

There will not be institutional membership until TUG has to play a larger role than circulation of information. Individual membership will be \$10 annually and will cover newsletter expenses. All memberships and fees will be reconsidered at the next Steering Committee meeting.

Richard Friday will work up a proposal for a validation suite for programs whose authors desire to call them \TeX . Presumably, the Users Group would pass recommendations to the AMS Board of Trustees about a given request to use the \TeX logo.

The role of the Users Group in distribution will be re-examined after the Pascal release is made. In about six months the Steering Committee will decide when to meet again. At this time it is hoped that Pascal distribution will be under way from Stanford and alternate development sites.

Respectfully submitted,

Robert Morris,
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Interface Software

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THE STATUS OF THE PASCAL IMPLEMENTATION OF \TeX

September 9, 1980

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This document (PTEX.TXT[TEX,IAZ]%SAIL) is intended as a public, up-to-date report on the status of the PASCAL implementation of \TeX . A file PTEX.BBD[TEX,IAZ]%SAIL is maintained that contains all the mail and new events related to PTEX.

SYSTEM ORGANIZATION:

The \TeX -PASCAL system consists mainly of three modules:

- the TEXPRE module implements the pre-processor that generates the data structures employed by TEX.
- the SYSDEP module contains routines that are very much dependent on the particular host system. It is used both by TEXPRE and TEX.
- the main TEX module.

COMPATIBILITIES AND INCOMPATIBILITIES:

Neither TEX nor TEXPRE should need modification at any installation, but, surely, SYSDEP must be adjusted for each host site. The three modules are programmed in PASCAL though some

installations may find it convenient to reprogram SYSDEP in assembler language for the sake of execution speed.

As the default case in the CASE statement is a non-standard feature of PASCAL, it has been given different names by different compilers. Compile time initialization is not standard either, but available under different names in most compilers. These are the only reasons why TEX and TEXPRE may have to be modified, and the modifications are straightforward.

PTEX INSTALLATIONS:

\TeX -PASCAL has been running in the PDP-10 (SAIL) machine in our CS Dept., here at Stanford, since April 1980. Since then, all changes made by Don Knuth in the SAIL program have been incorporated immediately into the PASCAL program, which has also undergone modifications as more information was obtained on the characteristics of widely used PASCAL compilers. The program has been in-house tested. It has already processed the whole \TeX manual and several chapters of Knuth's *Art of Computer Programming*.

Stanford's CIT has an IBM machine of the 370 family. Eagle Berns is in charge of the installation of \TeX there. He has obtained a copy of the new IBM PASCAL VS compiler, and has tried to compile PTEX with it. As of September 9, both TEXPRE and SYSDEP (in PASCAL, only slightly modified) had compiled and run successfully to generate the table of data structures employed by the main TEX module. For these trials, Berns used 36 bpw font information files from SAIL. There was a problem with two procedures in the main TEX module which were still too large for the VS compiler. This module has been modified accordingly and we are waiting for feedback from Berns.

Charles Lawson is installing PTEX on the UNIVAC 1100 of the Jet Propulsion Lab at Caltech using the University of Wisconsin PASCAL compiler. He has made a good programming effort to get PTEX up. (For instance, he has coded the "environment" modules required by his compiler.) This installation seems to be already past the compilation phase.

At the University of Minnesota, Mike Frisch is installing PTEX on a CDC-Cyber.

George Otto is in charge of the installation at Wharton. The Moore school has a UNIVAC 90-VS/9 where they use the PASCAL-8000 compiler.

David Kashtan has compiled everything successfully on the VAX (VMS) at SRI.

Richard Friday has also compiled everything on a VAX (UNIX) at DEC.

T_EX-PASCAL has been distributed to more centers: Stanford Linear Accelerator Center, University of Aarhus in Denmark, Universities of Milan and Pisa in Italy, University of Valencia in Spain, etc. The ones mentioned above have given the most feedback.

At this time, it seems that most pioneer installations are free of compilation problems and are now trying to obtain adequately interfaced output devices, together with fonts and font information files suitable for them.

The only fully operational PTEX system is still this at Stanford CSD, but we expect to be printing DVI files produced by the CIT installation very soon.

COMPILER ISSUES:

T_EX-PASCAL was developed using the Hamburg PASCAL compiler for the PDP-10 by Kisicki and Nagel. Some compiler maintenance was needed during the debugging of PTEX. We have found this to be a rather powerful and permissive compiler.

There have only been three system requirements on PTEX hosts and these were explicit since the beginning of the project:

- The system must have enough addressable memory to store the large arrays employed by PTEX (about 128K words of 32 bits).
- The compiler should be able to really pack fields of a PACKED RECORD and overlap multiple variants of packed records. If this requisite is not satisfied, PTEX will require at least four times as much memory.
- The compiler should be able to handle large case statements (say over 64 actual cases in a range [-500..500]) and have a default case (this is non-standard in PASCAL but available in most compilers).

Additionally, PTEX requires an EXTERNAL (or separate) compilation facility. If no such thing is available, the SYSDEP module has to be inserted both in TEX and in TEXPRES by hand. Also, if there is no compile time variable initialization, the INITPROCEDURE appearing in the program has to be changed into an ordinary procedure.

We have fought not to add more requirements and have changed the program to facilitate the installation with simpler or more restrictive compilers. Encountered problems have been common to most pioneer installations:

- lines of code were too long
- octal constants were not accepted
- identifiers containing the underscore character were not accepted
- some identifiers were too long

- sometimes two different identifiers were equal in the first eight characters
- fields of packed records could not be passed as procedure arguments
- loop counters had to be local variables
- all declared labels had to be used
- use of GOTOs was restricted: not even allowed from the body of a procedure out to the block in which the procedure was declared
- there were discrepancies in the treatment of nested WITH statements
- the compiler lacked the standard MAX and MIN functions
- procedures had to be kept small (less than 400 statements)

The program has been modified to avoid them. Currently, the code is all uppercase in lines that are never longer than 72 characters. All identifiers are shorter than 16 characters and differ in the first 8 characters. Octal variables appear only in SYSDEP.

DISTRIBUTION:

Currently, **T_EX-PASCAL** can be obtained from the **T_EX** group at the CS Dept. at Stanford. Anyone asking for the system will get a tape containing the files TEX.PAS, TEXPRES.PAS, SYSDEP.PAS, TEX.STR, TEXPRES.STR, and SYSDEP.STR, which is about everything that is needed to have PTEX running. The distribution package also contains a short installation guide, a description of the DVI format of the output file of TEX, and extensively documented listings of TEX, TEXPRES and SYSDEP. (Of course, the ultimate documentation on TEX is the **T_EX** manual.) All these files (not the listings) are available on-line in the directory (TEX.PASCAL)%SCORE, accessible via the ARPANET.

Fonts and font information files may also be provided on request (in the format employed here at SAIL). These files are very system-and-output-device-dependent and of restricted general value for that reason.

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THE FORMAT OF **T_EX**'S DVI FILES

David Fuchs

DVI files contain information about where characters go on pages. The format is such that there are those who claim that almost any reasonable device can be driven by a program that takes DVI files as input. In particular, DVI files can be sent to the Xerox Graphics Printer (XGP), Versatec, Canon or