

The atveryend package

Heiko Oberdiek
<oberdiek@uni-freiburg.de>

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	3
2	Implementation	3
2.1	Hooks	4
2.2	Redefining <code>\enddocument</code>	5
2.2.1	\LaTeX kernel	5
2.2.2	Package <code>booklet</code> , file <code>2up.tex</code>	7
2.2.3	Class <code>dinbrief</code>	7
2.2.4	Class <code>combine</code>	7
2.2.5	Class <code>jpsj2</code>	8
2.2.6	Testing and redefining	9
2.3	Using hooks of other packages	10
2.3.1	Package <code>scrfile</code>	10
2.3.2	Package <code>etoolbox</code>	10
2.4	Hack into <code>\enddocument</code>	10
2.5	Class <code>letter</code>	11
3	Test	13
3.1	Catcode checks for loading	13
4	Installation	14
4.1	Download	14
4.2	Bundle installation	14
4.3	Package installation	15
4.4	Refresh file name databases	15
4.5	Some details for the interested	15
5	Acknowledgement	16
6	References	16

7 History	16
[2009/12/06 v1.0]	16
[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	17

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

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 `scrfile` (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 `scrfile` or class `revtex4-1`).
- It redefines `\@checkend` and `\@dofilelist` to insert the hooks similar to `packagescrfile`.
- 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

```
43 \newcommand*{\BeforeClearDocument}{%
44   \g@addto@macro\AtVeryEnd@BeforeClearDocumentHook
45 }
```

\AfterLastShipout

```
46 \newcommand*{\AfterLastShipout}{%
47   \g@addto@macro\AtVeryEnd@AfterLastShipoutHook
48 }
```

\AtVeryEndDocument

```
49 \newcommand*{\AtVeryEndDocument}{%
50   \g@addto@macro\AtVeryEnd@AtVeryEndDocumentHook
51 }
```

`\Call@BeforeClearDocument`

```
52 \newcommand*{\Call@BeforeClearDocument}{%
53   \let\BeforeClearDocument\@firstofone
54   \ifx\AtVeryEnd@BeforeClearDocumentHook\@empty
55     \PackageInfo{atveryend}{Empty hook 'BeforeClearDocument'}%
56   \else
57     \PackageInfo{atveryend}{Executing hook 'BeforeClearDocument'}%
58     \AtVeryEnd@AfterLastShipoutHook
59   \fi
60   \global\let\AtVeryEnd@BeforeClearDocumentHook\@undefined
61   \global\let\Call@BeforeClearDocument\relax
62 }
```

`\Call@AfterLastShipout`

```
63 \newcommand*{\Call@AfterLastShipout}{%
64   \let\AfterLastShipout\@firstofone
65   \ifx\AtVeryEnd@AfterLastShipoutHook\@empty
66     \PackageInfo{atveryend}{Empty hook 'AfterLastShipout'}%
67   \else
68     \PackageInfo{atveryend}{Executing hook 'AfterLastShipout'}%
69     \AtVeryEnd@AfterLastShipoutHook
70   \fi
71   \global\let\AtVeryEnd@AfterLastShipoutHook\@undefined
72   \global\let\Call@AfterLastShipout\relax
73 }
```

`\Call@AtVeryEndDocument`

```
74 \newcommand*{\Call@AtVeryEndDocument}{%
75   \let\AtVeryEndDocument\@firstofone
76   \ifx\AtVeryEnd@AtVeryEndDocumentHook\@empty
77     \PackageInfo{atveryend}{Empty hook 'AtVeryEndDocument'}%
78   \else
79     \PackageInfo{atveryend}{Executing hook 'AtVeryEndDocument'}%
80     \AtVeryEnd@AtVeryEndDocumentHook
81   \fi
82   \global\let\AtVeryEnd@AtVeryEndDocumentHook\@undefined
83   \global\let\Call@AtVeryEndDocument\relax
84 }
```

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 L^AT_EX kernel

`\AtVeryEnd@test@standard`

```
85 \def\AtVeryEnd@test@standard{%
86   \let\AtEndDocument\@firstofone
87   \@enddocumenthook
88   \@checkend{document}%
89   \clearpage
90   \begingroup
91     \if@filesw
92       \immediate\closeout\@mainaux
93       \let\@setckpt\@gobbletwo
94       \let\@newl@bel\@testdef
95       \@tempswafalse
96       \makeatletter
97       \input\jobname.aux %
```

```

98     \fi
99     \@dofilelist
100    \ifdim \font@submax >\fontsubfuzz\relax
101        \@font@warning{Size substitutions with differences\MessageBreak
102            up to \font@submax\space have occurred.\@gobbletwo}%
103    \fi
104    \@defaultsubs
105    \@refundefined
106    \if@files
107        \ifx \@multiplelabels \relax
108            \if@tempw
109                \@latex@warning@no@line{Label(s) may have changed. %
110                    Rerun to get cross-references right}%
111            \fi
112        \else
113            \@multiplelabels
114        \fi
115    \fi
116 \endgroup
117 \deadcycles\z@
118 \@@end
119 }

```

tVeryEnd@enddocument@standard

```

120 \def\AtVeryEnd@enddocument@standard{%
121     \let\AtEndDocument\@firstofone
122     \@enddocumenthook
123     \@checkend{document}%
124     \Call@BeforeClearDocument
125     \clearpage
126     \Call@AfterLastShipout
127     \begingroup
128         \if@files
129             \immediate\closeout\@mainaux
130             \let\@setckpt\@gobbletwo
131             \let\@newl@bel\@testdef
132             \@tempwfalse
133             \makeatletter
134             \input\jobname.aux %
135         \fi
136         \Call@AtVeryEndDocument
137         \@dofilelist
138         \ifdim \font@submax >\fontsubfuzz\relax
139             \@font@warning{Size substitutions with differences\MessageBreak
140                 up to \font@submax\space have occurred.\@gobbletwo}%
141         \fi
142         \@defaultsubs
143         \@refundefined
144         \if@files
145             \ifx \@multiplelabels \relax
146                 \if@tempw
147                     \@latex@warning@no@line{Label(s) may have changed. %
148                         Rerun to get cross-references right}%
149                 \fi
150             \else
151                 \@multiplelabels
152             \fi
153         \fi
154     \endgroup
155     \deadcycles\z@
156     \@@end
157 }

```

2.2.2 Package booklet, file 2up.tex

\AtVeryEnd@test@booklet

```
158 \expandafter\def\expandafter\AtVeryEnd@test@booklet\expandafter{%
159   \expandafter\twoclearpage
160   \AtVeryEnd@test@standard
161 }
```

AtVeryEnd@enddocument@booklet

```
162 \expandafter\def\expandafter\AtVeryEnd@enddocument@booklet\expandafter{%
163   \expandafter\twoclearpage
164   \AtVeryEnd@enddocument@standard
165 }
```

2.2.3 Class dinbrief

\AtVeryEnd@test@dinbrief

```
166 \def\AtVeryEnd@test@dinbrief{%
167   \@checkend{document} %
168   \newpage
169   \begingroup
170     \if@filesw
171       \ifnum\c@labelgen>0 %
172         \immediate\closeout\@mainlbl
173         \makeatletter
174         \input \jobname@lbl\relax
175         \clearpage
176       \fi
177       \immediate\closeout\@mainaux
178     \fi
179   \endgroup
180   \deadcycles\z@
181   \@@end
182 }
```

tVeryEnd@enddocument@dinbrief

```
183 \def\AtVeryEnd@enddocument@dinbrief{%
184   \@checkend{document}%
185   \Call@BeforeClearDocument
186   \newpage
187   \Call@AfterLastShipout
188   \begingroup
189     \if@filesw
190       \ifnum\c@labelgen>\z@
191         \immediate\closeout\@mainlbl
192         \makeatletter
193         \input \jobname@lbl\relax
194         \clearpage
195       \fi
196       \immediate\closeout\@mainaux
197     \fi
198   \Call@AtVeryEndDocument
199   \endgroup
200   \deadcycles\z@
201   \@@end
202 }
```

2.2.4 Class combine

\AtVeryEnd@test@combine

```
203 \def\AtVeryEnd@test@combine{%
```

```

204 \@enddocumenthook
205 \@checkend{document}%
206 \clearpage
207 \begingroup
208   \if@filesw
209     \immediate\closeout\@mainaux
210     \immediate\closeout\@partaux
211     \let\@setckpt\@gobbletwo
212     \let\@newl@bel\@testdef
213     \@tempswafalse
214     \makeatletter \input\c@lmainauxfile %% change here
215   \fi
216   \c@lenddoca %% a replacement
217   \@refundefined
218 \endgroup
219 \deadcycles\z@
220 \@@end
221 }

```

AtVeryEnd@enddocument@combine

```

222 \def\AtVeryEnd@enddocument@combine{%
223   \@enddocumenthook
224   \@checkend{document}%
225   \Call@BeforeClearDocument
226   \clearpage
227   \Call@AfterLastShipout
228   \begingroup
229     \if@filesw
230       \immediate\closeout\@mainaux
231       \immediate\closeout\@partaux
232       \let\@setckpt\@gobbletwo
233       \let\@newl@bel\@testdef
234       \@tempswafalse
235       \makeatletter \input\c@lmainauxfile %% change here
236     \fi
237     \Call@AtVeryEndDocument
238     \c@lenddoca %% a replacement
239     \@refundefined
240   \endgroup
241   \deadcycles\z@
242   \@@end
243 }

```

2.2.5 Class jpsj2

\AtVeryEnd@test@jpsj

```

244 \def\AtVeryEnd@test@jpsj{%
245   \if@lastpagebalancing
246     \global\let\@outputdblcol=\balancing@outputdblcol
247   \fi
248   \@checkend{document}%
249   \clearpage
250   \begingroup
251     \if@filesw
252       \immediate\closeout\@mainaux
253       \def\global\@namedef##1##2{%
254         \def\newlabel{\@testdef r}%
255         \def\bibcite{\@testdef b}%
256       \@tempswafalse
257       \makeatletter
258       \input \jobname.aux %
259       \if@tempswa

```



```

260      \@warning{%
261        Label(s) may have changed. %
262        Rerun to get cross-references right%
263      }%
264    \fi
265  \fi
266 \endgroup
267 \deadcycles\z@
268 \@@end
269 }

```

\AtVeryEnd@enddocument@jpsj

```

270 \def\AtVeryEnd@enddocument@jpsj{%
271   \if@lastpagebalancing
272     \global\let\@outputdblcol=\balancing@outputdblcol
273   \fi
274   \@checkend{document}%
275   \Call@BeforeClearDocument
276   \clearpage
277   \Call@AfterLastShipout
278   \begingroup
279     \if@filesw
280       \immediate\closeout\@mainaux
281       \def\global\@namedef##1##2{%
282         \def\newlabel{\@testdef r}%
283         \def\bibcite{\@testdef b}%
284         \@tempswafalse
285         \makeatletter
286         \input \jobname.aux %
287         \if@tempswa
288           \@warning{%
289             Label(s) may have changed. %
290             Rerun to get cross-references right%
291           }%
292         \fi
293       \fi
294       \Call@AtVeryEndDocument
295     \endgroup
296     \deadcycles\z@
297     \@@end
298 }

```

2.2.6 Testing and redefining

\AtVeryEnd@Test

```

299 \def\AtVeryEnd@Test#1#2{%
300   \expandafter\ifx\csname AtVeryEnd@test@#2\endcsname#1%
301     \expandafter\let\expandafter#1%
302     \csname AtVeryEnd@enddocument@#2\endcsname
303   \begingroup
304     \let\on@line\@empty
305     \PackageInfo{atveryend}{%
306       \string#1 detected (#2)%
307     }%
308   \endgroup
309   \expandafter\AtVeryEnd@SkipToNil
310 \fi
311 }

```

\AtVeryEnd@SkipToNil

```

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

```

`\AtVeryEnd@RedefEndDocument`

```

313 \def\AtVeryEnd@RedefEndDocument#1{%
314   \ifx#1\@undefined
315   \else
316     \AtVeryEnd@Test#1{standard}%
317     \AtVeryEnd@Test#1{booklet}%
318     \AtVeryEnd@Test#1{dinbrief}%
319     \AtVeryEnd@Test#1{combine}%
320     \AtVeryEnd@Test#1{jpsj}%
321     \AtVeryEnd@SkipToNil
322     \@nil
323   \fi
324 }

325 \AtVeryEnd@RedefEndDocument\enddocument
326 \AtVeryEnd@RedefEndDocument\AP@enddocument % afterpage.sty
327 \AtVeryEnd@RedefEndDocument\hyper@back@cite@enddocument % htx-bc.sty
328 \AtVeryEnd@RedefEndDocument\hyper@enddocument % hyper.sty
329 \AtVeryEnd@RedefEndDocument\hyper@fn@enddocument % hyper.sty
330 \AtVeryEnd@RedefEndDocument\cweb@save@enddocument % cweb.cls
331 \AtVeryEnd@RedefEndDocument\prev@enddocument % flushend.sty
332 \AtVeryEnd@RedefEndDocument\endorigdocument % gaceta.cls
333 \AtVeryEnd@RedefEndDocument\keependdoc % aguplus.sty
334 \AtVeryEnd@RedefEndDocument\EMenddocument % t-angles.sty
335 \AtVeryEnd@RedefEndDocument\docmute@enddocument % docmute.sty
336 \AtVeryEnd@RedefEndDocument\@a@enddocument % al latex.sty
337 \AtVeryEnd@RedefEndDocument\enddocumentasusual % frenchle.sty
338 \AtVeryEnd@RedefEndDocument\old@enddocument % uwthesis.cls

```

2.3 Using hooks of other packages

2.3.1 Package `scrfile`

```

339 \AtBeginDocument{%
340   \@ifpackageloaded{scrfile}{%
341     \@ifundefined{BeforeClosingMainAux}{}{%
342       \BeforeClosingMainAux{\Call@AfterLastShipout}%
343     }%
344     \@ifundefined{AfterReadingMainAux}{}{%
345       \AfterReadingMainAux{\Call@AtVeryEndDocument}%
346     }%
347   }{}%

```

2.3.2 Package `etoolbox`

```

348   \@ifpackageloaded{etoolbox}{%
349     \@ifundefined{AfterEndDocument}{}{%
350       \AfterEndDocument{\Call@AtVeryEndDocument}%
351     }%
352   }{}%

```

2.4 Hack into `\enddocument`

```

353 \def\AtVeryEnd@document{document}%
354 \def\AtVeryEnd@RedefCheckEnd{%
355   \expandafter\def\expandafter\@checkend
356   \expandafter##\expandafter1\expandafter{%
357     \@checkend{##1}%
358     \def\AtVeryEnd@temp{##1}%
359     \ifx\AtVeryEnd@temp\AtVeryEnd@document
360       \let\AtVeryEnd@OrgClearpage\clearpage
361       \def\clearpage{%
362         \let\clearpage\AtVeryEnd@OrgClearpage
363         \Call@BeforeClearDocument

```

```

364         \clearpage
365         \Call@AfterLastShipout
366     }%
367     \fi
368 }%
369 \aftergroup\AtVeryEnd@RedefCheckEnd
370 }%
371 \AtEndDocument{%
372     \AtVeryEnd@RedefCheckEnd
373 }%
374 }

375 \AtEndDocument{%
376     \@ifundefined{@dofilelist}{%
377         \gdef@dofilelist{\Call@AtVeryEndDocument}%
378     }{%
379         \begingroup
380             \toks@\expandafter{\@dofilelist}%
381             \xdef@dofilelist{%
382                 \noexpand\Call@AtVeryEndDocument
383                 \the\toks@
384             }%
385         \endgroup
386     }%
387 }

```

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`.

```

388 \def\AtVeryEnd@temp{%
389     \AtBeginDocument{%
390         \let\@startlabels\startlabels
391         \let\@mlabel\mlabel
392         \if@filesw
393             \immediate\write\@mainaux{\string\@startlabels}%
394         \fi
395     }%
396     \AtEndDocument{%
397         \if@filesw
398             \immediate\write\@mainaux{\string\clearpage}%
399         \fi
400     }%
401 }

402 \ifx\makelabels\AtVeryEnd@temp
403 \else
404     \expandafter\AtVeryEnd@AtEnd
405 \fi
406 \let\AtVeryEnd@PatchLetter=N%
407 \begingroup\expandafter\expandafter\expandafter\endgroup
408 \expandafter\ifx\csname endletter\endcsname\relax
409 \else
410     \long\def\AtVeryEnd@TestEndLetter#1\@auxout#2#3\AtVeryEnd@Nil{%
411         \def\AtVeryEnd@temp{#2}%
412         \ifx\AtVeryEnd@temp\@empty
413         \else
414             \@onelevel@sanitize\AtVeryEnd@temp
415             \edef\AtVeryEnd@StringMlabel{%
416                 \string\string
417                 \string\@mlabel

```

```

418     \expandafter\@gobble\string\{%
419 }%
420 \def\AtVeryEnd@CatchFirst##1##2##3##4##5##6##7##8{%
421     ##1##2##3##4##5##6##7##8\AtVeryEnd@CatchSecond
422 }%
423 \def\AtVeryEnd@CatchSecond##1##2##3##4##5##6##7##8##9\@nil{%
424     ##1##2##3##4##5##6##7##8%
425 }%
426 \edef\AtVeryEnd@temp{%
427     \expandafter\AtVeryEnd@CatchFirst\AtVeryEnd@temp
428     {}{}{}{}{}{}{}{}%
429     {}{}{}{}{}{}{}{}%
430     \@nil
431 }%
432 \ifx\AtVeryEnd@temp\AtVeryEnd@StringMlabel
433     \expandafter\def\expandafter\endletter\expandafter{%
434         \endletter
435         \begingroup
436             \let\=\relax
437             \let\protect\@unexpandable@protect
438             \let\@mlabel=\relax
439             \edef\x{\endgroup
440                 \noexpand\AtEndDocument{%
441                     \@gobble#2%
442                 }%
443             }%
444             \x
445         }%
446     \let\AtVeryEnd@PatchLetter=Y%
447 \fi
448 \fi
449 }%
450 \expandafter\AtVeryEnd@TestEndLetter\endletter
451 \@auxout{}\AtVeryEnd@Nil
452 \fi
453 \ifx\AtVeryEnd@PatchLetter Y%
454     \begingroup
455         \let\online\@empty
456         \PackageInfo{atveryend}{%
457             \@backslashchar makelabels detected. %
458             Moving labels\MessageBreak
459             from '.aux' file to \@backslashchar AtEndDocument%
460         }%
461     \endgroup
462     \def\makelabels{%
463         \AtBeginDocument{%
464             \let\@startlabels\startlabels
465             \let\@mlabel\mlabel
466         }%
467     }%
468     \AtEndDocument{%
469         \@ifundefined{@startlabels}{%
470             }{%
471                 \clearpage
472                 \@startlabels
473             }%
474         }%
475     \AfterLastShipout{%
476         \let\@startlabels\relax
477         \let\@mlabel\@gobbletwo
478     }%
479 \else

```

```

480 \PackageWarningNoLine{atveryend}{%
481   \@backslashchar makelabels detected, but labels cannot\MessageBreak
482   be moved to \@backslashchar AtEndDocument, because\MessageBreak
483   \@backslashchar endletter is not in expected form%
484 }%
485 \fi
486 \AtVeryEnd@AtEnd
487 \end{package}

```

3 Test

3.1 Catcode checks for loading

```

488 (*test1)
489 \catcode'\{=1 %
490 \catcode'\}=2 %
491 \catcode'\#=6 %
492 \catcode'\@=11 %
493 \expandafter\ifx\csname count@\endcsname\relax
494   \countdef\count@=255 %
495 \fi
496 \expandafter\ifx\csname @gobble\endcsname\relax
497   \long\def\@gobble#1{%
498 \fi
499 \expandafter\ifx\csname @firstofone\endcsname\relax
500   \long\def\@firstofone#1{#1}%
501 \fi
502 \expandafter\ifx\csname loop\endcsname\relax
503   \expandafter\@firstofone
504 \else
505   \expandafter\@gobble
506 \fi
507 {%
508   \def\loop#1\repeat{%
509     \def\body{#1}%
510     \iterate
511   }%
512   \def\iterate{%
513     \body
514     \let\next\iterate
515   \else
516     \let\next\relax
517   \fi
518   \next
519 }%
520 \let\repeat=\fi
521 }%
522 \def\RestoreCatcodes{}
523 \count@=0 %
524 \loop
525   \edef\RestoreCatcodes{%
526     \RestoreCatcodes
527     \catcode\the\count@=\the\catcode\count@\relax
528   }%
529 \ifnum\count@<255 %
530   \advance\count@ 1 %
531 \repeat
532
533 \def\RangeCatcodeInvalid#1#2{%
534   \count@=#1\relax
535   \loop

```

```

536     \catcode\count@=15 %
537     \ifnum\count@<#2\relax
538     \advance\count@ 1 %
539     \repeat
540 }
541 \expandafter\ifx\csname LoadCommand\endcsname\relax
542 \def\LoadCommand{\input atveryend.sty\relax}%
543 \fi
544 \def\Test{%
545   \RangeCatcodeInvalid{0}{47}%
546   \RangeCatcodeInvalid{58}{64}%
547   \RangeCatcodeInvalid{91}{96}%
548   \RangeCatcodeInvalid{123}{255}%
549   \catcode'\@=12 %
550   \catcode'\=0 %
551   \catcode'\{=1 %
552   \catcode'\}=2 %
553   \catcode'\#=6 %
554   \catcode'\[=12 %
555   \catcode'\]=12 %
556   \catcode'\%=14 %
557   \catcode'\ =10 %
558   \catcode13=5 %
559   \LoadCommand
560   \RestoreCatcodes
561 }
562 \Test
563 \csname @@end\endcsname
564 \end
565 </test1>

```

4 Installation

4.1 Download

Package. This package is available on CTAN¹:

[CTAN:macros/latex/contrib/oberdiek/atveryend.dtx](#) The source file.

[CTAN:macros/latex/contrib/oberdiek/atveryend.pdf](#) Documentation.

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

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

TDS refers to the standard “A Directory Structure for \TeX Files” ([CTAN:tds/tds.pdf](#)). Directories with `texmf` in their name are usually organized this way.

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
```

¹<http://ftp.ctan.org/tex-archive/>

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 (te \TeX , mi \TeX , ...) relies on file name databases, you must refresh these. For example, te \TeX users run `texhash` or `mktextlsr`.

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 pdf \LaTeX :

```
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 L^AT_EX3 Project: *L^AT_EX2_ε 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	\AfterEndDocument 350
\%	556	\aftergroup 369
\@	492, 549	\AfterLastShipout 3, <u>46</u> , 64, 475
\@end	118,	\AfterReadingMainAux 345
	156, 181, 201, 220, 242, 268, 297	\AP@enddocument 326
\@auxout	410, 451	\AtBeginDocument 339, 389, 463
\@backslashchar	457, 459, 481, 482, 483	\AtEndDocument
\@checkend	88, 123, 167,	
	184, 205, 224, 248, 274, 355, 357	\AtVeryEnd@AfterLastShipoutHook .
\@defaultsubs	104, 142	
\@dofilelist	99, 137, 377, 380, 381	
\@empty	40,	\AtVeryEnd@AtEnd . 19, 20, 36, 404, 486
	41, 42, 54, 65, 76, 304, 412, 455	\AtVeryEnd@AtVeryEndDocumentHook
\@enddocumenthook	87, 122, 204, 223	
\@firstofone	53, 64, 75, 86, 121, 500, 503	
\@font@warning	101, 139	\AtVeryEnd@BeforeClearDocumentHook
\@gobble	418, 441, 497, 505	
\@gobbletwo		
	93, 102, 130, 140, 211, 232, 477	\AtVeryEnd@CatchFirst 420, 427
\@ifpackageloaded	340, 348	\AtVeryEnd@CatchSecond 421, 423
\@ifundefined	341, 344, 349, 376, 469	\AtVeryEnd@document 353, 359
\@latex@warning@no@line	109, 147	\AtVeryEnd@enddocument@booklet . <u>162</u>
\@mainaux	92, 129, 177,	\AtVeryEnd@enddocument@combine . <u>222</u>
	196, 209, 230, 252, 280, 393, 398	\AtVeryEnd@enddocument@dinbrief . <u>183</u>
\@mainlbl	172, 191	\AtVeryEnd@enddocument@jpsj <u>270</u>
\@mlabel	391, 417, 438, 465, 477	
\@multiplelabels	107, 113, 145, 151	
\@namedef	253, 281	\AtVeryEnd@OrgClearpage 360, 362
\@newl@bel	94, 131, 212, 233	\AtVeryEnd@PatchLetter 406, 446, 453
\@nil	312, 322, 423, 430	\AtVeryEnd@RedefCheckEnd 354, 369, 372
\@onelevel@sanitize	414	\AtVeryEnd@RedefEndDocument
\@outputdblcol	246, 272	
\@partaux	210, 231	
\@refundefined	105, 143, 217, 239	\AtVeryEnd@SkipToNil . . 309, <u>312</u> , 321
\@setckpt	93, 130, 211, 232	\AtVeryEnd@StringMlabel . . . 415, 432
\@startlabels	390, 393, 464, 472, 476	\AtVeryEnd@temp 358, 359, 388,
\@tempswafalse		
	95, 132, 213, 234, 256, 284	
\@testdef	94,	\AtVeryEnd@Test
	131, 212, 233, 254, 255, 282, 283	
\@undefined	60, 71, 82, 314	\AtVeryEnd@test@booklet <u>158</u>
\@unexpandable@protect	437	\AtVeryEnd@test@combine <u>203</u>
\@warning	260, 288	\AtVeryEnd@test@dinbrief <u>166</u>
\[554	\AtVeryEnd@test@jpsj <u>244</u>
\	436, 550	\AtVeryEnd@test@standard <u>85</u> , 160
\{	418, 489, 551	\AtVeryEnd@TestEndLetter . . . 410, 450
\}	490, 552	\AtVeryEndDocument 3, <u>49</u> , 75
\]	555	
_	557	
A		B
\a@enddocument	336	\balancing@outputdblcol . . . 246, 272
\advance	530, 538	\BeforeClearDocument 3, <u>43</u> , 53
		\BeforeClosingMainAux 342
		\biblecite 255, 283
		\body 509, 513
C		
\c@labelgen	171, 190	
\c@lenddoca	216, 238	

\c@lmainauxfile	214, 235	\iterate	510, 512, 514
\Call@AfterLastShipout	63, 126, 187, 227, 277, 342, 365	J	
\Call@AtVeryEndDocument	74, 136, 198, 237, 294, 345, 350, 377, 382	\jobname	97, 134, 258, 286
\Call@BeforeClearDocument	52, 124, 185, 225, 275, 363	\jobname@lbl	174, 193
\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	K	
\clearpage	89, 125, 175, 194, 206, 226, 249, 276, 360, 361, 362, 364, 398, 471	\keependdoc	333
\closeout	92, 129, 172, 177, 191, 196, 209, 210, 230, 231, 252, 280	L	
\count@	494, 523, 527, 529, 530, 534, 536, 537, 538	\LoadCommand	542, 559
\countdef	494	\loop	508, 524, 535
\csname	6, 300, 302, 408, 493, 496, 499, 502, 541, 563	M	
\cweb@save@enddocument	330	\makeatletter	96, 133, 173, 192, 214, 235, 257, 285
D		\makelabels	402, 462
\deadcycles	117, 155, 180, 200, 219, 241, 267, 296	\MessageBreak	101, 139, 458, 481, 482
\docmute@enddocument	335	\mlabel	391, 465
E		N	
\EMenddocument	334	\NeedsTeXFormat	37
\end	564	\newcommand	43, 46, 49, 52, 63, 74
\endcsname	6, 300, 302, 408, 493, 496, 499, 502, 541, 563	\newlabel	254, 282
\enddocument	325	\newpage	168, 186
\enddocumentasusual	337	\next	514, 516, 518
\endinput	36	O	
\endletter	433, 434, 450	\old@enddocument	338
\endorigdocument	332	\on@line	304, 455
F		P	
\font@submax	100, 102, 138, 140	\PackageInfo	55, 57, 66, 68, 77, 79, 305, 456
\fontsubfuzz	100, 138	\PackageWarningNoLine	480
G		\prev@enddocument	331
\g@addto@macro	36, 44, 47, 50	\protect	437
\gdef	377	\ProvidesPackage	38
H		R	
\hyper@back@cite@enddocument	327	\RangeCatcodeInvalid	533, 545, 546, 547, 548
\hyper@enddocument	328	\repeat	508, 520, 531, 539
\hyper@fn@enddocument	329	\RestoreCatcodes	522, 525, 526, 560
I		S	
\if@files	91, 106, 128, 144, 170, 189, 208, 229, 251, 279, 392, 397	\space	102, 140
\if@lastpagebalancing	245, 271	\startlabels	390, 464
\if@temp	108, 146, 259, 287	T	
\ifdim	100, 138	\Test	544, 562
\ifnum	171, 190, 529, 537	\the	7, 8, 9, 10, 21, 383, 527
\ifx	54, 65, 76, 107, 145, 300, 314, 359, 402, 408, 412, 432, 453, 493, 496, 499, 502, 541	\TMP@EnsureCode	18, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35
\immediate	92, 129, 172, 177, 191, 196, 209, 210, 230, 231, 252, 280, 393, 398	\toks@	380, 383
\input	97, 134, 174, 193, 214, 235, 258, 286, 542	\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