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INTRODUCTION

1.1 SCOPE. This standard defines for the IBM Corporation the BCD coded representation for up to 256 graphics and controls in punched cards, in magnetic tape, on data transmission lines, and in 8-bit BCD CPUs. It also defines a collating sequence.

This standard includes:

a) The 256 character Extended BCD Card Code.

b) The 256 character, 8-bit Extended BCD CPU Code.

c) The 256 character, 8-bit Extended BCD Magnetic Tape Code.

d) The 256 character, 8-bit Extended BCD Transmission Code.

e) The collating sequence for the 256 characters.

f) Control characters, graphic characters, and characters with special meaning.

g) Names for some of the characters.

h) Information on the 128-character ISO 7-Bit Code, on the 128-character American National Standard Code for Information Interchange, on the 128-character Hollerith Card Code, and the correspondences of those codes to 128 characters of the 256-character 8-bit Extended BCD Interchange Code.

i) Information on signed numerics.

j) Information on packed decimal.

k) Information on WTC graphic options.

l) Information on graphic options.

m) The 8-bit IBM 96-column card code correspondence to EBCDIC.

n) Information on MICR special symbols.

Code, dated 1964 October, and CSS 3-3220-002, Extended BCD Interchange Code, dated 68/11.

1.10 SUPERSESSION. This document supersedes CSS 2-8015-002, Extended BCD Interchange

REQUIREMENTS

2.1 EXTENDED BCD CARD CODE. The 256 character, twelve-row card code is given in Column 5 of Table IV.

2.2 EXTENDED BCD CPU, TRANSMISSION, AND MAGNETIC TAPE CODE. The 8-bit, Extended BCD CPU, Transmission, and Magnetic Tape Code is given in Column 6 of Table IV.

2.2.1 Track Assignment for Magnetic Tape. The Track Numbering for 9-track, One-Half-Inch magnetic tape and for 10-track, One-Inch magnetic tape and the correspondence between this Track Assignment and the 8 bits of the Extended BCD Magnetic Tape Code (Column 6 of Table IV) is shown in Table I.

2.3 REFERENCE NUMBERS. Reference numbers for the characters are given in Columns 1, 2, 3, and 4, of Table IV.

2.3.1 Column 1 gives reference numbers for the 256 characters of this standard, running 0, 1, 2, 3, ... 255.

2.3.2. Column 2 in this standard gives reference numbers for the 64 card and magnetic tape characters specified in BCDIC. The reference numbers given in Column 2 of this standard are called "Collating Numbers" in BCDIC. It is to be noted that where the Reference Number in Column 2 of this standard matches the Collating Number of BCDIC, the card codes also match, but graphics do not always match. A 6-bit BCD magnetic tape character translates to the 8-bit BCD character whose Reference Number in Column 2, Table IV of this standard matches the Collating Number in Column 1, Table I of BCDIC.

2.3.3 Column 3 gives Reference Numbers for PTTC/EBCD for use in 8-bit Environments. It is to be noted that where the Reference Numbers in Column 3 of this standard match the Reference Numbers in Column 1 of Tables I and II of PTTC/EBCD, the card characters of this standard match the Extended Card" Code characters in Column 5 of Tables I and II of PTTC/EBCD, and the graphics of Column 8 of this standard also match the Duocase Alphabet Set in Column 7 of Tables I and II of PTTC/EBCD.

2.3.4 Column 4 gives Reference Numbers for the Monocase PTTC/EBCD. It is to be noted that where the Reference Numbers in Column 4 of Table IV of this standard match the Reference Numbers in Column 1 of Tables I and II of PTTC/EBCD, the card characters of this standard match the Basic Card Code Characters in Column 4 of Tables I and II of PTTC/EBCD,

and the graphics of Column 8 of this standard also match the Monocase Alphabet Set in Column 6 of Table I and II of PTTC/EBCD.

2.4 CONTROLS AND SPECIAL MEANINGS.

2.4.1 General Definitions. The control characters of EBCDIC fall into eight major classifications by function, (described below), and into a minor classification by use or not in data communications systems control (described below).

2.4.1.1 Customer Use Control Characters. These characters are used to designate a customer assigned function which may be realizable by programming but are not realizable by hardware (CU1, CU2, CU3).

2.4.1.2 Device Control Characters. These characters are used to control devices, or to control major functions of devices (PF, DC1, DC2, TM/DC3, PN, RS, DC4).

2.4.1.3 Error Control Characters. These characters are used for error control, for indicating "alarms", or for identifying or requesting identification of stations in a communications system (DEL, CAN, ENQ, ACK, BEL, NAK, SUB/CH, EO).

2.4.1.4 Formatting (or Editing) Control Characters. These characters are used for formatting, or for editing data (HT, RLF, VT, FF, CR, NL, BS, DS, SOS, FS, LF).

2.4.1.5 Grouping Control Characters. These characters are used for grouping data or information. Depending on the actual control character, they may be at the start of data, at the end of a data-block, at the start and end of a data-block (data framing), at the end of communications control block or procedure, etc., (SOH, STX, ETX, SMM, EM, CC, IFS, IGS, IRS, IUS, ETB/EOB, EOT).

2.4.1.6 Mode Control Characters. These characters are used to set modes of operation, to change a mode of operation, or to restore a previous mode of operation (LC, SO, SI, DLE, RES, BYP, ESC/PRE, SM, UC GE).

2.4.1.7 Reserved Control Characters. These are characters for which a function has not yet been assigned. They are reserved for assignment of future functions.

2.4.1.8 Synchronization Control Characters. These are characters used for synchronization of communications systems, or for "synchronization" of data within a format or for synchronization of data streams with certain timing characteristics of some device functions (NUL, IL, SYN).

2.4.1.9 Communications Control Characters. These characters (which also fall into the major function classifications above) are reserved exclusively for communications control (SOH, STX, ETX, DLE, ETB/EOB, ENQ, ACK, SYN, EOT, NAK). These controls are not to be used for device control.

2.4.1.10 7-Bit Code Control Characters. Some of the control characters of this standard are defined in the ISO recommendation for 6 and 7-Bit Coded Characters for Information Processing Interchange (ISO-7, see 3.5.1.1) and in the American National Standard Code for Information Interchange (ANSCII, see 3.5.1.2). Other manufacturers may use some of these characters in their I/O devices and communication devices and may interpret the definitions differently than as defined below. Such devices are sometimes attached (by customer request) locally or remotely to our 8-bit BCD CPU's. In such cases, the possibly different interpretations of definitions may have to be recognized and handled (in programming products, for example). Caution should be particularly exercised in the interpretation of NUL, DEL, SO, SI, ESC, DLE, DC1, DC2, DC3, DC4, IFS, IGS, IRS, IUS, EM, SUB when received from or transmitted to other manufacturers' devices.

2.4.1.11 PTTC/EBCD Control Characters. Some of these control characters are defined in PTTC/EBCD environments. These include those shown in Table II. For the use of such characters in PTTC/EBCD environments, refer to Section 2.8 of CSS 2-8015-003. It is to be noted that ETB, End of Transmission Block (Reference Number 38) has been called EOB, End of Block, and that ESC, Escape (Reference Number 39) has been called PRE, Prefix, in PTTC/EBCD environments.

2.4.1.12 BCDIC Alternate Meanings. Some of the characters in the graphic section of this standard have alternate meanings when used in 6-bit BCD data processing systems. These include those shown in Table III. For the functions and special meanings of these characters in BCDIC environments, refer to Section 8 of CSS 2-8015-000.

2.4.1.13 Signed Numerics. In card applications and equivalent 8-bit code representations involving overpunched numerics to indicate algebraic signs, Character Numbers 192 through 201 may have the meanings Plus Zero through Plus Nine, respectively, and Character Numbers 208 through 217 may have the meanings Minus Zero through Minus Nine, respectively. These representations are usually reserved for the low-order digit of a signed numeric field.

2.4.1.14 Packed Decimal. In certain CPU and magnetic-recorded storage applications, each 8-bit coded character may represent two decimal digits (or one decimal digit and sign). This representation has meaning only when considered as a field of one or more such contiguous characters to be operated upon as an arithmetic quantity, and is not to be confused in application with the graphic and control characters having explicit individual meanings as given elsewhere in this standard. In this special representation: The low-order character of the field is coded as the low-order decimal digit of the arithmetic quantity (in binary-coded-decimal form) in bits 0-3, with a "sign indicator" in bits 4-7. The sign indicator is identical to the value contained in bits 0-3 of the standard 8-bit code for unsigned or signed numeric characters. (The "unsigned" sign indicator is treated as "plus"). The remaining characters of the field (from low to high order) are coded as pairs of decimal digits, in corresponding sequence. For each such pair, the high-order digit is encoded into bits 0-3, and the low-order digit into bits 4-7, of the single 8-bit character. If the decimal field contains an even number of digits, bits 0-3 of the highest order 8-bit character are encoded as "all zeros".

2.4.2 Specific Definitions. Specific definitions for the control characters are given below. A part of the definition identifies the major classification by function, and the classification by use in communications control.

2.4.2.0 NUL -- Null (Reference Number 0). A synchronization control character, with an all-zeros bit-pattern, which may serve to accomplish time and media fill.

2.4.2.1 SOH -- Start of Heading (Reference Number 1). A communication grouping control character which is used at the beginning of a sequence of characters which constitute a machine-sensible address or routing information. Such a sequence is referred to as the "heading". An STX character has the effect of terminating a heading.

2.4.2.2 STX -- Start of Text (Reference Number 2). A communication grouping control character which precedes a sequence of characters that is to be treated as an entity and entirely transmitted through to the ultimate destination. Such a sequence is referred to as "text". STX may be used to terminate a sequence of characters started by SOH.

2.4.2.3 ETX -- End of Text (Reference Number 3). A communication grouping control character which is used to terminate a sequence of characters started with STX and transmitted as an entity.

2.4.2.4 PF -- Punch Off (Reference Number 4). A device control character, which deactivates a perforated tape punch.

2.4.2.5 HT -- Horizontal Tab (Reference Number 5). A formatting control character which:

a) moves the printing position horizontally, left to right, to the next tab stop setting,

b) is applicable to display devices, in a manner similar to (a) above, and

c) advances a card to the next tab stop setting.

2.4.2.6 LC -- Lower Case (Reference Number 6). A mode control character which shifts the BCD Perforated Tape and Transmission Codes to the Lower Case Mode. All characters which follow this precedence character are in the Lower Case Mode until an Upper Case control character is reached.

2.4.2.7 DEL -- Delete (Reference Number 7). An error control character which erases characters on perforated tape (see "Note" following 2.4.2.64). Delete may also apply to other devices such as displays.

2.4.2.8 GE -- Graphic Escape (Reference Number 8). A mode control character used to extend the standard set of the code table. It is a non-locking shift character which changes the graphic meaning of the next single following bit-pattern

2.4.2.9 RLF -- Reverse Line Feed (Reference Number 9). A formatting control character which:

a) moves the printing position vertically, bottom to top, to the previous printing line,

b) is applicable to display devices, in a manner similar to (a) above.

2.4.2.10 SMM -- Start of Manual Message (Reference Number 10). A grouping control character which identifies the start of that part of a message which is manually entered.

2.4.2.11 VT -- Vertical Tab (Reference Number 11). A formatting control character which:

a) moves the printing position vertically, top to bottom, to the next in a series of predetermined printing lines, and,

b) is applicable to display devices, in a manner similar to (a) above.

2.4.2.12 FF -- Form Feed (Reference Numoer 12). A formatting control character which:

a) moves the printing position vertically, top to bottom, to the first predetermined printing line on the next form or page, and,

b) is applicable to display devices, in a manner similar to (a) above.

2.4.2.13 CR -- Carriage Return (Reference Number 13). A formatting control character which:

a) moves the printing position horizontally, right to left, to the first printing position on the same printing line, and,

b) is applicable to display devices, in a manner similar to (a) above.

2.4.2.14 SO -- Shift Out (Reference Number 14). A mode control character which indicates that the code combinations which follow shall be interpreted as outside of the character set of the standard code table until a Shift In character is reached.

2.4.2.15 SI -- Shift In (Reference number 15). A mode control character which indicates that the code combinations which follow shall be interpreted according to the standard code table.

2.4.2.16 DLE -- Data Link Escape (Reference Number 16). A communication mode control character which will change the meaning of a limited number of contiguously following characters. It is used exclusively to provide supplementary controls in data communication networks.

2.4.2.17 DC1 -- Device Control 1 (Reference Number 17). A device control character which controls ancillary devices associated with data processing or telecommunication systems, more especially switching devices "on" or "off".

2.4.2.18 DC2 -- Device Control 2 (Reference Number 18). A device control character which controls ancillary devices associated with data processing or telecommunication systems, more especially switching devices "on" or "off".

2.4.2.19 TM -- Tape Mark. Also, DC3 -- Device Control 3 (Reference Number 19). A device control character which when recorded in a special single character control block (no CRC, but with LRC) on one-half inch, 800 BPI, 9 track magnetic tape serves to cause a special device status indication. The detection of this special single character control block by a tape control unit causes a special device status indication, without the transfer to main storage of the TM character. Tape control unit and channel hardware in general and programming practice always, require that the special control block be written on tape by execution of a channel command. The transfer of the TM character as a single character block will create the special control block which when detected causes the special device status indication. This character within a multiple byte block or in other tape formats has no special meaning. DC-3 is not restricted to the above use, it may also be used for other device controls.

2.4.2.20 RES -- Restore (Reference Number 20). A mode control character which terminates the Bypass mode of operation.

2.4.2.21 NL -- New Line (Reference Number 21). A formatting control character which:

a) moves the printing position horizontally, right to left, and vertically, top to bottom, to the first printing position of the next printing line,

b) advances the writing beam of the cathode ray tube of a display device to the left most position of the next display line-section,

c) advances a card to the next field defined by field definition controls.

2.4.2.22 BS -- Backspace (Reference Number 22). A formatting control character which:

a) moves the printing position horizontally, right to left, to the next printing position to the left, and,

b) is applicable to display devices in a manner similar to (a) above.

2.4.2.23 IL -- Idle (Reference Number 23). A synchronization control character which serves as a "No-Operation" fill character for perforated tape and on transmission lines.

2.4.2.24 CAN -- Cancel (Reference Number 24). An error control character which is used to indicate that the data with which it is sent is in error or is to be disregarded.

2.4.2.25 EM -- End of Medium (Reference Number 25). A grouping control character associated with the sent data which may be used to identify the physical end of the medium, or the end of the used, or wanted, portion of information recorded on a medium. (The position of this character does not necessarily correspond to the physical end of the medium.)

2.4.2.26 CC -- Cursor Control (Reference Number 26). A grouping control character which, for some buffer read operations used in conjunction with some display devices, when a cursor bit is detected in a data byte in the buffer, is transmitted to main storage instead of that data byte.

2.4.2.27 CUI -- Customer Use 1 (Reference Number 27). A customer use control character sent into a system to designate a customer assigned function (see 2.4.1.1).

2.4.2.28 IFS -- Interchange File Separator (Reference Number 28). A grouping control character which terminates an information block called a FILE (see definitions of IGS, IRS, IUS).

When used in hierarchical order, the hierarchical order is ascending, IUS, IRS, IGS, IFS.

An information block must not be split by a higher order separator; e.g., a RECORD may contain a whole number of UNITS, but may not contain a part of a UNIT.

2.4.2.29 IGS -- Interchange Group Separator (Reference Number 29). A grouping control character which terminates an information block called a GROUP (see definition of IFS, Interchange File Separator).

2.4.2.30 IRS -- Interchange Record Separator (Reference Number 30). A grouping control character which terminates an information block called a RECORD (see definition of IFS, Interchange File Separator).

2.4.2.31 IUS -- Interchange Unit Separator (Reference Number 31). A grouping control character which terminates an information block called a UNIT (see definition of IFS, Interchange File Separator).

2.4.2.32 DS -- Digit Select (Reference Number 32). An editing control character which causes either a digit from the source field or a fill character to be inserted in the result field, in CPU editing operations.

2.4.2.33 SOS -- Start of Significance (Reference Number 33). An editing control character which causes either a digit from the source field or a fill character to be inserted in the result field, and also indicates by setting a trigger, that the following digits are significant in CPU editing operations.

2.4.2.34 FS -- Field Separator (Reference Number 34). An editing control character which identifies individual fields in a multiple -- field CPU editing operation.

2.4.2.35 (Reference Number 35). A control character reserved for assignment of future functions.

2.4.2.36 BYP -- Bypass (Reference Number 36). A mode control character which in the normal

mode (frequently identified in terminal equipment as the program mode) causes the succeeding control characters except Restore (RES), End of Transmission (EOT), and End of Block (EOB) to be ignored and deactivates associated printers.

2.4.2.37 LF -- Line Feed (Reference Number 37). A formatting control character which:

a) moves the printing position vertically, top to bottom, to the next printing line,

b) is applicable to display devices in a manner similar to (a) above.

2.4.2.38 ETB -- End of Transmission Block Also, EOB -- End of Block (Reference Number 38). A communication grouping control character which indicates the end of a block of data for transmission purposes.

NOTE: The preferred designation shall be ETB -- End of Transmission Block, and not EOB -- End of Block.

2.4.2.39 ESC -- Escape. Also PRE -- Prefix (Reference Number 39). A mode control character used to extend the standard character set of the code table. It is a warning or non locking shift character which changes the meaning of the next single following bit-pattern. Where required, the character following Escape may extend the Escape sequence.

Escape sequences are used to obtain additional control functions. Such control functions must not be used as additional Communication Controls.

Null, Delete, Eight Ones, and the ten Communication Controls (SOH, STX, ETX, DLE, ETB, ENQ, ACK, SYN, EOT, NAK) must not be used in Escape sequences

NOTE: The preferred designation shall be ESC -- Escape, and not PRE -- Prefix.

2.4.2.40 (Reference Number 40). A control character reserved for assignment of future functions.

2.4.2.41 (Reference Number 41). A control character reserved for assignment of future functions.

2.4.2.42 SM -- Set Mode (Reference Number 42). A mode control character which sets a new mode of operation.

2.4.2.43 CU2 -- Customer Use 2 (Reference Number 43). A customer use control character sent into a system to designate a customer assigned function (see 2.4.1.1).

2.4.2.44 (Reference Number 44). A control character reserved for assignment of future functions.

2.4.2.45 ENQ -- Enquiry (Reference Number 45). A communication error control character which is used in data communication systems as a request for a response from a remote station. It may be used as a "Who Are You" (WRU) to obtain identification, or may be used to obtain station status, or both.

2.4.2.46 ACK -- Acknowledge (Reference Number 46). A communication error control character which is transmitted by a receiver as an affirmative response to a sender.

2.4.2.47 BEL -- Bell (Reference Number 47). An error (or alarm) control character which is used when there is a need to call for human attention. It may control alarm or attention devices.

2.4.2.48 (Reference Number 48). A control character reserved for assignment of future functions.

2.4.2.49 (Reference Number 49). A control character reserved for assignment of future functions.

2.4.2.50 SYN -- Synchronous Idle (Reference Number 50). A communication synchronization control character which is used by a synchronous transmission system in the absence of any other character to provide a signal from which synchronism may be achieved or retained.

2.4.2.51 (Reference Number 51). A control character reserved for assignment of future functions.

2.4.2.52 PN -- Punch On (Reference Number 52). A device control character which activates a perforated tape punch.

2.4.2.53 RS -- Reader Stop (Reference Number 53). A device control character which stops a reading device, such as a perforated tape or card reader.

2.4.2.54 UC -- Upper Case (Reference Number 54). A mode control character which shifts the BCD Perforated Tape and Transmission Code to the Upper Case Mode. All characters which follow this precedence character are in the Upper Case Mode until a Lower Case control character is reached.

2.4.2.55 EOT -- End of Transmission (Reference Number 55). A communication grouping control character which is used to indicate the conclusion of a transmission, which may have contained one or more texts and any associated headings.

2.4.2.56 (Reference Number 56). A control character reserved for assignment of future functions.

2.4.2.57(Reference 57). A control character reserved for assignment of future functions.

2.4.2.58 (Reference Number 58). A control character reserved for assignment of future functions.

2.4.2.59 CU3 -- Customer Use 3 (Reference Number 59). A customer use control character sent into a system to designate a customer assigned function (see 2.4.1.1).

2.4.2.60 DC4 -- Device Control 4 (Reference Number 60). A device control character which controls ancillary devices associated with data processing or telecommunication systems, more especially switching devices "on" or "off". (If a single "stop" control is required to interrupt or turn off ancillary devices, DC4 is the preferred assignment.)

2.4.2.61 NAK -- Negative Acknowledge (Reference Number 61). A communication error control character which is transmitted by a receiver as a negative response to the sender.

2.4.2.62 (Reference Number 62). A control character reserved for assignment of future functions.

2.4.2.63 SUB -- Substitute: Also, CH -- Check (Reference Number 63). An error control character which replaces a character which is determined to be invalid or in error, or, for graphic display devices is inserted at the end of a message to signify that some character or characters in the message are in error.

NOTE: The preferred designation shall be SUB -- Substitute, and not CH -- Check.

2.4.2.64 EO -- Eight Ones (Reference Number 255). An error control character which is used instead of Delete (Reference Number 7) on 8-bit BCD paper tape.

NOTE:

Delete and Eight Ones. These two characters have a somewhat similar function in two related media environments, paper tape and data communications, and in three different code environments, as follows:

a) EBCDIC (this standard). When EBCDIC is punched in paper tape, or transmitted on data communications lines, and either a character with eight one-bits, or the equivalent of a Delete character is required, the Eight Ones character (Reference Number 255) should be used.

b) PTTC/EBCD (CSS 2-8015-003). In the shifted 6-bit code environment of PTTC, when a Delete character is required, the Delete character (Reference Number 7) should be used. If the application is for transmission from an 8-bit EBCDIC environment, then the EBCDIC bit-pattern for Delete must first be translated, by programming and/or hardware as appropriate, to the 6-bit PTTC bit-pattern for Delete.

c) The 7-Bit Code. In the 7-bit code environment (see 3.5), when a Delete character is required, the Delete character (Reference Number 7) should be used. The 7-bit bit-pattern for Delete is 111 1111, from high to low order bit. If the application is for transmission from an 8-bit EBCDIC environment, then the EBCDIC bit-pattern for Delete must first be translated, by programming and/or hardware as appropriate, to the 7-bit bit-pattern for Delete.

2.5 STANDARD GRAPHICS.Column 8 of Table IV gives the Standard Graphics to be used with this standard.

2.5.1 WTC Graphic Options

2.5.1.1 Latin Alphabets. In countries where a Latin alphabet is used, alphabetic extenders are provided by replacement of some or all of the graphics # @ $ " ! c as shown in Tables V and VI. These characters are indicated by AE (alphabetic extenders) in Column 9 of Table IV. The assigned WTC Graphic Options are shown in Tables V and VI (see 1.8). When these graphic options are provided on any product in any country (see 1.6, 1.7), they shall be provided as shown in Tables V and VI.

2.5.1.2 Sterling. Whenever a character for 10 or 11 is required to appear in a single column of a card, the 11 or 12 punch, respectively, will be used.

2.5.1.3 Yen Sign. Products marketed in Japan normally have the Yen Sign (¥) assigned to EBCDIC code position reference number 91. The Japanese Industrial Standard Code for Information Interchange (JISCII) places the Yen Sign in code position 5/12 which corresponds to EBCDIC reference number 224. The Yen Sign may be provided in EBCDIC code position 224. However, this is normally a non-printing position and might cause system problems when provided in this location.

2.5.1.4 Non-Latin Alphabets. In countries where non-Latin alphabets are used, the applicable standard is CSS 3-3220-004, Extended BCD Interchange Code for Non-Latin Alphabets.

2.6 Graphic Options. Assigned publishing and printing graphic options are shown in Table VII (see 1.8). When these graphic options are provided (see 1.6, 1.7), they shall be provided as shown in this table.

2.7 STANDARD NAMES. In column 10 of Table IV are given standard names for some of the graphics and controls. When two names are given, as Minus, Hyphen, it is because two different meanings are associated with the graphic.

2.8 COLLATING SEQUENCE. The collating sequence of the 256 characters is defined by the Reference Numbers of Column 1 of Table IV, which run from 0 to 255, from low to high. The collating sequence of the 64 characters of BCDIC is given by the Reference Numbers of Column 2 of the Table, which run from low to high. It is to be noted that the collating sequence of the 64 character set is embedded in the collating sequence of the 256 character set.

2.9 GRAPHIC AND CONTROL ASSIGNMENTS.

2.9.1 Graphic Assignments. Characters in Table IV with Reference Numbers from 64 to 254 inclusive are reserved for assignment to graphic characters. Graphics are not yet assigned to character positions in Table IV with the following Reference Numbers:

65 to 73	81 to 89
98 to 105	112 to 120
128	138 to 144
154 to 160	170 to 191
202	203
205	207
218 to 223	225
234	235
237 to 239	251 to 254

(See 1.6, 1.8.)

2.9.2 Control Assignments. Characters in Table IV with Reference Numbers from 0 to 63 inclusive, and 255, are reserved for assignment to control characters. Controls are not yet assigned to character positions in Table IV with the following Reference Numbers:

	35	40	41	44	48
49	51	56	57	58	62

(See 1.6, 1.8.)

Table I. TRACK ASSIGNMENTS FOR MAGNETIC TAPE

9 track, 1/2 inch		10 track, 1 inch	
Bit Number	Track Number	Bit Number	Track Number
Reference Edge			
5	1		1(Check bit)
7	2		2(Check bit)
3	3	0	3
	4(odd parity)	1	4
2	5	2	5
1	6	3	6
0	7	4	7
6	8	5	8
4	9	6	9
		7	10
		Reference Edge	

Table II. PERFORATED TAPE AND TRANSMISSION CONTROLS

Col. 1 Reference Numbers (correspond to column Reference numbers of Table IV)	Col. 3 Reference Numbers (correspond to column Reference numbers of Table IV)	Col. 9 Reference Numbers (correspond to column Reference numbers of Table IV)	
4	61	PF	Punch Off
5	62	HT	Horizontal Tab
6	63	LC	Lower Case
7	64	DEL	Delete
20	45	RES	Restore
21	46	NL	New Line
22	47	BS	Backspace
23	48	IL	Idle
36	29	BYP	Bypass
37	30	LF	Line Feed
38	31	ETB	End of Transmission Block
39	32	ESC	Escape
52	13	PN	Punch On
53	14	RS	Reader Stop
54	15	UC	Upper Case
55	16	EOT	End of Transmission
64	1	SP	Space

Table III. ALTERNATE CODE MEANINGS

Col. 1 Reference	Col. 2 Numbers	Col. 7	Alternate Functions or Meanings
79	5	|	GM: Group Mark
95	11	¬	MC: Mode Change
109	16	_	WS: Word Separator
111	18	?	SM: Segment Mark
122	19	:	SB: Substitute Blank
127	24	"	TM: Tape Mark
192	25	{	PZ: Plus Zero
208	35	}	MZ: Minus Zero
224	45	\	RM: Record Mark

Table IV. CODE TABLE

1 2 3 4 REFERENCE NUMBERS				5 CARD CODE					6 8-BIT CODE		7 96 COLUMN CARD CODE		8 9 GRAPHICS, CONTROLS, AND SPECIAL MEANINGS		10 GRAPHIC AND CONTROL NAMES	11 SEE SECTION
256	64	111E	64B	12	11	0	9	8	0123	4567	DCBA	8421				
0				12		0	9	8	1 0000	0000	C			NUL	Null	2.4.2
1				12			9		1	0001	DCBA	1		SOH	Start of Heading	2.4.2
2				12			9		2	0010	DCBA	2		STX	Start of Text	2.4.2
3				12			9		3	0011	DCBA	21		ETX	End of Text	2.4.2
4		61	61	12			9		4	0100	DCBA	4		PF	Punch Off	2.4.2
5		62	62	12			9		5	0101	DCBA	41		HT	Horizontal Tab	2.4.2
6		63	63	12			9		6	0110	DCBA	42		LC	Lower Case	2.4.2
7		64	64	12			9		7	0111	DCBA	421		DEL	Delete	2.4.2
8				12			9	8		1000	DCBA	8		GE	Graphic Escape	2.4.2
9				12			9	8	1	1001	DCBA	81		RLF	Reverse Line Feed	2.4.2
10				12			9	8	2	1010	CBA	82		SMM	Start of Manual Message	2.4.2
11				12			9	8	3	1011	CBA	821		VT	Vertical Tab	2.4.2
12				12			9	8	4	1100	CBA	84		FF	Form Feed	2.4.2
13				12			9	8	5	1101	CBA	841		CR	Carriage Return	2.4.2
14				12			9	8	6	1110	CBA	842		SO	Shift Out	2.4.2
15				12			9	8	7	1111	CBA	8421		SI	Shift In	2.4.2

Table IV (Continued)

1 2 3 4 REFERENCE NUMBERS				5 CARD CODE					6 8-BIT CODE		7 96 COLUMN CARD CODE		8 9 GRAPHICS, CONTROLS, AND SPECIAL MEANINGS		10 GRAPHIC AND CONTROL NAMES	11 SEE SECTION
256	64	111E	64B	12	11	0	9	8	0123	4567	DCBA	8421				
16				12	11		9	8 1	0001	0000	CA	82		DLE	Data Link Escape	2.4.2
17					11		9	1		0001	DCB	1		DC1	Device Control 1	2.4.2
18					11		9	2		0010	DCB	2		DC2	Device Control 2	2.4.2
19					11		9	3		0011	DCB	21		TM	Tape Mark	2.4.2 3.5.5a
20		45	45		11		9	4		0100	DCB	4		RES	Restore	2.4.2
21		46	46		11		9	5		0101	DCB	41		NL	New Line	2.4.2
22		47	47		11		9	6		0110	DCB	42		BS	Backspace	2.4.2
23		48	48		11		9	7		0111	DCB	421		IL	Idle	2.4.2
24					11		9 8			1000	DCB	8		CAN	Cancel	2.4.2
25					11		9	8 1		1001	DCB	81		EM	End of Medium	2.4.2
26					11		9	8 2		1010	CB	82		CC	Cursor Control	2.4.2
27					11		9	8 3		1011	CB	821		CU1	Customer Use 1	2.4.2
28					11		9	8 4		1100	CB	84		IFS	Interchange File Separator	2.4.2 3.5.5b
29					11		9	8 5		1101	CB	841		IGS	Interchange Group Separator	2.4.2 3.5.5b
30					11		9	8 6		1110	CB	842		IRS	Interchange Record Separator	2.4.2 3.5.5b
31					11		9	8 7		1111	CB	8421		IUS	Interchange Unit Separator	2.4.2 3.5.5b

Table IV (Continued)

1 2 3 4 REFERENCE NUMBERS				5 CARD CODE					6 8-BIT CODE		7 96 COLUMN CARD CODE		8 9 GRAPHICS, CONTROLS, AND SPECIAL MEANINGS		10 GRAPHIC AND CONTROL NAMES	11 SEE SECTION
256	64	111E	64B	12	11	0	9	8	0123	4567	DCBA	8421				
32					11	0	9	8 1	0010	0000	CB			DS	Digit Select	2.4.2
33						0	9	1		0001	CA	1		SOS	Start of Significance	2.4.2
34						0	9	2		0010	DCA	2		FS	Field Separator	2.4.2
35						0	9	3		0011	DCA	21			Reserved	2.4.2
36		29	29			0	9	4		0100	DCA	4		BYP	Bypass	2.4.2
37		30	30			0	9	5		0101	DCA	41		LF	Line Feed	2.4.2
38		31	31			0	9	6		0110	DCA	42		ETB	End of Transmission Block	2.4.2
39		32	32			0	9	7		0111	DCA	421		ESC	Escape	2.4.2
40						0	9	8		1000	DCA	8			Reserved	2.4.2
41						0	9	8 1		1001	DCA	81			Reserved	2.4.2
42						0	9	8 2		1010	DCBA			SM	Set Mode	2.4.2
43						0	9	8 3		1011	CA	821		CU2	Customer Use 2	2.4.2
44						0	9	8 4		1100	CA	84			Reserved	2.4.2
45						0	9	8 5		1101	CA	841		ENQ	Enquiry	2.4.2
46						0	9	8 6		1110	CA	842		ACK	Acknowledge	2.4.2
47						0	9	8 7		1111	CA	8421		BEL	Bell	2.4.2

Table IV (Continued)

1 2 3 4 REFERENCE NUMBERS				5 CARD CODE					6 8-BIT CODE		7 96 COLUMN CARD CODE		8 9 GRAPHICS, CONTROLS, AND SPECIAL MEANINGS		10 GRAPHIC AND CONTROL NAMES	11 SEE SECTION
256	64	111E	64B	12	11	0	9	8	0123	4567	DCBA	8421				
48				12	11	0	9	8 1	0011	0000	DCA				Reserved	2.4.2
49							9	1		0001	DC	1			Reserved	2.4.2
50							9	2		0010	DC	2		SYN	Synchronous Idle	2.4.2
51							9	3		0011	DC	21			Reserved	2.4.2
52		13	13				9	4		0100	DC	4		PN	Punch On	2.4.2
53		14	14				9	5		0101	DC	41		RS	Reader Stop	2.4.2
54		15	15				9	6		0110	DC	42		UC	Upper Case	2.4.2
55		16	16				9	7		0111	DC	421		EOT	End of Transmission	2.4.2
56							9	8		1000	DC	8			Reserved	2.4.2
57							9	8 1		1001	DC	81			Reserved	2.4.2
58							9	8 2		1010	C	82			Reserved	2.4.2
59							9	8 3		1011	C	821		CU3	Customer Use 3	2.4.2
60							9	8 4		1100	C	84		DC4	Device Control 4	2.4.2
61							9	8 5		1101	C	841		NAK	Negative Acknowledge	2.4.2
62							9	8 6		1110	C	842			Reserved	2.4.2
63							9	8 7		1111	C	8421		SUB	Substitute	2.4.2

Table IV (Continued)

1 2 3 4 REFERENCE NUMBERS				5 CARD CODE					6 8-BIT CODE		7 96 COLUMN CARD CODE		8 9 GRAPHICS, CONTROLS, AND SPECIAL MEANINGS		10 GRAPHIC AND CONTROL NAMES	11 SEE SECTION
256	64	111E	64B	12	11	0	9	8	0123	4567	DCBA	8421				
64	0	1	1	No	Punches				0100	0000				SP	Space	
65				12		0	9	1		0001	DBA	1				
66				12		0	9	2		0010	DBA	2				
67				12		0	9	3		0011	DBA	21				
68				12		0	9	4		0100	DBA	4				
69				12		0	9	5		0101	DBA	41				
70				12		0	9	6		0110	DBA	42				
71				12		0	9	7		0111	DBA	421				
72				12		0	9	8		1000	DBA	8				
73		98		12			8	1		1001	DBA	81				
74		76		12			8	2		1010	BA	82	¢	AE	Cent Sign	2.5.1 3.5.5c
75	1	60	60	12			8	3		1011	BA	821	.		Period, Decimal Point	
76	2	66		12			8	4		1100	BA	84	<		Less Than Sign	3.3 3.6
77	3	73		12			8	5		1101	BA	841	(		Left Parenthesis	
78	4	100		12			8	6		1110	BA	842	+		Plus Sign	
79	5	87		12			8	7		1111	BA	8421	|	GM	Logical OR	2.4.1.12 3.5.5d

Table IV (Continued)

1 2 3 4 REFERENCE NUMBERS				5 CARD CODE					6 8-BIT CODE		7 96 COLUMN CARD CODE		8 9 GRAPHICS, CONTROLS, AND SPECIAL MEANINGS		10 GRAPHIC AND CONTROL NAMES	11 SEE SECTION
256	64	111E	64B	12	11	0	9	8	0123	4567	DCBA	8421				
80	6	49	49	12					0101	0000	A	82	&		Ampersand	3.6
81				12	11		9	1		0001	DB	1				
82				12	11		9	2		0010	DB	2				
83				12	11		9	3		0011	DB	21				
84				12	11		9	4		0100	DB	4				
85				12	11		9	5		0101	DB	41				
86				12	11		9	6		0110	DB	42				
87				12	11		9	7		0111	DB	421				
88				12	11		9	8		1000	DB	8				
89					11			8	1	1001	DB	81				
90		99			11			8	2	1010	B	82	!	AE	Exclamation Point	2.5.1 3.5.5c
91	7	44	44		11			8	3	1011	B	821	$	AE	Dollar Sign	2.5.1 3.6
92	8	72			11			8	4	1100	B	84	*		Asterisk	3.6
93	9	74			11			8	5	1101	B	841	)		Right Parenthesis	
94	10	67			11			8	6	1110	B	842	;		Semi Colon	
95	11	111			11			8	7	1111	B	8421	¬	MC	Logical NOT	2.4.1.12 3.5.5d

Table IV (Continued)

1 2 3 4 REFERENCE NUMBERS				5 CARD CODE					6 8-BIT CODE		7 96 COLUMN CARD CODE		8 9 GRAPHICS, CONTROLS, AND SPECIAL MEANINGS		10 GRAPHIC AND CONTROL NAMES	11 SEE SECTION
256	64	11-1E	64B	12	11	0	9	8	0123	4567	DCBA	8421				
96	12	33	33		11				0110	0000	B		-		Minus Sign, Hyphen	3.6
97	13	18	18			0		1		0001	A	1	/		Slash	
98					11	0	9	2		0010	DA	2				
99					11	0	9	3		0011	DA	21				
100					11	0	9	4		0100	DA	4				
101					11	0	9	5		0101	DA	41				
102					11	0	9	6		0110	DA	42				
103					11	0	9	7		0111	DA	421				
104					11	0	9	8		1000	DA	8				
105		86				0		8	1	1001	DA	81				
106				12	11					1010	DBA		¦		Vertical Line	3.5.5
107	14	28	28			0		8	3	1011	A	821	,		Comma	3.6
108	15	69				0		8	4	1100	A	84	%		Percent Sign	
109	16	88				0		8	5	1101	A	841	_	WS	Underscore	2.4.1.12
110	17	71				0		8	6	1110	A	842	>		Greater Than Sign	
111	18	77				0		8	7	1111	A	8421	?	SM	Question Mark	2.4.1.12

Table IV (Continued)

1 2 3 4 REFERENCE NUMBERS				5 CARD CODE					6 8-BIT CODE		7 96 COLUMN CARD CODE		8 9 GRAPHICS, CONTROLS, AND SPECIAL MEANINGS		10 GRAPHIC AND CONTROL NAMES	11 SEE SECTION
256	64	111E	64B	12	11	0	9	8	0123	4567	DCBA	8421				
112				12	11	0			0111	0000	DA					
113				12	11	0	9	1		0001	D	1				
114				12	11	0	9	2		0010	D	2				
115				12	11	0	9	3		0011	D	21				
116				12	11	0	9	4		0100	D	4				
117				12	11	0	9	5		0101	D	41				
118				12	11	0	9	6		0110	D	42				
119				12	11	0	9	7		0111	D	421				
120				12	11	0	9	8		1000	D	8				
121		110						8	1	1001	D	81	`		Grave Accent	3.5.5
122	19	68						8	2	1010		82	:	SB	Colon	2.4.1.12
123	20	12	12					8	3	1011		821	#	AE	Number Sign	2.5.1
124	21	17	17					8	4	1100		84	@	AE	At Sign	2.5.1
125	22	70						8	5	1101		841	'		Prime, Apostrophe	
126	23	65						8	6	1110		842	=		Equal Sign	
127	24	75						8	7	1111		8421	"	AE, TM	Quotation Marks	2.5.1 2.4.1.12

Table IV (Continued)

1 2 3 4 REFERENCE NUMBERS				5 CARD CODE					6 8-BIT CODE		7 96 COLUMN CARD CODE		8 9 GRAPHICS, CONTROLS, AND SPECIAL MEANINGS		10 GRAPHIC AND CONTROL NAMES	11 SEE SECTION
256	64	111E	64B	12	11	0	9	8	0123	4567	DCBA	8421				
128				12		0		8	1000	0000	DC					
129		50		12		0			0001		CBA	1	a			
130		51		12		0			0010		CBA	2	b			
131		52		12		0			0011		CBA	21	c			
132		53		12		0			0100		CBA	4	d			
133		54		12		0			0101		CBA	41	e			
134		55		12		0			0110		CBA	42	f			
135		56		12		0			0111		CBA	421	g			
136		57		12		0			1000		CBA	8	h			
137		58		12		0			1001		CBA	81	i			
138				12		0		8	1010		DCBA	82				
139				12		0		8	1011		DCBA	821				
140				12		0		8	1100		DCBA	84				
141				12		0		8	1101		DCBA	841				
142				12		0		8	1110		DCBA	842				
143				12		0		8	1111		DCBA	8421				

Table IV (Continued)

1 2 3 4 REFERENCE NUMBERS				5 CARD CODE					6 8-BIT CODE		7 96 COLUMN CARD CODE		8 9 GRAPHICS, CONTROLS, AND SPECIAL MEANINGS		10 GRAPHIC AND CONTROL NAMES	11 SEE SECTION
256	64	111E	64B	12	11	0	9	8	0123	4567	DCBA	8421				
144				12	11			8 1	1001	0000	CBA					
145		34		12	11			1		0001	CB	1	j			
146		35		12	11			2		0010	CB	2	k			
147		36		12	11			3		0011	CB	21	l			
148		37		12	11			4		0100	CB	4	m			
149		38		12	11			5		0101	CB	41	n			
150		39		12	11			6		0110	CB	42	o			
151		40		12	11			7		0111	CB	421	p			
152		41		12	11			8		1000	CB	8	q			
153		42		12	11			9		1001	CB	81	r			
154				12	11			8 2		1010	DCB	82				
155				12	11			8 3		1011	DCB	821				
156				12	11			8 4		1100	DCB	84				
157				12	11			8 5		1101	DCB	841				
158				12	11			8 6		1110	DCB	842				
159				12	11			8 7		1111	DCB	8421				

Table IV (Continued)

1 2 3 4 REFERENCE NUMBERS				5 CARD CODE					6 8-BIT CODE		7 96 COLUMN CARD CODE		8 9 GRAPHICS, CONTROLS, AND SPECIAL MEANINGS		10 GRAPHIC AND CONTROL NAMES	11 SEE SECTION
256	64	111E	64B	12	11	0	9	8	0123	4567	DCBA	8421				
160					11	0		8 1	1010	0000	DCB					
161					11	0		1		0001	DCA	1	~		Tilde	3.5.5
162		19			11	0		2		0010	CA	2	s			
163		20			11	0		3		0011	CA	21	t			
164		21			11	0		4		0100	CA	4	u			
165		22			11	0		5		0101	CA	41	v			
166		23			11	0		6		0110	CA	42	w			
167		24			11	0		7		0111	CA	421	x			
168		25			11	0		8		1000	CA	8	y			
169		26			11	0		9		1001	CA	81	z			
170					11	0		8 2		1010	DCA	82				
171					11	0		8 3		1011	DCA	821				
172					11	0		8 4		1100	DCA	84				
173					11	0		8 5		1101	DCA	841				
174					11	0		8 6		1110	DCA	842				
175					11	0		8 7		1111	DCA	8421				

Table IV (Continued)

1 2 3 4 REFERENCE NUMBERS				5 CARD CODE					6 8-BIT CODE		7 96 COLUMN CARD CODE		8 9 GRAPHICS, CONTROLS, AND SPECIAL MEANINGS		10 GRAPHIC AND CONTROL NAMES	11 SEE SECTION
256	64	111E	64B	12	11	0	9	8	0123	4567	DCBA	8421				
176				12	11	0		8 1	1011	0000	CA					
177				12	11	0		1		0001	C	1				
178				12	11	0		2		0010	C	2				
179				12	11	0		3		0011	C	21				
180				12	11	0		4		0100	C	4				
181				12	11	0		5		0101	C	41				
182				12	11	0		6		0110	C	42				
183				12	11	0		7		0111	C	421				
184				12	11	0		8		1000	C	8				
185				12	11	0		9		1001	C	81				
186				12	11	0		8 2		1010	DC	82				
187				12	11	0		8 3		1011	DC	821				
188				12	11	0		8 4		1100	DC	84				
189				12	11	0		8 5		1101	DC	841				
190				12	11	0		8 6		1110	DC	842				
191				12	11	0		8 7		1111	DC	8421				

Table IV (Continued)

1 2 3 4	5	6	7	8 9	10	11
REFERENCE NUMBERS	CARD CODE	8-BIT CODE	96 COLUMN CARD CODE	GRAPHICS, CONTROLS, AND SPECIAL MEANINGS	GRAPHIC AND CONTROL NAMES	SEE SECTION

256	64	111E	64B	12	11	0	9	8		0123	4567	DCBA	8421				
192	25	59	59	12		0				1100	0000	D		{	+0	Opening Brace	2.4.1.13 3.5.5
193	26	101	50	12					1		0001	BA	1	A	+1		2.4.1.13
194	27	102	51	12					2		0010	BA	2	B	+2		2.4.1.13
195	28	103	52	12					3		0011	BA	21	C	+3		2.4.1.13
196	29	104	53	12					4		0100	BA	4	D	+4		2.4.1.13
197	30	105	54	12					5		0101	BA	41	E	+5		2.4.1.13
198	31	106	55	12					6		0110	BA	42	F	+6		2.4.1.13
199	32	107	56	12					7		0111	BA	421	G	+7		2.4.1.13
200	33	108	57	12					8		1000	BA	8	H	+8		2.4.1.13
201	34	109	58	12					9		1001	BA	81	I	+9		2.4.1.13
202				12		0	9	8	2		1010	DBA	82				
203				12		0	9	8	3		1011	DBA	821				
204				12		0	9	8	4		1100	DBA	84		∫	Hook	
205				12		0	9	8	5		1101	DBA	841				
206				12		0	9	8	6		1110	DBA	842		⊦	Fork	
207				12		0	9	8	7		1111	DBA	8421				

Table IV (Continued)

1 2 3 4 REFERENCE NUMBERS				5 CARD CODE					6 8-BIT CODE		7 96 COLUMN CARD CODE		8 9 GRAPHICS, CONTROLS, AND SPECIAL MEANINGS		10 GRAPHIC AND CONTROL NAMES	11 SEE SECTION
256	64	111E	64B	12	11	0	9	8	0123	4567	DCBA	8421				
208	35	43	43		11	0			1101	0000	BA		}	-0	Closing Brace	2.4.1.13 3.5.5
209	36	89	34		11			1		0001	B	1	J	-1		2.4.1.13
210	37	90	35		11			2		0010	B	2	K	-2		2.4.1.13
211	38	91	36		11			3		0011	B	21	L	-3		2.4.1.13
212	39	92	37		11			4		0100	B	4	M	-4		2.4.1.13
213	40	93	38		11			5		0101	B	41	N	-5		2.4.1.13
214	41	94	39		11			6		0110	B	42	O	-6		2.4.1.13
215	42	95	40		11			7		0111	B	421	P	-7		2.4.1.13
216	43	96	41		11			8		1000	B	8	Q	-8		2.4.1.13
217	44	97	42		11			9		1001	B	81	R	-9		2.4.1.13
218				12	11		9	8	2	1010	DE	82				
219				12	11		9	8	3	1011	DE	821				
220				12	11		9	8	4	1100	DE	84				
221				12	11		9	8	5	1101	DE	841				
222				12	11		9	8	6	1110	DE	842				
223				12	11		9	8	7	1111	DE	8421				

Table IV (Continued)

1 2 3 4 REFERENCE NUMBERS				5 CARD CODE					6 8-BIT CODE		7 96 COLUMN CARD CODE		8 9 GRAPHICS, CONTROLS, AND SPECIAL MEANINGS		10 GRAPHIC AND CONTROL NAMES	11 SEE SECTION
256	64	111E	64B	12	11	0	9	8	0123	4567	DCBA	8421				
224	45	27	27			0		8 2	1110	0000	DB		\	RM	Reverse Slant	2.4.1.12 3.5.5
225					11	0	9	1		0001	DA	1				
226	46	78	19			0		2		0010	A	2	S			
227	47	79	20			0		3		0011	A	21	T			
228	48	80	21			0		4		0100	A	4	U			
229	49	81	22			0		5		0101	A	41	V			
230	50	82	23			0		6		0110	A	42	W			
231	51	83	24			0		7		0111	A	421	X			
232	52	84	25			0		8		1000	A	8	Y			
233	53	85	26			0		9		1001	A	81	Z			
234					11	0	9	8 2		1010	DA	82				
235					11	0	9	8 3		1011	DA	821				
236					11	0	9	8 4		1100	DA	84	∩		Chair	
237					11	0	9	8 5		1101	DA	841				
238					11	0	9	8 6		1110	DA	842				
239					11	0	9	8 7		1111	DA	8421				

Table IV (Continued)

1 2 3 4 REFERENCE NUMBERS				5 CARD CODE						6 8-BIT CODE		7 96 COLUMN CARD CODE		8 9 GRAPHICS, CONTROLS, AND SPECIAL MEANINGS		10 GRAPHIC AND CONTROL NAMES	11 SEE SECTION
256	64	111E	64B	12	11	0	9	8		0123	4567	DCBA	8421				
240	54	11	11						0	1111	0000	A		0			
241	55	2	2						1		0001		1	1			
242	56	3	3						2		0010		2	2			
243	57	4	4						3		0011		21	3			
244	58	5	5						4		0100		4	4			
245	59	6	6						5		0101		41	5			
246	60	7	7						6		0110		42	6			
247	61	8	8						7		0111		421	7			
248	62	9	9						8		1000		8	8			
249	63	10	10						9		1001		81	9			
250				12	11	0	9	8	2		1010	D	82			Long Vertical Mark	
251				12	11	0	9	8	3		1011	D	821				
252				12	11	0	9	8	4		1100	D	84				
253				12	11	0	9	8	5		1101	D	841				
254				12	11	0	9	8	6		1110	D	842				
255				12	11	0	9	8	7		1111	D	8421		EO	Eight Ones	2.4.2

Table V. WTC GRAPHIC OPTIONS

Reference Number	91	123	124	90	127	74
Card Code	11-8-3	8-3	8-4	11-8-2	8-7	12-8-2
Bit Code	0101-1011	0111-1011	0111-1100	0101-1010	0111-1111	0100-1010
Country						
Austria/Germany	Ü	Ä	Ö	ü	ä	ö
Belgium/France	F	é	à	è	ù	ç
Denmark/Norway	Å	Æ	ø	å	ae	ø
Finland/Sweden	Å	Ä	Ö	å	ä	ö
Italy	$	ì	ò	è	ù	à
Spanish Speaking	Pts	Ñ	@	!	ñ	ç
U. K.	£	#	@	!	"	$
Japan	¥	#	@	!	"	ç
U. S. A.	$	#	@	!	"	ç

Table VI. WTC GRAPHIC OPTIONS

Reference Number	91	123	124	90	127	74
Card Code	11-8-3	8-3	8-4	11-8-2	8-7	12-8-2
Bit Code	0101-1011	0111-1011	0111-1100	0101-1010	0111-1111	0100-1010
Country						
Bulgaria	JB	#	@	!	"	ç
Hungary	Ë	É	Á	ö	"	ü
Portuguese Speaking	ç	ã	Ã	ç	õ	ã
Yugoslavia	Č	š	Ž	č	Đ	Currency Symbol
Turkey	ı	ö	ş	ğ	ü	ç

TABLE VII. PUBLISHING AND PRINTING GRAPHIC OPTIONS

REFERENCE NUMBER	HEX CODE	CARD CODE	8-BIT CODE	GRAPHIC SYMBOL	GRAPHIC NAME
112	70	12-11-0	0111 0000	°	Scandanavian Accent
113	71	12-11-0-9-1	0111 0001	^	Circumflex
114	72	12-11-0-9-2	0111 0010	¨	Diaeresis
115	73	12-11-0-9-3	0111 0011	/	Diacritical Virgule
116	75	12-11-0-9-4	0111 0100	´	Acute Accent
117	75	12-11-0-9-5	0111 0101	•	Superior Dot
118	76	12-11-0-9-6	0111 0110	,	Cedilla
119	77	12-11-0-9-7	0111 0111	˘	Breve
120	78	12-11-0-9-8	0111 1000	ˇ	Caron
138	8A	12-0-8-2	1000 1010	↑	Up Arrow
139	8B	12-0-8-3	1000 1011	{	Left Brace*
140	8C	12-0-8-4	1000 1100	≤	Equal or Less Than*
141	8D	12-0-8-5	1000 1101	(	Superscript Left Parenthesis*
142	8E	12-0-8-6	1000 1110	+	Superscript Plus Sign*
143	8F	12-0-8-7	1000 1111	+	D.A. Cross, Plotting Cross*
154	9A	12-11-8-2	1001 1010	†	Dagger
155	9B	12-11-8-3	1001 1011	}	Right Brace*
156	9C	12-11-8-4	1001 1100	⌑	Lozenge*
157	9D	12-11-8-5	1001 1101	)	Superscript Right Parenthesis*
158	9E	12-11-8-6	1001 1110	±	Plus or Minus*
159	9F	12-11-8-7	1001 1111	■	Histogram*
160	A0	11-0-8-1	1010 0000	-	Superscript Minus*
161	A1	11-0-1	1010 0001	°	Degree*
171	AB	11-0-8-3	1010 1011	⌞	Lower Left Corner*

* in accordance with TN (1403 printing chain for S/360).

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TABLE VII. (Continued)

REFERENCE NUMBER	HEX CODE	CARD CODE	8-BIT CODE	GRAPHIC SYMBOL	GRAPHIC NAME
172	AC	11-0-8-4	1010 1100	⌜	Upper Left Corner*
173	AD	11-0-8-5	1010 1101	[	Open Square Bracket *
174	AE	11-0-8-6	1010 1110	≥	Equal or Greater Than*
175	AF	11-0-8-7	1010 1111	•	Bullet * (Plotting Circle)
176	B0	12-11-0-8-1	1011 0000	° 〃	Superscript* Double Acute
177	B1	12-11-0-1	1011 0001	¹ ˛	Superscript* Inferior Hook
178	B2	12-11-0-2	1011 0010	² ¯	Superscript* Macron
179	B3	12-11-0-3	1011 0011	³ ¸	Superscript* Inferior Comma
180	B4	12-11-0-4	1011 0100	⁴	Superscript*
181	B5	12-11-0-5	1011 0101	⁵	Superscript*
182	B6	12-11-0-6	1011 0110	⁶	Superscript*
183	B7	12-11-0-7	1011 0111	⁷	Superscript*
184	B8	12-11-0-8	1011 1000	⁸	Superscript*
185	B9	12-11-0-9	1011 1001	⁹	Superscript*
187	BB	12-11-0-8-3	1011 1011	⌟	Lower Right Corner*
188	BC	12-11-0-8-4	1011 1100	⌝	Upper Right Corner*
189	BD	12-11-0-8-5	1011 1101	]	Close Square Bracket *
190	BE	12-11-0-8-6	1011 1110	≠	Not Equal*
191	BF	12-11-0-8-7	1011 1111	–	Extended Dash*
205	CD	12-0-9-8-5	1100 1101	‘	Open Quote
219	DB	12-11-9-8-3	1101 1011	£	Pound Sign
220	DC	12-11-9-8-4	1101 1100	§	Section Sign
221	DD	12-11-9-8-5	1101 1101	¶	Paragraph Sign
237	ED	11-0-9-8-5	1110 1101	’	Close Quote

* in accordance with TN (1403 printing chain for S/360).

Table VIII. Examples of Use of EBCDIC Chart

Character	Type	Bit Pattern	Hex	Hole Pattern	
		01 23 4567		Zone Punches	Digit Punches
PF	Control Character	00 00 0100	04	12 - 9	-4
%	Special Graphic	01 10 1100	6C	0	-8-4
R	Upper Case	11 01 1001	D9	11	-9
a	Lower Case	10 00 0001	81	12 - 0	-1
	Control Character, function not yet assigned	00 11 0000	30	12 - 11 -0- 9	-8-1

SUPPLEMENTARY INFORMATION

3.1 DIFFERENCES BETWEEN EQUIPMENT FOR BCDIC AND EBCDIC. It should be recognized that some equipment designed for use in 6-bit BCD environments have different code-to-graphic assignments than those prescribed by this standard.

3.2 NAME OF CODE. In the internal and external documents:

a) The code of this standard should be referred to as the Extended BCD Interchange Code and may be abbreviated EBCDIC for convenience.

b) The card code of EBCDIC should be referred to as the Extended BCD Card Code.

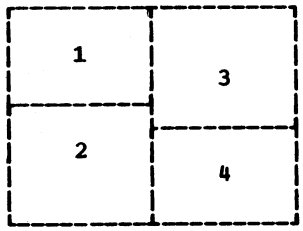
c) The magnetic tape code of EBCDIC should be referred to as the Extended BCD Magnetic Tape Code.

d) The CPU code of EBCDIC should be referred to as the Extended BCD CPU Code.

3.3 LOZENGE. The standard graphic for Reference Number 76 is " < " (Less Than Sign). Where , within a specific customer installation, a customer requirement exists for compatibility with previously installed equipment, the graphic "⌑" (Lozenge) may continue to be provided, and, if provided, will be in the code position of Reference Number 76.

3.4 16 by 16 CODE CHART. For reference purposes, bit-patterns, card hole-patterns, graphics and controls from Table IV are shown rearranged into a 16 by 16 matrix in Table IX. This 16 by 16 code chart shows the graphic characters and control character representations for EBCDIC. The bit-position numbers (bits), bit-patterns, hexadecimal (hex) representations and card hole patterns for these and other possible EBCDIC characters are also shown.

To find the card hole patterns for most characters, partition the 256-position table into four blocks as follows:



Block 1: Zone punches at top of table; digit punches at left

Block 2: Zone punches at bottom of table; digit punches at left

Block 3: Zone punches at top of table; digit punches at right

Block 4: Zone punches at bottom of table; digit punches at right

Fifteen positions in the table are exceptions to the above arrangement. These positions are indicated by small numbers in the upper right corners of their boxes in the table. The card hole patterns for these positions are given at the bottom of the table. Bit-position numbers, bit patterns, and hexadecimal representations for these positions are found in the usual manner.

Table VIII shows some examples of the use of the EBCDIC chart.

3.5 EBCDIC, 7-BIT CODE, HOLLERITH RELATIONSHIPS.

3.5.1.1 ISO-7. The International Standards Organization Recommendation for 6 and 7 BIT CODED CHARACTER SETS FOR INFORMATION PROCESSING INTERCHANGE (officially designated ISO/R646-1967) consists of a 64 character, 6-bit code and a 128 character, 7-bit code, primarily intended as a data interchange and communications code. Only the 7-bit code is of interest in this document and it is referred to in this document as ISO-7. National versions of ISO-7 are being standardized.

3.5.1.2 ASCII. The American National Standard Code for Information Interchange (officially designated as ANSI X3.4-1968) is a 128-character, 7-bit code, primarily intended as a data interchange and communications code. It is colloquially called "USASCII" or "ASCII" with "ASCII" being the preferred designation in IBM literature.

3.5.1.3 Other Countries. In the U.S.S.R., a 7-bit code standard following the ISO Recommendation has been finalized. In France, the United Kingdom and Germany, draft 7-bit code standards are being processed. In Japan, Japanese Industrial Standard Code for Information Interchange (JISCII) has been published 1969, September for 7 and 8-bit codes.

3.5.2 Hollerith. There is an American National Standard Hollerith Card Code for Information Interchange, ANSI-X3.26-1968. It is a 256-character card code, which assigns 128 card hole-patterns to the 128 characters of the 7-Bit Code and the remaining 128 card hole-patterns to an 8-Bit Code expansion of the 7-Bit Code.

3.5.3 7-Bit Code/Hollerith Code Chart. The combined 7-Bit Code/Hollerith code chart is shown in Table X. The 7-Bit Code graphic or control character, and the Hollerith card hole-patterns are shown for each of the 128 code-positions.

3.5.4 7-Bit Code Table Positional Notation. In the 7-Bit Code, a code table positional notation is used. The eight columns of the code table are numbered 0 through 7. The sixteen rows of the code table are numbered 0 through 15. Then a code table position is referred to as x/y, where x is the column number, and y is the row number. For example, the 7-Bit Code graphic "R" is in table position 5/2.

3.5.5 Correspondence Between 7-Bit Code Hollerith and EBCDIC. Data from 7-Bit Code/Hollerith environments may enter 8-bit EBCDIC environments. In such cases, it may be necessary to translate the characters before further processing. The correspondence to be used for translation is shown in Table XI. In the EBCDIC code table, the 128 7-Bit Code characters are shown. The graphic or control character is shown, and also the 7-Bit Code code table position. Some anomalies between the 7-Bit Code and EBCDIC are to be noted.

a) In hexadecimal code position 13 is shown the 7-Bit Code character Device Control 3 (DC3). The corresponding EBCDIC character is Tape Mark (TM).

b) In hexadecimal positions 1C, 1D, 1E, 1F are shown the 7-Bit Code characters File Separator, Group Separator, Record Separator, Unit Separator (FS, GS, RS, US). The corresponding EBCDIC characters are Interchange File Separator, Interchange Group Separator, Interchange Record Separator, and Interchange Unit Separator (IFS, IGS, IRS, IUS).

c) In hexadecimal code positions 4A and 5A of Table XI are shown 7-Bit Code graphics Left Bracket ([ ) and Right Bracket ( ]). These correspond to EBCDIC graphics Cent Sign (c) and Exclamation Point (!).

d) In hexadecimal positions 4F and 5F are shown the EBCDIC graphics Logical OR (|) and the Logical NOT (¬). These correspond to ASCII graphics Exclamation Point (!) and Circumflex (^). However, the substitution of "|" and " ¬ " for ASCII "!" and "^" is specifically permitted in the ASCII and USA Hollerith standards.

e) In ISO-7, preferred graphics are not yet assigned to ISO-7 code positions 5/12, 6/0, 7/11, 7/12, 7/13, 7/14.

3.6 MICR Secial Symbols. On MICR equipment which reads the MICR special symbols (either CMC-7 or E13B) it is the practive to generate bit patterns corresponding to those of existing EBCDIC graphics as shown in the following table.

MICR SPECIAL SYMBOLS		EBCDIC	
CMC-7	E13B	REF. NUMBER	EXISTING GRAPHIC
SS-1	Amount	91	$ Dollar Sign
SS-2	On Us	107	, Comma
SS-3	Transit	76	< Less Than
SS-4	Dash	96	- Minus Sign, Hyphen
SS-5		80	& Ampersand
	Unreadable	92	* Asterisk

EXTENDED BCD INTERCHANGE CODE
LATIN ALPHABETS

TABLE IX. EXTENDED BCD INTERCHANGE CODE

BITS 4 5 6 7 (SECOND HEX DIGIT)	00				01				10				11				
BITS 0,1	00				01				10				11				
BITS 2,3	00	01	10	11	00	01	10	11	00	01	10	11	00	01	10	11	
FIRST HEXADECIMAL DIGIT	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
ZONE PUNCHES	12				12	12		12	12	12		12	12				
		11				11	11	11		11	11	11		11			
			0		0		0	0	0		0	0			0		
DIGIT PUNCHES	9	9	9	9	9	9	9	9									
	①	②	③	④	⑤	⑥	⑦	⑧					⑨	⑩	⑪	⑫	
0000 0 8-1	NUL	DLE	DS		SP	&	-						{	}	\	0	8-1
0001 1 1	SOH	DC1	SOS				⑬ /		a	j	~		A	J	⑭	1	1
0010 2 2	STX	DC2	FS	SYN					b	k	s		B	K	S	2	2
0011 3 3	ETX	TM							c	l	t		C	L	T	3	3
0100 4 4	PF	RES	BYP	PN					d	m	u		D	M	U	4	4
0101 5 5	HT	NL	LF	RS					e	n	v		E	N	V	5	5
0110 6 6	LC	BS	ETB	UC					f	o	w		F	O	W	6	6
0111 7 7	DEL	IL	ESC	EOT					g	p	x		G	P	X	7	7
1000 8 8	GE	CAN							h	q	y		H	Q	Y	8	8
1001 9 8-1	RLF	EM						`	i	r	z		I	R	Z	9	9
1010 A 8-2	SMM	CC	SM		¢	!	⑮	:								LVM	8-2
1011 B 8-3	VT	CU1	CU2	CU3	.	$	,	#									8-3
1100 C 8-4	FF	IFS		DC4	<	*	%	@					∫		⊣		8-4
1101 D 8-5	CR	IGS	ENQ	NAK	(	)	_	'									8-5
1110 E 8-6	SO	IRS	ACK		+	;	>	=					⊢				8-6
1111 F 8-7	SI	IUS	BEL	SUB	|	¬	?	"								EO	8-7
Zone Punches	12				12				12	12		12	12	12		12	
		11				11				11	11	11		11	11	11	
			0				0		0		0	0	0		0	0	
	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	

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CUSTOMER USE CHARACTERS

REF. #	GRAPHICS	NAME	DESCRIPTION SEE SECTION
27	CU1	Customer Use 1	2.4.2.27
43	CU2	Customer Use 2	2.4.2.43
59	CU3	Customer Use 3	2.4.2.59

DEVICE CONTROL CHARACTERS

REF. #	GRAPHICS	NAME	DESCRIPTION SEE SECTION
4	PF	Punch Off	2.4.2.4
17	DC1	Device Control 1	2.4.2.17
18	DC2	Device Control 2	2.4.2.18
19	DC3/TM	Device Control 3/ Tape Mark	2.4.2.19
52	PN	Punch On	2.4.2.52
53	RS	Reader Stop	2.4.2.53
60	DC4	Device Control 4	2.4.2.60

ERROR CONTROL CHARACTERS

REF. #	GRAPHICS	NAME	DESCRIPTION SEE SECTION
7	DEL	Delete	2.4.2.7
24	CAN	Cancel	2.4.2.24
45	ENQ	Enquiry	2.4.2.45
46	ACK	Acknowledge	2.4.2.46
47	BEL	Bell	2.4.2.47
61	NAK	Negative Acknowledge	2.4.2.61
63	SUB/CH	Substitute Check	2.4.2.63
64	EO	Eight Ones	2.4.2.64

FORMATTING OR EDITING CONTROL CHARACTERS

REF. #	GRAPHICS	NAME	DESCRIPTION SEE SECTION
5	HT	Horizontal Tab	2.4.2.5
9	RLF	Reverse Line Feed	2.4.2.9
11	VT	Vertical Tab	2.4.2.11
12	FF	Form Feed	2.4.2.12
13	CR	Carriage Return	2.4.2.13
21	NL	New Line	2.4.2.21
22	BS	Back Space	2.4.2.22
32	DS	Digit Select	2.4.2.32
33	SOS	Start of Significance	2.4.2.33
34	FS	Field Separator	2.4.2.34
37	LF	Line Feed	2.4.2.37

GROUPING CONTROL CHARACTERS

REF. #	GRAPHICS	NAME	DESCRIPTION SEE SECTION
1	SOH	Start of Heading	2.4.2.1
2	STX	Start of Text	2.4.2.2
3	ETX	End of Text	2.4.2.3
10	SMM	Start of manual message	2.4.2.10
25	EM	End of Medium	2.4.2.25
26	CC	Cursor Control	2.4.2.26
28	IFS	Interchange File Separator	2.4.2.28
29	IGS	Interchange Group Separator	2.4.2.29
30	IRS	Interchange Record Separator	2.4.2.30
31	IUS	Interchange Unit Separator	2.4.2.31
38	ETB/EOB	End of Transmission Block	2.4.2.38
55	EOT	End of Transmission	2.4.2.55

MODE CONTROL CHARACTERS

REF. #	GRAPHICS	NAME	DESCRIPTION SEE SECTION
6	LC	Lower Case	2.4.2.6
8	GE	Graphic Escape	2.4.2.8
14	SO	Shift Out	2.4.2.14
15	SI	Shift In	2.4.2.15
16	DLC	Data Link Escape	2.4.2.16
20	RES	Restore	2.4.2.20
36	BYP	Bypass	2.4.2.36
39	ESC/PRE	Escape Prefix	2.4.2.39
42	SM	Set Mode	2.4.2.42
54	UC	Upper Case	2.4.2.54

SYNCHRONIZATION CONTROL CHARACTERS

REF. #	GRAPHICS	NAME	DESCRIPTION SEE SECTION
0	NUL	Null	2.4.2.0
23	IL	Idle	2.4.2.23
50	SYN	Synchronous Idle	2.4.2.50

SPECIAL GRAPHIC CHARACTERS			
REF. #	GRAPHIC	DESCRIPTION NAME	SEE SECTION
74	¢	Cent Sign	2.5.1 3.5.5-c
75	.	Period Decimal Point	
76	<	Less-Than Sign	3.3 3.6
77	(	Left Parenthesis	
78	+	Plus Sign	
79	|	Logical OR	2.4.1.12 3.5.5-d
80	&	Ampersand	3.6
90	!	Exclamation Point	2.5.1 3.5.5-c
91	$	Dollar Sign	2.5.1 3.6
92	*	Asterisk	3.6
93	)	Right Parenthesis	
94	;	Semicolon	
95	¬	Logical Not	2.4.1.12 3.5.5-d
96	-	Minus Sign Hyphen	3.6
97	/	Slash	
106	¦	Vertical Line	3.5.5
107	,	Comma	3.6
108	%	Percent Sign	
109	_	Underscore	2.4.1.12
110	>	Greater-Than Sign	
111	?	Question Mark	2.4.1.12
121	`	Grave Accent	3.5.5
122	:	Colon	2.4.1.12
123	#	Number Sign	2.5.1
124	@	At Sign	2.5.1
125	'	Prime Apostrophe	
126	=	Equal Sign	

SPECIAL GRAPHIC CHARACTERS			
REF. #	GRAPHIC	DESCRIPTION NAME	SEE SECTION
127	"	Quotation Mark	2.5.1
161	~	Tilde	3.5.5
192	{	Opening Brace	2.4.1.13 3.5.5
204	⌠	Hook	
206	⅂	Fork	
208	}	Closing Brace	2.4.1.13 3.5.5
224	\	Reverse Slant	2.4.1.12 3.5.5
236	⌂	Chair	
250	|	Long Vertical Mark	

TABLE X. 7-BIT CODE/HOLLERITH CODE TABLE

Col→	0	1	2	3	4	5	6	7
Row ↓0	NUL 12-0-9-8-1	DLE 12-11-9-8-1	SP no punches	0 0	@ (1) 8-4	P 11-7	(3) 8-1	p 12-11-7
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
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
3	ETX 12-9-3	DC3 11-9-3	# (4) 8-3	3 3	C 12-3	S 0-2	c 12-0-3	s 11-0-2
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
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
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
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
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
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
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
11	VT 12-9-8-3	ESC 0-9-7	+ 12-8-6	; 11-8-6	K 11-2	[(1) 12-8-2	k 12-11-2	{ (2) 12-0
12	FF 12-9-8-4	FS 11-9-8-4	' 0-8-3	< 12-8-4	L 11-3	\ (2) 0-8-2	l 12-11-3	(2) 12-11
13	CR 12-9-8-5	GS 11-9-8-5	- 11	= 8-6	M 11-4	] (1) 11-8-2	m 12-11-4	} (2) 11-0
14	SO 12-9-8-6	RS 11-9-8-6	. 12-8-3	> 0-8-6	N 11-5	¬ (3) 11-8-7	n 12-11-5	(3) 11-0-1
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

(1) National Use. Graphic shown is preferred when other National Use is not required.
(2) National Use.
(3) National Use when 8, 9 or 10 National Use characters are required.
(4) When the £ symbol is required, it should replace the # symbol.

EXTENDED BCD INTERCHANGE CODE
LATIN ALPHABETS

TABLE XI. EBCDIC AND 7-BIT CODE/HOLLERITH CORRESPONDENCES

BITS 4 5 6 7	SECOND HEX DIGIT		00				01				10				11				
			00	01	10	11	00	01	10	11	00	01	10	11	00	01	10	11	BITS 0,1 / BITS 2,3
			0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	FIRST HEX DIGIT
		PUNCHES	12				12	12		12	12	12		12	12				ZONE PUNCHES
				11				11	11	11		11	11	11		11			
					0		0		0	0	0		0	0			0		
			9	9	9	9	9	9	9	9									DIGIT PUNCHES
0000	0	8-1	① NUL 0/0	② DLE 1/0	③	④	⑤ SP 2/0	⑥ & 2/6	⑦ - 2/13	⑧					⑨ { 7/11	⑩ } 7/13	⑪ \ 5/12	⑫ 0 3/0	8-1
0001	1	1	SOH 0/1	DC1 1/1					⑬ / 2/15		a 6/1	j 6/10	~ 7/14		A 4/1	J 4/10	⑭	1 3/1	1
0010	2	2	STX 0/2	DC2 1/2		SYN 1/6					b 6/2	k 6/11	s 7/3		B 4/2	K 4/11	S 5/3	2 3/2	2
0011	3	3	ETX 0/3	DC3 1/3							c 6/3	l 6/12	t 7/4		C 4/3	L 4/12	T 5/4	3 3/3	3
0100	4	4									d 6/4	m 6/13	u 7/5		D 4/4	M 4/13	U 5/5	4 3/4	4
0101	5	5	HT 0/9		LF 0/10						e 6/5	n 6/14	v 7/6		E 4/5	N 4/14	V 5/6	5 3/5	5
0110	6	6		BS 0/8	ETB 1/7						f 6/6	o 6/15	w 7/7		F 4/6	O 4/15	W 5/7	6 3/6	6
0111	7	7	DEL 7/15		ESC 1/11	EOT 0/4					g 6/7	p 7/0	x 7/8		G 4/7	P 5/0	X 5/8	7 3/7	7
1000	8	8		CAN 1/8							h 6/8	q 7/1	y 7/9		H 4/8	Q 5/1	Y 5/9	8 3/8	8
1001	9	8-1		EM 1/9						\ 6/0	i 6/9	r 7/2	z 7/10		I 4/9	R 5/2	Z 5/10	9 3/9	9
1010	A	8-2					[5/11	] 5/13	⑮ 7/12	: 3/10									8-2
1011	B	8-3	VT 0/11				. 2/14	$ 2/4	, 2/12	# 2/3									8-3
1100	C	8-4	FF 0/12	FS 1/12		DC4 1/4	< 3/12	* 2/10	% 2/5	@ 4/0									8-4
1101	D	8-5	CR 0/13	GS 1/13	ENQ 0/5	NAK 1/5	(2/8	) 2/9	¬ 5/15	' 2/7									8-5
1110	E	8-6	SO 0/14	RS 1/14	ACK 0/6		+ 2/11	; 3/11	> 3/14	= 3/13									8-6
1111	F	8-7	SI 0/15	US 1/15	BEL 0/7	SUB 1/10	| 2/1	¬ 5/14	? 3/15	" 2/2									8-7
			12				12				12	12		12	12	12		12	Zone Punches
				11				11				11	11	11		11	11	11	
					0				0		0		0	0	0		0	0	
			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		

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