COMPUTER SYSTEMS LABORATORY
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LINC Tape Dump (TAPEDUMP)

M. S. Lenahan
Laboratory Computer Facility
University of Wisconsin
83 Medical Sciences Building
Madison, Wisconsin 53706

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Abstract

TAPEDUMP will print the contents of LINC tape with octal, unsigned or signed decimal, or octal and alphanumeric conversions. The output device may be either the LINC Teletype or a line printer.

LINC Tape Dump

TAPEDUMP

TAPEDUMP was developed by the Laboratory Computer Facility at the University of Wisconsin Medical Center under grant FR00249-04 from the Division of Research Facilities and Resources of the National Institutes of Health.

Marilyn S. Lenahan
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Title:	LINC Tape Dump
Manuscript Name:	TAPEDUMP
Binary Name:	TAPEDUMP
Program Language:	LAP6
Computers:	LINC, LINC-8, μLINC-1
Programmer:	Marilyn S. Lenahan
Contrib. Organ.:	Laboratory Computer Facility University of Wisconsin

1.0 PURPOSE

TAPEDUMP will print the contents of LINC tape with octal, unsigned or signed decimal, or octal and alphanumeric conversions. The output device may be either the LINC Teletype or a line printer.

2.0 USAGE

2.1 Program Implementation

The binary is filed in the LAP6 file and may be loaded from any unit with the LOad meta-command.

2.2 Space Required

The program utilizes memory quarters 0 thru 6. The binary requires 7 tape blocks. The manuscript requires 37_8 blocks.

2.3 Operational Procedure

The flow of the program is guided by questions displayed on the oscilloscope and answered through the keyboard. For all questions which require a numerical value for an answer, each of the following is true:

a. the response must be an octal number
b. leading zeros are not required
c. a response consisting of all blanks is equal to 0.

The first display determines the output device to be used.

```
PRINT VIA ?
0 TELETYPE
1 PRINTER
```

A response of 1 will cause output to be printed on the line printer, if implemented. Any other response will cause the output to be printed on the LINC Teletype.

The location and number of blocks to be dumped are determined from the following display:

```
PRINT ??? BLOCKS
FIRST BLOCK ???
UNIT ?
QUARTER ?
ID IS ????????
TAPE NO. IS ?????
```

Any number of blocks $000\text{-}777_8$ may be requested starting at any block $000\text{-}777_8$ on unit 0, 1, 4, or 5. A request of 000_8 blocks acts as no operation and the program proceeds to the PRINT MORE? display described below. The quarter requested may be 0-7 and will determine in which memory locations the first block appears to be stored. Successive blocks will appear to be in successively higher locations through 7777_8. The identifier may be any 8 LINC keyboard characters and the tape number any 5 LINC keyboard characters; each will be printed with every block. The following question determines the type of conversion desired:

```
IN ?
0 OCTAL
1 UNSIGNED DECIMAL
2 SIGNED DECIMAL
3 ALPHANUMERIC
```

If alphanumeric conversion is chosen, the output will consist of both octal values and alphanumeric equivalents. (See section 2.5).

Printing will proceed after EOL is struck for the above display. The printing may be terminated at any time by striking EOL. The following display appears when the output has been stopped due to EOL or completion of the requested blocks:

```
PRINT MORE ?
```

A response of Y will cause TAPEDUMP to restart at the display which determines the number and location of blocks to be dumped. Any other response causes LAP6 to be loaded and started.

2.5 Printer Output

The output, whether on line printer or Teletype, consists of one or more LINC tape blocks per page with proper headings. Each block begins with the line:

DUMP OF *AAAAAAAA* LINC TAPE NO. *nnnnn* BLOCK *bbb*

where *AAAAAAAA* is the ID, *nnnnn* is tape number and *bbb* is the block number in octal. If the block could not be read without a parity (checksum) error, the following message is inserted:

******** LINC TAPE ERROR PERSISTS AFTER 5 REREADS, CHECKSUM = *xxxx* ********

where *xxxx* is the LINC tape checksum in octal. The printing of the tape contents follows. Each line consists of the octal location of the first word on the line followed by the contents of the next 8 locations. The contents are converted to octal or signed or unsigned decimal as requested. In the case of the alphanumeric conversion, the contents of each word is printed in octal on the left of the page with their alphanumeric interpretation on the same line at the right.

If the block has never been written in and hence contains a mark pattern, the following message will appear after the heading:

LINC TAPE BLOCK *nnn* CONTAINS A MARK PATTERN

where *nnn* is the block number in octal. The contents of the block will not be printed.

If the block contains a group of 2 or more lines of like data values, the following message will appear in place of these lines:

LOCS *mmm* THRU *nnn* ALL = *xxxxx*

where *mmm* is the octal location of the beginning of the repetitions, *nnn* the octal location of the end of the repetitions, and *xxxxx* the value of the data converted to octal or signed or unsigned decimal as requested. Only whole lines of data are considered in forming the condensed message above. Non-repetitious data will be printed out normally.

2.7 Input and Output Mountings

TAPEDUMP may be loaded from any unit (however control returns to LAP6 on unit 0 when TAPEDUMP terminates). Blocks from any unit may be printed.

2.9 Timing

Using the Teletype: a maximum of 3 minutes per block.
Using the line printer: dependent upon printer..

2.12 Equipment Configuration

TAPEDUMP selects tape units 4 and 5 using the 740 and 750 tape instructions. Teletype output is via all three methods:

Relays for Classic LINC
OPR 14 for LINC-8
Inverted OPR2 for μLINC-1.

2.13 Software Configuration

TAPEDUMP is assembled for standard configuration of LAP6. For use with another configuration the equalities at the end of the TAPEDUMP manuscript must be changed.

The PRINTER option in this program provides output on a device other than a 10 character per second Teletype if such a device is available.

At the University of Wisconsin this option uses the CDC 3600-LINC satellite connection for access to a line printer. Other installations desiring to use the PRINTER option on their hardware configuration should follow the specifications given below for coding and implementing a new printer driver. This new printer driver replaces the driver called DRMSLG (sometimes referred to as the SUTURE driver).

The driver must have its entry point at 1400_8. The driver may occupy $1400\text{-}1777_8$. The calling sequence to the driver is:

```
JMP 1400
  *
 FWA
 NW
  *
RETURN
```

The words marked * should be ignored. *FWA* gives the first word address of the buffer area to be printed. Characters are stored two per word. The first character is in the left-half of *FWA*. *NW* gives the number of words to be printed on this line. The number of words will always be a multiple of 4 and $4 \leq NW \leq 70_8$ will always hold. Thus, the number of characters per line will be less than or equal to 112_{10}.

If the first character of the buffer is a 66_8 (LAP6 [), then the driver is to:

1) Ignore *NW* and the rest of the buffer.
2) Perform a page eject to bring the paper to top of form.
3) Return to the calling program.

If the first character is any other character, then the buffer should be printed normally.

2.14 References

1. Technical Report No. 2: LAP6 HANDBOOK, CRL, Washington University.

3.0 METHOD

TAPEDUMP reads LINC tape into LINC memory and converts one line of print at a time. Different conversions are selected by inserting JMP instructions to the proper routine. The output is thru one of two driver routines.

4.0 DESIGN SPECIFICATIONS

The source program for TAPEDUMP may be converted to a binary program by using CV and SB in the usual manner. The manuscript for the PRINTER driver must be converted separately and copied into the 7th block of TAPEDUMP.