

# expl3    L<sup>A</sup>T<sub>E</sub>X3    \*

L<sup>A</sup>T<sub>E</sub>X3

2019-01-01

L<sup>A</sup>T<sub>E</sub>X    T<sub>E</sub>X    L<sup>A</sup>T<sub>E</sub>X3

- L<sup>A</sup>T<sub>E</sub>X    L<sup>A</sup>T<sub>E</sub>X    L<sup>A</sup>T<sub>E</sub>X
- 
- 

L<sup>A</sup>T<sub>E</sub>X3    T<sub>E</sub>X  
expl3    L<sup>A</sup>T<sub>E</sub>X3    interface3

## 1

|  |                                  |   |  |
|--|----------------------------------|---|--|
| L <sup>A</sup> T <sub>E</sub> X 2 <sub>ε</sub> | L <sup>A</sup> T <sub>E</sub> X  | L <sup>A</sup> T <sub>E</sub> X    T <sub>E</sub> X | L <sup>A</sup> T <sub>E</sub> X3    T <sub>E</sub> X |
|  | L <sup>A</sup> T <sub>E</sub> X  | plainT <sub>E</sub> X                               |  |
| <hr/>  |                                  |   |  |
| * <a href="#">expl3.pdf</a>                    | L <sup>A</sup> T <sub>E</sub> X3 | L <sup>A</sup> T <sub>E</sub> X3                    |  |

**convention**    L<sup>A</sup>T<sub>E</sub>X3    “ ”

**interface**    “ ”

**primitive** (e)T<sub>E</sub>X    “ ”

**token**    T<sub>E</sub>X    zoho    *T<sub>E</sub>X for the Impatient*    “ ” “token list” “ ”

**register**    “ ”

**quark** L<sup>A</sup>T<sub>E</sub>X3    “ ”

<https://github.com/WenboSheng/LaTeX3-doc-cn/expl3-doc-cn>

L<sup>A</sup>T<sub>E</sub>X    LPPL, L<sup>A</sup>T<sub>E</sub>X Project Public License    LPPL    <http://www.latex-project.org/lppl/>

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2019    1    14

expl3      L<sup>A</sup>T<sub>E</sub>X      L<sup>A</sup>T<sub>E</sub>X3      L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub>      plain T<sub>E</sub>X      L<sup>A</sup>T<sub>E</sub>X3

T<sub>E</sub>X

2

T<sub>E</sub>X      L<sup>A</sup>T<sub>E</sub>X3

.tex      tag

*declarative*      T<sub>E</sub>X      [3] [2]      L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub>      HTML      XML

T<sub>E</sub>X      [1]      T<sub>E</sub>X      “ ”

T<sub>E</sub>X      \box

\special

“ ”

L<sup>A</sup>T<sub>E</sub>X      L<sup>A</sup>T<sub>E</sub>X2.09      L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub>      L<sup>A</sup>T<sub>E</sub>X

“ ”

T<sub>E</sub>X      “ T<sub>E</sub>X ”      L<sup>A</sup>T<sub>E</sub>X

L<sup>A</sup>T<sub>E</sub>X3

- T<sub>E</sub>X
- L<sup>A</sup>T<sub>E</sub>X      L<sup>A</sup>T<sub>E</sub>X
- 
- L<sup>A</sup>T<sub>E</sub>X
- T<sub>E</sub>X

3

L<sup>A</sup>T<sub>E</sub>X3      @      “ ”      \_ :      plainT<sub>E</sub>X      L<sup>A</sup>T<sub>E</sub>X

T<sub>E</sub>X      expl3

### 3.1

```

\l_tmpa_box      l_
\g_tmpa_int      TEX      g_
\c_empty_tl      c_

\seq_push:Nn      :Nn      N
TEX “ ”      n “ normal”      seq

```

### 3.2

```

LATEX3

\⟨ module⟩_⟨ description⟩:⟨ arg-spec⟩

\⟨ scope⟩_⟨ module⟩_⟨ description⟩_⟨ type⟩

⟨ module⟩ ⟨ description⟩

module      int seq box
            box      l3box

l3prefixes.csv
description      -      -      “ ”      LATEX3
\if_cs_exist:N
g      \tl_set:Nn      \tl_gset:Nn
g

```

#### 3.2.1

```

TEX      name space      LATEX 2ε
LATEX 2ε
expl3      /
“ ”      “ ”
--

```

```
\module_foo:nnn
```

```
\_module_foo_nnn
```

```
-
```

```
\l_module_foo_tl
```

```
\l\_module_foo_tl
```

### 3.2.2 @@ l3docstrip

```
--<module> l3docstrip
```

```
%<@@=<module>>
```

```
@@ _@@ _<module> l3docstrip
```

```
%<@@=foo>
```

```
% \begin{macrocode}
```

```
\cs_new:Npn \@@_function:n #1
```

```
...
```

```
\tl_new:N \l_@@_my_tl
```

```
% \end{macrocode}
```

```
\cs_new:Npn \_foo_function:n #1
```

```
...
```

```
\tl_new:N \l_foo_function_my_tl
```

```
_@@ @@ _<module> @@
```



$\langle type \rangle$   $\langle module \rangle$   $\langle module \rangle$   
 “ ”  $\text{\TeX}$  toks  $\text{\LaTeX3}$  toks  
 $\text{\texttt{t1}}$   
 $\text{\TeX}$   $\text{\TeX}$  prop toks  $\text{\texttt{t1}}$

### 3.2.4

“ ”

$\text{\texttt{expl3}}$   $\text{\texttt{\seq\_push:Nn}}$   
 $\text{\TeX}$   $\text{\LaTeX3}$   
 $\text{\texttt{expl3}}$   $\text{\texttt{check-declarations}}$

### 3.2.5

$\langle arg-spec \rangle$   $\langle arg-spec \rangle$

$\text{\texttt{n}}$   
 $\text{\TeX}$   
 $\text{\texttt{N}}$   $\text{\texttt{n}}$   
 $\text{\texttt{N}}$   $\text{\texttt{\cs\_set}}$   
 $\text{\texttt{p}}$   $\text{\TeX}$   
 $\text{\texttt{\#1\#2\#3}}$   $\text{\texttt{\#1,\#2\q\_stop\#3}}$

$\text{\texttt{T,F}}$   $\text{\texttt{n}}$

$\text{\texttt{D}}$   $\text{\texttt{Do not use}}$   $\text{\TeX}$   
 $\text{\texttt{w}}$  “ weird”  $\text{\TeX}$   $\text{\texttt{\if...}}$   
 $\text{\texttt{n}}$  —  $\text{\texttt{n}}$

## 4

`\g_ior_file_name_seq`      `ior`

`\seq_gpush:Nn \g_ior_file_name_seq {#1}`

#1

`\l_ior_curr_file_tl`

`\seq_gpush:Nn \g_ior_file_name_seq \l_ior_curr_file_tl`

———— `\exp_after:wN` 3

`\exp_after:wN`

`\seq_gpush:Nn`

`\exp_after:wN`

`\g_ior_file_name_seq`

`\exp_after:wN`

`{ \l_ior_curr_file_tl }`

L<sup>A</sup>T<sub>E</sub>X3

`\seq_gpush:NV \g_ior_file_name_seq \l_ior_curr_file_tl`

`V`      “      ”

**c**    character

`\csname ... \endcsname`

`\seq_gpush:cV { g_file_name_seq } \l_tmpa_tl`

`\seq_gpush:NV \g_file_name_seq \l_tmpa_tl`

(a)      (b)

`\tl_new:N \g_file_seq_name_tl`

`\tl_gset:Nn \g_file_seq_name_tl { g_file_name_seq }`

`\seq_gpush:cV { \tl_use:N \g_file_seq_name_tl } \l_tmpa_tl.`

---

<sup>3</sup>`\exp_after:wN`    T<sub>E</sub>X    `\expandafter`    L<sup>A</sup>T<sub>E</sub>X3

|          |                           |                        |                                 |          |
|----------|---------------------------|------------------------|---------------------------------|----------|
|          |                           | <code>\tl_use:N</code> | <code>\&lt;var&gt;_use:N</code> |          |
| <b>V</b> | Value                     |                        |                                 |          |
|          |                           |                        | <code>\&lt;var&gt;_use:N</code> | “ ”      |
| <b>v</b> | value                     |                        |                                 |          |
|          | <code>c V</code>          |                        | <code>\&lt;var&gt;_use:N</code> |          |
| <b>x</b> | expand                    |                        |                                 |          |
|          | <code>\edef</code>        |                        | <code>x</code>                  |          |
| <b>o</b> | one-level                 |                        |                                 |          |
|          | <code>\expandafter</code> |                        |                                 | <b>V</b> |
|          | <code>o</code>            |                        |                                 |          |
| <b>f</b> | first                     |                        |                                 |          |
|          | <code>x</code>            |                        |                                 |          |

#### 4.1

```

                                TEX                latex.ltx

\global\expandafter\let
    \csname\cf@encoding \string#1\expandafter\endcsname
    \csname ?\string#1\endcsname

    \let          \let          #1          \textcurrency
\cf@encoding      ?          \expandafter
\csname          TEX

\cs_gset_eq:cc
{ \cf@encoding \token_to_str:N #1 } { ? \token_to_str:N #1 }

\cs_gset_eq:cc \let \token_to_str:N
\string LATEX3

\expandafter
    \in@
\csname sym#3%
    \expandafter

```



```

\endcsname
\expandafter
{%
\group@list}%

\group@list      sym#3      \in@
\in@              "n"

\tl_test_in:nn      \tl_test_in:cV

\tl_test_in:cV { sym #3 } \group@list

\l_group_seq      \group@list      \expandafter      }

```

## 4.2

```

LATEX3

" "TEX
" "\demo_cmd:Nnn      \demo_cmd:cnx      " "

\demo_cmd:Nnn

\cs_generate_variant:Nn \demo_cmd:Nnn { cnx }

\demo_cmd:cnx { abc } { pq } { \rst \xyz }

.....

\def \tempa {{pq}}%
\edef \tempb {\rst \xyz}%
\expandafter
\demo@cmd:nnn
\csname abc%
\expandafter
\expandafter
\expandafter
\endcsname
\expandafter
\tempa
\expandafter

```

```
{%
\tempb
}%

\demo_cmd_b:nnnnn \demo_cmd_b:xcxcx 135 \csname
24

\cs_generate_variant:Nn \demo_cmd_b:nnnnn { xcxcx }
```

5

```
expl3 LATEX 2ε LATEX 3 LATEX 2ε LATEX 3
expl3 expl3
expl3 expl3 LATEX 2ε
\RequirePackage{expl3}

expl3

l3basics

l3box

l3clist

l3coffins

l3expan

l3int int

l3keys { key1=val1 , key2=val2 } LATEX 3 xkeyval/kvoptions
pgfkeys

l3msg

l3names TEX

l3prg bool do-while

l3prop “ ”

l3quark “ quark”
```

4

`l3seq`

`l3skip` “ ” `skip`“ ” `dim` “ ” `muskip`

`l3tl` `tl` `var.`  $\text{\TeX}$

`l3token`

## 6 $\text{\LaTeX} 2_{\epsilon}$ $\text{\LaTeX} 3$

$\text{\LaTeX} 2_{\epsilon}$   $\text{\LaTeX} 3$

- `expl3`  $\text{\LaTeX} 2_{\epsilon}$  `\@ifpackageloaded`  $\text{\LaTeX} 3$
- `xparse` `l3package` CTAN  $\text{\LaTeX} 3$  SVN
- `\long` `\cs_new:Npn` “short” `\cs_new_nopar:Npn`
- `\cs_new:Npn`, `\tl_new:N`
- “ ” “ ” `\cs_if_exist:N(TF)` `\if_cs_exist:N`
- ```

\cs_new:Npn \foo_bar:Nn #1#2
{
  \cs_if_exist:NTF #1
    { \__foo_bar:n {#2} }
    { \__foo_bar:nn {#2} { literal } }
}

{ } #1, #2

```
- 
- `aux`, `auxi`, `auxii`
- [LaTeX-L](#)

7 expl3

```

\LaTeX 2ε expl3 true false true
check-declarations \LaTeX 3 TEX TEX check-declarations
\l3candidates \debug_on:n {check-declarations}
log-functions .log \LaTeX 3 bootstrap \l3candidates
\debug_on:n {log-functions}
enable-debug check-declarations log-functions expl3 \debug_...
expl3 enable-debug
driver
auto \LaTeX 3 DVI pdfTEX LuaTEX dvips pTEX upTEX
dvipdfmx
latex2e graphics \LaTeX 3
dvips dvips
dvipdfmx dvipdfmx
dvisvgm dvisvgm
pdfmode pdfmode pdfTEX LuaTEX PDF
xdvipdfmx xdvipdfmx XƎTEX
```

8 \LaTeX 2<sub>ε</sub> expl3

```

\LaTeX 2ε expl3 “ ” expl3.tex plainTEX
\input expl3-generic %
“ ” \LaTeX 2ε “ ”
\ExplSyntaxOn \ExplSyntaxOff interface3
expl3 \LaTeX 2ε \LaTeX 2ε
```

9

expl3

- T<sub>E</sub>X90
- $\varepsilon$ -T<sub>E</sub>X \TeXeTstate, \beginL, \beginR, \endL, \endR T<sub>E</sub>X--X<sub>Ǝ</sub>T

- $\text{pdf}\text{\TeX}$      $\backslash\text{pdfstrcmp}$   
 $\backslash\text{pdfoutput}$     DVI    PDF     $\backslash\text{pdfcolorstack}$ ,  $\backslash\text{pdfliteral}$ ,  
 $\backslash\text{pdfmatrix}$ ,  $\backslash\text{pdfrestore}$ ,  $\backslash\text{pdfsave}$     Unicode
- $\text{pdf}\text{\TeX}$  v1.40
- $\text{X}\text{\TeX}$  v0.99992
- $\text{Lua}\text{\TeX}$  v0.70
- e-(u)p $\text{\TeX}$  2012
- expl3

## 10 $\text{\LaTeX}$ 3

$\text{\LaTeX}$ 3     $\text{\LaTeX}$ 3

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- [3] Leslie Lamport.  *$\text{\LaTeX}$ : A Document Preparation System*. Addison-Wesley, Reading, Massachusetts, second edition, 1994.
- [4] Frank Mittelbach and Chris Rowley. “The  $\text{\LaTeX}$ 3 Project”. *TUGboat*, Vol. 18, No. 3, pp. 195–198, 1997.