The picture package

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2026-03-07 v2.0

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

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

1 Change in version 2.0

Most of the functionality of this package is no longer needed, as the LaTeX definitions provides support for dimensions in the arguments of `picture` and macros such as `\put`, `\line`, `\vector` out of the box. The exception is the support for the syntax of the calc package. Input like `\put(0,\widthof{text})` will *not* work with the kernel commands.

Starting with version 2 this package is disabled by default and does nothing. If support for the calc is wanted, the loading of the previous version of the picture can be forced with any of the following variants:

```
\usepackage{picture}[=v1]
\usepackage[calc]{picture}[=v1]
\usepackage[calc]{picture}
```

The last option can also be used if the picture has already been loaded without or without some other option. There will be no option clash error and the package will revert to the old behaviour.

2 User interface of version 1.7

2.1 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`.

2.2 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.

2.3 Example

```
⟨*example⟩
\documentclass{article}

\usepackage[calc]{picture}

\begin{document}

\setlength{\unitlength}{1pt}

\begin{picture}(\widthof{Hello World}, 10mm)
  \put(0, 0){\makebox(0,0)[lb]{Hello World}}%
  \put(0, \heightof{Hello World} + \fboxsep){%
    \line(1, 0){\widthof{Hello World}}%
  }%
  \put(\widthof{Hello World}, 10mm){%
    \line(0, -1){10mm}%
  }%
\end{picture}

\end{document}
⟨/example⟩
```

2.4 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}
```

3 Implementation

3.1 Identification

```
⟨*package⟩
\NeedsTeXFormat{LaTeX2e}
\ProvidesPackage{picture}%
  [2026-03-07 v2 Dimens for picture macros (HO)]%
```

3.2 Release handling

```
\providecommand\DeclareRelease[3]{}
\providecommand\DeclareCurrentRelease[2]{}
\DeclareRelease{v1}{0000-00-00}{picture-2024-01-11.sty}
\DeclareCurrentRelease{}{2024-01-11}
```

3.3 Option

```
\def\Pc@calcname{calc}
\def\Pc@load@frozen@version
 {
   \RequirePackage{calc}%
   \RequirePackage[calc]{picture-2024-01-11}%
 }
\DeclareKeys
 {
   calc .code:n = \Pc@load@frozen@version,
```

```
   calc .usage:n= preamble,
   plain.code:n={},
   etex .code:n={}
 }

\ProcessKeyOptions
\AtBeginDocument{
\ifx\Pc@method\Pc@calcname
\else
 {
   \PackageWarning{picture}
     {The picture package has been disabled as most\MessageBreak
      of its functionality is now provided by LaTeX directly.\MessageBreak
      To force the loading of the previous version use\MessageBreak
      `\string\usepackage\string{picture\string}[=v1]`\MessageBreak
      or
      `\string\usepackage[calc]\string{picture\string}`
      }
     {}
 }
\fi}
```

¡/package¿

3.4 Identification of version 1

```
⟨*packagev1⟩
\NeedsTeXFormat{LaTeX2e}
\ProvidesPackage{picture-2024-01-11}%
  [2024/01/11 version1.7 Dimens for picture macros (HO)]%
```

3.5 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
```

3.6 Calculation method

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

3.6.1 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
```

3.6.2 Method etex

```
\ifx\Pc@method\Pc@etexname
  \def\Pc@tokslength#1{%
    \begingroup
```

```
      \afterassignment\Pc@next
      \dimen@=\dimexpr#1\unitlength\Pc@nil{#1}%
  }%
\fi
```

3.6.3 Method plain

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

3.6.4 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@}%
    }%
  \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@
}
```

3.7 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
}
```

3.7.1 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)}
```

3.7.2 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)}%
}
```

3.7.3 Package pict2e

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

```
\@ifpackageloaded{pict2e}{%
  \AtBeginDocument{%
    \picture@redefine\@cbezier{[#1](&2,&3)(&4,&5)(&6,&7)(&8,&9)}%
  }
  \picture@redefine\pIIe@arc@@{(#1,#2)&3}
  \picture@redefine\polyline{(&1,&2)}
  \picture@redefine\@polyline{(&1,&2)}
  \picture@redefine\@polygon{(&1,&2)}
  \picture@redefine\@@polygon{(&1,&2)}
  \picture@redefine\moveto{(&1,&2)}
  \picture@redefine\lineto{(&1,&2)}
  \picture@redefine\curveto{(&1,&2)(&3,&4)(&5,&6)}
}{}
```

3.8 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%
        }%
      }{}%
    }%
  }%
}

\Pc@checkpackage{pict2e}
\Pc@checkpackage{pspicture}
```

⟨/packagev1⟩

4 Installation

4.1 Download

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

CTAN:macros/latex/contrib/picture/picture.dtx The source file.

CTAN:macros/latex/contrib/picture/picture.pdf Documentation.

4.2 Package installation

Unpacking. Run tex or latex on the `.ins`

```
tex picture.dtx
```

[1] CTAN:pkg/picture

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-2024-01-11.sty → tex/latex/picture/picture-2024-01-11.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.

4.3 Refresh file name databases

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

Generating the documentation. You can use the `.dtx`. 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
```

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.

[2019/12/09 v1.5]

- Documentation updates.

[2020-04-22 v1.6]

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

[2024-01-11 v1.7]

- Remove a now unneeded `\@gobble`, requires LaTex 2020-10-01 (https://github.com/ho-tex/picture/issues/2)

[2026-03-07 v2.0]

- Package is disabled unless the calc option is required.

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.

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