Proposal to Include IEC Power Button Symbols

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Abstract

The international symbol IEC 60417-5009 ⏻ meaning 'power' is not in Unicode. Clearly it would be useful to anyone writing technical or user manuals. Furthermore, for electronically published documentation, it is crucial for this and a few other symbols to be defined because it makes them searchable in plain text. In this proposal we provide a TrueType font named 'IECpower' containing the glyphs as specified in three international standards together with all of the needed character properties for Unicode specification.

1 Introduction

The ⏻, ⏼, ⭘, and ⏽ symbols are defined in IEC 60417 [2], which is also ISO 7000:2012 [3]. IEEE 1621 defines ☾ and refines the definition of ⏻, notably by saying:

> IEC 60417 defines ⏻ for use with a power switch that does not do a total mains disconnect, and hence the device consumes standby power. ⏻ is generally used and understood to mean "power," as on power buttons, indicators, and elsewhere. ⏻, therefore, means "power" with a nonzero power level in the *off* state. Electronic devices shall use ⏻ to be a synonym for "power" on power controls.

[1, §4.3, emphasis in original]. IEEE 1621 standardises current practice for devices with regard to the ⏻ symbol and to a lesser extent for ☾.

These characters, particularly ⏻, are needed for technical writing and are not in Unicode. The advantage of having them there would be that for the first time they would be searchable in plain text, something not possible with embedded graphics, which is the way the symbols have been displayed to date.

2 Suitability for Inclusion

These symbols are *characters* according to the definition in the Glossary, and do not appear in the Archive of Notices of Non-Approval. They are neither in the Pipeline Table nor in BETA. They are all widely used on equipment and would benefit technical writers if they were available in Unicode and benefit readers

because it would make user manuals and other technical documentation more searchable in plain text.

We provide with our proposal a TrueType font, with no restrictions on its use.

3 Character Properties

Suggested character properties for the proposed symbols are given in Tables 1–5. These are the same names as in IEEE 1621-2004. None of the proposed names appear already in the Character Name Index.

Property	**Suggested Value**
Code point	*to be determined*
Name	POWER
General Category	So
Canonical Combining Class	0
Bidirectional Class	ON
Decomposition Type/Decomposition Mapping	
Numeric Type	
Numeric Value	
Bidi Mirrored	N
Unicode 1 Name	
ISO Comment	
Simple Uppercase Mapping	
Simple Lowercase Mapping	
Simple Titlecase Mapping	

Table 1: Suggested character properties for ⏻.

Property	**Suggested Value**
Code point	*to be determined*
Name	ON
General Category	So
Canonical Combining Class	0
Bidirectional Class	ON
Decomposition Type/Decomposition Mapping	
Numeric Type	
Numeric Value	
Bidi Mirrored	N
Unicode 1 Name	
ISO Comment	
Simple Uppercase Mapping	
Simple Lowercase Mapping	
Simple Titlecase Mapping	

Table 2: Suggested character properties for ⏽.

Property	**Suggested Value**
Code point	*to be determined*
Name	OFF
General Category	So
Canonical Combining Class	0
Bidirectional Class	ON
Decomposition Type/Decomposition Mapping	
Numeric Type	
Numeric Value	
Bidi Mirrored	N
Unicode 1 Name	
ISO Comment	
Simple Uppercase Mapping	
Simple Lowercase Mapping	
Simple Titlecase Mapping	

Table 3: Suggested character properties for ⭘.

Property	**Suggested Value**
Code point	*to be determined*
Name	ON/OFF
General Category	So
Canonical Combining Class	0
Bidirectional Class	ON
Decomposition Type/Decomposition Mapping	
Numeric Type	
Numeric Value	
Bidi Mirrored	N
Unicode 1 Name	
ISO Comment	
Simple Uppercase Mapping	
Simple Lowercase Mapping	
Simple Titlecase Mapping	

Table 4: Suggested character properties for ⏼.

Property	Suggested Value
Code point	*to be determined*
Name	SLEEP
General Category	So
Canonical Combining Class	0
Bidirectional Class	ON
Decomposition Type/Decomposition Mapping	
Numeric Type	
Numeric Value	
Bidi Mirrored	N
Unicode 1 Name	
ISO Comment	
Simple Uppercase Mapping	
Simple Lowercase Mapping	
Simple Titlecase Mapping	

Table 5: Suggested character properties for ⏾.

3.1 Collation Order

There is no required collation order, although there is an implied state transition ordering:

> Power states shall be understood to have physical relationships to each other. Specifically, *on* is taken to be above *sleep*, and *sleep* above *off*.

[1, §4.4, emphasis in original]. They exhibit no shaping behaviour and have no particular required sorting order (except see the quoted paragraph above). The characters are uncased. There is no special linebreaking behaviour required. These characters are not meant for use in identifiers, although they have been used for such. They are stand-alone symbols. They are not white-space characters and have no numeric values. They are neither combining characters nor punctuation.

4 The *IECpower* TrueType Font

The five symbols included in the *IECpower* TrueType font are shown in Table 6. Only these symbols exist in the font; if an undefined character, for example 'A' is called for, the result is implementation-defined.[1]

Placement of the symbols in the *IECpower* TrueType font was chosen thoughtfully so as to be mnemonic: 'P' for power, 'S' for stand-by or sleep, 'T' for toggling power on or off, and '1' and '0' for power-on and power-off, respectively; these mnemonics 'fail gracefully' in text should the *IECpower* font happen to be unavailable.

[1] In XeTeX, for example, the result of 'A' in *IECpower* is ■. In OpenOffice Writer, the result is the letter 'A' but in a san-serif typeface.

Symbol	Applicable Standard(s)	Character To Type	Mnemonic	Meaning
⏻	IEC 60417-5009	P	‘power’	Power
⏼	IEC 60417-5010	T	‘toggle’	Power on/off
⭘	IEC 60417-5008	0	‘binary zero’	Power off
⏽	IEC 60417-5007	1	‘binary one’	Power on
⏾	IEEE 1621	S	‘sleep’	Stand-by

Table 6: All of the available glyphs in the *IEC power* TrueType font.

4.1 Example Usage

In-line in text with normal spacing, the ⏻ characters ⏾ look ⏼ like ⏽ this ⭘.

5 Anticipated Objections

It might be argued that the meaning of ⏻ is disputed between IEC 60417 and IEEE 1621, *i.e.*, that IEC 60417 (as well as ISO 7000:2012) defined ⏻ to mean ‘stand-by’ and IEEE 1621 changed it to mean ‘power’. We counter that the issue is irrelevant to the Unicode Consortium for two reasons: firstly, because the symbol itself is needed by writers, who could use it—if it were available to them—according to local conventions regardless of the disagreement between IEC/ISO and IEEE; and secondly, because IEEE 1621 specifically codifies existing practice; the number of devices out there using ⏻ to mean ‘power’ dwarfs the number of devices that use it to mean ‘stand-by’. Furthermore,

> No safety issue is introduced by the use of the symbol on a switch that causes the device to go to a *hard-off* state.

[1, §4.3, emphasis in original].

There are, of course, many characters in Unicode already resembling circles (⭘), or lines (⏽), or the crescent moon (⏾). None of the existing characters, however, has anything semantically to do with the concepts of ‘power’, ‘switch’, ‘toggle’, or ‘interrupter’. There are several occurrences of the crescent moon, but none showing the ⏾ phase. There are eleven occurrences of the word ‘power’ in Version 6.3.0 of the Unicode standard (Table 7) but none has anything to do with device control [4].

6 Drawing the Symbols

The proposed characters are not part of any script and the precise form of their drawing is not critical. As IEEE 1621-2004 says:

> In accordance with IEC 80416-3, symbols can be filled, be rotated, have their lines thickened, or be used on digital displays, as long as an ordinary user can recognize the symbol correctly.

[1, §4.3].

Section	Code Point	Description
Telugu fractions and weights	0C78	TELUGU FRACTION DIGIT ZERO FOR ODD POWERS OF FOUR
	0C79	TELUGU FRACTION DIGIT ONE FOR ODD POWERS OF FOUR
	0C7A	TELUGU FRACTION DIGIT TWO FOR ODD POWERS OF FOUR
	0C7B	TELUGU FRACTION DIGIT THREE FOR ODD POWERS OF FOUR
	0C7C	TELUGU FRACTION DIGIT ONE FOR EVEN POWERS OF FOUR
	0C7D	TELUGU FRACTION DIGIT TWO FOR EVEN POWERS OF FOUR
	0C7E	TELUGU FRACTION DIGIT THREE FOR EVEN POWERS OF FOUR
Miscellaneous Symbols	26EE	GEAR WITH HANDLES (= power plant, power substation)
Kangxi Radicals	2F12	KANGXI RADICAL POWER
Yijing Hexagram Symbols	4DE1	HEXAGRAM FOR GREAT POWER
Mathematical Alphanumeric Symbols	1D4AB	MATHEMATICAL SCRIPT CAPITAL P (= power set)

Table 7: All occurrences of 'power' in the Unicode Standard, Version 6.3.0.

6.1 Sever-ability

Of all the characters in Table 6, the most needed is ⏻. We included the others in this proposal because they form a logical group. If, however, there is any objection to inclusion of ⏽, ⭘, ⏼, or ⏾, the one we really need is ⏻.

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8 Summary and Conclusion

The ⏻, ⭘, ⏽, ⏼, and ⏾ symbols are needed by technical writers to produce manuals in which these important symbols are searchable in plain text. Because they were invented by the standards body to be distinctive, new, and unambiguous, there is no confusion with existing scripts. The suggested character properties are simple. We provide along with this proposal a TrueType font called *IECpower* containing the new symbols; the TrueType font is made available with no restrictions.

References

[1] IEEE Standards Association. *IEEE Standard for User Interface Elements in Power Control of Electronic Devices Employed in Office/Consumer Environments*, 2004. IEEE Std 1621-2004.

[2] International Electrotechnical Commision. *IEC 60417: Graphical symbols for use on equipment*, 2005.

[3] International Organisation for Standardisation. *ISO 7000:2012, Graphical symbols for use on equipment—Registered symbols*, 2012.

[4] The Unicode Consortium. The Unicode standard, version 6.3.0, 2013.