

OUTPUT DEVICES AND COMPUTERS												
	Alpha CRS	APS-5	Canon LBP10	Comp. 8600	Fla. Data BNY	HP2680	Linotron 202	Varian	Versatec	Xerox 9700	Xerox Dover	Xerox XGP
Ethernet						Stanford					Stanford	
DEC10			Vanderbilt						Vanderbilt	Univ. Del.		
DEC20	AMS				Math Reviews		Adapt, Inc.	AMS				
IBM (VM)									SLAC			
IBM 370		Info. Handling										
Onyx C8002			TYX Corp.									
Sail												Stanford
Univac 1100				Univ. Wis.								
VAX (Unix)									Cal. Tech.			
VAX (VMS)			Argonne						Sandia			

* * * * *

Output Devices

* * * * *

OUTPUT DEVICES

Rilla J. Thedford
Mathematical Reviews

Thanks to all who responded to the questionnaire on output devices; it was genuinely appreciated. The most common question concerning output devices seems to be "Who has what device on what machine?" In response, we have compiled the above chart of active \TeX configurations. It is far from complete. Please, if you know of or hear of a new or an existing configuration that is not on the chart, notify me or David Fuchs. We recognize that more than one site can have the same configuration, so we listed only one for each. If a list of known sites for a device or for a configuration is desired please contact me at (313) 764-7228. We will do our best to get you the information.

Future articles will describe the characteristics of various output devices, with user comments.

Editor's note: In the membership list, computer hardware and output devices are shown for individual members in the form communicated by the member. For the listing by device type, however, an effort has been made to consolidate similar devices into groups which, when possible, coincide with Site Coordinator coverage. In the case of VAX, for example, there are

two significant groups, depending on operating system (VMS or UNIX). When communicating information about hardware for publication in the membership list, please take a look at the device groupings, and provide enough specifics to yield both a satisfactory individual listing and a suitable group assignment. (If your hardware does not belong to any of the existing groups, that is also useful information.)

* * * * *

Site Reports

* * * * *

NEWS FROM STANFORD

David Fuchs

\TeX 82 runs. We're about to put it up for general use. The test input file, called TRIP.TEX, causes 99% of the statements that make up the \TeX 82 program to be executed at least once. Additionally, some of us have been using \TeX 82, and it really works. It seems to be about the same speed as the old Sail version of \TeX 80, even though our compiler does not optimize at all, so with a good compiler and runtimes, it could well be faster. We're getting output on our Dover printer (thanks to Ignacio Zabala), and there's a nice new program by Joe Weening that displays pages of a DVI file on the Sail (DEC10) computer's Data-Disc displays. The TOPS-20 change file seems to be in order, and we hope that installation on VAX and IBM systems will proceed smoothly.

Professor Charles Bigelow just arrived to start the joint Art Department and Computer Science Department Program in Digital Typography. He and his students will be telling us everything that is wrong with \TeX and METAFONT.

We have been in contact with Max Díaz, and he has accepted our invitation to stop by and update his FÁCIL \TeX macro package to work under \TeX 82. It may even be given new features based on the added flexibility of \TeX 82.

Joe Weening worked out a first draft of PLAIN.TEX (the new name for BASIC), which Professor Knuth is now polishing up. In the next few days, WEAVE will be changed slightly to work with \TeX 82. When this is done, we'll be making up a new distribution tape with the whole system, so now might be a good time to send Ron Code an order form for 'complete, debugged \TeX 82'. The new tape will include new versions of some of the Computer Modern fonts, but not all. The following release, which will come out along with the first version of the \TeX 82 manual, will have a whole new version of Computer Modern; you may wish to wait for the later distribution because it will also include a more widely user-tested \TeX , as well as whatever change files we receive from those of you who have brought it up.

Version 2 of DVI format is now frozen. There are some changes from the documentation handed out at the recent TUG meeting. These changes allow DVI files to be read from front to back, for systems that can't do a random access to find the postamble. This also helps systems that utilize Unix-like pipes—you can pipe the output of \TeX right into a DVI-to-device translator program. I extracted the relevant modules from TEX.WEB and ran WEAVE on them—the results appear elsewhere in this issue of TUGboat (our Dover printer was used for this, so please excuse the reproduction quality). The revised sections are the ones dealing with the 'preamble', 'postamble' and 'font def' commands. The preamble contains the static job information; font defs appear all through the DVI file as new fonts are defined, as well as in the postamble as before.

As a study in the feasibility of automatic Pascal-to-C translation, I recently translated TANGLE into C by hand. The results work both on our VAXes (running Berkeley Unix) and on our SUN stations (with M68000 micro-processors running stand-alone, reading and writing files over the Ethernet). Interestingly, both versions run at about the same speed, but TANGLE is an I/O bound program, so this may not be too significant. On the other hand, TANGLE running on VAX/VMS Pascal runs

a fair bit slower, probably because the character-by-character runtimes are very slow. In any case, this is a reasonably hopeful sign that \TeX 82 on small computers will be feasible. We're hoping to find a good Pascal compiler for the M68000 soon, but none seems to be available right now. We intend to go ahead with the C translation effort, which is another path to getting \TeX 82 onto micro-processors, but there are problems here as well. In particular, TANGLE.C found one bug in the M68000 C compiler which no one has yet managed to fix. Our SUNs with stand-alone Unix will be arriving soon, so we'll have more information next time.

Autologic continues to be the photo-typesetter manufacturer most sensitive to the \TeX community. They have designated an official \TeX person, Peter Jedrzejek, who can be reached at 213-889-7400. I suggest you give him a call and tell him you're out there. Autologic has also officially requested raster information on METAFONT fonts, e.g. the Computer Modern family, so that they can provide them to their users. We're delaying them, since an overhauled version of Computer Modern is next on Professor Knuth's to-do list.

* * * * *

FIXES TO KNOWN BUGS IN \TeX /370

Susan Plass

About twenty-five sites have obtained \TeX 80 in the form distributed by the Stanford Center for Information Technology (CIT) as \TeX /370. Many thanks to those patient people who have installed this version and found, fixed, and reported bugs in it. The following list represents an amalgamation of the problems those users have found and how they have been corrected.

In ASCIITBL:

Change line 34 from | (X'4F') to ! (X'5A')
and line 125 from † (X'6A') to | (X'4F')

In SYSDEF:

Change the assignment statement
`chrX['7E']x := 'D0'xc; (*¬rc*)`
in line 333 to `chrX['7E']x := '5F'xc; (*¬¬*)`

After line 1143 add the following:

```
IF eofchan(fyl)
THEN
BEGIN
  eoff := true;
  bufptr := 1;
  buffer[bufptr] := 13;
  goto 0;
END;
```

In addition there are several problems with `\send` files. The text to be sent must have length less than the LRECL for that file. And in line 1540 change

```
  rwritefile(fil,'DDNAME='||trim(fname));
to  rwritefile(fil,fname);
```

Change line 1584 from `ELSE IF fj <= 8` to `ELSE IF fj <= 8`

The development effort for `TEX` at CIT is now directed at installing `TEX82`. I expect to report on our progress at the next meeting, and I encourage others who are also installing `TEX82` to report back on your efforts either to me before the meeting or at the IBM Birds of a Feather session at the March meeting.

* * * * *

T_EX INSTALLATION AT THE UNIVERSITY OF MICHIGAN

Paul Grosso

ABSTRACT. Work has been done at the University of Michigan to convert parts of the `TEX` system to run under MTS. Currently we have the capability to run `TEX` and produce text output on a Linotron 202 typesetter in standard, bold, and italic fonts in a variety of point sizes. Further work needs to be done on input macro packages and the user interface as well as the support of other output devices.

Over the past year, the joint IBM/University of Michigan Word Processing Project has been experimenting with parts of the `TEX` system. Having gained much experience with it as well as some related software, the University of Michigan (UM) ordered a Pascal/VS copy of `TEX` from the Stanford Center for Information Technology (CIT) designed to run under IBM's MVS operating system.

The Word Processing Project (WPP) has an IBM 370/148 running VM/CMS, MVS, and MTS (Michigan Terminal System) with a network connection to UM's Amdahl 470V/8 running MTS (MTS-UM). When the tape came from Stanford (in record time—a week after we mailed out our order we had a tape in our hands), we read most of the files directly into files under VM/CMS; one file, that containing the font file partitioned data set, was written in “unloaded format”, so we read it under MVS and transferred the individual font files to VM.

`TEX` compiled with no problems; with a few VM file definitions (to reassign files to DDNAMEs), `TEXPRE` ran generating `TEXINTBL`. A few more file definitions and `TEX` generated a DVI file for a sample input file. We then transferred the files to the MTS operating system on the 148 (MTS-WPP) and made

several changes to the `SYSDEP` module to convert `TEX` to run on MTS.

File naming conventions were the major changes including the removal of most file extensions, allowing file names of up to 20 characters including periods, altering the option specifications of the `RESET` and `REWRITE` calls for MTS usage, and changing the `PDSIN` call used to open font files into a standard `RESET` call.

Some values in the ASCII ↔ EBCDIC tables had to be altered to allow for differences between the EBCDIC codes that IBM and MTS uses for some of the characters; we had some hard to trace problems before these differences were noticed—would you believe the characters in question were `\` (backslash), ``` (grave), `{` (left curly brace), and `}` (right curly brace). Then there were the differences in character sets caused by the discrepancies between standard ASCII and Stanford SUAI code. Presumably because the right curly brace is ``175` in ASCII and ``176` for SUAI, the `CHRX` array in `SYSDEP` had both the `'7D'x` and `'7E'x` mapped into `'D0'x` (right curly). Normally in ASCII (and to be consistent with its inverse in the `ORDX` array), `'7E'x` should get mapped into `'5F'x` (not-sign or tilde)

We also had some problems with `ASCIITBL`. Line 34 (character ``042`) was a vertical bar (`|` or `'4F'x`) and should have been an exclamation point (`!` or `'5A'x`). Line 95 (character ``136`) was a not-sign (`¬` or `'5F'x`) which we changed to a cent-sign (`¢` or `'4A'x`) to agree with `SYSDEP`. Line 125 (character ``174`) was a broken vertical bar (`;` or `'6A'x`) rather than the vertical bar expected by `SYSDEP` (`|` or `'4F'x`). Finally to maintain consistency with the right curly brace change to `SYSDEP` mentioned above, lines 126 and 127 (characters ``175` and ``176`) were changed from `ALT` and right curly to right curly (`}` or `'D0'x`) and not-sign (`¬` or `'5F'x`) respectively. (Of course, the `chcode` declaration in the `BASIC` macro file making character ``176` a close delimiter had to be changed accordingly.

We encountered a Pascal/VS problem running `TEXPRE` on MTS. Due to its large memory requirements (and some glitches in the MTS Pascal/VS), we had to increase the `STACK` and `HEAP` Pascal/VS run-time parameters to get `TEXPRE` to run properly. `TEX` itself bombed reading font files that had lines that had been padded with a blank (introduced because files are shipped from VM/CMS to MTS-WPP through a “virtual card reader,” and MTS trims all but one blank when trimming file lines). When this was corrected, we ran across several problems with the code in `INLN` in `SYSDEP`.

A logical test for end-of-line failed at the end of a file and an end-of-line test had to be added to the logical expression. (Technically, in Pascal EOLN is not defined for a text input file when EOF is true. On page 115 of IBM's Pascal/VS Language Reference Manual, EOLN is to be true if the file is positioned to the EOLN character and false otherwise. However, under MVS and VM/CMS, EOLN is true at the end of the file, and TeX depended on this. In the Pascal/VS at UM, EOLN was false when EOF was true.) Also, we got a Pascal/VS run time error when reading input lines that were too long and needed to be broken. The code in INLN failed to assign a value to the last character of the buffer; we assigned "buffer[bufptr]:=c" after the REPEAT...UNTIL. All in all, the initial installation went smoothly and took less than a week of part time work.

Noting that TeX reads and writes four byte file lines (most notably TEXINTBL which is over 44,000 lines and the DVI file itself) and that Pascal/VS does no blocking of such files, we added some blocking to TeX's I/O routines. We noticed about a threefold improvement in TeX's execution speed on MTS by blocking TEXINTBL and the DVI files into 4000 byte records. Furthermore, since MTS does its own dynamic memory allocation (and charges for memory for just the time it is allocated), we made several changes to TeX's memory management process.

Initially we allocate a small part of the MEM array (by using the REF feature of Pascal/VS and allocating the space dynamically with our operating system) and then get and free blocks of extra memory as required. We still would like to make some additions and changes to SYSDEP so that the interaction between TeX and the user at the terminal works a bit better on MTS.

With the help of David Fuchs, a program was developed to convert DVI files to a format that the Linotron 202 can handle. Of course, much of the display mathematics and more interesting capabilities of TeX are not available since we are restricted to the fonts available on the Linotron, but the output looks good. Next we hope to investigate cheaper proof quality output devices so the expensive Linotron copy need only be produced for the final copy. In the future we may consider purchasing a phototypesetter such as an Autologic APS-Micro 5.

VAX/VMS

Monte C. Nichols	David Kellerman
Sandia Laboratories	Oregon Software
Livermore, CA	Portland, Oregon

The most recent Stanford version of TeX-Pascal along with the improved spooler for the Versatec is now available from Oregon Software. This is of course the version having magnification capability, etc., and is the last version prior to TeX82. The new version should get rid of most of the remaining bugs and keep the VAX/VMS community running in a superior fashion until a version of TeX82 becomes available for VMS. For those of you new to TUG, Oregon Software has volunteered to distribute TeX for the VAX/VMS community. For \$50 they will send you a tape with all the VAX/TeX related files on it. See TUGboat Vol. 2, No. 2 and Vol. 3, No. 1 for further information.

A rather large number of VMser's attended the most recent TUG meeting at Stanford as well as the classes for TeX82 that followed. Several individuals have gotten WEB, TANGLE and WEAVE running on the VAX/VMS system, so we should be able to see a preliminary version of TeX82 at some reasonable date. Our best guess for the availability of a production version of TeX82 would be Nov-Dec 1982, but it could happen sooner.

The newest version of TeX as well as TeX82 use .tfm and .pxl font files. Unfortunately the 200 dot/in font files made available from Stanford in this new format did not include some of the old font files we had come to know and love; especially noted by their absence were the larger fonts that had proven useful for a number of purposes. One of us (MCN) has obtained METAFONT files for some of these missing files and plans to find a DEC 10 or 20 soon where the missing 200 dpi fonts can be generated.

Anyone who has developed spoolers for devices other than Versatec is encouraged to send them to Oregon Software for inclusion on the next distribution tape.