

DVIPS-manual—good old portability, and some more

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Abstract

Portable manuals should be written and marked up in this way. Just a few macros to take care of the formatting. The manual can be easily personalized. The dvips manual has been made available as a BLUe report with an index—based on IR-s by Rokicki—and a ToC. Both are welcome when using the manual. Some experience in using dvips under UNIX is also reported: overprinting a picture, adding a caption, and aligning pictures. A pitfall in using `\psfig` is mentioned as well.

Keywords: Aligning figures, BLUe format, captions, dvi, eps, figures, minimal markup, overprinting, portability, PostScript.

1 Introduction

This note is about my experience with the dvips manual, with respect to the markup and the contents.

POSTSCRIPT can be seen as a no-nonsense, refreshing approach to printing, well ... to describe what should be printed. Fundamental was to embrace outlines, reducing complexity by an order, as an alternative to bitmaps, especially in the beginning of its introduction. Equally unusual was to explore the stack idea to its deepest. Underlying was the awareness that for computer graphics only a few primitives is all that is really needed, apart from add-ons and bells-and-whistles. The attitude to consider fonts as a special case of graphics contributed further to a uniform approach.

In short POSTSCRIPT had—and still has—much to offer to the world.

Looking back after ≈ 10 years since its introduction as POSTSCRIPT we can only conclude that POSTSCRIPT made it.¹ It is a de facto standard. Its promises have been recognized and picked up by Original Equipment Manufacturers, OEMs for short. It has been embraced as THE universal laser printer language, abstracting from the technologies of the various printers.

The software industry responded with applications which can automatically generate (E)PS, to be visualised by printers or screens, or included in (La)T_EX documents.

Tomas Rokicki in dvips—and other persons with drivers I'm not familiar with—paid the T_EX community a great service in bridging the gap between dvi files and ps files. They provided 'convertors,' to transform a dvi file into POSTSCRIPT format. His dvips not only converts but

also allows to merge POSTSCRIPT,² well ... encapsulated POSTSCRIPT, EPS for short.

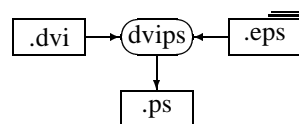


Fig.1 dvips use

dvips allows for several ways of including pictures.

1.1 Pictures interspersed with text

At the moment I use mostly

```
$$\psfig{file=...}$$
```

1.2 Pictures as background for a page

Hooks like at each beginning or ending of a page

```
/bop-hook {...}def%to be user-defined
```

are provided as well, to facilitate for example overprinting of a page.

1.3 Audience

I hope that my discussions will draw the attention of the unwearry, those who still struggle with the unusualities of (La)T_EX, that there should be a right balance between T_EXpertise, METAFONTry, and the emerging cooperating tools which are provided by the world outside.

1.4 Beyond PostScript

But, ... as time moved on limitations of POSTSCRIPT became apparent³ giving birth to successors. Maybe Adobe's

¹For the history of the predecessors see the introduction in Adobe's red book.

²The important aspect for including EPS graphics with your (La)T_EX document. I read that `\psfig` is obsolete and replaced by `\epsfig`. Hmmm, not yet available on the system I'm using remotely for this purpose, at least I could not find it.

³Well, relatively spoken newer tools responded better to the growing demands and changing needs, of course.

PDF will be accepted as the successor of POSTSCRIPT, but it is too early to tell.⁴

1.5 Is the manual still needed?

Since the emerge of user interfaces to POSTSCRIPT, such as PStricks, one can ask whether a user needs this dvips manual at all. For the L^AT_EX users this seems to be true; they are served by a UI in L^AT_EX jargon, enhancing portability of the L^AT_EX script with the lower level `\special-s` taken care off for each environment. Carlisle⁵ has put it as follows.

‘At a given site the graphics packages will be customized to use a suitably back end file that converts the L^AT_EX syntax into the form required by the local driver.’

So plain T_EXies are more and more suffering from the law of diminishing returns,⁶ ... or so it seems.

For the options of the invocation of dvips one still needs the manual, or the prompt from the system when using dvips without arguments.

2 DVIPS manual

Only recently I could lay hands on the dvips manual,⁷ and I was surprised that just ≈ 50 lines of macros was all that was needed on top of plain T_EX to format the manual. Portability in the spirit of Knuth.⁸

So, the manual was easily printed. Before I collected my remotely produced prints I read the source file as T_EXies do. Ah, indeed very close to *minimal* markup. Great joy.

This is how portable manuals should be written. Just a few macros on top of plain T_EX, is all that is needed to mark up your script.

To really appreciate the contents the T_EX formatted output was more convenient. Paging through the 50 odd pages, the price which has been paid to portability became evident: no table of contents nor an index.⁹ I was puzzled.

On second thoughts, I could easily add my own bells-and-whistles and you can probably add yours. That is portability! To refrain from (too-)detailedness, to ease personalization.

2.1 Customization

Personally, I like a TOC and an Index. Very convenient for reusing the material.

2.1.1 What about a ToC?

To provide a ToC is not hard especially when printed at the end of the job. I like simple, one-pass jobs.

2.1.2 What about an Index?

The general attitude is that sorting should be done outside of T_EX, and that entails the answer. However, since my BLUe’s format, indexing can be done within T_EX on-the-fly and in one-pass.

So I decided to edit the markup of the manual. To let the IR-s conform with Knuth’s markup for IR-s, which has been adopted in BLUe’s format, to keep up compatibility with Knuth.

3 DVIPS manual as a BLUe’s report

Rokicki has used `\sec` and `\sub`, which come functionally close to a chapter heading and a subheading.¹⁰ The IR-s markup had to be adapted too. The adaptations read

```
\^{...}      into    \{...}
\^{\\tt...} into    \!...!
```

Ipsa facto for the silent variants, that is with the hats doubled.

The script was surrounded by commands as follows.¹¹

```
\input blue.tex \loadindexmacros\report
\beginscript
<script proper>
\sortindex\pasteupindex\pasteuptoc
\endscript
```

The nasty `\hoffset` and `\magnification` have been commented out among others.

The `\author` token variable was assigned a `\btable` with appropriate data.

Et voilà, the dvips manual was for reuse personalized as a BLUe’s report.

⁴PDF compensates for the size of POSTSCRIPT files, allows multi-media usage, and is suited for WWW browsing. On the other hand Erik Frambach communicated that printing of a pdf file goes via converting it first to POSTSCRIPT, for example. Printing such a file on a Laserjet III failed as yet, however. In general PDF drivers are needed.

⁵MAPS 96.2.

⁶In Dutch: ‘De wet van de remmende voorsprong.’

⁷Thank you Taco Hoekwater for providing me with the files.

⁸Knuth writes his macros on ‘demand.’ For the book Concrete Mathematics manmac as such was not used. A new set of macros was written to serve whatever was the purpose. For his TAOCP he develops a new bunch.

⁹Some sort of Index Reminders were in the file but gobbled away.

¹⁰A few chapter titles had to be added, though, demonstrating that even such knowledgeable people like Rokicki are led astray when not supported by a ToC.

¹¹Note that `\loadindexmacros` and `\report` don’t commute. When you commute them you will get the wrong size of the head font. This inelegance could have been circumvented by not giving the option for loading the index macros, but just include them as part of the kernel. This consideration might be a reminder for the right hierarchy of specification order.

4 Some experience

Functionalities of POSTSCRIPT↔(La)T_EX use—L^AT_EX biased—have been reported by Reckdahl in among others MAPS 96.2. It seems that plain T_EXies suffer from lagging behind, because it is tied up with L^AT_EX. Not true. Happily, plain T_EXies hardly need this elaboration. All what is needed is to wrap the picture in a (v)box and manipulate the box as usual, whatever the contents. From this point of view alignment and overprinting is nothing new.

4.1 Alignment of pictures

As said nothing new. How to wrap up an eps figure in a box is something different however, but independent from placement within context.¹² For the unwearied a little elaboration follows below.

Example (*Aligning pictures at the bottom*)

```
\setbox0=\vbox to 5cm{<picture1>}
\setbox1=\vbox to 2cm{<picture2>}
$$\copy0\quad\copy1$$
```

Do you see how to align at the top?

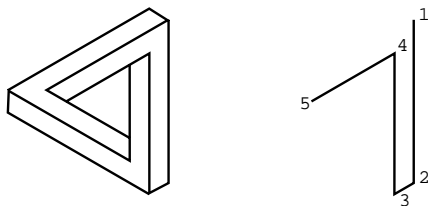
Example (*Centering pictures*)

This goes straightforwardly as follows.

```
\setbox0=\vbox to 5cm{<picture1>}
\setbox1=\vbox to 2cm{<picture2>}
$$\vcenter{\copy0}\quad\vcenter{\copy1}$$
```

Example (*Aligning EPS figures from files*)

The Escher pictures



are obtained via¹³

```
$$\psfig{file=eschera.eps,height=1in}
\psfig{file=escherb.eps,height=1in}$$
```

4.2 Captions

A similar application is the use of a caption tied up with a figure.¹⁴

The idea is the same. Instead of backskipping and overprinting—\llap—a user can box the picture together with the caption.

Example (*Caption tied up with a figure*)

The figure and caption on the first page of this note was obtained as follows.¹⁵

```
\setbox0=\hbox{\dvipspic}
$$\vbox{\copy0\vskip5pt
\hbox to\wd0{\hss
Fig.1 dvips use\hss}
}$$
```

4.3 Overprinting

Rokicki in his dvips manual provided in ‘Other bells and whistles’ an example of how to use /bop-hook for overprinting each page by a light grey, rotated and magnified representation of the word DRAFT.

In his ‘NEAT’ example he shows how to realize the functionality of a grey background with a (white) shadow. This comes down to overprint the \hrule set in some greyscale, by the word NEAT.

A related application is to overprint a greyscale picture. The principle reads as follows.

```
\setbox0=\vbox to5cm{<picture>}
\setbox1=\vbox to5cm{<overprint>}
\hbox{\copy0\hskip-\wd0\copy1}
```

In case the picture is just EPS code the contents of box0 can be built as follows, where it is assumed that the POSTSCRIPT picture is constructed above and right from the reference point. Note the sequence order of the \vss and the \special.

```
\hrule width...height0pt%to warrant space
\vss
\special{"...}
```

Details have to be synchronized. The height of the vbox must correspond with the upperright corner of the BoundingBox, if the lower left corner is the origin.¹⁶ The clipping boundary must also match these dimensions. Error-prone? Well, ...yes, but adopt a discipline from it, and know what you are doing.

¹²See the Overprint figure below as an example.

¹³For the contents of the EPS files consult my earlier note ‘Just a little bit of POSTSCRIPT’, MAPS 96.2.

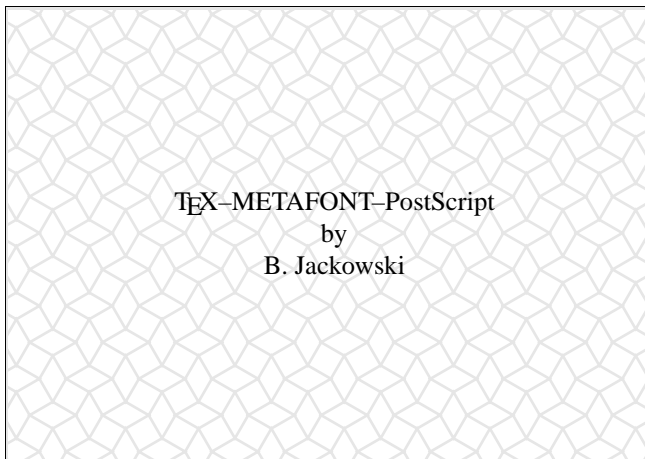
¹⁴So far, I have hardly used captions because the figures are part of examples which have the argument of the \example tag as label, or caption. It is a bit overdone to provide also for a caption.

¹⁵It looks low-level, but ... it is not so low. These commands can be easily wrapped into a macro. The point is that the few lines make explicit what one is doing, in a nutshell. The advantages are that one does not have to learn new things, and BLUE—Ben Lee User—remains in control.

¹⁶1 inch corresponds to 72 units of POSTSCRIPT.

I'm sorry that the example is not as simple as could have been, because I chose for an intriguing background.¹⁷

Example (*Overprint a (greyscale) picture*)



via

```
{\parindent0pt\medskip\hsize8.47cm %\vsize25cm
\def\ok{\hbox{\boxit{\vbox to6cm
  {\hrule width\hsize height0pt
\sss\special{"
/a 10 def
/tena {a 10 mul}def
/ha {a .5 mul} def
/tile {ha 3 sqrt mul 0 moveto
  0 ha lineto
  ha 3 sqrt mul neg 0 lineto
  0 ha neg lineto
  closepath
  ha 1 3 sqrt add mul ha 3 sqrt mul lineto
  ha 2 3 sqrt add mul 0 lineto
  ha 1 3 sqrt add mul ha 3 sqrt mul neg lineto
  closepath
} def
/frame {0 0 moveto
  0 170 rlineto
  240 0 rlineto
  0 -170 rlineto
  closepath
} def
/dotiling{
7{gsave
  11{tile a 1 3 sqrt add mul 0 translate
  }repeat stroke
  grestore
  gsave ha 1 3 sqrt add mul dup translate
  11{tile a 1 3 sqrt add mul 0 translate
  }repeat stroke grestore
  0 a 1 3 sqrt add mul translate
  }repeat
} def
%tile
```

```
gsave
frame gsave stroke grestore clip
a neg dup translate
0.9 setgray dotiling
grestore}%end \special
}}
%
\llap{\vbox to6cm{\vfil
\centerline{\strut\TeX--METAFONT--PostScript}
\centerline{\strut by}
\centerline{\strut B. Jackowski}
\vfil}%end vbox
}}}%end ok
%
\ok
\smallskip}
```

Explanation. The (overprinted) vboxes are wrapped up in a hbox to prevent a (line-)break between the vbox-es. The boxit command is there to show the boundary on my Mac where the special is not executed.

Remarks. Note the dependencies. Size of the vbox-es, and the size of the frame, each takes its own units, cm versus bp. Do you see the variant to frame it by an oval?

4.4 A pitfall in using psfig

Inclusion of eps files in BLUE scripts worked. But, ...it hiccuped with my transparencies. It turned out that reading of the BoundingBox data assumes that the e-o-l is changed (by T_EX) into a space. My transparencies format is line-oriented which entails that the e-o-l is changed into a \par. The following mod in the straight invocation was necessary.

```
{\catcode'\^=7 \catcode'\
  $$\psfig{...}$$}
```

5 Conclusions

The dvips manual which comes with version 5.58 is highly portable and a genuine example of minimal markup. In general it is an example of how a manual should be done to enhance portability.

It lacks a ToC and Index, however. The latter facilitate reading and browsing. Grace to the few macros and the IR-s markup already present, these elements can be easily added. Slight adaptations could compensate for these, at the expense of being dependent on BLUE's format \report and sorting within T_EX.

The next step is probably to provide a representation of the manual as a hypertext.

The use of dvips—\special-s—is not so portable as yet.¹⁸ As long as there is no generally accepted \special

¹⁷In the tutorial of Adobe's blue book a simple example of overprinting within PostScript alone is provided on p.42, about the business card for the Diamond Cafe. Here we are combining the best of both worlds: PostScript for the graphics and T_EX for the formatting, merging PostScript parts within a T_EX script.

¹⁸Rokicki works on a standard for \special-s. Keep fingers crossed.

syntax—a standard—I’ll do as much graphics as I can by T_EX alone via

- stacking of boxes,
- using of gkppic macros of Knuth (the picture functionality), or
- my turtle graphics macros.

These facilities come with BLUe’s format and have been documented in the Publishing with T_EX user’s guide. With respect to my POSTSCRIPT pictures I concentrate on merging—just including the eps file—keeping the interface as thin as possible.

It is demonstrated further that alignment of figures is nothing special when the figures are wrapped up in boxes. How to create the contents of those boxes is another story.

Related to Reckdahl’s note, MAPS 96.2, it’s amazing what a little insight can do.

Finally, when an error is made in the POSTSCRIPT code I was frustrated by the fact that the printer did not give me feedback, read, there were no pages from the erroneous page onwards.

Have fun, and all the best.

Appendix: ToC of dvips

Although the page numbers won’t correspond with the original manual the structure of the manual can be read from the following ToC.

1	dvips	3	Using PostScript Fonts
1.1	Why Use dvips?	3.1	The afm2tfm Program
1.2	Using dvips	3.2	Changing a Font’s Encoding
1.3	Paper Size and Landscape Mode	3.3	Special Effects
2	Including PostScript Graphics	3.4	Non-Resident PostScript Fonts
2.1	The Bounding Box Comment	3.5	Font Aliases
2.2	Using the EPSF Macros	4	Font Naming Conventions
2.3	Header Files	4.1	Foundry
2.4	Literal PostScript	4.2	Typeface Families
2.5	Literal Headers	4.3	Weight
2.6	Other Graphics Support	4.4	Variants
2.7	Dynamic Creation of PS Graphics Files	4.5	Expansion
		4.6	Naming Virtual Fonts
		4.7	Examples
		5	Command Line Options
		6	Configuration file
		6.1	Configuration File Searching
		6.2	Configuration File Options
		7	Automatic Font Generation
		8	Path Interpretation
		9	Environment Variables
		10	Other Bells And Whistles
		11	MS-DOS and OS/2
		12	Installation
		13	Diagnosing Problems
		13.1	Debug Options
		13.3	No Output At All
		13.3	Output Too Small or Inverted
		13.4	Error Messages From Printer
		13.5	400 DPI Is Used Instead Of 300 DPI
		13.6	Long Documents Fail To Print
		13.7	Including Graphics Fails
		13.8	Can’t Find Font Files
		13.9	Can’t Generate Fonts
		14	Using Color with dvips
		14.1	The Macro Files
		14.2	User Definable Colors
		14.3	Subtleties in Using Color
		14.4	Printing in Black/White, after Colorizing
		14.5	Configuring dvips for Color Devices
		14.6	Protecting Regions From Spurious Colors
		14.7	Color Support Details
		14.8	Index
		15	Table of Contents