

# Changes to the L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> format

© Copyright 2015–2021, L<sup>A</sup>T<sub>E</sub>X3 Project Team.  
All rights reserved.

2021-01-08

## Abstract

This document describes changes that were made to the L<sup>A</sup>T<sub>E</sub>X format since the 2014-05-01 L<sup>A</sup>T<sub>E</sub>X releases.

As announced in [L<sup>A</sup>T<sub>E</sub>X News 22](#), the 2015 L<sup>A</sup>T<sub>E</sub>X release adopts a new policy. Improvements and bug fixes will be made to the format sources, with the `latexrelease` package being available to revert changes to use definitions from an earlier format.

As a summary of changes for a main release will always be available in L<sup>A</sup>T<sub>E</sub>X News, detailed changes are not repeated in this document, but changes in any patch releases will be listed in more detail here.

More detailed change logs are available as `changes.txt` in the base distribution, and full code differences may be browsed via the code repository on GitHub see for example <https://github.com/latex3/latex2e/commits/master>.

## Contents

|           |   |          |
|-----------|---|----------|
| <b>1</b>  | <b>Changes introduced in 2020-10-01 patch 4</b> | <b>3</b> |
| <b>2</b>  | <b>Changes introduced in 2020-10-01 patch 3</b> | <b>3</b> |
| <b>3</b>  | <b>Changes introduced in 2020-10-01 patch 2</b> | <b>3</b> |
| <b>4</b>  | <b>Changes introduced in 2020-10-01 patch 1</b> | <b>3</b> |
| <b>5</b>  | <b>Changes introduced in 2020-10-01</b>         | <b>3</b> |
| <b>6</b>  | <b>Changes introduced in 2020-02-02 patch 5</b> | <b>4</b> |
| <b>7</b>  | <b>Changes introduced in 2020-02-02 patch 4</b> | <b>4</b> |
| <b>8</b>  | <b>Changes introduced in 2020-02-02 patch 3</b> | <b>4</b> |
| <b>9</b>  | <b>Changes introduced in 2020-02-02 patch 2</b> | <b>4</b> |
| <b>10</b> | <b>Changes introduced in 2020-02-02 patch 1</b> | <b>5</b> |
| <b>11</b> | <b>Changes introduced in 2020-02-02</b>         | <b>5</b> |

|           |   |           |
|-----------|---|-----------|
| <b>12</b> | <b>Changes introduced in 2019-10-01 patch 3</b>                                       | <b>5</b>  |
| <b>13</b> | <b>Changes introduced in 2019-10-01 patch 2</b>                                       | <b>5</b>  |
| <b>14</b> | <b>Changes introduced in 2019-10-01 patch 1</b>                                       | <b>5</b>  |
| <b>15</b> | <b>Changes introduced in 2019-10-01</b>   | <b>5</b>  |
| <b>16</b> | <b>Changes introduced in 2018-12-01</b>   | <b>7</b>  |
| <b>17</b> | <b>Changes introduced in 2018-04-01 patch 5</b>                                       | <b>7</b>  |
| <b>18</b> | <b>Changes introduced in 2018-04-01 patch 4</b>                                       | <b>7</b>  |
| <b>19</b> | <b>Changes introduced in 2018-04-01 patch 3</b>                                       | <b>7</b>  |
| <b>20</b> | <b>Changes introduced in 2018-04-01 patch 2</b>                                       | <b>7</b>  |
| <b>21</b> | <b>Changes introduced in 2018-04-01 patch 1</b>                                       | <b>7</b>  |
| <b>22</b> | <b>Changes introduced in 2018-04-01</b>   | <b>8</b>  |
| <b>23</b> | <b>Changes introduced in 2017-04-15</b>   | <b>8</b>  |
| <b>24</b> | <b>Changes introduced in 2017/01/01 patch 3</b>                                       | <b>8</b>  |
| <b>25</b> | <b>Changes introduced in 2017/01/01 patch 2</b>                                       | <b>8</b>  |
| <b>26</b> | <b>Changes introduced in 2017/01/01 patch 1</b>                                       | <b>9</b>  |
| <b>27</b> | <b>Changes introduced in 2017/01/01</b>   | <b>9</b>  |
| <b>28</b> | <b>Changes introduced in 2016/03/31 patch 3</b>                                       | <b>9</b>  |
| <b>29</b> | <b>Changes introduced in 2016/03/31 patch 2</b>                                       | <b>9</b>  |
| <b>30</b> | <b>Changes introduced in 2016/03/31 patch 1</b>                                       | <b>9</b>  |
| <b>31</b> | <b>Changes introduced in 2016/03/31</b>   | <b>9</b>  |
| <b>32</b> | <b>Changes introduced in 2016/02/01</b>   | <b>9</b>  |
| <b>33</b> | <b>Changes introduced in 2015/10/01 patch 2</b>                                       | <b>10</b> |
| <b>34</b> | <b>Changes introduced in 2015/10/01 patch 1</b>                                       | <b>10</b> |
| <b>35</b> | <b>Changes introduced in L<sup>A</sup>T<sub>E</sub>X 2015/10/01</b>                   | <b>10</b> |
| <b>36</b> | <b>Changes introduced in 2015/01/01 patch 2</b>                                       | <b>11</b> |
| <b>37</b> | <b>Changes introduced in 2015/01/01 patch 1</b>                                       | <b>11</b> |
| <b>38</b> | <b>Changes between L<sup>A</sup>T<sub>E</sub>X releases 2014/05/01 and 2015/01/01</b> | <b>11</b> |

## 1 Changes introduced in 2020-10-01 patch 4

This patch fixed two bugs in the hook management: if debugging for the L3 programming layer was turned on it reported inconsistent use of local/global variables. This was a spurious warning but nevertheless disconcerting ([github 463](#)). The other bug was more serious, in some situations a wrong value of `\CurrentFile` inside of file-related hooks could lead to errors ([github 464](#)).

We also added the documentation file `userguide3.pdf` which will become the main home for documenting new features of L<sup>A</sup>T<sub>E</sub>X. At this point in time it covers the `xparse` functionality that has been added to the kernel.

## 2 Changes introduced in 2020-10-01 patch 3

This patch fixed some rollback issues that prevented successful rollback to other release levels in some cases. It also fixed an issue with file hooks involving files with explicit paths ([github 422](#)).

One important change was to handle hook declarations done in the document preamble in a special way, e.g., those done with `\AtBeginDocument`. They are now always executed last and are not subject to the normal code sorting for hooks, because they are nearly always needed to overwrite earlier settings made in packages.

Finally, the NFSS series handling was slightly changed to automatically drop surplus “m”s from series specifications when needed (and warn about them when encountered), e.g., “mc” automatically becomes “c” which is the official NFSS name for a *medium compact* series ([github 453](#)). This was done to improve the fix in 2020-02-02 PL 5.

## 3 Changes introduced in 2020-10-01 patch 2

This patch fixed the passing of options to packages and classes when they are stored in a special place (denoted by `\input@path`) instead of their normal location ([github 414](#)). In that case the options got lost.

## 4 Changes introduced in 2020-10-01 patch 1

This patch fixed a file handling issue: to allow for spaces in file names quotes were used but this upsets Bib<sub>T</sub>E<sub>X</sub> ([github 400](#)). In addition, two rollback issues got corrected.

## 5 Changes introduced in 2020-10-01

Major enhancements in this release include pre-loading of the `xparse` package for producing document-level commands with more complicated argument

signatures and the new hook management system for L<sup>A</sup>T<sub>E</sub>X documented in `lthooks-doc.pdf`, `ltfilehook-doc.pdf` and `ltshipout-doc.pdf`.

In addition there have been many smaller fixes and enhancements. Please see [L<sup>A</sup>T<sub>E</sub>X News 32](#) for an overview of the new features and the change log in `changes.txt` for a more detailed list of individual changes.

## 6 Changes introduced in 2020-02-02 patch 5

The patch 4 dropped a bit too much in certain situations, e.g., it changed a series value of `semibold` (as used by `autoinst`) to `seibold`, rendering it useless. So we now only correct series values if they are a member of the following list: `ulm`, `elm`, `lm`, `slm`, `mm`, `sbm`, `bm`, `ebm`, `ubm`, `muc`, `mec`, `mc`, `msc`, `msx`, `mx`, `mex` or `mux`. Here we assume that people intended to follow the NFSS convention but somehow got it wrong. So we drop one “m” and also add a warning that the `\DeclareFontShape` declaration in question should be updated ([github 293](#)).

## 7 Changes introduced in 2020-02-02 patch 4

In some cases the `filecontents` environment was opening the file for writing without quoting it, so that files with spaces failed ([github 284](#)).

Ensure that `\DeclareFontShape` drops surplus “m” in situations where an `.fd` incorrectly specifies `mc` instead of `c`, etc. ([github 289](#)).

## 8 Changes introduced in 2020-02-02 patch 3

Support the following scenario:

```
\fontfamily{ptm}\selectfont text \textbf{\sffamily bold sans text}
```

The default bold series for `ptm` is `b` so `\textbf` switches to that. The `\sffamily` then tried to find `OT1/cmss/b/n` which doesn’t exist instead of first altering the series default to use `bx` as needed for Computer Modern Sans Serif. This has now been corrected ([github 277](#)).

## 9 Changes introduced in 2020-02-02 patch 2

Correct `\capitalacute`, etc. so that they work in `tabbing` ([github 271](#)). Provide `\@defaultfamilyhook` to support CJK packages ([github 269](#)). Provide a list of `fontenc` loads with their options in `\@fontenc@load@list` so that Babel can determine the right `\latinencoding` value ([github 273](#)).

## 10 Changes introduced in 2020-02-02 patch 1

Fixed a misspelled command name that caused trouble ([github 264](#)). Make `textcomp` package issue only info messages about glyph substitutions ([github 262](#)) and warn if it attempts to run in an old format ([github 260](#)).

## 11 Changes introduced in 2020-02-02

Major enhancements in this release include pre-loading `expl3` to improve startup times, especially with LuaTeX and XeTeX, and extra features in the font selection mechanism. Please see [L<sup>A</sup>T<sub>E</sub>X News 31](#) for an overview of the new features and the change log in `changes.txt` for a more detailed list of individual changes.

## 12 Changes introduced in 2019-10-01 patch 3

Further fixes to the handling of filenames, expand macros (and `\jobname before` removing "`,`" not after.

## 13 Changes introduced in 2019-10-01 patch 2

Further fixes to the handling of filenames, [github 204](#): non-ascii filenames and filenames with spaces and multiple dots should now work in `\includegraphics`.

Reclassify some `luatex` callbacks. Other fixes for Issues raised: [github 198](#), [github 201](#), [github 202](#), [github 205](#).

## 14 Changes introduced in 2019-10-01 patch 1

Adjustments to `\set@curr@file`, and `\@extracolsep`.

Added missing `\else` branch in `nfssfont` so that `\action` is executed if provided.

## 15 Changes introduced in 2019-10-01

Introduced `LATEX-dev` formats for pre testing future `LATEX` releases. Now there's a `latex-base-dev` package on CTAN which contains a pre-release of the `LATEX2ε` kernel and both `TEXLive` and `MiKTEX` include the standard `LATEX` executables (`pdflatex`, `lualatex`, etc.) with `-dev` appended, which use the pre-release format.

The handling of Unicode characters was improved by making them safe inside `\refs` and `\labels`, by using `\ifincsname` to make these characters safe in these contexts ([github 95](#)).

In line with the better handling of Unicode characters, file names can now contain any Unicode character plus spaces, as these cases are now correctly handled by the kernel.

An optional argument was added to the `filecontents` environment, to which a comma-separated list of options can be given. The options include `overwrite` (or `force`), `nosearch`, and `noheader` (which has the same effect as the starred form of the environment). The environment is now allowed anywhere in the document.

A plethora of  $\LaTeX$  commands was made robust so that fewer `\protect` are needed when using some commands in moving arguments. There are a few border cases where it's trickier to make the command robust or where it's not worth it to do so, but most reasonable use cases are covered. The most notable change was `\begin` and `\end`, which are now robust and won't break when used in moving arguments.

An extra `\hskip 1sp` was added to c-column table cells to protect against the presence of an `\unskip` in the table cell ([github 102](#)).

U+012F which is “i with ogonek” should produce an “i” and not a “dotless i”. This has been corrected ([github 122](#)).

The Unicode slots 27E8 and 27E9 have been mapped to `textlangle` and `textrangle` which is the recommended mapping ([github 110](#)).

Basic ligatures (ff, fi, fl, ffi, ffl, ft, st) can now be input as a single unicode character in pdf $\TeX$ , which is useful when copy-pasting ([github 154](#)).

`\InputIfFileExists{foo}{\input{bar}}{}` did not load the files `foo.tex` and `bar.tex` but would load `bar.tex` twice. This has been corrected ([github 109](#)).

The `fncylab` and `varioref` packages changed  $\LaTeX$ 's internal counter prefix commands `p@...` so that they would take the counter value as an argument instead of just acting as a prefix to them. These packages also provided the `\labelformat` macro to change the prefix macro and `\Ref` so that using counters defined that way in the beginning of sentences would have the proper capitalization. These features were added to the  $\LaTeX 2_{\epsilon}$  kernel.

The kernel now says “Trying to load...” instead of “Try loading...” in one of its informal messages to match style of similar messages ([github 107](#)).

`\DeclareErrorFont` would change the font size to 10pt which, when used in the wrong place, would make incorrect font settings in the document. This has now been fixed ([gnats 4399](#)).

The default action of the file `nfssfont.tex` was set to produce a font table, so that one can simply hit enter instead of having to write `\table\bye`.

The  $\LaTeX$  kernel now provides dummy (empty) definitions for the two commands `\conditionally@traceoff` and `\conditionally@traceon` from the `trace` package so they can be used by package developers without worrying about them being defined or not ([github 164](#)).

## 16 Changes introduced in 2018-12-01

Further additions to the characters supported by default in UTF-8. The commands `\guillemetleft` and `\guillemetright` are provided as alias for the names based on the Adobe font names ([github 65](#)).

The use of potrusion in tables of contents is suppressed by default, see <https://tex.stackexchange.com/q/172785>.

The handling of visible space in verbatim was adjusted for [github 69](#) and [github 70](#).

Spaces are removed from the argument passed to BiBTeX, [github 88](#).

New commands `\Hwithstroke` and `\hwithstroke` added to T1 encoding support.

The internal box structure for floats is adjusted to preserve box levels of split hyperlinks, avoiding a fatal pdftex error. [github 94](#).

## 17 Changes introduced in 2018-04-01 patch 5

Improved support for non ASCII filenames on the command line on filesystems using legacy encodings.

Adjusted the new package rollback code so that some edge cases where rollback can not be guaranteed become a warning not an error.

## 18 Changes introduced in 2018-04-01 patch 4

No changes to the format, but `docstrip` adjusted so that non-ASCII `.ins` files work with the new UTF-8 defaults.

## 19 Changes introduced in 2018-04-01 patch 3

Additional adjustments for GitHub issues [github 34](#) and [github 38](#), adjustment to the location of some documentation files, such as `source2e.tex` to be installed in the documentation sources not the default T<sub>E</sub>X input tree.

## 20 Changes introduced in 2018-04-01 patch 2

Additional adjustments for GitHub issues [github 32](#) and [github 33](#).

## 21 Changes introduced in 2018-04-01 patch 1

Make `\UseRawInputEncoding` and `latexrelease` reset `\inputencodingname` when disabling the UTF-8 input handling.

## 22 Changes introduced in 2018-04-01

Further details of changes at this release are given in [L<sup>A</sup>T<sub>E</sub>X News 28](#), but in brief the main changes are as listed below.

The default encoding for files has been changed to UTF-8.

A new possibility to refer to older versions of packages has been added.

New commands previously available in `remreset` and `chngcntr` packages for controlling counters have been added.

The definition of `\@ifundefined` has been refined to use the `e-TeX\ifcsname` primitive when available, and to avoid defining the command being tested to be `\relax` in the case that it was previously undefined.

## 23 Changes introduced in 2017-04-15

Optionally, L<sup>A</sup>T<sub>E</sub>X format and package dates may use ISO style dates with - rather than /.

For Unicode T<sub>E</sub>Xs, made further adjustments to the composite accent code in `tuenc.def`, and further updates tracking changes in LuaT<sub>E</sub>X, now at 1.04.

Previously defining an encoding-specific composite with an undeclared accent (or an accent declared later) gave no error, but did nothing useful. L<sup>A</sup>T<sub>E</sub>X will now detect this and give the accent command a default definition as an error, allowing the declared composite to work as intended.

The definition of `\-` is adjusted to match the comments in [gnats 3855](#) to accommodate non standard settings of `\hyphenchar`.

In `parboxes` and similar settings, `\lineskiplimit` is now reset (to the existing default value, `\normallineskiplimit`). See <https://tex.stackexchange.com/a/359934>.

The code for `\newpage` has been adjusted to add a test on the value of `\prevdepth` so that the depth of the last line is preserved in forced page breaks.

## 24 Changes introduced in 2017/01/01 patch 3

Emergency patch to correct a typo in a change introduced in patch 2.

## 25 Changes introduced in 2017/01/01 patch 2

More adjustments for TU encoding, allowing for characters missing in common system fonts. Additional `fd` files for Latin Modern variants are included in the documented sources.



## 26 Changes introduced in 2017/01/01 patch 1

Fixes to TU encoding definitions for LuaTeX and XeTeX.

## 27 Changes introduced in 2017/01/01

A new test is added during format making that eTeX extensions are available. As noted in L<sup>A</sup>TeX news, eTeX will now be required to build L<sup>A</sup>TeX.

Further updates tracking changes for LuaTeX 1.0.

The definition of `\showhyphens` is changed in formats built with XeTeX, as the original version, inherited from plain TeX does not work with Xe-TeX.

Changes to the default encoding used by LuaTeX and XeTeX formats to be TU (Unicode) rather than OT1 (7 bit legacy TeX encoding).

## 28 Changes introduced in 2016/03/31 patch 3

Fixes to `\newinsert` and `\extrafloats`.

## 29 Changes introduced in 2016/03/31 patch 2

Adjustments to `\c{g}` in OT1 encoding.

## 30 Changes introduced in 2016/03/31 patch 1

Adjust the upper limit for Character Class allocation in Xe-TeX to 4096 to match a change in Xe-TeX.

## 31 Changes introduced in 2016/03/31

Modify picture mode as suggested in latex/4452 to avoid leaders of almost zero length.

Modify the checks in `\DeclareMathSymbol` and related commands so that they do not give errors with new LuaTeX releases.

## 32 Changes introduced in 2016/02/01

Adjustments to LuaTeX support to match changes to the LuaTeX engine, and to the character class allocation in XeTeX.

Load Unicode data from new generic `unicode-data` distribution.

## 33 Changes introduced in 2015/10/01 patch 2

This release fixes the behavior of the allocation mechanism if the switch from the standard to extended pool takes place within a group.

## 34 Changes introduced in 2015/10/01 patch 1

This release allows `latexrelease` to revert the LuaTeX-specific changes, in particular fixing an incorrect date in part of the mechanism and adding a method to disable callback management entirely.

## 35 Changes introduced in L<sup>A</sup>T<sub>E</sub>X 2015/10/01

### 35.1 LuaTeX allocation

Almost all changes at this release relate to incorporating allocation macros for `luatex` into the format as done for `etex` and `xetex` in 2015/01/01. For details see `lAuatex.dtx` or [L<sup>A</sup>T<sub>E</sub>X News 22](#). `lAuatex.dtx` now forms a new chapter (N) in the documented sources, `source2e.tex`.

### 35.2 Increased number of floats

The default float list has been increased from 18 to 52 registers if eTeX is available. The list can be increased further using `\extrafloats` however this default allocation uses classic registers below 256 so the registers are also available for `\newinsert` as described below.

### 35.3 Improved `\newinsert`

The command `\newinsert` has been extended to take registers from the lists of free float registers once the classic register allocation is used up. This should make it highly unlikely to get “no room” errors on register allocation assuming the format is used with an eTeX based TeX engine.

### 35.4 New accent, `\textcommabelow` ([pr/4414](#))

The command `\textcommabelow` has been added. This is mainly intended for Romanian letters Ș ș Ț ț.

### 35.5 Unicode 8

The file `unicode-letters.def` used to initialize character data in Unicode TeX variants has been regenerated from data files updated to Unicode 8.

## 36 Changes introduced in 2015/01/01 patch 2

There were no changes to the format at this release, but the sources were fixed to fix bug latex/4434 affecting bottom float positioning if the latexrelease package was used.

## 37 Changes introduced in 2015/01/01 patch 1

This release re-introduces the “Patch Level” scheme for identifying releases between main “dated” releases. Early L<sup>A</sup>T<sub>E</sub>X<sub>2 $\epsilon$</sub>  releases included a mechanism whereby updates could be provided by a *patch file*. This was mainly intended to allow updates to be made without downloading the full sources again, which was an important consideration with download speeds and costs at the time.

The new mechanism incorporates any changes directly into the sources, but having the patch level identified in the banner allows the L<sup>A</sup>T<sub>E</sub>X release to be identified, even if (as in this case) most of the changes do not affect the format but affect other base packages such as latexrelease and inputenc. The patch level is shown in the banner at the start of the job, but does not affect the date handling of the `\IncludeInRelease` mechanism.

Apart from re-arranging the version banner, the only change in the format is that `\newtoks` was accidentally defined twice, using the old and new allocation scheme described in Section 38.2. The old definition is now only in the latexrelease package, for use when emulating old formats.

## 38 Changes between L<sup>A</sup>T<sub>E</sub>X releases 2014/05/01 and 2015/01/01<sup>1</sup>

### 38.1 Support for L<sup>A</sup>T<sub>E</sub>X version changes

```
\includeInRelease{<date>}[<date>]{<label>}{<message>}{<code>}
```

The `\includeInRelease` command has been added to support backward and forward compatibility for the L<sup>A</sup>T<sub>E</sub>X format. It supports the declaration of conditional code that can be loaded based on options given to the latexrelease package. Its use is described in detail in the latexrelease package documentation.

### 38.2 New Allocation Code

Previously `\newcount` and related commands were based on classic TeX and only allocated in the range 0–255. This was extended (in different ways) for e<sub>T</sub><sub>E</sub>X in the `etex` package and in the `xelatex.ini` and `lualatex.ini` files used in those formats. Related to this the number of boxes allocated to store floats

---

<sup>1</sup>Much of this text is taken from fixltx2e package which was formerly used to make such changes available separately.

was limited. This was extended to a certain extent in the `morefloats` package (by Don Hosek and H.-Martin Muench) but the new allocation incorporates float allocation directly and supports much larger float lists using the extended registers.

The new code allocates registers in the full extended range ( $2^{15} - 1$  for `etex` and `xelatex`,  $2^{16} - 1$  for `lualatex`). In addition a new command `\extrafloats` is provided.

```
\extrafloats{<number>}
```

This allocates additional registers for the  $\LaTeX$  float system to hold figures and tables etc. Similar functionality has been available via the `morefloats` package but this is a different implementation using extended e- $\TeX$  registers when available so allows many more registers to be reserved for floats as they are allocated from a pool of 32 or 64 thousand rather than 256 registers, depending on the engine in use.

```
\newmarks{<command>}
```

e- $\TeX$  only, previously available via the `etex` package. Allocates commands to use the extended e- $\TeX$  mark mechanism.

```
\newXeTeXintercharclass{<command>}
```

Xe- $\TeX$  only, previously in the Xe- $\LaTeX$  format, but added via `xelatex.ini` not part of the core release. Allocates commands to use the Xe- $\TeX$  character class mechanism.

### 38.3 e- $\TeX$ tracing if available

`\loggingall` (Usually used via `\tracingall`) is extended to enable additional e- $\TeX$  tracing if e- $\TeX$  is available. (`\tracingall` extension has been available as part of the `etex` package previously).

Also based on code from the `etex` package, a command `\tracingnone` is added to reverse the effects of `\tracingall` and turn off all primitive  $\TeX$  tracing. A new command `\hideoutput` has been added which resets the tracing parameters set by `\showoutput`.

### 38.4 `\textsubscript` not defined in `latex.ltx` (pr/3492)

```
>Number:          3492
>Category:        latex
>Synopsis:        \textsubscript not defined in latex.ltx
>Arrival-Date:    Tue Jan 14 23:01:00 CET 2003
>Originator:      Ionel Mugurel Ciobica
```

I use `\textsubscript` much more often than `\textsuperscript`, and `\textsubscript` it is not defined in `latex.ltx`. Could you please consider including the definition of `\textsubscript` in the `latex.ltx` for the next versions of LaTeX. Thank you.

## 38.5 \@ discards spaces when moving (pr/3039)

>Number: 3039  
>Category: latex  
>Synopsis: \@ discards spaces when moving  
>Arrival-Date: Sat May 22 09:01:06 1999  
>Originator: Donald Arseneau  
>Description:  
The \@ command expands to \spacefactor\@m in auxiliary files,  
which then ignores following spaces when it is reprocessed.

## 38.6 1-col fig can come before earlier 2-col fig (pr/2346)

>Number: 2346  
>Category: latex  
>Synopsis: 2-col: 1-col fig can come before earlier 2-col fig  
>Arrival-Date: Wed Dec 18 15:41:07 1996  
>Originator: bil kleb  
>Description:  
as documented in Lamport's book, p. 198, concerning figure  
placement, "a figure will not be printed before an earlier  
figure, and a table will not be printed before an earlier  
table." however, there is a footnote stating, "However,  
in two-column page style, a single-column figure can come before  
an earlier double-column figure, and vice versa."

This twocolumn behavior is undesirable---at least by me and  
most professional organizations i publish in. ed snyzter developed  
a hack fix for 2.09 several years ago which links the two  
counters, but i have not run across a similar "fix" for 2e...

Originally fixed in package fix2col which was merged into this package. Docu-  
mentation and code from this package have been merged into this file.

### 38.6.1 Notes on the Implementation Strategy

The standard output routine maintains two lists of floats that have been 'de-  
ferred' for later consideration. One list for single column floats, and one for  
double column floats (which are always immediately put onto their deferred  
list). This mechanism means that L<sup>A</sup>T<sub>E</sub>X 'knows' which type of float is con-  
tained in each box by the list that it is processing, but having two lists means  
that there is no mechanism for preserving the order between the floats in each  
list.

The solution to this problem consists of two small changes to the output routine.

Firstly, abandon the 'double column float list' \@dbldeferlist and change  
every command where it is used so that instead the same \@deferlist is used  
as for single column floats. That one change ensures that double and single  
column floats stay in the same sequence, but as L<sup>A</sup>T<sub>E</sub>X no longer 'knows' whether  
a float is double or single column, it will happily insert a double float into a  
single column, overprinting the other column, or the margin.

The second change is to provide an alternative mechanism for recording the two column floats.  $\text{\LaTeX}$  already has a compact mechanism for recording float information, an integer count register assigned to each float records information about the ‘type’ of float ‘figure’, ‘table’ and the position information ‘htp’ etc.

The type information is stored in the ‘high’ bits, one bit position (above ‘32’) allocated to each float type. The ‘low’ bits store information about the allowed positions, one bit each allocated for `h t b p`. In the  $\text{\LaTeX}2.09$  system, the bit corresponding to ‘16’ formed a ‘boundary’ between these two sets of information, and it was never actually used by the system. Ed Sznyter’s `fixfloats` package not unreasonably used this position to store the double column information, setting the bit for double column floats. Then at each point in the output routine at which a float is committed to a certain region, an additional check must be made to check that the float is (or is not) double column. If it spans the wrong number of columns it is deferred rather than being added.

Unfortunately the bit ‘16’ is not available in  $\text{\LaTeX}2_{\epsilon}$ . It is used to encode the extra float position possibility ‘!’ that was added in that system. It would be possible to use position ‘32’ and to move the flags for ‘table’, ‘figure’,... up one position, to start at 64, but this would mean that in principle one less float type would be supported, and more importantly is likely to break any other packages that assume anything about the output routine internals. So here I instead use another mechanism for flagging double column floats: By default all floats have depth `0pt`. This package arranges that double column ones have depth `1sp`. This information may then be used in the same manner as in the `fixfloats` package, to defer any floats that are not of the correct column spanning type.

### 38.7 Infinite glue found (pr/4023 and pr/2346)

The fix for pr/2346 did not work as intended when used in conjunction with `\enlargethispage` as the latter introduced an infinite negative glue at the bottom of the page. That in turn make a `\vsplit` operation to get at the column marks invalid.

### 38.8 Wrong header for twocolumn (pr/2613)

```
>Number:          2613
>Category:        latex
>Synopsis:         wrong headline for twocolumn
>Arrival-Date:    Mon Sep 22 16:41:09 1997
>Originator:      Daniel Reischert
>Description:
When setting the document in two columns
the headline shows the top mark of the second column,
but it should show the top mark of the first column.
```

Originally fixed in package `fix2col` which was merged into this package. Documentation and code from this package have been merged into this file.

### 38.8.1 Notes on the Implementation Strategy

The standard L<sup>A</sup>T<sub>E</sub>X twocolumn system works internally by making each column a separate ‘page’ that is passed independently to T<sub>E</sub>X’s page breaker. (Unlike say the multicol package, where all columns are gathered together and then split into columns later, using `\vsplit`.) This means that the primitive T<sub>E</sub>X marks that are normally used for header information, are globally reset after the first column. By default L<sup>A</sup>T<sub>E</sub>X does nothing about this. A good solution is provided by Piet van Oostrum (building on earlier work of Joe Pallas) in his `fixmarks` package.

After the first column box has been collected the mark information for that box is saved, so that any `\firstmark` can be ‘artificially’ used to set the page-level marks after the second column has been collected. (The second column `\firstmark` is not normally required.) Unfortunately T<sub>E</sub>X does not provide a direct way of knowing if any marks are in the page, `\firstmark` always has a value from previous pages, even if there is no mark in this page. The solution is to make a copy of the box and then `\vsplit` it so that any marks show up as `\splitfirstmark`.

The use of `\vsplit` does mean that the output routine will globally change the value of `\splitfirstmark` and `\splitbotmark`. The `fixmarks` package goes to some trouble to save and restore these values so that the output routine does *not* change the values. This part of `fixmarks` is not copied here as it is quite costly (having to be run on every page) and there is no reason why anyone writing code using `\vsplit` should allow the output routine to be triggered before the split marks have been accessed.

### 38.9 `\setlength` produces error if used with registers like `\dimen0` (pr/3066)

```
>Number:      3066
>Category:    latex
>Synopsis:    \setlength{\dimen0}{10pt}
>Arrival-Date: Tue Jul  6 15:01:06 1999
>Originator:  Heiko Oberdiek
>Description:
The current implementation of \setlength causes an error,
because the length specification isn't terminated properly.
More safe:
\def\setlength#1#2{#1=#2\relax}
```

### 38.10 Fewer fragile commands

```
>Number:      3816
>Category:    latex
>Synopsis:    Argument of \@sect has an extra }.
>Arrival-Date: Sat Oct 22 23:11:01 +0200 2005
>Originator:  Susanne Wunsch
```

Use of a `\raisebox` in `\section{}` produces the error message mentioned in the subject.

PR latex/1738 described a similar problem, which has been solved 10 years ago. Protecting the `\raisebox` with `\protect` solved my problem as well, but wouldn't it make sense to have a similar fix as in the PR?

It is particularly confusing, that an unprotected `\raisebox` in a `\section*-environment` works fine, while in a `\section-environment` produces error.

While not technically a bug, in this day and age there are few reasons why commands taking optional arguments should not be robust.

### 38.10.1 Notes on the implementation strategy

Rather than changing the kernel macros to be robust, we have decided to add the macro `\MakeRobust\MakeRobust` in `fixltx2e` so that users can easily turn fragile macros into robust ones. A macro `\foo` is made robust by doing the simple `\MakeRobust{\foo}`. `fixltx2e` makes the following kernel macros robust: `\(, \)`, `\[, \]`, `\makebox`, `\savebox`, `\framebox`, `\parbox`, `\rule` and `\raisebox`.

... TODO ... fleqn vesion of `\[\]`

### 38.11 `\addpenalty` ruins flush-bottom (pr/3073)

```
>Number:          3073
>Category:        latex
>Synopsis:        \addpenalty ruins flush-bottom
>Arrival-Date:    Sat Jul 17 05:11:05 1999
>Originator:      Donald Arseneau
>Description:
Just to keep in mind for further development eh?
A page break at an \addpenalty after \vspace does *not*
give a flush-bottom page. (The intent of \addpenalty is
apparently just to preserve the flush bottom by putting
the breakpoint 'above' the skip.)
```

### 38.12 Within counters only reset next level down (pr4393)

This is actually implicitly documented behavior in the  $\LaTeX$  Manual that states that `\stepcounter` resets all counters marked "within". However it means that if, for example, theorems are numbered within sections and you start a new chapter in a book, the section counter is reset to zero but the theorem counter is not until the first section appears. Thus a theorem directly within the chapter body (without a new section) would show an incremented number relative to the last theorem of the previous chapter.

For this reason we are now resetting all levels of within in one go even if that means that some of these resets may happen several times unnecessarily.



### 38.13 Check the optional arguments of floats

By default LaTeX silently ignores unknown letters in the optional arguments of floats. `\begin{figure}[tB]` the B is ignored so it acts like `\begin{figure}[t]`. However `\begin{figure}[B]` does *not* act like `\begin{figure}[]` as the check for an empty argument, or unsupplied argument, is earlier. `[]` causes the default float placement to be used, but `[B]` means that *no* float area is allowed and so the float will not be placed until the next `\clearpage` or end of document, no warning is given.

This package adds a check on each letter, and if it not one of `!tbhp` then an error is given and the code acts as if `p` had been used, so that the float may be placed somewhere.

### 38.14 `\DeclareMathSizes` only take pts. (pr/3693)

```
>Number:      3693
>Category:    latex
>Synopsis:    \DeclareMathSizes only take pts.
>Arrival-Date:  Fri Jun 11 16:21:00 CEST 2004
>Originator:  Morten Hoegholm
```

The last three arguments of `\@DeclareMathSizes` cannot take a dimension as argument, making it inconsistent with the rest of the font changing commands and itself, as the second argument can take a dimension specification.

### 38.15 No hyphenation in first word after float environment (pr/3498)

```
>Number:      3498
>Category:    latex
>Synopsis:    No hyphenation in first word after float environment
>Arrival-Date:  Thu Jan 30 13:21:00 CET 2003
>Originator:  Harald Harders
```

If a float environment (`figure`, `table`) is written within a paragraph, the first word after the environment is not hyphenated.

### 38.16 `\fnsymbol` should use text symbols (pr/3400)

```
>Number:      3400
>Category:    latex
>Synopsis:    \fnsymbol should use text symbols if possible
>Arrival-Date:  Fri Jan 04 20:41:00 CET 2002
>Originator:  Walter Schmidt
```

The `\fnsymbol` command can be used in both text and math mode. The symbols produced are, however, always taken from the math fonts. As a result, they may not match the text

fonts, even if the symbols are actually available, for instance from the TS1 encoding. Since `\fnsymbol` is primarily used for footnotes in text, this should be fixed, IMO.

### 38.17 `\footnotemark[x]` crashes with `fixltx2e.sty` (pr/3752)

```
>Number:      3752
>Category:    tools
>Synopsis:    feature \footnotemark[x] crashes with fixltx2e.sty
>Arrival-Date:  Fri Dec 17 10:11:00 +0100 2004
>Originator:  Stefan Pofahl
```

```
If I use /fnsymbol together with fixltx2e.sty I can not use
optional parameter [num]
\footnotemark[1] is not showing the mark number 1 but
the mark \value{footnote}.
```

This bug was related to pr/3400, where `\@fnsymbol` was made robust.

#### 38.17.1 Notes on the implementation strategy

Pr/3400 made `\@fnsymbol` decide between text-mode and math-mode, which requires a certain level of robustness somewhere as the decision between text and math must be made at typesetting time and not when inside `\protected@edef` or similar commands. One way of dealing with this is to make sure the value seen by `\@fnsymbol` is a fully expanded number, which could be handled by code such as

```
\def\fnsymbol#1{\expandafter\@fnsymbol
\expandafter{\the\csname c@#1\endcsname}}
```

This would be a good solution if everybody used the high level commands only by writing code like `\fnsymbol{footnote}`. Unfortunately many classes (including the standard classes) and packages use the internal forms directly as in `\@fnsymbol\c@footnote` so the easy solution of changing `\fnsymbol` would break code that had worked for the past 20 years.

Therefore the implementation here makes `\@fnsymbol` itself a non-robust command again and instead uses a new robust command `\TextOrMath\TextOrMath`, which will take care of typesetting either the math or the text symbol. In order to do so, we face an age old problem and unsolvable problem in  $\TeX$ : A reliable test for math mode that doesn't destroy kerning. Fortunately this problem can be solved when using  $e\TeX$  so if you use this as engine for your  $\LaTeX$  format, as recommended by the  $\LaTeX$ 3 Project, you will get a fully functioning `\TextOrMath` command with no side effects. If you use regular  $\TeX$  as engine for your  $\LaTeX$  format then we have to choose between the lesser of two evils: 1) breaking ligatures and preventing kerning or 2) face the risk of choosing text-mode at the beginning of an alignment cell, which was supposed to be math-mode. We have decided upon 1) as is customary for regular robust commands in  $\LaTeX$ .