

OS-9 FILE HANDLER TOOL BOX
User's Manual

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INTRODUCTION

The OS-9 File Handler Tool Box is intended to be a tool box from which the programmer may draw resources. For the most part, the utilities are programs which can be used as filters for reading standard input, modifying the data in some fashion, and writing to standard output. Several of the utilities have the capability to take a stream of file names from standard input and perform the intended operation on all file names given.

The package is a collection of 12 OS-9 commands which are similar to tools that have proven to be popular and useful in the UNIX operating system. Most of the utilities are recommended in the "Software Tools" book written by Brian W. Kernighan and P. L. Plauger (published by Addison-Wesley). The programs included in the package are:

Code	Display the hexadecimal equivalent of a key.
Count	Character count, word count, line count.
Compress	Compress a text file.
D	Print directory listing.
Expand	Expand a compressed file.
Grep	Globally find Regular Expression and Print
Pr	Print a file with formatting.
Qsort	Quick in memory sort.
Space	Space and/or indent a file.
Split	Split a file into pieces.
Tr	Transliterate file contents.
Xmode	Examine or change device descriptor

Since these programs are "pipe" oriented, it is possible to use several of them together on the same file to obtain the desired output. For instance, it is possible to enter this command line:

```
D -e ! QSORT -f6 ! PR "-u=Sorted Dir" >/p
```

This will do an extended directory listing passing the result to qsort. Qsort will sort the given listing on field 6 (filename) passing the output to pr. Then, pr will print the resulting directory listing on the printer adding the page header 'Sorted Dir' and paging the output as needed.

INSTALLATION

All files should be copied to the system's CMDS directory. The pages of this manual are designed to be similar to the pages in the Operating System User's Manual. They can be inserted in the User's Manual for convenience.

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CODE

Print hex value of input character.

Syntax: CODE

Code prints the input character followed by the hex value of the input character. Unprintable characters will print as '.'. The abort key (normally control - C) or the quit key (normally control - Q) will terminate code.

The most common usage of code is to discover the value of an unknown key on the keyboard or the hex value of an ascii character.

Examples of output:

a -> 61
e -> 65
A -> 41
. -> 10
. -> 04

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COMPRESS

Compress ascii files.

Syntax: COMPRESS [opts] [file] ... [file] [opts]

Examples:

```
list <file name> ! compress [opts]
d ! compress -z [opts]
```

Compress reads the specified file(s) and writes the compressed file to standard output or to an optional output file. If no files are given on the command line, standard input is used.

Compress replaces multiple occurrences of a character with a three character coded sequence. Example:

"aaaaabbbbbccccccccc" would be replaced with "~Ea~Eb~Jc".

Each input file is converted to compressed form with "_comp" appended to the file name. Typical files will compress about 30% smaller than the original file.

Compress reduces the size of a file to save disk space.

Options:

```
-n  send output to a file instead of standard out
-x  delete the original file
-z  read file names from standard input
-?  print the usage of compress
```

Note: Standard input and the -n option are not compatible.

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COUNT

Count characters, words, or lines in a file.

Syntax: COUNT [opts] [file] ... [file] [opts]

COUNT will count the number of characters in a file and, optionally print a break down consisting of each unique character found and the number of times it occurred. COUNT will also count the number of words in a file where a word is defined as a sequence of non-blank, non-carriage-return characters. Finally, COUNT will count the number of lines in a file by counting the number of carriage-returns.

Examples:

count <file name> <file name> [opts]

merge <file name> <file name> ! count [opts]

Options:

- b Count characters and print breakdown.
- c Count characters.
- l Count lines. (default)
- w Count words.
- z Read file names from standard input.
- ? Prints the usage of COUNT

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D

Print directory listing

Syntax: D [opts] [dir pathlist][match string]

D prints a directory list to standard output. Its default form is one filename per line. Also it defaults to current data directory and to printing no header lines. The real power of D is found in its ability to print only matched filenames. Case is folded for purposes of matching. There is one metacharacter in D, the '*'. This character will match 0 or more unknown characters. Some examples will best explain its use:

a*	matches	ABC, afile, a, arm.c or a.tempfile
a	matches	all the above, file.a, break, or file.bak
*a	matches	file.a, testa, temp.a or wondra
*.bak	matches	file1.bak, test.bak, asm.bak, or .bak

In short it is great for choosing all occurrences of particular file name forms! This ability to break down directories is especially useful when a directory becomes too large for one screen. The output of D may be piped into several of the other utilities in this package. Here are some sample command lines:

d /d0/temp	prints "temp" if file exists
d /d0/temp/	prints dir of temp (if temp is a dir)
d /d0/temp/*	prints same as above
d -d /d0/temp	prints same as above
d abc*	prints all files in the current working directory that begin with abc
d -x abc*	prints all files in current execution directory that begin with abc
d abc	prints "abc" if file exists in current data directory
d -f	prints similar to standard "dir" command
d -fe	prints similar to standard "dir e" command
d /d0/TOMDIR/*.c	prints all C files found in tom's dir

Options: **NOTE:** D options must **IMMEDIATELY** follow command.

- d Assume dir of given path is desired. * is not recognized.
- e Print listing in extended form as standard "dir"
- f Print listing formatted as in standard "dir". This includes headers and if not extended format several filenames per line.
- x Defaults to current execution directory.

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EXPAND

Expand a compressed file

Syntax: EXPAND [opts] [file] ... [file] [opts]

Expand will restore compressed files to their original form. It is the complement of "Compress". If no file names are given on the command line, standard input is assumed.

Examples:

```
list <file name> ! expand [opts]
```

```
d ! expand -z [opts]
```

Options:

- n Send output to a file instead of standard output. The file will have "_exp" appended to it.
- x Delete the old version of the file.
- z Read file names from standard input.
- ? Prints the usage of expand.

Note: A file with a "_comp" suffix will be renamed to the file name without the suffix after a call to Expand. If an existing file has the same name, it will be truncated to zero length and rewritten. Files with no "_comp" suffix will have "_exp" appended.

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GREP

Search a file for a pattern

Syntax: GREP [opts] expression [file] ... [files] [opts]

Grep searches the input file(s) (default is standard input) for lines matching a pattern. If grep finds a line matching the expression, then the line is written to standard output with an optional line number of where the line is within the file. Grep recognizes expressions according to "regular expressions" described in the REGULAR EXPRESSION section in the manual.

Options:

- v All lines but those matching are printed.
- c Only a count of matching lines is printed.
- l Only the names of files with matching lines are printed.
- n Each line is preceded by its relative line number within the file.
- e = expression
Same as simple expression argument.
- f = file
The regular expression of strings list is taken from the file.
- g Groups together the c, l, and n options.
- z Read file names from standard input

In all cases, the file name is output if there is more than one input file.

CAVEATS:

Memory is requested from the system. This can cause an error in OS-9 Level One even if memory is available because new memory must be contiguous with present memory. This is only a problem if the system has multiple users and or multiple processes. Adding #xxk to the command line will not solve the problem.

Beware of double negates. Using [^xyz] along with the 'c' option will give unexpected results.

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PR

Print Files

Syntax: PR [opts] [file] ... [file] [opts]

Examples:

```
list <file name> ! pr [opts]
```

```
d ! pr -z [opts]    reads file names from standard input
```

Pr produces a listing of one or more files to the standard output. The listing is separated into pages. Each page has the page number, the name of the listing, and the date and time printed at the top. Pr can produce multi-column output, and it can also print files simultaneously; one per column. Files and options may be intermixed. If no files are specified on the command line, stdin is assumed.

Options:

- p<num> Set number of lines per page. Default is 61 which includes the title and a 5 line header. 55 lines of text are printed per page and are followed by a 5 line trailer. The trailer can be reduced or eliminated by expanding the number of lines per page.
- x<num> Set starting page number. Default is 1.
- h<num> Set number of blank lines after title line. Default is 5.
- n<num> Set line numbering. Specify increment. Default is 1.
- k<num> Set multi-column output. The output file will be listed in <num> columns.
- m Print files simultaneously. One per column. If three files are given on the command line, each file will be printed in its own column on the page.
- c<char> Use specified column separation character instead of default. Default is a space.

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- u<title> Use specified title instead of file name.
- f Pad the page using a series of '\n' instead of a '\f'(form feed).
- t Do not print title.
- r<num> Use specified right margin instead of default(79).
- l<num> Use specified left margin instead of default(0).
- o Truncate lines that are longer than right margin. Default is to wrap long lines to the next line.
- z File names are read from standard input.

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QSORT

In-memory quick sort

Syntax: QSORT [opts] [file] ... [file] [opts]

Examples:

list <file name> ! Qsort [opts]

d ! Qsort -z [opts]

Qsort is a quick sort algorithm that will sort up to 200 lines. Qsort will sort on a given field or sort on field one by default. The field separation character may be specified or it will default to space.

If no file names are given, standard input is assumed.

Options:

- f=<num> Specify field to sort on
- c=<char> Specify field separation character
- z Read file names from standard input
- ? Display Qsort usage

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SPACE

Space and indent ascii files.

Syntax: SPACE [opts] [file] ... [file] [opts]

Examples:

list <file name> ! space [opts]

d ! space -z [opts]

Space reads the specified file(s) and writes the spaced file to standard output. If no file names are given standard input is assumed.

Space can optionally indent lines and can optionally put blank lines between text lines.

Options:

- s=<num> Put <num> blank lines between text lines.
- i=<num> Indent each line <num> spaces.
- z Read file names from standard input.
- ? Print usage of space.

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SPLIT

Split a large file into smaller fixed size files

Syntax: SPLIT -n=<num> [opts] [file] [opts]

Split is used to split a large file into a group of smaller files. The procedure reads a file and writes it to n-line files or n-byte files. Files that are created by split are denoted by the file name with 000 through 00n appended. If standard input is used, output files have a name of x000 - xnnn. If previously split files exist with the same name, they will be rewritten. If no file name is given, standard input is assumed.

Options:

- n=<num> Specifies number of lines or number of bytes in each output file.
- t The file being split is not a text file. This implies that <num> is specified as bytes.
- ? Display Split usage.

Note: If the -n option is not specified, the file will not be split.

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TR

Transliterate characters

Syntax: TR [opts] str1 [str2] [str3] [str4] [opts]

TR transliterates characters from str1 into a corresponding character in str2. Str1 is required and if str2 is missing it is assumed all characters in str1 should be deleted from output. If str2 is missing str3 and str4 are not recognized. Str3 is a pathlist to the input file, default is of course standard input. If str4 is given str2 and str3 must be present. Str4 is a pathlist to the output file, default is again standard output. Options may be upper or lower case and given anywhere on the line.

Options:

- c compliment the set of characters in str1 with respect to the set of ascii characters starting at 1 and going through \$7F.
- d delete all matching input characters/expressions.
- e enable expression mode.
- s squeezes all repeated output characters/expressions in str2 to single characters/expressions.
- v same as -c above.
- z reads standard input for stream of file names.
- ? print TR use/syntax.

Some comments on the options. The 'c' (or 'v') option is only recognized in the character mode. It makes little sense in expression mode. Squeeze option and delete option are mutually exclusive (obviously!!).

Tr recognizes certain abbreviations to aid the entry of ranges of strings:

- [a-z] is equivalent to the character string 'abcdefghijklmnopqrstuvwxyz'.
- [m-pa-f] is equivalent to the character string 'mnopabcdef'.
- [0-7] is equivalent to the character string '01234567'.
- [a*n] stands for n repetitions of a. Where n is taken to be a decimal number from 1 to 127. If n is missing or zero, it is taken to be 127.

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TR has a bonus mode called expression. In this mode str1 is considered to be a "regular expression". Now the entire expression must match before str2 is substituted in the output stream. To use the expression option of TR it is recommended that the user read the section on regular expressions in this manual. TR does not recognize one metacharacter and that is the CLOSURE.

CAVEATS:

Memory is requested from the system. This can cause an error in OS-9 Level One even if memory is available because new memory must be contiguous with present memory. This only a problem if the system has multiple users and or multiple processes. Adding #xxK to the command line will not help this.

Beware of double negates. Using [^xyz] along with 'c' option will give unexpected results.

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XMODE

Examine or Change Device Initialization Mode

Syntax: XMODE <devname> [<arglist>]

This command is used to display or change the initialization parameters of any SCF-type device such as the video display, printer, RS232 port, etc. A common use is to change baud rates, control key definitions, etc.

XMODE is very similar to the TMODE command. TMODE only operates on open paths so its effect is temporary. XMODE actually updates the device descriptor so the change persists as long as the computer is running, even if paths to the device are repetitively opened and closed. If XMODE is used to change parameter(s) and the COBBLER program is used to make a new system disk, the changed parameter will be permanently reflected on the new system disk.

XMODE requires a device name to be given. If no arguments are given, the present values for each parameter are displayed, otherwise, the parameter(s) given in the argument list are processed. Any number of parameters can be given, and are separated by spaces or commas.

XMODE Parameter Names

upc	Upper case only. Lower case characters are automatically converted to upper case.
-upc	Upper case and lower case characters permitted (default).
bsb	Erase on backspace: backspace characters echoed as a backspace-space-backspace sequence (default).
-bsb	no erase on backspace: echoes single backspace only
bsl	Backspace over line: lines are "deleted" by sending backspace-space-backspace sequences to erase the same line (for video terminals) (default).
-bsl	No backspace over line: lines are "deleted" by printing a "new line" sequence (for hard-copy terminals).
echo	Input characters "echoed" back to terminal (default)
-echo	No echo
lf	Auto line feed on: line feeds automatically echoed to terminal on input and output carriage returns (default).
-lf	Auto line feed off.

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XMODE - CONTINUED

- pause Screen pause on: output suspended upon full screen. See "pag" parameter for definition of screen size. Output can be resumed by typing any key.
- pause Screen pause mode off.
- null=n Set null count: number of null (\$00) characters transmitted after carriage returns for return delay. The number is decimal. default = 0.
- pag=n Set video display page length to n (decimal) lines. Used for "pause" mode, see above.
- bsp=h Set input backspace character. Numeric value of character in hexadecimal. Default = 08.
- bse=h Set output backspace character. Numeric value of character in hexadecimal. Default = 08.
- del=h Set input delete line character. Numeric value of character in hexadecimal. Default = 18.
- bell=h Set bell (alert) output character. Numeric value of character in hexadecimal. Default = 07
- eor=h Set end-of-record (carriage return) input character. Numeric value of character in hexadecimal. Default = 0D
- eof=h Set end-of-file input character. Numeric value of character in hexadecimal. Default = 1B.
- type=h ACIA initialization value: sets parity, word size, etc. Value in hexadecimal. Default = 15
- reprint=h Reprint line character. Numeric value of character in hexadecimal.
- dup=h Duplicate last input line character. Numeric value of character in hexadecimal.
- psc=h Pause character. Numeric value of character in hexadecimal.
- abort=h Abort character (normally control C). Numeric value of character in hexadecimal.
- quit=h Quit character (normally control E). Numeric value of character in hexadecimal.

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XMODE (continued)

xon=h DC1 resume output character (normally control Q). Numeric value of character in hexadecimal.

xoff=h DC2 suspend output character (normally control S). Numeric value of character in hexadecimal.

baud=d Set baud rate for software-controllable interface. Numeric code for baud rate: 0=110 1=300 2=600 3=1200 4=2400 5=4800 6=9600 7=19200

Examples:

```
xmode /TERM -upc lf null=4 bse=1F pause
```

```
xmode /Tl pag=24 pause bs1 -echo bsp=8
```

```
xmode /P baud=3 -lf
```


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REGULAR EXPRESSIONS

A regular expression (RE) is used to specify a set of characters. A string which is a member of this set is said to match the RE. To facilitate the creation of REs metacharacters are defined which enable creation of complex sets of characters. These special characters are:

- . - called ANY is defined to match any ascii character except new-line.
- * - called CLOSURE is defined to modify the preceeding single character RE such that it will match ZERO or more occurrences of the single character. If a choice is available the longest such group is chosen.
- [] - called CHARACTER CLASS defines a group of characters which will match any single character in the compare string. Within the brackets the '-' character is significant such that [a-g] is equivalent to [abcdefg]. The NEGATE character described below modifies the character class such that it will match any ascii character NOT in the given class, or newline.
- ^ - called BOL or NEGATE is defined to modify a character class, when between [], as described above. When at beginning of the entire RE it requires the RE to match only when compared to the beginning of the line.
- \$ - called EOL is defined to require the RE to match only when at end of line.
- \ - called ESCAPE is defined such that it removes special significance from the special characters. Any ascii numeric value (1-127) can immediately follow the ESCAPE. It also allows entry of some non-printing characters such as:
 - \t = tab char
 - \n = new-line char
 - \b = backspace char
 - \f = form feed char

Any combination of metacharacters and normal characters can be combined to create a RE. The best way to explain REs is to give some examples:

Regular Expression	Same as
-----	-----
abcd	abcd
ab.d	abcd, abxd, ab?d, etc.
"ab *d"	ab d, ab d, ab d, etc.
^abcd	abcd (only if very first chars on a line)
abcd\$	abcd (only if very last chars on a

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<code>^abcd\$</code>	abcd (only if abcd is the complete line)
<code>[a-z]bcd</code>	abcd, bbcd, cbcd, ... zbcd
<code>[Aa]bcd</code>	abcd, Abcd
<code>abcd[0-9a-zA-z]</code>	abcd followed by any alpha-numeric char
<code>abcd[a-d]</code>	abcd followed by a, b, c, or d
<code>bcd[^a-d]</code>	abcd followed by any ascii char except a, b, c, d, or new-line