I. TO ADJUST ALIGNER SHAFT FOR TAPE POSITION

   1. Place Feed – Load – Rewind lever to
      LOAD.

   2. Use a coin, or Allen Wrench, turn
      aligner locks until flat side is next
      to aligner disc. Remove aligners by
      pulling straight outward on discs.

   3. Loosen Allen Head Set screws in both
      aligner discs. See FIGURE #1.

   4. Rotate disc to adjust distance from
      inside edge of disc to guide edge to
      .750 inch on both aligners.

   5. Tighten set screws enough to hold
      adjustment temporarily.

   6. Install aligners in position and us-
      ing a coin, or Allen Wrench, turn
      aligner lock to hold disc in position.
      NOTE: Right side aligner has a key-
      ing pin and will fit only that side.

Alignment Screw

.750

Guide Edge

Allen Set Screw

Disc

Aligner Lock
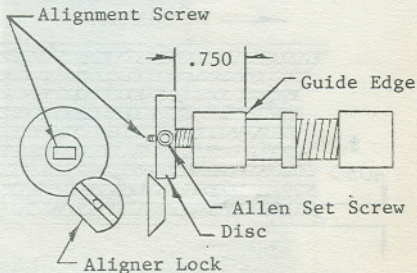
7. On 6401 set switches to: ENT., REL.,
   ON, AUTO DUP./SKIP OFF, PRG. OFF,
   SEARCH OFF, PRG. REVERT-OFF-NORMAL TO
   NORMAL.

8. Install a scratch tape.

9. On the 6401 ground Tape Error Flip-
   Flop (TEFF - 04A66) and K/8 line
   (07A03). "K" line and TEFF remain
   grounded for all subsequent tests.

Pag 7
et. 753 ←

10. Turn power switch ON; clear 6401 of
    all program bits (This can be done by
    placing PRG. switch ON and depressing
    REL key).

11. Press number 7 key and load all memory
    positions with all bits which will
    cause machine to go into tape cycle.
    Press DUP key and develop a few more
    records on tape.

12. Measure distance from front edge of
    tape to inside edge of Channel 1.

◄── TAPE MOTION

±.002

.050
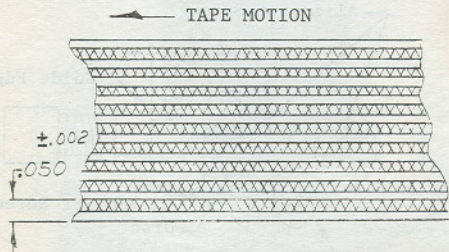
This measurement has to be adjusted
to .050 inch.

13. Loosen set screws mentioned in Step 5 and using aligner tool #8008900, turn screw in center of disc counter clockwise to move tape so as to increase measurement, or clockwise to decrease measurement. Turn only a few degrees on each aligner, snug set screw and return to Step 11.

14. Repeat until .050 is obtained.

II. TO ALIGN THE TAPE FOR LEAST AMOUNT OF MECHANICAL SKEW:

1. Mount and thread IBM master alignment tape TS800, Part Number 432640 or equivalent.

2. BE ABSOLUTELY SURE the 6401 is in VERIFY mode before applying power, so as not to destroy the recording on the master skew tape.

3. Turn power ON and initiate a tape read (This is accouplished by pressing the RELEASE key).

4. Trigger scope on the "8" bit 14A20. This is channel 9, which is nearest to the main plate. Scope settings should be 10 us/cm, 5 v/cm, ext. trigger.

5. Look at "8" bit info 14A20 and observe wave form and timing.

6. Leave scope trigger where it is and move probe to "2" bit (12A20) or Channel 8. If the "2" bit is coming

6. (con't)
later than the "8" bit, the tape is
positioned with respect to the head
as shown in Figure #3A. Proceed to
Step 7. If part of a waveform or no
waveform is observed, the tape is
positioned with respect to the head
as shown in Figure #3B. Now change
the SYNC to 13A20, and observe 11A20,
then 15A20, etc. In either case, al-
ways trigger on the leading channel
and align adjacent channels. Go to
Step 10.

7. If channel 8 is lagging, now move
probe to channel 7, which is "D" bit
(18A20). This waveform will probably
be lagging more than the previous
channel.

8. Continue to channel 6, bit "C" (17A20).
Each channel will probably be lagging
the previous by a few microseconds.
Proceed in order to channel 1 ("4"
bit).

9. If channel 1 can be observed, pro-
ceed to Step 10. If not, then find
the channel which still can be ob-
served and then move to Step 10.

CHANNELS AND TEST POINTS ARE AS FOLLOWS:

IBM	CHANNEL	BIT	TEST POINT
4	9	8	14A20
6	8	2	12A20
0	7	D	18A20
1	6	C	17A20
2	5	B	16A20

IBM	CHANNEL	BIT	TEST POINT
P	4	P	19A20
3	3	A	15A20
7	2	1	11A20
5	1	4	13A20

10. Loosen set screws and using aligner tool #8008900, turn alignment screws, one in and one out, while looking at scope waveform. Waveform should move toward the beginning of the trace, when alignment screws are turned in proper direction. When the waveform has moved back to the approximate position of the trigger channel, then proceed to Step 11.
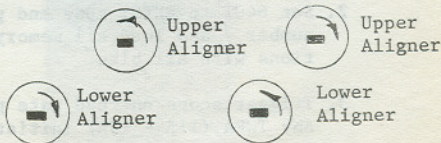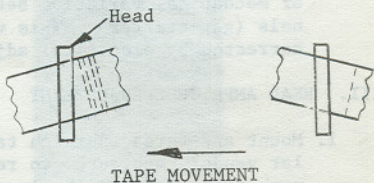

Head

TAPE MOVEMENT

Upper Aligner

Upper Aligner

Lower Aligner

Lower Aligner

FIGURE #3A   FIGURE #3B

FIGURE #3 shows movement of alignment screws to correct skew

11. Tighten aligner set screws, but not excessively, as the nylon insert will crush.

12. Recheck channels for accuracy, re-align if needed.

13. Recheck tape tracking as described in I-11 & I-12. NOTE: <u>DO</u> <u>NOT</u> trigger scope on channel 9 and immediately go to an outer channel, as the skew could be great enough to be off a whole frame (80 microseconds). In this case the information would look properly positioned, and would be a false indication.

14. Some heads may exhibit a small amount of mechanical variation between channels (gap-scatter). This will be corrected by electrical adjustments.

III. READ AMPLITUDE ADJUSTMENT

1. Mount and thread scratch tape, simi-lar vendor, age, etc. to regular work tapes used at the location.

2. Set 6401 to ENTRY mode and press number 7 and load all memory positions with all bits.

3. Trigger scope on read gate pin 69 of any TWRA (11A - 19A) initiate a tape write by pressing DUP key. (You should be writing all bits)

4. Hang probe on anode of CR6 of each TWRA and adjust the channel for an amplitude of 15 volts (+10.6 to -4.4)

4. (con't)
   by turning uppermost pot of the as-
   sociated TWRA. See FIGURE #4 for
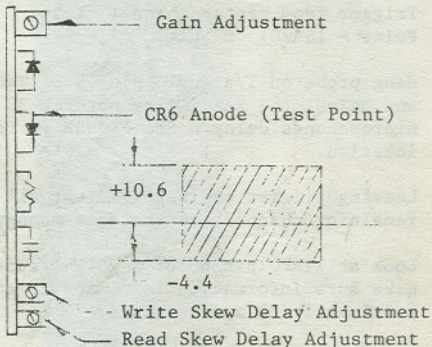   locations.

FIGURE #4

IV. INITIAL WRITE-READ DELAY ADJUSTMENTS

1. While writing tape by pressing DUP
   key, trigger scope on BTWR signal
   pin 65 on any TWRA (11A - 19A) and
   adjust write delay to 30 microseconds.
   While looking at associated TWRA pin
   19 T/ (   ) D signal.

2. Continue to write, trigger on pin 20
   of each channel. Adjust read delay
   pot for that channel to 30 micro-
   seconds.

V. READ DELAY ADJUSTMENT

1. Return the 6401 to VERIFY mode.

6401 ALIGNMENT PROCEDURE

2. Install the master alignment tape.

3. Initiate a tape read (By pressing REL.
   key).

4. Trigger from center channel (Test
   Point - 16A20) "B" bit.

5. Hang probe on T/signal, pin 19 of TWRA
   and adjust the Read Delay pot for 30
   microseconds delay. See FIGURE #4 for
   location.

6. Leaving trigger on 16A20, adjust all
   remaining channels in the same manner.

7. Look at TINFO pin 60 of any TWRA and
   make sure information is coming at ap-
   proximately 30 microseconds.

VI. WRITE DELAY ADJUSTMENT

1. Install a scratch tape similar to
   customer work tape.

2. Set 6401 to ENTRY mode. Load memory
   by pressing number 7 key and initiate
   all following tape writes by pressing
   DUP key.

3. Trigger scope on 16A20, and hang probe
   on 16A19. Using this waveform for re-
   ference, adjust all remaining channels.
   Continue to trigger from 16A20 through-
   out remaining channels.

4. Hang probe on pin 19 of each TWRA and
   adjust associated Write Delay pot to
   correspond with reference waveform.

     5. Recheck all channels.

VII.

     1. As a final check, while still trig-
gered on 16A20, observe TINFO, 19A60.
A maximum jitter of 10 microseconds
is permissable.

     2. Remove all jumper wires and make sure
the machine writes without a tape
error.