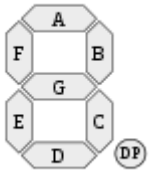
Seven-segment display character representations

The topic of **seven-segment display character representations** revolves around the various shapes of numerical digits, letters, and punctuation devisable on seven-segment displays. Such representation of characters is not standardized by any relevant entity (e.g. ISO, IEEE or IEC).



The individual segments of a seven-segment display.

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Digit conventions

Two basic conventions are in common use for some Hindu-Arabic numerals: display segment *A* is optional for digit 6,[1][2][3][4] segment *F* for 7, and segment *D* for 9.[1][2][3][4] Although *EF* could also be used to represent digit 1, this seems to be rarely done if ever. *CDEG* is occasionally encountered on older calculators to represent 0.

Alphabetic letters

In addition to the ten digits, seven-segment displays can be used to show letters of the Latin, Cyrillic and Greek alphabets including punctuation, but only very few representations are unambiguous and intuitive at the same time, and a number of letters in all three scripts have either too many vertical strokes or have diagonal strokes that cannot fit into the seven segments given.

Also, alphabetic letters, and many other characters, are much clearer and unambiguously shown on the currently ubiquitous and low-priced dot matrix displays as well as on fourteen-segment and sixteen-segment displays. All this obviates the need for seven-segment displays to show letters in all but the most special cases.

One such special case is the display of the letters A–F when denoting the hexadecimal values (digits) 10–15. These are needed on some scientific calculators, and are used with some testing displays on electronic equipment. Although there is no official standard, today most devices displaying hex digits use the unique forms shown to the right: uppercase A, C, E, and F, and lowercase b and d.[5] To avoid ambiguity between the digit 6 and the letter b the digit 6 is displayed with segment A lit.[6][7][8][9][2]

modern[5][6][7][8][9]
TI[2]**, Siemens**[3][4]
Elektronika
National Semiconductor

However, this modern scheme was not always followed in the past, and various other schemes could be found as well:

- The Texas Instruments seven-segment display decoder chips 7446/7447/7448/7449 and 74246/74247/74248/74249 and the Siemens FLH551-7448/555-8448 chips used truncated versions of "2", "3", "4", "5" and "6" for digits A–E. Digit F (1111 binary) was blank.[2][3][4]
- Soviet programmable calculators like the Б3-34 instead used the symbols "−", "L", "C", "Г", "E", and "" (space) to display hexadecimal numbers above nine.

- Not all 7-segment decoders were suitable to display digits above nine at all. For comparison, the National Semiconductor MM74C912 displayed "o" for A and B, "−" for C, D and E, and blank for F.
- The CD4511 even just displayed blanks.

For the remainder of characters, ad hoc and corporate solutions dominate the field of using seven-segment displays to show general words and phrases. Such applications of seven-segment displays are usually not considered essential and are only used for basic notifications on consumer electronics appliances (as is the case of this article's example phrases), and as internal test messages on equipment under development.

Examples

The following phrases come from a portable media player's seven-segment display. They give a good illustration of an application where a seven-segment display may be sufficient for displaying letters, since the relevant messages are neither critical nor in any significant risk of being misunderstood, much due to the limited number and rigid domain specificity of the messages. As such, there is no direct need for a more expressive display, in this case, although even a slightly wider repertoire of messages would require at least a 14-segment display or a dot matrix one.

On		**Off**	
Close		**Play**	
Pause		**Stop**	
List		**Shuffle**	
Error		**Wait**	

See also

- Calculator spelling

References

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2. *BCD-to-Seven-Segment Decoders/Drivers: SN54246/SN54247/SN54LS247, SN54LS248 SN74246/SN74247/SN74LS247/SN74LS248* (http://www.ralphselectronics.com/ProductImages/SEMI-SN74247N.PDF) (PDF), Texas Instruments, March 1988 [March 1974], SDLS083, archived (https://web.archive.org/web/20170329223343/http://www.ralphselectronics.com/ProductImages/SEMI-SN74247N.PDF) (PDF) from the original on 2017-03-29, retrieved 2017-03-30, "[…] They can be used interchangeable in present or future designs to offer designers a choice between two indicator fonts. The '46A, '47A, 'LS47, and 'LS48 compose the 6 and the 9 without tails and the '246, '247, 'LS247, and 'LS248 compose the 6 and the 0 with tails. Composition of all other characters, including display patterns for BCD inputs above nine, is identical. […] Display patterns for BCD input counts above 9 are unique symbols to authenticate input conditions. […]"
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9. *electronic calculator – TI LCD programmer* (http://www.datamath.net/Manuals/LCD-Programmer_US.pdf) (PDF). Texas Instruments Incorporated. 1981. p. 8. Archived (https://web.archive.org/web/20170328231558/http://www.datamath.net/Manuals/LCD-Programmer_US.pdf) (PDF) from the original on 2017-03-28. Retrieved 2017-03-28.

External links

- Seven Segment Optical Character Recognition