October 20, 1959

MEMORANDUM TO: 1401 File

SUBJECT: Tape Operation

A new instruction will be included on the tape attachment.

U(AAA)u   Rewind and Unload

This instruction operates the same as the REWIND TAPE instruction except that in addition to rewinding the tape it will cause an unload condition to occur at the end of rewind.

To allow the maximum amount of processing time when reading or writing tape the 1401 will operate as follows:

1. When reading tape and an inter-record gap is recognized, a group mark with a Word Mark is placed in storage and the 1401 allows the next instruction to be started immediately. The tape unit has not stopped operating at this time. There will be at least an additional 108 microseconds before an LRCR check is made for the record just read and the tape error latch can be checked. The actual movement of tape will not stop for several more milliseconds. Therefore, even though further processing has been allowed it is with the condition that any Branch instruction or Tape instruction will stop processing until after the LRCR check has been made. This is to insure that when a Branch on Tape Error instruction is executed it will give a true indication, and that another tape operation cannot start before this tape operation is completed.

2. When reading tape and a Group Mark with a Word Mark
is read from the 1401 storage, a Group Mark with a
Word Mark is placed in storage and the 1401 allows
the next instruction to be started immediately. In
this case, the tape LACR check cannot be made until
after the rest of the tape record has been passed
over (16 microseconds per character) plus 144 micro-
seconds. Processing can continue in this case also,
as long as a Branch instruction or a Tape instruction
is not to be executed. Any Branch instruction or
Tape instruction will stop processing until after the
LACR check is made.

3. When writing on tape a Group Mark with a Word Mark
from storage will indicate the end of the record to
be written on tape and the 1401 will allow the next
instruction to be started immediately. In this case,
the LACR check cannot be made for an additional 1.8
milliseconds. However, processing can continue during
this time as long as a Branch instruction or Tape in-
struction is not to be executed.

The (AAA) address in a tape read or write instruction will
be used to specify the tape unit selected and the type of parity
check on tape (odd or even).

The % sign in the first position signals that a tape unit
is to be selected. The second character can be varied to
specify a particular type of operation. If the second charac-
ter is (B) it will specify that the tape is to be read or
written in odd redundancy. Any other character in the position
implies even redundancy. The third digit specifies the parti-
cular tape unit involved.

EXAMPLE: The instruction M(%Ø1)(100)R means to read
an even redundancy record from Tape Unit 1
and put it into the 1401 storage starting
at address 100.

The instruction M(%B1)(100)R means to read
an odd redundancy record from Tape Unit 1
and put it into the 1401 storage starting
at address 100.

2. When reading tape and a Group Mark with a Word Mark is read from the 1401 storage, a Group Mark with a Word Mark is placed in storage and the 1401 allows the next instruction to be started immediately. In this case, the tape LACR check cannot be made until after the rest of the tape record has been passed over (16 microseconds per character) plus 144 microseconds. Processing can continue in this case also, as long as a Branch instruction or a Tape instruction is not to be executed. Any Branch instruction or Tape instruction will stop processing until after the LACR check is made.

3. When writing on tape a Group Mark with a Word Mark from storage will indicate the end of the record to be written on tape and the 1401 will allow the next instruction to be started immediately. In this case, the LACR check cannot be made for an additional 1.8 milliseconds. However, processing can continue during this time as long as a Branch instruction or Tape instruction is not to be executed.

The (AAA) address in a tape read or write instruction will be used to specify the tape unit selected and the type of parity check on tape (odd or even).

The % sign in the first position signals that a tape unit is to be selected. The second character can be varied to specify a particular type of operation. If the second character is (B) it will specify that the tape is to be read or written in odd redundancy. Any other character in the position implies even redundancy. The third digit specifies the particular tape unit involved.

EXAMPLE: The instruction M(%Ø1)(100)R means to read an even redundancy record from Tape Unit 1 and put it into the 1401 storage starting at address 100.

The instruction M(%B1)(100)R means to read an odd redundancy record from Tape Unit 1 and put it into the 1401 storage starting at address 100.