

# Documentation for 2up.tex: Two-up printing for Generic TeX

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`2up.tex/2up.sty` allows one to print a document two-up, with considerable flexibility as to paper size and layout. It produces a standard dvi file, and does not involve an additional dvi or PostScript filter. It should work with most TeX macro packages.

**Usage:** Input `2up.tex`, or include `2up` as a LaTeX style option. There is a good chance you will get the desired layout. (But you will probably need to generate new font bitmaps to get high quality output.) See the rest of this documentation for detailed information on controlling `2up.tex`.

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\*The documentation was put into L<sup>A</sup>T<sub>E</sub>X format by David Todd.

## 1 Comparison with other methods

There are other tools for two-up printing:

**PostScript filters** These work well as long as you only use PostScript fonts (as opposed to the usual Metafont fonts). Otherwise, the PostScript filter scales bitmapped fonts, and the quality is lower than with `2up.tex`.

**Rokicki's `dvidvi`** `dvidvi` is a versatile tool that does much more than 2up printing. However, it only rearranges the pages, and does not adjust the magnification to ensure that the pages fit properly in a two-up format. It also adds one more step to the  $\TeX$ -dvi-printer cycle. `2up.tex`, on the other hand, combines the changes to  $\TeX$ 's magnification and page layout with the rearranging of the pages, all with an easy-to-use interface and from within your  $\TeX$  document. (See Section 8 on using both `2up.tex` and `dvidvi` together.)

## 2 A warning about fonts

Two-up printing generally involves reducing a document, and thus using font sizes that are not typically found on your system. If you are using bitmapped fonts (standard for  $\TeX$  users), and you do not have and cannot generate the extra fonts bitmaps, you will find `2up.sty` (and any other method of two-up printing) to give very poor quality output.

If you are using a program like Rokicki's `dvips` that can generate extra font bitmaps as needed, you will find that it takes a long time to print your 2up document the first few times, as `dvips` is busy making the extra fonts. This problem will go away. Be thankful you have such an easy way to get extra font bitmaps.

## 3 Usage

Input `2up.tex`.  $\LaTeX$  users can include `2up` as a style option.

Then set the target and source layout:

```
\source{mag}{width}{height}
\target{mag}{width}{height}
```

- The “source” layout is the layout of your document the way it is usually printed. The “target” layout is the layout when it is printed two-up.
- *width* and *height* are the true width and height of the paper, when looking at the output right-side-up.
- *mag* refers to the source and target magnification. It should be an integer, equal to 1000 times the magnification factor. There are also some magic magnification numbers:

`\magstepn` for a magnification of  $1.2^n$  ( $n=0,\dots,5$ ), or

`\magstepminusn` for a magnification of  $1.2^{-n}$  ( $n=0,\dots,5$ ).

Using these magnification values will make best use of the available fonts on your system.

`2up.tex` takes each source page, and centers in half a target page. To get the pages to fit, the magnification of the document typically has to be reduced. If you find that the pages are too crowded, try reducing the target magnification. If they are too lonely, try increasing the target magnification. If you want to adjust the positioning of the scaled pages, try changing the values of `\hoffset` or `\voffset` with `\advance` or L<sup>A</sup>T<sub>E</sub>X’s `\addtolength`. Don’t change the magnification of your document after using the `\target` command, as you will override the settings made by `2up.tex`.

You can also specify some options:

`\targetlayout{options}`

where *options* is a comma separated list with no spaces. Valid options are:

**topbottom**    The two source pages are printed one on top of the other.

**twosided**    Odd pages are always printed on the right or the bottom.

**booklet**      Pages are printed like a booklet. See Section 7.

**Booklet**     Like `booklet`, but for two-sided printers/copiers.

**dvidvi**       For arranging in two-up layout with `dvidvi`. See Section 8.

The only other changes you might want to make to your document are the following:

- You have to see to it that the target output is printed with the correct orientation (landscape or portrait). See the documentation for your dvi driver for details.
- `2up.tex` will insert a line between pages if you change the following dimensions:

`\pagesepwidth` Thickness of line. (Default 0pt)

`\pageseplength` Length of line. (Default 6.5in)

`\pagesepoffset` Distance from bottom of page to bottom of line, or (with `topbottom` layout) from side of page to beginning of line. (Default 1in)

- You can, but do not need to, use the following commands:

`\twoupemptypage` inserts a completely blank half page in the target.

`\twoupclearpage` L<sup>A</sup>T<sub>E</sub>X users: ejects a complete target page.

`\twoupeject` Plain T<sub>E</sub>X users: ejects a complete target page.

## 4 Defaults

The following commands set the parameters for some common sources and targets. The definitions of these commands are also useful examples.

For A4 paper, just replace `8.5in` and `11in` in the definitions below by the width and height of A4 paper.

`\twouparticle` This is the default for L<sup>A</sup>T<sub>E</sub>X.

**Source:** A portrait document on 8.5x11 inch paper with wide margins as used in L<sup>A</sup>T<sub>E</sub>X's article style, and without marginal notes.

**Target:** A landscape document on the same size paper, with the source pages printed side by side.

**Definition:**

```
\target{\magstepminus1}{11in}{8.5in}
\source{\magstep0}{8.5in}{11in}
```

If you use narrower side margins, or if you use marginal notes, then you will need to use `\twoupplain` or `\twouplegaltarget`, defined below.

**\twoupplain** This is the default for non- $\LaTeX$ .

It is the same as `\twouparticle`, but for source documents with narrower margins.

**Definition:**

```
\target{\magstepminus2}{11in}{8.5in}
\source{\magstep0}{8.5in}{11in}
```

**\twoplegaltarget Source:** A portrait document on 8.5x11 inch paper with just about any margins and perhaps with marginal notes.

**Target:** A landscape document on legal size paper (8.5x14 inches), with the source pages printed side by side.

**Definition:**

```
\target{\magstepminus1}{14in}{8.5in}
\source{\magstep0}{8.5in}{11in}
```

**\twouplandscape**

**Source:** A landscape document on 8.5x11 inch paper with just about any margins.

**Target:** A portrait document on the same size paper, with the source pages stacked vertically.

**Definition:**

```
\target{\magstepminus2}{8.5in}{11in}
\source{\magstep0}{11in}{8.5in}
\targetlayout{topbottom}
```

## 5 True Dimensions

$\TeX$  lets you use ‘true’ dimensions, as in

```
\topmargin 1truein
\setlength{\topmargin}{1truein}
```

This sets the length to 1 inch as it appears on the page, no matter what the magnification.

Once you use ‘true’ dimensions, it is impossible to change the magnification of your document, and hence it is almost impossible to use `2up.tex`. You will get an error like:

```
! Incompatible magnification (833);
   the previous value will be retained (2000).
```

The use of ‘true’ dimensions might be hiding in macros or style files you are using. For example, Plain  $\TeX$ ’s `\magnification` command uses true dimensions; use `\mag` instead, and then set `\hsize` and `\vsize` appropriately scaled. If you can’t find the culprit ‘true’ dimension in your document or input files, try putting this on the (very) first line of your document:

```
\mag 143 \voffset 1truein \mag 1000
```

You will get the error listed above wherever true dimensions are used (and in some other places as well).

## 6 Page Cross-References

Page cross-references (e.g., in an index or table of contents) will not be accurate with `2up.tex`, because finished pages are not immediately shipped out. This can also cause problems with some special  $\LaTeX$  styles that have multiple `.aux` files (e.g., for each chapter).

To get better, but not perfect, page cross-references, try putting the command

```
\TwoupWrites
```

at the beginning of your document, after inputting `2up.tex`. This is good for drafts, and may fix problems with  $\LaTeX$  styles that have multiple `.aux` files. `\TwoupWrites` makes `\write` and `\read \immediate`, if you know what that means. It might cause problems of its own, but try it and see.

To get accurate page cross-references:

1. Run the job without `2up.tex`, until all cross-references are properly resolved. Run any index utility at this point.
2. Run the job ONE MORE TIME with `2up.tex`; it will use the correct cross-references from the previous runs. (In  $\LaTeX$  documents, it is useful at this point to include the `\nofiles` command, so that the correct cross-references are preserved.)

## 7 Booklets

Here are some special considerations for making booklets:

- Use the `booklet` target layout if your printer or copier cannot print two sides directly. `2up.tex` prints out the “tops” of the pages, and then the “bottoms”, so that you can copy or print on both sides by doing one side, flipping the output over, and doing the other side.
- Use `Booklet` if your printer or copier can print directly on two sides.
- You must have enough memory and box registers to hold all the pages in the document. A Big $\TeX$  should be able to handle at least a 32-page booklet.
- Sometimes booklet printing is part of the design of a document, rather than an afterthought. In this case, you should set up the margins for the target half-page rather than using `2up.tex` to scale the document. For example, if using  $\LaTeX$ , 8.5x11 inch paper,  $\LaTeX$ 's `twoside` style option, and headings, try the following page parameter changes:

```
\setlength{\oddsidemargin}{-0.2in}
\setlength{\evensidemargin}{-0.5in}
\setlength{\textwidth}{4.2in}
\setlength{\textheight}{6.5in}
\setlength{\topmargin}{-.4in}
```

If you do this, `2up.tex` isn't adjusting margins or scaling the document. You could therefore get by without `2up.tex` by using `dvidvi`.

## 8 Using `dvidvi`

With the `dvidvi` layout option, `2up.tex` takes care of adjusting the margins, and you then use `dvidvi` to arrange the pages in a two-up format. The advantage is that cross referencing comes out right. The disadvantage is that it involves one more step.

Start by  $\TeX$ ing your document with `2up.tex` and the `dvidvi` layout option. Then run the dvi file through `dvidvi`. Specify the offsets for `dvidvi` at the middle of the page. E.g., for a side-by-side layout on 8.5x11in paper, use

```
dvidvi '2:0,1(5.5in,0in)' foo bar
```

For other paper sizes, replace `5.5in` by half the target paper width. For the `topbottom` layout, reverse the dimensions, e.g., `(0in,5.5in)`. For booklet printing, see the the documentation for `dvidvi`.

## 9 Compatibility

These macros should work with most  $\TeX$  macro packages, except for the following possible but unlikely compatibility problems:

- If you use a macro package other than  $\LaTeX$  that does unusual things to end a document and/or that modifies the definition of `\end`, you may find that the last page is not printed or that an extra page with headings is inserted at the end of the document. This is fixable on a case-by-case basis. See the redefinition of `\end` in `2up.tex`.
- `2up.tex` might not work if you meddle with  $\TeX$ 's `\shipout` primitive after loading `2up.tex`.
- If the first page of the source document is not on the first two-up target page (possible, for example, with two-sided printing and the `booklet` option, but generally unlikely), `\special`'s that come at the beginning of the document also do not get onto the first page of output. This can mess up `\special`'s for landscape printing or including a PostScript header file. In this case, you have to specify these things as command line options when using your dvi driver.

## 10 Changes

- V0.9a** Everything redone. Too many differences to point out.
- V0.9b** Interface redone again. `booklet` option added.
- V0.9c** Pages ship out a little earlier. A few bugs fixed.  
Parameters `\pageseplength` and `\pagesepthickness` added.
- V0.9d** Fixed bug with `\twoupclearpage` and `\twoupeject`.
- V0.9e** Made pages be counted (from dvi driver's viewpoint) by the physical page number.

- V0.9f** Parameter `\pagesepoffset` added, and `\pagesepthickness` changed to `\pagesepwidth`.
- V1.0** None. Just seemed like it was time to call it 1.0
- V1.1** Added `Booklet` and `dvidvi` target layouts.  
`\hoffset` and `\voffset` in source document now have expected effect.
- V1.2** Fixed incompatibility problem with AmS- $\TeX$ /AmS- $\LaTeX$ .  
Added `\TwoupWrites` command.