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# ECMA

EUROPEAN COMPUTER MANUFACTURERS ASSOCIATION

## ECMA STANDARD

for the

Representation of the Standard ECMA-6  
(7 bit Code) on Punched Cards

April 1965

Free copies of this standard ECMA-7 are available from  
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## BRIEF HISTORY

On April 30, 1965, ECMA adopted their Standard ECMA-6 for a 7-bit Character Code for Input and Output purposes. 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-7 for Data Interchange on Punched Cards is essentially associated with the physical implementation of the Standard for a 7-bit Code.

Adopted on April 30, 1965 by the General Assembly of ECMA as Standard ECMA-7.

PREFACE

This preface does not form part of the Standard.

1. In considering the representation of a seven bit code in punched cards the relative merits of attempting extensions of existing representations or changing to binary or to decimal representations were assessed. It was agreed that a decimal system was superior to either of the others. A number of different punched card codings are already in existence. Most of these are based upon a "binary coded decimal" notation and are largely incompatible with basic principles in the ECMA six and seven bit codes. On the other hand, the ECMA six and seven bit codes are also incompatible with basic principles of conventional punched card machines of which many thousands exist in installations today. A direct (binary) representation of the ECMA 6 and 7 bit codes in punched cards would, therefore, not be acceptable to conventional punched card machines. In addition such codes would, with multiple punching, weaken the cards so that many machines would have difficulties in feeding them, particularly at high speeds. It was appreciated that existing binary coded decimal codes would continue to be used for some considerable time and a standard has accordingly been produced so that the punching of numerals in existing codes is compatible with the new codes.
2. The main area of application of this Standard is for the interchange of data where compatibility between media and between industries (e.g. punched tape, magnetic tape, data transmission and public telecommunication facilities) is of primary importance. The Standard will also operate in new fields of application which are not closely linked with conventional punched card usage.
3. The card coding of the dense subset of the seven bit code, i.e. columns 2, 3, 4 and 5, is similar to or identical with some binary coded decimal codes, although the characters are ordered differently (apart from numerals). This makes it possible to handle the dense subset directly in certain existing equipments designed for use with a binary coded decimal code.

ECMA STANDARD FOR THE REPRESENTATION OF  
THE STANDARD ECMA 7 BIT CODE IN PUNCHED CARDS

Introduction

1. The Standard ECMA-6 for a 7 bit Input/Output Character Code defined a character set comprising letters, figures, punctuation marks, special symbols and controls and their seven bit coded representation. It was primarily designed for the interchange of information among data processing systems and associated equipment, with due attention to the integration of computers and communication systems. This code table is reproduced as an Appendix.
2. This Standard deals with the representation of the 7 bit code of the Standard ECMA-6 in punched cards.
3. 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 A, B, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, (see Chart 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.

Definitions

1. For ease of reference the punching positions on a card are considered in two groups; the digit area consisting of the punching positions 1 to 9, and the zone area which contains the remaining three punching positions A, B, 0, (see Chart I).
2. The four low order bits are represented by punchings in the digit area i.e. positions 1 to 9 in the following way.

Four Low Order Bits of 7 Bit Code	Card Punching Positions
0000	No punching
0001	1
0010	2
0011	3
0100	4
0101	5
0110	6
0111	7
1000	8
1001	9
1010	8 and 2

Four Low Order Bits of 7 Bit Code	Card Punching Positions
1011	8 and 3
1100	8 and 4
1101	8 and 5
1110	8 and 6
1111	8 and 7

3. The three high order bits are represented by punchings in the zone area i.e. A, B, O in the following way.

Three High Order Bits of 7 Bit Code	Card Punching Positions
000	A and B and O
001	A and B
010	O
011	No punching
100	A
101	B
110	A and O
111	B and O

However, there is one important exception to this pattern, the 7 bit code combination 010 0000 will be represented by no punching and the 7 bit code combination 011 0000 will be represented by a punching in the zero position. The reason for this exception is to ensure that the figure "0" takes its normal place in the numeric series and that space is represented by an unpunched column. Both of these are compatible with existing usage.

4. Unpunched columns separating elements of the same field are defined as spaces, and in 7 bit form are represented as 010 0000. With fixed field working, field fill shall be represented by spaces or by zeroes in the case of numeric fields. With variable length working, field fills are inapplicable and Information Separators shall terminate fields, wherever necessary.
5. The all zeroes character (000 0000, NULL) of the 7 bit code has the representation on punched cards of A and B and O. It is not to be used in data interchange without prior agreement between sender and recipient.
6. There is no separate representation of the ECMA 6 bit code (ECMA-1). The characters in any such restricted set shall be represented on punched cards by the same punchings as the corresponding characters in the full 7 bit set.

7. The details of the representations defined in paragraphs 1 to 6 above are shown in a tabulated form in chart II. Charts I and II are part of the Standard.



CHART I

LAYOUT OF PUNCHING POSITIONS

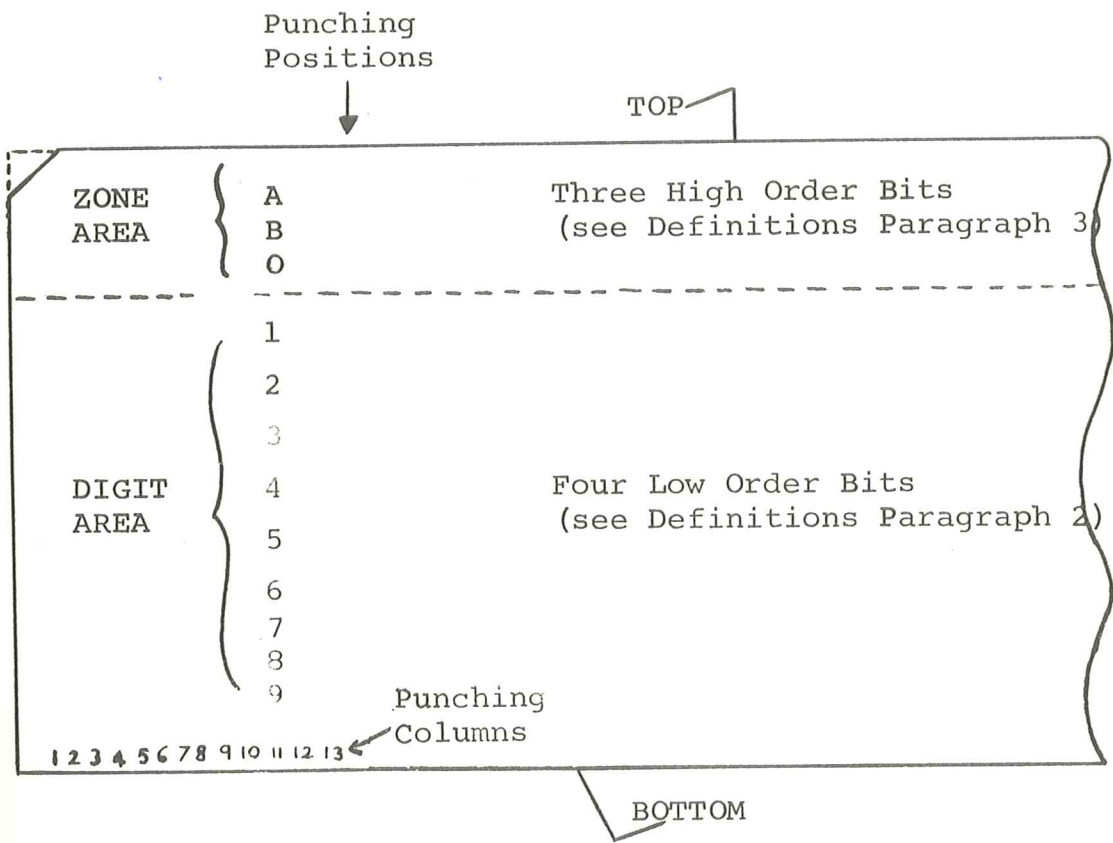


CHART II

Representation of 7-bit Code in Punched Cards

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>	0	0	0	0	0	1	1	1	1	1	1
0	0	0	0	0	0	0	A-B-O	A-B	1	2	3	4	5	6	7	B-O	
0	0	0	1	1	0	0	A-B-O 1	A-B 1	no punch	0	1	A	B	A-O	A-O	B-O	
0	0	1	0	2	2	0	A-B-O 2	A-B 2	0	1	2	A 1	B 1	A-O 1	A-O 1	B-O 1	
0	0	1	1	3	3	0	A-B-O 3	A-B 3	0	2	3	A 2	B 2	A-O 2	A-O 2	B-O 2	
0	1	0	0	4	4	0	A-B-O 4	A-B 4	0	3	4	A 3	B 3	A-O 3	A-O 3	B-O 3	
0	1	0	1	5	5	0	A-B-O 5	A-B 5	0	4	5	A 4	B 4	A-O 4	A-O 4	B-O 4	
0	1	1	0	6	6	0	A-B-O 6	A-B 6	0	5	6	A 5	B 5	A-O 5	A-O 5	B-O 5	
0	1	1	1	7	7	0	A-B-O 7	A-B 7	0	6	7	A 6	B 6	A-O 6	A-O 6	B-O 6	
1	0	0	0	8	8	0	A-B-O 8	A-B 8	0	7	8	A 7	B 7	A-O 7	A-O 7	B-O 7	
1	0	0	1	9	9	0	A-B-O 9	A-B 9	0	8	9	A 8	B 8	A-O 8	A-O 8	B-O 8	
1	0	1	0	10	8-2	0	A-B-O 8-2	A-B 8-2	0	8-2	8-3	A 8-2	B 8-2	A-O 8-2	A-O 8-2	B-O 8-2	
1	0	1	1	11	8-3	0	A-B-O 8-3	A-B 8-3	0	8-3	8-4	A 8-3	B 8-3	A-O 8-3	A-O 8-3	B-O 8-3	
1	1	0	0	12	8-4	0	A-B-O 8-4	A-B 8-4	0	8-4	8-5	A 8-4	B 8-4	A-O 8-4	A-O 8-4	B-O 8-4	
1	1	0	1	13	8-5	0	A-B-O 8-5	A-B 8-5	0	8-5	8-6	A 8-5	B 8-5	A-O 8-5	A-O 8-5	B-O 8-5	
1	1	1	0	14	8-6	0	A-B-O 8-6	A-B 8-6	0	8-6	8-7	A 8-6	B 8-6	A-O 8-6	A-O 8-6	B-O 8-6	
1	1	1	1	15	8-7	0	A-B-O 8-7	A-B 8-7	0	8-7	8-7	A 8-7	B 8-7	A-O 8-7	A-O 8-7	B-O 8-7	

APPENDIX

Code Table of the 7 Bit Coded Character Set  
(Standard ECMA-6)

7	6	5	4	3	2	1	0	0	0	0	1	1	1	1	1	1	1
b	b	b	b	b	b	b	0	0	0	0	0	0	0	0	0	0	0
b	b	b	b	b	b	b	0	0	1	0	1	0	0	0	1	0	1
b	b	b	b	b	b	b	0	0	1	1	0	1	0	1	0	1	1
b	b	b	b	b	b	b	0	0	1	1	1	0	1	0	1	0	1
0	0	0	0	0	0	0	0	1	2	3	4	5	6	7			
0	0	0	0	0	0	0	0	1	Space	0	.	P	@	3			p
0	0	0	1	1	1	1	1	1	!	1	A	Q	a				q
0	0	1	0	2	2	2	2	2	"	2	B	R	b				r
0	0	1	1	3	3	3	3	3	#	3	C	S	c				s
0	1	0	0	4	4	4	4	4	CS	4	D	T	d				t
0	1	0	1	5	5	5	5	5	%	5	E	U	e				u
0	1	1	0	6	6	6	6	6	&	6	F	V	f				v
0	1	1	1	7	7	7	7	7	'	7	G	W	g				w
1	0	0	0	8	8	8	8	8	(	8	H	X	h				x
1	0	0	1	9	9	9	9	9	)	9	I	Y	i				y
1	0	1	0	10	10	10	10	10	*	10	J	Z	j				z
1	0	1	1	11	11	11	11	11	+	11	K	(L)	k				3
1	1	0	0	12	12	12	12	12	,	12	L	(~)	l				3
1	1	0	1	13	13	13	13	13	-	13	M	(I)	m				3
1	1	1	0	14	14	14	14	14	.	14	N	^	n				3
1	1	1	1	15	15	15	15	15	/	15	O	—	o				Delete

