

L^AT_EX font encodings

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6 January 2006

Contents

| | | |
|----------|---|-----------|
| 1 | Introduction | 1 |
| 1.1 | Encodings in T _E X | 2 |
| 1.2 | The history of T _E X font encodings | 2 |
| 1.3 | Further information | 3 |
| 2 | Existing font encodings | 3 |
| 2.1 | Naming conventions | 3 |
| 2.2 | 128 ⁺ glyph encodings (text) | 4 |
| 2.3 | 256 glyph encodings (text) | 6 |
| 2.4 | 256 ⁻ glyph encodings (text symbols) | 8 |
| 2.5 | 256 glyph encodings (text extended) | 9 |
| 2.6 | 128 ⁺ glyph encodings (mathematics) | 9 |
| 2.7 | 256 glyph encodings (mathematics) | 10 |
| 2.8 | Other encodings | 10 |
| 3 | Restrictions | 12 |
| 3.1 | Required glyphs for general text encodings | 12 |
| 3.2 | The constraints on upper/lower case tables | 13 |
| 4 | Encoding specific commands | 13 |
| | References | 15 |
| A | Example code tables | 17 |
| A.1 | Text encodings | 17 |
| A.2 | Text symbol encodings | 28 |
| A.3 | Extended text encodings | 31 |
| A.4 | Mathematical encodings | 32 |
| A.5 | Other encodings | 34 |
| B | Uppercase and lowercase tables | 37 |

1 Introduction

This document explains the ideas that underpin L^AT_EX font encodings and the constraints that apply when defining a new encoding; it also lists the encodings that have already been defined.

1.1 Encodings in T_EX

T_EX (the program) implicitly recognises three sorts of encoding, and all are (in a sense) discussed in the T_EXbook [16]:

1. The input encoding, which specifies the meanings of characters in files presented to T_EX for processing. The T_EXbook suggests that ‘your version of T_EX will recognise the characters you type on your keyboard’ (T_EX the program has provision for static translations of input characters).

Such direct use of T_EX’s facilities is not the way modern L^AT_EX (or indeed any other T_EX macro package) is likely to deal with input encodings. This document does not address the topic of input encodings; the interested reader should examine the L^AT_EX base package `inputenc` [21, sec. 7.5.2, p. 357].

2. The token stream that T_EX processes internally. This stream of T_EX’s consciousness is discussed in great detail in the T_EXbook.

Again, this document does not address the topic. L^AT_EX’s internal character representation (LICR) is well discussed in [21, sec. 7.11.2, p. 442].

3. The font encoding—i.e., the mapping of character codes to glyphs in the fonts that are used to typeset T_EX’s output. Again, a set of font encodings is enumerated in the T_EXbook, but that set has proved inadequate to the needs of modern multilingual use of L^AT_EX.

This document explains *why* Knuth’s original set of encodings is inadequate to modern conditions, and discusses the issues that surround the design and definition of new font encodings.

Font encodings are important for more than their rôle in mapping the glyphs of the fonts to be used for typesetting: their glyph tables are also the context in which T_EX’s hyphenation algorithm operates. There are constraints imposed by T_EX that affect the way in which new font encodings, for use in a multi-lingual environment, may be structured (see section 3 for details).

1.2 The history of T_EX font encodings

Little attention was paid to font encodings prior to the arrival of T_EX 3. Up to that time, one used Donald Knuth’s fonts (the Computer Modern family, using the encodings we now refer to as OT1 and the OM series), or one was on one’s own.

The Computer Modern text encoding raises problems in unmodified T_EX, because hyphenation cannot break words containing `\accent` commands. Even in those Western European languages for which the OT1 encoding has symbols for the necessary `\accent`-based diacritics, this shortcoming ruins typesetting of running text.

With the advent of T_EX 3, with its ability to switch between hyphenation pattern sets, it was clear that the situation could not continue. Thus a group at the TUG Annual General Meeting in Cork, Ireland, specified a uniform encoding for 256-glyph fonts, that contains accented letters and non-ASCII letters necessary to express most Western European languages (and some Eastern European ones) without recourse to the `\accent` command.

This “Cork” encoding has since been realised in a series of fonts designed with Metafont, in at least one font series that is available both in Adobe Type 1 format and in OpenType format, and in a number of virtual-font mappings of other font series.

Since the time of the Cork meeting, much effort has been devoted to the design of encodings for text fonts to use with $\text{T}_{\text{E}}\text{X}$, and the Cork encoding influenced the design of many such encodings.

Encodings for mathematical fonts have, in contrast, changed little since Knuth's contributions. A TUG Technical Working Group was established at the Cork meeting, whose aim was to define a set of 256-glyph encodings to regularise and extend Knuth's originals, using ideas from several other fonts that had appeared since, and from the known needs of researchers in mathematics and the mathematical sciences.

Independently, a first proposal (the so-called *Aston proposal*) was worked out by Justin Ziegler together with Frank Mittelbach and other members of the $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}3$ project team [23]. A first implementation of this proposal was realized by Matthias Clasen and Ulrik Vieth [6, 7].

However, the slow progress of these Mathematical encodings has been overtaken by the addition (in the last decade or so) of a large number of mathematical symbols to Unicode [3]; one can expect further changes so that new public mathematical font encodings will most likely be delayed still further.

1.3 Further information

For a general introduction to $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$, including the new features of $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X} 2_{\epsilon}$, you should read *L^AT_EX: A Document Preparation System*, Leslie Lamport, Addison Wesley, 2nd ed, 1994.

A more detailed description of the new features of $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$, including an overview of more than 200 packages and nearly 1000 ready to run examples, is to be found in *The L^AT_EX Companion second edition* by Frank Mittelbach and Michel Goossens [21].

The $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$ project sponsored a report on Mathematical font encodings, which is worth reading for its insight into the problems of defining the way in which math is used: see [23, 6, 7].

The $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$ font selection scheme is based on $\text{T}_{\text{E}}\text{X}$, which is described by its developer in *The T_EXbook*, Donald E. Knuth, Addison Wesley, 1986, revised in 1991 to include the features of $\text{T}_{\text{E}}\text{X} 3$.

For more information about $\text{T}_{\text{E}}\text{X}$ and $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$, please contact your local $\text{T}_{\text{E}}\text{X}$ Users Group, or the international $\text{T}_{\text{E}}\text{X}$ Users Group (<http://www.tug.org>).

2 Existing font encodings

This section lists the encodings currently assigned; for each encoding, we list the registered ($\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$) name, the assigned purpose of the encoding, and the author. Further details may list the code positions used in the encoding, the *variable slots* (see below), an example font (for which a listing will be provided later in the document if the relevant fonts are present), and a source for further reference.

While the characteristic feature of an encoding is that each font encoded according to the encoding should have the same glyph set, there are some encodings (notably $\text{O}\text{T}1$ and its descendants) in which a few glyph code slots differ in their contents in different fonts.

2.1 Naming conventions

Names for encoding schemes are strings of up to three letters (all upper case) plus digits.

The L^AT_EX3 project reserves the use of encoding names starting with the following letters: T (standard 256-long text encodings), TS (symbols that are designed to extend a corresponding T encoding), X (text encodings that do not conform to the strict requirements for T encodings), M (standard 256-long mathematical encodings), S (other symbol encodings), A (other special applications), OT (standard 128-long text encodings), and OM (standard 128-long mathematical encodings).

Please do not use the above starting letters for non-portable encodings. If new standard encodings emerge then we shall add them in a later release of L^AT_EX.

Encoding schemes which are local to a site or a system should start with L, experimental encodings intended for wide distribution will start with E, whilst U is for Unknown or Unclassified encodings.

We recommend that new encoding names should not be introduced unless careful consideration and discussion in the user community has confirmed the need for the encoding. If encodings have to change from font to font, a number of problems arise, so it is best to develop encodings that can be used with a large number of fonts in parallel. This allows documents to be typeset using different fonts without problems.

The TS1 encoding is a good example of a bad encoding (even though it was developed with the best intentions) as a huge number of fonts can only implement parts of it. Similarly, the fact that the few sets of available mathematical fonts (beside Computer Modern Math) nearly all implement slightly different encodings is a huge source of problems. Don't add to this if possible!

2.2 128⁺ glyph encodings (text)

The ‘OT’ series of font encodings start with Donald Knuth’s original text encoding, that used for the text fonts in the earliest releases of T_EX itself. The ‘O’ of the encoding designator may be taken as signifying ‘original’, or just ‘old’.

L^AT_EX name: OT1
Public name: T_EX text
Author: Donald Ervin Knuth
Glyph slots used: 0x00–0x7F
Variable slots: 0x0B–0x0F, 0x24, 0x3C, 0x3E, 0x5C, 0x7B–0x7D
Font example: cmr10 ; encoding table on page 17
Further reference: [16, p.427]

Donald Knuth designed his font encoding (and hence his fonts) in a very different environment from that which now pervades the T_EX world: his (mainframe) computer had very little memory, there was little experience in (or demand for) for multilingual technical typesetting, and as a result it was appropriate to sacrifice uniformity for efficiency.

Thus Knuth’s original fonts differ slightly in some encoded slots: for example, the glyphs <, >, \, {, and } are only available in the typewriter fonts and the \$ and £ signs share the same position (in different font shapes).

This means that direct selection of these slots can produce unpredictable results, e.g., typing < or `\symbol{'74}` in a document can yield ‘¿’.

L^AT_EX name: OT2
Public name: UW cyrillic encoding
Author: University of Washington
Glyph slots used: 0x00–0x7F
Variable slots: —
Font example: **wnr10** ; encoding table on page 17
Further reference: [2]

Support for this encoding is available in the Cyrillic bundle although for all practical purposes it is better to use one of the T2 encodings.

L^AT_EX name: OT3
Public name: UW IPA encoding
Author: University of Washington
Glyph slots used: 0x00–0x7f
Variable slots: —
Font example: **wsuipa10** ; encoding table on page 18
Further reference: [8, p.149]

The OT3 encoding was never really used with L^AT_EX 2_ε following the introduction of the TIPA system which offers much better support for IPA. In particular, no `ot3enc.def` file was ever produced.

L^AT_EX name: OT4
Public name: Polish text encoding
Author: B. Jackowski and M. Ryćko
Glyph slots used: 0x00–0x7F, 0x81, 0x82, 0x86, 0x8A, 0x8B, 0x91, 0x99, 0x9B, 0xA1, 0xA2, 0xA6, 0xAA, 0xAB, 0xAE, 0xAF, 0xB1, 0xB9, 0xBB, 0xD3, 0xF3, 0xFF
Variable slots: 0x0B–0x0F, 0x24, 0x3C, 0x3E, 0x5C, 0x7B–0x7D
Font example: **plr10** ; encoding table on page 19
Further reference: —

While Knuth included the means of typesetting the ‘lost L’ (Ł) in his OT1 encoding, he omitted the ogonek (ł), a diacritic mark that is also needed in Polish text; hence the appearance, well before the T1 encoding, of fonts using this encoding.

L^AT_EX name: OT5
Public name: Not currently allocated
Author: —
Glyph slots used: —
Variable slots: —
Font example: —
Further reference: —

L^AT_EX name: OT6
Public name: Armenian text encoding
Author: Serguei Dachian
Glyph slots used: 0x03–0x0F, 0x13–0x7F
Variable slots: —
Font example: **artmr10** ; encoding table on page 20
Further reference: —

This encoding was allocated to permit use of Dachian’s Armenian fonts in a standard L^AT_EX environment.

2.3 256 glyph encodings (text)

L^AT_EX name: T1
Public name: Cork encoding
Author: Euro T_EX conference at Cork
Glyph slots used: 0x00–0xFF
Variable slots: —
Font example: `ecrm1000` ; encoding table on page 21
Further reference: [10, p.514], [15, p.99]

The Cork encoding was developed so that advantage could be taken of the (then) new facilities of T_EX 3, allowing hyphenation of most Western European (and some Eastern European) languages in an unmodified version of T_EX.

The encoding was developed in the absence of any extant effort at font design, but instances written in Metafont (the ‘EC’ fonts), and more recently Adobe Type 1 instances of the same fonts have become available.

Substantial (but incomplete) instances have also been developed, which use virtual fonts. These latter instances map either Knuth’s original (OT1-encoded) fonts, or commercial fonts that contain the Adobe ‘standard’ set of 224 glyphs.

L^AT_EX name: T2A, T2B, T2C
Public name: Cyrillic encodings
Author: The CyrTUG font team
Glyph slots used: 0x00–0xFF
Variable slots: — (within each encoding)
Font example: `larm1000` ; encoding table on page 22
Further reference: [4]

There are too many glyphs in the full Cyrillic complement of languages for all of them to be covered by a single L^AT_EX-compliant encoding (the lower half of each T2 encoding is identical to that of T1, in order that each should be a conforming L^AT_EX encoding — see section 3). The approach taken is therefore to develop a single encoding, X2 (see 2.5) which contains all the glyphs needed for the full set of languages, and then to derive the three L^AT_EX-complaint T2-family encodings using the X2 set together with that of T1.

L^AT_EX name: T3
Public name: IPA encoding
Author: FUKUI Rei, University of Tokyo
Glyph slots used: 0x00–0xFF
Variable slots: —
Font example: `tipa10` ; encoding table on page 25
Further reference: [12, p.102]

The T3 encoding (and associated macros) provides the glyphs required in phonetic description according to current International Phonetic Association recommendations [18].

The T3 encoding does *not fulfil* the requirements for T encodings—the name is a historical accident. The correct name would be X3, but due to the fact that this font family has been used under its current encoding name for a long time, the name will not change for compatibility reasons.

\LaTeX name: T4
 Public name: African Latin (fc)
 Author: Jörg Knappen
 Glyph slots used: 0x00–0xFF
 Variable slots: 0x24
 Font example: `fcr10` ; encoding table on page 26
 Further reference: [14]

The African Latin fonts contain in their lower half (0–127) the same characters as the European Latin (T1-encoded) Fonts, while in their upper half (128–255) they contain letters and symbols for African languages that use extended Latin alphabets. Due to lack of space, Jörg had to play the unfortunate trick of assigning `\textdollar` and `\textsterling` the same position; users should take these characters from the text companion font, if they are needed. Instead of defining a lot of new control sequences for the single letters, there are three accent-like control sequences with general purpose: `\m` (Modified-1), `\M` (Modified-2) and `\B` (Barred). Most standard \LaTeX encoding-dependent commands work. However, the Icelandic special letters are not available and ‘best replacements’ for `\Th`, `\th`, and `\dh` are used (barred T and d resp.).

\LaTeX name: T5
 Public name: Vietnamese encoding
 Author: Werner Lemberg and Vladimir Volovich
 Glyph slots used: 0x00–0xFF
 Variable slots: —
 Font example: `vnr10` ; encoding table on page 27
 Further reference: [17]

The T5 encoding was developed for Vietnamese. Again, this encoding *does not* conform to the requirements for a T-encoding because its large number of accented letters prevent the `\lccode` and `\uccode` mapping requirements for T encodings from being fulfilled. However, since the Vietnamese language does not use word division in typesetting so that this requirement is actually not important for this particular language. Since every glyph used in Vietnamese text is internally represented as LICR macros, the commands `\MakeUppercase` and `\MakeLowercase` still work as expected (as they change the case of the ASCII characters in LICR definitions).

\LaTeX name: T6
 Public name: Armenian
 Author: —
 Glyph slots used: —
 Variable slots: —
 Font example: —
 Further reference: —

This encoding is reserved to permit future expansion of Armenian \TeX to use 256-character (hyphenatable) fonts.

L^AT_EX name: T7
 Public name: Greek encoding
 Author: —
 Glyph slots used: —
 Variable slots: —
 Font example:
 Further reference: —

The name is already reserved for a 256 glyph greek encoding. The encoding itself hasn't been defined so far.

2.4 256⁻ glyph encodings (text symbols)

L^AT_EX name: TS1
 Public name: Text Companion encoding (Cork)
 Author: Jörg Knappen
 Glyph slots used: 0x00–0x0D, 0x12, 0x15, 0x16, 0x18–0x1D, 0x20, 0x24, 0x27, 0x2A, 0x2C–0x3A, 0x3C–0x3E, 0x4D, 0x4F, 0x57, 0x5B, 0x5D–0x60, 0x62–0x64, 0x6C–0x6E, 0x7E–0xBF, 0xD6, 0xF6
 Variable slots: —
 Font example: `tcrm1000` ; encoding table on page 28
 Further reference: [15]

The text symbol encoding offers access to symbolic glyphs that are commonly used in text (for a variety of reasons), and whose style should vary with the text that surrounds them.

Unfortunately, the TS1 encoding was developed without reference to the glyphs available in existing commercial fonts. As a result, only font families explicitly developed for T_EX (i.e., typically originating with METAFONT) actually contain all glyphs required by the TS1 encoding. Most other font families (whether free or commercial) often only provide half of the set (compare the two tables for TS1 on pages 28 and 29). To improve this situation somewhat, NFSS provides a way to define encoding subsets on a per family basis in the `textcomp` package (which package offers support for the TS1 encoding).

L^AT_EX name: TS3
 Public name: IPA symbol encoding
 Author: FUKUI Rei, University of Tokyo
 Glyph slots used: 0x00–0x0A, 0x20–0x49, 0x50–0x56, 0x70–0x7B
 Variable slots: —
 Font example: `tipx10` ; encoding table on page 30
 Further reference: [12]

The TS3 encoding (together with the T3 encoding) provides the glyphs for typesetting phonetic transcriptions following the guidelines of the International Phonetic Association [18]. Support is offered through the `tipa` package.

2.5 256 glyph encodings (text extended)

L^AT_EX name: X2
Public name: Cyrillic glyph container
Author: The CyrTUG font team
Glyph slots used: 0x00–0xFF
Variable slots: —
Font example: `rxrm1000` ; encoding table on page 31
Further reference: [4]

This encoding specifies the glyph container for Cyrillic characters, which is used in specifying the T2A, T2B and T2C encodings.

2.6 128⁺ glyph encodings (mathematics)

L^AT_EX name: OML
Public name: T_EX math italic
Author: Donald Ervin Knuth
Glyph slots used: 0x00–0x7F
Variable slots: —
Font example: `cmmi10` ; encoding table on page 32
Further reference: [16, p.430]

The OML encoding contains italic Latin and Greek letters for use in mathematical formulas (typically used for variables) together with some symbols.

L^AT_EX name: OMS
Public name: T_EX math symbol
Author: Donald Ervin Knuth
Glyph slots used: 0x00–0x7F
Variable slots: —
Font example: `cmsy10` ; encoding table on page 32
Further reference: [16, p.431]

The OMS encoding contains basic mathematical symbols, together with an uppercase “calligraphic” Latin alphabet.

L^AT_EX name: OMX
Public name: T_EX math extension
Author: Donald Ervin Knuth
Glyph slots used: 0x00–0x7F
Variable slots: —
Font example: `cmex10` ; encoding table on page 33
Further reference: [16, p.432]

OMX encodes mathematical symbols with variable sizes, such as the \sum sign, which changes its size if used in displayed formulas, and the construction parts for brackets, braces and radicals, etc., which can stretch to accommodate the thing they’re enclosing.

2.7 256 glyph encodings (mathematics)

So far there are no 256 glyph mathematical encodings. A proposal is given in [23].

2.8 Other encodings

L^AT_EX name: C . .
Public name: CJK encodings
Author: Werner Lemberg
Glyph slots used: 0x00–0xFF
Variable slots: —
Font example:
Further reference: [5]

The CJK package defines a number of encodings which access Chinese, Japanese and Korean fonts.

L^AT_EX name: E . .
Public name: Experimental encodings
Author: —
Glyph slots used: 0x00–0xFF
Variable slots: all
Font example:
Further reference: [21, p.416]

As the name indicates, encodings starting with the letter E are intended for experimental encodings, that are still likely to change.

L^AT_EX name: L . .
Public name: Local encoding (site dependent)
Author: —
Glyph slots used: 0x00–0xFF
Variable slots: all
Font example:
Further reference: [21, p.416]

‘Local’ encodings provide the means to develop representation techniques that are suited to a particular T_EX environment. While the developer has freedom to specify their encoding as he or she pleases, there is a strong incentive to obey the L^AT_EX rules for encodings, since it will otherwise be difficult to compose text using the encoding.

At least it was the intention that L . . encodings are local and site dependent. However, a number of such encodings became generally used without ever getting a different name allocated.

L^AT_EX name: LY1
Public name: Y&Y 256 glyph encoding
Author: Berthold Horn
Glyph slots used: 0x00–0x08, 0x0C, 0x10, 0x12–0xFF
Variable slots: *believed none*
Font example: **ptmr8y** ; encoding table on page 34
Further reference: [21, p.416]

This is an alternative to the T1 encoding developed by Y&Y and used in their commercial T_EX implementation.

L^AT_EX name: LV1
Public name: MicroPress encoding
Author: Michael Vulis
Glyph slots used: *unknown*
Variable slots: *unknown*
Font example:
Further reference: [21, p.416]

This is an encoding developed by MicroPress and used for some of their fonts.

L^AT_EX name: LGR
Public name: Greek 256 glyph encoding
Author: *unknown*
Glyph slots used: 0x00–0xFF
Variable slots: *believed none*
Font example: grmn1000 ; encoding table on page 35
Further reference: [21, p.575]

Currently the main encoding in use for the Greek language.

This encoding doesn't conform to the restrictions for T-encodings described in section 3 on page 12 as it doesn't have ASCII glyphs at all.

L^AT_EX name: PD1
Public name: PDF DocEncoding
Author: Adobe
Glyph slots used: 0x08–0x0A, 0x0C, 0x0D, 0x18–0x7E, 0x80–0x9E, 0xA0–0xAE, 0xB0–0xFF
Variable slots: —
Font example:
Further reference: [1], [13]

The PD1 encoding is a virtual encoding with 256 glyphs needed to produce bookmarks and similar text in PDF document generated with pdfL^AT_EX. The encoding is “virtual” because by design there are no T_EX fonts that cover PD1. Details can be found in appendix D.1 of [1].

L^AT_EX name: PU
Public name: PDF Unicode Encoding
Author: Adobe
Glyph slots used: —
Variable slots: —
Font example:
Further reference: [1], [13]

Another virtual encoding (with more than 600 characters) for Unicode-encoded bookmarks in PDF documents.

L^AT_EX name: U
 Public name: Unknown encoding
 Author: —
 Glyph slots used: potentially 0x00-0xFF
 Variable slots: all
 Font example: wasy10 ; encoding table on page 36
 Further reference: [21, p.416]

This encoding should be used for fonts that resist classification, e.g., when it is clear that there will never be more than one font using the same encoding.

3 Restrictions

3.1 Required glyphs for general text encodings

Encodings that are supposed to be used with L^AT_EX for ‘general purpose text fonts’ need to have certain fixed glyphs in certain encoding slots. A ‘general purpose text font’ is one intended for arbitrary natural language text and not just within special environments (such as the phonetic alphabet) or just for typesetting individual symbols (e.g., the text companion font with encoding TS1).

This is the case for the following glyphs that have to be in their ASCII positions for general purpose text encodings:

| Glyph | Position | Glyph | Position | Glyph ¹ | Position |
|---------|----------|---------|-----------|--------------------|----------|
| ! | 33 | : | 58 | < | 60 |
| , | 39 | ; | 59 | > | 62 |
| (| 40 | = | 61 | | 124 |
|) | 41 | ? | 63 | | |
| * | 42 | @ | 64 | | |
| + | 43 | A ... Z | 65 to 90 | | |
| , | 44 | [| 91 | | |
| - | 45 |] | 93 | | |
| . | 46 | ‘ | 96 | | |
| / | 47 | a ... z | 97 to 122 | | |
| 0 ... 9 | 48 to 57 | | | | |

In addition the following glyphs have to be present somewhere² in the encoding together with corresponding ligature programs to generate them:

| Glyph | Ligature program |
|-------|------------------|
| “ | ‘ ‘ |
| ” | ’ ’ |
| — | -- |
| --- | --- |

This is $33 + 2 * 26 = 85$ positions “required”, which leaves 171 positions free.

If there are free slots available then adding all or some of the diacritics would be the best way to fill them.

If there are insufficient slots for the characters needed, a possible technique is to create a subsidiary encoding, and to move non-letter characters to it. Since only “letters” take part in the hyphenation algorithm, this technique doesn’t affect the appearance of the typeset result.

¹The requirement for these three glyphs is violated in the Latin alphabet OT encodings.

²The position in this case is not important as they are generated from ligature programs.

3.2 The constraints on upper/lower case tables

Due to some technical restrictions of $\text{T}_{\text{E}}\text{X}$ related to hyphenation it is not possible in $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$ to use more than one `\lccode` or `\uccode` table. Therefore all encodings need to share these two tables which are defined to be those of the T1 encoding.

The T1 encoding has some nasty peculiarities which make certain slot positions more or less unusable for other encodings if this restriction is to be obeyed. This is unfortunate but since T1 is well established and the basis for a large number of languages it seemed better to live with this situation instead of trying to replace T1 with a slightly better standard (with the result that for a long time different $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$ installations would not be able to communicate with each other because of incompatible font sets).

The positions that are problematic are as follows.

- 25 (i) uppercase maps strangely (same as for 105, i)
- 26 (j) uppercase maps strangely (same as for 106, j)
- 27 (ff) lowercase maps to itself which makes this slot subject to hyphenation (used to support OT1 encoding)
- 157 (İ) lowercase maps strangely (same as for 73, I)
- 158 (đ) uppercase maps strangely (same as for 240, ð)

One way to use such slots is to fill them with ligature glyphs as $\text{T}_{\text{E}}\text{X}$ will not consult these tables for glyphs constructed through ligatures programs but instead uses the entries for the individual glyphs used to produce the ligature.

A complete listing of the uppercase/lowercase mapping tables is to be found in section B (page 37).

4 Encoding specific commands

An encoding specific command is one that generates a glyph (or glyphs), to produce a graphic effect that may be implemented differently in different encodings. The encoding specific command automatically changes its implementation when the encoding changes in the course of the document. Encoding specific commands figure in $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$'s internal character representation (LICR) and are also discussed in [21, sec. 7.11.2, p. 442].

The following table only covers the encoding specific commands from the OT1 and T1 encodings. Other encodings may specify additional encoding specific commands. In the table, the first 15 commands are ‘accent-like’ and need as an argument the character to be accented. For example, `\v{c}` is the LICR for ‘č’.

| | | | |
|-----------------|--------|---|--------------------|
| <code>\`</code> | OT1,T1 | ` | (grave) |
| <code>\’</code> | OT1,T1 | ’ | (acute) |
| <code>\~</code> | OT1,T1 | ^ | (circumflex) |
| <code>\~</code> | OT1,T1 | ~ | (tilde) |
| <code>\"</code> | OT1,T1 | ¨ | (umlaut) |
| <code>\H</code> | OT1,T1 | ” | (Hungarian umlaut) |
| <code>\r</code> | OT1,T1 | ◦ | (ring) |
| <code>\v</code> | OT1,T1 | ˇ | (haček) |
| <code>\u</code> | OT1,T1 | ˘ | (breve) |
| <code>\t</code> | OT1,T1 | ˆ | (tie) |
| <code>\=</code> | OT1,T1 | – | (macron) |
| <code>\.</code> | OT1,T1 | · | (dot) |
| <code>\b</code> | OT1,T1 | – | (underbar) |
| <code>\c</code> | OT1,T1 | ¸ | (cedilla) |

| | | | |
|---------------------------------|--------|----|-------------|
| <code>\d</code> | OT1,T1 | . | (dot under) |
| <code>\k</code> | T1 | ˙ | (ogonek) |
| <code>\AE</code> | OT1,T1 | Æ | |
| <code>\DH</code> | T1 | Ð | |
| <code>\DJ</code> | T1 | Đ | |
| <code>\L</code> | OT1,T1 | Ł | |
| <code>\NG</code> | T1 | Ń | |
| <code>\OE</code> | OT1,T1 | Œ | |
| <code>\O</code> | OT1,T1 | Ø | |
| <code>\SS</code> | OT1,T1 | Š | |
| <code>\TH</code> | T1 | Þ | |
| <code>\ae</code> | OT1,T1 | æ | |
| <code>\dh</code> | T1 | ð | |
| <code>\dj</code> | T1 | đ | |
| <code>\guillemotleft</code> | T1 | « | (guillemet) |
| <code>\guillemotright</code> | T1 | » | (guillemet) |
| <code>\guilsinglleft</code> | T1 | ‹ | (guillemet) |
| <code>\guilsinglright</code> | T1 | › | (guillemet) |
| <code>\i</code> | OT1,T1 | ı | |
| <code>\j</code> | OT1,T1 | ĵ | |
| <code>\l</code> | OT1,T1 | ł | |
| <code>\ng</code> | T1 | ŋ | |
| <code>\oe</code> | OT1,T1 | œ | |
| <code>\o</code> | OT1,T1 | ø | |
| <code>\quotedblbase</code> | T1 | ” | |
| <code>\quotesinglbase</code> | T1 | ‘ | |
| <code>\ss</code> | OT1,T1 | ß | |
| <code>\textasciicircum</code> | OT1,T1 | ˆ | |
| <code>\textasciitilde</code> | OT1,T1 | ˜ | |
| <code>\textbackslash</code> | OT1,T1 | \ | |
| <code>\textbar</code> | OT1,T1 | | |
| <code>\textbraceleft</code> | OT1,T1 | { | |
| <code>\textbraceright</code> | OT1,T1 | } | |
| <code>\textcompwordmark</code> | OT1,T1 | | (invisible) |
| <code>\textdollar</code> | OT1,T1 | \$ | |
| <code>\textemdash</code> | OT1,T1 | — | |
| <code>\textendash</code> | OT1,T1 | – | |
| <code>\textexclamdown</code> | OT1,T1 | ¡ | |
| <code>\textgreater</code> | OT1,T1 | > | |
| <code>\textless</code> | OT1,T1 | < | |
| <code>\textquestiondown</code> | OT1,T1 | ¿ | |
| <code>\textquotedbl</code> | T1 | ” | |
| <code>\textquotedblleft</code> | OT1,T1 | “ | |
| <code>\textquotedblright</code> | OT1,T1 | ” | |
| <code>\textquoteleft</code> | OT1,T1 | ‘ | |
| <code>\textquoteright</code> | OT1,T1 | ’ | |
| <code>\textregistered</code> | OT1,T1 | ® | |
| <code>\textsection</code> | OT1,T1 | § | |
| <code>\textsterling</code> | OT1,T1 | £ | |
| <code>\texttrademark</code> | OT1,T1 | ™ | |
| <code>\textunderscore</code> | OT1,T1 | — | |
| <code>\textvisiblespace</code> | OT1,T1 | □ | |
| <code>\th</code> | T1 | þ | |

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Appendices

A Example code tables

This appendix contains a table of each font mentioned as an “example” font above, providing that the font was available when the document was processed with L^AT_EX. (L^AT_EX generates a warning message for each font it fails to find.)

A.1 Text encodings

| cmr10, OT1 | '0 | '1 | '2 | '3 | '4 | '5 | '6 | '7 | |
|-------------------|----|----|----|----|----|----|-----|-----|-----|
| '00x | Г | Δ | Θ | Λ | Ξ | Π | Σ | Υ | "0x |
| '01x | Φ | Ψ | Ω | ff | fi | fl | ffi | fff | |
| '02x | ı | ı | ` | ' | ˘ | ˙ | - | ° | "1x |
| '03x | ı | ß | æ | œ | ø | Æ | Œ | Ø | |
| '04x | - | ! | " | # | \$ | % | & | ' | "2x |
| '05x | (|) | * | + | , | - | . | / | |
| '06x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | "3x |
| '07x | 8 | 9 | : | ; | i | = | ı | ? | |
| '10x | @ | A | B | C | D | E | F | G | "4x |
| '11x | H | I | J | K | L | M | N | O | |
| '12x | P | Q | R | S | T | U | V | W | "5x |
| '13x | X | Y | Z | [| " |] | ^ | . | |
| '14x | ' | a | b | c | d | e | f | g | "6x |
| '15x | h | i | j | k | l | m | n | o | |
| '16x | p | q | r | s | t | u | v | w | "7x |
| '17x | x | y | z | - | — | " | ~ | .. | |
| | "8 | "9 | "A | "B | "C | "D | "E | "F | |

| wmr10, OT2 | '0 | '1 | '2 | '3 | '4 | '5 | '6 | '7 | |
|-------------------|----|----|----|----|----|----|----|----|-----|
| '00x | Ъ | Ь | Ц | Э | І | Є | Ђ | Ѓ | "0x |
| '01x | ь | ь | ц | э | і | є | ђ | ѓ | |
| '02x | Ю | Ж | Й | Ё | Ѕ | Ѳ | Ѕ | Я | "1x |
| '03x | ю | ж | й | ё | ѕ | ѳ | ѕ | я | |
| '04x | " | ! | " | Ђ | ˘ | % | ' | ' | "2x |
| '05x | (|) | * | Ѓ | , | - | . | / | |
| '06x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | "3x |
| '07x | 8 | 9 | : | ; | « | ı | » | ? | |
| '10x | ˘ | A | B | Ц | Д | E | Ф | Г | "4x |
| '11x | X | И | J | K | Л | M | Н | О | |
| '12x | П | Ч | Р | С | Т | У | В | Щ | "5x |
| '13x | Ш | Ы | З | [| " |] | Ь | Ђ | |
| '14x | ' | a | б | ц | д | e | ф | г | "6x |
| '15x | x | и | j | к | л | m | н | о | |
| '16x | п | ч | р | с | т | у | в | щ | "7x |
| '17x | ш | ы | з | - | — | № | ь | ђ | |
| | "8 | "9 | "A | "B | "C | "D | "E | "F | |

| wsuipa10, OT3 | '0 | '1 | '2 | '3 | '4 | '5 | '6 | '7 | |
|----------------------|----|----|----|----|----|----|----|----|-----|
| '00x | ɐ | ɑ | α | ɒ | ʌ | ɓ | ɸ | ʃ | "0x |
| '01x | β | β | ϕ | ε | Ϟ | đ | đ | đ | |
| '02x | ɖ | ɖ | ɖ | ð | D | ə | ə | ə | "1x |
| '03x | ε | ɜ | ɜ | ɜ | g | g | G | γ | |
| '04x | ɣ | ɣ | ɮ | ɦ | ɦ | ɦ | ɥ | i | "2x |
| '05x | ɪ | ɪ | I | ɪ | J | ɪ | ɪ | ɪ | |
| '06x | ɭ | ɭ | λ | λ | ɱ | ɱ | ɱ | ɱ | "3x |
| '07x | ɱ | ɱ | N | ⊙ | ə | ɔ | ω | ω | |
| '10x | ∞ | ɸ | ɸ | φ | ɾ | ɾ | ɾ | ɾ | "4x |
| '11x | ɹ | ɹ | R | ɹ | ɹ | ɹ | ɹ | σ | |
| '12x | ɹ | ɹ | ɹ | θ | ɸ | ɸ | ɸ | U | "5x |
| '13x | ɸ | ɸ | ɸ | χ | ɹ | Y | Z | Z | |
| '14x | ɜ | ɜ | ɹ | ɹ | ɮ | ɹ | ɹ | ɹ | "6x |
| '15x | ɹ | ɹ | ɹ | ɹ | ɹ | ɹ | ɹ | ɹ | |
| '16x | ɹ | ɹ | .. | ɹ | ^ | v | < | > | "7x |
| '17x | ° | ° | ° | ~ | ~ | ~ | ~ | ~ | |
| | "8 | "9 | "A | "B | "C | "D | "E | "F | |

| plr10, OT4 | '0 | '1 | '2 | '3 | '4 | '5 | '6 | '7 | |
|------------|----|----|----|----|----|----|-----|-----|-----|
| '00x | Γ | Δ | Θ | Λ | Ξ | Π | Σ | Υ | "0x |
| '01x | Φ | Ψ | Ω | ff | fi | fl | ffi | ffl | |
| '02x | ı | ı | ` | ' | ˘ | ˙ | - | ° | "1x |
| '03x | ˘ | ß | æ | œ | ø | Æ | Œ | Ø | |
| '04x | - | ! | " | # | \$ | % | & | ' | "2x |
| '05x | (|) | * | + | , | - | . | / | |
| '06x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | "3x |
| '07x | 8 | 9 | : | ; | i | = | ı | ? | |
| '10x | @ | A | B | C | D | E | F | G | "4x |
| '11x | H | I | J | K | L | M | N | O | |
| '12x | P | Q | R | S | T | U | V | W | "5x |
| '13x | X | Y | Z | [| " |] | ^ | . | |
| '14x | ' | a | b | c | d | e | f | g | "6x |
| '15x | h | i | j | k | l | m | n | o | |
| '16x | p | q | r | s | t | u | v | w | "7x |
| '17x | x | y | z | - | — | " | ~ | .. | |
| '20x | | Ą | Ć | | | | Ę | | "8x |
| '21x | | | Ł | Ń | | | | | |
| '22x | | Ś | | | | | | | "9x |
| '23x | | Ż | | Ż | | | | | |
| '24x | | ą | ć | | | | ę | | "Ax |
| '25x | | | ł | ń | | | « | » | |
| '26x | | ś | | | | | | | "Bx |
| '27x | | ż | | ż | | | | | |
| '30x | | | | | | | | | "Cx |
| '31x | | | | | | | | | |
| '32x | | | | Ó | | | | | "Dx |
| '33x | | | | | | | | | |
| '34x | | | | | | | | | "Ex |
| '35x | | | | | | | | | |
| '36x | | | | ó | | | | | "Fx |
| '37x | | | | | | | | " | |
| | "8 | "9 | "A | "B | "C | "D | "E | "F | |

| artmr10, OT6 | '0 | '1 | '2 | '3 | '4 | '5 | '6 | '7 | |
|---------------------|----|----|----|----|----|----|----|----|-----|
| '00x | | | | ᠒ | ᠒ | ᠔ | ᠫ | ᠯ | "0x |
| '01x | ᠎ | ᠊ | ᠎ | ᠒ | ᠎ | ᠎ | ᠎ | ᠎ | |
| '02x | | | | ᠔ | ᠒ | ᠔ | ᠫ | ᠯ | "1x |
| '03x | ᠎ | ᠊ | ᠒ | ᠒ | ᠎ | ᠎ | ᠫ | ᠎ | |
| '04x | ᠎ | ' | " | # | \$ | % | & | ' | "2x |
| '05x | (|) | * | + | , | - | . | / | |
| '06x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | "3x |
| '07x | 8 | 9 | : | ; | « | = | » | ' | |
| '10x | @ | ᠯ | ᠎ | ᠎ | ᠎ | ᠫ | ᠎ | ᠎ | "4x |
| '11x | ᠎ | ᠎ | ᠎ | ᠎ | ᠎ | ᠎ | ᠎ | ᠎ | |
| '12x | ᠎ | ᠎ | ᠎ | ᠎ | ᠎ | ᠎᠎ | ᠎ | ᠎ | "5x |
| '13x | ᠎ | ᠎ | ᠎ | [| " |] | { | } | |
| '14x | ` | w | p | g | ᠎ | ᠫ | ᠎ | q | "6x |
| '15x | h | ᠎ | ᠎ | ᠎ | ᠎ | ᠎ | ᠎ | n | |
| '16x | w | p | ᠎ | u | w | ᠎ | ᠎ | ᠎ | "7x |
| '17x | u | j | q | - | ' | — | ! | ? | |
| | "8 | "9 | "A | "B | "C | "D | "E | "F | |

| ecrm1000, T1 | '0 | '1 | '2 | '3 | '4 | '5 | '6 | '7 | |
|---------------------|----|----|----|----|----|----|-----|-----|-----|
| '00x | ` | ´ | ^ | ~ | ¨ | ˘ | ° | ˘ | "0x |
| '01x | ˘ | – | · | ˘ | ˘ | , | < | > | |
| '02x | “ | ” | „ | « | » | – | — | | "1x |
| '03x | o | ı | J | ff | fi | fl | ffi | ffl | |
| '04x | ˘ | ! | " | # | \$ | % | & | ' | "2x |
| '05x | (|) | * | + | , | - | . | / | |
| '06x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | "3x |
| '07x | 8 | 9 | : | ; | < | = | > | ? | |
| '10x | @ | A | B | C | D | E | F | G | "4x |
| '11x | H | I | J | K | L | M | N | O | |
| '12x | P | Q | R | S | T | U | V | W | "5x |
| '13x | X | Y | Z | [| \ |] | ^ | _ | |
| '14x | ‘ | a | b | c | d | e | f | g | "6x |
| '15x | h | i | j | k | l | m | n | o | |
| '16x | p | q | r | s | t | u | v | w | "7x |
| '17x | x | y | z | { | | } | ~ | - | |
| '20x | Ă | Ą | Ć | Č | Ď | Ě | Ę | Ğ | "8x |
| '21x | Ĺ | Ł | Ł | Ń | Ñ | Đ | Ŏ | Ř | |
| '22x | Ŕ | Ś | Š | Ş | Ť | Ț | Ū | Ŭ | "9x |
| '23x | Ÿ | Ž | Ž | Ž | IJ | ı | đ | š | |
| '24x | ă | ą | ć | č | ď | ě | ę | ğ | "Ax |
| '25x | ĺ | ł | ł | ń | ñ | đ | ó | ř | |
| '26x | ř | ś | š | ş | ť | ț | ű | ŭ | "Bx |
| '27x | ÿ | ž | ž | ž | ij | ı | đ | š | |
| '30x | À | Á | Â | Ã | Ä | Å | Æ | Ç | "Cx |
| '31x | È | É | Ê | Ë | Ì | Í | Î | Ï | |
| '32x | Ð | Ñ | Ò | Ó | Ô | Õ | Ö | Œ | "Dx |
| '33x | Ø | Ù | Ú | Û | Ü | Ý | Þ | ŠS | |
| '34x | à | á | â | ã | ä | å | æ | ç | "Ex |
| '35x | è | é | ê | ë | ì | í | î | ï | |
| '36x | ð | ñ | ò | ó | ô | õ | ö | œ | "Fx |
| '37x | ø | ù | ú | û | ü | ý | þ | š | |
| | "8 | "9 | "A | "B | "C | "D | "E | "F | |

| larm1000, T2A | '0 | '1 | '2 | '3 | '4 | '5 | '6 | '7 | |
|---------------|----|----|----|----|----|----|-----|-----|-----|
| '00x | ` | ´ | ^ | ~ | ¨ | ˘ | ° | ˘ | "0x |
| '01x | ˘ | – | · | ˘ | ˘ | I | < | > | |
| '02x | “ | ” | ˆ | ˘ | ˘ | – | – | | "1x |
| '03x | o | ı | J | ff | fi | fl | ffi | ffl | |
| '04x | ˘ | ! | " | # | \$ | % | & | ' | "2x |
| '05x | (|) | * | + | , | - | . | / | |
| '06x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | "3x |
| '07x | 8 | 9 | : | ; | < | = | > | ? | |
| '10x | @ | A | B | C | D | E | F | G | "4x |
| '11x | H | I | J | K | L | M | N | O | |
| '12x | P | Q | R | S | T | U | V | W | "5x |
| '13x | X | Y | Z | [| \ |] | ^ | _ | |
| '14x | ‘ | a | b | c | d | e | f | g | "6x |
| '15x | h | i | j | k | l | m | n | o | |
| '16x | p | q | r | s | t | u | v | w | "7x |
| '17x | x | y | z | { | | } | ~ | - | |
| '20x | Г | Г | Ђ | Ђ | h | Ж | З | Љ | "8x |
| '21x | Ї | Қ | К | К | Æ | Ң | Н | С | |
| '22x | Ө | Ç | Ў | У | У | Х | Ц | Ч | "9x |
| '23x | Ч | Є | Ә | Һ | Ё | № | О | § | |
| '24x | г | г | ђ | ђ | h | ж | з | љ | "Ax |
| '25x | ї | қ | к | к | æ | ң | н | с | |
| '26x | ө | ç | ў | у | у | х | ц | ч | "Bx |
| '27x | ч | е | ә | һ | ё | „ | « | » | |
| '30x | А | Б | В | Г | Д | Е | Ж | З | "Cx |
| '31x | И | Й | К | Л | М | Н | О | П | |
| '32x | Р | С | Т | У | Ф | Х | Ц | Ч | "Dx |
| '33x | Ш | Щ | Ъ | Ы | Ь | Э | Ю | Я | |
| '34x | а | б | в | г | д | е | ж | з | "Ex |
| '35x | и | й | к | л | м | н | о | п | |
| '36x | р | с | т | у | ф | х | ц | ч | "Fx |
| '37x | ш | щ | ъ | ы | ь | э | ю | я | |
| | "8 | "9 | "A | "B | "C | "D | "E | "F | |

| lbrm1000, T2B | '0 | '1 | '2 | '3 | '4 | '5 | '6 | '7 | |
|---------------|----|----|----|----|----|----|-----|-----|-----|
| '00x | ` | ´ | ^ | ~ | ¨ | ˘ | ˙ | ˚ | "0x |
| '01x | ˛ | ˜ | ˆ | ˙ | ˚ | I | < | > | |
| '02x | “ | ” | ˆ | ˘ | ˙ | – | — | | "1x |
| '03x | o | l | J | ff | fi | fl | ffi | ffl | |
| '04x | ˘ | ! | " | # | \$ | % | & | ' | "2x |
| '05x | (|) | * | + | , | - | . | / | |
| '06x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | "3x |
| '07x | 8 | 9 | : | ; | < | = | > | ? | |
| '10x | @ | A | B | C | D | E | F | G | "4x |
| '11x | H | I | J | K | L | M | N | O | |
| '12x | P | Q | R | S | T | U | V | W | "5x |
| '13x | X | Y | Z | [| \ |] | ^ | _ | |
| '14x | ‘ | a | b | c | d | e | f | g | "6x |
| '15x | h | i | j | k | l | m | n | o | |
| '16x | p | q | r | s | t | u | v | w | "7x |
| '17x | x | y | z | { | | } | ~ | - | |
| '20x | Ґ | Ғ | Ғ | Ғ | Һ | Җ | Ҙ | Ҝ | "8x |
| '21x | Љ | Қ | Љ | Қ | Ј | Ң | Ң | Ң | |
| '22x | Ө | С | Ў | У | Х | Х | Х | Ҷ | "9x |
| '23x | Ҷ | Ң | Ә | Ә | Ё | № | □ | § | |
| '24x | ғ | ғ | ғ | Ғ | Һ | Җ | Ҙ | Ҝ | "Ax |
| '25x | љ | қ | љ | қ | ј | ң | ң | ң | |
| '26x | ө | с | ў | у | х | х | х | җ | "Bx |
| '27x | ҷ | њ | ә | ә | ё | „ | « | » | |
| '30x | А | Б | В | Г | Д | Е | Ж | З | "Cx |
| '31x | И | Й | К | Л | М | Н | О | П | |
| '32x | Р | С | Т | У | Ф | Х | Ц | Ч | "Dx |
| '33x | Ш | Щ | Ъ | Ы | Ь | Э | Ю | Я | |
| '34x | а | б | в | г | д | е | ж | з | "Ex |
| '35x | и | й | к | л | м | н | о | п | |
| '36x | р | с | т | у | ф | х | ц | ч | "Fx |
| '37x | ш | щ | ъ | ы | ь | э | ю | я | |
| | "8 | "9 | "A | "B | "C | "D | "E | "F | |

| lcrm1000, T2C | '0 | '1 | '2 | '3 | '4 | '5 | '6 | '7 | |
|---------------|----|----|----|----|----|----|-----|-----|-----|
| '00x | ` | ´ | ^ | ~ | ¨ | ˘ | ° | ˘ | "0x |
| '01x | ˘ | ˉ | · | ˘ | ˙ | I | < | > | |
| '02x | “ | ” | ˆ | ˜ | ˚ | – | — | | "1x |
| '03x | o | l | J | ff | fi | fl | ffi | ffl | |
| '04x | ˘ | ! | " | # | \$ | % | & | ' | "2x |
| '05x | (|) | * | + | , | - | . | / | |
| '06x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | "3x |
| '07x | 8 | 9 | : | ; | < | = | > | ? | |
| '10x | @ | A | B | C | D | E | F | G | "4x |
| '11x | H | I | J | K | L | M | N | O | |
| '12x | P | Q | R | S | T | U | V | W | "5x |
| '13x | X | Y | Z | [| \ |] | ^ | _ | |
| '14x | ‘ | a | b | c | d | e | f | g | "6x |
| '15x | h | i | j | k | l | m | n | o | |
| '16x | p | q | r | s | t | u | v | w | "7x |
| '17x | x | y | z | { | | } | ~ | - | |
| '20x | Ѓ | Є | Ѕ | І | Ї | Љ | Њ | Ћ | "8x |
| '21x | Ќ | Ѝ | Ў | а | Ј | Њ | Ѓ | Ѕ | |
| '22x | Ө | Ɔ | Ɔ | Ђ | Ѓ | Х | Ц | Q | "9x |
| '23x | Ч | Н | Ә | Ђ | Ё | № | Q | § | |
| '24x | Ѓ | ц | т | ђ | h | Р | р | з | "Ax |
| '25x | м | к | л | к | Ј | ц | м | њ | |
| '26x | ө | е | е | ђ | й | х | ц | Q | "Bx |
| '27x | ч | н | ә | ђ | ё | „ | « | » | |
| '30x | А | Б | В | Г | Д | Е | Ж | З | "Cx |
| '31x | И | Й | К | Л | М | Н | О | П | |
| '32x | Р | С | Т | У | Ф | Х | Ц | Ч | "Dx |
| '33x | Ш | Щ | Ъ | Ы | Ь | Э | Ю | Я | |
| '34x | а | б | в | г | д | е | ж | з | "Ex |
| '35x | и | й | к | л | м | н | о | п | |
| '36x | р | с | т | у | ф | х | ц | ч | "Fx |
| '37x | ш | щ | ъ | ы | ь | э | ю | я | |
| | "8 | "9 | "A | "B | "C | "D | "E | "F | |

| tipa10, T3 | '0 | '1 | '2 | '3 | '4 | '5 | '6 | '7 | |
|------------|----|----|----|----|----|----|----|----|-----|
| '00x | ` | ´ | ^ | ~ | ¨ | ” | ° | ˘ | "0x |
| '01x | ˘ | – | • | › | € | “ | ˆ | ˙ | |
| '02x | ^ | ˆ | ˘ | ˚ | › | ˘ | ˚ | ˚ | "1x |
| '03x | × | 1 | J | + | ± | τ | † | ‡ | |
| '04x | / | ! | ' | ˆ | ˘ | ˘ | ˘ | ˘ | "2x |
| '05x | (|) | * | + | , | - | . | / | |
| '06x | н | і | Λ | З | ц | е | в | γ | "3x |
| '07x | ө | ə | : | • | ˘ | = | ˘ | ? | |
| '10x | ə | ɑ | β | ε | ð | ε | ϕ | γ | "4x |
| '11x | ñ | ı | j | ʋ | Λ | η | η | ɔ | |
| '12x | ʔ | ƒ | r | f | θ | υ | υ | υ | "5x |
| '13x | χ | γ | ζ | [| ˆ |] | ˆ | ˆ | |
| '14x | ‘ | a | b | c | d | e | f | g | "6x |
| '15x | h | i | j | k | l | m | n | o | |
| '16x | p | q | r | s | t | u | v | w | "7x |
| '17x | x | y | z | | | ‡ | ˘ | ˙ | |
| '20x | – | ˘ | ˘ | ˘ | ˘ | ˘ | ˘ | ˘ | "8x |
| '21x | / | – | ˘ | ˘ | ˘ | ˘ | ˘ | ˘ | |
| '22x | / | / | | | ↓ | ↑ | ↗ | ↘ | "9x |
| '23x | ˘ | ˘ | ˘ | ˘ | ˙ | ˘ | ˘ | ˘ | |
| '24x | ḃ | ḋ | Ḍ | ḏ | ɛ | g | l | l | "Ax |
| '25x | J | ɣ | ı | λ | λ | ɓ | ɓ | æ | |
| '26x | ω | Ω | ı | ı | ı | ts | ı | ı | "Bx |
| '27x | ƒ | ƒ | ɓ | ɓ | ? | < | > | | |
| '30x | A | C | Ĉ | Ċ | ø | ø | ø | ʒ | "Cx |
| '31x | ɣ | Ċ | ĥ | н | ı | J | k | L | |
| '32x | ḅ | ω | β | ɔ | ɔ | l | t | æ | "Dx |
| '33x | ı | ı | υ | ı | ı | ı | ı | p | |
| '34x | B | β | ɔ | ɔ | ɔ | ɔ | æ | ç | "Ex |
| '35x | ħ | J | f | ı | ı | ı | ı | ı | |
| '36x | N | ı | Θ | ı | ı | ı | ı | œ | "Fx |
| '37x | ø | ş | t | Λ | z | z | ɓ | lv | |
| | "8 | "9 | "A | "B | "C | "D | "E | "F | |

| fcr10, T4 | '0 | '1 | '2 | '3 | '4 | '5 | '6 | '7 | |
|------------------|----|----|----|----|----|----|-----|-----|-----|
| '00x | ` | ' | ^ | ~ | ¨ | ˆ | ˚ | ˇ | "0x |
| '01x | ˘ | - | · | ˙ | ˚ | , | < | > | |
| '02x | “ | ” | „ | « | » | – | — | | "1x |
| '03x | o | l | J | ff | fi | fl | ffi | ffl | |
| '04x | □ | ! | " | # | \$ | % | & | ' | "2x |
| '05x | (|) | * | + | , | - | . | / | |
| '06x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | "3x |
| '07x | 8 | 9 | : | ; | < | = | > | ? | |
| '10x | @ | A | B | C | D | E | F | G | "4x |
| '11x | H | I | J | K | L | M | N | O | |
| '12x | P | Q | R | S | T | U | V | W | "5x |
| '13x | X | Y | Z | [| \ |] | ^ | _ | |
| '14x | ' | a | b | c | d | e | f | g | "6x |
| '15x | h | i | j | k | l | m | n | o | |
| '16x | p | q | r | s | t | u | v | w | "7x |
| '17x | x | y | z | { | | } | ~ | - | |
| '20x | Ɔ | Ɖ | Ɛ | Ǝ | Ƒ | Ɠ | Ɣ | ƕ | "8x |
| '21x | Ɔ | Ɖ | Ɛ | Ǝ | Ƒ | Ɠ | Ɣ | ƕ | |
| '22x | Ɔ | Ɖ | Ɛ | Ǝ | Ƒ | Ɠ | Ɣ | ƕ | "9x |
| '23x | Ɔ | Ɖ | Ɛ | Ǝ | Ƒ | Ɠ | Ɣ | ƕ | |
| '24x | Ɔ | Ɖ | Ɛ | Ǝ | Ƒ | Ɠ | Ɣ | ƕ | "Ax |
| '25x | Ɔ | Ɖ | Ɛ | Ǝ | Ƒ | Ɠ | Ɣ | ƕ | |
| '26x | Ɔ | Ɖ | Ɛ | Ǝ | Ƒ | Ɠ | Ɣ | ƕ | "Bx |
| '27x | Ɔ | Ɖ | Ɛ | Ǝ | Ƒ | Ɠ | Ɣ | ƕ | |
| '30x | Ɔ | Ɖ | Ɛ | Ǝ | Ƒ | Ɠ | Ɣ | ƕ | "Cx |
| '31x | Ɔ | Ɖ | Ɛ | Ǝ | Ƒ | Ɠ | Ɣ | ƕ | |
| '32x | Ɔ | Ɖ | Ɛ | Ǝ | Ƒ | Ɠ | Ɣ | ƕ | "Dx |
| '33x | Ɔ | Ɖ | Ɛ | Ǝ | Ƒ | Ɠ | Ɣ | ƕ | |
| '34x | Ɔ | Ɖ | Ɛ | Ǝ | Ƒ | Ɠ | Ɣ | ƕ | "Ex |
| '35x | Ɔ | Ɖ | Ɛ | Ǝ | Ƒ | Ɠ | Ɣ | ƕ | |
| '36x | Ɔ | Ɖ | Ɛ | Ǝ | Ƒ | Ɠ | Ɣ | ƕ | "Fx |
| '37x | Ɔ | Ɖ | Ɛ | Ǝ | Ƒ | Ɠ | Ɣ | ƕ | |
| | "8 | "9 | "A | "B | "C | "D | "E | "F | |

| vnr10, T5 | '0 | '1 | '2 | '3 | '4 | '5 | '6 | '7 | |
|------------------|----|----|----|----|----|----|----|----|-----|
| '00x | ` | ´ | ^ | ~ | ¨ | · | ° | ˘ | "0x |
| '01x | ˘ | - | · | ˘ | ˙ | , | < | > | |
| '02x | “ | ” | „ | « | » | - | — | | "1x |
| '03x | o | ı | ÿ | ÿ | Ÿ | Ÿ | Đ | đ | |
| '04x | ˘ | ! | " | # | \$ | % | & | ' | "2x |
| '05x | (|) | * | + | , | - | . | / | |
| '06x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | "3x |
| '07x | 8 | 9 | : | ; | < | = | > | ? | |
| '10x | @ | A | B | C | D | E | F | G | "4x |
| '11x | H | I | J | K | L | M | N | O | |
| '12x | P | Q | R | S | T | U | V | W | "5x |
| '13x | X | Y | Z | [| \ |] | ^ | _ | |
| '14x | ‘ | a | b | c | d | e | f | g | "6x |
| '15x | h | i | j | k | l | m | n | o | |
| '16x | p | q | r | s | t | u | v | w | "7x |
| '17x | x | y | z | { | | } | ~ | - | |
| '20x | À | Á | Ã | Å | Ạ | Â | Ã | Ä | "8x |
| '21x | Ã | Ä | Å | Ă | Ǻ | Ǻ | Ǻ | Ǻ | |
| '22x | Ǻ | È | É | Ê | Ë | Ě | Ë | È | "9x |
| '23x | É | Ë | Ê | Ě | Ì | Í | Ī | Ī | |
| '24x | à | á | ã | å | ạ | â | ã | ä | "Ax |
| '25x | ã | ä | å | ă | Ǻ | Ǻ | Ǻ | Ǻ | |
| '26x | Ǻ | è | é | ê | ë | ě | ë | è | "Bx |
| '27x | é | ë | ê | Ě | ì | í | ī | ī | |
| '30x | İ | Ò | Ó | Õ | Ǫ | Ǫ | Ô | Ồ | "Cx |
| '31x | Ǫ | Ǫ | Ǫ | Ǫ | Ǫ | Ǫ | Ǫ | Ǫ | |
| '32x | Ǫ | Ǫ | Ù | Ú | Û | Ü | Ū | Ū | "Dx |
| '33x | Û | Ū | Ū | Ū | Ū | Ÿ | Ÿ | Ÿ | |
| '34x | ì | ò | ó | õ | Ǫ | Ǫ | ô | ồ | "Ex |
| '35x | Ǫ | Ǫ | Ǫ | ộ | ơ | ờ | ớ | ỡ | |
| '36x | ổ | ợ | ù | ú | û | ü | ұ | ư | "Fx |
| '37x | ừ | ứ | ữ | ử | ự | ỳ | ý | ỷ | |
| | "8 | "9 | "A | "B | "C | "D | "E | "F | |

A.2 Text symbol encodings

The full table for TS1 as provided by European Computer Modern family:

| tcrm1000, TS1 | '0 | '1 | '2 | '3 | '4 | '5 | '6 | '7 | |
|---------------|----|----|----|-----|----|----|----|----|-----|
| '00x | ˘ | ˙ | ˆ | ˜ | ¨ | ˘ | ˚ | ˇ | "0x |
| '01x | ˘ | ˙ | ˆ | ˜ | ¨ | ˘ | ˚ | ˇ | |
| '02x | | | ¨ | | | — | — | | "1x |
| '03x | ← | → | ˆ | ˆ | ˆ | ˆ | | | |
| '04x | ℔ | | | | § | | | ¡ | "2x |
| '05x | | | * | | , | = | . | / | |
| '06x | o | 1 | 2 | 3 | 4 | 5 | 6 | 7 | "3x |
| '07x | 8 | 9 | | | < | — | > | | |
| '10x | | | | | | | | | "4x |
| '11x | | | | | | U | | ○ | |
| '12x | | | | | | | | Ω | "5x |
| '13x | | | | ∥ | | ∥ | ↑ | ↓ | |
| '14x | ` | | * | o o | † | | | | "6x |
| '15x | | | | | ☛ | ∞ | ♪ | | |
| '16x | | | | | | | | | "7x |
| '17x | | | | | | | ~ | = | |
| '20x | ˘ | ˙ | ¨ | ˘ | ‡ | ‡ | ∥ | ‰ | "8x |
| '21x | • | °C | § | ¢ | f | © | W | ℞ | |
| '22x | € | ℙ | £ | ℞ | ‡ | ‡ | ‡ | ™ | "9x |
| '23x | ‰ | ¶ | ℞ | ℞ | ‰ | € | ◊ | SM | |
| '24x | { | } | ¢ | £ | ¤ | ¥ | ¦ | § | "Ax |
| '25x | ¨ | © | ª | © | ¬ | ® | ® | — | |
| '26x | ° | ± | ² | ³ | ´ | µ | ¶ | · | "Bx |
| '27x | ※ | ¹ | º | √ | ¼ | ½ | ¾ | € | |
| '30x | | | | | | | | | "Cx |
| '31x | | | | | | | | | |
| '32x | | | | | | | × | | "Dx |
| '33x | | | | | | | | | |
| '34x | | | | | | | | | "Ex |
| '35x | | | | | | | | | |
| '36x | | | | | | | ÷ | | "Fx |
| '37x | | | | | | | | | |
| | "8 | "9 | "A | "B | "C | "D | "E | "F | |

In contrast typical PostScript fonts usually have incomplete implementations of TS1 sometimes missing more than half of the glyphs:

| ptmr8c, TS1 | '0 | '1 | '2 | '3 | '4 | '5 | '6 | '7 | |
|-------------|----|----|----|----|----|----|----|----|-----|
| '00x | ` | ´ | ^ | ~ | ¨ | ˘ | ° | ˘ | "0x |
| '01x | ˘ | - | · | ˘ | ˘ | ˘ | | | |
| '02x | | | „ | | | — | — | | "1x |
| '03x | ■ | ■ | ■ | ■ | ■ | ■ | | | |
| '04x | ■ | | | | \$ | | | ' | "2x |
| '05x | | | * | | , | ■ | . | / | |
| '06x | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | "3x |
| '07x | ■ | ■ | | | ■ | - | ■ | | |
| '10x | | | | | | | | | "4x |
| '11x | | | | | | ■ | | ■ | |
| '12x | | | | | | | | ■ | "5x |
| '13x | | | | [| |] | ■ | ■ | |
| '14x | ` | | ■ | ■ | ■ | | | | "6x |
| '15x | | | | | ■ | ■ | ■ | | |
| '16x | | | | | | | | | "7x |
| '17x | | | | | | | ~ | ■ | |
| '20x | ˘ | ˘ | ˘ | ˘ | † | ‡ | | ‰ | "8x |
| '21x | · | °C | ■ | ■ | f | ■ | ■ | ■ | |
| '22x | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ™ | "9x |
| '23x | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | |
| '24x | ■ | ■ | ¢ | £ | ¤ | ¥ | ¦ | § | "Ax |
| '25x | ¨ | © | ª | ■ | ¬ | ■ | ® | - | |
| '26x | ° | ± | ² | ³ | ´ | µ | ¶ | · | "Bx |
| '27x | ■ | ¹ | º | ■ | ¼ | ½ | ¾ | € | |
| '30x | | | | | | | | | "Cx |
| '31x | | | | | | | | | |
| '32x | | | | | | | × | | "Dx |
| '33x | | | | | | | | | |
| '34x | | | | | | | | | "Ex |
| '35x | | | | | | | | | |
| '36x | | | | | | | ÷ | | "Fx |
| '37x | | | | | | | | | |
| | "8 | "9 | "A | "B | "C | "D | "E | "F | |

| tipx10, TS3 | '0 | '1 | '2 | '3 | '4 | '5 | '6 | '7 | |
|-------------|----|----|----|----|----|----|----|----|-----|
| '00x | ↵ | ↳ | ↘ | ↙ | ▣ | ← | ↔ | ↓ | "0x |
| '01x | ↑ | → | ↔ | | | | | | |
| '02x | | | | | | | | | "1x |
| '03x | | | | | | | | | |
| '04x | α | σ | ω | ϕ | Ϸ | ϸ | Ϲ | Ϻ | "2x |
| '05x | ϻ | ϼ | Ͻ | Ͽ | Ͽ | Ͽ | Ͽ | Ͽ | |
| '06x | Ͽ | ι | Ͽ | Ͽ | Ͽ | Ͽ | Ͽ | Ͽ | "3x |
| '07x | Ͽ | ⊖ | Ͽ | Ͽ | Ͽ | Ͽ | Ͽ | Ͽ | |
| '10x | Ͽ | Ͽ | Ͽ | Ͽ | Ͽ | Ͽ | Ͽ | Ͽ | "4x |
| '11x | Ͽ | Ͽ | | | | | | | |
| '12x | Ͽ | Ͽ | Ͽ | Ͽ | ? | ? | ? | | "5x |
| '13x | | | | | | | | | |
| '14x | | | | | | | | | "6x |
| '15x | | | | | | | | | |
| '16x | ∨ | ∅ | Δ | ∅ | κ | κ | ∅ | ∅ | "7x |
| '17x | ∅ | ∅ | ∅ | ∅ | | | | | |
| | "8 | "9 | "A | "B | "C | "D | "E | "F | |

A.3 Extended text encodings

| rxrm1000, X2 | '0 | '1 | '2 | '3 | '4 | '5 | '6 | '7 | |
|---------------------|----|----|----|----|----|----|----|----|-----|
| '00x | ` | ´ | ^ | ~ | ¨ | ˘ | ˙ | ˚ | "0x |
| '01x | ˘ | ˙ | ˚ | ¸ | ˙ | I | < | > | |
| '02x | “ | ” | ˆ | ˜ | ˚ | – | — | | "1x |
| '03x | o | ˘ | ˙ | ˚ | δ | δ | Ɀ | Ɀ | |
| '04x | ˘ | ! | " | # | \$ | % | & | ' | "2x |
| '05x | (|) | * | + | , | - | . | / | |
| '06x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | "3x |
| '07x | 8 | 9 | : | ; | < | = | > | ? | |
| '10x | @ | Æ | Ђ | Ђ | € | € | К | К | "4x |
| '11x | Л | І | Ј | Љ | Ѓ | Њ | Ќ | Љ | |
| '12x | Р | Q | Т | Ѕ | Ц | Ц | Ч | W | "5x |
| '13x | Ђ | Ж | V | | \ | | ^ | _ | |
| '14x | ‘ | æ | ђ | ђ | е | е | к | к | "6x |
| '15x | л | і | ј | љ | џ | њ | ќ | љ | |
| '16x | р | q | т | ѕ | ц | ц | ч | w | "7x |
| '17x | ђ | ж | v | { | | } | ~ | - | |
| '20x | Г | Г | Г | Ђ | h | Ж | З | З | "8x |
| '21x | Ї | Қ | К | Қ | Ј | Њ | Н | Њ | |
| '22x | Ө | Ç | ÿ | Y | Y | X | X | Ч | "9x |
| '23x | Ч | € | Ə | ε | È | № | □ | § | |
| '24x | г | г | г | ђ | h | ж | з | з | "Ax |
| '25x | ї | қ | к | қ | ј | њ | н | њ | |
| '26x | ө | ç | ÿ | у | у | х | х | ч | "Bx |
| '27x | ч | € | ə | ε | è | „ | « | » | |
| '30x | А | Б | В | Г | Д | Е | Ж | З | "Cx |
| '31x | И | Й | К | Л | М | Н | О | П | |
| '32x | Р | С | Т | У | Ф | Х | Ц | Ч | "Dx |
| '33x | Ш | Щ | Ъ | Ы | Ь | Э | Ю | Я | |
| '34x | а | б | в | г | д | е | ж | з | "Ex |
| '35x | и | й | к | л | м | н | о | п | |
| '36x | р | с | т | у | ф | х | ц | ч | "Fx |
| '37x | ш | щ | ъ | ы | ь | э | ю | я | |
| | "8 | "9 | "A | "B | "C | "D | "E | "F | |

A.4 Mathematical encodings

| cmmi10, OML | '0 | '1 | '2 | '3 | '4 | '5 | '6 | '7 | |
|--------------------|--------------|------------------|---------------|-------------------|--------------|---------------|------------------|-----------------|-----|
| '00x | Γ | Δ | Θ | Λ | Ξ | Π | Σ | Υ | "0x |
| '01x | Φ | Ψ | Ω | α | β | γ | δ | ϵ | |
| '02x | ζ | η | θ | ι | κ | λ | μ | ν | "1x |
| '03x | ξ | π | ρ | σ | τ | υ | ϕ | χ | |
| '04x | ψ | ω | ε | ϑ | ϖ | ϱ | ς | φ | "2x |
| '05x | \leftarrow | \longleftarrow | \rightarrow | \longrightarrow | \leftarrow | \rightarrow | \triangleright | \triangleleft | |
| '06x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | "3x |
| '07x | 8 | 9 | . | , | < | / | > | * | |
| '10x | ∂ | A | B | C | D | E | F | G | "4x |
| '11x | H | I | J | K | L | M | N | O | |
| '12x | P | Q | R | S | T | U | V | W | "5x |
| '13x | X | Y | Z | b | \natural | \sharp | \smile | \frown | |
| '14x | ℓ | a | b | c | d | e | f | g | "6x |
| '15x | h | i | j | k | l | m | n | o | |
| '16x | p | q | r | s | t | u | v | w | "7x |
| '17x | x | y | z | ι | j | \wp | \rightarrow | \leftarrow | |
| | "8 | "9 | "A | "B | "C | "D | "E | "F | |

| cmsy10, OMS | '0 | '1 | '2 | '3 | '4 | '5 | '6 | '7 | |
|--------------------|---------------|----------------|---------------|---------------|--------------------|--------------------|---------------|---------------|-----|
| '00x | - | . | \times | $*$ | \div | \diamond | \pm | \mp | "0x |
| '01x | \oplus | \ominus | \otimes | \oslash | \odot | \circ | \bullet | | |
| '02x | \asymp | \equiv | \subseteq | \supseteq | \leq | \geq | \preceq | \succeq | "1x |
| '03x | \sim | \approx | \subset | \supset | \ll | \gg | \prec | \succ | |
| '04x | \leftarrow | \rightarrow | \uparrow | \downarrow | \leftrightarrow | \nearrow | \searrow | \approx | "2x |
| '05x | \Lleftarrow | \Rrightarrow | \Uparrow | \Downarrow | \Lleftrightarrow | \Rleftrightarrow | \swarrow | \nwarrow | |
| '06x | ι | ∞ | \in | \exists | Δ | ∇ | / | ' | "3x |
| '07x | \forall | \exists | \neg | \emptyset | \Re | \Im | \top | \perp | |
| '10x | \aleph | \mathcal{A} | \mathcal{B} | \mathcal{C} | \mathcal{D} | \mathcal{E} | \mathcal{F} | \mathcal{G} | "4x |
| '11x | \mathcal{H} | \mathcal{I} | \mathcal{J} | \mathcal{K} | \mathcal{L} | \mathcal{M} | \mathcal{N} | \mathcal{O} | |
| '12x | \mathcal{P} | \mathcal{Q} | \mathcal{R} | \mathcal{S} | \mathcal{T} | \mathcal{U} | \mathcal{V} | \mathcal{W} | "5x |
| '13x | \mathcal{X} | \mathcal{Y} | \mathcal{Z} | \cup | \cap | \uplus | \wedge | \vee | |
| '14x | \vdash | \dashv | \lfloor | \rfloor | \lceil | \rceil | { | } | "6x |
| '15x | \langle | \rangle | | | \updownarrow | \Updownarrow | \ | ? | |
| '16x | \surd | \amalg | ∇ | \int | \sqcup | \sqcap | \sqsubseteq | \sqsupseteq | "7x |
| '17x | \S | \dagger | \ddagger | \clubsuit | \clubsuit | \diamond | \heartsuit | \spadesuit | |
| | "8 | "9 | "A | "B | "C | "D | "E | "F | |

| cmex10, OMX | '0 | '1 | '2 | '3 | '4 | '5 | '6 | '7 | |
|-------------|----|----|----|----|----|----|----|----|-----|
| '00x | (|) | [|] | [|] | [|] | "0x |
| '01x | { | } | < | > | | | / | \ | |
| '02x | (|) | (|) | [|] | [|] | "1x |
| '03x | [|] | { | } | < | > | / | \ | |
| '04x | (|) | [|] | [|] | [|] | "2x |
| '05x | { | } | < | > | / | \ | / | \ | |
| '06x | (|) | [|] | [|] | | | "3x |
| '07x | (|) | (|) | { | } | . | | |
| '10x | \ | / | | | < | > | ⊥ | ⊥ | "4x |
| '11x | § | § | ⊙ | ⊙ | ⊕ | ⊕ | ⊗ | ⊗ | |
| '12x | ∑ | ∏ | ∫ | ∪ | ∩ | ⊕ | ∧ | ∨ | "5x |
| '13x | ∑ | ∏ | ∫ | ∪ | ∩ | ⊕ | ∧ | ∨ | |
| '14x | ∏ | ∏ | ˆ | ˆ | ˆ | ˜ | ˜ | ˜ | "6x |
| '15x | [|] | [|] | [|] | { | } | |
| '16x | √ | √ | √ | √ | √ | | Γ | | "7x |
| '17x | ↑ | ↓ | ↖ | ↗ | ↘ | ↙ | ↕ | ↕ | |
| | "8 | "9 | "A | "B | "C | "D | "E | "F | |

A.5 Other encodings

| ptmr8y, LY1 | '0 | '1 | '2 | '3 | '4 | '5 | '6 | '7 | |
|-------------|----|----|----|----|----|-----|----|----|-----|
| '00x | | | | | / | . | ~ | . | "0x |
| '01x | fl | | | | fi | | | | |
| '02x | ı | | ` | ´ | ˘ | ˙ | - | ° | "1x |
| '03x | ı | ß | æ | œ | ø | Æ | Œ | Ø | |
| '04x | | ! | " | # | \$ | % | & | ' | "2x |
| '05x | (|) | * | + | , | - | . | / | |
| '06x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | "3x |
| '07x | 8 | 9 | : | ; | < | = | > | ? | |
| '10x | @ | A | B | C | D | E | F | G | "4x |
| '11x | H | I | J | K | L | M | N | O | |
| '12x | P | Q | R | S | T | U | V | W | "5x |
| '13x | X | Y | Z | [| \ |] | ^ | _ | |
| '14x | ‘ | a | b | c | d | e | f | g | "6x |
| '15x | h | i | j | k | l | m | n | o | |
| '16x | p | q | r | s | t | u | v | w | "7x |
| '17x | x | y | z | { | | } | ~ | .. | |
| '20x | Ł | ' | , | f | „ | ... | † | ‡ | "8x |
| '21x | ^ | %o | Š | < | Œ | Ž | ^ | - | |
| '22x | ł | ‘ | ’ | “ | ” | • | - | — | "9x |
| '23x | ~ | ™ | š | > | œ | ž | ~ | ÿ | |
| '24x | | ı | ¢ | £ | ¤ | ¥ | ı | § | "Ax |
| '25x | .. | © | ª | « | ¬ | | ® | - | |
| '26x | ° | ± | ² | ³ | ´ | µ | ¶ | . | "Bx |
| '27x | ı | ı | ° | » | ¼ | ½ | ¾ | ¿ | |
| '30x | À | Á | Â | Ã | Ä | Å | Æ | Ç | "Cx |
| '31x | È | É | Ê | Ë | Ì | Í | Î | Ï | |
| '32x | Ð | Ñ | Ò | Ó | Ô | Õ | Ö | × | "Dx |
| '33x | Ø | Ù | Ú | Û | Ü | Ý | Þ | ß | |
| '34x | à | á | â | ã | ä | å | æ | ç | "Ex |
| '35x | è | é | ê | ë | ì | í | î | ï | |
| '36x | ð | ñ | ò | ó | ô | õ | ö | ÷ | "Fx |
| '37x | ø | ù | ú | û | ü | ý | þ | ÿ | |
| | "8 | "9 | "A | "B | "C | "D | "E | "F | |

| grmn1000, LGR | '0 | '1 | '2 | '3 | '4 | '5 | '6 | '7 | | |
|---------------|----|----|----|----|----|----|----|----|---|-----|
| '00x | – | ˆ | ⊠ | ⊡ | ⊢ | ⊣ | ⊤ | ⊥ | ⊦ | "0x |
| '01x | ı | Ä | H | Ω | A | ÿ | α | ü | | |
| '02x | , | \ | ı | ı | ı | ı | ı | ı | ı | "1x |
| '03x | € | % | ə | ɳ | ‘ | ’ | ˘ | – | | |
| '04x | ≈ | ! | .. | ˆ | ˆ | % | . | ' | | "2x |
| '05x | (|) | * | + | , | - | . | / | | |
| '06x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | "3x |
| '07x | 8 | 9 | : | . | ˆ | = | ˘ | ; | | |
| '10x | ˘ | A | B | ˆ | Δ | E | Φ | Γ | | "4x |
| '11x | H | I | Θ | K | Λ | M | N | O | | |
| '12x | Π | X | P | Σ | T | Υ | ˘ | Ω | | "5x |
| '13x | Ξ | Ψ | Z | [| ˘ |] | ˘ | ˆ | | |
| '14x | ` | α | β | ς | δ | ε | φ | γ | | "6x |
| '15x | η | ι | θ | κ | λ | μ | ν | ο | | |
| '16x | π | χ | ρ | σ | τ | υ | | ω | | "7x |
| '17x | ξ | ψ | ζ | « | . | » | ˘ | — | | |
| '20x | à | á | â | ã | ä | å | ä | å | | "8x |
| '21x | á | ă | ǎ | ã | ą | ǻ | ǻ | ǻ | | |
| '22x | ã | ǎ | ǎ | F | ǻ | ǻ | ǻ | ˘ | | "9x |
| '23x | ĥ | ĥ | ĥ | | ĥ | ĥ | ĥ | | | |
| '24x | ĥ | ĥ | ĥ | ĥ | ĥ | ĥ | ĥ | ĥ | | "Ax |
| '25x | ĥ | ĥ | ĥ | ĥ | ĥ | ĥ | ĥ | ĥ | | |
| '26x | ò | ó | ô | õ | ò | ó | ô | õ | | "Bx |
| '27x | ó | ô | õ | õ | ó | ô | ô | õ | | |
| '30x | õ | õ | õ | F | õ | õ | õ | | | "Cx |
| '31x | ì | í | î | ï | ù | ú | û | ü | | |
| '32x | í | ĭ | ĭ | ĭ | ú | ű | ű | ű | | "Dx |
| '33x | ĩ | ĩ | ĩ | İ | ü | ű | ű | ÿ | | |
| '34x | è | é | ê | ë | ò | ó | ô | õ | | "Ex |
| '35x | é | ě | ě | ë | ó | ő | ő | ò | | |
| '36x | ï | ì | í | ĭ | ü | ù | ú | ű | | "Fx |
| '37x | φ | η | φ | ř | ř | | ' | , | | |
| | "8 | "9 | "A | "B | "C | "D | "E | "F | | |

| wasy10, U | '0 | '1 | '2 | '3 | '4 | '5 | '6 | '7 | |
|-----------|----|----|----|----|----|----|----|----|-----|
| '00x | △ | ◁ | ≤ | ▷ | ▾ | ∴ | ∅ | 👁 | "0x |
| '01x | ✓ | ♠ | ♣ | ♤ | ♥ | ♦ | ♧ | ♨ | |
| '02x | ◀ | ▶ | ⚡ | Ω | ∪ | ∩ | ⊗ | ∩ | "1x |
| '03x | ┌ | ♀ | ♂ | ♁ | ⊕ | ∞ | ♁ | ♁ | |
| '04x | ● | ♻ | ♻ | ○ | ☾ | ☽ | ♁ | ♀ | "2x |
| '05x | < | > | ^ | v | ☺ | ☹ | ☼ | ☹ | |
| '06x | ∪ | ⊗ | □ | ◇ | ⊗ | ⊞ | ✦ | ○ | "3x |
| '07x | ○ | ◊ | ~ | ~ | □ | □ | ≲ | ≳ | |
| '10x | ≈ | * | * | ☆ | ☆ | * | ▽ | ☾ | "4x |
| '11x | ◐ | ◑ | ◒ | ▲ | ▼ | | | | |
| '12x | ∂ | ∕ | ∖ | | | ∂ | ♂ | ♂ | "5x |
| '13x | ♁ | ♁ | ♁ | ♁ | ♁ | ♁ | ♁ | ♁ | |
| '14x | ♁ | ♁ | ♁ | ♁ | ♁ | ♁ | ♁ | ♁ | "6x |
| '15x | ‰ | ♯ | ♯ | ♯ | ♯ | ♯ | ♯ | ♯ | |
| '16x | ∫ | ∫ | ∫ | ∫ | ∫ | ∫ | ∫ | ∫ | "7x |
| '17x | ∫ | ∫ | ∫ | ∫ | ∫ | ∫ | ∫ | ∫ | |
| | "8 | "9 | "A | "B | "C | "D | "E | "F | |

| logo10, U | '0 | '1 | '2 | '3 | '4 | '5 | '6 | '7 | |
|-----------|----|----|----|----|----|----|----|----|-----|
| '00x | | | | | | | | | "0x |
| '01x | | | | | | | | | |
| '02x | | | | | | | | | "1x |
| '03x | | | | | | | | | |
| '04x | | | | | | | | | "2x |
| '05x | | | | | | | | | |
| '06x | | | | | | | | | "3x |
| '07x | | | | | | | | | |
| '10x | | A | | | | E | F | | "4x |
| '11x | | | | | | M | N | O | |
| '12x | P | | | S | T | | | | "5x |
| '13x | | | | | | | | | |
| '14x | | | | | | | | | "6x |
| '15x | | | | | | | | | |
| '16x | | | | | | | | | "7x |
| '17x | | | | | | | | | |
| | "8 | "9 | "A | "B | "C | "D | "E | "F | |

B Uppercase and lowercase tables

The following two sets of tables list the `\uppercase` and `\lowercase` values for each position in the L^AT_EX standard 256-character tables.

Each row of each table lists:

- pos The position in the table (0-255)
- lc The value in the `\lowercase` table at the position
(note that value 0 here means that `\lowercase` is ineffective for this character, and hyphenation does not apply to it)
- uc The value in the `\uppercase` table at the position
(note that value 0 here means that `\uppercase` is ineffective for this character)
- glyphs The glyphs specified for the T1 encoding for this position, laid out as `\langle glyph \rangle \langle \langle lowercase glyph \rangle / \langle \langle uppercase glyph \rangle \rangle`

| pos | lc | uc | glyphs | pos | lc | uc | glyphs | pos | lc | uc | glyphs | pos | lc | uc | glyphs |
|-----|----|----|------------|-----|----|----|---------|-----|-----|----|--------|-----|-----|----|--------|
| 0 | 0 | 0 | `(-/-) | 32 | 0 | 0 | ␣(-/-) | 64 | 0 | 0 | @(-/-) | 96 | 0 | 0 | '(-/-) |
| 1 | 0 | 0 | ´(-/-) | 33 | 0 | 0 | !(-/-) | 65 | 97 | 65 | A(a/A) | 97 | 97 | 65 | a(a/A) |
| 2 | 0 | 0 | ^(-/-) | 34 | 0 | 0 | "(-/-) | 66 | 98 | 66 | B(b/B) | 98 | 98 | 66 | b(b/B) |
| 3 | 0 | 0 | ~(-/-) | 35 | 0 | 0 | #(-/-) | 67 | 99 | 67 | C(c/C) | 99 | 99 | 67 | c(c/C) |
| 4 | 0 | 0 | ¨(-/-) | 36 | 0 | 0 | \$(-/-) | 68 | 100 | 68 | D(d/D) | 100 | 100 | 68 | d(d/D) |
| 5 | 0 | 0 | ¨(-/-) | 37 | 0 | 0 | %(-/-) | 69 | 101 | 69 | E(e/E) | 101 | 101 | 69 | e(e/E) |
| 6 | 0 | 0 | °(-/-) | 38 | 0 | 0 | &(-/-) | 70 | 102 | 70 | F(f/F) | 102 | 102 | 70 | f(f/F) |
| 7 | 0 | 0 | ˘(-/-) | 39 | 0 | 0 | '(-/-) | 71 | 103 | 71 | G(g/G) | 103 | 103 | 71 | g(g/G) |
| 8 | 0 | 0 | ˙(-/-) | 40 | 0 | 0 | ((-/-) | 72 | 104 | 72 | H(h/H) | 104 | 104 | 72 | h(h/H) |
| 9 | 0 | 0 | ˚(-/-) | 41 | 0 | 0 |)(-/-) | 73 | 105 | 73 | I(i/I) | 105 | 105 | 73 | i(i/I) |
| 10 | 0 | 0 | ˛(-/-) | 42 | 0 | 0 | *(-/-) | 74 | 106 | 74 | J(j/J) | 106 | 106 | 74 | j(j/J) |
| 11 | 0 | 0 | ¸(-/-) | 43 | 0 | 0 | +(-/-) | 75 | 107 | 75 | K(k/K) | 107 | 107 | 75 | k(k/K) |
| 12 | 0 | 0 | ˆ(-/-) | 44 | 0 | 0 | ,(-/-) | 76 | 108 | 76 | L(l/L) | 108 | 108 | 76 | l(l/L) |
| 13 | 0 | 0 | ˚(-/-) | 45 | 45 | 0 | -(-/-) | 77 | 109 | 77 | M(m/M) | 109 | 109 | 77 | m(m/M) |
| 14 | 0 | 0 | ˘(-/-) | 46 | 0 | 0 | .(-/-) | 78 | 110 | 78 | N(n/N) | 110 | 110 | 78 | n(n/N) |
| 15 | 0 | 0 | ˙(-/-) | 47 | 0 | 0 | /(-/-) | 79 | 111 | 79 | O(o/O) | 111 | 111 | 79 | o(o/O) |
| 16 | 0 | 0 | “(-/-) | 48 | 0 | 0 | 0(-/-) | 80 | 112 | 80 | P(p/P) | 112 | 112 | 80 | p(p/P) |
| 17 | 0 | 0 | ”(-/-) | 49 | 0 | 0 | 1(-/-) | 81 | 113 | 81 | Q(q/Q) | 113 | 113 | 81 | q(q/Q) |
| 18 | 0 | 0 | „(-/-) | 50 | 0 | 0 | 2(-/-) | 82 | 114 | 82 | R(r/R) | 114 | 114 | 82 | r(r/R) |
| 19 | 0 | 0 | «(-/-) | 51 | 0 | 0 | 3(-/-) | 83 | 115 | 83 | S(s/S) | 115 | 115 | 83 | s(s/S) |
| 20 | 0 | 0 | »(-/-) | 52 | 0 | 0 | 4(-/-) | 84 | 116 | 84 | T(t/T) | 116 | 116 | 84 | t(t/T) |
| 21 | 0 | 0 | -(-/-) | 53 | 0 | 0 | 5(-/-) | 85 | 117 | 85 | U(u/U) | 117 | 117 | 85 | u(u/U) |
| 22 | 0 | 0 | —(-/-) | 54 | 0 | 0 | 6(-/-) | 86 | 118 | 86 | V(v/V) | 118 | 118 | 86 | v(v/V) |
| 23 | 23 | 0 | (/-) | 55 | 0 | 0 | 7(-/-) | 87 | 119 | 87 | W(w/W) | 119 | 119 | 87 | w(w/W) |
| 24 | 0 | 0 | o(-/-) | 56 | 0 | 0 | 8(-/-) | 88 | 120 | 88 | X(x/X) | 120 | 120 | 88 | x(x/X) |
| 25 | 25 | 73 | ı(ı/I) | 57 | 0 | 0 | 9(-/-) | 89 | 121 | 89 | Y(y/Y) | 121 | 121 | 89 | y(y/Y) |
| 26 | 26 | 74 | ĵ(j/J) | 58 | 0 | 0 | :(-/-) | 90 | 122 | 90 | Z(z/Z) | 122 | 122 | 90 | z(z/Z) |
| 27 | 27 | 0 | ff(ff/-) | 59 | 0 | 0 | ;-(-/-) | 91 | 0 | 0 | [(-/-) | 123 | 0 | 0 | {(-/-) |
| 28 | 0 | 0 | fi(fi/-) | 60 | 0 | 0 | <(-/-) | 92 | 0 | 0 | \(-/-) | 124 | 0 | 0 | (-/-) |
| 29 | 0 | 0 | fl(fl/-) | 61 | 0 | 0 | =(-/-) | 93 | 0 | 0 |](-/-) | 125 | 0 | 0 | }(-/-) |
| 30 | 0 | 0 | ffi(ffi/-) | 62 | 0 | 0 | >(-/-) | 94 | 0 | 0 | ˆ(-/-) | 126 | 0 | 0 | ~(-/-) |
| 31 | 0 | 0 | ffl(ffl/-) | 63 | 0 | 0 | ?(-/-) | 95 | 0 | 0 | _(-/-) | 127 | 127 | 0 | -(-/-) |

| pos | lc | uc | glyphs | pos | lc | uc | glyphs | pos | lc | uc | glyphs | pos | lc | uc | glyphs |
|-----|-----|-----|-----------|-----|-----|-----|-----------|-----|-----|-----|--------|-----|-----|-----|--------|
| 128 | 160 | 128 | À(ǎ/ǎ) | 160 | 160 | 128 | ǎ(ǎ/ǎ) | 192 | 224 | 192 | À(à/À) | 224 | 224 | 192 | à(à/À) |
| 129 | 161 | 129 | Ā(ā/Ā) | 161 | 161 | 129 | ā(ā/Ā) | 193 | 225 | 193 | Á(á/Á) | 225 | 225 | 193 | á(á/Á) |
| 130 | 162 | 130 | Ć(ć/Ć) | 162 | 162 | 130 | ć(ć/Ć) | 194 | 226 | 194 | Â(â/Â) | 226 | 226 | 194 | â(â/Â) |
| 131 | 163 | 131 | Č(č/Č) | 163 | 163 | 131 | č(č/Č) | 195 | 227 | 195 | Ă(ă/Ă) | 227 | 227 | 195 | ă(ă/Ă) |
| 132 | 164 | 132 | Ď(d/Ď) | 164 | 164 | 132 | d(d/Ď) | 196 | 228 | 196 | Ä(ä/Ä) | 228 | 228 | 196 | ä(ä/Ä) |
| 133 | 165 | 133 | Ě(ě/Ě) | 165 | 165 | 133 | ě(ě/Ě) | 197 | 229 | 197 | Å(å/Å) | 229 | 229 | 197 | å(å/Å) |
| 134 | 166 | 134 | Ě(ę/Ě) | 166 | 166 | 134 | ę(ę/Ě) | 198 | 230 | 198 | Æ(æ/Æ) | 230 | 230 | 198 | æ(æ/Æ) |
| 135 | 167 | 135 | Ğ(ğ/Ğ) | 167 | 167 | 135 | ğ(ğ/Ğ) | 199 | 231 | 199 | Ç(ç/Ç) | 231 | 231 | 199 | ç(ç/Ç) |
| 136 | 168 | 136 | Í(í/Í) | 168 | 168 | 136 | í(í/Í) | 200 | 232 | 200 | È(è/È) | 232 | 232 | 200 | è(è/È) |
| 137 | 169 | 137 | Ĺ(ĺ/Ĺ) | 169 | 169 | 137 | ĺ(ĺ/Ĺ) | 201 | 233 | 201 | É(é/É) | 233 | 233 | 201 | é(é/É) |
| 138 | 170 | 138 | Ł(ł/Ł) | 170 | 170 | 138 | ł(ł/Ł) | 202 | 234 | 202 | Ê(ê/Ê) | 234 | 234 | 202 | ê(ê/Ê) |
| 139 | 171 | 139 | Ń(ń/Ń) | 171 | 171 | 139 | ń(ń/Ń) | 203 | 235 | 203 | Ë(ë/Ë) | 235 | 235 | 203 | ë(ë/Ë) |
| 140 | 172 | 140 | Ň(ň/Ň) | 172 | 172 | 140 | ň(ň/Ň) | 204 | 236 | 204 | Ï(ï/Ï) | 236 | 236 | 204 | ï(ï/Ï) |
| 141 | 173 | 141 | Đ(đ/Đ) | 173 | 173 | 141 | đ(đ/Đ) | 205 | 237 | 205 | Í(í/Í) | 237 | 237 | 205 | í(í/Í) |
| 142 | 174 | 142 | Ŏ(ö/Ŏ) | 174 | 174 | 142 | ö(ö/Ŏ) | 206 | 238 | 206 | Î(î/Î) | 238 | 238 | 206 | î(î/Î) |
| 143 | 175 | 143 | Ř(ř/Ř) | 175 | 175 | 143 | ř(ř/Ř) | 207 | 239 | 207 | Ï(ï/Ï) | 239 | 239 | 207 | ï(ï/Ï) |
| 144 | 176 | 144 | Ř(ř/Ř) | 176 | 176 | 144 | ř(ř/Ř) | 208 | 240 | 208 | Ð(ð/Ð) | 240 | 240 | 208 | ð(ð/Ð) |
| 145 | 177 | 145 | Ś(ś/Ś) | 177 | 177 | 145 | ś(ś/Ś) | 209 | 241 | 209 | Ń(ń/Ń) | 241 | 241 | 209 | ń(ń/Ń) |
| 146 | 178 | 146 | Š(š/Š) | 178 | 178 | 146 | š(š/Š) | 210 | 242 | 210 | Ò(ò/Ò) | 242 | 242 | 210 | ò(ò/Ò) |
| 147 | 179 | 147 | Ş(ş/Ş) | 179 | 179 | 147 | ş(ş/Ş) | 211 | 243 | 211 | Ó(ó/Ó) | 243 | 243 | 211 | ó(ó/Ó) |
| 148 | 180 | 148 | Ť(ť/Ť) | 180 | 180 | 148 | ť(ť/Ť) | 212 | 244 | 212 | Ô(ô/Ô) | 244 | 244 | 212 | ô(ô/Ô) |
| 149 | 181 | 149 | Ŧ(ŧ/Ŧ) | 181 | 181 | 149 | ŧ(ŧ/Ŧ) | 213 | 245 | 213 | Õ(õ/Õ) | 245 | 245 | 213 | õ(õ/Õ) |
| 150 | 182 | 150 | Ũ(ú/Ũ) | 182 | 182 | 150 | ú(ú/Ũ) | 214 | 246 | 214 | Ö(ö/Ö) | 246 | 246 | 214 | ö(ö/Ö) |
| 151 | 183 | 151 | Û(û/Û) | 183 | 183 | 151 | û(û/Û) | 215 | 247 | 215 | Œ(œ/Œ) | 247 | 247 | 215 | œ(œ/Œ) |
| 152 | 184 | 152 | ÿ(ÿ/ÿ) | 184 | 184 | 152 | ÿ(ÿ/ÿ) | 216 | 248 | 216 | Ø(ø/Ø) | 248 | 248 | 216 | ø(ø/Ø) |
| 153 | 185 | 153 | Ž(ž/Ž) | 185 | 185 | 153 | ž(ž/Ž) | 217 | 249 | 217 | Ù(ù/Ù) | 249 | 249 | 217 | ù(ù/Ù) |
| 154 | 186 | 154 | Ž(ž/Ž) | 186 | 186 | 154 | ž(ž/Ž) | 218 | 250 | 218 | Ú(ú/Ú) | 250 | 250 | 218 | ú(ú/Ú) |
| 155 | 187 | 155 | Ž(ž/Ž) | 187 | 187 | 155 | ž(ž/Ž) | 219 | 251 | 219 | Û(û/Û) | 251 | 251 | 219 | û(û/Û) |
| 156 | 188 | 156 | IJ(ij/IJ) | 188 | 188 | 156 | ij(ij/IJ) | 220 | 252 | 220 | Ü(ü/Ü) | 252 | 252 | 220 | ü(ü/Ü) |
| 157 | 105 | 157 | Í(i/Í) | 189 | 0 | 0 | ı(-/-) | 221 | 253 | 221 | Ý(ý/Ý) | 253 | 253 | 221 | ý(ý/Ý) |
| 158 | 158 | 208 | đ(đ/Đ) | 190 | 0 | 0 | ı(-/-) | 222 | 254 | 222 | Þ(þ/Þ) | 254 | 254 | 222 | þ(þ/Þ) |
| 159 | 0 | 0 | §(-/-) | 191 | 0 | 0 | £(-/-) | 223 | 255 | 223 | Š(š/Š) | 255 | 255 | 223 | š(š/Š) |