

The `picture` package

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2020-04-22 v1.6

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.

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*Please report any issues at <https://github.com/ho-tex/picture/issues>

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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

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 [2020-04-22 v1.6 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 \Pc@Org@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 \Pc@Org@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 }

```

2.4.3 Package `pict2e`

Additions suggested in <https://github.com/ho-tex/picture/issues/1>

```

205 \@ifpackageloaded{pict2e}{%
206   \AtBeginDocument{%
207     \picture@redefine\@cbezier[#1](&2,&3)(&4,&5)(&6,&7)(&8,&9)}%
208   }
209   \picture@redefine\pIIE@arc@{(#1,#2)&3}
210   \picture@redefine\polyline{(&1,&2)}
211   \picture@redefine\@polyline{(&1,&2)}
212   \picture@redefine\@polygon{(&1,&2)}
213   \picture@redefine\@@polygon{(&1,&2)}
214   \picture@redefine\moveto{(&1,&2)}
215   \picture@redefine\lineto{(&1,&2)}
216   \picture@redefine\curveto{(&1,&2)(&3,&4)(&5,&6)}
217 }{}

```

2.5 Check package loading order

`\PC@checkpackage`

```

218 \def\PC@checkpackage#1{%
219   \@ifpackageloaded{#1}{%
220   }{%
221     \AtBeginDocument{%
222       \@ifpackageloaded{#1}{%
223         \PackageWarningNoLine{picture}{%
224           Package ‘#1’ is loaded after ‘picture’.\MessageBreak
225           Load package ‘picture’ afterwards to get full support%
226           \MessageBreak
227           of its additional syntax with length specifications%
228         }%
229       }{}%
230     }%
231   }%
232 }

233 \PC@checkpackage{pict2e}
234 \PC@checkpackage{pspicture}

235 </package>

```

3 Installation

3.1 Download

Package. This package is available on CTAN¹:

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

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

Bundle. All the packages of the bundle ‘picture’ 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/picture.tds.zip](#)

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

3.2 Bundle installation

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

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

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

3.4 Refresh file name databases

If your T_EX distribution (T_EX Live, MiK_TE_X, ...) relies on file name databases, you must refresh these. For example, T_EX Live users run `texhash` or `mktextlsr`.

¹[CTAN:pkg/picture](#)

3.5 Some details for the interested

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.)

[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.

[2016/05/16 v1.4]

- Documentation updates.

[2019/12/09 v1.5]

- Documentation updates.

[2020-04-22 v1.6]

- Added definitions for pict2e (<https://github.com/ho-tex/picture/issues/1>)

<code>\ProvidesPackage</code>	24	<code>\toks@</code>	133, 137, 141
<code>\put</code>	11, 12, 15, 187		
		U	
R		<code>\unitlength</code>	8, 67, 72, 90, 110, 117
<code>\RequirePackage</code>	61	<code>\usepackage</code>	4
<code>\reserved@a</code>	145, 178, 181		
		V	
S		<code>\Vector</code>	201
<code>\setlength</code>	8, 67	<code>\vector</code>	191
		W	
T		<code>\widthof</code>	10, 13, 15
<code>\the</code>	127, 133, 141, 162, 163, 170, 171, 178, 179, 180		
<code>\toks</code>	150, 154, 155, 162, 163, 170, 171, 178, 179, 180	X	
		<code>\x</code>	176, 184