

The picture package

Heiko Oberdiek
<oberdiek@uni-freiburg.de>

2009/10/11 v1.3

Abstract

There are macro and environment arguments that expect numbers that will internally be multiplied with `\unitlength`. This package extends the syntax of these arguments that `dimens` with calculation support can be added for these arguments.

Contents

1	User interface	2
1.1	Introduction	2
1.2	Options	2
1.3	Example	2
1.4	Supported packages	2
2	Implementation	3
2.1	Identification	3
2.2	Options	3
2.3	Calculation method	3
2.3.1	Method <code>calc</code>	3
2.3.2	Method <code>etex</code>	4
2.3.3	Method <code>plain</code>	4
2.3.4	Help macros	4
2.4	Redefinitions	5
2.4.1	<code>L^AT_EX</code> base macros	6
2.4.2	Package <code>pspicture</code>	6
2.5	Check package loading order	6
3	Installation	7
3.1	Download	7
3.2	Bundle installation	7
3.3	Package installation	7
3.4	Refresh file name databases	8
3.5	Some details for the interested	8
4	History	8
	[2006/08/26 v1.0]	8
	[2007/04/11 v1.1]	8
	[2008/11/26 v1.2]	8
	[2009/10/11 v1.3]	8
5	Index	9

1 User interface

1.1 Introduction

The environment `picture` and macros such as `\put`, `\line`, `\vector` and other macros have arguments that expect numbers that are used as factor for `\unitlength`. This package redefines such macros and adds code that detects whether such an argument is given as number or as length. In the latter case, the length is used directly without multiplying with `\unitlength`.

1.2 Options

Depending on the available features, also length expressions can be given. Option `calc` loads package `calc`. Then expressions of these package may be used. Otherwise `etex` wraps the length argument inside `\dimexpr...\relax`, if ϵ -TeX is available. Otherwise option `plain` uses plain assignments without calculation support.

The default is `calc` if package `calc` is loaded before package `picture`. If you specify option `calc` the loading of `calc` is ensured. Otherwise package `picture` looks whether `\dimexpr` is available and uses then option `etex` as default. If ϵ -TeX also could not be found, then `plain` is used.

1.3 Example

```
1 (*example)
2 \documentclass{article}
3
4 \usepackage[calc]{picture}
5
6 \begin{document}
7
8 \setlength{\unitlength}{1pt}
9
10 \begin{picture}(\widthof{Hello World}, 10mm)
11   \put(0, 0){\makebox(0,0)[lb]{Hello World}}%
12   \put(0, \heightof{Hello World} + \fboxsep){%
13     \line(1, 0){\widthof{Hello World}}}%
14   }%
15   \put(\widthof{Hello World}, 10mm){%
16     \line(0, -1){10mm}}%
17   }%
18 \end{picture}
19
20 \end{document}
21 \end{example}
```

1.4 Supported packages

Packages `pspicture` and `pict2e` are supported, but they must be loaded before package `picture`.

New macros can be supported by `\picture@redefine`. The first argument is the macro which contains the arguments in its parameter text that you want to support by package `picture`. The second argument contains the parameter text. Change `#` to `&` for the arguments in question. Examples (already used by package `picture`):

```
\picture@redefine\put{(&1,&2)}
\picture@redefine\line{(#1,#2)&3}
```

2 Implementation

2.1 Identification

```
22 (*package)
23 \NeedsTeXFormat{LaTeX2e}
24 \ProvidesPackage{picture}%
25 [2009/10/11 v1.3 Dimens for picture macros (HO)]%
```

2.2 Options

```
26 \def\Pc@calcname{calc}
27 \def\Pc@etexname{etex}
28 \def\Pc@plainname{plain}

\Pc@method Macro \Pc@method stores the method to use for calculations. Check which features
are available and set the default for \Pc@method.

29 \@ifpackageloaded{calc}{%
30   \let\Pc@method\Pc@calcname
31 }{%
32   \begingroup\expandafter\expandafter\expandafter\endgroup
33   \expandafter\ifx\csname dimexpr\endcsname\relax
34     \let\Pc@method\Pc@plainname
35   \else
36     \let\Pc@method\Pc@etexname
37   \fi
38 }

39 \DeclareOption{plain}{%
40   \let\Pc@method\Pc@plainname
41 }
42 \DeclareOption{etex}{%
43   \begingroup\expandafter\expandafter\expandafter\endgroup
44   \expandafter\ifx\csname dimexpr\endcsname\relax
45     \PackageError{picture}{%
46       e-TeX is not available%
47     }\@ehc
48   \else
49     \let\Pc@method\Pc@etexname
50   \fi
51 }
52 \DeclareOption{calc}{%
53   \let\Pc@method\Pc@calcname
54 }
55 \ProcessOptions*
56 \begingroup
57   \let\on@line\@empty
58   \PackageInfo{picture}{Calculation method: \Pc@method}%
59 \endgroup
```

2.3 Calculation method

```
60 \ifx\Pc@method\Pc@calcname
61   \RequirePackage{calc}%
62 \fi
```

2.3.1 Method calc

```
63 \ifx\Pc@method\Pc@calcname
64   \def\Pc@tokslength#1{%
65     \begingroup
66       \let\calc@error\Pc@calc@error
67       \setlength\dimen@{#1\unitlength}\Pc@next\Pc@nil{#1}%
68     }%
69   \let\Pc@org@calc@error\calc@error
```

```

70 \@ifpackagelater{calc}{2007/08/22}{% v4.3
71   \def\Pc@calc@error#1{%
72     \expandafter\ifx\expandafter\unitlength\noexpand#1\relax
73       \def\calc@next##1!{%
74         \endgroup
75         \aftergroup\afterassignment
76         \aftergroup\Pc@next
77       }%
78     \expandafter\@firstoftwo
79   \else
80     \expandafter\@secondoftwo
81   \fi
82   {%
83     \calc@next{#1}%
84   }{%
85     \PcOrg@calc@error{#1}%
86   }%
87 }%
88 }{%
89   \def\Pc@calc@error#1{%
90     \expandafter\ifx\expandafter\unitlength\noexpand#1\relax
91       \def\calc@next##1!{%
92         \endgroup
93         \aftergroup\afterassignment
94         \aftergroup\Pc@next
95       }%
96     \expandafter\@gobble
97   \else
98     \expandafter\@firstofone
99   \fi
100   {%
101     \PcOrg@calc@error{#1}%
102   }%
103 }%
104 }%
105 \fi

```

2.3.2 Method etex

```

106 \ifx\Pc@method\Pc@etexname
107   \def\Pc@tokslength#1{%
108     \begingroup
109       \afterassignment\Pc@next
110       \dimen@=\dimexpr#1\unitlength\Pc@nil{#1}%
111     }%
112 \fi

```

2.3.3 Method plain

```

113 \ifx\Pc@method\Pc@plainname
114   \def\Pc@tokslength#1{%
115     \begingroup
116       \afterassignment\Pc@next
117       \dimen@=#1\unitlength\Pc@nil{#1}%
118     }%
119 \fi

```

2.3.4 Help macros

```

120 \def\Pc@next#1\Pc@nil#2{%
121   \ifx\\#1\\%
122     \endgroup
123     \Pc@addtoks{#{#2}}%
124   \else
125     \expandafter\endgroup

```

```

126     \expandafter\Pc@addtoks\expandafter{%
127     \expandafter{\the\dimen@\@gobble}%
128     }%
129 \fi
130 }

\Pc@nil \Pc@nil must not have the meaning of \relax because of \dimexpr.
131 \let\Pc@nil\message

\Pc@addtoks
132 \def\Pc@addtoks#1{%
133     \toks@=\expandafter{\the\toks@#1}%
134 }

\Pc@init
135 \def\Pc@init#1{%
136     \begingroup
137     \toks@={#1}%
138 }

\Pc@finish
139 \def\Pc@finish#1{%
140     \expandafter\endgroup
141     \expandafter#1\the\toks@
142 }

```

2.4 Redefinitions

```

\picture@redefine #1: command name
#2: parameter text, length parameter with & instead of #

143 \def\picture@redefine#1#2{%
144     \begingroup
145     \edef\reserved@a{%
146         \noexpand\noexpand
147         \expandafter\noexpand
148         \csname PcOrg@\expandafter\@gobble\string#1\endcsname
149     }%
150     \toks0{#1}%
151     \Pc@first#2&0%
152 }

\Pc@first
153 \def\Pc@first#1&{%
154     \toks1={#1}%
155     \toks2={\Pc@init{#1}}%
156     \Pc@scanlength
157 }

\Pc@scanlength #1: number of length parameter or zero
158 \def\Pc@scanlength#1{%
159     \ifcase#1 %
160     \expandafter\Pc@last
161     \else
162     \toks1=\expandafter{\the\toks1 ###1}%
163     \toks2=\expandafter{\the\toks2 \Pc@tokslength{###1}}%
164     \expandafter\Pc@scannext
165     \fi
166 }

```

\Pc@scannext

```

167 \def\Pc@scannext#1{%
168   \ifx\#1\%
169   \else
170     \toks1=\expandafter{\the\toks1 #1}%
171     \toks2=\expandafter{\the\toks2 \Pc@addtoks{#1}}%
172   \fi
173   \Pc@scanlength
174 }

```

\Pc@last

```

175 \def\Pc@last{%
176   \edef\x{%
177     \endgroup
178     \let\reserved@a\the\toks0 %
179     \def\the\toks0 \the\toks1 {%
180       \the\toks2 %
181       \noexpand\Pc@finish\reserved@a
182     }%
183   }%
184   \x
185 }

```

2.4.1 L^AT_EX base macros

```

186 \picture@redefine\picture{(&1,&2)(&3,&4)}
187 \picture@redefine\put{(&1,&2)}
188 \picture@redefine\multiput{(&1,&2)}
189 \picture@redefine\@multiput{(&1,&2)}
190 \picture@redefine\line{(#1,#2)&3}
191 \picture@redefine\vector{(#1,#2)&3}
192 \picture@redefine\dashbox{&1(&2,&3)}
193 \picture@redefine\@circle{&1}
194 \picture@redefine\@dot{&1}
195 \picture@redefine\@bezier{#1(&2,&3)(&4,&5)(&6,&7)}
196 \picture@redefine\@makepicbox{(&1,&2)}

```

2.4.2 Package pspicture

Package pspicture changes the signature of \@oval by adding an optional argument.

```

197 \@ifpackageloaded{pspicture}{%
198   \picture@redefine\@oval{[&1](&2,&3)}%
199   \picture@redefine\Line{(&1,&2)}%
200   \picture@redefine\Curve{(&1,&2)}%
201   \picture@redefine\Vector{(&1,&2)}%
202 }{%
203   \picture@redefine\@oval{(&1,&2)}%
204 }

```

2.5 Check package loading order

\PC@checkpackage

```

205 \def\Pc@checkpackage#1{%
206   \@ifpackageloaded{#1}{%
207   }{%
208     \AtBeginDocument{%
209       \@ifpackageloaded{#1}{%
210         \PackageWarningNoLine{picture}{%
211           Package ‘#1’ is loaded after ‘picture’.\MessageBreak
212           Load package ‘picture’ afterwards to get full support%
213           \MessageBreak

```

```

214         of its additional syntax with length specifications%
215     }%
216     }{}%
217     }%
218 }%
219 }

220 \Pc@checkpackage{pict2e}
221 \Pc@checkpackage{pspicture}
222 \</package>

```

3 Installation

3.1 Download

Package. This package is available on CTAN¹:

[CTAN:macros/latex/contrib/oberdiek/picture.dtx](#) The source file.

[CTAN:macros/latex/contrib/oberdiek/picture.pdf](#) Documentation.

Bundle. All the packages of the bundle ‘oberdiek’ are also available in a TDS compliant ZIP archive. There the packages are already unpacked and the documentation files are generated. The files and directories obey the TDS standard.

[CTAN:install/macros/latex/contrib/oberdiek.tds.zip](#)

TDS refers to the standard “A Directory Structure for T_EX Files” ([CTAN:tds/tds.pdf](#)). Directories with `texmf` in their name are usually organized this way.

3.2 Bundle installation

Unpacking. Unpack the `oberdiek.tds.zip` in the TDS tree (also known as `texmf` tree) of your choice. Example (linux):

```
unzip oberdiek.tds.zip -d ~/texmf
```

Script installation. Check the directory `TDS:scripts/oberdiek/` for scripts that need further installation steps. Package `attachfile2` comes with the Perl script `pdfatfi.pl` that should be installed in such a way that it can be called as `pdfatfi`. Example (linux):

```
chmod +x scripts/oberdiek/pdfatfi.pl
cp scripts/oberdiek/pdfatfi.pl /usr/local/bin/
```

3.3 Package installation

Unpacking. The `.dtx` file is a self-extracting `docstrip` archive. The files are extracted by running the `.dtx` through plain-T_EX:

```
tex picture.dtx
```

TDS. Now the different files must be moved into the different directories in your installation TDS tree (also known as `texmf` tree):

```

picture.sty      → tex/latex/oberdiek/picture.sty
picture.pdf      → doc/latex/oberdiek/picture.pdf
picture-example.tex → doc/latex/oberdiek/picture-example.tex
picture.dtx      → source/latex/oberdiek/picture.dtx

```

If you have a `docstrip.cfg` that configures and enables `docstrip`’s TDS installing feature, then some files can already be in the right place, see the documentation of `docstrip`.

¹<http://ftp.ctan.org/tex-archive/>

3.4 Refresh file name databases

If your $\text{T}_{\text{E}}\text{X}$ distribution ($\text{t}_{\text{e}}\text{T}_{\text{E}}\text{X}$, $\text{m}_{\text{i}}\text{k}_{\text{T}}\text{E}_{\text{X}}$, ...) relies on file name databases, you must refresh these. For example, $\text{t}_{\text{e}}\text{T}_{\text{E}}\text{X}$ users run `texhash` or `mktexlsr`.

3.5 Some details for the interested

Attached source. The PDF documentation on CTAN also includes the `.dtx` source file. It can be extracted by AcrobatReader 6 or higher. Another option is `pdftk`, e.g. unpack the file into the current directory:

```
pdftk picture.pdf unpack_files output .
```

Unpacking with $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$. The `.dtx` chooses its action depending on the format:

plain- $\text{T}_{\text{E}}\text{X}$: Run `docstrip` and extract the files.

$\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$: Generate the documentation.

If you insist on using $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$ for `docstrip` (really, `docstrip` does not need $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$), then inform the autodetect routine about your intention:

```
latex \let\install=y\input{picture.dtx}
```

Do not forget to quote the argument according to the demands of your shell.

Generating the documentation. You can use both the `.dtx` or the `.drv` to generate the documentation. The process can be configured by the configuration file `ltxdoc.cfg`. For instance, put this line into this file, if you want to have A4 as paper format:

```
\PassOptionsToClass{a4paper}{article}
```

An example follows how to generate the documentation with `pdf $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$` :

```
pdflatex picture.dtx
makeindex -s gind.ist picture.idx
pdflatex picture.dtx
makeindex -s gind.ist picture.idx
pdflatex picture.dtx
```

4 History

[2006/08/26 v1.0]

- First released version. (First start of the project was June/July 2002.)

[2007/04/11 v1.1]

- Line ends sanitized.

[2008/11/26 v1.2]

- Package `pict2e` added to documentation section “Supported packages”.
- Package order of supported packages is checked.

[2009/10/11 v1.3]

- Fix because of new version v4.3 of package `calc`.

5 Index

Numbers written in *italic* refer to the page where the corresponding entry is described; numbers underlined refer to the code line of the definition; numbers in roman refer to the code lines where the entry is used.

Symbols	M
\@bezier 195	\makebox 11
\@circle 193	\message 131
\@dot 194	\MessageBreak 211, 213
\@ehc 47	\multiput 188
\@empty 57	
\@firstofone 98	N
\@firstoftwo 78	\NeedsTeXFormat 23
\@gobble 96, 127, 148	O
\@ifpackagelater 70	\on@line 57
\@ifpackageloaded .. 29, 197, 206, 209	
\@imakepicbox 196	P
\@multiput 189	\PackageError 45
\@oval 198, 203	\PackageInfo 58
\@picture 186	\PackageWarningNoLine 210
\@secondoftwo 80	\Pc@addtoks 123, 126, <u>132</u> , 171
\\ 121, 168	\Pc@calc@error 66, 71, 89
	\Pc@calcname 26, 30, 53, 60, 63
A	\PC@checkpackage <u>205</u>
\afterassignment 75, 93, 109, 116	\Pc@checkpackage 205, 220, 221
\aftergroup 75, 76, 93, 94	\Pc@etexname 27, 36, 49, 106
\AtBeginDocument 208	\Pc@finish <u>139</u> , 181
	\Pc@first 151, <u>153</u>
B	\Pc@init <u>135</u> , 155
\begin 6, 10	\Pc@last 160, <u>175</u>
	\Pc@method <u>29</u> ,
C	40, 49, 53, 58, 60, 63, 106, 113
\calc@error 66, 69	\Pc@next 67, 76, 94, 109, 116, 120
\calc@next 73, 83, 91	\Pc@nil 67, 110, 117, 120, <u>131</u>
\csname 33, 44, 148	\Pc@plainname 28, 34, 40, 113
\Curve 200	\Pc@scanlength 156, <u>158</u> , 173
	\Pc@scannext 164, <u>167</u>
D	\Pc@tokslength 64, 107, 114, 163
\dashbox 192	\PcOrg@calc@error 69, 85, 101
\DeclareOption 39, 42, 52	\picture@redefine <u>143</u> , 186, 187, 188,
\dimen@ 67, 110, 117, 127	189, 190, 191, 192, 193, 194,
\dimexpr 110	195, 196, 198, 199, 200, 201, 203
\documentclass 2	\ProcessOptions 55
	\ProvidesPackage 24
E	\put 11, 12, 15, 187
\end 18, 20	
\endcsname 33, 44, 148	R
	\RequirePackage 61
F	\reserved@a 145, 178, 181
\fboxsep 12	
	S
H	\setlength 8, 67
\heightof 12	
	T
I	\the 127, 133, 141,
\ifcase 159	162, 163, 170, 171, 178, 179, 180
\ifx 33,	\toks 150, 154, 155,
44, 60, 63, 72, 90, 106, 113, 121, 168	162, 163, 170, 171, 178, 179, 180
	\toks@ 133, 137, 141
L	
\Line 199	U
\line 13, 16, 190	\unitlength 8, 67, 72, 90, 110, 117
	\usepackage 4

	V		W
<code>\Vector</code> 201	<code>\widthof</code> 10, 13, 15
<code>\vector</code> 191		X
		<code>\x</code> 176, 184