The subfig Package*

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Abstract

This article documents the LaTeX package 'subfig', which provides support for the inclusion of small, 'sub', figures and tables. It simplifies the positioning, captioning and labeling of such objects within a single `figure` or `table` environment and to continue a `figure` or `table` across multiple pages. In addition, this package allows such subcaptions to be written to a List-of-Floats page as desired. The 'subfig' package requires the 'caption' package by H.A. Sommerfeldt and replaces the older 'subfigure' package.

*This paper documents the subfig package ver: 1.1, last revised 2004/01/12.

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1 Introduction

This package provides support for the manipulation and reference of small or 'sub' floats within a single floating (*e.g.*, `figure` or `table`) environment[1] It is convenient to use this package when your subfloats are to be separately captioned, referenced, or when such subcaptions are to be included on a List-of-Floats page.

This package is a replacement for the subfigure package, from which it was derived. However, the new subfig package is not completely backward compatible (see section 4.4. Therefore, a new name was called for. The newer package is smaller and easier to use than the older package, however, it now requires that the following packages be available:

- caption
- everysel
- keyval
- ragged2e

It will work without the ragged2e and everysel packages if you do not use the following justification options: 'Center', 'RaggedRight' and 'RaggedLeft'. NOTE: 'center', 'raggedright' and 'raggedleft' will work without the above two packages.

1.1 Do You Need This Package?

Before using the subfig package, consider the following to see if you really need it.

1. If you simply want to center your figure on the page, then you can use `\centerline`, `\centering` or the `center` environment to do so.

2. If your figure has a short width or if you wrap your figure in a `\parbox` or a `minipage` of a short width, then you can place multiple figures or tables side-by-side[2]. For example, the following will put two images side-by-side in a single figure as shown in figure 1:

```
\begin{figure}%
  \centering
  \parbox{1.2in}{...figure code...}%
  \qquad
  \begin{minipage}{1.2in}%
    ...figure code...
  \end{minipage}%
  \caption{Here are two figures side-by-side.}%
  \label{fig:1figs}%
\end{figure}
```

[1] Section 4.2 describes how to add support for additional `float` environments.

[2] You might have to use the optional position arguments '[b]' or '[t]' if the figures are of different heights (see [7, page 218]).

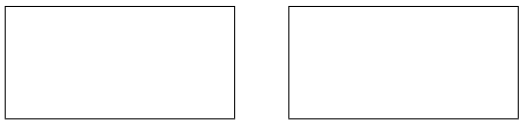


Figure 1: Here are two figures side-by-side.

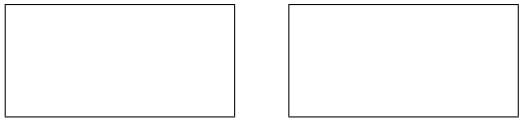


Figure 2: First.

Figure 3: Second.

3. Finally, if you place the caption inside the `\parbox` or `minipage`, then the width of the caption will be limited to the width of the parbox or minipage as shown in figures 2 and 3:

```
\begin{figure}%
  \centering
  \parbox{1.2in}{%
    ...figure code...
    \caption{First.}%
    \label{fig:2figsA}}%
  \qquad
  \begin{minipage}{1.2in}%
    ...figure code...
    \caption{Second.}%
    \label{fig:2figsB}%
  \end{minipage}%
\end{figure}
```

For more information on typesetting figures and tables, see the document "Using Imported Graphics in LaTeX 2$_\varepsilon$" by Keith Reckdahl [6].

2 Package Commands

In this section, we describe the commands defined by the subfig package and three commands from the caption package that are needed or very useful in setting and changing the package options.

2.1 Preamble Commands

In the preamble of your LaTeX file, you may load the subfig package, define new and extended options and create new subfloats. See the documentation for the caption package for other preamble commands that may be used to customize the caption portion of a subfloat.

2.1.1 The \usepackage Command

\usepackage[⟨*KV-list*⟩]{subfig}

The optional argument list to the subfig package is in the form of a KV-list or "Key-Value list" (see [4] for more detail). The KV-list is composed of a comma-separated list of keywords with optional values. The keywords without a value indicate that a default value is to be used. This list is bound to the variable "subfloat" and is re-evaluated each time a \subfloat is encountered. These initial values may also be viewed, removed or changed with the \showcaptionsetup[uniq]{subfloat}, \clearcaptionsetup[subfloat] and/or \captionsetup[subfloat]{⟨*KV-list*⟩} commands.

2.1.2 The \newsubfloat Command

\newsubfloat

\newsubfloat[⟨*KV-list*⟩]{⟨*float-name*⟩}

In addition to the caption packages declaration commands, the subfig package defines the \DeclareCaptionListOfFormat to define how the caption label should be formatted for the List-of-Floats.

The KV-list passed to the new subfloat is placed at the top "level". For example the options for a figure subfloat are added to the name "subfigure". See section 2.2.5 below, for more detail about option layers.

2.1.3 The \DeclareCaptionListOfFormat Command

\DeclareCaptionListOfFormat

\DeclareCaptionListOfFormat{⟨*keyword*⟩}{⟨*code*⟩}

The \DeclareCaptionListOfFormat command allows the specification of how the subcaption references are shown on the List-of-Floats pages. See section 3.3.1 for more details on setting up and adjusting the List-of-Floats entries.

2.2 General Commands

These commands are available within the body of the paper and the commands \captionsetup, \showcaptionsetup and \clearcaptionsetup are available anytime after loading either the caption or subfig packages.

2.2.1 The \subfloat Command

\subfloat

\subfloat[⟨*list_entry*⟩][⟨*subcaption*⟩]{⟨*body*⟩}

This command creates the subfloat in the floating environment. In a figure environment it creates a subfigure. The required argument contains the subfloat "body". This is the code that imports or creates the figure portion of the subfloat.

The two optional arguments control the caption. If only one optional argument is present, than a caption label is generated and if any text is included in the optional argument, than it becomes the caption argument.

Table 1: `\subfloat` calling arguments.

Subfloat Command	List-of-Floats	Subfloat Caption
`\subfloat`{body}		
`\subfloat`[ ]{body}	(b)	(b)
`\subfloat`[Subcaption.]{body}	(c) Subcaption. . . .	(c) Subcaption.
`\subfloat`[ ][Subcaption.]{body}		(d) Subcaption.
`\subfloat`[ ][ ]{body}		(e)
`\subfloat`[List_entry.][Subcaption.]{body}	(f) List_entry. . . .	(f) Subcaption.
`\subfloat`[List_entry.][ ]{body}	(g) List_entry. . . .	(g)

Normally, if a caption is present, it is also included on the List-of-Floats page. However, if a second optional argument is present, than the first one controls what is on the List-of-Floats page and the second is the caption text. If the List-of-Floats argument is empty, than nothing is printed on the List-of-Floats page. Otherwise, if there is text in the List-of-Floats argument, than that text is used on the List-of-Floats page rather than the text in the other optional argument.

See Table 1 for more detail on the `\subfloat` command's arguments.

2.2.2 The `\subref` Command

`\subref` `\subref{`⟨*label*⟩`}`

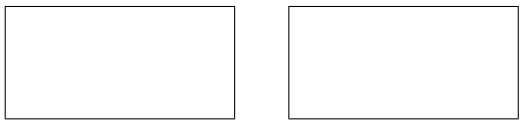
The `\subref` command is provided to give an alternative reference to a subfloat. The standard `\ref` command returns a label built by concatenating the `\p@float` + `\thesubfloat`, which is often of the form "1a". The `\subref` command returns the label shown on the List-of-Floats page, which may be in the format "(a)". This may be combined with a reference to the main caption to give "1(a)", or used within the main caption to refer to a specific local subfloat.

2.2.3 The `\ContinuedFloat` Command

`\ContinuedFloat` `\ContinuedFloat`

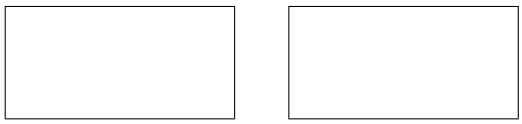
It sometimes occurs, especially when using subfloats, that a single figure needs to be continued across pages. The `\ContinuedFloat` command is placed at the beginning of the floating environment or after changing `\@captype` inside the floating environment to make the next figure, table or other floating `\caption` a continuation of the last float `\caption` of the same type. It does this by saving the subfloat numbering internally and keeping the float numbering from advancing.

In order to keep subsequent float entries from appearing on the List-of-Floats page, you can use the `\caption` command with the optional argument present, but empty; as shown in figure 4 (and on the list-of-figures page).



(a) (b)

Figure 4: Here are the first two figures of a continued figure.



(c) (d)

Figure 4: Here are the last two figures of a continued figure.

```
\begin{figure}%
  \centering
  \subfloat[]{...figure code...}%
  \qquad
  \subfloat[]{...figure code...}%
  \caption{Here are the first two figures of a continued figure.}%
  \label{fig:cont}%
\end{figure}
\begin{figure}%
  \ContinuedFloat
  \centering
  \subfloat[]{...figure code...}%
  \qquad
  \subfloat[]{...figure code...}%
  \caption[]{Here are the last two figures of a continued figure.}%
  \label{fig:cont}%
\end{figure}
```

2.2.4 The `\listsubcaptions` Command

`\listsubcaptions` `\listsubcaptions`

The last command provided by the subfigure package is the `\listsubcaptions`. This is automatically called in most cases by the `\caption` command and at the end of the `float` environment. However, the following example shows a rare situation in which the user will every have to use the `\lastsubcaptions` command as shown in the definition of the `\zaptype` command.

```
\documentclass{article}
\usepackage{subfloat}
\setcounter{lofdepth}{2}
\setcounter{lotdepth}{2}
  ⋮
\makeatletter
  \def\zaptype#1{%
      \listsubcaptions  % Finish the last set of subfloats before
      \def\@captype{#1}}%   switching to another float type.
\makeatother
  ⋮
\begin{document}
  ⋮
\listoffigures
\listoftables
\clearpage
\begin{table}%
  \begin{center}%
    \caption{Table caption.}%
      \subfloat[Tab one]{X}\quad
      \subfloat[Tab two]{X}\\
    %
    \zaptype{figure}%
    %
      \subfloat[Fig one]{Y}\quad
      \subfloat[Fig two]{Y}
    \caption{Figure caption.}%
  \end{center}%
\end{table}
  ⋮
\end{document}
```

2.2.5 The `\captionsetup` Command

`\captionsetup[`⟨*variable*⟩`]{`⟨*KV-list*⟩`}`

The `\captionsetup` command is actually part of the caption package, but is very important is you want to adjust some option in the subfig package. If the optional "variable" is left out, than the settings are made at the global level; otherwise, the settings are bound to the variable and executed just before being used.

There are three "levels" at which you can define options to apply to a subfloat. The first level is the default or global values of the various options, which are set either by the package, by a configuration file or by the optional Key-Value list in the `\usepackage` command.

The second "level" consists of those options bound to the value **subfloat**. These are value that hold across subfloats, but which have a different global value. One such item is the "font" size, which is usually either null or **normalsized**, but which is usually **footnotesized** for the subfloat captions.

The third "level" holds those options bound to a specific subfloat, say "subfigure". An example is the caption 'position' relative to the subfigure itself.

3 Options: Keywords and Values

Table 2 shows all of the formal keywords and values from both the caption and the subfig packages. These may be used on the `\usepackage` options line, or with the `\captionsetup` command.

3.1 Configuration Files

The default settings and layout of the subfig package can be modified by loading a configuration file. The subfig 'config' option loads a configuration file after the package is setup, but before the "subfigure" or "subtable" subfloats have been created (with the `\newsubfloat` command) and before the package options have been processed. See section 4.4 for an example of using the `subfig.cfg` file to emulate the subfigure package.

Without a value, the 'config' keyword loads the file `subfig.cfg`. Use the value to load another file, for instance, 'config=altsf.cfg'. When used outside the package options, the 'config' keyword is processed by the caption package and loads `caption.cfg` by default.

3.2 Options from the Caption Package

The subfig package uses the caption package commands to typeset the captions under each subfloat. The settings used in the captions come from three sources. The first is the global settings provided by the caption package. The second is the keys and key/value pairs stored on the "subfloat" variable. The third is the keys and key/value pairs stored on (for figure subfloats) the "subfigure" variable. In these three sources, if a key appears most recent value is used.

Therefore, you can keep all of your common settings associated with the "subfloat" variable and, if needed, special settings for individual subfloat types (figure, table, etc.) on the associated variable (eg., "subfigure", "subtable", etc.).

The package options supplied with the `\usepackage` command are bound to the "subfloat" variable, and so, affect all of the subfloats. The one exception to this is the 'config' or 'config=filename' option that is executed immediately. This is handy for two reasons, the first is that you only want to load a configuration file once (not every time you use a subfloat; and, second the'config' keyword, without a value, will only load the "subfloat.cfg" file when used on the options

Table 2: Keywords with Defaults and Values. (Note: Entries Enclosed in '[]' Indicate Initial Values Rather than Defaults.)

PACKAGE	**KEYWORD**	**DEFAULT / [INIT]**	**VALUE(S)**
Caption Package	config	"caption.cfg"	<filename>
	font (size)	[default]	default
	labelfont	[default]	scriptsize rm md up
	textfont	[default]	footnotesize sf bf it
			small tt sl
			normalsize sc
			large
			Large
	style	[default]	(default)
			ruled
	singlelinecheck	1	<boolean>
	format	[default]	normal (default)
			hang (isu)
	indent	[0pt]	<length>
	hangindent	[0pt]	<length>
	width	[`\hsize`]	<length>
	margin	[0pt]	<length>
	justification	[default]	justified (default)
			centering
			centerfirst
			centerlast (anne)
			raggedleft
			raggedright
			Centering
			RaggedLeft
			RaggedRight
	labelformat	[default]	empty
			simple (default)
			parens

Table 2: Keywords with Defaults and Values (cont).

PACKAGE	KEYWORD	DEFAULT / [INIT]	VALUE(S)
Caption Package (cont.)	labelseparator (labelsep)	[default]	none colon (default) period space quad widespace newline
	position[3]		top bottom
Subfig Package	config	"subfig.cfg"	<filename>
	listofformat	[parens]	empty simple parens subsimple subparens
	listofindent	3.8em	<length>
	listofnumwidth	2.5em	<length>
	topskip	10pt	<length>
	captionskip	5pt	<length>
	topadjust	0pt	<length>
	bottomskip	0pt	<length>

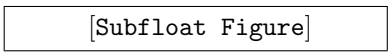
line, therefore you can set common options in both the float and subfloat captions with the command:

\usepackage[config, labelfont={sf,bf}, textfont=sf]{caption,subfig}

which will load the "caption.cfg" file and set the label and text fonts and also load the "subfig.cfg" file and set the sublabel and subtext fonts. Here we don't use the 'font' key, since this is initialized with the default font sizes to be used and defaults to 'normalsized' for the float captions and to 'footnotesized' for the subfloat captions, as shown in figure 5.

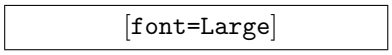
Next we will review the options provided by the caption package. First the font settings, then the shape options, the justification and the other caption options

[3]Only the 'top' and 'bottom' values are allowed for the 'position' option with the subfig package.

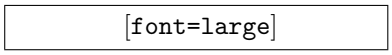


(a) Subfloat caption.

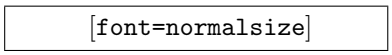
Figure 5: Float caption.



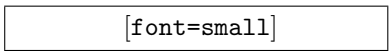
(a) Short caption.



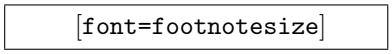
(b) Short caption.



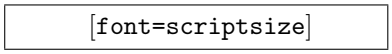
(c) Short caption.



(d) Short caption.



(e) Short caption.



(f) Short caption.

Figure 6: Font Size Options.

that affect the subfloats. Next, we review the options provided by the subfig package.

3.2.1 Caption Font Settings

There are three font variables that can be set to control the float or subfloat captions. They are 'font', 'labelfont' and 'textfont'. The "font" variable is applied to both the caption label and text; and is usually[4] used to specify the size of the caption and the other two variables are used to specify the other aspects of the font, the family, series and shape. The "labelfont" variable is used to specify the font used for the caption label and separator, while the "textfont" specifies that for the caption text.

Each of these variables can have one value from each of the four columns in the "VALUE" section of table 2 associated with the font keywords. If nothing is specified for one of the four sections, than that aspect of the current font is used.

Figures 6a–6f show the effect of the font size options on the "font" variable.

Figures 7a–7x show the effect of all combinations of the other font settings on the "textfont" variable. Note that not all combinations are necessarily available. Where the specified font attributes are not available LaTeX will substitute an alternate font. For instance, when compiling this file on one system, LaTeX substituted alternate fonts for the requested ones in ten of the twenty-four cases

[4]But not always, careful use of these three variables can produce useful effects. Their application is as:

{\font {\labelfont <label><separator>}{\textfont <text>}

Table 3: Example font attribute substitutions.[4]

Figure	Desired Options	Substitution Reason	Actual Options
7 (h)	rm,bf,sc	undefined	rm,bf,up
7 (m)	sf,md,it	unavailable in size 8	sf,md,sl
7 (n)	sf,md,sc	unavailable in size 8	rm,md,sc
7 (o)	sf,bf,it	undefined	sf,bf,up
7 (l)	sf,bf,sl	undefined	sf,bf,up
7 (p)	sf,bf,sc	undefined	sf,bf,up
7 (t)	tt,bx,up	unavailable in size 8	tt,md,up
7 (w)	tt,bx,it	unavailable in size 8	tt,md,it
7 (s)	tt,bf,sl	unavailable in size 8	tt,md,up
7 (x)	tt,bf,sc	unavailable in size 8	tt,md,up

(See table 3[5]. Recompiling this documentation on your system and looking at the LaTeX warnings will show you any combinations that are not available for you.

3.2.2 Caption Shape Settings

There are seven options for setting the subcaption shape or "format". The default setting is produced by

```
\captionsetup[subfigure]{style=default, margin=0pt, parskip=0pt,
                         hanginden=0pt, indention=0pt, singlelinecheck=true}
```

which is shown in figure 9. Figure 8 shows the same thing, but without setting the 'singlelinecheck' to true. You can see that the 'singlelinecheck' option only affects the short caption.

Any or all of the other shape option may be used at one time, since they define orthogonal aspects of the caption shape. The other options are:

- 'singlelinecheck', (Boolean) which causes a caption that will fit on one line to be centered below the figure (actually, to use the singlelinecheck format);
- 'indent', (length) which indents the caption text of each line of each paragraph (except the first line of the first paragraph);
- 'hangindent', (length) which indents the caption text of all but the first line of each paragraph;
- 'parskip', (length) which adds some extra space between separate paragraphs in a caption;
- 'hang', which causes the label to hang out to the left of the caption text, 'normal' turns it off; and,
- 'margin', (length) which sets extra space to either side of the caption, the option 'width' may also be used. This sets the margins to provide the requested width of the caption.

Figures 8 thru 71 show the different combinations of these formats.

[5]This table is only valid with one distribution of LaTeX. Examine the LaTeX log for font warnings for your specific system.

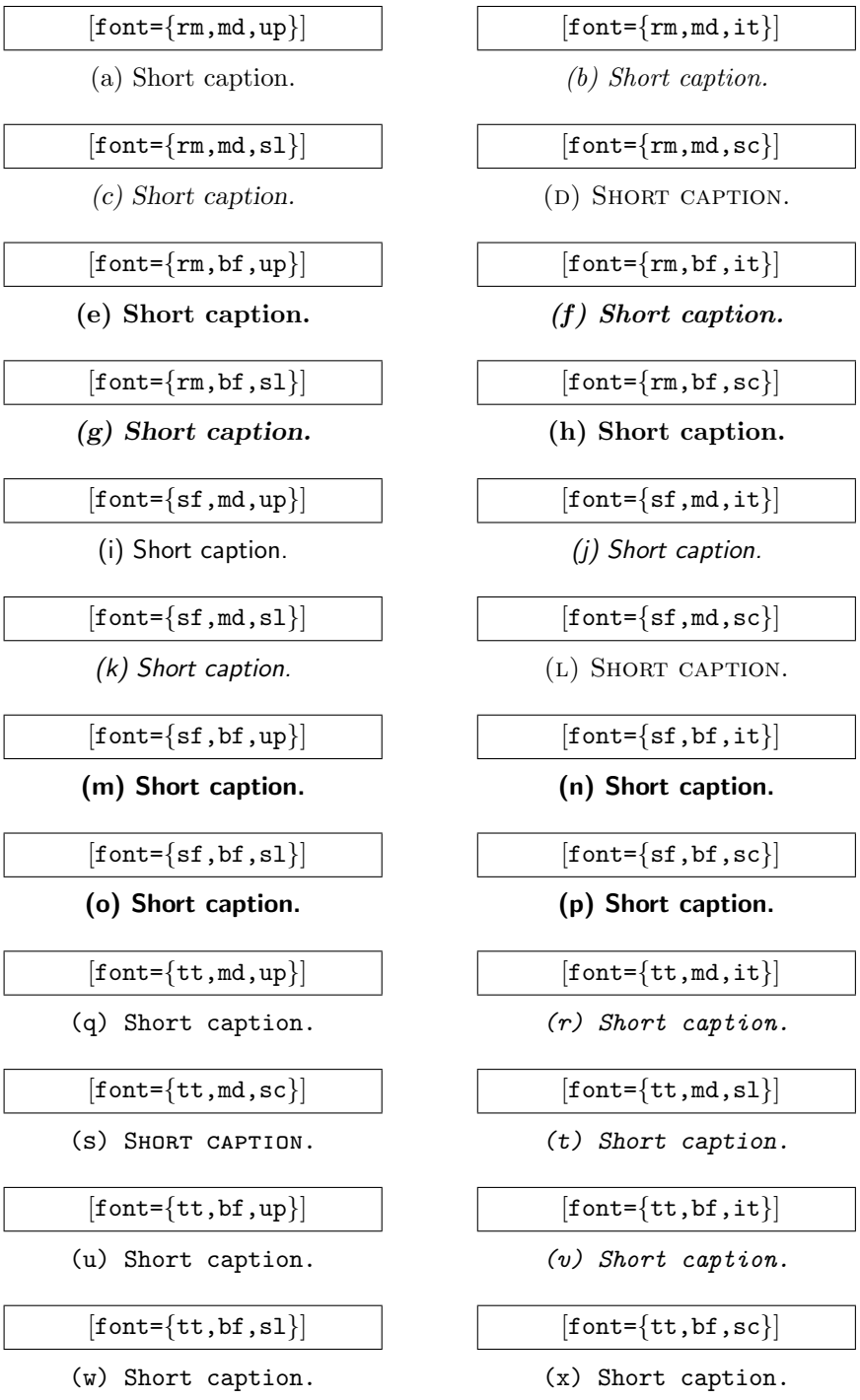


Figure 7: Other Font Options.

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.
Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 8: Options [`singlelinecheck=false`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.
Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 9: Options [ ].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.
Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 10: Options [`indention=10pt,singlelinecheck=false`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.
Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 11: Options [`indention=10pt`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.
Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 12: Options [`hangindent=10pt,singlelinecheck=false`].

(a) Short caption.

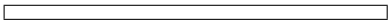
(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.
Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 13: Options [`hangindent=10pt`].

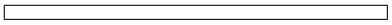
(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.
Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 14: Options [`hangindent=10pt,indention=10pt,singlelinecheck=false`].



(a) Short caption.



(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.
Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 15: Options [`hangindent=10pt,indention=10pt`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.

Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 16: Options [`parskip=5pt,singlelinecheck=false`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.

Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 17: Options [`parskip=5pt`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.

Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 18: Options [`parskip=5pt,indention=10pt,singlelinecheck=false`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.

Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 19: Options [`parskip=5pt,indention=10pt`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.

Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 20: Options [`parskip=5pt,hangindent=10pt,singlelinecheck=false`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.

Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

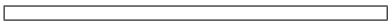
Figure 21: Options [`parskip=5pt,hangindent=10pt`].

(a) Short caption.

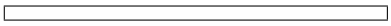
(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.

Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 22: Options [`parskip=5pt,hangindent=10pt,indention=10pt,singlelinecheck=false`].



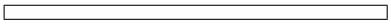
(a) Short caption.



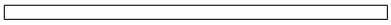
(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.

Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 23: Options [`parskip=5pt,hangindent=10pt,indention=10pt`].

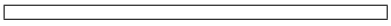


(a) Short caption.

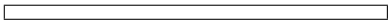


(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.
Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 24: Options [`format=hang,singlelinecheck=false`].



(a) Short caption.



(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.
Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 25: Options [`format=hang,`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.
Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 26: Options [`format=hang,indention=10pt,singlelinecheck=false`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.
Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 27: Options [`format=hang,indention=10pt`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see. Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 28: Options [`format=hang,hangindent=10pt,singlelinecheck=false`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see. Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 29: Options [`format=hang,hangindent=10pt`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see. Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 30: Options [`format=hang,hangindent=10pt,indention=10pt,singlelinecheck=false`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see. Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 31: Options [`format=hang,hangindent=10pt,indention=10pt`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.

Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 32: Options [`format=hang,parskip=5pt,singlelinecheck=false`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.

Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 33: Options [`format=hang,parskip=5pt`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.

Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 34: Options [`format=hang,parskip=5pt,indention=10pt,singlelinecheck=false`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.

Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 35: Options [`format=hang,parskip=5pt,indention=10pt`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.

Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 36: Options [`format=hang,parskip=5pt,hangindent=10pt,singlelinecheck=false`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.

Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 37: Options [`format=hang,parskip=5pt,hangindent=10pt`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.

Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 38: Options [`format=hang,parskip=5pt,hangindent=10pt, indention=10pt,singlelinecheck=false`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.

Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 39: Options [`format=hang,parskip=5pt,hangindent=10pt, indention=10pt`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see. Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 40: Options [`margin=10pt,singlelinecheck=false`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see. Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 41: Options [`margin=10pt,`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see. Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 42: Options [`margin=10pt,indention=10pt,singlelinecheck=false`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see. Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 43: Options [`margin=10pt,indention=10pt`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see. Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 44: Options [`margin=10pt,hangindent=10pt,singlelinecheck=false`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see. Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 45: Options [`margin=10pt,hangindent=10pt`].

(a) Short caption.

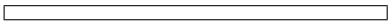
(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see. Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 46: Options [`margin=10pt,hangindent=10pt,indention=10pt, singlelinecheck=false`].

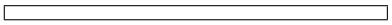
(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see. Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 47: Options [`margin=10pt,hangindent=10pt,indention=10pt`].



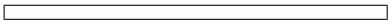
(a) Short caption.



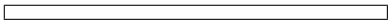
(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.

Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 48: Options [`margin=10pt,parskip=5pt,singlelinecheck=false`].



(a) Short caption.



(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.

Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

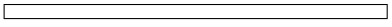
Figure 49: Options [`margin=10pt,parskip=5pt`].

(a) Short caption.

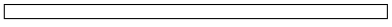
(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.

Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 50: Options [`margin=10pt,parskip=5pt,indention=10pt,singlelinecheck=false`].



(a) Short caption.



(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.

Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

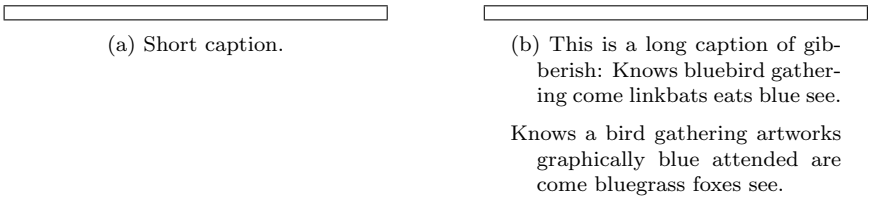
Figure 51: Options [`margin=10pt,parskip=5pt,indention=10pt`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.

Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 52: Options [`margin=10pt,parskip=5pt,hangindent=10pt,singlelinecheck=false`].

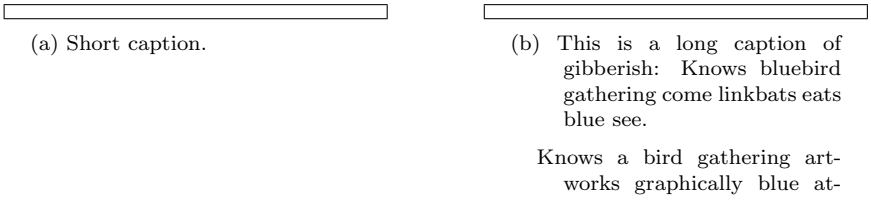


(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.

Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 53: Options [`margin=10pt,parskip=5pt,hangindent=10pt`].

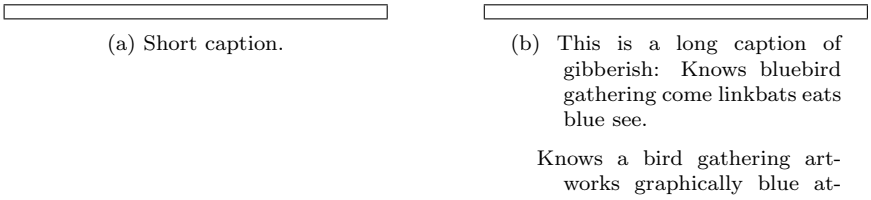


(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.

Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 54: Options [`margin=10pt,parskip=5pt,hangindent=10pt, indention=10pt,singlelinecheck=false`].

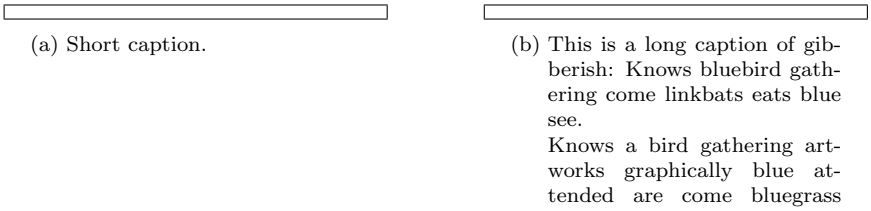


(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.

Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 55: Options [`margin=10pt,parskip=5pt,hangindent=10pt, indention=10pt`].



(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.

Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 56: Options [`margin=10pt,format=hang,singlelinecheck=false`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.
Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 57: Options [`margin=10pt,format=hang,`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.
Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 58: Options [`margin=10pt,format=hang,indention=10pt, singlelinecheck=false`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.
Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 59: Options [`margin=10pt,format=hang,indention=10pt`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.
Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 60: Options [`margin=10pt,format=hang,hangindent=10pt, singlelinecheck=false`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.
Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 61: Options [`margin=10pt,format=hang,hangindent=10pt`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.
Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 62: Options [`margin=10pt,format=hang,hangindent=10pt,indention=10pt,singlelinecheck=false`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.
Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 63: Options [`margin=10pt,format=hang,hangindent=10pt,indention=10pt`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.

Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 64: Options [`margin=10pt,format=hang,parskip=5pt,singlelinecheck=false`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.

Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

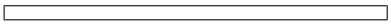
Figure 65: Options [`margin=10pt,format=hang,parskip=5pt`].

(a) Short caption.

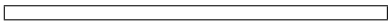
(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.

Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 66: Options [`margin=10pt,format=hang,parskip=5pt,indention=10pt,`
`singlelinecheck=false`].



(a) Short caption.



(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.

Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 67: Options [`margin=10pt,format=hang,parskip=5pt,`
`indention=10pt`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.

Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 68: Options [`margin=10pt,format=hang,parskip=5pt,hangindent=10pt,`
`singlelinecheck=false`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.

Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 69: Options [`margin=10pt,format=hang,parskip=5pt,hangindent=10pt`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.

Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 70: Options [`margin=10pt,format=hang,parskip=5pt,hangindent=10pt,indention=10pt,singlelinecheck=false`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.

Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 71: Options [`margin=10pt,format=hang,parskip=5pt,hangindent=10pt,indention=10pt`].

3.2.3 Caption Justification Options

There are nine options for setting the subcaption format. The first is 'justified' which produces the format shows in figure 72. Only one of these options is allowed at a time. If multiple options appear, then only the last is used. The Figures 73 thru 80 show the rest of these formats. The shape options selected along with each format option is the default (see Figure 9), this shows the effect of the justification option on a single line caption.

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.
Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 72: Options [`justification=justified,singlelinecheck=false`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.
Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 73: Options [`justification=centerfirst,singlelinecheck=false`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.
Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 74: Options [`justification=centerlast,singlelinecheck=false`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.
Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 75: Options [`justification=centering,singlelinecheck=false`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.
Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 76: Options [`justification=Centering,singlelinecheck=false`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see. Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 77: Options [`justification=raggedleft,singlelinecheck=false`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see. Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 78: Options [`justification=RaggedLeft,singlelinecheck=false`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see. Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 79: Options [`justification=raggedright,singlelinecheck=false`].

(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see. Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

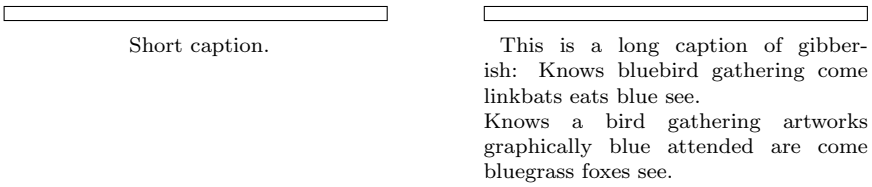
Figure 80: Options [`justification=RaggedRight,singlelinecheck=false`].

3.2.4 Caption Label Options

There are three options for setting the subcaption 'labelformat' as shown in figures 81–83. This is the label number and not any following punctuation or separator space (see below for setting these). The three cases are:

- 'empty': Without any label.
- 'simple': Just the label number.
- 'parens': The label number surrounded by '{}'.

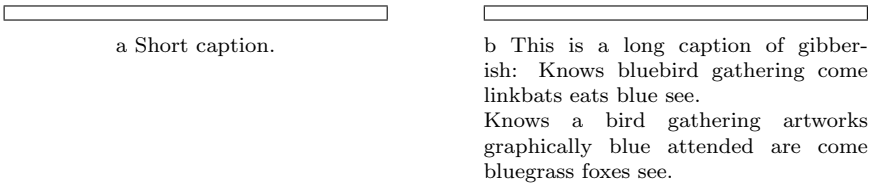
The latter option, 'parens', is the default for subfloats.



Short caption.

This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.
Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

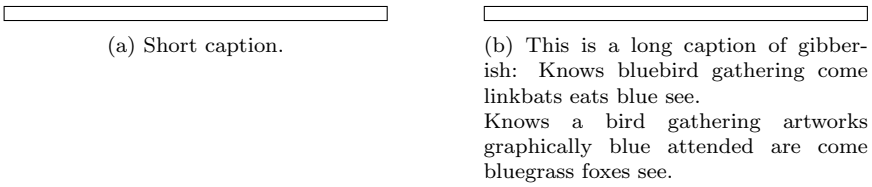
Figure 81: Options [`labelformat=empty`].



a Short caption.

b This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.
Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 82: Options [`labelformat=simple`].



(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.
Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 83: Options [`labelformat=parens`].

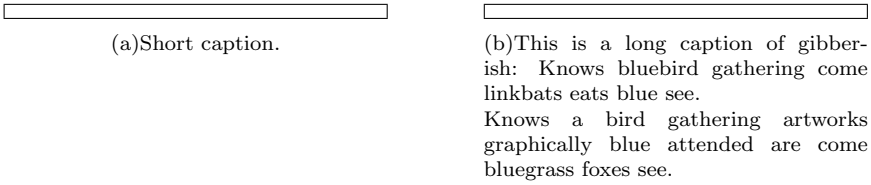
Figures 84–90 show the options for setting the punctuation and separator space following the figure number. These options are set with the 'labelseparator' keyword.

The label separator options are:

- 'none' Nothing is added after the label.
- 'colon' A colon followed by a `\space` is added following the label.
- 'period' A period followed by a `\space` is added following the label.
- 'space' Just a `\space` is added following the label.
- 'quad' A `\quad` space is added following the label.
- 'widespace' Some 'glue' space of '1em plus .3em' is added following the label.
- 'newline' A new line is inserted after the label.

3.2.5 Caption Position Option

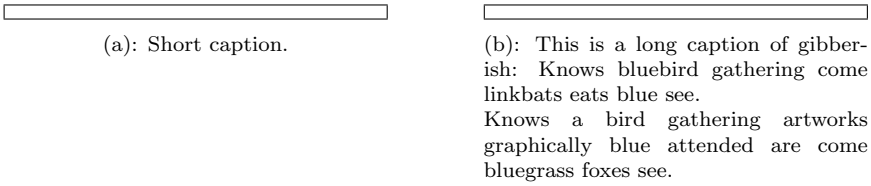
The caption package 'position' option specifies whether the caption appears before or after the figure or table. This can adjust the relative spacing used to separate the float from the surrounding text. However, for the subfig package, it serves a more important function. That is it determines if the subfloats belong to or are



(a)Short caption.

(b)This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.
Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

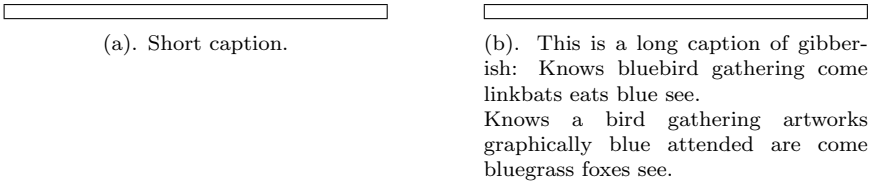
Figure 84: Options [`labelsep=none`].



(a): Short caption.

(b): This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.
Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

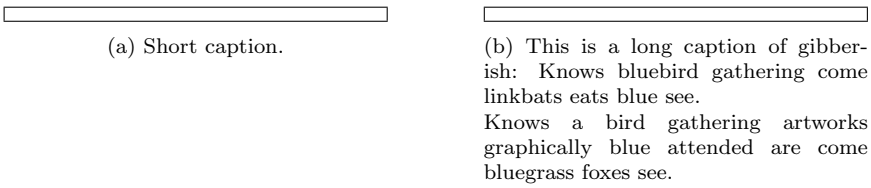
Figure 85: Options [`labelsep=colon`].



(a). Short caption.

(b). This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.
Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

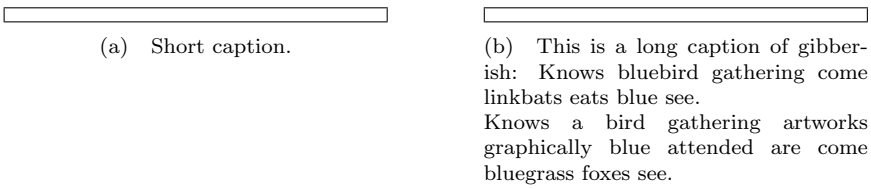
Figure 86: Options [`labelsep=period`].



(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.
Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

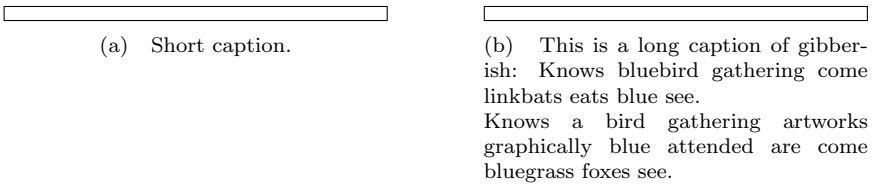
Figure 87: Options [`labelsep=space`].



(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.
Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

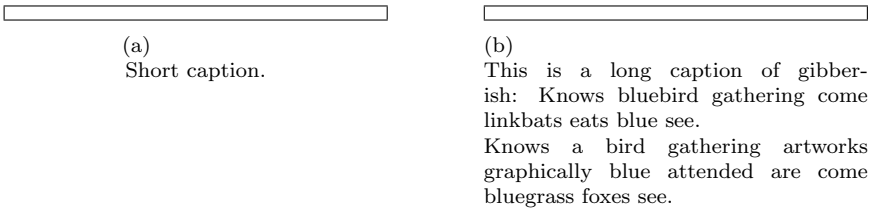
Figure 88: Options [`labelsep=quad`].



(a) Short caption.

(b) This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.
Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 89: Options [`labelsep=widespace`].



(a)
Short caption.

(b)
This is a long caption of gibberish: Knows bluebird gathering come linkbats eats blue see.
Knows a bird gathering artworks graphically blue attended are come bluegrass foxes see.

Figure 90: Options [`labelsep=newline`].

associated with the last `\caption` command to be given, or the next one to be executed sometime in the future. If you find that you sub-references do not agree with the top-level labels, than you may need to specifically set the 'position'. This is best done when loading the caption package, but may be done at anytime with the `\captionsetup` command.

3.3 Options from the Subfig Package

In addition to the options provided by the caption package, the subfig package provides the options shown in Table 4.

3.3.1 The Subfig List-of-Floats Specification

The first three options control and adjust the way that the subfloat number is displayed on the List-of-Floats page. The 'listofformat' shows how or if the subfloat number is shown. Where there are two '#' signs in the List-of-Page label formats, the first one stands for the `\p@<`***subfloat_type***`>` value and the second for the `\the<`***subfloat_type***`>` value. Where there is only one '#' it stands for the latter.

The 'listofindent' keyword sets the total indentation from the left margin, while the 'listofnumwidth' keyword controls the width of box for the label number. This is also the amount of extra indentation added to second and later lines of a multiple line entry.

3.3.2 The Subfig Layout

The layout of the subfloat contains several internal values which may be changed to customize appearance of the object. The following illustration shows the relationship of these values. Figure 91a shows the standard layout with the caption

Table 4: subfig specific options.

KeyWord	Value	Notes
'listofformat'	'empty'	Label format: (none)
	'simple'	Label format: ##
	'parens'	Label format: #(#)
	'subsimple'	Label format: #
	'subparens'	Label format: (#)
'listofindent'	<length>	Entry indention on List-of-Floats page.
'listofnumwidth'	<length>	Space allocated for entry label.
'topskip'	<glue>	Glue placed opposite the subfloat caption.
'captionskip'	<glue>	Glue placed between the subfloat and the caption.
'topadjust'	<glue>	Extra glue added to 'captionskip' when above the subfloat.
'bottomskip'	<glue>	Glue placed opposite the caption from the subfloat.

following the figure. The figure is vertically centered with 'topskip' of space added above, then 'captionskip' of space is added below the figure followed by the subcaption and, finally, 'bottomskip' of space added below. The baseline is located at the bottom of the figure. It is along this baseline that adjacent subfigure boxes are aligned.

Figure 91c shows the case where the caption precedes the figure (*ie.*, 'position=top'). In this case the various boxes and glue are reversed, except that the 'captionskip' is increased by 'topadjust'. The other two cases, figures 91b and (d), show the cases where there is no caption. Note that the 'captionskip' is left out when there is no caption. Note also, for all of these cases, that the space at the top of the subfigure is automatically removed for items that are the first box in a vertical list or other than the first box in a horizontal list. This allows tighter packing of the subfloats and the full use of the page or `minipage`.

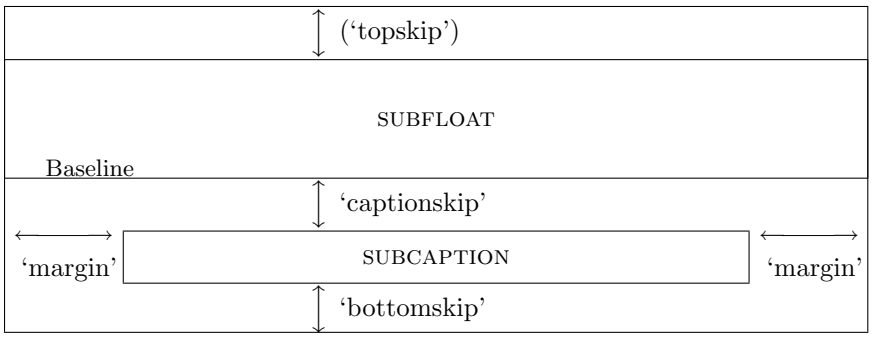
Each of these values 'topskip', 'captionskip', 'topadjust', 'bottomskip', and 'margin' may be changed from their defaults (see table tab:keywords) to adjust the subfigure for the current layout style. In addition, they may all assume negative values, which in some cases may solve problems with the layout.

4 Compatibility With Other Packages.

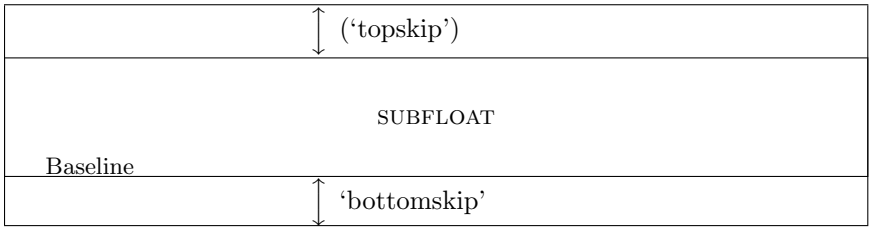
This section discusses specific aspects of compatibility with other packages with which the subfig package is often used.

4.1 Caption Package

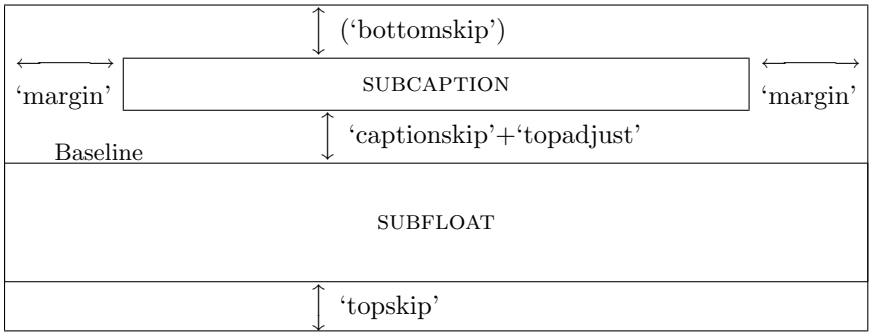
The subfig package requires the caption package in order to format the subfloat captions. However, the 'position' keyword option may only take two values when



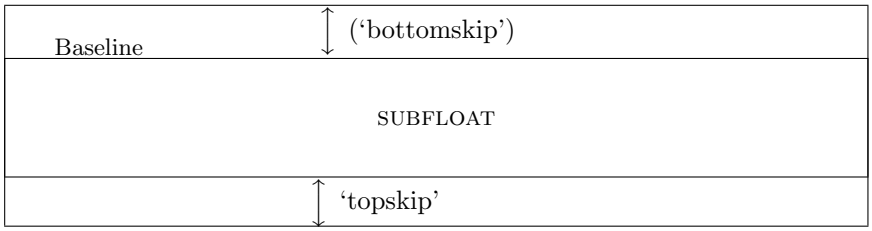
(a) Standard layout (Float Bottom Caption).



(b) Standard layout (Float Bottom Caption) with no caption present.



(c) Reversed layout (Float Top Caption).



(d) Reversed layout (Float Top Caption) with no caption present.

Figure 91: Subfloat Layout.

used with the subfig package; those are, 'top' and 'bottom'. Any other value will be treated as if 'position=bottom' was specified.

By default (without the subfig.cfg loaded), the 'position' values are expected to be defined prior to loading the subfig package or defined afterward. However they are defined, it is up to the user to insure that the captions are used correctly with the subcaptions, because using a caption, that is expected to preceed the subcaptions, after the subcaptions (or *vise-versa*) will cause the list-of and label references to be incorrect.

Also the `\topcaption` and the `\bottomcaption` commands should not be used. The use of these commands can cause inconsistent labeling of the subfloats.

4.2 float Package

To create a new subfloat, you first need a new floating environment. If you have that, great, otherwise, load the float package and create one with a series of commands similar to the following. Here we create a new `map` environment so that the subfig package will work with it.

```
\usepackage{float}
\newfloat{map}{tbph}{lom}
\restylefloat*{map}
\floatstyle{plain}
\floatname{map}{Map}
\newcommand\mapname{Map}
\captionsetup[map]{position=top}
\newsubfloat[position=top,listofformat=subsimple]{map}
\newcommand{\listofmaps}{\listof{map}{List of Maps}}
```

Then you can then create the new subfloat with:

```
\newsubfloat[position=top,listofformat=subsimple]{map}
```

now the `\subfloat` command will work in the `map` environment.

For example, the following code generates map 1:

```
\begin{map}%
  \centering
  \caption{This example shows two small maps.}%
  \label{map:example}%
  \subfloat[First map.]{...figure code...}%
  \qquad
  \subfloat[Second map.]{...figure code...}%
\end{map}
```

Map 1: This example shows two small maps.

(a) First map.

(b) Second map.

4.3 Other Packages

The subfig package has been tested with the following packages and is known to work correctly.[5]

- caption
- fixltx2e
- float
- hyperref
- captcont

4.4 Backward Compatibility with the Subfigure Package

The following code sets up a configuration file to make the subfig package be nearly compatible with the older subfigure package. The major difference is that the spacing is not quite the same due to internal changes in the subfloat setup and that some of the old tweaks that involved changing internal variables often will no longer work.

`\subfigure` `\subtable`

The first section creates the `\subfigure` and the `\subtable` commands. It also forces the "figure" to expect its caption to follow the body (as the default case) and the "table" to expect its caption to precede the body (as an exception to the default).

```
\captionsetup[figure]{position=bottom}
\captionsetup[table]{position=bottom}

\@ifundefined{c@subfigure}{\newsubfloat{figure}}{}
\def\subfigure{\subfloat}

\@ifundefined{c@subtable}{\newsubfloat{table}}{}
\def\subtable{\subfloat}
```

Next we restore the caption value-keywords for the option list. Currently these are available within the main document with the `\captionsetup` command. However, this may change in a later release of the subfig package.

[5] If you find any problem with these or any other package, please create a small example demonstrating the problem and send it to the author.

```
\DeclareCaptionOption{normal}[]{\caption@setformat{default}}
\DeclareCaptionOption{isu}[]{\caption@setformat{hang}}
\DeclareCaptionOption{hang}[]{\caption@setformat{hang}}
\DeclareCaptionOption{center}[]{\caption@setjustification{centering}}
\DeclareCaptionOption{anne}[]{\caption@setjustification{centerlast}}
\DeclareCaptionOption{centerlast}[]{\caption@setjustification{centerlast}}
\DeclareCaptionOption{nooneline}[]{\caption@setbool{slc}{0}}
\DeclareCaptionOption{scriptsize}[]{\def\captionfont{\scriptsize}}
\DeclareCaptionOption{footnotesize}[]{\def\captionfont{\footnotesize}}
\DeclareCaptionOption{small}[]{\def\captionfont{\small}}
\DeclareCaptionOption{normalsize}[]{\def\captionfont{\normalsize}}
\DeclareCaptionOption{large}[]{\def\captionfont{\large}}
\DeclareCaptionOption{Large}[]{\def\captionfont{\Large}}
\DeclareCaptionOption{up}[]{\l@addto@macro\captionlabelfont\upshape}
\DeclareCaptionOption{it}[]{\l@addto@macro\captionlabelfont\itshape}
\DeclareCaptionOption{sl}[]{\l@addto@macro\captionlabelfont\slshape}
\DeclareCaptionOption{sc}[]{\l@addto@macro\captionlabelfont\scshape}
\DeclareCaptionOption{md}[]{\l@addto@macro\captionlabelfont\mdseries}
\DeclareCaptionOption{bf}[]{\l@addto@macro\captionlabelfont\bfseries}
\DeclareCaptionOption{rm}[]{\l@addto@macro\captionlabelfont\rmfamily}
\DeclareCaptionOption{sf}[]{\l@addto@macro\captionlabelfont\sffamily}
\DeclareCaptionOption{tt}[]{\l@addto@macro\captionlabelfont\ttfamily}
\DeclareCaptionOption{ruled}[1]{\caption@setbool{ruled}{#1}}
\DeclareCaptionOption{singlelinecheck}[1]{\caption@setbool{slc}{#1}}
\DeclareCaptionOption{oneline}[1]{\caption@setbool{slc}{#1}}
\DeclareCaptionOption{justified}[]{\caption@setjustification{justified}}
\DeclareCaptionOption{centering}[]{\caption@setjustification{centering}}
\DeclareCaptionOption{centerfirst}[]{\caption@setjustification{centerfirst}}
\DeclareCaptionOption{flushright}[]{\caption@setjustification{raggedleft}}
\DeclareCaptionOption{raggedleft}[]{\caption@setjustification{raggedleft}}
\DeclareCaptionOption{raggedright}[]{\caption@setjustification{raggedright}}
\DeclareCaptionOption{RaggedRight}[]{\caption@setjustification{RaggedRight}}
\DeclareCaptionOption{RaggedLeft}[]{\caption@setjustification{RaggedLeft}}
\DeclareCaptionOption{Centering}[]{\caption@setjustification{Centering}}
```

The second list of value-keywords allows the uppercase font options to set the font for the caption text.

```
\DeclareCaptionOption{UP}[]{\l@addto@macro\captiontextfont\upshape}
\DeclareCaptionOption{IT}[]{\l@addto@macro\captiontextfont\itshape}
\DeclareCaptionOption{SL}[]{\l@addto@macro\captiontextfont\slshape}
\DeclareCaptionOption{SC}[]{\l@addto@macro\captiontextfont\scshape}
\DeclareCaptionOption{MD}[]{\l@addto@macro\captiontextfont\mdseries}
\DeclareCaptionOption{BF}[]{\l@addto@macro\captiontextfont\bfseries}
\DeclareCaptionOption{RM}[]{\l@addto@macro\captiontextfont\rmfamily}
\DeclareCaptionOption{SF}[]{\l@addto@macro\captiontextfont\sffamily}
\DeclareCaptionOption{TT}[]{\l@addto@macro\captiontextfont\ttfamily}
```

Next, the subfigure "*topcap" and "*bottomcap" options are emulated using the new "position" option.

```
\DeclareCaptionOption{figbotcap}[]{\captionsetup[figure]{position=bottom}}
```

```
\DeclareCaptionOption{tabbotcap}[]{\captionsetup[table]{position=bottom}}
\DeclareCaptionOption{FIGBOTCAP}[]{\captionsetup[figure]{position=bottom}%
                                   \captionsetup[subfigure]{position=bottom}}
\DeclareCaptionOption{TABBOTCAP}[]{\captionsetup[table]{position=bottom}%
                                   \captionsetup[subtable]{position=bottom}}
\DeclareCaptionOption{figtopcap}[]{\captionsetup[figure]{position=top}}
\DeclareCaptionOption{tabtopcap}[]{\captionsetup[table]{position=top}}
\DeclareCaptionOption{FIGTOPCAP}[]{\captionsetup[figure]{position=top}%
                                   \captionsetup[subfigure]{position=top}}
\DeclareCaptionOption{TABTOPCAP}[]{\captionsetup[table]{position=top}%
                                   \captionsetup[subtable]{position=top}}
```

Finally, the "loose" and "tight" options are approximately emulated.

```
\DeclareCaptionOption{loose}[]{%
    \captionsetup[subfloat]{topskip=10pt,topadjust=0pt,captionskip=10pt,%
                            bottomskip=10pt,margin=10pt}}
\DeclareCaptionOption{tight}[]{%
    \captionsetup[subfloat]{topskip=5pt,topadjust=0pt,captionskip=3pt,%
                            bottomskip=5pt,margin=0pt}}
```

5 Some Examples

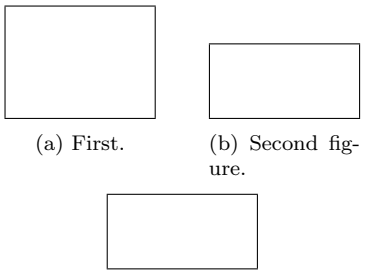
The easiest way to show the use of this package is to give a few examples. The two most important things to remember when working with the subfig package are that (1) the subfloats are aligned along their baselines (see figure 91 and (2) that whitespace in the floating environments are significant and affect the layout.

The baseline of the subfloat is usually at the bottom of the subfloat body or (when the subcaption appears at the top) at the bottom of the subcaption *and* the 'captionskip' space—which is usually the same as the top of the subfloat. However sometimes, especially when using the `tabular`, `array`, or `minipage` environments to build the figure, the baseline appears elsewhere. The above three environments are all aligned at their center by default but that may be changed with the optional '[**t**]' or '[**b**]' arguments. As a last resort you can wrap all of your figures in a `\vtop` box with a `\vbox to 0pt{\null}` at the top followed by the subfloat body.

If your subfloat is not quite centered or where you want it to be, the problem is often a space character being placed to one side or the other of the subfloat body. Someg eneral rules of thumb are:[6]

- Two end-of-lines following each other (ignoring any whitespace) are turned into a `\par` or paragraph break.
- Multiple whitespace (including the end-of-line) are compressed into a single space.
- The spaces after a macro command name (*e.g.*, `\foo`) are ignored.
- A '%' character at the end of the line suppresses the end-of-line and all of the spaces (if any) at the beginning of the next line.

[6] See chapters 7 and 8 of "The TEXbook" [9] for details.



(a) First. (b) Second figure.

(c) Third.

Figure 92: Three subfloats.

Figure 92 contains two top 'subfloats' and figure 92c.[7]

To suppress significant extra whitespace, you can add some '%' characters at the end of each line that doesn't end with a command name. This is more than is required, but extra '%' usually don't cause a problem.

5.1 A Simple Example

The first example, shown in figure 92, specifies `\centering` to horizontally center the set of subfloats, and uses `\\` and some horizontal space (using `\qquad`) to control the placement of the subfloats. Note that the alignment of the top two subfloats is along the bottom of the body portion of each.

```
\begin{figure}%
  \centering
  \subfloat[First.]{...}\qquad
  \subfloat[Second figure.]{...}\\
  \subfloat[Third.]{\label{3figs-c}...}%
  \caption{Three subfloats.}
  \label{3figs}
\end{figure}
  ⋮
Figure~\ref{3figs} contains two top ‘subfloats’ and
figure~\ref{3figs-c}.
```

5.2 A More Advanced Example

A second example, shown in figure 93, demonstrates how to change the subfloat labels and have the subcaptions printed on the List-of-Figures.

[7] In this and later boxed figures, the boxes are intended to represent a portion of the page in which the figure occurs. This is usually to show the figure along with some text or to show the effect of some option on multiple pages.

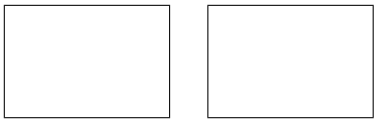
The first `\renewcommand` changes the reference to `\thesubfigure` to return both the figure number and the subfigure number separated with a period. The next two `\renewcommand`'s turn off the `\p@subfigure` (since it is now included in `\thesubfigure` and adds the colon and space to the subfigure label. Later in the file, the *lofdepth* is set to "2" so allow the subfigure captions to show and the `\listoffigures` is loaded. Finally, the `figure` is defined and a little following text is given that refers to it.

```
\renewcommand{\thesubfigure}{\thefigure.\arabic{subfigure}}
\captionsetup[subfigure]{labelformat=simple,labelsep=colon,
                         listofformat=subsimple}
\makeatletter
  \renewcommand{\p@subfigure}{}
\makeatother
  ⋮
\setcounter{lofdepth}{2}
\listoffigures
  ⋮
\begin{figure}%
  \centering
  \subfigure[First.]{%
    \label{fig:first}%
    ...figure code...}%
  \qquad
  \subfigure[Second.]{%
    \label{fig:second}%
    ...figure code...}%
  \caption{Two subfigures.}
\end{figure}
  ⋮
See figures~\ref{fig:first} and \ref{fig:second}.
```

5.3 An Example Without Subcaption Text

The last example, shown in figure 94, demonstrates a commonly required format where the subfigure are just labeled and the description occurs in the main caption. This is easy to do by using the "empty" optional caption arguments "[ ][ ]". This creates a label for the subfigure in the text, but it does not show on the List-of-Figures page. However, by default the caption may not be perfectly centered, so `\subfiglabelskip` is reduced to zero points to ensure that there is not any extra space hidden in the subcaption. To refer to the subfigure label within the text or the main caption, you can use the `\subref` command, which is similar to the `\ref` command, but does not carry the figure number.

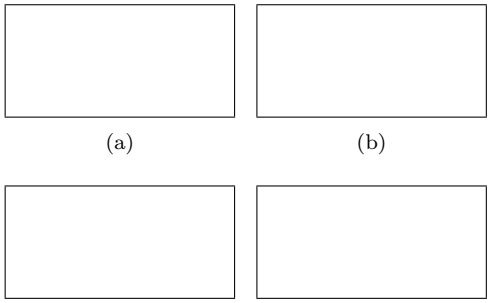
List of Figures



93.1: First. 93.2: Second.

Figure 93: Two subfigures.
See figures 93.1 and 93.2.

List of Figures



(a) (b)

(c) (d)

Figure 94: A set of four subfigures: (a) describes the first subfigure; (b) describes the second subfigure; (c) describes the third subfigure; and, (d) describes the last subfigure.
The text references the main figure as figure 94 or part of it as figures 94(a)–(c).

```
\listoffigures
  ⋮
\begin{figure}%
  \centering
  \subfloat[][]{%
    \label{fig:ex3-a}%
    ...figure code...}%
  \hspace{8pt}%
  \subfloat[][]{%
    \label{fig:ex3-b}%
    ...figure code...}\\
  \subfloat[][]{%
    \label{fig:ex3-c}%
    ...figure code...}%
  \hspace{8pt}%
  \subfloat[][]{%
    \label{fig:ex3-d}%
    ...figure code...}%
  \caption[A set of four subfigures.]{A set of four subfigures:
           \subref{fig:ex3-a} describes the first subfigure;
           \subref{fig:ex3-b} describes the second subfigure;
           \subref{fig:ex3-c} describes the third subfigure; and,
           \subref{fig:ex3-d} describes the last subfigure.}%
  \label{fig:ex3}%
\end{figure}
  ⋮
The text references the main figure as figure~\ref{fig:ex3}
or part of it as
figures~\ref{fig:ex3}\subref{fig:ex3-a}--\subref{fig:ex3-c}.
```

6 Frequently Asked Questions (FAQs)

The four most frequently asked questions about the subfig package are:

6.1 "My subfloats are not aligned along their bottoms. Why?"

Remember! The subfloat package aligns subfloats along their baselines with the subcaption (if any) sticking out above or below. The above problem is usually due to using a `minipage`, `tabular` or `array` environment that, by default, places the baseline at the center of the box that it generates. If the two subfloats are different sizes, or if one subfloat is generated in some other way with its baseline not at the expected place (perhaps an `\includegraphics`), then the subfloat will be misaligned. One solution is to use the environment options '[t]' or '[b]' to move the baseline to the top or bottom rather than the center.

6.2 "How can I get my floats/subfloats to line up the way I want?"

A similar question, but this one is caused by extra whitespace in the source text generating spaces next to the floats, and `\par`'s generated by blank lines. The main thing is *be aware* that extra whitespace can move floats and subfloats around, sometimes a lot and sometimes just a little so that they look "wrong". Placing too many '%'s at the end of the lines is better than too few in the various float environments. (See the discussion of "white space" in section 5.)

6.3 "I have too many subfloats for one page, How can I spread them over two or more pages and continue the numbering?"

The `\ContinuedFloat` command makes creating continued floating environments easy. See the discussion in section 2.2.3.

6.4 "Why do I get a garbled caption or an error when I use square brackets?"

```
\subfloat[SHIFT: ``register[3] $<<=$ 3;'']{... float text ...}
```

Since the `\subfloat` command has an optional argument, delimited with square brackets, before their required argument, you cannot use the ']' character at the top level of either the ⟨*subcaption*⟩ or ⟨*list_entry*⟩ argument. To overcome this problem, you must wrap all or the portion of the text containing the ']' character, in a pair of curly brackets (see [7, § C.1.1] for more detail). For example:

```
\subfloat[SHIFT: ``register{[3]} $<<=$ 3;'']{... float text ...}
```

or

```
\subfloat[{SHIFT: ``register[3] $<<=$ 3;''}]{... float text ...}.
```

7 The Code

7.1 Identification

Check LaTeX release and announce the subfig package.

```
\NeedsTeXFormat{LaTeX2e}[1994/12/01]
\ProvidesPackage{subfig}[2004/01/12 ver: 1.1 subfig package]
```

7.2 Load and Extend the caption Package

This version of the subfig package is dependent on the new caption package by Axel Sommerfeldt [1]. These packages were rewritten in order to both improve the processing and to reduce the amount of redundant code.

First we load the caption package if it has not already been loaded.

```
\RequirePackage{caption}[2003/12/20]
```

`\sf@ifpositiontop` First we make sure that the `\caption@position` is recognizable to the subfig code. We assume that if it is not the same as `\@firstoftwo` (e.g. 'top'), than it must be `\@secondoftwo`, or 'bottom'.

```
\def\sf@ifpositiontop{%
  \ifx\caption@position\@firstoftwo \let\next\@firstoftwo \else
  \let\next\@secondoftwo \fi \next}
```

`\DeclareCaptionListOfFormat` `\caption@setlistofformat` Next, we define the `\DeclareCaptionListOfFormat` command which controls how the subfloat captions appear on the List-Of-Floats pages. Note that this command can only be used to define new formats in the preamble. The format may be changed at anytime using the `\captionsetup` command

```
\def\DeclareCaptionListOfFormat#1{%
  \@namedef{caption@lstfmt@#1}##1##2}
\@onlypreamble\DeclareCaptionListOfFormat
\def\caption@setlistofformat#1{%
  \@ifundefined{caption@lstfmt@#1}{%
    \PackageError
      {subfig}%
      {Undefined caption listof format `#1'}%
      {\caption@eh}%
  }{%
   \expandafter\let\expandafter\caption@lstfmt
         \csname caption@lstfmt@#1\endcsname}}
```

Using this command, we define some common formats and the new keyword, 'listofformat', to change the setting.

```
\DeclareCaptionListOfFormat{empty}{}
\DeclareCaptionListOfFormat{simple}{#1#2}
\DeclareCaptionListOfFormat{parens}{#1(#2)}
\DeclareCaptionListOfFormat{subsimple}{#2}
\DeclareCaptionListOfFormat{subparens}{(#2)}
\DeclareCaptionOption{listofformat}{\caption@setlistofformat{#1}}
```

\sf@indent
\sf@numwidth

We also add two new keywords, 'listofindent' and 'listofnumwidth', which set the lengths used to show where and how wide the caption label will be when typeset. These are used as the fourth and fifth arguments of the \dottedxxxline command, see section 7.4 for more detail.

```
\def\sf@indent{3.8em}
\define@key{caption}{listofindent}[3.8em]{\def\sf@indent{#1}}
\def\sf@numwidth{2.5em}
\define@key{caption}{listofnumwidth}[2.5em]{\def\sf@numwidth{#1}}
```

7.3 Options Processing

\sf@config
\sf@split
\ProcessPackageOptions

In order to work within the caption package, the subfig package saves most of the options provided on the \usepackage and (re-)applies them each time a subfloat is started. The one exception is the 'config' keyword, which is executed immediately. To accomplish this, we use a modified version of the keyval package processing.

```
\newcounter{KVtest}
\def\sf@config{config}
\def\sf@split#1=#2=#3\relax{%
  \setcounter{KVtest}{1}%
  \KV@@sp@def\@tempa{#1}%
  \ifx\@tempa\@empty
  \else\ifx\@tempa\sf@config
    \setcounter{KVtest}{2}%
    \expandafter\let\expandafter\@tempc
        \csname\KV@prefix\@tempa\endcsname
    \ifx\@tempc\relax
      \KV@errx
          {\@tempa\space undefined}%
    \else\ifx\@empty#3\@empty
      \KV@default
    \else
      \KV@@sp@def\@tempb{#2}%
      \expandafter\@tempc\expandafter{\@tempb}\relax
    \fi\fi
  \fi\fi}
\def\ProcessPackageOptions{%
  \def\KV@prefix{KV@\@currname @}%
  \let\@tempc\relax
  \let\caption@tempa\@empty
  \@for\CurrentOption:=\@classoptionslist\do{%
    \@ifundefined{KV@caption@\CurrentOption}{}{%
      \edef\caption@tempa{\caption@tempa,\CurrentOption,}%
      \@expandtwoargs\@removeelement\CurrentOption
        \@unusedoptionlist\@unusedoptionlist}}%
  \edef\caption@tempb{\@ptionlist{\@currname.\@currext}}%
  \@for\CurrentOption:=\caption@tempb\do{%
```

```
    \expandafter\sf@split\CurrentOption==\relax
    \ifnum\c@KVtest<2\relax
      \edef\caption@tempa{\caption@tempa,\CurrentOption,}%
    \fi}%
  \edef\caption@tempa{%
    \noexpand\captionsetup[subfloat]{\caption@tempa}}%
  \caption@tempa}
```

7.4 Generalized List-of-Floats

`\dottedxxxline` This is a generalized wrapper for the `\@dottedtocline` command. It checks for the level based on the output file extension (first argument) and not using only `\@tocdepth`.

The arguments of the `\@dottedxxxline` command are:

1. Float Type.
2. File Extension. The usual values are: `lof` or `lot`. The internal values `\ext@subfigure` and `\ext@subtable` hold these extensions.
3. Level. By default this is '2' for subfloats. If the level is greater than ⟨*Ext*⟩*depth* (where ⟨*Ext*⟩ is the second argument, above), then no line is produced.
4. Indent. Total indentation from the left margin.
5. Numwidth. Width of box for the label number if the Title has a `\numberline` command. This is also the amount of extra indentation added to second and later lines of a multiple line entry.
6. Title. Contents of entry (*e.g.* the ⟨*list_entry*⟩ or ⟨*subcaption*⟩).
7. Page. The page number of the figure or table.

The final two arguments, title and page, are automatically appended to the value of `\l@subfigure` (and symmetrically for other subfloat types).

```
\def\@dottedxxxline#1#2#3#4#5#6#7{%
  \begingroup
    \caption@settype{subfloat}%
    \caption@settype{#1}%
    \ifnum #3>\@nameuse{c@#2depth}\else
      \@dottedtocline{\z@}{#4}{#5}{#6}{#7}%
    \fi
  \endgroup}
```

7.5 Create New Subfloats

`\newsubfloat` `\@newsubfloat` This command is used to create new types of subfloats. It is used during the subfig configuration to create the two standard float types: "subfigure" and "subtable" and may be used anywhere in the preamble to create other types of subfloats (see section 4.2).

```
\newif\ifmaincaptiontop
```

```
\def\newsubfloat{%
  \@ifnextchar[  %] bracket matching
    {\@newsubfloat}
    {\@newsubfloat[]}}
\def\@newsubfloat[#1]#2{%
  \@ifundefined{c@sub#2}{%
    \begingroup
      \caption@settype{#2}%
      \sf@ifpositiontop{%
        \global\maincaptiontoptrue
      }{%
        \global\maincaptiontopfalse
      }%
    \endgroup
      \newcounter{sub#2}[#2]
      \newcounter{sub#2@save}%
      \@namedef{sub#2name}{}%
      \ifmaincaptiontop
        \captionsetup[sub#2]{position=top}%
      \else
        \captionsetup[sub#2]{position=bottom}%
      \fi
    \@namedef{p@sub#2}{\@nameuse{the#2}}%
    \@namedef{thesub#2}{\alph{sub#2}}%
   \@namedef{ext@sub#2}{\@nameuse{ext@#2}}%
   \@namedef{l@sub#2}{%
       \@dottedxxxline{sub#2}%
           {\@nameuse{ext@sub#2}}{2}{\sf@indent}{\sf@numwidth}}%
   \@ifundefined{c@\@nameuse{ext@#2}depth}{%
      \expandafter\newcounter\expandafter{\@nameuse{ext@#2}depth}%
      \expandafter\addtocounter\expandafter{\@nameuse{ext@#2}depth}\@ne}{}%
    \edef\sf@counterlist{%
      \@ifundefined{sf@counterlist}{}%
        {\sf@counterlist,}sub#2}%
    \captionsetup[sub#2]{#1}%
  }{%
    \PackageWarning{subfig}{%
        The sub#2\space type is already defined.}%
  }}
\@onlypreamble\@newsubfloat
\@onlypreamble\newsubfloat
```

7.6 Layout Parameters

sf@topskip
sf@captopadj
sf@capskip
sf@bottomskip

We now create the subfloat layout parameters. We do it now so that the values will be available during the configuration and options processing, below.

```
\newskip\sf@topskip
\sf@topskip 10\p@
```

```
\define@key{caption}{topskip}[10\p@]{\sf@topskip=#1}
\newdimen\sf@captopadj
\sf@captopadj \z@
\define@key{caption}{topadjust}[\z@]{\sf@captopadj=#1}
\newskip\sf@capskip
\sf@capskip 5\p@
\define@key{caption}{captionskip}[5\p@]{\sf@capskip=#1}
\newskip\sf@bottomskip
\sf@bottomskip \z@
\define@key{caption}{bottomskip}[\z@]{\sf@bottomskip=#1}
```

\caption@@orig
\sf@oldcaption
\@caption

```
\let\caption@@orig\@caption
\let\sf@oldcaption\caption@@orig
\def\@caption{\caption@}
```

7.7 Process the Package Options

1. Set the default values.
2. Load the configuration file if 'config' keyword is given. (Use `\captionsetup` to change options.)
3. Process the options list using the KV macros. Note, the 'config' option is processed before any other option in the package list.
4. Process calls to `\captionsetup` throughout the paper.

```
\captionsetup{%
    topskip=10\p@,topadjust=\z@,captionskip=5\p@,bottomskip=\z@}
\captionsetup[subfloat]{%
    labelformat=parens,labelsep=space,listofformat=subparens,%
                font=footnotesize}
\define@key{subfig}{config}[subfig]{%
  \InputIfFileExists{#1.cfg}{%
    \typeout{**********************************************^^J%
             * Subfig configuration file #1.cfg used ^^J%
             **********************************************}%
  }{%
    \PackageWarning{subfig}{Configuration file #1.cfg not found}}%
}
\ProcessPackageOptions
\@ifundefined{c@subfigure}{\newsubfloat{figure}}{}
\@ifundefined{c@subtable}{\newsubfloat{table}}{}
```

```
\AtEndOfPackage{%
  \global\let\KV@config@\relax
  \global\let\sf@split\relax
  \global\let\ProcessPackageOptions\relax
  \global\let\@unprocessedoptions\relax
}
```

7.8 Define the Subfloat Layout

\sf@top
\sf@bottom
\subfloat
\sf@subfloat
\sf@@subfloat
\sf@@@subfloat

The main command is \subfloat. This command takes the figure code and the optional caption and builds a vertical box that contains them along with some additional padding as defined by the layout parameters defined in section 7.6

```
\newskip\sf@top
\newskip\sf@bottom
\def\subfloat{%
  \ifx\@captype\@undefined
    \@latex@error{\noexpand\subfloat outside float}\@ehd
     \expandafter\@gobble
  \else
    \expandafter\@firstofone
  \fi
  {\sf@subfloat}}
\def\sf@subfloat{%
  \begingroup
    \caption@settype{\@captype}%
    \sf@ifpositiontop{%
      \maincaptiontoptrue
    }{%
      \maincaptiontopfalse
    }%
    \caption@settype{subfloat}%
    \caption@settype{sub\@captype}%
    \let\sf@oldlabel=\label
    \let\label=\subfloat@label
    \ifmaincaptiontop\else
      \advance\@nameuse{c@\@captype}\@ne
    \fi
    \refstepcounter{sub\@captype}%
    \setcounter{sub\@captype @save}{\value{sub\@captype}}%
    \@ifnextchar [%  %] match left bracket
      {\sf@@subfloat}%
      {\sf@@subfloat[\@empty]}}
\long\def\sf@@subfloat[#1]{%
    \@ifnextchar [%  %] match left bracket
      {\sf@@@subfloat{sub\@captype}[{#1}]}%
      {\sf@@@subfloat{sub\@captype}[\@empty{#1}][{#1}]}}
```

```
\long\def\sf@@@subfloat#1[#2][#3]#4{%
    \@tempcnta=\@ne
    \if@minipage
      \@tempcnta=\z@
    \else\ifdim \lastskip=\z@ \else
      \@tempcnta=\tw@
    \fi\fi
    \sf@ifpositiontop{%
      \sf@top=\sf@bottomskip
      \sf@bottom=\sf@topskip
    }{%
      \sf@top=\sf@topskip
      \sf@bottom=\sf@bottomskip
    }%
    \leavevmode
    \setbox\@tempboxa \hbox{#4}%
    \@tempdima=\wd\@tempboxa
    \vtop\bgroup
      \vbox\bgroup
        \ifcase\@tempcnta
          \@minipagefalse
        \or
%%          \leaders\vrule\vskip\sf@top                   %debug
          \vskip\sf@top
        \or
          \ifdim \lastskip=\z@ \else
            \@tempskipb\sf@top\relax\@xaddvskip
          \fi
        \fi
        \sf@ifpositiontop{%
          \ifx \@empty#3\relax \else
            \@subcaption{#1}{#2}{#3}%
%%            \leaders\vrule width.8pt\vskip\sf@capskip    %debug
%%            \leaders\vrule width1.2pt\vskip\sf@captopadj %debug
            \vskip\sf@capskip
            \vskip\sf@captopadj
          \fi\egroup
          \box\@tempboxa
        }{%
          \box\@tempboxa\egroup
          \ifx \@empty#3\relax \else
%%            \leaders\vrule width.8pt\vskip\sf@capskip    %debug
            \vskip\sf@capskip
            \hrule width0pt height0pt depth0pt
            \@subcaption{#1}{#2}{#3}%
          \fi
        }%
%%     \leaders\vrule\vskip\sf@bottom  %debug
      \vskip\sf@bottom
    \egroup
```

```
    \ifmaincaptiontop\else
      \global\advance\@nameuse{c@\@captype}\m@ne
    \fi
  \endgroup}
```

7.9 Connect the Subfloat Captions to the caption Package

`\@subcaption` This command first adds the subcaption to the list of subcaptions for printing later (after the main caption is printed, which is either before the next caption or at the end of the current `float` environment). Next, we make room for the subcaption and call the caption package `\caption@make` command to print it.

```
\long\def\@subcaption#1#2#3{%
  \ifx \relax#2\relax \else
    \bgroup
      \let\label=\@gobble
      \let\protect=\string
      \def\@subcaplabel{%
        \caption@lstfmt{\@nameuse{p@#1}}{\@nameuse{the#1}}}%
      \xdef\sf@captionlist{%
        \sf@captionlist,%
        {\protect\numberline{\@subcaplabel}\noexpand{\ignorespaces #2}}}%
    \egroup
  \fi
  \bgroup
    \ifx \relax#3\relax
      \let\captionlabelsep=\relax
    \fi
    \hb@xt@\the\@tempdima{%
      \hss
      \parbox[t]{\the\@tempdima}{%
        \caption@make
            {\@nameuse{sub\@captype name}}%
            {\@nameuse{thesub\@captype}}%
            {#3}}%
      \hss}%
  \egroup}
```

7.10 Subfig Caption Processing for the List-of-Floats Files

`\sf@captionlist` `\listsubcaptions` `\@listsubcaptions` `\caption@` `\sf@addcontentsline` The `\listsubcaptions` command writes the list of subcaptions to the list-of file. This is done so that they will follow the associated caption in the file. The `\istsubcaptions` command is (optionally) called by the `\caption` command and at the end of the float environment by the internal `\end@float` command. In rare instances the user may need to call it also, see section 2.2.4 for an example.

```
\def\sf@captionlist{}
\def\listsubcaptions{%
  \@ifstar
```

```
    {\gdef\sf@captionlist{}}%
    {\@listsubcaptions{\@captype}}}
\def\@listsubcaptions#1{%
  \@ifundefined{@captype}{}{%
    \@ifundefined{ext@sub#1}{}{%
      \@for \sf@temp:=\sf@captionlist \do {%
        \ifx \@empty\sf@temp\relax \else
          \sf@addcontentsline
            {\@nameuse{ext@sub#1}}%
            {sub#1}%
            {\sf@temp}%
        \fi}}}%
  \gdef\sf@captionlist{}}
\long\def\caption@#1[#2]#3{%
  \begingroup
    \caption@settype{\@captype}%
    \sf@ifpositiontop{%
      \global\maincaptiontoptrue
    }{%
      \global\maincaptiontopfalse
    }%
    \caption@settype{subfloat}%
    \caption@settype{sub\@captype}%
  \endgroup
  \caption@settype\@captype % moved from \caption@caption to here also!
  \ifmaincaptiontop
    \@listsubcaptions{#1}%
    \sf@oldcaption{#1}[{#2}]{#3}%
  \else
    \sf@oldcaption{#1}[{#2}]{#3}%
    \@listsubcaptions{#1}%
  \fi}
\AtBeginDocument{%
  \let\sf@addcontentsline=\addcontentsline}
```

7.11 Subfig Label Handling

\sf@oldlabel
\subfloat@label
\sub@label
\sf@sub@label
\sf@@sub@label
\subref

The label handling has three aspects. The first is that the label for a subfloat is defined as the \p@<*subfloat_type*> value prepended to the \the<*subfloat_type*> value. Secondly, the \subref command is similar, except that it shows label as formatted on the list-of page. Finally, we need to check for the hyperref package and provide the extended reference format if it is present.

```
\let\sf@oldlabel=\relax
\def\subfloat@label{%
  \@ifnextchar(%   %) match left parenthesis
    {\sf@sub@label}
    {\sf@sub@label(Sub\@captype\space
```

```
                    \@ifundefined{thechapter}{}{%
                      \@nameuse{thechapter}\space}%
                    \@nameuse{p@sub\@captype}%
                    \@nameuse{thesub\@captype}.)}}

\let\sub@label=\subfloat@label

\def\sf@sub@label(#1)#2{%
  \ifhyperrefloaded
    \protected@edef\@currentlabelname{%
      \expandafter\strip@period #1\relax.\relax\@@@}%
  \fi
  \sf@@sub@label{#2}}

\def\sf@@sub@label#1{%
  \@bsphack
  \sf@oldlabel{#1}%
  \ifhyperrefloaded
    \protected@write\@auxout{}{%
        \string\newlabel{sub@#1}%
            {{\caption@lstfmt
               {\@nameuse{p@sub\@captype}}%
               {\@nameuse{thesub\@captype}}}%
             {\thepage}%
             {\expandafter\strip@period\@currentlabelname\relax.\relax\@@@}%
             {\@currentHref}%
             {}}}%
  \else
    \protected@write\@auxout{}{%
        \string\newlabel{sub@#1}%
            {{\caption@lstfmt
               {\@nameuse{p@sub\@captype}}%
               {\@nameuse{thesub\@captype}}}%
            {\thepage}}}%
  \fi
  \@esphack}

\def\subref#1{\ref{sub@#1}}
```

7.12 Support for Continued Figures

`\ContinuedFloat` `\sf@caption`

Now we add the ability to have continued floating environments and have it work with the subfloats without having to load the captcont package.

Add `\ContinuedFloat` at the beginning of a float environment or after a `\caption` or after (re)setting `\@captype` and before any `\subfloat` command or the `\caption` which is to be continued.

If the `\caption` is followed by an empty option (e.g. `\caption[]{caption text}`) than no entry is made in the List-of-Floats pages for this caption. The associated subfloats may or may not appear in the List-of-Floats pages depending on their optional arguments.

Keep compatibility with the captcont package if it is loaded. But still provide the \ContinuedFloat command.

```
\newif\if@ccflag
\@ccflagfalse

\AtBeginDocument{%
  %
  \let\sf@refstepcounter=\refstepcounter
  %
  \@ifpackageloaded{captcont}{}{%
    \def\refsteponlycounter#1{%
      \if@ccflag
        \global\expandafter\advance\csname c@#1\endcsname\@ne
        \let\sf@temp\protect
        \def\protect{\noexpand\protect\noexpand}%
        \edef\@currentlabel{\csname p@#1\endcsname\csname the#1\endcsname}%
        \let\protect\sf@temp
      \else
        \sf@refstepcounter{#1}%
      \fi
      \@ccflagfalse}%
  }%
  %
  \def\ContinuedFloat{%
    \addtocounter{\@captype}{\m@ne}%
    \setcounter{sub\@captype}{\value{sub\@captype @save}}%
    \@ccflagtrue}}

\def\sf@caption{%
  \let\refstepcounter=\refsteponlycounter
  \sf@savecaption}
\AtBeginDocument{
  \let\sf@savecaption=\caption
  \let\caption=\sf@caption
}
```

7.13 Automate the Subfloat Listings

sf@end@float
sf@end@dblfloat
end@dblfloat

Use the end@float and end@dblfloat hooks to process the List-of-Floats subcaptions at the end of a float environment so that the pagenumbers will be correct.

```
\let\sf@end@float=\end@float

\def\end@float{%
  \@ifundefined{sf@counterlist}{}{%
    \@for\sf@temp:=\sf@counterlist\do{%
      \setcounter{\sf@temp}{\z@}}%
    \@listsubcaptions{\@captype}}%
  \sf@end@float}%

\let\sf@end@dblfloat=\end@dblfloat
```

```
\def\end@dblfloat{%
  \@ifundefined{sf@counterlist}{}{%
    \@for\sf@temp:=\sf@counterlist\do{%
      \setcounter{\sf@temp}{\z@}}%
    \@listsubcaptions{\@captype}}%
  \sf@end@dblfloat}
```

7.14 Provide Compatibility for the **hyperref** Package

```
\newif\ifhyperrefloaded
\AtBeginDocument{%
  \@ifpackageloaded{hyperref}{%
    \hyperrefloadedtrue
    %
    \def\sf@setref#1sub#2\relax{%
      \@namedef{theHsub#2\expandafter}{\@nameuse{the#2}.\arabic{sub#2}}%
      \@namedef{toclevel@sub#2}{1}%
    }
    %
    \@for\sf@temp:=\sf@counterlist\do{%
      \expandafter\sf@setref\sf@temp\relax}%
    %
    \global\let\sf@setref\relax
    %
  }{}%
```

7.15 Provide Compatibility for the **float** Package

```
  \@ifpackageloaded{float}{%
    \let\sf@endfloatbox=\@endfloatbox
    \def\@endfloatbox{%
      \listsubcaptions
      \sf@endfloatbox}%
  }{}%
```

7.16 Provide Compatibility for the **fixltx2e** Package

We also provide compatibility with the older fix2col package that the fixltx2e package supersedes.

```
  \@ifpackageloaded{fixltx2e}{%
    \def\end@dblfloat{%
      \if@twocolumn
        \@ifundefined{sf@counterlist}{}{%
          \@for\sf@temp:=\sf@counterlist\do{%
            \setcounter{\sf@temp}{\z@}}%
          \@listsubcaptions{\@captype}}%
        \@endfloatbox
        \ifnum\@floatpenalty <\z@
          \@largefloatcheck
          \global\dp\@currbox1sp %
```

```
          \expandafter\@gobble\sf@end@float
        \fi
      \else
        \end@float
      \fi}%
  }{%
    \@ifpackageloaded{fix2col}{%
      \def\end@dblfloat{%
        \if@twocolumn
          \@ifundefined{sf@counterlist}{}{%
            \@for\sf@temp:=\sf@counterlist\do{%
              \setcounter{\sf@temp}{\z@}}%
            \@listsubcaptions{\@captype}}%
          \@endfloatbox
          \ifnum\@floatpenalty <\z@
            \@largefloatcheck
            \global\dp\@currbox1sp %
            \expandafter\@gobble\sf@end@float
          \fi
        \else
          \end@float
        \fi}}{}%
  }
}
\endinput
```

8 Acknowledgments

This package was adapted from the subfigure package, which was originally written to automatically line up some figure boxes and place labels under them for my Ph.D. dissertation, years ago. I thought it useful and uploaded it to the Internet community and later to CTAN. Many people have asked questions or given comments which collectively have changed and improved the usefulness of that package. In 2002, Michel Goossens requested an updated version of the subfigure package and, in collaboration with Axel Sommerfeldt and many suggestions from Frank Mittelbach, this version uses the new version of the caption package, which had a large overlap in function with the old subfigure package. This both simplifies the package code and, unfortunately, forces it to be backward *in*-compatible with the older versions of the subfigure package, therefore the change in name.

A few people have contributed more than most to the development of the prior subfigure package and to the present subfig package. I want to thank them publicly and they are, alphabetically:

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that are often needed. Also, for the suggestion of supporting the 'ragged2e' justification options.

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