

# The Symbol Font *wasy*

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The font *wasy* contains all *lasy* characters, and a lot more symbols. New characters were modified from the *mf* files of the standard  $\text{T}_{\text{E}}\text{X}$  fonts, and many were designed from scratch. Metafont sources for 5–10pt and a bold 10pt font are available.

An extension to PLAIN- $\text{T}_{\text{E}}\text{X}$  for using the fonts is included in the file *wasyfont.tex*. This can probably be used in  $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$  documents, but a new  $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$  format with the bindings already included and with *wasy* replacing the *lasy* font would be the superior solution. This version includes all *lasy* characters at the proper codes (causing some incompatibilities with version 1 of *wasy*) to make such a procedure easy. The file *wasyfont.2* contains substitutes for some macros of *wasyfont.tex* to be used at installations, that do not support the *wasy* fonts.

A list of characters with their bindings in *wasyfont.tex* follows. Some macros are actually compositions of several characters useful in the given context. Macros using symbols which are already available from standard  $\text{T}_{\text{E}}\text{X}$  fonts are also included; these are marked with \*.

general symbols

<code>\male</code>	♂	<code>\female</code>	♀
<code>\currency</code>	⌘	<code>\cent</code>	¢
<code>\lozenge</code>	⌘	<code>\kreuz</code>	✝
<code>\smiley</code>	☺	<code>\blacksmiley</code>	☹
<code>\frownie</code>	☹	<code>\sun</code>	☼
<code>\checked</code>	✓	<code>\brokenvert</code>	‡
<code>\diameter</code>	∅	<code>\invdiameter</code>	∅
<code>\phone</code>	☎	<code>\recorder</code>	Ⓛ
<code>\clock</code>	⌚	<code>\permil</code>	‰
<code>\bell</code>	🔔	<code>\ataribox</code>	Ⓛ
<code>\pointer</code>	☞	<code>\lightning</code>	⚡
<code>\agem0</code>	U		

diagrams

<code>\photon</code>	~~~~~	<code>\gluon</code>	⊗⊗⊗⊗
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music notes

<code>\eighthnote</code>	♪	<code>\quarternote</code>	♩
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`\halfnote` ♩     `\fullnote` ◦  
`\twonotes` ♪

electrical engineering

`\AC` ~     `\HF` ≈  
`\VHF` ≅

APL

<code>\APLup</code>	△	<code>\APLdown</code>	▽
<code>\APLbox</code>	□	<code>\APLinv</code>	⊞
<code>\APLleftarrowbox</code>	←	<code>\APLrightarrowbox</code>	→
<code>\APLuparrowbox</code>	↑	<code>\APLdownarrowbox</code>	↓
<code>\APLinput</code>	□	<code>\APLminus*</code>	−
<code>\APLlog</code>	⊗	<code>\APLstar</code>	*
<code>\APLvert*</code>		<code>\APLvert{\APLdown}</code>	∇
<code>\APLnot*</code>	~	<code>\APLnot{\APLdown}</code>	∇
<code>\APLnot{\land}</code>	∧	<code>\APLnot{\lor}</code>	∨
<code>\APLcirc*</code>	○	<code>\APLcirc{\bot}</code>	⊥
<code>\notbackslash*</code>	∖	<code>\notslash*</code>	/
<code>\APLcomment</code>	Ⓐ		

astronomy

<code>\ascnode</code>	♁	<code>\descnode</code>	♂
<code>\vernal</code>	♈	<code>\astrosun*</code>	☉
<code>\newmoon</code>	●	<code>\fullmoon</code>	○
<code>\leftmoon</code>	☾	<code>\rightmoon</code>	☽
<code>\mercury</code>	♿	<code>\venus</code>	♀
<code>\mars</code>	♂	<code>\jupiter</code>	♃
<code>\saturn</code>	♄	<code>\uranus</code>	♅
<code>\neptune</code>	♆	<code>\pluto</code>	♇
<code>\earth</code>	♁		

astrological symbols and zodiacal symbols

<code>\conjunction</code>	♌	<code>\opposition</code>	♍
<code>\aries</code>	♈	<code>\libra</code>	♎
<code>\taurus</code>	♉	<code>\scorpio</code>	♏
<code>\gemini</code>	♊	<code>\sagittarius</code>	♐
<code>\cancer</code>	♋	<code>\capricornus</code>	♑
<code>\leo</code>	♌	<code>\aquarius</code>	♒
<code>\virgo</code>	♍	<code>\pisces</code>	♓

geometrical shapes

<code>\hexstar</code>	✱	<code>\varhexstar</code>	✱
<code>\davidstar</code>	☆	<code>\APLstar</code>	✱
<code>\Circle</code>	○	<code>\CIRCLE</code>	●
<code>\Leftcircle</code>	◐	<code>\LEFTCIRCLE</code>	◐
<code>\Rightcircle</code>	◑	<code>\RIGHTCIRCLE</code>	◑
<code>\LEFTcircle</code>	◐	<code>\RIGHTcircle</code>	◑
<code>\LEFTarrow</code>	◀	<code>\RIGHTarrow</code>	▶
<code>\UParrow</code>	▲	<code>\DOWNarrow</code>	▼
<code>\Box</code>	□	<code>\APLbox</code>	□
<code>\XBox</code>	⊠	<code>\Bowtie</code>	⊠
<code>\Diamond</code>	◇	<code>\octagon</code>	⬡
<code>\hexagon</code>	⬡	<code>\varhexagon</code>	⬡
<code>\pentagon</code>	⬠		

general math & physics

<code>\varangle</code>	∠	<code>\$_\text{invneg}\$</code>	⊖
<code>\leftturn</code>	↶	<code>\rightturn</code>	↷
<code>\diameter</code>	∅	<code>\therefore</code>	∴

math operators

<code>\$_\text{ocircle}\$ b</code>	$a \circ b$	<code>\$_\text{logof}\$ b</code>	$a \otimes b$
<code>\$_\text{oplus}\$* b</code>	$a \oplus b$	<code>\$_\text{otimes}\$* b</code>	$a \otimes b$
<code>\$_\text{le}\$* b</code>	$a \leq b$	<code>\$_\text{ge}\$* b</code>	$a \geq b$
<code>\$_\text{apprle}\$ b</code>	$a \lesssim b$	<code>\$_\text{apprge}\$ b</code>	$a \gtrsim b$
<code>\$_\text{lhs}\$ b</code>	$a \triangleleft b$	<code>\$_\text{rhs}\$ b</code>	$a \triangleleft b$
<code>\$_\text{unlhs}\$ b</code>	$a \trianglelefteq b$	<code>\$_\text{unrhs}\$ b</code>	$a \trianglerighteq b$
<code>\$_\text{LHD}\$ b</code>	$a \blacktriangleleft b$	<code>\$_\text{RHD}\$ b</code>	$a \blacktriangleright b$
<code>\$_\text{sqsubset}\$ b</code>	$a \sqsubset b$	<code>\$_\text{sqsupset}\$ b</code>	$a \sqsupset b$
<code>\$_\text{sqsubteq}\$* b</code>	$a \sqsubseteq b$	<code>\$_\text{sqsupseteq}\$* b</code>	$a \sqsupseteq b$
<code>\$_\text{propto}\$* b</code>	$a \propto b$	<code>\$_\text{varpropto}\$ b</code>	$a \propto b$
<code>\$_\text{leadsto}\$ b</code>	$a \rightsquigarrow b$		

integrals (text style)

<code>\$_\text{varint}_a^b f(x)dx</code>	$\int_a^b f(x)dx$	<code>\$_\text{iint}_a^b f(x)dx</code>	$\iint_a^b f(x)dx$
<code>\$_\text{iiint}_a^b f(x)dx</code>	$\iiint_a^b f(x)dx$	<code>\$_\text{varoint}_a^b f(x)dx</code>	$\oint_a^b f(x)dx$
<code>\$_\text{oiint}_a^b f(x)dx</code>	$\oiint_a^b f(x)dx$		

integrals (display style)

$$\int \iint \iiint \oint \oiint$$

With the control sequence `\newpropto` you can change the proportional sign to the thin wasy symbol ( $\propto$ ), which is more distinct from alpha ( $\alpha$ ) than the default symbol ( $\propto$ ).

With the control sequence `\newint` you can change the T<sub>E</sub>X integrals from  $\int, \oint$  to the vertical ones  $\int, \oint$ , in display:

$$\int_a^b \rightarrow \int_a^b, \quad \oint_C \rightarrow \oint_C$$

There are also a few letters in roman style added (although these and some symbols as  $\mathcal{U}, \mathcal{V}$  should be in a separate font, to be created in different styles like italic, sans serif etc. – the `wasychr.mf` source is prepared for that.

<code>\thorn</code>	þ	<code>\Thorn</code>	Þ
<code>\dh</code>	ð	<code>\Dh*</code>	Ð
<code>\inve</code>	ø	<code>\openo</code>	o

### Examples

“We provide the ♫♪, you provide the ☺”

The planets ( $\odot \rightarrow$  outer space): ☿ ♀ ☽ ♂ asteroids ♃ ♄ ♅ ♆ ♁.

special characters on IBM PC's: ☺, ☹, ♥, ♦, ♣, ♠, ●, ○, ♂, ♀, ♫, ♪, ☼, ▶, ◀, ⤴, !!, ¶, §, ==, ⤵, ↑, ↓, →, ←, ▲, ▼, †, ‡, ⌋, ⌌, ...

special characters on Atari ST's: ♪, ♫, √, ⊕, ♠, ♫, ♫, ♫, ♫, ♫, ♫, ♫, ...

tube dimensions:  $\varnothing 5$  mm,  $d = 0.5$  mm,  $l = 50$  mm

display math:

$$\angle(\vec{a}, \vec{b}) = 30^\circ$$

$$\prod_{x \leq 5} a_x \otimes b_x \simeq \int_{x \geq 5} a \circ b dx \quad (\text{nonsense.1})$$

$$\text{Gauss' law: } \iiint_V \nabla \mathbf{F}(\mathbf{x}) d^3x = \iint_{S(V)} \mathbf{F}(\mathbf{x}) da$$

$$\text{Stokes' law: } \iint_A [\nabla \times \mathbf{F}(\mathbf{x})] da = \oint_{C(A)} \mathbf{F}(\mathbf{x}) dl$$

APL Program:

`U ← -1 + G ← 2 × I N ← □`     ♫ generate vectors of odd and even numbers

APL keyboard layout:

1	2	3	4	5	6	7	8	9	0	+	×	◇
Q	W	E	R	T	Y	U	I	O	P	←	→	

A S D F G H J K L [ ] #  
 † Z X C V B N M , . /  
 .. - < ≤ = ≥ > ≠ ∨ ∧ - ÷ \$  
 ? ω ε ρ ~ ↑ ↓ √ ∘ \* { }  
 α ∫ ∫ ∩ ∪ ⊥ ∟ ∣ ; : \  
 I √ ∇ ∆ ∅ ⊖ ⊕ ∞ ∞ ! ∞ ∞  
 Q W E R T Y U I O P ∞ ∞  
 A S D F G H J K L ∞ ∞  
 Δ Z X C V B N M ∞ ∞

⊗  
 ↑ ↓

simple phonetic notation: corner [ˈkɔːnə], this [ðis], thrash [θræʃ]

check the appropriate box like this ☒ or that ☑:

- I need the **wasy** fonts
- I don't need the **wasy** fonts

### Font Table

wasy:

00 = Δ	01 = ∠	02 = ∠	03 = ∠	04 = ∠	05 = ∴	06 = ∅	07 = 🗿
08 = ✓	09 = ↻	0A = ♣	0B = ♣	0C = ♣	0D = ♣	0E = ∘	0F = ♣
10 = ◀	11 = ▶	12 = ⚡	13 = Ω	14 = ∪	15 = ∞	16 = ⊕	17 = ∩
18 = ∩	19 = ♀	1A = ♂	1B = ∞	1C = ⊕	1D = ∞	1E = ∞	1F = ∅
20 = ●	21 = ⦿	22 = ⦿	23 = ○	24 = ☾	25 = ☽	26 = ♂	27 = ♀
28 = <	29 = >	2A = ^	2B = v	2C = ☺	2D = ☹	2E = ☼	2F = ☺
30 = ∪	31 = ∩	32 = □	33 = ◇	34 = ☒	35 = ∞	36 = ✦	37 = ∅
38 = ○	39 = ∅	3A = ~	3B = ~	3C = □	3D = □	3E = ≤	3F = ≥
40 = ≈	41 = *	42 = *	43 = ☆	44 = ∠	45 = *	46 = ∇	47 = ◐
48 = ◐	49 = ∠	4A = ∠	4B = ▲	4C = ▼	4D = §	4E = €	4F = 3
50 = ∞	51 = ∞	52 = ∞	53 = ⌘	54 = f	55 = ∅	56 = ∞	57 = ∞
58 = ∞	59 = ∞	5A = ∞	5B = ∞	5C = ∞	5D = ∞	5E = ∞	5F = ∞
60 = ∞	61 = ∞	62 = ∞	63 = ∞	64 = ∞	65 = ∞	66 = ∞	67 = ∞
68 = ‰	69 = ∞	6A = ∞	6B = ∞	6C = ∞	6D = ∞	6E = ∞	6F = ∞
70 = ∞	71 = ∞	72 = ∞	73 = ∞	74 = ∞	75 = ∞	76 = ∞	77 = ∞
78 = ∞	79 = ∞	7A = ∞	7B = ∞	7C = ∞	7D = ∞	7E = ∞	7F = ∞

wasyb:

00 = $\Delta$	01 = $\triangleleft$	02 = $\trianglelefteq$	03 = $\triangleright$	04 = $\trianglerighteq$	05 = $\therefore$	06 = $\oslash$	07 = $\heartsuit$
08 = $\surd$	09 = $\rightrightarrows$	0A = $\clubsuit$	0B = $\heartsuit$	0C = $\heartsuit$	0D = $\heartsuit$	0E = $\circ$	0F = $\heartsuit$
10 = $\blacktriangleleft$	11 = $\blacktriangleright$	12 = $\blacklightning$	13 = $\mathcal{R}$	14 = $\mathcal{U}$	15 = $\mathcal{Q}$	16 = $\otimes$	17 = $\Upsilon$
18 = $\lrcorner$	19 = $\mathfrak{f}$	1A = $\mathfrak{m}$	1B = $\mathfrak{d}$	1C = $\odot$	1D = $\infty$	1E = $\mathfrak{A}$	1F = $\mathfrak{B}$
20 = $\bullet$	21 = $\circlearrowright$	22 = $\circlearrowleft$	23 = $\circ$	24 = $\mathcal{C}$	25 = $\mathcal{D}$	26 = $\delta$	27 = $\mathfrak{f}$
28 = $\lessdot$	29 = $\gtrdot$	2A = $\hat{\phantom{x}}$	2B = $\check{\phantom{x}}$	2C = $\odot$	2D = $\odot$	2E = $\star$	2F = $\odot$
30 = $\mathcal{U}$	31 = $\boxtimes$	32 = $\square$	33 = $\diamond$	34 = $\boxtimes$	35 = $\mathfrak{A}$	36 = $\mathfrak{A}$	37 = $\square$
38 = $\square$	39 = $\square$	3A = $\sim$	3B = $\rightsquigarrow$	3C = $\square$	3D = $\square$	3E = $\lesssim$	3F = $\gtrsim$
40 = $\approx$	41 = $\mathfrak{A}$	42 = $\mathfrak{A}$	43 = $\mathfrak{A}$	44 = $\square$	45 = $\mathfrak{A}$	46 = $\nabla$	47 = $\blacktriangle$
48 = $\blacktriangle$	49 = $\mathcal{D}$	4A = $\mathcal{D}$	4B = $\blacktriangle$	4C = $\blacktriangledown$	4D = $\mathfrak{S}$	4E = $\mathfrak{E}$	4F = $\mathfrak{Z}$
50 = $\mathfrak{Z}$	51 = $\mathfrak{Z}$	52 = $\mathfrak{Z}$	53 = $\mathfrak{Z}$	54 = $\mathfrak{f}$	55 = $\mathfrak{a}$	56 = $\mathfrak{a}$	57 = $\infty$
58 = $\mathfrak{Z}$	59 = $\mathfrak{h}$	5A = $\mathfrak{d}$	5B = $\mathfrak{Z}$	5C = $\mathcal{P}$	5D = $\mathfrak{Z}$	5E = $\mathfrak{A}$	5F = $\mathfrak{B}$
60 = $\mathfrak{M}$	61 = $\mathfrak{h}$	62 = $\mathfrak{M}$	63 = $\mathfrak{A}$	64 = $\mathfrak{Z}$	65 = $\approx$	66 = $\mathfrak{A}$	67 = $\mathfrak{Z}$
68 = $\%$	69 = $\mathfrak{b}$	6A = $\mathfrak{D}$	6B = $\mathfrak{d}$	6C = $\mathfrak{c}$	6D = $\mathfrak{M}$	6E = $\mathfrak{A}$	6F = $\mathfrak{B}$
70 = $\mathfrak{B}$	71 = $\mathfrak{B}$	72 = $\int$	73 = $\iint$	74 = $\iiint$	75 = $\mathfrak{f}$	76 = $\mathfrak{H}$	77 = $\int$
78 = $\iint$	79 = $\iiint$	7A = $\mathfrak{f}$	7B = $\mathfrak{H}$	7C = $\mathfrak{I}$	7D = $\mathfrak{A}$	7E = $\square$	7F = $\mathfrak{A}$

### Changes since version 1.0

version 1.1:

`\varangle` has been centered at the math axis

version 2.0:

new: letters  $\mathfrak{D}, \mathfrak{b}, \mathfrak{d}, \mathfrak{a}, \mathfrak{c}, \mathfrak{U}$

new astrological and zodiacal symbols

new symbols permil, cent, ataribox

now the full set of `lasy` is included; for this purpose 9 characters ( $\odot$ ,  $\bullet$ ,  $\ominus$ ,  $\star$ ,  $\mathfrak{Z}$ ,  $\mathfrak{h}$ ,  $\mathfrak{d}$ ,  $\mathfrak{Z}$ ,  $\mathcal{P}$ ) have **changed code!**

`wasyb10` font for bold math added