

# The atbegshi package

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## Abstract

This package is a modern reimplementation of package `everyshi` without the burden of compatibility. It makes use of  $\varepsilon$ -TeX's if available. Both L<sup>A</sup>T<sub>E</sub>X and plain T<sub>E</sub>X are supported.

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

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## 1 Documentation

Package `atbegshi` redefines `\shipout` to insert hooks for user code that is executed before the page is shipped out. The code may modify or even discard the output page. Three hooks are implemented:

1. A hook that is executed for every page, see `\AtBeginShipout`
2. A hook that is executed for the next page only, see `\AtBeginShipoutNext`
3. A hook that is only executed for the first page, see `\AtBeginShipoutFirst`

The hooks are executed in this order. The following three macros provide the user interface for adding code to these hooks:

```
\AtBeginShipout {⟨code⟩}
\AtBeginShipoutBox
```

Execute the `⟨code⟩` for every page. The page contents is held in box register `\AtBeginShipoutBox` and may be modified. Use `\AtBeginShipoutDiscard` if you want to discard the page.

*Note:* Package `everyshi` uses box register 255. With package `atbegshi` you must use `\AtBeginShipoutBox` instead.

If L<sup>A</sup>T<sub>E</sub>X calls `\shipout` in `\@outputpage` (part of its output routine), the meaning of `\protect` is `\noexpand`. L<sup>A</sup>T<sub>E</sub>X sets `\protect` to the appropriate `\@typeset@protect` in the box that is shipped out. This is too late for the hooks, they are called earlier in the redefined `\shipout`. Therefore package `atbegshi` sets `\protect` to `\@typeset@protect` before it calls the hooks. (In `\EveryShipout` of package `everyshi` the user is responsible for the correct setting of `\protect`.)

`\AtBeginShipoutNext {⟨code⟩}`

This reimplements package `everyshi`'s `\AtNextShipout`. The `⟨code⟩` is executed at shipout time of the next page only. It is just a convenience macro, it can be easily replaced by something like:

```
\newcommand{\MyShipoutHook}{}%
\AtBeginShipout{\MyShipoutHook}
\gdef\MyShipoutHook{%
  ... do something with next page ...
\gdef\MyShipoutHook{}}%
```

(This can be necessary, if hook order does matter).

`\AtBeginShipoutFirst {⟨code⟩}`

This reimplements L<sup>A</sup>T<sub>E</sub>X's `\AtBeginDvi`. This hook is usually used for `\special` commands that include PostScript header files. The `\code` is directly executed in a `\vbox` that is put at the beginning of the output page. Dealing with the output box `\AtBeginShipoutBox` is not necessary and not permitted here.

`\AtBeginShipoutDiscard`

This macro notifies package `atbegshi` that the output page is discarded. The remaining hook code and the remaining hooks are not executed and the page is thrown away. Also `\deadcycles` is cleared to zero like an ordinary `\shipout` would do.

`\AtBeginShipoutInit`

Usually the redefinition of `\shipout` is delayed by `\AtBeginDocument` (if this macro exists). This can be too late, if other packages also redefines `\shipout` and the order does matter. `\AtBeginShipoutInit` forces the immediate redefinition of `\shipout`.

`\AtBeginShipoutAddToBox {⟨stuff⟩}`  
`\AtBeginShipoutAddToBoxForeground {⟨stuff⟩}`

A quite common use case is the addition of `\special` or other whatsits to the page output box. Macro `\AtBeginShipoutAddToBox` puts `⟨stuff⟩` in a box with zeroed dimensions. The box with the `⟨stuff⟩` is put in the upper left corner of the shipout box `\AtBeginShipoutBox`. Macro `\AtBeginShipoutAddToBox` puts the `⟨stuff⟩` in

the background, the other macro `\AtBeginShipoutAddToBoxForeground` in the foreground after the original shipout box contents is set.

A void shipout box (that means a discarded page) remains void that means `\stuff` is ignored in this case. The box type of `\AtBeginShipoutBox` is preserved. Also the box nesting level for the original contents of `\AtBeginShipoutBox` remains, for example, to avoid trouble with links across pages in case of pdfTeX.

`\AtBeginShipoutUpperLeft {\background material}`

This is a macro that puts material in the background of box `\AtBeginShipoutBox`. The `\background material` is set in an `\hbox`, the reference point is the upper left corner of the output page. In case of pdfTeX in PDF mode, the settings of `\pdfhorigin` and `\pdfvorigin` are respected.

The macro `\AtBeginShipoutUpperLeft` is intended to be used in one of the hook setting macros, such as `\AtBeginShipout`, `\AtBeginShipoutFirst`, or `\AtBeginShipoutNext`.

For L<sup>A</sup>T<sub>E</sub>X users the `\background material` is set inside a `picture` environment:

```
\begin{picture}(0,0)
  \setlength{\unitlength}{1pt}%
  \background material
\end{picture}
```

`\AtBeginShipoutUpperLeftForeground {\foreground material}`

See `\AtBeginShipoutUpperLeft`. The difference is that the material is put in the foreground.

`\AtBeginShipoutOriginalShipout \box`

It stores the meaning of `\shipout` at the time this package is loaded.

`\AtBeginShipoutBoxWidth`  
`\AtBeginShipoutBoxHeight`  
`\AtBeginShipoutBoxDepth`

These macros store the dimensions of the output box `\AtBeginShipoutBox` before the original shipout is called. If `\shipout` is not redefined before the package loading or the box dimensions are not changed by the redefined `\shipout`, these macros contain the dimensions of the shipout box. These values can be remembered by `\label` and `\ref`. For example, this is done by the package module `zref-pagelayout` of project `zref`. The dimensions of the shipout page can be used in some T<sub>E</sub>X engines (pdfTeX in PDF mode, X<sub>Y</sub>L<sup>A</sup>T<sub>E</sub>X) to calculate the media size of the shipout page if `\pdfpagewidth` and `\pdfpageheight` are not set.

## 1.1 Examples

### 1.1.1 Example: circle in background

In this example we put a circle in the background in the middle of the paper.

```
1 \example1
```

```

2 \documentclass[a4paper]{article}
3 \usepackage{color}
4 \usepackage{atbegshi}

```

Package `picture` makes life a little easier, because we can now also use length specifications in `picture`'s commands.

```

5 \usepackage{picture}

```

Now we draw the circle in the middle of the paper. `\put` moves downwards, because the origin is at the top of the page, not at its bottom.

```

6 \AtBeginShipout{%
7   \AtBeginShipoutUpperLeft{%
8     \put(0.5\paperwidth,-0.5\paperheight){\circle{10}}%
9   }%
10 }
11 \begin{document}
12 \section{Hello World}
13 \newpage
14 \AtBeginShipoutNext{%
15   \AtBeginShipoutUpperLeft{%
16     \color{red}%
17     \put(0,-0.5\paperheight){\line(1,0){\paperwidth}}%
18     \put(0.5\paperwidth, 0){\line(0,-1){\paperheight}}%
19   }%
20 }
21 Only on this page we add a red cross.
22 \newpage
23 This page has the circle only.
24 \par
25 \vspace{\fill}
26 The next page will be discarded.
27 \newpage
28 \AtBeginShipoutNext{%
29   \AtBeginShipoutDiscard
30 }
31 This page is discarded.
32 \newpage
33 The last page.
34 \end{document}
35 /example1}

```

### 1.1.2 Example: adding TrimBox for dvipdfmx

Now an example from “real life” follows. Someone from the mailing list for `dvipdfmx` wants to put a TrimBox on every page. If we use `\AtBeginShipout`, we have to put the `\special` inside the box `\AtBeginShipoutBox` that gets shipped out.

```

36 (*example2)
37 \documentclass{minimal}
38 \usepackage{atbegshi}
39 \usepackage[
40   dvipdfm,
41   paperwidth=630bp,
42   paperheight=810bp
43 ]{geometry}
44 \AtBeginShipout{%
45   \setbox\AtBeginShipoutBox=\hbox{%
46     \special{pdf: put @thispage <</TrimBox[9 9 621 801]>>}%

```

```

47   \box\AtBeginShipoutBox
48 }%
49 }
50 \begin{document}
51   First page
52   \newpage
53   Second page
54 \end{document}
55 \end{example2}

```

Remember, in `\AtBeginShipoutBoxFirst` the `\setbox` wrapper code is implicitly given and the `\special` is used directly.

## 2 Method of `\shipout` overloading

### 2.1 `\shipout`

The  $\TeX$  primitive command `\shipout` takes a box specification and puts the box as a new page in the output file. There are two kinds of box specifications:

**Direct boxes:** They are given by `\hbox`, `\vbox`, or `\vtop`,  
e.g. `\shipout\hbox{Hello World}`.

**Indirect boxes:** `\box` or `\copy` references a box register by number. The box register contains the contents of the box.

*Note:* `\box` also clears the box register globally.

Then we have to differentiate between void and empty boxes:

**Void:** Initially or after `\box` there is no box in the box register. In this cases the box register is not empty, but *void*.

**Empty:** A box with empty contents, such as `\hbox{}` ( $= \text{\null}$ ) or `\vbox{}` is an *empty* `\hbox` or *empty* `\vbox`. If a box register holds such a box, the box still exists, therefore the box register is *not void*.

### 2.2 `\afterassignment`

We want to overload `\shipout` to do something with the box. It is quite impossible to do this reliable by catching the box using macro arguments. The variety of box specifications is too large, Examples:

```

\shipout\null
\shipout\vbox{...}
\shipout\vtop\bgroup ... \egroup
\shipout\box255

```

Even worse, the braces don't need to be balanced:

```

\shipout\hbox\bgroup}
\shipout\vbox{\egroup

```

Happily  $\TeX$  provides a reliable way via `\afterassignment`. It takes a macro name and executes it just after the assignment.

Now we can redefine `\shipout`. The box specification that follows `\shipout` is caught by `\setbox`. This is an assignment to a box register. `\afterassignment` notifies  $\TeX$ , that we want to call `\@test` right after the assignment:

```

\shipout :=
  \afterassignment\@test
  \setbox\mybox=

```

We have seen different box specifications. Indirect boxes are easy to understand:

```

\shipout\box0 ⇒ \setbox\mybox=\box0 \@test

```

However direct boxes can have arbitrary contents with lots of other assignments. It would be quite unpredictable if  $\text{\TeX}$  would put  $\@test$  after the first of such an assignment or after the box specification if the box lacks of assignments. Therefore  $\text{\TeX}$  puts  $\@test$  right at the beginning of the box specification, e.g:

```

\shipout\hbox{Hello World}
⇒ \setbox\mybox=\hbox{\@test Hello World}

```

## 2.3 Test for direct or indirect boxes

Now we want to execute  $\@test$ , but where are we? We can be after the completed box assignment, if  $\@shipout$  was called with an indirect box. Or we are right at the beginning of a direct box.

### 2.3.1 With $\varepsilon\text{-TeX}$

With the  $\varepsilon\text{-TeX}$ 's extensions the answer is very easy: Being inside the direct box means that we are inside a new group. The new primitive command  $\@currentgrouplevel$  tells how deeply the groups are currently nested. Macro  $\@test$  just compares the previously stored group level with the current one:

```

\shipout :=
  \edef\saved@grouplevel{\number\currentgrouplevel}
  \afterassignment\@test
  \setbox\mybox=

\@test :=
  \ifnum\saved@grouplevel=\currentgrouplevel
    % case: indirect box, the assignment is completed
    \@output
  \else
    % case: direct box, we are inside the box
    \aftergroup\@outbox
  \fi

```

### 2.3.2 Without $\varepsilon\text{-TeX}$

Life becomes complicate without  $\varepsilon\text{-TeX}$ . We cannot ask the group level. However, if we are inside a direct box, the box register  $\@mybox$  is not yet changed by  $\@setbox$ . Thus we need a special initial value and compare it in  $\@test$  with the current value of the box.

What can be used as initial value? Arbitrary box contents cannot be compared.  $\text{\TeX}$  only tells us a few properties:

- Box type:  $\@ifhbox$ ,  $\@ifvbox$
- Dimensions:  $\@wd$ ,  $\@ht$ ,  $\@dp$
- Voidness:  $\@ifvoid$

Unhappily all these qualities even combined are not sufficient for constructing an initial box value, because `\shipout` can be called with a box that is accidentally just the same as the chosen initial value.

Nevertheless we have two alternatives for an initial value:

- A box of some type with some funny settings that are unlikely to occur in real life, e.g a height of `4911sp-\maxdimen`.
- A void box.

A collision between this initial value and an indirect `\shipout` box with just the same value is possible. Then `\@test` will make a wrong decision that it is executed inside a direct box and delays `\@output` by `\aftergroup`. Thus `\@output` is not called at the place we want. In contrary, the result is an uncertainty about the place:

- `\shipout` is used in a group that perhaps closes some pages later. A bad place for `\@output`.
- Without a surrounding group `\aftergroup` effectively kills its argument.

In the first case of a box with special dimensions we can even loose the page. However in the case of the void box, this effect is even desired, because the original `\shipout` does not output void boxes. All we have to do is to ensure that our box `\mybox` is always void except for the phase when the overloaded `\shipout` is executed. And secondly we must keep this semantics of `\shipout` for the void case in our macros, namely `\@output`.

```
\shipout :=
% trick to get a void box \mybox
\begingroup
  \setbox\mybox=\box\mybox
\endgroup
\afterassignment\@test
\setbox\mybox=

\@test :=
\ifvoid\mybox
  \aftergroup\@output
\else
  \@output
\fi
```

The nasty case is `\shipout\box\voidb@x` where the indirect box is void and that must not generate an output page. If a surrounding group is missing the output is ignored because of `\aftergroup`. Otherwise output is called some time later when the surrounding group closes. But `\mybox` is void outside the execution phase of the redefined `\shipout`. Also `\@output` checks for a void box and cancels the page output. The disadvantage remains that the hook in `\@output` is called for a page that will not be output.

### 2.3.3 `\lastkern` method

At the beginning of a new box, there is no `\kern`, the contents of the box is still empty and `\lastkern` returns 0 pt. This can be used to distinguish between direct and indirect boxes: We execute `\setbox` in a box with a preceding non-zero kern. After an indirect box, `\lastkern` sees this kern, otherwise it returns 0 pt.



```

\shipout :=
\begingroup
\setbox\mybox=\hbox\bgroup
\kern1pt
\afterassignment\shipout@test
\global\setbox\mybox=
\@test :=
\ifdim\lastkern=0pt
% direct box
\aftergroup\egroup
\aftergroup\endgroup
\aftergroup\@output
\else
\egroup
\endgroup
\@output
\fi

```

We have two `\setbox` commands. The first creates a controlled context box where we can safely insert a `\kern`. We get rid of this temporarily used context box by putting the local `\setbox` in a group.

After the group we want to have our `shipout` box in `\mybox`. Therefore we use a global assignment here.

## 2.4 Output

With or without  $\varepsilon$ -TeX we ensure the original behaviour of `\shipout` that void boxes do not generate output pages.

Now we can place the hook `\@hook` for the user code that wants to manipulate the output box.

```

\@output :=
\ifvoid\mybox
% cancel output of void box
\else
\@hook
\ifvoid\mybox
% user code in \@hook could has voided the box
\else
\original@shipout\box\mybox
\fi
\fi

```

## 2.5 Separate box register

So far we have said nothing about the box number of `\mybox`. The following case that outputs the same page twice shows that we are not free in the use of the box register:

```
\shipout\copy<num> \shipout\box<num>
```

We manipulate the box by the hook and without  $\varepsilon$ -TeX the box must even be voided. However, the use case above requires that the box contents does not change at all. Therefore we must reserve a separate box register to avoid collisions with user box registers.

*Note:* Box register number 255 is special for the output routine, because TeX complains if this box is not voided by the output routine. However, this requirement does not apply to `\shipout` at all. In fact `\shipout` does not change any

box register. This is usually done by a call of `\box`, but the output routine can do it later *after* invoking of `\shipout`.

## 2.6 Summary

### 2.6.1 With $\varepsilon$ -TeX

Putting the pieces together we get for  $\varepsilon$ -TeX:

```
\newbox\mybox
\let\original@shipout\shipout

\shipout :=
\edef\saved@grouplevel{\number\currentgrouplevel}
\afterassignment\@test
\setbox\mybox=

\@test :=
\ifnum\saved@grouplevel<\currentgrouplevel
\expandafter\aftergroup
\fi
\@output

\@output :=
\ifvoid\mybox
% cancel output of void box
\else
\@hook
\ifvoid\mybox
% user code in \@hook could have voided the box
\else
\original@shipout\box\mybox
\fi
\fi
```

### 2.6.2 Without $\varepsilon$ -TeX, traditional way

And for TeX without  $\varepsilon$ -TeX:

```
\newbox\mybox
\begingroup
\setbox\mybox=\box\mybox % ensure \mybox is void
\endgroup
\let\original@shipout\shipout

\shipout :=
% trick to get a void box \mybox
\begingroup
\setbox\mybox=\box\mybox
\endgroup
\afterassignment\@test
\setbox\mybox=

\@test :=
\ifvoid\mybox
\expandafter\aftergroup
\fi
\@output
```

```

\@output :=
\ifvoid\mybox
% cancel output of void box
\else
\@hook
\ifvoid\mybox
% user code in \@hook could have voided the box
\else
\original@shipout\box\mybox
\fi
\fi

```

### 2.6.3 \lastkern method

And for T<sub>E</sub>X without  $\varepsilon$ -T<sub>E</sub>X using the \lastkern method:

```

\newbox\mybox
\let\original@shipout\shipout

\shipout :=
\begingroup
\setbox\mybox=\hbox\bgroup
\kern1pt
\afterassignment\@test
\setbox\mybox=

\@test :=
\ifdim\lastkern=0pt
\expandafter\aftergroup
\fi
\@output

\@output :=
\egroup
\endgroup
\ifvoid\mybox
% cancel output of void box
\else
\@hook
\ifvoid\mybox
% user code in \@hook could have voided the box
\else
\original@shipout\box\mybox
\fi
\fi

```

## 3 Implementation

Package atbegshi uses  $\varepsilon$ -T<sub>E</sub>X's \currentgrouplevel, if it is available. Otherwise the \lastkern method is used.

```
56 \<package>
```

### 3.1 Reload check and package identification

Reload check, especially if the package is not used with L<sup>A</sup>T<sub>E</sub>X.

```

57 \begingroup\catcode61\catcode48\catcode32=10\relax%
58 \catcode13=5 % ^^M

```

```

59 \endlinechar=13 %
60 \catcode35=6 % #
61 \catcode39=12 % '
62 \catcode44=12 % ,
63 \catcode45=12 % -
64 \catcode46=12 % .
65 \catcode58=12 % :
66 \catcode64=11 % @
67 \catcode123=1 % {
68 \catcode125=2 % }
69 \expandafter\let\expandafter\x\csname ver@atbegshi.sty\endcsname
70 \ifx\x\relax % plain-TeX, first loading
71 \else
72   \def\empty{}%
73   \ifx\x\empty % LaTeX, first loading,
74     % variable is initialized, but \ProvidesPackage not yet seen
75   \else
76     \expandafter\ifx\csname PackageInfo\endcsname\relax
77       \def\x#1#2{%
78         \immediate\write-1{Package #1 Info: #2.}%
79       }%
80     \else
81       \def\x#1#2{\PackageInfo{#1}{#2, stopped}}%
82     \fi
83     \x{atbegshi}{The package is already loaded}%
84     \aftergroup\endinput
85   \fi
86 \fi
87 \endgroup%

```

Package identification:

```

88 \begingroup\catcode61\catcode48\catcode32=10\relax%
89 \catcode13=5 % ^^M
90 \endlinechar=13 %
91 \catcode35=6 % #
92 \catcode39=12 % '
93 \catcode40=12 % (
94 \catcode41=12 % )
95 \catcode44=12 % ,
96 \catcode45=12 % -
97 \catcode46=12 % .
98 \catcode47=12 % /
99 \catcode58=12 % :
100 \catcode64=11 % @
101 \catcode91=12 % [
102 \catcode93=12 % ]
103 \catcode123=1 % {
104 \catcode125=2 % }
105 \expandafter\ifx\csname ProvidesPackage\endcsname\relax
106   \def\x#1#2#3[#4]{\endgroup
107     \immediate\write-1{Package: #3 #4}%
108     \xdef#1{#4}%
109   }%
110 \else
111   \def\x#1#2[#3]{\endgroup
112     #2[{#3}]%
113     \ifx#1\@undefined
114       \xdef#1{#3}%
115     \fi

```

```

116      \ifx#1\relax
117      \xdef#1{#3}%
118      \fi
119    }%
120  \fi
121 \expandafter\x\csname ver@atbegshi.sty\endcsname
122 \ProvidesPackage{atbegshi}%
123 [2016/05/16 v1.17 At begin shipout hook (H0)]%

```

### 3.2 Catcodes

```

124 \begingroup\catcode61\catcode48\catcode32=10\relax%
125 \catcode13=5 % ^^M
126 \endlinechar=13 %
127 \catcode123=1 % {
128 \catcode125=2 % }
129 \catcode64=11 % @
130 \def\x{\endgroup
131   \expandafter\edef\csname AtBegShi@AtEnd\endcsname{%
132     \endlinechar=\the\endlinechar\relax
133     \catcode13=\the\catcode13\relax
134     \catcode32=\the\catcode32\relax
135     \catcode35=\the\catcode35\relax
136     \catcode61=\the\catcode61\relax
137     \catcode64=\the\catcode64\relax
138     \catcode123=\the\catcode123\relax
139     \catcode125=\the\catcode125\relax
140   }%
141 }%
142 \x\catcode61\catcode48\catcode32=10\relax%
143 \catcode13=5 % ^^M
144 \endlinechar=13 %
145 \catcode35=6 % #
146 \catcode64=11 % @
147 \catcode123=1 % {
148 \catcode125=2 % }
149 \def\TMP@EnsureCode#1#2{%
150   \edef\AtBegShi@AtEnd{%
151     \AtBegShi@AtEnd
152     \catcode#1=\the\catcode#1\relax
153   }%
154   \catcode#1=#2\relax
155 }
156 \TMP@EnsureCode{40}{12}% (
157 \TMP@EnsureCode{41}{12}% )
158 \TMP@EnsureCode{44}{12}% ,
159 \TMP@EnsureCode{45}{12}% -
160 \TMP@EnsureCode{47}{12}% /
161 \TMP@EnsureCode{46}{12}% .
162 \TMP@EnsureCode{58}{12}% :
163 \TMP@EnsureCode{91}{12}% [
164 \TMP@EnsureCode{93}{12}% ]
165 \TMP@EnsureCode{94}{7}% ^ (superscript)
166 \TMP@EnsureCode{96}{12}% '
167 \edef\AtBegShi@AtEnd{\AtBegShi@AtEnd\noexpand\endinput}

```

### 3.3 Preparations

```

168 \begingroup\expandafter\expandafter\expandafter\endgroup

```

```

169 \expandafter\ifx\csname RequirePackage\endcsname\relax
170   \def\TMP@RequirePackage#1[#2]{%
171     \begingroup\expandafter\expandafter\expandafter\endgroup
172     \expandafter\ifx\csname ver@#1.sty\endcsname\relax
173       \input #1.sty\relax
174     \fi
175   }%
176   \TMP@RequirePackage{infwarerr}[2007/09/09]%
177   \TMP@RequirePackage{ltxcmds}[2010/03/01]%
178 \else
179   \RequirePackage{infwarerr}[2007/09/09]%
180   \RequirePackage{ltxcmds}[2010/03/01]%
181 \fi

\AtBegShi@CheckDefinable

182 \begingroup\expandafter\expandafter\expandafter\endgroup
183 \expandafter\ifx\csname @ifdefinable\endcsname\relax
184   \def\AtBegShi@CheckDefinable#1{%
185     \ifcase\ifx#1\relax
186       \ltx@one
187     \else
188       \ifx#1\@undefined
189         \ltx@one
190       \else
191         \ltx@zero
192       \fi
193     \fi
194     \@PackageError{atbegshi}{%
195       \string#1\space is already defined%
196     }\@ehd
197   \fi
198 }%
199 \else
200   \def\AtBegShi@CheckDefinable#1{%
201     \@ifdefinable{#1}{}%
202   }%
203 \fi

\ifAtBegShi@Discarded

204 \ltx@newif\ifAtBegShi@Discarded

\AtBeginShipoutDiscard

205 \AtBegShi@CheckDefinable\AtBeginShipoutDiscard
206 \def\AtBeginShipoutDiscard{%
207   \deadcycles=\ltx@zero
208   \global\AtBegShi@Discardedtrue
209 }

210 \begingroup\expandafter\expandafter\expandafter\endgroup
211 \expandafter\ifx\csname currentgrouplevel\endcsname\relax
212   \catcode'X=9 % ignore
213   \catcode'E=14 % comment
214 \else
215   \catcode'X=14 % comment
216   \catcode'E=9 % ignore
217 \fi

\AtBegShi@Shipout

```

```

218 \def\AtBegShi@Shipout{%
219 X \begingroup
220 X \setbox\AtBeginShipoutBox=\hbox\bgroup
221 X \kern\p@
222 E \edef\AtBegShi@GroupLevel{\number\currentgrouplevel}%
223 \afterassignment\AtBegShi@Test
224 X \global
225 \setbox\AtBeginShipoutBox=%
226 }

```

\AtBegShi@Test

```

227 \def\AtBegShi@Test{%
228 X \ifdim\lastkern=0pt %
229 E \ifnum\AtBegShi@GroupLevel<\currentgrouplevel
230 \expandafter\aftergroup
231 \fi
232 \AtBegShi@Output
233 }

```

\AtBegShi@Output

```

234 \def\AtBegShi@Output{%
235 X \egroup
236 X \endgroup
237 \ifvoid\AtBeginShipoutBox
238 \@PackageWarning{atbegshi}{Ignoring void shipout box}%
239 \else
240 \let\AtBegShi@OrgProtect\protect
241 \csname set@typeset@protect\endcsname
242 \global\AtBegShi@Discardedfalse
243 \AtBegShi@Hook
244 \expandafter\gdef\expandafter\AtBegShi@HookNext
245 \expandafter{\expandafter}%
246 \AtBegShi@HookNext
247 \ifAtBegShi@Discarded
248 \@PackageInfoNoLine{atbegshi}{Shipout page discarded}%
249 \global\AtBegShi@Discardedfalse
250 \begingroup
251 \setbox\AtBeginShipoutBox\box\AtBeginShipoutBox
252 \endgroup
253 \let\protect\AtBegShi@OrgProtect
254 \else
255 \AtBegShi@First
256 \let\protect\AtBegShi@OrgProtect
257 \AtBegShi@GetBoxSize\AtBeginShipoutBox
258 \ltx@ifundefined{AtNextShipout}{%
259 }{%
260 \AtNextShipout{\AtBegShi@GetBoxSize\@cclv}%
261 }%
262 \AtBeginShipoutOriginalShipout\box\AtBeginShipoutBox
263 \fi
264 \fi
265 }

```

\AtBegShi@GetBoxSize

```

266 \def\AtBegShi@GetBoxSize#1{%
267 \xdef\AtBeginShipoutBoxWidth{\the\wd#1}%
268 \xdef\AtBeginShipoutBoxHeight{\the\ht#1}%
269 \xdef\AtBeginShipoutBoxDepth{\the\dp#1}%

```

```

270 }

\AtBeginShipoutBoxWidth
271 \def\AtBeginShipoutBoxWidth{Opt}

\AtBeginShipoutBoxHeight
272 \def\AtBeginShipoutBoxHeight{Opt}

\AtBeginShipoutBoxDepth
273 \def\AtBeginShipoutBoxDepth{Opt}

274 \catcode'\X=11 %
275 \catcode'\E=11 %

\AtBegShi@First
276 \def\AtBegShi@First{%
277   \ifx\AtBegShi@HookFirst\ltx@empty
278   \else
279     \AtBeginShipoutAddToBox{\AtBegShi@HookFirst}%
280   \fi
281   \global\let\AtBegShi@First\ltx@empty
282   \global\let\AtBeginShipoutFirst\AtBegShi@FirstDisabled
283 }

\AtBegShi@Hook
284 \gdef\AtBegShi@Hook{}

\AtBegShi@HookNext
285 \gdef\AtBegShi@HookNext{}

\AtBegShi@HookFirst
286 \gdef\AtBegShi@HookFirst{}

\AtBeginShipout
287 \AtBegShi@CheckDefinable\AtBeginShipout
288 \def\AtBeginShipout{%
289   \AtBegShi@AddHook\AtBegShi@Hook
290 }

\AtBeginShipoutNext
291 \AtBegShi@CheckDefinable\AtBeginShipoutNext
292 \def\AtBeginShipoutNext{%
293   \AtBegShi@AddHook\AtBegShi@HookNext
294 }

\AtBeginShipoutFirst
295 \AtBegShi@CheckDefinable\AtBeginShipoutFirst
296 \def\AtBeginShipoutFirst{%
297   \AtBegShi@AddTo\AtBegShi@HookFirst
298 }

\AtBegShi@FirstDisabled
299 \long\def\AtBegShi@FirstDisabled#1{%
300   \@PackageWarning{atbegshi}{%
301     First page is already shipped out, ignoring\MessageBreak
302     \string\AtBeginShipoutFirst
303   }%
304 }

```



```

\AtBegShi@AddTo
305 \begingroup\expandafter\expandafter\expandafter\endgroup
306 \expandafter\ifx\csname g@addto@macro\endcsname\relax
307   \long\def\AtBegShi@AddTo#1#2{%
308     \begingroup
309       \toks\ltx@zero\expandafter{#1#2}%
310       \xdef#1{\the\toks\ltx@zero}%
311     \endgroup
312   }%
313 \else
314   \let\AtBegShi@AddTo\g@addto@macro
315 \fi

\AtBegShi@AddHook
316 \long\def\AtBegShi@AddHook#1#2{%
317   \AtBegShi@AddTo#1{\AtBegShi@Item{#2}}%
318 }

\AtBegShi@Item
319 \long\def\AtBegShi@Item#1{%
320   \ifAtBegShi@Discarded
321   \else
322     #1%
323   \ifAtBegShi@Discarded
324   \else
325     \ifvoid\AtBeginShipoutBox
326       \@PackageWarning{atbegshi}{%
327         Shipout box was voided by hook,\MessageBreak
328         ignoring shipout box%
329       }%
330     \AtBeginShipoutDiscard
331   \fi
332 \fi
333 \fi
334 }

\AtBeginShipoutInit
335 \AtBegShi@CheckDefinable\AtBeginShipoutInit
336 \def\AtBeginShipoutInit{%
337   \ltx@ifundefined{newbox}{%
338     \@PackageError{atbegshi}{%
339       \string\AtBeginShipoutInit\space failed\MessageBreak
340       because of missing \expandafter\string\csname newbox\endcsname
341     }\@ehc
342   }{%
343     \csname newbox\endcsname\AtBeginShipoutBox
344     \AtBegShi@CheckDefinable\AtBeginShipoutOriginalShipout
345     \global\let\AtBeginShipoutOriginalShipout\shipout
346     \global\let\shipout\AtBegShi@Shipout
347   }%
348   \gdef\AtBeginShipoutInit{}%
349 }

350 \begingroup\expandafter\expandafter\expandafter\endgroup
351 \expandafter\ifx\csname AtBeginDocument\endcsname\relax
352   \AtBeginShipoutInit
353 \else
354   \AtBeginDocument{\AtBeginShipoutInit}%
355 \fi

```

### 3.4 Additions to the shipout box

\AtBeginShipoutAddToBox

```
356 \def\AtBeginShipoutAddToBox#1{%
357   \ifhbox\AtBeginShipoutBox
358     \edef\AtBegShi@restore{%
359       \hfuzz=\the\hfuzz\relax
360       \hbadness=\the\hbadness\relax
361     }%
362     \hfuzz=1073741823sp\relax
363     \hbadness=2147483647\relax
364     \setbox\AtBeginShipoutBox=\hbox to \wd\AtBeginShipoutBox{%
365       \setbox\ltx@zero=\hbox{%
366         \begingroup
367         \AtBegShi@restore
368         #1%
369       \endgroup
370     }%
371     \wd\ltx@zero=0pt\relax
372     \ht\ltx@zero=0pt\relax
373     \dp\ltx@zero=0pt\relax
374     \raise\ht\AtBeginShipoutBox\copy\ltx@zero
375     \unhcopy\AtBeginShipoutBox
376   }%
377   \AtBegShi@restore
378 \else
379   \ifvbox\AtBeginShipoutBox
380     \edef\AtBegShi@restore{%
381       \vfuzz=\the\vfuzz\relax
382       \vbadness=\the\vbadness\relax
383       \dimen\ltx@zero=\the\dimen\ltx@zero\relax
384     }%
385     \edef\AtBegShi@restorebox{%
386       \ht\AtBeginShipoutBox=\the\ht\AtBeginShipoutBox\relax
387       \dp\AtBeginShipoutBox=\the\dp\AtBeginShipoutBox\relax
388     }%
389     \vfuzz=1073741823sp\relax
390     \vbadness=2147483647\relax
391     \dimen\ltx@zero=\ht\AtBeginShipoutBox
392     \advance\dimen\ltx@zero by \dp\AtBeginShipoutBox
393     \setbox\AtBeginShipoutBox=\vbox to \dimen\ltx@zero{%
394       \setbox\ltx@zero=\hbox{%
395         \begingroup
396         \AtBegShi@restore
397         #1%
398       \endgroup
399     }%
400     \wd\ltx@zero=0pt\relax
401     \ht\ltx@zero=0pt\relax
402     \dp\ltx@zero=0pt\relax
403     \baselineskip=0pt\relax
404     \lineskip=0pt\relax
405     \lineskiplimit=0pt\relax
406     \copy\ltx@zero
407     \unvbox\AtBeginShipoutBox
408     \kern0pt%
409   }%
410   \AtBegShi@restore
```

```

411     \AtBegShi@restorebox
412     \fi
413 \fi
414 }

```

BeginShipoutAddToBoxForeground

```

415 \def\AtBeginShipoutAddToBoxForeground#1{%
416   \ifhbox\AtBeginShipoutBox
417     \edef\AtBegShi@restore{%
418       \hfuzz=\the\hfuzz\relax
419       \hbadness=\the\hbadness\relax
420     }%
421     \hfuzz=1073741823sp\relax
422     \hbadness=2147483647\relax
423     \setbox\AtBeginShipoutBox=\hbox to \wd\AtBeginShipoutBox{%
424       \unhcopy\AtBeginShipoutBox
425       \kern-\wd\AtBeginShipoutBox
426       \setbox\ltx@zero=\hbox{%
427         \begingroup
428         \AtBegShi@restore
429         #1%
430       \endgroup
431     }%
432     \wd\ltx@zero=0pt\relax
433     \ht\ltx@zero=0pt\relax
434     \dp\ltx@zero=0pt\relax
435     \raise\ht\AtBeginShipoutBox\copy\ltx@zero
436     \kern\wd\AtBeginShipoutBox
437   }%
438   \AtBegShi@restore
439 \else
440   \ifvbox\AtBeginShipoutBox
441     \edef\AtBegShi@restore{%
442       \vfuzz=\the\vfuzz\relax
443       \vbadness=\the\vbadness\relax
444       \dimen\ltx@zero=\the\dimen\ltx@zero\relax
445     }%
446     \edef\AtBegShi@restorebox{%
447       \ht\AtBeginShipoutBox=\the\ht\AtBeginShipoutBox\relax
448       \dp\AtBeginShipoutBox=\the\dp\AtBeginShipoutBox\relax
449     }%
450     \vfuzz=1073741823sp\relax
451     \vbadness=2147483647\relax
452     \dimen\ltx@zero=\ht\AtBeginShipoutBox
453     \advance\dimen\ltx@zero by \dp\AtBeginShipoutBox
454     \setbox\AtBeginShipoutBox=\vbox to \dimen\ltx@zero{%
455       \setbox\ltx@zero=\hbox{%
456         \begingroup
457         \AtBegShi@restore
458         #1%
459       \endgroup
460     }%
461     \wd\ltx@zero=0pt\relax
462     \ht\ltx@zero=0pt\relax
463     \dp\ltx@zero=0pt\relax
464     \baselineskip=0pt\relax
465     \lineskip=0pt\relax
466     \lineskiplimit=0pt\relax

```

```

467         \unvbox\AtBeginShipoutBox
468         \kern-\dimen\ltx@zero
469         \copy\ltx@zero
470         \kern\dimen\ltx@zero
471     }%
472     \AtBegShi@restore
473     \AtBegShi@restorebox
474 \fi
475 \fi
476 }

```

### 3.5 Positioning

```

477 \begingroup\expandafter\expandafter\expandafter\endgroup
478 \expandafter\ifx\csname RequirePackage\endcsname\relax
479   \def\TMP@RequirePackage#1[#2]{%
480     \begingroup\expandafter\expandafter\expandafter\endgroup
481     \expandafter\ifx\csname ver@#1.sty\endcsname\relax
482       \input #1.sty\relax
483     \fi
484   }%
485   \TMP@RequirePackage{ifpdf}[2011/01/30]%
486 \else
487   \RequirePackage{ifpdf}[2011/01/30]%
488 \fi

489 \ifpdf
490   \def\AtBegShi@horigin{\pdfhorigin}%
491   \def\AtBegShi@vorigin{\pdfvorigin}%
492 \else
493   \def\AtBegShi@horigin{72.27pt}%
494   \def\AtBegShi@vorigin{72.27pt}%
495 \fi

496 \begingroup
497 \ifcase
498   \expandafter\ifx\csname picture\endcsname\relax
499     1%
500   \else
501     \expandafter\ifx\csname endpicture\endcsname\relax
502       1%
503     \else
504       0%
505     \fi
506   \fi
507 \endgroup
508 \def\AtBegShi@BeginPicture{%
509   \begingroup
510   \picture(0,0)\relax
511   \begingroup\expandafter\expandafter\expandafter\endgroup
512   \expandafter\ifx\csname unitlength\endcsname\relax
513     \else
514       \unitlength=1pt\relax
515     \fi
516   \ignorespaces
517 }%
518 \def\AtBegShi@EndPicture{%
519   \endpicture
520 \endgroup

```

```

521 }%
522 \else
523 \endgroup
524 \def\AtBegShi@BeginPicture{%
525   \setbox\ltx@zero=\hbox\bgroup
526   \begingroup
527   \ignorespaces
528 }%
529 \def\AtBegShi@endPicture{%
530   \endgroup
531   \egroup
532   \ht\ltx@zero=0pt\relax
533   \dp\ltx@zero=0pt\relax
534   \copy\ltx@zero
535 }%
536 \fi

```

`\AtBeginShipoutUpperLeft` A surrounding `\rlap` is not necessary, because the stuff is put in an `\hbox` with zero width.

```

537 \def\AtBeginShipoutUpperLeft#1{%
538   \AtBeginShipoutAddToBox{%
539     \kern-\AtBegShi@horigin\relax
540     \vbox to 0pt{%
541       \kern-\AtBegShi@vorigin\relax
542       \AtBegShi@BeginPicture
543       #1%
544       \AtBegShi@endPicture
545       \vss
546     }%
547   }%
548 }

```

`\AtBeginShipoutUpperLeftForeground`

```

549 \def\AtBeginShipoutUpperLeftForeground#1{%
550   \AtBeginShipoutAddToBoxForeground{%
551     \kern-\AtBegShi@horigin\relax
552     \vbox to 0pt{%
553       \kern-\AtBegShi@vorigin\relax
554       \AtBegShi@BeginPicture
555       #1%
556       \AtBegShi@endPicture
557       \vss
558     }%
559   }%
560 }

```

### 3.6 Patches

Patches for  $\text{\LaTeX}$  packages that redefine `\shipout`.  $\text{\LaTeX}$  is now supposed to use  $\varepsilon\text{-TeX}$ . Thus we do not patch, without  $\text{\LaTeX}$  and  $\varepsilon\text{-TeX}$ .

```

561 \def\AtBegShi@AbortIfUndefined#1{%
562   \begingroup\expandafter\expandafter\expandafter\endgroup
563   \expandafter\ifx\csname#1\endcsname\relax
564     \expandafter\AtBegShi@AtEnd
565   \fi
566 }
567 \AtBegShi@AbortIfUndefined{currentgrouplevel}%
568 \AtBegShi@AbortIfUndefined{AtBeginDocument}%

```

```

569 \AtBegShi@AbortIfUndefined{@ifpackageloaded}%
570 \AtBegShi@AbortIfUndefined{@ifclassloaded}%

```

### 3.6.1 Package crop

Fix of method and box.

```

571 \def\AtBegShi@PatchCrop{%
572   \begingroup
573   \def\AtBegShi@Crop@shipout{%
574     \afterassignment\CROP@ship
575     \setbox\@cclv=%
576   }%
577   \def\AtBegShi@Crop@ship{%
578     \ifvoid\@cclv
579     \expandafter\aftergroup
580     \fi
581     \CROP@ship
582   }%
583   \def\AtBegShi@Crop@shiplist{%
584     \lineskip\z@
585     \lineskiplimit\z@
586     \baselineskip\z@
587     \CROP@kernel
588     \box\@cclv
589   }%
590   \def\AtBegShi@Crop@@ship{%
591     \CROP@shipout\vbox{%
592       \CROP@shiplist
593     }%
594   }%
595   \ifx\AtBegShi@Crop@ship\CROP@ship
596     \ifx\AtBegShi@Crop@shiplist\CROP@shiplist
597       \ifx\AtBegShi@Crop@@ship\CROP@@ship
598         \let\AtBegShi@found\relax
599         \ifx\shipout\AtBegShi@Crop@shipout
600           \def\AtBegShi@found{\shipout}%
601         \else\ifx\AtBeginShipoutOriginalShipout\AtBegShi@Crop@shipout
602           \def\AtBegShi@found{\AtBeginShipoutOriginalShipout}%
603         \else\ifx\@EveryShipout@Org@Shipout\AtBegShi@Crop@shipout
604           \def\AtBegShi@found{\@EveryShipout@Org@Shipout}%
605         \else\ifx\GPTorg@shipout\AtBegShi@Crop@shipout
606           \def\AtBegShi@found{\GPTorg@shipout}%
607         \else\ifx\THBorg@shipout\AtBegShi@Crop@shipout
608           \def\AtBegShi@found{\THBorg@shipout}%
609         \else\ifx\mem@oldshipout\AtBegShi@Crop@shipout
610           \def\AtBegShi@found{\mem@oldshipout}%
611         \fi\fi\fi\fi\fi
612       \ifx\AtBegShi@found\relax
613         \else
614           \expandafter\endgroup
615           \expandafter\def\AtBegShi@found{%
616             \edef\AtBegShi@GroupLevel{\number\currentgrouplevel}%
617             \afterassignment\CROP@ship
618             \setbox\AtBeginShipoutBox=%
619           }%
620           \def\CROP@ship{%
621             \ifnum\AtBegShi@GroupLevel=\currentgrouplevel
622               \else

```

```

623         \expandafter\aftergroup
624         \fi
625         \CROP@@ship
626     }%
627     \def\CROP@shiplist{%
628         \lineskip Opt\relax
629         \lineskiplimit Opt\relax
630         \baselineskip Opt\relax
631         \CROP@kernel
632         \box\AtBeginShipoutBox
633     }%
634     \def\CROP@@ship{%
635         \ifvoid\AtBeginShipoutBox
636         \else
637             \setbox\AtBeginShipoutBox=\vbox{%
638                 \CROP@shiplist
639             }%
640             \AtBegShi@GetBoxSize\AtBeginShipoutBox
641             \expandafter\CROP@shipout
642             \expandafter\box
643             \expandafter\AtBeginShipoutBox
644         \fi
645     }%
646     \@PackageInfoNoLine{atbegshi}{Package ‘crop’ patched}%
647     \begingroup
648     \fi
649     \fi
650     \fi
651     \fi
652 \endgroup
653 \let\AtBegShi@PatchCrop\relax
654 }
655 \ifpackageloaded{crop}{%
656     \AtBegShi@PatchCrop
657 }{%
658     \AtBeginDocument{\AtBegShi@PatchCrop}%
659 }

```

### 3.6.2 Package everyshi

Fix of method. Use of box 255 is not changed.

```

660 \def\AtBegShi@PatchEveryshi{%
661     \begingroup
662     \long\def\AtBegShi@Everyshi@shipout{%
663         \afterassignment\@EveryShipout@Test
664         \global\setbox\@ccclv= %
665     }%
666     \long\def\AtBegShi@Everyshi@Test{%
667         \ifvoid\@ccclv\relax
668             \aftergroup\@EveryShipout@Output
669         \else
670             \@EveryShipout@Output
671         \fi
672     }%
673     \ifx\AtBegShi@Everyshi@Test\@EveryShipout@Test
674         \let\AtBegShi@found\relax
675     \ifx\shipout\AtBegShi@Everyshi@shipout
676         \def\AtBegShi@found{\shipout}%

```

```

677 \else\ifx\AtBeginShipoutOriginalShipout\AtBegShi@Everyshi@shipout
678 \def\AtBegShi@found{\AtBeginShipoutOriginalShipout}%
679 \else\ifx\CROP@shipout\AtBegShi@Everyshi@shipout
680 \def\AtBegShi@found{\CROP@shipout}%
681 \else\ifx\GPTorg@shipout\AtBegShi@Everyshi@shipout
682 \def\AtBegShi@found{\GPTorg@shipout}%
683 \else\ifx\THBorg@shipout\AtBegShi@Everyshi@shipout
684 \def\AtBegShi@found{\THBorg@shipout}%
685 \else\ifx\mem@oldshipout\AtBegShi@Everyshi@shipout
686 \def\AtBegShi@found{\mem@oldshipout}%
687 \else
688 \expandafter\ifx\csname @EveryShipout@Org@Shipout\endcsname
689 \relax
690 \ifx\@EveryShipout@Shipout\AtBegShi@Everyshi@shipout
691 \def\AtBegShi@found{\@EveryShipout@Shipout}%
692 \fi
693 \fi
694 \fi\fi\fi\fi\fi\fi
695 \ifx\AtBegShi@found\relax
696 \else
697 \expandafter\endgroup
698 \expandafter\def\AtBegShi@found{%
699 \edef\AtBegShi@GroupLevel{\number\currentgrouplevel}%
700 \afterassignment\@EveryShipout@Test
701 \setbox\AtBeginShipoutBox=%
702 }%
703 \def\@EveryShipout@Test{%
704 \ifnum\AtBegShi@GroupLevel=\currentgrouplevel
705 \else
706 \expandafter\aftergroup
707 \fi
708 \AtBegShi@Everyshi@Output
709 }%
710 \def\AtBegShi@Everyshi@Output{%
711 \ifvoid\AtBeginShipoutBox
712 \else
713 \global\setbox\ltx@cclv\box\AtBeginShipoutBox
714 \expandafter\@EveryShipout@Output
715 \fi
716 }%
717 \@PackageInfoNoLine{atbegshi}{Package 'everyshi' patched}%
718 \begingroup
719 \fi
720 \fi
721 \endgroup
722 \let\AtBegShi@PatchEveryshi\relax
723 }
724 \ifpackageloaded{everyshi}{%
725 \AtBegShi@PatchEveryshi
726 }{%
727 \AtBeginDocument{\AtBegShi@PatchEveryshi}%
728 }

```

### 3.6.3 Class memoir

Fix of method and box.

```

729 \def\AtBegShi@PatchMemoir{%
730 \begingroup

```



```

731 \def\AtBegShi@Memoir@shipout{%
732     \afterassignment\mem@shipi
733     \setbox\@cclv=%
734 }%
735 \def\AtBegShi@Memoir@shipi{%
736     \ifvoid\@cclv
737     \expandafter\aftergroup
738     \fi
739     \mem@shipii
740 }%
741 \def\AtBegShi@Memoir@shipiiA{%
742     \mem@oldshipout\vbox{%
743         \trimmarks
744         \unvbox\@cclv
745     }%
746 }%
747 \def\AtBegShi@Memoir@shipiiB{%
748     \ifvoid\@cclv
749     \mem@oldshipout\box\@cclv
750     \else
751     \mem@oldshipout\vbox{%
752         \trimmarks
753         \unvbox\@cclv
754     }%
755     \fi
756 }%
757 \def\AtBegShi@Memoir@PatchAB{%
758     \ifvoid\AtBeginShipoutBox
759     \else
760     \setbox\AtBeginShipoutBox=\vbox{%
761         \trimmarks
762         \ifvbox\AtBeginShipoutBox
763         \unvbox\AtBeginShipoutBox
764         \else
765         \box\AtBeginShipoutBox
766         \fi
767     }%
768     \AtBegShi@GetBoxSize\AtBeginShipoutBox
769     \expandafter\mem@oldshipout
770     \expandafter\box
771     \expandafter\AtBeginShipoutBox
772     \fi
773 }%
774 \def\AtBegShi@Memoir@shipiiC{% 2008/08/07 v1.6180339a
775     \ifvoid\@cclv
776     \mem@oldshipout\box\@cclv
777     \else
778     \ifshowtrims
779     \mem@oldshipout\vbox{\trimmarks\unvbox\@cclv}%
780     \else
781     \mem@oldshipout\box\@cclv
782     \fi
783     \fi
784 }%
785 \def\AtBegShi@Memoir@shipiiD{% 2011/03/06 v3.6j
786     \ifvoid\@cclv
787     \mem@oldshipout\box\@cclv
788     \else

```

```

789         \ifshowtrims
790         \mem@oldshipout\vbox{%
791         \trimmarks
792         \nointerlineskip
793         \box\@cclv
794     }%
795     \else
796     \mem@oldshipout\box\@cclv
797     \fi
798 \fi
799 }%
800 \def\AtBegShi@Mmemoir@PatchCD{%
801     \ifvoid\AtBeginShipoutBox
802     \else
803     \ifshowtrims
804     \setbox\AtBeginShipoutBox=\vbox{%
805     \trimmarks
806     \nointerlineskip
807     \box\AtBeginShipoutBox
808     }%
809     \fi
810     \AtBegShi@GetBoxSize\AtBeginShipoutBox
811     \expandafter\mem@oldshipout
812     \expandafter\box
813     \expandafter\AtBeginShipoutBox
814     \fi
815 }%
816 \ifx\AtBegShi@Mmemoir@shipi\mem@shipi
817     \let\AtBegShi@found\ltx@one
818 \ifx\AtBegShi@Mmemoir@shipiiA\mem@shipii
819     \let\AtBegShi@found\ltx@zero
820 \global\let\AtBegShi@Mmemoir@PatchX\AtBegShi@Mmemoir@PatchAB
821 \else\ifx\AtBegShi@Mmemoir@shipiiB\mem@shipii
822     \let\AtBegShi@found\ltx@zero
823 \global\let\AtBegShi@Mmemoir@PatchX\AtBegShi@Mmemoir@PatchAB
824 \else\ifx\AtBegShi@Mmemoir@shipiiC\mem@shipii
825     \let\AtBegShi@found\ltx@zero
826 \global\let\AtBegShi@Mmemoir@PatchX\AtBegShi@Mmemoir@PatchCD
827 \else\ifx\AtBegShi@Mmemoir@shipiiD\mem@shipii
828     \let\AtBegShi@found\ltx@zero
829 \global\let\AtBegShi@Mmemoir@PatchX\AtBegShi@Mmemoir@PatchCD
830 \fi\fi\fi\fi
831 \ifcase\AtBegShi@found
832     \let\AtBegShi@found\relax
833 \ifx\shipout\AtBegShi@Mmemoir@shipout
834     \def\AtBegShi@found{\shipout}%
835 \else\ifx\AtBeginShipoutOriginalShipout\AtBegShi@Mmemoir@shipout
836     \def\AtBegShi@found{\AtBeginShipoutOriginalShipout}%
837 \else\ifx\CROP@shipout\AtBegShi@Mmemoir@shipout
838     \def\AtBegShi@found{\CROP@shipout}%
839 \else\ifx\GPTorg@shipout\AtBegShi@Mmemoir@shipout
840     \def\AtBegShi@found{\GPTorg@shipout}%
841 \else\ifx\THBorg@shipout\AtBegShi@Mmemoir@shipout
842     \def\AtBegShi@found{\THBorg@shipout}%
843 \else\ifx\@EveryShipout@Org@Shipout\AtBegShi@Mmemoir@shipout
844     \def\AtBegShi@found{\@EveryShipout@Org@Shipout}%
845 \fi\fi\fi\fi\fi\fi
846 \ifx\AtBegShi@found\relax

```

```

847         \else
848         \expandafter\endgroup
849         \expandafter\def\AtBegShi@found{%
850         \edef\AtBegShi@GroupLevel{\number\currentgrouplevel}%
851         \afterassignment\mem@shipi
852         \setbox\AtBeginShipoutBox=%
853         }%
854         \def\mem@shipi{%
855         \ifnum\AtBegShi@GroupLevel=\currentgrouplevel
856         \else
857         \expandafter\aftergroup
858         \fi
859         \mem@shipii
860         }%
861         \let\mem@shipii\AtBegShi@Mmemoir@PatchX
862         \@PackageInfoNoLine{atbegshi}{Class 'memoir' patched}%
863         \begingroup
864         \fi
865         \fi
866         \fi
867     \endgroup
868     \let\AtBegShi@PatchMemoir\relax
869 }
870 \ifclassloaded{memoir}{%
871     \AtBegShi@PatchMemoir
872 }{%
873     \AtBeginDocument{\AtBegShi@PatchMemoir}%
874 }
875 \AtBegShi@AtEnd%
876 \endpackage

```

## 4 Test

### 4.1 Catcode checks for loading

```

877 \test1
878 \catcode'\{=1 %
879 \catcode'\}=2 %
880 \catcode'\#=6 %
881 \catcode'\@=11 %
882 \expandafter\ifx\csname count@\endcsname\relax
883     \countdef\count@=255 %
884 \fi
885 \expandafter\ifx\csname @gobble\endcsname\relax
886     \long\def\@gobble#1{}%
887 \fi
888 \expandafter\ifx\csname @firstofone\endcsname\relax
889     \long\def\@firstofone#1{#1}%
890 \fi
891 \expandafter\ifx\csname loop\endcsname\relax
892     \expandafter\@firstofone
893 \else
894     \expandafter\@gobble
895 \fi
896 {%
897     \def\loop#1\repeat{%
898         \def\body{#1}%

```

```

899     \iterate
900 }%
901 \def\iterate{%
902     \body
903     \let\next\iterate
904     \else
905     \let\next\relax
906     \fi
907     \next
908 }%
909 \let\repeat=\fi
910 }%
911 \def\RestoreCatcodes{}
912 \count@=0 %
913 \loop
914     \edef\RestoreCatcodes{%
915         \RestoreCatcodes
916         \catcode\the\count@=\the\catcode\count@\relax
917     }%
918 \ifnum\count@<255 %
919     \advance\count@ 1 %
920 \repeat
921
922 \def\RangeCatcodeInvalid#1#2{%
923     \count@=#1\relax
924     \loop
925         \catcode\count@=15 %
926     \ifnum\count@<#2\relax
927         \advance\count@ 1 %
928     \repeat
929 }
930 \def\RangeCatcodeCheck#1#2#3{%
931     \count@=#1\relax
932     \loop
933         \ifnum#3=\catcode\count@
934     \else
935         \errmessage{%
936             Character \the\count@\space
937             with wrong catcode \the\catcode\count@\space
938             instead of \number#3%
939         }%
940     \fi
941     \ifnum\count@<#2\relax
942         \advance\count@ 1 %
943     \repeat
944 }
945 \def\space{ }
946 \expandafter\ifx\csname LoadCommand\endcsname\relax
947     \def\LoadCommand{\input atbegshi.sty\relax}%
948 \fi
949 \def\Test{%
950     \RangeCatcodeInvalid{0}{47}%
951     \RangeCatcodeInvalid{58}{64}%
952     \RangeCatcodeInvalid{91}{96}%
953     \RangeCatcodeInvalid{123}{255}%
954     \catcode'\@=12 %
955     \catcode'\=0 %
956     \catcode'\%=14 %

```

```

957 \LoadCommand
958 \RangeCatcodeCheck{0}{36}{15}%
959 \RangeCatcodeCheck{37}{37}{14}%
960 \RangeCatcodeCheck{38}{47}{15}%
961 \RangeCatcodeCheck{48}{57}{12}%
962 \RangeCatcodeCheck{58}{63}{15}%
963 \RangeCatcodeCheck{64}{64}{12}%
964 \RangeCatcodeCheck{65}{90}{11}%
965 \RangeCatcodeCheck{91}{91}{15}%
966 \RangeCatcodeCheck{92}{92}{0}%
967 \RangeCatcodeCheck{93}{96}{15}%
968 \RangeCatcodeCheck{97}{122}{11}%
969 \RangeCatcodeCheck{123}{255}{15}%
970 \RestoreCatcodes
971 }
972 \Test
973 \csname @@end\endcsname
974 \end
975 /test1}
976 (*test2)
977 \input atbegshi.sty\relax
978 \def\msg#{\immediate\write16}
979 \msg{File: atbegshi-test2.tex 2016/05/16 v1.17 Test file for plain-TeX}
980 \def\testmsg#1#2{%
981   \msg{}%
982   \msg{*** Test with box (#1), expected page output [#2]}% hash-ok
983 }
984
985 \newbox\voidbox
986 \def\void{\box\voidbox}
987 \begingroup
988   \setbox\voidbox=\void
989 \endgroup
990
991 \count0=0\relax
992 \AtBeginShipout{%
993   \global\advance\count0 by 1\relax
994   \msg{* Inside \string\AtBeginShipout: [\the\count0]}%
995 }
996
997 \AtBeginShipoutFirst{%
998   \msg{* Inside \string\AtBeginShipoutFirst}%
999   Hello World%
1000 }
1001
1002 \testmsg{\string\null}{1}
1003 \shipout\null
1004
1005 \AtBeginShipoutFirst{%
1006   This is too late%
1007 }
1008
1009 \testmsg{void}{1}
1010 \shipout\void
1011
1012 \testmsg{\string\copy255 (not void)}{2}
1013 \setbox255\hbox{\vrule height 10bp width 10bp}
1014 \shipout\copy255 %

```

```

1015
1016 \testmsg{\string\copy255 (again)}{3}
1017 \shipout\copy255 %
1018
1019 \testmsg{\string\box255}{4}
1020 \shipout\box255 %
1021
1022 \testmsg{\string\box255 (again)}{5}
1023 \shipout\box255 %
1024
1025 \testmsg{\string\hbox}{5}
1026 \shipout\hbox{\vrule height 5bp width 20bp}
1027
1028 \testmsg{\string\vbox}{6}
1029 \shipout\vbox{\hrule height 20bp width 5bp}
1030
1031 \testmsg{\string\null, voided by hook}{}
1032 \def\VoidBox{%
1033   \begingroup
1034     \setbox\AtBeginShipoutBox=\box\AtBeginShipoutBox
1035   \endgroup
1036 }
1037 \AtBeginShipout{\VoidBox}
1038 \shipout\null
1039 \def\VoidBox{}
1040
1041 \msg{*** \string\begingroup}
1042 \begingroup
1043   \testmsg{void}{}%
1044   \shipout\void
1045 \msg{*** \string\endgroup}
1046 \endgroup
1047
1048 \msg{*** \string\begingroup}
1049 \begingroup
1050   \testmsg{void}{}%
1051   \shipout\void
1052   \testmsg{\string\null}{8}%
1053   \shipout\null
1054 \msg{*** \string\endgroup}
1055 \endgroup
1056
1057 \testmsg{output routine}{9}
1058 Hello World
1059 \vfill
1060 \eject
1061
1062 \testmsg{\string\null\space(discarded)}{}
1063 \AtBeginShipout{%
1064   \msg{* Inside \string\AtBeginShipout: DISCARD}%
1065   \AtBeginShipoutDiscard
1066 }
1067 \shipout\null
1068
1069 \end
1070 /test2)
1071 (*test3)
1072 \NeedsTeXFormat{LaTeX2e}

```

```

1073 \ProvidesFile{atbegshi-test3.tex}[2016/05/16 v1.17 Test file for LaTeX]
1074 \RequirePackage{color}
1075 \pagecolor{yellow}
1076 \documentclass[a5paper,showtrims]{memoir}
1077 \usepackage{atbegshi}
1078 \AtBeginShipout{%
1079   \setbox\AtBeginShipoutBox=\vbox{%
1080     \vbox to 0pt{%
1081       \kern-1.5in %
1082       \hbox to 0pt{%
1083         \kern-1.5in %
1084         \color{blue}%
1085         \rule{1in}{1in}%
1086         \hss
1087       }%
1088     \vss
1089   }%
1090   \hrule
1091   \hbox{\vrule\box\AtBeginShipoutBox\vrule}%
1092   \hrule
1093 }%
1094 }
1095 \usepackage{eso-pic}
1096 \makeatletter
1097 \ifundefined{@EveryShipout@Init}{%
1098   \typeout{Test skipped}%
1099   \@@end
1100 }{}
1101 \@EveryShipout@Init
1102 \let\@EveryShipout@Init\relax
1103 \makeatother
1104 \AddToShipoutPicture{%
1105   \hspace{.52\paperwidth}%
1106   \colorbox{cyan}{%
1107     \rule{0mm}{\paperheight}%
1108     \hspace{.48\paperwidth}%
1109   }%
1110 }

```

Newer versions of class memoir emulate package crop and prevents its loading. This is undone in next line for this test file.

```

1111 \expandafter\let\csname ver@crop.sty\endcsname\relax
1112 \usepackage[color=red,cross,a4,center]{crop}
1113 \begin{document}
1114 \shipout\null
1115 \shipout\box\csname voidb@x\endcsname
1116 \section{Hello World}
1117 \end{document}
1118 \end{test3}

```

## 5 Installation

### 5.1 Download

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

[CTAN:macros/latex/contrib/oberdiek/atbegshi.dtx](http://ctan.org/macros/latex/contrib/oberdiek/atbegshi.dtx) The source file.

---

<sup>1</sup><http://ctan.org/pkg/atbegshi>

[CTAN:macros/latex/contrib/oberdiek/atbegshi.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 T<sub>E</sub>X Files” ([CTAN:tds/tds.pdf](#)). Directories with `texmf` in their name are usually organized this way.

## 5.2 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/
```

## 5.3 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 atbegshi.dtx
```

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

<code>atbegshi.sty</code>	→ <code>tex/generic/oberdiek/atbegshi.sty</code>
<code>atbegshi.pdf</code>	→ <code>doc/latex/oberdiek/atbegshi.pdf</code>
<code>atbegshi-example1.tex</code>	→ <code>doc/latex/oberdiek/atbegshi-example1.tex</code>
<code>atbegshi-example2.tex</code>	→ <code>doc/latex/oberdiek/atbegshi-example2.tex</code>
<code>test/atbegshi-test1.tex</code>	→ <code>doc/latex/oberdiek/test/atbegshi-test1.tex</code>
<code>test/atbegshi-test2.tex</code>	→ <code>doc/latex/oberdiek/test/atbegshi-test2.tex</code>
<code>test/atbegshi-test3.tex</code>	→ <code>doc/latex/oberdiek/test/atbegshi-test3.tex</code>
<code>atbegshi.dtx</code>	→ <code>source/latex/oberdiek/atbegshi.dtx</code>

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`.

## 5.4 Refresh file name databases

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



## 5.5 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 atbegshi.pdf unpack_files output .
```

**Unpacking with  $\text{\LaTeX}$ .** The `.dtx` chooses its action depending on the format:

**plain  $\text{\TeX}$ :** Run `docstrip` and extract the files.

**$\text{\LaTeX}$ :** Generate the documentation.

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

```
latex \let\install=y\input{atbegshi.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 $\text{\LaTeX}$` :

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

## 6 Catalogue

The following XML file can be used as source for the  [\$\text{\TeX}\$  Catalogue](#). The elements `caption` and `description` are imported from the original XML file from the Catalogue. The name of the XML file in the Catalogue is `atbegshi.xml`.

```
1119 (*catalogue)
1120 <?xml version='1.0' encoding='us-ascii'?>
1121 <!DOCTYPE entry SYSTEM 'catalogue.dtd'>
1122 <entry datestamp='$Date$' modifier='$Author$' id='atbegshi'>
1123   <name>atbegshi</name>
1124   <caption>Execute stuff at \shipout time.</caption>
1125   <authorref id='auth:oberdiek'>
1126     <copyright owner='Heiko Oberdiek' year='2007-2011'>
1127       <license type='lppl1.3'>
1128         <version number='1.17'>
1129         <description>
1130           This package is a modern reimplementation of package
1131           <xref refid='everyshi'>everyshi</xref>, providing various commands
1132           to be executed before a <tt>\shipout</tt> command. It makes use of
1133           e- $\text{\TeX}$ 's facilities if they are available. The package may
1134           be used either with  $\text{\LaTeX}$  or with plain  $\text{\TeX}$ .
1135         </p>
```

```

1136     The package is part of the <xref refid='oberdiek'>oberdiek</xref> bundle.
1137 </description>
1138 <documentation details='Package documentation'
1139     href='ctan:/macros/latex/contrib/oberdiek/atbegshi.pdf' />
1140 <ctan file='true' path='/macros/latex/contrib/oberdiek/atbegshi.dtx' />
1141 <miktex location='oberdiek' />
1142 <texlive location='oberdiek' />
1143 <install path='/macros/latex/contrib/oberdiek/oberdiek.tds.zip' />
1144 </entry>
1145 </catalogue>

```

## 7 History

[2007/04/17 v1.0]

- First version.

[2007/04/18 v1.1]

- New method based on `\lastkern` is used if  $\varepsilon$ -TeX is missing.
- `\AtBeginShipoutDiscard` also resets `\deadcycles`.

[2007/04/19 v1.2]

- `\AtBeginShipoutEarly` removed for simplification reasons.
- Forgotten definition of `\AtBegShi@Info` added.
- Patches for packages `crop` and `everyshi` and class `memoir` added.

[2007/04/26 v1.3]

- Use of package `infwarerr`.
- Catcode section after generic header.

[2007/04/27 v1.4]

- Small optimizations.

[2007/06/06 v1.5]

- `\AtBeginShipoutUpperLeft` added.
- Example added.
- Fix in second test file for newer version of `memoir`.

[2007/09/09 v1.6]

- Catcode section rewritten.

[2008/07/18 v1.7]

- Documentation of `\AtBeginShipoutUpperLeft` fixed and extended.

[2008/07/19 v1.8]

- `\AtBeginShipoutUpperLeftForeground` added.

[2008/07/31 v1.9]

- Second example (TrimBox for dvipdfmx) added.
- No changes in package code.

[2009/12/02 v1.10]

- `\AtBeginShipoutOriginalShipout` added.
- Test file fixed.

[2010/03/01 v1.11]

- Compatibility with ini-TeX except for `\newbox`.

[2010/03/25 v1.12]

- `\AtBeginShipoutNext` can now be used inside `\AtBeginShipoutNext`.

[2010/08/18 v1.13]

- Fixes for `\AtBegShi@CheckDefinable`.

[2010/12/02 v1.14]

- Remove the warning because of void box if the hook calls `.`

[2011/01/30 v1.15]

- Already loaded package files are not input in plain TeX.

[2011/10/05 v1.16]

- `\AtBeginShipoutAddToBox`, `\AtBeginShipoutAddToBoxForeground` added.
- `\AtBeginShipoutBoxWidth`, `\AtBeginShipoutBoxHeight`, `\AtBeginShipoutBoxDepth` added.
- Updates for patches of class memoir.

[2016/05/16 v1.17]

- Documentation updates.

## 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; plain numbers refer to the code lines where the entry is used.

### Symbols

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\@	881, 954	\AtBeginShipoutInit	3, 335, 352, 354
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\@ehd	196	\AtBegShi@Crop@ship	577, 595
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