The atveryend package

Heiko Oberdiek
<heiko.oberdiek at googlemail.com>

2010/01/25 v1.4

Abstract

This LaTeX package provides two hooks for `\end{document}` that are executed after the hook of `\AtEndDocument`. `\AfterLastShipout` can be used for code that is to be executed right after the last `\clearpage` before the `..aux` file is closed. `\AtVeryEndDocument` is used for code after closing and final reading of the `..aux` file.

Contents

1 Documentation **2**
1.1 Related work . . . 2

2 Implementation **3**
2.1 Hooks . . . 3
2.2 Redefining `\enddocument` . . . 4
2.2.1 LaTeX kernel . . . 5
2.2.2 Package booklet, file 2up.tex . . . 6
2.2.3 Class dinbrief . . . 6
2.2.4 Class combine . . . 7
2.2.5 Class jpsj2 . . . 8
2.2.6 Testing and redefining . . . 9
2.3 Using hooks of other packages . . . 9
2.3.1 Package scrlfile . . . 9
2.3.2 Package etoolbox . . . 10
2.4 Hack into `\enddocument` . . . 10
2.5 Class letter . . . 10

3 Test **12**
3.1 Catcode checks for loading . . . 12

4 Installation **13**
4.1 Download . . . 13
4.2 Bundle installation . . . 14
4.3 Package installation . . . 14
4.4 Refresh file name databases . . . 14
4.5 Some details for the interested . . . 14

5 Acknowledgement **15**

6 References **15**

7 History **15**
[2009/12/06 v1.0] 15
[2009/12/07 v1.1] 16
[2009/12/09 v1.2] 16
[2009/12/11 v1.3] 16
[2010/01/25 v1.4] 16

8 Index **16**

1 Documentation

There are packages (e.g. hyperref [4], lastpage [6]) that want to call code after the typesetting is done, for example to remember the last page number. LaTeX provides the hook `\AtEndDocument` (clsguide [1]). There are packages that use this hook to do their job for typesetting pages (e.g. endfloat emits the floats here [2]). Also a user might provide additional code in `\AtEndDocument`. Therefore packages have to call `\clearpage` in `\AtEndDocument` to get after the last shipout page. But this is not too reliable, because the right timing is important between packages that want or have to do things before the last page is output and packages that only work properly if they can reach the point after the last shipout.

Therefore the task of this package is to provide additional hooks for `\end{document}`. All hooks are called after the hook of `\AtEndDocument`.

`\BeforeClearDocument` {⟨*code*⟩}

The code is called before the final `\clearpage` in `\enddocument`. However it is unknown, whether the last page is already shipped out or if this will be triggered by the final `\clearpage`.

`\AfterLastShipout` {⟨*code*⟩}

The code is called after the final `\clearpage` of `\enddocument` before the main `..aux` file is closed. This is the right place to remember the last page in the `..aux` file, for instance.

`\AtVeryEndDocument` {⟨*code*⟩}

The code is called after the `..aux` file is closed and read in again. It is the place for final checks, rerun hints, final messages.

1.1 Related work

Package scrfile: Markus Kohm has written package scrlfile (part of KOMA-Script [5]) that provides hooks `\BeforeClosingMainAux` and after `\AfterReadingMainAux`. They have the same function as the hooks of this package. In fact this package uses them, if they are available.

Class revtex4-1: This class calls `\clear@document` in `\enddocument` that wraps the final call of `\clearpage`. Thus it can be used as hook to call stuff after that `\clearpage`. This is also done by this package.

Package etoolbox: It provides `\AfterEndDocument`, a hook right before `\deadcycles` or `\@@end` [3].

This package tries to combine as many approaches as possible:

- It looks for a known `\enddocument` and redefines it.

- Hooks that are provided by others are used (package scrlfile or class revtex4-1.
- It redefines `\@checkend` and `\@dofilelist` to insert the hooks similar to packagescrlfile.
- The hook execution is wrapped in a macro that is redefined by its first call to prevent calling the hook more than once.

2 Implementation

```
1 ⟨*package⟩
2 \begingroup
3   \catcode123 1 % {
4   \catcode125 2 % }
5   \def\x{\endgroup
6     \expandafter\edef\csname AtVeryEnd@AtEnd\endcsname{%
7       \catcode35 \the\catcode35\relax
8       \catcode64 \the\catcode64\relax
9       \catcode123 \the\catcode123\relax
10      \catcode125 \the\catcode125\relax
11    }%
12  }%
13 \x
14 \catcode35 6 % #
15 \catcode64 11 % @
16 \catcode123 1 % {
17 \catcode125 2 % }
18 \def\TMP@EnsureCode#1#2{%
19   \edef\AtVeryEnd@AtEnd{%
20     \AtVeryEnd@AtEnd
21     \catcode#1 \the\catcode#1\relax
22   }%
23   \catcode#1 #2\relax
24 }
25 \TMP@EnsureCode{9}{10}% (tab)
26 \TMP@EnsureCode{39}{12}% '
27 \TMP@EnsureCode{40}{12}% (
28 \TMP@EnsureCode{41}{12}% )
29 \TMP@EnsureCode{42}{12}% *
30 \TMP@EnsureCode{45}{12}% -
31 \TMP@EnsureCode{46}{12}% .
32 \TMP@EnsureCode{47}{12}% /
33 \TMP@EnsureCode{61}{12}% =
34 \TMP@EnsureCode{62}{12}% >
35 \TMP@EnsureCode{96}{12}% `
36 \g@addto@macro{\AtVeryEnd@AtEnd}{\endinput}%
```

Package identification.

```
37 \NeedsTeXFormat{LaTeX2e}
38 \ProvidesPackage{atveryend}%
39   [2010/01/25 v1.4 Hooks at very end of document (HO)]
```

2.1 Hooks

```
ryEnd@BeforeClearDocumentHook
40 \let\AtVeryEnd@BeforeClearDocumentHook\@empty
tVeryEnd@AfterLastShipoutHook
41 \let\AtVeryEnd@AfterLastShipoutHook\@empty
VeryEnd@AtVeryEndDocumentHook
42 \let\AtVeryEnd@AtVeryEndDocumentHook\@empty
```

\BeforeClearDocument

```
\newcommand*{\BeforeClearDocument}{%
  \g@addto@macro\AtVeryEnd@BeforeClearDocumentHook
}
```

\AfterLastShipout

```
\newcommand*{\AfterLastShipout}{%
  \g@addto@macro\AtVeryEnd@AfterLastShipoutHook
}
```

\AtVeryEndDocument

```
\newcommand*{\AtVeryEndDocument}{%
  \g@addto@macro\AtVeryEnd@AtVeryEndDocumentHook
}
```

\Call@BeforeClearDocument

```
\newcommand*{\Call@BeforeClearDocument}{%
  \let\BeforeClearDocument\@firstofone
  \ifx\AtVeryEnd@BeforeClearDocumentHook\@empty
    \PackageInfo{atveryend}{Empty hook `BeforeClearDocument'}%
  \else
    \PackageInfo{atveryend}{Executing hook `BeforeClearDocument'}%
    \AtVeryEnd@AfterLastShipoutHook
  \fi
  \global\let\AtVeryEnd@BeforeClearDocumentHook\@undefined
  \global\let\Call@BeforeClearDocument\relax
}
```

\Call@AfterLastShipout

```
\newcommand*{\Call@AfterLastShipout}{%
  \let\AfterLastShipout\@firstofone
  \ifx\AtVeryEnd@AfterLastShipoutHook\@empty
    \PackageInfo{atveryend}{Empty hook `AfterLastShipout'}%
  \else
    \PackageInfo{atveryend}{Executing hook `AfterLastShipout'}%
    \AtVeryEnd@AfterLastShipoutHook
  \fi
  \global\let\AtVeryEnd@AfterLastShipoutHook\@undefined
  \global\let\Call@AfterLastShipout\relax
}
```

\Call@AtVeryEndDocument

```
\newcommand*{\Call@AtVeryEndDocument}{%
  \let\AtVeryEndDocument\@firstofone
  \ifx\AtVeryEnd@AtVeryEndDocumentHook\@empty
    \PackageInfo{atveryend}{Empty hook `AtVeryEndDocument'}%
  \else
    \PackageInfo{atveryend}{Executing hook `AtVeryEndDocument'}%
    \AtVeryEnd@AtVeryEndDocumentHook
  \fi
  \global\let\AtVeryEnd@AtVeryEndDocumentHook\@undefined
  \global\let\Call@AtVeryEndDocument\relax
}
```

2.2 Redefining \enddocument

This approach looks for known versions of \enddocument and redefines it. Class seminar and package slidesec are not checked, because there would be too much combinations to check.

2.2.1 LaTeX kernel

\AtVeryEnd@test@standard

```
\def\AtVeryEnd@test@standard{%
  \let\AtEndDocument\@firstofone
  \@enddocumenthook
  \@checkend{document}%
  \clearpage
  \begingroup
    \if@filesw
      \immediate\closeout\@mainaux
      \let\@setckpt\@gobbletwo
      \let\@newl@bel\@testdef
      \@tempswafalse
      \makeatletter
      \input\jobname.aux %
    \fi
    \@dofilelist
    \ifdim \font@submax >\fontsubfuzz\relax
      \@font@warning{Size substitutions with differences\MessageBreak
                 up to \font@submax\space have occurred.\@gobbletwo}%
    \fi
    \@defaultsubs
    \@refundefined
    \if@filesw
      \ifx \@multiplelabels \relax
        \if@tempswa
          \@latex@warning@no@line{Label(s) may have changed. %
              Rerun to get cross-references right}%
        \fi
      \else
        \@multiplelabels
      \fi
    \fi
  \endgroup
  \deadcycles\z@
  \@@end
}
```

tVeryEnd@enddocument@standard

```
\def\AtVeryEnd@enddocument@standard{%
  \let\AtEndDocument\@firstofone
  \@enddocumenthook
  \@checkend{document}%
  \Call@BeforeClearDocument
  \clearpage
  \Call@AfterLastShipout
  \begingroup
    \if@filesw
      \immediate\closeout\@mainaux
      \let\@setckpt\@gobbletwo
      \let\@newl@bel\@testdef
      \@tempswafalse
      \makeatletter
      \input\jobname.aux %
    \fi
    \Call@AtVeryEndDocument
    \@dofilelist
    \ifdim \font@submax >\fontsubfuzz\relax
      \@font@warning{Size substitutions with differences\MessageBreak
                 up to \font@submax\space have occurred.\@gobbletwo}%
    \fi
```

```
    \@defaultsubs
    \@refundefined
    \if@filesw
      \ifx \@multiplelabels \relax
        \if@tempswa
          \@latex@warning@no@line{Label(s) may have changed. %
              Rerun to get cross-references right}%
        \fi
      \else
        \@multiplelabels
      \fi
    \fi
  \endgroup
  \deadcycles\z@
  \@@end
}
```

2.2.2 Package **booklet**, file **2up.tex**

\AtVeryEnd@test@booklet

```
\expandafter\def\expandafter\AtVeryEnd@test@booklet\expandafter{%
  \expandafter\twoupclearpage
  \AtVeryEnd@test@standard
}
```

\AtVeryEnd@enddocument@booklet

```
\expandafter\def\expandafter\AtVeryEnd@enddocument@booklet\expandafter{%
  \expandafter\twoclearpage
  \AtVeryEnd@enddocument@standard
}
```

2.2.3 Class **dinbrief**

\AtVeryEnd@test@dinbrief

```
\def\AtVeryEnd@test@dinbrief{%
  \@checkend{document} %
  \newpage
  \begingroup
    \if@filesw
      \ifnum\c@labelgen>0 %
        \immediate\closeout\@mainlbl
        \makeatletter
        \input \jobname@lbl\relax
        \clearpage
      \fi
      \immediate\closeout\@mainaux
    \fi
  \endgroup
  \deadcycles\z@
  \@@end
}
```

tVeryEnd@enddocument@dinbrief

```
\def\AtVeryEnd@enddocument@dinbrief{%
  \@checkend{document}%
  \Call@BeforeClearDocument
  \newpage
  \Call@AfterLastShipout
  \begingroup
    \if@filesw
      \ifnum\c@labelgen>\z@
```

```
        \immediate\closeout\@mainlbl
        \makeatletter
        \input \jobname@lbl\relax
        \clearpage
      \fi
      \immediate\closeout\@mainaux
    \fi
    \Call@AtVeryEndDocument
  \endgroup
  \deadcycles\z@
  \@@end
}
```

2.2.4 Class combine

\AtVeryEnd@test@combine

```
\def\AtVeryEnd@test@combine{%
  \@enddocumenthook
  \@checkend{document}%
  \clearpage
  \begingroup
    \if@filesw
      \immediate\closeout\@mainaux
      \immediate\closeout\@partaux
      \let\@setckpt\@gobbletwo
      \let\@newl@bel\@testdef
      \@tempswafalse
      \makeatletter \input\c@lmainauxfile  %% change here
    \fi
    \c@lenddoca                            %% a replacement
    \@refundefined
  \endgroup
  \deadcycles\z@
  \@@end
}
```

AtVeryEnd@enddocument@combine

```
\def\AtVeryEnd@enddocument@combine{%
  \@enddocumenthook
  \@checkend{document}%
  \Call@BeforeClearDocument
  \clearpage
  \Call@AfterLastShipout
  \begingroup
    \if@filesw
      \immediate\closeout\@mainaux
      \immediate\closeout\@partaux
      \let\@setckpt\@gobbletwo
      \let\@newl@bel\@testdef
      \@tempswafalse
      \makeatletter \input\c@lmainauxfile  %% change here
    \fi
    \Call@AtVeryEndDocument
    \c@lenddoca                            %% a replacement
    \@refundefined
  \endgroup
  \deadcycles\z@
  \@@end
}
```

2.2.5 Class jpsj2

\AtVeryEnd@test@jpsj

```
\def\AtVeryEnd@test@jpsj{%
  \if@lastpagebalancing
    \global\let\@outputdblcol=\balancing@outputdblcol
  \fi
  \@checkend{document}%
  \clearpage
  \begingroup
    \if@filesw
      \immediate\closeout\@mainaux
      \def\global\@namedef##1##2{}%
      \def\newlabel{\@testdef r}%
      \def\bibcite{\@testdef b}%
      \@tempswafalse
      \makeatletter
      \input \jobname.aux %
      \if@tempswa
        \@warning{%
          Label(s) may have changed. %
          Rerun to get cross-references right%
        }%
      \fi
    \fi
  \endgroup
  \deadcycles\z@
  \@@end
}
```

\AtVeryEnd@enddocument@jpsj

```
\def\AtVeryEnd@enddocument@jpsj{%
  \if@lastpagebalancing
    \global\let\@outputdblcol=\balancing@outputdblcol
  \fi
  \@checkend{document}%
  \Call@BeforeClearDocument
  \clearpage
  \Call@AfterLastShipout
  \begingroup
    \if@filesw
      \immediate\closeout\@mainaux
      \def\global\@namedef##1##2{}%
      \def\newlabel{\@testdef r}%
      \def\bibcite{\@testdef b}%
      \@tempswafalse
      \makeatletter
      \input \jobname.aux %
      \if@tempswa
        \@warning{%
          Label(s) may have changed. %
          Rerun to get cross-references right%
        }%
      \fi
    \fi
    \Call@AtVeryEndDocument
  \endgroup
  \deadcycles\z@
  \@@end
}
```

2.2.6 Testing and redefining

\AtVeryEnd@Test

```
\def\AtVeryEnd@Test#1#2{%
  \expandafter\ifx\csname AtVeryEnd@test@#2\endcsname#1%
    \expandafter\let\expandafter#1%
    \csname AtVeryEnd@enddocument@#2\endcsname
    \begingroup
      \let\on@line\@empty
      \PackageInfo{atveryend}{%
        \string#1 detected (#2)%
      }%
    \endgroup
    \expandafter\AtVeryEnd@SkipToNil
  \fi
}
```

\AtVeryEnd@SkipToNil

```
\def\AtVeryEnd@SkipToNil#1\@nil{}
```

\AtVeryEnd@RedefEndDocument

```
\def\AtVeryEnd@RedefEndDocument#1{%
  \ifx#1\@undefined
  \else
    \AtVeryEnd@Test#1{standard}%
    \AtVeryEnd@Test#1{booklet}%
    \AtVeryEnd@Test#1{dinbrief}%
    \AtVeryEnd@Test#1{combine}%
    \AtVeryEnd@Test#1{jpsj}%
    \AtVeryEnd@SkipToNil
    \@nil
  \fi
}

\AtVeryEnd@RedefEndDocument\enddocument
\AtVeryEnd@RedefEndDocument\AP@enddocument % afterpage.sty
\AtVeryEnd@RedefEndDocument\hyper@back@cite@enddocument % htx-bc.sty
\AtVeryEnd@RedefEndDocument\hyper@enddocument % hyper.sty
\AtVeryEnd@RedefEndDocument\hyper@fn@enddocument % hyper.sty
\AtVeryEnd@RedefEndDocument\cweb@save@enddocument % cweb.cls
\AtVeryEnd@RedefEndDocument\prev@enddocument % flushend.sty
\AtVeryEnd@RedefEndDocument\endorigdocument % gaceta.cls
\AtVeryEnd@RedefEndDocument\keependdoc % aguplus.sty
\AtVeryEnd@RedefEndDocument\EMenddocument % t-angles.sty
\AtVeryEnd@RedefEndDocument\docmute@enddocument % docmute.sty
\AtVeryEnd@RedefEndDocument\a@enddocument % alatex.sty
\AtVeryEnd@RedefEndDocument\enddocumentasusual % frenchle.sty
\AtVeryEnd@RedefEndDocument\old@enddocument % uwthesis.cls
```

2.3 Using hooks of other packages

2.3.1 Package scrlfile

```
\AtBeginDocument{%
  \@ifpackageloaded{scrlfile}{%
    \@ifundefined{BeforeClosingMainAux}{}{%
      \BeforeClosingMainAux{\Call@AfterLastShipout}%
    }%
    \@ifundefined{AfterReadingMainAux}{}{%
      \AfterReadingMainAux{\Call@AtVeryEndDocument}%
    }%
  }{}%
```

2.3.2 Package **etoolbox**

```
  \@ifpackageloaded{etoolbox}{%
    \@ifundefined{AfterEndDocument}{}{%
      \AfterEndDocument{\Call@AtVeryEndDocument}%
    }%
  }{}%
```

2.4 Hack into \enddocument

```
  \def\AtVeryEnd@document{document}%
  \def\AtVeryEnd@RedefCheckEnd{%
    \expandafter\def\expandafter\@checkend
    \expandafter##\expandafter1\expandafter{%
      \@checkend{##1}%
      \def\AtVeryEnd@temp{##1}%
      \ifx\AtVeryEnd@temp\AtVeryEnd@document
        \let\AtVeryEnd@OrgClearpage\clearpage
        \def\clearpage{%
          \let\clearpage\AtVeryEnd@OrgClearpage
          \Call@BeforeClearDocument
          \clearpage
          \Call@AfterLastShipout
        }%
      \fi
    }%
    \aftergroup\AtVeryEnd@RedefCheckEnd
  }%
  \AtEndDocument{%
    \AtVeryEnd@RedefCheckEnd
  }%
}
\AtEndDocument{%
  \@ifundefined{@dofilelist}{%
    \gdef\@dofilelist{\Call@AtVeryEndDocument}%
  }{%
    \begingroup
      \toks@\expandafter{\@dofilelist}%
      \xdef\@dofilelist{%
        \noexpand\Call@AtVeryEndDocument
        \the\toks@
      }%
    \endgroup
  }%
}
```

2.5 Class **letter**

The class letter and some similar classes insert material (`\@startlabels`) at the end of the document. However, this method violates a precondition of this package that the `\clearpage` in `\enddocument` is the final call with no material at later times. Therefore we move the label making from the `..aux` file to `\AtEndDocument`.

```
\def\AtVeryEnd@temp{%
  \AtBeginDocument{%
    \let\@startlabels\startlabels
    \let\@mlabel\mlabel
    \if@filesw
      \immediate\write\@mainaux{\string\@startlabels}%
    \fi
  }%
  \AtEndDocument{%
    \if@filesw
```

```
      \immediate\write\@mainaux{\string\clearpage}%
    \fi
  }%
}
\ifx\makelabels\AtVeryEnd@temp
\else
  \expandafter\AtVeryEnd@AtEnd
\fi
\let\AtVeryEnd@PatchLetter=N%
\begingroup\expandafter\expandafter\expandafter\endgroup
\expandafter\ifx\csname endletter\endcsname\relax
\else
  \long\def\AtVeryEnd@TestEndLetter#1\@auxout#2#3\AtVeryEnd@Nil{%
    \def\AtVeryEnd@temp{#2}%
    \ifx\AtVeryEnd@temp\@empty
    \else
      \@onelevel@sanitize\AtVeryEnd@temp
      \edef\AtVeryEnd@StringMlabel{%
        \string\string
        \string\@mlabel
        \expandafter\@gobble\string\{%
      }%
      \def\AtVeryEnd@CatchFirst##1##2##3##4##5##6##7##8{%
        ##1##2##3##4##5##6##7##8\AtVeryEnd@CatchSecond
      }%
      \def\AtVeryEnd@CatchSecond##1##2##3##4##5##6##7##8##9\@nil{%
        ##1##2##3##4##5##6##7##8%
      }%
      \edef\AtVeryEnd@temp{%
        \expandafter\AtVeryEnd@CatchFirst\AtVeryEnd@temp
        {}{}{}{}{}{}{}{}%
        {}{}{}{}{}{}{}{}%
        \@nil
      }%
      \ifx\AtVeryEnd@temp\AtVeryEnd@StringMlabel
        \expandafter\def\expandafter\endletter\expandafter{%
          \endletter
          \begingroup
            \let\\=\relax
            \let\protect\@unexpandable@protect
            \let\@mlabel=\relax
            \edef\x{\endgroup
              \noexpand\AtEndDocument{%
                \@gobble#2%
              }%
            }%
          \x
        }%
        \let\AtVeryEnd@PatchLetter=Y%
      \fi
    \fi
  }%
  \expandafter\AtVeryEnd@TestEndLetter\endletter
    \@auxout{}\AtVeryEnd@Nil
\fi
\ifx\AtVeryEnd@PatchLetter Y%
  \begingroup
    \let\on@line\@empty
    \PackageInfo{atveryend}{%
      \@backslashchar makelabels detected. %
      Moving labels\MessageBreak
      from `.aux' file to \@backslashchar AtEndDocument%
```

```
    }%
  \endgroup
  \def\makelabels{%
    \AtBeginDocument{%
      \let\@startlabels\startlabels
      \let\@mlabel\mlabel
    }%
  }%
  \AtEndDocument{%
    \@ifundefined{@startlabels}{%
    }{%
      \clearpage
      \@startlabels
    }%
  }%
  \AfterLastShipout{%
    \let\@startlabels\relax
    \let\@mlabel\@gobbletwo
  }%
\else
  \PackageWarningNoLine{atveryend}{%
    \@backslashchar makelabels detected, but labels cannot\MessageBreak
    be moved to \@backslashchar AtEndDocument, because\MessageBreak
    \@backslashchar endletter is not in expected form%
  }%
\fi
\AtVeryEnd@AtEnd
```
⟨/package⟩

3 Test

3.1 Catcode checks for loading

⟨*test1⟩

```
\catcode`\{=1 %
\catcode`\}=2 %
\catcode`\#=6 %
\catcode`\@=11 %
\expandafter\ifx\csname count@\endcsname\relax
  \countdef\count@=255 %
\fi
\expandafter\ifx\csname @gobble\endcsname\relax
  \long\def\@gobble#1{}%
\fi
\expandafter\ifx\csname @firstofone\endcsname\relax
  \long\def\@firstofone#1{#1}%
\fi
\expandafter\ifx\csname loop\endcsname\relax
  \expandafter\@firstofone
\else
  \expandafter\@gobble
\fi
{%
  \def\loop#1\repeat{%
    \def\body{#1}%
    \iterate
  }%
  \def\iterate{%
    \body
      \let\next\iterate
    \else
```

```
      \let\next\relax
    \fi
    \next
  }%
  \let\repeat=\fi
}%
\def\RestoreCatcodes{}
\count@=0 %
\loop
  \edef\RestoreCatcodes{%
    \RestoreCatcodes
    \catcode\the\count@=\the\catcode\count@\relax
  }%
\ifnum\count@<255 %
  \advance\count@ 1 %
\repeat

\def\RangeCatcodeInvalid#1#2{%
  \count@=#1\relax
  \loop
    \catcode\count@=15 %
  \ifnum\count@<#2\relax
    \advance\count@ 1 %
  \repeat
}
\expandafter\ifx\csname LoadCommand\endcsname\relax
  \def\LoadCommand{\input atveryend.sty\relax}%
\fi
\def\Test{%
  \RangeCatcodeInvalid{0}{47}%
  \RangeCatcodeInvalid{58}{64}%
  \RangeCatcodeInvalid{91}{96}%
  \RangeCatcodeInvalid{123}{255}%
  \catcode`\@=12 %
  \catcode`\\=0 %
  \catcode`\{=1 %
  \catcode`\}=2 %
  \catcode`\#=6 %
  \catcode`\[=12 %
  \catcode`\]=12 %
  \catcode`\%=14 %
  \catcode`\ =10 %
  \catcode13=5 %
  \LoadCommand
  \RestoreCatcodes
}
\Test
\csname @@end\endcsname
\end
```

⟨/test1⟩

4 Installation

4.1 Download

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

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

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

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

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

CTAN:install/macros/latex/contrib/oberdiek.tds.zip

TDS refers to the standard "A Directory Structure for TEX Files" (CTAN:tds/tds.pdf). Directories with `texmf` in their name are usually organized this way.

4.2 Bundle installation

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

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

Script installation. Check the directory `TDS:scripts/oberdiek/` for scripts that need further installation steps. Package attachfile2 comes with the Perl script `pdfatfi.pl` that should be installed in such a way that it can be called as `pdfatfi`. Example (linux):

```
chmod +x scripts/oberdiek/pdfatfi.pl
cp scripts/oberdiek/pdfatfi.pl /usr/local/bin/
```

4.3 Package installation

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

```
tex atveryend.dtx
```

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

```
atveryend.sty            → tex/latex/oberdiek/atveryend.sty
atveryend.pdf            → doc/latex/oberdiek/atveryend.pdf
test/atveryend-test1.tex → doc/latex/oberdiek/test/atveryend-test1.tex
atveryend.dtx            → source/latex/oberdiek/atveryend.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.

4.4 Refresh file name databases

If your TEX distribution (teTEX, mikTEX, ...) relies on file name databases, you must refresh these. For example, teTEX users run `texhash` or `mktexlsr`.

4.5 Some details for the interested

Attached source. The PDF documentation on CTAN also includes the `.dtx` source file. It can be extracted by AcrobatReader 6 or higher. Another option is pdftk, e.g. unpack the file into the current directory:

```
pdftk atveryend.pdf unpack_files output .
```

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

plain-TeX: Run docstrip and extract the files.

LaTeX: Generate the documentation.

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

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

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

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

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

An example follows how to generate the documentation with pdfLaTeX:

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

5 Acknowledgement

Arthur Ogawa: He proposed the new API with `\AfterLastShipout` and gave me much feedback, comprehensive class/package lists, many suggestions and comments.

6 References

[1] The LaTeX3 Project: *LaTeX2e for class and package writers* 2006/02/15; CTAN:macros/latex/doc/clsguide.pdf.

[2] James Darrell McCauley, Jeff Goldberg: *The endfloat package*; 1995/10/11 v2.4i; CTAN:macros/latex/contrib/endfloat/endfloat.pdf.

[3] Philipp Lehmann: *The etoolbox package*; 2009/08/06 v1.8; CTAN:macros/latex/contrib/etoolbox/etoolbox.pdf.

[4] Sebastian Rahtz, Heiko Oberdiek: *The hyperref package*; 2009/12/05 v6.79l; CTAN:macros/latex/contrib/hyperref/.

[5] Markus Kohm: *KOMA-Script*; 2009/07/24 v3.04a; http://www.komascript.de/.

[6] Jeff Goldberg: *The lastpage package*; 1994/07/20 v0.1b; CTAN:macros/latex/contrib/lastpage/lastpage.pdf.

[7] APS, AIP, Arthur Orgawa; ReVTeX 4.1; 2009/10/13 v4.1; http://authors.aps.org/revtex4/.

7 History

[2009/12/06 v1.0]

- The first version.

[2009/12/07 v1.1]

- Bug fixes.

[2009/12/09 v1.2]

- Additional support of classes and packages.

[2009/12/11 v1.3]

- Patch for letter like classes that puts label into the '.aux' file.
- Hook `\BeforeClearDocument` added (request from Arthur Ogawa).
- Patch of `\clear@document` removed (Arthur Ogawa).
- A nested `\AtBeginDocument` removed.

[2010/01/25 v1.4]

- Moved from `TDS:*/generic/*` to `TDS:*/latex/*`.

8 Index

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

Symbols

\# 491, 553
\% 556
\@ 492, 549
\@@end 118, 156, 181, 201, 220, 242, 268, 297
\@auxout 410, 451
\@backslashchar 457, 459, 481, 482, 483
\@checkend 88, 123, 167, 184, 205, 224, 248, 274, 355, 357
\@defaultsubs 104, 142
\@dofilelist . . . 99, 137, 377, 380, 381
\@empty 40, 41, 42, 54, 65, 76, 304, 412, 455
\@enddocumenthook . . 87, 122, 204, 223
\@firstofone 53, 64, 75, 86, 121, 500, 503
\@font@warning 101, 139
\@gobble 418, 441, 497, 505
\@gobbletwo 93, 102, 130, 140, 211, 232, 477
\@ifpackageloaded 340, 348
\@ifundefined . 341, 344, 349, 376, 469
\@latex@warning@no@line . . . 109, 147
\@mainaux 92, 129, 177, 196, 209, 230, 252, 280, 393, 398
\@mainlbl 172, 191
\@mlabel 391, 417, 438, 465, 477
\@multiplelabels . . 107, 113, 145, 151
\@namedef 253, 281
\@newl@bel 94, 131, 212, 233
\@nil 312, 322, 423, 430
\@onelevel@sanitize 414
\@outputdblcol 246, 272
\@partaux 210, 231
\@refundefined 105, 143, 217, 239
\@setckpt 93, 130, 211, 232
\@startlabels . 390, 393, 464, 472, 476
\@tempswafalse 95, 132, 213, 234, 256, 284
\@testdef 94, 131, 212, 233, 254, 255, 282, 283
\@undefined 60, 71, 82, 314
\@unexpandable@protect 437
\@warning 260, 288
\[. 554
\\ 436, 550
\{ 418, 489, 551
\} 490, 552
\] 555

\␣ 557

A

\a@enddocument 336
\advance 530, 538
\AfterEndDocument 350
\aftergroup 369
\AfterLastShipout 2, 46, 64, 475
\AfterReadingMainAux 345
\AP@enddocument 326
\AtBeginDocument 339, 389, 463
\AtEndDocument 86, 121, 371, 375, 396, 440, 468
\AtVeryEnd@AfterLastShipoutHook 41, 47, 58, 65, 69, 71
\AtVeryEnd@AtEnd . 19, 20, 36, 404, 486

\AtVeryEnd@AtVeryEndDocumentHook 42, 50, 76, 80, 82
\AtVeryEnd@BeforeClearDocumentHook 40, 44, 54, 60
\AtVeryEnd@CatchFirst 420, 427
\AtVeryEnd@CatchSecond 421, 423
\AtVeryEnd@document 353, 359
\AtVeryEnd@enddocument@booklet . 162
\AtVeryEnd@enddocument@combine . 222
\AtVeryEnd@enddocument@dinbrief . 183
\AtVeryEnd@enddocument@jpsj 270
\AtVeryEnd@enddocument@standard 120, 164
\AtVeryEnd@Nil 410, 451
\AtVeryEnd@OrgClearpage . . . 360, 362
\AtVeryEnd@PatchLetter 406, 446, 453
\AtVeryEnd@RedefCheckEnd 354, 369, 372
\AtVeryEnd@RedefEndDocument 313, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338
\AtVeryEnd@SkipToNil . . 309, 312, 321
\AtVeryEnd@StringMlabel . . . 415, 432
\AtVeryEnd@temp . . . 358, 359, 388, 402, 411, 412, 414, 426, 427, 432
\AtVeryEnd@Test 299, 316, 317, 318, 319, 320
\AtVeryEnd@test@booklet 158
\AtVeryEnd@test@combine 203
\AtVeryEnd@test@dinbrief 166
\AtVeryEnd@test@jpsj 244
\AtVeryEnd@test@standard 85, 160
\AtVeryEnd@TestEndLetter . . . 410, 450
\AtVeryEndDocument 2, 49, 75

B

\balancing@outputdblcol . . . 246, 272
\BeforeClearDocument 2, 43, 53
\BeforeClosingMainAux 342
\bibcite 255, 283
\body 509, 513

C

\c@labelgen 171, 190
\c@lenddoca 216, 238
\c@lmainauxfile 214, 235
\Call@AfterLastShipout 63, 126, 187, 227, 277, 342, 365
\Call@AtVeryEndDocument . 74, 136, 198, 237, 294, 345, 350, 377, 382
\Call@BeforeClearDocument 52, 124, 185, 225, 275, 363
\catcode 3, 4, 7, 8, 9, 10, 14, 15, 16, 17, 21, 23, 489, 490, 491, 492, 527, 536, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558
\clearpage 89, 125, 175, 194, 206, 226, 249, 276, 360, 361, 362, 364, 398, 471
\closeout . . 92, 129, 172, 177, 191, 196, 209, 210, 230, 231, 252, 280
\count@ 494, 523, 527, 529, 530, 534, 536, 537, 538
\countdef 494
\csname 6, 300, 302, 408, 493, 496, 499, 502, 541, 563
\cweb@save@enddocument 330

D

\deadcycles 117, 155, 180, 200, 219, 241, 267, 296
\docmute@enddocument 335

E

\EMenddocument 334
\end 564
\endcsname 6, 300, 302, 408, 493, 496, 499, 502, 541, 563
\enddocument 325
\enddocumentasusual 337
\endinput 36
\endletter 433, 434, 450
\endorigdocument 332

F

\font@submax 100, 102, 138, 140
\fontsubfuzz 100, 138

G

\g@addto@macro 36, 44, 47, 50
\gdef 377

H

\hyper@back@cite@enddocument . . . 327
\hyper@enddocument 328
\hyper@fn@enddocument 329

I

\if@filesw . 91, 106, 128, 144, 170, 189, 208, 229, 251, 279, 392, 397
\if@lastpagebalancing 245, 271
\if@tempswa 108, 146, 259, 287
\ifdim 100, 138
\ifnum 171, 190, 529, 537
\ifx 54, 65, 76, 107, 145, 300, 314, 359, 402, 408, 412, 432, 453, 493, 496, 499, 502, 541
\immediate 92, 129, 172, 177, 191, 196, 209, 210, 230, 231, 252, 280, 393, 398
\input 97, 134, 174, 193, 214, 235, 258, 286, 542
\iterate 510, 512, 514

J

\jobname 97, 134, 258, 286
\jobname@lbl 174, 193

K

\keependdoc 333

L

\LoadCommand 542, 559
\loop 508, 524, 535

M

\makeatletter 96, 133, 173, 192, 214, 235, 257, 285
\makelabels 402, 462

\MessageBreak . 101, 139, 458, 481, 482
\mlabel 391, 465

N

\NeedsTeXFormat 37
\newcommand 43, 46, 49, 52, 63, 74
\newlabel 254, 282
\newpage 168, 186
\next 514, 516, 518

O

\old@enddocument 338
\on@line 304, 455

P

\PackageInfo 55, 57, 66, 68, 77, 79, 305, 456
\PackageWarningNoLine 480
\prev@enddocument 331
\protect 437
\ProvidesPackage 38

R

\RangeCatcodeInvalid 533, 545, 546, 547, 548
\repeat 508, 520, 531, 539
\RestoreCatcodes .. 522, 525, 526, 560

S

\space 102, 140
\startlabels 390, 464

T

\Test 544, 562
\the 7, 8, 9, 10, 21, 383, 527
\TMP@EnsureCode 18, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35
\toks@ 380, 383
\twoclearpage 163
\twoupclearpage 159

W

\write 393, 398

X

\x 5, 13, 439, 444

Z

\z@ 117, 155, 180, 190, 200, 219, 241, 267, 296