BELL TELEPHONE LABORATORIES
INCORPORATED

SUBJECT: Punched Card Code Standardization - Case 39065

DATE: DEC 1 1967

FROM: D. A. Kerr

ENGINEER'S NOTES

ABSTRACT

The proposed USA Standard Hollerith Punched Card Code is progressing through the USA Standards Institute approval process. Negotiations with international standards bodies have produced a suggested amendment to the proposed standard. It is hoped that approval both here and internationally can be achieved for the resulting code arrangement. Also proposed for addition to the standard is a revised set of 128 additional hole-patterns for use in representing the additional characters of an 8-bit code, should one be subsequently standardized. Code tables and related reference material is attached.

HO-3142

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For some years now technical committees of the USA Standards Institute (USASI) have been attempting to develop an acceptable standard punched-card code. For a number of practical reasons, the only such code for use with the "12-row" card format which has had any success in the approval proceedings is one based upon the classical "Hollerith" coding principle widely used by IBM and other manufacturers.

Such a code, giving unambiguous representations for the 128 characters of ASCII, has been approved by USASI Subcommittee X3.2, and is now awaiting national publication for comment prior to a ballot of Standards Committee X3. The code arrangement is identical for many characters to the EBCDIC-related card code now standard in the IBM System/360, and it is possible that if the standard is approved, IBM may take steps to revise their standard into greater conformity with it. Thus the proposed standard is viewed by many of its developers as a useful tool to allow the interchange of data between ASCII- and EBCDIC-oriented data processing systems.

Attached is a copy of the related standards proposal (document X3.2/534) as of some months ago. Changes made since then have been mainly editorial in nature, although attention should be given to the proposed amendment described below.

Since the preparation of the standard under discussion, negotiations have been underway between the USASI technical groups and their counterpart groups in the principal international standards organizations. The results of this negotiation suggest that international agreement is within reach, but the US workers have recently proposed certain slight changes in the US code which appear necessary to such agreement. These are indicated on the marked-up "Table I" which is attached; it is proposed that it supersede the table of Section 2.1 of document X3.2/534.

These amendments to the proposed standard will soon be made the subject of a letter ballot in Subcommittee X3.2, and are expected to receive approval there without difficulty.

The proposed standard actually provides 256 distinct hole-patterns, each equated to a member of a hypothetical 8-bit code of which ASCII is a subset. This is justified by the fact that many people feel the emergence of a standard 8-bit code to be inevitable in the future, and because all the other standardized record media can somehow accommodate 8 bits of data per character. Such an extension is also felt by some to enhance the benefits of the relationship with the IBM EBCDIC-related card code, which has, of course, 256 valid hole-patterns as required to represent the 256 character positions of EBCDIC.

The current thinking of the cognizant Task Group (X3.2.3) on specific allocation of the additional 128 hole-patterns is shown in the attached "Table II." It is proposed that this supersede the information given in Section A5 of the appendix of document X3.2/534.

D. A. KERR

HO-3142-DAK-cf

Att.
X3.2/534
Table I
Table II

TABLE I

STANDARD HOLLERITH PUNCHED CARD CODE

ASCII Columns → / ASCII Rows ↓

ASCII Rows	0 (ø)	1	2	3	4	5	6	7
0	12-0-9-8-1	12-11-9-8-1	No Punches	0	8-4	11-7	8-1 ⟵ (circled)	12-11-7
1	12-9-1	11-9-1	12 / 8-7 (X)	1	12-1	11-8	12-0-1	12-11-8
2	12-9-2	11-9-2	8-7	2	12-2	11-9	12-0-2	12-11-9
3	12-9-3	11-9-3	8-3	3	12-3	0-2	12-0-3	11-0-2
4	9-7	9-8-4	11 / 8-3	4	12-4	0-3	12-0-4	11-0-3
5	0-9-8-5	9-8-5	0 / 8-4	5	12-5	0-4	12-0-5	11-0-4
6	0-9-8-6	9-2	12	6	12-6	0-5	12-0-6	11-0-5
7	0-9-8-7	0-9-6		7	12-7	0-6	12-0-7	11-0-6
8	11-9-8-6	11-9-8	8-5	8	12-8	0-7	12-0-8	11-0-7
9	12-9-8-5	11-9-8-1	12 / 8-5	9	12-9	0-8	12-0-9	11-0-8
10	0-9-5 (X)	9-8-7	11 / 8-5	8-2	11-1	0-9	12-11-1	11-0-9
11	12-9-8-3	0-9-7	11 / 8-4	11 / 8-6	11-2	12	12-11-2 (X)	12-0 (X)
12	12-9-8-4	11-9-8-4	0 / 8-6	12 / 8-4	11-3	8-2 (X)	12-11-3 (X)	12-11 (X)
13	12-9-8-5	11-9-8-5	11 / 8-3	8-6	11-4	8-2 (X)	12-11-4 (X)	11-0 / 1-0-11-3
14	12-9-8-6	11-9-8-6	12 / 8-3	0 / 8-6	11-5	11 / 8-7	12-11-5	
15	12-9-8-7	11-9-8-7	0 / 1	0 / 8-7	11-6	0 / 8-5	12-11-6	

TABLE II

ADDITIONAL HOLE PATTERNS

Columns of a hypothetical 8-bit code table containing ASCII in columns 0-7

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

SUBJECT: Errata - Punched Card Code Standardization - Case 39065

DATE: December 4, 1967

FROM: D. A. Kerr

ERRATA

My Engineer's Notes of December 1, 1967, entitled "Punched Card Code Standardization - Case 39065", referred to USASI document X3.2/534, which should have been attached. It was inadvertently omitted, but is attached hereto.

D. A. KERR

HO-3142-DAK-MR

Att.
X3.2/534

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