

November 30, 1959

MEMORANDUM TO: 1401 File

SUBJECT: Compressed Word Optional Feature

Since 7070 tapes can be written with compressed words (words with up to 5 leading zeros suppressed), it is necessary for the 1401 to be able to accept this type of tape record for use in the 1401. To read this information and arrange it into usable form, one 1401 instruction must be modified and another added as follows:

M(~~X~~C1)(BBB)R MOVE Compressed Magnetic Tape

This instruction will operate the same as the basic Move Magnetic Tape instruction except that it will not put a word mark with the group mark that is put into storage as the last character when a tape gap is sensed. A group mark plus a word mark in storage will not stop the tape read operation as it normally does. The B address register will be setting at the address where the group mark was written when this instruction is completed.

X(AAA)(BBB) Expand the Compressed Record

This new instruction will expand the compressed tape records into the full length records as is explained in the following description.

Rules for Use of Compressed Word:

1. To utilize a minimum amount of 1401 storage it is recommended that the compressed tape record be read into the same area of storage that the compressed records are to be expanded into. Example: If the expanded record is to be located in addresses 500 through 800, then read the compressed record into storage at address 500.

2. Set word marks in storage for the expanded record. These word marks will not be affected by the move compressed magnetic tape instruction.  
Note: You cannot use the load magnetic tape instruction when reading compressed records.
3. With the <sup>move</sup> move compressed magnetic tape instruction the interrecord gap on tape will cause a group mark (CBA8421) without a word mark to go into storage and the B Address Register will be adjusted to containing this same address where the GM is written. A group mark plus a word mark in storage will not stop this tape operation.
4. When reading the compressed record from tape a binary trigger is utilized to keep track of the numeric and alphabetic mode which is controlled by the Delroy characters written on the tape. This trigger is reset by the next read call, therefore, the "Expand Compressed Tape" instruction must be executed before further read tape instructions are given. This trigger is also used by the expand compress record instruction.
5. After the tape record is read into storage the Store B address register instructions (optional feature for the 1401) should be executed to retain the address located in the B address register (location of the group mark indicating the end of the compressed record).
6. The actual address just stored should be compared to the address of the last character of the expanded record and if these addresses are equal no expansion is required. If not equal the expand compressed record instruction should be executed.
7. The expand compressed record instruction should contain the address which was stored in (5) above as the address of the A field (AAA). The (BBB) address should be the address of the last character of the expanded record. (Should contain a group mark)
8. The expand compressed record instruction will operate under control of the binary trigger mentioned in (4) above. This trigger will also change its' state every time a Delroy character is read from storage on an A cycle.
9. When the binary trigger is in its' numeric mode the expand instruction will operate as follows:

Transfer the character at the AAA address to the BBB address if it is a group mark, the units position of a word, or any character that is not in the units position that does not contain a B bit.

When a B bit and not a group mark is recognized in the A field and it is not the units position of that field this character is retained in the A register, further A cycles will be suppressed until after a B field word mark occurs, and zeros will be put into storage in each B cycle until a word mark occurs. One more B cycle then occurs and the character in the A register is put into storage, then A and B cycles continue as before.

When a Delroy character is sensed on an A cycle the binary trigger will be changed to its' alphabetic mode.

10. When the binary trigger is in its' alphabetic mode the expand instruction will operate as follows:  
Transfer the character at the (AAA) address to the (BBB) address.

When a Delroy character is sensed on an A cycle the binary trigger will be changed to the numeric mode.

11. The Expand Compressed Record instruction is completed when a group mark with a word mark is sensed. The group mark with the word mark is preset in the highest order position of the field under program control. All other word marks encountered have no control over this operation.



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