REFERENCE SHEET · RFC 20 · USAS X3.4-1968

USA Standard Code *for Information Interchange*

Vint Cerf · UCLA

Network Working Group · RFC 20, *ASCII format for Network Interchange* · 16 October 1969

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b7 b6 b5 b4 b3 b2 b1	0 0 0 0	0 0 1 1	0 1 0 2	0 1 1 3	1 0 0 4	1 0 1 5	1 1 0 6	1 1 1 7
0 0 0 0 0	0 00 **NUL** Null	16 10 **DLE** Data Link Escape CC	32 20 **SP** Space *(Normally Non-Printing)*	48 30 0	64 40 @ Commercial At[3]	80 50 P	96 60 ` Grave Accent *(Opening Single Quotation Mark)*[2,3]	112 70 p
1 0 0 0 1	1 01 **SOH** Start of Heading CC	17 11 **DC1** Device Control 1	33 21 ! Exclamation Point	49 31 1	65 41 A	81 51 Q	97 61 a	113 71 q
2 0 0 1 0	2 02 **STX** Start of Text CC	18 12 **DC2** Device Control 2	34 22 " Quotation Marks *(Diaeresis)*[2]	50 32 2	66 42 B	82 52 R	98 62 b	114 72 r
3 0 0 1 1	3 03 **ETX** End of Text CC	19 13 **DC3** Device Control 3	35 23 # Number Sign[3,4]	51 33 3	67 43 C	83 53 S	99 63 c	115 73 s
4 0 1 0 0	4 04 **EOT** End of Transmission CC	20 14 **DC4** Device Control 4 *(Stop)*	36 24 $ Dollar Sign	52 34 4	68 44 D	84 54 T	100 64 d	116 74 t
5 0 1 0 1	5 05 **ENQ** Enquiry CC	21 15 **NAK** Negative Acknowledge CC	37 25 % Percent	53 35 5	69 45 E	85 55 U	101 65 e	117 75 u
6 0 1 1 0	6 06 **ACK** Acknowledge CC	22 16 **SYN** Synchronous Idle CC	38 26 & Ampersand	54 36 6	70 46 F	86 56 V	102 66 f	118 76 v
7 0 1 1 1	7 07 **BEL** Bell *(audible or attention signal)*	23 17 **ETB** End of Transmission Block CC	39 27 ' Apostrophe *(Closing Single Quotation Mark Acute Accent)*[2]	55 37 7	71 47 G	87 57 W	103 67 g	119 77 w
8 1 0 0 0	8 08 **BS** Backspace FE	24 18 **CAN** Cancel	40 28 (Opening Parenthesis	56 38 8	72 48 H	88 58 X	104 68 h	120 78 x
9 1 0 0 1	9 09 **HT** Horizontal Tabulation *(punched card skip)* FE	25 19 **EM** End of Medium	41 29) Closing Parenthesis	57 39 9	73 49 I	89 59 Y	105 69 i	121 79 y
10 1 0 1 0	10 0A **LF** Line Feed FE	26 1A **SUB** Substitute	42 2A * Asterisk	58 3A : Colon	74 4A J	90 5A Z	106 6A j	122 7A z
11 1 0 1 1	11 0B **VT** Vertical Tabulation FE	27 1B **ESC** Escape	43 2B + Plus	59 3B ; Semicolon	75 4B K	91 5B [Opening Bracket[3]	107 6B k	123 7B { Opening Brace[3]
12 1 1 0 0	12 0C **FF** Form Feed FE	28 1C **FS** File Separator IS	44 2C , Comma *(Cedilla)*[2]	60 3C < Less Than	76 4C L	92 5C \ Reverse Slant[3]	108 6C l	124 7C | Vertical Line[3]
13 1 1 0 1	13 0D **CR** Carriage Return FE	29 1D **GS** Group Separator IS	45 2D - Hyphen *(Minus)*	61 3D = Equals	77 4D M	93 5D] Closing Bracket[3]	109 6D m	125 7D } Closing Brace[3]
14 1 1 1 0	14 0E **SO** Shift Out	30 1E **RS** Record Separator IS	46 2E . Period *(Decimal Point)*	62 3E > Greater Than	78 4E N	94 5E ^ Circumflex[2,3]	110 6E n	126 7E ~ Overline *(Tilde; General Accent)*[2,3]
15 1 1 1 1	15 0F **SI** Shift In	31 1F **US** Unit Separator IS	47 2F / Slant	63 3F ? Question Mark	79 4F O	95 5F _ Underline	111 6F o	127 7F **DEL** Delete[1]

The code

RFC 20, *ASCII format for Network Interchange*, written by Vint Cerf at UCLA and dated 16 October 1969, proposes standard 7-bit ASCII in an 8-bit byte whose high-order bit is always 0, for the HOST-HOST connections of the network. It attaches the code of the USA Standard Code for Information Interchange, USAS X3.4-1968, whose table is set above with the names of its legend. The RFC Editor lists RFC 20 as Internet Standard STD 80.

Reading the table

A character is a number of seven bits, b7 the high-order bit and b1 the low-order bit. Bits b7, b6 and b5 give the column, 0 to 7, and bits b4 to b1 the row, 0 to 15, so that the standard can name a position as column/row: K is at 4/11, bits 1001011. Each cell gives the code in decimal, 16 times the column plus the row, and in hexadecimal, whose two digits are the column and the row. Letters and digits have no name in the legend.

The standard defines the order of any two characters, for collation, by their binary values, and prescribes no type style for the graphics.

Control characters

Columns 0 and 1 hold 32 control characters, shown by their abbreviations. The legend marks three groups:

- **CC**, communication control: SOH, STX, ETX, EOT, ENQ, ACK, DLE, NAK, SYN and ETB.
- **FE**, format effector: BS, HT, LF, VT, FF and CR.
- **IS**, information separator: FS, GS, RS and US, from the most inclusive, FS, to the least, US.

SP, the space at 2/0, is a graphic character, normally non-printing, and DEL, at 7/15, is not a control character in the strict sense.

Notes of the legend

Small figures in the table refer to the notes of the legend of RFC 20:

1. DEL is not a control character in the strict sense.
2. The symbols at 2/2, 2/7, 2/12, 5/14, 6/0 and 7/14 can also serve as diacritical marks, as Appendix A of the standard describes; RFC 20 does not reproduce its appendixes.
3. These characters should not be used in international interchange without agreement between sender and recipient.
4. Where the number sign is not needed, the pound sterling symbol may take position 2/3.

Data: RFC 20 (Vint Cerf, UCLA, 1969; Internet Standard STD 80), which copies the code of USAS X3.4-1968. Compilation: MIT.

Names, abbreviations and notes as in the legend of RFC 20; the text was written for this sheet in 2026.