

The `latexrelease` package^{*}

The L^AT_EX Project

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This file is maintained by the L^AT_EX Project team.
Bug reports can be opened (category `latex`) at
<https://latex-project.org/bugs.html>.

1 Introduction

Prior to the 2015 release of L^AT_EX, essentially no changes had been made to the L^AT_EX format code for some years, with all improvements being instead added to the package `fixltx2e`.

While this worked at a technical level it meant that you had to explicitly opt-in to bug fixes and improvements, and the vast majority of documents did not benefit.

As described in L^AT_EX News 22, a new policy is being implemented in which improvements will now be added to the format by default, and this `latexrelease` package may be used to ensure stability where needed, either by making a new format use an older definition of some commands, or conversely may be used to supply the new definitions for use with an old format.

The basic use is:

```
\RequirePackage[2015/01/01]{latexrelease}  
\documentclass{article}  
....
```

After such a declaration the document will use definitions current in the January 2015 L^AT_EX, whether the actual format being used is older, or newer than that date. In the former case a copy of `latexrelease.sty` would need to be made available for use with the older format. This may be used, for example, to share a document between co-workers using different L^AT_EX releases, or to protect a document from being affected by system updates. As well as the definitions within the format itself, individual packages may use the commands defined here to adjust their definitions to the specified date as described below.

Note that the `latexrelease` package is intended for use at the start of a *document*. Package and class code should not include this package as loading a package should not normally globally reset the effective version of L^AT_EX that is in force, so affecting all other packages used in the document.

The bulk of this package, after some initial setup and option handling consists of a series of `\IncludeInRelease` commands which have been extracted from the

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main source files of the L^AT_EX format. These contain the old and new versions of any commands with modified definitions.

2 Package Options

- *yyyy/mm/dd* or *yyyy-nn-dd* The package accepts any possible L^AT_EX format date as argument, although dates in the future for which the current release of this package has no information will generate a warning. Dates earlier than 2015 will work but will roll back to some point in 2015 when the method was introduced. The `\requestedLaTeXdate` is set to the normalized date argument so that package rollback defaults to the specified date.
- **current** This is the default behaviour, it does not change the effective date of the format but does ensure that the `\IncludeInRelease` command is defined. The `\requestedLaTeXdate` macro is reset to 0 so that package rollback does not use the implicit date.
- **latest** sets the effective date of the format to the release date of this file, so in an older format applies all patches currently available. The `\requestedLaTeXdate` macro is reset to 0 so that package rollback does not use the implicit date.

In all cases, when the package is loaded, the `\sourceLaTeXdate` is defined to be the numerical representation of `\fmtversion` before the rollback/forward actually happens, so it is possible to test from which was the original L^AT_EX version before `latexrelease` was loaded. This is particularly useful when some code in a package has to be redefined differently if rolling backwards in time or forwards.

3 Release Specific Code

The `\IncludeInRelease` mechanism allows the kernel developer to associate code with a specific date to choose different versions of definitions depending on the date specified as an option to the `latexrelease` package. Is also available for use by package authors (or even in a document if necessary).

```
\IncludeInRelease {<code-date>}[<format-date>]{<label>}{<message>}{<code>}\EndIncludeInRelease
```

`{<code-date>}` This date is associated with the `{<code>}` argument and will be compared to the requested date in the option to the `latexrelease`.

`[<format-date>]` This optional argument can be used to specify a format date with the code in addition to the mandatory `{<code-date>}` argument. This can be useful for package developers as described below.

`{<label>}` The `{<label>}` argument is an identifier (string) that within a given package must be a unique label for each related set of optional definitions. Per package at most one code block from all the `\IncludeInRelease` declarations with the same label will be executed.

`{<message>}` The `{<message>}` is an informative string that is used in messages. It has no other function.

⟨*code*⟩ Any $\text{\TeX}$ code after the `\IncludeInRelease` arguments up until the and the following `\EndIncludeInRelease` is to be conditionally included depending on the date of the format as described below.

The `\IncludeInRelease` declarations with a given label should be in reverse chronological order in the file. The one chosen will depend on this order, the effective format version and the date options, as described below.

If your package `mypackage` defines a `\widget` command but has one definition using the features available in the 2015 $\text{\LaTeX}$ release, and a different definition is required for older formats then you can use:

```
\IncludeInRelease{2015/01/01}{\widget}{Widget Definition}
\def\widget{new version}%
\EndIncludeInRelease

\IncludeInRelease{0000/00/00}{\widget}{Widget Definition}
\def\widget{old version}%
\EndIncludeInRelease
```

If a document using this package is used with a format with effective release date of 2015/01/01 or later the new code will be used, otherwise the old code will be used. Note the *effective release date* might be the original $\text{\LaTeX}$ release date as shown at the start of every $\text{\LaTeX}$ job, or it may be set by the `latexrelease` package, so for example a document author who wants to ensure the new version is used could use

```
\RequirePackage[2015/01/01]{latexrelease}
\documentclass{article}
\usepackage{mypackage}
```

If the document is used with a $\text{\LaTeX}$ format from 2014 or before, then `latexrelease` will not have been part of the original distribution, but it may be obtained from a later $\text{\LaTeX}$ release or from CTAN and distributed with the document, it will make an older $\text{\LaTeX}$ release act essentially like the 2015 release.

3.1 Intermediate Package Releases

The above example works well for testing against the latex format but is not always ideal for controlling code by the release date of the *package*. Suppose $\text{\LaTeX}$ is not updated but in March you update the `mypackage` package and modify the definition of `\widget`. You could code the package as:

```
\IncludeInRelease{2015/03/01}{\widget}{Widget Definition}
\def\widget{even newer improved March version}%
\EndIncludeInRelease

\IncludeInRelease{2015/01/01}{\widget}{Widget Definition}
\def\widget{new version}%
\EndIncludeInRelease

\IncludeInRelease{0000/00/00}{\widget}{Widget Definition}
\def\widget{old version}%
\EndIncludeInRelease
```

This would work and allow a document author to choose a date such as

```
\RequirePackage[2015/03/01]{latexrelease}
\documentclass{article}
\usepackage{mypackage}
```

To use the latest version, however it would have disadvantage that until the next release of L^AT_EX, by default, if the document does not use `latexrelease` to specify a date, the new improved code will not be selected as the effective date will be 2015/01/01 and so the first code block will be skipped.

For this reason `\IncludeInRelease` has an optional argument that specifies an alternative date to use if a date option has not been specified to `latexrelease`.

```
\IncludeInRelease{2015/03/01}[2015/01/01]{\widget}{Widget Definition}
\def\widget{even newer improved March version}%
\EndIncludeInRelease

\IncludeInRelease{2015/01/01}{\widget}{Widget Definition}
\def\widget{new version}%
\EndIncludeInRelease

\IncludeInRelease{0000/00/00}{\widget}{Widget Definition}
\def\widget{old version}%
\EndIncludeInRelease
```

Now, by default on a 2015/01/01 L^AT_EX format, the first code block will compare the format date to the optional argument 2015/01/01 and so will execute the *even newer improved* version. The remaining blocks using the `\widget` label argument will all then be skipped.

If on the other hand the document requests an explicit release date using `latexrelease` then this date will be used to decide what code block to include.

3.2 Using `\IncludeInRelease` in Packages

If `\IncludeInRelease` is used within a package then all such conditional code needs to be within such declarations, e.g., it is not possible in the above example to have the “current” definition of `\widget` somewhere in the main code and only the two older definitions inside `\IncludeInRelease` declarations. If you would do this then one of those `\IncludeInRelease` declarations would be included overwriting the even newer code in the main part of the package. As a result your package may get fragmented over time with various `\IncludeInRelease` declarations sprinkled throughout your code or you have to interrupt the reading flow by putting those declarations together but not necessarily in the place where they belong.

To avoid this issue you can use the following coding strategy: place the current `\widget` definition in the main code where it correctly belongs.

```
...
\def\widget {even newer improved March version}
\def\@widget{newly added helper command no defined in older releases}
...
```

Then, near the end of your package place the following:

```
\IncludeInRelease{2015/03/01}[2015/01/01]{\widget}{Widget Definition}
```

```

\EndIncludeInRelease

\IncludeInRelease{2015/01/01}{\widget}{Widget Definition}
\def\widget{new version}%
\let\@widget\@undefined % this doesn't exist in earlier releases
\EndIncludeInRelease

\IncludeInRelease{0000/00/00}{\widget}{Widget Definition}
\def\widget{old version}%
\EndIncludeInRelease

```

This way the empty code block hides the other `\IncludeInRelease` declarations unless there is an explicit request with a date 2015/01/01 or earlier.

Now if you make a further change to `\widget` in the future you simply copy the current definition into the empty block and add a new empty declaration with today's date and the current format date. This way your main code stays readable and the old versions accumulate at the end of the package.¹

The only other “extra effort” necessary when using this approach is that it may be advisable to undo new definitions in the code block for the previous release, e.g., in the above example we undefined `\@widget` as that isn't available in the 2015/01/01 release but was defined in the main code. If all your conditional code is within `\IncludeInRelease` declarations that wouldn't been necessary as the new code only gets defined if that release is chosen.

4 Declaring entire modules

Sometimes a large chunk of code is added as a module to another larger code base. As example of that in the 2020-10-01 release L^AT_EX got a new hook management system, `lthooks`, which was added in one go and, as with all changes to the kernel, it was added to `latexrelease`. However rolling back from a future date to the 2020-10-01 release didn't work because `latexrelease` would try to define again all those commands, which would result in many “already defined” errors and similar issues.

To solve that problem, completely new modules can be defined in `latexrelease` using the commands:

```

\NewModuleRelease{<initial release date>}{<name>}{<message>}
  <module code>
\IncludeInRelease{0000/00/00}{<name>}{<message>}
  <undefine module code>
\EndModuleRelease

```

With that setup, the module `<name>` will be declared to exist only in releases equal or later `<initial release date>`.

If `latexrelease` is rolling backwards or forwards between dates after `<initial release date>`, then all the `<module code>` is skipped, except when inside `<IncludeInRelease>` guards, in which case the code is applied or skipped as discussed above.

If rolling forward from a date before the module's `<initial release date>` to a date after that, then all the `<module code>` is executed to define the module,

¹Of course there may be some cases in which the old code has to be in a specific place within the package as other code depends on it (e.g., if you `\let` something to it). In that case you have to place the code variations in the right place in your package rather than accumulating them at the very end.

and `\IncludeInRelease` guards are executed accordingly, depending on the date declared and the target date.

If `latexrelease` is rolling back to a date before $\langle release\ date \rangle$, then the code in the `\IncludeInRelease` guard dated 0000/00/00 is executed instead to undefine the module. This guard *is not* ended by the usual `\EndIncludeInRelease`, but instead by `\EndModuleRelease`.

Finally, if rolling backwards or forwards between dates both before $\langle initial\ release\ date \rangle$, the entire code between $\langle NewModuleRelease \rangle$ and $\langle EndModuleRelease \rangle$ is entirely skipped.

4.1 Example

Here is an example usage of the structure described above, as it would be used in the L^AT_EX kernel, taking `lthooks` as example:

```
%<*2ekernel|latexrelease>
\ExplSyntaxOn
%<latexrelease>\NewModuleRelease{2020/10/01}{lthooks}%
%<latexrelease>          {The~hook~management~system}
\NewDocumentCommand \NewHook { m }
{ \hook_new:n {#1} }
%<latexrelease>\IncludeInRelease{2021/06/01}{\AddToHook}{Long~argument}
\NewDocumentCommand \AddToHook { m o +m }
{ \hook_gput_code:nnn {#1} {#2} {#3} }
%<latexrelease>\EndIncludeInRelease
%<latexrelease>
%<latexrelease>\IncludeInRelease{2020/10/01}{\AddToHook}{Long~argument}
%<latexrelease>\NewDocumentCommand \AddToHook { m o m }
%<latexrelease> { \hook_gput_code:nnn {#1} {#2} {#3} }
%<latexrelease>\EndIncludeInRelease
%<latexrelease>
%<latexrelease>\IncludeInRelease{0000/00/00}{lthooks}{Undefine~lthooks}
%<latexrelease>\cs_undefine:N \NewHook
%<latexrelease>\cs_undefine:N \AddToHook
%<latexrelease>\EndModuleRelease
\ExplSyntaxOff
%</2ekernel|latexrelease>
```

In the example above, `\NewHook` is declared only once, and unchanged in the next release (2021/06/01 in the example), so it has no `\IncludeInRelease` guards, and will only be defined if needed. `\AddToHook`, on the other hand, changed between the two releases (made up for the example; it didn't really happen) and has an `\IncludeInRelease` block for the current release (off `docstrip` guards, so it goes into the kernel too), and another for the previous release (in `docstrip` guards so it goes only into `latexrelease`).

Note that in the example above, `\ExplSyntaxOn` and `\ExplSyntaxOff` were added *outside* the module code because, as discussed above, sometimes the code outside `\IncludeInRelease` guards may be skipped, but not the code inside them, and in that case the catcodes would be wrong when defining the code.

5 fixltx2e

As noted above, prior to the 2015 L^AT_EX release updates to the L^AT_EX kernel were not made in the format source files but were made available in the fixltx2e package. That package is no longer needed but we generate a small package from this source that just makes a warning message but otherwise does nothing.

6 Implementation

We require at least a somewhat sane version of L^AT_EX 2_ε. Earlier ones were really quite different from one another.

```
1 (*latexrelease)
2 \NeedsTeXFormat{LaTeX2e}[1996/06/01]
```

6.1 Setup

`\sourceLaTeXdate` Store the original L^AT_EX format version as a number in the format YYYYMMDD . This macro has to be defined conditionally, so that it isn't changed in case `latexrelease.sty` is reloaded, but it can't be defined in the kernel only, otherwise `latexrelease.sty` wouldn't work in older L^AT_EX due to the missing macro.

```
3 \ifundefined{sourceLaTeXdate}{%
4   \edef\sourceLaTeXdate{%
5     \expandafter\@parse@version\fmtversion//00\@nil}}{}}%
```

`\IncludeInRelease` These are defined in `ltvers.dtx`.

`\EndIncludeInRelease`

```
6 \DeclareOption*{%
7   \def\@IncludeInRelease#1[#2]{\@IncludeInRelease#1}%
8   \let\requestedpatchdate\CurrentOption}
9 \DeclareOption{latest}{%
10  \let\requestedpatchdate\latexreleaseversion
11  \AtEndOfPackage{\def\requestedLaTeXdate{0}}}
12 \DeclareOption{current}{%
13  \let\requestedpatchdate\fmtversion
14  \AtEndOfPackage{\def\requestedLaTeXdate{0}}}
15 \let\requestedpatchdate\fmtversion
16 \ProcessOptions\relax
```

Sanity check options, it allows some non-legal dates but always ensures `requestedLaTeXdate` gets set to a number. Generate an error if there are any non digit tokens remaining after removing the `//`.

```
17 \def\reserved@a{%
18 \edef\requestedLaTeXdate{\the\count@}%
19 \reserved@b}
20 \def\reserved@b#1\{\%
21 \def\reserved@b{#1}%
22 \ifx\reserved@b\@empty\else
23 \PackageError{latexrelease}%
24   {Unexpected option \requestedpatchdate}%
25   {The option must be of the form yyyy/mm/dd or yyyy-mm-dd}%
26 \fi}
27 \afterassignment\reserved@a
```

```

28 \count@\expandafter
29 \@parse@version\expandafter0\requestedpatchdate//00\@nil\
    less precautions needed for \fmtversion
30 \edef\currentLaTeXdate{%
31   \expandafter\@parse@version\fmtversion//00\@nil}
32 \ifnum\requestedLaTeXdate=\currentLaTeXdate
33 \PackageWarningNoLine{latexrelease}{%
34   Current format date selected, no patches applied}
35 \expandafter\endinput
36 \fi

```

A newer version of latexrelease should have been distributed with the later format.

```

37 \ifnum\currentLaTeXdate
38   >\expandafter\@parse@version\latexreleaseversion//00\@nil
39 \PackageWarningNoLine{latexrelease}{%
40   The current package is for an older LaTeX format:\MessageBreak
41   LaTeX \latexreleaseversion\space\MessageBreak
42   Obtain a newer version of this package!}
43 \expandafter\endinput
44 \fi

```

can't patch into the future, could make this an error but it has some uses to control package updates so allow for now.

```

45 \ifnum\requestedLaTeXdate
46   >\expandafter\@parse@version\latexreleaseversion//00\@nil
47 \PackageWarningNoLine{latexrelease}{%
48   The current package is for LaTeX \latexreleaseversion:\MessageBreak
49   It has no patches beyond that date\MessageBreak
50   There may be an updated version\MessageBreak
51   of this package available from CTAN}
52 \expandafter\endinput
53 \fi

```

Update the format version to the requested date.

```

54 \let\fmtversion\requestedpatchdate
55 \let\currentLaTeXdate\requestedLaTeXdate

```

6.2 Ignoring _new errors when rolling back

Enforce \ExplSyntaxOn and \ExplSyntaxOff to be \relax in latexrelease if they are not yet defined. They are later restored to be undefined if needed.

```

56 \csname ExplSyntaxOn\endcsname
57 \csname ExplSyntaxOff\endcsname

```

Define a set of changes here, but we'll only use them later to make sure they are applied after expl3 is loaded. If loading from a rather old format, we don't have \ExplSyntaxOn yet.

```

58 \begingroup
59   \endlinechar=-1
60   \catcode95=11 % _
61   \catcode58=11 % :
62   \catcode126=10 % ~
63   \catcode32=09 % <space>

```



```

64 \xdef\latexrelease@postltxpl{\unexpanded{%
65 \@@=latexrelease}

```

First we'll define a `\declarecommand` that does `\renewcommand` if the command being defined already exists, and `\newcommand` otherwise.

```

66 \cs_gset_protected:Npn \@@_declare_command:w
67 { \@star@or@long \@@_declare_command:Nw }
68 \cs_gset_protected:Npn \@@_declare_command:Nw #1
69 { \cs_if_exist:NTF #1 { \renewcommand } { \newcommand } #1 }

```

Then define a version of `\e@alloc` that checks if the control sequence being defined already exists, and if so, checks if its meaning is the same as the one that would be defined with the call to `\e@alloc`. If both tests pass, nothing is defined to save a register. This version also takes care of setting `\allocationnumber` to the value it would have after the register is allocated.

```

70 \cs_gset_protected:Npn \@@_e@alloc:NnnnnN #1 #2 #3 #4 #5 #6
71 {
72   \cs_if_free:NTF #6
73   { \use:n }
74   {
75     \exp_after:wN \@@_e@alloc:N
76     \token_to_meaning:N #6 \scan_stop: {#2} #6
77   }
78   { \@@_e@alloc #1 {#2} {#3} {#4} {#5} #6 }
79 }

```

Walk through the meaning of the control sequence token by token, looking for the register allocation number.

```

80 \cs_gset_protected:Npn \@@_e@alloc:N #1
81 {
82   \if_int_compare:w 0 < 0
83   \if_int_compare:w 10 < 9#1 ~ 1 \fi:
84   \if_charcode:w " #1 1 \fi: \exp_stop_f:
85   \tex_afterassignment:D \@@_e@alloc:w
86   \@tempcnta #1
87   \use_i:nnn
88   \fi:
89   \use:n
90   {
91     \if_meaning:w \scan_stop: #1
92     \exp_after:wN \use_iv:nnnn
93     \fi:
94     \@@_e@alloc:N
95   }
96 }

```

When found, check if it is the exact same register as it would be allocated, and if it is, set `\allocationnumber` accordingly and exit, otherwise undefine the register and allocate from scratch.

```

97 \cs_gset_protected:Npn \@@_e@alloc:w #1 \scan_stop: #2 #3
98 {
99   #2 \@@_tmp:w = \@tempcnta
100   \token_if_eq_meaning:NNTF #3 \@@_tmp:w
101   { \int_set_eq:NN \allocationnumber \@tempcnta \use_none:n }
102   { \cs_set_eq:NN #3 \tex_undefined:D \use:n }

```

```
103 }
```

Now create a token list to hold the list of changed commands, and define a temporary macro that will loop through the command list, store each in `\l_@@_restores_tl`, save a copy, and redefine each.

```
104 \tl_clear_new:N \l_@@_restores_tl
105 \cs_gset:Npn \@@_redefines:w #1 #2
106 {
107   \quark_if_recursion_tail_stop:N #1
108   \tl_put_right:Nn \l_@@_restores_tl {#1}
109   \cs_set_eq:cN { @@_ \cs_to_str:N #1 } #1
110   \cs_set_eq:NN #1 #2
111   \@@_redefines:w
112 }
```

The redefinitions below are needed because:

`\__kernel_chk_if_free_cs:N` This function is used ubiquitously in the `l3kernel` to check if a control sequence is definable, and give an error otherwise (similar to `\@ifdefinable`). Making it a no-op is enough for most cases (except when defining new registers);

`\e@alloc` In the case of new registers, we waste an allocation number if we do `\new\meta {thing}` in a register that's already allocated, so the redefinition of `\e@alloc` checks if the new register is really necessary. This code does not clear the register, which might cause problems in the future, if a register is allocated but not properly cleared before using;

`\__kernel_msg_error:nne` This command is used to error on already defined scan marks. Just making the error do nothing is enough, as no action is taken in that case;

`\msg_new:nnnn` Used to define new messages. Making it `_set` is enough. Other msg commands like `\msg_new:nnn` and `\__kernel_msg_new:nnn(n)` are defined in terms of `\msg_new:nnnn`, so there is no need to change the other ones;

`\NewDocumentCommand` Used to define user-level commands in the kernel. Making it equal to `\DeclareDocumentCommand` solves the problem;

`\newcommand` Same as above.

And here we go:

```
113 \@@_redefines:w
114 \__kernel_chk_if_free_cs:N \use_none:n
115 \e@alloc \@@_e@alloc:NnnnnN
116 \__kernel_msg_error:nne \use_none:nnn
117 \msg_new:nnnn \msg_set:nnnn
118 % \NewDocumentCommand \DeclareDocumentCommand % after ltcmd.dtx
119 \newcommand \@@_declare_command:w
120 \q_recursion_tail \q_recursion_tail
121 \q_recursion_stop
```

Finally, redirect the error thrown by `\NewHook` to nowhere so it can be safely reused (the hook isn't redeclared if it already exists). The same happens for `\NewMarkClass`.

```

122 \msg_redirect_name:nnn { hooks } { exists } { none }
123 \msg_redirect_name:nnn { mark } { class-already-defined } { none }

```

The same is also needed for `\NewSocket` and `\NewSocketPlug`.

```

124 \msg_redirect_name:nnn { socket } { already-declared } { none }
125 \msg_redirect_name:nnn { socket } { plug-already-declared } { none }

```

Now a one-off for `ltxcmd.dtx`: we need to make `\NewDocumentCommand` not complain on an already existing command, but it has to be done after `\NewDocumentCommand` is defined, so this is separate from the `\latexrelease@postltxexpl` actions above:

```

126 \cs_gset_protected:Npn \latexrelease@postltxcmd
127 {
128   \@@_redefines:w
129     \NewDocumentCommand \DeclareDocumentCommand
130     \q_recursion_tail \q_recursion_tail
131     \q_recursion_stop
132 }
133 }%
134 \endgroup
135 \latexrelease

```

6.3 Undoing the temp modifications

If `\ExplSyntaxOn` exists (defined and not equal `\relax`), then use the `expl3` restore code, otherwise restore `\ExplSyntaxOn` and `\ExplSyntaxOff` to be undefined.

```

136 (*\latexrelease-finish)
137 \ifundefined{ExplSyntaxOn}%
138   {\let\ExplSyntaxOn\undefined
139     \let\ExplSyntaxOff\undefined
140     \gobble}%
141   {\ExplSyntaxOn
142     \@firstofone}%
143   {%

```

Now just loop through the list of redefined commands and restore their previous meanings.

```

144 \tl_map_inline:Nn \l_@@_restores_tl
145 {
146   \cs_set_eq:Nc #1 { @@_ \cs_to_str:N #1 }
147   \cs_undefine:c { @@_ \cs_to_str:N #1 }
148 }
149 \tl_clear:N \l_@@_restores_tl

```

And restore the silenced error messages.

```

150 \msg_redirect_name:nnn { hooks } { exists } { }
151 \msg_redirect_name:nnn { mark } { class-already-defined } { }
152 \msg_redirect_name:nnn { socket } { already-declared } { }
153 \msg_redirect_name:nnn { socket } { plug-already-declared } { }

154 (@@=)
155 \ExplSyntaxOff}%
156 \latexrelease-finish

```

6.4 Individual Changes

The code for each change will be inserted at this point, extracted from the kernel source files.

6.5 fixltx2e

Generate a stub fixltx2e package:

```
157 (*fixltx2e)
158 \IncludeInRelease{2015/01/01}{\fixltxe}{Old fixltx2e package}
159 \NeedsTeXFormat{LaTeX2e}
160 \PackageWarningNoLine{fixltx2e}{%
161 fixltx2e is not required with releases after 2015\MessageBreak
162 All fixes are now in the LaTeX kernel.\MessageBreak
163 See the latexrelease package for details}
164 \EndIncludeInRelease
165 \IncludeInRelease{0000/00/00}{\fixltxe}{Old fixltx2e package}
166 \def\@outputdblcol{%
167   \if@firstcolumn
168     \global\@firstcolumnfalse
169     \global\setbox\@leftcolumn\copy\@outputbox
170     \splitmaxdepth\maxdimen
171     \vbadness\maxdimen
172     \setbox\@outputbox\vbox{\unvbox\@outputbox\unskip}%
173     \setbox\@outputbox\vsplit\@outputbox to\maxdimen
174     \toks@\expandafter{\topmark}%
175     \xdef\@firstcoltopmark{\the\toks@}%
176     \toks@\expandafter{\splitfirstmark}%
177     \xdef\@firstcolfirstmark{\the\toks@}%
178     \ifx\@firstcolfirstmark\@empty
179       \global\let\@setmarks\relax
180     \else
181       \gdef\@setmarks{%
182         \let\firstmark\@firstcolfirstmark
183         \let\topmark\@firstcoltopmark}%
184     \fi
185   \else
186     \global\@firstcolumntrue
187     \setbox\@outputbox\vbox{%
188       \hb@xt@\textwidth{%
189         \hb@xt@\columnwidth{\box\@leftcolumn \hss}%
190         \hfil
191         {\normalcolor\vrule \width\columnseprule}%
192         \hfil
193         \hb@xt@\columnwidth{\box\@outputbox \hss}}}%
194   \@combinedblfloats
195   \@setmarks
196   \@outputpage
197   \begingroup
198     \dblfloatplacement
199     \startdblcolumn
200     \@whilesw\ifcolmade \fi{\@outputpage\@startdblcolumn}%
201   \endgroup
202 \fi}
```

```

203 \def\end@dblfloat{%
204   \if@twocolumn
205     \endfloatbox
206     \ifnum\@floatpenalty <\z@
207       \@largefloatcheck
208       \global\dp\@currbox1sp %
209       \@cons\@currlist\@currbox
210       \ifnum\@floatpenalty <-\@Mii
211         \penalty -\@Miv
212         \@tempdima\prevdepth
213         \vbox{}}%
214       \prevdepth\@tempdima
215       \penalty\@floatpenalty
216     \else
217       \adjust{\penalty -\@Miv \vbox{}}\penalty\@floatpenalty\@Esphack
218     \fi
219   \fi
220 \else
221   \end@float
222 \fi
223 }
224 \def\@testwrongwidth #1{%
225   \ifdim\dp#1=f@depth
226   \else
227     \global\@testtrue
228   \fi}
229 \let f@depth \z@
230 \def\@dblfloatplacement{\global\@dbltopnum\c@dbltopnumber
231   \global\@dbltoproom \dbltopfraction\@colht
232   \@textmin \@colht
233   \advance \@textmin -\@dbltoproom
234   \@fpmin \dblfloatpagefraction\textheight
235   \@fptop \dblfpsep
236   \@fpsep \dblfpsep
237   \@fpbot \dblfpbot
238   \def f@depth{1sp}}
239 \def \doclearpage {%
240   \ifvoid\footins
241     \setbox\@tempboxa\vsplit\@cclv to\z@ \unvbox\@tempboxa
242     \setbox\@tempboxa\box\@cclv
243     \xdef\@deferlist{\@toplist\@botlist\@deferlist}%
244     \global \let \@toplist \@empty
245     \global \let \@botlist \@empty
246     \global \@colroom \@colht
247     \ifx \@currlist\@empty
248     \else
249       \@latexerr{Float(s) lost}\@ehb
250       \global \let \@currlist \@empty
251     \fi
252     \makefcolumn\@deferlist
253     \@whiles\if@colmade \fi{\@opcol\@makefcolumn\@deferlist}%
254   \if@twocolumn
255     \if@firstcolumn
256       \xdef\@deferlist{\@dbltoplist\@deferlist}%

```

```

257         \global \let \@dbltoplist \@empty
258     \global \@colht \textheight
259     \begingroup
260         \@dblfloatplacement
261         \@makefcolumn\@deferlist
262         \@whiles\if@fcolmade \fi{\@outputpage
263                                     \@makefcolumn\@deferlist}%
264     \endgroup
265     \else
266         \vbox{}\clearpage
267     \fi
268 \fi
269 \ifx\@deferlist\@empty \else\clearpage \fi
270 \else
271     \setbox\@cclv\vbox{\box\@cclv\vfil}%
272     \@makecol\@opcol
273     \clearpage
274 \fi
275 }
276 \def \@startdblcolumn {%
277     \@tryfcolumn \@deferlist
278     \if@fcolmade
279     \else
280         \begingroup
281             \let \reserved@b \@deferlist
282             \global \let \@deferlist \@empty
283             \let \@elt \@sdblcote
284             \reserved@b
285         \endgroup
286     \fi
287 }
288 \def \@addtonextcol{%
289     \begingroup
290         \@insertfalse
291         \@setfloatypecounts
292         \ifnum \@fpstype=8
293         \else
294             \ifnum \@fpstype=24
295             \else
296                 \@flsettextmin
297                 \@reqcolroom \ht\@currbox
298                 \advance \@reqcolroom \@textmin
299                 \ifdim \@colroom>\@reqcolroom
300                     \@flsetnum \@colnum
301                     \ifnum \@colnum>\z@
302                         \@bitor\@currtype\@deferlist
303                         \@testwrongwidth\@currbox
304                     \if@test
305                     \else
306                         \@addtotoporbot
307                     \fi
308                 \fi
309             \fi
310         \fi

```

```

311 \fi
312 \if@insert
313 \else
314 \cons\@deferlist\@currbox
315 \fi
316 \endgroup
317 }
318 \def\@addtodblcol{%
319 \begingroup
320 \@insertfalse
321 \@setfloattypescounts
322 \@getfpsbit \tw@
323 \ifodd\@tempcnta
324 \@flsetnum \@dbltopnum
325 \ifnum \@dbltopnum>\z@
326 \@tempswafalse
327 \ifdim \@dbltoproom>\ht\@currbox
328 \@tempwattrue
329 \else
330 \ifnum \@fpstype<\sist@@n
331 \advance \@dbltoproom \@textmin
332 \ifdim \@dbltoproom>\ht\@currbox
333 \@tempwattrue
334 \fi
335 \advance \@dbltoproom -\@textmin
336 \fi
337 \fi
338 \if@tempswa
339 \@bitor \@currtype \@deferlist
340 \@testwrongwidth\@currbox
341 \if@test
342 \else
343 \@tempdima -\ht\@currbox
344 \advance\@tempdima
345 -\ifx \@dbltoplist\@empty \dbltextfloatsep \else
346 \dblfloatsep \fi
347 \global \advance \@dbltoproom \@tempdima
348 \global \advance \@colht \@tempdima
349 \global \advance \@dbltopnum \m@ne
350 \cons \@dbltoplist \@currbox
351 \inserttrue
352 \fi
353 \fi
354 \fi
355 \fi
356 \if@insert
357 \else
358 \cons\@deferlist\@currbox
359 \fi
360 \endgroup
361 }
362 \def\@addtocurcol{%
363 \@insertfalse
364 \@setfloattypescounts

```

```

365 \ifnum \@fpstype=8
366 \else
367   \ifnum \@fpstype=24
368   \else
369     \flsettextmin
370     \advance \@textmin \@textfloatsheight
371     \reqcolroom \@pageht
372     \ifdim \@textmin>\@reqcolroom
373       \reqcolroom \@textmin
374     \fi
375     \advance \@reqcolroom \ht\@currbox
376     \ifdim \@colroom>\@reqcolroom
377       \flsetnum \@colnum
378       \ifnum \@colnum>\z@
379         \bitor\@currtype\@deferlist
380         \@testwrongwidth\@currbox
381         \if@test
382         \else
383           \bitor\@currtype\@botlist
384           \if@test
385             \@addtobot
386           \else
387             \ifodd \count\@currbox
388               \advance \@reqcolroom \intextsep
389               \ifdim \@colroom>\@reqcolroom
390                 \global \advance \@colnum \m@ne
391                 \global \advance \@textfloatsheight \ht\@currbox
392                 \global \advance \@textfloatsheight 2\intextsep
393                 \cons \@midlist \@currbox
394                 \if@nobreak
395                   \nobreak
396                   \@nobreakfalse
397                   \everypar{}\%
398                 \else
399                   \addpenalty \interlinepenalty
400                 \fi
401                 \vskip \intextsep
402                 \box\@currbox
403                 \penalty\interlinepenalty
404                 \vskip\intextsep
405                 \ifnum\outputpenalty <-\@Mii \vskip -\parskip\fi
406                 \outputpenalty \z@
407                 \@inserttrue
408               \fi
409             \fi
410           \if@insert
411           \else
412             \@addtotoporbot
413           \fi
414         \fi
415       \fi
416     \fi
417   \fi
418 \fi

```



```

419 \fi
420 \if@insert
421 \else
422 \@resetfhps
423 \@cons\@deferlist\@currbox
424 \fi
425 }
426 \def\@xtryfc #1{%
427 \@next\reserved@a\@trylist{}\{}%
428 \@currtype \count #1%
429 \divide\@currtype\@xxxii
430 \multiply\@currtype\@xxxii
431 \@bitor \@currtype \@failedlist
432 \@testfp #1%
433 \@testwrongwidth #1%
434 \ifdim \ht #1>\@colht
435 \@testtrue
436 \fi
437 \if@test
438 \@cons\@failedlist #1%
439 \else
440 \@ytryfc #1%
441 \fi}
442 \def\@ztryfc #1{%
443 \@tempcnta\count #1%
444 \divide\@tempcnta\@xxxii
445 \multiply\@tempcnta\@xxxii
446 \@bitor \@tempcnta {\@failedlist \@flfail}%
447 \@testfp #1%
448 \@testwrongwidth #1%
449 \@tempdimb\@tempdima
450 \advance\@tempdimb\ht #1%
451 \advance\@tempdimb\@fpsep
452 \ifdim \@tempdimb >\@colht
453 \@testtrue
454 \fi
455 \if@test
456 \@cons\@flfail #1%
457 \else
458 \@cons\@flsucceed #1%
459 \@tempdima\@tempdimb
460 \fi}
461 \def\@{\spacefactor\@m{}}
462 \def\@tempa#1#2{#1#2\relax}
463 \ifx\setlength\@tempa
464 \def\setlength#1#2{#1 #2\relax}
465 \fi
466 \def\addpenalty#1{%
467 \ifvmode
468 \if@minipage
469 \else
470 \if@nobreak
471 \else
472 \ifdim\lastskip=\z@

```

```

473         \penalty#1\relax
474     \else
475         \@tempskipb\lastskip
476         \begingroup
477             \advance \@tempskipb
478                 \ifdim\prevdepth>\maxdepth\maxdepth\else
479                     \ifdim \prevdepth = -\@m\p@ \z@ \else \prevdepth \fi
480                 \fi
481             \vskip -\@tempskipb
482             \penalty#1%
483             \vskip\@tempskipb
484         \endgroup
485         \vskip -\@tempskipb
486         \vskip \@tempskipb
487     \fi
488 \fi
489 \fi
490 \else
491     \@noitemerr
492 \fi}
493 \def\@fnsymbol#1{%
494     \ifcase#1\or \TextOrMath\textasteriskcentered *\or
495     \TextOrMath \textdagger \dagger\or
496     \TextOrMath \textdaggerdbl \ddagger \or
497     \TextOrMath \textsection \mathsection\or
498     \TextOrMath \textparagraph \mathparagraph\or
499     \TextOrMath \textbardbl /\or
500     \TextOrMath {\textasteriskcentered\textasteriskcentered}{**}\or
501     \TextOrMath {\textdagger\textdagger}{\dagger\dagger}\or
502     \TextOrMath {\textdaggerdbl\textdaggerdbl}{\ddagger\ddagger}\else
503     \@ctrerr \fi
504 }
505 \begingroup\expandafter\expandafter\expandafter\endgroup
506 \expandafter\ifx\csname eTeXversion\endcsname\relax
507 \DeclareRobustCommand\TextOrMath{%
508     \ifmmode \expandafter\@secondoftwo
509     \else \expandafter\@firstoftwo \fi}
510 \protected@edef\TextOrMath#1#2{\TextOrMath{#1}{#2}}
511 \else
512 \protected\expandafter\def\csname TextOrMath\space\endcsname{%
513     \ifmmode \expandafter\@secondoftwo
514     \else \expandafter\@firstoftwo \fi}
515 \edef\TextOrMath#1#2{%
516     \expandafter\noexpand\csname TextOrMath\space\endcsname
517     {#1}{#2}}
518 \fi
519 \def\@esphack{%
520     \relax
521     \ifhmode
522         \spacefactor\@savsf
523         \ifdim\@savsk>\z@
524             \nobreak \hskip\z@skip % <-----
525             \ignorespaces
526         \fi

```

```

527 \fi}
528 \def\@Esphack{%
529 \relax
530 \ifhmode
531 \spacefactor\@savsf
532 \ifdim\@savsk>\z@
533 \nobreak \hskip\z@skip % <-----
534 \@ignoretrue
535 \ignorespaces
536 \fi
537 \fi}
538 \DeclareRobustCommand\em
539 {\@nomath\em \ifdim \fontdimen\@ne\font >\z@
540 \emminnershape \else \itshape \fi}
541 \def\emminnershape{\upshape}
542 \DeclareRobustCommand* \textsubscript[1]{%
543 \@textsubscript{\selectfont#1}}
544 \def\@textsubscript#1{%
545 {\m@th\ensuremath_{\mbox{\fontsize\sf@size\z@#1}}}}
546 \def\@DeclareMathSizes #1#2#3#4#5{%
547 \@defaultunits\dimen@ #2pt\relax\@nnil
548 \if $#3$%
549 \expandafter\let\csname S@\strip@pt\dimen@\endcsname\math@fontsfalse
550 \else
551 \@defaultunits\dimen@ii #3pt\relax\@nnil
552 \@defaultunits\@tempdima #4pt\relax\@nnil
553 \@defaultunits\@tempdimb #5pt\relax\@nnil
554 \toks@{#1}%
555 \expandafter\xdef\csname S@\strip@pt\dimen@\endcsname{%
556 \gdef\noexpand\tf@size{\strip@pt\dimen@ii}%
557 \gdef\noexpand\sf@size{\strip@pt\@tempdima}%
558 \gdef\noexpand\ssf@size{\strip@pt\@tempdimb}%
559 \the\toks@
560 }%
561 \fi
562 }
563 \providecommand*\MakeRobust[1]{%
564 \@ifundefined{\expandafter\@gobble\string#1}{%
565 \@latex@error{The control sequence '\string#1' is undefined!%
566 \MessageBreak There is nothing here to make robust}%
567 \@eha
568 }%
569 {%
570 \@ifundefined{\expandafter\@gobble\string#1\space}%
571 {%
572 \expandafter\let\csname
573 \expandafter\@gobble\string#1\space\endcsname=#1%
574 \edef\reserved@a{\string#1}%
575 \def\reserved@b{#1}%
576 \edef\reserved@b{\expandafter\strip@prefix\meaning\reserved@b}%
577 \edef#1{%
578 \ifx\reserved@a\reserved@b
579 \noexpand\x@protect\noexpand#1%
580 \fi

```

```

581         \noexpand\protect\expandafter\noexpand
582         \csname\expandafter@gobble\string#1\space\endcsname}%
583     }%
584     {\@latex@info{The control sequence '\string#1' is already robust}}%
585 }%
586 }
587 \MakeRobust\ (
588 \MakeRobust\ )
589 \MakeRobust\ [
590 \MakeRobust\ ]
591 \MakeRobust\ makebox
592 \MakeRobust\ savebox
593 \MakeRobust\ framebox
594 \MakeRobust\ parbox
595 \MakeRobust\ rule
596 \MakeRobust\ raisebox
597 \def\@xfloat #1[#2]{%
598     \@nodocument
599     \def \@cuptype {#1}%
600     \def \@fps {#2}%
601     \@onelevel@sanitize \@fps
602     \def \reserved@a {!}%
603     \ifx \reserved@a \@fps
604         \@fpsadddefault
605     \else
606         \ifx \@fps \@empty
607             \@fpsadddefault
608         \fi
609     \fi
610     \ifhmode
611         \@bsphack
612         \@floatpenalty -\@Mii
613     \else
614         \@floatpenalty-\@Miii
615     \fi
616     \ifinner
617         \@parmoderr\@floatpenalty\z@
618     \else
619         \@next\@currbox\@freelist
620         {%
621             \@tempcnta \sixt@@n
622             \expandafter \@tfor \expandafter \reserved@a
623             \expandafter :\expandafter =\@fps
624             \do
625             {%
626                 \if \reserved@a h%
627                     \ifodd \@tempcnta
628                     \else
629                         \advance \@tempcnta \@ne
630                     \fi
631                 \else\if \reserved@a t%
632                     \@setfpsbit \tw@
633                 \else\if \reserved@a b%
634                     \@setfpsbit 4%

```

```

635         \else\if \reserved@a p%
636             \@setfpsbit 8%
637         \else\if \reserved@a !%
638             \ifnum \@tempcnta>15
639                 \advance\@tempcnta -\sixt@@n\relax
640             \fi
641         \else
642             \@latex@error{Unknown float option '\reserved@a'}%
643             {Option '\reserved@a' ignored and 'p' used.}%
644             \@setfpsbit 8%
645             \fi\fi\fi\fi\fi
646         }%
647         \@tempcntb \csname ftype@\@capytype \endcsname
648         \multiply \@tempcntb \@xxxii
649         \advance \@tempcnta \@tempcntb
650         \global \count\@currbox \@tempcnta
651     }%
652     \@fltovf
653 \fi
654 \global \setbox\@currbox
655     \color@vbox
656     \normalcolor
657     \vbox \bgroup
658         \hsize\columnwidth
659         \@parboxrestore
660         \@floatboxreset
661 }
662 \def\@stpelt#1{\global\csname c@#1\endcsname \m@ne\stepcounter{#1}}
663 \EndIncludeInRelease
664 \fixltx2e

```