# The refcount package

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2019/12/15 v3.6

## 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
1 Usage

1.1 Setting counters

The following commands are similar to \LaTeX{}'s \texttt{\setcounter} and \texttt{\addtocounter}, but they extract the number value from a reference:

\begin{verbatim}
\setcounterref, \addtocounterref
\setcounterpageref, \addtocounterpageref
\end{verbatim}

They take two arguments:

\begin{verbatim}
\...counter...ref {⟨\LaTeX{} counter⟩} {⟨reference⟩}
\end{verbatim}

An undefined reference produces the usual \LaTeX{} warning and its value is assumed to be zero. Example:

\begin{verbatim}
\newcounter{ctrA}
\newcounter{ctrB}
\refstepcounter{ctrA}\label{ref:A}
\setcounterref{ctrB}{ref:A}
\addtocounterpageref{ctrB}{ref:A}
\end{verbatim}

1.2 Expandable commands

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

\begin{verbatim}
\getrefnumber, \getpagerefnumber
\end{verbatim}

They take one argument, the reference:

\begin{verbatim}
\get...refnumber {⟨reference⟩}
\end{verbatim}

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

\begin{verbatim}
\setrefcountdefault{0}
\end{verbatim}

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

\begin{verbatim}
\getrefbykeydefault {⟨reference⟩} {⟨key⟩} {⟨default⟩}
\end{verbatim}

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:
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 expandable 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\getpagerefnumber{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.

\IfRefUndefinedExpandable{⟨refname⟩}{⟨then⟩}{⟨else⟩}
\IfRefUndefinedBabel{⟨refname⟩}{⟨then⟩}{⟨else⟩}

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

Reload check, especially if the package is not used with \TeX.
\begingroup\catcode61=10\relax\%
\catcode13=5 % ^^M
\catcode35=6 % #
\catcode39=12 % ,
\catcode44=12 % ,
\catcode45=12 % -
\catcode46=12 % .
\catcode58=12 % :
\catcode64=11 % @
\catcode123=1 % {
\catcode125=2 % }
\expandafter\let\expandafter\x\csname ver@refcount.sty\endcsname
\ifx\x\relax % plain-\TeX, first loading
\else
\ifx\x\empty % \LaTeX, first loading,
% variable is initialized, but \ProvidesPackage not yet seen
\else
\expandafter\ifx\csname PackageInfo\endcsname\relax
\def\x#1#2{\immediate\write-1{Package #1 Info: #2.}}%
\else
\def\x#1#2{\PackageInfo{#1}{#2, stopped}}%
\fi
\x{refcount}{The package is already loaded}%
\aftergroup\endinput
\fi
\fi\endgroup%

Package identification:
\begingroup\catcode61=10\relax\%
\catcode13=5 % ^^M
\catcode35=6 % #
\catcode39=12 % ,
\catcode44=12 % ,
\catcode45=12 % -
\catcode46=12 % .
\catcode58=12 % :
\catcode64=11 % @
\catcode123=1 % {
\catcode125=2 % }
\expandafter\ifx\csname ProvidesPackage\endcsname\relax
\def\x#1#2#3\[#4\]{\endgroup
\immediate\write-1{Package: #3 #4}%
\xdef#1{#4}}%
\endgroup
\endinput
\begin{verbatim}
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 (HO)]
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{
76 \expandafter\edef\csname rc@AtEnd\endcsname{%
77 \endlinechar=\the\endlinechar\relax
78 \catcode13=\the\catcode13\relax
79 \catcode123=\the\catcode123\relax
80 \catcode125=\the\catcode125\relax
81 \catcode64=\the\catcode64\relax
82 \catcode6=\the\catcode6\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 \catcode123=6 % #
91 \catcode64=11 % @
92 \catcode123=1 % {
93 \catcode125=2 % }
94 \def\TMP@EnsureCode#1#2{%
95 \edef\rc@AtEnd{\rc@AtEnd
96 \catcode#1=\the\catcode#1\relax
97 }%
98 \tmp@code#1=\the\catcode#1\relax
99 \catcode#1=#2\relax}
100 \TMP@EnsureCode{33}{12}% !
101 \TMP@EnsureCode{39}{12}% '
102 \TMP@EnsureCode{42}{12}% *
103 \TMP@EnsureCode{45}{12}% -
104 \TMP@EnsureCode{46}{12}% ,
105 \TMP@EnsureCode{47}{12}% /
106 \TMP@EnsureCode{91}{12}% [
107 \TMP@EnsureCode{93}{12}% ]
108 \TMP@EnsureCode{96}{12}% '
109 \edef\rc@AtEnd{\rc@AtEnd\noexpand\endinput}
2.1 Loading packages
\end{verbatim}
2.2 Defining commands

```latex
\rc@IfDefinable
\ltx@IfUndefined{@ifdefinable}{%
  \def\rc@IfDefinable#1{%
    \ifx#1\ltx@undefined
      \expandafter\ltx@firstofone
    \else
      \ifx#1\relax
        \expandafter\expandafter\expandafter\ltx@firstofone
      \else
        \@PackageError{refcount}{%Command \string#1 is already defined.\MessageBreakIt will not redefined by this package\MessageBreak}%\@ehc
      \expandafter\expandafter\expandafter\ltx@gobble
    \fi
    }%
    \fi
  }{%
  \let\rc@IfDefinable\@ifdefinable
}
\rc@RobustDefOne
\rc@RobustDefZero
\ltx@IfUndefined{protected}{%
  \ltx@IfUndefined{DeclareRobustCommand}{%
    \def\rc@RobustDefOne#1#2#3#4{%
      \rc@IfDefinable#3{%
        #1\def#3##1{#4}%
      }%
    }%
    \def\rc@RobustDefZero#1#2{%
      \rc@IfDefinable#1{%
        \def#1{#2}%
      }%
    }%
  }%
  \def\rc@RobustDefOne#1#2#3#4{%
    \rc@IfDefinable#3{%
      \DeclareRobustCommand#2#3[1]{#4}%
    }%
  }%
  \def\rc@RobustDefZero#1#2{%
    \rc@IfDefinable#1{%
      \DeclareRobustCommand#1[2]{%}
    }%
  }%
}
\ltx@IfUndefined{protected}{%
  \ltx@IfUndefined{DeclareRobustCommand}{%
    \def\rc@RobustDefOne#1#2#3#4{%
      \rc@IfDefinable#3{%
        \DeclareRobustCommand#2#3[1]{#4}%
      }%
    }%
    \def\rc@RobustDefZero#1#2{%
      \rc@IfDefinable#1{%
        \DeclareRobustCommand#1[2]{%}
      }%
    }%
  }%
  \def\rc@RobustDefOne#1#2#3#4{%
    \rc@IfDefinable#3{%
      \DeclareRobustCommand#2#3[1]{#4}%
    }%
  }%
  \def\rc@RobustDefZero#1#2{%
    \rc@IfDefinable#1{%
      \DeclareRobustCommand#1[2]{%}
    }%
  }%
}
\def\rc@RobustDefOne#1#2#3#4{%
```

---

6
\rc@IfDefinable#3{%  
\protected#1\def#3##1{#4}%  
}%  
}\def\rc@RobustDefZero#1#2{%  
\rc@IfDefinable#1{%  
\protect\def#1{#2}%  
}%  
}%  
}\def\rc@newcommand{\ltx@IfUndefined{newcommand}{\def\rc@newcommand*#1[#2]#3{% hash-ok  
\rc@IfDefinable#1{%  
\ifcase#2 %  
\def#1{#3}%  
or  
\def#1##1{#3}%  
or  
\def#1##1##2{#3}%  
else  
\rc@InternalError  
\fi  
}}%  
}%  
}\let\rc@newcommand\newcommand  
}

2.3 \setrefcountdefault  
\setrefcountdefault{0}  

2.4 \refused  
\refused
\rc@WarningUndefined
\ltx@ifundefined{@latex@warning}{% 
  \def\rc@WarningUndefined#1{% 
    \ltx@ifundefined{thepage}{% 
      \def\thepage{\number\count0 }% 
    }{% 
      @PackageWarning{refcount}{% 
        Reference ‘#1’ on page \thepage\space undefined% 
    }% 
  }{% 
    \def\rc@WarningUndefined#1{% 
      \@latex@warning{\% 
        Reference ‘#1’ on page \thepage\space undefined% 
    }% 
  }% 
}{}
\endgroup

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@carsecond (for \pageref)
#3: LaTeX counter
#4: reference

\def\rc@set#1#2#3#4{% 
  \begingroup 
  %\csname @safe@activestrue\endcsname
  \refused{#4}%
  \expandafter\rc@@set\csname r@#4\endcsname{#1}{#2}{#3}%
  \endgroup 
}

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

\def\rc@@set#1#2#3#4{% 
  \ifx#1\relax #2{#4}{\rc@default}\rc@default\@nil\fi 
}

8
2.5.2 User commands

```latex
\setcounterref
\rc@RobustDefZero\setcounterref{\%}
\rc@set\setcounter\ltx@car
\setcounterpageref
\rc@RobustDefZero\setcounterpageref{\%}
\rc@set\setcounter\ltx@carsecond
\setcounter
\rc@RobustDefZero\setcounter{\%}
\rc@set\addtocounter\ltx@car
\addtocounter
\rc@RobustDefZero\addtocounter{\%}
\rc@set\addtocounter\ltx@carsecond
```

2.6 Extracting references

```latex
\getrefnumber
\rc@newcommand*{\getrefnumber}{1}{\%}
\romannumeral\ltx@ifundefined{r@#1}{\expandafter\ltx@zero\rc@default}{\expandafter\expandafter\expandafter\rc@extract@\expandafter\expandafter\expandafter!\csname r@#1\expandafter\expandafter\expandafter\endcsname\expandafter\expandafter\expandafter{\expandafter\rc@default\expandafter}}\@nil
\getpagerefnumber
\rc@newcommand*{\getpagerefnumber}{1}{\%}
\romannumeral\ltx@ifundefined{r@#1}{\expandafter\ltx@zero\rc@default}{\expandafter\expandafter\expandafter\rc@extract@page\expandafter\expandafter\expandafter!\csname r@#1\expandafter\expandafter\expandafter\endcsname\expandafter\expandafter\expandafter\expandafter{\expandafter\rc@default\expandafter}}\@nil
\getrefbykeydefault
\rc@newcommand*{\getrefbykeydefault}{2}{\%}
\romannumeral
\expandafter\rc@getrefbykeydefault
\csname r@#1\expandafter\endcsname
\csname rc@extract@#2\endcsname
\rc@getrefbykeydefault
#1: \r@<...>
#2: \rc@extract@<...>
#3: default
\long\def\rc@getrefbykeydefault#1#2#3{% 
\ifx#1\relax
% reference is undefined
\ltx@ReturnAfterElseFi{% 
\ltx@zero
#3%
}%
\else
\ltx@ReturnAfterFi{% 
\ifx#2\relax
% extract method is missing
\ltx@ReturnAfterElseFi{% 
\ltx@zero
#3%
}%
\else
\ltx@ReturnAfterFi{% 
\expandafter
\rc@generic#1{#3}{#3}{#3}{#3}{#3}\@nil#2{#3}% 
}%
\fi
\fi
}\fi
\rc@generic
#1: first item in \r@<...>
#2: remaining items in \r@<...>
#3: \rc@extract@<...>
#4: default
\long\def\rc@generic#1#2\@nil#3#4{% 
#3{#1\TR@TitleReference\@empty{#4}\@nil}{#1}#2\@nil 
} 
\rc@extract@page
\long\def\rc@extract@page#1#2#3#4\@nil{% 
\ltx@zero
#3%
} 
\rc@extract@name
\long\def\rc@extract@name#1#2#3#4#5\@nil{% 
\ltx@zero
#4%
}
2.7 Macros for checking undefined references

\IfRefUndefinedExpandable

\IfRefUndefinedBabel

3 Installation

3.1 Download

Package. This package is available on CTAN\textsuperscript{1}:


\textsuperscript{1}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 TeX 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 TeX:

```
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 TeX distribution (TeX Live, MiKTeX, ...) relies on file name databases, you must refresh these. For example, TeX Live users run texhash or mktexlsr.

### 3.5 Some details for the interested

Unpacking with \LaTeX. The .dtx chooses its action depending on the format:

plain TeX: Run docstrip and extract the files.

\LaTeX: Generate the documentation.

If you insist on using \LaTeX for docstrip (really, docstrip does not need \LaTeX), then inform the autodetect routine about your intention:

```
latex \let\install=y\input{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 \texttt{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 \texttt{pdflatex}:

\begin{verbatim}
\texttt{pdflatex reffcount.dtx}
\texttt{makeindex -s gind.ist reffcount.idx}
\texttt{pdflatex reffcount.dtx}
\texttt{makeindex -s gind.ist reffcount.idx}
\texttt{pdflatex reffcount.dtx}
\end{verbatim}

4 History

\textbf{1998/04/08 v1.0}
\begin{itemize}
\item First public release, written as answer in the newsgroup \texttt{comp.text.tex}:
  \begin{quote}
  “Re: Adding a \texttt{ref} to a counter?”\footnote{Url: https://groups.google.com/group/comp.text.tex/msg/c3f2a135ef5ee528}
  \end{quote}
\end{itemize}

\textbf{2000/09/07 v2.0}
\begin{itemize}
\item Documentation added.
\item LPPL 1.2
\item Package rewritten, new commands added.
\end{itemize}

\textbf{2006/02/20 v3.0}
\begin{itemize}
\item Support for \texttt{hyperref} and \texttt{nameref} improved.
\item Support for \texttt{titleref} and \texttt{babel}'s shorthands added.
\item New: \texttt{reffused}, \texttt{getrefbykeydefault}
\end{itemize}

\textbf{2008/08/11 v3.1}
\begin{itemize}
\item Code is not changed.
\item URLs updated.
\end{itemize}

\textbf{2010/12/01 v3.2}
\begin{itemize}
\item \texttt{IfRefUndefinedExpandable} and \texttt{IfRefUndefinedBabel} added.
\item \texttt{getrefnumber}, \texttt{getpagerefnumber}, \texttt{getrefbykeydefault} are expandable in exact two expansion steps.
\item Non-expandable macros are made robust.
\item Test files added.
\end{itemize}

\footnote{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 \(\setaddtocounter{page}\ref\) are made robust.

[2016/05/16 v3.5]
• Documentation updates.

[2019/12/15 v3.6]
• Documentation updates.

5 Index

Numbers written in italic refer to the page where the corresponding entry is described; numbers underlined refer to the code line of the definition; plain numbers refer to the code lines where the entry is used.

Symbols

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</tr>
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<td>\addtocounterref</td>
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<td>\endinput</td>
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I

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