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

7

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.