

# The `refcount` package

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## Abstract

References are not numbers, however they often store numerical data such as section or page numbers. `\ref` or `\pageref` cannot be used for counter assignments or calculations because they are not expandable, generate warnings, or can even be links. The package provides expandable macros to extract the data from references. Packages `hyperref`, `nameref`, `titleref`, and `babel` are supported.

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\*Please report any issues at <https://github.com/ho-tex/refcount/issues>

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## 1 Usage

### 1.1 Setting counters

The following commands are similar to L<sup>A</sup>T<sub>E</sub>X's `\setcounter` and `\addtocounter`, but they extract the number value from a reference:

```
\setcounterref, \addtocounterref
\setcounterpageref, \addtocounterpageref
```

They take two arguments:

```
\...counter...ref {\LaTeX counter} {\reference}
```

An undefined references produces the usual LaTeX warning and its value is assumed to be zero. Example:

```
\newcounter{ctrA}
\newcounter{ctrB}
\refstepcounter{ctrA}\label{ref:A}
\setcounterref{ctrB}{ref:A}
\addtocounterpageref{ctrB}{ref:A}
```

### 1.2 Expandable commands

These commands that can be used in expandible contexts (inside calculations, `\edef`, `\csname`, `\write`, ...):

```
\getrefnumber, \getpagerefnumber
```

They take one argument, the reference:

```
\get...refnumber {\reference}
```

The default for undefined references can be changed with macro `\setrefcountdefault`, for example this package calls:

```
\setrefcountdefault{0}
```

Since version 2.0 of this package there is a new command:

```
\getrefbykeydefault {\reference} {\key} {\default}
```

This generalized version allows the extraction of further properties of a reference than the two standard ones. Thus the following properties are supported, if they are available:

| Key                 | Description                   | Package                                  |
|---------------------|-------------------------------|--|
| <code>\empty</code> | same as <code>\ref</code>     | <code>L<sup>A</sup>T<sub>E</sub>X</code> |
| <code>page</code>   | same as <code>\pageref</code> | <code>L<sup>A</sup>T<sub>E</sub>X</code> |
| <code>title</code>  | section and caption titles    | <code>titleref</code>                    |
| <code>name</code>   | section and caption titles    | <code>nameref</code>                     |
| <code>anchor</code> | anchor name                   | <code>hyperref</code>                    |
| <code>url</code>    | url/file                      | <code>hyperref/xr</code>                 |

Since version 3.2 the expandable macros described before in this section are expandable in exact two expansion steps.

### 1.3 Undefined references

Because warnings and assignments cannot be used in expandible contexts, undefined references do not produce a warning, their values are assumed to be zero. Example:

```
\label{ref:here}% somewhere
\refused{ref:here}% see below
\ifodd\getpagerefname{ref:here}%
  reference is on an odd page
\else
  reference is on an even page
\fi
```

In case of undefined references the user usually want's to be informed. Also `LATEX` prints a warning at the end of the `LATEX` run. To notify `LATEX` and get a normal warning, just use

```
\refused {\reference}
```

outside the expanding context. Example, see above.

#### 1.3.1 Check for undefined references

In version 3.2 macros were added, that test, whether references are defined.

|   |
|---|
| <code>\IfRefUndefinedExpandable {&lt;refname&gt;} {&lt;then&gt;} {&lt;else&gt;}</code><br><code>\IfRefUndefinedBabel {&lt;refname&gt;} {&lt;then&gt;} {&lt;else&gt;}</code> |
|---|

If the reference is not available and therefore undefined, then argument `<then>` is executed, otherwise argument `<else>` is called. Macro `\IfRefUndefinedExpandable` is expandable, but `<refname>` must not contain babel shorthand characters. Macro `\IfRefUndefinedBabel` supports shorthand characters of babel, but it is not expandable.

### 1.4 Notes

- The method of extracting the number in this package also works in cases, where the reference cannot be used directly, because a package such as `hyperref` has added extra stuff (hyper link), so that the reference cannot be used as number any more.
- If the reference does not contain a number, assignments to a counter will fail of course.

## 2 Implementation

```

1 \(*package)
Reload check, especially if the package is not used with LATEX.
2 \begingroup\catcode61\catcode48\catcode32=10\relax%
3 \catcode13=5 % ^M
4 \endlinechar=13 %
5 \catcode35=6 % #
6 \catcode39=12 % '
7 \catcode44=12 % ,
8 \catcode45=12 % -
9 \catcode46=12 % .
10 \catcode58=12 % :
11 \catcode64=11 % @
12 \catcode123=1 % {
13 \catcode125=2 % }
14 \expandafter\let\expandafter\x\csname ver@refcount.sty\endcsname
15 \ifx\x\relax % plain-TeX, first loading
16 \else
17 \def\empty{}%
18 \ifx\x\empty % LaTeX, first loading,
19 % variable is initialized, but \ProvidesPackage not yet seen
20 \else
21 \expandafter\ifx\csname PackageInfo\endcsname\relax
22 \def\x#1#2{%
23 \immediate\write-1{Package #1 Info: #2.}%
24 }%
25 \else
26 \def\x#1#2{\PackageInfo{#1}{#2, stopped}}%
27 \fi
28 \x{refcount}{The package is already loaded}%
29 \aftergroup\endinput
30 \fi
31 \fi
32 \endgroup%

```

Package identification:

```

33 \begingroup\catcode61\catcode48\catcode32=10\relax%
34 \catcode13=5 % ^M
35 \endlinechar=13 %
36 \catcode35=6 % #
37 \catcode39=12 % '
38 \catcode40=12 % (
39 \catcode41=12 % )
40 \catcode44=12 % ,
41 \catcode45=12 % -
42 \catcode46=12 % .
43 \catcode47=12 % /
44 \catcode58=12 % :
45 \catcode64=11 % @
46 \catcode91=12 % [
47 \catcode93=12 % ]
48 \catcode123=1 % {
49 \catcode125=2 % }
50 \expandafter\ifx\csname ProvidesPackage\endcsname\relax
51 \def\x#1#2#3[#4]{\endgroup
52 \immediate\write-1{Package: #3 #4}%
53 \xdef#1{#4}%
54 }%

```

```

55 \else
56 \def\x#1#2[#3]{\endgroup
57 #2[#3]}%
58 \ifx#1\@undefined
59 \xdef#1{#3}%
60 \fi
61 \ifx#1\relax
62 \xdef#1{#3}%
63 \fi
64 }%
65 \fi
66 \expandafter\x\csname ver@refcount.sty\endcsname
67 \ProvidesPackage{refcount}%
68 [2019/12/15 v3.6 Data extraction from label references (H0)]%
69 \begingroup\catcode61\catcode48\catcode32=10\relax%
70 \catcode13=5 % ^M
71 \endlinechar=13 %
72 \catcode123=1 % {
73 \catcode125=2 % }
74 \catcode64=11 % @
75 \def\x{\endgroup
76 \expandafter\edef\csname rc@AtEnd\endcsname{%
77 \endlinechar=\the\endlinechar\relax
78 \catcode13=\the\catcode13\relax
79 \catcode32=\the\catcode32\relax
80 \catcode35=\the\catcode35\relax
81 \catcode61=\the\catcode61\relax
82 \catcode64=\the\catcode64\relax
83 \catcode123=\the\catcode123\relax
84 \catcode125=\the\catcode125\relax
85 }%
86 }%
87 \x\catcode61\catcode48\catcode32=10\relax%
88 \catcode13=5 % ^M
89 \endlinechar=13 %
90 \catcode35=6 % #
91 \catcode64=11 % @
92 \catcode123=1 % {
93 \catcode125=2 % }
94 \def\TMP@EnsureCode#1#2{%
95 \edef\rc@AtEnd{%
96 \rc@AtEnd
97 \catcode#1=\the\catcode#1\relax
98 }%
99 \catcode#1=#2\relax
100 }
101 \TMP@EnsureCode{33}{12}% !
102 \TMP@EnsureCode{39}{12}% '
103 \TMP@EnsureCode{42}{12}% *
104 \TMP@EnsureCode{45}{12}% -
105 \TMP@EnsureCode{46}{12}% .
106 \TMP@EnsureCode{47}{12}% /
107 \TMP@EnsureCode{91}{12}% [
108 \TMP@EnsureCode{93}{12}% ]
109 \TMP@EnsureCode{96}{12}% '
110 \edef\rc@AtEnd{\rc@AtEnd\noexpand\endinput}

```

## 2.1 Loading packages

```

111 \begingroup\expandafter\expandafter\expandafter\endgroup
112 \expandafter\ifx\csname RequirePackage\endcsname\relax
113   \input ltxcmds.sty\relax
114   \input infwarerr.sty\relax
115 \else
116   \RequirePackage{ltxcmds}[2011/11/09]%
117   \RequirePackage{infwarerr}[2010/04/08]%
118 \fi

```

## 2.2 Defining commands

\rc@ifdefinable

```

119 \ltx@ifundefined{ifdefinable}{%
120   \def\rc@ifdefinable#1{%
121     \ifx#1\ltx@undefined
122       \expandafter\ltx@firstofone
123     \else
124       \ifx#1\relax
125         \expandafter\expandafter\expandafter\ltx@firstofone
126       \else
127         \@PackageError{refcount}{%
128           Command \string#1 is already defined.\MessageBreak
129           It will not redefined by this package%
130         }{@ehc
131         \expandafter\expandafter\expandafter\ltx@gobble
132       \fi
133     \fi
134   }%
135 }{%
136   \let\rc@ifdefinable\ifdefinable
137 }

```

\rc@robustdefone

\rc@robustdefzero

```

138 \ltx@ifundefined{protected}{%
139   \ltx@ifundefined{DeclareRobustCommand}{%
140     \def\rc@robustdefone#1#2#3#4{%
141       \rc@ifdefinable#3{%
142         #1\def#3##1{#4}%
143       }%
144     }%
145     \def\rc@robustdefzero#1#2{%
146       \rc@ifdefinable#1{%
147         \def#1{#2}%
148       }%
149     }%
150   }{%
151     \def\rc@robustdefone#1#2#3#4{%
152       \rc@ifdefinable#3{%
153         \DeclareRobustCommand#2#3[1]{#4}%
154       }%
155     }%
156     \def\rc@robustdefzero#1#2{%
157       \rc@ifdefinable#1{%
158         \DeclareRobustCommand#1{#2}%
159       }%
160     }%
161   }%
162 }{%
163   \def\rc@robustdefone#1#2#3#4{%

```

```

164 \rc@IfDefinable#3{%
165 \protected#1\def#3##1{#4}%
166 }%
167 }%
168 \def\rc@RobustDefZero#1#2{%
169 \rc@IfDefinable#1{%
170 \protected\def#1{#2}%
171 }%
172 }%
173 }

```

\rc@newcommand

```

174 \ltx@IfUndefined{newcommand}{%
175 \def\rc@newcommand*1[#2]#3{% hash-ok
176 \rc@IfDefinable#1{%
177 \ifcase#2 %
178 \def#1{#3}%
179 \or
180 \def#1##1{#3}%
181 \or
182 \def#1##1##2{#3}%
183 \else
184 \rc@InternalError
185 \fi
186 }%
187 }%
188 }{%
189 \let\rc@newcommand\newcommand
190 }

```

## 2.3 \setrefcountdefault

\setrefcountdefault

```

191 \rc@RobustDefOne\long{}\setrefcountdefault{%
192 \def\rc@default{#1}%
193 }

194 \setrefcountdefault{0}

```

## 2.4 \refused

\refused

```

195 \ltx@IfUndefined{G@refundundefinedtrue}{%
196 \rc@RobustDefOne{}{*}\refused{%
197 \begingroup
198 \csname @safe@activetrue\endcsname
199 \ltx@IfUndefined{r@#1}{%
200 \protect\G@refundundefinedtrue
201 \rc@WarningUndefined{#1}%
202 }{%
203 \endgroup
204 }%
205 }{%
206 \rc@RobustDefOne{}{*}\refused{%
207 \begingroup
208 \csname @safe@activetrue\endcsname
209 \ltx@IfUndefined{r@#1}{%

```

```

210         \csname protect\expandafter\endcsname
211         \csname G@refundefinedtrue\endcsname
212         \rc@WarningUndefined{#1}%
213     }{}%
214 \endgroup
215 }%
216 }

\rc@WarningUndefined

217 \ltx@ifundefined{@latex@warning}{%
218     \def\rc@WarningUndefined#1{%
219         \ltx@ifundefined{thepage}{%
220             \def\thepage{\number\count0 }%
221         }{}%
222         \@PackageWarning{refcount}{%
223             Reference ‘#1’ on page \thepage\space undefined%
224         }%
225     }%
226 }{}%
227 \def\rc@WarningUndefined#1{%
228     \@latex@warning{%
229         Reference ‘#1’ on page \thepage\space undefined%
230     }%
231 }%
232 }

```

## 2.5 Setting counters by reference data

### 2.5.1 Generic setting

`\rc@set` Generic command for `\{set,addto\}counter{page,}ref:`

```

#1: \setcounter, \addtocounter
#2: \ltx@car (for \ref), \ltx@cartwo (for \pageref)
#3: LATEX counter
#4: reference

```

```

233 \def\rc@set#1#2#3#4{%
234     \begingroup
235     \csname @safe@activetrue\endcsname
236     \refused{#4}%
237     \expandafter\rc@@set\csname r@#4\endcsname{#1}{#2}{#3}%
238 \endgroup
239 }

```

```

\rc@@set      #1: \r@<...>
               #2: \setcounter, \addtocounter
               #3: \ltx@car (for \ref), \ltx@carsecond (for \pageref)
               #4: LATEX counter

240 \def\rc@@set#1#2#3#4{%
241     \ifx#1\relax
242         #2{#4}{\rc@default}%
243     \else
244         #2{#4}{%
245             \expandafter#3#1\rc@default\rc@default\@nil
246         }%
247     \fi
248 }

```



### 2.5.2 User commands

`\setcounterref`

```
249 \rc@RobustDefZero\setcounterref{%  
250   \rc@set\setcounter\ltx@car  
251 }
```

`\addtocounterref`

```
252 \rc@RobustDefZero\addtocounterref{%  
253   \rc@set\addtocounter\ltx@car  
254 }
```

`\setcounterpageref`

```
255 \rc@RobustDefZero\setcounterpageref{%  
256   \rc@set\setcounter\ltx@carsecond  
257 }
```

`\addtocounterpageref`

```
258 \rc@RobustDefZero\addtocounterpageref{%  
259   \rc@set\addtocounter\ltx@carsecond  
260 }
```

## 2.6 Extracting references

`\getrefnumber`

```
261 \rc@newcommand*\getrefnumber}[1]{%  
262   \romannumeral  
263   \ltx@ifundefined{r@#1}{%  
264     \expandafter\ltx@zero  
265     \rc@default  
266   }{%  
267     \expandafter\expandafter\expandafter\rc@extract@  
268     \expandafter\expandafter\expandafter!%  
269     \csname r@#1\expandafter\endcsname  
270     \expandafter{\rc@default}\@nil  
271   }%  
272 }
```

`\getpagerefnumber`

```
273 \rc@newcommand*\getpagerefnumber}[1]{%  
274   \romannumeral  
275   \ltx@ifundefined{r@#1}{%  
276     \expandafter\ltx@zero  
277     \rc@default  
278   }{%  
279     \expandafter\expandafter\expandafter\rc@extract@page  
280     \expandafter\expandafter\expandafter!%  
281     \csname r@#1\expandafter\expandafter\expandafter\endcsname  
282     \expandafter\expandafter\expandafter{%  
283       \expandafter\rc@default  
284       \expandafter}\expandafter{\rc@default}\@nil  
285     }%  
286 }
```

`\getrefbykeydefault`

```
287 \rc@newcommand*\getrefbykeydefault}[2]{%  
288   \romannumeral
```

```

289 \expandafter\rc@getrefbykeydefault
290 \csname r@#1\expandafter\endcsname
291 \csname rc@extract@#2\endcsname
292 }

\rc@getrefbykeydefault #1: \r@<...>
#2: \rc@extract@<...>
#3: default

293 \long\def\rc@getrefbykeydefault#1#2#3{%
294 \ifx#1\relax
295 % reference is undefined
296 \ltx@ReturnAfterElseFi{%
297 \ltx@zero
298 #3%
299 }%
300 \else
301 \ltx@ReturnAfterFi{%
302 \ifx#2\relax
303 % extract method is missing
304 \ltx@ReturnAfterElseFi{%
305 \ltx@zero
306 #3%
307 }%
308 \else
309 \ltx@ReturnAfterFi{%
310 \expandafter
311 \rc@generic#1{#3}{#3}{#3}{#3}{#3}\@nil#2{#3}%
312 }%
313 \fi
314 }%
315 \fi
316 }

\rc@generic #1: first item in \r@<...>
#2: remaining items in \r@<...>
#3: \rc@extract@<...>
#4: default

317 \long\def\rc@generic#1#2\@nil#3#4{%
318 #3{#1\TR@TitleReference\@empty{#4}\@nil}{#1}#2\@nil
319 }

\rc@extract@

320 \long\def\rc@extract@#1#2#3\@nil{%
321 \ltx@zero
322 #2%
323 }

\rc@extract@page

324 \long\def\rc@extract@page#1#2#3#4\@nil{%
325 \ltx@zero
326 #3%
327 }

\rc@extract@name

328 \long\def\rc@extract@name#1#2#3#4#5\@nil{%
329 \ltx@zero
330 #4%
331 }

```

```

\rc@extract@anchor
332 \long\def\rc@extract@anchor#1#2#3#4#5#6\@nil{%
333   \ltx@zero
334   #5%
335 }

\rc@extract@url
336 \long\def\rc@extract@url#1#2#3#4#5#6#7\@nil{%
337   \ltx@zero
338   #6%
339 }

\rc@extract@title
340 \long\def\rc@extract@title#1#2\@nil{%
341   \rc@@extract@title#1%
342 }

\rc@@extract@title
343 \long\def\rc@@extract@title#1\TR@TitleReference#2#3#4\@nil{%
344   \ltx@zero
345   #3%
346 }

```

## 2.7 Macros for checking undefined references

```

\IfRefUndefinedExpandable
347 \rc@newcommand*{\IfRefUndefinedExpandable}[1]{%
348   \ltx@ifundefined{r@#1}\ltx@firstoftwo\ltx@secondoftwo
349 }

\IfRefUndefinedBabel
350 \rc@RobustDefOne{*}\IfRefUndefinedBabel{%
351   \begingroup
352     \csname safe@actives@true\endcsname
353     \expandafter\expandafter\expandafter\endgroup
354     \expandafter\ifx\csname r@#1\endcsname\relax
355       \expandafter\ltx@firstoftwo
356     \else
357       \expandafter\ltx@secondoftwo
358     \fi
359 }

360 \rc@AtEnd%
361 \endpackage

```

## 3 Installation

### 3.1 Download

**Package.** This package is available on CTAN<sup>1</sup>:

[CTAN:macros/latex/contrib/refcount/refcount.dtx](http://CTAN:macros/latex/contrib/refcount/refcount.dtx) The source file.

[CTAN:macros/latex/contrib/refcount/refcount.pdf](http://CTAN:macros/latex/contrib/refcount/refcount.pdf) Documentation.

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<sup>1</sup>[CTAN:pkg/refcount](http://CTAN:pkg/refcount)

**Bundle.** All the packages of the bundle ‘oberdiek’ are also available in a TDS compliant ZIP archive. There the packages are already unpacked and the documentation files are generated. The files and directories obey the TDS standard.

[CTAN:install/macros/latex/contrib/refcount.tds.zip](#)

*TDS* refers to the standard “A Directory Structure for T<sub>E</sub>X Files” ([CTAN:pkg/tds](#)). Directories with `texmf` in their name are usually organized this way.

## 3.2 Bundle installation

**Unpacking.** Unpack the `oberdiek.tds.zip` in the TDS tree (also known as `texmf` tree) of your choice. Example (linux):

```
unzip oberdiek.tds.zip -d ~/texmf
```

## 3.3 Package installation

**Unpacking.** The `.dtx` file is a self-extracting `docstrip` archive. The files are extracted by running the `.dtx` through plain T<sub>E</sub>X:

```
tex refcount.dtx
```

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

```
refcount.sty → tex/latex/refcount/refcount.sty
refcount.pdf → doc/latex/refcount/refcount.pdf
refcount.dtx → source/latex/refcount/refcount.dtx
```

If you have a `docstrip.cfg` that configures and enables `docstrip`’s TDS installing feature, then some files can already be in the right place, see the documentation of `docstrip`.

## 3.4 Refresh file name databases

If your T<sub>E</sub>X distribution (T<sub>E</sub>X Live, MiK<sub>T</sub><sub>E</sub>X, ...) relies on file name databases, you must refresh these. For example, T<sub>E</sub>X Live users run `texhash` or `mktextlsr`.

## 3.5 Some details for the interested

**Unpacking with L<sup>A</sup>T<sub>E</sub>X.** The `.dtx` chooses its action depending on the format:

**plain T<sub>E</sub>X:** Run `docstrip` and extract the files.

**L<sup>A</sup>T<sub>E</sub>X:** Generate the documentation.

If you insist on using L<sup>A</sup>T<sub>E</sub>X for `docstrip` (really, `docstrip` does not need L<sup>A</sup>T<sub>E</sub>X), then inform the autodetect routine about your intention:

```
latex \let\install=y\input{refcount.dtx}
```

Do not forget to quote the argument according to the demands of your shell.

**Generating the documentation.** You can use both the `.dtx` or the `.drv` to generate the documentation. The process can be configured by the configuration file `ltxdoc.cfg`. For instance, put this line into this file, if you want to have A4 as paper format:

```
\PassOptionsToClass{a4paper}{article}
```

An example follows how to generate the documentation with pdfL<sup>A</sup>T<sub>E</sub>X:

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

## 4 History

[1998/04/08 v1.0]

- First public release, written as answer in the newsgroup `comp.text.tex`:  
“`Re: Adding a \ref to a counter?`”<sup>2</sup>

[2000/09/07 v2.0]

- Documentation added.
- LPPL 1.2
- Package rewritten, new commands added.

[2006/02/20 v3.0]

- Support for hyperref and nameref improved.
- Support for titleref and babel’s shorthands added.
- New: `\refused`, `\getrefbykeydefault`

[2008/08/11 v3.1]

- Code is not changed.
- URLs updated.

[2010/12/01 v3.2]

- `\IfRefUndefinedExpandable` and `\IfRefUndefinedBabel` added.
- `\getrefnumber`, `\getpagerefnumber`, `\getrefbykeydefault` are expandable in exact two expansion steps.
- Non-expandable macros are made robust.
- Test files added.

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<sup>2</sup>Url: <https://groups.google.com/group/comp.text.tex/msg/c3f2a135ef5ee528>

[2011/06/22 v3.3]

- Bug fix: `\rc@refused` is undefined for `\setcounterpageref` and similar macros. (Bug found by Marc van Dongen.)

[2011/10/16 v3.4]

- Bug fix: `\setcounterpageref` and `\addtocounterpageref` fixed. (Bug found by Staz.)
- Macros `\(setaddto)counter(page)ref` are made robust.

[2016/05/16 v3.5]

- Documentation updates.

[2019/12/15 v3.6]

- Documentation updates.

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