# The picture package

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2016/05/16 v1.4

**Abstract**

There are macro and environment arguments that expect numbers that will internally be multiplicated 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 calc . . . 3
2.3.2 Method etex . . . 4
2.3.3 Method plain . . . 4
2.3.4 Help macros . . . 4
2.4 Redefinitions . . . 5
2.4.1 LaTeX base macros . . . 6
2.4.2 Package pspicture . . . 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 Catalogue** **8**

**5 History** **9**
[2006/08/26 v1.0] . . . 9
[2007/04/11 v1.1] . . . 9
[2008/11/26 v1.2] . . . 9
[2009/10/11 v1.3] . . . 9
[2016/05/16 v1.4] . . . 9

*Please report any issues at https://github.com/ho-tex/oberdiek/issues

6 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 ⟨/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

```
⟨*package⟩
\NeedsTeXFormat{LaTeX2e}
\ProvidesPackage{picture}%
  [2016/05/16 v1.4 Dimens for picture macros (HO)]%
```

## 2.2 Options

```
\def\Pc@calcname{calc}
\def\Pc@etexname{etex}
\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.

```
\@ifpackageloaded{calc}{%
  \let\Pc@method\Pc@calcname
}{%
  \begingroup\expandafter\expandafter\expandafter\endgroup
  \expandafter\ifx\csname dimexpr\endcsname\relax
    \let\Pc@method\Pc@plainname
  \else
    \let\Pc@method\Pc@etexname
  \fi
}

\DeclareOption{plain}{%
  \let\Pc@method\Pc@plainname
}
\DeclareOption{etex}{%
  \begingroup\expandafter\expandafter\expandafter\endgroup
  \expandafter\ifx\csname dimexpr\endcsname\relax
    \PackageError{picture}{%
      e-TeX is not available%
    }\@ehc
  \else
    \let\Pc@method\Pc@etexname
  \fi
}
\DeclareOption{calc}{%
  \let\Pc@method\Pc@calcname
}
\ProcessOptions*
\begingroup
  \let\on@line\@empty
  \PackageInfo{picture}{Calculation method: \Pc@method}%
\endgroup
```

## 2.3 Calculation method

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

### 2.3.1 Method calc

```
\ifx\Pc@method\Pc@calcname
  \def\Pc@tokslength#1{%
    \begingroup
      \let\calc@error\Pc@calc@error
      \setlength\dimen@{#1\unitlength}\Pc@next\Pc@nil{#1}%
  }%
  \let\PcOrg@calc@error\calc@error
```

```
\@ifpackagelater{calc}{2007/08/22}{% v4.3
  \def\Pc@calc@error#1{%
    \expandafter\ifx\expandafter\unitlength\noexpand#1\relax
      \def\calc@next##1!{%
        \endgroup
        \aftergroup\afterassignment
        \aftergroup\Pc@next
      }%
      \expandafter\@firstoftwo
    \else
      \expandafter\@secondoftwo
    \fi
    {%
      \calc@next{#1}%
    }{%
      \PcOrg@calc@error{#1}%
    }%
  }%
}{%
  \def\Pc@calc@error#1{%
    \expandafter\ifx\expandafter\unitlength\noexpand#1\relax
      \def\calc@next##1!{%
        \endgroup
        \aftergroup\afterassignment
        \aftergroup\Pc@next
      }%
      \expandafter\@gobble
    \else
      \expandafter\@firstofone
    \fi
    {%
      \PcOrg@calc@error{#1}%
    }%
  }%
}%
\fi
```

### 2.3.2 Method etex

```
\ifx\Pc@method\Pc@etexname
  \def\Pc@tokslength#1{%
    \begingroup
      \afterassignment\Pc@next
      \dimen@=\dimexpr#1\unitlength\Pc@nil{#1}%
  }%
\fi
```

### 2.3.3 Method plain

```
\ifx\Pc@method\Pc@plainname
  \def\Pc@tokslength#1{%
    \begingroup
      \afterassignment\Pc@next
      \dimen@=#1\unitlength\Pc@nil{#1}%
  }%
\fi
```

### 2.3.4 Help macros

```
\def\Pc@next#1\Pc@nil#2{%
  \ifx\\#1\\%
    \endgroup
    \Pc@addtoks{{#2}}%
  \else
    \expandafter\endgroup
```

```
    \expandafter\Pc@addtoks\expandafter{%
      \expandafter{\the\dimen@\@gobble}%
    }%
  \fi
}
```

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

```
\let\Pc@nil\message
```

\Pc@addtoks

```
\def\Pc@addtoks#1{%
  \toks@=\expandafter{\the\toks@#1}%
}
```

\Pc@init

```
\def\Pc@init#1{%
  \begingroup
    \toks@={#1}%
}
```

\Pc@finish

```
\def\Pc@finish#1{%
  \expandafter\endgroup
  \expandafter#1\the\toks@
}
```

## 2.4 Redefinitions

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

```
\def\picture@redefine#1#2{%
  \begingroup
    \edef\reserved@a{%
      \noexpand\noexpand
      \expandafter\noexpand
          \csname PcOrg@\expandafter\@gobble\string#1\endcsname
    }%
    \toks0{#1}%
    \Pc@first#2&0%
}
```

\Pc@first

```
\def\Pc@first#1&{%
  \toks1={#1}%
  \toks2={\Pc@init{#1}}%
  \Pc@scanlength
}
```

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

```
\def\Pc@scanlength#1{%
  \ifcase#1 %
    \expandafter\Pc@last
  \else
    \toks1=\expandafter{\the\toks1 ###1}%
    \toks2=\expandafter{\the\toks2 \Pc@tokslength{###1}}%
    \expandafter\Pc@scannext
  \fi
}
```

\Pc@scannext

```
\def\Pc@scannext#1&{%
```

```
  \ifx\\#1\\%
  \else
    \toks1=\expandafter{\the\toks1 #1}%
    \toks2=\expandafter{\the\toks2 \Pc@addtoks{#1}}%
  \fi
  \Pc@scanlength
}
```

\Pc@last

```
\def\Pc@last{%
  \edef\x{%
    \endgroup
    \let\reserved@a\the\toks0 %
    \def\the\toks0 \the\toks1 {%
      \the\toks2 %
      \noexpand\Pc@finish\reserved@a
    }%
  }%
  \x
}
```

### 2.4.1 LaTeX base macros

```
\picture@redefine\@picture{(&1,&2)(&3,&4)}
\picture@redefine\put{(&1,&2)}
\picture@redefine\multiput{(&1,&2)}
\picture@redefine\@multiput{(&1,&2)}
\picture@redefine\line{(#1,#2)&3}
\picture@redefine\vector{(#1,#2)&3}
\picture@redefine\dashbox{&1(&2,&3)}
\picture@redefine\@circle{&1}
\picture@redefine\@dot{&1}
\picture@redefine\@bezier{#1(&2,&3)(&4,&5)(&6,&7)}
\picture@redefine\@imakepicbox{(&1,&2)}
```

### 2.4.2 Package pspicture

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

```
\@ifpackageloaded{pspicture}{%
  \picture@redefine\@oval{[&1](&2,&3)}%
  \picture@redefine\Line{(&1,&2)}%
  \picture@redefine\Curve{(&1,&2)}%
  \picture@redefine\Vector{(&1,&2)}%
}{%
  \picture@redefine\@oval{(&1,&2)}%
}
```

## 2.5 Check package loading order

\PC@checkpackage

```
\def\Pc@checkpackage#1{%
  \@ifpackageloaded{#1}{%
  }{%
    \AtBeginDocument{%
      \@ifpackageloaded{#1}{%
        \PackageWarningNoLine{picture}{%
          Package '#1' is loaded after 'picture'.\MessageBreak
          Load package 'picture' afterwards to get full support%
          \MessageBreak
          of its additional syntax with length specifications%
        }%
      }{}%
    }%
```

```
218   }%
219 }

220 \Pc@checkpackage{pict2e}
221 \Pc@checkpackage{pspicture}

222 ⟨/package⟩
```

# 3 Installation

## 3.1 Download

**Package.** This package is available on CTAN[1]:

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 TEX 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 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.

[1] http://ctan.org/pkg/picture

### 3.4 Refresh file name databases

If your TEX distribution (teTEX, mikTEX, ...) relies on file name databases, you must refresh these. For example, teTEX users run `texhash` or `mktexlsr`.

### 3.5 Some details for the interested

**Unpacking with LATEX.** The .dtx chooses its action depending on the format:

**plain TEX:** Run docstrip and extract the files.

**LATEX:** Generate the documentation.

If you insist on using LATEX for docstrip (really, docstrip does not need LATEX), 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 pdfLATEX:

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

## 4 Catalogue

The following XML file can be used as source for the TEX Catalogue. The elements caption and description are imported from the original XML file from the Catalogue. The name of the XML file in the Catalogue is picture.xml.

```
⟨*catalogue⟩
<?xml version='1.0' encoding='us-ascii'?>
<!DOCTYPE entry SYSTEM 'catalogue.dtd'>
<entry datestamp='$Date$' modifier='$Author$' id='picture'>
  <name>picture</name>
  <caption>Dimens for picture macros.</caption>
  <authorref id='auth:oberdiek'/>
  <copyright owner='Heiko Oberdiek' year='2006-2009'/>
  <license type='lppl1.3'/>
  <version number='1.4'/>
  <description>
    There are macro and environment arguments that expect numbers
    that will internally be multiplied by <tt>\unitlength</tt>.
    This package extends the syntax of these arguments, so that
    dimensions with calculation support may be used for these arguments.
    <p/>
    The package is part of the <xref refid='oberdiek'>oberdiek</xref> bundle.
  </description>
  <documentation details='Package documentation'
      href='ctan:/macros/latex/contrib/oberdiek/picture.pdf'/>
  <ctan file='true' path='/macros/latex/contrib/oberdiek/picture.dtx'/>
  <miktex location='oberdiek'/>
```

```
<texlive location='oberdiek'/>
<install path='/macros/latex/contrib/oberdiek/oberdiek.tds.zip'/>
</entry>
⟨/catalogue⟩
```

# 5 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.

# 6 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; plain numbers refer to the code lines where the entry is used.


**Symbols**

\@bezier . . . . . 195
\@circle . . . . . 193
\@dot . . . . . 194
\@ehc . . . . . 47
\@empty . . . . . 57
\@firstofone . . . . . 98
\@firstoftwo . . . . . 78
\@gobble . . . . . 96, 127, 148
\@ifpackagelater . . . . . 70
\@ifpackageloaded . . . 29, 197, 206, 209
\@imakepicbox . . . . . 196
\@multiput . . . . . 189
\@oval . . . . . 198, 203
\@picture . . . . . 186
\@secondoftwo . . . . . 80
\\ . . . . . 121, 168

**A**

\afterassignment . . . . . 75, 93, 109, 116
\aftergroup . . . . . 75, 76, 93, 94
\AtBeginDocument . . . . . 208

**B**

\begin . . . . . 6, 10

**C**

\calc@error . . . . . 66, 69
\calc@next . . . . . 73, 83, 91
\csname . . . . . 33, 44, 148
\Curve . . . . . 200

**D**

\dashbox . . . . . 192
\DeclareOption . . . . . 39, 42, 52
\dimen@ . . . . . 67, 110, 117, 127
\dimexpr . . . . . 110
\documentclass . . . . . 2

**E**

\end . . . . . 18, 20
\endcsname . . . . . 33, 44, 148

**F**

\fboxsep . . . . . 12

**H**

\heightof . . . . . 12

**I**

\ifcase . . . . . 159

\ifx . . . . . 33, 44, 60, 63, 72, 90, 106, 113, 121, 168

**L**

\Line . . . . . 199
\line . . . . . 13, 16, 190

**M**

\makebox . . . . . 11
\message . . . . . 131
\MessageBreak . . . . . 211, 213
\multiput . . . . . 188

**N**

\NeedsTeXFormat . . . . . 23

**O**

\on@line . . . . . 57

**P**

\PackageError . . . . . 45
\PackageInfo . . . . . 58
\PackageWarningNoLine . . . . . 210
\Pc@addtoks . . . . . 123, 126, 132, 171
\Pc@calc@error . . . . . 66, 71, 89
\Pc@calcname . . . . . 26, 30, 53, 60, 63
\PC@checkpackage . . . . . 205
\Pc@checkpackage . . . . . 205, 220, 221
\Pc@etexname . . . . . 27, 36, 49, 106
\Pc@finish . . . . . 139, 181
\Pc@first . . . . . 151, 153
\Pc@init . . . . . 135, 155
\Pc@last . . . . . 160, 175
\Pc@method . . . . . 29, 40, 49, 53, 58, 60, 63, 106, 113
\Pc@next . . . . . 67, 76, 94, 109, 116, 120
\Pc@nil . . . . . 67, 110, 117, 120, 131
\Pc@plainname . . . . . 28, 34, 40, 113
\Pc@scanlength . . . . . 156, 158, 173
\Pc@scannext . . . . . 164, 167
\Pc@tokslength . . . . . 64, 107, 114, 163
\PcOrg@calc@error . . . . . 69, 85, 101
\picture@redefine 143, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 198, 199, 200, 201, 203
\ProcessOptions . . . . . 55
\ProvidesPackage . . . . . 24
\put . . . . . 11, 12, 15, 187

**R**

\RequirePackage . . . . . 61
\reserved@a . . . . . 145, 178, 181

**S**

\setlength . . . . . 8, 67

**T**

\the . . . . . 127, 133, 141, 162, 163, 170, 171, 178, 179, 180
\toks . . . . . 150, 154, 155, 162, 163, 170, 171, 178, 179, 180
\toks@ . . . . . 133, 137, 141

**U**

\unitlength . 8, 67, 72, 90, 110, 117, 235
\usepackage . . . . . 4

**V**

\Vector . . . . . 201
\vector . . . . . 191

**W**

\widthof . . . . . 10, 13, 15

**X**

\x . . . . . 176, 184