

Report on Workshop Getting PostScript into T_EX and L^AT_EX Documents¹

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1 Introduction

I had a very difficult time deciding how to conduct this workshop. I had mixed feelings because I did not have general solutions for all computer platforms and printers. It became a nightmare trying to solve just one platform, UNIX. So the more I worked on the preparing for the workshop, the sooner I realized that I should present the research on UNIX and open the floor for comments from those who attended.

This format worked wonderfully. The point of a workshop is to exchange ideas. Many interesting comments came out of the workshop and I would like to share them with all who attended the conference.

2 Anita Z. Hoover, University of Delaware (USA)

Anita presented her solution for the UNIX environment. The following information can be accessed via anonymous ftp from zebra.acs.udel.edu (128.175.8.11) in pub/tex/postscript.

- Document from workshop `psw.tex`
- LaserPrep files for System 7 (unmodified)
 - `lprep71.pro` generated from a MacWrite file
 - `lprep71md.pro` generated from a MacDraw II file
- `psfig.tex` macros for dvips version 5.47 (Tom Rokicki)
 - The original `psfig.tex` can be accessed via anonymous ftp from
 - `whitechapel.media.mit.edu` (18.85.0.125) in `pub/psfig` or
 - `linc.cis.upenn.edu` (130.91.6.8) in `dist/psfig`.
- Filter to fix Framemaker (landscape and portrait), Splus and Mathematica `epsf_filter`

3 Edward A. Garay, Univesity of Illinois at Chicago (USA)

Ed presented a solution that he uses for the VM/CMS environment. The driver he is currently using is DVI-LASER/PS from ArborText Incorporated and `psfig` macros.

4 Calvin W. Jackson, Jr., California Institute of Technology (USA)

Cal talked about a group called SUMEX. He said that this group is a very good resource for information about Macintosh computers. Here is the readme file if you are interested in Info-Mac.

```
Welcome to the Info-Mac archive at
sumex-aim.stanford.edu [36.44.0.6].
Our software is available through anonymous FTP,
a mailserver, and the Bitnet shadow archives.
```

```
More information is stored in the
/info-mac/help directory:
```

```
accessing-files.txt -- instructions on accessing
                        and converting files
all-files.txt -- a list of all files in the archive
recent-files.txt -- a list of recently created or
                    modified files
```

```
To get there, type "cd help". Then either
"ls" or "dir" should show you the available help
files. Use the "get" command to transfer them to
your system. Since these files are text, no
special decoding is necessary.
```

```
NOTE: As a volunteer staff, we do not have the
time to check every binary for viruses or system
compatibility. You should always use caution
when running a downloaded binary.
```

```
Please read "help/posting-guidelines.txt" before
making a submission to the archives or the digests.
```

```
The Info-Mac Moderators
info-mac-request@sumex-aim.stanford.edu
```

¹To be published in TUGboat, © 1991, T_EX Users Group.

5 Shashi Sathaye, University of Kentucky (USA)

Shashi presented her solution for the VM/CMS environment. She is using a package called PsT_EX. PsT_EX is a BIBT_EX-like processor for including figures into L^AT_EX documents. Figures are included using the “\psbox” macro; this macro causes L^AT_EX to make entries in the “.aux” file(s) for the job. PsT_EX finds these entries, locates the corresponding POSTSCRIPT files (which should be in EPSF format as appropriate for dvips), and determines how to size the figure according to the options specified in the macro in L^AT_EX, and according to the nominal size and shape of the POSTSCRIPT. PsT_EX was originally developed for the UNIX environment, Shashi has made the necessary changes for VM/CMS and this is now available through the standard VM/CMS T_EX distribution tape managed by Joachim C. Lammarsch.

She also said she was willing to port Tom Rokicki's driver (dvips version 5.47) to VM/CMS.

One week after the conference, Shashi had done the port to VM/CMS. She tested it for Computer Modern Roman fonts, and Edward Garay is currently testing the PostScript fonts. When the testing is complete, dvips version 5.47 will be available through the standard VM/CMS T_EX distribution tape managed by Joachim C. Lammarsch.

For more information, e-mail to shashi@ms.uky.edu (Internet) for PsT_EX (UNIX and VM/CMS) and dvips (VM/CMS). For dvips (VM/CMS), you may also send e-mail to Ed Garay at U12570@UICVM (Bitnet).

6 Standardization of \special

General comment about standardizing on the syntax of \special would be helpful as a first start for driver standards rather than trying to get all of the standards agreed upon.

7 Robert A. Adams, University of British Columbia (CANADA)

Bob presented his solution by using a package called MG (Mathematical Graphics System). From the first paragraph of his handout at the Conference,

“MG is a program for generating high-quality two- and three-dimensional mathematical graphics on an IBM PC (or compatible) computer, and for printing these graphics on a POSTSCRIPT output device. The POSTSCRIPT output of MG can be obtained either as an encapsulated POSTSCRIPT file for direct printing, or else as a pair of T_EX readable POSTSCRIPT and Label files suitable for incorporating into a T_EX document. In this case T_EX will typeset the labels on the graph; the graph itself is relayed to the output device driver by a

T_EX \special command. Low- and high-level T_EX macros are provided to enable such inclusion of T_EX-labelled MG graphics in T_EX documents.”

From the last paragraph of his handout at the Conference,

“The MG System software is available on two 5.25 inch diskettes or one 3.5 diskette. When ordering, please specify which format you prefer. Single CPU licences for MG are being offered at US\$ 95.00 or CAN\$ 110 plus \$5.00 shipping in the USA or Canada, or \$10.00 overseas. Network and site licences are also available. Orders or inquiries should be sent to MG Software, 4223 West Ninth Avenue, Vancouver, B.C., Canada, V6R 2C6. E-mail inquiries: useradms@mtsg.ubc.ca (Internet), or useradms@ubcmtsg (Bitnet). Payment by cheque, or money-order. Institutional purchase orders are also accepted.”

8 Jan Michael Rynning, K.T.H. Royal Institute of Technology (Sweden)

Jan made a suggestion for determining if your POSTSCRIPT file has font independence by scaling the entire document up or down a percentage. If the fonts remain unchanged, then your POSTSCRIPT file has font independence.

9 Roger B. Jagoda, Cornell University (USA)

Roger talked about an integrated network approach for Macintosh and UNIX computers. Here is a detailed description from Roger.

We have SPARCstations (SUN OS 4.1.1) and DECstations (Ulrix 4.2), both UNIX workstations, connected over a thin ethernet network (TCP/IP). The thin net connects to a Kinetics FastPath K-4 box (K-box) to our AppleTalk network. The K-box is the gateway from UNIX TCP/IP to the Macintosh AppleTalk protocol. It also converts between these two protocols. ALL printing (i.e. all the POSTSCRIPT LaserWriter NTX printing) is done on the AppleTalk side. There are no printers directly connected to any UNIX workstations. This is because we've found AppleTalk to be faster than 9600 baud. To let the UNIX workstations "see" the AppleTalk LaserWriter NTX printers, we use CAP (Columbia AppleTalk Protocols) ver. 6.01 from the network.

So what works? We use *Textures* from Blue Sky Research on the Macintoshes and they can do everything. Blue Sky Research now has available POSTSCRIPT fonts, so you can avoid the Computer Modern Roman font nightmares. But, DO NOT install ANY of these fonts into the Macintosh System Folder. . . only *Textures* is set up to use them and it can REALLY screw

things up for any other applications such as MicroSoft Word or Excel.

The UNIX side is a bit tougher. We have used two products successfully. We use Sitka (formerly TOPS) Corporation product, TOPS and that links the UNIX workstations so they can at least “see” the AppleTalk printers as “bsd line printers”. However, this works for text files only. Xinet (Berkely, CA, formerly Mt. Xinu) also has a product to do this called K-Spool which works better (faster) than TOPS. Again this works for text files only. For PostScript, we use Adobe Systems Incorporated product, TRANSCRIPT, which Cornell has a site license for (~\$900.00 per year to maintain, don’t ask what the initial cost was, I just don’t know). This software provides the filters and AFM (Adobe Font Metric) files needed for ANY UNIX box to prepare true POSTSCRIPT files (i.e. BoundingBox, etc.). The POSTSCRIPT file is sent to the LaserWriter NTX printers via TOPS or K-Spool.

The problems are related to the UNIX side, TOPS doesn’t handle the K-Box routing as well as K-Spool and it’s slower. Also, when you try to include POSTSCRIPT files, `psfig` is needed, otherwise the file never gets to the printers. We’ve traced this problem to the UNIX `lpr` program and how it interacts with the routing software. Without the K-Box, `lpr` STILL chokes on included files, so I think the K-Box may be innocent on this problem.

The Macintosh never has a problem as they are native to AppleTalk. They are just slow and all our data is on the UNIX side. Sun Microsystems Incorporated has a new way of printing called NeWSPrint, where the processing is done on the UNIX machine and then the POSTSCRIPT file is dumped to a dumb printer (no on-board smarts, like an HP Laserjet or similar beast). The problem is that to make it work you REALLY have to dedicate a whole CPU as a printer server with at least 32MB of RAM. I’d rather get the POSTSCRIPT printer and keep the CPU for as a usable system (screen/user/desktop).

For more information,
e-mail roger@ionvax.tn.cornell.edu (Internet)
or roger@crlion (Bitnet).

10 David K. Steiner, Rutgers University (USA)

Dave presented a document that explains what programs, macro packages, and fonts are available for T_EX, L^AT_EX, S^LT_EX, A^MS-T_EX, L^AM^S-T_EX on UNIX machines at Rutgers. This document also explains how to use various programs to create graphical output (in POSTSCRIPT) and include them into your T_EX document.

It was discussed during the workshop that a document like this should be put together for general use. Perhaps the ideal situation would be to have a document for each platform/operating system. We could use the standard installations and develop documents based on

this information. Hopefully there will be overlap in certain areas.

11 Barry Smith, Blue Sky Research (USA)

Barry presented an integrated approach on the Macintosh using *Textures*. He also mentioned that Adobe will be coming out with their own print driver and this should eliminate a lot of the Macintosh related problems. It is also important to make sure that your LaserPrep files match with the POSTSCRIPT file you are trying to include in the T_EX and/or L^AT_EX document.

He also pointed out that there is a problem with the Adobe Type Fonts for Computer Modern Roman when used with `dvips` version 5.47 (Tom Rokicki). The discussion led to the fact that Tom was aware of this and the problem was being worked on.

12 Lee Thompson, University of Wisconsin (USA)

Lee presented some tricks that can be directly done in POSTSCRIPT. He was using `\special` commands with raw POSTSCRIPT that worked for DVILASER/PS from ArborText Incorporated. These `\special` commands can be adapted to work with other drivers and the POSTSCRIPT should still work.

Here is an example for “reverse printing” (reverse video—white on black). The basic idea is to generate a closed curve (in the simplest case, a rectangle outlining the entire page), fill it with black, then set the halftone parameter to “white” before returning. Subsequent T_EX output will then be “painted” in white on the black background.

```
% PostScript procedure for use by TeX \special
% to do reversed printing
% For the ArborText DVILASER/PS software,
% invoke by a line such as:
% \vbox to 0pt{\hbox to \hsize{%
%   \special{ps: plotfile rvrsprnt.psx}\hfil}}
% The syntax for other drivers will differ.
%
% Utility procedure: lets work in inches
/inch {72 mul} def
gsave
% Make a black rectangle that fills the page
0 0 moveto 8.5 inch 0 rlineto 0 11. inch rlineto
-8.5 inch 0 rlineto closepath
0 setgray fill
grestore
% Now, leave "graylevel" set to "white" when we
% go back
1 setgray
% That's all
```

(Note that this procedure deliberately violates one of the rules normally followed when invoking POSTSCRIPT

procedures; it returns to T_EX with the graphic state of the laser printer altered.)

With more elaborate coding, one can fill only a specific area (say a rectangle with rounded corners) with black, let T_EX set some type, then use another invocation of `\special` to restore the halftone to “black”.

Comment by Anita Hoover: It would also be very easy to write a macro to enter the numbers being used in the POSTSCRIPT. You would probably have to change the way you include the raw POSTSCRIPT.

13 Final Comments

Solving the problem of getting POSTSCRIPT into T_EX and L^AT_EX documents certainly proved to be a difficult one. It appears that many working solutions exist for different computer platforms and environments. I hope this report can put you in contact with the right people to help you. Please feel free to contact me if you would like to add any information or comment on this report. There was a lot of good information exchanged at the workshop. I want to thank everyone who contributed to the workshop and this report. I could not have done this without you.

APPENDIX

Getting PostScript into T_EX and L^AT_EX Documents

UNIX environment

Anita Z. Hoover

1 Introduction

Most of the testing I did was based on the UNIX platform. My hope is that most of these ideas will help with the transition to other platforms. However, some of the programs are written specifically for the UNIX platform and therefore solving problems may not be so easy.

My basic environment consisted of the following:

- T_EX 3.0 and L^AT_EX 2.09
- dvips version 5.47 by Tom Rokicki
- Macro packages used to include POSTSCRIPT
 1. psfig

These macros worked well because it allowed you to scale the height and width (soon to be available with dvips macros). It also allows a clip option if the POSTSCRIPT figure contained a lot of white space.
 2. epsf

These macros are part of the dvips program, and with the exception of the added features mentioned above in psfig, is a fine macro package.
- bbfig to help calculate the BoundingBox values

I first used this to calculate the BoundingBox values. If this did not work I would calculate it by hand using the great explanation in the dvips document by Tom Rokicki.
- The LaserPrep files for the Macintosh
 1. LaserPrep5.2, "(AppleDict md)" 68 0
 2. LaserPrep6.0, "(AppleDict md)" 70 0
 3. LaserPrep7.0, "(AppleDict md)" 71 0
- Three POSTSCRIPT printers
 1. HPIIIsi
 2. QMS-PS1500
 3. Apple LaserWriter
- Example POSTSCRIPT files
 1. Mathematic
 2. Macsyma
 3. S
 4. FrameMaker
 5. Macintosh Applications
 - CricketGraph
 - SuperPaint
 - MacDrawII

- MacDraw (only for LaserPrep5.2)

2 Mathematica, Macsyma, S

Just incorporate the POSTSCRIPT file following the directions for psfig or epsf.

3 FrameMaker

I found it the easiest to run the FrameMaker POSTSCRIPT file through a filter which fixes the location of the BoundingBox and changes the line which uses the BoundingBox called FMDOCUMENT.

4 Macintosh

4.1 LaserPrep5.2

You must include this file as a header in your document using the following \special command for dvips

```
\special{header=lprep68.pro}
```

Assuming you have your LaserPrep file as lprep68.pro.

Include your POSTSCRIPT file using psfig or epsf with the correct BoundingBox option. When you create this file from the Macintosh, the file should not contain the LaserPrep file.

```
\psfig{figure=file.ps, bllxpt, bbllypt, %
bburxpt, bburyppt}
\epsf[bllx, bblly, bburx, bbury]{file.ps}
```

These POSTSCRIPT files printed on the Apple LaserWriter NTX, QMS-PS1500, and HPIIIsi.

4.2 LaserPrep6.0

All that applies to LaserPrep5.2 (except you need to include the LaserPrep file for version 6.0), however these files only printed on the Apple LaserWriter NTX. I tried everything and could not get these to work on the other 2 printers.

4.3 LaserPrep7.0

Under System 7.0, the new Print Dialog Box now provides a button to create a POSTSCRIPT file. Doing so creates a file that automatically includes the LaserPrep file.

4.4 QMS-PS1500 and HPIIIsi Printer

All Macintosh POSTSCRIPT files that did not require fonts to be downloaded worked fine. In the case where a font needed to be downloaded, you must change the Macintosh POSTSCRIPT file so that `cexec` is something different. I changed it to be `texexec` and this worked. I was able to combine all types of Macintosh POSTSCRIPT files this way in T_EX and L^AT_EX documents.

This method worked especially nice for the HPIIIsi. I ran into a problem for the QMS-PS1500, where the SuperPaint file did not translate properly. Following the method below for the Apple LaserWriter printer solved this problem.

4.5 Apple LaserWriter

I do not know why this happens, as I am not a POSTSCRIPT Language expert, but taking the same files that printed on the QMS-PS1500 and HPIIIsi did not print on the Apple LaserWriter. In order to consistently get these files to work, I needed to split out the original POSTSCRIPT files created by the Macintosh to **not** include the LaserPrep file. To do this, you need to delete the text from

```
%%BeginProcSet :
      :
%%EndProlog
```

This is somewhat of a hassle, but I was able to get consistent results. I also needed to create 2 different LaserPrep files.

1. MacWrite, CricketGraph and SuperPaint
2. MacDrawII

I was not able to get the MacDrawII POSTSCRIPT file to print using the same LaserPrep file for the other Macintosh applications. Perhaps the difference was based on the downloaded fonts required for my MacDrawII example. I will have to do further investigation.

As a result of having to use 2 different LaserPrep files to print these specific applications, I was not able to combine MacDrawII POSTSCRIPT files with the other Macintosh POSTSCRIPT files.

5 Conclusion

I think the best thing to do is to just include the POSTSCRIPT file originally. If it does not print, see if there is a filter available to make the proper changes to allow it to print. Lastly, see if there is a logical change that can be made to the POSTSCRIPT file to make it work.

Also if you plan to mix different POSTSCRIPT files generated from different applications, you can expect to have problems.