American National Standard

hollerith punched card code

American National Standard

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American National Standard
Hollerith Punched Card Code

Secretariat

Computer and Business Equipment Manufacturers Association

Approved May 2, 1980

American National Standards Institute, Inc

Foreword

This standard presents the Hollerith card code representation of 256 characters, including the 128 characters of the American National Standard Code for Information Interchange (ASCII), ANSI X3.4-1977, and 128 additional characters in 12-row punched cards. It is one of a series of standards implementing ASCII in media.

Other standards specify the dimensions and quality of punched paper cards and the dimensions and locations of the holes punched in the cards.

This coded representation of the ASCII character set for the 12-row punched card was developed from research, review of historical work, and careful consideration of the use of punched cards in information processing and communication. Resolution of several conflicting requirements is reflected herein.

In the development of this standard careful consideration was given to current practices, existing equipment and supplies, and the broadest possible acceptance, while providing a basis for future improvement in the use of the medium.

This standard is a revision of ANSI X3.26-1970 and reflects the changes made in ANSI X3.4-1977. Specifically, several previously permitted dualities for specific graphics have been eliminated. Appendix E outlines each change.

Suggestions for improvement gained in the use of this standard will be welcome. They should be sent to the American National Standards Institute, 1430 Broadway, New York, N.Y. 10018.

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It should be recognized that although X3L2 members are variously affiliated, work on the sub-committee is achieved on an individual competence and experience basis.

Contents

American National Standard
Hollerith Punched Card Code

1. Scope

This standard specifies 256 hole patterns in 12-row punched cards. Hole patterns are assigned to the 128 characters of ASCII (American National Standard Code for Information Interchange, ANSI X3.4-1977) and to 128 additional characters for use in 8-bit coded systems. The assignments incorporate the commonly used "Hollerith" hole patterns for the numerals and single case letters.

2. Hollerith Punched-Card Code

2.1 Code Table. See Table 1.

2.2 The standard row positional order and notation for the 12-row punched card is shown in Fig. 1. The card code hole patterns in the Code Table represent punches in the corresponding rows of the card.

2.3 This standard specifies the Hollerith card hole patterns for representing the characters of ASCII when punched in the standard 12-row punched card. A single hole pattern (such as 12-2, or 11-8-6, or 11-9-8-6) is to be punched in a single column of the standard 12-row punched card.
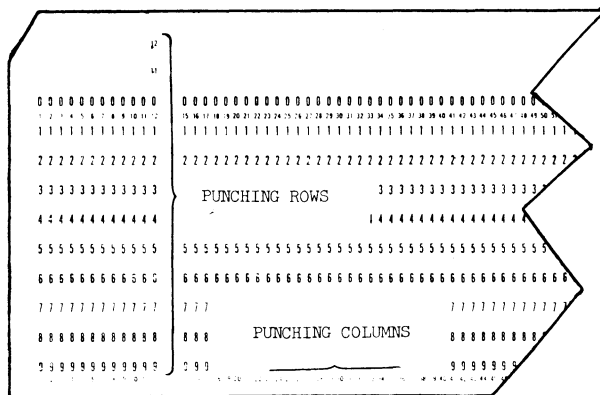

Fig. 1
Layout of Punching Positions

2.4 A particular hole pattern may be referred to as being in Code Table position x/y, where x is the table column and y is the table row. The vertical columns (x) in the body of the Code Table (not to be confused with columns on a punched card) are designated column 0, 1, 2, 3, 4, 5, 6, . . . , 15 for reference purposes only. The horizontal rows (y) in the body of the Code Table (not to be confused with rows on the punched card) are designated row 0, 1, 2, 3, . . . , 15 for reference purposes only.

EXAMPLE: Hole pattern 12-9-8-4 is in Code Table position 0/12.

2.5 A particular hole pattern may also be related to a particular bit pattern in an 8-bit system, as described, for example, in American National Standard Recorded Magnetic Tape for Information Interchange (800 CPI, NRZI), ANSI X3.22-1973.

EXAMPLE: Hole pattern 12-9-8-4 corresponds to bit pattern 0000 1100.

3. Qualifications

3.1 This standard does not include any redundancy or define techniques for error control.

3.2 This standard does not specify a card-sorting sequence.

3.3 Punched-card systems have used the convention of overpunching digits with 12 or 11 to represent signed numbers or for other purposes. This standard does not provide a simple translation of overpunched digits to the ASCII representation of digits. Where possible, signs of numbers should be in separate card columns. Overpunched digits should be used in information interchange only by specific agreement between sender and receiver.

3.4 Deviations from the standard may create serious difficulties in general information interchange. Such deviations should be used only with the full cognizance of the parties involved. The use of hole patterns not defined in this standard is considered a deviation from the standard. (See Appendix A.) ·

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Table 1
Code Table

b4b3b2b1	ROW	b8 0 b7 0 b6 0 b5 0 **0**	0 0 0 1 **1**	0 0 1 0 **2**	0 0 1 1 **3**	0 1 0 0 **4**	0 1 0 1 **5**	0 1 1 0 **6**	0 1 1 1 **7**	1 0 0 0 **8**	1 0 0 1 **9**	1 0 1 0 **10**	1 0 1 1 **11**	1 1 0 0 **12**	1 1 0 1 **13**	1 1 1 0 **14**	1 1 1 1 **15**
0000	0	NUL 12-0-9-8-1	DLE 12-11-9-8-1	SP NO PCH	0 0	@ 8-4	P 11-7	` 8-1	p 12-11-7	11-0-9-8-1	12-11-0-9-8-1	12-0-9-1	12-11-9-8	12-11-0-9-6	12-11-8-7	12-11-0-8	12-11-9-8-4
0001	1	SOH 12-9-1	DC1 11-9-1	! 12-8-7	1 1	A 12-1	Q 11-8	a 12-0-1	q 12-11-8	0-9-1	9-1	12-0-9-2	11-8-1	12-11-0-9-7	11-0-8-1	12-11-0-9	12-11-9-8-5
0010	2	STX 12-9-2	DC2 11-9-2	" 8-7	2 2	B 12-2	R 11-9	b 12-0-2	r 12-11-9	0-9-2	11-9-8-2	12-0-9-3	11-0-9-2	12-11-0-9-8	11-0-8-2	12-11-0-8-2	12-11-9-8-6
0011	3	ETX 12-9-3	DC3 11-9-3	# 8-3	3 3	C 12-3	S 0-2	c 12-0-3	s 11-0-2	0-9-3	9-3	12-0-9-4	11-0-9-3	12-0-8-1	11-0-8-3	12-11-0-8-3	12-11-9-8-7
0100	4	EOT 9-7	DC4 9-8-4	$ 11-8-3	4 4	D 12-4	T 0-3	d 12-0-4	t 11-0-3	0-9-4	9-4	12-0-9-5	11-0-9-4	12-0-8-2	11-0-8-4	12-11-0-8-4	11-0-9-8-2
0101	5	ENQ 0-9-8-5	NAK 9-8-5	% 0-8-4	5 5	E 12-5	U 0-4	e 12-0-5	u 11-0-4	11-9-5	9-5	12-0-9-6	11-0-9-5	12-0-8-3	11-0-8-5	12-11-0-8-5	11-0-9-8-3
0110	6	ACK 0-9-8-6	SYN 9-2	& 12	6 6	F 12-6	V 0-5	f 12-0-6	v 11-0-5	12-9-6	9-6	12-0-9-7	11-0-9-6	12-0-8-4	11-0-8-6	12-11-0-8-6	11-0-9-8-4
0111	7	BEL 0-9-8-7	ETB 0-9-6	' 8-5	7 7	G 12-7	W 0-6	g 12-0-7	w 11-0-6	11-9-7	12-9-8	12-0-9-8	11-0-9-7	12-0-8-5	11-0-8-7	12-11-0-8-7	11-0-9-8-5
1000	8	BS 11-9-6	CAN 11-9-8	(12-8-5	8 8	H 12-8	X 0-7	h 12-0-8	x 11-0-7	0-9-8	9-8	12-8-1	11-0-9-8	12-0-8-6	12-11-0-8-1	12-0-9-8-2	11-0-9-8-6
1001	9	HT 12-9-5	EM 11-9-8-1	) 11-8-5	9 9	I 12-9	Y 0-8	i 12-0-9	y 11-0-8	0-9-8-1	9-8-1	12-11-9-1	0-8-1	12-0-8-7	12-11-0-1	12-0-9-8-3	11-0-9-8-7
1010	10	LF 0-9-5	SUB 9-8-7	* 11-8-4	: 8-2	J 11-1	Z 0-9	j 12-11-1	z 11-0-9	0-9-8-2	9-8-2	12-11-9-2	12-11-0	12-11-8-1	12-11-0-2	12-0-9-8-4	12-11-0-9-8-2
1011	11	VT 12-9-8-3	ESC 0-9-7	+ 12-8-6	; 11-8-6	K 11-2	[12-8-2	k 12-11-2	{ 12-0	0-9-3	9-8-3	12-11-3	12-11-0-9-1	12-11-8-2	12-11-0-3	12-0-9-8-5	12-11-0-9-8-3
1100	12	FF 12-9-8-4	FS 11-9-8-4	, 0-8-3	< 12-8-4	L 11-3	\ 0-8-2	l 12-11-3	| 12-11	0-9-8-4	12-9-4	12-11-9-4	12-11-0-9-2	12-11-8-3	12-11-0-4	12-0-9-8-6	12-11-0-9-8-4
1101	13	CR 12-9-8-5	GS 11-9-8-5	- 11	= 8-6	M 11-4	] 11-8-2	m 12-11-4	} 11-0	12-9-8-1	11-9-4	12-11-9-5	12-11-0-9-3	12-11-8-4	12-11-0-5	12-0-9-8-7	12-11-0-9-8-5
1110	14	SO 12-9-8-6	RS 11-9-8-6	. 12-8-3	> 0-8-6	N 11-5	^ 11-8-7	n 12-11-5	~ 11-0-1	12-9-8-2	9-8-6	12-11-9-6	12-11-0-9-4	12-11-8-5	12-11-0-6	12-11-9-8-2	12-11-0-9-8-6
1111	15	SI 12-9-8-7	US 11-9-8-7	/ 0-1	? 0-8-7	O 11-6	_ 0-8-5	o 12-11-6	DEL 12-9-7	11-9-8-3	11-0-9-1	12-11-9-7	12-11-0-9-5	12-11-8-6	12-11-0-7	12-11-9-8-3	EO 12-11-0-9-8-7

NOTE: The top line in each entry to the table represents an assigned character (columns 0 to 7). The bottom line in each entry is the corresponding card hole pattern.

Table 2
Code Table Arranged for Ease of Reference

	12	11	0		12 / 0	12 / 11	11 / 0	12 / 11 / 0	12	11	0		12 / 0	12 / 11	11 / 0	12 / 11 / 0	
	&	—	0 ①	SP	{	|	}	11/10	10/8	11/1	11/9	`	12/3	12/10	13/1	13/8	8-1
1	A	J	/	1	a	j	~	13/9	SOH	DC1	8/1	9/1	10/0	10/9	9/15	11/11	9-1
2	B	K	S	2	b	k	s	13/10	STX	DC2	8/2	SYN	10/1	10/10	11/2	11/12	9-2
3	C	L	T	3	c	l	t	13/11	ETX	DC3	8/3	9/3	10/2	10/11	11/3	11/13	9-3
4	D	M	U	4	d	m	u	13/12	9/12	9/13	8/4	9/4	10/3	10/12	11/4	11/14	9-4
5	E	N	V	5	e	n	v	13/13	HT	8/5	LF	9/5	10/4	10/13	11/5	11/15	9-5
6	F	O	W	6	f	o	w	13/14	8/6	BS	ETB	9/6	10/5	10/14	11/6	12/0	9-6
7	G	P	X	7	g	p	x	13/15	DEL	8/7	ESC	EOT	10/6	10/15	11/7	12/1	9-7
8	H	Q	Y	8	h	q	y	14/0	9/7	CAN	8/8	9/8	10/7	11/0	11/8	12/2	9-8
9	I	R	Z	9	i	r	z	14/1	8/13	EM	8/9	9/9	NUL	DLE	8/0	9/0	9-8-1
8-2	[	]	\	:	12/4	12/11	13/2	14/2	8/14	9/2	8/10	9/10	14/8	14/14	15/4	15/10	9-8-2
8-3	.	$	,	#	12/5	12/12	13/3	14/3	VT	8/15	8/11	9/11	14/9	14/15	15/5	15/11	9-8-3
8-4	<	*	%	@	12/6	12/13	13/4	14/4	FF	FS	8/12	DC4	14/10	15/0	15/6	15/12	9-8-4
8-5	(	)	_	'	12/7	12/14	13/5	14/5	CR	GS	ENQ	NAK	14/11	15/1	15/7	15/13	9-8-5
8-6	+	;	>	=	12/8	12/15	13/6	14/6	SO	RS	ACK	9/14	14/12	15/2	15/8	15/14	9-8-6
8-7	!	^	?	"	12/9	13/0	13/7	14/7	SI	US	BEL	SUB	14/13	15/3	15/9	15/15	9-8-7

① Numeral zero.

4. Hole-Pattern Cross-Reference Table

Table 2 shows the 256 hole patterns of the Code Table rearranged for ease of reference. In the body of the table are two types of entries. One type consists of the ASCII character representation such as A, #, SOH, etc. There are 128 of these entries, the 128 characters from columns 0 through 7 of the Code Table (see Table 1).

The other type of entry consists of the column/row notation explained in 2.4. There are 128 of these entries, the 128 characters from columns 8 through 15 of the Code Table.

5. Revision of American National Standards Referred to in This Document

When any of the following American National Standards referred to in this document is superseded by a revision approved by the American National Standards Institute, the revision shall apply:

American National Standard Code for Information Interchange, ANSI X3.4-1977

American National Standard Recorded Magnetic Tape for Information Interchange (800 CPI, NRZI), ANSI X3.22-1973

Appendixes

Appendix A
Design Considerations

A1. Introduction

The standard Hollerith representation was designed to provide for representation of the full ASCII character set in punched cards, in a code which incorporates and extends commonly used Hollerith practices. Such a code thus permits continued use in many applications of existing equipment, files, tabulating procedures, and data code structures based on a subset of the full ASCII. The potential benefits of a capability for full interchange of cards and data from users of the subset to the full set, and limited interchange in the reverse direction, are thus extended to the large body of producers and users of current card equipment.

The punched card is unique as an input/output medium for data processing systems in the variety of types of usage to which it is put. In some applications it serves as the unit record for storage of data and is created, processed, stored, and reprocessed repeatedly over a long life cycle in a single machine facility and handled exclusively by trained operators. In other applications it is punched solely for the purpose of a single reading into an electronic data-processing system and, having served that purpose, is immediately destroyed. In a different situation, it is punched as a result of a data-processing operation, distributed to clerical staffs or the general public, and, after considerable manual handling, returned to a data-processing facility, not necessarily its originator, to serve as an input medium to further processing. The majority of cards used for these various purposes have to date been punched with Hollerith coding, which has thus acquired the status of a de facto standard. The ability of the code to serve this variety of purposes, together with the large investment in hardware and software based on the code, warrants its extension to include the full ASCII character set and provide for an additional 128-character set.

A2. Commonly Used Hollerith Codes

The Hollerith coding in general usage has many requisites of a standard specification. The majority of punched-card equipments, and hence the applications

employing them, have a set of 48 characters. This set provides:

Blank or space	—	1 character
Digits 0-9	—	10 characters
Letters A-Z	—	26 characters

for a total of 37 characters, leaving 11 character positions for assignment to punctuation or other special symbols. For the basic 37 characters there is almost complete uniformity in the hole pattern assigned to each graphic.

Further assignments of hole patterns were then made to accommodate the remaining ASCII graphics. The previous Hollerith practices had not contained the ASCII control characters. However, EBCDIC, which is an extension of Hollerith practices used on a number of existing equipments (see Appendix B), contains a number of controls. For those control characters contained in both ASCII and EBCDIC, the EBCDIC hole patterns were selected. The remaining ASCII control characters were assigned hole patterns having a translation relationship to ASCII.

For the 11 positions in the set remaining for special symbols, there are a number of different subsets developed by producers and users. However, the majority of applications are found to use one of two common groupings of special symbols, identified in Fig. A1.

The same 48 hole patterns are assigned in all cases, but between the two sets shown in Fig. A1, the last 5 of the graphics listed are different for the same hole pattern.

In addition to these 48, some punched-card equipments have sets containing as many as 16 additional hole patterns, for totals of up to 64. These vary widely, both in the graphics and in the hole patterns assigned in the extension to the basic set.

Set A	SP	0-9	A-Z	∘	,	*	/	—	$	&	@	#	%	⌗
Set H	SP	0-9	A-Z	∘	,	*	/	—	$	+	'	=	(	)

Fig. A1
Special Symbols

A3. Extension

Since there are almost no deviations in the hole-pattern assignments to the digits and letters, these code assignments were placed directly in the Hollerith punched-card code.

Surveys of existing installations showed the single most widely used grouping of special symbols to be Set A. Accordingly, the hole patterns assigned to these symbols were incorporated in the standard. However, since the lozenge (¤) is not an ASCII character, the hole pattern assigned to it in Set A has been assigned to the ASCII character "less than" (<).

On some Hollerith-related data-processing equipments, certain hole patterns were assigned to control characters such as Group Mark, Record Mark, Segment Mark, Tape Mark, Word Separator, and Substitute Blank. In general, identifying graphics were assigned to these control characters. However, neither these control characters nor their graphic representations are in ASCII. To preserve the usefulness of existing punches which produce these hole patterns, these hole patterns were reassigned to ASCII graphics in this standard.

Further assignments of hole patterns were then made to accommodate the remaining ASCII graphics. The previous Hollerith practices had not contained the ASCII control characters. However, EBCDIC, which is an extension of Hollerith practices used on a number of existing equipments (see Appendix B), contains a number of controls. For those control characters contained in both ASCII and EBCDIC, the EBCDIC hole patterns were selected. The remaining ASCII control characters were assigned hole patterns having a translation relationship to ASCII.

Appendix B
EBCDIC Card Code

Table B1 shows the relation of the Hollerith punched-card code to EBCDIC.

A particular hole pattern may be referred to as being in a Code Table position according to a hexadecimal column/row convention. Both columns and rows are numbered 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F. The Code Table position is given as "xy," where "x" is the column hexadecimal number and "y" is the row hexadecimal number.

EXAMPLE: In Table B1, hole pattern 11-8-4 is in position 5C.

The card hole patterns are found by the heavy lines partitioning Table B1 into 4 blocks as shown in Fig. B1.

Table B2 shows the 256 hole patterns rearranged for ease of reference. The table contains two types of entries. One type consists of the 128 assigned character representations from columns 0 through 7 of the Code Table. The remaining 128 entries consist of the hexadecimal column/row designations described above that refer to Table B1.

Block 1. Zone punches at top, digit punches at left, of table.
Block 2. Zone punches at bottom, digit punches at left, of table.
Block 3. Zone punches at top, digit punches at right, of table.
Block 4. Zone punches at bottom, digit punches at right, of table.

Fig. B1
Key to Hole Patterns in Table B1

Table B1
EBCDIC Card Code

Bit Positions 0,1 group the columns: **00** (hex 0–3), **01** (hex 4–7), **10** (hex 8–B), **11** (hex C–F).
Bit Positions 2,3 sub-divide each group: **00 01 10 11**.
First Hexadecimal Digit = column headers **0–F**.
Left labels: Bit Positions 4,5,6,7 / Second Hexadecimal Digit / Digit Punches.

Top zone/digit-punch guide:

2nd Hex	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
12	12		.		12	12		12	12	12		12	12			
11		11				11	11	11		11	11	11		11		
0			0		0		0	0	0		0	0			0	
9	9	9	9	9	9	9	9	9								

Main code grid:

Bit 4,5,6,7	2nd Hex	Digit Punches	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	Digit Punches
0000	0	8-1	NUL (1)	DLE (2)	(3)	(4)	SP (5)	& (6)	- (7)	(8)					{ (9)	} (10)	\ (11)	0 (12)	8-1
0001	1	1	SOH	DC1					/ (13)		a	j	~		A	J	(14)	1	1
0010	2	2	STX	DC2		SYN					b	k	s		B	K	S	2	2
0011	3	3	ETX	DC3							c	l	t		C	L	T	3	3
0100	4	4									d	m	u		D	M	U	4	4
0101	5	5	HT		LF						e	n	v		E	N	V	5	5
0110	6	6		BS	ETB						f	o	w		F	O	W	6	6
0111	7	7	DEL		ESC	EOT					g	p	x		G	P	X	7	7
1000	8	8		CAN							h	q	y		H	Q	Y	8	8
1001	9	8-1		EM						`	i	r	z		I	R	Z	9	9
1010	A	8-2					[	]	| (15)	:									8-2
1011	B	8-3	VT				.	$	,	#									8-3
1100	C	8-4	FF	FS		DC4	<	*	%	@									8-4
1101	D	8-5	CR	GS	ENQ	NAK	(	)	_	'									8-5
1110	E	8-6	SO	RS	ACK		+	;	>	=									8-6
1111	F	8-7	SI	US	BEL	SUB	!	^	?	"									8-7

Bottom zone/digit-punch guide:

2nd Hex	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
12	12				12				12	12		12	12	12		12
11		11				11				11	11	11		11	11	11
0			0				0		0		0	0	0		0	0
9	9	9	9	9									9	9	9	9

Card Hole Patterns

(1) 12-0-9-8-1		(5) No Punches		(9) 12-0		(13) 0-1	
(2) 12-11-9-8-1		(6) 12		(10) 11-0		(14) 11-0-9-1	
(3) 11-0-9-8-1		(7) 11		(11) 0-8-2		(15) 12-11	
(4) 12-11-0-9-8-1		(8) 12-11-0		(12) 0			

NOTE: It is common practice on many EBCDIC products to provide the graphics |,¬, and ¦ in hex positions 4F, 5F, and 6A, respectively.

Table B2
EBCDIC Code Table Arranged for Ease of Reference

	12	11	0		12 0	12 11	11 0	12 11 0
	&	–	0①	SP	{	|	}	70
1	A	J	/	1	a	j	~	B1
2	B	K	S	2	b	k	s	B2
3	C	L	T	3	c	l	t	B3
4	D	M	U	4	d	m	u	B4
5	E	N	V	5	e	n	v	B5
6	F	O	W	6	f	o	w	B6
7	G	P	X	7	g	p	x	B7
8	H	Q	Y	8	h	q	y	B8
9	I	R	Z	9	i	r	z	B9
8-2	[	]	\	:	8A	9A	AA	BA
8-3	.	$	,	#	8B	9B	AB	BB
8-4	<	*	%	@	8C	9C	AC	BC
8-5	(	)	_	'	8D	9D	AD	BD
8-6	+	;	>	=	8E	9E	AE	BE
8-7	!	^	?	"	8F	9F	AF	BF

12	11	0		12 0	12 11	11 0	12 11 0	
49	59	69	`	80	90	A0	B0	8-1
SOH	DC1	21	31	41	51	E1	71	9-1
STX	DC2	22	SYN	42	52	62	72	9-2
ETX	DC3	23	33	43	53	63	73	9-3
04	14	24	34	44	54	64	74	9-4
HT	15	LF	35	45	55	65	75	9-5
06	BS	ETB	36	46	56	66	76	9-6
DEL	17	ESC	EOT	47	57	67	77	9-7
08	CAN	28	38	48	58	68	78	9-8
09	EM	29	39	NUL	DLE	20	30	9-8-1
0A	1A	2A	3A	CA	DA	EA	FA	9-8-2
VT	1B	2B	3B	CB	DB	EB	FB	9-8-3
FF	FS	2C	DC4	CC	DC	EC	FC	9-8-4
CR	GS	ENQ	NAK	CD	DD	ED	FD	9-8-5
SO	RS	ACK	3E	CE	DE	EE	FE	9-8-6
SI	US	BEL	SUB	CF	DF	EF	FF	9-8-7

① Numeral zero.

Appendix C

Subsets

There exist several recognized subsets of the punched-card code:

(1) A subset of 63 characters (including space) consisting of the characters of columns 2, 3, 4, and 5, exclusive of the "reverse slash" (position 5/12), normally associated with typewriter-like keyboards limited to 44 keys (see also the 89-character subset).

(2) A subset of 89 characters which includes the 63 characters above and the 26 lowercase characters of the alphabet (positions 6/1 to 6/15 and 7/0 to 7/10), also normally associated with 44-key typewriter-like keyboards.

(3) A subset of 64 characters consisting of the characters of columns 2, 3, 4, and 5, exclusive of positions 5/11 (12-8-2) and 5/13 (11-8-2) and inclusive of positions 7/11 (12-0) and 7/13 (11-0), normally used in keypunches intended for a 6-bit environment.

(4) A subset of 66 characters consisting of the characters of columns 2, 3, 4, and 5 and those of positions 7/11 (12-0) and 7/13 (11-0), used primarily in existing keypunches.

(5) A subset of 95 or more characters; 95 of these characters are the graphic characters of ASCII, columns 2, 3, 4, 5, 6, and 7, exclusive of position 7/15. Additional characters may be selected from columns 0 and 1 and may include position 7/15.

(6) A subset of 128 characters consisting of all the characters of columns 0-7 of the Code Table (see Table 1) for "full ASCII" keyboard devices.

Appendix D

Related Standards

American National Standard Code for Information Interchange, ANSI X3.4-1977

American National Standard Specification for General Purpose Paper Cards for Information Processing, ANSI X3.11-1969

American National Standard Rectangular Holes in Twelve-Row Punched Cards, ANSI X3.21-1967

American National Standard Recorded Magnetic Tape for Information Interchange (800 CPI, NRZI), ANSI X3.22-1973

Appendix E

Revision Criteria

This appendix has been added to assist users of the standard. The criteria used in arriving at a given revision will be briefly stated in this appendix.

(1) The revision of ANSI X3.4-1968 (which resulted in ANSI X3.4-1977) (ASCII) changed 6.4 to eliminate the reference to the possible stylization of the graphics in code positions 2/1 (!) and 5/14 (^) into those frequently associated with logical OR (|) and logical NOT (⌐), respectively. Thus, footnotes 1 and 2 were eliminated on pages 7, 8, and 12 of ANSI X3.26-1970, and 3.3 was eliminated on page 6.

(2) Vertical line shown in code position 7/12 is now shown continuous, rather than broken, to be in agreement with the revision to ANSI X3.4-1968 (which resulted in ANSI X3.4-1977).

(3) The following note was added under Table B1 in Appendix B for the characters !, ^ , and |, respectively:

NOTE: It is common practice on many EBCDIC products to provide the graphics |, ⌐, and ¦ in hex positions 4F, 5F, and 6A, respectively.

(4) In Table B1, in position Hex 4B, the missing graphic "period" was added. (This was a typographical error in ANSI X3.26-1970.)

(5) The slash on the graphic "zero" was removed from Table 2 and Table B2 and a note added.

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American National Standards for Information Processi

X3.1-1976 Synchronous Signaling Rates for Data Transmission

X3.2-1970 (R1976) Print Specifications for Magnetic Ink Character Recognition

X3.3-1970 (R1976) Bank Check Specifications for Magnetic Ink Character Recognition

X3.4-1977 Code for Information Interchange

X3.5-1970 Flowchart Symbols and Their Usage in Information Processing

X3.6-1965 (R1973) Perforated Tape Code for Information Interchange

X3.9-1978 FORTRAN

X3.11-1969 Specification for General Purpose Paper Cards for Information Processing

X3.14-1973 Recorded Magnetic Tape for Information Interchange (200 CPI, NRZI)

X3.15-1976 Bit Sequencing of the American National Standard Code for Information Interchange in Serial-by-Bit Data Transmission

X3.16-1976 Character Structure and Character Parity Sense for Serial-by-Bit Data Communication in the American National Standard Code for Information Interchange

X3.17-1977 Character Set and Print Quality for Optical Character Recognition (OCR-A)

X3.18-1974 One-Inch Perforated Paper Tape for Information Interchange

X3.19-1974 Eleven-Sixteenths-Inch Perforated Paper Tape for Information Interchange

X3.20-1967 (R1974) Take-Up Reels for One-Inch Perforated Tape for Information Interchange

X3.21-1967 Rectangular Holes in Twelve-Row Punched Cards

X3.22-1973 Recorded Magnetic Tape for Information Interchange (800 CPI, NRZI)

X3.23-1974 Programming Language COBOL

X3.24-1968 Signal Quality at Interface between Data Processing Terminal Equipment and Synchronous Data Communication Equipment for Serial Data Transmission

X3.25-1976 Character Structure and Character Parity Sense for Parallel-by-Bit Data Communication in the American National Standard Code for Information Interchange

X3.26-1980 Hollerith Punched Card Code

X3.27-1978 Magnetic Tape Labels and File Structure for Information Interchange

X3.28-1976 Procedures for the Use of the Communication Control Characters of American National Standard Code for Information Interchange in Specified Data Communication Links

X3.29-1971 Specifications for Properties of Unpunched Oiled Paper Perforator Tape

X3.30-1971 Representation for Calendar Date and Ordinal Date for Information Interchange

X3.31-1973 Structure for the Identification of the Counties of the United States for Information Interchange

X3.32-1973 Graphic Representation of the Control Characters of American National Standard Code for Information Interchange

X3.34-1972 Interchange Rolls of Perforated Tape for Information Interchange

X3.36-1975 Synchronous High-Speed Data Signaling Rates between Data Terminal Equipment and Data Communication Equipment

X3.37-1977 Programming Language APT

X3.38-1972 (R1977) Identification of States of the United States (Including the District of Columbia) for Information Interchange

X3.39-1973 Recorded Magnetic Tape for Information Interchange (1600 CPI, PE)

X3.40-1976 Unrecorded Magnetic Tape for Information Interchange (9-Track 200 and 800 CPI, NRZI, and 1600 CPI, PE)

X3.41-1974 Code Extension Techniques for Use with the 7-Bit Coded Character Set of American National Standard Code for Information Interchange

X3.42-1975 Representation of Numeric Values in Character Strings for Information Interchange

X3.43-1977 Representations of Local Time of the Day for Information Interchange

X3.44-1974 Determination of the Performance of Data Communication Systems

X3.45-1974 Character Set for Handprinting

X3.46-1974 Unrecorded Magnetic Six-Disk Pack (General, Physical, and Magnetic Characteristics)

X3.47-1977 Structure for the Identification of Named Populated Places and Related Entities of the States of the United States for Information Interchange

X3.48-1977 Magnetic Tape Cassettes for Information Interchange (3.810-mm [0.150-in] Tape at 32 bpmm [800 bpi], PE)

X3.49-1975 Character Set for Optical Character Recognition (OCR-B)

X3.50-1976 Representations for U.S. Customary, SI, and Other Units to Be Used in Systems with Limited Character Sets

X3.51-1975 Representations of Universal Time, Local Time Differentials, and United States Time Zone References for Information Interchange

X3.52-1976 Unrecorded Single-Disk Cartridge (Front Loading, 2200 BPI), General, Physical, and Magnetic Requirements

X3.53-1976 Programming Language PL/I

X3.54-1976 Recorded Magnetic Tape for Information Interchange (6250 CPI, Group Coded Recording)

X3.55-1977 Unrecorded Magnetic Tape Cartridge for Information Interchange, 0.250 Inch (6.30 mm), 1600 bpi (63 bpmm), Phase Encoded

X3.56-1977 Recorded Magnetic Tape Cartridge for Information Interchange, 4 Track, 0.250 Inch (6.30 mm), 1600 bpi (63 bpmm), Phase Encoded

X3.57-1977 Structure for Formatting Message Headings for Information Interchange Using the American National Standard Code for Information Interchange for Data Communication Systems Control

X3.58-1977 Unrecorded Eleven-Disk Pack, General, Physical, and Magnetic Requirements

X3.60-1978 Programming Language Minimal BASIC

X3.61-1978 Representation of Geographic Point Locations for Information Interchange

X3.62-1979 Paper Used in Optical Character Recognition (OCR) Systems

X3.64-1979 Additional Controls for Use with American National Standard Code for Information Interchange

X3.66-1979 Advanced Data Communication Control Procedures (ADCCP)

X3.73-1980 Single-Sided Unformatted Flexible Disk Cartridge (for 6631-BPR Use)

X3.77-1980 Representation of Pocket Select Characters in Information Interchange

X3.83-1980 ANSI Sponsorship Procedures for ISO Registration According to ISO 2375

X3.86-1980 Optical Character Recognition (OCR) Inks

X3/TRI-77 Dictionary for Information Processing (Technical Report)