SYSTEM PROGRAMMING PROCEDURE

DUMP REFERENCE MANUAL

Date: 15-Aug-72
File: DMPREF.RNO
Edition: 1

This document reflects the software as of DUMP version 4 and DAEMON Version 7.

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1,Ø INTRODUCTION

DUMP is a program that converts a file to a format suitable for human understanding.

A file is nothing more than a collection of bits. Any meaning given to those bits must be supplied by the reader. DUMP provides a language for describing the format of a file and various routines for printing out the file.

DUMP "knows" about some formats of files (.DAE, .SAV, .SHR, ...); however, any format of file may be dumped.

DUMP can be used with the monitor and the DAEMON program to provide dumps of the user's core area and his job environment.

This is a reference manual, not a "getting started with..." However, if the novice user reads the manual and tries DUMP, he will soon become a dump expert.

2,Ø EXPRESSIONS AND SYMBOLS

Any place in a command where a number can be used, an expression can be used.

The following operators are valid in an expression:

```
^ - power  (2^3 is 8)
* - multiply (2*3 is 6)
/ - integer divide (2/3 is Ø  3/2 is 1)
+ - addition (2+3 is 5)
- - subtraction (2-3 is -1)
- - unary minus (-(2+3) is -5)
" - half word left to right and extend operator.
    This takes the left half of a 36 bit byte and
    places it in the right half. If the number
    was negative, the left half is set to ones. If
    the number was positive, the left half is set
    to zero.
    ("(-1) is -1, and "1 is Ø)
```

In addition, there are 3 unary "contents of" operators

```
[ - The contents of the argument, e.g., [17 has
    the value of the seventeenth word of the file.

\ - The contents of the right half of the
    argument. \17 has the value of the right half
    of the seventeenth word.
```

@ - The contents of the word addressed by the right-most 23 bits of the argument. The argument address, including indexing and indirect evaluation.

N.B. When [, \, or @ are nested, the PDP-10 addressing modes apply with the first 16 words in the addressing space used as AC's. Therefore @@@10 may give different results from \\\10.

Symbols may be used in place of numbers (see the SYFILE and XTRACT commands for information about loading symbols). A symbol is of the form program!symbol where program is the name of the program defining the symbol. If the symbol is unique, the program name may be omitted.

The following symbols are built into DUMP:

. = The address of the last word dumped. This is the location counter.

$ = The last byte typed out.

% = The last expression evaluated.

These will be overridden by the same symbol appearing in the symbol table.

3.0 COMMANDS TO DUMP

DUMP notes its readiness by typing a slash(/).

The commands are listed in alphabetical order on the following pages.

ADDRESS

Specifies whether or not addresses will be dumped along with their contents.

EXAMPLE:

Assume word 10 of the current file contains 53 decimal.

```
/MODE DEC
/ADDRESS:ON
/D [10
```

would dump

```
10/ 53
```

```
/MODE DEC
/ADDRESS:OFF
/D [10
```

would dump

```
53
```

NOTE:

1. The default is ON.
2. The output is an address followed by a slash and then a tab.

ALL

Dumps the entire file. When the file is a DAEMON core-image file, the entire category is dumped.

EXAMPLE:

```
/AL
/ALL
```

APPEND

If the selected output file exists, new output is written at the end of the file. The old contents are not overwritten.

EXAMPLES:

```
/APPEND
/AP
```

NOTES:

1. APPEND is the default.
2. The command which turns off APPEND is SUPERSEDE.
3. This command should be issued prior to doing any writing. It can be given before or after the OUTPUT command.

AUTOFORMAT

If AUTOFORMAT is on, DUMP will attempt to format the output by inserting line feeds, form feeds, and titles where needed. If AUTOFORMAT is off, the user must ensure that the output is correctly formatted.

EXAMPLES:

```
/AUTO ON
/AUTO OFF
/AU ON
```

NOTES:

1. Unless the user wants to obtain a special result, it is suggested that AUTOFORMAT should be left on.

2. The default is ON.

CATEGORY

This command selects which category of a DAEMON dump file will be used. Addressing begins with 0 at the beginning of each category. Refer to Section 5.0 for a description of DAEMON dump files.

EXAMPLES:

```
/CAT JOB
/CAT CONFIGURATION
/CAT CON; same as configuration
/CAT DDB
/CAT CORE
/CAT FEATURES
```

NOTES:

1. CORE is the default.
2. The CATEGORY command has no effect if the input file is not a DAEMON dump file.

CLOSE

Close the output file.

EXAMPLES:

```
/CLOSE
/CL
```

NOTES:

1. After a CLOSE command is given, another OUT command should be given before the next command that does any output.
2. A CLOSE not followed by another OUT command will cause an error if any writing is attempted.

DUMP <dump descriptor>,<dump descriptor>,...

Dumps the specified bytes in the current modes. A dump descriptor is any of:

1. A string delimited by single quotes and containing alphanumeric characters and special patterns.

EXAMPLE:

```
'THIS IS TEXT'
```

A special pattern is:

```
<EL>        - END LINE, (CR-LF)
<VT>        - VERTICAL TAB
<FF>        - FORM FEED
<AL>        - ALTMODE
<HT>        - HORIZONTAL TAB
^<LETTER>   - CONTROL CHARACTER
\<LETTER>   - LOWER CASE
```

EXAMPLE:

```
D 'LINE1<EL>LINE2<EL><HT>LINE3'
```

will generate

```
Line1
Line2
    Line3
```

A leading double quote (") will cause the next character to be taken literally.

EXAMPLE:

```
D 'THIS IS A QUOTE "" AND AN ARROW "^'
```

will generate

```
THIS IS A QUOTE " AND AN ARROW ^
```

2. A byte descriptor of the form:

```
WORD<POS,SIZE>

WORD is the address of a word,
POS  is the position of the byte. It is the bit
     number of the leftmost bit in the byte,
SIZE is the number of bits in the byte,
```

EXAMPLES:

```
6<3,2>      specifies bits 3 and 4 in word 6.

5<0,11>     specifies bits 0 thru 10 in word 5.

2<27,18>    specifies bits 27 thru 35 in word 2 and
            0 thru 8 in word 3.  That is an 18 bit
            byte split over word boundries.

27          specifies all of word 27.

31<18>      specifies bits 0 thru 17 of word 31.
```

3. <From byte-descriptor> & <To byte-descriptor>

   This specifies everything from the first byte descriptor to the second byte descriptor.

Examples:

```
/D  [0&1000 dump from 0 to 1000
/D  [0&[,JBREL dump from 0 to the word whose
    address is in .JBREL
/IR 8
/D  [0&[44 dump the entire low segment
```

Although numbers were shown in the previous examples, a dump descripter can consist of any valid expression.

EXAMPLES:

```
6+7
2*2+4
(3+5*6)<(4+3),(3*3)>
DOG-CAT
```

4. The letter D may be used as an abbreviation of DUMP.

5. Each DUMP command starts a new line.

EJECT

Skips to a new page.

EXAMPLE:

```
/EJECT
/EJ
```

EXIT

Close all files and return control to the DECsystem-10 monitor.

EXAMPLE:

```
/EXIT
.
```

HELP

Copies the HELP text from SYS: to the user's terminal.

EXAMPLES:

```
/HELP
```

NOTES:

1. /HELP SWITCHES will list the names for all the switches.
2. The letter H may be used as an abbreviation for HELP.

INPUT

Selects an input file.

EXAMPLE:

```
/IN
/IN ABC
/IN DSKB0:ABC.DAE[10,251,SFDX]
```

NOTES:

1. The default file name is nnnDAE. Where nnn is the job number.

2. Dump will look for the following extensions:

   ```
   .TMP,.DAE,.SHR,.SAV,
   .HGH,.LOW,.XPN,.DMP
   ```

   In that order.

3. The letter I may be used as an abbreviation for INPUT.

IRADIX

This command sets the input radix. WARNING, the IRADIX command uses decimal. The argument cannot be an expression.

EXAMPLES:

```
/IR 8      ;Go from decimal to octal
/IR 10     ;Go from octal to decimal
```

NOTES:

1. If an IRADIX command is given without an argument or with an argument of 0, the input radix is set back to its default value.
2. The default is 10 (decimal).

JUSTIFY

This takes a key-word argument of LEFT, CENTER, or RIGHT and specifies how the output should be justified. [Refer to the MODES and WIDTH commands.]

EXAMPLES:

```
/JUST  L,L,C,R
/JUST  LE,LEF,LEFT,C,CE,CEN
```

NOTES:

1. JUSTIFY keys are used in a one to one relation with MODE and WIDTH keys. If there are more MODE keys than JUSTIFY keys, LEFT will be used. If there are more JUSTIFY keys, the extra keys will be ignored.

LEFTMARGIN

Sets the left margin.

EXAMPLES:

```
/LEFT 7
/LEFT 1+2+6/3
/LEFT MAIN.!LEFTX
```

NOTES:

1. The default is 0.

LINEPAGE

Sets the number of lines per page.

EXAMPLE:

```
/LINE 50
```

NOTES:

1. The default is 50.
2. This counts all lines including blank lines and titles.

MODES

Selects a list of output modes from:

ALL • Dump in all modes.

ASCII • Dump the byte in ASCII. If bits 0 thru 28 are zero, the word is dumped as a single right justified character. If bits 0 thru 28 are non-zero, the word is dumped as 5 ASCII characters. Non-printing characters print as spaces.

DECIMAL • Dump as a signed decimal number.

NULL • Do not dump anything.

NUMERIC • Dump as a signed number in the current ORADIX.

OCTAL • Dump as 12 octal digits. This mode always takes 13 positions. (6 digits, a comma, 6 digits).

RADIX50 • Dump in RADIX50.

SIXBIT • Dump as 1 SIXBIT character if bits 0 thru 29 are zero. Otherwise, dump as 6 SIXBIT characters.

SOCTAL • Dump as signed octal. This mode suppresses leading zeros.

SYMBOLIC • Dump as a symbolic instruction.

EXAMPLES:

```
M ASC,SIX,NUL,RAD,SIX
MODE ASCII,SIXBIT,NULL,RADIX50
MODE OCT
```

NOTES:

1. A mode may be repeated in the list.
2. The output is in the same order as the mode list.
3. MODES has no control over what is listed on a single line.
4. The MODES command may be abbreviated as M.
5. The default mode is OCTAL.

NUMPAGE

Starts numbering pages, If the argument is 0, page numbering is turned off.

EXAMPLES:

```
/NUM 10
/NUM 0
```

ORADIX

Selects the output radix. WARNING! the ORADIX command uses decimal. The argument cannot be an expression.

Examples:

```
/OR 10
/OR 2
```

NOTES:

1. The default is 10.

OUTPUT

Selects the output file.

Example:

```
/OUT DSK:LEMON
/OUT S55123[10,1,DUMP]
```

---

1. The default file name is nnnDAE,LSD. Where nnn is the job number.

2. The default device is LPT if no file name is typed, and DSK if a file name is typed.

3. The letter O may be used as an abbreviation for OUTPUT.

RIGHTMARGIN

Sets the right margin. If a field would exceed this limit, inserts a carriage-return, line-feed and spaces to the left of any printing before dumping the field.

EXAMPLES:

```
/RI 72
/RIGH 100
/RIGHT (8*8)/(15+2)
```

NOTE:

1. If a field will not fit between the left and right margins, it is allowed to overflow the right margin.

2. If ADDRESSION is in effect, the new line will have an address typed on it. If a page overflow took place a title line may also be printed.

RUN

This command runs some other program. It is the same as the R command in the monitor.

EXAMPLES:

```
/RUN:PIP
/RUN LOGOUT
```

SUPERSEDE

If the output file already exists, it is overwritten by the new output file.

EXAMPLES:

```
/SUPER
/SUP
```

NOTES:

1. The opposite of SUPERSEDE is APPEND.
2. APPEND is the default.
3. This command should be issued prior to any writing. It may be given before or after the OUTPUT command.

SYFILE

Selects a symbol file for the XTRACT command.

EXAMPLES:

```
/SYF DSKB:SYSTEM,SAV[1,4]
/SYF DUMP.LOW
/SYF DSKD:S50273,XPN[10,1]
```

NOTES:

1. Defaults are the same as those for the INPUT command.

TDUMP

Same as the DUMP command except that it also dumps on TTY:.

EXAMPLES:

```
TD 'AC17',[17,'AC2',[2
TD [8&17
```

NOTES:

1. Refer to the DUMP command.
2. The letter T may be used as an abbreviation for TDUMP.

TITLE

Specifies a title to be included in all subsequent page headings.

EXAMPLES:

```
/TITLE DUMP OF LOWSEG
/TITLE DUMP OF DDB CHAIN
/TITLE NMB'S ON THIS UFB
```

NOTES:

1. TITLE with no argument turns off titling.
2. After a title command is given, an EJECT command should be given to skip to a new page.

TYPE

Specifies that the format of the input is one of the following:

```
DAE -DAEMON dump file
DAT -Unspecified data (no special processing is
     done)
HGH -High segment
LOW -Low segment
SAV -Save file
SHR -Shareable high segment
XPN -Expanded format
```

EXAMPLE:

```
/TYPE DAT
```

NOTE:

1. If the input file has one of the above types as an extension, that is the default, Otherwise, DAE is the default.

WIDTH

Selects the width that each output mode will occupy. Refer to the MODE and JUSTIFY commands.

EXAMPLE:

```
/MOD     SYM,OCT,RADIX50,SIX,ASCII
/WID     30,15,10,10,10
/JUS     L,R,R,R,R
/RIGHT   8+2*(30 +15 + 10 + 10 + 10)
```

This will print each byte dumped as: a symbolic instruction left justified in a 30 character field; an octal number right justified in a 15 character field; and RADIX50, SIXBIT, and ASCII each right justified in a 10 character field. The RIGHTMARGIN command will insure 2 words are printed per line (the 8 is an allowance for the address).

NOTES:

1. WIDTH without any argument will turn off filling and justification.

2. If a mode is specified without a corresponding width, the byte is dumped in exactly the number of positions required followed by 3 blanks.

3. If a width is specified, no free blanks are output, (e.g. MODE ASCII and WIDTH 5, will dump ASCII without any spaces between words).

4. If a MODE overflows its WIDTH, the entire output is given and no justification takes place.

XTRACT

Uses the file specified by the last SYFILE command as a core image and extracts the symbol table left by the loader and adds that to the symbol table in core.

EXAMPLE:

```
/SYFILE  DSK:KSYS.DAE
/XTRACT

4293 symbols extracted
```

NOTES:

1. To cause the loader to leave a symbol table, use loader switches /S/B or /S/1B to load the symbol table into the low or high segment respectively.

The following commands are reserved for future versions of DUMP:

```
BEGIN
COFILE
COMPARE
DELSYM
DENSITY
DO
END
IF
INDEX
INSTRUCTION
IOFFSET
LISTAB
OOFFSET
OKNONE
PAGELIMIT
PARITY
PHYSICAL
POP
PROGSYM
PROTECTION
PUSH
RUNOFF
SKPBLOCKS
SKPFILES
STRS
SORT
SUBTITLE
SYMBOL
TABSYM
TCOMPARE
TSORT
```

4.0 ERROR MESSAGES

4.1 Monitor Error Messages on DUMP or DCORE

?DAEMON NOT RUNNING
The DAEMON program must be started by the operator to allow the DCORE or DUMP commands to function.

4.2 DAEMON Error Messages on DUMP or DCORE

?CANT OPEN DEVICE <dev>
The selected device is not available or does not exist.

?YOU DONT HAVE PRIVILEGES TO WRITE <type> file
The selected file (CCL or DAEMON) is protected.

?ENTER FAILURE <n> ON CCL FILE
The CCL file for DUMP cannot be entered.

?DAEMON FILE MUST BE WRITTEN ON DISK
The DCORE device must be a disk device.

?LOOKUP/ENTER FAILURE <n> ON DAEMON FILE
The lookup or enter monitor call failed with the indicated code. Refer to the Monitor Calls manual for a description of the error codes.

?PLEASE LOG IN AS [OPR]
Only the operator can type ".R DAEMON" to start the DAEMON program.

%SWAP READ ERROR UNIT <disk> STATUS=<n>
An I/O error took place reading the swapping space. The data is written into the DAEMON file as read.

?INPUT/OUTPUT ERROR, STATUS=<n>
An error occurred during the creation or updating of the DAEMON file.

4.3 Messages From DUMP

?INPUT ERROR STATUS =<n>
An error occurred while DUMP was reading the input file. A new IN command will cause another LOOKUP to be done.

%LISTING DEVICE OUTPUT ERROR, STATUS <n>
An error took place while DUMP was writing the output file. A new OUT command may be given to select a new file, or an OUT command and an APPEND command may be given to try again.

?<command> NOT CODED
The selected command is not in this version of DUMP.

?CANT EXPAND TABLE <table>
There is not enough core to expand the selected table. SYMTAB is the symbol table and SYVTAB is a permutation vector used for symbolic typeout.

?SYNTAX ERROR
The expression evaluator could not evaluate an expression. Check for wrong parentheses or 2 operators in a row.

?MAX =<n>
An argument was too large.

?CANT ENTER OUTPUT FILE <n> <file>
DUMP cannot enter the output file; the error code is n.

?NXM <address>
While DUMP was evaluating an expression, a "contents-of" operator was encountered, but the selected word was not in the file.

?LOOKUP FAILURE FOR INPUT FILE - CODE <n> <file>
DUMP can't read the input file.

?<symbol> IS AN UNDEFINED SYMBOL TABLE NAME
The symbol table specified has not been loaded with an XTRACT command.

?WRONG FORMAT FOR SYMBOL
A colon (:) must be followed by a symbol.

?<symbol> IS AN UNDEFINED SYMBOL
The symbol is not in DUMP's symbol table.

<symbol> IS A MULTIPLY DEFINED LOCAL
The symbol is in more than one symbol table with different values.

4.4 System Error Messages

All these messages indicate that there is an error in the system. They may indicate that a monitor which will not support DAEMON is being run.

4.4.1 Messages from DAEMON

```
? ATTACH TO USER$ JOB FAILED
? CANT GET USER'S PPN
? DETACH UUO FAILED
? JOBPEK UUO REQUIRED, NOT IMPLEMENTED
? CANT GET SWAPPING PARAMETERS
? DSKCHR FAILURE <n> UNIT <disk>
? CANT OPEN SWAP UNIT <disk>
? CANT GET SWAPPING POINTER FOR JOB <n>
? TRIED TO OVERWRITE DATA WORD
```

4.5 SCAN Error Messages

Many of the messages from SCAN can be provoked,

5.0 HOW TO MAKE A DAEMON DUMP FILE

A DAEMON file is a file that contains information about a job (job tables, monitor information, file status and a complete core image).

A DAEMON file is written by a program called DAEMON. This program runs as an operator service program and is poked by the monitor when a user requests DAEMON service. DAEMON then copies the user's core image into a file.

5.1 The DCORE Command

This command causes a DAEMON file to be written but does not alter the state of the job in any way.

Format:

```
.DCORE dev:file,ext[project,programmer]
```

This command will write a DAEMON file on the specified device with the selected filename.

Defaults:

dev:	DSK:
file	nnnDAE where nnn is your job number.
ext	If a filename was typed, .DAE; otherwise, .TMP.
[p,pn]	The number you are logged in under, not your default path.

5.2 The DUMP Command

This command writes a DAEMON file with the name nnnDAE.TMP. It then runs the DUMP program.

Format:

```
.DUMP /command/command/command
```

or

```
.DUMP @dev:file,ext[p,pn]
```

The switches on the DUMP command are passed to the DUMP program. An indirect file may be specified.

Defaults:

If no argument is typed @SYS:QUIKDM.CCL is used.

Normal execution of this command with no arguments (i.e., implying use of SYS:QUIKDM.CCL) causes two files to be created in the user's area: nnnDAE.TMP and ??????.LPT, the first is the core image file and the second is the listing file to be queued and deleted; return is then made to the user at monitor command level.

5.3 The .DCORE Function of CALLI DAEMON

This is a method for taking a snapshot dump of a running program. The call is:

```
CALLI AC,102
  error return
normal return
```

and AC contains:

```
XWD LENGTH,BLOCK
```

and block contains:

```
BLOCK/    1                          ;FUNCTION
BLOCK+1/  SIXBIT/DEV/
BLOCK+2/  SIXBIT/FILE/
BLOCK+3/  SIXBIT/EXT/
BLOCK+4/  <PROTECTION>B8
BLOCK+5/  PPN
```

If a word in the block (except the function) is missing or zero, the default is substituted. The default is the same as that of the DCORE command.

On the normal return, the file was written.

On the error return, AC will contain one of the following codes:

unchanged		UUO not implemented or DAEMON not running
1	DMILFX%	Illegal function
2	DMACKX%	address check
3	DMWNAX%	wrong number of arguments
4	DMSNHX%	something which should never happen just did.
5	DMCWFX%	can't write file
6	DMNPVX%	no privileges
7	DMFFBX%	fact format bad
10	DMPTHX%	invalid path specification

6.0 FORMAT OF A DAEMON DUMP FILE

A DAEMON dump file consists of five categories (job, configuration, DDB, core, and features). Each category begins with two header words; the first contains the category number (1 for job, 2 for configuration,,), and the second word contains the number of data words in the category. DUMP treats each category as a file, and addresses within that category start at zero. The user cannot examine the category header. It is also impossible to read past the end of one category into the next category. NOTE: The categories may be in any order.

6.1 The Job Category

This category contains information about the job obtained by the use of the GETTAB UUO. The following table lists the information in the job category. The first 2 columns list the address in octal and decimal. The third column gives the contents and the fourth column gives the location of further information.

WORD(8)	WORD(10)	CONTENTS	SEE
0	0	DAEMON version #	a,b
1	1	DATE (given by CALLI date)	b
2	2	TIME (given by MSTIME)	b
3	3	LH=JOB# RH=SEG#	b
4	4	LH is reserved RH=TTY#	b
5	5	,GTSTS for job	c
6	6	,GTSTS for seg	c
7	7	,GTPPN for job	b,c
10	8	,GTPPN for seg	b,c
11	9	,GTPRG for job	b,c

12	10	,GTPRG for seg	b,e
13	11	,GTTIM (runtime in jiffies)	b,e
14	12	,GTKCT (kilo-core-ticks)	b,e
15	13	,GTPRV	b,e
16	14	,GTSWP for job	e
17	15	,GTSWP for seg	e
20	16	,GTRCT (total disk reads)	b,d
21	17	,GTWCT (total disk writes)	b,d
22	18	,GTTDB always zero	
23	19	,GTDEV (device containing seg)	e
24	20	,GTNM1 (1st half user name)	e
25	21	,GTNM2 (2nd half user name)	e
26	22	,GTCNO (charge number)	e
27	23	,GTTMP (TMPCOR pointers)	e
30	24	,GTWCH (watch bits)	a,b,c
31	25	,GTSPL (spool bits)	a,b,c
32	26	,GTRTD (real time status)	b,e
33	27	,GTLIM (core and time limit)	b,e
34	28	,GTSPS (processor status)	a,b,c

a Operating System Commands Manual (DEC-10-MRDC-D)
b Monitor Calls Manual (DEC-10-MRRC-D)
c listing of COMMON for your monitor
d listing of COMMOD for your monitor

6.2 The Configuration Category

This is a copy of ,GTCNF from the monitor. This is described in a listing of COMMON for your monitor. A description of ,GTCNF for the 5.05 monitor is in Section 3.6.3.4.2 of DECsystem-10 Monitor Calls (DEC-10-MRRC-D).

6.3 The DDB Category

This is a copy of the device data blocks currently in use for this job. Each DDB begins with a word containing the length of the DDB. The format of the DDB varies from device to device and monitor to monitor. For more information consult a monitor listing.

6.4 The Core Category

This is a zero-compressed core image of both the high and low segments. This file only contains non-zero words.

6.5 The Feature Category

This is a copy of .GTFET from the monitor. A description of .GTFET for the 5.05 monitor is in section 3.6.3.4.14 of DECsystem-10 Monitor Calls (DEC-10-MRRC-D).