

xCJK2uni 宏包

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第 1 节 简介

xCJK2uni 是一个 L^AT_EX 宏包, 提供了将 CJK 文字转换成 Unicode 的功能。以宏包形式实现 gbk2uni 程序的功能, 使得使用 CJK 和 hyperref 宏包时, 可以得到正确的书签。并提供了 /ToUnicode 映射文件, 使得使用 GBK 等编码时, 配合 cmap 宏包, 用 pdfL^AT_EX 编译得到的 pdf 文件支持查找、复制和粘贴。

xCJK2uni 只适用于下一节说明的有效编码和以 pdfL^AT_EX 作为编译引擎的工作方式。

xCJK2uni 依赖 l3kernel。应该与 CJK 或 CCT 等配合使用, 但 xCJK2uni 不会自动引入它们。

第 2 节 基本命令

`\useCJKencmap` `\useCJKencmap {<Bg5|Bg5+|GB|GBK|JIS|KS>}`

设置当前的编码环境。以上是 xCJK2uni 支持的文字编码, 缺省使用 GBK。xCJK2uni 会在 CJK 环境内自动更新支持的编码。

`\CJKchartouni` * `\CJKchartouni {<单个CJK文字>}`

将文字转换成 16 进制形式的 Unicode。例如 `\CJKchartouni{一}` 将得到 4E00。将它展开两次就可以得到结果。

`\CJKsfdtouni` * `\CJKsfdtouni {<plane>} {<slot>}`

`<plane>` 表示由 .sfd 文件定义的字体的编号, `<slot>` 表示在子字体中的位置, 这个命令将得到该坐标位置的 Unicode。将它展开两次就可以得到结果。如果在当前编码下, 该坐标位置不合法, 将展开为空。

第 3 节 代码实现

3.1 xCJK2uni

```
1 <(*package)
2 <@@=CJKtu)
3 \msg_new:nnn { xCJK2uni } { l3-too-old }
4 {
5   Support~package~'expl3'~too~old. \\\
6   Please~update~an~up~to~date~version~of~the~bundles\\
7   'l3kernel'~and~'l3packages'\\
```

*ctex-kit rev. 21b29fd.

```

8   using~your~TeX~package~manager~or~from~CTAN.
9   }
10  \ifpackagelater { expl3 } { 2019/03/05 } { }
11  { \msg_error:nn { xCJK2uni } { l3-too-old } }
12  \sys_if_engine_pdftex:F
13  {
14    \msg_new:nnn { xCJK2uni } { pdflatex }
15    { The~xCJK2uni~package~is~only~supported~in~pdfTeX. }
16    \msg_critical:nn { xCJK2uni } { pdflatex }
17  }
18  \tl_new:N \l__CJKtu_sfd_tl
19  \prop_new:N \c__CJKtu_sfd_prop
20  \seq_new:N \c__CJKtu_encoding_seq
21  \int_new:N \l__CJKtu_i_min_int
22  \int_new:N \l__CJKtu_i_max_int
23  \int_new:N \l__CJKtu_ii_min_int
24  \int_new:N \l__CJKtu_ii_max_int
25  \int_new:N \l__CJKtu_gap_begin_int
26  \int_new:N \l__CJKtu_gap_end_int
27  \int_new:N \l__CJKtu_plane_int
28  \int_set:Nn \l__CJKtu_i_max_int { "FE }
29  \int_set:Nn \l__CJKtu_ii_max_int { "FE }

```

__CJKtu_set_enc:nnnnnn

```

30  \cs_new_protected_nopar:Npn \__CJKtu_set_enc:nnnnnn #1#2#3#4#5#6
31  {
32    \seq_gput_right:Nn \c__CJKtu_encoding_seq {#1}
33    \prop_gput:Nnn \c__CJKtu_sfd_prop {#1} {#2}
34    \int_const:cn { c__CJKtu_ #1 _i_min_int } {#3}
35    \int_const:cn { c__CJKtu_ #1 _ii_min_int } {#4}
36    \tl_if_empty:nTF {#5}
37    {
38      \int_const:cn { c__CJKtu_ #1 _gap_begin_int }
39      { \l__CJKtu_ii_max_int + 1 }
40      \int_const:cn { c__CJKtu_ #1 _gap_end_int }
41      { \use:c { c__CJKtu_ #1 _gap_begin_int } }
42      \int_const:cn { c__CJKtu_ #1 _plane_int }
43      { \l__CJKtu_ii_max_int - (#4) + 1 }
44    }
45    {
46      \int_const:cn { c__CJKtu_ #1 _gap_begin_int } { #5 + 1 }
47      \int_const:cn { c__CJKtu_ #1 _gap_end_int } {#6}
48      \int_const:cn { c__CJKtu_ #1 _plane_int }
49      { (#5) - (#4) + \l__CJKtu_ii_max_int - (#6) + 2 }
50    }
51  \cs_if_exist_use:NTF \CJKaddEncHook
52  { {#1} { \__CJKtu_enc_map:nn {#1} {#2} } }
53  {
54    \AtBeginDocument
55    {
56      \cs_if_exist_use:NT \CJKaddEncHook
57      { {#1} { \__CJKtu_enc_map:nn {#1} {#2} } }
58    }
59  }
60  }

```

__CJKtu_enc_map:nn

```

61  \cs_new_protected_nopar:Npn \__CJKtu_enc_map:nn #1#2
62  {
63    \int_set_eq:Nc \l__CJKtu_i_min_int { c__CJKtu_ #1 _i_min_int }
64    \int_set_eq:Nc \l__CJKtu_ii_min_int { c__CJKtu_ #1 _ii_min_int }
65    \int_set_eq:Nc \l__CJKtu_gap_begin_int { c__CJKtu_ #1 _gap_begin_int }
66    \int_set_eq:Nc \l__CJKtu_gap_end_int { c__CJKtu_ #1 _gap_end_int }
67    \int_set_eq:Nc \l__CJKtu_plane_int { c__CJKtu_ #1 _plane_int }
68    \cs_if_exist:cF { CJKtu_ #1 _sfd_map:nn }
69    { \group_begin: \file_input:n { xCJK2uni-#2.def } \group_end: }
70    \cs_set_eq:Nc \CJKtu_sfd_map:nn { CJKtu_ #1 _sfd_map:nn }
71  }

```

__CJKtu_use_enc_map:n

```

72  \cs_new_protected_nopar:Npn \__CJKtu_use_enc_map:n #1

```

```

73 {
74   \prop_get:NxNTF \c__CJKtu_sfd_prop {#1} \l__CJKtu_sfd_tl
75   { \c__CJKtu_enc_map:nn {#1} { \l__CJKtu_sfd_tl } }
76   { \msg_error:nnx { xCJK2uni } { invalid-encoding } {#1} }
77 }
78 \msg_new:nnn { xCJK2uni } { invalid-encoding }
79 {
80   The~encoding~`#1'~is~invalid.\\
81   Only~\seq_use:Nnnn \c__CJKtu_encoding_seq { ~and~ } { ,~ } { ,~and~ } ~
82   are~supported.
83 }
84 \prg_generate_conditional_variant:Nnn \prop_get:NnN { Nx } { TF }

85 \c__CJKtu_set_enc:nnnnnn { GB } { UGB } { "A1 } { "A1 } { } { }
86 \c__CJKtu_set_enc:nnnnnn { JIS } { UJIS } { "A1 } { "A1 } { } { }
87 \c__CJKtu_set_enc:nnnnnn { KS } { UKS } { "A1 } { "A1 } { } { }
88 \c__CJKtu_set_enc:nnnnnn { Bg5 } { UBig5 } { "A1 } { "40 } { "7E } { "A1 }
89 \c__CJKtu_set_enc:nnnnnn { Bg5+ } { UBg5plus } { "81 } { "40 } { "7E } { "80 }
90 \c__CJKtu_set_enc:nnnnnn { GBK } { UGBK } { "81 } { "40 } { "7E } { "80 }
\__CJKtu_sfd_to_unicode:nn 91 \cs_new_nopar:Npn \__CJKtu_sfd_to_unicode:nn #1#2
92 {
93   \exp:w \exp_last_unbraced:Nf
94   \__CJKtu_get_unicode:w \CJKtu_sfd_map:nn {#1} {#2} \exp_end:
95 }

\__CJKtu_get_unicode:w 96 \cs_new_nopar:Npn \__CJKtu_get_unicode:w #1 \exp_end:
97 {
98   \tl_if_empty:nTF {#1}
99   { \exp_end: }
100   { \__CJKtu_get_unicode_aux:w #1 \q_stop }
101 }
102 \cs_new_nopar:Npn \__CJKtu_get_unicode_aux:w #1 \or: #2 \q_stop
103 { \or: #2 \exp_end: #1 }

\__CJKtu_char_to_unicode:n 104 \group_begin:
105 \char_set_catcode_active:n { "7F }
106 \cs_new_nopar:Npn \__CJKtu_char_to_unicode:n #1
107 {
108   \exp:w
109   \int_compare:nNnTF { \tl_count:n {#1} } = 2
110   { \CJKtu_byte:NN #1 }
111   {
112     \tl_if_head_eq_meaning:nNTF {#1} ^^7f
113     { \__CJKtu_byte:wNnw #1 }
114     { \__CJKtu_encoding_error: }
115   }
116 }
117 \cs_new_nopar:Npn \__CJKtu_byte:wNnw ^^7f #1 ^^7f #2 ^^7f
118 { \CJKtu_byte_map:nn { `#1 } {#2} }
119 \cs_new_nopar:Npn \__CJKtu_byte:wNnw #1 ^^7f #2 ^^7f
120 { \CJKtu_byte_map:nn { `#1 } {#2} }

\CJKtu_bookmarks_hook: 121 \cs_new_protected_nopar:Npn \CJKtu_bookmarks_hook:
122 {
123   \cs_set_eq:NN ^^7f \__CJKtu_byte:wNnw
124   \cs_set_eq:NN \CJK@XX \CJKtu_byte:NN
125   \cs_set_eq:NN \CJKchar \__CJKtu_byte:wNnw
126   \cs_set_eq:NN \CCTchar \CJKtu_byte:nn
127   \cs_set_eq:NN \@CCTSetChar \__CJKtu_CCT_byte:NNN
128   \cs_set_eq:NN \__CJKtu_get_unicode:n \__CJKtu_UTF_xvi_be:n
129 }
130 \group_end:

\CJKtu_byte:NN 131 \cs_new_nopar:Npn \CJKtu_byte:NN #1#2
\__CJKtu_CCT_byte:NNN 132 { \CJKtu_byte:nn { `#1 } { `#2 } }
133 \cs_new_nopar:Npn \__CJKtu_CCT_byte:NNN #1#2#3
134 { \CJKtu_byte:nn { `#1 } { `#3 } }

```

```

__CJKtu_byte:wnn 135 \cs_new_nopar:Npn __CJKtu_byte:wnn #1# { \CJKtu_byte:nn }

\CJKtu_byte:nn 136 \cs_new_nopar:Npn \CJKtu_byte:nn #1#2
137 {
138   \int_compare:nTF { \l__CJKtu_i_min_int <= #1 <= \l__CJKtu_i_max_int }
139   {
140     \int_compare:nTF { \l__CJKtu_ii_min_int <= #2 < \l__CJKtu_gap_begin_int }
141     { \CJKtu_byte_map:nn {#1} {#2} }
142     {
143       \int_compare:nTF
144       { \l__CJKtu_gap_end_int <= #2 <= \l__CJKtu_ii_max_int }
145       { \CJKtu_byte_map:nn {#1} {#2} }
146       { \__CJKtu_encoding_error: }
147     }
148   }
149   { \__CJKtu_encoding_error: }
150 }
151 \cs_new_nopar:Npn __CJKtu_encoding_error:
152 {
153   \msg_expandable_error:nn { xCJK2uni } { encoding-error }
154   \exp_end:
155 }
156 \msg_new:nnn { xCJK2uni } { encoding-error }
157 { Wrong~encoding~scheme. }

\CJKtu_byte_map:nn 158 \cs_new_nopar:Npn \CJKtu_byte_map:nn #1#2
159 {
160   \exp_args:Nf \__CJKtu_index_map:n
161   {
162     \int_eval:n
163     {
164       ( #1 - \l__CJKtu_i_min_int ) * \l__CJKtu_plane_int
165       + (#2) - \l__CJKtu_ii_min_int
166       \int_compare:nNnF {#2} < \l__CJKtu_gap_begin_int
167       { + \l__CJKtu_gap_begin_int - \l__CJKtu_gap_end_int }
168     }
169   }
170 }

__CJKtu_index_map:n 171 \cs_new_nopar:Npn __CJKtu_index_map:n #1
172 {
173   \__CJKtu_get_unicode:n
174   {
175     \CJKtu_sfd_map:nn
176     { \int_div_truncate:nn {#1} { 256 } + 1 }
177     { \int_mod:nn {#1} { 256 } }
178   }
179 }

__CJKtu_get_unicode:n 180 \cs_new_nopar:Npn __CJKtu_get_unicode:n #1
181 { \exp_last_unbraced:Nf \__CJKtu_get_unicode:w #1 \exp_end: }

__CJKtu_UTF_xvi_be:n 182 \cs_new_nopar:Npn __CJKtu_UTF_xvi_be:n #1
183 { \exp_args:Nf \__CJKtu_UTF_xvi_aux:n { \int_eval:n { "#1" } } }
184 \cs_new_nopar:Npn \__CJKtu_UTF_xvi_aux:n #1
185 {
186   \HyPsd@DecimalToOctalFirst
187   { \int_div_truncate:nn {#1} { 256 } }
188   \HyPsd@DecimalToOctalSecond
189   { \int_mod:nn {#1} { 256 } }
190 }

191 \cs_if_exist_use:NTF \hypersetup { { unicode , CJKbookmarks = false } }
192 { \PassOptionsToPackage { unicode , CJKbookmarks = false } { hyperref } }
193 \msg_new:nnn { xCJK2uni } { UTF-8-encoding }
194 { It~is~not~necessary~to~load~xCJK2uni~in~UTF-8~encoding. }
195 \tl_if_exist:NF \pdfstringdefPreHook { \tl_new:N \pdfstringdefPreHook }
196 \@ifpackageloaded { CJKutf8 }

```

```

197 { \msg_warning:nn { xCJK2uni } { UTF-8-encoding } }
198 {
199   \cs_new_eq:NN \CJKtu@bookmarks@hook \CJKtu_bookmarks_hook:
200   \tl_gput_right:Nn \pdfstringdefPreHook { \CJKtu@bookmarks@hook }
201   \AtBeginDocument
202   {
203     \@ifpackageloaded { CJKutf8 }
204     {
205       \cs_gset_eq:NN \CJKtu@bookmarks@hook \scan_stop:
206       \msg_warning:nn { xCJK2uni } { UTF-8-encoding }
207     }
208     { \cs_if_exist_use:NT \hypersetup { { CJKbookmarks = false } } }
209   }
210 }
\useCJKencmap 211 \cs_new_eq:NN \useCJKencmap \__CJKtu_use_enc_map:n
\CJKchartouni 212 \cs_new_eq:NN \CJKchartouni \__CJKtu_char_to_unicode:n
\CJKsfdtouni 213 \cs_new_eq:NN \CJKsfdtouni \__CJKtu_sfd_to_unicode:n
\__CJKtu_initial:N 214 \cs_new_protected_nopar:Npn \__CJKtu_initial:N #1
215 {
216   \tl_if_exist:NTF #1
217   {
218     \prop_get:NxNTF \c__CJKtu_sfd_prop {#1} \l__CJKtu_sfd_tl
219     { \__CJKtu_enc_map:nn {#1} { \l__CJKtu_sfd_tl } }
220     { \__CJKtu_use_enc_map:n { GBK } }
221   }
222   { \__CJKtu_use_enc_map:n { GBK } }
223 }
224 \exp_args:Nc \__CJKtu_initial:N { CJK @ @ @ enc }
225 </package>

```

3.2 xCJK2uni-make

```

226 <*make>
227 \msg_new:nnn { xCJK2uni } { file-not-found }
228 {
229   SFD file~`#2'~for~encoding~`#1'~not~found.\\
230   xCJK2uni~will~not~work!
231 }
232 \ior_new:N \g__CJKtu_sfd_ior
233 \str_new:N \g__CJKtu_path_str
234 \sys_if_engine luatex:TF
235 {
236   \str_gset:Nx \g__CJKtu_path_str
237   {
238     \lua_now:e
239     {
240       kpse.set_program_name("kpsewhich") ~
241       local ~ sfd = kpse.find_file("UGBK.sfd", "subfont~definition~files") ~
242       if ~ sfd ~ then ~
243         tex.write(sfd) ~
244       end
245     }
246   }
247 }
248 {
249   \sys_shell_get:nnNTF { kpsewhich ~ UGBK.sfd } { } \l_tmpa_str
250   { \str_gset_eq:NN \g__CJKtu_path_str \l_tmpa_str }
251   { \msg_fatal:nnnn { xCJK2uni } { file-not-found } { GBK } { UGBK.sfd } }
252 }
253 \tl_if_blank:oTF { \g__CJKtu_path_str }
254 { \msg_fatal:nnnn { xCJK2uni } { file-not-found } { GBK } { UGBK.sfd } }
255 {
256   \exp_args:No \file_parse_full_name:nNNN { \g__CJKtu_path_str }
257   \l_tmpa_str \l_tmpb_str \l_tmpb_str
258   \str_gset_eq:NN \g__CJKtu_path_str \l_tmpa_str

```

```

259 }
260 \str_const:Nx \c__CJKtu_indent_str
261 { \c_catcode_other_space_tl \c_catcode_other_space_tl }
262 \iow_new:N \g__CJKtu_sfd_map_iow
263 \iow_new:N \g__CJKtu_sfd_cmap_iow
264 \seq_new:N \l__CJKtu_sfd_plane_seq
265 \seq_new:N \l__CJKtu_sfd_line_seq
266 \tl_new:N \l__CJKtu_sfd_plane_tl
267 \tl_new:N \l__CJKtu_cmap_block_tl
268 \int_new:N \l__CJKtu_sfd_index_int
\c__CJKtu_sfd_map_prop 269 \prop_const_from_keyval:Nn \c__CJKtu_sfd_map_prop
270 {
271   GB = { 10 } { UGB } ,
272   JIS = { 40 } { UJIS } ,
273   KS = { 60 } { UKS } ,
274   Bg5 = { 00 } { UBig5 } ,
275   Bg5+ = { 09 } { UBg5plus } ,
276   GBK = { 19 } { UGBK }
277 }
\__CJKtu_write_file:nnn 278 \cs_new_protected_nopar:Npn \__CJKtu_write_file:nnn #1#2#3
279 {
280   \group_begin:
281   \seq_put_right:No \l_file_search_path_seq { \g__CJKtu_path_str }
282   \ior_open:NnTF \g__CJKtu_sfd_ior { #3.sfd }
283   {
284     \group_end:
285     \seq_clear:N \l__CJKtu_sfd_plane_seq
286     \__CJKtu_write_sfd_map_header:n {#1}
287     \ior_str_map_inline:Nn \g__CJKtu_sfd_ior
288     { \str_if_eq:nnT {##1} { 00 ~ 0x0000_0x00FF } { \ior_map_break: } }
289     \ior_str_map_inline:Nn \g__CJKtu_sfd_ior
290     {
291       \tl_if_blank:nTF {##1}
292       {
293         \ior_map_break:n
294         {
295           \__CJKtu_write_sfd_map_trailer:n {#1}
296           \__CJKtu_write_cmap_file:n {#2}
297         }
298       }
299       { \__CJKtu_read_sfd_line:nnn {##1} {#1} {#2} }
300     }
301     \iow_close:N \g__CJKtu_sfd_cmap_iow
302     \ior_close:N \g__CJKtu_sfd_ior
303     \seq_clear:N \l__CJKtu_sfd_plane_seq
304     \seq_clear:N \l__CJKtu_sfd_line_seq
305   }
306   {
307     \group_end:
308     \msg_critical:nxxx { xCJK2uni } { file-not-found } {#1} { #3.sfd }
309   }
310 }
\__CJKtu_read_sfd_line:n 311 \cs_new_protected_nopar:Npx \__CJKtu_read_sfd_line:nnn #1#2#3
\__CJKtu_read_sfd_line:nn 312 {
313   \exp_not:N \__CJKtu_read_sfd_line:nwnn #1
314   \c_backslash_str \exp_not:N \q_nil \exp_not:N \q_stop {#2} {#3}
315 }
316 \use:x
317 {
318   \cs_new_protected_nopar:Npn \exp_not:N \__CJKtu_read_sfd_line:nwnn
319   ##1 0 \token_to_str:N x ##2 \c_backslash_str ##3 \exp_not:N \q_stop
320   ##4##5
321   {
322     \exp_not:N \__CJKtu_read_sfd_line:nnnnn
323     {##1} { 0 \token_to_str:N x } {##2} {##4} {##5}

```

```

324     }
325 }

\__CJKtu_read_sfd_line:nnnnn 326 \cs_new_protected_nopar:Npn \__CJKtu_read_sfd_line:nnnnn #1#2#3#4#5
327 {
328   \tl_if_blank:nF {#1}
329   {
330     \seq_if_empty:NF \l__CJKtu_sfd_plane_seq
331     {
332       \iow_now:Nx \g__CJKtu_sfd_map_iow
333       {
334         \c__CJKtu_indent_str \c__CJKtu_indent_str
335         \token_to_str:N \fi: \iow_newline:
336         \c__CJKtu_indent_str \c_right_brace_str
337       }
338       \__CJKtu_write_cmap_file:n {#5}
339     }
340     \__CJKtu_write_plane_map:nn {#1} {#4}
341     \tl_set:Nx \l__CJKtu_sfd_plane_tl { \tl_trim_spaces:n {#1} }
342   }
343   \seq_set_split:Nnn \l__CJKtu_sfd_line_seq {#2} {#3}
344   \seq_concat:NNN \l__CJKtu_sfd_plane_seq
345   \l__CJKtu_sfd_plane_seq \l__CJKtu_sfd_line_seq
346   \iow_now:Nx \g__CJKtu_sfd_map_iow
347   {
348     \c__CJKtu_indent_str \c__CJKtu_indent_str \c__CJKtu_indent_str
349     \seq_use:Nn \l__CJKtu_sfd_line_seq { ~ \or: } ~
350     \token_to_str:N \or:
351   }
352 }

\__CJKtu_write_plane_map:nn 353 \cs_new_protected_nopar:Npn \__CJKtu_write_plane_map:nn #1#2
354 {
355   \iow_now:Nx \g__CJKtu_sfd_map_iow
356   {
357     \cs_new_nopar:cpn { ~ __CJKtu_ #2 _sfd_map_ \int_eval:n {#1} :n ~ } ~
358     \c_hash_str 1 \iow_newline:
359     \c__CJKtu_indent_str \c_left_brace_str \iow_newline:
360     \c__CJKtu_indent_str \c__CJKtu_indent_str
361     \exp_not:N \if_case:w \tex_numexpr:D
362     \c_hash_str 1 ~ \token_to_str:N \scan_stop:
363   }
364 }

\__CJKtu_write_cmap_file:n 365 \cs_new_protected_nopar:Npn \__CJKtu_write_cmap_file:n #1
366 {
367   \tl_clear:N \l__CJKtu_cmap_block_tl
368   \int_zero:N \l__CJKtu_sfd_index_int
369   \iow_open:Nn \g__CJKtu_sfd_cmap_iow { c #1 \l__CJKtu_sfd_plane_tl .cmap }
370   \__CJKtu_write_cmap_header:nn { C #1 } { \l__CJKtu_sfd_plane_tl }
371   \iow_now:Nx \g__CJKtu_sfd_cmap_iow
372   {
373     \iow_newline:
374     1~begincodespacerange \iow_newline:
375     \c__CJKtu_indent_str < 00 > ~
376     <
377     \int_to_Hex:n
378     { \seq_count:N \l__CJKtu_sfd_plane_seq - 1 }
379     > \iow_newline:
380     endcodespacerange
381   }
382   \seq_map_function:NN \l__CJKtu_sfd_plane_seq \__CJKtu_write_cmap_body:n
383   \tl_if_empty:NF \l__CJKtu_cmap_block_tl
384   {
385     \iow_now:Nx \g__CJKtu_sfd_cmap_iow
386     {
387       \iow_newline:
388       \int_mod:nn { \l__CJKtu_sfd_index_int } { 100 } ~

```

```

389         beginbfchar \iow_newline:
390         \l__CJktu_cmap_block_tl
391         endbfchar
392     }
393 }
394 \__CJktu_write_cmap_trailer:
395 \seq_clear:N \l__CJktu_sfd_plane_seq
396 }

\__CJktu_write_cmap_body:n 397 \cs_new_protected_nopar:Npn \__CJktu_write_cmap_body:n #1
398 {
399     \int_case:nnTF { \l__CJktu_sfd_index_int }
400     { { 99 } { } { 199 } { } }
401     {
402         \iow_now:Nx \g__CJktu_sfd_cmap_iow
403         {
404             \iow_newline:
405             100 ~ beginbfchar \iow_newline:
406             \l__CJktu_cmap_block_tl
407             < \int_to_Hex:n { \l__CJktu_sfd_index_int } > ~
408             <#1> \iow_newline:
409             endbfchar
410         }
411         \tl_clear:N \l__CJktu_cmap_block_tl
412     }
413     {
414         \tl_put_right:Nx \l__CJktu_cmap_block_tl
415         {
416             <
417             \int_compare:nNnF \l__CJktu_sfd_index_int > { 15 } { 0 }
418             \int_to_Hex:n { \l__CJktu_sfd_index_int }
419             > ~ <#1> \iow_newline:
420         }
421     }
422     \int_incr:N \l__CJktu_sfd_index_int
423 }

\__CJktu_write_sfd_map_header:n 424 \group_begin:
425 \char_set_catcode_other:N \%
426 \cs_new_protected_nopar:Npn \__CJktu_write_sfd_map_header:n #1
427 {
428     \iow_now:Nx \g__CJktu_sfd_map_iow
429     {
430         %<#1> \iow_newline:
431         \cs_new_nopar:cpn { ~ CJktu_#1_sfd_map:nn ~ } ~ \c_hash_str 1
432         \iow_newline: \c__CJktu_indent_str \c_left_brace_str \iow_newline:
433         \c__CJktu_indent_str \c__CJktu_indent_str
434         \token_to_str:N \cs_if_exist_use:cF
435         \iow_newline: \c__CJktu_indent_str \c__CJktu_indent_str \c__CJktu_indent_str
436         { ~ __CJktu_#1_sfd_map_ ~ \exp_not:N \int_eval:n { \c_hash_str 1 } ~ :n ~}
437         \iow_newline: \c__CJktu_indent_str \c__CJktu_indent_str \c__CJktu_indent_str
438         { ~ \exp_not:N \use_none:n } \iow_newline:
439         \c__CJktu_indent_str \c_right_brace_str
440     }
441 }

\__CJktu_write_sfd_map_trailer:n 442 \cs_new_protected_nopar:Npn \__CJktu_write_sfd_map_trailer:n #1
443 {
444     \iow_now:Nx \g__CJktu_sfd_map_iow
445     {
446         \c__CJktu_indent_str \c__CJktu_indent_str
447         \token_to_str:N \fi: \iow_newline:
448         \c__CJktu_indent_str \c_right_brace_str \iow_newline:
449         %</#1>
450     }
451 }

\__CJktu_write_cmap_header:nn 452 \cs_new_protected_nopar:Npn \__CJktu_write_cmap_header:nn #1#2

```



```

453 {
454   \iow_now:Nx \g__CJKtu_sfd_cmap_iow
455   {
456     %!PS-Adobe-3.0~Resource-CMap \iow_newline:
457     %DocumentNeededResources:~ProcSet~(CIDInit) \iow_newline:
458     %IncludeResource:~ProcSet~(CIDInit) \iow_newline:
459     %BeginResource:~CMap~(TeX-#1-#2-0) \iow_newline:
460     %%Title:~(TeX-#1-#2-0~TeX~#1-#2~0) \iow_newline:
461     %%Version:~1.000 \iow_newline:
462     %%EndComments \iow_newline: \iow_newline:
463     /CIDInit~/ProcSet~findresource~begin \iow_newline: \iow_newline:
464     12~dict~begin \iow_newline: \iow_newline:
465     begincmap \iow_newline: \iow_newline:
466     /CIDSystemInfo~3~dict~dup~begin \iow_newline:
467     \c__CJKtu_indent_str /Registry~(TeX)~def \iow_newline:
468     \c__CJKtu_indent_str /Ordering~(#1-#2)~def \iow_newline:
469     \c__CJKtu_indent_str /Supplement~0~def \iow_newline:
470     end~def \iow_newline: \iow_newline:
471     /CMapName~/TeX-#1-#2-0~def \iow_newline:
472     /CMapVersion~1.000~def \iow_newline:
473     /CMapType~2~def \iow_newline: \iow_newline:
474     /WMode~0~def
475   }
476 }

\__CJKtu_write_cmap_trailer: 477 \cs_new_protected_nopar:Npx \__CJKtu_write_cmap_trailer:
478 {
479   \iow_now:Nn \g__CJKtu_sfd_cmap_iow
480   {
481     \iow_newline:
482     endcmap \iow_newline:
483     CMapName~currentdict~/CMap~defineresource~pop \iow_newline:
484     end \iow_newline:
485     end \iow_newline: \iow_newline:
486     %%EndResource \iow_newline:
487     %%EOF
488   }
489 }
490 \group_end:

491 \iow_open:Nn \g__CJKtu_sfd_map_iow { xCJK2uni-sfd.def }
492 \prop_map_inline:Nn \c__CJKtu_sfd_map_prop
493 { \__CJKtu_write_file:nnn {#1} #2 }
494 \iow_close:N \g__CJKtu_sfd_map_iow
495 \cs_if_exist_use:NF \CJKtuend { \tex_end:D }
496 </make>

```

代码索引

意大利体的数字表示描述对应索引项的页码;带下划线的数字表示定义对应索引项的代码行号;罗马字体的数字表示使用对应索引项的代码行号。

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