seconds] (.STM)

Resets time (\$\$hours,\$\$minutes,\$\$seconds). (See .FLAGS SUBSTITUTE.)

.SKIP† [[-]vertical-spacing] (.S)

Similar to .BLANK, but .SPACING setting controls the number of lines that are skipped.

Default: .SKIP 1

.SPACING† vertical-spacing (.SP)

Changes the amount of spacing between lines of text (and between blank lines output by .SKIP).

Default: .SPACING 1 (single spacing)

.STYLE HEADERS† (n1,n2,n3,n4,n5,n6,n7,n8,n9) (.STHL)

Assigns header levels at which different formatting styles are in effect. Parameters n2 and n3 are in effect at the specified level and at all levels with a header level less than n2 or n3. Parameters n1, n4, and n5 are in effect at the specified level and at all levels with a header number greater than n1, n4, or n5.

- n1 = Lowest level at which text starts on same line as title
- n2 = Highest level at which title is in all capitals
- n3 = Highest level at which first letter of title words is capitalized
- n4 = Lowest level that has no header number
- n5 = Lowest level that has a centered title
- n6 = Number of blank lines before the start of a header
- n7 = Number of blank lines after the end of a header
- n8 = Implicit test page value executed at start of each header
- n9 = Number of spaces between the section number and title

Default: .STYLE HEADERS 3,1,6,7,7,2,1,9,2

.SUBPAGE† (.SPG)

.END SUBPAGE† (.ES)

Places text between the .SUBPAGE and .END SUBPAGE commands on pages numbered by appending a letter to the page number. Outputs new pages both before and after subpagging.

.SUBTITLE [new-subtitle] (.ST)

.NO SUBTITLE (.NST) (Default)

Enables (disables) subtitling.

.TAB STOPS [[[+/-]tab-column],...] (.TS)

Resets tab stops. A null parameter causes the corresponding tab to remain unchanged. No parameters at all disables all tabs.

Default: .TAB STOPS 8,16,24,32,40,...

.TEST PAGE† n (.TP)

Starts a new page if there are fewer than **n** lines left on the current page.

.TITLE† new-title (.T)

Specifies a new title.

.VARIABLE variant-name [true,false] (.VR)

Finds conditional commands (.IF, .IFNOT, .ELSE, and .ENDIF) and identifies which are "true" and which are "false." "True" conditionals will be processed. /DEBUG must be specified.

Default: A space character is output as both "true" and "false".

.XLOWER (.XL)

Makes the case of letters in index entries correspond to the case specified (explicitly or by flags) in .INDEX and .ENTRY commands (and after the index flag).

.XUPPER (.XU) (Default)

Capitalizes the first letter of the first word of each index entry and makes all subsequent text in the index entry lowercase, unless explicit use of the Uppercase or Capitalize flag in the corresponding .INDEX or .ENTRY command (or after the index flag) overrides this.

DSR.2 DSR Flags

For bolding, overstriking, hyphenating, and underlining, the DSR command .FLAGS flag-name causes recognition of the flag character and the .ENABLE function-name command causes actual operation of the flag. The .FLAGS command causes both recognition of the flag character and operation of the flag for all .FLAGS commands except the following: BOLD, HYPHENATE, OVERSTRIKE, and UNDERLINE.

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DSR Flags

Table DSR-1 DSR Flags

Operation		Recognition		
.ENABLE/ .DISABLE	.FLAGS/ .NOFLAGS	Flag	Action	Example
	ACCEPT	—	Takes next character as literal text.	—\$—\$day is \$\$day → \$\$day is 18
BOLDING	BOLD	*	Bolds (overprints) next character.	B*BB → BBB
		^*	Turns on bolding of all text.	^*AB CD* CD → AB CD CD
		*	Turns off automatic bolding.	
	BREAK		Allows but does not require a line break at this point.	... end- of- line ... → ... end- of-line ...
	CAPITALIZE	<	Capitalizes next word.	a <bc <de → a BC DE
		^ <	Turns on capitalization of all text.	aBc ^ <dEf Ghi^ jKL →
		^^	Turns off automatic capitalization.	aBc DEF GHI jKL
	COMMENT	.!	Starts comment.	.!Whole Line Comment
	CONTROL	.	Starts DSR command.	.FILL,JUSTIFY
HYPHENATION	HYPHENATE	=	Allows but does not require hyphenation at this point	... hy=phen=ate ... → Some people will hyphen- ate to improve a book's appearance.
	INDEX	>	Indexes next word.	> Digital Equipment → Digital, 1-1
	LOWERCASE	\	Makes next character lowercase.	AB\CD → ABcD

Table DSR-1 (Cont.) DSR Flags

Operation		Recognition		
.ENABLE/ .DISABLE	.FLAGS/ .NOFLAGS	Flag	Action	Example
		\\	Turns on lowercasing of all text.	ABC\\DEF G [^] HIj →
		^^	Turns off automatic lowercasing.	ABCdef gHIj
OVERSTRIKING	OVERSTRIKE	%	Overstrikes previous character.	0%/ → Ø
	PERIOD	+	Causes (at least) two spaces to be output (if flag is followed by a space).	... end.)+ Start ...→ ... end.) Start ...
	SPACE	#	Outputs (exactly) one space.	A##B#C###D → A B C D
OVERSTRIKING	SUBINDEX	>	Subindexes next word. (Used in .INDEX and .ENTRY commands.)	.X DSR> pocket guide> flags → DSR pocket guide flags, 357
	SUBSTITUTE	\$	Inserts time and date information.	\$\$date → 12 March 1986 \$\$time → 15:09:32 \$\$year → 1986 \$\$month → March \$\$day → 12 \$\$hours → 15 \$\$minutes → 09 \$\$seconds → 32

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DSR Flags

Table DSR-1 (Cont.) DSR Flags

Operation		Recognition		
.ENABLE/ .DISABLE	.FLAGS/ .NOFLAGS	Flag	Action	Example
UNDERLINING	UNDERLINE	&	Underlines next character.	A&BC → A <u>B</u> C
		^&	Turns on underlining of all nonblank text.	^&AB CD_EF\&GH → A <u>B</u> C <u>D</u> <u>E</u> F <u>G</u> H
		\&	Turns off automatic underlining.	
	UPPERCASE	^	Capitalizes next character.	^abc → Abc

DSR.3 RUNOFF Command Line Format

```
$ RUNOFF[/qualifier...] input-file-spec[/qualifier...]
```

DSR.3.1 Default File Types for Output

The following defaults are applied, except when /DEVICE=LN01 or /DEVICE=LN03 is specified, in which case the default output type is LNI.

Input	Output	Input	Output
.RNB	.BLB	.RNO	.MEM
.RNC	.CCO	.CCO	.RNP
.RND	.DOC	.RNS	.STD
.RNE	.ERR	.RNT	.MEC
.RNH	.HLP	.RNX	.MEX
.RNL	.PLM	none	.MEM
.RNM	.MAN	other	.MEM

DSR.3.2 Command Line Qualifiers

/BACKSPACE

Backspaces (instead of overprinting) to underline, boldface, and overstrike.

/BOLD=overstrikes

/NOBOLD

/BOLD specifies the number of **overstrikes** to simulate bolding. The .FLAGS BOLD command must be executed within the input file to cause the Bold flag (*) to be recognized. /NOBOLD disables bolding for all input.

Default: /BOLD=1

/CHANGE_BARS[="new-change-bar-character"]

/NOCHANGE_BARS

Enables change bars and optionally specifies a change bar character other than the default vertical bar (|). /NOCHANGEBARS disables change bars for all input.

/DEBUG[=ALL]

Traces all the DEBUG options.

/DEBUG=CONDITIONALS

Ignores conditionals; draft flags appear in output.

/DEBUG=CONTENTS

Echoes .SEND TOC commands in output file.

/DEBUG=FILES

Echoes .REQUIRE commands in output file.

/DEBUG=INDEX

Echoes index entries in output file.

/DEBUG=SAVE_RESTORE

Echoes .SAVE and .RESTORE commands in output.

/DEBUG=(option,...)

Default: No debugging features are enabled.

/DEVICE=LN01[,option,...]

/DEVICE=LN01E[,option,...]

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RUNOFF Command Line Format

/DEVICE=LN03[,option,...]

Generates output for the LN01 laser printer, the European LN01E, or the LN03 laser printer, respectively. If specified, the default file type is .LNI and the following options may be specified:

ITALIC	Determines whether underlined or italic text is generated for DSR
UNDERLINE	underlining sequences. Default: ITALIC
PORTRAIT	Selects orientation of text displayed by the laser printer. Default:
LANDSCAPE	PORTRAIT

/DOWN[=n]

Skips **n** blank lines at the top of each page before the header (title) information.

Defaults: /DOWN=0. /DOWN without a parameter skips 5 lines.

/FORM_SIZE[=number]

Specifies maximum number of lines of text that can be output on a page.

Default: /FORM_SIZE=66

/INTERMEDIATE[=file-spec]

/NOINTERMEDIATE (Default)

Creates an intermediate file (.BRN) of table of contents and indexing information. This file is used for processing by the DSR Indexing and Table of Contents utilities.

/LOG

/NOLOG (Default)

Outputs termination message (number of errors, DSR version number, number of pages) to terminal after completion of DSR processing.

/MESSAGES=option

The OUTPUT option sends error messages to the output file only. The USER option sends error messages to the terminal only.

Default: Error messages sent to both terminal and output file.

/OUTPUT[=file-spec]

/NOOUTPUT

Specifies output file.

Default: /OUTPUT=input.MEM

/PAGES="start1:end1,..."

Outputs only the pages within the ranges specified. If **endn** is not specified in the last range, defaults to the last page of the text. A maximum of 5 ranges may be specified.

Default: All pages output.

/PAUSE

/NOPAUSE (Default)

Output pauses and terminal bell rings after printing of each page. You can press any key to resume printing.

/REVERSE_EMPHASIS

Reverses the standard order of underlining and printing for text to be underlined. Cause the following output sequence: line of text, carriage return without line feed, underline character(s).

Default: Output sequence as follows: underline character(s), carriage return without line feed, line of text.

/RIGHT[=columns]

Shifts each line of the output file right by the specified number of columns. /RIGHT without a parameter shifts the text 5 columns.

Default: /RIGHT=0

/SEPARATE_UNDERLINE[="character"]

Underlines after executing a line feed. Uses separate characters on the next line, rather than overprinting with the underscore character.

Default: /SEPARATE_UNDERLINE="-"

/SEQUENCE

/NOSEQUENCE (Default)

Generates input file sequence numbers in the output file.

/SIMULATE

/NOSIMULATE (Default)

Simulates form feeds with line feeds. (Causes an automatic /PAUSE before the first page.)

/UNDERLINE_CHARACTER="character"

/NOUNDERLINE_CHARACTER

Substitutes **character** for the underscore as the underlining character. **Character** will be overprinted. /NOUNDERLINE disables underlining for all input. (See /NONSPACING_UNDERLINE and /SEPARATE_UNDERLINE.)

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Default: /UNDERLINE_CHARACTER="_"

/VARIANT=string
/VARIANT="string,..."

Associates **string** or **strings** with a true condition in the execution of conditional commands (.IF, .IFNOT, .ELSE, .ENDIF).

DSR.4 /INDEX Command Line Qualifiers

\$ RUNOFF /INDEX file-spec[,...] or file-spec[+...]

/IDENTIFICATION
/NOIDENTIFICATION (Default)

Controls whether /INDEX reports its version number.

/LINES_PER_PAGE=number-of-lines

Specifies number of lines per page to be used for indexing information (exclusive of headings and footings). /LINES_PER_PAGE has no effect if /LAYOUT=GALLEY has been specified.

Default: LINES_PER_PAGE=55 (54 for typeset output)

/LOG
/NOLOG (Default)

Controls whether /INDEX reports the file specification of each input (intermediate) file it processes, and the file specification of the generated output file.

/OUTPUT[=file-spec]
/NOOUTPUT

Specifies output file.

Default: /OUTPUT=input.RNX

/PAGE_NUMBERS=option
/NOPAGE_NUMBERS

Controls appearance of page numbers in the index. The options are:

NORUNNING Chapter-oriented page numbers (such as 6-4) are used.

RUNNING Running page numbers (such as 127) are used.

Default: /PAGE_NUMBERS=NORUNNING

/REQUIRE=file-spec

Specifies a file of DSR input to be inserted at the top of the first index page (instead of the default centered title "INDEX" followed by three blank lines).

/RESERVE=number-of-lines

Specifies the number of lines to allow at the top of the first index page for inclusion of required text. Usually used in conjunction with /REQUIRE.

DSR.5 /CONTENTS Command Line Qualifiers

\$ RUNOFF/CONTENTS file-spec[,...] or file-spec[+...]

/BOLD[=header-level-depth]

/NOBOLD (Default)

Performs any bolding that is present in header, example, figure, and table titles. If an argument is supplied, performs bolding only up through the level specified.

/DEEPEST_HEADER[=header-level-depth]

Displays in the table of contents only those headers up through the level specified.

Default: /DEEPEST_HEADER=6

/IDENTIFICATION

/NOIDENTIFICATION (Default)

Controls whether /CONTENTS reports its version number.

/INDENT

/NOINDENT (Default)

Establishes Table of Contents indention rules.

/LOG

/NOLOG (Default)

Controls whether /CONTENTS reports the file specification of each input (.BRN /.BIX) file it processes, and the file specification of each generated output file.

/OUTPUT[=file-spec]

/NOOUTPUT

Specifies output file.

Default: /OUTPUT=input.RNT

/PAGE_NUMBERS=option

Controls appearance of page numbers in the table of contents. The options are:

NORUNNING Uses chapter-oriented page numbers (such as 1-2).

RUNNING Uses running page numbers (such as 127).

Default: /PAGE_NUMBERS=NORUNNING

DSR-22 **DIGITAL Standard Runoff** **/CONTENTS Command Line Qualifiers**

/REQUIRE=file-spec

Includes the contents of a file of DSR input to be inserted at the top of the first table of contents page, instead of the default centered title "CONTENTS" followed by three blank lines.

/SECTION_NUMBERS (Default)

/NOSECTION_NUMBERS

Controls the display of section (header level) numbers in the table of contents.

/UNDERLINE

/NOUNDERLINE (Default)

Performs any underlining that is present in header, example, figure, or table titles.

DSR.6 Producing an Index

Use the following steps to produce an index:

1. Enter indexing commands (.X or .Y) in the RNO file.
2. Process the RNO file with RUNOFF/INTERMEDIATE to generate an intermediate binary file (BRN).
3. Process the resulting BRN file with RUNOFF/INDEX to generate an RNX file.
4. Process the RNX file with RUNOFF in one of the following ways:
 - Process the RNX file with RUNOFF to produce a MEX file that contains a formatted index.
 - Include the RNX file in a master file that uses .REQUIRE commands to include all parts of your document. When you process the master file with the RUNOFF command, the formatted index will be placed in your document where you "require" it.
5. Use the DCL PRINT command on either the MEX or MEM file to see a copy of your index.

These steps are described more fully in the *VAX DIGITAL Standard Runoff (DSR) Reference Manual*.

DSR.7 Producing a Table of Contents

The DSR table of contents utility creates a formatted table-of-contents file from the chapter, section, and appendix titles specified by .CHAPTER, .APPENDIX, .HEADER LEVEL, and .SEND TOC commands in your RNO file.

Use the following steps to produce a table of contents:

1. Process the RNO file with RUNOFF/INTERMEDIATE to produce an intermediate binary file (BRN).
2. Process the resulting BRN file with RUNOFF/CONTENTS to produce an RNT file.
3. Process the RNT file with RUNOFF in one of the following ways:
 - Process the RNT file with the RUNOFF command to produce a MEC file that contains the formatted table of contents.
 - Include the RNT file in a master file that uses .REQUIRE commands to include all parts of your document. When you process the master file with the RUNOFF command, the formatted table of contents will be placed in the MEM file where you "require" it.
4. Use the DCL PRINT command on either the MEC or MEM file to get a copy of your table of contents.

These steps are described more fully in the *VAX DIGITAL Standard Runoff (DSR) Reference Manual*.

Introduction to System Routines

The sections that follow provide quick reference information for programmers using VAX/VMS system services (SYS), Run-Time Library routines (RTL), callable utility routines (UTIL), and VAX Record Management Services (RMS). Complete documentation of these components, including examples and explanations of important concepts, is in the appropriate reference manuals in the VAX/VMS document set.

In this Mini-Reference, routines are listed alphabetically within each section. Following the routine format is a description of each argument, with the following items of information: argument name, VMS usage, data type, access method, and passing mechanism. For example,

flags|mask_longword|longword (unsigned)|read only|by value

indicates that the *flags* argument has a VMS usage of *mask_longword*, is an unsigned longword, is accessed as read-only data by the called routine, and contains the actual data to be used by the called routine (and thus is passed “by value”). The *Introduction to VAX/VMS System Routines* explains each of these items; it also includes the “VAX Procedure Calling and Condition Handling Standard” and tables matching VMS Usage entries with their implementations in various VAX languages.

Several system services have synchronous forms ending in “W,” indicating the program should “wait” until the called routine completes before proceeding. Each synchronous form system service has an abbreviated entry following the asynchronous form; you should refer to the asynchronous form service for return status and argument information. For example, the return status and arguments for SYS\$GETQUIW (Get Queue Information and Wait) are the same as for SYS\$GETQUI (Get Queue Information).

System Services

SYSS\$ADD_HOLDER id ,holder ,[attrib]

id|rights_id|longword (unsigned)|read only|by value
holder|rights_holder|quadword (unsigned)|read only|by reference
attrib|mask_longword|longword (unsigned)|read only|by value

SYSS\$ADD_IDENT name ,[id] ,[attrib] ,[resid]

name|char-string|character-coded text string|read only|by descriptor-fixed length
string descriptor
id|rights_id|longword (unsigned)|read only|by value
attrib|mask_longword|longword (unsigned)|read only|by value
resid|rights_id|longword (unsigned)|write only|by reference

SYSS\$ADJSTK [acmode] ,[adjust] ,newadr

acmode|access_mode|longword (unsigned)|read only|by value
adjust|word_signed|word (signed)|read only|by value
newadr|address|longword (unsigned)|modify|by reference

SYSS\$ADJWSL [pagcnt] ,[wsetlm]

pagcnt|longword_signed|longword (signed)|read only|by value
wsetlm|longword_unsigned|longword (unsigned)|write only|by reference

SYSS\$ALLOC devnam ,[phylen] ,[phybuf] ,[acmode] ,[flags]

devnam|device_name|character-coded text string|read only|by descriptor-fixed length
string descriptor
phylen|word_unsigned|word (unsigned)|write only|by reference
phybuf|device_name|character-coded text string|write only|by descriptor-fixed length
string descriptor

SYS-2 System Services

acmode|access__mode|longword (unsigned)|read only|by value
flags|mask__longword|longword (unsigned)|read only|by value

SYS\$ASCEFC efn ,name ,[prot] ,[perm]

efn|ef__number|longword (unsigned)|read only|by value
name|ef__cluster__name|character-coded text string|read only|by descriptor-fixed length string descriptor
prot|boolean|byte (unsigned)|read only|by value
perm|boolean|byte (unsigned)|read only|by value

SYS\$ASCTIM [timlen] ,timbuf ,[timadr] ,[cvtfllg]

timlen|word__unsigned|word (unsigned)|write only|by reference
timbuf|time__name|character-coded text string|write only|by descriptor-fixed length string descriptor
timadr|date__time|quadword (unsigned)|read only|by reference
cvtfllg|longword__unsigned|longword (unsigned)|read only|by value

SYS\$ASCTOID name ,[id] ,[attrib]

name|char__string|character-coded text string|read only|by descriptor-fixed length string descriptor
id|rights__id|longword (unsigned)|write only|by reference
attrib|mask__longword|longword (unsigned)|write only|by reference

SYS\$ASSIGN devnam ,chan ,[acmode] ,[mbxnam]

devnam|device__name|character-coded text string|read only|by descriptor-fixed length string descriptor
chan|channel|word (unsigned)|write only|by reference
acmode|access__mode|longword (unsigned)|read only|by value
mbxnam|device__name|character-coded text string|read only|by descriptor-fixed length string descriptor

SYS\$BINTIM timbuf ,timadr

timbuf|time__name|character-coded text string|read only|by descriptor-fixed length string descriptor
timadr|date__time|quadword (unsigned)|write only|by reference

SYS\$BRKTHRU [efn] ,msgbuf [,sendto] [,sndtyp] [,iosb] [,carcon] [,flags] [,reqid]
[,timeout] [,astadr] [,astprm]

efn|ef_number|longword (unsigned)|read only|by value
msgbuf|char_string|character-coded text string|read only|by descriptor-fixed length
string descriptor
sendto|char_string|character-coded text string|read only|by descriptor-fixed length
string descriptor
sndtyp|longword_unsigned|longword (unsigned)|read only|by value
iosb|io_status_block|quadword (unsigned)|write only|by reference
carcon|longword_unsigned|longword (unsigned)|read only|by value
flags|mask_longword|longword (unsigned)|read only|by value
reqid|longword_unsigned|longword (unsigned)|read only|by value
timeout|longword_unsigned|longword (unsigned)|read only|by value
astadr|last_procedure|procedure entry mask|call without stack unwinding|by reference
astprm|user_arg|longword (unsigned)|read only|by value

SYS\$BRKTHRUW [efn] ,msgbuf [,sendto] [,sndtyp] [,iosb] [,carcon] [,flags] [,reqid]
[,timeout] [,astadr] [,astprm]

SYS\$CANCEL chan

chan|channel|word (unsigned)|read only|by value

SYS\$CANEXH [desblk]

desblk|lexit_handler_block|longword (unsigned)|read only|by reference

SYS\$CANTIM [reqidt] ,[acmode]

reqidt|user_arg|longword (unsigned)|read only|by value
acmode|access_mode|longword (unsigned)|read only|by value

SYS\$CANWAK [pidadr] ,[prcnam]

pidadr|process_id|longword (unsigned)|modify|by reference
prcnam|process_name|character-coded text string|read only|by descriptor-fixed length
string descriptor

SYS\$CHANGE_ACL [chan] ,objtyp ,[objnam] ,itmlst ,[acmode] ,[nullarg] ,[contxt]

chan|channel|word (unsigned)|read only|by value
objtyp|longword_unsigned|longword (unsigned)|read only|by reference
objnam|char_string|character-coded text string|read only|by descriptor-fixed length
string descriptor
itmlst|item_list_3|longword (unsigned)|read only|by reference

SYS-4 System Services

acmode|access__mode|longword (unsigned)|read only|by reference
nullarg|null__arg|longword (unsigned)|read only|by value
context|context|longword (unsigned)|modify|by reference

SYS\$CHECK__ACCESS objtyp ,objnam ,usnam ,itmlst

objtyp|longword__unsigned|longword (unsigned)|read only|by reference
objnam|char__string|character-coded text string|read only|by descriptor-fixed length
string descriptor
usnam|char__string|character-coded text string|read only|by descriptor-fixed length
string descriptor
itmlst|item__list__3|longword (unsigned)|read only|by reference

SYS\$CHKPRO itmlst

itmlst|item__list__3|longword (unsigned)|read only|by reference

SYS\$CLREF efn

efn|ef__number|longword (unsigned)|read only|by value

SYS\$CMEXEC routin ,[arglst]

routin|procedure|procedure entry mask|call without stack unwinding |by reference
arglst|arg__list|longword (unsigned)|read only|by reference

SYS\$CMKRNL routin ,[arglst]

routin|procedure|procedure entry mask|call without stack unwinding |by reference
arglst|arg__list|longword (unsigned)|read only|by reference

SYS\$CNTREG pagcnt ,[retadr] ,[acmode] ,[region]

pagcnt|longword__unsigned|longword (unsigned)|read only|by value
retadr|address__range|longword (unsigned)|write only|by reference
acmode|access__mode|longword (unsigned)|read only|by value
region|longword__unsigned|longword (unsigned)|read only|by value

SYS\$CREATE__RDB [sysid]

sysid|system__access__id|quadword (unsigned)|read only|by reference

SYS\$CRELN [attr] ,tabnam ,lognam ,[acmode] ,[itmlst]

attr|mask__longword|longword (unsigned)|read only|by reference
tabnam|logical__name|character-coded text string|read only|by descriptor-fixed length
string descriptor

lognam|logical__name|character-coded text string|read only|by descriptor-fixed length string descriptor

acmodelaccess__model|byte (unsigned)|read only|by reference

itmlst|item__list__3|longword (unsigned)|read only|by reference

SYSS\$CRELNT [attr] ,[resnam] ,[reslen] ,[quota] ,[promsk] ,[tabnam] ,partab ,[acmode]

attr|mask__longword|longword (unsigned)|read only|by reference

resnam|logical__name|character-coded text string|write only|by descriptor-fixed length string descriptor

reslen|word__unsigned|word (unsigned)|write only|by reference

quota|longword__unsigned|longword (unsigned)|read only|by reference

promsk|file__protection|word (unsigned)|read only|by reference

tabnam|logical__name|character-coded text string|read only|by descriptor-fixed length string descriptor

partab|char__string|character-coded text string|read only|by descriptor-fixed length string descriptor

acmodelaccess__model|byte (unsigned)|read only|by reference

SYSS\$CREMBX [prmflg] ,chan ,[maxmsg] ,[bufquo] ,[promsk] ,[acmode] ,[lognam]

prmflg|boolean|byte (unsigned)|read only|by value

chan|channel|word (unsigned)|write only|by reference

maxmsg|longword__unsigned|longword (unsigned)|read only|by value

bufquo|longword__unsigned|longword (unsigned)|read only|by value

promsk|file__protection|longword (unsigned)|read only|by value

acmodelaccess__model|longword (unsigned)|read only|by value

lognam|logical__name|character-coded text string|read only|by descriptor-fixed length string descriptor

SYSS\$CREPRC [pidadr] ,[image] ,[input] ,[output] ,[error] ,[prvadr] ,[quota] ,[prcnam] ,[baspri] ,[uic] ,[mbxunt] ,[stsflg]

pidadr|process__id|longword (unsigned)|write only|by reference

image|logical__name|character-coded text string|read only|by descriptor-fixed length string descriptor

input|logical__name|character-coded text string|read only|by descriptor-fixed length string descriptor

output|logical__name|character-coded text string|read only|by descriptor-fixed length string descriptor

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error|logical_name|character-coded text string|read only|by descriptor-fixed length string descriptor
prvadr|mask_privileges|quadword (unsigned)|read only|by reference
quota|item_quota_list|longword (unsigned)|read only|by reference
prcnam|process_name|character-coded text string|read only|by descriptor-fixed length string descriptor
baspr|longword_unsigned|longword (unsigned)|read only|by value
uicluc|longword (unsigned)|read only|by value
mbxunt|word_unsigned|word (unsigned)|read only|by value
stsf|mask_longword|longword (unsigned)|read only|by value

SYS\$CRETVA inadr [,retadr] [,acmode]

inadr|address_range|longword (unsigned)|read only|by reference
retadr|address_range|longword (unsigned)|write only|by reference-array reference or descriptor
acmode|access_mode|longword (unsigned)|read only|by value

SYS\$CRMPSC [inadr] [,retadr] [,acmode] [,flags] [,gsdnam] [,ident] [,relpag] [,chan] [,pagcnt] [,vbn] [,prot] [,pfc]

inadr|address_range|longword (unsigned)|read only|by reference
retadr|address_range|longword (unsigned)|write only|by reference-array reference or descriptor
acmode|access_mode|longword (unsigned)|read only|by value
flags|mask_longword|longword (unsigned)|read only|by value
gsdnam|section_name|character-coded text string|read only|by descriptor-fixed length string descriptor
ident|section_id|quadword (unsigned)|read only|by reference
relpag|longword_unsigned|longword (unsigned)|read only|by value
chan|channel|word (unsigned)|read only|by value
pagcnt|longword_unsigned|longword (unsigned)|read only|by value
vbn|longword_unsigned|longword (unsigned)|read only|by value
prot|file_protection|longword (unsigned)|read only|by value
pfc|longword_unsigned|longword (unsigned)|read only|by value

SYS\$DACEFC efn

efn|ef_number|longword (unsigned)|read only|by value

SYS\$DALLOC [devnam] ,[acmode]

devnam|device_name|character-coded text string|read only|by descriptor-fixed length
string descriptor
acmode|access_model|longword (unsigned)|read only|by value

SYS\$DASSGN chan

chan|channel|word (unsigned)|read only|by value

SYS\$DCLAST astadr ,[astprm] ,[acmode]

astadr|last_procedure|procedure entry mask|call without stack unwinding|by reference
astprm|user_arg|longword (unsigned)|read only|by value
acmode|access_model|longword (unsigned)|read only|by value

SYS\$DCLCMH addres ,[prvhnd] ,[type]

addres|procedure|procedure entry mask|call without stack unwinding|by reference
prvhnd|address|longword (unsigned)|write only|by reference
type|longword_unsigned|longword (unsigned)|read only|by value

SYS\$DCLEXH desblk

desblk|exit_handler_block|longword (unsigned)|read only|by reference

SYS\$DELLNM tabnam ,[lognam] ,[acmode]

tabnam|logical_name|character-coded text string|read only|by descriptor-fixed length
string descriptor
lognam|logical_name|character-coded text string|read only|by descriptor-fixed length
string descriptor
acmode|access_model|byte (unsigned)|read only|by reference

SYS\$DELMBX chan

chan|channel|word (unsigned)|read only|by value

SYS\$DELPRC [pidadr] ,[prcnam]

pidadr|process_id|longword (unsigned)|modify|by reference
prcnam|process_name|character-coded text string|read only|by descriptor-fixed length
string descriptor

SYS\$DELTVA inadr ,[retadr] ,[acmode]

inadr|address_range|longword (unsigned)|read only|by reference
retadr|address_range|longword (unsigned)|write only|by reference
acmode|access_model|longword (unsigned)|read only|by value

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SYS\$DEQ [lkid] [,valblk] [,acmode] [,flags]

lkid|lock_id|longword (unsigned)|read only|by value
valblk|lock_value_block|longword (unsigned)|modify|by reference
acmode|access_mode|longword (unsigned)|read only|by value
flags|mask_longword|longword (unsigned)|read only|by value

SYS\$DGBLSC [flags] ,gsdnam [,ident]

flags|mask_longword|longword (unsigned)|read only|by value
gsdnam|section_name|character-coded text string|read only|by descriptor-fixed length string descriptor
ident|section_id|quadword (unsigned)|read only|by reference

SYS\$DISMOU devnam [,flags]

devnam|device_name|character-coded text string|read only|by descriptor-fixed length string descriptor
flags|mask_longword|longword (unsigned)|read only|by value

SYS\$DLCEFC name

name|ef_cluster_name|character-coded text string|read only|by descriptor-fixed length string descriptor

SYS\$ENQ [efn] ,lkmode ,lksb [,flags] [,resnam] [,parid] [,astadr] [,astprm] [,blkast] [,acmode] [,nullarg]

efn|ef_number|longword (unsigned)|read only|by value
lkmode|longword_unsigned|longword (unsigned)|read only|by value
lksb|lock_status_block|longword (unsigned)|write only|by reference
flags|mask_longword|longword (unsigned)|read only|by value
resnam|char_string|character-coded text string|read only|by descriptor-fixed length string descriptor
parid|lock_id|longword (unsigned)|read only|by value
astadr|last_procedure|procedure entry mask|call without stack unwinding|by reference
astprm|user_arg|longword (unsigned)|read only|by value
blkast|last_procedure|procedure entry mask|call without stack unwinding|by reference
acmode|access_mode|longword (unsigned)|read only|by value
nullarg|null_arg|longword (unsigned)|read only|by value

SYS\$ENQW [efn] ,lkmode ,lksb [,flags] [,resnam] [,parid] [,astadr] [,astprm] [,blkast]
[,acmode] [,nullarg]

SYS\$ERAPAT [type] ,[count] ,[patadr]

type|longword__unsigned|longword (unsigned)|read only|by value
count|longword__unsigned|longword (unsigned)|read only|by value
patadr|longword__unsigned|longword (unsigned)|write only|by reference

SYS\$EXIT [code]

code|cond__value|longword (unsigned)|read only|by value

SYS\$EXPREG pagcnt ,[retadr] ,[acmode] ,[region]

pagcnt|longword__unsigned|longword (unsigned)|read only|by value
retadr|address__range|longword (unsigned)|write only|by reference
acmode|access__mode|longword (unsigned)|read only|by value
region|longword__unsigned|longword (unsigned)|read only|by value

SYS\$FAO ctrstr ,[outlen] ,outbuf ,[p1]...[Pn]

SYS\$FAOL ctrstr ,[outlen] ,outbuf [,prmlst]

ctrstr|char__string|character-coded text string|read only|by descriptor-fixed length
string descriptor
outlen|word__unsigned|word (unsigned)|write only|by reference
outbuf|char__string|character-coded text string|write only|by descriptor-fixed length
string descriptor
p1 to pn|varying__arg|longword (unsigned)|read only|by value
prmlst|vector__longword__unsigned|longword (unsigned)|read only|by reference

SYS\$FILESCAN srcstr ,valuelst ,[fldflags]

srcstr|char__string|character-coded text string|read only|by descriptor-fixed length
string descriptor
valuelst|item__list__2|longword (unsigned)|modify|by reference
fldflags|mask__longword|longword (unsigned)|write only|by reference

SYS\$FIND_HELD holder ,[id] ,[attrib] ,[contxt]

holder|rights__holder|quadword (unsigned)|read only|by reference
id|rights__id|longword (unsigned)|write only|by reference
attrib|mask__longword|longword (unsigned)|write only|by reference
contxt|context|longword (unsigned)|modify|by reference

SYS-10 System Services

SYSS\$FIND_HOLDER id ,[holder] ,[attrib] ,[contxt]

id|rights_id|longword (unsigned)|read only|by value
holder|rights_holder|quadword (unsigned)|write only|by reference
attrib|mask_longword|longword (unsigned)|write only|by reference
contxt|context|longword (unsigned)|modify|by reference

SYSS\$FINISH_RDB contxt

contxt|context|longword (unsigned)|modify|by reference

SYSS\$FORCEX [pidadr] ,[prcnam] ,[code]

pidadr|process_id|longword (unsigned)|modify|by reference
prcnam|process_name|character-coded text string|read only|by descriptor-fixed length
string descriptor
code|cond_value|longword (unsigned)|read only|by value

SYSS\$FORMAT_ACL aclent ,[acllen] ,aclstr ,[width] ,[trmdsc] ,[indent] ,[accnam]

aclent|char_string|character-coded text string|read only|by descriptor-fixed length
string descriptor
acllen|word_unsigned|word (unsigned)|write only|by reference
aclstr|char_string|character-coded text string|write only|by descriptor-fixed length
string descriptor
width|word_unsigned|word (unsigned)|read only|by reference
trmdsc|char_string|character-coded text string|read only|by descriptor-fixed length
string descriptor
indent|word_unsigned|word (unsigned)|read only|by reference
accnam|access_bit_names|longword (unsigned)|read only|by reference

SYSS\$GETDVI [efn] ,[chan] ,[devnam] ,itmlst [,iosb] [,astadr] [,astprm] [,nullarg]

efn|ef_number|longword (unsigned)|read only|by value
chan|channel|word (unsigned)|read only|by value
devnam|device_name|character-coded text string|read only|by descriptor-fixed length
string descriptor
itmlst|item_list_3|longword (unsigned)|read only|by reference
iosblo_status_block|quadword (unsigned)|write only|by reference
astadr|last_procedure|procedure entry mask|call without stack unwinding|by reference
astprm|user_arg|longword (unsigned)|read only|by value
nullarg|null_arg|quadword (unsigned)|read only|by reference

SY\$GETDVIW [efn] [,chan] [,devnam] ,itmlst [,iosb] [,astadr] [,astprm] [,nullarg]

SY\$GETJPI [efn] [,pidadr] [,prcnam] ,itmlst [,iosb] [,astadr] [,astprm]

efn|ef_number|longword (unsigned)|read only|by value

pidadr|process_id|longword (unsigned)|modify|by reference

prcnam|process_name|character-coded text string|read only|by descriptor-fixed length string descriptor

itmlst|item_list_3|longword (unsigned)|read only|by reference

iosblo_status_block|quadword (unsigned)|write only|by reference

astadr|last_procedure|procedure entry mask|call without stack unwinding|by reference

astprm|user_arg|longword (unsigned)|read only|by value

SY\$GETJPIW [efn] [,pidadr] [,prcnam] ,itmlst [,iosb] [,astadr] [,astprm]

SY\$GETLKI [efn] ,lkidadr ,itmlst [,iosb] [,astadr] [,astprm] [,nullarg]

efn|ef_number|longword (unsigned)|read only|by value

lkidadr|lock_id|longword (unsigned)|modify|by reference

itmlst|item_list_3|longword (unsigned)|read only|by reference

iosblo_status_block|quadword (unsigned)|write only|by reference

astadr|last_procedure|procedure entry mask|call without stack unwinding|by reference

astprm|user_arg|longword (unsigned)|read only|by value

nullarg|null_arg|longword (unsigned)|read only|by value

SY\$GETLKIW [efn] ,lkidadr ,itmlst [,iosb] [,astadr] [,astprm] [,nullarg]

SY\$GETMSG msgid ,msglen ,bufadr [,flags] [,outadr]

msgid|cond_value|longword (unsigned)|read only|by value

msglen|word_unsigned|word (unsigned)|write only|by reference

bufadr|char_string|character-coded text string|write only|by descriptor-fixed length string descriptor

flags|mask_longword|longword (unsigned)|read only|by value

outadr|vector_byte_unsigned|byte (unsigned)|write only|by reference

SY\$GETQUI [efn] ,func [,nullarg] [,itmlst] [,iosb] [,astadr] [,astprm]

efn|ef_number|longword (unsigned)|read only|by value

func|function_code|longword (unsigned)|read only|by value

nullarg|null_arg|longword (unsigned)|read only|by value

itmlst|item_list_3|longword (unsigned)|read only|by reference

iosblo_status_block|quadword (unsigned)|write only|by reference

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astadr|last_procedure|procedure entry mask|call without stack unwinding|by reference
astprm|user_parm|longword (unsigned)|read only|by value

SYS\$GETQUIW [efn] ,func [,nullarg] [,itmlst] [,iosb] [,astadr] [,astprm]

SYS\$GETSYI [efn] ,[csidadr] ,[nodename] ,itmlst [,iosb] [,astadr] [,astprm]

efn|ef_number|longword (unsigned)|read only|by value
csidadr|process_id|longword (unsigned)|modify|by reference
nodename|process_name|character-coded text string|read only|by descriptor-fixed length string descriptor
itmlst|item_list_3|longword (unsigned)|read only|by reference
iosblo_status_block|quadword (unsigned)|write only|by reference
astadr|last_procedure|procedure entry mask|call without stack unwinding|by reference
astprm|user_arg|longword (unsigned)|read only|by value

SYS\$GETSYIW [efn] ,[csidadr] ,[nodename] ,itmlst [,iosb] [,astadr] [,astprm]

SYS\$GETTIM timadr

timadr|date_time|quadword (unsigned)|write only|by reference

SYS\$GETUAI [nullarg] ,[nullarg] ,usnam ,itmlst ,[nullarg] ,[nullarg] ,[nullarg]

nullarg|null_arg|longword (unsigned)|read only|by value
usnam|char_string|character-coded text string|read only|by descriptor-fixed length string descriptor
itmlst|item_list_3|longword (unsigned)|read only|by reference

SYS\$GRANTID [pidadr] ,[prcnam] ,[id] ,[name] ,[prvatr]

pidadr|process_id|longword (unsigned)|modify|by reference
prcnam|process_name|character-coded text string|read only|by descriptor-fixed length string descriptor
id|rights_holder|quadword (unsigned)|modify|by reference
name|char_string|character-coded text string|read only|by descriptor-fixed length string descriptor
prvatr|mask_longword|longword (unsigned)|write only|by reference

SYS\$HIBER

SY\$\$IDTOASC id ,[namlen] ,[nambuf] ,[resid] ,[attrib] ,[contxt]

id|rights_id|longword (unsigned)|read only|by value
 namlen|word_unsigned|word (unsigned)|write only|by reference
 nambuf|char_string|character-coded text string|write only|by descriptor-fixed length
 string descriptor
 resid|rights_id|longword (unsigned)|write only|by reference
 attrib|mask_longword|longword (unsigned)|write only|by reference
 contxt|context|longword (unsigned)|modify|by reference

SY\$\$LCKPAG inadr ,[retadr] ,[acmode]

inadr|address_range|longword (unsigned)|read only|by reference
 retadr|address_range|longword (unsigned)|write only|by reference-array reference or
 descriptor
 acmode|access_mode|longword (unsigned)|read only|by value

SY\$\$LKWSET inadr ,[retadr] ,[acmode]

inadr|address_range|longword (unsigned)|read only|by reference
 retadr|address_range|longword (unsigned)|write only|by reference
 acmode|access_mode|longword (unsigned)|read only|by value

SY\$\$MGBLSC inadr ,[retadr] ,[acmode] ,[flags] ,gsdnam ,[ident] ,[relpag]

inadr|address_range|longword (unsigned)|read only|by reference
 retadr|address_range|longword (unsigned)|write only|by reference
 acmode|access_mode|longword (unsigned)|read only|by value
 flags|mask_longword|longword (unsigned)|read only|by value
 gsdnam|section_name|character-coded text string|read only|by descriptor-fixed length
 string descriptor
 ident|section_id|quadword (unsigned)|read only|by reference
 relpag|longword_unsigned|longword (unsigned)|read only|by value

SY\$\$MOD HOLDER id ,holder ,[set_attrib] ,[clr_attrib]

id|rights_id|longword (unsigned)|read only|by value
 holder|rights_holder|quadword (unsigned)|read only |by reference
 set_attrib|mask_longword|longword (unsigned)|read only|by value
 clr_attrib|mask_longword|longword (unsigned)|read only|by value

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SYS\$MOD_IDENT id ,[set_attr] ,[clr_attr] ,[new_name] ,[new_value]

id|rights_id|longword (unsigned)|read only|by value
set_attr|mask_longword|longword (unsigned)|read only|by value
clr_attr|mask_longword|longword (unsigned)|read only|by value
new_name|char_string|character-coded text string|read only|by descriptor-fixed length string descriptor
new_value|rights_id|longword (unsigned)|read only|by value

SYS\$MOUNT itmlst

itmlst|item_list_3|longword (unsigned)|read only|by reference

SYS\$MTACCESS lblnam ,[uic] ,[std_version] ,[access_char] ,[access_spec] ,type

lblnam|address|longword (unsigned)|read only|by reference
uic|uic|longword (unsigned)|read only|by value
std_version|longword_unsigned|longword (unsigned)|read only|by value
access_char|longword_unsigned|longword (unsigned)|read only|by value
access_spec|longword_unsigned|longword (unsigned)|read only|by value
type|longword_unsigned|longword (unsigned)|read only|by value

SYS\$NUMTIM timbuf ,[timadr]

timbuf|vector_word_unsigned|word (unsigned)|write only|by reference
timadr|date_time|quadword (unsigned)|read only|by reference

SYS\$PARSE_ACL aclstr ,aclent ,[errpos] ,[accnam]

aclstr|char_string|character-coded text string|read only|by descriptor-fixed length string descriptor
aclent|char_string|character-coded text string|write only|by descriptor-fixed length string descriptor
errpos|word_unsigned|word (unsigned)|write only|by reference
accnam|access_bit_names|longword (unsigned)|read only|by reference

SYS\$PURGWS inadr

inadr|address_range|longword (unsigned)|read only|by reference

SY\$PUTMSG msgvec [,actrtn] [,facnam] [,actprm]

msgvec|cntrlblk|longword (unsigned)|read only|by reference

actrtn|procedure|procedure entry mask|call without stack unwinding|by reference

facnam|char_string|character-coded text string|read only|by descriptor-fixed length string descriptor

actprm|user_arg|longword (unsigned)|read only|by value

SY\$QIO [efn] ,chan ,func [,iosb] [,astadr] [,astprm] [,p1] [,p2] [,p3] [,p4] [,p5] [,p6]

efn|ef_number|longword (unsigned)|read only|by value

chan|channel|word (unsigned)|read only|by value

func|function_code|longword (unsigned)|read only|by value

iosb|io_status_block|quadword (unsigned)|write only|by reference

astadr|last_procedure|procedure entry mask|call without stack unwinding|by reference

astprm|user_arg|longword (unsigned)|read only|by value

p1 to p6|varying_arg|longword (unsigned)|read only|by reference

SY\$QIOW [efn] ,chan ,func [,iosb] [,astadr] [,astprm] [,p1] [,p2] [,p3] [,p4] [,p5] [,p6]**SY\$READEF** efn ,state

efn|ef_number|longword (unsigned)|read only|by value

state|mask_longword|longword (unsigned)|write only|by reference

SY\$REM_HOLDER id ,holder

id|rights_id|longword (unsigned)|read only|by value

holder|rights_holder|quadword (unsigned)|read only|by reference

SY\$REM_IDENT id

id|rights_id|longword (unsigned)|read only|by value

SY\$RESUME [pidadr] [,prcnam]

pidadr|process_id|longword (unsigned)|modify|by reference

prcnam|process_name|character-coded text string|read only|by descriptor-fixed length string descriptor

SY\$REVOKID [pidadr] [,prcnam] [,id] [,name] [,prvatr]

pidadr|process_id|longword (unsigned)|modify|by reference

prcnam|process_name|character-coded text string|read only|by descriptor-fixed length string descriptor

id|rights_id|quadword (unsigned)|modify|by reference

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name|char_string|character-coded text string|read only|by descriptor-fixed length
string descriptor

prvatr|mask_longword|longword (unsigned)|write only|by reference

SYS\$RMSRUNDWN buf-addr, type-value

buf-addr|char_string|character-coded text string|write only|by descriptor

type-value|byte_unsigned|byte (unsigned)|read only|by value

SYS\$SCHDWK [pidadr] [,prcnam] ,daytim [,reptim]

pidadr|process_id|longword (unsigned)|modify|by reference

prcnam|process_name|character-coded text string|read only|by descriptor-fixed length
string descriptor

daytim|date_time|quadword (unsigned)|read only|by reference

reptim|date_time|quadword (unsigned)|read only|by reference

SYS\$SETAST enbflg

enbflg|boolean|byte (unsigned)|read only|by value

SYS\$SETDDIR [new-dir-addr] [,length-addr] [,cur-dir-addr]

new-dir-addr|char_string|character-coded text string|read only|by descriptor-fixed
length string descriptor

length-addr|word_unsigned|word (unsigned)|write only|by reference

cur-dir-addr|char_string|character-coded text string|write only|by descriptor-fixed
length string descriptor

SYS\$SETDFPROT [new-def-prot-addr,] [cur-def-prot-addr]

new-def-prot-addr|file_protection|word (unsigned)|read only|by reference

cur-def-prot-addr|file_protection|word (unsigned)|write only|by reference

SYS\$SETEF efn

efn|ef_number|longword (unsigned)|read only|by value

SYS\$SETEXV [vector] [,addres] [,acmode] [,prvhnd]

vector|longword_unsigned|longword (unsigned)|read only|by value

addres|procedure|procedure entry mask|call without stack unwinding|by reference

acmode|access_mode|longword (unsigned)|read only|by value

prvhnd|procedure|longword (unsigned)|write only|by reference

SYS\$SETIME [timadr]

timadr|date_time|quadword (unsigned)|read only|by reference

SYS\$SETIMR [efn] ,daytim ,[astadr] ,[reqidt]

efn|ef_number|longword (unsigned)|read only|by value

daytim|date_time|quadword (unsigned)|read only|by reference

astadr|last_procedure|procedure entry mask|call without stack unwinding|by reference

reqidt|user_arg|longword (unsigned)|read only|by value

SYS\$SETPRA astadr ,[acmode]

astadr|last_procedure|procedure entry mask|call without stack unwinding|by reference

acmode|access_model|longword (unsigned)|read only|by value

SYS\$SETPRI [pidadr] ,[prcnam] ,pri ,[prvpri]

pidadr|process_id|longword (unsigned)|modify|by reference

prcnam|process_name|character-coded text string|read only|by descriptor-fixed length string descriptor

pri|longword_unsigned|longword (unsigned)|read only|by value

prvpri|longword_unsigned|longword (unsigned)|write only|by reference

SYS\$SETPRN [prcnam]

prcnam|process_name|character-coded text string|read only|by descriptor-fixed length string descriptor

SYS\$SETPRT inadr ,[retadr] ,[acmode] ,prot ,[prvpri]

inadr|address_range|longword (unsigned)|read only|by reference

retadr|address_range|longword (unsigned)|write only|by reference-array reference or descriptor

acmode|access_model|longword (unsigned)|read only|by value

prot|page_protection|longword (unsigned)|read only|by value

prvpri|page_protection|byte (unsigned)|write only|by reference

SYS\$SETPRV [enbflg] ,[prvadr] ,[prmflg] ,[prvprv]

enbflg|boolean|byte (unsigned)|read only|by value

prvadr|mask_privileges|quadword (unsigned)|read only|by reference

prmflg|boolean|byte (unsigned)|read only|by value

prvprv|mask_privileges|quadword (unsigned)|write only|by reference

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SYS\$SETRWM [watflg]

watflg|longword_unsigned|longword (unsigned)|read only|by value

SYS\$SETSFM [enbflg]

enbflg|boolean|byte (unsigned)|read only|by value

SYS\$SETSSF [mask]

mask|mask_longword|longword (unsigned)|read only|by value

SYS\$SETSTK inadr [,retadr] [,acmode]

inadr|address_range|longword (unsigned)|read only|by reference

retadr|address_range|longword (unsigned)|write only|by reference

acmode|access_mode|longword (unsigned)|read only|by value

SYS\$SETSWM [swpflg]

swpflg|longword_unsigned|longword (unsigned)|read only|by value

SYS\$SETUAI [nullarg] [,nullarg] ,usnam ,itmlst [,nullarg] [,nullarg]

nullarg|null_arg|longword (unsigned)|read only|by value

usnam|char_string|character-coded text string|read only|by descriptor-fixed length
string descriptor

itmlst|item_list_3|longword (unsigned)|read only|by reference

SYS\$SDERR msgbuf

msgbuf|char_string|character-coded text string|read only|by descriptor-fixed length
string descriptor

SYS\$SDJBC [efn] ,func [,nullarg] [,itmlst] [,iosb] [,astadr] [,astprm]

efn|ef_number|longword (unsigned)|read only|by value

func|function_code|longword (unsigned)|read only|by value

nullarg|null_arg|longword (unsigned)|read only|by value

itmlst|item_list_3|longword (unsigned)|read only|by reference

iosb|io_status_block|quadword (unsigned)|write only|by reference

astadr|last_procedure|procedure entry mask|call without stack unwinding|by reference

astprm|user_arg|longword (unsigned)|read only|by value

SYS\$SDJBCW [efn] ,func [,nullarg] [,itmlst] [,iosb] [,astadr] [,astprm]

SYSSNDOPR msgbuf ,[chan]

msgbuf|char_string|character-coded text string|read only|by descriptor-fixed length
string descriptor
chan|channel|word (unsigned)|read only|by value

SYSSUSPND [pidadr] ,[prcnam]

pidadr|process_id|longword (unsigned)|modify|by reference
prcnam|process_name|character-coded text string|read only|by descriptor-fixed length
string descriptor

SYSSYNCH [efn] ,[iosb]

efn|ef_number|longword (unsigned)|read only|by value
iosb|io_status_block|quadword (unsigned)|write only|by reference

SYSTRNLNM [attr] ,tabnam ,lognam ,[acmode] ,[itmlst]

attr|mask_longword|longword (unsigned)|read only|by reference
tabnam|logical_name|character-coded text string|read only|by descriptor-fixed length
string descriptor
lognam|logical_name|character-coded text string|read only|by descriptor-fixed length
string descriptor
acmode|access_model|byte (unsigned)|read only|by reference
itmlst|item_list_3|longword (unsigned)|read only|by reference

SY\$ULKPAG inadr ,[retadr] ,[acmode]

inadr|address_range|longword (unsigned)|read only|by reference
retadr|address_range|longword (unsigned)|write only|by reference-array reference or
descriptor
acmode|access_model|longword (unsigned)|read only|by value

SY\$ULWSET inadr ,[retadr] ,[acmode]

inadr|address_range|longword (unsigned)|read only|by reference-array reference or
descriptor
retadr|address_range|longword (unsigned)|write only|by reference-array reference or
descriptor
acmode|access_model|longword (unsigned)|read only|by value

SY\$UNWIND [depadr] ,[newpc]

depadr|longword_unsigned|longword (unsigned)|read only|by reference
newpc|address|longword (unsigned)|read only|by reference

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SYS\$UPDSEC inadr [,retadr] [,acmode] [,updfg] [,efn] [,iosb] [,astadr] [,astprm]

inadr|address_range|longword (unsigned)|read only|by reference-array reference or descriptor

retadr|address_range|longword (unsigned)|write only|by reference-array reference or descriptor

acmode|access_mode|longword (unsigned)|read only|by value

updfg|longword_unsigned|longword (unsigned)|read only|by value

efn|ef_number|longword (unsigned)|read only|by value

iosb|io_status_block|quadword (unsigned)|write only|by reference

astadr|last_procedure|procedure entry mask|call without stack unwinding|by reference-procedure reference or descriptor

astprm|user_arg|longword (unsigned)|read only|by value

SYS\$UPDSECW inadr [,retadr] [,acmode] [,updfg] [,efn] [,iosb] [,astadr] [,astprm]

SYS\$WAITFR efn

efn|ef_number|longword (unsigned)|read only|by value

SYS\$WAKE [pidadr] [,prcnam]

pidadr|process_id|longword (unsigned)|modify|by reference

prcnam|process_name|character-coded text string|read only|by descriptor-fixed length string descriptor

SYS\$WFLAND efn ,mask

efn|ef_number|longword (unsigned)|read only|by value

mask|mask_longword|longword (unsigned)|read only|by value

SYS\$WFLOR efn ,mask

efn|ef_number|longword (unsigned)|read only|by value

mask|mask_longword|longword (unsigned)|read only|by value

Run-Time Library Routines

DTK\$ANSWER_PHONE voice-id [,num-rings] [,text]

voice-id|identifier|longword (unsigned)|read only|by reference
num-rings|longword_signed|longword (signed)|read only|by reference
text|char_string|character string|read only|by descriptor

DTK\$DIAL_PHONE voice-id ,phone-num [,mode] [,text] [,timeout]

voice-id|identifier|longword (unsigned)|read only|by reference
phone-num|char_string|character string|read only|by descriptor
mode|mask_longword|longword (unsigned)|read only|by reference
text|char_string|character string|read only|by descriptor
timeout|longword_signed|longword (signed)|read only|by reference

DTK\$HANGUP_PHONE voice-id [,text]

voice-id|identifier|longword (unsigned)|read only|by reference
text|char_string|character string|read only|by descriptor

DTK\$INITIALIZE new-voice-id ,out-device [,device-type]

new-voice-id|identifier|longword (unsigned)|write only|by reference
out-device|device_name|character string|read only|by descriptor
device-type|longword_signed|longword (signed)|write only|by reference

DTK\$LOAD_DICTIONARY voice-id ,text ,substitution

voice-id|identifier|longword (unsigned)|read only|by reference
text|char_string|character string|read only|by descriptor
substitution|char_string|character string|read only|by descriptor

RTL-2 Run-Time Library Routines

DTK\$READ_KEYSTROKE voice-id ,key-code [,prompt] [,timeout]

voice-id|identifier|longword (unsigned)|read only|by reference
key-code|longword__signed|longword (signed)|write only|by reference
prompt|char__string|character string|read only|by descriptor
timeout|longword__signed|longword (signed)|read only|by reference

DTK\$READ_STRING voice-id ,out-string [,prompt] [,timeout] [,term-code]

voice-id|identifier|longword (unsigned)|read only|by reference
out-string|char__string|character string|write only|by descriptor
prompt|char__string|character string|read only|by descriptor
timeout|longword__signed|longword (signed)|read only|by reference
term-code|longword__signed|longword (signed)|write only|by reference

DTK\$RETURN_LAST_INDEX voice-id ,p-index

voice-id|identifier|longword (unsigned)|read only|by reference
p-index|longword__signed|longword (signed)|write only|by reference

DTK\$SET_INDEX voice-id ,p-index

voice-id|identifier|longword (unsigned)|read only|by reference
p-index|longword__signed|longword (signed)|read only|by reference

DTK\$SET_KEYPAD_MODE voice-id ,mode

voice-id|identifier|longword (unsigned)|read only|by reference
mode|mask__longword|longword (unsigned)|read only|by reference

DTK\$SET_LOGGING_MODE voice-id [,new-mode] [,old-mode]

voice-id|identifier|longword (unsigned)|read only|by reference
new-mode|mask__longword|longword (unsigned)|read only|by reference
old-mode|mask__longword|longword (unsigned)|write only|by reference

DTK\$SET_MODE voice-id [,new-mode] [,old-mode]

voice-id|identifier|longword (unsigned)|read only|by reference
new-mode|mask__longword|longword (unsigned)|read only|by reference
old-mode|mask__longword|longword (unsigned)|write only|by reference

DTK\$SET_SPEECH_MODE voice-id ,new-mode [,old-mode]

voice-id|identifier|longword (unsigned)|read only|by reference
new-mode|mask__longword|longword (unsigned)|read only|by reference
old-mode|mask__longword|longword (unsigned)|write only|by reference

DTK\$SET_TERMINAL_MODE voice-id [,new-mode] [,old-mode]

voice-id|identifier|longword (unsigned)|read only|by reference

new-mode|mask_longword|longword (unsigned)|read only|by reference

old-mode|mask_longword|longword (unsigned)|write only|by reference

DTK\$SET_VOICE voice-id [,new-voice] [,speech-rate]
[,comma-pause] [,period-pause]

voice-id|identifier|longword (unsigned)|read only|by reference

new-voice|longword_signed|longword (signed)|read only|by reference

speech-rate|longword_signed|longword (signed)|read only|by reference

comma-pause|longword_unsigned|longword (unsigned)|read only|by reference

period-pause|longword_unsigned|longword (unsigned)|read only|by reference

DTK\$SPEAK_FILE voice-id ,filespec [,mode]

voice-id|identifier|longword (unsigned)|read only|by reference

filespec|char_string|character string|read only|by descriptor

mode|mask_longword|longword (unsigned)|read only|by reference

DTK\$SPEAK_PHONEMIC_TEXT voice-id ,text [,mode]

voice-id|identifier|longword (unsigned)|read only|by reference

text|char_string|character string|read only|by descriptor

mode|mask_longword|longword (unsigned)|read only|by reference

DTK\$SPEAK_TEXT voice-id ,text [,mode]

voice-id|identifier|longword (unsigned)|read only|by reference

text|char_string|character string|read only|by descriptor

mode|mask_longword|longword (unsigned)|read only|by reference

DTK\$TERMINATE voice-id

voice-id|identifier|longword (unsigned)|read only|by reference

LIB\$ADDX a ,b ,result [,len]

a|longword_signed|longword integer (signed)|read only|by reference, array reference

b|longword_signed|longword integer (signed)|read only|by reference, array reference

result|longword_signed|longword integer (signed)|write only|by reference, array reference

len|longword_signed|longword integer (signed)|read only|by reference

RTL-4 Run-Time Library Routines

LIB\$ANALYZE_SDESC inp-dsc ,len ,data-adr

JSB entry: LIB\$ANALYZE_SDESC_R2

inp-dsc|char_string|character string|read only|by descriptor
len|word_unsigned|word (unsigned)|write only|by reference
data-adr|longword_unsigned|longword (unsigned)|write only|by reference

LIB\$ASN_WTH_MBX dev-nam ,max-msg ,buf-quo ,dev-chn ,mbx-chn

dev-nam|device_name|character string|read only|by descriptor
max-msg|longword_signed|longword integer (signed)|read only|by reference
buf-quo|longword_signed|longword integer (signed)|read only|by reference
dev-chn|word_signed|word integer (signed)|write only|by reference
mbx-chn|channel|word integer (signed)|write only|by reference

LIB\$AST_IN_PROG

LIB\$ATTACH process-id

process-id|process_id|longword integer (unsigned)|read only|by reference

LIB\$BBCCI position ,base

position|longword_signed|longword integer (signed)|read only|by reference
base|address|unspecified|read only|by reference

LIB\$BBSSI position ,base

position|longword_signed|longword integer (signed)|read only|by reference
base|address|unspecified|read only|by reference

LIB\$CALLG arglist ,procedure

arglist|arg_list|longword (unsigned)|read only|by reference, array reference
procedure|procedure|procedure entry mask|function call (before return) |by
reference, procedure reference

LIB\$CHAR one-char-str ,ascii-code

one-char-str|char_string|character string|write only|by descriptor
ascii-code|byte_unsigned|byte (unsigned)|read only|by reference

LIB\$CRC table ,inicrc ,stream

table|longword_signed|longword integer (signed)|read only|by reference
inicrc|longword_signed|longword integer (signed)|read only|by reference
stream|char_string|character string|read only|by descriptor

LIB\$CRC_TABLE poly ,table

poly|mask_longword|longword (unsigned)|read only|by reference
 table|longword_signed|longword integer (signed)|write only|by reference, array
 reference

LIB\$CREATE_DIR dev-dir-spec [,owner-UIC] [,prot-enable] [,prot-value]
[,max-versions] [,rvn]

dev-dir-spec|device_name|character string|read only|by descriptor
 owner-UIC|uic|longword (unsigned)|read only|by reference
 prot-enable|mask_word|word (unsigned)|read only|by reference
 prot-value|file_protection|word (unsigned)|read only|by reference
 max-versions|word_unsigned|word (unsigned)|read only|by reference
 rvn|word_unsigned|word (unsigned)|read only|by reference

LIB\$CREATE_USER_VM_ZONE zone-id [,user-arg] [,user-get-rtn] [,user-free-rtn]
[,user-reset-rtn] [,user-delete-rtn]

zone-id|longword_unsigned|longword (unsigned)|write only|by reference
 user-arg|user_arg|longword (unsigned)|read only|by reference
 user-get-rtn|procedure|procedure entry mask|function call (before return)|by reference,
 procedure reference
 user-free-rtn|procedure|procedure entry mask|function call (before return)|by
 reference, procedure reference
 user-reset-rtn|procedure|procedure entry mask|function call (before return)|by
 reference, procedure reference
 user-delete-rtn|procedure|procedure entry mask|function call (before return)|by
 reference, procedure reference

LIB\$CREATE_VM_ZONE zone-id [,algorithm] [,algorithm-arg] [,flags] [,extend-size]
[,initial-size] [,block-size] [,alignment] [,page-limit] [,p1]

zone-id|longword_unsigned|longword (unsigned)|write only|by reference
 algorithm|longword_signed|longword integer (signed)|read only|by reference
 algorithm-arg|longword_signed|longword integer (signed)|read only|by reference
 flags|longword_signed|longword integer (signed)|read only|by reference
 extend-size|longword_signed|longword integer (signed)|read only|by reference
 initial-size|longword_signed|longword integer (signed)|read only|by reference
 block-size|longword_signed|longword integer (signed)|read only|by reference

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alignment|longword_signed|longword integer (signed)|read only|by reference
page-limit|longword_signed|longword integer (signed)|read only|by reference
p1|longword_signed|longword integer (signed)|read only|by reference

LIB\$CRF_INS_KEY ctl-tbl ,key1 ,val1 ,flags

ctl-tbl|longword_signed|longword integer (signed)|read only|by reference, array reference
key1|char_string|character string|read only|by descriptor
val1|longword_signed|longword integer (signed)|read only|by reference
flags|mask_longword|longword (unsigned)|read only|by reference

LIB\$CRF_INS_REF ctl-tbl ,key1 ,ref2 ,ref1 ,ref-def

ctl-tbl|vector_longword_signed|longword integer (signed)|read only|by reference, array reference
key1|longword_signed|longword integer (signed)|read only|by reference
ref2|char_string|character string|read only|by descriptor
ref1|longword_signed|longword integer (signed)|write only|by reference
ref-def|longword_signed|longword integer (signed)|read only|by reference

LIB\$CRF_OUTPUT ctl-tbl ,width ,pag1 ,pag2 ,mode-ind ,del-sav-ind

ctl-tbl|vector_longword_signed|longword integer (signed)|read only|by reference, array reference
width|longword_signed|longword integer (signed)|read only|by reference
pag1|longword_signed|longword integer (signed)|read only|by reference
pag2|longword_signed|longword integer (signed)|read only|by reference
mode-ind|longword_signed|longword integer (signed)|read only|by reference
del-sav-ind|longword_signed|longword integer (signed)|read only|by reference

LIB\$CURRENCY currency-str [,out-len]

currency-str|char_string|character string|write only|by descriptor
out-len|word_unsigned|word (unsigned)|write only|by reference

LIB\$CVT_DX_DX src ,dst [,dst-len]

src|address|unspecified|read only|by descriptor
dst|address|unspecified|write only|by descriptor
dst-len|word_unsigned|word (unsigned)|write only|by reference

LIB\$CVT_DTB count ,string ,result

LIB\$CVT-HTB count ,string ,result

LIB\$CVT_OTB count ,string ,result

count|longword_signed|longword integer (signed)|read only|by value
 string|char_string|character string|read only|by reference
 result|longword_signed|longword integer (signed)|write only|by reference

LIB\$DATE_TIME dst-str

dst-str|date_time|character string|write only|by descriptor

LIB\$DAY day-number [,user-time] [,day-time]

day-number|longword_signed|longword integer (signed)|write only|by reference
 user-time|date_time|quadword integer (signed)|read only|by reference
 day-time|longword_signed|longword integer (signed)|write only|by reference

LIB\$DAY_OF_WEEK time ,day-num

time|date_time|quadword (unsigned)|read only|by reference
 day-num|longword_unsigned|longword (unsigned)|write only|by reference

LIB\$DECODE_FAULT signal-args ,mechanism-args ,user-action [,user-arg] [,instruction-definitions]

signal-args|vector_longword_unsigned|longword (unsigned)|read only|by reference,
 array reference
 mechanism-args|vector_longword_unsigned|longword (unsigned)|read only|by
 reference, array reference
 user-action|procedure|bound procedure value or procedure entry mask|call after stack
 unwind|by descriptor, procedure
 user-arg|user_arg|unspecified|read only|by value
 instruction-definitions|vector_byte_unsigned|byte (unsigned)|read only|by reference,
 array reference

LIB\$DEC_OVER new-setting

new-setting|byte_unsigned|byte (unsigned)|read only|by reference

LIB\$DELETE_FILE filespec [,default-filespec] [,related-filespec] [,success-routine] [,error-routine] [,confirm-routine] [,user-arg] [,resultant-name] [,file-scan-context]

filespec|char_string|character string|read only|by descriptor
 default-filespec|char_string|character string|read only|by descriptor
 related-filespec|char_string|character string|read only|by descriptor
 success-routine|procedure|procedure entry mask|function call (before return)|by
 reference

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error-routine|procedure|procedure entry mask|function call (before return)|by reference
confirm-routine|procedure|procedure entry mask|function call (before return)|by reference
user-arg|user_arg|unspecified|read only|unspecified
resultant-name|char_string|character string|write only|by descriptor
file-scan-context|context|longword (unsigned)|modify|by reference

LIB\$DELETE_LOGICAL log-nam [,table-desc]

log-nam|logical_name|character string|read only|by descriptor
table-desc|char_string|character string|read only|by descriptor

LIB\$DELETE_SYMBOL symbol [,tbl-ind]

symbol|char_string|character string|read only|by descriptor
tbl-ind|longword_signed|longword integer (signed)|read only|by reference

LIB\$DELETE_VM_ZONE zone-id

zone-id|longword_unsigned|longword (unsigned)|read only|by reference

LIB\$DIGIT_SEP digit-sep-str [,out-len]

digit-sep-str|char_string|character string|write only|by descriptor
out-len|word_unsigned|word (unsigned)|write only|by reference

LIB\$DISABLE_CTRL disable-msk [,old-msk]

disable-msk|mask_longword|longword (unsigned)|read only|by reference
old-msk|mask_longword|longword (unsigned)|write only|by reference

LIB\$DO_COMMAND cmd-text

cmd-text|char_string|character string|read only|by descriptor

LIB\$EDIV divisor ,dividend ,quotient ,remainder

divisor|longword_signed|longword integer (signed)|read only|by reference
dividend|quadword_signed|quadword integer (signed)|read only|by reference
quotient|longword_signed|longword integer (signed)|write only|by reference
remainder|longword_signed|longword integer (signed)|write only|by reference

LIB\$EMODF multiplier ,mult-ext ,multiplicand ,int ,fract

LIB\$EMODD multiplier ,mult-ext ,multiplicand ,int ,fract

LIB\$EMODG multiplier ,mult-ext ,multiplicand ,int ,fract

LIB\$EMODH multiplier ,mult-ext ,multiplicand ,int ,fract

multiplier|floating_point|D_floating, F_floating, G_floating, H_floating|read only|by reference

mult-ext|byte_signed, word_unsigned|byte integer (signed), word (unsigned)|read only|by reference

multiplicand|floating_point|D_floating, F_floating, G_floating, H_floating|read only|by reference

int|longword_signed|longword integer (signed)|write only|by reference

fract|floating_point|D_floating, F_floating, G_floating, H_floating|write only|by reference

LIB\$EMUL multiplier ,multiplicand ,addend ,product

multiplier|longword_signed|longword integer (signed)|read only|by reference

multiplicand|longword_signed|longword integer (signed)|read only|by reference

addend|longword_signed|longword integer (signed)|read only|by reference

product|quadword_signed|quadword integer (signed)|write only|by reference

LIB\$ENABLE_CTRL enable-msk [,old-msk]

enable-msk|mask_longword|longword (unsigned)|read only|by reference

old-msk|mask_longword|longword (unsigned)|write only|by reference

LIB\$ESTABLISH new-handler

new-handler|procedure|procedure entry mask|read only|by reference

LIB\$EXTV pos ,size ,base

pos|longword_signed|longword integer (signed)|read only|by reference

size|byte_unsigned|byte (unsigned)|read only|by reference, array reference

base|longword_unsigned|longword (unsigned)|read only|by value

LIB\$EXTZV pos ,size ,base

pos|longword_signed|longword (signed)|read only|by reference

size|byte_unsigned|byte (unsigned)|read only|by reference

base|longword_unsigned|longword (unsigned)|read only|by value

LIB\$FFC start-pos ,size ,base ,find-pos

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LIB\$FFS start-pos ,size ,base ,find-pos

start-pos|longword_signed|longword integer (signed)|read only|by reference
size|byte_unsigned|byte (unsigned)|read only|by reference
base|longword_unsigned|longword (unsigned)|read only|by reference
find-pos|longword_signed|longword integer (signed)|write only|by reference

LIB\$FILE_SCAN fab ,success-rtn ,error-rtn [,context]

fab|fab|unspecified|read only|by reference
success-rtn|procedure|procedure entry mask|function call (before return)|by reference,
procedure reference
error-rtn|procedure|procedure entry mask|function call (before return)|by reference,
procedure reference
context|context|longword (unsigned)|modify|by reference

LIB\$FILE_SCAN_END fab [,context]

fab|fab|unspecified|modify|by reference
context|context|longword (unsigned)|modify|by reference

LIB\$FIND_FILE file-spec ,result-spec ,context [,default-spec] [,related-spec] [,stv-addr] [,user-flags]

file-spec|char_string|character string|read only|by descriptor
result-spec|char_string|character string|modify|by descriptor
context|context|longword (unsigned)|modify|by reference
default-spec|char_string|character string|read only|by descriptor
related-spec|char_string|character string|read only|by descriptor
stv-addr|longword_unsigned|longword (unsigned)|write only|by reference
user-flags|mask_longword|longword (unsigned)|read only|by reference

LIB\$FIND_FILE_END context

context|context|longword (unsigned)|read only|by reference

LIB\$FIND_IMAGE_SYMBOL filename ,symbol-desc ,symbol-val

filename|char_string|character string|read only|by descriptor
symbol-desc|char_string|character string|read only|by descriptor
symbol-val|longword_signed|longword (signed)|write only|by reference

LIB\$FIXUP_FLT sig-args ,mch-args [,new-operand]

sig-args|vector_longword_unsigned|longword (unsigned)|read only|by reference,
array reference
mch-args|vector_longword_unsigned|longword (unsigned)|read only|by reference,
array reference
new-operand|floating-point|F_floating|read only|by reference

LIB\$FLT_UNDER new-setting

new-setting|byte_unsigned|byte (unsigned)|read only|by reference

LIB\$FREE_EF event-flag-num

event-flag-num|ef_number|longword integer (signed)|read only|by reference

LIB\$FREE_LUN log-unit-num

log-unit-num|longword_signed|longword integer (signed)|read only|by reference

LIB\$FREE_TIMER handle-adr

handle-adr|address|longword (unsigned)|modify|by reference

LIB\$FREE_VM num-bytes ,base-adr [,zone-id]

num-bytes|longword_signed|longword integer (signed)|read only|by reference
base-adr|address|longword (unsigned)|read only|by reference
zone-id|longword_unsigned|longword (unsigned)|read only|by reference

LIB\$FREE_VM_PAGE num-pages ,base-adr

num-pages|longword_signed|longword integer (signed)|read only|by reference
base-adr|address|longword (unsigned)|read only|by reference

LIB\$GET_COMMAND get-str [,prompt-str] [,out-len]

get-str|char_string|character string|write only|by descriptor
prompt-str|char_string|character string|read only|by descriptor
out-len|word_unsigned|word (unsigned)|write only|by reference

LIB\$GET_COMMON dst-str [,chars-copied]

dst-str|char_string|character string|write only|by descriptor
chars-copied|word_signed|word integer (signed)|write only|by reference

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LIB\$GETDVI item-code [,channel] [,device-name] [,out-value] [,out-string] [,out-len]

item-code|longword_signed|longword integer (signed)|read only|by reference
channel|channel|word (unsigned)|read only|by reference
device-name|device_name|character string|read only|by descriptor
out-value|longword_unsigned|longword (unsigned)|write only|by reference
out-string|char_string|character string|write only|by descriptor
out-len|word_unsigned|word (unsigned)|write only|by reference

LIB\$GET_EF event-flag-num

event-flag-num|ef_number|longword integer (signed)|write only|by reference

LIB\$GET_FOREIGN get-str [,user-prompt] [,out-len] [,force-prompt]

get-str|char_string|character string|write only|by descriptor
user-prompt|char_string|character string|read only|by descriptor
out-len|word_unsigned|word (unsigned)|write only|by reference
force-prompt|longword_signed|longword integer (signed)|modify|by reference

LIB\$GET_INPUT get-str [,prompt-str] [,out-len]

get-str|char_string|character string|write only|by descriptor
prompt-str|char_string|character string|read only|by descriptor
out-len|word_unsigned|word (unsigned)|write only|by reference

LIB\$GETJPI item-code [,process-id] [,process-name] [,out-value] [,out-string] [,out-len]

item-code|longword_signed|longword integer (signed)|read only|by reference
process-id|process_id|longword (unsigned)|modify|by reference
process-name|process_name|character string|read only|by descriptor
out-value|varying_arg|unspecified|write only|by reference
out-string|char_string|character string|write only|by descriptor
out-len|word_signed|word integer (signed)|write only|by reference

LIB\$GET_LUN log-unit-num

log-unit-num|longword_signed|longword integer (signed)|write only|by reference

LIB\$GETSYI item-code [,out-value] [,out-string] [,out-len] [,csid] [,node-name]

item-code|longword_signed|longword integer (signed)|read only|by reference
 out-value|varying_arg|unspecified|write only|by reference
 out-string|char_string|character string|write only|by descriptor
 out-len|word_unsigned|word (unsigned)|write only|by reference
 csid|longword_unsigned|longword (unsigned)|modify|by reference
 node-name|char_string|character string|read only|by descriptor

LIB\$GET_SYMBOL symbol ,ret-buf [,ret-len] [,tbl-ind]

symbol|char_string|character string|read only|by descriptor
 ret-buf|char_string|character string|write only|by descriptor
 ret-len|word_signed|word integer (signed)|write only|by reference
 tbl-ind|longword_signed|longword integer (signed)|write only|by reference

LIB\$GET_VM num-bytes, base-adr [,zone-id]

num-bytes|longword_signed|longword integer (signed)|read only|by reference
 base-adr|address|longword (unsigned)|write only|by reference
 zone-id|longword_unsigned|longword (unsigned)|read only|by reference

LIB\$GET_VM_PAGE num-pages ,base-adr

num-pages|longword_signed|longword integer (signed)|read only|by reference
 base-adr|address|longword (unsigned)|write only|by reference

LIB\$ICHAR src-str

src-str|char_string|character string|read only|by descriptor

LIB\$INDEX src-str ,sub-str

src-str|char_string|character string|read only|by descriptor
 sub-str|char_string|character string|read only|by descriptor

LIB\$INIT_TIMER [handle-adr]

handle-adr|longword_unsigned|longword (unsigned)|modify|by reference

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LIB\$INSERT_TREE treehead ,sym-str ,ctrl-flg ,compare-rtn ,alloc-rtn ,newnode
[,user-data]

treehead|longword_unsigned|longword (unsigned)|modify|by reference
sym-str|char_string|character string|read only|by descriptor
ctrl-flg|mask_longword|longword (unsigned)|read only|by reference
compare-rtn|procedure|procedure entry mask|function call (before return)|by
reference, procedure reference
alloc-rtn|procedure|procedure entry mask|function call (before return)|by reference,
procedure reference
newnode|longword_unsigned|longword (unsigned)|write only|by reference
user-data|user_arg|unspecified|unspecified|unspecified

LIB\$INSQHI entry ,header [,retry-cnt]

entry|quadword_signed|quadword integer (signed)|modify|by reference, array
reference
header|quadword_signed|quadword integer (signed)|modify|by reference
retry-cnt|longword_unsigned|longword (unsigned)|read only|by reference

LIB\$INSQTI entry ,header [,retry-cnt]

entry|quadword_signed|quadword integer (signed)|modify|by reference, array
reference
header|quadword_signed|quadword integer (signed)|modify|by reference
retry-cnt|longword_unsigned|longword (unsigned)|read only|by reference

LIB\$INSV src ,pos ,size ,base

src|longword_signed|longword integer (signed)|read only|by reference
pos|longword_signed|longword integer (signed)|read only|by reference
size|byte_unsigned|byte (unsigned)|read only|by reference
base|address|aligned bit string|write only|by reference

LIB\$INT_OVER new-setting

new-setting|byte_unsigned|byte (unsigned)|read only|by reference

LIB\$LEN src-str

src-str|char_string|character string|read only|by descriptor

LIB\$LOCC char-str ,src-str

char-str|char_string|character string|read only|by descriptor
src-str|char_string|character string|read only|by descriptor

LIB\$LOOKUP_KEY search-str ,key-table [,key-value] [,full-str] [,out-len]

search-str|char_string|character string|read only|by descriptor

key-table|longword_unsigned|longword (unsigned)|read only|by reference, array reference

key-value|longword_unsigned|longword (unsigned)|write only|by reference

full-str|char_string|character string|write only|by descriptor

out-len|word_signed|word integer (signed)|write only|by reference

LIB\$LOOKUP_TREE treehead ,sym-str ,compare-rtn ,newnode

treehead|longword_unsigned|longword (unsigned)|read only|by reference

sym-str|char_string|character string|read only|by descriptor

compare-rtn|procedure|procedure entry mask|function call (before return)|by reference, procedure reference

newnode|longword_unsigned|longword (unsigned)|write only|by reference

LIB\$LP_LINES

LIB\$MATCHC sub-str ,scr-str

sub-str|char_string|character string|read only|by descriptor

src-str|char_string|character string|read only|by descriptor

LIB\$MATCH_COND cond-val ,cond-val-i ,...

cond-val|cond_value|longword (unsigned)|read only|by reference

cond-val-i|cond_value|longword (unsigned)|read only|by reference

LIB\$MOVC3 length ,source ,dest

length|word_unsigned|word (unsigned)|read only|by reference

source|address|unspecified|read only|by reference

dest|address|unspecified|write only|by reference

LIB\$MOVC5 src-len ,source ,fill ,dst-len ,dest

src-len|word_unsigned|word (unsigned)|read only|by reference

source|address|unspecified|read only|by reference

fill|byte_signed|byte integer (signed)|read only|by reference

dst-len|word_unsigned|word (unsigned)|read only|by reference

dest|varying_arg|unspecified|write only|by reference

LIB\$MOVTC src-str ,fill-char ,trans-tbl ,dst-str

src-str|char_string|character string|read only|by descriptor
fill-char|char_string|character string|read only|by descriptor
trans-tbl|char_string|character string|read only|by descriptor
dst-str|char_string|character string|write only|by descriptor

LIB\$MOVTUC src-str ,stop-char ,trans-tbl ,dst-str [,fill-char]

src-str|char_string|character string|read only|by descriptor
stop-char|char_string|character string|read only|by descriptor
trans-tbl|char_string|character string|read only|by descriptor
dst-str|char_string|character string|write only|by descriptor
fill-char|char_string|character string|read only|by descriptor

LIB\$PAUSE

LIB\$POLYF arg ,degree ,coeff ,result

LIB\$POLYD arg ,degree ,coeff ,result

LIB\$POLYG arg ,degree ,coeff ,result

LIB\$POLYH arg ,degree ,coeff ,result

Each of the above four formats accepts as input one of the four floating-point types.

arg|floating_point|F_floating, D_floating, G_floating, H_floating|read only|by reference
degree|word_signed|word integer (signed)|read only|by reference
coeff|floating_point|F_floating, D_floating, G_floating, H_floating|read only|by reference, array reference
result|floating_point|F_floating, D_floating, G_floating, H_floating|write only|by reference

LIB\$PUT_COMMON src-str [,chars-copied]

src-str|char_string|character string|read only|by descriptor
chars-copied|word_signed|word integer (signed)|write only|by reference

LIB\$PUT_OUTPUT msg-str

msg-str|char_string|character string|read only|by descriptor

LIB\$RADIX_POINT radix-point-str [,out-len]

radix-point-str|char_string|character string|write only|by descriptor
out-len|word_unsigned|word (unsigned)|write only|by reference

LIB\$REMQHI header ,remque-adr [,retry-cnt]

header|quadword_signed|quadword integer (signed)|modify|by reference
 remque-adr|address|longword (unsigned)|write only|by reference
 retry-cnt|longword_unsigned|longword (unsigned)|read only|by reference

LIB\$REMQTI header ,remque-adr [,retry-cnt]

header|quadword_signed|quadword integer (signed)|modify|by reference
 remque-adr|address|longword (unsigned)|write only|by reference
 retry-cnt|longword_unsigned|longword (unsigned)|read only|by reference

LIB\$RENAME_FILE old-filespec ,new-filespec [,default-filespec] [,related-filespec] [,flags] [,success-routine] [,error-routine] [,confirm-routine] [,user-arg] [,old-resultant-name] [,new-resultant-name] [,file-scan-context]

old-filespec|char_string|character string|read only|by descriptor
 new-filespec|char_string|character string|read only|by descriptor
 default-filespec|char_string|character string|read only|by descriptor
 related-filespec|char_string|character string|read only|by descriptor
 flags|mask_longword|longword (unsigned)|read only|by reference
 success-routine|procedure|procedure entry mask|function call (before return)|by reference
 error-routine|procedure|procedure entry mask|function call (before return)|by reference
 confirm-routine|procedure|procedure entry mask|function call (before return)|by reference
 user-arg|user_arg|unspecified|read only|unspecified
 old-resultant-name|char_string|character string|write only|by descriptor
 new-resultant-name|char_string|character string|write only|by descriptor
 file-scan-context|context|longword (unsigned)|modify|by reference

LIB\$RESERVE_EF event-flag-num

event-flag-num|ef_number|longword integer (signed)|read only|by reference

LIB\$RESET_VM_ZONE zone-id

zone-id|longword_unsigned|longword (unsigned)|read only|by reference

LIB\$REVERT

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LIB\$RUN_PROGRAM pgm-name

pgm-name|char_string|character string|read only|by descriptor

LIB\$SCANC src-str ,table-arr ,mask

src-str|char_string|character string|read only|by descriptor

table-arr|byte_unsigned|byte (unsigned)|read only|by reference, array reference

mask|byte_unsigned|byte (unsigned)|read only|by reference

LIB\$SCOPY_DXDX src-str ,dst-str

JSB entry: LIB\$SCOPY_DXDX6

src-str|char_string|character string|read only|by descriptor

dst-str|char_string|character string|write only|by descriptor

LIB\$SCOPY_R_DX src-len ,src-adr ,dst-str

JSB entry: LIB\$SCOPY_R_DX6

src-len|word_unsigned|word (unsigned)|read only|by reference

src-adr|char_string|character string|read only|by reference

dst-str|char_string|character string|read only|by descriptor

LIB\$SET_LOGICAL log-nam [,value] [,table-desc] [,attributes] [,item-list]

Either the **item-list** or **value** argument must be specified. If both **item-list** and **value** are specified, the value argument is ignored.

log-nam|logical_name|character string|read only|by descriptor

value|char_string|character string|read only|by descriptor

table-desc|char_string|character string|read only|by descriptor

attributes|longword_unsigned|longword (unsigned)|read only|by reference

item-list|item_list|longword (unsigned)|read only|by reference, array reference

LIB\$SET_SYMBOL symbol ,value [,tbl-ind]

symbol|char_string|character string|read only|by descriptor

value|char_string|character string|read only|by descriptor

tbl-ind|longword_signed|longword integer (signed)|read only|by reference

LIB\$SFREE1_DD dsc-adr

JSB entry: LIB\$SFREE1_DD6

dsc-adr|quadword_unsigned|quadword (unsigned)|modify|by reference

LIB\$SFREEN_DD dsc-num ,first-dsc

JSB entry: LIB\$SFREEN_DD6

dsc-num|longword_unsigned|longword (unsigned)|read only|by reference
 first-dsc|vector_quadword_unsigned|quadword (unsigned)|modify|by reference, array
 reference

LIB\$SGET1_DD length ,string

JSB entry: LIB\$SGET1_DD_R6

length|word_unsigned|word (unsigned)|read only|by reference
 string|quadword_unsigned|quadword (unsigned)|modify|by reference

LIB\$SHOW_TIMER [handle-adr] [,code] [,action-rtn [,user-arg]]

handle-adr|address|longword (unsigned)|read only|by reference
 code|longword_signed|longword integer (signed)|read only|by reference
 action-rtn|procedure|procedure entry mask|function call (before return)|by reference,
 procedure reference
 user-arg|user_arg|unspecified|read only|by value

LIB\$SHOW_VM [code] [,action-rtn [,user-arg]]

code|longword_signed|longword integer (signed)|read only|by reference
 action-rtn|procedure|procedure entry mask|function call (before return)|by reference,
 procedure reference
 user-arg|user_arg|unspecified|read only|unspecified

LIB\$SIGNAL condition-value1 [,number1] [,FAO-arg1...,FAO-argn1]
 [,condition-value2] [,number2] [,FAO-arg2...,FAO-argn2]

Only the **condition-value1** argument must be specified; other arguments are optional. The **number1** argument, if specified, contains the number of FAO arguments that will be associated with **condition-value1**. The **condition-value2** argument is optional; it may be specified with or without the **number2** or **FAO-arg2** arguments. The **number2** argument, if specified, contains the number of FAO arguments that will be associated with **condition-value2**. You may specify **condition-value3**, **condition-value4**, **condition-value5**, and so on, along with their corresponding **number** and **FAO** arguments.

condition-value|cond_value|longword (unsigned)|read only|by value
 number|longword_signed|longword integer (signed)|read only|by value
 FAO-arg(s)|varying_arg|unspecified|read only|unspecified

RTL-20 Run-Time Library Routines

LIB\$SIG_TO_RET sig-args ,mch-args

sig-args|vector_longword_unsigned|longword (unsigned)|read only|by reference,
array reference

mch-args|vector_longword_unsigned|longword (unsigned)|read only|by reference,
array reference

LIB\$SIG_TO_STOP sig-args ,mch-args

sig-args|vector_longword_unsigned|longword (unsigned)|modify|by reference, array
reference

mch-args|vector_longword_unsigned|longword (unsigned)|read only|by reference,
array reference

LIB\$SIM_TRAP sig-args ,mch-args

sig-args|vector_longword_unsigned|longword (unsigned)|modify|by reference, array
reference

mch-args|vector_longword_unsigned|longword (unsigned)|read only|by reference,
array reference

LIB\$SKPC char-str ,src-str

char-str|char_string|character string|read only|by descriptor

src-str|char_string|character string|read only|by descriptor

LIB\$SPANC src-str ,table-arr ,mask

src-str|char_string|character string|read only|by descriptor

table-arr|vector_byte_unsigned|byte (unsigned)|read only|by reference, array
reference

mask|byte_unsigned|byte (unsigned)|read only|by reference

LIB\$SPAWN [command-string] [,input-file] [,output-file] [,flags] [,process-name] [,process-id] [,completion-status] [,completion-efn] [,completion-astadr] [,completion-astarg] [,prompt] [,cli]

command-string|char_string|character string|read only|by descriptor

input-file|char_string|character string|read only|by descriptor

output-file|char_string|character string|read only|by descriptor

flags|mask_longword|longword (unsigned)|read only|by reference

process-name|char_string|character string|read only|by descriptor

process-id|longword_unsigned|longword (unsigned)|write only|by reference

completion-status|longword_unsigned|longword (unsigned)|write only|by reference

completion-efn|byte__unsigned|byte (unsigned)|read only|by reference
 completion-astadr|procedure|procedure entry mask|call without stack unwinding|by reference
 completion-astarg|user__arg|unspecified|read only|unspecified
 prompt|char__string|character string|read only|by descriptor
 cli|char__string|character string|read only|by descriptor

LIB\$STAT_TIMER code ,value [,handle-adr]

code|function__code|longword integer (signed)|read only|by reference
 value|user__arg|unspecified|write only|by reference
 handle-adr|address|longword (unsigned)|read only|by reference

LIB\$STAT_VM code ,value

code|function__code|longword integer (signed)|read only|by reference
 value|longword__signed|longword integer (signed)|write only|by reference

LIB\$STOP condition-value1 [,number1] [,FAO-arg1...,FAO-argn1] [,condition-value2] [,number2] [,FAO-arg2...,FAO-argn2]

Only the **condition-value1** argument must be specified; other arguments are optional. The **number1** argument, if specified, contains the number of FAO arguments that will be associated with **condition-value1**. The **condition-value2** argument is optional; it may be specified with or without the **number2** or **FAO-arg2** arguments. The **number2** argument, if specified, contains the number of FAO arguments that will be associated with **condition-value2**. You may specify **condition-value3**, **condition-value4**, **condition-value5**, and so on, along with their corresponding **number** and **FAO** arguments.

condition-value|cond__value|longword (unsigned)|read only|by value
 number|longword__signed|longword integer (signed)|read only|by value
 FAO-arg(s)|varying__arg|unspecified|read only|by value

LIB\$SUBX a ,b ,diff [,len]

a|vector__longword__signed|longword integer (signed)|read only|by reference, array reference
 b|vector__longword__signed|longword integer (signed)|read only|by reference, array reference
 diff|vector__longword__signed|longword integer (signed)|write only|by reference, array reference
 len|longword__signed|longword integer (signed)|read only|by reference

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LIB\$SYS_ASCTIM [out-len] ,dst-str [,user-time] [,cnv-flg]

out-len|word_signed|word integer (signed)|write only|by reference
dst-str|time_name|character string|write only|by descriptor
user-time|date_time|quadword integer (signed)|read only|by reference
cnv-flg|mask_longword|longword (unsigned)|read only|by reference

LIB\$SYS_FAO ctr-str [,out-len] ,out-buf [,p1,...,pn]

ctr-str|char_string|character string|read only|by descriptor
out-len|word_integer|word integer (signed)|write only|by reference
out-buf|char_string|character string|write only|by descriptor
p1—pn|varying_arg|unspecified|read only|unspecified

LIB\$SYS_FAOL ctr-str [,out-len] ,out-buf ,p1 - pn

ctr-str|char_string|character string|read only|by descriptor
out-len|word_integer|word integer (signed)|write only|by reference
out-buf|char_string|character string|write only|by descriptor
p1—pn|varying_arg|longword (unsigned)|read only|by reference, array reference

LIB\$SYS_GETMSG msg-id [,msg-len] ,dst-str [,flags] [,out-arr]

msg-id|longword_signed|longword integer (signed)|read only|by reference
msg-len|word_signed|word integer (signed)|write only|by reference
dst-str|char_string|character string|write only|by descriptor
flags|mask_longword|longword (unsigned)|read only|by reference
out-arr|longword_unsigned|longword (unsigned)|write only|by reference, array reference

LIB\$SYS_TRNLOG logical-name [,dst-len] ,dst-str [,table] [,acc-mode] [,dsb-msk]

logical-name|logical_name|character string|read only|by descriptor
dst-len|word_signed|word integer (signed)|write only|by reference
dst-str|char_string|character string|write only|by descriptor
table|byte_integer|byte integer (signed)|write only|by reference
acc-mode|access_model|byte integer (signed)|write only|by reference
dsb-msk|byte_unsigned|byte (unsigned)|read only|by reference

LIB\$TPARSE arg-blk ,state-tbl ,key-tbl

arg-blk|address|longword (unsigned)|modify|by reference
state-tbl|address|unspecified|read only|by reference
key-tbl|address|unspecified|read only|by reference

LIB\$TRA__ASC__EBC src-str ,dst-str

src-str|char__string|character string|read only|by descriptor
dst-str|byte__unsigned|byte (unsigned)|write only|by descriptor

LIB\$TRA__EBC__ASC src-str ,dst-str

src-str|byte__unsigned|byte (unsigned)|read only|by descriptor
dst-str|char__string|character string|write only|by descriptor

LIB\$TRAVERSE__TREE treehead ,action-rtn [,user-data]

treehead|longword__unsigned|longword (unsigned)|read only|by reference
action-rtn|procedure|procedure entry mask|function call (before return)|by reference,
procedure reference
user-data|user_arg|unspecified|read only|by reference

LIB\$TRIM__FILESPEC in-file ,out-file [,width] [,out-len]

in-file|char__string|character string|read only|by descriptor
out-file|char__string|character string|write only|by descriptor
width|word__unsigned|word (unsigned)|read only|by reference
out-len|word__unsigned|word (unsigned)|write only|by reference

LIB\$WAIT seconds

seconds|floating__point|F_floating|read only|by reference

MTH\$ACOS x

MTH\$DACOS x

MTH\$GACOS x

MTH\$HACOS h_radians ,x

Each of the above four formats accepts as input one of the four floating-point types.

JSB entry: MTH\$ACOS_R4

JSB entry: MTH\$DACOS_R7

JSB entry: MTH\$GACOS_R7

JSB entry: MTH\$HACOS_R8

Each of the above four JSB entries accepts as input one of the four floating-point types.

x|floating__point|F_floating, D_floating, G_floating, H_floating|read only|by reference
h_radians|floating__point|H_floating|write only|by reference

MTH\$ACOSD *x*

MTH\$DACOSD *x*

MTH\$GACOSD *x*

MTH\$HACOSD *h_degrees ,x*

Each of the above four formats accepts as input one of the four floating-point types.

JSB entry: MTH\$ACOSD_R4

JSB entry: MTH\$DACOSD_R7

JSB entry: MTH\$GACOSD_R7

JSB entry: MTH\$HACOSD_R8

Each of the above JSB entries accepts as input one of the four floating-point types.

x|floating_point|F_floating, G_floating, D_floating, H_floating|read only|by reference

h_degrees|floating_point|H_floating|write only|by reference

MTH\$ASIN *x*

MTH\$DASIN *x*

MTH\$GASIN *x*

MTH\$HASIN *h_radians ,x*

Each of the above four formats accepts as input one of the four floating-point types.

JSB entry: MTH\$ASIN_R4

JSB entry: MTH\$DASIN_R7

JSB entry: MTH\$GASIN_R7

JSB entry: MTH\$HASIN_R8

Each of the above four JSB entries accepts as input one of the four floating-point types.

x|floating_point|F_floating, D_floating, G_floating, H_floating|read only|by reference

h_radians|floating_point|H_floating|write only|by reference

MTH\$ASIND x **MTH\$DASIND** x **MTH\$GASIND** x **MTH\$HASIND** $h_degrees, x$

Each of the above four formats accepts as input one of the four floating-point types.

JSB entry: MTH\$ASIND_R4

JSB entry: MTH\$DASIND_R7

JSB entry: MTH\$GASIND_R7

JSB entry: MTH\$HASIND_R8

Each of the above four JSB entries accepts as input one of the four floating-point types.

x |floating_point|F_floating, D_floating, G_floating, H_floating|read only|by reference
 $h_degrees$ |floating_point|H_floating|write only|by reference

MTH\$ATAN x **MTH\$DATAN** x **MTH\$GATAN** x **MTH\$HATAN** $h_radians, x$

Each of the above four formats accepts as input one of the four floating-point types.

JSB entry: MTH\$ATAN_R4

JSB entry: MTH\$DATAN_R7

JSB entry: MTH\$GATAN_R7

JSB entry: MTH\$HATAN_R8

Each of the above four JSB entries accepts as input one of the four floating-point types.

x |floating_point|F_floating, D_floating, G_floating, H_floating|read only|by reference
 $h_radians$ |floating_point|H_floating|write only|by reference

MTH\$ATAND x

MTH\$DATAND x

MTH\$GATAND x

MTH\$HATAND h_degrees ,x

Each of the above four formats accepts as input one of the four floating-point types.

JSB entry: MTH\$ATAND_R4

JSB entry: MTH\$DATAND_R7

JSB entry: MTH\$GATAND_R7

JSB entry: MTH\$HATAND_R8

Each of the above four JSB entries accepts as input one of the four floating-point types.

x|floating_point|F_floating, D_floating, G_floating, H_floating|read only|by reference
h_degrees|floating_point|H_floating|write only|by reference

MTH\$ATAN2 y ,x

MTH\$DATAN2 y ,x

MTH\$GATAN2 y ,x

MTH\$HATAN2 h_radians ,y ,x

Each of the above four formats accepts as input one of the four floating-point types.

y|floating_point|F_floating, D_floating, G_floating, H_floating|read only|by
reference
x|floating_point|F_floating, D_floating, G_floating, H_floating|read only|by reference
h_radians|floating_point|H_floating|write only|by reference

MTH\$ATAN2 y ,x

MTH\$DATAN2 y ,x

MTH\$GATAN2 y ,x

MTH\$HATAN2 h_degrees ,y ,x

Each of the above four formats accepts as input one of the four floating-point types.

y|floating_point|F_floating, D_floating, G_floating, H_floating|read only|by
reference
x|floating_point|F_floating, D_floating, G_floating, H_floating|read only|by reference
h_degrees|floating_point|H_floating|write only|by reference

MTH\$ATANH *x***MTH\$DATANH** *x***MTH\$GATANH** *x***MTH\$HATANH** *h_atanh ,x*

Each of the above four formats accepts as input one of the four floating-point types.

x|floating_point|F_floating, D_floating, G_floating, H_floating|read only|by reference
h_atanh|floating_point|H_floating|write only|by reference

MTH\$CABS complex-number**MTH\$CDABS** complex-number**MTH\$CGABS** complex-number

Each of the above three formats accepts as input one of the three floating-point complex types.

complex-number|complex_number|F_floating complex, D_floating complex, G_floating complex|read only|by reference

MTH\$CCOS complex-number**MTH\$CDCOS** complex-cosine ,complex-number**MTH\$CGCOS** complex-cosine ,complex-number

Each of the above three formats accepts as input one of the three floating-point types.

complex-number|complex_number|F_floating complex, D_floating complex, G_floating complex|read only|by reference
 complex-cosine|complex_number|D_floating complex, G_floating complex|write only|by reference

MTH\$CEXP complex-number**MTH\$CDEXP** complex-exp ,complex-number**MTH\$CGEXP** complex-exp ,complex-number

Each of the above three formats accepts as input one of the three floating-point complex types.

complex-number|complex_number|F_floating complex, D_floating complex, G_floating complex|read only|by reference
 complex-exp|complex_number|D_floating complex, G_floating complex|write only|by reference

MTH\$CLOG complex-number

MTH\$CDLOG complex-natlog ,complex-number

MTH\$CGLOG complex-natlog ,complex-number

Each of the above three formats accepts as input one of the three floating-point complex types.

complex-number|complex_number|F_floating complex, D_floating complex, G_floating complex|read only|by reference

complex-natlog|complex_number|D_floating complex, G_floating complex|write only|by reference

MTH\$CMPLX real-part ,imag-part

MTH\$DCMPLX complx ,real-part ,imag-part

MTH\$GCMPLX complx ,real-part ,imag-part

Each of the above three formats accepts as input one of three floating-point types.

real-part|floating_point|F_floating, D_floating, G_floating|write only|by reference

imag-part|floating_point|F_floating, D_floating, G_floating|write only|by reference

complx|complex_number|D_floating complex, G_floating complex|write only|by reference

MTH\$CONJG complex-number

MTH\$DCONJG complex-conjugate ,complex-number

MTH\$GCONJG complex-conjugate ,complex-number

Each of the above three formats accepts as input one of the three floating-point complex types.

complex-number|complex_number|F_floating complex, D_floating complex, G_floating complex|read only|by reference

complex-conjugate|complex_number|D_floating complex, G_floating complex|write only|by reference

MTH\$COS x**MTH\$DCOS** x**MTH\$GCOS** x**MTH\$HCOS** h_cosine ,x

Each of the above four formats accepts as input one of the four floating-point types.

JSB entry: MTH\$COS_R4

JSB entry: MTH\$DCOS_R7

JSB entry: MTH\$GCOS_R7

JSB entry: MTH\$HCOS_R5

Each of the above four JSB entries accepts as input one of the four floating-point types.

x|floating_point|F_floating, D_floating, G_floating, H_floating|read only|by reference

h_cosine|floating_point|H_floating|write only|by reference

MTH\$COSD x**MTH\$DCOSD** x**MTH\$GCOSD** x**MTH\$HCOSD** h_cosine ,x

Each of the above four formats accepts as input one of the four floating-point types.

JSB entry: MTH\$COSD_R4

JSB entry: MTH\$DCOSD_R7

JSB entry: MTH\$GCOSD_R7

JSB entry: MTH\$HCOSD_R5

Each of the above four JSB entries accepts as input one of the four floating-point types.

x|floating_point|F_floating, D_floating, G_floating, H_floating|read only|by reference

h_cosine|floating_point|H_floating|write only|by reference

MTH\$COSH x**MTH\$DCOSH** x**MTH\$GCOSH** x**MTH\$HCOSH** h_cosh ,x

Each of the above four formats accepts as input one of the four floating-point types.

x|floating_point|F_floating, D_floating, G_floating, H_floating|read only|by reference

h_cosh|floating_point|H_floating|write only|by reference

MTH\$CSIN complex-number

MTH\$CDSIN complex-sine ,complex-number

MTH\$CGSIN complex-sine ,complex-number

Each of the above three formats accepts as input one of the three floating-point complex types.

complex-number|complex_number|F_floating complex, D_floating complex, G_floating complex|read only|by reference

complex-sine|floating_point|D_floating, G_floating|write only|by reference

MTH\$CSQRT complex-number

MTH\$CDSQRT complex-sqrt ,complex-number

MTH\$CGSQRT complex-sqrt ,complex-number

Each of the above three formats accepts as input one of the three floating-point complex types.

complex-number|complex_number|F_floating complex, D_floating complex, G_floating complex|read only|by reference

complex-sqrt|complex_number|D_floating complex, G_floating complex|write only|by reference

MTH\$CVT_D_G source

MTH\$CVT_G_D source

source|floating_point|D_floating, G_floating|read only|by reference

MTH\$CVT_DA_GA source ,dest [,count]

MTH\$CVT_GA_DA source ,dest [,count]

source|floating_point|D_floating, G_floating|read only|by reference, array reference

dest|floating_point|G_floating, D_floating|write only|by reference, array reference

count|longword_signed|longword integer (signed)|read only|by reference

MTH\$EXP *x***MTH\$DEXP** *x***MTH\$GEXP** *x***MTH\$HEXP** *h_exp* ,*x*

Each of the above four formats accepts as input one of the four floating-point types.

JSB entry: MTH\$EXP_R4

JSB entry: MTH\$DEXP_R6

JSB entry: MTH\$GEXP_R6

JSB entry: MTH\$HEXP_R6

Each of the above four JSB entries accepts as input one of the four floating-point types.

x|floating_point|F_floating, D_floating, G_floating, H_floating|read only|by reference

h_exp|floating_point|H_floating|write only|by reference

MTH\$AIMAG complex-number**MTH\$DIMAG** complex-number**MTH\$GIMAG** complex-number

Each of the above three formats corresponds to one of the three floating-point complex types.

complex-number|complex_number|F_floating complex, D_floating complex, G_floating complex|read only|by reference

MTH\$ALOG *x***MTH\$DLOG** *x***MTH\$GLOG** *x***MTH\$HLOG** *h_natlog* ,*x*

Each of the above four formats accepts as input one of the four floating-point types.

JSB entry: MTH\$ALOG_R5

JSB entry: MTH\$DLOG_R8

JSB entry: MTH\$GLOG_R8

JSB entry: MTH\$HLOG_R8

Each of the above four JSB entries accepts as input one of the four floating-point types.

x|floating_point|F_floating, D_floating, G_floating, H_floating|read only|by reference

h_natlog|floating_point|H_floating|write only|by reference

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MTH\$ALOG2 x

MTH\$DLOG2 x

MTH\$GLOG2 x

MTH\$HLOG2 h_log2 ,x

Each of the above four formats accepts as input one of the four floating-point types.

x|floating_point|F_floating, D_floating, G_floating, H_floating|read only|by reference
h_log2|floating_point|H_floating|write only|by reference

MTH\$ALOG10 x

MTH\$DLOG10 x

MTH\$GLOG10 x

MTH\$HLOG10 h_log10 ,x

Each of the above four formats accepts as input one of the four floating-point types.

JSB entry: MTH\$ALOG10_R5

JSB entry: MTH\$DLOG10_R8

JSB entry: MTH\$GLOG10_R8

JSB entry: MTH\$HLOG10_R8

Each of the above four JSB entries accepts as input one of the four floating-point types.

x|floating_point|F_floating, D_floating, G_floating, H_floating|read only|by reference
h_log10|floating_point|H_floating|write only|by reference

MTH\$RANDOM seed

seed|longword_unsigned|longword (unsigned)|modify|by reference

MTH\$REAL complex-number

MTH\$DREAL complex-number

MTH\$GREAL complex-number

Each of the above three formats accepts as input one of the three floating-point complex types.

complex-number|complex_number|F_floating complex, D_floating complex, G_floating complex|read only|by reference

MTH\$SIN x

MTH\$DSIN x

MTH\$GSIN x

MTH\$HSIN h_sine ,x

Each of the above four formats accepts as input one of the four floating-point types.

JSB entry: MTH\$SIN_R4

JSB entry: MTH\$DSIN_R7

JSB entry: MTH\$GSIN_R7

JSB entry: MTH\$HSIN_R5

Each of the above four JSB entries accepts as input one of the four floating-point types.

x|floating_point|F_floating, D_floating, G_floating, H_floating|read only|by reference
h_sine|floating_point|H_floating|write only|by reference

MTH\$SINCOS x ,sine ,cosine

MTH\$DSINCOS x ,sine ,cosine

MTH\$GSINCOS x ,sine ,cosine

MTH\$HSINCOS x ,sine ,cosine

Each of the above four formats accepts as input one of the four floating-point types.

JSB entry: MTH\$SINCOS_R5

JSB entry: MTH\$DSINCOS_R7

JSB entry: MTH\$GSINCOS_R7

JSB entry: MTH\$HSINCOS_R7

Each of the above four JSB entries accepts as input one of the four floating-point types.

x|floating_point|F_floating, D_floating, G_floating, H_floating|read only|by reference
sine|floating_point|F_floating, D_floating, G_floating, H_floating|write only|by
reference
cosine|floating_point|F_floating, D_floating, G_floating, H_floating|write only|by
reference

RTL-34 Run-Time Library Routines

MTH\$SINCOSD x ,sine ,cosine

MTH\$DSINCOSD x ,sine ,cosine

MTH\$GSINCOSD x ,sine ,cosine

MTH\$HSINCOSD x ,sine ,cosine

Each of the above four formats accepts as input one of the four floating-point types.

JSB entry: MTH\$SINCOSD_R5

JSB entry: MTH\$DSINCOSD_R7

JSB entry: MTH\$GSINCOSD_R7

JSB entry: MTH\$HSINCOSD_R7

Each of the above four JSB entries accepts as input one of the four floating-point types.

x|floating_point|F_floating, D_floating, G_floating, H_floating|read only|by reference

sine|floating_point|F_floating, D_floating, G_floating, H_floating|write only|by reference

cosine|floating_point|F_floating, D_floating, G_floating, H_floating|write only|by reference

MTH\$SIND x

MTH\$DSIND x

MTH\$GSIND x

MTH\$HSIND h_sine ,x

Each of the above four formats accepts as input one of the four floating-point types.

JSB entry: MTH\$SIND_R4

JSB entry: MTH\$DSIND_R7

JSB entry: MTH\$GSIND_R7

JSB entry: MTH\$HSIND_R5

Each of the above four JSB entries accepts as input one of the four floating-point types.

x|floating_point|F_floating, D_floating, G_floating, H_floating|read only|by reference

h_sine|floating_point|H_floating|write only|by reference

MTH\$SINH x**MTH\$DSINH** x**MTH\$GSINH** x**MTH\$HSINH** h_sinh ,x

Each of the above four formats accepts as input one of the four floating-point types.

x|floating_point|F_floating, D_floating, G_floating, H_floating|read only|by reference
h_sinh|floating_point|H_floating|write only|by reference

MTH\$SQRT x**MTH\$DSQRT** x**MTH\$GSQRT** x**MTH\$HSQRT** h_sqrt ,x

Each of the above four formats accepts as input one of the four floating-point types.

JSB entry: MTH\$SQRT_R3

JSB entry: MTH\$DSQRT_R5

JSB entry: MTH\$GSQRT_R5

JSB entry: MTH\$HSQRT_R8

Each of the above four JSB entries accepts as input one of the four floating-point types.

x|floating_point|F_floating, D_floating, G_floating, H_floating|read only|by reference
h_sqrt|floating_point|H_floating|write only|by reference

MTH\$TAN x**MTH\$DTAN** x**MTH\$GTAN** x**MTH\$HTAN** h_tan ,x

Each of the above four formats accepts as input one of the four floating-point types.

JSB entry: MTH\$TAN_R4

JSB entry: MTH\$DTAN_R7

JSB entry: MTH\$GTAN_R7

JSB entry: MTH\$HTAN_R5

Each of the above four JSB entries accepts as input one of the four floating-point types.

x|floating_point|F_floating, D_floating, G_floating, H_floating|read only|by value
h_tan|floating_point|H_floating|write only|by reference

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MTH\$TAND x

MTH\$DTAND x

MTH\$GTAND x

MTH\$HTAND h_tan ,x

Each of the above four formats accepts as input one of the four floating-point types.

JSB entry: MTH\$TAND_R4

JSB entry: MTH\$DTAND_R7

JSB entry: MTH\$GTAND_R7

JSB entry: MTH\$HTAND_R5

Each of the above four JSB entries accepts as input one of the four floating-point types.

x|floating_point|F_floating, D_floating, G_floating, H_floating|read only|by reference

h_tan|floating_point|H_floating|write only|by reference

MTH\$TANH x

MTH\$DTANH x

MTH\$GTANH x

MTH\$HTANH h_tanh ,x

Each of the above four formats accepts as input one of the four floating-point types.

x|floating_point|F_floating, D_floating, G_floating, H_floating|read only|by reference

h_tanh|floating_point|H_floating|write only|by reference

MTH\$UMAX arg1 [... ,argn]

arg1|longword_unsigned|longword (unsigned)|read only|by reference

argn|longword_unsigned|longword (unsigned)|read only|by reference

MTH\$UMIN arg1 [... ,argn]

arg1|longword_unsigned|longword (unsigned)|read only|by reference

argn|longword_unsigned|longword (unsigned)|read only|by reference

OT\$CNVOUT value ,out-string ,digits-in-fract

OT\$CNVOUT_G value ,out-string ,digits-in-fract

OTS\$CNVOUT_H value ,out-string ,digits-in-fract

value|floating_point|D_floating, G_floating, H_floating|read only|by reference
 out-string|char_string|character string|write only|by descriptor, fixed length
 digits-in-fract|longword_unsigned|longword (unsigned)|read only|by value

OTS\$CVT_L_TB value ,out-str [,int-digits] [,value-size]

value|varying_arg|unspecified|read only|by reference
 out-str|char_string|character string|write only|by descriptor, fixed-length
 int-digits|longword_signed|longword integer (signed)|read only|by value
 value-size|longword_signed|longword integer (signed)|read only|by value

OTS\$CVT_L_TI value ,out-str [,int-digits] [,value-size] [,flags]

value|varying_arg|unspecified|read only|by reference
 out-str|char_string|character string|write only|by descriptor, fixed length
 int-digits|longword_signed|longword integer (signed)|read only|by value
 value-size|longword_signed|longword integer (signed)|read only|by value
 flags|mask_longword|longword (unsigned)|read only|by value

OTS\$CVT_L_TL value ,out-str

value|longword_signed|longword integer (signed)|read only|by reference
 out-str|char_string|character string|write only|by descriptor, fixed length

OTS\$CVT_L_TO value ,out-str [,int-digits] [,value-size]

value|varying_arg|unspecified|read only|by reference
 out-str|char_string|character string|write only|by descriptor, fixed length
 int-digits|longword_signed|longword integer (signed)|read only|by value
 value-size|longword_signed|longword integer (signed)|read only|by value

OTS\$CVT_L_TU value ,out-str [,int-digits] [,value-size]

value|varying_arg|unspecified|read only|by reference
 out-str|char_string|character string|write only|by descriptor, fixed-length
 int-digits|longword_unsigned|longword (unsigned)|read only|by value
 value-size|longword_unsigned|longword (unsigned)|read only|by value

OT\$CVT_L_TZ value ,out-str [,int-digits] [,value-size]

value|varying_arg|unspecified|read only|by reference
out-str|char_string|character string|write only|by descriptor, fixed length
int-digits|longword_signed|longword integer (signed)|read only|by value
value-size|longword_signed|longword integer (signed)|read only|by value

OT\$CVT_TB_L inp-str ,value [,value-size] [,flags]

inp-str|char_string|character string|read only|by descriptor
value|varying_arg|unspecified|write only|by reference
value-size|longword_signed|longword integer (signed)|read only|by value
flags|mask_longword|longword (unsigned)|read only|by value

OT\$CVT_TI_L inp-str ,value [,value-size] [,flags]

inp-str|char_string|character string|read only|by descriptor, fixed-length or dynamic string
value|varying_arg|unspecified|write only|by reference
value-size|longword_signed|longword integer (signed)|read only|by value
flags|mask_longword|longword (unsigned)|read only|by value

OT\$CVT_TL_L inp-str ,value [,value-size]

inp-str|char_string|character string|read only|by descriptor, fixed-length or dynamic string
value|varying_arg|unspecified|write only|by reference
value-size|longword_signed|longword integer (signed)|read only|by value

OT\$CVT_TO_L inp-str ,value [,value-size] [,flags]

inp-str|char_string|character string|read only|by descriptor, fixed-length or dynamic string
value|varying_arg|unspecified|write only|by reference
value-size|longword_signed|longword integer (signed)|read only|by value
flags|mask_longword|longword (unsigned)|read only|by value

OT\$CVT_TU_L inp-str ,value [,value-size] [,flags]

inp-str|char_string|character string|read only|by descriptor, fixed-length
value|varying_arg|unspecified|write only|by reference
value-size|longword_signed|longword integer (signed)|read only|by value
flags|mask_longword|longword (unsigned)|read only|by value

OTSS\$CVT_T_D inp-str ,value [,digits-in-fract] [,scale-factor] [,flags] [,ext-bits]

OTSS\$CVT_T_F inp-str ,value [,digits-in-fract] [,scale-factor] [,flags] [,ext-bits]

OTSS\$CVT_T_G inp-str ,value [,digits-in-fract] [,scale-factor] [,flags] [,ext-bits]

OTSS\$CVT_T_H inp-str ,value [,digits-in-fract] [,scale-factor] [,flags] [,ext-bits]

Each of the above four formats corresponds to one of the four floating-point types.

inp-str|char_string|character string|read only|by descriptor, fixed-length or dynamic string

value|floating_point|D_floating, F_floating, G_floating, H_floating|write only|by reference

digits-in-fract|longword_unsigned|longword (unsigned)|read only|by value

scale-factor|longword_signed|longword integer (signed)|read only|by value

flags|mask_longword|longword (unsigned)|read only|by value

ext-bits|word_signed|word integer (signed)|write only|by reference

OTSS\$CVT_TZ_L inp-str ,value [,value-size] [,flags]

inp-str|char_string|character string|read only|by descriptor, fixed-length or dynamic string

value|varying_arg|unspecified|write only|by reference

value-size|longword_signed|longword integer (signed)|read only|by value

flags|mask_longword|longword (unsigned)|read only|by value

OTSS\$DIVC dividend ,divisor

OTSS\$DIVCD_R3 dividend ,divisor

OTSS\$DIVCG_R3 dividend ,divisor

Each of the above three formats corresponds to one of the three floating-point complex types.

dividend|complex_number|F_floating complex, D_floating complex, G_floating complex|read only|by value

divisor|complex_number|F_floating complex, D_floating complex, G_floating complex|read only|by value

OTSS\$DIV_PK_LONG divd ,divr ,divr-prec ,quot ,quot-prec ,prec-data ,scale-data

divd|address|packed decimal string|read only|by reference

divr|address|packed decimal string|read only|by reference

divr-prec|word_signed|word integer (signed)|read only|by value

quot|address|packed decimal string|write only|by reference
 quot-prec|word_signed|word integer (signed)|read only|by value
 prec-data|word_signed|word integer (signed)|read only|by value
 scale-data|word_signed|word integer (signed)|read only|by value

OTSDIV_PK_SHORT divd ,divr ,divr-prec ,quot ,quot-prec ,prec-data

divd|address|packed decimal string|read only|by reference
 divr|address|packed decimal string|read only|by reference
 divr-prec|word_signed|word integer (signed)|read only|by value
 quot|address|packed decimal string|write only|by reference
 quot-prec|word_signed|word integer (signed)|read only|by value
 prec-data|word_signed|word integer (signed)|read only|by value

OTSMOVE3 length ,source ,dest

JSB entry: OTSMOVE3_R5

length|longword_signed|longword integer (signed)|read only|by value
 source|byte_unsigned|byte (unsigned)|read only|by reference, array reference
 dest|byte_unsigned|byte (unsigned)|write only|by reference, array reference

OTSMOVE5 srclen ,source ,fill ,dstlen ,dest

JSB entry: OTSMOVE5_R5

srclen|longword_signed|longword integer (signed)|read only|by value
 source|byte_unsigned|byte (unsigned)|read only|by reference, array reference
 fill|byte_unsigned|byte (unsigned)|read only|by value
 dstlen|longword_signed|longword integer (signed)|read only|by value
 dest|byte_unsigned|byte (unsigned)|write only|by reference, array reference

OTSMULCD_R3 multiplier ,multiplicand

OTSMULCG_R3 multiplier ,multiplicand

The above formats correspond to the D_floating and G_floating complex types.

multiplier|complex_number|D_floating complex, G_floating complex|read only|by value
 multiplicand|complex_number|D_floating complex, G_floating complex|read only|by value

OTSP\$POWCC base ,exponent

OTSP\$POWDCD_R3 base ,exponent

OTSP\$POWCGCG_R3 base ,exponent

Each of the above three formats corresponds to one of the three floating-point complex types.

base|complex_number|F_floating complex, D_floating complex, G_floating complex|read only|by value

exponent|complex_number|F_floating complex, D_floating complex, G_floating complex|read only|by value

OTSP\$POWCJ base ,exponent

OTSP\$POWCDJ_R3 base ,exponent

OTSP\$POWCGJ_R3 base ,exponent

Each of the above three formats corresponds to one of the three floating-point complex types.

base|complex_number|F_floating complex, D_floating complex, G_floating complex|read only|by value

exponent|longword_signed|longword integer (signed)|read only|by value

OTSP\$POWDD base ,exponent

OTSP\$POWDJ base ,exponent

OTSP\$POWDR base ,exponent

The above formats correspond to raising the D_floating base to a D_floating, longword, or F_floating exponent.

base|floating_point|D_floating|read only|by value

exponent|floating_point|D_floating, longword integer (signed), F_floating|read only|by value

OTSP\$POWGG base ,exponent

OTSP\$POWGJ base ,exponent

base|floating_point|G_floating|read only|by value

exponent|floating_point|G_floating, longword integer (signed)|read only|by value

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OT\$POWHH_R3 base ,exponent

OT\$POWHJ_R3 base ,exponent

The above formats correspond to raising an H_floating number to either an H_floating or a signed longword integer exponent.

base|floating_point|H_floating|read only|by value

exponent|longword_signed|H_floating, longword integer (signed)|read only|by value

OT\$POWII base ,exponent

base|word_signed|word integer (signed)|read only|by value

exponent|word_signed|word integer (signed)|read only|by value

OT\$POWJJ base ,exponent

base|longword_signed|longword integer (signed)|read only|by value

exponent|longword_signed|longword integer (signed)|read only|by value

OT\$POWLULU base ,exponent

base|longword_unsigned|longword (unsigned) |read only|by value

exponent|longword_unsigned|longword (unsigned) |read only|by value

OT\$POWRLU base ,exponent

OT\$POWDLU base ,exponent

OT\$POWGLU base ,exponent

OT\$POWHLU_R3 base ,exponent

base|floating_point|F_floating, D_floating, G_floating, H_floating|read only|by value

exponent|longword_unsigned|longword (unsigned) |read only|by value

OT\$POWRD base ,exponent

OT\$POWRJ base ,exponent

OT\$POWRR base ,exponent

The above formats correspond to raising the base to a D_floating, longword and F_floating exponent.

base|floating_point|F_floating|read only|by value

exponent|varying_arg|D_floating, longword integer (signed), F_floating|read only|by value

OTS\$SCOPY_DXDX src-str ,dst-str

JSB entry: OTS\$SCOPY_DXDX6

src-str|char_string|character string|read only|by descriptor

dst-str|char_string|character string|write only|by descriptor

OTS\$SCOPY_R_DX src-len ,src-adr ,dst-str

JSB entry: OTS\$SCOPY_R_DX6

src-len|word_unsigned|word (unsigned)|read only|by value

src-adr|char_string|character string|read only|by reference

dst-str|char_string|character string|write only|by descriptor

OTS\$SFREE1_DD dyn-dsc

JSB entry: OTS\$SFREE1_DD6

dyn-dsc|quadword_unsigned|quadword (unsigned)|modify|by reference

OTS\$SFREEN_DD dsc-num ,first-dsc

JSB entry: OTS\$SFREEN_DD6

dsc-num|longword_unsigned|longword (unsigned)|read only|by value

first-dsc|quadword_unsigned|quadword (unsigned)|modify|by reference

OTS\$SET1_DD len ,dyn-dsc

JSB entry: OTS\$SET1_DD_R6

len|word_unsigned|word (unsigned)|read only|by value

dyn-dsc|quadword_unsigned|quadword (unsigned)|modify|by reference

SMG\$ADD_KEY_DEF key-table-id ,key-name [,if-state] [,attributes] [,equiv-string]
[,state-string]

key-table-id|longword_unsigned|longword (unsigned)|read only|by reference

key-name|char_string|character string|read only|by descriptor

if-state|char_string|character string|read only|by descriptor

attributes|mask_longword|longword (unsigned)|read only|by reference

equiv-string|char_string|character string|read only|by descriptor

state-string|char_string|character string|read only|by descriptor

SMG\$ALLOW_ESCAPE display-id ,esc-flag

display-id|longword_unsigned|longword (unsigned)|read only|by reference

esc-flag|mask_longword|longword (unsigned)|read only|by reference

SMG\$BEGIN_DISPLAY_UPDATE display-id

display-id||longword_unsigned||longword (unsigned)|read only|by reference

SMG\$BEGIN_PASTEBOARD_UPDATE pasteboard-id

pasteboard-id||longword_unsigned||longword (unsigned)|read only|by reference

SMG\$CANCEL_INPUT keyboard-id

keyboard-id||longword_unsigned||longword (unsigned)|read only|by reference

SMG\$CHANGE_PBD_CHARACTERISTICS pasteboard-id [,desired-width]
[,resulting-width] [,desired-height] [,resulting-height] [,desired-background-color]
[,resulting-background-color]

pasteboard-id||longword_unsigned||longword (unsigned)|read only|by reference
desired-width||longword_signed||longword integer (signed)|read only|by reference
resulting-width||longword_signed||longword integer (signed)|write only|by reference
desired-height||longword_signed||longword integer (signed)|read only|by reference
resulting-height||longword_signed||longword integer (signed)|write only|by reference
desired-background-color||longword_unsigned||longword (unsigned)|read only|by
reference
resulting-background-color||longword_unsigned||longword (unsigned)|write only|by
reference

SMG\$CHANGE_RENDITION display-id ,start-row ,start-col ,rows ,columns
[,rendition-set] [,rendition-complement]

display-id||longword_unsigned||longword (unsigned)|read only|by reference
start-row||longword_signed||longword integer (signed)|read only|by reference
start-col||longword_signed||longword integer (signed)|read only|by reference
rows||longword_signed||longword integer (signed)|read only|by reference
columns||longword_signed||longword integer (signed)|read only|by reference
rendition-set||longword_unsigned||longword (unsigned)|read only|by reference
rendition-complement|mask||longword||longword (unsigned)|read only|by reference

SMG\$CHANGE_VIRTUAL_DISPLAY display-id ,rows ,columns
[,display-attributes] [,video-attributes] [,char-set]

display-id||longword_unsigned||longword (unsigned)|read only|by reference
rows||longword_signed||longword integer (signed)|read only|by reference
columns||longword_signed||longword integer (signed)|read only|by reference
display-attributes|mask||longword||longword (unsigned)|read only|by reference

video-attributes|mask_longword|longword (unsigned)|read only|by reference

char-set|longword_unsigned|longword (unsigned)|read only|by reference

SMG\$CHECK_FOR_OCCLUSION display-id ,pasteboard-id ,occlusion-state

display-id|longword_unsigned|longword (unsigned)|read only|by reference

pasteboard-id|longword_unsigned|longword (unsigned)|read only|by reference

occlusion-state|longword_signed|longword integer (signed)|write only|by reference

SMG\$CONTROL_MODE pasteboard-id [,new-mode] [,old-mode]

pasteboard-id|longword_unsigned|longword (unsigned)|read only|by reference

new-mode|longword_unsigned|longword (unsigned)|read only|by reference

old-mode|longword_unsigned|longword (unsigned)|write only|by reference

SMG\$COPY_VIRTUAL_DISPLAY curr-display-id ,new-display-id

curr-display-id|longword_unsigned|longword (unsigned)|read only|by reference

new-display-id|longword_unsigned|longword (unsigned)|write only|by reference

SMG\$CREATE_KEY_TABLE new-key-table-id

new-key-table-id|longword_unsigned|longword (unsigned)|write only|by reference

SMG\$CREATE_PASTEBOARD new-pasteboard-id [,output-device] [,pb-rows]
[,pb-columns] [,preserve-screen-flag]

new-pasteboard-id|longword_unsigned|longword (unsigned)|write only|by reference

output-device|char_string|character string|read only|by descriptor

pb-rows|longword_signed|longword integer (signed)|write only|by reference

pb-columns|longword_signed|longword integer (signed)|write only|by reference

preserve-screen-flag|mask_longword|longword (unsigned)|read only|by reference

SMG\$CREATE_VIRTUAL_DISPLAY num-rows, num-columns, new-display-id
[,display-attributes] [,video-attributes] [,char-set]

num-rows|longword_signed|longword integer (signed)|read only|by reference

num-columns|longword_signed|longword integer (signed)|read only|by reference

new-display-id|longword_unsigned|longword (unsigned)|write only|by reference

display-attributes|longword_unsigned|longword (unsigned)|read only|by reference

video-attributes|mask_longword|longword (unsigned)|read only|by reference
char-set|longword_unsigned|longword (unsigned)|read only|by reference

SMG\$CREATE_VIRTUAL_KEYBOARD new-keyboard-id [,filespec]
[,default-filespec] [,resultant-filespec] [,recall-size]

new-keyboard-id|longword_unsigned|longword (unsigned)|write only|by reference
filespec|char_string|character string|read only|by descriptor
default-filespec|char_string|character string|read only|by descriptor
resultant-filespec|char_string|character string|write only|by descriptor
recall-size|byte_unsigned|byte (unsigned)|read only|by reference

SMG\$CURSOR_COLUMN display-id

display-id|longword_unsigned|longword (unsigned)|read only|by reference

SMG\$CURSOR_ROW display-id

display-id|longword_unsigned|longword (unsigned)|read only|by reference

SMG\$DEFINE_KEY key-table-id ,command-line

key-table-id|longword_unsigned|longword (unsigned)|read only|by reference
command-line|char_string|character string|read only|by descriptor

SMG\$DEL_TERM_TABLE

SMG\$DELETE_CHARS display-id ,num-chars ,row ,column

display-id|longword_unsigned|longword (unsigned)|read only|by reference
num-chars|longword_signed|longword integer (signed)|read only|by reference
row|longword_signed|longword integer (signed)|read only|by reference
column|longword_signed|longword integer (signed)|read only|by reference

SMG\$DELETE_KEY_DEF key-table-id ,key-name [,if-state]

key-table-id|longword_unsigned|longword (unsigned)|read only|by reference
key-name|char_string|character string|read only|by descriptor
if-state|char_string|character string|read only|by descriptor

SMG\$DELETE_LINE display-id ,start-line [,number-lines]

display-id|longword_unsigned|longword (unsigned)|read only|by reference
start-line|longword_signed|longword integer (signed)|read only|by reference
number-lines|longword_signed|longword integer (signed)|read only|by reference

SMG\$DELETE_PASTEBOARD pasteboard-id [,clear-screen-flag]

pasteboard-id||longword__unsigned||longword (unsigned)|read only|by reference
 clear-screen-flag|mask__longword||longword (unsigned)|read only|by reference

SMG\$DELETE_VIRTUAL_DISPLAY display-id

display-id||longword__unsigned||longword (unsigned)|read only|by reference

SMG\$DELETE_VIRTUAL_KEYBOARD keyboard-id

keyboard-id||longword__unsigned||longword (unsigned)|read only|by reference

SMG\$DISABLE_BROADCAST_TRAPPING pasteboard-id

pasteboard-id||longword__unsigned||longword (unsigned)|read only|by reference

SMG\$DISABLE_UNSOLICITED_INPUT pasteboard-id

pasteboard-id||longword__unsigned||longword (unsigned)|read only|by reference

SMG\$DRAW_LINE display-id ,start-row ,start-column ,end-row ,end-column
[,rendition-set] [,rendition-complement]

display-id||longword__unsigned||longword (unsigned)|read only|by reference
 start-row||longword__signed||longword integer (signed)|read only|by reference
 start-column||longword__signed||longword integer (signed)|read only|by reference
 end-row||longword__signed||longword integer (signed)|read only|by reference
 end-column||longword__signed||longword integer (signed)|read only|by reference
 rendition-set|mask__longword||longword (unsigned)|read only|by reference
 rendition-complement|mask__longword||longword (unsigned)|read only|by reference

SMG\$DRAW_RECTANGLE display-id ,top-left-row ,top-left-column
,bottom-right-row ,bottom-right-column [,rendition-set] [,rendition-complement]

display-id||longword__unsigned||longword (unsigned)|read only|by reference
 top-left-row||longword__signed||longword integer (signed)|read only|by reference
 top-left-column||longword__signed||longword integer (signed)|read only|by reference
 bottom-right-row||longword__signed||longword integer (signed)|read only|by reference
 bottom-right-column||longword__signed||longword integer (signed)|read only|by reference
 reference

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rendition-set|mask_longword|longword (unsigned)|read only|by reference

rendition-complement|mask_longword|longword (unsigned)|read only|by reference

SMG\$ENABLE_UNSOLICITED_INPUT pasteboard-id ,AST-routine
[,AST-argument]

pasteboard-id|longword_unsigned|longword (unsigned)|read only|by reference

AST-routine|last_procedure|procedure entry mask|read only|by reference

AST-argument|user_arg|longword|read only|by value

SMG\$END_DISPLAY_UPDATE display-id

display-id|longword_unsigned|longword (unsigned)|read only|by reference

SMG\$END_PASTEBOARD_UPDATE pasteboard-id

pasteboard-id|longword_unsigned|longword (unsigned)|read only|by reference

SMG\$ERASE_CHARS display-id ,number-of-chars ,row-number ,column-number

display-id|longword_unsigned|longword (unsigned)|read only|by reference

number-of-chars|longword_signed|longword integer (signed)|read only|by reference

row-number|longword_signed|longword integer (signed)|read only|by reference

column-number|longword_signed|longword integer (signed)|read only|by reference

SMG\$ERASE_DISPLAY display-id [,start-row] [,start-column] [,end-row]
[,end-column]

display-id|longword_unsigned|longword (unsigned)|read only|by reference

start-row|longword_signed|longword integer (signed)|read only|by reference

start-column|longword_signed|longword integer (signed)|read only|by reference

end-row|longword_signed|longword integer (signed)|read only|by reference

end-column|longword_signed|longword integer (signed)|read only|by reference

SMG\$ERASE_LINE display-id [,line-number] [,column-number]

display-id|longword_unsigned|longword (unsigned)|read only|by reference

line-number|longword_signed|longword integer (signed)|read only|by reference

column-number|longword_signed|longword integer (signed)|read only|by reference

SMG\$ERASE_PASTEBOARD pasteboard-id

pasteboard-id|longword_unsigned|longword (unsigned)|read only|by reference

SMG\$FIND_CURSOR_DISPLAY pasteboard-id ,returned-display-id

pasteboard-id|longword_unsigned|longword (unsigned)|read only|by reference

returned-display-id|longword_unsigned|longword (unsigned)|write only|by reference

SMG\$FLUSH_BUFFER pasteboard-id

pasteboard-id|longword_unsigned|longword (unsigned)|read only|by reference

SMG\$GET_BROADCAST_MESSAGE pasteboard-id [,message] [,message-length]

pasteboard-id|longword_unsigned|longword (unsigned)|read only|by reference

message|char_string|character string|write only|by descriptor

message-length|word_signed|word integer (signed)|write only|by reference

SMG\$GET_CHAR_AT_PHYSICAL_CURSOR pasteboard-id ,character

pasteboard-id|longword_unsigned|longword (unsigned)|read only|by reference

character|byte_unsigned|byte (unsigned)|write only|by reference

SMG\$GET_DISPLAY_ATTR display-id [,height] [,width] [,display-attributes]
[,video-attributes] [,char-set]

display-id|longword_unsigned|longword (unsigned)|read only|by reference

height|longword_signed|longword integer (signed)|write only|by reference

width|longword_signed|longword integer (signed)|write only|by reference

display-attributes|longword_unsigned|longword (unsigned)|write only|by reference

video-attributes|longword_unsigned|longword (unsigned)|write only|by reference

char-set|longword_unsigned|longword (unsigned)|read only|by reference

SMG\$GET_KEY_DEF key-table-id ,key-name [,if-state] [,attributes] [,equiv-string]
[,state-string]

key-table-id|longword_unsigned|longword (unsigned)|read only|by reference

key-name|char_string|character string|read only|by descriptor

if-state|char_string|character string|read only|by descriptor

attributes|mask_longword|longword (unsigned)|write only|by reference

equiv-string|char_string|character string|write only|by descriptor

state-string|char_string|character string|write only|by descriptor

SMG\$GET_KEYBOARD_ATTRIBUTES keyboard-id ,p-kit ,p-kit-size

keyboard-id|longword_unsigned|longword (unsigned)|read only|by reference

p-kit|address|longword (unsigned)|write only|by reference

p-kit-size|longword_unsigned|longword (unsigned)|read only|by reference

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SMG\$GET_NUMERIC_DATA termtable-address ,request-code ,buffer-address

termtable-address|address|longword (unsigned)|read only|by reference
request-code|longword__signed|longword integer (signed)|read only|by reference
buffer-address|address|longword (unsigned)|write only|by reference

SMG\$GET_PASTEBOARD_ATTRIBUTES pasteboard-id ,pb-info-table
,pb-info-table-size

pasteboard-id|longword__unsigned|longword (unsigned)|read only|by reference
pb-info-table|vector__byte__unsigned|byte (unsigned)|write only|by reference, array
reference
pb-info-table-size|longword__unsigned|longword (unsigned)|read only|by reference

SMG\$GET_PASTING_INFO display-id ,pasteboard-id ,pasted-flag
[,pasteboard-row] [,pasteboard-col]

display-id|longword__unsigned|longword (unsigned)|read only|by reference
pasteboard-id|longword__unsigned|longword (unsigned)|read only|by reference
pasted-flag|boolean|longword (unsigned)|write only|by reference
pasteboard-row|longword__signed|longword (signed)|write only|by reference
pasteboard-col|longword__signed|longword (signed)|write only|by reference

SMG\$GET_TERM_DATA termtable-address ,request-code ,max-buffer-length
,return-length ,buffer-address [,input-argument-vector]

termtable-address|address|longword (unsigned)|read only|by reference
request-code|longword__unsigned|longword (unsigned)|read only|by reference
max-buffer-length|longword__signed|longword integer (signed)|read only|by reference
return-length|longword__signed|longword integer (signed)|write only|by reference
buffer-address|address|longword (unsigned)|write only|by reference
input-argument-vector|address|longword (unsigned)|read only|by reference, array
reference

SMG\$HOME_CURSOR display-id [,position]

display-id|longword__unsigned|longword (unsigned)|read only|by reference
position|longword__unsigned|longword (unsigned)|read only|by reference

SMG\$INIT_TERM_TABLE terminal-name, term-entry-address

terminal-name|char__string|character string|read only|by descriptor
term-entry-address|longword__unsigned|longword (unsigned)|write only|by reference

SMG\$INIT_TERM_TABLE_BY_TYPE terminal-type ,term-entry-address
[,terminal-name]

terminal-type|byte_signed|byte integer (signed)|read only|by reference
term-entry-address|address|longword (unsigned)|write only|by reference
terminal-name|device_name|character string|write only|by descriptor

SMG\$INSERT_CHARS display-id ,string ,row ,column [,rendition-set]
[,rendition-complement] [,char-set]

display-id|longword_unsigned|longword (unsigned)|read only|by reference
string|char_string|character string|read only|by descriptor
row|longword_signed|longword integer (signed)|read only|by reference
column|longword_signed|longword integer (signed)|read only|by reference
rendition-set|mask_longword|longword (unsigned)|read only|by reference
rendition-complement|mask_longword|longword (unsigned)|read only|by reference
char-set|longword_unsigned|longword (unsigned)|read only|by reference

SMG\$INSERT_LINE display-id ,line-number [,string] [,direction] [,rendition-set]
[,rendition-complement] [,wrap-flag] [,char-set]

display-id|longword_unsigned|longword (unsigned)|read only|by reference
line-number|longword_signed|longword integer (signed)|read only|by reference
string|char_string|character string|read only|by descriptor
direction|longword_unsigned|longword (unsigned)|read only|by reference
rendition-set|mask_longword|longword (unsigned)|read only|by reference
rendition-complement|mask_longword|longword (unsigned)|read only|by reference
wrap-flag|mask_longword|longword (unsigned)|read only|by reference
char-set|longword_unsigned|longword (unsigned)|read only|by reference

SMG\$INVALIDATE_DISPLAY display-id

display-id|longword_unsigned|longword (unsigned)|read only|by reference

SMG\$LABEL_BORDER display-id [,label-text] [,position] [,units] [,rendition-set]
[,rendition-complement] [,char-set]

display-id|longword_unsigned|longword (unsigned)|read only|by reference
label-text|char_string|character string|read only|by descriptor
position|longword_unsigned|longword (unsigned)|read only|by reference
units|longword_signed|longword integer (signed)|read only|by reference
rendition-set|mask_longword|longword (unsigned)|read only|by reference

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rendition-complement|mask_longword|longword (unsigned)|read only|by reference
char-set|longword_unsigned|longword (unsigned)|read only|by reference

SMG\$LIST_KEY_DEFS key-table-id ,context [,key-name] [,if-state] [,attributes]
[,equiv-string] [,state-string]

key-table-id|longword_unsigned|longword (unsigned)|read only|by reference
context|context|longword integer (signed)|modify|by reference
key-name|char_string|character string|modify|by descriptor
if-state|char_string|character string|write only|by descriptor
attributes|longword_unsigned|longword (unsigned)|write only|by reference
equiv-string|char_string|character string|write only|by descriptor
state-string|char_string|character string|write only|by descriptor

SMG\$LOAD_KEY_DEFS key-table-id ,filespec [,default-filespec] [,lognam-flag]

key-table-id|longword_unsigned|longword (unsigned)|read only|by reference
filespec|char_string|character string|read only|by descriptor
default-filespec|char_string|character string|read only|by descriptor
lognam-flag|mask_longword|longword (unsigned)|read only|by reference

SMG\$MOVE_VIRTUAL_DISPLAY display-id ,pasteboard-id ,pasteboard-row
,pasteboard-column [,top-display-id]

display-id|longword_unsigned|longword (unsigned)|read only|by reference
pasteboard-id|longword_unsigned|longword (unsigned)|read only|by reference
pasteboard-row|longword_signed|longword integer (signed)|read only|by reference
pasteboard-column|longword_signed|longword integer (signed)|read only|by reference
top-display-id|longword_unsigned|longword (unsigned)|read only|by reference

SMG\$PASTE_VIRTUAL_DISPLAY display-id ,pasteboard-id ,pasteboard-row
,pasteboard-column [,top-display-id]

display-id|longword_unsigned|longword (unsigned)|read only|by reference
pasteboard-id|longword_unsigned|longword (unsigned)|read only|by reference
pasteboard-row|longword_signed|longword integer (signed)|read only|by reference
pasteboard-column|longword_signed|longword integer (signed)|read only|by reference
top-display-id|longword_unsigned|longword (unsigned)|read only|by reference

SMG\$POP_VIRTUAL_DISPLAY display-id ,pasteboard-id

display-id|longword_unsigned|longword (unsigned)|read only|by reference
pasteboard-id|longword_unsigned|longword (unsigned)|read only|by reference

SMG\$PUT_CHARS display-id ,text [,line-number] [,column-number] [,erase-flag]
[,rendition-set] [,rendition-complement] [,char-set]

display-id|longword_unsigned|longword (unsigned)|read only|by reference
text|char_string|character string|read only|by descriptor
line-number|longword_signed|longword integer (signed)|read only|by reference
column-number|longword_signed|longword integer (signed)|read only|by reference
erase-flag|mask_longword|longword (unsigned)|read only|by reference
rendition-set|mask_longword|longword (unsigned)|read only|by reference
rendition-complement|mask_longword|longword (unsigned)|read only|by reference
char-set|longword_unsigned|longword (unsigned)|read only|by reference

SMG\$PUT_CHARS_HIGHWIDE display-id ,text [,line-number] [,column-number]
[,rendition-set] [,rendition-complement] [,char-set]

display-id|longword_unsigned|longword (unsigned)|read only|by reference
text|char_string|character string|read only|by descriptor
line-number|longword_signed|longword integer (signed)|read only|by reference
column-number|longword_signed|longword integer (signed)|read only|by reference
rendition-set|mask_longword|longword (unsigned)|read only|by reference
rendition-complement|mask_longword|longword (unsigned)|read only|by reference
char-set|longword_unsigned|longword (unsigned)|read only|by reference

SMG\$PUT_CHARS_WIDE display-id ,text [,line-number] [,column-number]
[,rendition-set] [,rendition-complement] [,char-set]

display-id|longword_unsigned|longword (unsigned)|read only|by reference
text|char_string|character string|read only|by descriptor
line-number|longword_signed|longword integer (signed)|read only|by reference
column-number|longword_signed|longword integer (signed)|read only|by reference
rendition-set|mask_longword|longword (unsigned)|read only|by reference
rendition-complement|mask_longword|longword (unsigned)|read only|by reference
char-set|longword_unsigned|longword (unsigned)|read only|by reference

SMG\$PUT_LINE display-id ,text [,line-advance] [,rendition-set]
[,rendition-complement] [,wrap-flag] [,char-set] [,direction]

display-id|longword_unsigned|longword (unsigned)|read only|by reference
text|char_string|character string|read only|by descriptor
line-advance|longword_signed|longword integer (signed)|read only|by reference
rendition-set|mask_longword|longword (unsigned)|read only|by reference

rendition-complement|mask_longword|longword (unsigned)|read only|by reference
 wrap-flag|mask_longword|longword (unsigned)|read only|by reference
 char-set|longword_unsigned|longword (unsigned)|read only|by reference
 direction|longword_unsigned|longword (unsigned)|read only|by reference

SMG\$PUT_LINE_HIGHWIDE display-id ,text [,line-adv] [,rendition-set]
 [,rendition-complement] [,wrap-flag] [,char-set]

display-id|longword_unsigned|longword (unsigned)|read only|by reference
 text|char_string|character string|read only|by descriptor
 line-adv|longword_signed|longword integer (signed)|read only|by reference
 rendition-set|longword_unsigned|longword (unsigned)|read only|by reference
 rendition-complement|longword_unsigned|longword (unsigned)|read only|by reference
 wrap-flag|longword_unsigned|longword (unsigned)|read only|by reference
 char-set|longword_signed|longword integer (signed)|read only|by reference

SMG\$PUT_LINE_WIDE display-id ,text [,line-advance] [,rendition-set]
 [,rendition-complement] [,wrap-flag] [,char-set]

display-id|longword_unsigned|longword (unsigned)|read only|by reference
 text|char_string|character string|read only|by descriptor
 line-advance|longword_signed|longword integer (signed)|read only|by reference
 rendition-set|mask_longword|longword (unsigned)|read only|by reference
 rendition-complement|mask_longword|longword (unsigned)|read only|by reference
 wrap-flag|mask_longword|longword (unsigned)|read only|by reference
 char-set|longword_unsigned|longword (unsigned)|read only|by reference

SMG\$PUT_PASTEBOARD pasteboard-id ,p-rtn ,p-prm ,p-ff-flag

pasteboard-id|longword_unsigned|longword (unsigned)|read only|by reference
 p-rtn|longword_unsigned|procedure entry mask|read only|by reference
 p-prm|user_arg|longword integer (signed)|read only|by reference
 p-ff-flag|mask_longword|longword (unsigned)|read only|by reference

SMG\$PUT_VIRTUAL_DISPLAY_ENCODED display-id ,encoded-length
 ,encoded-text [,line-number] [,column-number] [,placeholder-arg] [,char-set]

display-id|longword_unsigned|longword (unsigned)|read only|by reference
 encoded-length|longword_unsigned|longword (unsigned)|read only|by reference
 encoded-text|address|unspecified|read only|by reference

line-number|longword_signed|longword integer (signed)|read only|by reference
 column-number|longword_signed|longword integer (signed)|read only|by reference
 placeholder-arg|longword_unsigned|longword (unsigned)|read only|by reference
 char-set|longword_unsigned|longword (unsigned)|read only|by reference

SMG\$PUT_WITH_SCROLL display-id [,text] [,direction] [,rendition-set]
 [,rendition-complement] [,wrap-flag] [,char-set]

display-id|longword_unsigned|longword (unsigned)|read only|by reference
 text|char_string|character string|read only|by descriptor
 direction|longword_unsigned|longword (unsigned)|read only|by reference
 rendition-set|mask_longword|longword (unsigned)|read only|by reference
 rendition-complement|mask_longword|longword (unsigned)|read only|by reference
 wrap-flag|mask_longword|longword (unsigned)|read only|by reference
 char-set|longword_unsigned|longword (unsigned)|read only|by reference

SMG\$READ_COMPOSED_LINE keyboard-id ,key-table-id ,received-text
 [,prompt-string] [,received-string-length] [,display-id] [,function-keys-flag] [,ini-string]
 [,timeout] [,rendition-set] [,rendition-complement] [,terminator-code]

keyboard-id|longword_unsigned|longword (unsigned)|read only|by reference
 key-table-id|longword_unsigned|longword (unsigned)|read only|by reference
 received-text|char_string|character string|write only|by descriptor
 prompt-string|char_string|character string|read only|by descriptor
 received-string-length|word_unsigned|word (unsigned)|write only|by reference
 display-id|longword_unsigned|longword (unsigned)|read only|by reference
 function-keys-flag|longword_unsigned|longword (unsigned)|read only|by reference
 ini-string|char_string|character string|read only|by descriptor
 timeout|longword_signed|longword (signed)|read only|by reference
 rendition-set|mask_longword|longword (unsigned)|read only|by reference
 rendition-complement|mask_longword|longword (unsigned)|read only|by reference
 terminator-code|word_unsigned|word (unsigned)|write only|by reference

SMG\$READ_FROM_DISPLAY display-id ,returned-string [,terminator-string][,row]

display-id|longword_unsigned|longword (unsigned)|read only|by reference
 returned-string|char_string|character string|write only|by descriptor
 terminator-string|char_string|character string|read only|by descriptor
 row|longword_signed|longword (signed)|read only|by reference

SMG\$READ_KEYSTROKE keyboard-id ,terminator-code [,prompt-string] [,timeout]
[,display-id] [,rendition-set] [,rendition-complement]

keyboard-id|longword_unsigned|longword (unsigned)|read only|by reference
terminator-code|word_unsigned|word (unsigned)|write only|by reference
prompt-string|char_string|character string|read only|by descriptor
timeout|longword_signed|longword (signed)|read only|by reference
display-id|longword_unsigned|longword (unsigned)|read only|by reference
rendition-set|mask_longword|longword (unsigned)|read only|by reference
rendition-complement|mask_longword|longword (unsigned)|read only|by reference

SMG\$READ_STRING keyboard-id ,received-text [,prompt-string] [,max-length]
[,modifiers] [,timeout] [,terminator-set] [,received-string-length] [,terminator-code]
[,display-id] [,ini-string] [,rendition-set] [,rendition-complement]

keyboard-id|longword_unsigned|longword (unsigned)|read only|by reference
received-text|char_string|character string|write only|by descriptor
prompt-string|char_string|character string|read only|by descriptor
max-length|longword_signed|longword integer (signed)|read only|by reference
modifiers|mask_longword|longword (unsigned)|read only|by reference
timeout|longword_signed|longword integer (signed)|read only|by reference
terminator-set|char_string|character string|read only|by descriptor, fixed length
received-string-length|word_unsigned|word (unsigned)|write only|by reference
terminator-code|word_unsigned|word (unsigned)|write only|by reference
display-id|longword_unsigned|longword (unsigned)|read only|by reference
ini-string|char_string|character string|read only|by descriptor
rendition-set|mask_longword|longword (unsigned)|read only|by reference
rendition-complement|mask_longword|longword (unsigned)|read only|by reference

SMG\$READ_VERIFY keyboard-id ,out-string ,in-string ,pic-string ,fill-char
 ,clear-char [,prompt-string] [,modifiers] [,timeout] [,terminator-set] [,ini-offset]
[,terminator-code] [,display-id] [,alt-echo-string] [,alt-display-id] [,rendition-set]
[,rendition-complement]

keyboard-id|longword_unsigned|longword (unsigned)|read only|by reference
out-string|char_string|character string|write only|by descriptor
in-string|char_string|character string|write only|by descriptor
pic-string|char_string|character string|read only|by descriptor
fill-char|char_string|character string|read only|by descriptor
clear-char|char_string|character string|read only|by descriptor

prompt-string|char_string|character string|read only|by descriptor
 modifiers|mask_longword|longword (unsigned)|read only|by reference
 timeout|longword_signed|longword (signed)|read only|by reference
 terminator-set|char_string|character string|read only|by descriptor, fixed length
 ini-offset|longword_signed|longword (signed)|read only|by reference
 terminator-code|word_unsigned|word (unsigned)|write only|by reference
 display-id|longword_unsigned|longword (unsigned)|read only|by reference
 alt-echo-string|char_string|character string|read only|by descriptor
 alt-display-id|longword_signed|longword (signed)|read only|by reference
 rendition-set|mask_longword|longword (unsigned)|read only|by reference
 rendition-complement|mask_longword|longword (unsigned)|read only|by reference

SMG\$REPAINT_LINE pasteboard-id ,row-start [,num-of-lines]

pasteboard-id|longword_unsigned|longword (unsigned)|read only|by reference
 row-start|longword_signed|longword (signed)|read only|by reference
 num-of-lines|longword_signed|longword (signed)|read only|by reference

SMG\$REPAINT_SCREEN pasteboard-id

pasteboard-id|longword_unsigned|longword (unsigned)|read only|by reference

SMG\$REPASTE_VIRTUAL_DISPLAY display-id ,pasteboard-id ,pb-row ,pb-column [,top-display-id]

display-id|longword_unsigned|longword (unsigned)|read only|by reference
 pasteboard-id|longword_unsigned|longword (unsigned)|read only|by reference
 pb-row|longword_signed|longword integer (signed)|read only|by reference
 pb-column|longword_signed|longword integer (signed)|read only|by reference
 top-display-id|longword_unsigned|longword (unsigned)|read only|by reference

SMG\$REPLACE_INPUT_LINE keyboard-id [,out-line] [,num-of-lines]

keyboard-id|longword_unsigned|longword (unsigned)|read only|by reference
 out-line|char_string|character string|read only|by descriptor
 num-of-lines|byte_unsigned|byte (unsigned)|read only|by reference

SMG\$RESTORE_PHYSICAL_SCREEN pasteboard-id ,saved-display-id

pasteboard-id|longword_unsigned|longword (unsigned)|read only|by reference
 saved-display-id|longword_unsigned|longword (unsigned)|read only|by reference

SMG\$RETURN_CURSOR_POS display-id ,row-number ,column-number

display-id||longword_unsigned||longword (unsigned)|read only|by reference
row-number||longword_signed||longword integer (signed)|write only|by reference
column-number||longword_signed||longword integer (signed)|write only|by reference

SMG\$RETURN_INPUT_LINE keyboard-id ,out-line [,match-string] [,line-num]
[,out-length]

keyboard-id||longword_unsigned||longword (unsigned)|read only|by reference
out-line|char_string|character string|write only|by descriptor
match-string|char_string|character string|read only|by descriptor
line-num|byte_unsigned|byte (unsigned)|read only|by reference
out-length|word_unsigned|word (unsigned)|write only|by reference

SMG\$RING_BELL display-id [,number-of-times]

display-id||longword_unsigned||longword (unsigned)|read only|by reference
number-of-times||longword_signed||longword integer (signed)|read only|by reference

SMG\$SAVE_PHYSICAL_SCREEN pasteboard-id ,saved-display-id
[,desired-row-start] [,desired-row-end]

pasteboard-id||longword_unsigned||longword (unsigned)|read only|by reference
saved-display-id||longword_unsigned||longword (unsigned)|write only|by reference
desired-row-start||longword_signed||longword integer (signed)|read only|by reference
desired-row-end||longword_signed||longword integer (signed)|read only|by reference

SMG\$SCROLL_DISPLAY_AREA display-id [,starting-row ,starting-column]
[,height] [,width] [,direction] [,count]

display-id||longword_unsigned||longword (unsigned)|read only|by reference
starting-row||longword_signed||longword integer (signed)|read only|by reference
starting-column||longword_signed||longword integer (signed)|read only|by reference
height||longword_signed||longword integer (signed)|read only|by reference
width||longword_signed||longword integer (signed)|read only|by reference
direction||longword_unsigned||longword (unsigned)|read only|by reference
count||longword_signed||longword integer (signed)|read only|by reference

SMG\$SET_BROADCAST_TRAPPING pasteboard-id [,AST-routine]
[,AST-argument]

pasteboard-id||longword_unsigned||longword (unsigned)|read only|by reference
AST-routine|last_procedure|procedure entry mask|read only|by reference
AST-argument|user_arg||longword (unsigned)|read only|by value

SMG\$SET_CURSOR_ABS display-id [,row] [,column]

display-id||longword_unsigned||longword (unsigned)|read only|by reference
row||longword_signed||longword integer (signed)|read only|by reference
column||longword_signed||longword integer (signed)|read only|by reference

SMG\$SET_CURSOR_MODE pasteboard-id ,cursor-mode

pasteboard-id||longword_unsigned||longword (unsigned)|read only|by reference
cursor-mode|boolean||longword (unsigned)|read only|by reference

SMG\$SET_CURSOR_REL display-id [,delta-row] [,delta-column]

display-id||longword_unsigned||longword (unsigned)|read only|by reference
delta-row||longword_signed||longword integer (signed)|read only|by reference
delta-column||longword_signed||longword integer (signed)|read only|by reference

SMG\$SET_DEFAULT_STATE key-table-id [,new-state] [,old-state]

key-table-id||longword_unsigned||longword (unsigned) |read only|by reference
new-state|char_string|character string|read only|by descriptor
old-state|char_string|character string|write only|by descriptor

SMG\$SET_DISPLAY_SCROLL_REGION display-id [,starting-line] [,ending-line]

display-id||longword_unsigned||longword (unsigned)|read only|by reference
starting-line||longword_signed||longword integer (signed)|read only|by reference
ending-line||longword_signed||longword integer (signed)|read only|by reference

SMG\$SET_KEYPAD_MODE keyboard-id ,new-mode

keyboard-id||longword_unsigned||longword (unsigned)|read only|by reference
new-mode||longword_unsigned||longword (unsigned)|read only|by reference

SMG\$SET_OUT_OF_BAND_ASTS pasteboard-id ,control-char-mask ,AST-routine
[,AST-argument]

pasteboard-id|longword_unsigned|longword (unsigned)|read only|by reference
control-char-mask|mask_longword|longword (unsigned)|read only|by reference
AST-routine|last_procedure|procedure entry mask|read only|by reference
AST-argument|user_arg|longword (unsigned)|read only|by value

SMG\$SET_PHYSICAL_CURSOR pasteboard-id ,pb-row ,pb-column

pasteboard-id|longword_unsigned|longword (unsigned)|read only|by reference
pb-row|longword_unsigned|longword (unsigned)|read only|by reference
pb-column|longword_unsigned|longword (unsigned)|read only|by reference

SMG\$SNAPSHOT pasteboard-id [,ff-flag]

pasteboard-id|longword_unsigned|longword (unsigned)|read only|by reference
ff-flag|boolean|longword (unsigned)|read only|by reference

SMG\$UNPASTE_VIRTUAL_DISPLAY display-id ,pasteboard-id

display-id|longword_unsigned|longword (unsigned)|read only|by reference
pasteboard-id|longword_unsigned|longword (unsigned)|read only|by reference

STR\$ADD asign ,aexp ,adigits ,bsign ,bexp ,bdigits ,csign ,cexp ,cdigits

asign|longword_unsigned|longword (unsigned)|read only|by reference
aexp|longword_signed|longword integer (signed)|read only|by reference
adigits|char_string|character string|read only|by descriptor
bsign|longword_unsigned|longword (unsigned)|read only|by reference
bexp|longword_signed|longword integer (signed)|read only|by reference
bdigits|char_string|character string|read only|by descriptor
csign|longword_signed|longword integer (signed)|write only|by reference
cexp|longword_signed|longword integer (signed)|write only|by reference
cdigits|char_string|character string|write only|by descriptor

STR\$ANALYZE_SDESC inp-dsc ,len ,data-adr

JSB entry: STR\$ANALYZE_SDESC_R1

inp-dsc|char_string|character string|read only|by descriptor
len|word_signed|word integer (signed)|write only |by reference for CALL entry point,
by value for JSB entry point
data-adr|address|longword (unsigned)|write only |by reference for CALL entry point,
by reference for JSB entry point

STR\$APPEND dst-str ,src-str

dst-str|char_string|character string|write only|by descriptor

src-str|char_string|character string|read only|by descriptor

STR\$CASE__BLIND__COMPARE src1-str ,src2-str

src1-str|char_string|character string|read only|by descriptor

src2-str|char_string|character string|read only|by descriptor

STR\$COMPARE src1-str ,src2-str

src1-str|char_string|character string|read only|by descriptor

src2-str|char_string|character string|read only|by descriptor

STR\$COMPARE__EQL src1-str ,src2-str

src1-str|char_string|character string|read only|by descriptor

src2-str|char_string|character string|read only|by descriptor

STR\$COMPARE__MULTI src1-str ,src2-str [,case-blind-flag] [,foreign-lang]

src1-str|char_string|character string|read only|by descriptor

src2-str|char_string|character string|read only|by descriptor

case-blind-flag|mask_longword|longword (unsigned)|read only|by value

foreign-lang|longword_unsigned|longword (unsigned)|read only|by value

STR\$CONCAT dst-str ,src1-str [... ,srcn-str]

dst-str|char_string|character string|write only|by descriptor

src1-str|char_string|character string|read only|by descriptor

srcn-str|char_string|character string|read only|by descriptor

STR\$COPY_DX dst-str ,src-str

JSB entry: STR\$COPY_DX_R8

dst-str|char_string|character string|write only|by descriptor

src-str|char_string|character string|read only|by descriptor

STR\$COPY_R dst-str ,src-len ,src-str

JSB entry: STR\$COPY_R_R8

dst-str|char_string|character string|write only|by descriptor

src-len|word_unsigned|word (unsigned)|read only|by reference

src-str|char_string|character string|read only|by reference

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STR\$DIVIDE *asign ,aexp ,adigits ,bsign ,bexp ,bdigits ,tot-digits ,rnd-trunc ,csign ,cexp ,cdigits*

asign | longword__unsigned | longword (unsigned) | read only | by reference
aexp | longword__signed | longword integer (signed) | read only | by reference
adigits | char__string | num. string, unsigned | read only | by descriptor
bsign | longword__unsigned | longword (unsigned) | read only | by reference
bexp | longword__signed | longword integer (signed) | read only | by reference
bdigits | char__string | num. string, unsigned | read only | by descriptor
tot-digits | longword__signed | longword integer (signed) | read only | by reference
rnd-trunc | longword__unsigned | aligned bit string | read only | by reference
csign | longword__signed | longword integer (signed) | write only | by reference
cexp | longword__signed | longword integer (signed) | write only | by reference
cdigits | char__string | num. string, unsigned | write only | by descriptor

STR\$DUPL__CHAR *dst-str [,length] [,char]*

JSB entry: STR\$DUPL__CHAR__R8

dst-str | char__string | character string | write only | by descriptor
length | longword__signed | longword integer (signed) | read only | by reference
char | byte__unsigned | byte (unsigned) | read only | by reference

STR\$FIND__FIRST_IN__SET *src-str ,set-of-chars*

src-str | char__string | character string | read only | by descriptor
set-of-chars | char__string | character string | read only | by descriptor

STR\$FIND__FIRST_NOT_IN__SET *src-str ,set-of-chars*

src-str | char__string | character string | read only | by descriptor
set-of-chars | char__string | character string | read only | by descriptor

STR\$FIND__FIRST_SUBSTRING *src-str ,index ,sub-string-index ,sub-string1 ... [,sub-stringn]*

src-str | char__string | character string | read only | by descriptor
index | longword__signed | longword integer (signed) | write only | by reference
sub-string-index | longword__signed | longword integer (signed) | write only | by reference
sub-string1 | char__string | character string | read only | by descriptor
sub-stringn | char__string | character string | read only | by descriptor

STR\$FREE1_DX dsc-adr

JSB entry: STR\$FREE1_DX_R4

dsc-adr|char_string|character string (unsigned)|modify|by descriptor

STR\$GET1_DX len ,str

JSB entry: STR\$GET1_DX_R4

len|word_unsigned|word (unsigned)|read only|by reference

str|char_string|character string|modify|by descriptor

STR\$LEFT dst-str ,src-str ,end-pos

entry: STR\$LEFT_R8

dst-str|char_string|character string|write only|by descriptor

src-str|char_string|character string|read only|by descriptor

end-pos|longword_signed|longword integer (signed)|read only|by reference

STR\$LEN_EXTR dst-str ,src-str ,start-pos ,length

JSB entry: STR\$LEN_EXTR_R8

dst-str|char_string|character string|write only|by descriptor

src-str|char_string|character string|read only|by descriptor

start-pos|longword_signed|longword integer (signed)|read only|by reference

length|longword_signed|longword integer (signed)|read only|by reference

STR\$MATCH_WILD cand-str ,pattern-str

cand-str|char_string|character string|read only|by descriptor

pattern-str|char_string|character string|read only|by descriptor

STR\$MUL asign ,aexp ,adigits ,bsign ,bexp ,bdigits ,csign ,cexp ,cdigits

asign|longword_unsigned|longword (unsigned)|read only|by reference

aexp|longword_signed|longword integer (signed)|read only|by reference

adigits|char_string|num. string, unsigned|read only|by descriptor

bsign|longword_unsigned|longword (unsigned)|read only|by reference

bexp|longword_signed|longword integer (signed)|read only|by reference

bdigits|char_string|num. string, unsigned|read only|by descriptor

csign|longword_signed|longword integer (signed)|write only|by reference

cexp|longword_signed|longword integer (signed)|write only|by reference

cdigits|char_string|num. string, unsigned|write only|by descriptor

RTL-64 Run-Time Library Routines

STR\$POSITION src-str ,sub-str [,start-pos]

JSB entry: STR\$POSITION_R6

src-str|char_string|character string|read only|by descriptor

sub-str|char_string|character string|read only|by descriptor

start-pos|longword_signed|longword integer (signed)|read only|by reference

STR\$POS_EXTR dst-str ,src-str ,start-pos ,end-pos

JSB entry: STR\$POS_EXTR_R8

dst-str|char_string|character string|write only|by descriptor

src-str|char_string|character string|read only|by descriptor

start-pos|longword_signed|longword integer (signed)|read only|by reference for CALL
entry point, by value for JSB entry point

end-pos|longword_signed|longword integer (signed)|read only|by reference for CALL
entry point, by value for JSB entry point

STR\$PREFIX dst-str ,src-str

dst-str|char_string|character string|write only|by descriptor

src-str|char_string|character string|read only|by descriptor

STR\$RECIPI asign ,aexp ,adigits ,bsign ,bexp ,bdigits ,csign ,cexp ,cdigits

aassign|longword_unsigned|longword (unsigned)|read only|by reference

aexp|longword_signed|longword integer (signed)|read only|by reference

adigits|char_string|num. string, unsigned|read only|by descriptor

bsign|longword_unsigned|longword (unsigned)|read only|by reference

bexp|longword_signed|longword integer (signed)|read only|by reference

bdigits|char_string|num. string, unsigned|read only|by descriptor

csign|longword_signed|longword integer (signed)|write only|by reference

cexp|longword_signed|longword integer (signed)|write only|by reference

cdigits|char_string|num. string, unsigned|write only|by descriptor

STR\$REPLACE dst-str ,src-str ,start-pos ,end-pos ,rpl-str

JSB entry: STR\$REPLACE_R8

dst-str|char_string|character string|write only|by descriptor

src-str|char_string|character string|read only|by descriptor

start-pos|longword_signed|longword integer (signed)|read only|by reference for CALL
entry point, by value for JSB entry point

end-pos|longword_signed|longword integer (signed)|read only|by reference for CALL
entry point, by value for JSB entry point

rpl-str|char_string|character string|read only|by descriptor

STR\$RIGHT dst-str ,src-str ,start-pos

JSB entry: STR\$RIGHT_R8

dst-str|char_string|character string|write only|by descriptor

src-str|char_string|character string|read only|by descriptor

start-pos|longword_signed|longword integer (signed)|read only|by reference for CALL
entry point, by value for JSB entry point

STR\$ROUND places ,trunc-flg ,assign ,aexp ,adigits ,csign ,cexp ,cdigits

places|longword_signed|longword integer (signed)|read only|by reference

trunc-flg|longword_unsigned|longword (unsigned)|read only|by reference

assign|longword_unsigned|longword (unsigned)|read only|by reference

aexp|longword_signed|longword integer (signed)|read only|by reference

adigits|char_string|num. string, unsigned|read only|by descriptor

csign|longword_signed|longword integer (signed)|write only|by reference

cexp|longword_signed|longword integer (signed)|write only|by reference

cdigits|char_string|num. string, unsigned|write only|by descriptor

STR\$TRANSLATE dst-str ,src-str ,trans-str ,match-str

dst-str|char_string|character string|write only|by descriptor

src-str|char_string|character string|read only|by descriptor

trans-str|char_string|character string|read only|by descriptor

match-str|char_string|character string|read only|by descriptor

STR\$TRIM dst-str ,src-str [,out-len]

dst-str|char_string|character string|write only|by descriptor

src-str|char_string|character string|read only|by descriptor

out-len|word_unsigned|word (unsigned)|write only|by reference

STR\$UPCASE dst-str ,src-str

dst-str|char_string|character string|write only|by descriptor

src-str|char_string|character string|read only|by descriptor

Callable Utility Routines

CLI\$DCL_PARSE command-string ,table [,param-routine] [,prompt-routine]
[,prompt-string]

command-string|char_string|character string|read only|by descriptor-fixed length
table|char_string|unspecified|read only|by reference
param-routine|procedure|procedure entry mask|read only|by reference
prompt-routine|procedure|procedure entry mask|read only|by reference
prompt-string|char_string|character string|read only|by descriptor

CLI\$DISPATCH [userarg]

userarg|longword_unsigned| longword (unsigned)|read only|by value

CLI\$GET_VALUE entity_desc ,retdesc [,retlength]

entity_desc|char_string|character string|read only|by descriptor
retdesc|char_string|character string|write only|by descriptor
retlength|word_unsigned|word (unsigned)|write only|by reference

CLI\$PRESENT entity_desc

entity_desc|char_string|character string|read only|by descriptor

CONV\$CONVERT [status-block-address] [,flags]

status-block-address|vector_longword_unsigned|longword (unsigned)|write only|by
reference
flags|mask_longword|longword (unsigned)|read only|by reference

UTIL-2 Callable Utility Routines

CONV\$PASS_FILES input-file-spec ,output-file-spec [,fdl-file-spec] [,exception-file-spec] [,flags]

input-file-spec|char_string|character-coded text string|read only |by descriptor-fixed length string descriptor

output-file-spec|char_string|character-coded text string|read only |by descriptor-fixed length string descriptor

fdl-file-spec|char_string|character-coded text string|read only |by descriptor-fixed length string descriptor

exception-file-spec|char_string|character-coded text string|read only |by descriptor-fixed length string descriptor

flags|mask_longword|longword (unsigned)|read only|by reference

CONV\$PASS_OPTIONS [parameter-list-address] [,flags]

parameter-list-address|vector_longword_unsigned|longword (unsigned)|read only|by reference

flags|mask_longword|longword (unsigned)|read only|by reference

CONV\$RECLAIM input-file-spec [,statistics_blk]

input-file-spec|char_string|character-coded text string|read only|by descriptor-fixed length string descriptor

statistics_blk|vector_longword_unsigned|longword (unsigned)|write only|by reference

DCX\$ANALYZE_DATA context ,record

context|context|longword (unsigned)|read only|by reference

record|char_string|character string|read only|by descriptor

DCX\$ANALYZE_DONE context

context|context|longword|write only|by reference

DCX\$ANALYZE_INIT context [,item-code ,item-value]

The second and third arguments are both optional but, if specified, must be specified together. Further, this pair of arguments may be repeated, with different values, in the same call.

context|context|longword (unsigned)|write only|by reference

item-code|longword_unsigned|longword (unsigned)|read only|by reference

item-value|longword_unsigned|longword (unsigned)|read only|by reference

DCX\$COMPRESS_DATA context ,in-rec ,out-rec [,out-length]

context|context|longword (unsigned)|read only|by reference
in-rec|char_string|character string|read only|by descriptor
out-rec|char_string|character string|write only|by descriptor
out-length|word_signed|word integer (signed)|write only|by reference

DCX\$COMPRESS_DONE context

context|context|longword (unsigned)|write only|by reference

DCX\$COMPRESS_INIT context ,map

context|context|longword (unsigned)|write only|by reference
map|address|longword (unsigned)|read only|by reference

DCX\$EXPAND_DATA context ,in-rec ,out-rec [,out-length]

context|context|longword (unsigned)|read only|by reference
in-rec|char_string|character string|read only|by descriptor
out-rec|char_string|character string|write only|by descriptor
out-length|word_signed|word integer (signed)|write only|by reference

DCX\$EXPAND_DONE context

context|context|longword (unsigned)|write only|by reference

DCX\$EXPAND_INIT context ,map

context|context|longword (unsigned)|write only|by reference
map|address|longword (unsigned)|read only|by reference

DCX\$MAKE_MAP context ,map-addr [,map-size]

context|context|longword (unsigned)|write only|by reference
map-addr|address|longword (unsigned)|write only|by reference
map-size|longword_signed|longword (unsigned)|write only|by reference

EDT\$EDIT in_file [,out_file] [,com_file] [,jou_file] [,options] [,fileio] [,workio] [,xlate]

in_file|char_string|character-coded text string|read only|by descriptor
out_file|char_string|character-coded text string|read only|by descriptor
com_file|char_string|character-coded text string|read only|by descriptor
jou_file|char_string|character-coded text string|read only|by descriptor
options|mask_longword|aligned bit string|read only|by reference

UTIL-4 Callable Utility Routines

fileio|vector_longword_unsigned|bound procedure value|function call|by reference
workio|vector_longword_unsigned|bound procedure value|function call|by reference
xlate|vector_longword_unsigned|bound procedure value|function call|by reference

FILEIO code ,stream ,record ,rhh

code|longword_unsigned|longword (unsigned)|read only|by reference
stream|longword_unsigned|longword (unsigned)|read only|by reference
record|char_string|character-coded text string|modify|by descriptor
rhh|char_string|character-coded text string|modify|by descriptor

WORKIO code ,recordno ,record

code|longword_unsigned|longword (unsigned)|read only|by reference
recordno|longword_signed|longword integer (signed)|read only|by reference
record|char_string|character string|modify|by descriptor

XLATE string

string|char_string|character-coded text string|modify|by descriptor

FDL\$CREATE fdl_desc [,file_name] [,default_name] [,result_name] [,fid_block] [,flags] [,stmt_num] [,retlen] [,sts] [,stv]

fdl_desc|char_string|character-coded text string|read only |by descriptor-fixed length
string descriptor
file_name|char_string|character-coded text string|read only |by descriptor-fixed length
string descriptor
default_name|char_string|character-coded text string|read only |by descriptor-fixed
length string descriptor
result_name|char_string|character-coded text string|write only |by descriptor-fixed
length string descriptor
fid_block|vector_longword_unsigned|longword (unsigned)|write only|by reference
flags|mask_longword|longword (unsigned)|read only|by reference
stmt_num|longword_unsigned|longword (unsigned)|write only|by reference
retlen|longword_unsigned|longword (unsigned)|write only|by reference
sts|longword_unsigned|longword_unsigned|write only|by reference
stv|longword_unsigned|longword (unsigned)|write only|by reference

FDL\$GENERATE flags ,fab_pointer ,rab_pointer [,fdl_file_dst] [,fdl_file_resnam] [,fdl_str_dst] [,bad_blk_addr] [,retlen]

flags|mask_longword|longword (unsigned)|read only|by reference
 fab_pointer|address|longword (unsigned)|read only|by reference
 rab_pointer|address|longword (unsigned)|read only|by reference
 fdl_file_dst|char_string|character-coded text string|read only |by descriptor
 fdl_file_resnam|char_string|character-coded text string|write only |by descriptor-fixed
 length string descriptor
 fdl_str_dst|char_string|character-coded text string|write only |by descriptor-fixed
 length string descriptor
 bad_blk_addr|address|longword (unsigned)|write only|by reference
 retlen|longword_unsigned|longword (unsigned)|write only|by reference

FDL\$PARSE fdl_spec ,fdl_fab_pointer ,fdl_rab_pointer [,flags] [,dflt_fdl_spc] [,stmnt_num]

fdl_spec|char_string|character-coded text string|read only |by descriptor-fixed length
 string descriptor
 fdl_fab_pointer|address|longword (unsigned)|write only|by reference
 fdl_rab_pointer|address|longword (unsigned)|write only|by reference
 flags|mask_longword|longword (unsigned)|read only|by reference
 dflt_fdl_spc|char_string|character-coded text string|read only |by descriptor-fixed
 length string descriptor
 stmnt_num|longword_unsigned|longword (unsigned)|write only|by reference

FDL\$RELEASE [fab_pointer] [,rab_pointer] [,flags] [,badblk_addr]

fab_pointer|address|longword (unsigned)|read only|by reference
 rab_pointer|address|longword (unsigned)|read only|by reference
 flags|mask_longword|longword (unsigned)|read only|by reference
 badblk_addr|address|longword (unsigned)|write only|by reference

LBR\$CLOSE library-index

library-index|longword_unsigned|longword (unsigned)|read only|by reference

LBR\$DELETE_DATA library-index ,txtrfa

library-index|longword_unsigned|longword (unsigned) |read only|by reference
 txtrfa|vector_longword_unsigned|longword (unsigned)|read only| by reference

LBR\$DELETE_KEY library-index ,key-name

library-index|longword_unsigned|longword (unsigned)|read only |by reference
 key-name|longword_unsigned|longword (unsigned)|read only|by reference

UTIL-6 Callable Utility Routines

LBR\$FIND library-index ,txtrfa

library-index|longword__unsigned|longword (unsigned)|read only |by reference
txtrfa|vector__longword__unsigned|longword (unsigned)|read only |by reference

LBR\$FLUSH library-index ,block-type

library-index|longword__unsigned|longword (unsigned)|read only |by reference
block-type|longword__unsigned|longword (unsigned)|read only |by value

LBR\$GET_HEADER library-index ,retary

library-index|longword__unsigned|longword (unsigned)|read only |by reference
retary|vector__longword__signed|longword (signed)|write only |by reference

LBR\$GET_HELP library-index [,line-width] [,routine] [,data] [,key-1] [,key-2... ,key-10]

If the **key-1** descriptor is 0, or if it is not present, LBR\$GET_HELP will assume that the **key-1** name is "HELP," and it ignores all the other keys. For **key-2** through **key-10**, a descriptor address of 0, or a length of 0, or a string address of 0 will terminate the list.

library-index|longword__unsigned|longword (unsigned)|read only |by reference
line-width|longword__signed|longword (signed)|read only|by reference
routine|procedure|procedure entry mask|read only|by reference
data|longword__unsigned|longword (unsigned)|write only|by reference
key-1,key-2,...,key-10|longword__signed|longword (signed)|read only| by descriptor

LBR\$GET_HISTORY library-index ,action-routine

library-index|longword__unsigned|longword (unsigned)|read only |by reference
action-routine|procedure|procedure entry mask|modify|by reference

LBR\$GET_INDEX library-index ,index-number ,routine-name [,match-desc]

library-index|longword__unsigned|longword (unsigned)|read only |by reference
index-number|longword__unsigned|longword (unsigned)|read only |by reference
routine-name|procedure|procedure entry mask|read only|by reference
match-desc|char__string|character string|read only|by descriptor

LBR\$GET_RECORD library-index [,inbufdes] [,outbufdes]

library-index|longword__unsigned|longword (unsigned)|read only |by reference
inbufdes|char__string|character string|write only|by descriptor
outbufdes|char__string|character string|write only|by descriptor

LBR\$INI_CONTROL library-index ,func [,type] [,namblk]

library-index|longword_unsigned|longword (unsigned)|write only| by reference
 func|function_codellongword (unsigned)|read only|by reference
 typellongword_unsigned|longword (unsigned)|read only|by reference
 namblk|nam|longword (unsigned)|read only|by reference

LBR\$INSERT_KEY library-index ,key-name ,txtrfa

library-index|longword_unsigned|longword (unsigned)|read only |by reference
 key-namellongword_unsigned|longword (unsigned)|write only|by reference
 txtrfa|vector_longword_unsigned|longword (unsigned)|modify| by reference

LBR\$LOOKUP_KEY library-index ,key-name ,txtrfa

library-index|longword_unsigned|longword (unsigned)|read only |by reference
 key-namellongword_unsigned|longword (unsigned)|read only|by reference
 txtrfa|vector_longword_unsigned|longword (unsigned)|write only| by reference

LBR\$OPEN library-index [,fns] [,create-options] [,dns] [,rlfna] [,rns] [,rnslen]

The **fns** argument and the **create-options** argument are required in some circumstances. See the descriptions of these arguments for more information.

library-index|longword_unsigned|longword (unsigned)|read only| by reference
 fns|char_string|character string|read only|by descriptor
 create-options|vector_longword_unsigned|longword (unsigned)|read only |by reference
 dns|char_string|character string|read only|by descriptor
 rlfna|longword_unsigned|longword (unsigned)|read only|by reference
 rns|char_string|character string|write only|by descriptor
 rnslen|longword_signed|longword (signed)|write only| by reference

LBR\$OUTPUT_HELP output-routine [,output-width] [,line-desc] [,library-name] [,flags] [,input-routine]

output-routine|procedure|procedure entry mask|write only|by reference
 output-width|longword_signed|longword (signed)|read only |by reference
 line-desc|char_string|character string|read only|by descriptor
 library-name|char_string|character string|read only|by descriptor
 flags|mask_longword|longword (unsigned)|read only|by reference
 input-routine|procedure|procedure entry mask|read only|by reference

LBR\$PUT_END library-index

library-index|longword_unsigned|longword (unsigned)|read only |by reference

UTIL-8 Callable Utility Routines

LBR\$PUT_HISTORY library-index ,record-desc

library-index||longword_unsigned||longword (unsigned)|read only| by reference
record-desc|char_string|character string|read only|by descriptor

LBR\$PUT_RECORD library-index ,bufdes ,txtrfa

library-index||longword_unsigned||longword (unsigned)|read only |by reference
bufdes|char_string|character string|read only|by descriptor
txtrfa|vector_longword_unsigned||longword (unsigned)|write only |by descriptor

LBR\$REPLACE_KEY library-index ,key-name ,oldrfa ,newrfa

library-index||longword_unsigned||longword (unsigned)|read only |by reference
key-name|char_string|character string|read only|by descriptor
key-name||longword_unsigned||longword (unsigned)|read only| by reference
oldrfa|vector_longword_unsigned||longword (unsigned)|write only |by reference
newrfa|vector_longword_unsigned||longword (unsigned)|read only |by reference

LBR\$RET_RMSSTV

LBR\$SEARCH library-index ,index-number ,rfa-to-find ,routine-name

library-index||longword_unsigned||longword (unsigned)|read only |by reference
index-number||longword_unsigned||longword (unsigned)|read only |by reference
rfa-to-find|vector_longword_unsigned||longword (unsigned)|write only |by reference
routine-name|procedure|procedure entry mask|read only|by reference

LBR\$SET_INDEX library-index ,index-number

library-index||longword_unsigned||longword (unsigned)|read only |by reference
index-number||longword_unsigned||longword (unsigned)|read only|by reference

LBR\$SET_LOCATE library-index

library-index||longword_unsigned||longword (unsigned)|read only |by reference

LBR\$SET_MODULE library-index ,rfa [,bufdesc] [,buflen] [,updatedesc]

library-index||longword_unsigned||longword (unsigned)|read only |by reference
rfa|vector_longword_unsigned||longword (unsigned)|write only |by reference
bufdesc|char_string|character string|write only|by descriptor
buflen||longword_signed||longword (signed)|write only|by reference
updatedesc|char_string|character string|read only|by descriptor

LBR\$SET_MOVE library-index

library-index||longword_unsigned||longword (unsigned)|read only| by reference

PSM\$PRINT [streams] [,bufsiz] [,worksiz]

streams|longword_unsigned|longword (unsigned)|read only|by reference
 bufsiz|longword_unsigned|longword (unsigned)|read only|by reference
 worksiz|longword_unsigned|longword (unsigned)|read only|by reference

PSM\$READ_ITEM_DX request_id ,item ,buffer

request_id|address|longword (unsigned)|read only|by reference
 item|longword_unsigned|longword (unsigned)|write only|by reference
 buffer|char_string|character string|read only|by descriptor

PSM\$REPLACE code ,routine

code|longword_unsigned|longword (unsigned)|read only|by reference
 routine|procedure|procedure entry mask|read only|by reference

PSM\$REPORT request_id [,status]

request_id|identifier|longword (unsigned)|read only|by reference
 status|cond_value|longword (unsigned)|write only|by reference

USER-FORMAT-ROUTINE request_id ,work_area ,func ,func_desc_1 ,func_arg_1 ,func_desc_2 ,func_arg_2

The **func_arg_1** and **func_arg_2** arguments are not used in some cases; see the Description section for more information.

request_id|identifier|longword (unsigned)|write only|by reference
 work_area|address|longword (unsigned)|write only|by reference
 func|function_code|longword (unsigned)|write only|by reference
 func_desc_1|char_string|character string|read only|by descriptor
 func_arg_1|vector_byte_unsigned|byte (unsigned)|read only|by reference
 func_desc_2|char_string|character string|read only|by reference
 func_arg_2|vector_byte_unsigned|byte (unsigned)|read only|by reference

USER-INPUT-ROUTINE request_id ,work_area ,func ,funcdesc ,funcarg

request_id|identifier|longword (unsigned)|write only|by reference
 work_area|address|longword (unsigned)|write only|by reference
 func|function_code|longword (unsigned)|read only|by reference
 funcdesc|char_string|character string|read only|by descriptor
 funcarg|longword_unsigned|longword (unsigned)|read only|by reference

UTIL-10 Callable Utility Routines

USER-OUTPUT-ROUTINE request_id ,work_area ,func ,funcdesc ,funcarg

request_id|identifier|longword (unsigned)|write only|by reference
work_area|address|longword (unsigned)|write only|by reference
func|function_code|longword (unsigned)|read only|by reference
funcdesc|char_string|character string|read only|by descriptor
funcarg|user_arg|longword (unsigned)|read only|by reference

SMB\$CHECK_FOR_MESSAGE

SMB\$INITIALIZE structure_level [,ast_routine] [,streams]

structure_level|longword_unsigned|longword (unsigned)|read only|by reference
ast_routine|ast_procedure|procedure entry mask|read only|by reference
streams|longword_unsigned|longword (unsigned)|read only|by reference

SMB\$READ_MESSAGE stream ,buffer ,request

stream|longword_unsigned|longword (unsigned)|write only|by reference
buffer|char_string|character string|write only|by descriptor
request|identifier|longword (unsigned)|write only|by reference

SMB\$READ_MESSAGE_ITEM message ,context ,item_code ,buffer [,size]

message|char_string|character string|read only|by descriptor
context|context|longword (unsigned)|read only|by reference
item_code|longword_unsigned|longword (unsigned)|write only|by reference
buffer|char_string|character string|read only|by descriptor
size|word_unsigned|word (unsigned)|write only|by reference

SMB\$SEND_TO_JOBCTL stream [,request] [,accounting] [,checkpoint]
[,device_status] [,error]

stream|longword_unsigned|longword (unsigned)|read only|by reference
request|identifier|longword (unsigned)|read only|by reference
accounting|char_string|character string|read only|by descriptor
checkpoint|char_string|character string|read only|by descriptor
device_status|longword_unsigned|longword (unsigned)|read only|by reference
error|vector_longword_unsigned|longword (unsigned)|read only|by reference

SOR\$BEGIN_MERGE [key_buffer] [,lrl] [,options] [,merge_order] [,user_compare]
[,user_equal] [,user_input] [,context]

key_buffer|vector_word_unsigned|word (unsigned)|read only|by reference
lrl|word_unsigned|word (unsigned)|read only|by reference
options|mask_longword|longword (unsigned)|read only|by reference
merge_order|byte_unsigned|byte (unsigned)|read only|by reference
user_compare|procedure|procedure entry mask|function call|by reference
user_equal|procedure|procedure entry mask|function call|by reference
user_input|procedure|procedure entry mask|function call|by reference
context|context|longword (unsigned)|modify|by reference

SOR\$BEGIN_SORT [key_buffer] [,lrl] [,options] [,file_alloc] [,user_compare]
[,user_equal] [,sort_process] [,work_files] [,context]

key_buffer|vector_word_unsigned|word (unsigned)|read only|by reference
lrl|word_unsigned|word (unsigned)|read only|by reference
options|mask_longword|longword (unsigned)|read only|by reference
file_alloc|longword_unsigned|longword (unsigned)|read only|by reference
user_compare|procedure|procedure entry mask|function call|by reference
user_equal|procedure|procedure entry mask|function call|by reference
sort_process|byte_unsigned|byte (unsigned)|read only|by reference
work_files|byte_unsigned|byte (unsigned)|read only|by reference
context|context|longword (unsigned)|write only|by reference

SOR\$END_SORT [context]

context|context|longword|write only|by reference

SOR\$PASS_FILES [inp_desc] [,out_desc] [,org] [,rfm] [,bks] [,bls] [,mrs] [,alq] [,fop]
[,fsz] [,context]

inp_desc|char_string|character-coded text string|read only|by descriptor
out_desc|char_string|character-coded text string|read only|by descriptor
org|byte_unsigned|byte (unsigned)|read only|by reference
rfm|byte_unsigned|byte (unsigned)|read only|by reference
bks|byte_unsigned|byte (unsigned)|read only|by reference
bls|word_unsigned|word (unsigned)|read only|by reference
mrs|word_unsigned|word (unsigned)|read only|by reference
alq|longword_unsigned|longword (unsigned)|read only|by reference

UTIL-12 Callable Utility Routines

fop|mask_longword|longword (unsigned)|read only|by reference
fsz|byte_unsigned|byte (unsigned)|read only|by reference
context|context|longword (unsigned)|write only|by reference

SOR\$RELEASE_REC desc [,context]

desc|char_string|character-coded text string|read only|by descriptor
context|context|longword|modify|by reference

SOR\$RETURN_REC desc [,length] [,context]

desc|char_string|character-coded text string|write only|by descriptor
length|word_unsigned|word (unsigned)|write only|by reference
context|context|longword (unsigned)|modify|by reference

SOR\$SORT_MERGE [context]

context|context|longword (unsigned)|modify|by reference

SOR\$SPEC_FILE [spec_file] [,spec_buffer] [,context]

spec_file|char_string|character-coded text string|read-only|by descriptor
spec_buffer|char_string|character-coded text string|read-only|by descriptor
context|context|longword (unsigned)|modify|by reference

SOR\$STAT code ,result [,context]

code|word_unsigned|word (unsigned)|read only|by reference
result|longword_unsigned|longword (unsigned)|write only|by reference
context|context|longword (unsigned)|modify|by reference

TPU\$CLEANUP flags

flags|mask_longword|longword (unsigned)|read only|by reference

TPU\$CLIPARSE string, fileio, calluser

string|char_string|character string|read only|by descriptor
fileio|vector_longword_unsigned|bound procedure value|read only|by descriptor
calluser|vector_longword_unsigned|bound procedure value|read only|by descriptor

TPU\$CONTROL

TPU\$EDIT input, output

input|char_string|character string|read only|by descriptor
output|char_string|character string|read only|by descriptor

TPU\$EXECUTE_COMMAND string

string|char_string|character string|read only|by value

TPU\$EXECUTE_INIFILE**TPU\$FILEIO** code, stream, data

code|longword_unsigned|longword (unsigned)|read only|by reference

stream|unspecified|longword (unsigned)|modify|by reference

data|item_list_3|longword (unsigned)|modify|by reference

TPU\$HANDLER signal_vector, mechanism_vector

signal_vector|arg_list|longword (unsigned)|modify|by reference

mechanism_vector|arg_list|longword (unsigned)|read only|by reference

TPU\$INITIALIZE callback

callback|vector_longword_unsigned|bound procedure value|read only|by descriptor

TPU\$MESSAGE string

string|char_string|character string|read only|by descriptor

TPU\$PARSEINFO fileio, calluser

fileio|vector_longword_unsigned|bound procedure value|read only|by descriptor

calluser|vector_longword_unsigned|bound procedure value|read only|by descriptor

TPU\$TPU command

command|char_string|character string|read only|by descriptor

FILEIO code, stream, data

code|longword_unsigned|longword (unsigned)|read only|by reference

stream|unspecified|longword (unsigned)|modify|by reference

data|item_list_3|longword (unsigned)|modify|by reference

HANDLER signal_vector, mechanism_vector

signal_vector|arg_list|longword (unsigned)|modify|by reference

mechanism_vector|arg_list|longword (unsigned)|read only|by reference

INITIALIZE callback

callback|vector_longword_unsigned|bound procedure value|read only|by reference

UTIL-14 Callable Utility Routines

USER integer, stringin, stringout

integer|longword__unsigned|longword (unsigned)|read only|by descriptor

stringin|char__string|character string|read only|by descriptor

stringout|char__string|character string|read only|by descriptor

VAX Record Management Services

RMS.1 RMS Control Blocks

Table RMS-1 FAB Fields

Field Offset	Size (bytes)	FDL Attribute	Description
<FALQ>	4	FILE ALLOCATION	Allocation quantity (blocks)
<FBID> ¹	1	None	Block identifier
<FBKS>	1	FILE BUCKET_SIZE	Bucket size
<FBLN> ¹	1	None	Block length
<FBLS>	2	FILE MT_BLOCK_SIZE	Magnetic tape block size
<FCHAN_MODE>	- ²	None	Channel access mode protection
<FCTX>	4	FILE CONTEXT	Context
<FDEQ>	2	FILE EXTENSION	Default file extension quantity
<FDEV> ³	4	None	Device characteristics
<FDNA>	4	FILE DEFAULT_NAME	Default file specification string address
<FDNS>	1	FILE DEFAULT_NAME	Default file specification string size

¹Statically initialized field (by the VAX MACRO \$FAB macro) to identify this control block as a FAB.

²Two-bit field.

³Field cannot be initialized by the VAX MACRO \$FAB macro.

RMS-2 VAX Record Management Services

RMS Control Blocks

Table RMS-1 (Cont.) FAB Fields

Field Offset	Size (bytes)	FDL Attribute	Description
<FFAC>	1	ACCESS ⁴	File access
<FFNA>	4	FILE NAME	File specification string address
<FFNS>	1	FILE NAME	File specification string size
<FFOP>	4	FILE ⁴	File-processing options
<FFSZ>	1	RECORD CONTROL _ FIELD_SIZE	Fixed length control area size
<FGBC>	2	FILE GLOBAL_BUFFER_ COUNT	Global buffer count
<FIFI> ³	2	None	Internal file identifier
<FLNM>	- ²	None	Logical name translation access mode
<FMRN>	4	FILE MAX_RECORD_ NUMBER	Maximum record number
<FMRS>	2	RECORD SIZE	Maximum record size
<FNAM>	4	None	Name block address
<FORG>	1	FILE ORGANIZATION	File organization
<FRAT>	1	RECORD ⁴	Record attributes
<FRFM>	1	RECORD FORMAT	Record format
<FRTV>	1	FILE WINDOW_SIZE	Retrieval window size
<FSDC> ³	4	None	Secondary device characteristics
<FSHR>	1	SHARING ⁴	File sharing
<FSTS> ³	4	None	Completion status code
<FSTV> ³	4	None	Status values
<FXAB>	4	None	Extended attribute block address

²Two-bit field.

³Field cannot be initialized by the VAX MACRO \$FAB macro.

⁴Field contains options; corresponding FDL equivalents are listed in the description of the field.

Table RMS-2 NAM Block Fields

Field	Offset	Size (bytes)	Description
<NBID>	¹	1	Block identifier
<NBLN>	¹	1	Block length
<NDEV_B>	²	1	Device string length
<NDEV_L>	²	4	Device string address
<NDID>	²	6	Directory identification
<NDIR_B>	²	1	Directory string length
<NDIR_L>	²	4	Directory string address
<NDVI>	²	16	Device identification
<NESA>		4	Expanded string area address
<NESL>	²	1	Expanded string length
<NESS>		1	Expanded string area size
<NFID>	²	6	File identification
<NFB>	²	4	File name status bits
<NNAME_B>	²	1	File name string length
<NNAME_L>	²	4	File name string address
<NNODE_B>	²	1	Node name string length
<NNODE_L>	²	4	Node name string address
<NNOP>		1	Name block options
<NRLF>		4	Related file NAM block address
<NRSA>		4	Resultant string area address
<NRSL>	²	1	Resultant string length
<NRSS>		1	Resultant string area size
<NTYPE_B>	²	1	File type string length
<NTYPE_L>	²	4	File type string address
<NVER_B>	²	1	File version string length
<NVER_L>	²	4	File version string address
<NWCC>	²	4	Wildcard context

¹Statically initialized field (by the VAX MACRO \$NAM macro) to identify this control block as a NAM.

²Field cannot be initialized by the VAX MACRO \$NAM macro.

RMS-4 VAX Record Management Services

RMS Control Blocks

Table RMS-3 RAB Fields

Field Offset	Size (bytes)	FDL Attribute	Description
<RBID> ¹	1	None	Block identifier
<RBKT>	4	CONNECT BUCKET_CODE	Bucket code
<RBLN> ¹	1	None	Block length
<RCTX>	4	CONNECT CONTEXT	User context
<RFAB>	4	None	File access block address
<RISI> ²	2	None	Internal stream identifier
<RKBF>	4	None	Key buffer address
<RKRF>	1	CONNECT KEY_OF_REFERENCE	Key of reference
<RKSZ>	1	None	Key size
<RMBC>	1	CONNECT MULTIBLOCK_COUNT	Multiblock count
<RMBF>	1	CONNECT MULTIBUFFER_COUNT	Multibuffer count
<RPBF>	4	None	Prompt buffer address
<RPSZ>	1	None	Prompt buffer size
<RRAC>	1	CONNECT ³	Record access mode
<RRBF>	4	None	Record buffer address
<RRFA>	6	None	Record's file address
<RRHB>	4	None	Record header buffer
<RROP>	4	CONNECT ³	Record-processing options
<RRSZ>	2	None	Record size
<RSTS> ²	4	None	Completion status code
<RSTV> ²	4	None	Status value
<RSTV0> ⁴	2	None	Low-order word status value
<RSTV2> ⁴	2	None	High-order word status value
<RTMO>	1	CONNECT TIMEOUT_PERIOD	Timeout period

¹Statically initialized field (by the VAX MACRO \$RAB macro) to identify this control block as a RAB.

²Field cannot be initialized by VAX MACRO \$RAB macro.

³Field contains options; corresponding FDL equivalents are listed in the description of the field.

⁴Alternate definition of <RSTV> field.

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RMS Control Blocks

Table RMS-3 (Cont.) RAB Fields

Field Offset	Size (bytes)	FDL Attribute	Description
<RUBF>	4	None	User record area address
<RUSZ>	2	None	User record area size
<RXAB>	4	None	Next XAB address

Table RMS-4 XABALL Fields

Field Offset	Size (bytes)	FDL Attribute	Description
<XAID>	1	AREA n	Area identification number
<XALN>	1	AREA POSITION ¹	Alignment boundary type
<XALQ>	4	AREA ALLOCATION	Allocation quantity
<XAOP>	1	AREA ¹	Allocation options
<XBKZ>	1	AREA BUCKET_SIZE	Bucket size
<XBLN> ²	1	None	Block length
<XCOD> ²	1	None	Type code
<XDEQ>	2	AREA EXTENSION	Default extension quantity
<XLOC>	4	AREA POSITION	Location
<XNXT>	4	None	Next XAB address
<XRFI>	6	AREA POSITION FILE_ID or FILE_NAME	Related file identifier
<XVOL>	2	AREA VOLUME	Related volume number

¹Field contains options; corresponding FDL equivalents are listed in the description of the field.

²Statically initialized field (by the VAX MACRO \$XABALL macro) to identify this control block as a XABALL.

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RMS Control Blocks

Table RMS-5 XABDAT Fields

Field Offset	Size (bytes)	FDL Attribute	Description
<XBDT> ¹	8	DATE BACKUP	Backup date and time
<XBLN> ²	1	None	Block length
<XCDT> ¹	8	DATE CREATION	Creation date and time
<XCOD> ²	1	None	Type code
<XEDT>	8	DATE EXPIRATION	Expiration date and time
<XNXT>	4	None	Next XAB address
<XRDT> ¹	8	DATE REVISION	Revision date and time
<XRVN> ¹	2	FILE REVISION	Revision number

¹Field cannot be initialized by the VAX MACRO \$XABDAT macro.

²Statically initialized field (by the VAX MACRO \$XABDAT macro) to identify this control block as a XABDAT.

Table RMS-6 XABFHC Fields

Field Offset	Size (bytes)	Description
<XATR> ¹	1	Record attributes; equivalent to <FRAT>
<XBKZ> ¹	1	Bucket size; equivalent to <FBKS>
<XBLN> ²	1	Block length
<XCOD> ²	1	Type code
<XDXQ> ¹	2	Default file extension quantity; equivalent to <FDEQ>
<XEBK> ¹	4	End-of-file block
<XFFB> ¹	2	First free byte in the end-of-file block
<XGBC> ¹	2	Default global buffer count
<XHBK> ¹	4	Highest virtual block in the file; equivalent to <FALQ>
<XHSZ> ¹	1	Fixed-length control header size; equivalent to <FFSZ>
<XLRL> ¹	2	Longest record length

¹Field cannot be initialized by the VAX MACRO \$XABFHC macro.

²Statically initialized field (by the VAX MACRO \$XABFHC macro) to identify this control block as a XABFHC.

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RMS Control Blocks

Table RMS-6 (Cont.) XABFHC Fields

Field Offset	Size (bytes)	Description
<XMRZ> ¹	2	Maximum record size; equivalent to <FMRS>
<XNXT>	4	Next XAB address
<XRFO> ¹	1	File organization and record format; combines <FRFM> and <FORG>
<XSBN> ¹	4	Starting logical block number for the file if it is contiguous; otherwise this field is 0
<XVERLIMIT> ¹	2	Version limit for the file

¹Field cannot be initialized by the VAX MACRO \$XABFHC macro.

Table RMS-7 XABKEY Fields

Field Offset	Size (bytes)	FDL Attribute	Description
<XBLN> ¹	1	None	Block length
<XCOD> ¹	1	None	Type code
<XDAN>	1	KEY DATA__AREA	Data bucket area number
<XDBS> ²	1	None	Data bucket size
<XDFL>	2	KEY DATA__FILL	Data bucket fill size
<XDTP>	1	KEY TYPE ³	Data type of the key
<XDVB> ²	4	None	First data bucket virtual block number
<XFLG>	1	KEY ³	Key options flag
<XIAN>	1	KEY INDEX__AREA	Index bucket area number
<XIBS> ²	1	None	Index bucket size
<XIFL>	2	KEY INDEX__FILL	Index bucket file size
<XKNM>	4	KEY NAME	Key name buffer address

¹Statically initialized field (by VAX MACRO \$XABKEY macro) to identify this control block as an XABKEY.

²Field cannot be initialized by the VAX MACRO \$XABKEY macro.

³Field contains options; corresponding FDL equivalents are listed in the description of the field.

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RMS Control Blocks

Table RMS-7 (Cont.) XABKEY Fields

Field Offset	Size (bytes)	FDL Attribute	Description
<XLAN>	1	KEY LEVEL1_INDEX_AREA	Lowest level of index area number
<XLVL> ²	1	None	Level of root bucket
<XMRL> ²	2	None	Minimum record length
<XNSG> ²	1	None	Number of key segments
<XNUL>	1	KEY NULL_VALUE	Null key value
<XNXT>	4	None	Next XAB address
<XPOS _n >	2	KEY POSITION and SEG _n _POSITION	Key position, XAB\$W_POS0 to XAB\$W_POS7
<XPROLOG>	1	KEY PROLOG	Prologue level
<XREF>	1	KEY n	Key of reference
<XRVB> ²	4	None	Root bucket virtual block number
<XSIZ _n >	1	KEY LENGTH and SEG _n _LENGTH	Key size XAB\$B_SIZ0 to XAB\$B_SIZ7
<XTKS> ²	1	None	Total key field size

²Field cannot be initialized by the VAX MACRO \$XABKEY macro.

Table RMS-8 XABPRO Fields

Field Offset	Size (bytes)	FDL Attribute	Description
<XACLBUF>	4	None	Address of buffer that contains ACL
<XACLCTX>	4	None	ACL positioning context
<XACLEN>	2	None	Receives the length of an ACL during an Open or Display service
<XACLSIZ>	2	None	Length of buffer containing binary ACEs
<XACLSTS>	4	None	System error status for ACL processing

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RMS Control Blocks

Table RMS-8 (Cont.) XABPRO Fields

Field Offset	Size (bytes)	FDL Attribute	Description
<XBLN> ¹	1	None	Block length
<XCOD> ¹	1	None	Type code
<XGRP> ²	2	FILE OWNER	Group number of file owner
<XMBM> ²	2	FILE OWNER	Member number of file owner
<XMTACC>	1	FILE MT_PROTECTION	Magnetic tape accessibility
<XNXT>	4	None	Next XAB address
<XPRO>	2	FILE PROTECTION	File protection; contains four separate fields denoting protection for system, owner, group, and world
<XPROT_ OPT>	1	None	File protection options
<XUIC>	4	FILE OWNER	User identification code; contains both the group and member fields

¹Statically initialized field (by the VAX MACRO \$XABPRO macro) to identify this control block as a XABPRO.

²Field cannot be initialized by the VAX MACRO \$XABPRO macro.

Table RMS-9 XABRDT Fields

Field Offset	Size (bytes)	FDL Attribute	Description
<XBLN> ¹	1	None	Block length
<XCOD> ¹	1	None	Type code
<XNXT>	4	None	Next XAB address
<XRDT> ²	8	DATE REVISION	Revision date and time
<XRVN> ²	2	FILE REVISION	Revision number

¹Statically initialized field (by the VAX MACRO \$XABRDT macro) to identify this control block as a XABRDT.

²Field cannot be initialized by the VAX MACRO \$XABRDT macro; these fields must be set after an Open or Create service and before the Close service to be used as input to the Close service.

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RMS Control Blocks

Table RMS-10 XABSUM Fields

Field Offset	Size	Description
<XBLN> ¹	Byte	Block length
<XCOD> ¹	Byte	Type code
<XNOA> ²	Byte	Number of allocation areas defined for the file
<XNOK> ²	Byte	Numbers of keys defined for the file
<XNXT>	Longword	Next XAB address
<XPVN> ²	Word	Prologue version number

¹Statically initialized field (by VAX MACRO \$XABSUM macro) to identify this control block as an XABSUM.

²Field cannot be initialized by the VAX MACRO \$XABSUM macro.

Table RMS-11 XABTRM Fields

Field Offset	Size (bytes)	Description
<XBLN> ¹	1	Block length
<XCOD> ¹	1	Type code
<XITMLST>	4	Item list address
<XITMLST_LEN>	2	Item list length
<XNXT>	4	Next XAB address

¹Statically initialized field (by the VAX MACRO \$XABTRM macro) to identify this control block as an XABTRM.

RMS.2 RMS Control Block Macros

\$FAB ALQ=allocation-quantity,
 BKS=bucket-size,
 BLS=block-size,
 CHAN_MODE=channel-access-mode,
 CTX=user-context-value,
 DEQ=extension-quantity,
 DNA=default-filespec-address,
 DNM= <filespec> ,

DNS=default-filespec-string-size,
 FAC= <BIO BRO DEL GET PUT TRN UPD> ,
 FNA=filespec-string-address,
 FNM= <filespec> ,
 FNS=filespec-string-size,
 FOP= <CBT CIF CTG DFW DLT MXV NAM NEF NFS OFP POS
 RCK RWC RWO SCF SPL SQO SUP TEF TMD TMP UFO WCK> ,
 FSZ=header-size,
 GBC=global-buffer-count,
 LNM_MODE=logical-name-translation-access-mode,
 MRN=maximum-record-number,
 MRS=maximum-record-size,
 NAM=nam-address,
 ORG= $\left\{ \begin{array}{c} \text{IDX} \\ \text{REL} \\ \text{SEQ} \end{array} \right\} ,$
 RAT= $\left\{ \begin{array}{c} \text{CR} \\ \text{<BLK FTN>} \\ \text{PRN} \end{array} \right\} ,$
 RFM= $\left\{ \begin{array}{c} \text{FIX} \\ \text{STM} \\ \text{STMCR} \\ \text{STMLF} \\ \text{UDF} \\ \text{VAR} \\ \text{VFC} \end{array} \right\} ,$
 RTV=window-size,
 SHR= <DEL GET MSE NIL PUT UPD UPI> ,
 XAB=xab-address

\$FAB_STORE fab=fab-address,

ALQ= allocation-quantity,
 BKS=bucket-size,
 BLS=block-size,
 CHAN_MODE=channel-access-mode,
 CTX=user-context-value,
 DEQ=extension-quantity,
 DNA=default-filespec-address,
 DNM= <filespec> ,
 DNS=default-filespec-string-size,
 FAC= <BIO BRO DEL GET PUT TRN UPD> ,
 FNA=filespec-string-address,
 FNM= <filespec> ,
 FNS=filespec-string-size,

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RMS Control Block Macros

<CBT CIF CTG DFW DLT MXV NAM NEF NFS OFP
FOP= POS RCK RWC RWO SCF
SPL SQO SUP TEF TMD TMP UFO WCK> ,
FSZ=header-size,
GBC=global-buffer-count,
LNM_MODE=logical-name-translation-access-mode,
MRN=maximum-record-number,
MRS=maximum-record-size,
NAM=nam-address,
ORG= {
 IDX
 REL
 SEQ
} ,
RAT= {
 CR
 <BLK FTN>
 PRN
} ,
RFM= {
 FIX
 STM
 STMCR
 STMLF
 UDF
 VAR
 VFC
} ,
RTV=window-size,
SHR= <DEL GET MSE NIL PUT UPD UPI> ,
XAB=xab-address
\$NAM ESA=expanded-string-address,
ESS=expanded-string-size,
NOP= <NOCONCEAL PWD SRCHXABS SYNCHK> ,
RLF=related-file-nam-block-address,
RSA=resultant-string-address,
RSS=resultant-string-size
\$NAM_STORE NAM=nam-address,
DID= directory-identification,
DVI= device-identification,
ESA=expanded-string-address,
ESS= expanded-string-size,
FID= file-identification,
NOP= <NOCONCEAL PWD SRCHXABS SYNCHK> ,
RLF=related-file-nam-block-address,
RSA=resultant-string-address,
RSS= resultant-string-size

\$RAB BKT=bucket-code-number,
 CTX=user-context-value,
 FAB=fab-address,
 KBF=key-buffer-address,
 KRF=key-of-reference-number,
 KSZ=key-size,
 MBC=multiblock-count-number,
 MBF=multibuffer-count-number,
 PBF=prompt-buffer-address,
 PSZ=prompt-buffer-size,
 RAC= $\left\{ \begin{array}{c} \text{KEY} \\ \text{RFA} \\ \text{SEQ} \end{array} \right\}$,
 RBF=record-buffer-address,
 RHB=record-header-buffer-address,
 <ASY BIO CCO CVT EOF EQNXT
 ETO FDL KGE KGT LIM LOA
 ROP= LOC NLK NXR NXT PMT PTA
 RAH REA RLK RNE RNF RRL
 TMO TPT UIF ULK WAT WBH> ,
 RSZ=record-size,
 TMO=time-out-number-of-seconds,
 UBF=user-record-buffer-address,
 USZ=user-record-buffer-size,
 XAB=xab-address
\$RAB_STORE RAB=rab-address,
 BKT= bucket-code-number,
 CTX=user-context-value,
 FAB=fab-address,
 KBF=key-buffer-address,
 KRF= key-of-reference-number,
 KSZ= key-size,
 MBC= multiblock-count-number,
 MBF= multibuffer-count-number,
 PBF=prompt-buffer-address,
 PSZ= prompt-buffer-size,
 RAC= $\left\{ \begin{array}{c} \text{KEY} \\ \text{RFA} \\ \text{SEQ} \end{array} \right\}$,
 RBF=record-buffer-address,
 RFA= record-file-address,
 RHB=record-header-buffer-address,

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RMS Control Block Macros

 <ASY BIO CCO CVT EOF EQNXT
 ETO FDL KGE KGT LIM LOA
ROP= LOC NLK NXR NXT PMT PTA
 RAH REA RLK RNE RNF RRL
 TMO TPT UIF ULK WAT WBH> ,

RSZ= record-size,
TMO=time-out-number-of-seconds,
UBF=user-record-buffer-address,
USZ= user-record-buffer-size,
XAB=xab-address

\$XABALL AID=area-identification-number,

ALN= $\left\{ \begin{array}{c} \text{ANY} \\ \text{CYL} \\ \text{LBN} \\ \text{RFI} \\ \text{VBN} \end{array} \right\} ,$

ALQ=allocation-quantity,
AOP= <CBT CTG HRD ONC> ,
BKZ=bucket-size,
DEQ=extension-quantity,
LOC=location-number,
NXT=next-xab-address,
RFI= <f(1), f(2), f(3)> ,
VOL=volume-number

\$XABALL_STORE XAB=xaball-address,

AID= area-identification-number,

ALN= $\left\{ \begin{array}{c} \text{ANY} \\ \text{CYL} \\ \text{LBN} \\ \text{RFI} \\ \text{VBN} \end{array} \right\} ,$

ALQ= allocation-quantity,
AOP= <CBT CTG HRD ONC> ,
BKZ= bucket-size,
DEQ= extension-quantity,
LOC= location-number,
NXT=next-xab-address,
RFI= related-file-identification,
VOL= volume-number

\$XABDAT EDT=date-time,

NXT=next-xab-address

\$XABDAT_STORE XAB=xabdat-address,
 CDT= creation-date-time,
 EDT= expiration-date-time,
 RDT= revision-date-time,
 RVN= revision-number,
 NXT=next-xab-address

\$XABFHC NXT=next-xab-address

\$XABFHC_STORE XAB=xabfhc-address,
 NXT=next-xab-address

\$XABKEY DAN=data-bucket-area-number,
 DFL=data-bucket-fill-size,

DTP= { BN2
 DBN2
 BN4
 DBN4
 BN8
 IN2
 DIN2
 IN4
 DIN4
 IN8
 DIN8
 PAC
 DPAC
 STG
 DSTG } ,

FLG= <CHG DAT_NCMPR DUP
 IDX_NCMPR KEY_NCMPR NUL> ,
 IAN=index-bucket-area-number,
 IFL=index-bucket-file-size,
 KNM=key-name-buffer-address,
 LAN=lowest-level-index-area-number,
 NUL=null-key-value,
 NXT=next-xab-address,
 POS= <position,...> ,
 PROLOG=prologue-level,
 REF=key-of-reference-value,
 SIZ= <size,...>

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RMS Control Block Macros

\$XABKEY_STORE XAB=xabkey-address,

DAN= data-bucket-area-number,

DFL= data-bucket-fill-size,

DTP= { BN2
DBN2
BN4
DBN4
BN8
IN2
DIN2
IN4
DIN4
IN8
DIN8
PAC
DPAC
STG
DSTG } ,

FLG= <CHG DAT_NCMPR DUP
IDX_NCMPR KEY_NCMPR NUL> ,

IAN= index-bucket-area-number,

IFL= index-bucket-fill-size,

KNM=key-name-buffer-address,

LAN= lowest-level-index-area-number,

NUL= null-key-value,

NXT=next-xab-address,

POS= <position,...> ,

PROLOG= prologue-level,

REF= key-of-reference-value,

SIZ= <size,...>

\$XABPRO ACLBUF=ACL-buffer-address,

ACLCTX= <ACL-context> ,

ACLSIZ=ACL-buffer-size,

MTACC=magnetic-tape-accessibility,

NXT=next-xab-address,

PRO= <system, owner, group, world> ,

PROT_OPT= <PROPAGATE> ,

UIC= <group, member>

\$XABPRO_STORE XAB=xabpro-address,
ACLBUF=ACL-buffer-address,
ACLCTX= <ACL-context> ,
ACLSIZ= ACL-buffer-size,
MTACC= magnetic-tape-accessibility,
NXT=next-xab-address,
PRO= <system, owner, group, world> ,
PROT_OPT= <PROPAGATE> ,
UIC= uic-value

\$XABRDT NXT=next-xab-address

\$XABRDT_STORE XAB=xabrdt-address,
RDT= revision-date-time,
RVN= revision-number,
NXT=next-xab-address

\$XABSUM NXT=next-xab-address

\$XABSUM_STORE XAB=xabsum-address,
NXT=next-xab-address

\$XABTRM ITMLST=item-list-address,
ITMLST_LEN=item-list-length,
NXT=next-xab-address

\$XABTRM XAB=xabtrm-address,
ITMLST=item-list-address,
ITMLST_LEN= item-list-length,
NXT=next-xab-address

RMS.3 RMS Services

SY\$CLOSE fab [, [err] [,suc]]

fab|fab|longword (unsigned)|modify|by reference

err|last_procedure|procedure entry mask|call without stack unwinding|by reference

suc|last_procedure|procedure entry mask|call without stack unwinding|by reference

SY\$CONNECT rab [, [err] [,suc]]

rab|rab|longword (unsigned)|modify|by reference

err|last_procedure|procedure entry mask|call without stack unwinding|by reference

suc|last_procedure|procedure entry mask|call without stack unwinding|by reference

RMS-18 VAX Record Management Services
RMS Services

SYSS\$CREATE fab [, [err] [,suc]]

fab|fab|longword (unsigned)|modify|by reference

err|last_procedure|procedure entry mask|call without stack unwinding|by reference

suc|last_procedure|procedure entry mask|call without stack unwinding|by reference

SYSS\$DELETE rab [, [err] [,suc]]

rab|rab|longword (unsigned)|modify|by reference

err|last_procedure|procedure entry mask|call without stack unwinding|by reference

suc|last_procedure|procedure entry mask|call without stack unwinding|by reference

SYSS\$DISCONNECT rab [, [err] [,suc]]

rab|rab|longword (unsigned)|modify|by reference

err|last_procedure|procedure entry mask|call without stack unwinding|by reference

suc|last_procedure|procedure entry mask|call without stack unwinding|by reference

SYSS\$DISPLAY fab [, [err] [,suc]]

fab|fab|longword (unsigned)|modify|by reference

err|last_procedure|procedure entry mask|call without stack unwinding|by reference

suc|last_procedure|procedure entry mask|call without stack unwinding|by reference

SYSS\$ENTER fab [, [err] [,suc]]

fab|fab|longword (unsigned)|modify|by reference

err|last_procedure|procedure entry mask|call without stack unwinding|by reference

suc|last_procedure|procedure entry mask|call without stack unwinding|by reference

SYSS\$ERASE fab [, [err] [,suc]]

fab|fab|longword (unsigned)|modify|by reference

err|last_procedure|procedure entry mask|call without stack unwinding|by reference

suc|last_procedure|procedure entry mask|call without stack unwinding|by reference

SYSS\$EXTEND fab [, [err] [,suc]]

fab|fab|longword (unsigned)|modify|by reference

err|last_procedure|procedure entry mask|call without stack unwinding|by reference

suc|last_procedure|procedure entry mask|call without stack unwinding|by reference

SY\$\$FIND rab [, [err] [,suc]]

rab|rab|longword (unsigned)|modify|by reference

err|last_procedure|procedure entry mask|call without stack unwinding|by reference

suc|last_procedure|procedure entry mask|call without stack unwinding|by reference

SY\$\$FLUSH rab [, [err] [,suc]]

rab|rab|longword (unsigned)|modify|by reference

err|last_procedure|procedure entry mask|call without stack unwinding|by reference

suc|last_procedure|procedure entry mask|call without stack unwinding|by reference

SY\$\$FREE rab [, [err] [,suc]]

rab|rab|longword (unsigned)|modify|by reference

err|last_procedure|procedure entry mask|call without stack unwinding|by reference

suc|last_procedure|procedure entry mask|call without stack unwinding|by reference

SY\$\$GET rab [, [err] [,suc]]

rab|rab|longword (unsigned)|modify|by reference

err|last_procedure|procedure entry mask|call without stack unwinding|by reference

suc|last_procedure|procedure entry mask|call without stack unwinding|by reference

SY\$\$NXTVOL rab [, [err] [,suc]]

rab|rab|longword (unsigned)|modify|by reference

err|last_procedure|procedure entry mask|call without stack unwinding|by reference

suc|last_procedure|procedure entry mask|call without stack unwinding|by reference

SY\$\$OPEN fab [, [err] [,suc]]

fab|fab|longword (unsigned)|modify|by reference

err|last_procedure|procedure entry mask|call without stack unwinding|by reference

suc|last_procedure|procedure entry mask|call without stack unwinding|by reference

SY\$\$PARSE fab [, [err] [,suc]]

fab|fab|longword (unsigned)|modify|by reference

err|last_procedure|procedure entry mask|call without stack unwinding|by reference

suc|last_procedure|procedure entry mask|call without stack unwinding|by reference

SY\$\$PUT rab [, [err] [,suc]]

rab|rab|longword (unsigned)|modify|by reference

err|last_procedure|procedure entry mask|call without stack unwinding|by reference

suc|last_procedure|procedure entry mask|call without stack unwinding|by reference

RMS-20 VAX Record Management Services

RMS Services

SY\$READ rab [,err] [,suc]

rab|rab|longword (unsigned)|modify|by reference

err|last_procedure|procedure entry mask|call without stack unwinding|by reference

suc|last_procedure|procedure entry mask|call without stack unwinding|by reference

SY\$RELEASE rab [,err] [,suc]

rab|rab|longword (unsigned)|modify|by reference

err|last_procedure|procedure entry mask|call without stack unwinding|by reference

suc|last_procedure|procedure entry mask|call without stack unwinding|by reference

SY\$REMOVE fab [,err] [,suc]

fab|fab|longword (unsigned)|modify|by reference

err|last_procedure|procedure entry mask|call without stack unwinding|by reference

suc|last_procedure|procedure entry mask|call without stack unwinding|by reference

SY\$RENAME old-fab [,err] [,suc] ,newfab

old-fab|fab|longword (unsigned)|modify|by reference

err|last_procedure|procedure entry mask|call without stack unwinding|by reference

suc|last_procedure|procedure entry mask|call without stack unwinding|by reference

new-fab|fab|longword (unsigned)|modify|by reference

SY\$REWIND rab [,err] [,suc]

rab|rab|longword (unsigned)|modify|by reference

err|last_procedure|procedure entry mask|call without stack unwinding|by reference

suc|last_procedure|procedure entry mask|call without stack unwinding|by reference

SY\$SEARCH fab [,err] [,suc]

fab|fab|longword (unsigned)|modify|by reference

err|last_procedure|procedure entry mask|call without stack unwinding|by reference

suc|last_procedure|procedure entry mask|call without stack unwinding|by reference

SY\$SPACE rab [,err] [,suc]

rab|rab|longword (unsigned)|modify|by reference

err|last_procedure|procedure entry mask|call without stack unwinding|by reference

suc|last_procedure|procedure entry mask|call without stack unwinding|by reference

SYS\$TRUNCATE rab [, [err] [,suc]]

rab|rab|longword (unsigned)|modify|by reference

err|last_procedure|procedure entry mask|call without stack unwinding|by reference

suc|last_procedure|procedure entry mask|call without stack unwinding|by reference

SYS\$UPDATE rab [, [err] [,suc]]

rab|rab|longword (unsigned)|modify|by reference

err|last_procedure|procedure entry mask|call without stack unwinding|by reference

suc|last_procedure|procedure entry mask|call without stack unwinding|by reference

SYS\$WAIT rab

rab|rab|longword (unsigned)|modify|by reference

SYS\$WRITE rab [, [err] [,suc]]

rab|rab|longword (unsigned)|modify|by reference

err|last_procedure|procedure entry mask|call without stack unwinding|by reference

suc|last_procedure|procedure entry mask|call without stack unwinding|by reference

System Mgt.,
Operations

System Management, Operations, and Programming Tools

This section provides “how-to” instructions for dealing with common duties and problems faced by operators, and includes information on utilities that do not have DCL command interfaces.

MISC.1 “How-To” Instructions for Useful Tasks

Task	Procedure or Command
Stopping a job that is currently printing.	Press “Off Line” button or switch on printer, if desired. Then type \$ DELETE/ENTRY=n queue-name. (Type SHOW QUEUE/ALL queue-name to find entry number.)
Deleting a print or batch job that has not yet started.	\$ DELETE/ENTRY=n queue-name
Backing up to tape or disk	\$ BACKUP input-specifier output-specifier (See the <i>VAX/VMS Backup Utility Reference Manual</i> .)
Capturing terminal output in a file	\$ DEFINE/USER_MODE SYS\$OUTPUT file-spec (for next image only); \$ SET HOST/LOG (for an entire session)

MISC-2 System Management, Operations, and Programming Tools

"How-To" Instructions for Useful Tasks

MISC.2 Utilities Without DCL Commands

NOTE: Utilities invoked by their own DCL commands are included in the DCL section of this manual.

MISC.2.1 RUN AUTHORIZE

Interactive Commands:

ADD

```
/[NO]ACCESS[=(range[,...])]
/ACCOUNT=account-name
/[NO]ADD_IDENTIFIER
/ASTLIM=value
/ATTRIBUTES=(keyword[,...])
/[NO]BATCH[=(range[,...])]
/BIOLM=value
/BYTLIM=value
/CLI=cli-name
/CLITABLES=clitable-name
/CPUTIME=time
/DEFPRIVILEGES=([NO]privname[,...])
/DEVICE=name
/[NO]DIALUP[=(range[,...])]
/DIOLM=value
/DIRECTORY=directory-name
/ENQLM=value
/EXPIRATION=time
/FILLM=value
/FLAGS=([NO]option[,...])
/GENERATE_PASSWORD[=keyword]
/[NO]INTERACTIVE[=(range[,...])]
/JTQUOTA=value
/LGICMD=file-spec
/[NO]LOCAL[=(range[,...])]
/MAXACCTJOBS=value
/MAXDETACH=value
/MAXJOBS=value
/[NO]NETWORK[=(range[,...])]
/OWNER=owner-name
/[NO]PASSWORD=(password[,password2])
/PFLAGS=([NO]option[,...])
/PGFLQUOTA=value
/PRCLM=value
```

```
/P_RESTRICT=(range[,...])
/PRIMEDAYS=([NO]day[,...])
/PRIORITY=value
/PRIVILEGES=([NO]privname[,...])
/[NO]PWDEXPIRED
/[NO]PWDLIFETIME=time
/PWDMINIMUM=value
/QUEPRIORITY=value
/[NO]REMOTE=(range[,...])
/SFLAGS=([NO]option[,...])
/SHRFILLM=value
/S_RESTRICT=(range[,...])
/TQELM=value
/UIC=uic
/WSDEFAULT=value
/WSEXTENT=value
/WSQUOTA=value
ADD/IDENTIFIER
  /ATTRIBUTES=(keyword[,...])
  /USER=user-spec
  /VALUE=value-specifier
ADD/PROXY
COPY
  (Same qualifiers as ADD)
CREATE/PROXY
CREATE/RIGHTS
DEFAULT
  (Same qualifiers as ADD)
EXIT
GRANT/IDENTIFIER
  /ATTRIBUTES=(keyword[,...])
HELP
  (All commands and qualifiers)
LIST
  /BRIEF
  /FULL
LIST/IDENTIFIER
  /BRIEF
  /FULL
  /USER=user-spec
  /VALUE=value-specifier
LIST/PROXY
LIST/RIGHTS
  /USER=user-spec
```

MISC-4 System Management, Operations, and Programming Tools

Utilities Without DCL Commands

MODIFY

```
/[NO]ACCESS[=(range[,...])]
/ACCOUNT=account-name
/ASTLM=value
/[NO]BATCH[=(range[,...])]
/BIOLM=value
/BYTLM=value
/CLI=cli-name
/CLITABLES=clitable-name
/CPUTIME=time
/DEFPRIVILEGES=([NO]privname[,...])
/DEVICE=name
/[NO]DIALUP[=(range[,...])]
/DIOLM=value
/DIRECTORY=directory-name
/ENQLM=value
/EXPIRATION=time
/FILLM=value
/FLAGS=([NO]option[,...])
/GENERATE_PASSWORD
/[NO]INTERACTIVE[=(range[,...])]
/JTQUOTA=value
/LGICMD=file-spec
/[NO]LOCAL[=(range[,...])]
/MAXACCTJOBS=value
/MAXDETACH=value
/MAXJOBS=value
/[NO]MODIFY_IDENTIFIER
/[NO]NETWORK[=(range[,...])]
/OWNER=owner-name
/PASSWORD[=(password[,password2])]
/PFLAGS=([NO]option[,...])
/PGFLQUOTA=value
/PRCLM=value
/P_RESTRICT=(range[,...])
/PRIMEDAYS=([NO]day[,...])
/PRIORITY=value
/PRIVILEGES=([NO]privname[,...])
/[NO]PWDEXPIRED
/[NO]PWDLIFETIME=time
/PWDMINIMUM=value
/QUEPRIORITY=value
/[NO]REMOTE[=(range[,...])]
/SFLAGS=([NO]option[,...])
```

```
/SHRFILLM=value
/S_RESTRICT=(range[,...])
/TQELM=value
/UIC=uic
/WSDEFAULT=value
/WSEXTENT=value
/WSQUOTA=value
MODIFY/IDENTIFIER
  /ATTRIBUTES=(keyword[,...])
  /HOLDER=holder-name
  /NAME=id-name
  /VALUE=value-specifier
MODIFY/SYSTEM_PASSWORD=system-password
REMOVE
  /[NO]REMOVE_IDENTIFIER
REMOVE/PROXY
RENAME
  /PASSWORD[(password[,password2])]
  /[NO]MODIFY_IDENTIFIER
RENAME/IDENTIFIER
REVOKE/IDENTIFIER
SHOW
  /BRIEF
SHOW/IDENTIFIER
  /BRIEF
  /FULL
  /USER=user-spec
  /VALUE=value-specifier
SHOW/PROXY
SHOW/RIGHTS
  /USER=user-spec
```

MISC.2.2 DELTA Debugger

Interactive Commands:

```
RETURN (Close Current Location)
LINEFEED (Close Current Location and Open Next)
ESC (Open and Display Previous Location)
= (Display Value of Expression)
;E (Execute Command String)
;G (Go)
/ (Open Location and Display Contents in Prevailing Mode)
! (Open Location and Display Contents in Instruction Mode)
```

MISC-6 **System Management, Operations, and Programming Tools**

Utilities Without DCL Commands

[TAB] (Open Location Specified by Q, the Current Value)
;P (Proceed from Breakpoint)
" (Set ASCII Mode)
;X (Set Base Register)
;B (Set, Clear, or Display Breakpoint)
[(Set Display Mode)
S (Step Instruction)
O (Step Instruction Over Subroutine)
;M (Set All Processes Writeable)
'string' (Deposit ASCII String)

MISC.2.3 RUN SYS\$SYSTEM:DISKQUOTA

Interactive Commands:

ADD
 /PERMQUOTA =quota
 /OVERDRAFT =quota-plus
CREATE
DISABLE
ENABLE
EXIT
HELP
MODIFY
 /PERMQUOTA =quota
 /OVERDRAFT =quota-plus
REBUILD
REMOVE
SHOW
USE

MISC.2.4 \$ RUN SYS\$SYSTEM:DTSEND

Interactive Commands:

CONNECT
 /NODENAME =node-id
 /[NO]PRINT
 /SPEED =number
 /TYPE =test-type
 /RETURN =return-option

DATA

/NODENAME =node-id
/[NO]PRINT
/[NO]STATISTICS
/[NO]DISPLAY=number
/SPEED =number
/TYPE =test-type
/SIZE =number
/[test-duration]
/FLOW =flow-control
/RQUEUE =number
/SQUEUE =number
/[NO]NAK =number
/[NO]BACK =number

DISCONNECT

(same as for CONNECT)

INTERRUPT

/NODENAME =node-id
/[NO]PRINT
/[NO]STATISTICS
/[NO]DISPLAY
/SPEED =number
/TYPE =test-type
/SIZE =number
/[test-duration]
/FLOW =flow-control
/RQUEUE =number
/SQUEUE =number

MISC.2.5 INSTALL

Interactive Commands:

ADD

/[NO]ACCOUNTING
/[NO]EXECUTE_ONLY
/[NO]HEADER_RESIDENT
/[NO]LOG
/[NO]OPEN
/[NO]PRIVILEGED [(priv-name[...])]
/[NO]PROTECTED
/[NO]PURGE
/[NO]SHARED
/[NO]WRITEABLE

MISC-8 System Management, Operations, and Programming Tools
Utilities Without DCL Commands

CREATE

 /[NO]ACCOUNTING
 /[NO]EXECUTE_ONLY
 /[NO]HEADER_RESIDENT
 /[NO]LOG
 /[NO]OPEN
 /[NO]PRIVILEGED [(priv-name[,...])]
 /[NO]PROTECTED
 /[NO]PURGE
 /[NO]SHARED
 /[NO]WRITEABLE

DELETE

EXIT

HELP

LIST

 /FULL
 /GLOBAL
 /STRUCTURE
 /SUMMARY

PURGE

REMOVE

REPLACE

 /[NO]ACCOUNTING
 /[NO]EXECUTE_ONLY
 /[NO]HEADER_RESIDENT
 /[NO]LOG
 /[NO]OPEN
 /[NO]PRIVILEGED [(priv-name[,...])]
 /[NO]PROTECTED
 /[NO]PURGE
 /[NO]SHARED
 /[NO]WRITEABLE

MISC.2.6 RUN SYS\$SYSTEM:NCP

Interactive Commands:

CLEAR/PURGE CIRCUIT
CLEAR/PURGE EXECUTOR
CLEAR EXECUTOR NODE
CLEAR/PURGE LINE
CLEAR/PURGE LOGGING
CLEAR/PURGE LOGGING EVENTS
CLEAR/PURGE LOGGING NAME
CLEAR/PURGE MODULE X25-ACCESS
CLEAR/PURGE MODULE X25-PROTOCOL
CLEAR/PURGE MODULE X25-SERVER/X29-SERVER
CLEAR/PURGE NODE
CLEAR/PURGE NODE CIRCUIT
CLEAR/PURGE OBJECT
CONNECT NODE
CONNECT VIA
COPY KNOWN NODES
DISCONNECT LINK
HELP
LOAD NODE
LOAD VIA
LOOP CIRCUIT
LOOP EXECUTOR
LOOP LINE
LOOP NODE
PURGE MODULE CONFIGURATOR
SET CIRCUIT ALL
SET/DEFINE CIRCUIT
SET EXECUTOR ALL
SET/DEFINE EXECUTOR
SET EXECUTOR NODE
SET LINE ALL
SET/DEFINE LINE
SET LOGGING ALL
SET/DEFINE LOGGING EVENTS
SET/DEFINE LOGGING STATE
SET/DEFINE MODULE CONFIGURATOR
SET/DEFINE MODULE X25-ACCESS
SET/DEFINE MODULE X25-PROTOCOL
SET/DEFINE MODULE X25-SERVER/X29-SERVER
SET NODE ALL

MISC-10 **System Management, Operations, and Programming Tools**

Utilities Without DCL Commands

SET/DEFINE NODE
SET/DEFINE NODE CIRCUIT
SET OBJECT ALL
SET/DEFINE OBJECT
SHOW AREA
SHOW/LIST CIRCUIT
SHOW/LIST EXECUTOR
SHOW/LIST LINE
SHOW LINKS
SHOW/LIST LOGGING
SHOW/LIST MODULE CONFIGURATOR
SHOW/LIST MODULE X25-ACCESS
SHOW/LIST MODULE X25-PROTOCOL
SHOW/LIST MODULE X25-SERVER/X29-SERVER
SHOW/LIST NODE
SHOW/LIST OBJECT
TELL
TRIGGER NODE
TRIGGER VIA
ZERO CIRCUITS
ZERO EXECUTOR
ZERO LINE
ZERO MODULE X25-PROTOCOL
ZERO MODULE X25-SERVER/X29-SERVER
ZERO NODE

MISC.2.7 RUN SYS\$SYSTEM:SYSGEN

Interactive Commands:

AUTOCONFIGURE adapter-spec
 /EXCLUDE=(device-name[,...])
 /LOG
 /SELECT=(device-name[,...])
CONFIGURE
 /INPUT=file-spec
 /OUTPUT=file-spec
 /[NO]RESET
CONNECT/ADAPTER=adapter-spec
 /CSR=csr-addr
 /CSR_OFFSET=value
 /DRIVERNAME=driver
 /MAXUNITS=max-unit-cnt
 /NUMVEC=vector-cnt

```
/SYSIDHIGH=value
/SYSIDLOW=value
/VECTOR=vector-addr
/VECTOR_OFFSET=value
CONNECT/NOADAPTER
/DRIVERNAME=driver
CONNECT CONSOLE
CREATE file-spec
/[NO]CONTIGUOUS
/SIZE=block-count
DISABLE CHECKS
ENABLE CHECKS
EXIT
HELP
INSTALL file-spec
/INPUT=file-spec
/OUTPUT=file-spec
/PAGEFILE
/SWAPFILE
LOAD file-spec
MSCP
/BUFFER=value
/HOST=value
/MAXIMUM=value
/MINIMUM=value
/PACKETS=value
/PRIORITY=value
/TIMEOUT=value
RELOAD file-spec
SET/OUTPUT[=] file-spec
SET parameter-name value
SET/STARTUP[=] file-spec
SHARE/CONNECT
/MAXCEFCLUSTERS=max-cef
/MAXGBLSECTIONS=max-gbl
/MAXMAILBOXES=max-mail
SHARE/INITIALIZE
/CEFCLUSTERS=cef
/GBLSECTIONS=gbl
/MAILBOXES=mail
/MAXCEFCLUSTERS=max-cef
/MAXGBLSECTIONS=max-gbl
/MAXMAILBOXES=max-mail
/POOLBCOUNT=block-cnt
```

MISC-12 System Management, Operations, and Programming Tools
Utilities Without DCL Commands

```
/POOLBSIZE=block-size  
/PRQCOUNT=prq-cnt  
SHOW/ADAPTER  
SHOW/CONFIGURATION  
  /ADAPTER=nexus  
  /COMMAND_FILE  
  /OUTPUT=file-spec  
SHOW/DEVICE=device-driver  
SHOW/DRIVER=device-driver  
SHOW [parameter]  
  /ACP  
  /ALL  
  /CLUSTER  
  /DYNAMIC  
  /GEN  
  /HEX  
  /JOB  
  /LGI  
  /MAJOR  
  /NAMES  
  /PQL  
  /RMS  
  /SCS  
  /SPECIAL  
  /SYS  
  /TTY  
SHOW/STARTUP  
SHOW/UNIBUS  
  /ADAPTER[=nexus]  
TERMINAL/ECHO  
USE file-spec  
WRITE file-spec
```

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Organization _____

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City _____ State _____ Zip Code _____

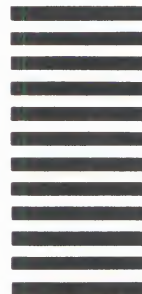
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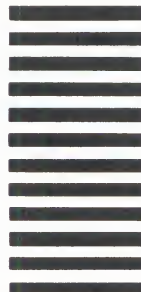
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