

# The `magicnum` package

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## Abstract

This packages allows to access magic numbers by a hierarchical name system.

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# 1 Documentation

## 1.1 Introduction

Especially since  $\varepsilon$ -TeX there are many integer values with special meanings, such as catcodes, group types, ... Package `etex`, enabled by options, defines macros in the user namespace for these values.

This package goes another approach for storing the names and values.

- If L<sup>A</sup>T<sub>E</sub>X is available, they are stored in Lua tables.
- Without L<sup>A</sup>T<sub>E</sub>X they are remembered using internal macros.

## 1.2 User interface

The integer values and names are organized in a hierarchical scheme of categories with the property names as leaves. Example:  $\varepsilon$ -TeX's `\currentgrouplevel` reports 2 for a group caused by `\hbox`. This package has chosen to organize the group types in a main category `etex` and its subcategory `grouptype`:

`etex.grouptype.hbox = 2`

The property name `hbox` in category `etex.grouptype` has value 2. Dots are used to separate components.

If you want to have the value, the access key is constructed by the category with all its components and the property name. For the opposite the value is used instead of the property name.

Values are always integers (including negative numbers).

### 1.2.1 `\magicnum`

`\magicnum {⟨access key⟩}`

Macro `\magicnum` expects an access key as argument and expands to the requested data. The macro is always expandable. In case of errors the expansion result is empty.

The same macro is also used for getting a property name. In this case the property name part in the access key is replaced by the value.

The catcodes of the resulting numbers and strings follow T<sub>E</sub>X's tradition of `\string`, `\meaning`, ...: The space has catcode 10 (`tex.catcode.space`) and the other characters have catcode 12 (`tex.catcode.other`).

Examples:

```
\magicnum{etex.grouptype.hbox} ⇒ 2
\magicnum{tex.catcode.14} ⇒ comment
\magicnum{tex.catcode.undefined} ⇒ ∅
```

### 1.2.2 Properties

- The components of a category are either subcategories or key value pairs, but not both.
- The full specified property names are unique and thus has one integer value exactly.
- Also the values inside a category are unique. This condition is a prerequisite for the reverse mapping of `\magicnum`.
- All names start with a letter. Only letters or digits may follow.

## 1.3 Data

### 1.3.1 Category `tex.catcode`

|                                      |    |
|--------------------------------------|----|
| <code>tex.catcode.escape</code>      | 0  |
| <code>tex.catcode.begingroup</code>  | 1  |
| <code>tex.catcode.endgroup</code>    | 2  |
| <code>tex.catcode.math</code>        | 3  |
| <code>tex.catcode.align</code>       | 4  |
| <code>tex.catcode.eol</code>         | 5  |
| <code>tex.catcode.parameter</code>   | 6  |
| <code>tex.catcode.superscript</code> | 7  |
| <code>tex.catcode.subscript</code>   | 8  |
| <code>tex.catcode.ignore</code>      | 9  |
| <code>tex.catcode.space</code>       | 10 |
| <code>tex.catcode.letter</code>      | 11 |
| <code>tex.catcode.other</code>       | 12 |
| <code>tex.catcode.active</code>      | 13 |
| <code>tex.catcode.comment</code>     | 14 |
| <code>tex.catcode.invalid</code>     | 15 |

### 1.3.2 Category `etex.grouptype`

|  |    |
|--|----|
| <code>etex.grouptype.bottomlevel</code>  | 0  |
| <code>etex.grouptype.simple</code>       | 1  |
| <code>etex.grouptype.hbox</code>         | 2  |
| <code>etex.grouptype.adjustedhbox</code> | 3  |
| <code>etex.grouptype.vbox</code>         | 4  |
| <code>etex.grouptype.align</code>        | 5  |
| <code>etex.grouptype.noalign</code>      | 6  |
| <code>etex.grouptype.output</code>       | 8  |
| <code>etex.grouptype.math</code>         | 9  |
| <code>etex.grouptype.disc</code>         | 10 |
| <code>etex.grouptype.insert</code>       | 11 |
| <code>etex.grouptype.vcenter</code>      | 12 |
| <code>etex.grouptype.mathchoice</code>   | 13 |
| <code>etex.grouptype.semisimple</code>   | 14 |
| <code>etex.grouptype.mathshift</code>    | 15 |
| <code>etex.grouptype.mathleft</code>     | 16 |

### 1.3.3 Category etex.ifttype

|                       |    |
|-----------------------|----|
| etex.ifttype.none     | 0  |
| etex.ifttype.char     | 1  |
| etex.ifttype.cat      | 2  |
| etex.ifttype.num      | 3  |
| etex.ifttype.dim      | 4  |
| etex.ifttype.odd      | 5  |
| etex.ifttype.vmode    | 6  |
| etex.ifttype.hmode    | 7  |
| etex.ifttype.mmode    | 8  |
| etex.ifttype.inner    | 9  |
| etex.ifttype.void     | 10 |
| etex.ifttype.hbox     | 11 |
| etex.ifttype.vbox     | 12 |
| etex.ifttype.x        | 13 |
| etex.ifttype.eof      | 14 |
| etex.ifttype.true     | 15 |
| etex.ifttype.false    | 16 |
| etex.ifttype.case     | 17 |
| etex.ifttype.defined  | 18 |
| etex.ifttype.csname   | 19 |
| etex.ifttype.fontchar | 20 |

### 1.3.4 Category etex.nodetype

|                        |    |
|------------------------|----|
| etex.nodetype.none     | -1 |
| etex.nodetype.char     | 0  |
| etex.nodetype.hlist    | 1  |
| etex.nodetype.vlist    | 2  |
| etex.nodetype.rule     | 3  |
| etex.nodetype.ins      | 4  |
| etex.nodetype.mark     | 5  |
| etex.nodetype.adjust   | 6  |
| etex.nodetype.ligature | 7  |
| etex.nodetype.disc     | 8  |
| etex.nodetype.whatsit  | 9  |
| etex.nodetype.math     | 10 |
| etex.nodetype.glue     | 11 |
| etex.nodetype.kern     | 12 |
| etex.nodetype.penalty  | 13 |
| etex.nodetype.unset    | 14 |
| etex.nodetype.maths    | 15 |

### 1.3.5 Category etex.interactionmode

|                                |   |
|--------------------------------|---|
| etex.interactionmode.batch     | 0 |
| etex.interactionmode.nonstop   | 1 |
| etex.interactionmode.scroll    | 2 |
| etex.interactionmode.errorstop | 3 |

### 1.3.6 Category luatex.pdfliteral.mode

|                                  |   |
|----------------------------------|---|
| luatex.pdfliteral.mode.setorigin | 0 |
| luatex.pdfliteral.mode.page      | 1 |
| luatex.pdfliteral.mode.direct    | 2 |

## 2 Implementation

```
1 (*package)
```

## 2.1 Reload check and package identification

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

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

Package identification:

```
30 \begingroup
31 \catcode35 6 % #
32 \catcode40 12 % (
33 \catcode41 12 % )
34 \catcode44 12 % ,
35 \catcode45 12 % -
36 \catcode46 12 % .
37 \catcode47 12 % /
38 \catcode58 12 % :
39 \catcode64 11 % @
40 \catcode91 12 % [
41 \catcode93 12 % ]
42 \catcode123 1 % {
43 \catcode125 2 % }
44 \expandafter\ifx\csname ProvidesPackage\endcsname\relax
45 \def\x#1#2#3[#4]{\endgroup
46 \immediate\write-1{Package: #3 #4}%
47 \xdef#1{#4}%
48 }%
49 \else
50 \def\x#1#2[#3]{\endgroup
51 #2[#{#3}]%
52 \ifx#1\@undefined
53 \xdef#1{#3}%
54 \fi
55 \ifx#1\relax
56 \xdef#1{#3}%
57 \fi
```

```

58     }%
59   \fi
60 \expandafter\x\csname ver@magicnum.sty\endcsname
61 \ProvidesPackage{magicnum}%
62 [2009/04/10 v1.1 Magic numbers (H0)]

```

## 2.2 Catcodes

```

63 \begingroup
64   \catcode123 1 % {
65   \catcode125 2 % }
66 \def\x{\endgroup
67   \expandafter\edef\csname magicnum@AtEnd\endcsname{%
68     \catcode35 \the\catcode35\relax
69     \catcode64 \the\catcode64\relax
70     \catcode123 \the\catcode123\relax
71     \catcode125 \the\catcode125\relax
72   }%
73 }%
74 \x
75 \catcode35 6 % #
76 \catcode64 11 % @
77 \catcode123 1 % {
78 \catcode125 2 % }
79 \def\TMP@EnsureCode#1#2{%
80   \edef\magicnum@AtEnd{%
81     \magicnum@AtEnd
82     \catcode#1 \the\catcode#1\relax
83   }%
84   \catcode#1 #2\relax
85 }
86 \TMP@EnsureCode{34}{12}% "
87 \TMP@EnsureCode{40}{12}% (
88 \TMP@EnsureCode{41}{12}% )
89 \TMP@EnsureCode{42}{12}% *
90 \TMP@EnsureCode{44}{12}% ,
91 \TMP@EnsureCode{45}{12}% -
92 \TMP@EnsureCode{46}{12}% .
93 \TMP@EnsureCode{47}{12}% /
94 \TMP@EnsureCode{60}{12}% <
95 \TMP@EnsureCode{62}{12}% >

```

## 2.3 Check for previous definition

```

96 \begingroup\expandafter\expandafter\expandafter\endgroup
97 \expandafter\ifx\csname newcommand\endcsname\relax
98   \expandafter\ifx\csname magicnum\endcsname\relax
99     \else
100       \input infwarerr.sty\relax
101       \@PackageErrorNoLine{magicnum}{%
102         \string\magicnum\space is already defined%
103       }\@ehc
104     \fi
105   \else
106     \newcommand*{\magicnum}{}%
107   \fi

```

## 2.4 Without LuaTeX

```

108 \begingroup\expandafter\expandafter\expandafter\endgroup
109 \expandafter\ifx\csname directlua\endcsname\relax
\magicnum
110 \begingroup\expandafter\expandafter\expandafter\endgroup

```

```

111 \expandafter\ifx\csname ifcsname\endcsname\relax
112   \def\magicnum#1{%
113     \expandafter\ifx\csname MG@#1\endcsname\relax
114       \else
115         \csname MG@#1\endcsname
116       \fi
117     }%
118   \else
119     \begingroup
120     \edef\x{\endgroup
121       \def\noexpand\magicnum##1{%
122         \expandafter\noexpand\csname
123           ifcsname\endcsname MG@##1\noexpand\endcsname
124           \noexpand\csname MG@##1%
125             \noexpand\expandafter\noexpand\endcsname
126             \expandafter\noexpand\csname fi\endcsname
127         }%
128       }%
129     \x
130   \fi
131 \else

```

## 2.5 With LuaTeX

```

132 \begingroup\expandafter\expandafter\expandafter\endgroup
133 \expandafter\ifx\csname RequirePackage\endcsname\relax
134   \input luatex.sty\relax
135 \else
136   \RequirePackage{luatex}[2009/04/10]%
137 \fi

```

\magicnum@directlua

```

138 \ifnum\luatexversion<36 %
139   \def\magicnum@directlua{\directlua0 }%
140 \else
141   \let\magicnum@directlua\directlua
142 \fi

```

\magicnum

```

143 \def\magicnum#1{%
144   \magicnum@directlua{%
145     require("oberdiek.magicnum")%
146     oberdiek.magicnum.get(%
147       "\luaescapestring{#1}",\number\CatcodeTableString
148     )%
149   }%
150 }%

151 \magicnum@AtEnd
152 \expandafter\endinput
153 \fi
154 \</package>

```

## 2.6 Data

### 2.6.1 Plain data

```

155 \<data>
156 \tex.catcode
157   escape = 0
158   begingroup = 1
159   endgroup = 2

```

```

160 math = 3
161 align = 4
162 eol = 5
163 parameter = 6
164 superscript = 7
165 subscript = 8
166 ignore = 9
167 space = 10
168 letter = 11
169 other = 12
170 active = 13
171 comment = 14
172 invalid = 15
173 etex.grouptype
174 bottomlevel = 0
175 simple = 1
176 hbox = 2
177 adjustedhbox = 3
178 vbox = 4
179 align = 5
180 noalign = 6
181 output = 8
182 math = 9
183 disc = 10
184 insert = 11
185 vcenter = 12
186 mathchoice = 13
187 semisimple = 14
188 mathshift = 15
189 mathleft = 16
190 etex.ifttype
191 none = 0
192 char = 1
193 cat = 2
194 num = 3
195 dim = 4
196 odd = 5
197 vmode = 6
198 hmode = 7
199 mmode = 8
200 inner = 9
201 void = 10
202 hbox = 11
203 vbox = 12
204 x = 13
205 eof = 14
206 true = 15
207 false = 16
208 case = 17
209 defined = 18
210 csname = 19
211 fontchar = 20
212 etex.nodetype
213 none = -1
214 char = 0
215 hlist = 1
216 vlist = 2
217 rule = 3
218 ins = 4
219 mark = 5
220 adjust = 6
221 ligature = 7

```



```

222 disc = 8
223 whatsit = 9
224 math = 10
225 glue = 11
226 kern = 12
227 penalty = 13
228 unset = 14
229 maths = 15
230 etex.interactionmode
231 batch = 0
232 nonstop = 1
233 scroll = 2
234 errorstop = 3
235 luatex.pdfliteral.mode
236 setorigin = 0
237 page = 1
238 direct = 2
239 </data>

```

## 2.6.2 Data for T<sub>E</sub>X

```

240 <*package>

\magicnum@add

241 \begingroup\expandafter\expandafter\expandafter\endgroup
242 \expandafter\ifx\csname detokenize\endcsname\relax
243   \def\magicnum@add#1#2#3{%
244     \expandafter\magicnum@@add
245       \csname MG@#1.#2\endcsname
246       \csname MG@#1.#3\endcsname
247     {#3}{#2}%
248   }%
249   \def\magicnum@@add#1#2#3#4{%
250     \def#1{#3}%
251     \def#2{#4}%
252     \edef#1{%
253       \expandafter\strip@prefix\meaning#1%
254     }%
255     \edef#2{%
256       \expandafter\strip@prefix\meaning#2%
257     }%
258   }%
259   \expandafter\ifx\csname strip@prefix\endcsname\relax
260     \def\strip@prefix#1->{%}%
261   \fi
262 \else
263   \def\magicnum@add#1#2#3{%
264     \expandafter\edef\csname MG@#1.#2\endcsname{%
265       \detokenize{#3}%
266     }%
267     \expandafter\edef\csname MG@#1.#3\endcsname{%
268       \detokenize{#2}%
269     }%
270   }%
271 \fi

272 \magicnum@add{tex.catcode}{escape}{0}
273 \magicnum@add{tex.catcode}{begingroup}{1}
274 \magicnum@add{tex.catcode}{endgroup}{2}
275 \magicnum@add{tex.catcode}{math}{3}
276 \magicnum@add{tex.catcode}{align}{4}
277 \magicnum@add{tex.catcode}{eol}{5}
278 \magicnum@add{tex.catcode}{parameter}{6}
279 \magicnum@add{tex.catcode}{superscript}{7}

```

```

280 \magicnum@add{tex.catcode}{subscript}{8}
281 \magicnum@add{tex.catcode}{ignore}{9}
282 \magicnum@add{tex.catcode}{space}{10}
283 \magicnum@add{tex.catcode}{letter}{11}
284 \magicnum@add{tex.catcode}{other}{12}
285 \magicnum@add{tex.catcode}{active}{13}
286 \magicnum@add{tex.catcode}{comment}{14}
287 \magicnum@add{tex.catcode}{invalid}{15}
288 \magicnum@add{etex.grouptype}{bottomlevel}{0}
289 \magicnum@add{etex.grouptype}{simple}{1}
290 \magicnum@add{etex.grouptype}{hbox}{2}
291 \magicnum@add{etex.grouptype}{adjustedhbox}{3}
292 \magicnum@add{etex.grouptype}{vbox}{4}
293 \magicnum@add{etex.grouptype}{align}{5}
294 \magicnum@add{etex.grouptype}{noalign}{6}
295 \magicnum@add{etex.grouptype}{output}{8}
296 \magicnum@add{etex.grouptype}{math}{9}
297 \magicnum@add{etex.grouptype}{disc}{10}
298 \magicnum@add{etex.grouptype}{insert}{11}
299 \magicnum@add{etex.grouptype}{vcenter}{12}
300 \magicnum@add{etex.grouptype}{mathchoice}{13}
301 \magicnum@add{etex.grouptype}{semisimple}{14}
302 \magicnum@add{etex.grouptype}{mathshift}{15}
303 \magicnum@add{etex.grouptype}{mathleft}{16}
304 \magicnum@add{etex.ifttype}{none}{0}
305 \magicnum@add{etex.ifttype}{char}{1}
306 \magicnum@add{etex.ifttype}{cat}{2}
307 \magicnum@add{etex.ifttype}{num}{3}
308 \magicnum@add{etex.ifttype}{dim}{4}
309 \magicnum@add{etex.ifttype}{odd}{5}
310 \magicnum@add{etex.ifttype}{vmode}{6}
311 \magicnum@add{etex.ifttype}{hmode}{7}
312 \magicnum@add{etex.ifttype}{mmode}{8}
313 \magicnum@add{etex.ifttype}{inner}{9}
314 \magicnum@add{etex.ifttype}{void}{10}
315 \magicnum@add{etex.ifttype}{hbox}{11}
316 \magicnum@add{etex.ifttype}{vbox}{12}
317 \magicnum@add{etex.ifttype}{x}{13}
318 \magicnum@add{etex.ifttype}{eof}{14}
319 \magicnum@add{etex.ifttype}{true}{15}
320 \magicnum@add{etex.ifttype}{false}{16}
321 \magicnum@add{etex.ifttype}{case}{17}
322 \magicnum@add{etex.ifttype}{defined}{18}
323 \magicnum@add{etex.ifttype}{csname}{19}
324 \magicnum@add{etex.ifttype}{fontchar}{20}
325 \magicnum@add{etex.nodetype}{none}{-1}
326 \magicnum@add{etex.nodetype}{char}{0}
327 \magicnum@add{etex.nodetype}{hlist}{1}
328 \magicnum@add{etex.nodetype}{vlist}{2}
329 \magicnum@add{etex.nodetype}{rule}{3}
330 \magicnum@add{etex.nodetype}{ins}{4}
331 \magicnum@add{etex.nodetype}{mark}{5}
332 \magicnum@add{etex.nodetype}{adjust}{6}
333 \magicnum@add{etex.nodetype}{ligature}{7}
334 \magicnum@add{etex.nodetype}{disc}{8}
335 \magicnum@add{etex.nodetype}{whatsit}{9}
336 \magicnum@add{etex.nodetype}{math}{10}
337 \magicnum@add{etex.nodetype}{glue}{11}
338 \magicnum@add{etex.nodetype}{kern}{12}
339 \magicnum@add{etex.nodetype}{penalty}{13}
340 \magicnum@add{etex.nodetype}{unset}{14}
341 \magicnum@add{etex.nodetype}{maths}{15}

```

```

342 \magicnum@add{etex.interactionmode}{batch}{0}
343 \magicnum@add{etex.interactionmode}{nonstop}{1}
344 \magicnum@add{etex.interactionmode}{scroll}{2}
345 \magicnum@add{etex.interactionmode}{errorstop}{3}
346 \magicnum@add{luatex.pdfliteral.mode}{setorigin}{0}
347 \magicnum@add{luatex.pdfliteral.mode}{page}{1}
348 \magicnum@add{luatex.pdfliteral.mode}{direct}{2}

349 \magicnum@AtEnd
350 \end{package}

```

### 2.6.3 Lua module

```

351 \lua
352 module("oberdiek.magicnum", package.seeall)

353 local data = {
354   ["tex.catcode"] = {
355     [0] = "escape",
356     [1] = "begingroup",
357     [2] = "endgroup",
358     [3] = "math",
359     [4] = "align",
360     [5] = "eol",
361     [6] = "parameter",
362     [7] = "superscript",
363     [8] = "subscript",
364     [9] = "ignore",
365     [10] = "space",
366     [11] = "letter",
367     [12] = "other",
368     [13] = "active",
369     [14] = "comment",
370     [15] = "invalid",
371     ["active"] = 13,
372     ["align"] = 4,
373     ["begingroup"] = 1,
374     ["comment"] = 14,
375     ["endgroup"] = 2,
376     ["eol"] = 5,
377     ["escape"] = 0,
378     ["ignore"] = 9,
379     ["invalid"] = 15,
380     ["letter"] = 11,
381     ["math"] = 3,
382     ["other"] = 12,
383     ["parameter"] = 6,
384     ["space"] = 10,
385     ["subscript"] = 8,
386     ["superscript"] = 7
387   },
388   ["etex.grouptype"] = {
389     [0] = "bottomlevel",
390     [1] = "simple",
391     [2] = "hbox",
392     [3] = "adjustedhbox",
393     [4] = "vbox",
394     [5] = "align",
395     [6] = "noalign",
396     [8] = "output",
397     [9] = "math",
398     [10] = "disc",
399     [11] = "insert",
400     [12] = "vcenter",

```

```

401     [13] = "mathchoice",
402     [14] = "semisimple",
403     [15] = "mathshift",
404     [16] = "mathleft",
405     ["adjustedhbox"] = 3,
406     ["align"] = 5,
407     ["bottomlevel"] = 0,
408     ["disc"] = 10,
409     ["hbox"] = 2,
410     ["insert"] = 11,
411     ["math"] = 9,
412     ["mathchoice"] = 13,
413     ["mathleft"] = 16,
414     ["mathshift"] = 15,
415     ["noalign"] = 6,
416     ["output"] = 8,
417     ["semisimple"] = 14,
418     ["simple"] = 1,
419     ["vbox"] = 4,
420     ["vcenter"] = 12
421 },
422 ["etex.ifttype"] = {
423     [0] = "none",
424     [1] = "char",
425     [2] = "cat",
426     [3] = "num",
427     [4] = "dim",
428     [5] = "odd",
429     [6] = "vmode",
430     [7] = "hmode",
431     [8] = "mmode",
432     [9] = "inner",
433     [10] = "void",
434     [11] = "hbox",
435     [12] = "vbox",
436     [13] = "x",
437     [14] = "eof",
438     [15] = "true",
439     [16] = "false",
440     [17] = "case",
441     [18] = "defined",
442     [19] = "csname",
443     [20] = "fontchar",
444     ["case"] = 17,
445     ["cat"] = 2,
446     ["char"] = 1,
447     ["csname"] = 19,
448     ["defined"] = 18,
449     ["dim"] = 4,
450     ["eof"] = 14,
451     ["false"] = 16,
452     ["fontchar"] = 20,
453     ["hbox"] = 11,
454     ["hmode"] = 7,
455     ["inner"] = 9,
456     ["mmode"] = 8,
457     ["none"] = 0,
458     ["num"] = 3,
459     ["odd"] = 5,
460     ["true"] = 15,
461     ["vbox"] = 12,
462     ["vmode"] = 6,

```

```

463     ["void"] = 10,
464     ["x"] = 13
465 },
466 ["etex.nodetype"] = {
467     [-1] = "none",
468     [0] = "char",
469     [1] = "hlist",
470     [2] = "vlist",
471     [3] = "rule",
472     [4] = "ins",
473     [5] = "mark",
474     [6] = "adjust",
475     [7] = "ligature",
476     [8] = "disc",
477     [9] = "whatsit",
478     [10] = "math",
479     [11] = "glue",
480     [12] = "kern",
481     [13] = "penalty",
482     [14] = "unset",
483     [15] = "maths",
484     ["adjust"] = 6,
485     ["char"] = 0,
486     ["disc"] = 8,
487     ["glue"] = 11,
488     ["hlist"] = 1,
489     ["ins"] = 4,
490     ["kern"] = 12,
491     ["ligature"] = 7,
492     ["mark"] = 5,
493     ["math"] = 10,
494     ["maths"] = 15,
495     ["none"] = -1,
496     ["penalty"] = 13,
497     ["rule"] = 3,
498     ["unset"] = 14,
499     ["vlist"] = 2,
500     ["whatsit"] = 9
501 },
502 ["etex.interactionmode"] = {
503     [0] = "batch",
504     [1] = "nonstop",
505     [2] = "scroll",
506     [3] = "errorstop",
507     ["batch"] = 0,
508     ["errorstop"] = 3,
509     ["nonstop"] = 1,
510     ["scroll"] = 2
511 },
512 ["luatex.pdfliteral.mode"] = {
513     [0] = "setorigin",
514     [1] = "page",
515     [2] = "direct",
516     ["direct"] = 2,
517     ["page"] = 1,
518     ["setorigin"] = 0
519 }
520 }

521 function get(name, catcodetable)
522     local startpos, endpos, category, entry =
523         string.find(name, "^(%a[%a%d%.]*)%.(?[%a%d]+)$")
524     if not entry then

```

```

525     return
526 end
527 local node = data[category]
528 if not node then
529     return
530 end
531 local num = tonumber(entry)
532 local value
533 if num then
534     value = node[num]
535     if not value then
536         return
537     end
538 else
539     value = node[entry]
540     if not value then
541         return
542     end
543     value = "" .. value
544 end
545 tex.print(catcodetable, value)
546 end
547  $\langle$ /lua $\rangle$ 

```

### 3 Test

#### 3.1 Catcode checks for loading

```

548  $\langle$ *test1 $\rangle$ 
549 \catcode'\{=1 %
550 \catcode'\}=2 %
551 \catcode'\#=6 %
552 \catcode'\@=11 %
553 \expandafter\ifx\csname count@\endcsname\relax
554   \countdef\count@=255 %
555 \fi
556 \expandafter\ifx\csname @gobble\endcsname\relax
557   \long\def@gobble#1{}%
558 \fi
559 \expandafter\ifx\csname @firstofone\endcsname\relax
560   \long\def@firstofone#1{#1}%
561 \fi
562 \expandafter\ifx\csname loop\endcsname\relax
563   \expandafter@firstofone
564 \else
565   \expandafter@gobble
566 \fi
567 {%
568   \def\loop#1\repeat{%
569     \def\body{#1}%
570     \iterate
571   }%
572   \def\iterate{%
573     \body
574     \let\next\iterate
575   \else
576     \let\next\relax
577   \fi
578   \next
579 }%
580 \let\repeat=\fi
581 }%

```

```

582 \def\RestoreCatcodes{}
583 \count@=0 %
584 \loop
585   \edef\RestoreCatcodes{%
586     \RestoreCatcodes
587     \catcode\the\count@=\the\catcode\count@\relax
588   }%
589 \ifnum\count@<255 %
590   \advance\count@ 1 %
591 \repeat
592
593 \def\RangeCatcodeInvalid#1#2{%
594   \count@=#1\relax
595   \loop
596     \catcode\count@=15 %
597   \ifnum\count@<#2\relax
598     \advance\count@ 1 %
599   \repeat
600 }
601 \expandafter\ifx\csname LoadCommand\endcsname\relax
602 \def\LoadCommand{\input magicnum.sty\relax}%
603 \fi
604 \def\Test{%
605   \RangeCatcodeInvalid{0}{47}%
606   \RangeCatcodeInvalid{58}{64}%
607   \RangeCatcodeInvalid{91}{96}%
608   \RangeCatcodeInvalid{123}{255}%
609   \catcode'\@=12 %
610   \catcode'\=0 %
611   \catcode'\{=1 %
612   \catcode'\}=2 %
613   \catcode'\#=6 %
614   \catcode'\[=12 %
615   \catcode'\]=12 %
616   \catcode'\%=14 %
617   \catcode'\ =10 %
618   \catcode13=5 %
619   \LoadCommand
620   \RestoreCatcodes
621 }
622 \Test
623 \csname @@end\endcsname
624 \end
625 </test1>

```

### 3.2 Test data

```

626 (*testplain)
627 \input magicnum.sty\relax
628 \def\Test#1#2{%
629   \edef\result{\magicnum{#1}}%
630   \edef\expect{#2}%
631   \edef\expect{\expandafter\stripprefix\meaning\expect}%
632   \ifx\result\expect
633   \else
634     \errmessage{%
635       Failed: [#1] % hash-ok
636       returns [\result] instead of [\expect]%
637     }%
638   \fi
639 }
640 \def\stripprefix#1->{}
641 </testplain>

```

```

642 <*testlatex>
643 \NeedsTeXFormat{LaTeX2e}
644 \documentclass{minimal}
645 \usepackage{magicnum}[2009/04/10]
646 \usepackage{qstest}
647 \IncludeTests{*}
648 \LogTests{log}{*}{*}
649 \newcommand*{\Test}[2]{%
650   \Expect*{\magicnum{#1}}{#2}%
651 }
652 \begin{qstest}{magicnum}{magicnum}
653 </testlatex>

654 <*testdata>
655 \Test{tex.catcode.escape}{0}
656 \Test{tex.catcode.invalid}{15}
657 \Test{tex.catcode.unknown}{}
658 \Test{tex.catcode.0}{escape}
659 \Test{tex.catcode.15}{invalid}
660 \Test{etex.iftypes.true}{15}
661 \Test{etex.iftypes.false}{16}
662 \Test{etex.iftypes.15}{true}
663 \Test{etex.iftypes.16}{false}
664 \Test{etex.nodetype.none}{-1}
665 \Test{etex.nodetype.-1}{none}
666 \Test{luatex.pdfliteral.mode.direct}{2}
667 \Test{luatex.pdfliteral.mode.1}{page}
668 \Test{}{}
669 \Test{unknown}{}
670 \Test{unknown.foo.bar}{}
671 \Test{unknown.foo.4}{}
672 </testdata>

673 <*testplain>
674 \csname @@end\endcsname
675 \end
676 </testplain>
677 <*testlatex>
678 \end{qstest}
679 \csname @@end\endcsname
680 </testlatex>

```

## 4 Installation

### 4.1 Download

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

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

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

**Bundle.** All the packages of the bundle ‘oberdiek’ are also available in a TDS compliant ZIP archive. There the packages are already unpacked and the documentation files are generated. The files and directories obey the TDS standard.

[CTAN:install/macros/latex/contrib/oberdiek.tds.zip](#)

*TDS* refers to the standard “A Directory Structure for T<sub>E</sub>X Files” ([CTAN:tds/tds.pdf](#)). Directories with `texmf` in their name are usually organized this way.

---

<sup>1</sup><http://ftp.ctan.org/tex-archive/>



## 4.2 Bundle installation

**Unpacking.** Unpack the `oberdiek.tds.zip` in the TDS tree (also known as `texmf` tree) of your choice. Example (linux):

```
unzip oberdiek.tds.zip -d ~/texmf
```

**Script installation.** Check the directory `TDS:scripts/oberdiek/` for scripts that need further installation steps. Package `attachfile2` comes with the Perl script `pdfatfi.pl` that should be installed in such a way that it can be called as `pdfatfi`. Example (linux):

```
chmod +x scripts/oberdiek/pdfatfi.pl
cp scripts/oberdiek/pdfatfi.pl /usr/local/bin/
```

## 4.3 Package installation

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

```
tex magicnum.dtx
```

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

|                                      |   |
|--------------------------------------|---|
| <code>magicnum.sty</code>            | → <code>tex/generic/oberdiek/magicnum.sty</code>          |
| <code>magicnum.lua</code>            | → <code>scripts/oberdiek/magicnum.lua</code>              |
| <code>oberdiek.magicnum.lua</code>   | → <code>scripts/oberdiek/oberdiek.magicnum.lua</code>     |
| <code>magicnum.pdf</code>            | → <code>doc/latex/oberdiek/magicnum.pdf</code>            |
| <code>magicnum.txt</code>            | → <code>doc/latex/oberdiek/magicnum.txt</code>            |
| <code>test/magicnum-test1.tex</code> | → <code>doc/latex/oberdiek/test/magicnum-test1.tex</code> |
| <code>test/magicnum-test2.tex</code> | → <code>doc/latex/oberdiek/test/magicnum-test2.tex</code> |
| <code>test/magicnum-test3.tex</code> | → <code>doc/latex/oberdiek/test/magicnum-test3.tex</code> |
| <code>magicnum.dtx</code>            | → <code>source/latex/oberdiek/magicnum.dtx</code>         |

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

## 4.4 Refresh file name databases

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

## 4.5 Some details for the interested

**Attached source.** The PDF documentation on CTAN also includes the `.dtx` source file. It can be extracted by AcrobatReader 6 or higher. Another option is `pdftk`, e.g. unpack the file into the current directory:

```
pdftk magicnum.pdf unpack_files output .
```

**Unpacking with L<sup>A</sup>T<sub>E</sub>X.** The `.dtx` chooses its action depending on the format:

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

**L<sup>A</sup>T<sub>E</sub>X:** Generate the documentation.

If you insist on using L<sup>A</sup>T<sub>E</sub>X for `docstrip` (really, `docstrip` does not need L<sup>A</sup>T<sub>E</sub>X), then inform the autodetect routine about your intention:

```
latex \let\install=y\input{magicnum.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 pdfL<sup>A</sup>T<sub>E</sub>X:

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

## 5 History

[2007/12/12 v1.0]

- First public version.

[2009/04/10 v1.1]

- Adaptation to L<sup>A</sup>T<sub>E</sub>X 0.40.

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