

The hamnosys package*

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1 Introduction

The Hamburg Notation System, HamNoSys for short, is a system for the phonetic transcription of signed languages. It was originally introduced in 1984 and the first public version followed in 1987 (Prillwitz et al., 1987; Prillwitz et al., 1989). The latest release of HamNoSys is version 4.1 (Schmaling and Hanke, 2001). For a brief introduction into the structure of HamNoSys see Hanke (2004).

The TeX package *hamnosys* enables the use of HamNoSys symbols in TeX documents. It provides three methods of entering HamNoSys symbols:

1. direct input of symbols as Unicode characters in the TeX file, just like one would enter regular characters (see Section 2).
2. using TeX commands that have been defined for each individual symbol (see Section 3),
3. listing names of symbols inside the command `\hamnosys` (see Section 4).

This document describes the technical requirements (Section 1.1), how to install the package (Section 1.2), how to use the TeX file (Section 1.3), the licence conditions of the package (Section 1.4), the three usage methods (Sections 2, 3 and 4), and provides an overview of all HamNoSys symbols (Section 5).

1.1 Requirements

This package requires the use of XeLaTeX or LuaLaTeX. It unfortunately does not work with regular LaTeX (i. e. the compilers `latex` and `pdfLatex`) as it needs to import an external unicode font.

1.2 Installation

The source code of the *hamnosys* package can be found in a git repository on the Github account of the DGS-Korpus project.¹ It is also archived via the research data repository of Universität Hamburg.²

As the *hamnosys* package is still in its test phase, it is not (yet) part of CTAN and is not listed in any TeX distribution. Therefore it has to be integrated manually into each LaTeX project. To do this you download the repository and copy the files `hamnosys.sty` and `HamNoSysUnicode.ttf` into the main directory of your LaTeX project.

To also be able to use HamNoSys elsewhere on your computer (see Section 2.3), it is recommended to install the font through your operating system as well. It is available online as part of the HamNoSys software package.³ In addition to the font file (Mac/Linux/Windows/Web), the archive also includes an application for writing HamNoSys via an input palette (Mac/Linux/Windows) and a HamNoSys keyboard layout (Mac only). The input palette is also available as a web interface⁴ and as part of the corpus software iLex⁵.

¹<https://github.com/DGS-Korpus/HamNoSys4TeX>

²TeX package *hamnosys* (latest version): <https://doi.org/10.25592/uhhfdm.9643>

³HamNoSys software package (latest version): <https://doi.org/10.25592/uhhfdm.9724>

⁴<https://www.sign-lang.uni-hamburg.de/hamnosys/input/>

⁵<https://www.sign-lang.uni-hamburg.de/illex/>

1.3 Usage

The package can be imported normally via `\usepackage{hamnosys}`. It has a single optional parameter, *autofont*, which automates switching to the HamNoSys font when entering HamNoSys symbols as Unicode characters. (siehe [Section 2.2](#)).

HamNoSys is displayed through the special font *HamNoSysUnicode*. To input HamNoSys symbols as regular Unicode characters in your document, you need to switch to this font by using the command `\texthamnosys{}` or the switch command `\hamnosysfont` (see [Section 2.1](#)).

Alternatively you can enter HamNoSys symbols via individual commands ([Section 3](#)) or enter their names inside the command `\hamnosys{}` ([Section 4](#)). For an overview of all HamNoSys symbols, their names and the commands with which they can be generated, see [Section 5](#).

1.4 Licence

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The HamNoSysUnicode 4.0 TrueType font may also be obtained under a [Creative Commons Attribution-ShareAlike 4.0 International](#) licence as part of the *HamNoSys software package* (see [Footnote 3](#)).

2 HamNoSys using character input

HamNoSys symbols can be entered directly into a TeX document like any other character. This allows you to copy-paste them from other programs or to enter them as direct input via HamNoSys keyboard layouts.

HamNoSys is displayed via a special font. You therefore need to either actively switch between regular fonts and the HamNoSys font ([Section 2.1](#)) or activate the package option *autofont* ([Section 2.2](#)).

2.1 Activating the HamNoSys font

`\texthamnosys`
`\hamnosysfont`

To explicitly tell LaTeX that content should be displayed using the HamNoSys font, you can use the command `\texthamnosys{}` or the switch command `\hamnosysfont`. These behave like e. g. the italics commands `\textit{}` and `\itshape` do, respectively.

You can use `\texthamnosys{\text{Hamburg}}` to sign Hamburg.

or

You can use `\hamnosysfont{\text{Hamburg}}` to sign Hamburg.

Output: You can use `\text{Hamburg}` to sign Hamburg.

⁶<https://www.latex-project.org/lppl.txt>

Warning: The HamNoSys font knows *only* HamNoSys symbols, but no other characters. Therefore you have to be careful to switch back to the regular font after using it. The easiest way to do so is to always put HamNoSys symbols inside the `\texthamnosys{}` command. If you use `\hamnosysfont`, it is best to limit its scope by using curly braces (see above). The following example shows display issues that follow from not limiting the scope of the font:

You can use `\hamnosysfont` $\overline{\varphi} \cdot \psi \cdot \rho \cdot \sigma \cdot (\tau \rightarrow \vartheta)$ to sign Hamburg.

Output: You can use $\overline{\varphi} \cdot \psi \cdot \rho \cdot \sigma \cdot (\tau \rightarrow \vartheta)$ ■ ■■■ ■■■■■■.

2.2 The package option *autofont*

An alternative to explicitly activating the HamNoSys font is the optional package parameter *autofont*, which activates automatic switching between regular and HamNoSys fonts. This makes the use of `\hamnosysfont` and `\texthamnosys{}` unnecessary in many cases. *autofont* is available in XeLaTeX, but not in LuaLaTeX.

An important limitation is that *autofont* only recognises those characters as HamNoSys symbols that are not also used in regular texts. It works for almost all HamNoSys symbols, except for those listed in [Section 5.11](#), which will be displayed using the regular document font unless you have activated the HamNoSys font explicitly. The following example shows such a case. Note that the curly braces and the vertical bar are displayed thinner in the regular font than in the HamNoSys font:

```
...
\usepackage[autofont]{hamnosys}
\begin{document}

Compare the braces and bar in
{\{|\}\}
with those in
\texthamnosys{\{|\}\}.

\end{document}
```

Output: Compare the braces and bar in $\{\mid\}$ with those in $\{\mid\}$.

The technical reason for this behaviour is that *autofont* takes advantage of the fact that almost all characters of the HamNoSys font are located in *Private Use Area* of Unicode. This is a group of characters that the Unicode Consortium intentionally provides no meanings for, reserving them instead for use by special use cases that are not covered by Unicode, such as HamNoSys. *autofont* uses the XeLaTeX package *ucharclasses* to define commands that automatically switch fonts for all characters in the *Private Use Area*. However, there is a small number of characters relevant to HamNoSys that are located in the regular areas of Unicode, e.g. the question mark and curly braces. As these lie outside of the *Private Use Area* *autofont* cannot detect that they are supposed to be part of HamNoSys.

Another limitation is that *autofont* will always format all characters in the *Private Use Area* with the HamNoSys font. In the special case where you are using yet another font that also makes use of the *Private Use Area* this could lead to conflicts. In such cases you should not use *autofont* and instead change fonts explicitly or use one of the other methods.

2.3 HamNoSys in the source document

If you would like to also correctly display HamNoSys symbols in your TeX source code (instead of as many identical rectangles) you need to make sure that the font *HamNoSysUnicode* is installed in your operating system (see [Section 1.2](#)). Should it not be possible to install fonts (e. g. in an online editor) or the editor you use still does not display the symbols, it might be preferable to use symbol commands or names instead (see [Sections 3](#) and [4](#)). It should be noted, however, that it does not matter for the final PDF output file whether the source code was readable in the editor. As long as the font was correctly activated (see [Section 2.1](#)) all symbols should be displayed, even if they looked like identical rectangles in the input.

3 HamNoSys using symbol commands

The *hamnosys* package defines individual commands for each HamNoSys symbol. This is an alternative ASCII-compatible input method for HamNoSys. A list of all symbol commands can be found in [Section 5](#).

You can use `\hamceeall\hamthumbopenmod\hamfingerstraightmod\hamextfingerul\hampalmdl\hamforehead\hamlrat\hamclose\hamparbegin\hammover\hamreplace\hampinchall\hamfingerstraightmod\hamparend{}` to sign Hamburg.

Output: You can use $\overline{\varphi}_{\text{r}\text{e}\text{a}\text{d}}^{(\text{t}\rightarrow\overline{\varphi})}$ to sign Hamburg.

As is usual for LaTeX you should make sure to close commands with `{}` where necessary to prevent the accidental consumption of the following character.

The names of the commands match the official names of the HamNoSys symbols as they are defined in the *HamNoSysUnicode* font. An exception are symbols whose names contain digits (see [Sections 5.1](#) and [5.10](#)). As digits are not allowed to be part of LaTeX commands, they are written out as English words instead. For example, the symbol \mathfrak{A} has the name *hamfinger2* and the command `\hamfingertwo`.

An advantage of symbol commands is that they are always displayed in the correct font. Explicitly switching fonts with the help of `\hamnosysfont` or `\texthamnosys{}` is not required.

4 HamNoSys using symbol names

`\hamnosys` The command `\hamnosys{}` allows you to input HamNoSys as a comma-separated sequence of symbol names. The symbol names can be taken from the lists in [Section 5](#) or copied from the web input palette (see [Section 1.2](#)).

You can use `\hamnosys{hamceeall,hamthumbopenmod,hamfingerstraightmod,hamextfingerul,hampalmdl,hamforehead,hamlrat,hamclose,hamparbegin,hammover,hamreplace,hampinchall,hamfingerstraightmod,hamparend}` to sign Hamburg.

Output: You can use $\overline{\varphi}_{\text{r}\text{e}\text{a}\text{d}}^{(\text{t}\rightarrow\overline{\varphi})}$ to sign Hamburg.

Unlike the symbol commands of [Section 3](#)), symbol names in `\hamnosys{}` may contain digits. In fact, both the name version with digits and the one with written out number words are accepted.

```
\hamnosys{hamfinger2}
```

or

```
\hamnosys{hamfingertwo}
```

Output: \lhd

Symbol names must be separated by commas. Whitespaces are allowed after the comma, but not required.

If a sequence contains an unknown term you will receive a compiler warning and the unknown term will be output as regular text. Unknown terms may be caused by typos, terms that are not part of the HamNoSys symbol name vocabulary, errors in comma separation or that a whitespace was entered **before** a comma. In the following example the symbol *hampalmdl* was accidentally spelled *hanpalmdl*:

```
\hamnosys{hamceeall,hamthumbopenmod,hamfingerstraightmod,hamextfingerul,
hanpalmdl,hamforehead,hamlrat,hamclose,hamparbegin,hammover,hamreplace
,hampinchall,hamfingerstraightmod,hamparend}
```

Output: $\overline{\varphi} \cdot \text{hanpalmdl} \cap \bullet \cdot ([\rightarrow \rightarrow \overline{\varphi}]$

5 List of HamNoSys symbols

The following tables provide an overview of all HamNoSys symbols. For each symbol they provide its name, which command produces it, the symbol itself, and the hexadecimal value that is used to represent it in Unicode. Modifiers are symbols that function as diacritics, combining with the preceding character.

5.1 Handshakes

Name	Command	Symbol	Hex
hamfist	<code>\hamfist</code>	○	E000
hamflathand	<code>\hamflathand</code>	◯	E001
hamfinger2	<code>\hamfingertwo</code>	㇏	E002
hamfinger23	<code>\hamfingertwothree</code>	㇏	E003
hamfinger23spread	<code>\hamfingertwothreespread</code>	㇏	E004
hamfinger2345	<code>\hamfingertwothreefourfive</code>	㇏	E005
hampinch12	<code>\hampinchonetwo</code>	◁	E006
hampinchall	<code>\hampinchall</code>	◁	E007
hampinch12open	<code>\hampinchonetwoopen</code>	▷	E008
hamcee12	<code>\hamceeonetwo</code>	▷	E009
hamceeall	<code>\hamceeall</code>	◁	E00A
hamceeopen	<code>\hamceeopen</code>	▷	E00B

5.2 Handshape modifiers

Name	Command	Symbol	Hex
hamthumboutmod	<code>\hamthumboutmod</code>	↗	E00C
hamthumbacrossmod	<code>\hamthumbacrossmod</code>	↘	E00D
hamthumbopenmod	<code>\hamthumbopenmod</code>	↖	E00E
hamfingerstraightmod	<code>\hamfingerstraightmod</code>	↖	E010
hamfingerbendmod	<code>\hamfingerbendmod</code>	↗	E011
hamfingerhookmod	<code>\hamfingerhookmod</code>	↖	E012
hamdoublebent	<code>\hamdoublebent</code>	↖	E013
hamdoublehooked	<code>\hamdoublehooked</code>	↖	E014

5.3 Extended finger directions

Name	Command	Symbol	Hex
hamextfingeru	<code>\hamextfingeru</code>	↖	E020
hamextfingerur	<code>\hamextfingerur</code>	↗	E021
hamextfingerr	<code>\hamextfingerr</code>	↘	E022
hamextfingerdr	<code>\hamextfingerdr</code>	↙	E023
hamextfingerd	<code>\hamextfingerd</code>	↘	E024

Name	Command	Symbol	Hex
hamextfingerdl	\hamextfingerdl	↳	E025
hamextfingerl	\hamextfingerl	◀	E026
hamextfingerul	\hamextfingerul	↖	E027
hamextfingerol	\hamextfingerol	↗	E028
hamextfingero	\hamextfingero	△	E029
hamextfingeror	\hamextfingeror	⌞	E02A
hamextfingeril	\hamextfingeril	⌞	E02B
hamextfingeri	\hamextfingeri	⌞	E02C
hamextfingerir	\hamextfingerir	⌞	E02D
hamextfingerui	\hamextfingerui	↖	E02E
hamextfingerdi	\hamextfingerdi	↖	E02F
hamextfingerdo	\hamextfingerdo	↖	E030
hamextfingeruo	\hamextfingeruo	↖	E031

5.4 Palm orientation

Name	Command	Symbol	Hex
hampalmu	\hampalmu	↶	E038
hampalmur	\hampalmur	↷	E039
hampalmr	\hampalmr	↶	E03A
hampalmdr	\hampalmdr	↷	E03B
hampalmd	\hampalmd	↶	E03C
hampalmdl	\hampalmdl	↷	E03D
hampalm	\hampalm	↶	E03E
hampalmul	\hampalmul	↷	E03F

5.5 Location

Name	Command	Symbol	Hex
hamhead	\hamhead	○	E040
hamheadtop	\hamheadtop	◯	E041
hamforehead	\hamforehead	∩	E042
hameyebrows	\hameyebrows	~	E043
hameyes	\hameyes	∞	E044
hamnose	\hamnose	⋈	E045
hamnostrils	\hamnostrils	⋈	E046
hamear	\hamear	∩	E047
hamearlobe	\hamearlobe	∩	E048
hamcheek	\hamcheek	∩	E049
hamlips	\hamlips	∩	E04A
hamtongue	\hamtongue	∩	E04B
hamteeth	\hamteeth	∩	E04C
hamchin	\hamchin	∩	E04D

Name	Command	Symbol	Hex
hamunderchin	\hamunderchin	ㄣ	E04E
hamneck	\hamneck	ㄤ	E04F
hamshouldertop	\hamshouldertop	ㄥ	E050
hamshoulders	\hamshoulders	ㄦ	E051
hamchest	\hamchest	ㄷ	E052
hamstomach	\hamstomach	ㄸ	E053
hambelowstomach	\hambelowstomach	ㄹ	E054
hamneutralspace	\hamneutralspace	ㄺ	E05F
hamupperarm	\hamupperarm	ㄻ	E060
hamelbow	\hamelbow	ㄼ	E061
hamelbowinside	\hamelbowinside	ㄽ	E062
hamlowerarm	\hamlowerarm	ㄾ	E063
hamwristback	\hamwristback	ㄿ	E064
hamwristpulse	\hamwristpulse	ㅀ	E065
hamthumbball	\hamthumbball	ㅁ	E066
hampalm	\hampalm	ㅂ	E067
hamhandback	\hamhandback	ㅃ	E068
hamthumbside	\hamthumbside	ㅄ	E069
hampinkyside	\hampinkyside	ㅅ	E06A
hamthumb	\hamthumb	ㅆ	E070
hamindexfinger	\hamindexfinger	ㅈ	E071
hammiddlefinger	\hammiddlefinger	ㅊ	E072
hamringfinger	\hamringfinger	ㅋ	E073
hampinky	\hampinky	ㅌ	E074
hamfingertip	\hamfingertip	ㅍ	E075
hamfingernail	\hamfingernail	ㅑ	E076
hamfingerpad	\hamfingerpad	ㅓ	E077
hamfingermidjoint	\hamfingermidjoint	ㅕ	E078
hamfingerbase	\hamfingerbase	ㅗ	E079
hamfingerside	\hamfingerside	ㅛ	E07A

5.6 Location modifiers

Name	Command	Symbol	Hex
hamlrbeside	\hamlrbeside	◦	E058
hamlrat	\hamlrat	▪	E059
hamcoreftag	\hamcoreftag	□	E05A
hamcorefref	\hamcorefref	○	E05B

5.7 Movement

Name	Command	Symbol	Hex
hammoveu	\hammoveu	↑	E080
hammoveur	\hammoveur	↗	E081
hammover	\hammover	→	E082
hammovedr	\hammovedr	↘	E083
hammoved	\hammoved	↓	E084
hammovedl	\hammovedl	↙	E085
hammove1	\hammove1	←	E086
hammoveul	\hammoveul	↖	E087
hammoveol	\hammoveol	↖	E088
hammoveo	\hammoveo	↕	E089
hammoveor	\hammoveor	↗	E08A
hammoveil	\hammoveil	↘	E08B
hammovei	\hammovei	↕	E08C
hammoveir	\hammoveir	↗	E08D
hammoveui	\hammoveui	↖	E08E
hammovedi	\hammovedi	↖	E08F
hammovedo	\hammovedo	↘	E090
hammoveuo	\hammoveuo	↗	E091
hamcircleo	\hamcircleo	⊙	E092
hamcirclei	\hamcirclei	⊖	E093
hamcircled	\hamcircled	⊙	E094
hamcircleu	\hamcircleu	⊖	E095
hamcirclel	\hamcirclel	⊙	E096
hamcircler	\hamcircler	⊖	E097
hamcircleul	\hamcircleul	⊙	E098
hamcircledr	\hamcircledr	⊖	E099
hamcircleur	\hamcircleur	⊙	E09A
hamcircledl	\hamcircledl	⊖	E09B
hamcircleol	\hamcircleol	⊙	E09C
hamcircleir	\hamcircleir	⊖	E09D
hamcircleor	\hamcircleor	⊙	E09E
hamcircleil	\hamcircleil	⊖	E09F
hamcircleui	\hamcircleui	⊙	E0A0
hamcircledo	\hamcircledo	⊖	E0A1
hamcircleuo	\hamcircleuo	⊙	E0A2

Name	Command	Symbol	Hex
hamcircledi	\hamcircledi	↻	E0A3
hamfingerplay	\hamfingerplay	✎	E0A4
hamnodding	\hamnodding	↔	E0A5
hamswinging	\hamswinging	↔	E0A6
hamtwisting	\hamtwisting	↻	E0A7
hamstircw	\hamstircw	↻	E0A8
hamstirccw	\hamstirccw	↻	E0A9
hamreplace	\hamreplace	↔	E0AA
hamnomotion	\hamnomotion	✂	E0AF
hamclocku	\hamclocku	○	E0B0
hamclockul	\hamclockul	○	E0B1
hamclockl	\hamclockl	○	E0B2
hamclockdl	\hamclockdl	○	E0B3
hamclockd	\hamclockd	○	E0B4
hamclockdr	\hamclockdr	○	E0B5
hamclockr	\hamclockr	○	E0B6
hamclockur	\hamclockur	○	E0B7
hamclockfull	\hamclockfull	⊕	E0B8
hamarcl	\hamarcl	⋈	E0B9
hamarcu	\hamarcu	⋈	E0BA
hamarcr	\hamarcr	⋈	E0BB
hamarcd	\hamarcd	⋈	E0BC
hamwavy	\hamwavy	~	E0BD
hamzigzag	\hamzigzag	~	E0BE
hamellipseh	\hamellipseh	⊖	E0C0
hamellipseur	\hamellipseur	⊖	E0C1
hamellipsev	\hamellipsev	⊖	E0C2
hamellipseul	\hamellipseul	⊖	E0C3
hamincreasing	\hamincreasing	↗	E0C4
hamdecreasing	\hamdecreasing	↘	E0C5
hamfast	\hamfast	*	E0C8
hamslow	\hamslow	—	E0C9
hamtense	\hamtense	✕	E0CA
hamrest	\hamrest	✕	E0CB
hamhalt	\hamhalt		E0CC
hamclose	\hamclose) (E0D0
hamtouch	\hamtouch	✕	E0D1
haminterlock	\haminterlock	⊗	E0D2
hamcross	\hamcross	✕	E0D3
hamarmextended	\hamarmextended	↗	E0D4
hambehind	\hambehind	↗	E0D5
hambrushing	\hambrushing	†	E0D6


5.8 Movement modifiers

Name	Command	Symbol	Hex
hamsmallmod	<code>\hamsmallmod</code>	\circ	E0C6
hamlargemod	<code>\hamlargemod</code>	\cdot	E0C7

5.9 Other symbols

Name	Command	Symbol	Hex
hamrepeatfromstart	<code>\hamrepeatfromstart</code>	$+$	E0D8
hamrepeatfromstartseveral	<code>\hamrepeatfromstartseveral</code>	$\#$	E0D9
hamrepeatcontinue	<code>\hamrepeatcontinue</code>	\rightarrow	E0DA
hamrepeatcontinueseveral	<code>\hamrepeatcontinueseveral</code>	$\# \rightarrow$	E0DB
hamrepeatreverse	<code>\hamrepeatreverse</code>	\leftarrow	E0DC
hamalternatingmotion	<code>\hamalternatingmotion</code>	\sim	E0DD
hamseqbegin	<code>\hamseqbegin</code>	$($	E0E0
hamseqend	<code>\hamseqend</code>	$)$	E0E1
hamparbegin	<code>\hamparbegin</code>	$[$	E0E2
hamparend	<code>\hamparend</code>	$]$	E0E3
hamfusionbegin	<code>\hamfusionbegin</code>	\langle	E0E4
hamfusionend	<code>\hamfusionend</code>	\rangle	E0E5
hambetween	<code>\hambetween</code>	\backslash	E0E6
hamplus	<code>\hamplus</code>	\neq	E0E7
hamsymmpar	<code>\hamsymmpar</code>	$:$	E0E8
hamsymmlr	<code>\hamsymmlr</code>	\cdot	E0E9
hamnondominant	<code>\hamnondominant</code>	$\not\subset$	E0EA
hamnonipsi	<code>\hamnonipsi</code>	\Re	E0EB
hametc	<code>\hametc</code>	\dots	E0EC
hamorirelative	<code>\hamorirelative</code>	\sim	E0ED
hammime	<code>\hammime</code>	\sqcup	E0F0

5.10 Version symbol

Name	Command	Symbol	Hex
hamversion40	<code>\hamversionfourzero</code>		E0F1







5.11 Regular Unicode characters

The following characters are not correctly recognised as HamNoSys symbols by *autofont* (see [Section 2.2](#)). If the HamNoSys font is not explicitly activated, these characters will instead be displayed using the regular document font. To compare these two possible output forms, they are contrasted in the columns *Symbol* (HamNoSys) and *Unicode* (normal).

Name	Command	Symbol	Unicode	Hex
hamspace	<code>\hamspace</code>			20
hamexclaim	<code>\hamexclaim</code>	!	!	21
hamcomma	<code>\hamcomma</code>	,	,	002C
hamfullstop	<code>\hamfullstop</code>	.	.	002E
hamquery	<code>\hamquery</code>	?	?	003F
hamaltbegin	<code>\hamaltbegin</code>	{	{	007B
hammetaalt	<code>\hammetaalt</code>			007C
hamaltend	<code>\hamaltend</code>	}	}	007D

5.12 Obsolete spacing symbols

The following symbols are marked as obsolete, but can still be found in the HamNoSys font.

Name	Command	Symbol	Hex
hamwristtopulse	<code>\hamwristtopulse</code>		E07C
hamwristtoback	<code>\hamwristtoback</code>		E07D
hamwristtothumb	<code>\hamwristtothumb</code>		E07E
hamwristtopinky	<code>\hamwristtopinky</code>		E07F
hammovecross	<code>\hammovecross</code>		E0AD
hammoveX	<code>\hammoveX</code>		E0AE

6 Implementation

6.1 Initialisation and Dependencies

Make sure the user uses Xe- oder LuaTeX.

```
1 \RequirePackage{iftex}
2 \ifXeTeX
3 \else
4 \ifLuaTeX
5 \else
6   \PackageError{hamnosys}{XeTeX or LuaTeX required}{The hamnosys package
7     requires either LuaTeX or XeTeX. You must change your typesetting engine
8     to, e.g., "xelatex" or "lualatex" instead of "latex" or "pdflatex".}
9 \fi
10 \fi
```

Additional package dependencies.

```
11 \RequirePackage{fontspec}
12 \RequirePackage{ifthen}
13 \RequirePackage{kvoptions}
```

Specify the *autofont* package option (see [Section 2.2](#)).

```
14 \SetupKeyvalOptions{family=hns, prefix=hns@}
15
16 \DeclareBoolOption{autofont}
17
18 \ProcessKeyvalOptions{hns}
```

6.2 HamNoSys font setup

`\hamnosysfont` Load the HamNoSys Unicode font family. This also declares the `\hamnosysfont` command for switching to the font (see [Section 2.1](#)).

```
19 \newfontfamily\hamnosysfont{HamNoSysUnicode}[
20   Extension = .ttf,
21   UprightFont = HamNoSysUnicode,
22 ]
```

`\texthamnosys` Declare font command `\texthamnosys` (see [Section 2.1](#)).

```
23 \newcommand{\texthamnosys}[1]{\hamnosysfont #1}
```

6.3 Automatic font switching

Implement the *autofont* package option (see [Section 2.2](#)). Use of this option adds the package *ucharclasses* as a dependency, which is only available for XeTeX.

```
24 \ifthenelse{\boolean{hns@autofont}}{%
25   \ifXeTeX
```

Only import *ucharclasses* if option is active to avoid unnecessary errors in LuaTeX.

```
26   \RequirePackage[Latin, PrivateUseArea]{ucharclasses}
27
```

Make it so that any characters in the *Private Use Area* of Unicode switch to the HamNoSys font and then back to the font setting they were at before. As any *Private Use Area* character will always do this, this is incompatible with using a second font that provides characters in the same Unicode area.

```

28 \setTransitionsFor{PrivateUseArea}%
29 {\let\curfamily\f@family\let\curshape\f@shape\let\curseries\f@series\hamnosysfont}
30 {\fontfamily{\curfamily}\fontshape{\curshape}\fontseries{\curseries}\selectfont}

```

If user is not using XeTeX, throw a warning.

```

31 \else
32 \PackageWarning{hamnosys}{Option autofont only available in XeTeX.}
33 \fi{}

```

6.4 HamNoSys symbol commands

Declare commands for individual HamNoSys symbols. See [Section 3](#) for a general discussion of how these are used and [Section 5](#) for a tabular representation of all symbols.

6.4.1 Handshapes

`\hamfist` Declare the symbol \circ (hamfist)

```
34 \DeclareTextCommand{\hamfist}{TU}{\texthamnosys{\char "E000}}
```

`\hamflathand` Declare the symbol \square (hamflathand)

```
35 \DeclareTextCommand{\hamflathand}{TU}{\texthamnosys{\char "E001}}
```

`\hamfingertwo` Declare the symbol \lrcorner (hamfinger2)

```
36 \DeclareTextCommand{\hamfingertwo}{TU}{\texthamnosys{\char "E002}}
```

`\hamfingertwothree` Declare the symbol \lrcorner (hamfinger23)

```
37 \DeclareTextCommand{\hamfingertwothree}{TU}{\texthamnosys{\char "E003}}
```

`\hamfingertwothreespread` Declare the symbol \lrcorner (hamfinger23spread)

```
38 \DeclareTextCommand{\hamfingertwothreespread}{TU}{\texthamnosys{\char "E004}}
```

`\hamfingertwothreefourfive` Declare the symbol \lrcorner (hamfinger2345)

```
39 \DeclareTextCommand{\hamfingertwothreefourfive}{TU}{\texthamnosys{\char "E005}}
```

`\hampinchonetwo` Declare the symbol \lrcorner (hampinch12)

```
40 \DeclareTextCommand{\hampinchonetwo}{TU}{\texthamnosys{\char "E006}}
```

`\hampinchall` Declare the symbol \lrcorner (hampinchall)

```
41 \DeclareTextCommand{\hampinchall}{TU}{\texthamnosys{\char "E007}}
```

`\hampinchonetwoopen` Declare the symbol \lrcorner (hampinch12open)

```
42 \DeclareTextCommand{\hampinchonetwoopen}{TU}{\texthamnosys{\char "E008}}
```

`\hamceeonetwo` Declare the symbol \supset (hamcee12)

```
43 \DeclareTextCommand{\hamceeonetwo}{TU}{\texthamnosys{\char "E009}}
```

`\hamceeall` Declare the symbol \supset (hamceeall)

```
44 \DeclareTextCommand{\hamceeall}{TU}{\texthamnosys{\char "E00A}}
```

`\hamceeopen` Declare the symbol \supset (hamceeopen)

```
45 \DeclareTextCommand{\hamceeopen}{TU}{\texthamnosys{\char "E00B}}
```

6.4.2 Handshape modifiers

<code>\hamthumboutmod</code>	Declare the symbol \swarrow (hamthumboutmod) 46 <code>\DeclareTextCommand{\hamthumboutmod}{TU}{\texthamnosys{\char "E00C}}</code>
<code>\hamthumbacrossmod</code>	Declare the symbol \sim (hamthumbacrossmod) 47 <code>\DeclareTextCommand{\hamthumbacrossmod}{TU}{\texthamnosys{\char "E00D}}</code>
<code>\hamthumbopenmod</code>	Declare the symbol \searrow (hamthumbopenmod) 48 <code>\DeclareTextCommand{\hamthumbopenmod}{TU}{\texthamnosys{\char "E00E}}</code>
<code>\hamfingerstraightmod</code>	Declare the symbol \neg (hamfingerstraightmod) 49 <code>\DeclareTextCommand{\hamfingerstraightmod}{TU}{\texthamnosys{\char "E010}}</code>
<code>\hamfingerbendmod</code>	Declare the symbol \wedge (hamfingerbendmod) 50 <code>\DeclareTextCommand{\hamfingerbendmod}{TU}{\texthamnosys{\char "E011}}</code>
<code>\hamfingerhookmod</code>	Declare the symbol \lrcorner (hamfingerhookmod) 51 <code>\DeclareTextCommand{\hamfingerhookmod}{TU}{\texthamnosys{\char "E012}}</code>
<code>\hamdoublebent</code>	Declare the symbol $\hat{\sim}$ (hamdoublebent) 52 <code>\DeclareTextCommand{\hamdoublebent}{TU}{\texthamnosys{\char "E013}}</code>
<code>\hamdoublehooked</code>	Declare the symbol $\sim\smile$ (hamdoublehooked) 53 <code>\DeclareTextCommand{\hamdoublehooked}{TU}{\texthamnosys{\char "E014}}</code>

6.4.3 Extended finger directions

<code>\hamextfingeru</code>	Declare the symbol \nearrow (hamextfingeru) 54 <code>\DeclareTextCommand{\hamextfingeru}{TU}{\texthamnosys{\char "E020}}</code>
<code>\hamextfingerur</code>	Declare the symbol \nearrow (hamextfingerur) 55 <code>\DeclareTextCommand{\hamextfingerur}{TU}{\texthamnosys{\char "E021}}</code>
<code>\hamextfingerr</code>	Declare the symbol \searrow (hamextfingerr) 56 <code>\DeclareTextCommand{\hamextfingerr}{TU}{\texthamnosys{\char "E022}}</code>
<code>\hamextfingerdr</code>	Declare the symbol \searrow (hamextfingerdr) 57 <code>\DeclareTextCommand{\hamextfingerdr}{TU}{\texthamnosys{\char "E023}}</code>
<code>\hamextfingerd</code>	Declare the symbol \swarrow (hamextfingerd) 58 <code>\DeclareTextCommand{\hamextfingerd}{TU}{\texthamnosys{\char "E024}}</code>
<code>\hamextfingerdl</code>	Declare the symbol \swarrow (hamextfingerdl) 59 <code>\DeclareTextCommand{\hamextfingerdl}{TU}{\texthamnosys{\char "E025}}</code>
<code>\hamextfingerl</code>	Declare the symbol \swarrow (hamextfingerl) 60 <code>\DeclareTextCommand{\hamextfingerl}{TU}{\texthamnosys{\char "E026}}</code>
<code>\hamextfingerul</code>	Declare the symbol \swarrow (hamextfingerul) 61 <code>\DeclareTextCommand{\hamextfingerul}{TU}{\texthamnosys{\char "E027}}</code>

`\hamextfingerol` Declare the symbol \perp (hamextfingerol)
62 `\DeclareTextCommand{\hamextfingerol}{TU}{\texthamnosys{\char "E028}}`

`\hamextfingero` Declare the symbol \triangleleft (hamextfingero)
63 `\DeclareTextCommand{\hamextfingero}{TU}{\texthamnosys{\char "E029}}`

`\hamextfingeror` Declare the symbol \lrcorner (hamextfingeror)
64 `\DeclareTextCommand{\hamextfingeror}{TU}{\texthamnosys{\char "E02A}}`

`\hamextfingeril` Declare the symbol \lshch (hamextfingeril)
65 `\DeclareTextCommand{\hamextfingeril}{TU}{\texthamnosys{\char "E02B}}`

`\hamextfingeri` Declare the symbol \rtimes (hamextfingeri)
66 `\DeclareTextCommand{\hamextfingeri}{TU}{\texthamnosys{\char "E02C}}`

`\hamextfingerir` Declare the symbol \dashv (hamextfingerir)
67 `\DeclareTextCommand{\hamextfingerir}{TU}{\texthamnosys{\char "E02D}}`

`\hamextfingerui` Declare the symbol \rhd (hamextfingerui)
68 `\DeclareTextCommand{\hamextfingerui}{TU}{\texthamnosys{\char "E02E}}`

`\hamextfingerdi` Declare the symbol \ltimes (hamextfingerdi)
69 `\DeclareTextCommand{\hamextfingerdi}{TU}{\texthamnosys{\char "E02F}}`

`\hamextfingerdo` Declare the symbol \lhd (hamextfingerdo)
70 `\DeclareTextCommand{\hamextfingerdo}{TU}{\texthamnosys{\char "E030}}`

`\hamextfingeruo` Declare the symbol \lhd (hamextfingeruo)
71 `\DeclareTextCommand{\hamextfingeruo}{TU}{\texthamnosys{\char "E031}}`

6.4.4 Palm orientation

`\hampalmu` Declare the symbol \circlearrowleft (hampalmu)
72 `\DeclareTextCommand{\hampalmu}{TU}{\texthamnosys{\char "E038}}`

`\hampalmur` Declare the symbol \circlearrowright (hampalmur)
73 `\DeclareTextCommand{\hampalmur}{TU}{\texthamnosys{\char "E039}}`

`\hampalmr` Declare the symbol \circ (hampalmr)
74 `\DeclareTextCommand{\hampalmr}{TU}{\texthamnosys{\char "E03A}}`

`\hampalmdr` Declare the symbol \circ (hampalmdr)
75 `\DeclareTextCommand{\hampalmdr}{TU}{\texthamnosys{\char "E03B}}`

`\hampalmd` Declare the symbol \ominus (hampalmd)
76 `\DeclareTextCommand{\hampalmd}{TU}{\texthamnosys{\char "E03C}}`

`\hampalmdl` Declare the symbol \oslash (hampalmdl)
77 `\DeclareTextCommand{\hampalmdl}{TU}{\texthamnosys{\char "E03D}}`

`\hampalm1` Declare the symbol \oplus (hampalm1)
78 `\DeclareTextCommand{\hampalm1}{TU}{\texthamnosys{\char "E03E}}`

`\hampalmul` Declare the symbol \otimes (hampalmul)
79 `\DeclareTextCommand{\hampalmul}{TU}{\texthamnosys{\char "E03F}}`

6.4.5 Location

<code>\hamhead</code>	Declare the symbol \circ (hamhead) 80 <code>\DeclareTextCommand{\hamhead}{TU}{\texthamnosys{\char "E040}}</code>
<code>\hamheadtop</code>	Declare the symbol \oslash (hamheadtop) 81 <code>\DeclareTextCommand{\hamheadtop}{TU}{\texthamnosys{\char "E041}}</code>
<code>\hamforehead</code>	Declare the symbol \cap (hamforehead) 82 <code>\DeclareTextCommand{\hamforehead}{TU}{\texthamnosys{\char "E042}}</code>
<code>\hameyebrows</code>	Declare the symbol \sim (hameyebrows) 83 <code>\DeclareTextCommand{\hameyebrows}{TU}{\texthamnosys{\char "E043}}</code>
<code>\hameyes</code>	Declare the symbol ∞ (hameyes) 84 <code>\DeclareTextCommand{\hameyes}{TU}{\texthamnosys{\char "E044}}</code>
<code>\hamnose</code>	Declare the symbol \pitchfork (hamnose) 85 <code>\DeclareTextCommand{\hamnose}{TU}{\texthamnosys{\char "E045}}</code>
<code>\hamnostrils</code>	Declare the symbol \pitchfork (hamnostrils) 86 <code>\DeclareTextCommand{\hamnostrils}{TU}{\texthamnosys{\char "E046}}</code>
<code>\hamear</code>	Declare the symbol \oslash (hamear) 87 <code>\DeclareTextCommand{\hamear}{TU}{\texthamnosys{\char "E047}}</code>
<code>\hamearlobe</code>	Declare the symbol \oslash (hamearlobe) 88 <code>\DeclareTextCommand{\hamearlobe}{TU}{\texthamnosys{\char "E048}}</code>
<code>\hamcheek</code>	Declare the symbol \oslash (hamcheek) 89 <code>\DeclareTextCommand{\hamcheek}{TU}{\texthamnosys{\char "E049}}</code>
<code>\hamlips</code>	Declare the symbol \oslash (hamlips) 90 <code>\DeclareTextCommand{\hamlips}{TU}{\texthamnosys{\char "E04A}}</code>
<code>\hamtongue</code>	Declare the symbol \oslash (hamtongue) 91 <code>\DeclareTextCommand{\hamtongue}{TU}{\texthamnosys{\char "E04B}}</code>
<code>\hamteeth</code>	Declare the symbol \oslash (hamteeth) 92 <code>\DeclareTextCommand{\hamteeth}{TU}{\texthamnosys{\char "E04C}}</code>
<code>\hamchin</code>	Declare the symbol \oslash (hamchin) 93 <code>\DeclareTextCommand{\hamchin}{TU}{\texthamnosys{\char "E04D}}</code>
<code>\hamunderchin</code>	Declare the symbol \oslash (hamunderchin) 94 <code>\DeclareTextCommand{\hamunderchin}{TU}{\texthamnosys{\char "E04E}}</code>
<code>\hamneck</code>	Declare the symbol \oslash (hamneck) 95 <code>\DeclareTextCommand{\hamneck}{TU}{\texthamnosys{\char "E04F}}</code>
<code>\hamshouldertop</code>	Declare the symbol \oslash (hamshouldertop) 96 <code>\DeclareTextCommand{\hamshouldertop}{TU}{\texthamnosys{\char "E050}}</code>

`\hamshoulders` Declare the symbol \sqsupset (hamshoulders)
97 `\DeclareTextCommand{\hamshoulders}{TU}{\texthamnosys{\char "E051}}`

`\hamchest` Declare the symbol \sqsupseteq (hamchest)
98 `\DeclareTextCommand{\hamchest}{TU}{\texthamnosys{\char "E052}}`

`\hamstomach` Declare the symbol \sqsubset (hamstomach)
99 `\DeclareTextCommand{\hamstomach}{TU}{\texthamnosys{\char "E053}}`

`\hambelowstomach` Declare the symbol \sqsubseteq (hambelowstomach)
100 `\DeclareTextCommand{\hambelowstomach}{TU}{\texthamnosys{\char "E054}}`

`\hamneutralspace` Declare the symbol \emptyset (hamneutralspace)
101 `\DeclareTextCommand{\hamneutralspace}{TU}{\texthamnosys{\char "E05F}}`

`\hamupperarm` Declare the symbol \lrcorner (hamupperarm)
102 `\DeclareTextCommand{\hamupperarm}{TU}{\texthamnosys{\char "E060}}`

`\hamelbow` Declare the symbol \llcorner (hamelbow)
103 `\DeclareTextCommand{\hamelbow}{TU}{\texthamnosys{\char "E061}}`

`\hamelbowinside` Declare the symbol \lrcorner (hamelbowinside)
104 `\DeclareTextCommand{\hamelbowinside}{TU}{\texthamnosys{\char "E062}}`

`\hamlowerarm` Declare the symbol \lrcorner (hamlowerarm)
105 `\DeclareTextCommand{\hamlowerarm}{TU}{\texthamnosys{\char "E063}}`

`\hamwristback` Declare the symbol \lrcorner (hamwristback)
106 `\DeclareTextCommand{\hamwristback}{TU}{\texthamnosys{\char "E064}}`

`\hamwristpulse` Declare the symbol \lrcorner (hamwristpulse)
107 `\DeclareTextCommand{\hamwristpulse}{TU}{\texthamnosys{\char "E065}}`

`\hamthumbball` Declare the symbol \lrcorner (hamthumbball)
108 `\DeclareTextCommand{\hamthumbball}{TU}{\texthamnosys{\char "E066}}`

`\hampalm` Declare the symbol \lrcorner (hampalm)
109 `\DeclareTextCommand{\hampalm}{TU}{\texthamnosys{\char "E067}}`

`\hamhandback` Declare the symbol \lrcorner (hamhandback)
110 `\DeclareTextCommand{\hamhandback}{TU}{\texthamnosys{\char "E068}}`

`\hamthumbside` Declare the symbol \lrcorner (hamthumbside)
111 `\DeclareTextCommand{\hamthumbside}{TU}{\texthamnosys{\char "E069}}`

`\hampinkyside` Declare the symbol \lrcorner (hampinkyside)
112 `\DeclareTextCommand{\hampinkyside}{TU}{\texthamnosys{\char "E06A}}`

`\hamthumb` Declare the symbol \lrcorner (hamthumb)
113 `\DeclareTextCommand{\hamthumb}{TU}{\texthamnosys{\char "E070}}`

`\hamindexfinger` Declare the symbol $\textcircled{2}$ (hamindexfinger)
114 `\DeclareTextCommand{\hamindexfinger}{TU}{\textthamosys{\char "E071}}`

`\hammiddlefinger` Declare the symbol $\textcircled{3}$ (hammiddlefinger)
115 `\DeclareTextCommand{\hammiddlefinger}{TU}{\textthamosys{\char "E072}}`

`\hamringfinger` Declare the symbol $\textcircled{4}$ (hamringfinger)
116 `\DeclareTextCommand{\hamringfinger}{TU}{\textthamosys{\char "E073}}`

`\hampinky` Declare the symbol $\textcircled{5}$ (hampinky)
117 `\DeclareTextCommand{\hampinky}{TU}{\textthamosys{\char "E074}}`

`\hamfingertip` Declare the symbol $\textcircled{\textcircled{1}}$ (hamfingertip)
118 `\DeclareTextCommand{\hamfingertip}{TU}{\textthamosys{\char "E075}}`

`\hamfingernail` Declare the symbol $\textcircled{\textcircled{2}}$ (hamfingernail)
119 `\DeclareTextCommand{\hamfingernail}{TU}{\textthamosys{\char "E076}}`

`\hamfingerpad` Declare the symbol $\textcircled{\textcircled{3}}$ (hamfingerpad)
120 `\DeclareTextCommand{\hamfingerpad}{TU}{\textthamosys{\char "E077}}`

`\hamfingermidjoint` Declare the symbol $\textcircled{\textcircled{4}}$ (hamfingermidjoint)
121 `\DeclareTextCommand{\hamfingermidjoint}{TU}{\textthamosys{\char "E078}}`

`\hamfingerbase` Declare the symbol $\textcircled{\textcircled{5}}$ (hamfingerbase)
122 `\DeclareTextCommand{\hamfingerbase}{TU}{\textthamosys{\char "E079}}`

`\hamfingerside` Declare the symbol $\textcircled{\textcircled{6}}$ (hamfingerside)
123 `\DeclareTextCommand{\hamfingerside}{TU}{\textthamosys{\char "E07A}}`

6.4.6 Location modifiers

`\hamlrbeside` Declare the symbol \circ (hamlrbeside)
124 `\DeclareTextCommand{\hamlrbeside}{TU}{\textthamosys{\char "E058}}`

`\hamlrat` Declare the symbol \bullet (hamlrat)
125 `\DeclareTextCommand{\hamlrat}{TU}{\textthamosys{\char "E059}}`

`\hamcoreftag` Declare the symbol \square (hamcoreftag)
126 `\DeclareTextCommand{\hamcoreftag}{TU}{\textthamosys{\char "E05A}}`

`\hamcorefref` Declare the symbol \circ (hamcorefref)
127 `\DeclareTextCommand{\hamcorefref}{TU}{\textthamosys{\char "E05B}}`

6.4.7 Movement

`\hammoveu` Declare the symbol \uparrow (hammoveu)
128 `\DeclareTextCommand{\hammoveu}{TU}{\texthamnosys{\char "E080}}`

`\hammoveur` Declare the symbol \nearrow (hammoveur)
129 `\DeclareTextCommand{\hammoveur}{TU}{\texthamnosys{\char "E081}}`

`\hammover` Declare the symbol \rightarrow (hammover)
130 `\DeclareTextCommand{\hammover}{TU}{\texthamnosys{\char "E082}}`

`\hammovedr` Declare the symbol \searrow (hammovedr)
131 `\DeclareTextCommand{\hammovedr}{TU}{\texthamnosys{\char "E083}}`

`\hammoved` Declare the symbol \downarrow (hammoved)
132 `\DeclareTextCommand{\hammoved}{TU}{\texthamnosys{\char "E084}}`

`\hammovedl` Declare the symbol \swarrow (hammovedl)
133 `\DeclareTextCommand{\hammovedl}{TU}{\texthamnosys{\char "E085}}`

`\hammoveul` Declare the symbol \nwarrow (hammoveul)
134 `\DeclareTextCommand{\hammoveul}{TU}{\texthamnosys{\char "E086}}`

`\hammoveul` Declare the symbol \nwarrow (hammoveul)
135 `\DeclareTextCommand{\hammoveul}{TU}{\texthamnosys{\char "E087}}`

`\hammoveol` Declare the symbol \nearrow (hammoveol)
136 `\DeclareTextCommand{\hammoveol}{TU}{\texthamnosys{\char "E088}}`

`\hammoveo` Declare the symbol \pm (hammoveo)
137 `\DeclareTextCommand{\hammoveo}{TU}{\texthamnosys{\char "E089}}`

`\hammoveor` Declare the symbol \nearrow (hammoveor)
138 `\DeclareTextCommand{\hammoveor}{TU}{\texthamnosys{\char "E08A}}`

`\hammoveil` Declare the symbol \nwarrow (hammoveil)
139 `\DeclareTextCommand{\hammoveil}{TU}{\texthamnosys{\char "E08B}}`

`\hammovei` Declare the symbol \pm (hammovei)
140 `\DeclareTextCommand{\hammovei}{TU}{\texthamnosys{\char "E08C}}`

`\hammoveir` Declare the symbol \nearrow (hammoveir)
141 `\DeclareTextCommand{\hammoveir}{TU}{\texthamnosys{\char "E08D}}`

`\hammoveui` Declare the symbol \nwarrow (hammoveui)
142 `\DeclareTextCommand{\hammoveui}{TU}{\texthamnosys{\char "E08E}}`

`\hammovedi` Declare the symbol \nwarrow (hammovedi)
143 `\DeclareTextCommand{\hammovedi}{TU}{\texthamnosys{\char "E08F}}`

`\hammovedo` Declare the symbol \nwarrow (hammovedo)
144 `\DeclareTextCommand{\hammovedo}{TU}{\texthamnosys{\char "E090}}`

`\hammoveuo` Declare the symbol \curvearrowright (hammoveuo)
145 `\DeclareTextCommand{\hammoveuo}{TU}{\texthamnosys{\char "E091}}`

`\hamcircleo` Declare the symbol \oslash (hamcircleo)
146 `\DeclareTextCommand{\hamcircleo}{TU}{\texthamnosys{\char "E092}}`

`\hamcirclei` Declare the symbol \oslash (hamcirclei)
147 `\DeclareTextCommand{\hamcirclei}{TU}{\texthamnosys{\char "E093}}`

`\hamcircled` Declare the symbol \oslash (hamcircled)
148 `\DeclareTextCommand{\hamcircled}{TU}{\texthamnosys{\char "E094}}`

`\hamcircleu` Declare the symbol \oslash (hamcircleu)
149 `\DeclareTextCommand{\hamcircleu}{TU}{\texthamnosys{\char "E095}}`

`\hamcirclel` Declare the symbol \oslash (hamcirclel)
150 `\DeclareTextCommand{\hamcirclel}{TU}{\texthamnosys{\char "E096}}`

`\hamcircler` Declare the symbol \oslash (hamcircler)
151 `\DeclareTextCommand{\hamcircler}{TU}{\texthamnosys{\char "E097}}`

`\hamcircleul` Declare the symbol \oslash (hamcircleul)
152 `\DeclareTextCommand{\hamcircleul}{TU}{\texthamnosys{\char "E098}}`

`\hamcircledr` Declare the symbol \oslash (hamcircledr)
153 `\DeclareTextCommand{\hamcircledr}{TU}{\texthamnosys{\char "E099}}`

`\hamcircleur` Declare the symbol \oslash (hamcircleur)
154 `\DeclareTextCommand{\hamcircleur}{TU}{\texthamnosys{\char "E09A}}`

`\hamcircledl` Declare the symbol \oslash (hamcircledl)
155 `\DeclareTextCommand{\hamcircledl}{TU}{\texthamnosys{\char "E09B}}`

`\hamcircleol` Declare the symbol \oslash (hamcircleol)
156 `\DeclareTextCommand{\hamcircleol}{TU}{\texthamnosys{\char "E09C}}`

`\hamcircleir` Declare the symbol \oslash (hamcircleir)
157 `\DeclareTextCommand{\hamcircleir}{TU}{\texthamnosys{\char "E09D}}`

`\hamcircleur` Declare the symbol \oslash (hamcircleur)
158 `\DeclareTextCommand{\hamcircleur}{TU}{\texthamnosys{\char "E09E}}`

`\hamcircleil` Declare the symbol \oslash (hamcircleil)
159 `\DeclareTextCommand{\hamcircleil}{TU}{\texthamnosys{\char "E09F}}`

`\hamcircleui` Declare the symbol \oslash (hamcircleui)
160 `\DeclareTextCommand{\hamcircleui}{TU}{\texthamnosys{\char "E0A0}}`

`\hamcircledo` Declare the symbol \oslash (hamcircledo)
161 `\DeclareTextCommand{\hamcircledo}{TU}{\texthamnosys{\char "E0A1}}`

`\hamcircleuo` Declare the symbol \circlearrowright (hamcircleuo)
162 `\DeclareTextCommand{\hamcircleuo}{TU}{\textthamnosys{\char "E0A2}}`

`\hamcircledi` Declare the symbol \circlearrowleft (hamcircledi)
163 `\DeclareTextCommand{\hamcircledi}{TU}{\textthamnosys{\char "E0A3}}`

`\hamfingerplay` Declare the symbol \blacklozenge (hamfingerplay)
164 `\DeclareTextCommand{\hamfingerplay}{TU}{\textthamnosys{\char "E0A4}}`

`\hamnodding` Declare the symbol \blacktriangleleft (hamnodding)
165 `\DeclareTextCommand{\hamnodding}{TU}{\textthamnosys{\char "E0A5}}`

`\hamswinging` Declare the symbol \blacktriangleright (hamswinging)
166 `\DeclareTextCommand{\hamswinging}{TU}{\textthamnosys{\char "E0A6}}`

`\hamtwisting` Declare the symbol \blacktriangledown (hamtwisting)
167 `\DeclareTextCommand{\hamtwisting}{TU}{\textthamnosys{\char "E0A7}}`

`\hamstircw` Declare the symbol \curvearrowright (hamstircw)
168 `\DeclareTextCommand{\hamstircw}{TU}{\textthamnosys{\char "E0A8}}`

`\hamstirccw` Declare the symbol \curvearrowleft (hamstirccw)
169 `\DeclareTextCommand{\hamstirccw}{TU}{\textthamnosys{\char "E0A9}}`

`\hamreplace` Declare the symbol \rightharpoonup (hamreplace)
170 `\DeclareTextCommand{\hamreplace}{TU}{\textthamnosys{\char "E0AA}}`

`\hamnomotion` Declare the symbol \otimes (hamnomotion)
171 `\DeclareTextCommand{\hamnomotion}{TU}{\textthamnosys{\char "E0AF}}`

`\hamclocku` Declare the symbol \circlearrowup (hamclocku)
172 `\DeclareTextCommand{\hamclocku}{TU}{\textthamnosys{\char "E0B0}}`

`\hamclockul` Declare the symbol \circlearrowupl (hamclockul)
173 `\DeclareTextCommand{\hamclockul}{TU}{\textthamnosys{\char "E0B1}}`

`\hamclockl` Declare the symbol \circlearrowleftl (hamclockl)
174 `\DeclareTextCommand{\hamclockl}{TU}{\textthamnosys{\char "E0B2}}`

`\hamclockdl` Declare the symbol \circlearrowleftl (hamclockdl)
175 `\DeclareTextCommand{\hamclockdl}{TU}{\textthamnosys{\char "E0B3}}`

`\hamclockd` Declare the symbol \circlearrowleft (hamclockd)
176 `\DeclareTextCommand{\hamclockd}{TU}{\textthamnosys{\char "E0B4}}`

`\hamclockdr` Declare the symbol \circlearrowleft (hamclockdr)
177 `\DeclareTextCommand{\hamclockdr}{TU}{\textthamnosys{\char "E0B5}}`

`\hamclockr` Declare the symbol \circlearrowright (hamclockr)
178 `\DeclareTextCommand{\hamclockr}{TU}{\textthamnosys{\char "E0B6}}`

`\hamclockur` Declare the symbol \circ (hamclockur)
179 `\DeclareTextCommand{\hamclockur}{TU}{\textthamosys{\char "E0B7}}`

`\hamclockfull` Declare the symbol \oplus (hamclockfull)
180 `\DeclareTextCommand{\hamclockfull}{TU}{\textthamosys{\char "E0B8}}`

`\hamarcl` Declare the symbol $\textcircled{\circ}$ (hamarcl)
181 `\DeclareTextCommand{\hamarcl}{TU}{\textthamosys{\char "E0B9}}`

`\hamarcu` Declare the symbol $\textcircled{\cup}$ (hamarcu)
182 `\DeclareTextCommand{\hamarcu}{TU}{\textthamosys{\char "E0BA}}`

`\hamarcr` Declare the symbol $\textcircled{\succ}$ (hamarcr)
183 `\DeclareTextCommand{\hamarcr}{TU}{\textthamosys{\char "E0BB}}`

`\hamarcd` Declare the symbol $\textcircled{\smile}$ (hamarcd)
184 `\DeclareTextCommand{\hamarcd}{TU}{\textthamosys{\char "E0BC}}`

`\hamwavy` Declare the symbol \sim (hamwavy)
185 `\DeclareTextCommand{\hamwavy}{TU}{\textthamosys{\char "E0BD}}`

`\hamzigzag` Declare the symbol \approx (hamzigzag)
186 `\DeclareTextCommand{\hamzigzag}{TU}{\textthamosys{\char "E0BE}}`

`\hamellipseh` Declare the symbol \ominus (hamellipseh)
187 `\DeclareTextCommand{\hamellipseh}{TU}{\textthamosys{\char "E0C0}}`

`\hamellipseur` Declare the symbol \oslash (hamellipseur)
188 `\DeclareTextCommand{\hamellipseur}{TU}{\textthamosys{\char "E0C1}}`

`\hamellipsev` Declare the symbol \otimes (hamellipsev)
189 `\DeclareTextCommand{\hamellipsev}{TU}{\textthamosys{\char "E0C2}}`

`\hamellipseul` Declare the symbol \oslash (hamellipseul)
190 `\DeclareTextCommand{\hamellipseul}{TU}{\textthamosys{\char "E0C3}}`

`\hamincreasing` Declare the symbol \lessdot (hamincreasing)
191 `\DeclareTextCommand{\hamincreasing}{TU}{\textthamosys{\char "E0C4}}`

`\hamdecreasing` Declare the symbol \gtrdot (hamdecreasing)
192 `\DeclareTextCommand{\hamdecreasing}{TU}{\textthamosys{\char "E0C5}}`

`\hamfast` Declare the symbol \ast (hamfast)
193 `\DeclareTextCommand{\hamfast}{TU}{\textthamosys{\char "E0C8}}`

`\hamslow` Declare the symbol -- (hamslow)
194 `\DeclareTextCommand{\hamslow}{TU}{\textthamosys{\char "E0C9}}`

`\hamtense` Declare the symbol \texttimes (hamtense)
195 `\DeclareTextCommand{\hamtense}{TU}{\textthamosys{\char "E0CA}}`

`\hamrest` Declare the symbol ̣ (hamrest)
196 `\DeclareTextCommand{\hamrest}{TU}{\textthamosys{\char "E0CB}}`

`\hamhalt` Declare the symbol ̤ (hamhalt)
197 `\DeclareTextCommand{\hamhalt}{TU}{\textthamosys{\char "E0CC}}`

`\hamclose` Declare the symbol ̥ (hamclose)
198 `\DeclareTextCommand{\hamclose}{TU}{\textthamosys{\char "E0D0}}`

`\hamtouch` Declare the symbol ̦ (hamtouch)
199 `\DeclareTextCommand{\hamtouch}{TU}{\textthamosys{\char "E0D1}}`

`\haminterlock` Declare the symbol ̧ (haminterlock)
200 `\DeclareTextCommand{\haminterlock}{TU}{\textthamosys{\char "E0D2}}`

`\hamcross` Declare the symbol ̨ (hamcross)
201 `\DeclareTextCommand{\hamcross}{TU}{\textthamosys{\char "E0D3}}`

`\hamarmextended` Declare the symbol ̩ (hamarmextended)
202 `\DeclareTextCommand{\hamarmextended}{TU}{\textthamosys{\char "E0D4}}`

`\hambehind` Declare the symbol ̪ (hambehind)
203 `\DeclareTextCommand{\hambehind}{TU}{\textthamosys{\char "E0D5}}`

`\hambrushing` Declare the symbol ̫ (hambrushing)
204 `\DeclareTextCommand{\hambrushing}{TU}{\textthamosys{\char "E0D6}}`

6.4.8 Movement modifiers

`\hamsmallmod` Declare the symbol ̬ (hamsmallmod)
205 `\DeclareTextCommand{\hamsmallmod}{TU}{\textthamosys{\char "E0C6}}`

`\hamlargemod` Declare the symbol ̭ (hamlargemod)
206 `\DeclareTextCommand{\hamlargemod}{TU}{\textthamosys{\char "E0C7}}`

6.4.9 Other symbols

`\hamrepeatfromstart` Declare the symbol ̮ (hamrepeatfromstart)
207 `\DeclareTextCommand{\hamrepeatfromstart}{TU}{\textthamosys{\char "E0D8}}`

`\hamrepeatfromstartseveral` Declare the symbol ̯ (hamrepeatfromstartseveral)
208 `\DeclareTextCommand{\hamrepeatfromstartseveral}{TU}{\textthamosys{\char "E0D9}}`

`\hamrepeatcontinue` Declare the symbol ̰ (hamrepeatcontinue)
209 `\DeclareTextCommand{\hamrepeatcontinue}{TU}{\textthamosys{\char "E0DA}}`

`\hamrepeatcontinueseveral` Declare the symbol ̱ (hamrepeatcontinueseveral)
210 `\DeclareTextCommand{\hamrepeatcontinueseveral}{TU}{\textthamosys{\char "E0DB}}`

`\hamrepeatreverse` Declare the symbol ̲ (hamrepeatreverse)
211 `\DeclareTextCommand{\hamrepeatreverse}{TU}{\textthamosys{\char "E0DC}}`

`\hamalternatingmotion` Declare the symbol \sim (hamalternatingmotion)
212 `\DeclareTextCommand{\hamalternatingmotion}{TU}{\texthamnosys{\char "E0DD}}`

`\hamseqbegin` Declare the symbol $\textcircled{}$ (hamseqbegin)
213 `\DeclareTextCommand{\hamseqbegin}{TU}{\texthamnosys{\char "E0E0}}`

`\hamseqend` Declare the symbol $\textcircled{}$ (hamseqend)
214 `\DeclareTextCommand{\hamseqend}{TU}{\texthamnosys{\char "E0E1}}`

`\hamparbegin` Declare the symbol $\textcircled{}$ (hamparbegin)
215 `\DeclareTextCommand{\hamparbegin}{TU}{\texthamnosys{\char "E0E2}}`

`\hamparend` Declare the symbol $\textcircled{}$ (hamparend)
216 `\DeclareTextCommand{\hamparend}{TU}{\texthamnosys{\char "E0E3}}`

`\hamfusionbegin` Declare the symbol $\textcircled{}$ (hamfusionbegin)
217 `\DeclareTextCommand{\hamfusionbegin}{TU}{\texthamnosys{\char "E0E4}}`

`\hamfusionend` Declare the symbol $\textcircled{}$ (hamfusionend)
218 `\DeclareTextCommand{\hamfusionend}{TU}{\texthamnosys{\char "E0E5}}`

`\hambetween` Declare the symbol \backslash (hambetween)
219 `\DeclareTextCommand{\hambetween}{TU}{\texthamnosys{\char "E0E6}}`

`\hamplus` Declare the symbol \times (hamplus)
220 `\DeclareTextCommand{\hamplus}{TU}{\texthamnosys{\char "E0E7}}`

`\hamsymmpar` Declare the symbol $\textcircled{}$ (hamsymmpar)
221 `\DeclareTextCommand{\hamsymmpar}{TU}{\texthamnosys{\char "E0E8}}`

`\hamsymmlr` Declare the symbol $\textcircled{}$ (hamsymmlr)
222 `\DeclareTextCommand{\hamsymmlr}{TU}{\texthamnosys{\char "E0E9}}`

`\hamnondominant` Declare the symbol \nexists (hamnondominant)
223 `\DeclareTextCommand{\hamnondominant}{TU}{\texthamnosys{\char "E0EA}}`

`\hamnonipsi` Declare the symbol $\textcircled{}$ (hamnonipsi)
224 `\DeclareTextCommand{\hamnonipsi}{TU}{\texthamnosys{\char "E0EB}}`

`\hametc` Declare the symbol \dots (hametc)
225 `\DeclareTextCommand{\hametc}{TU}{\texthamnosys{\char "E0EC}}`

`\hamorirelative` Declare the symbol \sim (hamorirelative)
226 `\DeclareTextCommand{\hamorirelative}{TU}{\texthamnosys{\char "E0ED}}`

`\hammime` Declare the symbol \square (hammime)
227 `\DeclareTextCommand{\hammime}{TU}{\texthamnosys{\char "E0F0}}`

6.4.10 Version symbol

`\hamversionfourzero` Declare the symbol $\textcircled{}$ (hamversion40)
228 `\DeclareTextCommand{\hamversionfourzero}{TU}{\texthamnosys{\char "E0F1}}`

6.4.11 Regular Unicode characters

<code>\hamspace</code>	Declare the symbol \hspace
229	<code>\DeclareTextCommand{\hamspace}{TU}{\texthamnosys{\char "20}}</code>
<code>\hamexclaim</code>	Declare the symbol $!$ (hamexclaim)
230	<code>\DeclareTextCommand{\hamexclaim}{TU}{\texthamnosys{\char "21}}</code>
<code>\hamcomma</code>	Declare the symbol $,$ (hamcomma)
231	<code>\DeclareTextCommand{\hamcomma}{TU}{\texthamnosys{\char "002C}}</code>
<code>\hamfullstop</code>	Declare the symbol $.$ (hamfullstop)
232	<code>\DeclareTextCommand{\hamfullstop}{TU}{\texthamnosys{\char "002E}}</code>
<code>\hamquery</code>	Declare the symbol $?$ (hamquery)
233	<code>\DeclareTextCommand{\hamquery}{TU}{\texthamnosys{\char "003F}}</code>
<code>\hamaltbegin</code>	Declare the symbol $\{$ (hamaltbegin)
234	<code>\DeclareTextCommand{\hamaltbegin}{TU}{\texthamnosys{\char "007B}}</code>
<code>\hammetaalt</code>	Declare the symbol $ $ (hammetaalt)
235	<code>\DeclareTextCommand{\hammetaalt}{TU}{\texthamnosys{\char "007C}}</code>
<code>\hamaltend</code>	Declare the symbol $\}$ (hamaltend)
236	<code>\DeclareTextCommand{\hamaltend}{TU}{\texthamnosys{\char "007D}}</code>

6.4.12 Obsolete spacing symbols

<code>\hamwristtopulse</code>	Declare the symbol \curvearrowright (hamwristtopulse)
237	<code>\DeclareTextCommand{\hamwristtopulse}{TU}{\texthamnosys{\char "E07C}}</code>
<code>\hamwristtoback</code>	Declare the symbol \curvearrowleft (hamwristtoback)
238	<code>\DeclareTextCommand{\hamwristtoback}{TU}{\texthamnosys{\char "E07D}}</code>
<code>\hamwristtothumb</code>	Declare the symbol \curvearrowup (hamwristtothumb)
239	<code>\DeclareTextCommand{\hamwristtothumb}{TU}{\texthamnosys{\char "E07E}}</code>
<code>\hamwristtopinky</code>	Declare the symbol \curvearrowright (hamwristtopinky)
240	<code>\DeclareTextCommand{\hamwristtopinky}{TU}{\texthamnosys{\char "E07F}}</code>
<code>\hammovecross</code>	Declare the symbol \times (hammovecross)
241	<code>\DeclareTextCommand{\hammovecross}{TU}{\texthamnosys{\char "E0AD}}</code>
<code>\hammoveX</code>	Declare the symbol \times (hammoveX)
242	<code>\DeclareTextCommand{\hammoveX}{TU}{\texthamnosys{\char "E0AE}}</code>

6.5 Symbol name sequence

Code required for entering HamNoSys as a sequence of symbol name as described in [Section 4](#).

6.5.1 For each

Declare an internal *for loop* macro that can iterate over a comma-separated list and perform a given command on each item of the list.⁷

`\@foreach` The *for each* loop. Takes two arguments:

1. Command that is called on each item of the list.
2. Comma-separated list of items.

```
243 \def\@foreach#1#2{%
244   \@test@foreach{#1}#2,\@end@token%
245 }
```

`\@swallow` Internal helper function that eats one input at a time.

```
246 \def\@swallow#1{}
```

`\@test@foreach` Internal helper function that checks the next character after `#1` and continues the loop iteration unless `\@end@token` is found.

```
247 \def\@test@foreach#1{%
248   \@ifnextchar\@end@token%
249     {\@swallow}%
250     {\@recurse@foreach{#1}}%
251 }
```

`\@recurse@foreach` Internal helper function that splits the sequence at the next comma thanks to the patter matching of `\def`.

```
252 \def\@recurse@foreach#1#2,#3\@end@token{%
253   #1{#2}%
254   \@test@foreach{#1}#3\@end@token%
255 }
```

6.5.2 Symbol name to symbol command

`\@wordtohamnosys` Internal command for converting a single HamNoSys symbol name to its TeX-command (and thus into the actual character). Most symbol names are passed straight through to the command of the same name, but symbols whose name contains digits are intercepted and manually replaced with their matching symbol command.

```
256 \newcommand{\@wordtohamnosys}[1]{%
257   \ifthenelse{\equal{#1}{hamfinger2}}{\hamfingertwo}{%
258     \ifthenelse{\equal{#1}{hamfinger23}}{\hamfingertwothree}{%
259       \ifthenelse{\equal{#1}{hamfinger23spread}}{\hamfingertwothreespread}{%
260         \ifthenelse{\equal{#1}{hamfinger2345}}{\hamfingertwothreefourfive}{%
261           \ifthenelse{\equal{#1}{hampinch12}}{\hampinchonetwo}{%
262             \ifthenelse{\equal{#1}{hampinch12open}}{\hampinchonetwoopen}{%
263               \ifthenelse{\equal{#1}{hamcee12}}{\hamceeonetwo}{%
264                 \ifthenelse{\equal{#1}{hamversion40}}{\hamversionfourzero}{%
265                   \@ifundefined{#1}{#1\PackageWarning{hamnosys}{Typo?}}{\csname #1\endcsname}}}}}}}}}}
266 Unknown symbol "#1" in \protect\hamnosys. Typo?}}{\csname #1\endcsname}}}}}}}}}
```

⁷Code adapted from <https://stackoverflow.com/a/2408268>.

6.5.3 Symbol name sequence command

`\hamnosys` Declare the user command for generating a HamNoSys symbol name sequence (see [Section 4](#)).

267 `\DeclareRobustCommand{\hamnosys}[1]{\@foreach{\@wordtohamnosys}{#1}}`

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