The kvoptions package

Heiko Oberdiek*
<heiko.oberdiek at googlemail.com>

2016/05/16 v3.12

Abstract

This package is intended for package authors who want to use options in key value format for their package options.

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

1 Introduction

First I want to recommend the very good review article "A guide to key-value methods" by Joseph Wright [1]. It introduces the different key-value packages and compares them.

1.1 The beginning

This package kvoptions addresses class or package writers that want to allow their users to specify options as key value pairs, e.g.:

```
\documentclass[verbose=false,name=me]{myclass}
\usepackage[format=print]{mylayout}
```

Prominent example is package hyperref, probably the first package that offers this service. It's \ProcessOptionsWithKV is often copied und used in other packages, e.g. package helvet that uses this interface for its option scaled.

However copying code is not the most modern software development technique. And hyperref's code for \ProcessOptionsWithKV was changed to fix bugs. The version used in other packages depends on the time of copying and the awareness of hyperref's changes. Now the code is sourced out into this package and available for other package or class writers.

1.2 Overview

Package kvoptions connects package *keyval* with LaTeX's package and class *options*:

Package keyval	**Package kvoptions**	**LaTeX kernel**
\define@key	\DeclareVoidOption \DeclareStringOption \DeclareBoolOption \DeclareComplementaryOption \DisableKeyvalOption	\DeclareOption
	\DeclareDefaultOption	\DeclareOption*
	\ProcessKeyvalOptions	\ProcessOptions*
	Option patch	Class/package option system
	\SetupKeyvalOptions	

2 Usage

2.1 Process options

2.1.1 \ProcessKeyvalOptions

\ProcessKeyvalOptions {⟨*family*⟩}
\ProcessKeyvalOptions *

This command evaluates the global or local options of the package that are defined with keyval's interface within the family ⟨*family*⟩. It acts the same way as LaTeX's

\ProcessOptions*. In a package unknown global options are ignored, in a class they are added to the unknown option list. The known global options and all local options are passed to keyval's \setkeys command for executing the options. Unknown options are reported to the user by an error.

If the family name happens to be the same as the name of the package or class where \ProcessKeyvalOptions is used or the family name has previously been setup by \SetupKeyvalOptions, then \ProcessKeyvalOptions knows the family name already and you can use the star form without mandatory argument.

2.1.2 \ProcessLocalKeyvalOptions

```
\ProcessLocalKeyvalOptions {⟨family⟩}
\ProcessLocalKeyvalOptions *
```

This macro has the same syntax and works similar as \ProcessKeyvalOptions. However it ignores global options and only processes the local package options. Therefore it only can be used inside a package. An error is thrown, if it is used inside a class.

Neither of the following macros are necessary for \ProcessKeyvalOptions. They just help the package/class author in common tasks.

2.1.3 \SetupKeyvalOptions

```
\SetupKeyvalOptions {
    family = ⟨family⟩,
    prefix = ⟨prefix⟩
    setkeys = ⟨setkeys command⟩
}
```

This command allows to configure the default assumptions that are based on the current package or class name. LaTeX remembers this name in \@currname. The syntax description of the default looks a little weird, therefor an example is given for a package or class named foobar.

Key	Default	(example)	Used by
family	⟨\@currname⟩	(foobar)	\ProcessKeyvalOptions* \DeclareBoolOption \DeclareStringOption
prefix	⟨\@currname⟩@	(foobar@)	\DeclareBoolOption \DeclareStringOption \DeclareVoidOption
setkeys	\setkeys	(\kvsetkeys)	\ProcessKeyvalOptions \ProcessLocalKeyvalOptions

Key setkeys was added in version 3.9. The original \setkeys of package keyval is not reentrant. If an option is processed by this \setkeys, then the option should not call \setkeys again with a different family. Otherwise the next options of the first \setkeys call are processed with the wrong family. With key setkeys the macro \kvsetkeys can be set that does not have the problem of the original \setkeys of package keyval.

Probably \setkeys of package xkeyval is safe in this respect. But I haven't made a full analysis. At least it does not have the problem of the original \setkeys.

2.2 Option declarations

The options for \ProcessKeyvalOptions are defined by keyval's \define@key. Common purposes of such keys are boolean switches, they enable or disable some-

thing. Or they store a name or some kind of string in a macro. The following commands help the user. He declares what he wants and kvoptions take care of the key definition, resource allocation and initialization.

In order to avoid name clashes of macro names, internal commands are prefixed. Both the prefix and the family name for the defined keys can be configured by \SetupKeyvalOptions.

2.2.1 \DeclareStringOption

\DeclareStringOption [⟨*init*⟩] {⟨*key*⟩} [⟨*default*⟩]

A macro is created that remembers the value of the key ⟨*key*⟩. The name of the macro consists of the option name ⟨*key*⟩ that is prefixed by the prefix (see 2.1.3). The initial contents of the macro can be given by the first optional argument ⟨*init*⟩. The default is empty.

The the option ⟨*key*⟩ is defined. The option code just stores its value in the macro. If the optional argument at the end of \DeclareStringOption is given, then option ⟨*key*⟩ is defined with the default ⟨*default*⟩.

Example for a package with the following two lines:

```
\ProvidesPackage{foobar}
\DeclareStringOption[me]{name}
```

Then \DeclareStringOption defines the macro with content me, note LaTeX complains if the name of the macro already exists:

```
\newcommand*{\foobar@name}{me}
```

The option definition is similar to:

```
\define@key{foobar}{name}{%
  \renewcommand*{\foobar@name}{#1}%
}
```

2.2.2 \DeclareBoolOption

\DeclareBoolOption [⟨*init*⟩] {⟨*key*⟩}

A boolean switch is generated, initialized by value ⟨*init*⟩ and the corresponding key ⟨*key*⟩ is defined. If the initialization value is not given, false is used as default.

The internal actions of \DeclareBoolOption are shown below. The example is given for a package author who has the following two lines in his package/class:

```
\ProvidesPackage{foobar}
\DeclareBoolOption{verbose}
```

First a new switch is created:

```
\newif\iffoobar@verbose
```

and initialized:

```
\foobar@verbosefalse
```

Finally the key is defined:

```
\define@key{foobar}{verbose}[true]{…}
```

The option code configures the boolean option in the following way: If the author specifies true or false then the switch is turned on or off respectivly. Also the option can be given without explicit value. Then the switch is enabled. Other values are reported as errors.

Now the switch is ready to use in the package/class, e.g.:

```
\iffoobar@verbose
% print verbose message
\else
% be quiet
\fi
```

Users of package **\ifthen** can use the switch as boolean:

```
\boolean{foobar@verbose}
```

2.2.3 \DeclareComplementaryOption

\DeclareComplementaryOption {⟨*key*⟩} {⟨*parent*⟩}

Sometimes contrasting names are used to characterize the two states of a boolean switch, for example draft vs. final. Both options behave like boolean options but they do not need two different switches, they should share one. **\DeclareComplementaryOption** allows this. The option ⟨*key*⟩ shares the switch of option ⟨*parent*⟩. Example:

```
\DeclareBoolOption{draft}
\DeclareComplementaryOption{final}{draft}
```

Then final sets the switch of draft to false, and final=false enables the draft switch.

2.2.4 \DeclareVoidOption

\DeclareVoidOption {⟨*key*⟩} {⟨*code*⟩}

\ProcessKeyvalOptions can be extended to recognize options that are declared in traditional way by **\DeclareOption**. But in case of the error that the user specifies a value, then this option would not recognized as key value option because of **\DeclareOption** and not detected as traditional option because of the value part. The user would get an unknown option error, difficult to understand.

\DeclareVoidOption solves this problem. It defines the option ⟨*key*⟩ as key value option. If the user specifies a value, a warning is given and the value is ignored.

The code part ⟨*code*⟩ is stored in a macro. The name of the macro consists of the option name ⟨*key*⟩ that is prefixed by the prefix (see 2.1.3). If the option is set, the macro will be executed. During the execution **\CurrentOption** is available with the current key name.

2.2.5 \DeclareDefaultOption

\DeclareDefaultOption {⟨*code*⟩}

This command does not define a specific key, it is the equivalent to LaTeX's **\DeclareOption***. It allows the specification of a default action ⟨*code*⟩ that is invoked if an unknown option is found. While ⟨*code*⟩ is called, macro **\CurrentOption** contains the current option string. In addition **\CurrentOptionValue** contains the value part if the option string is parsable as key value pair, otherwise it is **\relax**. **\CurrentOptionKey** contains the key of the key value pair, or the whole option string, if it misses the equal sign.

Inside packages typical default actions are to pass unknown options to another package. Or an error message can be thrown by **\@unknownoptionerror**. This is the original error message that LaTeX gives for unkown package options. This error

message is easier to understand for the user as the error message from package keyval that is given otherwise.

A Class ignores unknown options and puts them on the unused option list. Let LaTeX do the job and just call \OptionNotUsed. Or the options can be passed to another class that is later loaded.

2.2.6 Local options

\DeclareLocalOption {⟨*option*⟩}
\DeclareLocalOptions {⟨*option list*⟩}

Both macros mark package options as local options. That means that they are ignored by \ProcessKeyvalOptions if they are given as global options. \DeclareLocalOptions takes one option, \DeclareLocalOptions expects a comma separated list of options.

2.2.7 Dynamic options

Options of LaTeX's package/class system are cleared in \ProcessOptions. They modify the static model of a package. For example, depending on option bookmarks package hyperref loads differently.

Options, however, defined by keyval's \define@key remain defined, if the options are processed by \setkeys. Therefore these options can also be used to model the dynamic behaviour of a package. For example, in hyperref the link colors can be changed everywhere until the end in \end{document}.

However package color that adds color support is necessary and it cannot be loaded after \begin{document}. Option colorlinks that loads color should be active until \begin{document} and die in some way if it is too late for loading packages. With \DisableKeyvalOption the package/class author can specify and configure the death of an option and controls the life period of the option.

2.2.8 \DisableKeyvalOption

\DisableKeyvalOption [⟨*options*⟩] {⟨*family*⟩} {⟨*key*⟩}
⟨*options*⟩:

action	= undef, warning, error, or ignore	default: undef
global or local		default: global
package or class	= ⟨*name*⟩	

\DisableKeyvalOption can be called to mark the end when the option ⟨*key*⟩ is no longer useful. The behaviour of an option after its death can be configured by action:

undef: The option will be undefined, If it is called, \setkeys reports an error because of unknown key.

error or warning: Use of the option will cause an error or warning message. Also these actions require that exclusivly either the package or class name is given in options package or class.

ignore: The use of the option will silently be ignored.

The option's death can be limited to the end of the current group, if option local is given. Default is global.

The package/class author can wish the end of the option already during the package loading, then he will have static behaviour. In case of dynamic options \DisableKeyvalOption can be executed everywhere, also outside the package. Therefore the family name and the package/class name is usually unknown for

\DisableKeyvalOption. Therefore the argument for the family name is mandatory and for some actions the package/class name must be provided.

Usually a macro would configure the option death, Example:

```
\ProvidesPackage{foobar}
\DeclareBoolOption{color}
\DeclareStringOption[red]{emphcolor}
\ProcessKeyvalOptions*

\newcommand*{\foobar@DisableOption}[2]{%
  \DisableKeyvalueOption[
    action={#1},
    package=foobar
  ]{foobar}{#2}%
}

\iffoobar@color
  \RequirePackage{color}
  \renewcommand*{\emph}[1]{\textcolor{\foobar@emphcolor}{#1}}
\else
  % Option emphcolor is not wrong, if we have color support.
  % otherwise the option has no effect, but we don't want to
  % remove it. Therefore action 'ignore' is the best choice:
  \foobar@DisableOption{ignore}{emphcolor}
\fi
% No we don't need the option 'color'.
\foobar@DisableOption{warning}{color}

% With color support option 'emphcolor' will dynamically
% change the color of \emph statements.
```

2.2.9 \AddToKeyvalOption

\AddToKeyvalOption {⟨*family*⟩} {⟨*key*⟩} {⟨*code*⟩}
\AddToKeyvalOption * {⟨*key*⟩} {⟨*code*⟩}

The code for an existing key ⟨*key*⟩ of family ⟨*family*⟩ is extended by code ⟨*code*⟩. In the starred form the current family setting is used, see \ProcessKeyvalOptions*.

2.3 Global vs. local options

Options that are given for \documentclass are called global options. They are known to the class and all packages. A package may make use of a global option and marks it as used. The advantage for the user is the freedom to specify options both in the \documentclass or \usepackage commands.

However global options are shared with the class options and options of all other packages. Thus there can be the same option with different semantics for different packages and classes. As example, package bookmark knows option open that specifies whether the bookmarks are opened or closed initially. It's values are true or false. Since KOMA-Script version 3.00 the KOMA classes also introduces option open with values right and any and a complete different meaning.

Such conflicts can be resolved by marking all or part of options as local by \DeclareLocalOption or \DeclareLocalOptions. Then the packages ignores global occurences of these options. Package kvoptions provides two methods:

- \ProcessLocalKeyvalOptions automatically uses all options as local options. It ignores all global options.
- \DeclareLocalOption or \DeclareLocalOptions marks options as local options. \ProcessKeyvalOptions will then ignore global occurences for these local options.

Since version 1.5 package bookmark uses the latter method. It checks global and local option places for driver options and limits all other options as local options. Thus the class option open of KOMA-Script is not misread as option for package bookmark.

2.4 Summary of internal macros

The \Declare…Option commands define macros, additionally to the macros generated by the key definition. These macros can be used by the package/class author. The name of the macros starts with the prefix ⟨*prefix*⟩ that can be configured by \SetupKeyvalOptions.

Declare ⟨*key*⟩	Defined macro	Description
\DeclareStringOption	\⟨*prefix*⟩⟨*key*⟩	holds the string
\DeclareBoolOption	\if⟨*prefix*⟩⟨*key*⟩	boolean switch
	\⟨*prefix*⟩⟨*key*⟩false	disable switch
	\⟨*prefix*⟩⟨*key*⟩true	enable switch
\DeclareComplementaryOption	\⟨*prefix*⟩⟨*key*⟩false	enable parent switch
	\⟨*prefix*⟩⟨*key*⟩true	disable parent switch
\DeclareVoidOption	\⟨*prefix*⟩⟨*key*⟩	holds the action

2.5 plain TEX

Package keyval is also usable in plain TEX with the help of file miniltx.tex. Some features of this package kvoptions might also be useful for plain TEX. If LATEX is not found, \ProcessKeyvalOptions and option patch are disabled. Before using the option declaration commands \Declare...Option, \SetupKeyvalOptions must be used.

3 Example

The following example defined a package that serves some private color management. A boolean option print enables print mode without colors. An option emph redefines \emph to print in the given color. And the driver can be specified by option driver.

```
⟨*example⟩
    % Package identification
    % ----------------------
\NeedsTeXFormat{LaTeX2e}
\ProvidesPackage{example-mycolorsetup}[2016/05/16 Managing my colors]

\RequirePackage{ifpdf}
\RequirePackage{kvoptions}

    % Option declarations
    % -------------------

\SetupKeyvalOptions{
  family=MCS,
  prefix=MCS@
}
    % Use a shorter family name and prefix

    % Option print
\DeclareBoolOption{print}
    % is the same as
    % \DeclareBoolOption[false]{print}

    % Option driver
```

```
\ifpdf
  \DeclareStringOption[pdftex]{driver}
\else
  \DeclareStringOption[dvips]{driver}
\fi

    % Alternative interface for driver options
\DeclareVoidOption{dvips}{\SetupDriver}
\DeclareVoidOption{dvipdfm}{\SetupDriver}
\DeclareVoidOption{pdftex}{\SetupDriver}
    % In \SetupDriver we take the current option \CurrentOption
    % and pass it to the driver option.
    % The \expandafter commands expand \CurrentOption at the
    % time, when \SetupDriver is executed and \CurrentOption
    % has the correct meaning.
\newcommand*{\SetupDriver}{%
  \expandafter\@SetupDriver\expandafter{\CurrentOption}%
}
\newcommand*{\@SetupDriver}[1]{%
  \setkeys{MCS}{driver={#1}}%
}

    % Option emph
    % An empty value means, we want to have no color for \emph.
    % If the user specifies option emph without value, the red is used.
\DeclareStringOption{emph}[red]
    % is the same as
    % \DeclareStringOption[]{emph}[red]

    % Default option rule
\DeclareDefaultOption{%
  \ifx\CurrentOptionValue\relax
    \PackageWarningNoLine{\@currname}{%
      Unknown option `\CurrentOption'\MessageBreak
      is passed to package `color'%
    }%
    % Pass the option to package color.
    % Again it is better to expand \CurrentOption.
    \expandafter\PassOptionsToPackage
    \expandafter{\CurrentOption}{color}%
  \else
    % Package color does not take options with values.
    % We provide the standard LaTeX error.
    \@unknownoptionerror
  \fi
}

    % Process options
    % ---------------
\ProcessKeyvalOptions*

    % Implementation depending on option values
    % -----------------------------------------
    % Code for print mode
\ifMCS@print
  \PassOptionsToPackage{monochrome}{color}
    % tells package color to use black and white
\fi

\RequirePackage[\MCS@driver]{color}
    % load package color with the correct driver

```

```
    % \emph setup
\ifx\MCS@emph\@empty
    % \@empty is a predefined macro with empty contents.
    % the option value of option emph is empty, thus
    % we do not want a redefinition of \emph.
\else
  \renewcommand*{\emph}[1]{%
    \textcolor{\MCS@emph}{#1}%
  }
\fi
⟨/example⟩
```

4 Package options

The package kvoptions knows two package options patch and debugshow. The options of package kvoptions are intended for authors, not for package/class writers. Inside a package it is too late for option patch and debugshow enables some messages that are perhaps useful for the debugging phase. Also LaTeX is unhappy if a package is loaded later again with options that are previously not given. Thus package and class authors, stay with `\RequirePackage{kvoptions}` without options.

Option patch loads package kvoptions-patch.

4.1 Package kvoptions-patch

LaTeX's system of package/class options has some severe limitations that especially affects the value part if options are used as pair of key and value.

- Spaces are removed, regardless where:

  ```
  \documentclass[box=0 0 400 600]{article}
  ```

  Now each package will see box=00400600 as global option.

- In the previous case also braces would not help:

  ```
  \documentclass[box={0 0 400 600}]{article}
  ```

  The result is an error message:

  ```
  ! LaTeX Error: Missing \begin{document}.
  ```

  As local option, however, it works if the package knows about key value options (By using this package, for example).

- The requirements on robustness are extremly high. LaTeX expands the option. All that will not work as environment name will break also as option. Even a `\relax` will generate an error message:

  ```
  ! Missing \endcsname inserted.
  ```

  Of course, LaTeX does not use its protecting mechanisms. On contrary `\protect` itself will cause errors.

- The options are expanded. But perhaps the package will do that, because it has to setup some things before? Example hyperref:

  ```
  \usepackage[pdfauthor=M\"uller]{hyperref}
  ```

  Package hyperref does not see M\"uller but its expansion and it does not like it, you get many warnings

  ```
  Token not allowed in a PDFDocEncoded string
  ```

And the title becomes: Mu127uller. Therefore such options must usually be given after package hyperref is loaded:

```
\usepackage{hyperref}
\hypersetup{pdfauthor=Fran\c coise M\"uller}
```

As package option it will even break with Fran\c coise because of the cedilla \c c, it is not robust enough.

For users that do not want with this limitations the package offers package kvoptions-patch. It patches LaTeX's option system and tries to teach it also to handle options that are given as pairs of key and value and to prevent expansion. It can already be used at the very beginning, before \documentclass:

```
\RequirePackage{kvoptions-patch}
\documentclass[pdfauthor=Fran\c coise M\"uller]{article}
\usepackage{hyperref}
```

The latest time is before the package where you want to use problematic values:

```
\usepackage{kvoptions-patch}
\usepackage[Fran\c coise M\"uller]{hyperref}
```

Some remarks:

- The patch requires ε-TeX, its \unexpanded feature is much too nice. It is possible to work around using token registers. But the code becomes longer, slower, more difficult to read and maintain. The package without option patch works and will work without ε-TeX.
- The code for the patch is quite long, there are many test cases. Thus the probability for bugs is probably not too small.
- Since 2008/10/18 v3.0 package kvoptions-patch is available. Before option patch of package kvoptions must be used instead. I think, the solution as standalone package kvoptions-patch is cleaner and avoids option clashes.

4.2 Option debugshow

The name of this option follows the convention of packages multicol, tabularx, and tracefnt. Currently it prints the setting of boolean options, declared by \DeclareBoolOption in the .log file, if that boolean option is used. You can activate the option by

- \PassOptionsToPackage{debugshow}{kvoptions}
  Put this somewhere before package kvoptions is loaded first, e.g. before \documentclass.
- \RequirePackage[debugshow]{kvoptions}
  Before \documentclass even an author has to use \RequirePackage. \usepackage only works after \documentclass.

The preferred method is \PassOptionsToPackage, because it does not force the package loading and does not disturb, if the package is not loaded later at all.

5 Limitations

5.1 Compatibility

5.1.1 Package kvoptions-patch vs. package xkvltxp

Package xkvltxp from the xkeyval project has the same goal as package kvoptions-patch and to patch LaTeX's kernel commands in order to get better support for

key value options. Of course they cannot be used both. The user must decide, which method he prefers. Package kvoptions-patch aborts itself, if it detects that xkvltxp is already loaded.

However package xkvltxp and kvoptions can be used together, example:

```
\usepackage{xkvltxp}
\usepackage[...]{foobar} % foobar using kvoptions
```

The other way should work, too.

Package kvoptions-patch tries to catch more situations and to be more robust. For example, during the comparison of options it normalizes them by removing spaces around = and the value. Thus the following is not reported as option clash:

```
\RequirePackage{kvoptions-patch}
\documentclass{article}

\usepackage[scaled=0.7]{helvet}
\usepackage[scaled = 0.7]{helvet}

\begin{document}
\end{document}
```

5.2 Limitations

5.2.1 Option comparisons

In some situations LaTeX compares option lists, e.g. option clash check, \@ifpackagewith, or \@ifclasswith. Apart from catcode and sanitizing problems of option patch, there is another problem. LaTeX does not know about the type and default values of options in key value style. Thus an option clash is reported, even if the key value has the same meaning:

```
\usepackage[scaled]{helvet} % default is .95
\usepackage[.95]{helvet}
\usepackage[0.95]{helvet}
```

5.2.2 Option list parsing with package kvoptions-patch

With package kvoptions-patch the range of possible values in key value specifications is much large, for example the comma can be used, if enclosed in curly braces.

Other packages, especially the packages that uses their own process option code can be surprised to find tokens inside options that they do not expect and errors would be the consequence. To avoid errors the options, especially the unused option list is sanitized. That means the list will only contain tokens with catcode 12 (other) and perhaps spaces (catcode 10). This allows a safe parsing for other packages. But a comma in the value part is no longer protected by curly braces because they have lost their special meaning. This is the price for compatibility.

Example:

```
\RequirePackage{kvoptions-patch}
\documentclass[a={a,b,c},b]{article}
\begin{document}
\end{document}
```

Result:

```
LaTeX Warning: Unused global option(s):
    [a={a,c},b].
```

6 Implementation

6.1 Preamble

98 ⟨*package⟩

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

```
99 \begingroup\catcode61\catcode48\catcode32=10\relax%
100  \catcode13=5 % ^^M
101  \endlinechar=13 %
102  \catcode35=6 % #
103  \catcode39=12 % '
104  \catcode44=12 % ,
105  \catcode45=12 % -
106  \catcode46=12 % .
107  \catcode58=12 % :
108  \catcode64=11 % @
109  \catcode123=1 % {
110  \catcode125=2 % }
111  \expandafter\let\expandafter\x\csname ver@kvoptions.sty\endcsname
112  \ifx\x\relax % plain-TeX, first loading
113  \else
114    \def\empty{}%
115    \ifx\x\empty % LaTeX, first loading,
116      % variable is initialized, but \ProvidesPackage not yet seen
117    \else
118      \expandafter\ifx\csname PackageInfo\endcsname\relax
119        \def\x#1#2{%
120          \immediate\write-1{Package #1 Info: #2.}%
121        }%
122      \else
123        \def\x#1#2{\PackageInfo{#1}{#2, stopped}}%
124      \fi
125      \x{kvoptions}{The package is already loaded}%
126      \aftergroup\endinput
127    \fi
128  \fi
129 \endgroup%
```

Package identification:

```
130 \begingroup\catcode61\catcode48\catcode32=10\relax%
131  \catcode13=5 % ^^M
132  \endlinechar=13 %
133  \catcode35=6 % #
134  \catcode39=12 % '
135  \catcode40=12 % (
136  \catcode41=12 % )
137  \catcode44=12 % ,
138  \catcode45=12 % -
139  \catcode46=12 % .
140  \catcode47=12 % /
141  \catcode58=12 % :
142  \catcode64=11 % @
143  \catcode91=12 % [
144  \catcode93=12 % ]
145  \catcode123=1 % {
146  \catcode125=2 % }
147  \expandafter\ifx\csname ProvidesPackage\endcsname\relax
148    \def\x#1#2#3[#4]{\endgroup
149      \immediate\write-1{Package: #3 #4}%
150      \xdef#1{#4}%
151    }%
```

```
  \else
    \def\x#1#2[#3]{\endgroup
      #2[{#3}]%
      \ifx#1\@undefined
        \xdef#1{#3}%
      \fi
      \ifx#1\relax
        \xdef#1{#3}%
      \fi
    }%
  \fi
\expandafter\x\csname ver@kvoptions.sty\endcsname
\ProvidesPackage{kvoptions}%
  [2016/05/16 v3.12 Key value format for package options (HO)]%
```

Catcodes

```
\begingroup\catcode61\catcode48\catcode32=10\relax%
  \catcode13=5 % ^^M
  \endlinechar=13 %
  \catcode123=1 % {
  \catcode125=2 % }
  \catcode64=11 % @
  \def\x{\endgroup
    \expandafter\edef\csname KVO@AtEnd\endcsname{%
      \endlinechar=\the\endlinechar\relax
      \catcode13=\the\catcode13\relax
      \catcode32=\the\catcode32\relax
      \catcode35=\the\catcode35\relax
      \catcode61=\the\catcode61\relax
      \catcode64=\the\catcode64\relax
      \catcode123=\the\catcode123\relax
      \catcode125=\the\catcode125\relax
    }%
  }%
\x\catcode61\catcode48\catcode32=10\relax%
\catcode13=5 % ^^M
\endlinechar=13 %
\catcode35=6 % #
\catcode64=11 % @
\catcode123=1 % {
\catcode125=2 % }
\def\TMP@EnsureCode#1#2{%
  \edef\KVO@AtEnd{%
    \KVO@AtEnd
    \catcode#1=\the\catcode#1\relax
  }%
  \catcode#1=#2\relax
}
\TMP@EnsureCode{1}{14}% ^^A (comment)
\TMP@EnsureCode{2}{14}% ^^A (comment)
\TMP@EnsureCode{33}{12}% !
\TMP@EnsureCode{39}{12}% '
\TMP@EnsureCode{40}{12}% (
\TMP@EnsureCode{41}{12}% )
\TMP@EnsureCode{42}{12}% *
\TMP@EnsureCode{44}{12}% ,
\TMP@EnsureCode{45}{12}% -
\TMP@EnsureCode{46}{12}% .
\TMP@EnsureCode{47}{12}% /
\TMP@EnsureCode{58}{12}% :
\TMP@EnsureCode{62}{12}% >
\TMP@EnsureCode{91}{12}% [
```

```
\TMP@EnsureCode{93}{12}% ]
\TMP@EnsureCode{94}{7}% ^ (superscript)
\TMP@EnsureCode{96}{12}% `
\edef\KVO@AtEnd{\KVO@AtEnd\noexpand\endinput}
```

External resources. The package extends the support for key value pairs of package \keyval to package options. Thus the package needs to be loaded anyway. and we use it for \SetupKeyvalOptions. AFAIK this does not disturb users of xkeyval.

```
\@ifundefined{define@key}{%
  \RequirePackage{keyval}\relax
}{}
```

Macro \DeclareLocalOptions parses a comma separated key list and uses \comma@parse of package kvsetkeys, version 1.3.

```
\RequirePackage{ltxcmds}[2010/12/02]
\RequirePackage{kvsetkeys}[2007/09/29]
```

Provide macros for plain TEX.

```
\@ifundefined{@x@protect}{%
  \def\@x@protect#1\fi#2#3{%
    \fi\protect#1%
  }%
  \let\@typeset@protect\relax
}{}
\@ifundefined{@currname}{%
  \def\@currname{}%
}{}
\@ifundefined{@currext}{%
  \def\@currext{}%
}{}
```

Options Option debugshow enables additional lines of code that prints information into the .log file.

```
\DeclareOption{debugshow}{\catcode\@ne=9 }
\DeclareOption{patch}{%
  \AtEndOfPackage{%
    \RequirePackage{kvoptions-patch}[2016/05/16]%
  }%
}
```

Optionen auswerten:

```
\ProcessOptions\relax
```

6.2 Option declaration macros

6.2.1 \SetupKeyvalOptions

The family for the key value pairs can be setup once and is remembered later. The package name seems a reasonable default for the family key, if it is not set by the package author.

\KVO@family We cannot store the family setting in one macro, because the package should be usable for many other packages, too. Thus we remember the family setting in a macro, whose name contains the package name with extension, a key in LATEX's class/package system.

```
\define@key{KVO}{family}{%
  \expandafter\edef\csname KVO@family@%
      \@currname.\@currext\endcsname{#1}%
}
```

```
\def\KVO@family{%
  \@ifundefined{KVO@family@\@currname.\@currext}{%
    \@currname
  }{%
    \csname KVO@family@\@currname.\@currext\endcsname
  }%
}
```

\KVO@prefix The value settings of options that are declared by \DeclareBoolOption and \DeclareStringOption need to be saved in macros. in the first case this is a switch \if⟨*prefix*⟩⟨*key*⟩, in the latter case a macro \⟨*prefix*⟩⟨*key*⟩. The prefix can be configured, by prefix that is declared here. The default is the package name with @ appended.

```
\define@key{KVO}{prefix}{%
  \expandafter\edef\csname KVO@prefix@%
      \@currname.\@currext\endcsname{#1}%
}
\def\KVO@prefix{%
  \ltx@ifundefined{KVO@prefix@\@currname.\@currext}{%
    \@currname @%
  }{%
    \csname KVO@prefix@\@currname.\@currext\endcsname
  }%
}

\define@key{KVO}{setkeys}{%
  \expandafter\def\csname KVO@setkeys@%
      \@currname.\@currext\endcsname{#1}%
}
```

\KVO@setkeys

```
\def\KVO@setkeys{%
  \ltx@IfUndefined{KVO@setkeys@\@currname.\@currext}{%
    \setkeys
  }{%
    \csname KVO@setkeys@\@currname.\@currext\endcsname
  }%
}
```

\SetupKeyvalOptions The argument of \SetupKeyvalOptions expects a key value list, known keys are family and prefix.

```
\newcommand*{\SetupKeyvalOptions}{%
  \kvsetkeys{KVO}%
}
```

6.2.2 \DeclareBoolOption

\DeclareBoolOption Usually options of boolean type can be given by the user without value and this means a setting to *true*. We follow this convention here. Also it simplifies the user interface.

The switch is created and initialized with *false*. The default setting can be overwritten by the optional argument.

LaTeX's \newif does not check for already defined macros, therefore we add this check here to prevent the user from accidently redefining of TeX's primitives and other macros.

```
\newcommand*{\DeclareBoolOption}[2][false]{%
  \KVO@ifdefinable{if\KVO@prefix#2}{%
    \KVO@ifdefinable{\KVO@prefix#2true}{%
      \KVO@ifdefinable{\KVO@prefix#2false}{%
        \csname newif\expandafter\endcsname
        \csname if\KVO@prefix#2\endcsname
```

```
      \@ifundefined{\KVO@prefix#2#1}{%
        \PackageWarning{kvoptions}{%
          Initialization of option `#2' failed,\MessageBreak
          cannot set boolean option to `#1',\MessageBreak
          use `true' or `false', now using `false'%
        }%
      }{%
        \csname\KVO@prefix#2#1\endcsname
      }%
      \begingroup
        \edef\x{\endgroup
          \noexpand\define@key{\KVO@family}{#2}[true]{%
            \noexpand\KVO@boolkey{\@currname}%
            \ifx\@currext\@clsextension
              \noexpand\@clsextension
            \else
              \noexpand\@pkgextension
            \fi
            {\KVO@prefix}{#2}{####1}%
          }%
        }%
      \x
    }%
  }%
}
```

\DeclareComplementaryOption

The first argument is the key name, the second the key that must be a boolean option with the same current family and prefix. A new switch is not created for the new key, we have already a switch. Instead we define switch setting commands to work on the parent switch.

```
\newcommand*{\DeclareComplementaryOption}[2]{%
  \@ifundefined{if\KVO@prefix#2}{%
    \PackageError{kvoptions}{%
      Cannot generate option code for `#1',\MessageBreak
      parent switch `#2' does not exist%
    }{%
      You are inside %
      \ifx\@currext\@clsextension class\else package\fi\space
      `\@currname.\@currext'.\MessageBreak
      `\KVO@family' is used as familiy %
      for the keyval options.\MessageBreak
      `\KVO@prefix' serves as prefix %
      for internal switch macros.\MessageBreak
      \MessageBreak
      \@ehc
    }%
  }{%
    \KVO@ifdefinable{\KVO@prefix#1true}{%
      \KVO@ifdefinable{\KVO@prefix#1false}{%
        \expandafter\let\csname\KVO@prefix#1false\expandafter\endcsname
          \csname\KVO@prefix#2true\endcsname
        \expandafter\let\csname\KVO@prefix#1true\expandafter\endcsname
          \csname\KVO@prefix#2false\endcsname
```

The same code part as in \DeclareBoolOption can now be used.

```
        \begingroup
          \edef\x{\endgroup
            \noexpand\define@key{\KVO@family}{#1}[true]{%
              \noexpand\KVO@boolkey{\@currname}%
              \ifx\@currext\@clsextension
                \noexpand\@clsextension
              \else
```

```
            \noexpand\@pkgextension
           \fi
           {\KVO@prefix}{#1}{####1}%
         }%
       }%
      \x
    }%
  }%
}
```

\KVO@ifdefinable Generate the command token LaTeX's \@ifdefinable expects.

```
\def\KVO@ifdefinable#1{%
 \expandafter\@ifdefinable\csname #1\endcsname
}
```

\KVO@boolkey We check explicitly for true and false to prevent the user from accidently calling other macros.

- #1 package/class name
- #2 \@pkgextension/\@clsextension
- #3 prefix
- #4 key name
- #5 new value

```
\def\KVO@boolkey#1#2#3#4#5{%
 \edef\KVO@param{#5}%
 \ltx@onelevel@sanitize\KVO@param
 \ifx\KVO@param\KVO@true
  \expandafter\@firstofone
 \else
  \ifx\KVO@param\KVO@false
   \expandafter\expandafter\expandafter\@firstofone
  \else
   \ifx#2\@clsextension
    \expandafter\ClassWarning
   \else
    \expandafter\PackageWarning
   \fi
   {#1}{%
    Value `\KVO@param' is not supported by\MessageBreak
    option `#4'%
   }%
   \expandafter\expandafter\expandafter\@gobble
  \fi
 \fi
 {%
  ^^A\ifx#2\@clsextension
  ^^A  \expandafter\ClassInfo
  ^^A\else
  ^^A  \expandafter\PackageInfo
  ^^A\fi
  ^^A{#1}{[option] #4=\KVO@param}%
  \csname#3#4\KVO@param\endcsname
 }%
}
```

\KVO@true \KVO@false The macros \KVO@true and \KVO@false are used for string comparisons. After \ltx@onelevel@sanitize we have only tokens with catcode 12 (other).

```
\def\KVO@true{true}
\def\KVO@false{false}
\ltx@onelevel@sanitize\KVO@true
\ltx@onelevel@sanitize\KVO@false
```

6.2.3 \DeclareStringOption

\DeclareStringOption

```
\newcommand*{\DeclareStringOption}[2][]{%
  \@ifnextchar[{%
    \KVO@DeclareStringOption{#1}{#2}@%
  }{%
    \KVO@DeclareStringOption{#1}{#2}{}[]%
  }%
}
```

\KVO@DeclareStringOption

```
\def\KVO@DeclareStringOption#1#2#3[#4]{%
  \KVO@ifdefinable{\KVO@prefix#2}{%
    \@namedef{\KVO@prefix#2}{#1}%
    \begingroup
      \ifx\\#3\\%
        \toks@{}%
      \else
        \toks@{[{#4}]}%
      \fi
      \edef\x{\endgroup
        \noexpand\define@key{\KVO@family}{#2}\the\toks@{%
          ^^A\begingroup
          ^^A  \toks@{#####1}%
          ^^A  \ifx\@currext\@clsextension
          ^^A    \noexpand\ClassInfo
          ^^A  \else
          ^^A    \noexpand\PackageInfo
          ^^A  \fi
          ^^A  {\@currname}{%
          ^^A    [option] #2={\noexpand\the\toks@}%
          ^^A  }%
          ^^A\endgroup
          \noexpand\def
          \expandafter\noexpand\csname\KVO@prefix#2\endcsname{#####1}%
        }%
      }%
    \x
  }%
}
```

6.2.4 \DeclareVoidOption

\DeclareVoidOption

```
\newcommand*{\DeclareVoidOption}[2]{%
  \begingroup
    \let\next\@gobbletwo
    \KVO@ifdefinable{\KVO@prefix#1}{%
      \let\next\@firstofone
    }%
  \expandafter\endgroup
  \next{%
    \begingroup
      \edef\x{\endgroup
        \noexpand\define@key{\KVO@family}{#1}[\KVO@VOID@]{%
          \noexpand\KVO@voidkey{\@currname}%
          \ifx\@currext\@clsextension
            \noexpand\@clsextension
          \else
            \noexpand\@pkgextension
          \fi
```

```
        {#1}%
        {####1}%
        \expandafter\noexpand\csname\KVO@prefix#1\endcsname
      }%
    }%
   \x
   \begingroup
    \toks@{#2}%
   \expandafter\endgroup
   \expandafter\def
   \csname\KVO@prefix#1\expandafter\endcsname
   \expandafter{\the\toks@}%
  }%
}
\def\KVO@VOID@{@VOID@}
```

#1 package/class name
#2 \@pkgextension/\@clsextension
\KVO@voidkey #3 key name
#4 default (@VOID@)
#5 macro with option code

```
\def\KVO@voidkey#1#2#3#4{%
  \def\CurrentOption{#3}%
  \begingroup
    \def\x{#4}%
  \expandafter\endgroup
  \ifx\x\KVO@VOID@
  \else
    \ifx#2\@clsextension
      \expandafter\ClassWarning
    \else
      \expandafter\PackageWarning
    \fi
    {#1}{%
      Unexpected value for option `#3'\MessageBreak
      is ignored%
    }%
  \fi
  ^^A\ifx#2\@clsextension
  ^^A  \expandafter\ClassInfo
  ^^A\else
  ^^A  \expandafter\PackageInfo
  ^^A\fi
  ^^A{#1}{[option] #3}%
}
```

6.2.5 \DeclareDefaultOption

\DeclareDefaultOption

```
\newcommand*{\DeclareDefaultOption}{%
  \@namedef{KVO@default@\@currname.\@currext}%
}
```

6.2.6 \DeclareLocalOptions

\DeclareLocalOptions

```
\newcommand*{\DeclareLocalOptions}[1]{%
  \comma@parse{#1}\KVO@DeclareLocalOption
}
```

\KVO@DeclareLocalOption

```
\def\KVO@DeclareLocalOption#1{%
```

```
  \expandafter\def\csname KVO@local@\KVO@family @#1\endcsname{}%
}
```

6.3 Dynamic options

6.3.1 \DisableKeyvalOption

```
\SetupKeyvalOptions{%
  family=KVOdyn,%
  prefix=KVOdyn@%
}
\DeclareBoolOption[true]{global}
\DeclareComplementaryOption{local}{global}
\DeclareStringOption[undef]{action}
\let\KVOdyn@name\relax
\let\KVOdyn@ext\@empty
\define@key{KVOdyn}{class}{%
  \def\KVOdyn@name{#1}%
  \let\KVOdyn@ext\@clsextension
}
\define@key{KVOdyn}{package}{%
  \def\KVOdyn@name{#1}%
  \let\KVOdyn@ext\@pkgextension
}
\newcommand*{\DisableKeyvalOption}[3][]{%
  \begingroup
    \kvsetkeys{KVOdyn}{#1}%
    \def\x{\endgroup}%
    \@ifundefined{KVO@action@\KVOdyn@action}{%
      \PackageError{kvoptions}{%
        Unknown disable action %
        `\expandafter\strip@prefix\meaning\KVOdyn@action'\MessageBreak
        for option `#3' in keyval family '#2'%
      }\@ehc
    }{%
      \csname KVO@action@\KVOdyn@action\endcsname{#2}{#3}%
    }%
  \x
}
\def\KVO@action@undef#1#2{%
  \edef\x{\endgroup
    \ifKVOdyn@global\global\fi
    \let
    \expandafter\noexpand\csname KV@#1@#2\endcsname
    \relax
    \ifKVOdyn@global\global\fi
    \let
    \expandafter\noexpand\csname KV@#1@#2@default\endcsname
    \relax
  }%
  ^^A\PackageInfo{kvoptions}{%
  ^^A  [option] key `#2' of family `#1'\MessageBreak
  ^^A  is disabled (undef, \ifKVOdyn@global global\else local\fi)%
  ^^A}%
}
\def\KVO@action@ignore#1#2{%
  \edef\x{\endgroup
    \ifKVOdyn@global\global\fi
    \let
    \expandafter\noexpand\csname KV@#1@#2\endcsname
    \noexpand\@gobble
    \ifKVOdyn@global\global\fi
    \let
```

```
    \expandafter\noexpand\csname KV@#1@#2@default\endcsname
    \noexpand\@empty
  }%
  ^^A\PackageInfo{kvoptions}{%
  ^^A  [option] key `#2' of family `#1'\MessageBreak
  ^^A  is disabled (ignore, \ifKVOdyn@global global\else local\fi)%
  ^^A}%
}
\def\KVO@action@error{%
  \KVO@do@action{error}%
}
\def\KVO@action@warning{%
  \KVO@do@action{warning}%
}
```

#1 error or warning
#2 ⟨*family*⟩
#3 ⟨*key*⟩

```
\def\KVO@do@action#1#2#3{%
  \ifx\KVOdyn@name\relax
    \PackageError{kvoptions}{%
      Action type `#1' needs package/class name\MessageBreak
      for key `#3' in family `#2'%
    }\@ehc
  \else
    \edef\x{\endgroup
      \noexpand\define@key{#2}{#3}[]{%
        \expandafter\noexpand\csname KVO@disable@#1\endcsname
        {\KVOdyn@name}\noexpand\KVOdyn@ext{#3}%
      }%
      \ifKVOdyn@global
        \global\let
        \expandafter\noexpand\csname KV@#2@#3\endcsname
        \expandafter\noexpand\csname KV@#2@#3\endcsname
        \global\let
        \expandafter\noexpand\csname KV@#2@#3@default\endcsname
        \expandafter\noexpand\csname KV@#2@#3@default\endcsname
      \fi
    }%
    ^^A\ifx\KVOdyn@ext\@clsextension
    ^^A  \expandafter\ClassInfo
    ^^A\else
    ^^A   \expandafter\PackageInfo
    ^^A\fi
    ^^A{\KVOdyn@name}{%
    ^^A  [option] key `#3' of family `#2'\MessageBreak
    ^^A  is disabled (#1, \ifKVOdyn@global global\else local\fi)%
    ^^A}%
  \fi
}
\def\KVO@disable@error#1#2#3{%
  \ifx#2\@clsextension
    \expandafter\ClassError
  \else
    \expandafter\PackageError
  \fi
  {#1}{%
    Option `#3' is given too late,\MessageBreak
    now the option is ignored%
  }\@ehc
}
\def\KVO@disable@warning#1#2#3{%
  \ifx#2\@clsextension
```

```
    \expandafter\ClassWarning
  \else
    \expandafter\PackageWarning
  \fi
  {#1}{%
    Option `#3' is already consumed\MessageBreak
    and has no effect%
  }%
}
```

6.4 Change option code

6.4.1 \AddToKeyvalOption

\AddToKeyvalOption

```
\newcommand*{\AddToKeyvalOption}{%
  \@ifstar{%
    \begingroup
      \edef\x{\endgroup
        \noexpand\KVO@AddToKeyvalOption{\KVO@family}%
      }%
    \x
  }%
  \KVO@AddToKeyvalOption
}
```

\KVO@AddToKeyvalOption

```
\def\KVO@AddToKeyvalOption#1#2{%
  \@ifundefined{KV@#1@#2}{%
    \PackageWarning{kvoptions}{%
      Key `#2' of family `#1' does not exist.\MessageBreak
      Ignoring \string\AddToKeyvalOption
    }%
    \@gobble
  }{%
    \edef\KVO@next{%
      \noexpand\KVO@@AddToKeyvalOption
      \expandafter\noexpand\csname KV@#1@#2\endcsname
    }%
    \afterassignment\KVO@next
    \def\KVO@temp##1%
  }%
}
```

\KVO@@AddToKeyvalOption

```
\def\KVO@@AddToKeyvalOption#1{%
  \begingroup
    \toks@\expandafter{#1{##1}}%
    \toks@\expandafter{\the\expandafter\toks@\KVO@temp{##1}}%
    \edef\x{\endgroup
      \noexpand\def\noexpand#1####1{\the\toks@}%
    }%
  \x
}
```

6.5 Process options

6.5.1 Get global options

Package xkeyval removes options with equal signs from the global options (\@classoptionslist). The effect is that other packages and classes will not see these global options anymore. A bug-report was answered that this behaviour is

"by design". Thus I call it a design bug. Now getting the global options require an algorithm instead of a simple macro call.

```
⟨/package⟩
⟨*package | patch⟩
```

\KVO@IfDefThen Call #2 if command #1 is defined and not \relax. (Package kvoptions-patch does not load package ltxcmds.)

```
\def\KVO@IfDefThen#1#2{%
  \ifx#1\ltx@undefined
  \else
    \ifx#1\relax
    \else
      #2%
    \fi
  \fi
}%
```

\KVO@GetClassOptionsList

```
\def\KVO@GetClassOptionsList{%
  \let\KVO@classoptionslist\@classoptionslist
  \KVO@IfDefThen\@classoptionslist{%
    \KVO@IfDefThen\XKV@documentclass{%
      \ifx\XKV@documentclass\ltx@empty
      \else
        \KVO@IfDefThen\XKV@classoptionslist{%
          \ifx\XKV@classoptionslist\ltx@empty
          \else
            \let\KVO@classoptionslist\XKV@classoptionslist
          \fi
        }%
      \fi
    }%
  }%
}%
```

```
⟨/package | patch⟩
⟨*package⟩
```

6.5.2 \ProcessKeyvalOptions

\ProcessKeyvalOptions If the optional star is given, we get the family name and expand it for safety.

```
\newcommand*{\ProcessKeyvalOptions}{%
  \@ifstar{%
    \begingroup
      \edef\x{\endgroup
        \noexpand\KVO@ProcessKeyvalOptions{\KVO@family}%
      }%
    \x
  }%
  \KVO@ProcessKeyvalOptions
}
```

```
\def\KVO@ProcessKeyvalOptions#1{%
  \let\@tempc\relax
  \let\KVO@temp\@empty
```

Add any global options that are known to KV to the start of the list being built in \KVO@temp and mark them used (by removing them from the unused option list).

```
  \ifx\@currext\@clsextension
  \else
    \KVO@GetClassOptionsList
```

```
\ifx\KVO@classoptionslist\relax
\else
  \@for\KVO@CurrentOption:=\KVO@classoptionslist\do{%
    \@ifundefined{KV@#1@\expandafter\KVO@getkey
                  \KVO@CurrentOption=\@nil}{%
    }{%
      \@ifundefined{KVO@local@#1@\expandafter\KVO@getkey
                    \KVO@CurrentOption=\@nil}{%
        \ifx\KVO@Patch Y%
          \edef\KVO@temp{%
            \etex@unexpanded\expandafter{%
              \KVO@temp
            }%
            ,%
            \etex@unexpanded\expandafter{%
              \KVO@CurrentOption
            }%
            ,%
          }%
          \ltx@onelevel@sanitize\KVO@CurrentOption
        \else
          \edef\KVO@temp{%
            \KVO@temp
            ,%
            \KVO@CurrentOption
            ,%
          }%
        \fi
        \@expandtwoargs\@removeelement\KVO@CurrentOption
          \@unusedoptionlist\@unusedoptionlist
      }{}%
    }%
  }%
  \fi
\fi
```

Now stick the package options at the end of the list and wrap in a call to `\setkeys`. A class ignores unknown global options, we must remove them to prevent error messages from `\setkeys`.

```
\begingroup
  \toks\tw@{}%
  \@ifundefined{opt@\@currname.\@currext}{%
    \toks@\expandafter{\KVO@temp}%
  }{%
    \toks@\expandafter\expandafter\expandafter{%
      \csname opt@\@currname.\@currext\endcsname
    }%
    \ifx\@currext\@clsextension
      \edef\CurrentOption{\the\toks@}%
      \toks@\expandafter{\KVO@temp}%
      \@for\CurrentOption:=\CurrentOption\do{%
        \@ifundefined{%
          KV@#1@\expandafter\KVO@getkey\CurrentOption=\@nil
        }{%
```

A class puts not used options in the unused option list unless there is a default handler.

```
          \@ifundefined{KVO@default@\@currname.\@currext}{%
            \ifx\KVO@Patch Y%
              \ltx@onelevel@sanitize\CurrentOption
            \fi
            \ifx\@unusedoptionlist\@empty
              \global\let\@unusedoptionlist\CurrentOption
```

```
          \else
            \expandafter\expandafter\expandafter\gdef
            \expandafter\expandafter\expandafter\@unusedoptionlist
            \expandafter\expandafter\expandafter{%
              \expandafter\@unusedoptionlist
              \expandafter,\CurrentOption
            }%
          \fi
        }{%
          \toks\tw@\expandafter{%
            \the\toks\expandafter\tw@\expandafter,\CurrentOption
          }%
        }%
      }{%
        \toks@\expandafter{%
          \the\expandafter\toks@\expandafter,\CurrentOption
        }%
      }%
    }%
  \else
```

Without default action we pass all options to `\setkeys`. Otherwise we have to check which options are known. These are passed to `\setkeys`. For the others the default action is performed.

```
    \@ifundefined{KVO@default@\@currname.\@currext}{%
      \toks@\expandafter\expandafter\expandafter{%
        \expandafter\KVO@temp\the\toks@
      }%
    }{%
      \edef\CurrentOption{\the\toks@}%
      \toks@\expandafter{\KVO@temp}%
      \@for\CurrentOption:=\CurrentOption\do{%
        \@ifundefined{%
          KV@#1@\expandafter\KVO@getkey\CurrentOption=\@nil
        }{%
          \toks\tw@\expandafter{%
            \the\toks\expandafter\tw@\expandafter,\CurrentOption
          }%
        }{%
          \toks@\expandafter{%
            \the\expandafter\toks@\expandafter,\CurrentOption
          }%
        }%
      }%
    }%
  \fi
 }%
 \edef\KVO@temp{\endgroup
  \noexpand\KVO@calldefault{\the\toks\tw@}%
  \noexpand\KVO@setkeys{#1}{\the\toks@}%
 }%
\KVO@temp
```

Some cleanup of `\ProcessOptions`.

```
\let\CurrentOption\@empty
\AtEndOfPackage{\let\@unprocessedoptions\relax}%
}
```

6.5.3 \ProcessLocalKeyvalOptions

`\ProcessLocalKeyvalOptions` If the optional star is given, we get the family name and expand it for safety.

```
\newcommand*{\ProcessLocalKeyvalOptions}{%
 \@ifstar{%
```

```
    \begingroup
      \edef\x{\endgroup
        \noexpand\KVO@ProcessLocalKeyvalOptions{\KVO@family}%
      }%
    \x
  }%
  \KVO@ProcessLocalKeyvalOptions
}

\def\KVO@ProcessLocalKeyvalOptions#1{%
  \let\@tempc\relax
  \let\KVO@temp\@empty
```

Check if \ProcessLocalKeyvalOptions is called inside a package.

```
  \ifx\@currext\@pkgextension
  \else
    \PackageError{kvoptions}{%
      \string\ProcessLocalKeyvalOptions\space is intended for packages only%
    }\@ehc
  \fi
```

The package options are put into toks register \toks@.

```
  \begingroup
    \toks\tw@{}%
    \@ifundefined{opt@\@currname.\@currext}{%
      \toks@\expandafter{\KVO@temp}%
    }{%
      \toks@\expandafter\expandafter\expandafter{%
        \csname opt@\@currname.\@currext\endcsname
      }%
```

Without default action we pass all options to \setkeys. Otherwise we have to check which options are known. These are passed to \setkeys. For the others the default action is performed.

```
      \@ifundefined{KVO@default@\@currname.\@currext}{%
        \toks@\expandafter\expandafter\expandafter{%
          \expandafter\KVO@temp\the\toks@
        }%
      }{%
        \edef\CurrentOption{\the\toks@}%
        \toks@\expandafter{\KVO@temp}%
        \@for\CurrentOption:=\CurrentOption\do{%
          \@ifundefined{%
            KV@#1@\expandafter\KVO@getkey\CurrentOption=\@nil
          }{%
            \toks\tw@\expandafter{%
              \the\toks\expandafter\tw@\expandafter,\CurrentOption
            }%
          }{%
            \toks@\expandafter{%
              \the\expandafter\toks@\expandafter,\CurrentOption
            }%
          }%
        }%
      }%
    }%
    \edef\KVO@temp{\endgroup
      \noexpand\KVO@calldefault{\the\toks\tw@}%
      \noexpand\KVO@setkeys{#1}{\the\toks@}%
    }%
  \KVO@temp
```

Some cleanup of \ProcessOptions.

```
  \let\CurrentOption\@empty
```

```
  \AtEndOfPackage{\let\@unprocessedoptions\relax}%
}
```

6.5.4 Helper macros

\KVO@getkey Extract the key part of a key=value pair.

```
\def\KVO@getkey#1=#2\@nil{#1}
```

\KVO@calldefault

```
\def\KVO@calldefault#1{%
  \begingroup
    \def\x{#1}%
  \expandafter\endgroup
  \ifx\x\@empty
  \else
    \@for\CurrentOption:=#1\do{%
      \ifx\CurrentOption\@empty
      \else
        \expandafter\KVO@setcurrents\CurrentOption=\@nil
        \@nameuse{KVO@default@\@currname.\@currext}%
      \fi
    }%
  \fi
}
```

\KVO@setcurrents Extract the key part of a key=value pair.

```
\def\KVO@setcurrents#1=#2\@nil{%
  \def\CurrentOptionValue{#2}%
  \ifx\CurrentOptionValue\@empty
    \let\CurrentOptionKey\CurrentOption
    \let\CurrentOptionValue\relax
  \else
    \edef\CurrentOptionKey{\zap@space#1 \@empty}%
    \expandafter\KVO@setcurrentvalue\CurrentOption\@nil
  \fi
}
```

\KV@setcurrentvalue Here the value part is parsed. Package keyval's \KV@@sp@def helps in removing spaces at the begin and end of the value.

```
\def\KVO@setcurrentvalue#1=#2\@nil{%
  \KV@@sp@def\CurrentOptionValue{#2}%
}
```

6.6 plain TEX

Disable LATEX stuff.

```
\begingroup\expandafter\expandafter\expandafter\endgroup
\expandafter\ifx\csname documentclass\endcsname\relax
  \def\ProcessKeyvalOptions{%
    \@ifstar{}\@gobble
  }%
\fi
\KVO@AtEnd%
⟨/package⟩
```

6.7 Package kvoptions-patch

```
⟨*patch⟩
\NeedsTeXFormat{LaTeX2e}
\begingroup\catcode61\catcode48\catcode32=10\relax%
  \catcode13=5 % ^^M
```

```
  \endlinechar=13 %
  \catcode123=1 % {
  \catcode125=2 % }
  \catcode64=11 % @
  \def\x{\endgroup
    \expandafter\edef\csname KVO@AtEnd\endcsname{%
      \endlinechar=\the\endlinechar\relax
      \catcode13=\the\catcode13\relax
      \catcode32=\the\catcode32\relax
      \catcode35=\the\catcode35\relax
      \catcode61=\the\catcode61\relax
      \catcode64=\the\catcode64\relax
      \catcode123=\the\catcode123\relax
      \catcode125=\the\catcode125\relax
    }%
  }%
\x\catcode61\catcode48\catcode32=10\relax%
\catcode13=5 % ^^M
\endlinechar=13 %
\catcode35=6 % #
\catcode64=11 % @
\catcode123=1 % {
\catcode125=2 % }
\def\TMP@EnsureCode#1#2{%
  \edef\KVO@AtEnd{%
    \KVO@AtEnd
    \catcode#1=\the\catcode#1\relax
  }%
  \catcode#1=#2\relax
}
\TMP@EnsureCode{39}{12}% '
\TMP@EnsureCode{40}{12}% (
\TMP@EnsureCode{41}{12}% )
\TMP@EnsureCode{43}{12}% +
\TMP@EnsureCode{44}{12}% ,
\TMP@EnsureCode{45}{12}% -
\TMP@EnsureCode{46}{12}% .
\TMP@EnsureCode{47}{12}% /
\TMP@EnsureCode{58}{12}% :
\TMP@EnsureCode{60}{12}% <
\TMP@EnsureCode{62}{12}% >
\TMP@EnsureCode{91}{12}% [
\TMP@EnsureCode{93}{12}% ]
\TMP@EnsureCode{96}{12}% `
\TMP@EnsureCode{124}{12}% |
\edef\KVO@AtEnd{\KVO@AtEnd\noexpand\endinput}
\ProvidesPackage{kvoptions-patch}%
  [2016/05/16 v3.12 LaTeX patch for keyval options (HO)]%
```

Check for ε-TEX.

```
\begingroup\expandafter\expandafter\expandafter\endgroup
\expandafter\ifx\csname eTeXversion\endcsname\relax
  \PackageWarningNoLine{kvoptions-patch}{%
    Package loading is aborted, because e-TeX is missing%
  }%
  \expandafter\KVO@AtEnd
\fi%
```

Package etexcmds for \etex@unexpanded.

```
\RequirePackage{etexcmds}[2007/09/09]
\ifetex@unexpanded
\else
  \PackageError{kvoptions-patch}{%
    Could not find eTeX's \string\unexpanded.\MessageBreak
```

```
    Try adding \string\RequirePackage\string{etexcmds\string} %
    before \string\documentclass%
  }\@ehd
  \expandafter\KVO@AtEnd
\fi%
```

Check for package xkvltxp.

```
\@ifpackageloaded{xkvltxp}{%
  \PackageWarningNoLine{kvoptions}{%
    Option `patch' cannot be used together with\MessageBreak
    package `xkvltxp' that is already loaded.\MessageBreak
    Therefore package loading is aborted%
  }%
  \KVO@AtEnd
}{}%
\def\@if@ptions#1#2#3{%
  \begingroup
    \KVO@normalize\KVO@temp{#3}%
    \edef\x{\endgroup
      \noexpand\@if@pti@ns{%
        \detokenize\expandafter\expandafter\expandafter{%
          \csname opt@#2.#1\endcsname
        }%
      }{%
        \detokenize\expandafter{\KVO@temp}%
      }%
    }%
  \x
}
\def\@pass@ptions#1#2#3{%
  \KVO@normalize\KVO@temp{#2}%
  \@ifundefined{opt@#3.#1}{%
    \expandafter\gdef\csname opt@#3.#1%
        \expandafter\endcsname\expandafter{%
      \KVO@temp
    }%
  }{%
    \expandafter\gdef\csname opt@#3.#1%
        \expandafter\expandafter\expandafter\endcsname
        \expandafter\expandafter\expandafter{%
      \csname opt@#3.#1\expandafter\endcsname\expandafter,\KVO@temp
    }%
  }%
}
\def\ProcessOptions{%
  \let\ds@\@empty
  \@ifundefined{opt@\@currname.\@currext}{%
    \let\@curroptions\@empty
  }{%
    \expandafter\expandafter\expandafter\def
    \expandafter\expandafter\expandafter\@curroptions
    \expandafter\expandafter\expandafter{%
      \csname opt@\@currname.\@currext\endcsname
    }%
  }%
  \@ifstar\KVO@xprocess@ptions\KVO@process@ptions
}
\def\KVO@process@ptions{%
  \@for\CurrentOption:=\@declaredoptions\do{%
    \ifx\CurrentOption\@empty
    \else
      \begingroup
```

```
      \ifx\@currext\@clsextension
        \toks@{}%
      \else
        \KVO@GetClassOptionsList
        \toks@\expandafter{\KVO@classoptionslist,}%
      \fi
      \toks\tw@\expandafter{\@curroptions}%
      \edef\x{\endgroup
        \noexpand\in@{,\CurrentOption,}{,\the\toks@\the\toks\tw@,}%
      }%
    \x
    \ifin@
      \KVO@use@ption
      \expandafter\let\csname ds@\CurrentOption\endcsname\@empty
    \fi
  \fi
 }%
 \KVO@process@pti@ns
}
\def\KVO@xprocess@ptions{%
 \ifx\@currext\@clsextension
 \else
  \KVO@GetClassOptionsList
  \@for\CurrentOption:=\KVO@classoptionslist\do{%
    \ifx\CurrentOption\@empty
    \else
      \KVO@in@\CurrentOption\@declaredoptions
      \ifin@
        \KVO@use@ption
        \expandafter\let\csname ds@\CurrentOption\endcsname\@empty
      \fi
    \fi
  }%
 \fi
 \KVO@process@pti@ns
}
\def\KVO@in@#1#2{%
 \in@false
 \begingroup
  \@for\x:=#2\do{%
    \ifx\x#1\relax
      \in@true
    \fi
  }%
  \edef\x{\endgroup
    \ifin@
      \noexpand\in@true
    \fi
  }%
 \x
}
\def\KVO@process@pti@ns{%
 \@for\CurrentOption:=\@curroptions\do{%
  \@ifundefined{ds@\KVO@SanitizedCurrentOption}{%
    \KVO@use@ption
    \default@ds
  }%
  \KVO@use@ption
 }%
 \@for\CurrentOption:=\@declaredoptions\do{%
  \expandafter\let\csname ds@\CurrentOption\endcsname\relax
 }%
```

```
  \let\CurrentOption\@empty
  \let\@fileswith@pti@ns\@@fileswith@pti@ns
  \AtEndOfPackage{\let\@unprocessedoptions\relax}%
}
\def\KVO@use@ption{%
  \begingroup
    \edef\x{\endgroup
      \noexpand\@removeelement{%
        \detokenize\expandafter{\CurrentOption}%
      }{%
        \detokenize\expandafter{\@unusedoptionlist}%
      }%
    }%
  \x\@unusedoptionlist
  \csname ds@\KVO@SanitizedCurrentOption\endcsname
}
\def\OptionNotUsed{%
  \ifx\@currext\@clsextension
    \xdef\@unusedoptionlist{%
      \ifx\@unusedoptionlist\@empty
      \else
        \detokenize\expandafter{\@unusedoptionlist,}%
      \fi
      \detokenize\expandafter{\CurrentOption}%
    }%
  \fi
}
```

Variant of \ExecuteOptions that better protects \CurrentOption.

```
\def\CurrentOption@SaveLevel{0}
\def\ExecuteOptions{%
  \expandafter\KVO@ExecuteOptions
     \csname CurrentOption@\CurrentOption@SaveLevel\endcsname
}
\def\KVO@ExecuteOptions#1#2{%
  \let#1\CurrentOption
  \edef\CurrentOption@SaveLevel{%
    \the\numexpr\CurrentOption@SaveLevel+1%
  }%
  \@for\CurrentOption:=#2\do{%
    \csname ds@\CurrentOption\endcsname
  }%
  \edef\CurrentOption@SaveLevel{%
    \the\numexpr\CurrentOption@SaveLevel-1%
  }%
  \let\CurrentOption#1%
}
\def\KVO@fileswith@pti@ns#1[#2]#3[#4]{%
  \ifx#1\@clsextension
    \ifx\@classoptionslist\relax
      \KVO@normalize\KVO@temp{#2}%
      \expandafter\gdef\expandafter\@classoptionslist\expandafter{%
        \KVO@temp
      }%
      \def\reserved@a{%
        \KVO@onefilewithoptions{#3}[{#2}][{#4}]#1%
        \@documentclasshook
      }%
    \else
      \def\reserved@a{%
        \KVO@onefilewithoptions{#3}[{#2}][{#4}]#1%
      }%
```

```
  \fi
 \else
  \begingroup
    \let\KVO@temp\relax
    \let\KVO@onefilewithoptions\relax
    \let\@pkgextension\relax
    \def\reserved@b##1,{%
      \ifx\@nil##1\relax
      \else
        \ifx\relax##1\relax
        \else
          \KVO@onefilewithoptions{##1}[{\KVO@temp}][{#4}]%
          \@pkgextension
        \fi
        \expandafter\reserved@b
      \fi
    }%
    \edef\reserved@a{\zap@space#3 \@empty}%
    \edef\reserved@a{\expandafter\reserved@b\reserved@a,\@nil,}%
    \toks@{#2}%
    \def\KVO@temp{\the\toks@}%
  \edef\reserved@a{\endgroup \reserved@a}%
 \fi
 \reserved@a
}
\def\KVO@onefilewithoptions#1[#2][#3]#4{%
 \@pushfilename
 \xdef\@currname{#1}%
 \global\let\@currext#4%
 \expandafter\let\csname\@currname.\@currext-h@@k\endcsname\@empty
 \let\CurrentOption\@empty
 \@reset@ptions
 \makeatletter
 \def\reserved@a{%
  \@ifl@aded\@currext{#1}{%
   \@if@ptions\@currext{#1}{#2}{%
   }{%
    \begingroup
     \@ifundefined{opt@#1.\@currext}{%
      \def\x{}%
     }{%
      \edef\x{%
       \expandafter\expandafter\expandafter\strip@prefix
       \expandafter\meaning\csname opt@#1.\@currext\endcsname
      }%
     }%
     \def\y{#2}%
     \edef\y{\expandafter\strip@prefix\meaning\y}%
     \@latex@error{Option clash for \@cls@pkg\space #1}{%
      The package #1 has already been loaded %
      with options:\MessageBreak
      \space\space[\x]\MessageBreak
      There has now been an attempt to load it %
       with options\MessageBreak
      \space\space[\y]\MessageBreak
      Adding the global options:\MessageBreak
      \space\space
          \x,\y\MessageBreak
      to your \noexpand\documentclass declaration may fix this.%
      \MessageBreak
      Try typing \space <return> \space to proceed.%
     }%
```

```
      \endgroup
    }%
  }{%
    \@pass@ptions\@currext{#2}{#1}%
    \global\expandafter
    \let\csname ver@\@currname.\@currext\endcsname\@empty
    \InputIfFileExists
      {\@currname.\@currext}%
      {}%
      {\@missingfileerror\@currname\@currext}%
    \let\@unprocessedoptions\@@unprocessedoptions
    \csname\@currname.\@currext-h@@k\endcsname
    \expandafter\let\csname\@currname.\@currext-h@@k\endcsname
          \@undefined
    \@unprocessedoptions
  }%
  \@ifl@ter\@currext{#1}{#3}{%
  }{%
    \@latex@warning@no@line{%
      You have requested,\on@line, %
      version\MessageBreak
        #3' of \@cls@pkg\space #1,\MessageBreak
      but only version\MessageBreak
       `\csname ver@#1.\@currext\endcsname'\MessageBreak
      is available%
    }%
  }%
  \ifx\@currext\@clsextension\let\LoadClass\@twoloadclasserror\fi
  \@popfilename
  \@reset@ptions
 }%
 \reserved@a
}

\def\@unknownoptionerror{%
 \@latex@error{%
   Unknown option `\KVO@SanitizedCurrentOption' %
   for \@cls@pkg\space`\@currname'%
 }{%
   The option `\KVO@SanitizedCurrentOption' was not declared in %
   \@cls@pkg\space`\@currname', perhaps you\MessageBreak
   misspelled its name. %
   Try typing \space <return> %
   \space to proceed.%
 }%
}

\def\@@unprocessedoptions{%
 \ifx\@currext\@pkgextension
   \@ifundefined{opt@\@currname.\@currext}{%
     \let\@curroptions\@empty
   }{%
     \expandafter\let\expandafter\@curroptions
        \csname opt@\@currname.\@currext\endcsname
   }%
   \@for\CurrentOption:=\@curroptions\do{%
      \ifx\CurrentOption\@empty\else\@unknownoptionerror\fi
   }%
 \fi
}

\def\KVO@SanitizedCurrentOption{%
 \expandafter\strip@prefix\meaning\CurrentOption
}
```

Normalize option list.

```
\def\KVO@normalize#1#2{%
  \let\KVO@result\@empty
  \KVO@splitcomma#2,\@nil
  \let#1\KVO@result
}
\def\KVO@splitcomma#1,#2\@nil{%
  \KVO@ifempty{#1}{}{%
    \KVO@checkkv#1=\@nil
  }%
  \KVO@ifempty{#2}{}{\KVO@splitcomma#2\@nil}%
}
\def\KVO@ifempty#1{%
  \expandafter\ifx\expandafter\\\detokenize{#1}\\%
    \expandafter\@firstoftwo
  \else
    \expandafter\@secondoftwo
  \fi
}
\def\KVO@checkkv#1=#2\@nil{%
  \KVO@ifempty{#2}{%
    % option without value
    \edef\KVO@x{\zap@space#1 \@empty}%
    \ifx\KVO@x\@empty
      % ignore empty option
    \else
      % append to list
      \edef\KVO@result{%
        \etex@unexpanded\expandafter{\KVO@result},\KVO@x
      }%
    \fi
  }{%
    % #1: "key", #2: "value="
    % add key part
    \edef\KVO@result{%
      \etex@unexpanded\expandafter{\KVO@result},%
      \zap@space#1 \@empty
    }%
    \futurelet\@let@token\KVO@checkfirsttok#2 \@nil| = \@nil|\KVO@nil
  }%
}
\def\KVO@checkfirsttok{%
  \ifx\@let@token\bgroup
    % no space at start
    \expandafter\KVO@removelastspace\expandafter=%
    % "<value><spaceopt>= \@nil"
  \else
    \expandafter\KVO@checkfirstA
  \fi
}
\def\KVO@checkfirstA#1 #2\@nil{%
  \KVO@ifempty{#2}{%
    \KVO@removelastspace=#1 \@nil
  }{%
    \KVO@ifempty{#1}{%
      \KVO@removelastspace=#2\@nil
    }{%
      \KVO@removelastspace=#1 #2\@nil
    }%
  }%
}
\def\KVO@removelastspace#1 = \@nil|#2\KVO@nil{%
```

```
  \KVO@ifempty{#2}{%
    \edef\KVO@result{%
      \etex@unexpanded\expandafter{\KVO@result}%
      \etex@unexpanded\expandafter{\KVO@removegarbage#1\KVO@nil}%
    }%
  }{%
    \edef\KVO@result{%
      \etex@unexpanded\expandafter{\KVO@result}%
      \etex@unexpanded{#1}%
    }%
  }%
}
\def\KVO@removegarbage#1= \@nil#2\KVO@nil{#1}%
```

Arguments #1 and #2 are macros.

```
\def\KVO@removeelement#1#2{%
  \begingroup
    \toks@={}%
    \@for\x:=#2\do{%
      \ifx\x\@empty
      \else
        \ifx\x#1\relax
        \else
          \edef\t{\the\toks@}%
          \ifx\t\@empty
          \else
            \toks@\expandafter{\the\toks@,}%
          \fi
          \toks@\expandafter{\the\expandafter\toks@\x}%
        \fi
      \fi
    }%
    \edef\x{\endgroup
      \def\noexpand#2{\the\toks@}%
    }%
  \x
}
\let\@@fileswith@pti@ns\KVO@fileswith@pti@ns
\ifx\@fileswith@pti@ns\@badrequireerror
\else
  \let\@fileswith@pti@ns\KVO@fileswith@pti@ns
\fi
```

\KVO@Patch

```
\let\KVO@Patch=Y

\KVO@AtEnd%
```

⟨/patch⟩

7 Test

7.1 Preface for standard catcode check

```
⟨*test1⟩
\input miniltx.tex\relax
```

⟨/test1⟩

7.2 Catcode checks for loading

```
⟨*test1⟩

\catcode`\{=1 %
\catcode`\}=2 %
\catcode`\#=6 %
```

```
\catcode`\@=11 %
\expandafter\ifx\csname count@\endcsname\relax
  \countdef\count@=255 %
\fi
\expandafter\ifx\csname @gobble\endcsname\relax
  \long\def\@gobble#1{}%
\fi
\expandafter\ifx\csname @firstofone\endcsname\relax
  \long\def\@firstofone#1{#1}%
\fi
\expandafter\ifx\csname loop\endcsname\relax
  \expandafter\@firstofone
\else
  \expandafter\@gobble
\fi
{%
  \def\loop#1\repeat{%
    \def\body{#1}%
    \iterate
  }%
  \def\iterate{%
    \body
      \let\next\iterate
    \else
      \let\next\relax
    \fi
    \next
  }%
  \let\repeat=\fi
}%
\def\RestoreCatcodes{}
\count@=0 %
\loop
  \edef\RestoreCatcodes{%
    \RestoreCatcodes
    \catcode\the\count@=\the\catcode\count@\relax
  }%
\ifnum\count@<255 %
  \advance\count@ 1 %
\repeat

\def\RangeCatcodeInvalid#1#2{%
  \count@=#1\relax
  \loop
    \catcode\count@=15 %
  \ifnum\count@<#2\relax
    \advance\count@ 1 %
  \repeat
}
\def\RangeCatcodeCheck#1#2#3{%
  \count@=#1\relax
  \loop
    \ifnum#3=\catcode\count@
    \else
      \errmessage{%
        Character \the\count@\space
        with wrong catcode \the\catcode\count@\space
        instead of \number#3%
      }%
    \fi
  \ifnum\count@<#2\relax
    \advance\count@ 1 %
```

```
  \repeat
}
\def\space{ }
\expandafter\ifx\csname LoadCommand\endcsname\relax
  \def\LoadCommand{\input kvoptions.sty\relax}%
\fi
\def\Test{%
  \RangeCatcodeInvalid{0}{47}%
  \RangeCatcodeInvalid{58}{64}%
  \RangeCatcodeInvalid{91}{96}%
  \RangeCatcodeInvalid{123}{255}%
  \catcode`\@=12 %
  \catcode`\\=0 %
  \catcode`\%=14 %
  \LoadCommand
  \RangeCatcodeCheck{0}{36}{15}%
  \RangeCatcodeCheck{37}{37}{14}%
  \RangeCatcodeCheck{38}{47}{15}%
  \RangeCatcodeCheck{48}{57}{12}%
  \RangeCatcodeCheck{58}{63}{15}%
  \RangeCatcodeCheck{64}{64}{12}%
  \RangeCatcodeCheck{65}{90}{11}%
  \RangeCatcodeCheck{91}{91}{15}%
  \RangeCatcodeCheck{92}{92}{0}%
  \RangeCatcodeCheck{93}{96}{15}%
  \RangeCatcodeCheck{97}{122}{11}%
  \RangeCatcodeCheck{123}{255}{15}%
  \RestoreCatcodes
}
\Test
\csname @@end\endcsname
\end
```

⟨/test1⟩

⟨*test2⟩

```
\NeedsTeXFormat{LaTeX2e}
\makeatletter
\catcode`\@=11 %
\def\RestoreCatcodes{}
\count@=0 %
\loop
  \edef\RestoreCatcodes{%
    \RestoreCatcodes
    \catcode\the\count@=\the\catcode\count@\relax
  }%
\ifnum\count@<255 %
  \advance\count@\@ne
\repeat

\def\RangeCatcodeInvalid#1#2{%
  \count@=#1\relax
  \loop
    \catcode\count@=15 %
  \ifnum\count@<#2\relax
    \advance\count@\@ne
  \repeat
}
\def\Test#1{%
  \RangeCatcodeInvalid{0}{47}%
  \RangeCatcodeInvalid{58}{64}%
  \RangeCatcodeInvalid{91}{96}%
  \RangeCatcodeInvalid{123}{255}%
  \catcode`\@=12 %
```

```
  \catcode`\\=0 %
  \catcode`\{=1 %
  \catcode`\}=2 %
  \catcode`\#=6 %
  \catcode`\[=12 %
  \catcode`\]=12 %
  \catcode`\%=14 %
  \catcode`\ =10 %
  \catcode13=5 %
  #1\relax
  \RestoreCatcodes
}
\Test{\RequirePackage{kvoptions-patch}}%
\Test{\RequirePackage{kvoptions}}%
\csname @@end\endcsname
⟨/test2⟩
⟨*test3⟩
\NeedsTeXFormat{LaTeX2e}
\makeatletter
\RequirePackage{kvoptions}[2016/05/16]
\def\msg#{\immediate\write16}
\define@key{testfamily}{testkey}{%
  \msg{[testfamily/testkey/#1]}%
}
\define@key{testfamily}{testdefaultkey}[testdefault]{%
  \msg{[testfamily/testdefaultkey/#1]}%
}
\AddToKeyvalOption{testfamily}{testkey}{%
  \msg{[addition/#1]}%
}
\AddToKeyvalOption{testfamily}{testdefaultkey}{%
  \msg{[addition/#1]}%
}
\setkeys{testfamily}{%
  testkey=testA,%
  testdefaultkey=testB,%
  testdefaultkey,%
}
\SetupKeyvalOptions{%
  family=testfamily%
}
\AddToKeyvalOption*{testkey}{%
  \msg{[star addition/#1]}%
}
\AddToKeyvalOption*{testdefaultkey}{%
  \msg{[star addition/#1]}%
}
\setkeys{testfamily}{%
  testkey=testA,%
  testdefaultkey=testB,%
  testdefaultkey,%
}
\@@end
⟨/test3⟩
⟨*test4pkg⟩
\NeedsTeXFormat{LaTeX2e}
\ProvidesPackage{kvoptions-test4}[2016/05/16 package for testing]
\RequirePackage{kvoptions}[2016/05/16]
\SetupKeyvalOptions{%
  family=FOO,%
  prefix=foo,%
  setkeys=\kvsetkeys,%
```

```
}
\DeclareStringOption{str}
\define@key{FOO}{set}{%
  \setkeys{BAR}{strbar={#1}}%
}
\define@key{BAR}{strbar}{%
  \def\foostr{[BAR:#1]}%
}
\ProcessKeyvalOptions*
⟨/test4pkg⟩
⟨*test4⟩
\NeedsTeXFormat{LaTeX2e}
\ProvidesFile{kvoptions-test4.tex}[2016/05/16 test file]
\RequirePackage[%
  str=A,set=B,str=C,%
]{kvoptions-test4}[2016/05/16]
\def\TestExpected{C}
\ifx\foostr\TestExpected
  \typeout{* Test ok.}%
\else
  \typeout{* Result: [\foostr]}%
  \typeout{* Expected: [\TestExpected]}%
  \errmessage{Test failed!}%
\fi
\csname @@end\endcsname\end
⟨/test4⟩
```

8 Installation

8.1 Download

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

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

CTAN:macros/latex/contrib/oberdiek/kvoptions.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.

8.2 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/
```

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

8.3 Package installation

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

```
tex kvoptions.dtx
```

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

kvoptions.sty	→ tex/latex/oberdiek/kvoptions.sty
kvoptions-patch.sty	→ tex/latex/oberdiek/kvoptions-patch.sty
kvoptions.pdf	→ doc/latex/oberdiek/kvoptions.pdf
example-mycolorsetup.sty	→ doc/latex/oberdiek/example-mycolorsetup.sty
test/kvoptions-test1.tex	→ doc/latex/oberdiek/test/kvoptions-test1.tex
test/kvoptions-test2.tex	→ doc/latex/oberdiek/test/kvoptions-test2.tex
test/kvoptions-test3.tex	→ doc/latex/oberdiek/test/kvoptions-test3.tex
test/kvoptions-test4.tex	→ doc/latex/oberdiek/test/kvoptions-test4.tex
test/kvoptions-test4.sty	→ doc/latex/oberdiek/test/kvoptions-test4.sty
kvoptions.dtx	→ source/latex/oberdiek/kvoptions.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.

8.4 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.

8.5 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{kvoptions.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 kvoptions.dtx
makeindex -s gind.ist kvoptions.idx
pdflatex kvoptions.dtx
makeindex -s gind.ist kvoptions.idx
pdflatex kvoptions.dtx
```

9 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 kvoptions.xml.

```
⟨*catalogue⟩
<?xml version='1.0' encoding='us-ascii'?>
<!DOCTYPE entry SYSTEM 'catalogue.dtd'>
<entry datestamp='$Date$' modifier='$Author$' id='kvoptions'>
  <name>kvoptions</name>
  <caption>Key value format for package options.</caption>
  <authorref id='auth:oberdiek'/>
  <copyright owner='Heiko Oberdiek' year='2004,2006,2007,2009-2011'/>
  <license type='lppl1.3'/>
  <version number='3.12'/>
  <description>
    This package offers support for package authors who want to
    use options in key-value format for their package options.
    <p/>
    The package is part of the <xref refid='oberdiek'>oberdiek</xref> bundle.
  </description>
  <documentation details='Package documentation'
      href='ctan:/macros/latex/contrib/oberdiek/kvoptions.pdf'/>
  <ctan file='true' path='/macros/latex/contrib/oberdiek/kvoptions.dtx'/>
  <miktex location='oberdiek'/>
  <texlive location='oberdiek'/>
  <install path='/macros/latex/contrib/oberdiek/oberdiek.tds.zip'/>
</entry>
⟨/catalogue⟩
```

10 References

[1] A guide to key-value methods, Joseph Wright, second draft for TUGBoat, 2009-03-17. http://www.texdev.net/wp-content/uploads/2009/03/keyval.pdf

[2] Package ifthen, David Carlisle, 2001/05/26. CTAN:macros/latex/base/ifthen.dtx

[3] Package helvet, Sebastian Rahtz, Walter Schmidt, 2004/01/26. CTAN:macros/latex/required/psnfss/psfonts.dtx

[4] Package hyperref, Sebastian Rahtz, Heiko Oberdiek, 2006/02/12. CTAN:macros/latex/contrib/hyperref/

[5] Package keyval, David Carlisle, 1999/03/16. CTAN:macros/latex/required/graphics/keyval.dtx

[6] Package multicol, Frank Mittelbach, 2004/02/14. CTAN:macros/latex/required/tools/multicol.dtx

[7] Package tabularx, David Carlisle, 1999/01/07. CTAN:macros/latex/required/tools/tabularx.dtx

[8] Package tracefnt, Frank Mittelbach, Rainer Schöpf, 1997/05/29. CTAN:macros/latex/base/ltfsstrc.dtx

[9] Package xkeyval, Hendri Adriaens, 2005/05/07. CTAN:macros/latex/contrib/xkeyval/

[10] The LaTeX3 Project, *LaTeX 2ε for class and package writers*, 2003/12/09. CTAN:macros/latex/doc/clsguide.pdf

11 History

[0000/00/00 v0.0]

- Probably David Carlisle's code in hyperref was the start.

[2004/02/22 v1.0]

- The first version was never published. It also has offered a patch to get rid of LaTeX's option expansion.

[2006/02/16 v2.0]

- Now the package is redesigned with an easier user interface.
- `\ProcessKeyvalOptions` remains the central service, inherited from hyperref's `\ProcessOptionsWithKV`. Now the use inside classes is also supported.
- Provides help macros for boolean and simple string options.
- Fixes for the patch of LaTeX. The patch is only enabled, if the user requests it.

[2006/02/20 v2.1]

- Unused option list is sanitized to prevent problems with other packages that uses own processing methods for key value options. Disadvantage: the unused global option detection is weakened.
- New option type by `\DeclareVoidOption` for options without value.
- Default rule by `\DeclareDefaultOption`.
- Dynamic options: `\DisableKeyvalOption`.

[2006/06/01 v2.2]

- Fixes for option patch.

[2006/08/17 v2.3]

- `\DeclareBooleanOption` renamed to `\DeclareBoolOption` to avoid a name clash with package `\ifoption`.

[2006/08/22 v2.4]

- Option patch: `\ExecuteOptions` does not change the meaning of macro `\CurrentOption` at all.

[2007/04/11 v2.5]

- Line ends sanitized.

[2007/05/06 v2.6]

- Uses package etexcmds.

[2007/06/11 v2.7]

- The patch part fixes LaTeX bug latex/3965.

[2007/10/02 v2.8]

- Compatibility for plain TEX added.
- Typos in documentation fixed (Axel Sommerfeldt).

[2007/10/11 v2.9]

- Bug fix for option patch.

[2007/10/18 v3.0]

- New package kvoptions-patch.

[2009/04/10 v3.1]

- Space by line end removed in definition of internal macro.

[2009/07/17 v3.2]

- \ProcessLocalKeyvalOptions added.
- \DisableKeyvalOption with the action=ignore option fixed (Joseph Wright).

[2009/07/21 v3.3]

- \DeclareLocalOption, \DeclareLocalOptions added.

[2009/08/13 v3.4]

- Documentation addition: recommendation for Joseph Wright's review article.
- Documentation addition: local/global options.

[2009/12/04 v3.5]

- \AddToKeyvalOption added.

[2009/12/08 v3.6]

- Fix: If a default handler is configured, it is now also called for classes.

[2010/02/22 v3.7]

- Missing space in error message added.

[2010/07/23 v3.8]

- Documenation for package kvoptions-patch improved. No code changes.

[2010/12/02 v3.9]

- Key setkeys added for \SetupKeyvalOptions.

[2010/12/23 v3.10]

- \DeclareVoidOption also parses the second parameter as TEX argument to improve compatibility with \DeclareOption.

[2011/06/30 v3.11]

- Fix because of design bug in package xkeyval that removes global options with equal signs.

[2016/05/16 v3.12]

- Documentation updates.

12 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

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Z