

The `picture` package

Heiko Oberdiek
<oberdiek@uni-freiburg.de>

2006/08/26 v1.0

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	1
1.1	Introduction	1
1.2	Options	2
1.3	Example	2
1.4	Supported packages	2
2	Implementation	2
2.1	Identification	2
2.2	Options	2
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	5
2.4.2	Package <code>pspicture</code>	6
3	Installation	6
3.1	Some details for the interested	6
4	History	7
	[2006/08/26 v1.0]	7
5	Index	7

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 \example
```

1.4 Supported packages

Package `pspicture` is supported, but it 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 [2006/08/26 v1.0 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\PcOrg@calc@error\calc@error
70     \def\Pc@calc@error#1{%
71       \expandafter\ifx\expandafter\unitlength\noexpand#1\relax
72         \def\calc@next##1!{%
73           \endgroup
74           \aftergroup\afterassignment
75           \aftergroup\Pc@next
76         }%
77       \else
78         \@ReturnAfterFi{%
79           \PcOrg@calc@error{#1}%
80         }%
81       \fi
82     }%

```

```

83 \expandafter\@firstofone
84 \else
85 \expandafter\@gobble
86 \fi
87 {%
88 \long\def\@ReturnAfterFi#1\fi{\fi#1}%
89 }

```

2.3.2 Method etex

```

90 \ifx\Pc@method\Pc@etexname
91 \def\Pc@tokslength#1{%
92 \begingroup
93 \afterassignment\Pc@next
94 \dimen@=\dimexpr#1\unitlength\Pc@nil{#1}%
95 }%
96 \fi

```

2.3.3 Method plain

```

97 \ifx\Pc@method\Pc@plainname
98 \def\Pc@tokslength#1{%
99 \begingroup
100 \afterassignment\Pc@next
101 \dimen@=#1\unitlength\Pc@nil{#1}%
102 }%
103 \fi

```

2.3.4 Help macros

```

104 \def\Pc@next#1\Pc@nil#2{%
105 \ifx\#1\%
106 \endgroup
107 \Pc@addtoks{#{2}}%
108 \else
109 \expandafter\endgroup
110 \expandafter\Pc@addtoks\expandafter{%
111 \expandafter{\the\dimen@\@gobble}%
112 }%
113 \fi
114 }

```

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

```

115 \let\Pc@nil\message

```

\Pc@addtoks

```

116 \def\Pc@addtoks#1{%
117 \toks@=\expandafter{\the\toks@#1}%
118 }

```

\Pc@init

```

119 \def\Pc@init#1{%
120 \begingroup
121 \toks@={#1}%
122 }

```

\Pc@finish

```

123 \def\Pc@finish#1{%
124 \expandafter\endgroup
125 \expandafter#1\the\toks@
126 }

```

2.4 Redefinitions

```

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

127 \def\picture@redefine#1#2{%
128   \begingroup
129     \edef\reserved@a{%
130       \noexpand\noexpand
131       \expandafter\noexpand
132       \csname PcOrg@\expandafter\@gobble\string#1\endcsname
133     }%
134     \toks0{#1}%
135     \Pc@first#2&0%
136 }

\Pc@first

137 \def\Pc@first#1&{%
138   \toks1={#1}%
139   \toks2={\Pc@init{#1}}%
140   \Pc@scanlength
141 }

\Pc@scanlength #1: number of length parameter or zero

142 \def\Pc@scanlength#1{%
143   \ifcase#1 %
144     \expandafter\Pc@last
145   \else
146     \toks1=\expandafter{\the\toks1 ###1}%
147     \toks2=\expandafter{\the\toks2 \Pc@tokslength{###1}}%
148     \expandafter\Pc@scannext
149   \fi
150 }

\Pc@scannext

151 \def\Pc@scannext#1&{%
152   \ifx\#1\%
153   \else
154     \toks1=\expandafter{\the\toks1 #1}%
155     \toks2=\expandafter{\the\toks2 \Pc@addtoks{#1}}%
156   \fi
157   \Pc@scanlength
158 }

\Pc@last

159 \def\Pc@last{%
160   \edef\x{%
161     \endgroup
162     \let\reserved@a\the\toks0 %
163     \def\the\toks0 \the\toks1 {%
164       \the\toks2 %
165       \noexpand\Pc@finish\reserved@a
166     }%
167   }%
168   \x
169 }

```

2.4.1 L^AT_EX base macros

```

170 \picture@redefine\@picture{(&1,&2)(&3,&4)}
171 \picture@redefine\put{(&1,&2)}
172 \picture@redefine\multiput{(&1,&2)}
173 \picture@redefine\@multiput{(&1,&2)}

```

```

174 \picture@redefine\line{(#1,#2)&3}
175 \picture@redefine\vector{(#1,#2)&3}
176 \picture@redefine\dashbox{&1(&2,&3)}
177 \picture@redefine\@circle{&1}
178 \picture@redefine\@dot{&1}
179 \picture@redefine\@bezier{#1(&2,&3)(&4,&5)(&6,&7)}
180 \picture@redefine\@makepicbox{(&1,&2)}

```

2.4.2 Package pspicture

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

```

181 \ifpackageloaded{pspicture}{%
182   \picture@redefine\@oval{[&1](&2,&3)}
183   \picture@redefine\Line{(&1,&2)}
184   \picture@redefine\Curve{(&1,&2)}
185   \picture@redefine\Vector{(&1,&2)}
186 }{
187   \picture@redefine\@oval{(&1,&2)}
188 }
189 \</package>

```

3 Installation

CTAN. This package is available on CTAN¹:

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

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

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

```
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.

Refresh file databases. If your TeX distribution (teTeX, mikTeX, ...) rely on file databases, you must refresh these. For example, teTeX users run `texhash` or `mktextlsr`.

3.1 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 .
```

¹<http://ftp.ctan.org/tex-archive/>

Unpacking with L^AT_EX. The .dtx chooses its action depending on the format:

plain-T_EX: Run docstrip and extract the files.

L^AT_EX: Generate the documentation.

If you insist on using L^AT_EX for docstrip (really, docstrip does not need L^AT_EX), 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 pdfL^AT_EX:

```
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.)

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		C	
\@ReturnAfterFi	78, 88	\calc@error	66, 69
\@bezier	179	\calc@next	72
\@circle	177	\csname	33, 44, 132
\@dot	178	\Curve	184
\@ehc	47		
\@empty	57	D	
\@firstofone	83	\dashbox	176
\@gobble	85, 111, 132	\DeclareOption	39, 42, 52
\@ifpackageloaded	29, 181	\dimen@	67, 94, 101, 111
\@imakepicbox	180	\dimexpr	94
\@multiput	173	\documentclass	2
\@oval	182, 187		
\@picture	170	E	
\@	105, 152	\end	18, 20
		\endcsname	33, 44, 132
A		F	
\afterassignment	74, 93, 100	\fbboxsep	12
\aftergroup	74, 75		
B		H	
\begin	6, 10	\heightof	12

I		<code>\Pc@tokslength</code> 64, 91, 98, 147	
<code>\ifcase</code>	143	<code>\PcOrg@calc@error</code> 69, 79	
<code>\ifx</code> . 33, 44, 60, 63, 71, 90, 97, 105, 152		<code>\picture@redefine</code> <u>127</u> , 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 182, 183, 184, 185, 187	
L		<code>\ProcessOptions</code> 55	
<code>\Line</code>	183	<code>\ProvidesPackage</code> 24	
<code>\line</code>	13, 16, 174	<code>\put</code> 11, 12, 15, 171	
M			
<code>\makebox</code>	11	R	
<code>\message</code>	115	<code>\RequirePackage</code> 61	
<code>\multiput</code>	172	<code>\reserved@a</code> 129, 162, 165	
N		S	
<code>\NeedsTeXFormat</code>	23	<code>\setlength</code> 8, 67	
O		T	
<code>\on@line</code>	57	<code>\the</code> 111, 117, 125, 146, 147, 154, 155, 162, 163, 164	
P		<code>\toks</code> 134, 138, 139, 146, 147, 154, 155, 162, 163, 164	
<code>\PackageError</code>	45	<code>\toks@</code> 117, 121, 125	
<code>\PackageInfo</code>	58	U	
<code>\Pc@addtoks</code> 107, 110, <u>116</u> , 155		<code>\unitlength</code> 8, 67, 71, 94, 101	
<code>\Pc@calc@error</code> 66, 70		<code>\usepackage</code> 4	
<code>\Pc@calcname</code> 26, 30, 53, 60, 63		V	
<code>\Pc@etexname</code> 27, 36, 49, 90		<code>\Vector</code> 185	
<code>\Pc@finish</code> <u>123</u> , 165		<code>\vector</code> 175	
<code>\Pc@first</code> <u>135</u> , <u>137</u>		W	
<code>\Pc@init</code> <u>119</u> , 139		<code>\widthof</code> 10, 13, 15	
<code>\Pc@last</code> <u>144</u> , <u>159</u>		X	
<code>\Pc@method</code>		<code>\x</code> 160, 168	
. 29, 40, 49, 53, 58, 60, 63, 90, 97			
<code>\Pc@next</code> 67, 75, 93, 100, 104			
<code>\Pc@nil</code> 67, 94, 101, 104, <u>115</u>			
<code>\Pc@plainname</code> 28, 34, 40, 97			
<code>\Pc@scanlength</code> 140, <u>142</u> , 157			
<code>\Pc@scannext</code> <u>148</u> , <u>151</u>			