



SignWriting in Unicode Next

Prepared for UTC # 148 (August 2-4, 2016)
a Unicode Technical Committee meeting in Redmond, WA
by Stephen E Slevinski Jr
in association with the Center for Sutton Movement Writing

The Big Umbrella of the Center for Sutton Movement Writing



All sign languages
supported right now.

Various hand writing styles.

4+ years of stable and
free standards.

Many implementations
from separate groups.

Formal SignWriting (FSW) standard

Formal Language

According to Wikipedia, "In mathematics, computer science, and linguistics, a formal language is a set of strings of symbols that may be constrained by rules that are specific to it."

Sign as Word

TimeSpace

- Mathematical ASCII name
- Optional time for sorting
- Mandatory space for visual

<https://tools.ietf.org/html/draft-slevinski-signwriting-text#section-2>

Plain Text

Unicode Standard: Chapter 2

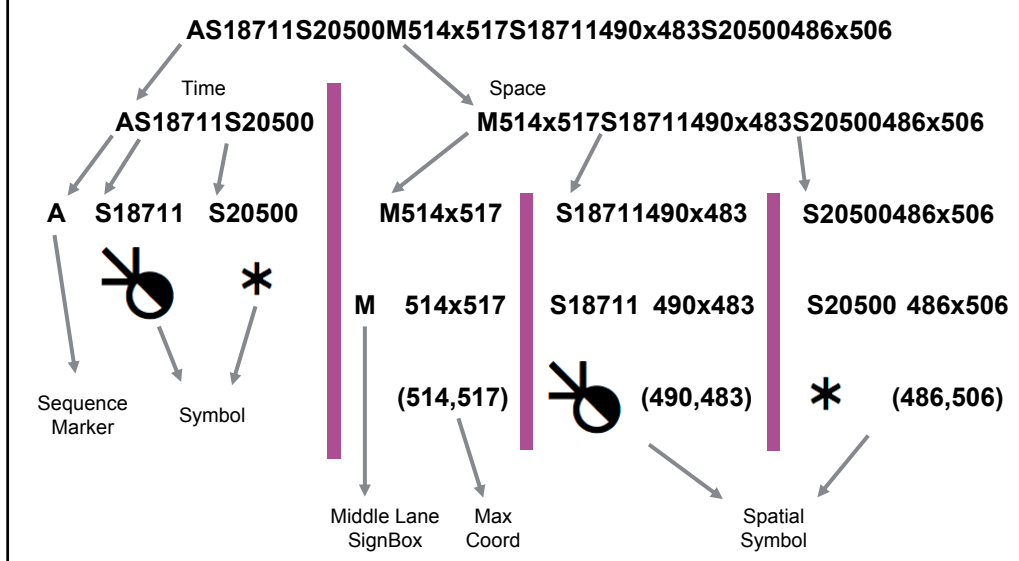
Plain text must contain enough information to permit the text to be rendered legibly, and nothing more.

Plain text is a pure sequence of character codes;

Formal SignWriting is Plain Text.

Formal SignWriting

FSW is a formal language and a script encoding



2016 Highlight - SignCorpus



Formal SignWriting

Web Interface

Generates flat file data

<https://bitbucket.org/unipampa/signcorpus>

A Web Tool for Building Parallel Corpora
of Spoken and Sign Languages.

<http://www.signwriting.org/symposium/presentation0057.html>

Real World Impact

Moving forward with sign language projects under Wikimedia.

WikiConference USA

October 2016 in San Diego

https://meta.wikimedia.org/wiki/WikiConference_USA

Formal SignWriting
Adoption

Unicode
Considerations

SignWriting Encyclopedia Projects: Wikipedias in
American Sign Language and Tunisian Sign Language

<http://www.signwriting.org/symposium/presentation0064.html>

CSMW Proposal for Unicode 10 and 2016 Font Development

SignWriting Character Viewer 2

Symbols Keys

Plane 4

	0	1	2	3	4	5	6	7	8	9	a	b	c	d	e	f
S10x																
S11x																
S12x																
S13x																
S14x																

16-bit glyphs set
created by Valerie Sutton

652 Palettes of 6 by 16 Grid

Dynamic Pages: single file 114 KB

http://signbank.org/SignWriting_Character_Viewer_2.html

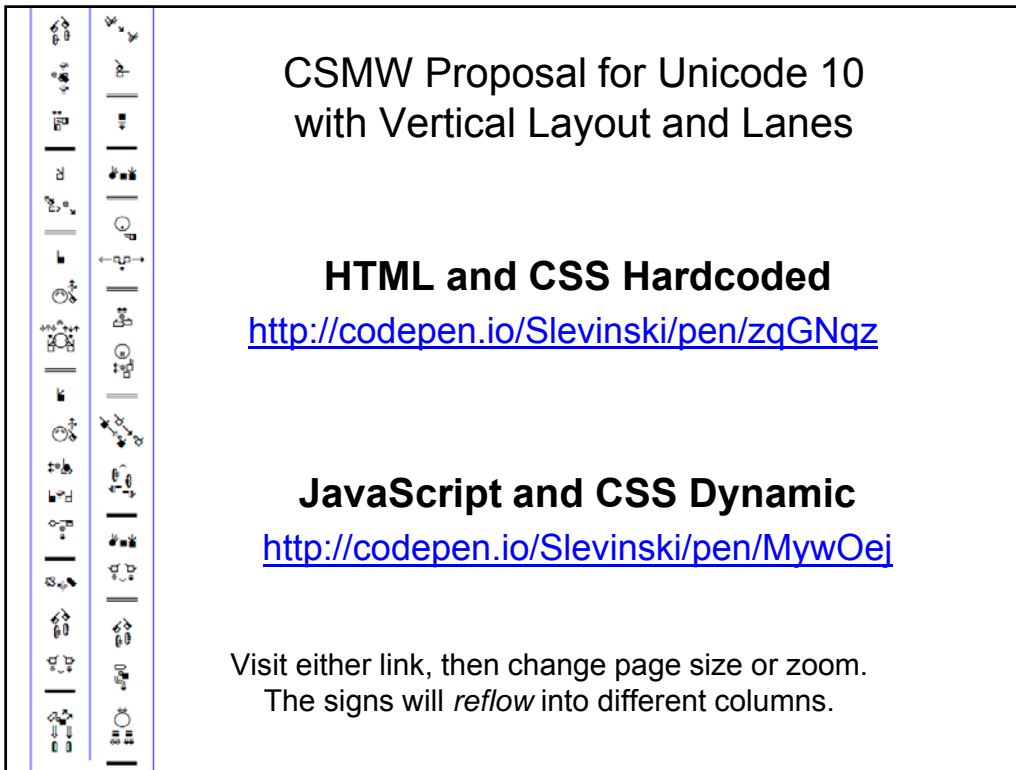
Symbol Encoding Model
Plane 4 (37,811 characters)

No Private Use Area

No Ligatures

Temporary Characters
used with 2 TrueType Fonts

SVG and CSS
for presentation

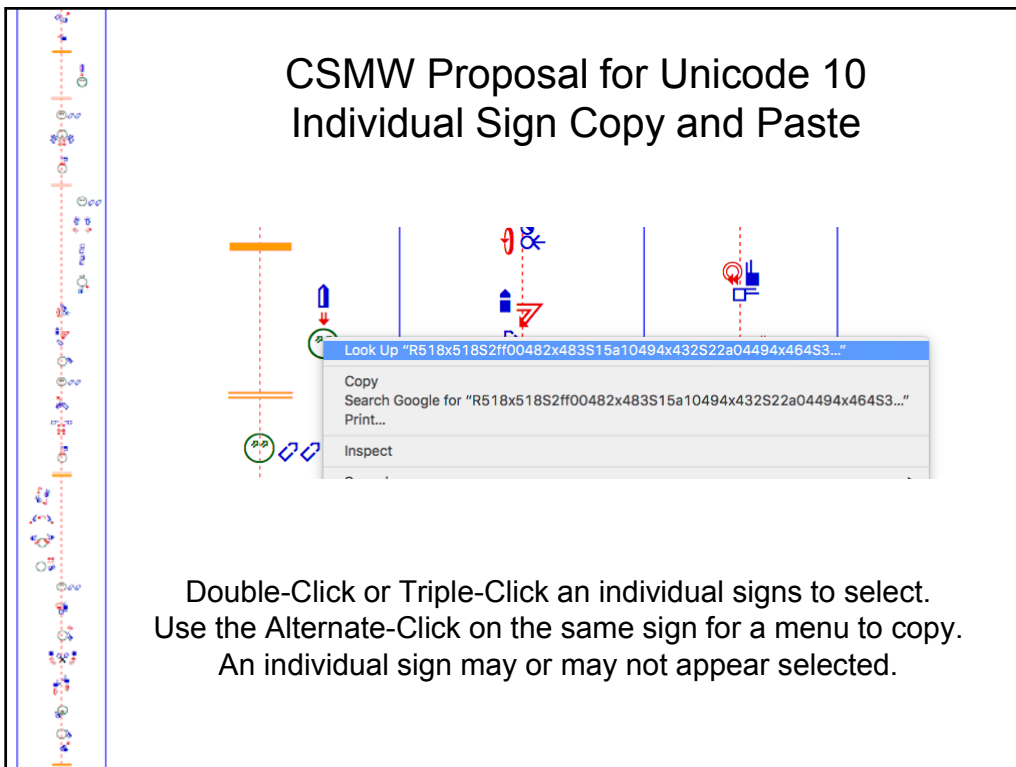


CSMW Proposal for Unicode 10 with Vertical Layout and Lanes

HTML and CSS Hardcoded
<http://codepen.io/Slevinski/pen/zqGNqz>

JavaScript and CSS Dynamic
<http://codepen.io/Slevinski/pen/MywOei>

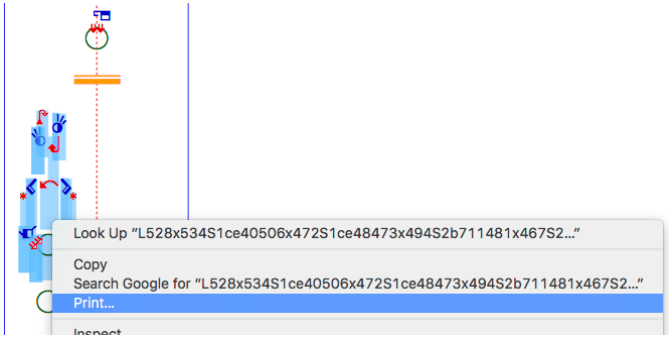
Visit either link, then change page size or zoom.
The signs will *reflow* into different columns.



CSMW Proposal for Unicode 10 Individual Sign Copy and Paste

Double-Click or Triple-Click an individual signs to select.
Use the Alternate-Click on the same sign for a menu to copy.
An individual sign may or may not appear selected.

CSMW Proposal for Unicode 10 Multiple Sign Copy and Paste



Using the mouse, click and drag to select several signs.
The FSW will be selected, with plane 4 or 16 characters.

CSMW Proposal for Unicode 10 with Vertical Layout and Lanes

HTML

```

2 <span class="outside">
3   <span class="middle">
4     <span class="inside">
5       <div class="sign" style="width: 56px;height: 35px;margin-right: 2px;"></div>
36      <div class="sign" style="width: 31px;height: 30px;margin-right: 1px;"></div>
59      <div class="sign" style="width: 72px;height: 8px;margin-right: 2px;"></div>
74      <div class="sign" style="width: 36px;height: 86px;margin-right: 152px;">
75        <svg xmlns="http://www.w3.org/2000/svg" width="36" height="86" viewBox="482 432 36 86">
76          <text style="font-size:0%;">
77            FSW source → RS18x518S2ff00482x483515a10494x432522a04494x464532107482x483
78              </text>
79              <g transform="translate(482,483)">
80                <text class="sym-fill" style="pointer-events:none;font-family:'SignWriting 2010
81                  Filling';font-size:30px;fill:white;">
82                  Unicode → □
83                  Plane 4 or 16 </text>
84                  for S2ff00 <text class="sym-line" style="pointer-events:none;font-family:'SignWriting
85                    2010';font-size:30px;fill:black;">
86                    □
87                  </text>
88                </g>
89              </svg>
90            </span>
91          </span>
92        </span>
93      </div>
94    </div>
95  </div>
96 </span>
97 </span>
98 </span>

```

<http://codepen.io/Slevinski/pen/zqGNqz>

CSMW Proposal for Unicode 10 with Vertical Layout and Lanes

JavaScript

```

3 var signs = sw10.signtext(signtext).map(function(fsw) {
4   var bbox = sw10.bbox(fsw).split(' ');
5   var w = bbox[1]-bbox[0];
6   var h = bbox[3]-bbox[2];
7   var adj = 1000 - bbox[0] - bbox[1];
8   adj += 2; //adjust for center dotted line
9   if (fsw.indexOf('L')>-1) adj += 150;
10  if (fsw.indexOf('R')>-1) adj -= 150;
11  var style = 'width: ' + w + 'px;height: ' + h + 'px;';
12  if (adj>0) {
13    style += 'margin-right: ' + adj + 'px;';
14  } else if (adj<0) {
15    adj = -adj;
16    style += 'border-left: ' + adj + 'px solid transparent;';
17  }
18  return '<div class="sign" style="' + style + '">' + sw10.svg(fsw) + '</div>';
19 });
20
21 var vertical = '<div class="signtext"><span class="outside"><span class="middle">
<span class="inside">' + signs.join('') + '</span></span></span></div>';
22 document.write(vertical);

```

<http://codepen.io/Slevinski/pen/MywOej>

Formal SignWriting and Fonts

Render FSW with css, zoom, and reflow

https://slevinski.github.io/SignWriting_Character_Viewer/

Version 1: Private Use Area Plane 16

SignWriting 2010 Fonts

Version 2: Proposed Unicode 10 Plane 4

Sutton SignWriting Fonts

Sutton SignWriting rendered from Formal SignWriting
with 2 KB each of HTML, CSS and JS

<http://codepen.io/Slevinski/full/XKRPzm/>

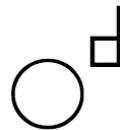
SignWriting in Unicode Next

Discuss accomplishments
Share insights
Create action items

SignWriting Design, With Three
Examples and Their Representation

<http://www.unicode.org/L2/L2015/15219-signwriting-design.pdf>

SignWriting Design, With Three Examples and Their Representation



Formal SW			Plane 15 PUA				Plane 16 PUA
Sign	F/R	Numbers	Sign	Fill	Rotation	Numbers	Glyph ID
M		536x518	FD803			FDf24 FDf12	
S2ff	00	482x483	FDA24	FD810	FD820	FDEEE FDEEF	10BFA1
S100	00	521x457	FD830	FD810	FD820	FDf15 FDEd5	100001

M536x518S2ff00482x483S10000521x457

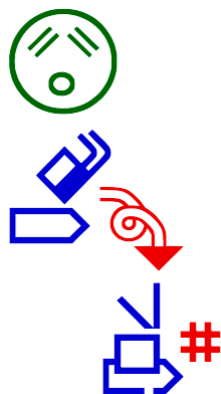
SignWriting Design, With Three Examples and Their Representation



Formal SW			Plane 15 PUA				Plane 16 PUA	
Sign	F/R	Numbers	Sign	Fill	Rotation	Numbers	Glyph ID	
M		518x524	FD803			FD812 FD818		
S2ff	10	482x495	FDA24	FD811	FD820	FDEEE FDEFB	10BFB1	
S342	10	490x510	FDA72	FD811	FD820	FDEF6 FDF0A	10D8D1	
S31a	30	481x498	FDA4A	FD813	FD820	FDEF5 FDEFE	10C9F1	
S324	10	491x485	FDA54	FD811	FD820	FDEF7 FDEF1	10CD91	
S321	27	497x476	FDA51	FD812	FD827	FDEFD FDEE8	10CC88	

M518x524S2ff10482x495S34210490x510S31a30489x498S32410491x485S32127497x476

SignWriting Design, With Three Examples and Their Representation



Formal SW			Plane 15 PUA				Plane 16 PUA	
Sign	F/R	Numbers	Sign	Fill	Rotation	Numbers	Glyph ID	
A			FD800					
S118	17		FD848	FD811	FD827		100918	
S15a	06		FD88A	FD810	FD826		1021C7	
S296	0b		FD9C6	FD810	FD82B		10984C	
S20b	00		FD93B	FD810	FD820		106421	
S10e	30		FD83E	FD813	FD820		100571	
S15a	36		FD88A	FD813	FD826		1021F7	
S30a	00		FDA3A	FD810	FD820		10C3C1	
S344	10		FDA74	FD811	FD820		10D991	
M		552x611	FD803			FD812 FD818		
S30a	00	482x483	FDA3A	FD810	FD820	FDEEE FDEEF	10C3C1	
S344	10	495x504	FDA74	FD811	FD820	FDEFB FDF04	10D991	
S118	17	491x523	FD848	FD811	FD827	FDEF7 FDF17	100918	
S15a	06	482x549	FD88A	FD810	FD826	FDEEE FDF31	1021C7	
S296	0b	512x542	FD9C6	FD810	FD82B	FDF0C FDF2A	10984C	
S15a	36	513x599	FD88A	FD813	FD826	FDF0D FDF63	1021F7	
S10e	30	517x574	FD83E	FD813	FD820	FDF11 FDF4A	100571	
S20b	00	539x587	FD93B	FD810	FD820	FDF27 FDF57	106421	

AS11817S15a06S2960bS20b00S10e30S15a36S30a00S34410M552x611S30a00482x483S34410495x504S11817491x523S15a06482x549S2960b512x542S15a36S13x599S10e30S17x574S20b00539x587

Discussion Ideas

Script Encoding Model
PUA Plane 15 (1,179 characters)

2-Dimensional Layout with Graphite and Cartesian coordinates

SignWriting has a prototype font that uses Cartesian coordinates to control the 2-dimensional layout with Graphite and PUA Plane 15 characters. If you have any experience with 2-dimensional layout using Cartesian coordinates, let's discuss the possibilities.

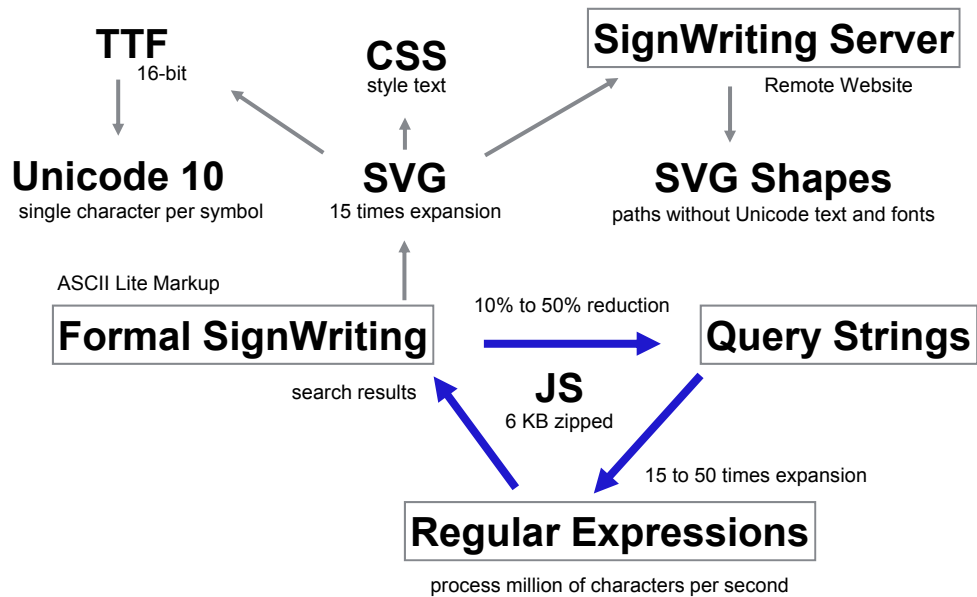
Symbol Encoding Model
PUA Plane 16 (37,811 characters)

Entire Plane for the International SignWriting Alphabet 2010

The ISWA 2010 uses 37,811 glyphs. Each glyph has a unique code point on Private Use Area Plane 16. These code points are used in the 16-bit font files. Rather than use plane 16, it would be nice to use Plane 4.

both designs are productive and plane 16 is used with fonts

CSMW Proposal Workflow



Discussion Ideas

2-Color Fonts

SignWriting relies on a 2-color font. Currently, SignWriting mimics a 2-color font by using 2 TrueType Fonts: one for the line and another for the filling. If you have any experience with 2-color fonts, let's discuss the possibilities.

Glyphs with 2 Types of Space

SignWriting creates signs as 2-dimensional arrangements of symbols. The glyphs for the SignWriting symbols have 2 types of space: a positive space and a negative space. The positive space is visible and reveals the line or shape of the glyph. The negative space is set to a background color or made transparent. When 2 symbols overlap, the symbols are placed in order on a 2-dimensional canvas. The negative space of the top symbol will overwrite the positive space of the symbol underneath. Current software uses a background color for the negative space. MicroSoft has a solution for making the negative space transparent and still overwriting the positive space of the symbol underneath.

What about SW in Unicode 8?

Character encoding design history

Please deprecate

PUA Plane 15 design (1,179 characters)



The symbol only design removed 2-D layout by dropping 5 structural markers and 500 number characters

N4015 Preliminary Unicode (674 characters)



A new inherent design removes 2 characters (F1 and R1) and breaks collation as stated in proposal

N4090 Revised Unicode (672 characters)



A new facial diacritic design is proposed that is unsupported and untested

N4342 Unicode Proposal (672 characters)

SignWriting in Unicode Next

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Thanks for viewing.

Feedback, comments, and
questions are welcomed.

<http://signpuddle.com>

<http://www.slideshare.net/StephenSlevinski/presentations>