

The ltxcmds package

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Abstract

The package `ltxcmds` exports some utility macros from the \LaTeX kernel into a separate namespace and also provides them for other formats such as `plain-TeX`.

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

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1 Documentation

1.1 Introduction

Many of my packages also support other formats such as plain- \TeX . Because I am rather familiar with the utility macros from \LaTeX 's kernel (e.g. `\@gobble`, `\@firstoftwo`), I found myself rewriting them again and again, because they are lacking in plain- \TeX .

Therefore this package provides often used macros and similar ones with the name prefix `\ltx@`. This avoids also faulty redefinitions. I remember an example where a package redefined `\@firstoftwo` with forgetting `\long`.

1.2 Numbers

<code>\ltx@zero</code>	→	0
<code>\ltx@one</code>	→	1
<code>\ltx@two</code>	→	2
<code>\ltx@ccclv</code>	→	255
<code>\ltx@minusone</code>	→	-1

These commands are numbers 0, 1, 2, 255 and -1. They are not digits and a space is not gobbled afterwards. Macro `\ltx@minusone` is available since version 2010/12/12 v1.15.

1.3 Scratch registers

Following the conventions of plain \TeX and \LaTeX the first ten registers are free to use. Even numbered registers are for local, odd numbered for global use.

<code>\ltx@(Loc, Glob)(Toks, Dimen, Skip)(A, B, C, D, E)</code>

The name consists of the prefix `\ltx@`, then `Loc` or `Glob` for local or global usage follows. The register type is given by `Toks` for token register, `Dimen` for dimen register and `Skip` for skip register. As last part the registers are numbered from A to E. Example: `\ltx@LocToksA`.

Since 2011/04/14 v1.19.

1.4 Argument killers

<code>\ltx@gobble {⟨1⟩}</code>	→
<code>\ltx@gobbletwo {⟨1⟩} {⟨2⟩}</code>	→
<code>\ltx@gobblethree {⟨1⟩} {⟨2⟩} {⟨3⟩}</code>	→
<code>\ltx@gobblefour {⟨1⟩} {⟨2⟩} {⟨3⟩} {⟨4⟩}</code>	→

<code>\ltx@GobbleNum {⟨num⟩} {⟨1⟩} {⟨2⟩} ... {⟨⟨num⟩⟩}</code>	→
---	---

The first argument `⟨num⟩` of macro `\ltx@GobbleNum` specifies, how many following arguments are eaten. Macro `\ltx@GobbleNum` is expandable in exact two expansion steps.

1.5 Argument grabbers

<code>\ltx@firstofone {⟨1⟩}</code>	→	⟨1⟩
<code>\ltx@firstoftwo {⟨1⟩} {⟨2⟩}</code>	→	⟨1⟩
<code>\ltx@secondoftwo {⟨1⟩} {⟨2⟩}</code>	→	⟨2⟩
<code>\ltx@firstofthree {⟨1⟩} {⟨2⟩} {⟨3⟩}</code>	→	⟨1⟩
<code>\ltx@secondofthree {⟨1⟩} {⟨2⟩} {⟨3⟩}</code>	→	⟨2⟩
<code>\ltx@thirdofthree {⟨1⟩} {⟨2⟩} {⟨3⟩}</code>	→	⟨3⟩
<code>\ltx@firstoffour {⟨1⟩} {⟨2⟩} {⟨3⟩} {⟨4⟩}</code>	→	⟨1⟩
<code>\ltx@secondoffour {⟨1⟩} {⟨2⟩} {⟨3⟩} {⟨4⟩}</code>	→	⟨2⟩
<code>\ltx@thirdoffour {⟨1⟩} {⟨2⟩} {⟨3⟩} {⟨4⟩}</code>	→	⟨3⟩
<code>\ltx@fourthoffour {⟨1⟩} {⟨2⟩} {⟨3⟩} {⟨4⟩}</code>	→	⟨4⟩

Macros `\ltx@firstofthree`, `\ltx@secondofthree` and `\ltx@thirdofthree` were added in version 2010/11/12 v1.11. Macros `\ltx@firstoffour`, ..., `\ltx@fourthoffour` were added in version 2011/02/04 v1.16.

1.6 List helpers

<code>\ltx@carzero ... \@nil</code>	→	
<code>\ltx@cdrzero ... \@nil</code>	→	...

<code>\ltx@car {⟨1⟩} ... \@nil</code>	→	⟨1⟩
<code>\ltx@cdr {⟨1⟩} ... \@nil</code>	→	...

<code>\ltx@cartwo {⟨1⟩} {⟨2⟩} ... \@nil</code>	→	⟨1⟩⟨2⟩
<code>\ltx@carsecond {⟨1⟩} {⟨2⟩} ... \@nil</code>	→	⟨2⟩
<code>\ltx@cdrtwo {⟨1⟩} {⟨2⟩} ... \@nil</code>	→	...

<code>\ltx@carthree {⟨1⟩} {⟨2⟩} {⟨3⟩} ... \@nil</code>	→	⟨1⟩⟨2⟩⟨3⟩
<code>\ltx@carthird {⟨1⟩} {⟨2⟩} {⟨3⟩} ... \@nil</code>	→	⟨3⟩
<code>\ltx@cdrthree {⟨1⟩} {⟨2⟩} {⟨3⟩} ... \@nil</code>	→	...

<code>\ltx@carfour {⟨1⟩} {⟨2⟩} {⟨3⟩} {⟨4⟩} ... \@nil</code>	→	⟨1⟩⟨2⟩⟨3⟩⟨4⟩
<code>\ltx@carfourth {⟨1⟩} {⟨2⟩} {⟨3⟩} {⟨4⟩} ... \@nil</code>	→	⟨4⟩
<code>\ltx@cdrfour {⟨1⟩} {⟨2⟩} {⟨3⟩} {⟨4⟩} ... \@nil</code>	→	...

<code>\ltx@CarNum {⟨num⟩} {⟨1⟩} ... {⟨⟨num⟩⟩} {⟨⟨num⟩+1⟩} ... \@nil</code>	→	{⟨1⟩} ... {⟨⟨num⟩⟩} ...
<code>\ltx@CarNumth {⟨num⟩} {⟨1⟩} ... {⟨⟨num⟩⟩} {⟨⟨num⟩+1⟩} ... \@nil</code>	→	{⟨⟨num⟩⟩} ...
<code>\ltx@CdrNum {⟨num⟩} {⟨1⟩} ... {⟨⟨num⟩⟩} {⟨⟨num⟩+1⟩} ... \@nil</code>	→	{⟨⟨num⟩+1⟩} ...

Macros with uppercase letters are expandable in two expansion steps. Changes in version 2023-12-04 v1.26:

- Macros `\ltx@carsecond`, `\ltx@carthird`, `\ltx@carfourth`, `\ltx@CarNumth` added.
- Macros `\ltx@cdr`, `\ltx@cdrtwo`, `\ltx@cdrthree`, `\ltx@cdrfour`, `\ltx@CdrNum` are expandable in two expansion steps and retain spaces and braces after the first gobbled arguments.

1.7 Tail recursion

<code>\ltx@ReturnAfterFi {⟨1⟩} \fi</code>	→	<code>\fi ⟨1⟩</code>
<code>\ltx@ReturnAfterElseFi {⟨1⟩} \else {⟨2⟩} \fi</code>	→	<code>\fi ⟨1⟩</code>

1.8 Empty macro

<code>\ltx@empty</code>	→
-------------------------	---

1.9 Characters

<code>\ltx@space</code>	→	<code>␣</code>
<code>\ltx@percentchar</code>	→	<code>%</code>
<code>\ltx@backslashchar</code>	→	<code>\</code>
<code>\ltx@hashchar</code>	→	<code>#</code> (since v1.7)
<code>\ltx@leftbracechar</code>	→	<code>{</code> (since v1.8)
<code>\ltx@rightbracechar</code>	→	<code>}</code> (since v1.8)

1.10 Boolean switch

<code>\ltx@newif {⟨cmd⟩}</code>

`\ltx@newif` defines a new boolean switch `⟨cmd⟩` like `\newif`. Unlike plain \TeX 's `\newif`, `\ltx@newif` is not `\outer`. The command `⟨cmd⟩` must start with the two characters `if`.

<code>\ltx@newglobalif {⟨cmd⟩}</code>

`\ltx@newglobalif` defines a new boolean switch `⟨cmd⟩` like `\ltx@newif`. However the switch setting commands, `⟨cmd⟩` without the prefix `if` and followed by `true` or `false` are acting globally.

1.11 Command definitions

<code>\ltx@ifundefined {⟨cmd⟩} {⟨yes⟩} {⟨no⟩}</code>
--

If $\varepsilon\text{-}\TeX$ is available, `\ifcsname` is used that does not have the side effect of defining undefined commands with meaning of `\relax`. This command is always expandable. Change in version 1.1: Also the meaning `\relax` is always considered “undefined”.

```
\ltx@ifundefined {<cmd>} {<yes>} {<no>}
```

If ε -TeX is available, `\ifcsname` is used that does not have the side effect of defining undefined commands with meaning of `\relax`. Also it always checks for the meaning of `\relax` and considers this as undefined. This macro is not expandable without ε -TeX.

```
\ltx@localexpandafter
```

It expands the token after the next token but in a local context. That is the difference to `\expandafter`. The local context discards the side effect of `\csname` and let the command undefined after the expansion step.

1.12 Stripping

```
\ltx@removeprefix  
\ltx@stripprefix
```

All tokens up to and including the next available character ‘>’ are thrown away. Usually it is used to strip the first part of the output of the commands `\meaning` or `\pdflastmatch`. Macro `\ltx@removeprefix` has the same meaning as L^AT_EX’s `\strip@prefix`, whereas macro `\ltx@stripprefix` expands the next token once before stripping the prefix.

```
\ltx@onelevel@sanitize {<macro>}
```

Macro `\ltx@onelevel@sanitize` provides L^AT_EX’s `\@onelevel@sanitize`. The macro is expanded once and the contents is converted to characters with catcode 12 (other) and space tokens with catcode 10 (space). Then then sanitized contents is stored into the macro again. Since version 1.12.

1.13 File management

All macros in this section are expandable like the counterparts of the L^AT_EX kernel. Also they can be used after the preamble.

1.13.1 File extensions

```
\ltx@clsextension  
\ltx@pkgextension
```

Macros `\ltx@clsextension` and `\ltx@styextension` stores the strings `cls` and `sty`. In opposite to L^AT_EX’s `\@clsextension` and `\@styextension` they can also be used after `\begin{document}`.

1.13.2 Load check

```
\ltx@ifclassloaded {<class>} {<yes>} {<no>}  
\ltx@ifpackageloaded {<package>} {<yes>} {<no>}
```

Macros `\ltx@ifclassloaded`/`\ltx@ifpackageloaded` execute `<yes>`, if the `<class>` or `<package>` is loaded, otherwise `<no>` is called. Both `<class>` and `<package>` are specified without extension. The macros can also be used after `\begin{document}`.

```
\ltx@iffileloaded {⟨file⟩} {⟨yes⟩} {⟨no⟩}
```

If L^AT_EX's `\ProvidesFile` macro was called before using `⟨file⟩` as argument, then `\ltx@iffileloaded` calls `⟨yes⟩`, otherwise `⟨no⟩`. Therefore it is possible that the `⟨file⟩` is loaded, but `⟨no⟩` is executed because of a missing `\ProvidesFile`. The L^AT_EX kernel does not have a counterpart of `\ltx@iffileloaded`.

Note that the file name used in `\ProvidesFile` and `\ltx@iffileloaded` must match. For example, if T_EX's default extension `.tex` was given in the first command, then it must also be specified in the latter command and vice versa.

1.13.3 Version date check

```
\ltx@ifclasslater {⟨class⟩} {⟨date⟩} {⟨yes⟩} {⟨no⟩}
\ltx@ifpackagelater {⟨package⟩} {⟨date⟩} {⟨yes⟩} {⟨no⟩}
\ltx@iffilelater {⟨file⟩} {⟨date⟩} {⟨yes⟩} {⟨no⟩}
```

If a `\ProvidesClass`/`\ProvidesPackage`/`\ProvidesFile` command with exact the same class/package/file was executed before with an optional argument that starts with a L^AT_EX version date, then this version date is compared with the argument `⟨date⟩`. If they are equal or if the version date is the later date, then `⟨yes⟩` is called. In all other cases `⟨no⟩` is executed.

A L^AT_EX date has the format `YYYY/MM/DD` with `YYYY` as year with four digits, `MM` as month with two digits and `DD` as day with two digits. If pdfT_EX's `\pdfmatch` is available, then it is used to detect the version date, to reject invalid date formats and to reject some invalid dates. Dates before `1994/01/01` are always invalid, because version dates are introduced with L^AT_EX 2_ε in 1994.

1.14 Macro additions

```
\ltx@GlobalAppendToMacro {⟨cmd⟩} {⟨addition⟩}
\ltx@LocalAppendToMacro {⟨cmd⟩} {⟨addition⟩}
```

The `⟨addition⟩` is appended to the parameterless macro `⟨cmd⟩`. If `⟨cmd⟩` is undefined or has the meaning `\relax`, then it will be initialized as empty macro beforehand. Due to a bug `⟨addition⟩` must not contain `\par` before version `2010/10/25 v1.9`.

```
\ltx@GlobalPrependToMacro {⟨cmd⟩} {⟨addition⟩}
\ltx@LocalPrependToMacro {⟨cmd⟩} {⟨addition⟩}
```

The `⟨addition⟩` is prepended to the parameterless macro `⟨cmd⟩`. If `⟨cmd⟩` is undefined or has the meaning `\relax`, then it will be initialized as empty macro beforehand. The macros were added in version `2011/08/22 v1.21`.

1.15 Next character detection

```
\ltx@ifnextchar {⟨char⟩} {⟨yes⟩} {⟨no⟩}
```

If next character is `⟨char⟩` then `⟨yes⟩` is called, otherwise `⟨no⟩`. The character is not removed. Spaces are silently removed when looking for `⟨char⟩` as L^AT_EX's version `\kernel@ifnextchar` does. But there are also small differences:

- The space can be used as `⟨char⟩`. In this case optional spaces before `⟨char⟩` are not supported of course.

- If the optional space is a command that is a character (defined by `\let` or `\futurelet`), then `\kernel@ifnextchar` breaks with an \TeX error. `\ltx@ifnextchar` silently removes this token as optional space.

Since 2010/03/01 v1.3.

`\ltx@ifnextchar@nospace` $\langle char \rangle$ $\langle yes \rangle$ $\langle no \rangle$

Macro `\ltx@ifnextchar@nospace` behaves like macro `\ltx@ifnextchar` with the exception that optional spaces are not supported before $\langle char \rangle$. Since 2011/04/14 v1.19.

1.16 `\ltx@leavevmode`, `\ltx@mbox`

`\ltx@leavevmode`

Macro `\ltx@leavevmode` calls pdf \TeX 's `\quitvmode`. Otherwise `\leavevmode` is used and defined if it is necessary.

`\ltx@mbox`

Macro `\ltx@mbox` reimplements `\mbox` with two changes. Instead of `\leavevmode` it uses `\ltx@leavevmode` and stops right after `\hbox`. Especially it does not grab the argument and allows the extended syntax of `\hbox`.

1.17 Expandable test for emptiness

`\ltx@ifempty` $\langle stuff \rangle$ $\langle yes \rangle$ $\langle no \rangle$

Macro `\ltx@ifempty` checks in exact two expansion steps whether $\langle stuff \rangle$ is empty or contains token. Depending on the result $\langle yes \rangle$ or $\langle no \rangle$ is executed. The token in $\langle stuff \rangle$ may contain `\par` and unmatched conditionals (`\if`, `\else`, `\fi`, ...). Since version 2010/11/12 v1.11.

`\ltx@ifblank` $\langle stuff \rangle$ $\langle yes \rangle$ $\langle no \rangle$

Macro `\ltx@ifblank` tests in exact two expansion steps if $\langle stuff \rangle$ is empty or contain only blank spaces. In this case argument $\langle yes \rangle$ is called. If $\langle stuff \rangle$ contains other tokens than spaces then $\langle no \rangle$ is executed. Since version 2010/12/04 v1.13.

1.18 Stripping spaces

`\ltx@zapspace` $\langle stuff \rangle$

Macro `\ltx@zapspace` strips spaces from $\langle stuff \rangle$ that are not hidden inside curly braces. Like \LaTeX 's `\zap@space` it is expandable. Differences:

- Syntax: `\zap@space` also expects a space token and `\@empty` after $\langle stuff \rangle$.
- Macro `\ltx@zapspace` is expandable in exact two expansion steps.
- Macro `\ltx@zapspace` always retains curly braces.
- Macro `\zap@space` has a bug. It stops stripping spaces after a token group in curly braces if the first two tokens inside the group are equal.

- Macro `\ltx@zapspace` also works with `\par` and conditionals (`\if`, `\else`, `\fi`, ...).

Macro `\ltx@zapspace` is available since version 2010/12/07 v1.14.

1.19 Check for emptiness of boxes

```
\ltx@ifboxempty {<box register number>} {<yes>} {<no>}
```

Macro `\ltx@ifboxempty` calls `<yes>` if the box exists (`\ifvoid` returns false) and the box does not contain any content. Otherwise if the box is void or contains something, then `<no>` is executed. Thus being empty means that the box exists and is either an `\hbox` or a `\vbox` and may even have dimensions other than 0.0pt, but the box does not contain anything. Macro `\ltx@ifboxempty` is available since 2010/02/04 v1.16.

```
\ltx@ifboxvoidoreempty {<box register number>} {<yes>} {<no>}
```

Macro `\ltx@ifboxvoidoreempty` calls `<yes>` if the box is either void or does not contain any content. Otherwise `<no>` is executed. Macro `\ltx@ifboxvoidoreempty` is available since 2010/02/04 v1.16.

2 Implementation

2.1 Identification

```
1 (*package)
```

Reload check, especially if the package is not used with L^AT_EX.

```
2 \begingroup\catcode61\catcode48\catcode32=10\relax%
3 \catcode13=5 % ^~M
4 \endlinechar=13 %
5 \catcode35=6 % #
6 \catcode39=12 % '
7 \catcode44=12 % ,
8 \catcode45=12 % -
9 \catcode46=12 % .
10 \catcode58=12 % :
11 \catcode64=11 % @
12 \catcode123=1 % {
13 \catcode125=2 % }
14 \expandafter\let\expandafter\x\csname ver@ltxcmds.sty\endcsname
15 \ifx\x\relax % plain-TeX, first loading
16 \else
17 \def\empty{}%
18 \ifx\x\empty % LaTeX, first loading,
19 % variable is initialized, but \ProvidesPackage not yet seen
20 \else
21 \expandafter\ifx\csname PackageInfo\endcsname\relax
22 \def\x#1#2{%
23 \immediate\write-1{Package #1 Info: #2.}%
24 }%
25 \else
26 \def\x#1#2{\PackageInfo{#1}{#2, stopped}}%
27 \fi
28 \x{ltxcmds}{The package is already loaded}%
29 \aftergroup\endinput
30 \fi
31 \fi
32 \endgroup%
```

Package identification:

```
33 \begingroup\catcode61\catcode48\catcode32=10\relax%
34 \catcode13=5 % ^~M
35 \endlinechar=13 %
36 \catcode35=6 % #
37 \catcode39=12 % '
38 \catcode40=12 % (
39 \catcode41=12 % )
40 \catcode44=12 % ,
41 \catcode45=12 % -
42 \catcode46=12 % .
43 \catcode47=12 % /
44 \catcode58=12 % :
45 \catcode64=11 % @
46 \catcode91=12 % [
47 \catcode93=12 % ]
48 \catcode123=1 % {
49 \catcode125=2 % }
50 \expandafter\ifx\csname ProvidesPackage\endcsname\relax
51 \def\x#1#2#3[#4]{\endgroup
52 \immediate\write-1{Package: #3 #4}%
53 \xdef#1{#4}%
54 }%
55 \else
56 \def\x#1#2[#3]{\endgroup
57 #2[#{#3}]%
58 \ifx#1\undefined
59 \xdef#1{#3}%
60 \fi
61 \ifx#1\relax
62 \xdef#1{#3}%
63 \fi
64 }%
65 \fi
66 \expandafter\x\csname ver@ltxcmds.sty\endcsname
67 \ProvidesPackage{ltxcmds}%
68 [2023-12-04 v1.26 LaTeX kernel commands for general use (HO)]%
69 \begingroup\catcode61\catcode48\catcode32=10\relax%
70 \catcode13=5 % ^~M
71 \endlinechar=13 %
72 \catcode123=1 % {
73 \catcode125=2 % }
74 \catcode64=11 % @
75 \def\x{\endgroup
76 \expandafter\edef\csname LTXcmds@AtEnd\endcsname{%
77 \endlinechar=\the\endlinechar\relax
78 \catcode13=\the\catcode13\relax
79 \catcode32=\the\catcode32\relax
80 \catcode35=\the\catcode35\relax
81 \catcode61=\the\catcode61\relax
82 \catcode64=\the\catcode64\relax
83 \catcode123=\the\catcode123\relax
84 \catcode125=\the\catcode125\relax
85 }%
86 }%
87 \x\catcode61\catcode48\catcode32=10\relax%
88 \catcode13=5 % ^~M
89 \endlinechar=13 %
90 \catcode35=6 % #
91 \catcode64=11 % @
92 \catcode123=1 % {
93 \catcode125=2 % }
```

```

94 \def\TMP@EnsureCode#1#2{%
95   \edef\LTxcmds@AtEnd{%
96     \LTxcmds@AtEnd
97     \catcode#1=\the\catcode#1\relax
98   }%
99   \catcode#1=#2\relax
100 }
101 \TMP@EnsureCode{36}{3}% $
102 \TMP@EnsureCode{38}{4}% &
103 \TMP@EnsureCode{40}{12}% (
104 \TMP@EnsureCode{41}{12}% )
105 \TMP@EnsureCode{45}{12}% -
106 \TMP@EnsureCode{46}{12}% .
107 \TMP@EnsureCode{47}{12}% /
108 \TMP@EnsureCode{60}{12}% <
109 \TMP@EnsureCode{62}{12}% >
110 \TMP@EnsureCode{91}{12}% [
111 \TMP@EnsureCode{96}{12}% ‘
112 \TMP@EnsureCode{93}{12}% ]
113 \TMP@EnsureCode{94}{12}% ^ (superscript) (!)
114 \TMP@EnsureCode{124}{12}% |
115 \edef\LTxcmds@AtEnd{\LTxcmds@AtEnd\noexpand\endinput}

```

2.2 Numbers

```

\ltx@zero
116 \chardef\ltx@zero=0 %

\ltx@one
117 \chardef\ltx@one=1 %

\ltx@two
118 \chardef\ltx@two=2 %

\ltx@active
119 \chardef\ltx@active=13 %

\ltx@ccclv
120 \chardef\ltx@ccclv=255 %

\ltx@minusone
121 \def\ltx@minusone{%
122   -\ltx@one
123 }

```

2.3 Scratch registers

```

\ltx@LocToksA
124 \toksdef\ltx@LocToksA=0 %

\ltx@LocToksB
125 \toksdef\ltx@LocToksB=2 %

\ltx@LocToksC
126 \toksdef\ltx@LocToksC=4 %

\ltx@LocToksD
127 \toksdef\ltx@LocToksD=6 %

\ltx@LocToksE
128 \toksdef\ltx@LocToksE=8 %

```

```

\ltx@GlobToksA
129 \toksdef\ltx@GlobToksA=1 %

\ltx@GlobToksB
130 \toksdef\ltx@GlobToksB=3 %

\ltx@GlobToksC
131 \toksdef\ltx@GlobToksC=5 %

\ltx@GlobToksD
132 \toksdef\ltx@GlobToksD=7 %

\ltx@GlobToksE
133 \toksdef\ltx@GlobToksE=9 %

\ltx@LocDimenA
134 \dimendef\ltx@LocDimenA=0 %

\ltx@LocDimenB
135 \dimendef\ltx@LocDimenB=2 %

\ltx@LocDimenC
136 \dimendef\ltx@LocDimenC=4 %

\ltx@LocDimenD
137 \dimendef\ltx@LocDimenD=6 %

\ltx@LocDimenE
138 \dimendef\ltx@LocDimenE=8 %

\ltx@GlobDimenA
139 \dimendef\ltx@GlobDimenA=1 %

\ltx@GlobDimenB
140 \dimendef\ltx@GlobDimenB=3 %

\ltx@GlobDimenC
141 \dimendef\ltx@GlobDimenC=5 %

\ltx@GlobDimenD
142 \dimendef\ltx@GlobDimenD=7 %

\ltx@GlobDimenE
143 \dimendef\ltx@GlobDimenE=9 %

\ltx@LocSkipA
144 \skipdef\ltx@LocSkipA=0 %

\ltx@LocSkipB
145 \skipdef\ltx@LocSkipB=2 %

\ltx@LocSkipC
146 \skipdef\ltx@LocSkipC=4 %

\ltx@LocSkipD
147 \skipdef\ltx@LocSkipD=6 %

\ltx@LocSkipE
148 \skipdef\ltx@LocSkipE=8 %

```

```

\ltx@GlobSkipA
149 \skipdef\ltx@GlobSkipA=1 %

\ltx@GlobSkipB
150 \skipdef\ltx@GlobSkipB=3 %

\ltx@GlobSkipC
151 \skipdef\ltx@GlobSkipC=5 %

\ltx@GlobSkipD
152 \skipdef\ltx@GlobSkipD=7 %

\ltx@GlobSkipE
153 \skipdef\ltx@GlobSkipE=9 %

```

2.4 Argument killers

```

\ltx@gobble
154 \long\def\ltx@gobble#1{}

\ltx@gobbletwo
155 \long\def\ltx@gobbletwo#1#2{}

\ltx@gobblethree
156 \long\def\ltx@gobblethree#1#2#3{}

\ltx@gobblefour
157 \long\def\ltx@gobblefour#1#2#3#4{}

\ltx@GobbleNum
158 \def\ltx@GobbleNum#1{%
159   \romannumeral
160   \csname ltx@zero%
161   \expandafter\LTXcmds@GobbleNum
162   \romannumeral\LTXcmds@num{#1}000{m\endcsname}%
163 }

\LTXcmds@GobbleNum
164 \def\LTXcmds@GobbleNum#1{%
165   \csname LTXcmds@G#1\LTXcmds@GobbleNum
166 }

\LTXcmds@Gm
167 \long\def\LTXcmds@Gm#1{%
168   \endcsname
169 }

```

2.5 Argument grabbers

```

\ltx@firstofone
170 \long\def\ltx@firstofone#1{#1}

\ltx@firstoftwo
171 \long\def\ltx@firstoftwo#1#2{#1}

\ltx@secondoftwo
172 \long\def\ltx@secondoftwo#1#2{#2}

\ltx@firstofthree
173 \long\def\ltx@firstofthree#1#2#3{#1}

```

```

\ltx@secondofthree
174 \long\def\ltx@secondofthree#1#2#3{#2}

\ltx@thirdofthree
175 \long\def\ltx@thirdofthree#1#2#3{#3}%

\ltx@firstoffour
176 \long\def\ltx@firstoffour#1#2#3#4{#1}

\ltx@secondoffour
177 \long\def\ltx@secondoffour#1#2#3#4{#2}

\ltx@thirdoffour
178 \long\def\ltx@thirdoffour#1#2#3#4{#3}%

\ltx@fourthoffour
179 \long\def\ltx@fourthoffour#1#2#3#4{#4}%

```

2.6 List helpers

```

\ltx@carzero
180 \long\def\ltx@carzero#1\@nil{}%

\LTxcms@cdrzero
181 \long\def\LTxcms@cdrzero#1\@nil{#1}

\ltx@cdrzero
182 \def\ltx@cdrzero{%
183 \romannumeral\LTxcms@cdrzero\ltx@zero
184 }

\ltx@car
185 \long\def\ltx@car#1#2\@nil{#1}

\ltx@cdr
186 \long\def\ltx@cdr#1{%
187 \romannumeral\LTxcms@cdrzero\ltx@zero
188 }

\ltx@cartwo
189 \long\def\ltx@cartwo#1#2#3\@nil{#1#2}

\ltx@carsecond
190 \long\def\ltx@carsecond#1#2#3\@nil{#2}

\ltx@cdrtwo
191 \long\def\ltx@cdrtwo#1#2{%
192 \romannumeral\LTxcms@cdrzero\ltx@zero
193 }

\ltx@carthree
194 \long\def\ltx@carthree#1#2#3#4\@nil{#1#2#3}

\ltx@carthird
195 \long\def\ltx@carthird#1#2#3#4\@nil{#3}

\ltx@cdrthree
196 \long\def\ltx@cdrthree#1#2#3{%
197 \romannumeral\LTxcms@cdrzero\ltx@zero
198 }

```

```

\ltx@carfour
299 \long\def\ltx@carfour#1#2#3#4#5\@nil{#1#2#3#4}

\ltx@carfourth
200 \long\def\ltx@carfourth#1#2#3#4#5\@nil{#4}

\ltx@cdrfour
201 \long\def\ltx@cdrfour#1#2#3#4{%
202 \romannumeral\LTXcmds@cdrzero\ltx@zero
203 }

\ltx@CarNum
204 \def\ltx@CarNum#1{%
205 \romannumeral
206 \csname LTXcmds@CarNumFinish%
207 \expandafter\LTXcmds@CarNum
208 \romannumeral\LTXcmds@num{#1}000{x\endcsname}%
209 }

\LTXcmds@CarNum
210 \def\LTXcmds@CarNum#1{%
211 \csname LTXcmds@C#1\LTXcmds@CarNum
212 }

\LTXcmds@Cm
213 \long\def\LTXcmds@Cm#1#2{%
214 \endcsname{#1#2}%
215 }

\LTXcmds@Cx
216 \def\LTXcmds@Cx#1{%
217 \endcsname{}}%
218 }

\LTXcmds@CarNumFinish
219 \long\def\LTXcmds@CarNumFinish#1#2\@nil{%
220 \ltx@zero
221 #1%
222 }

\ltx@CarNumth
223 \def\ltx@CarNumth#1{%
224 \romannumeral
225 \expandafter\expandafter\expandafter
226 \LTXcmds@CarNumth
227 \ltx@GobbleNum{#1}{}%
228 }

\LTXcmds@CarNumth
229 \long\def\LTXcmds@CarNumth#1#2\@nil{%
230 \ltx@zero
231 #1%
232 }

\ltx@CdrNum
233 \def\ltx@CdrNum#1{%
234 \romannumeral%
235 \expandafter\expandafter\expandafter\ltx@cdrzero
236 \expandafter\expandafter\expandafter\ltx@zero
237 \ltx@GobbleNum{#1}%
238 }

```

2.7 Tail recursion

```
\ltx@ReturnAfterFi
239 \long\def\ltx@ReturnAfterFi#1\fi{\fi#1}
```

```
\ltx@ReturnAfterElseFi
240 \long\def\ltx@ReturnAfterElseFi#1\else#2\fi{\fi#1}
```

2.8 Empty macro

```
\ltx@empty
241 \def\ltx@empty{}
```

2.9 Characters

```
\ltx@space
242 \def\ltx@space{ }
```

```
\ltx@percentchar
243 \begingroup
244 \lccode'0='%\relax
245 \lowercase{\endgroup
246 \def\ltx@percentchar{0}%
247 }
```

```
\ltx@backslashchar
248 \begingroup
249 \lccode'0='\\relax
250 \lowercase{\endgroup
251 \def\ltx@backslashchar{0}%
252 }
```

```
\ltx@hashchar
253 \begingroup
254 \lccode'0='#\relax
255 \lowercase{\endgroup
256 \def\ltx@hashchar{0}%
257 }
```

```
\ltx@leftbracechar
258 \begingroup
259 \lccode'0='{ \relax
260 \lowercase{\endgroup
261 \def\ltx@leftbracechar{0}%
262 }
```

```
\ltx@rightbracechar
263 \begingroup
264 \lccode'0='}\relax
265 \lowercase{\endgroup
266 \def\ltx@rightbracechar{0}%
267 }
```

2.10 Boolean switch

```
\ltx@newif
268 \def\ltx@newif#1{%
269 \begingroup
270 \escapechar=-1 %
271 \expandafter\endgroup
272 \expandafter\LTXcmds@newif\string#1@nil
273 }
```



```

\LTxcmds@newif
274 \begingroup
275 \escapechar=-1 %
276 \expandafter\endgroup
277 \expandafter\def\expandafter\LTxcmds@newif\string\if#1\@nil{%
278 \expandafter\edef\csname#1true\endcsname{%
279 \let
280 \expandafter\noexpand\csname if#1\endcsname
281 \noexpand\iftrue
282 }%
283 \expandafter\edef\csname#1false\endcsname{%
284 \let
285 \expandafter\noexpand\csname if#1\endcsname
286 \noexpand\iffalse
287 }%
288 \csname#1false\endcsname
289 }

```

```

\ltx@newglobalif
290 \def\ltx@newglobalif#1{%
291 \begingroup
292 \escapechar=-1 %
293 \expandafter\endgroup
294 \expandafter\LTxcmds@newglobalif\string#1\@nil
295 }

```

```

\LTxcmds@newglobalif
296 \begingroup
297 \escapechar=-1 %
298 \expandafter\endgroup
299 \expandafter
300 \def\expandafter\LTxcmds@newglobalif\string\if#1\@nil{%
301 \expandafter\edef\csname#1true\endcsname{%
302 \global\let
303 \expandafter\noexpand\csname if#1\endcsname
304 \noexpand\iftrue
305 }%
306 \expandafter\edef\csname#1false\endcsname{%
307 \global\let
308 \expandafter\noexpand\csname if#1\endcsname
309 \noexpand\iffalse
310 }%
311 \csname#1false\endcsname
312 }

```

2.11 Command definitions

```

\ltx@LocalExpandAfter
313 \def\ltx@LocalExpandAfter{%
314 \begingroup
315 \expandafter\expandafter\expandafter
316 \endgroup
317 \expandafter
318 }

```

```

319 \ltx@LocalExpandAfter
320 \ifx\csname ifcsname\endcsname\relax

```

```

\ltx@ifundefined
321 \def\ltx@ifundefined#1{%
322 \expandafter\ifx\csname #1\endcsname\relax
323 \expandafter\ltx@firstoftwo

```

```

324 \else
325 \expandafter\ltx@secondoftwo
326 \fi
327 }%

```

`\ltx@ifundefined`

```

328 \def\ltx@ifundefined#1{%
329 \begingroup\expandafter\expandafter\expandafter\endgroup
330 \expandafter\ifx\csname #1\endcsname\relax
331 \expandafter\ltx@firstoftwo
332 \else
333 \expandafter\ltx@secondoftwo
334 \fi
335 }%

336 \expandafter\ltx@gobble
337 \else
338 \expandafter\ltx@firstofone
339 \fi
340 {%

```

`\ltx@ifundefined`

```

341 \def\ltx@ifundefined#1{%
342 \ifcsname #1\endcsname
343 \expandafter\ifx\csname #1\endcsname\relax
344 \expandafter\expandafter\expandafter\ltx@firstoftwo
345 \else
346 \expandafter\expandafter\expandafter\ltx@secondoftwo
347 \fi
348 \else
349 \expandafter\ltx@firstoftwo
350 \fi
351 }%

```

`\ltx@ifundefined`

```

352 \let\ltx@ifundefined\ltx@ifundefined
353 }

```

2.12 Stripping

`\ltx@RemovePrefix`

```

354 \def\ltx@RemovePrefix#1>{}

```

`\ltx@StripPrefix`

```

355 \def\ltx@StripPrefix{%
356 \expandafter\ltx@RemovePrefix
357 }

```

`\ltx@onelevel@sanitize`

```

358 \def\ltx@onelevel@sanitize#1{%
359 \edef#1{%
360 \expandafter
361 \ltx@RemovePrefix\meaning#1%
362 }%
363 }

```

2.13 File management

2.13.1 File extensions

`\ltx@clsextension`

```

364 \def\ltx@clsextension{cls}

```

```
\ltx@pkgextension
365 \def\ltx@pkgextension{sty}
```

2.13.2 Load check

```
\ltx@iffileloaded
366 \def\ltx@iffileloaded#1{%
367 \ltx@ifundefined{ver@#1}\ltx@secondoftwo\ltx@firstoftwo
368 }
```

```
\ltx@ifclassloaded
369 \def\ltx@ifclassloaded#1{%
370 \ltx@iffileloaded{#1.\ltx@clsextension}%
371 }
```

```
\ltx@ifpackageloaded
372 \def\ltx@ifpackageloaded#1{%
373 \ltx@iffileloaded{#1.\ltx@pkgextension}%
374 }
```

2.13.3 Version date check

changed 2020-05-10 to adapt to dates with dashes (ISO) The core of the commands are copies from the latex commands.

```
\ltx@ifl@ter
\ltx@parse@version@
375 \def\ltx@ifl@ter#1#2{%
376 \expandafter\ltx@ifl@t@r
377 \csname ver@#2.#1\endcsname}
378 \def\ltx@ifl@t@r#1#2{%
379 \ifnum\expandafter\ltx@parse@version@#1//00\@nil<%
380 \expandafter\ltx@parse@version@#2//00\@nil
381 \expandafter\ltx@secondoftwo
382 \else
383 \expandafter\ltx@firstoftwo
384 \fi}
385 \def\ltx@parse@version@#1{\ltx@parse@version0#1}
386 \def\ltx@parse@version#1/#2/#3#4#5\@nil{%
387 \ltx@parse@version@dash#1-#2-#3#4\@nil
388 }
389 \def\ltx@parse@version@dash#1-#2-#3#4#5\@nil{%
390 \if\relax#2\relax\else#1\fi#2#3#4 }
```

```
\ltx@iffilelater
391 \def\ltx@iffilelater#1{\expandafter\ltx@ifl@t@r\csname ver@#1\endcsname}
```

```
\ltx@ifclasslater
392 \def\ltx@ifclasslater{\ltx@ifl@ter\ltx@clsextension}
```

```
\ltx@ifpackagelater
393 \def\ltx@ifpackagelater{\ltx@ifl@ter\ltx@pkgextension}
```

2.14 Macro additions

```
\ltx@GlobalAppendToMacro
394 \long\def\ltx@GlobalAppendToMacro#1#2{%
395 \ifx\ltx@undefined#1%
396 \let#1\ltx@empty
397 \else
398 \if\relax#1%
399 \let#1\ltx@empty
```

```

400   \fi
401 \fi
402 \begingroup
403   \ltx@LocToksA\expandafter{#1#2}%
404   \xdef#1{\the\ltx@LocToksA}%
405 \endgroup
406 }

\ltx@LocalAppendToMacro
407 \long\def\ltx@LocalAppendToMacro#1#2{%
408   \global\let\LTXcmds@gtemp#1%
409   \ifx\ltx@undefined\LTXcmds@gtemp
410     \global\let\LTXcmds@gtemp\ltx@empty
411   \else
412     \ifx\relax\LTXcmds@gtemp
413       \global\let\LTXcmds@gtemp\ltx@empty
414     \fi
415   \fi
416 \begingroup
417   \ltx@LocToksA\expandafter{\LTXcmds@gtemp#2}%
418   \xdef\LTXcmds@gtemp{\the\ltx@LocToksA}%
419 \endgroup
420 \let#1\LTXcmds@gtemp
421 }

```

```

\ltx@GlobalPrependToMacro
422 \long\def\ltx@GlobalPrependToMacro#1#2{%
423   \ifx\ltx@undefined#1%
424     \let#1\ltx@empty
425   \else
426     \ifx\relax#1%
427       \let#1\ltx@empty
428     \fi
429   \fi
430 \begingroup
431   \ltx@LocToksA{#2}%
432   \ltx@LocToksB\expandafter{#1}%
433   \xdef#1{\the\ltx@LocToksA\the\ltx@LocToksB}%
434 \endgroup
435 }

```

```

\ltx@LocalPrependToMacro
436 \long\def\ltx@LocalPrependToMacro#1#2{%
437   \global\let\LTXcmds@gtemp#1%
438   \ifx\ltx@undefined\LTXcmds@gtemp
439     \global\let\LTXcmds@gtemp\ltx@empty
440   \else
441     \ifx\relax\LTXcmds@gtemp
442       \global\let\LTXcmds@gtemp\ltx@empty
443     \fi
444   \fi
445 \begingroup
446   \ltx@LocToksA{#2}%
447   \ltx@LocToksB\expandafter{\LTXcmds@gtemp}%
448   \xdef\LTXcmds@gtemp{\the\ltx@LocToksA\the\ltx@LocToksB}%
449 \endgroup
450 \let#1\LTXcmds@gtemp
451 }

```

2.15 Next character detection

```
\ltx@ifnextchar
```

```

452 \long\def\ltx@ifnextchar#1#2#3{%
453 \begingroup
454 \let\LTXcmds@CharToken= #1\relax
455 \ltx@LocToksA{\endgroup#2}%
456 \ltx@LocToksB{\endgroup#3}%
457 \futurelet\LTXcmds@LetToken\LTXcmds@ifnextchar
458 }

```

`\LTXcmds@ifnextchar`

```

459 \def\LTXcmds@ifnextchar{%
460 \ifx\LTXcmds@LetToken\LTXcmds@CharToken
461 \the\expandafter\ltx@LocToksA
462 \else
463 \expandafter
464 \ifx\csname LTXcmds@LetToken\endcsname\LTXcmds@SpaceToken
465 \expandafter\expandafter\expandafter\LTXcmds@@ifnextchar
466 \else
467 \the\expandafter\expandafter\expandafter\ltx@LocToksB
468 \fi
469 \fi
470 }

```

`\LTXcmds@@ifnextchar` `\futurelet` does not distinguish between a character and a command that is a character (defined by using `\let` or `\futurelet`). Therefore the space is caught by `\romannumeral` with negative character constant that gobbles one optional space.

```

471 \def\LTXcmds@@ifnextchar{%
472 \expandafter\futurelet
473 \expandafter\LTXcmds@LetToken
474 \expandafter\LTXcmds@ifnextchar
475 \romannumeral-'\.%
476 }

```

`\LTXcmds@SpaceToken`

```

477 \ltx@firstofone{\let\LTXcmds@SpaceToken= } %

```

`\ltx@ifnextchar@nospace`

```

478 \long\def\ltx@ifnextchar@nospace#1#2#3{%
479 \begingroup
480 \let\LTXcmds@CharToken= #1\relax
481 \ltx@LocToksA{\endgroup#2}%
482 \ltx@LocToksB{\endgroup#3}%
483 \futurelet\LTXcmds@LetToken\LTXcmds@ifnextchar@nospace
484 }

```

`\LTXcmds@ifnextchar@nospace`

```

485 \def\LTXcmds@ifnextchar@nospace{%
486 \the
487 \ifx\LTXcmds@LetToken\LTXcmds@CharToken
488 \expandafter\ltx@LocToksA
489 \else
490 \expandafter\ltx@LocToksB
491 \fi
492 }

```

2.16 `\ltx@leavevmode`, `\ltx@mbbox`

`\ltx@leavevmode`

```

493 \ltx@ifUndefined{quitvmode}{%
494 \ltx@ifUndefined{leavevmode}{%
495 \ltx@ifUndefined{voidb@x}{%

```

```

496 \ltx@ifundefined{newbox}{%
497 \def\ltx@leavevmode{%
498 \begingroup
499 \setbox\ltx@zero=\hbox{}%
500 \begingroup
501 \setbox\ltx@zero=\hbox{\box\ltx@zero}%
502 \endgroup
503 \unhbox\ltx@zero
504 \endgroup
505 }%
506 }{%
507 \csname newbox\endcsname\LTXcmds@VoidBox
508 \ifvoid\LTXcmds@VoidBox
509 \else
510 \setbox\LTXcmds@VoidBox=\hbox{}%
511 \begingroup
512 \setbox\LTXcmds@VoidBox=\hbox{\box\LTXcmds@VoidBox}%
513 \endgroup
514 \fi
515 \def\ltx@leavevmode{\unhbox\LTXcmds@VoidBox}%
516 }%
517 }{%
518 \def\ltx@leavevmode{\unhbox\voidb@x}%
519 }%
520 }{%
521 \let\ltx@leavevmode\leavevmode
522 }%
523 }{%
524 \let\ltx@leavevmode\quitvmode
525 }

```

`\ltx@mbox`

```

526 \def\ltx@mbox{%
527 \ltx@leavevmode
528 \hbox
529 }

```

2.17 Help macros

`\LTXcmds@num`

```

530 \ltx@ifundefined{numexpr}{%
531 \def\LTXcmds@num#1{%
532 \expandafter\ltx@firstofone\expandafter{%
533 \number#1%
534 }%
535 }%
536 }{%
537 \def\LTXcmds@num#1{%
538 \expandafter\ltx@firstofone\expandafter{%
539 \the\numexpr#1%
540 }%
541 }%
542 }

```

2.18 Expandable test for emptiness

```

543 \ltx@ifundefined{detokenize}{%

```

2.18.1 Vanilla T_EX

`\ltx@ifempty` The macro is based on `\@ifempty` of Robert R. Schneck [1] and `\@ifnull` of Ulrich Diez [2]. There are three cases to consider:

1. #1 is empty,

2. #1 is not empty and the first token is not a begingroup character,
3. #1 starts with a begingroup character (catcode 1).

```

544 \def\LTXcmds@temp#1{%
545   \long\def\ltx@ifempty##1{%
546     \romannumeral0%
547     \iffalse{\fi
548       \expandafter\ltx@gobble\expandafter{%
549         \expandafter{\string##1}%
550         \expandafter\ltx@gobble\string
551       }%
552       \expandafter\ltx@firstofthree\expandafter
553       {\iffalse}\fi
554       \expandafter#1\ltx@secondoftwo
555     }%
556     \expandafter#1\ltx@firstoftwo
557   }%

```

\ltx@ifblank

```

558   \long\def\ltx@ifblank##1{%
559     \romannumeral0%
560     \iffalse{\fi
561       \expandafter\expandafter\expandafter\ltx@gobble
562       \expandafter\expandafter\expandafter{%
563         \expandafter\expandafter\expandafter{%
564           \expandafter\string\ltx@gobble##1.%
565         }%
566         \expandafter\ltx@gobble\string
567       }%
568       \expandafter\ltx@firstofthree\expandafter
569       {\iffalse}\fi
570       \expandafter#1\ltx@secondoftwo
571     }%
572     \expandafter#1\ltx@firstoftwo
573   }%
574 }%
575 \LTXcmds@temp{ }%

576 }{%

```

2.18.2 With \detokenize

Ahmed Musa provided `\ifstrempy` using `\detokenize` and `\pdfstrcmp` [3]. Ulrich Diez, GL, Heiko Oberdiek improved it further by removing `\pdfstrcmp` and taking three arguments [4, 5, 6, 7, 8].

\ltx@ifempty

```

577 \long\def\ltx@ifempty#1{%
578   \romannumeral%
579   \csname
580     LTXcmds@ifempty%
581     \ifcat$\detokenize{#1}$%
582     @%
583     \fi
584   \endcsname
585 }%

```

\LTXcmds@ifempty@

```

586 \long\def\LTXcmds@ifempty@#1#2{0 #1}%

```

\LTXcmds@ifempty

```

587 \long\def\LTXcmds@ifempty#1#2{0 #2}%

```

2.18.3 `\ltx@ifblank`

`\ltx@ifblank`

```
588 \long\def\ltx@ifblank#1{%
589   \romannumeral%
590   \csname
591     LTXcmds@ifempty%
592     \ifcat$\detokenize\expandafter{\ltx@gobble#1.}$%
593     @%
594     \fi
595   \endcsname
596 }%

597 }
```

2.19 `\ltx@zapspace`

`\ltx@zapspace`

```
598 \long\def\ltx@zapspace#1{%
599   \romannumeral
600   \LTXcmds@zapspace\ltx@zero#1 \@nil
601 }
```

`\LTXcmds@zapspace`

```
602 \long\def\LTXcmds@zapspace#1 #2\@nil{%
603   \ltx@ifempty{#2}{%
604     #1%
605   }{%
606     \LTXcmds@zapspace#1#2\@nil
607   }%
608 }
```

2.20 `\ltx@ifBoxEmpty`

In case of ε - $\text{T}_{\text{E}}\text{X}$ the test for an empty box is done via `\lastnodetype` as suggested by David Kastrup [9].

```
609 \ltx@ifUndefined{lastnodetype}{%
610   \catcode'\$=9 %
611   \catcode'\&=14 %
612 }{%
613   \catcode'\$=14 %
614   \catcode'\&=9 %
615 }
```

`\ltx@ifBoxEmpty`

```
616 \def\ltx@ifBoxEmpty#1{%
617   \ifvoid#1\relax
618   \expandafter\ltx@secondoftwo
619   \else
```

Implementation using ε - $\text{T}_{\text{E}}\text{X}$'s `\lastnodetype`.

```
620 & \begingroup
621 &   \setbox\ltx@zero=\ifhbox#1\hbox\else\vbox\fi{%
622 &     \ifhmode\unhcopy\else\unvcopy\fi#1\relax
623 &     \expandafter
624 &     }%
625 & \expandafter\endgroup
626 & \ifnum\lastnodetype<\ltx@zero
627 &   \expandafter\expandafter\expandafter\ltx@firstoftwo
628 & \else
629 &   \expandafter\expandafter\expandafter\ltx@secondoftwo
630 & \fi
```


Implementation without ε -TeX using a signature at the beginning of the test box.

```
631 $ \begingroup
632 $   \setbox\ltx@zero=\ifhbox#1\hbox\else\vbox\fi{%
633 $     \penalty\ltx@one
634 $     \ifhmode\unhcopy\else\unvcopy\fi#1\relax
635 $     \expandafter
636 $   }%
637 $   \ifnum\lastpenalty=\ltx@one

Box 0 has been changed and is restored by closing the group.

638 $   \endgroup
639 $   \begingroup
640 $   \setbox\ltx@zero=\ifhbox#1\hbox\else\vbox\fi{%
641 $     \penalty\ltx@two
642 $     \ifhmode\unhcopy\else\unvcopy\fi#1\relax
643 $     \expandafter
644 $   }%
645 $   \ifnum\lastpenalty=\ltx@two
646 $     \def\next{\endgroup\expandafter\ltx@firstoftwo}%
647 $   \else
648 $     \def\next{\endgroup\expandafter\ltx@secondoftwo}%
649 $   \fi
650 $   \else
651 $     \def\next{\endgroup\expandafter\ltx@secondoftwo}%
652 $   \fi
653 $ \next
654 \fi
655 }
```

`\ltx@ifboxvoidoreempty`

```
656 \def\ltx@ifboxvoidoreempty#1{%
657   \ifvoid#1\relax
658     \expandafter\ltx@thirdoffour
659   \fi
660   \ltx@ifboxempty{#1}%
661 }

662 \LTXcmds@AtEnd%
663 \endpackage
```

3 Installation

3.1 Download

Package. This package is available on CTAN¹:

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

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

3.2 Package installation

The package is at best installed with the package manager of the TeX system. Manual installation is possible too:

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

```
tex ltxcmds.dtx
```

¹[CTAN:pkg/ltxcmds](#)

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

```
ltxcmds.sty → tex/generic/ltxcmds/ltxcmds.sty
ltxcmds.pdf → doc/latex/ltxcmds/ltxcmds.pdf
ltxcmds.dtx → source/latex/ltxcmds/ltxcmds.dtx
```

If you have a `docstrip.cfg` that configures and enables `docstrip`'s TDS installing feature, then some files can already be in the right place, see the documentation of `docstrip`.

3.3 Refresh file name databases

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

3.4 Some details for the interested

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

plain `TEX`: Run `docstrip` and extract the files.

`LATEX`: Generate the documentation.

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

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

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

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

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

An example follows how to generate the documentation with `pdfLATEX`:

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

4 References

- [1] Robert R. Schneck: *Re: `\ifempty` solution (was Macro puzzle: maximally general `\ifempty`)*; newsgroup `comp.text.tex`, `news:3eef1ada_6@corp.newsgroups.com`, 2003-06-17.
<https://groups.google.com/group/comp.text.tex/msg/be03a159ec374895>
- [2] Ulrich Diez: *Re: `TeX` refuses to strip outer braces in argument*; newsgroup `comp.text.tex`, `news:ibk3t8$ee7$1@news.albasani.net`, 2010-11-12.
<https://groups.google.com/group/comp.text.tex/msg/803bd57221a04996>
- [3] Ahmed Musa: *Re: `TeX` refuses to strip outer braces in argument*; newsgroup `comp.text.tex`, `news:f5496afe-40ed-42bd-b629-a2419ecf7c0d@o14g2000prn.googlegroups.com`, 2010-12-03.
<https://groups.google.com/group/comp.text.tex/msg/fbf7d61a0c3a807d>

- [4] Ulrich Diez: *Re: TeX refuses to strip outer braces in argument*; newsgroup `comp.text.tex`, `news:idbo94uka1@four.albasani.net`, 2010-12-03.
<https://groups.google.com/group/comp.text.tex/msg/0c230ee479487962>
- [5] Ulrich Diez: *Re: TeX refuses to strip outer braces in argument*; newsgroup `comp.text.tex`, `news:idbpu4cgl1@news.albasani.net`, 2010-12-03.
<https://groups.google.com/group/comp.text.tex/msg/bbef4263390d647b>
- [6] Ulrich Diez: *Re: TeX refuses to strip outer braces in argument*; newsgroup `comp.text.tex`, `news:idd4ga$r83$1@four.albasani.net`, 2010-12-04.
<https://groups.google.com/group/comp.text.tex/msg/00dfd1ec103cd272>
- [7] GL: *Re: TeX refuses to strip outer braces in argument*; newsgroup `comp.text.tex`, `news:4cfa2e27$0$7389$426a74cc@news.free.fr`, 2010-12-04.
<https://groups.google.com/group/comp.text.tex/msg/d3a75995c1cf267e>
- [8] Heiko Oberdiek: *Re: TeX refuses to strip outer braces in argument*; newsgroup `comp.text.tex`, `news:iddhq1$3kj$1@news.eternal-september.org`, 2010-12-04.
<https://groups.google.com/group/comp.text.tex/msg/5f7a23e3ab70e347>
- [9] David Kastrup: *How to detect if \vbox is empty*; newsgroup `comp.text.tex`, 2011-02-04.
<https://groups.google.com/group/comp.text.tex/msg/8d3cb89496a4d86d>

5 History

[2009/08/05 v1.0]

- First version.

[2009/12/12 v1.1]

- Short title shortened.
- `\ltx@ifUndefined` added.

[2010/01/28 v1.2]

- `\ltx@RemovePrefix` and `\ltx@StripPrefix` added.
- `\ltx@ifclassloaded`, `\ltx@ifpackageloaded`, `\ltx@iffileloaded`, `\ltx@ifclasslater`, `\ltx@ifpackagelater`, `\ltx@iffilelater`, `\ltx@clsextension`, `\ltx@pkgextension` added.
- `\ltx@GlobalAppendToMacro`, `\ltx@LocalAppendToMacro` added.

[2010/03/01 v1.3]

- `\ltx@newif` added.
- `\ltx@ifnextchar` added.
- Numbers `\ltx@zero`, `\ltx@one`, `\ltx@two`, `\ltx@cclv` added.

[2010/03/09 v1.4]

- `\ltx@pkgextension` and `\ltx@clsextension` are hardcoded to avoid trouble with `\@onlypreamble`.

[2010/04/08 v1.5]

- `\ltx@cartwo`, `\ltx@cdrtwo`, `\ltx@carthree`, `\ltx@cdrthree`,
`\ltx@carfour`, `\ltx@cdrfour` added.
- `\ltx@ReturnAfterFi` and `\ltx@ReturnAfterElseFi` fixed.

[2010/04/16 v1.6]

- `\ltx@leavevmode`, `\ltx@mbox` added.

[2010/04/26 v1.7]

- `\ltx@GobbleNum`, `\ltx@CdrNum`, `\ltx@CarNum` added.
- `\ltx@carzero`, `\ltx@cdrzero` added.
- `\ltx@hashchar` added.

[2010/09/11 v1.8]

- `\ltx@leftbracechar`, `\ltx@rightbracechar` added.

[2010/10/25 v1.9]

- `\ltx@LocalAppendToMacro` and `\ltx@GlobalAppendToMacro` are now
`\long`.

[2010/10/31 v1.10]

- `\ltx@newglobalif` added.

[2010/11/12 v1.11]

- `\ltx@ifempty` added.
- `\ltx@firstofthree`, `\ltx@secondofthree`, `\ltx@thirdofthree` added.

[2010/12/02 v1.12]

- `\ltx@onelevel@sanitize` added.
- `\LTXcmds@num` fixed for the case with `\numexpr` (bug found by GL).

[2010/12/04 v1.13]

- `\ltx@ifblank` added.
- Optimization for `\ltx@ifempty`.

[2010/12/07 v1.14]

- `\ltx@zapspace` added.

[2010/12/12 v1.15]

- `\ltx@minusone` added.

[2011/02/04 v1.16]

- `\ltx@ifBoxEmpty` and `\ltx@ifBoxVoidOrEmpty` added.
- `\ltx@firstoffour`, ..., `\ltx@fourthoffour` added.

[2011/02/05 v1.17]

- `\ltx@ifBoxEmpty`: an empty box may have non-zero dimensions.

[2011/03/16 v1.18]

- `\ltx@ifclasslater` fixed.

[2011/04/14 v1.19]

- `\ltx@ifnextchar`: detection of optional spaces modified.
- `\ltx(Loc,Glob)(Toks,Dimen,Skip)(A,B,C,D,E)` added.

[2011/04/18 v1.20]

- `\ltx@ifnextchar` with conditional support (thanks GL for bug report).

[2011/08/22 v1.21]

- `\ltx@GlobalPrependToMacro`, `\ltx@LocalPrependToMacro` added (feature request of Martin Münch).

[2011/11/09 v1.22]

- `\ltx@carsecond`, `\ltx@carthird`, `\ltx@carfourth`, `\ltx@CarNumth` added.
- `\ltx@cdrzero`, `\ltx@cdr`, `\ltx@cdrtwo`, `csltx@cdrthree`, `\ltx@cdrfour`, `\ltx@CdrNum` modified to retain braces and spaces. They are expandable in two expansion steps.

[2016/05/16 v1.23]

- Documentation updates.

[2019/12/15 v1.24]

- Documentation updates.

[2020-05-10 v1.25]

- Changed the definitions of `\ltx@iffilelater`, `\ltx@ifpackagelater` and `\ltx@ifclasslater` to support dates in ISO format in same way as the LaTeX kernel does it since 2017. The commands now use the same test as the LaTeX kernel. `\pdfmatch` is no longer used with `pdftex`, and the tests for dates before 1994 have been removed

[2023-12-04 v1.26]

- corrected `\ltx@ifl@t@r` for plain.

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