



DECUS

PROGRAM LIBRARY

DECUS NO.	8-172
TITLE	Octal Systems Edit
AUTHOR	Edward A. Taft III
COMPANY	St. Mark's School Southborough, Massachusetts
DATE	December 8, 1968
SOURCE LANGUAGE	PAL

DECUS

RECORDS SECTION



OCTAL SYSTEMS EDIT

DECUS Program Library Write-up

DECUS No. 8-172

DESCRIPTION

The purpose of this editor is to allow advanced users of the PDP-8 Disk/DEctape monitor to edit the contents of the systems device. Information is read and written in single blocks (128 words and a link) which correspond to the blocks used by the Disk/DEctape monitor. Single words or groups of words within a block may be listed or changed at will. If the user turns on the low speed punch during a listing, the resulting tape may be reloaded at a future date. All operations are requested by typing on the Teletype.

Some important uses of this editor are as follows:

1. Examining the contents of the systems device after a crash or failure of the system, in order to ascertain and/or correct the cause.
2. Examining the SAM and DN blocks in order to ascertain the file structure on the systems device. This would be especially useful to a user who intends to use the PIP protect (P) option. He should look at the SAM block first (using the editor) in order to see what files will be protected and whether or not the protected area is completely filled.
3. Shifting files from one section of the systems device to another (for example, from protected to unprotected disk, or vice versa).
4. Examining and/or editing information written by a user program in a nonsystems format.
5. Saving on paper tape (in octal format) the contents of important blocks, so that they may be restored to the systems device in case of a crash or an unintentional deletion.

REQUIREMENTS

The hardware requirements for Octal Systems Edit are a PDP-8, 8/I, or 8/S with Disk type DF32 or DEctape Type TC01/TU55.

The Disk/DEctape monitor (DEC-D8-SBAC-PB) is used to operate the program.

LOADING

The BIN format tape may be loaded with either the binary loader

or the monitor loader. The editor (as supplied) uses locations 200-1177, with a starting address of 200.

There are two binary versions. One is for the PDP-8 and 8/I, the other for the PDP-8/S. The two differ in only one place: for the PDP-8 and 8/I, location 0456 contains 7540; for the 8/S, the same location contains 7740.

The editor is started by turning on the Teletype, setting 0200 into the switch register, pressing LOAD ADDRESS and then START.

OPERATING PROCEDURE

The system editor indicates its readiness to accept user input when it types an asterisk.

Command Summary

R nnnn - Read block nnnn from the systems device into the Editor buffer.

W - Write the current contents of the Editor buffer into the last block named (which is the block it was read from unless C has been used).

C nnnn - Change the current block number to nnnn. This command does not affect the Editor buffer.

L - List the entire Editor buffer.

L nnnn - List word nnnn of the buffer.

L mmmm nnnn - List words mmmm through nnnn of the Editor buffer.

nnnn aaaa bbbb ... - Change the contents of the Editor buffer to aaaa, bbbb, etc., starting at location nnnn and continuing to nnnn+1, nnnn+2, etc.

RUBOUT key - Abort current command or operation

CTRL-C keys - Exit Editor and jump to Monitor start (7600).

Command Formats

The delimiting characters for all commands are carriage returns and space. Return tells the Editor to terminate the current command string if it has not done so already. Space is used to separate numbers, and may be used to terminate commands of the form R nnnn, C nnnn, and L mmmm nnnn. Space is ignored when it appears elsewhere.

The following characters are ignored at all times on input: Blank leader (code 000), normal leader (code 200) and Line feed (code 212).

While the Editor is executing a listing, all characters except Rubout and CTRL-C are ignored.

All numbers must be octal and have value no greater than 7777. All characters except the digits 0 through 7 are illegal within a number. Furthermore, since space is used to delimit a number, embedded spaces cannot appear in a number.

Commands Pertaining to Reading and Writing

The Read command, which must be followed by a block number, transfers the contents of the specified block into the Editor buffer. The previous contents of the buffer are lost. The block number is remembered as the current block number.

1. The block named must actually exist on the systems device.
2. A Read command given without a block number is an error.
3. The command may be terminated by a space or a return. If it has not been terminated it may be aborted by rubout.

The Write command, which is used without an argument, transfers the contents of the Editor buffer into the block named by the current block number. The contents of the buffer is unchanged. Anything typed after the W is an error, except for space, which is ignored. The command must be terminated by a return; if not already terminated, it may be aborted by rubout.

1. The systems device block must not be protected (write locked).
2. When the Editor is loaded, the block number is set to 0, but the Editor buffer area is not cleared. Giving a W command before giving an R or entering data and giving a C will therefore have undesirable results (the monitor head will be wiped out).

The Change command, which must be followed by a block number, is used to change the current block number to a new value. The command does not affect the Editor buffer, nor does it affect the systems device.

1. The block named must actually exist.
2. A C command given without an octal block number is an error.
3. The C command may be terminated by return or space; if not terminated, it may be aborted by rubout.

Commands Pertaining to Editing

The List command, in any of its three forms, types out, in octal, the contents of the Editor buffer. Words within the buffer are numbered from 0 to 200 (the link word is word 200). If no numbers

are typed after L, the Editor will list the entire buffer. If a single octal number is given after the L, the single word specified will be listed. If two numbers are typed after the L (separated by spaces), the words from the first number to the second number inclusive will be listed.

1. Return must be used to terminate an L command, unless two numbers have been typed, in which case a space will terminate it.
2. Numbers, if given must be in the range 0 to 200 inclusive.
3. The user may abort a listing at any time by pressing rubout.
4. When the List command is terminated, the Editor will take the following action:
 - a. Pause momentarily so that the user may turn on the Teletype punch if desired.
 - b. Punches about three inches of leader code 200.
 - c. Types the buffer contents specified. The words are typed as four-digit octal numbers. Four words are typed per line, separated by spaces. At the beginning of each line is typed the buffer address (0-200) of the first word on that line.
 - d. Punches three more inches of code 200.
 - e. Pauses so that the user may turn off the punch, then types an asterisk in readiness for a new command.
5. The punched tape conforms to the format requirements for inputting modifications from the Teletype (see below).

The user may modify the contents of the Editor buffer as follows:

1. Type an octal buffer address (which must be in the range 0-200) followed by a space.
2. Type the new contents of that location. If the next sequential location is not to be changed, terminate the line with a carriage return; otherwise type a space followed by the new contents of the next sequential location. This may be continued for as many locations as desired, so long as the location counter is not incremented past 200.
3. The change is made as soon as the delimiting character is typed after any number. This, if rubout is pressed, the only modification aborted is the one currently being

typed. Thus,

```
*100 4326 5563 72
RUBOUT
*
```

will result in word 100 being changed to 4326, word 101 being changed to 5563, but word 102 not being affected.

4. A tape previously punched by L may be input by simply placing the tape in the low speed reader and setting the switch to START.

ERRORS

The System Editor continually checks for error conditions and will respond with the following errors where applicable:

TOO BIG	Octal number typed greater than 7777.
ADDR?	An attempt was made to reference a buffer word with an address greater than 200 (during a listing or modification). Note that, if editing word 200, the user pressed space after the modification, the Editor would take this as an intention to modify word 201.
RUBOUT	Indicates that the user aborted an operation by pushing the rubout key.
SYS ERROR	An error occurred while reading or writing on the systems device. If this happens during a Write, the Write-lock switch may have been left on.
???	Miscellaneous error. May be caused by (1) illegal command or character; (2) octal number too large; (3) nonnumeric character within a number; (4) spurious character typed where not expected or allowed.

RESTRICTIONS AND LIMITATIONS

The Editor uses the Disk/DEctape monitor input-output routine, which is contained in the Monitor Head stored from 7600-7777 in core. To make it possible to use the Editor after a system crash (when it is likely that the monitor head has been destroyed) it is recommended that the user make a binary copy of locations 7600-7777, using the Binary Punch, so that he may reload the Monitor Head into core in order to use the System Editor.

The Editor makes no check for nonexistent block numbers. If a nonexistent block is specified for a Read or a Write, the computer will hang up in the monitor I/O routine.

Restarting is not recommended. The Editor cannot be restarted at location 200 (the start address). Restart may take place at location 600; however, the Teletype flag must be set. Therefore, if it is necessary to restart, do the following:

```
Press STOP
Set the Switch Register to 0401
Press LOAD ADD
Set the Switch Register to 0600
Press DEP
Set the Switch Register to 0404
Press LOAD ADD
Press START
```

MISCELLANEOUS

System Edit may be reassembled into any four contiguous pages by setting SYSEDI= to the first location on a page.

The subroutine WAIT is used for timing the pause before and after listing, and must be changed for the PDP-8/S, which has a cycle time of 8 μ sec as opposed to 1.5 μ sec for the 8 and 8/I. To make the PDP-8/S modification, change CMPUTR=PDP8I to CMPUTR=PDP8S in the source and reassemble, or alternatively, change location WSTART (0456) from 7540 to 7740 after loading the Editor.

The following corrections may be made to either the source or the binary versions of the program to allow use on any 8-family computer.

0407	7600	LITEST,	7600	/(CLA)
0520	1376	READ,	TAD PLUS3	/
0570	1207		TAD LITEST	/
0576	0003	PLUS3,	3	/READ FUNCTION

Listing and Example of Use are available at a \$5.00 handling charge.