# The kvsetkeys package

Heiko Oberdiek
<oberdiek@uni-freiburg.de>

2006/10/19 v1.1

**Abstract**

Package kvsetkeys provides \kvsetkeys, a variant of package keyval's \setkeys. It allows to specify a handler that deals with unknown options. Active commas and equal signs may be used (e.g. see babel's shorthands) and only one level of curly braces is removed from the values.

## Contents

**1 Documentation** **1**
1.1 Normalizing key value lists . . . 2
1.2 Parsing key value lists . . . 2
1.3 Processing key value pairs . . . 3
1.4 Default family handler . . . 3
1.5 Do it all . . . 3

**2 Example** **3**

**3 Implementation** **4**
3.1 Identification . . . 4
3.2 Normalizing key value lists . . . 5
3.3 Parsing key value lists . . . 8
3.4 Processing key value pairs . . . 9
3.5 Error handling . . . 9
3.6 Do it all . . . 10

**4 Installation** **10**
4.1 Some details for the interested . . . 11

**5 References** **11**

**6 History** **12**
[2006/03/06 v1.0] . . . 12
[2006/10/19 v1.1] . . . 12

**7 Index** **12**

# 1 Documentation

\kvsetkeys can be used as replacement for keyval's \setkeys. Also it uses the same syntax. Before I describe \kvsetkeys in more detail, first I want to explain, how this package deals with key value lists. For the package also provides low level interfaces that can be used by package authors.

## 1.1 Normalizing key value lists

`\kv@normalize{`⟨*key value list*⟩`}`

Specifying key value lists, the user usually wants to have nice formatted souce code, e.g.:

```
\hypersetup{
  pdftitle    = {...},
  pdfsubject  = {...},
  pdfauthor   = {...},
  pdfkeywords = {...},
  ...
}
```

Thus there can be spaces around keys, around = or around the value. Also empty entries are possible by too many commas. Therefore these spaces and empty entries are silently removed by package keyval and this package. Whereas the contents of the value can be protected by curly braces, especially if spaces or commas are used inside, a key name must not use spaces or other syntax characters.

`\kv@normalize` takes a key value list and performs the cleanup:

- Spaces are removed.
- Syntax characters (comma and equal sign) that are active are replaces by the same characters with standard catcode. (Example: babel's language option turkish uses the equal sign as active shorthand character.)

The result is stored in `\kv@list`, e.g.:

`\kv@list` → `,pdftitle={},pdfsubject={},...,`

Empty entries are removed later. In fact it adds a comma at the begin and end to protect the last value and an easier implementation.

## 1.2 Parsing key value lists

`\kv@parse{`⟨*key value list*⟩`}{`⟨*processor*⟩`}`

It is easier to parse a normalized list, thus `\kv@parse` normalizes the list and calls `\kv@parse@normalized`.

`\kv@parse@normalized{`⟨*key value list*⟩`} {`⟨*processor*⟩`}`

Now the key value list is split into single key value pairs. For further processing the key and value are given as arguments for the ⟨*processor*⟩:

⟨*processor*⟩ {⟨*key*⟩} {⟨*value*⟩}

Also key and value are stored in macro names:

- `\kv@key` stores the key.
- `\kv@value` stores the value or if the value was not specified it has the meaning `\relax`.

The behaviour in pseudo code:

foreach (⟨*key*⟩, ⟨*value*⟩) in (⟨*key value list*⟩)
    `\kv@key` := ⟨*key*⟩
    `\kv@value` := ⟨*value*⟩
    ⟨*processor*⟩ {⟨*key*⟩} {⟨*value*⟩}

### 1.3 Processing key value pairs

`\kv@processor@default` {⟨*family*⟩} {⟨*key*⟩} {⟨*value*⟩}

There are many possiblities to process key value pairs. `\kv@processor@default` is the processor used in `\kvsetkeys`. It reimplements and extends the behaviour of keyval's `\setkeys`. In case of unknown keys `\setkeys` raise an error. This processer, however, calls a handler instead, if it is provided by the family.

The behaviour in pseudo code:

```
if ⟨key⟩ exists
    call the keyval code of ⟨key⟩
else
    if ⟨handler⟩ for ⟨family⟩ exists
        ⟨handler⟩ {⟨key⟩} {⟨value⟩}
    else
        raise unknown key error
    fi
fi
```

### 1.4 Default family handler

`\kv@processor@default` calls ⟨*handler*⟩, the default handler for the family, if the key does not exist in the family. The handler is called with two arguments, the key and the value. It can be defined with `\kv@set@family@hander`:

`\kv@set@family@handler` {⟨*family*⟩} {⟨*handler definition*⟩}

This sets the default family handler for the keyval family ⟨*family*⟩. Inside ⟨*handler definition*⟩ `#1` stands for the key and `#2` is the value. Also `\kv@key` and `\kv@value` can be used for the key and the value. If the value is not given, `\kv@value` has the meaning `\relax`.

### 1.5 Do it all

`\kvsetkeys` {⟨*family*⟩} {⟨*key value list*⟩}

The work is done by the previous commands. `\kvsetkeys` just calls them:

`\kv@parse` {⟨*key value list*⟩}{`\kv@processor@default` {⟨*family*⟩}}

Thus you can replace `\setkeys` of package keyval by the key value parser of this package:

```
\renewcommand*{\setkeys}{\kvsetkeys}
or
\let\setkeys\kvsetkeys
```

## 2 Example

The following example prints a short piece of HTML code using the tabbing environment for indenting purpose and a key value syntax for specifying the attributes of an HTML tag. The example illustrates the use of a default family handler.

```
1 ⟨*example⟩
2 \documentclass{article}
3 \usepackage[T1]{fontenc}
4 \usepackage{kvsetkeys}
```

```
\usepackage{keyval}

\makeatletter
\newcommand*{\tag}[2][]{%
  % #1: attributes
  % #2: tag name
  \begingroup
    \toks@={}%
    \let\@endslash\@empty
    \kvsetkeys{tag}{#1}%
    \texttt{%
      \textless #2\the\toks@\@endslash\textgreater
    }%
  \endgroup
}
\kv@set@family@handler{tag}{%
  % #1: key
  % #2: value
  \toks@\expandafter{%
    \the\toks@
    \space
    #1=\string"#2\string"%
  }%
}
\define@key{tag}{/}[]{%
  \def\@endslash{/}%
}
\makeatother

\begin{document}
\begin{tabbing}
  \mbox{}\qquad\=\qquad\=\kill
  \tag{html}\\
  \>\dots\\
  \>\tag[border=1]{table}\\
  \>\>\tag[width=200, span=3, /]{colgroup}\\
  \>\>\dots\\
  \>\tag{/table}\\
  \>\dots\\
  \tag{/html}\\
\end{tabbing}
\end{document}
```
⟨/example⟩

# 3 Implementation

## 3.1 Identification

⟨∗package⟩

Reload check, especially if the package is not used with LaTeX.

```
\begingroup
  \expandafter\let\expandafter\x\csname ver@kvsetkeys.sty\endcsname
  \ifcase 0%
    \ifx\x\relax % plain
    \else
      \ifx\x\empty % LaTeX
      \else
        1%
      \fi
    \fi
  \else
```

```
    \expandafter\ifx\csname PackageInfo\endcsname\relax
      \def\x#1#2{%
        \immediate\write-1{Package #1 Info: #2.}%
      }%
    \else
      \def\x#1#2{\PackageInfo{#1}{#2, stopped}}%
    \fi
    \x{kvsetkeys}{The package is already loaded}%
    \endgroup
    \expandafter\endinput
  \fi
\endgroup
```

Package identification:

```
\begingroup
  \expandafter\ifx\csname ProvidesPackage\endcsname\relax
    \def\x#1#2#3[#4]{\endgroup
      \immediate\write-1{Package: #3 #4}%
      \xdef#1{#4}%
    }%
  \else
    \def\x#1#2[#3]{\endgroup
      #2[{#3}]%
      \ifx#1\relax
        \xdef#1{#3}%
      \fi
    }%
  \fi
\expandafter\x\csname ver@kvsetkeys.sty\endcsname
\ProvidesPackage{kvsetkeys}%
  [2006/10/19 v1.1 Key value parser with default handler support (HO)]
\expandafter\edef\csname KVS@endinput\endcsname{%
  \catcode39 \the\catcode39 % '
  \catcode44 \the\catcode44 % ,
  \catcode61 \the\catcode61 % =
  \catcode64 \the\catcode64 % @
  \catcode94 \the\catcode94 % ^
  \catcode96 \the\catcode96 % `
  \catcode126 \the\catcode126 % ~
  \relax
  \noexpand\endinput
}
\catcode39 12 % '
\catcode44 12 % ,
\catcode61 12 % =
\catcode64 11 % @
\catcode94 7 % ^
\catcode96 12 % `
\catcode126 13 % ~
\def\KVS@empty{}
\long\def\@ReturnAfterFi#1\fi{\fi#1}
```

## 3.2 Normalizing key value lists

\kv@normalize

```
\def\kv@normalize#1{%
  \begingroup
    \toks@{,#1}%
    \KVS@comma
    \KVS@equal
    \KVS@spaceA
    \KVS@spaceB{ }%
    \KVS@spaceC
```

```
    \KVS@spaceD{ }%
    \xdef\kv@global{\the\toks@}%
  \endgroup
  \let\kv@list\kv@global
}
```

`\KVS@comma` Converts active commas into comma with catcode other. Also adds a comma at the end to protect the last value for next cleanup steps.

```
\begingroup
  \lccode`\,=`\,%
  \lccode`\~=`\,%
\lowercase{\endgroup
  \def\KVS@comma{%
    \toks@\expandafter{\expandafter}\expandafter
    \KVS@@comma\the\toks@~\KVS@nil
  }
  \def\KVS@@comma#1~#2\KVS@nil{%
    \toks@\expandafter{\the\toks@#1,}%
    \toks2{#2}%
    \edef\x{\the\toks2}%
    \ifx\x\KVS@empty
    \else
      \@ReturnAfterFi{%
        \KVS@@comma#2\KVS@nil
      }%
    \fi
  }%
}
```

`\KVS@equal` Converts active equal signs into catcode other characters.

```
\begingroup
  \lccode`\==`\=%
  \lccode`\~=`\=%
\lowercase{\endgroup
  \def\KVS@equal{%
    \toks@\expandafter{\expandafter}\expandafter
    \KVS@@equal\the\toks@~\KVS@nil
  }
  \def\KVS@@equal#1~#2\KVS@nil{%
    \edef\x{\the\toks@}%
    \ifx\x\KVS@empty
      \toks@{#1}%
    \else
      \toks@\expandafter{\the\toks@=#1}%
    \fi
    \toks2{#2}%
    \edef\x{\the\toks2}%
    \ifx\x\KVS@empty
    \else
      \@ReturnAfterFi{%
        \KVS@@equal#2\KVS@nil
      }%
    \fi
  }%
}
```

`\KVS@spaceA` Removes one space after the equal sign. In theory also several spaces could be removed, but this is not really necessary, because TEX usually collapses several spaces to one already.

```
\def\KVS@spaceA{%
  \toks@\expandafter{\expandafter}\expandafter
  \KVS@@spaceA\the\toks@= \KVS@nil
```

```
}
\def\KVS@@spaceA#1= #2\KVS@nil{%
  \edef\x{\the\toks@}%
  \ifx\x\KVS@empty
    \toks@{#1}%
  \else
    \toks@\expandafter{\the\toks@=#1}%
  \fi
  \toks2{#2}%
  \edef\x{\the\toks2}%
  \ifx\x\KVS@empty
  \else
    \@ReturnAfterFi{%
      \KVS@@spaceA#2\KVS@nil
    }%
  \fi
}
```

`\KVS@spaceB` Removes one space before the comma.

```
\def\KVS@spaceB#1{%
  \toks@\expandafter{\expandafter}\expandafter
  \KVS@@spaceB\the\toks@#1,\KVS@nil
}
\def\KVS@@spaceB#1 ,#2\KVS@nil{%
  \edef\x{\the\toks@}%
  \ifx\x\KVS@empty
    \toks@{#1}%
  \else
    \toks@\expandafter{\the\toks@,#1}%
  \fi
  \toks2{#2}%
  \edef\x{\the\toks2}%
  \ifx\x\KVS@empty
  \else
    \@ReturnAfterFi{%
      \KVS@@spaceB#2\KVS@nil
    }%
  \fi
}
```

`\KVS@spaceC` Removes one space after the comma.

```
\def\KVS@spaceC{%
  \toks@\expandafter{\expandafter}\expandafter
  \KVS@@spaceC\the\toks@, \KVS@nil
}
\def\KVS@@spaceC#1, #2\KVS@nil{%
  \edef\x{\the\toks@}%
  \ifx\x\KVS@empty
    \toks@{#1}%
  \else
    \toks@\expandafter{\the\toks@,#1}%
  \fi
  \toks2{#2}%
  \edef\x{\the\toks2}%
  \ifx\x\KVS@empty
  \else
    \@ReturnAfterFi{%
      \KVS@@spaceC#2\KVS@nil
    }%
  \fi
}
```

\KVS@spaceD Removes one space before the equal sign.

```
\def\KVS@spaceD#1{%
  \toks@\expandafter{\expandafter}\expandafter
  \KVS@@spaceD\the\toks@#1=\KVS@nil
}
\def\KVS@@spaceD#1 =#2\KVS@nil{%
  \edef\x{\the\toks@}%
  \ifx\x\KVS@empty
    \toks@{#1}%
  \else
    \toks@\expandafter{\the\toks@=#1}%
  \fi
  \toks2{#2}%
  \edef\x{\the\toks2}%
  \ifx\x\KVS@empty
  \else
    \@ReturnAfterFi{%
      \KVS@@spaceD#2\KVS@nil
    }%
  \fi
}
```

## 3.3 Parsing key value lists

\kv@parse Normalizes and parses the key value list. Also sets \kv@list.

```
\def\kv@parse#1{%
  \kv@normalize{#1}%
  \expandafter\kv@parse@normalized\expandafter{\kv@list}%
}
```

\kv@parse@normalized

```
\def\kv@parse@normalized#1#2{%
  \KVS@parse#1,\KVS@nil{#2}%
}

\def\KVS@parse#1,#2\KVS@nil#3{%
  \begingroup
    \toks@{#1}%
    \edef\x{\the\toks@}%
  \expandafter\endgroup
  \ifx\x\KVS@empty
  \else
    \KVS@process#1=\KVS@nil{#3}%
  \fi
  \begingroup
    \toks@{#2}%
    \edef\x{\the\toks@}%
  \expandafter\endgroup
  \ifx\x\KVS@empty
  \else
    \@ReturnAfterFi{%
      \KVS@parse#2\KVS@nil{#3}%
    }%
  \fi
}

\def\KVS@process#1=#2\KVS@nil#3{%
  \def\kv@key{#1}%
  \begingroup
    \toks@{#2}%
    \edef\x{\the\toks@}%
  \expandafter\endgroup
```

```
  \ifx\x\KVS@empty
    \let\kv@value\relax
    #3{#1}{}%
  \else
    \KVS@@process{#1}#2\KVS@nil{#3}%
  \fi
}
\def\KVS@@process#1#2=\KVS@nil#3{%
  \begingroup
    \toks@{#2}%
    \xdef\KVS@global{\the\toks@}%
  \endgroup
  \let\kv@value\KVS@global
  #3{#1}{#2}%
}
```

## 3.4 Processing key value pairs

\kv@processor@default

```
\def\kv@processor@default#1#2#3{%
  \begingroup\expandafter\expandafter\expandafter\endgroup
  \expandafter\ifx\csname KV@#1@#2\endcsname\relax
    \begingroup\expandafter\expandafter\expandafter\endgroup
    \expandafter\ifx\csname KVS@#1@handler\endcsname\relax
      \kv@error@unknownkey{#1}{#2}%
    \else
      \csname KVS@#1@handler\endcsname{#2}{#3}%
      \relax
    \fi
  \else
    \ifx\kv@value\relax
      \begingroup\expandafter\expandafter\expandafter\endgroup
      \expandafter\ifx\csname KV@#1@#2@default\endcsname\relax
        \kv@error@novalue{#1}{#2}%
      \else
        \csname KV@#1@#2@default\endcsname
        \relax
      \fi
    \else
      \csname KV@#1@#2\endcsname{#3}%
    \fi
  \fi
}
```

\kv@set@family@handler

```
\def\kv@set@family@handler#1{%
  \KVS@set@family@handler{#1}\@nil
}
\def\KVS@set@family@handler#1\@nil#{%
  \expandafter\def\csname KVS@#1@handler\endcsname##1##2%
}
```

## 3.5 Error handling

\kv@error@novalue

Only a poor \PackageError is provided by miniltx.tex.

```
\expandafter\ifx\csname MessageBreak\endcsname\relax
  \def\MessageBreak{^^J}%
\fi
\expandafter\ifx\csname @ehc\endcsname\relax
  \def\@ehc{%
    Try typing \space\string<return\string> %
```

```
    \space to proceed.\MessageBreak
    If that doesn't work, type \space X %
    \string<return\string> \space to quit\string.%
  }%
\fi
\def\kv@error@novalue{%
  \kv@error@generic{No value specified for}%
}
\def\kv@error@unknownkey{%
  \kv@error@generic{Undefined}%
}
\def\kv@error@generic#1#2#3{%
  \begingroup
    \newlinechar=10 %
    \def\MessageBreak{^^J}%
    \expandafter\ifx\csname PackageError\endcsname\relax
      \edef\x{%
        \errhelp{%
          The keyval family of the key `#3' is `#2'.\MessageBreak
          \MessageBreak
          \@ehc
        }%
      }%
      \x
      \errmessage{kvsetkeys: #1 key `#3'}%
    \else
      \edef\x{%
        \noexpand\PackageError{kvsetkeys}{%
           #1 key `#3'%
        }{%
          The keyval family of the key `#3' is `#2'.\MessageBreak
          \MessageBreak
          \@ehc
        }%
      }%
      \x
    \fi
  \endgroup
}%
```

### 3.6 Do it all

\kvsetkeys

```
\def\kvsetkeys#1#2{%
  \kv@parse{#2}{\kv@processor@default{#1}}%
}

\KVS@endinput
⟨/package⟩
```

## 4 Installation

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

CTAN:macros/latex/contrib/oberdiek/kvsetkeys.dtx The source file.

CTAN:macros/latex/contrib/oberdiek/kvsetkeys.pdf Documentation.

[1] ftp://ftp.ctan.org/tex-archive/

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

```
tex kvsetkeys.dtx
```

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

```
kvsetkeys.sty          →  tex/generic/oberdiek/kvsetkeys.sty
kvsetkeys.pdf          →  doc/latex/oberdiek/kvsetkeys.pdf
kvsetkeys-example.tex  →  doc/latex/oberdiek/kvsetkeys-example.tex
kvsetkeys.dtx          →  source/latex/oberdiek/kvsetkeys.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 `mktexlsr`.

### 4.1 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 kvsetkeys.pdf unpack_files output .
```

**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{kvsetkeys.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 kvsetkeys.dtx
makeindex -s gind.ist kvsetkeys.idx
pdflatex kvsetkeys.dtx
makeindex -s gind.ist kvsetkeys.idx
pdflatex kvsetkeys.dtx
```

## 5 References

[1] David Carlisle: *The keyval package*; 1999/03/16 v1.13; CTAN:macros/latex/required/graphics/keyval.dtx.

# 6 History

## [2006/03/06 v1.0]

- First version.

## [2006/10/19 v1.1]

- Fix of `\kv@set@family@handler`.
- Example added.

# 7 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**

\, . . . . . 123, 124
\= . . . . . 36, 143, 144
\> . . . . . 38, 39, 40, 41, 42, 43
\@ReturnAfterFi . . . . . 108, 136, 161, 182, 202, 222, 242, 269
\@ehc . . . . . 329, 351, 363
\@empty . . . . . 13
\@endslash . . . . . 13, 16, 30
\@nil . . . . . 320, 322
\\ . . . . . 37, 38, 39, 40, 41, 42, 43, 44
\~ . . . . . 124, 144

**B**

\begin . . . . . 34, 35

**C**

\catcode . . . . 90, 91, 92, 93, 94, 95, 96, 100, 101, 102, 103, 104, 105, 106
\csname . . . . . 50, 60, 73, 86, 89, 297, 299, 302, 308, 311, 315, 323, 325, 328, 346

**D**

\define@key . . . . . 29
\documentclass . . . . . 2
\dots . . . . . 38, 41, 43

**E**

\empty . . . . . 54
\end . . . . . 45, 46
\endcsname . . . . . 50, 60, 73, 86, 89, 297, 299, 302, 308, 311, 315, 323, 325, 328, 346
\endinput . . . . . 69, 98
\errhelp . . . . . 348
\errmessage . . . . . 355

**I**

\ifcase . . . . . 51
\ifx . . . 52, 54, 60, 73, 81, 134, 152, 159, 173, 180, 193, 200, 213, 220, 233, 240, 259, 267, 280, 297, 299, 306, 308, 325, 328, 346
\immediate . . . . . 62, 75

**K**

\kill . . . . . 36
\kv@error@generic . . . . 337, 340, 342
\kv@error@novalue . . . . . 309, 325
\kv@error@unknownkey . . . . . 300, 339
\kv@global . . . . . 118, 120
\kv@key . . . . . 275
\kv@list . . . . . 120, 249
\kv@normalize . . . . . *2*, 109, 248
\kv@parse . . . . . *2*, 247, 371
\kv@parse@normalized . . . . *2*, 249, 251
\kv@processor@default . . . *3*, 295, 371
\kv@set@family@handler . . . *3*, 20, 319
\kv@value . . . . . 281, 292, 306
\KVS@@comma . . . . . 128, 130, 137
\KVS@@equal . . . . . 148, 150, 162
\KVS@@process . . . . . 284, 287
\KVS@@spaceA . . . . . 169, 171, 183
\KVS@@spaceB . . . . . 189, 191, 203
\KVS@@spaceC . . . . . 209, 211, 223
\KVS@@spaceD . . . . . 229, 231, 243
\KVS@comma . . . . . 112, 122
\KVS@empty . . . . . 107, 134, 152, 159, 173, 180, 193, 200, 213, 220, 233, 240, 259, 267, 280
\KVS@endinput . . . . . 373
\KVS@equal . . . . . 113, 142
\KVS@global . . . . . 290, 292
\KVS@nil 128, 130, 137, 148, 150, 162, 169, 171, 183, 189, 191, 203, 209, 211, 223, 229, 231, 243, 252, 254, 261, 270, 274, 284, 287
\KVS@parse . . . . . 252, 254, 270
\KVS@process . . . . . 261, 274
\KVS@set@family@handler . . . 320, 322
\KVS@spaceA . . . . . 114, 167
\KVS@spaceB . . . . . 115, 187
\KVS@spaceC . . . . . 116, 207
\KVS@spaceD . . . . . 117, 227
\kvsetkeys . . . . . *3*, 14, 370

**L**

\lccode . . . . . 123, 124, 143, 144
\lowercase . . . . . 125, 145

**M**

\makeatletter . . . . . 7
\makeatother . . . . . 32
\mbox . . . . . 36
\MessageBreak . . . . . . 326, 331, 345, 349, 350, 361, 362

**N**

\newcommand . . . . . 8
\newlinechar . . . . . 344

**P**

\PackageError . . . . . 358
\PackageInfo . . . . . 65
\ProvidesPackage . . . . . 87

**Q**

\qquad . . . . . 36

**S**

\space . . . . . 25, 330, 331, 332, 333

**T**

\tag . . . . . 8, 37, 39, 40, 42, 44
\textgreater . . . . . 16
\textless . . . . . 16
\texttt . . . . . 15
\the . . . . . 16, 24, 90, 91, 92, 93, 94, 95, 96, 118, 128, 131, 133, 148, 151, 155, 158, 169, 172, 176, 179, 189, 192, 196, 199, 209, 212, 216, 219, 229, 232, 236, 239, 257, 265, 278, 290
\toks . . . . . 132, 133, 157, 158, 178, 179, 198, 199, 218, 219, 238, 239
\toks@ . . . . . 12, 16, 23, 24, 111, 118, 127, 128, 131, 147, 148, 151, 153, 155, 168, 169, 172, 174, 176, 188, 189, 192, 194, 196, 208, 209, 212, 214, 216, 228, 229, 232, 234, 236, 256, 257, 264, 265, 277, 278, 289, 290

**U**

\usepackage . . . . . 3, 4, 5

**W**

\write . . . . . 62, 75

**X**

\x . . . . . 50, 52, 54, 61, 65, 67, 74, 79, 86, 133, 134, 151, 152, 158, 159, 172, 173, 179, 180, 192, 193, 199, 200, 212, 213, 219, 220, 232, 233, 239, 240, 257, 259, 265, 267, 278, 280, 347, 354, 357, 366