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| | Paper Tape Reading and Punching | PTES/M-16 |

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**ABSTRACT and CONTENTS**

This tells how to take a file of arbitrary format and punch a paper tape on a Model 35 teletype from it. It also describes a similar program for reading paper tape. Both programs are designed to recover partially from system restarts.

PUNCHING PAPER TAPE

Assuming you have a file to punch on paper tape the procedure for punching is to give the following set of instructions to the 940 system:

```
KDF.
READ (PIRTLE)PAPER;
FINISHED.
QSPL.
INPUT FILE /PAPER,
OUTPUT FILE '/BPAPER'.
QRUN.
;T /BPAPER.
.PUNCH:G
INPUT FILE IS: /YOURFILE.
```

At this point it will ask you to turn on the output punch. Assuming you do this, it will start to punch a paper tape and then stop. At this point the section of the paper tape that has been punched should be put in the reader (someplace in the long section that is blank) and the paper tape reader should be turned on. The program will read this for a while and then resume punching.

The important point is that the program compares the tape that it reads with what it punched and will detect any errors.

ERROR RECOVERY AND DETECTION

If an error occurs the program will detect the fact, type out the error that it found and try to backup 1000 characters and continue punching. The tape can be spliced later someplace in the 1000 character overlap. (If the input file has the equivalent of some null characters each 1000 characters or more often it would expidite this process.)

Sometimes the program will not recover gracefully from this condition. In this case the user should stop the paper tape reader and wait until the program stops punching. Then the paper tape should be placed just before the long blank section of paper tape, and turn on the paper tape punch. This might have to be repeated a couple of times to get the program back in synchronization. If a System Restart occurs, branch to .PUNCH+1 to begin the error recovery procedure.

PUNCHING PAPER TAPE WITHOUT ERROR DETECTION

The same binary program may be loaded into core. If control is given to .QPUNCH, then it will punch the same file. The paper tape is not fed into the reader; therefore, no error checking is done.

HOW TO LABEL A PAPER TAPE

If the user would like to print a message at the beginning and/or end of his paper tape to easily identify it when punched, he should use the disk program (PIRTLE)PRPTP and compile it with QSPL. The resulting program should be loaded in QRUN and begun at .START. It will ask for an input file and an output file. The input file is normally the teletype. Type in the message that is needed and terminate it with a control D. This file may be prefixed to the file to be punched by loading paper and saying .COPYN;G. It will ask for an output file and then will ask for input files. All of the input file names, with the exception of the last one, should be terminated with comma; the last one is terminated with a period. Thus, for example, the following sequence would put a name and date at the beginning and end of a file to be punched.

```
QRUN.
;T/BPRPTP;
;T/BPAPER.
.START:G
INPUT FILE IS TELETYPE.
OUTPUT FILE IS '/SAVE'.
NOVEMBER 13, 1969 DDT FOR UTP (control D)
.COPYN:G
OUTPUT FILE IS '/OUT'.
FIRST FILE IS /SAVE,
NEXT FILE IS /YOUR FILE,
NEXT FILE IS /SAVE.
.PUNCH:G
INPUT FILE IS /OUT.
```

HOW TO READ A PAPER TAPE

The same program (PAPER) can be used to read a paper tape by starting at .READ. It will ask for the character number and the reply should be Ø. It will then ask for an output file. Then the paper tape should be put in the reader, and the reader turned on. If at some point the reader is turned off, the program may (keep trying) print out the character number and ask if it is finished, normally the answer is NO. Just type N and then turn on the paper tape reader. The reason that this is not always detected is because it waits for the buffer to fill before it will read any characters, and if the buffer is half filled the program stays blocked. If, when it tries to read a character, there are none ready, it waits one second and tries again. If no new characters have come in, the paper tape reader must have stopped, so it prints out the message.

One can take advantage of this pause to mark the character number on the paper tape. If a system crash or some other catastrophy occurs, then the program may be restarted (at .READ) and the character number supplied should be that of the last character number recorded on the paper tape. It will ask for an input file (the file that was being output on) and an output file (a new file). The program will then read the old file writing the character read on the new file and when it reaches the specified character, indicate this so the paper tape can be turned on. It will

then compare the characters read from the file with those read from paper tape and note any differences on the teletype.

When it has exhausted characters from the input file it will just copy the characters from the teletype to the output file as before. This allows the program both to resume after a system crash and to compare two readings of a paper tape to check for errors.