

ECMA

EUROPEAN COMPUTER MANUFACTURERS ASSOCIATION

STANDARD ECMA-118

8-BIT SINGLE-BYTE
CODED GRAPHIC CHARACTER SETS

LATIN/GREEK ALPHABET

December 1986

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BRIEF HISTORY

The adoption of ECMA-6 (ISO 646) as the agreed international 7-bit code for information interchange had led to the development of many national, international and application-oriented versions of this code which are in wide use today.

These versions have a number of limitations generally inherent to the size of the code:

- they do not provide all graphic characters which may be needed,
- for some characters, specially for accented letters, it is necessary to resort to BACKSPACE sequences, which creates problems when processing data containing such composite characters,
- interchange among different versions is practically limited to the 82 common graphic characters.

With the advent of 8-bit coding it was possible to increase the number of graphic characters. ISO 6937/2, for example, provides a character set covering the requirements of most languages based on the Latin alphabet. This character set, although well suited for text communication, is difficult to use for processing as some graphic characters are represented by one and others by two bit combinations.

Thus the need was recognized for coded graphic character sets, each of which:

- is the same for all users of a given area,
- provides single-byte coding of all graphic characters thus permitting easy processing,
- takes into account character sets used in the industry.

Since 1982 the urgency of the need for an 8-bit single-byte coded character set was recognized in ECMA as well as in ANSI/X3L2 and numerous working papers were exchanged between the two groups. In February 1984 ECMA TC1 submitted to ISO/TC97/SC2 a proposal for such a coded character set. At its meeting of April 1984 SC2 decided to submit to TC97 a proposal for a new item of work for this topic. Technical discussions during and after this meeting led TC1 to adopt the coding scheme proposed by X3L2. International Standard ISO 8859/1 is based on this joint ANSI/ECMA proposal. ECMA published the 1st edition of its corresponding Standard ECMA-94 in March 1985.

After this first publication, the work of ECMA TC1 on further coded graphic character sets has led to the following results:

- i) The present Standard for a Latin/Greek coded graphic character set. This set has been agreed by ELOT, the Greek Standardization Institution. It will be submitted to ISO for processing under the fast-track procedure.

- ii) The second Edition of Standard ECMA-94, dated June 1986, comprising four coded graphic character sets for the Latin script, identified as Latin Alphabets No 1 to No 4. These alphabets have a number of characters in common, in particular those allocated to columns 02 to 07. Latin Alphabet No 2 has been submitted to ISO and is the subject of ISO 8859/2. Latin Alphabets No. 3 and No. 4 are processed as ISO DP 8859/3 and DP 8859/4.
- iii) A series of ECMA Standards for coded graphic character sets comprising those characters of the Latin Alphabets allocated to columns 02 to 07 and characters of another script for multiple-language applications. These ECMA Standards cover the Cyrillic and Arabic scripts. They have been submitted to ISO as DIS 8859/5 and DIS 8859/6, respectively, for fast-track processing as ISO standards.

Adopted as an ECMA Standard by the General Assembly of December 12, 1986.

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1. SCOPE

This ECMA Standard defines a set of 185 graphic characters identified as Latin/Greek Alphabet, and specifies the coded representation of each of these characters by means of a single 8-bit byte. None of these characters are "non-spacing".

The use of control functions, such as BACKSPACE or CARRIAGE RETURN for the coded representation of composite characters is prohibited by this Standard.

2. FIELD OF APPLICATION

This set of graphic characters, the Latin/Greek Alphabet, is intended for use in data and text processing applications and may also be used for information interchange.

This set is suited for multiple-language applications involving the Latin and the Greek scripts. It allows handling of data and text expressed in Greek.

This set of graphic characters is suitable for use in a version of an 8-bit code according to ECMA-35 or ECMA-43.

3. CONFORMANCE

A set of graphic characters is in conformance with this Standard if it comprises all graphic characters specified herein to the exclusion of any other and if their coded representations are those specified by this Standard.

4. REFERENCES

ECMA-6 : 7-bit Input/Output Coded Character Set

ECMA-35 : Code Extension Techniques

ECMA-43 : 8-bit Coded Character Set - Structure and Rules

ECMA-48 : Control Functions

ECMA-94 : 8-bit Single-Byte Coded Graphic Character Sets - Latin Alphabets No 1 to No 4.

ECMA-113 : 8-bit Single-Byte Coded Graphic Character Sets - Latin/Cyrillic Alphabet

ECMA-114 : 8-bit Single-Byte Coded Graphic Character Sets - Latin/Arabic Alphabet

5. DEFINITIONS

For the purpose of this Standard the following definitions apply:

5.1 Bit Combination; Byte

An ordered set of bits that represents a character or is used as a part of the representation of a character.

5.2 Character

A member of a set of elements used for the organization, control or representation of data.

5.3 Coded Character Set; Code

A set of unambiguous rules that establishes a character set and the one-to-one relationship between each character of the set and its coded representation.

5.4 Code Table

A table showing the character allocated to each bit combination in a code.

5.5 Graphic Character

A character, other than a control function, that has a visual representation normally handwritten, printed or displayed, and that has a coded representation consisting of one or more bit combinations.

Note 1

In this Standard a single bit combination is used to represent each character.

5.6 Graphic Symbol

A visual representation of a graphic character.

5.7 Position

That part of a code table identified by its column and row co-ordinates.

6. NOTATION, CODE TABLE AND NAMES

6.1 Notation

The bits of the bit combinations of the 8-bit code are identified by $b_8, b_7, b_6, b_5, b_4, b_3, b_2$ and b_1 , where b_8 is the highest-order, or most-significant bit and b_1 is the lowest-order, or least-significant bit.

The bit combinations may be interpreted to represent numbers in binary notation by attributing the following weights to the individual bits:

Bit	b_8	b_7	b_6	b_5	b_4	b_3	b_2	b_1
Weight	128	64	32	16	8	4	2	1

Using these weights, the bit combinations of the 8-bit code represent numbers in the range 0 to 255.

In this Standard, the bit combinations are identified by notations of the form xx/yy , where xx and yy are numbers in the range 00 to 15. The correspondence between the notations of the form xx/yy and the bit combinations consisting of the bits b_8 to b_1 , is as follows:

- xx is the number represented by b_8 , b_7 , b_6 and b_5 where these bits are given the weights 8, 4, 2 and 1 respectively;
- yy is the number represented by b_4 , b_3 , b_2 and b_1 where these bits are given the weights 8, 4, 2 and 1 respectively.

6.2 Layout of the Code Table

An 8-bit code table consists of 256 positions arranged in 16 columns and 16 rows. The columns and the rows are numbered 00 to 15.

The code table positions are identified by notations of the form xx/yy, where xx is the column number and yy is the row number.

The positions of the code table are in one-to-one correspondence with the bit combinations of the code. The notation of a code table position, of the form xx/yy, is the same as that of the corresponding bit combination.

6.3 Names and Meanings

This Standard assigns at least one name to each character. In addition, it specifies a graphic symbol for each graphic character. By convention only capital letters, the graphic symbols of small letters and hyphens are used for writing the names of the characters.

The names chosen to denote graphic characters are intended to reflect their customary meaning. However, except for SPACE (SP), NO-BREAK SPACE (NBSP) and SOFT HYPHEN (SHY), this Standard does not define and does not restrict the meanings of graphic characters. Neither does it specify a particular style or font design for imaging graphic characters.

6.3.1 SPACE (SP)

This character may be interpreted as a graphic character, a control character or as both. As a graphic character it has the visual representation consisting of the absence of a graphic symbol.

6.3.2 NO-BREAK SPACE (NBSP)

A graphic character the visual representation of which consists of the absence of a graphic symbol, for use when a line break is to be prevented in the text as presented.

6.3.3 SOFT HYPHEN (SHY)

A graphic character that is imaged by a graphic symbol identical with, or similar to, that representing HYPHEN, for use when a line break has been established within a word.

7. SPECIFICATION OF THE CODED CHARACTER SET

This Standard specifies 185 characters allocated to the bit combinations of the Code Table.

7.1 Characters of the Set and their Coded Representation

Bit Combination	Name
02/00	SPACE
02/01	EXCLAMATION MARK
02/02	QUOTATION MARK
02/03	NUMBER SIGN
02/04	DOLLAR SIGN
02/05	PERCENT SIGN
02/06	AMPERSAND
02/07	APOSTROPHE
02/08	LEFT PARENTHESIS
02/09	RIGHT PARENTHESIS
02/10	ASTERISK
02/11	PLUS SIGN
02/12	COMMA
02/13	HYPHEN, MINUS SIGN
02/14	FULL STOP
02/15	SOLIDUS
03/00	DIGIT ZERO
03/01	DIGIT ONE
03/02	DIGIT TWO
03/03	DIGIT THREE
03/04	DIGIT FOUR
03/05	DIGIT FIVE
03/06	DIGIT SIX
03/07	DIGIT SEVEN
03/08	DIGIT EIGHT
03/09	DIGIT NINE
03/10	COLON
03/11	SEMICOLON (Eromatiko)
03/12	LESS-THAN SIGN

Bit Combination	Name
03/13	EQUALS SIGN
03/14	GREATER-THAN SIGN
03/15	QUESTION MARK
04/00	COMMERCIAL AT
04/01	CAPITAL LETTER A
04/02	CAPITAL LETTER B
04/03	CAPITAL LETTER C
04/04	CAPITAL LETTER D
04/05	CAPITAL LETTER E
04/06	CAPITAL LETTER F
04/07	CAPITAL LETTER G
04/08	CAPITAL LETTER H
04/09	CAPITAL LETTER I
04/10	CAPITAL LETTER J
04/11	CAPITAL LETTER K
04/12	CAPITAL LETTER L
04/13	CAPITAL LETTER M
04/14	CAPITAL LETTER N
04/15	CAPITAL LETTER O
05/00	CAPITAL LETTER P
05/01	CAPITAL LETTER Q
05/02	CAPITAL LETTER R
05/03	CAPITAL LETTER S
05/04	CAPITAL LETTER T
05/05	CAPITAL LETTER U
05/06	CAPITAL LETTER V
05/07	CAPITAL LETTER W
05/08	CAPITAL LETTER X
05/09	CAPITAL LETTER Y
05/10	CAPITAL LETTER Z
05/11	LEFT SQUARE BRACKET
05/12	REVERSE SOLIDUS
05/13	RIGHT SQUARE BRACKET
05/14	CIRCUMFLEX ACCENT
05/15	LOW LINE
06/00	GRAVE ACCENT

Bit Combination	Name
06/01	SMALL LETTER a
06/02	SMALL LETTER b
06/03	SMALL LETTER c
06/04	SMALL LETTER d
06/05	SMALL LETTER e
06/06	SMALL LETTER f
06/07	SMALL LETTER g
06/08	SMALL LETTER h
06/09	SMALL LETTER i
06/10	SMALL LETTER j
06/11	SMALL LETTER k
06/12	SMALL LETTER l
06/13	SMALL LETTER m
06/14	SMALL LETTER n
06/15	SMALL LETTER o
07/00	SMALL LETTER p
07/01	SMALL LETTER q
07/02	SMALL LETTER r
07/03	SMALL LETTER s
07/04	SMALL LETTER t
07/05	SMALL LETTER u
07/06	SMALL LETTER v
07/07	SMALL LETTER w
07/08	SMALL LETTER x
07/09	SMALL LETTER y
07/10	SMALL LETTER z
07/11	LEFT CURLY BRACKET
07/12	VERTICAL LINE
07/13	RIGHT CURLY BRACKET
07/14	TILDE
10/00	NO-BREAK SPACE
10/01	LEFT SINGLE QUOTATION MARK
10/02	RIGHT SINGLE QUOTATION MARK
10/03	POUND SIGN
10/04	This position shall not be used
10/05	This position shall not be used

Bit Combination	Name
10/06	BROKEN BAR
10/07	PARAGRAPH SIGN
10/08	DIAERESIS (Dialytika)
10/09	COPYRIGHT SIGN
10/10	This position shall not be used
10/11	LEFT ANGLE QUOTATION MARK
10/12	NOT SIGN
10/13	SOFT HYPHEN
10/14	This position shall not be used
10/15	HORIZONTAL BAR (Parenthetiki pavla)
11/00	DEGREE SIGN
11/01	PLUS-MINUS SIGN
11/02	SUPERSCRIPIT TWO
11/03	SUPERSCRIPIT THREE
11/04	ACCENT (Tonos)
11/05	DIAERESIS AND ACCENT (Dialytika and Tonos)
11/06	CAPITAL GREEK LETTER ALPHA WITH ACCENT
11/07	MIDDLE DOT (Ano Teleia)
11/08	CAPITAL GREEK LETTER EPSILON WITH ACCENT
11/09	CAPITAL GREEK LETTER ETA WITH ACCENT
11/10	CAPITAL GREEK LETTER IOTA WITH ACCENT
11/11	RIGHT ANGLE QUOTATION MARK
11/12	CAPITAL GREEK LETTER OMICRON WITH ACCENT
11/13	VULGAR FRACTION ONE HALF
11/14	CAPITAL GREEK LETTER UPSILON WITH ACCENT
11/15	CAPITAL GREEK LETTER OMEGA WITH ACCENT
12/00	SMALL GREEK LETTER IOTA WITH DIAERESIS AND ACCENT
12/01	CAPITAL GREEK LETTER ALPHA
12/02	CAPITAL GREEK LETTER BETA
12/03	CAPITAL GREEK LETTER GAMMA
12/04	CAPITAL GREEK LETTER DELTA
12/05	CAPITAL GREEK LETTER EPSILON
12/06	CAPITAL GREEK LETTER ZETA
12/07	CAPITAL GREEK LETTER ETA
12/08	CAPITAL GREEK LETTER THETA
12/09	CAPITAL GREEK LETTER IOTA

Bit Combination	Name
12/10	CAPITAL GREEK LETTER KAPPA
12/11	CAPITAL GREEK LETTER LAMDA
12/12	CAPITAL GREEK LETTER MU
12/13	CAPITAL GREEK LETTER NU
12/14	CAPITAL GREEK LETTER KSI
12/15	CAPITAL GREEK LETTER OMICRON
13/00	CAPITAL GREEK LETTER PI
13/01	CAPITAL GREEK LETTER RHO
13/02	This position shall not be used
13/03	CAPITAL GREEK LETTER SIGMA
13/04	CAPITAL GREEK LETTER TAU
13/05	CAPITAL GREEK LETTER UPSILON
13/06	CAPITAL GREEK LETTER PHI
13/07	CAPITAL GREEK LETTER KHI
13/08	CAPITAL GREEK LETTER PSI
13/09	CAPITAL GREEK LETTER OMEGA
13/10	CAPITAL GREEK LETTER IOTA WITH DIAERESIS
13/11	CAPITAL GREEK LETTER UPSILON WITH DIAERESIS
13/12	SMALL GREEK LETTER ALPHA WITH ACCENT
13/13	SMALL GREEK LETTER EPSILON WITH ACCENT
13/14	SMALL GREEK LETTER ETA WITH ACCENT
13/15	SMALL GREEK LETTER IOTA WITH ACCENT
14/00	SMALL GREEK LETTER UPSILON WITH DIAERESIS AND ACCENT
14/01	SMALL GREEK LETTER ALPHA
14/02	SMALL GREEK LETTER BETA
14/03	SMALL GREEK LETTER GAMMA
14/04	SMALL GREEK LETTER DELTA
14/05	SMALL GREEK LETTER EPSILON
14/06	SMALL GREEK LETTER ZETA
14/07	SMALL GREEK LETTER ETA
14/08	SMALL GREEK LETTER THETA
14/09	SMALL GREEK LETTER IOTA
14/10	SMALL GREEK LETTER KAPPA
14/11	SMALL GREEK LETTER LAMDA
14/12	SMALL GREEK LETTER MU
14/13	SMALL GREEK LETTER NU

Bit Combination	Name
14/14	SMALL GREEK LETTER KSI
14/15	SMALL GREEK LETTER OMICRON
15/00	SMALL GREEK LETTER PI
15/01	SMALL GREEK LETTER RHO
15/02	SMALL GREEK LETTER TERMINAL SIGMA
15/03	SMALL GREEK LETTER SIGMA
15/04	SMALL GREEK LETTER TAU
15/05	SMALL GREEK LETTER UPSILON
15/06	SMALL GREEK LETTER PHI
15/07	SMALL GREEK LETTER KHI
15/08	SMALL GREEK LETTER PSI
15/09	SMALL GREEK LETTER OMEGA
15/10	SMALL GREEK LETTER IOTA WITH DIAERESIS
15/11	SMALL GREEK LETTER UPSILON WITH DIAERESIS
15/12	SMALL GREEK LETTER OMICRON WITH ACCENT
15/13	SMALL GREEK LETTER UPSILON WITH ACCENT
15/14	SMALL GREEK LETTER OMEGA WITH ACCENT
15/15	This position shall not be used

7.2 Code Table

The Code Table shows the characters listed at the position in the code table corresponding to the specified bit combination.

The shaded positions correspond to bit combinations that do not represent graphic characters. Their use is outside the scope of this Standard, it is specified in other ECMA Standards, e.g. ECMA-6 or ECMA-48.

The cross-hatched positions indicate bit combinations that are reserved for future standardization (see 9.).

8. DESIGNATION OF THE CHARACTER SET

The graphic characters of this Standard constitute a single coded character set. However, when this character set is implemented together with other coding standards such as ECMA-35 or ECMA-43, the Code Table of this Standard shall be considered to consist of the following components:

- The character SPACE represented by bit combination 02/00.
- A 94-character G0 graphic character set represented by bit combinations 02/01 to 07/14.
- A 96-character G1 graphic character set represented by bit combinations 10/00 to 15/15.

When required by other coding standards, e.g. ECMA-35 or ECMA-43 the following pair of escape sequences shall be used:

ESC 02/08 04/02
ESC 02/13 04/06

to designate the G0 and the G1 sets, respectively. According to ECMA-35 the character SPACE does not require designation.

9. BIT COMBINATIONS NOT TO BE USED

Bit combinations 10/04, 10/05, 10/10, 10/14, 13/02 and 15/15 are reserved for future standardization and shall not be used. They are cross-hatched in the Code Table.

Any allocation of characters to these positions is incompatible with this Standard.

CODE TABLE

b.	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1					
b.	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1				
b.	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1				
b.	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1				
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15				
b.	b.	b.	b.																	
0	0	0	0	00			SP	0	@	P	`	p			NBSP	°	ı̇	Π	ı̇	π
0	0	0	1	01			!	1	A	Q	a	q			'	±	Λ	P	α	ρ
0	0	1	0	02			"	2	B	R	b	r			,	2	B	⊗	β	s
0	0	1	1	03			#	3	C	S	c	s			£	3	Γ	Σ	γ	σ
0	1	0	0	04			\$	4	D	T	d	t			⊗	'	Δ	T	δ	τ
0	1	0	1	05			%	5	E	U	e	u			⊗	!	E	Υ	ε	υ
0	1	1	0	06			&	6	F	V	f	v			!	'A	Z	Φ	ζ	φ
0	1	1	1	07			'	7	G	W	g	w			§	.	H	X	η	χ
1	0	0	0	08			(	8	H	X	h	x			"	'E	Θ	Ψ	θ	ψ
1	0	0	1	09			)	9	I	Y	i	y			©	'H	I	Ω	ι	ω
1	0	1	0	10			*	:	J	Z	j	z			⊗	'I	K	İ	κ	ï
1	0	1	1	11			+	;	K	Γ	k	ç			«	»	Λ	ÿ	λ	ü
1	1	0	0	12			,	<	L	\	l	|			-	'O	M	ά	μ	ό
1	1	0	1	13			-	=	M	]	m	ÿ			SHY	½	N	é	ν	ù
1	1	1	0	14			.	>	N	^	n	~			⊗	'Υ	Ξ	ή	ξ	ώ
1	1	1	1	15			/	?	0	_	o				-	'Ω	O	ı̇	o	⊗

