

**NOTE**

This pocket reference card is a supplement to the ADEX Operator's Guide, DGC Part No. 014-000744. For more in-depth details, refer to this guide.

**General Procedures**

Before you can use ADEX, you must load it into memory from tape or disk, a process known as bootstrapping. Once this is done, the programs responsible for bootstrapping run some quick diagnostic tests, load and initialize the operating system, and transfer control to the Command Line Interpreter (CLI).

To bootstrap ADEX, follow the instructions in the documentation for your hardware system, because this procedure varies from system to system. If bootstrapping is successful and the system hardware passes the test given by the ADEX bootstrap program, you will get the message:

FILENAME [ADEX] ?

**Using the CLI**

The Screen Edit utility lets you alter, delete, or repeat the CLI command line. This table summarizes the control characters that make up the Screen Edit commands.

**Screen Edit Commands**

Character	Action
CTRL-A	Moves the cursor to the end of the current command line, if the command line above it is shorter. If the command line above is longer, CTRL-A repeats the longer part of the command line on current line. If the cursor is on a blank line, it repeats the entire preceding line.  NOTE  You cannot repeat a command line after a CTRL-C, CTRL-A or CTRL-C, CTRL-B sequence.
CTRL-B	Positions the cursor at the beginning of the preceding word.
CTRL-E	Starts insert mode. This mode lets you insert characters in the middle of a command line. When you finish inserting, use CTRL-E again to turn off insert mode.
CTRL-H or HOME	Positions the cursor at the beginning of the line.
CTRL-J, CTRL-L, CTRL-M, NEWLINE or CR	Transmits command. Turns off the insert mode (if it was on) and uses the entire line as the command.
CTRL-K or ERASE EOL	Erases all characters to the right of the cursor.
CTRL-U	Deletes the entire line.
CTRL-X or ----->	Moves the cursor one position to the right.
CTRL-Y or <-----	Moves the cursor one position to the left.
ESC	Deletes the entire line, prints \$, and issues a new prompt.
DEL or RUBOUT	Deletes the preceding character.

In addition to the Screen Edit control characters, there are other control characters that tell the operating system to take some action. These control characters are listed in the following table:

**Control Characters**

CHARACTER	ACTION
CTRL-C CTRL-A	Terminates any test program or utility that is currently running. If the CLI is processing a multiple command line or a script file, the program goes on to the next command. If no command follows the one that was terminated, the CLI issues another prompt. When a CTRL-C CTRL-A is issued, the message ABORT appears.
CTRL-C CTRL-B	Aborts a script. The currently running diagnostic is aborted and all other CLI commands are ignored. The message ABORT appears, followed by a CLI prompt. If no script is running, CTRL-C CTRL-B has the same effect as CTRL-C CTRL-A.
CTRL-C CTRL-C	Prints the characters "C:C" if ADEX or a test program is still running. This control character sequence is very useful in checking whether the system is still up or a program has hung.  NOTE  The response of the system may not be immediate.
CTRL-D <0,....9>	Complements the corresponding bit (i.e., 0-9) in the 32-bit Switch Register.
CTRL-D <A,....V>	Complements the corresponding bit (i.e., 10-31) in the 32-bit Switch Register.  NOTE  To denote a character that is to act as a Switch Register function key, the symbol "&" is printed before the character. For example, typing CTRL-D 8 echos on the system as "D&8. On video displays, the characters are dimmed or blinking to distinguish them from non-control characters.
CTRL-D CTRL-M	Prints the contents of the 32-bit Switch Register in the current radix.  NOTE  CTRL-D is valid in both input mode and polling.
CTRL-O	Disables interrupts if they were on and executes the octal debugger.  NOTE  To abort execution of DTOS files, do the following:  CTRL-O @7777R (May not work on all sections of program.)
CTRL-P	Interprets the next character as single keystroke command. If the next character is a control character (i.e., less than 40 octal), do not process the character to see if it is an ADEX control character. Instead, input the character literally.  WARNING  CTRL-P followed by either NEW LINE, CR, or formfeed is functionally equivalent to ":" when parsed by the CLI.
CTRL-Q	Resumes output to the console (undoes the effect of CTRL-S).
CTRL-S	Suspends output to the console (to resume output, use CTRL-Q).

**CLI Commands by Function**

COMMAND	FORMAT	MEANING
Getting Help		
HELP	[/item]	Displays information about item.
Working with the System Equipment Table		
EQUIPMENT	[VERBOSE [device code]] [WRITE [filename]] [READ [filename]] [FLUSH]	Displays, saves, replaces, or clears the System Equipment Table (SET).
PROTECT	device_code [unit_number]	Protects a device against writing.
SCRATCH	device_code [unit_number]	Makes the specified disk or tape a SCRATCH media.
UNPROTECT	device_code [unit_number]	Removes write protection from a device.

**CLI Commands by Function**

COMMAND	FORMAT	MEANING
Controlling the Operating Environment		
CONSOLE	[device_code [line_number]]	Displays or sets the system console.
DEFAULT	<PASMAY,PORT> [new_value]	Displays or sets a system default.
ECLASS	[ERROR] [WARNING] [IGNORE]	Displays or sets the CLI error class.
ENVIRONMENT	[BRIEF [new_value1] [new_value2]] [INITIAL] [CLEAR,OFF,NO] flag1..flagn [SET,ON,YES] flag1..flagn	Displays sets, or clears one or more flags in the Environment Control Word.
INITIAL	[CPU ID Number]	Displays the current CPU ID number and the state of the CPUs in the system.
LOG	[CLEAR[device_code][unit_number]] [START[device_code][unit_number]] [DISPLAY[device_code][unit_number]] [STOP] [SIZE[new-size]]	Displays, enables, or disables console logging; or clears a console log.
NOTIFY	<SET,ON,YES><All, Tests, Modules, Passes>flag1..flagn	Displays or defines the level of notification.
OPERATOR	<SET,ON,YES> <CLEAR,OFF,NO>	Displays or defines the status of the operator flag.
RADIX	[8] [10] [16]	Displays or defines the radix.
SECONDARY	[device_code [line_number]] [slave_dev_code mux_dev_code [line_number]] [UNDEFINE]	Displays, defines, or undefines the secondary output device.
STATUS		Displays status of software control flags, runtime media, radix, string, switch register, CLI error class.
SYSD	[new_system-id]	Displays or defines the system identification message.
Manipulating Files		
APPEND	dest_file source_file	Appends one script source file to another.
DELETE	[template]	Deletes one or more files.
FILESTATUS	[template]	Lists all or some files on runtime media.
PERMANENCE	template[ON] [OFF]	Sets or displays a file's permanent status.
RENAME	current_name.filetype newname	Changes a file's name.
SPACE		Displays amount of disk space in use, not usable, and free.
TDUMP	filename.filetype [device_code][unit [file#]]	Dumps a file to the tape drive indicated.
TLOAD	filename.filetype [major_rev [:minor_rev] [device_code [unit [file#]]]	Loads a file from the specified file number on the drive indicated.
TYPE	filename.filetype	Displays a text or script source file.
Working with Media		
MEDIA	[device_code [unit_number]]	Displays or sets the runtime media.
PROTECT	device_code [unit_number]	Protects a device against writing.
SCRATCH	device_code [unit_number]	Makes the specified disk or tape a SCRATCH media.
UNPROTECT	device_code [unit_number]	Removes write protection from a device.

**CLI Commands by Function (continued)**

COMMAND	FORMAT	MEANING
ACCEPT*		Runs acceptance tests (one pass per program).
BOOT	[device_code [unit_number]]	Shuts down system and boots a device. To boot AOS, you must also set hard console switches (or switch register on soft console) to device code or media you are booting.
BYE	[NOHALT]	Shuts down system and optionally restarts CLI.
CHECKSUM	[pathname]	Checks the integrity of the resident system code or specified file.
DEFAULT	<PASMAY,PORT> [new_value]	Displays or sets a system default.
ERMES	error_code	Prints an explanation of error.
IAC*		Auto-sequences IAC tests.
ISC*		Auto-sequences ISC tests.
RUN*		Runs standard set of test programs (three passes per program).
SLAVE	device_code filename [address]	Loads file into slave processor's memory and optionally starts slave processor.
TESTCOMM*		Auto-sequences the communications diagnostics.
[XEQ]	filename [passes[address]]	Executes a program.
CHAIN	script_filename[.src] [macro_arguments] **	Loads in and executes the specified script file.
CLEAR	STRING ALL flag1..flagn	Clears one or more control flags or the string.
CMPSTR	<R0,R1,R2,R3,WARNING. [message]	Compares the string on the command line with the current string buffer.
COMMENT	comments	Enters a comment.
LABEL	label_name **	Names a node in a conditional script.
RDSCF	<R0,R1,R2,R3,WARNING. [message]	Prints the optional message and inputs the new value for the specified software control flag.
RDSWR	[message]	Prints the optional message and inputs a string containing one or two 16-bit values to store into SWREG.
READ	[message]	Prints an optional message, takes input from the operator, and stores it in the string.
SET	argument_1 [+,-,*,&]argument2	Sets some or all of the software control flags (optionally to value of expression).
STRING	[new_string]	Sets or displays the string.
TEST	flag true_label [false_label] **	Tests a software flag and proceeds to a node in the script.
WRITE	[message]	Prints a blank line or specified message.
Communicating with Programs		
STRING	[new_string]	Sets or displays the string.
SUBINFO	filename.prg	Prints the submittal information for the specified ADEX program.
SWREG	[16_bit-value [16_bit_value]]	Sets or displays the switch register.

\* Denotes macros. They are not really commands.

\*\* Valid only within a script.

## Operating Environment

The Environment Control Word is a double word memory that lets you control many aspects of the operating environment. Each bit of the double word represents a flag that you can turn on or off, depending on the desired effect. This table shows which commands you should use to change the effect of any flag.

### Environment Control Word Flags

FLAG NAME	EFFECT	INITIAL VALUE	COMMAND
LOOP	Loop when an error is detected.	Yes	ENVIRONMENT
CONSOLE	Print output on system console.	Yes	ENVIRONMENT
PERCENT	Print percentage of failure at end of tests.	No	ENVIRONMENT
PASSES	Notify or start of passes.	Yes	NOTIFY
SECONDARY	Enable output to secondary output device.	No	ENVIRONMENT
PAUSE	Execute the Octal Debugging Tool (ODT) if error is detected.	No	ENVIRONMENT
TESTS	Notify of start of tests.	No	NOTIFY
REPORTALL	Print all errors encountered.	No	ENVIRONMENT
TERMINATE	Terminate program if error is encountered.	No	ENVIRONMENT
LOGGING	Enable console logging.	No	LOG
MODULES	Notify of start of modules.	No	NOTIFY
VERIFY	Run only quick verification tests.	No	ENVIRONMENT
PAGE_MODE	Set page mode (that is, suspend output every 23 lines or when a formfeed is encountered).	No	ENVIRONMENT
ABORT	Terminate current program and abort current script if an error is detected.	No	ENVIRONMENT
OPERATOR	Operator present.	Yes	OPERATOR
DCHANNEL	Initiate background data channel activity on the second and subsequent passes of processor diagnostic test programs via the Data Channel Exerciser Utility.	No	ENVIRONMENT
RESTRICTION			
If the runtime media is a tape, then an I/O tester PCB should be installed (at manufacturing test facility).			
MULTIPLE	Allow Diagnostics to run under all processors on a multi-CPU machine (MV/20000).	No	ENVIRONMENT

You can also change the condition of flags using single or double keystroke commands. Use single keystroke commands only when a program is running or while something is being printed. If you see any kind of a prompt, use double keystroke commands, which consist of a CTRL-P, plus the appropriate single keystroke command.

### Single Keystroke Commands

COMMAND	FLAG
1	LOOP
2	CONSOLE
3	PERCENT
4	PASSES
5	SECONDARY
6	PAUSE
7	TESTS
8	REPORTALL
9	TERMINATE
A	ENVIRONMENT
B	MODULES
C	VERIFY
D	PAGE_MODE
E	ABORT
F	OPERATOR
G	ENABLE DATA CHANNEL ACTIVITY
L	MULTIPLE CPUs

## Panic Codes

An ADEX panic occurs when an unrecoverable error is detected. The following message appears:

FATAL ADEX ERROR # xxxxxx

where xxxxxx is the octal panic code.

On panics where a file was unable to be read in, AC0 contains the error code that describes the reason for read failure. The following table lists panic codes and their meanings.

### Software Panic Codes

PANIC CODE	DESCRIPTION
0	Jump to 0.
1	Stack underflow.
2	Stack underflow.
3	Unable to access the teletype input package.
4	Fatal error return from Console Log Driver (CONLOG?). AC0 = error code.
5	Unable to access the CLI utility (file CLI.SNRU).
6	Unable to access the filename of standard driver for system console.
7	Unable to read in system console driver file.
10	Unable to access CLIEER.AC0 = error code.
11	Attempt to output a character with system console driver undefined.
12	Unable to access abort module during an abort.
13	Kernel checksum error during 4 KW to 8 KW Kernel restoration.
14	System console or secondary output device timeout.
15	Unable to read in System Initialization program (SINIT).
16	Unable to read in PBL while trying to abort or terminate a script.
17	Unable to write out PBL while trying to abort or terminate a script.
20	SCALL? 0 attempted.
21	I/O error occurred before the system console device driver could be put into place. AC0 = device DIA status. AC1 + IOCB status (described in Table C-2).
22	Unknown model number received from ECLID instruction during CPU sizing.
23	Unable to load the CPU/Console/Memory size program CCMSZ.
24	Fatal error encountered within ERMMSG utility. AC0 = error code.
25	Unable to access EXCCHR within system console driver. AC0 = error code.
26	Duplicate filename found in directory structure.
27	Unable to access CLI support routine (file CLISR).
30	Kernel checksum failure during an abort.
31	Unable to read in the runtime media's Master Disk Directory.
32	Unable to access control characters routine (file EXCCHR).
33	Unable to relocate RSYS back to the top of logical memory.
34	DIA Status error received during a memory dump.
35	Directory segment integrity lost.
36	Device error from system console, or its slave processor or controller.
37	Unable to release file's memory resources after a file read error.
40	Unable to access terminate routines (file TERMINATE).
41	Unable to access Screen Edit utility (file SEDIT).
42	Jump indirect through location 1. (Interrupts illegally enabled).
43	Unable to resolve Kernel.RSYS during 4 KW to 8 KW Kernel restoration.
44	Nonresident system call made when caller was not at stack base level during 4 KW mode.
45	Unable to find secondary output device driver filename during 4 KW to 8 KW Kernel restoration.
46	Unable to read in secondary output device file during 4 KW to 8 KW Kernel restoration.
47	Unable to resolve runtime media driver during 4 KW to 8 KW Kernel restoration.
50	Runtime media driver checksum error during 4 KW to 8 KW Kernel restoration.

### Software Panic Codes (continued)

PANIC CODE	DESCRIPTION
51	RSYS overwrite attempt while in 4 KW mode.
52	MPT mini-diskette read or write operation attempted with MPT mini-diskette 512-word buffer undefined.
53	Unable to read in Kernel program during a media switch.
54	Unable to initialize runtime media after an IORST.
55	Attempt to execute a 32-bit system call, utility, or initialization routine on a 16-bit processor.
56	32-bit instruction or extended memory test failed.
57	DOIO called executed with AC3 as source or destination accumulator.
60	Unable to access "GTSF.SNRU". AC0 = error code.

The IOCB (I/O Command Block) status word is formatted as follows:

### IOCB Status Word

BIT	DESCRIPTION
Bit 0	1 = IOCB active
Bits 1-4	Not used.
Bits 5-7	Error Number 0 = DIA status error (DIC for fixed head disks) 1 = DIB status error 2 = BMC error (BMC status cleared) 3 = Controller full timeout 4 = Operation timeout 5 = Invalid model number 6 = Invalid command
Bits 8-13	Not used.
Bits 14-15	1 = done 3 = done + error

## Bootstrap Troubleshooting

If the test given by the ADEX bootstrap program fails, the CPU is halted before the message FILENAME [ADEX]? is completely displayed. The following table lists possible causes for messages you might get.

### Bootstrap Message Summary

BOOTSTRAP MESSAGE	CAUSES (in priority)
Nothing	Wrong media/density Boot device failure Faulty console device Memory failure CPU failure
NOVA INSTR OK	Lower memory failure
0-377 MEMORY OK	Upper memory failure
4000-TOP MEMORY OK	Passed bootstrap test

### Bootstrap Task Summary for Tape and Disk Systems

SEQUENCE	TASK INITIATED
1	NOVA Instruction Test
2	Print "NOVA INSTR OK"
3	Test memory locations 400-3777 (disk only) *
4	Load Multisector Loader (MSL) (disk only)
5	Checksum MSL (disk only)
6	Size the system console
7	Test memory locations 0-377
8	Print "0-377 MEMORY OK"
9	Test memory locations 4000-top of memory
10	Print "4000-TOP MEMORY OK"

\* Disk only, with the following exceptions: all current and future UNICORN disks, e.g.: Models 6236, 6239, 6310, 6328, 6329, 6363, etc.

Errors that occur after you answer the FILENAME question will result in one of the following error messages:

- FILE DOES NOT EXIST
- FILE CHECKSUM ERROR
- DEVICE STATUS ERROR, DIA = xxxxxx

## Mnemonic Codes

### Mnemonic Codes and Descriptions

MNEMONIC	NOTE	MODEL #	DESCRIPTION
ADCV	G,1	4120 4130 4140 4150 4223	A/D Converter A/D Converter A/D Converter A/D Converter A/D Converter (Micro Products)
ALM	C	4255 4227	ALM/4,8,16 Async Interface (Micro Products)
AP	G,1	8620 8644 8661	Array Processor (AP130) Array Processor (S/250) Array Processor (IOP)
AP2000	G	5520	Array Processor 2000.
ATP	G,3	0 8902	Attached Processor (DG10) Attached Processor (DG45)
IOC	G	9999	INTEGRATED I/O CONTROLLER
BMC	G	8642 8689 8734 8772	High Speed (Burst Multiplexor) Channel (S/250, C/350, M600) High Speed (Burst Multiplexor) Channel (S/140) High Speed (Burst Multiplexor) Channel (S/20) High Speed (Burst Multiplexor) Channel (S/280)
BMCT	G	9642	BMC Tester
BPC	G,1	4348 4349	Bit Synchronous Controller, 1 line Bit Synchronous Controller, 4 lines
CDR	G	4016	Card Reader
CHAR	G	8614 8639 8664 8731	Character Instruction Set (S/130) Character Instruction Set (S/250) Character Instruction Set (S/140) Character Instruction Set (S/120)
CIAC	C	4543	Combat Intelligent Async. Controller
CISC	C	4543	Combat Intelligent Sync. Controller
COMM	G	8633	Commercial Instruction Set
CPI	G	4398	Diamond PBX Communications Controller
CRC	G,1	4228 4286	CRC Gen/Chk (Micro Products) CRC Gen/Chk
DACV	G,1	4180 4224 4300	D/A Converter D/A Converter (Micro Products) DG/DAC
DCU	G	4250 4254	Data Control Unit DCU/50 Data Control Unit DCU/200
DIF	G,1	4335	Digital Interface Card
DIO	G,1	4085 4222	Digital I/O Digital I/O (Micro Products)
DKB	D	6063 6064	1 MB Fixed Head Disk 2 MB Fixed Head Disk
DKM	D,4,5	8323	358 KB Mini-diskette (MPT series)
DKP	D	4047 4048 4057 4231 6030 6045 6070	2.5 MB Diablo Disk 5 MB Century Disk 25 MB Century Disk 92 MB CDC Disk 315 KB Floppy 10 MB Phoenix Disk 20 MB Gemini Disk



SWREG Summary (continued)

BITS	DESCRIPTION
6	0 = Build a normal (Advanced) Mode media. 1 = Build a CORESIDENT (Advanced) Mode media.
7	0 = Build a normal (Advanced) Mode media. 1 = Build a Customer Mode media.
8	0 = Normal build. 1 = Customized build using System Equipment Table (SET) or a TXT file specified in STRING.
9	0 = Customizes the build to the current equipment table if STRING is null; or uses a special equipment table in the UDF file specified in STRING. 1 = Customizes the build by including only those files listed in the TXT file specified in STRING.
10	0 = Do not optimize disk space utilization on multiple media builds (diskettes). 1 = Optimize disk space utilization on multiple media builds.
11	0 = Unknown disk media and tape media are write-protected. Unknown disk media and tape media are write-enabled or scratch.
	NOTE Unknown disk media refers to non-ADEX media.
12	0 = Installs a new system bootstrap and does a surface analysis on the media (initializes the media). Any files currently on the media are destroyed. All selected files are transferred to the media. 1 = Does not install a new system bootstrap. Uses the free file space currently defined on the media. Those files already on the media are not destroyed. Only lower revision files are replaced by newer ones and/or new files are appended to the media. Bit 12 is only applicable if Bit 15 = 1.
13	0 = Reports block number of unusable sector and builds around or restarts disk build. 1 = Aborts disk build upon finding an unrecoverable unusable sector.
14	0 = Does not log transferred files to the system console. 1 = Logs transferred files to the system console.
15	0 = Manual mode of operation (questions asked). 1 = Automatic mode of operation (no questions asked).
16-31	If bit 15 = 1, then bits 16-31 contain the boot media model number, entered in decimal notation followed by a period (.).

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ADEX Pocket Reference Card  
014-000745-02  
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Revision History:

Original Release - February, 1983  
First Revision - May, 1984  
Second Revision - January, 1987



014-000745-02

Data General

Advanced  
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**ADEX**

POCKET REFERENCE CARD