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FILE MEMO

SUBJECT:          Chain Printer Proposal for Project 7000

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In selecting the features for the chain printer to be provided for Project 7000, it is proposed to take full advantage of two important characteristics inherent in the chain printer:

    a.    The ability to print an extended alphabet.

    b.    The ability to adjust its speed automatically according to the kind and amount of printing to be done on each line.

The extended alphabet feature of the chain printer will be a significant sales advantage of the IBM chain printer over existing competitive printers, and possibly the only one. It is especially appropriate as a printer for Project 7000 because it will allow us to experiment and gain experience in new application areas.

Because the extended alphabet feature of necessity lowers the maximum speed of printing, it is proposed to make two versions available to Project 7000 customers. One has a 48-character alphabet and runs at a nominal speed of 600 lpm. The other has a 96-character alphabet and runs at around 475 lpm when printing certain 48 out of the 96 available characters (these 48 corresponding to the 48 of the first version); the same printer runs at a reduced speed of at least 145 lpm when printing characters not contained in the basic set of 48.

The printer uses an 8-bit character code. The rightmost six bits are used in the following fashion:

|  |  |  |  |
|---|---|---|---|
| 000000 |  |  | Blank |
| 000001 | to | 001111 | Not used |
| 100000 | to | 111111 | 48 printable characters. |

The seventh bit from the right is a "shift" code which selects between the two sets of 48 characters on the 96-character printer. The bit is ignored on the 48-character printer. The eighth (leftmost) bit should always be zero, except that the code 1111 1111 is an "ignore" character which is not printed and does not produce a blank space either.

The codes are shown on the attached sheet. The 96-character code is selected so that 88 characters of the same code can also be used directly on the single-element typewriter; the remaining 8 characters are available only on the chain printer. The 48-character printer uses a subset consisting of the columns headed by zones 101, 110, and 011 in the 96-character set.

This printer arrangement has the following advantages:

1.  Decimal arithmetic can be performed on the numeric digits in this code.

2.  Blank, alphabetic characters, and numeric digits have binary code values which agree with the standard collating sequence.

3.  No code translation is needed when the information remains within the units of the 7000 Series.

4.  The lower case alphabet feature makes it possible to print large amounts of text material with greater legibility. It also provides more symbols for programming purposes.

5.  Compatibility with the typewriter assures that all information entered by keying can also be printed at high speed.

6.  It affords the opportunity to use the typewriter as a source recording and transcription device, especially where the keypunch does not provide enough characters.

It also has these disadvantages:

1.  With the 48-character version, two of the eight bits in each character code are unused and represent a waste of 25% in memory or tape storage space and reading time, as compared to a 6-bit character code. This is not considered serious because of the relatively low volume of printed data and the fact that storage of edited data is inefficient anyway.

2.  The 96-character printer is slower than some other extended alphabet version with fewer characters, such as 60. While speed is always desirable, it is believed that the customers who order such a printer, instead of the 48-character 600 lpm version, will prefer flexibility to speed.

WB/pkb

Attach.

# PROPOSED 96-CHARACTER CODE

## ZONES (cba)

| NUMERICS 8 4 2 1 | 000 | 001 | 010 | 011 | 100 | 101 | 110 | 111 |
|---|---|---|---|---|---|---|---|---|
| 0 0 0 0 | BLANK | a | q | 0 | | A | Q | ) |
| 0 0 0 1 | | b | r | 1 | | B | R | ! |
| 0 0 1 0 | | c | s | 2 | | C | S | @ |
| 0 0 1 1 | | d | t | 3 | | D | T | # |
| 0 1 0 0 | | e | u | 4 | | E | U | $ |
| 0 1 0 1 | | f | v | 5 | | F | V | % |
| 0 1 1 0 | | g | w | 6 | | G | W | ¢ |
| 0 1 1 1 | | h | x | 7 | | H | X | & |
| 1 0 0 0 | | i | y | 8 | | I | Y | * |
| 1 0 0 1 | | j | z | 9 | | J | Z | ( |
| 1 0 1 0 | | k | " | + | | K | ' | = |
| 1 0 1 1 | | l | ± | – | | L | ¤ | _ |
| 1 1 0 0 | | m | ☑ | . | | M | ✳ | . |
| 1 1 0 1 | | n | ☑ | , | | N | # | , |
| 1 1 1 0 | | o | ☑ | : | | Q | $ | ; |
| 1 1 1 1 | | p | ☑ | / | | P | % | ? |

✳ Symbols on printer only

☑ Symbol to be assigned

Typewriter Code Assignment:  $cba \; 8421$
$S \; R_2 \; \overline{R}_{2A} \; R_5 \; R_1 \; T_1 \; T_2$

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# PROPOSED
## 48-CHARACTER
### CODE

| NUMERICS 8 4 2 1 | ZONES (ba) | | | |
| --- | --- | --- | --- | --- |
| | 00 | 01 | 10 | 11 |
| 0 0 0 0 | BLANK | A | Q | 0 |
| 0 0 0 1 | | B | R | 1 |
| 0 0 1 0 | | C | S | 2 |
| 0 0 1 1 | | D | T | 3 |
| 0 1 0 0 | | E | U | 4 |
| 0 1 0 1 | | F | V | 5 |
| 0 1 1 0 | | G | W | 6 |
| 0 1 1 1 | | H | X | 7 |
| 1 0 0 0 | | I | Y | 8 |
| 1 0 0 1 | | J | Z | 9 |
| 1 0 1 0 | | K | . | + |
| 1 0 1 1 | | L | ¤ | − |
| 1 1 0 0 | | M | * | . |
| 1 1 0 1 | | N | # | , |
| 1 1 1 0 | | O | $ | : |
| 1 1 1 1 | | P | % | / |

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