

ECMA

EUROPEAN COMPUTER MANUFACTURERS ASSOCIATION

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ECMA STANDARD

for

THE IMPLEMENTATION OF THE  
ECMA 7 BIT CODED CHARACTER SET  
ON PUNCHED CARDS

June 1969

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## BRIEF HISTORY

On April 30, 1965, ECMA adopted their Standard ECMA-6 for a 7 Bit Coded Character Set for Information Interchange. In the form adopted it included no proposals for implementation in media which were deliberately left as the subject for future standards.

This Standard ECMA-20 defines a representation of the ECMA 7 Bit Coded Character Set on Punched Cards. The proposed assignment has not been chosen because of its technical merits but mainly because it seems pragmatic to adopt a solution which is more or less compatible with most existing punched card files.

The Committee TC1 have cooperated with following organizations in preparing this standard:

Association Française de Normalisation (AFNOR)

International Organization for Standardization (ISO)

USA Standards Institute (USASI)

On June 12, 1969, this Standard ECMA-20 was adopted by the General Assembly of ECMA.

ECMA STANDARD FOR THE REPRESENTATION OF THE  
STANDARD ECMA 7 BIT CODED CHARACTER SET  
ON 12 ROW PUNCHED CARDS

1. GENERAL

1.1 Scope

The present Standard ECMA-20 specifies the representation of the ECMA 7 Bit Coded Character Set on 12 Row Punched Cards. This representation is derived from and compatible with the code known as "Hollerith Code". It will ensure compatibility with a large proportion of existing punched cards files.

It does not specify any redundancy nor does it define techniques for error control.

1.2 Field of application

This Standard is intended for the general interchange of information among data processing systems, when using 12 Row Punched Cards.

1.3 References

1.3.1 Character Sets

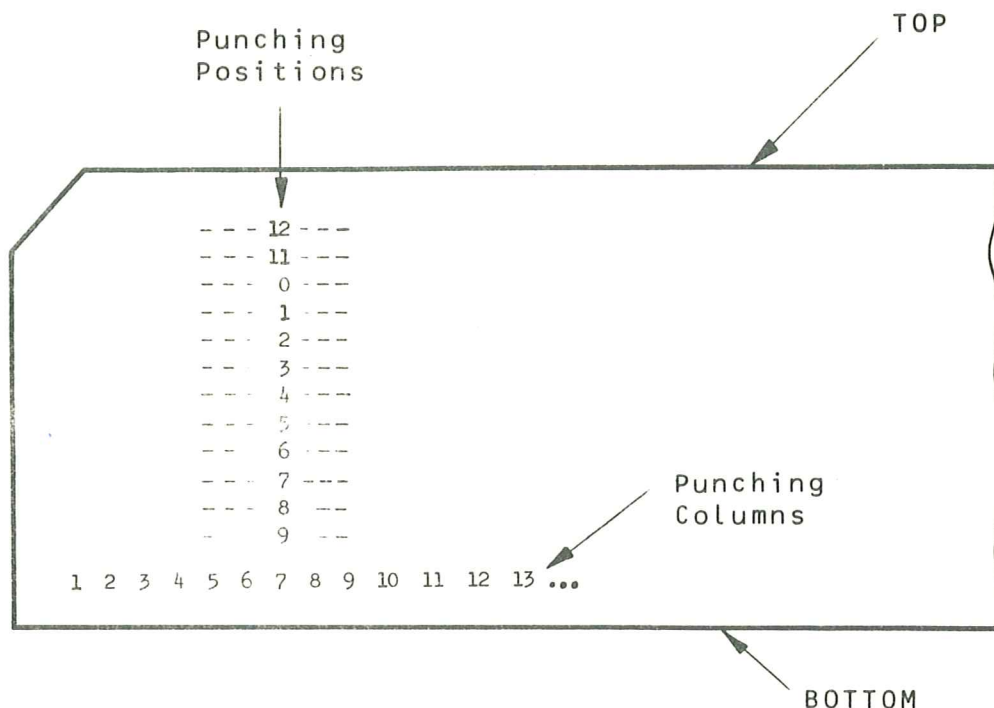
The present Standard refers to the 7 Bit Coded Character Set which is the subject of the Standard ECMA-6. If the characters of a restricted set (a 4 bit set for example) are to be represented on punched cards, they shall be represented by the same hole patterns as the corresponding characters in the full 7 bit set. If any ambiguity should arise, the choice of the corresponding characters requires agreement between the sender and the recipient of the cards.

1.3.2 Punched cards

A punched card as referred to in this Standard is a document in which characters are represented in successive columns, each column having twelve possible punching positions designated 12, 11, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 (see Fig. I). This Standard does not define the number of columns in a card, nor the shape of the holes punched in a card, nor any of its other physical characteristics.

Fig. 1

LAYOUT OF PUNCHING POSITIONS



2. SPECIFICATION

Table 1 specifies the card hole-patterns representing each bit combination of the ECMA 7 bit code.

The headings for the columns and row are identified by numbers written in binary and decimal notations identical to those used in Standard ECMA-6. Any one position in Table I may be identified by its column and row number (e.g. 6/11), or by the corresponding bit combination (e.g. 110 1011), and a character is allocated to each position (e.g. small letter k to position 6/11), except for those positions which are reserved for national use as explained in Standard ECMA-6.

The entries in the table are card hole-patterns. A single hole-pattern (such as 12-11-2 in position 6/11) is to be punched in a single column of the twelve-row punched card. It comprises a maximum of five different punching positions designated as defined in paragraph 1.3.2 and separated by hyphens.

TABLE I

Card hole patterns assigned to the 128 bit combinations of the ECMA 7 Bit Code Table

							0	0	0	0	1	1	1	1
							0	0	1	1	0	0	1	1
							0	1	0	1	0	1	0	1
							0	1	2	3	4	5	6	7
b <sub>7</sub>	b <sub>6</sub>	b <sub>5</sub>	b <sub>4</sub>	b <sub>3</sub>	b <sub>2</sub>	b <sub>1</sub>	Column							
Row														
0	0	0	0	0	0	0	12-0 9-8-1	12-11 9-8-1	no punch	0	8-4	11-7	8-1	12-11 7
0	0	0	1	1	1	1	12 9-1	11 9-1	12 8-7	1	12-1	11-8	12-0 1	12-11 8
0	0	1	0	0	0	2	12 9-2	11 9-2	8-7	2	12-2	11-9	12-0 2	12-11 9
0	0	1	1	1	1	3	12 9-3	11 9-3	8-3	3	12-3	0-2	12-0 3	11-0 2
0	1	0	0	0	0	4	9-7	9-8-4	11 8-3	4	12-4	0-3	12-0 4	11-0 3
0	1	0	1	1	1	5	0 9-8-5	9-8-5	0 8-4	5	12-5	0-4	12-0 5	11-0 4
0	1	1	0	0	0	6	0 9-8-6	9-2	12	6	12-6	0-5	12-0 6	11-0 5
0	1	1	1	1	1	7	0 9-8-7	0 9-6	8-5	7	12-7	0-6	12-0 7	11-0 6
1	0	0	0	0	0	8	11 9-5	11 9-8	12 8-5	8	12-8	0-7	12-0 8	11-0 7
1	0	0	1	1	1	9	12 9-5	11 9-8-1	11 8-5	9	12-9	0-8	12-0 9	11-0 8
1	0	1	0	0	0	10	0 9-5	9-8-7	11 8-4	8-2	11-1	0-9	12-11 1	11-0 9
1	0	1	1	1	1	11	12 9-8-3	0 9-7	12 8-6	11 8-6	11-2	12 8-2	12-11 2	12-0
1	1	0	0	0	0	12	12 9-8-4	11 9-8-4	0 8-3	12 8-4	11-3	0 8-2	12-11 3	12-11
1	1	0	1	1	1	13	12 9-8-5	11 9-8-5	11	8-6	11-4	11 8-2	12-11 4	11-0
1	1	1	0	0	0	14	12 9-8-6	11 9-8-6	12 8-3	0 8-6	11-5	11 8-7	12-11 5	11-0 1
1	1	1	1	1	1	15	12 9-8-7	11 9-8-7	0-1	0 8-7	11-6	0 8-5	12-11 6	12 9-7

APPENDIX 1

BIT-PATTERNS ASSIGNED TO CARD HOLE-PATTERNS

For ease of reference and with a view to helping the reader, the correspondence defined by the present Standard in Table I between the 128 bit combinations of the 7 bit code and 128 hole patterns is shown hereafter in another form.

Table II shows all possible combinations of 12, 11, 0, 8 and 9 (incl. NO PUNCH) on the one hand and one only of "no punch", 1, 2, 3, 4, 5, 6, or 7 on the other hand.

The layout of the table is as follows:

- the columns, the left half of the rows, and the right half of the rows are labelled with card hole-patterns;
- the entries of the table represent the column/row position in the 7 bit code table of Standard ECMA-6.

Example: The card hole-pattern 12-11-2 corresponds to position 6/11 of the 7 bit code table.



Table II - ECMA 7 bit code table positions assigned to card hole-patterns

	12	11	0		12	11	0		12	11	0		12	11	0		12	11	0		
	2/6	2/13	3/0	2/0	7/11	7/12	7/13						6/0								8-1
1	4/1	4/10	2/15	3/1	6/1	6/10	7/14						0/1	1/1							9-1
2	4/2	4/11	5/3	3/2	6/2	6/11	7/3						0/2	1/2		1/6					9-2
3	4/3	4/12	5/4	3/3	6/3	6/12	7/4						0/3	1/3							9-3
4	4/4	4/13	5/5	3/4	6/4	6/13	7/5														9-4
5	4/5	4/14	5/6	3/5	6/5	6/14	7/6						0/9		0/10						9-5
6	4/6	4/15	5/7	3/6	6/6	6/15	7/7							0/8	1/7						9-6
7	4/7	5/0	5/8	3/7	6/7	7/0	7/8						7/15		1/11	0/4					9-7
8	4/8	5/1	5/9	3/8	6/8	7/1	7/9							1/8							9-8
9	4/9	5/2	5/10	3/9	6/9	7/2	7/10							1/9		0/0	1/0				9-8-1
8-2	5/11	5/13	5/12	3/10																	9-8-2
8-3	2/14	2/4	2/12	2/3									0/11								9-8-3
8-4	3/12	2/10	2/5	4/0									0/12	1/12		1/4					9-8-4
8-5	2/8	2/9	5/15	2/7									0/13	1/13	0/5	1/5					9-8-5
8-6	2/11	3/11	3/14	3/13									0/14	1/14	0/6						9-8-6
8-7	2/1	5/14	3/15	2/2									0/15	1/15	0/7	1/10					9-8-7

Table IIa - Characters of the ECMA 7 bit code assigned to card hole-patterns

	12	11	0		12	11	0		12	11	0		12	11	0		12	11	0		
	&	-	0	SP	7/11	7/12	7/13														8-1
1	A	J	/	1	a	j	7/14						SOH	DC <sub>1</sub>							9-1
2	B	K	S	2	b	k	s						STX	DC <sub>2</sub>		SYN					9-2
3	C	L	T	3	c	l	t						ETX	DC <sub>3</sub>							9-3
4	D	M	U	4	d	m	u														9-4
5	E	N	V	5	e	n	v						HT		LF						9-5
6	F	O	W	6	f	o	w							BS	ETB						9-6
7	G	P	X	7	g	p	x						DEL		ESC	EOT					9-7
8	H	Q	Y	8	h	q	y							CAN							9-8
9	I	R	Z	9	i	r	z							EM		NUL	DLE				9-8-1
8-2	5/11	5/13	5/12	:																	9-8-2
8-3	.	\$	,	£									VT								9-8-3
8-4	<	*	%	4/0									FF	FS		DC <sub>4</sub>					9-8-4
8-5	(	)	_	'									CR	GS	ENQ	NAK					9-8-5
8-6	+	;	>	=									SO	RS	ACK						9-8-6
8-7	!	^	?	"									SI	US	BEL	SUB					9-8-7

APPENDIX 2

CONSIDERATION OF NATIONAL USAGES

This Standard features a unique character assignment for each hole-pattern . It is recognized that this Standard differs, for a few characters, from established practice. Dual assignments may exist in fact for some time but should not be carried into the future.

APPENDIX 3

## ECMA 7 BIT CODED CHARACTER SET FOR INFORMATION INTERCHANGE

								0	0	0	0	1	1	1	1	
								0	0	1	1	0	0	1	1	
								0	1	0	1	0	1	0	1	
Bits	b <sub>7</sub>	b <sub>6</sub>	b <sub>5</sub>	b <sub>4</sub>	b <sub>3</sub>	b <sub>2</sub>	b <sub>1</sub>	Column	0	1	2	3	4	5	6	7
Row								0	1	2	3	4	5	6	7	
	0	0	0	0	0	0	0	NUL	TC <sub>7</sub> (DLE)	SP	0	(@) <sup>③</sup>	P	` <sup>④</sup>	p	
	0	0	0	1	1	1	1	TC <sub>1</sub> (SOH)	DC <sub>1</sub>	!	1	A	Q	a	q	
	0	0	1	0	0	0	0	TC <sub>2</sub> (STX)	DC <sub>2</sub>	"⑥	2	B	R	b	r	
	0	0	1	1	1	1	1	TC <sub>3</sub> (ETX)	DC <sub>3</sub>	£ <sup>② ⑦</sup>	3	C	S	c	s	
	0	1	0	0	0	0	0	TC <sub>4</sub> (EOT)	DC <sub>4</sub>	\$ <sup>②</sup>	4	D	T	d	t	
	0	1	0	1	1	1	1	TC <sub>5</sub> (ENQ)	TC <sub>8</sub> (NAK)	%	5	E	U	e	u	
	0	1	1	0	0	0	0	TC <sub>6</sub> (ACK)	TC <sub>9</sub> (SYN)	&	6	F	V	f	v	
	0	1	1	1	1	1	1	BEL	TC <sub>10</sub> (ETB)	'⑥	7	G	W	g	w	
	1	0	0	0	0	0	0	FE <sub>0</sub> (BS)	CAN	(	8	H	X	h	x	
	1	0	0	1	1	1	1	FE <sub>1</sub> (HT)	EM	)	9	I	Y	i	y	
	1	0	1	0	0	0	0	FE <sub>2</sub> (LF) <sup>①</sup>	SUB	*	:⑧	J	Z	j	z	
	1	0	1	1	1	1	1	FE <sub>3</sub> (VT)	ESC	+	;⑧	K	(I) <sup>③</sup>	k	③	
	1	1	0	0	0	0	0	FE <sub>4</sub> (FF)	IS <sub>4</sub> (FS)	,	<	L	③	l	③	
	1	1	0	1	1	1	1	FE <sub>5</sub> (CR) <sup>①</sup>	IS <sub>3</sub> (GS)	-	=	M	(J) <sup>③</sup>	m	③	
	1	1	1	0	0	0	0	SO	IS <sub>2</sub> (RS)	.	>	N	^④⑥	n	—④⑤	
	1	1	1	1	1	1	1	SI	IS <sub>1</sub> (US)	/	?	O	_	o	DEL	

