TDI-1050

READ SKEW AND WRITE DESKEW ADJUSTMENTS PROCEDURE

1. PRELIMINARY

A. Prior to starting this procedure the speed, read gate and write deskew pulse width adjustments must be performed per the "Opeartional Self Test" procedure (Section 7.3, Rev. A of Tandberg 1050 Operation and Maintenance Manual).

B. Disconnect all cables connected to INPUT/OUTPUT P.C.B. and/or formatter input connectors.

C. Move blue jumpers as follows:

E10 - 12 to E10 - 11

E16 - 17 to E16 - 18

(Located at 16-J)

6	4	5
15	13	14
9	7	8
12	10	11
18	16	17
23	21	33

2. READ/WRITE HEAD AZIMUTH ADJ.

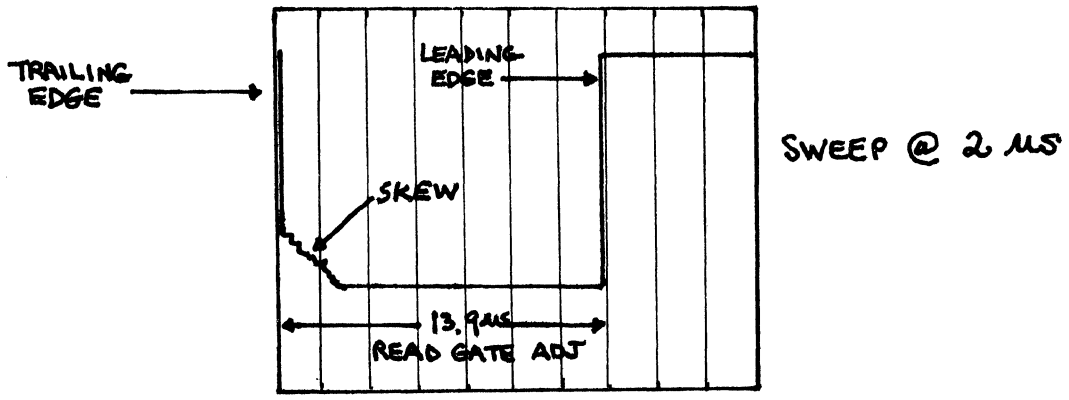
A. Load "800 bpi Master Skew Tape" (IBM P/N 432641) on drive and press LOAD SW. Tape will move forward to load point (BOT) and stop.

B. Press RESET SW. (switch will light)
Press FWD SW. and tape should move at normal speed.

C. Attach scope to test point 52 (location 6-P) ground lead to COM T.P. (at location 11-D of main PCB).

D. Set scope volt scale to 1 volt and sweep to 2 US for 45 and 37.5 ips or 5 US for 25-18.75-12.5. Using automatic trig. mode sync scope on trailing edge of pulse and position waveform to center of scope as shown:

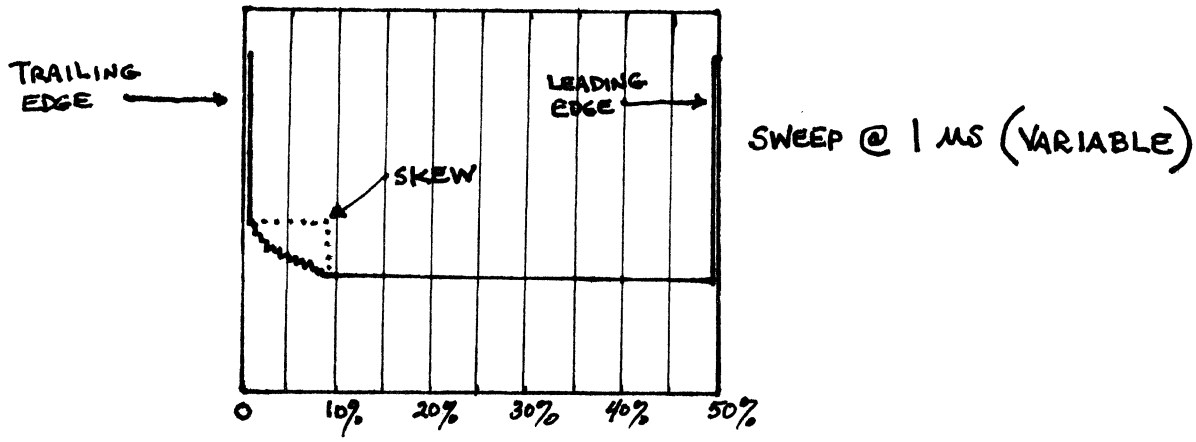
SCOPE WAVEFORM



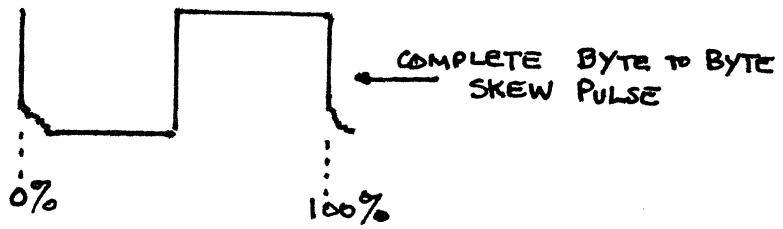
(Shown for 45 ips)

E. After noting that display is similar to the above drawing, switch the scope sweep to the next faster sweep (at 45 ips to 1 μs). Using the scope variable sweep, adjust waveform so the trailing edge triggers on the left of scope and the leading edge is on the right of scope (10th graticule) as shown below:

SCOPE WAVEFORM



F. With scope and waveform adjusted as above, each major graticule (10 total) equals 5% of the complete byte to byte skew pulse.

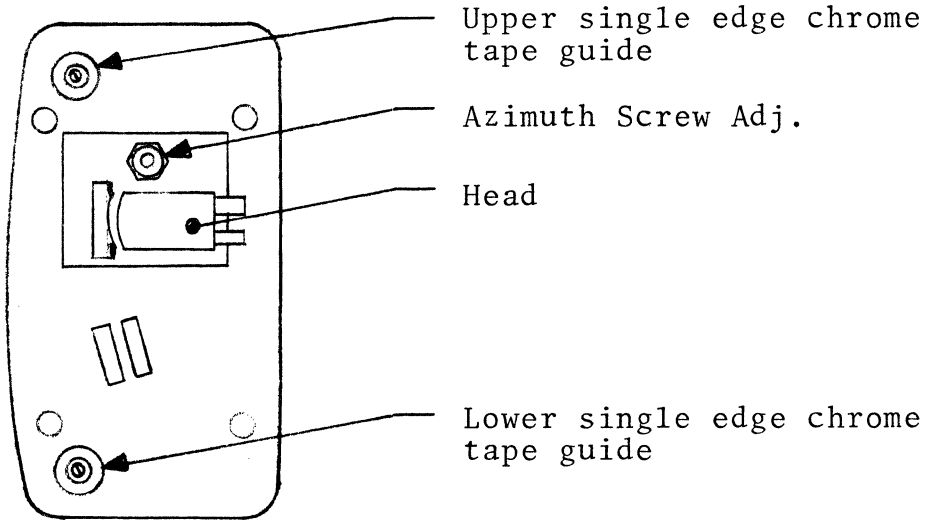


G. The actual skew is that portion on the trailing edge that is jagged and bouncy. This skew should not exceed 10% in forward and reverse directions. To operate drive in Reverse simply push Reset to Stop drive and then push WRT EN for Reverse.

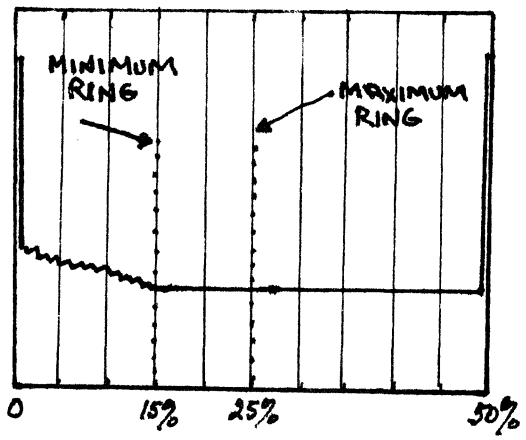
H. If skew is in excess of 10%, then while monitoring scope, slightly turn the azimuth screw, located directly above the head on front head plate, in either a CW or CCW direction. Field adjustment should not normally require more than a 1/4 turn to decrease skew to its minimum deflection. Check forward and reverse upon completion of adjustment.

3. SKEW RINGING ACTION (FORWARD)

A. With skew tape running in FWD, depress the spring loaded chrome washer on the upper single edge chrome tape guide. Do not touch tape.

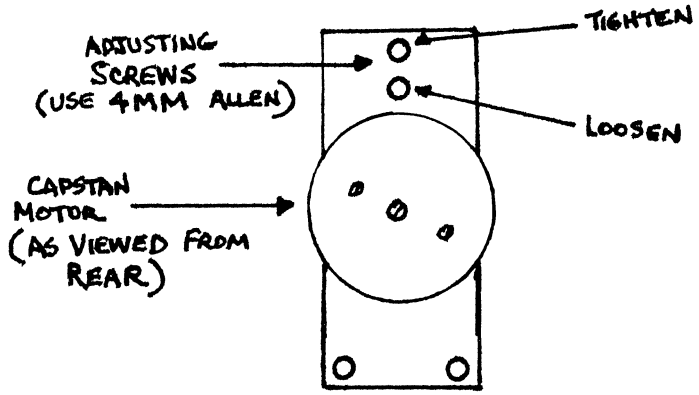


B. The skew waveform should increase on scope from a normal 10% or less to a range of between 15 and 25% (see below). If it does not fall in this range, then proceed as follows:



1) No Ringing Action (or less than minimum)

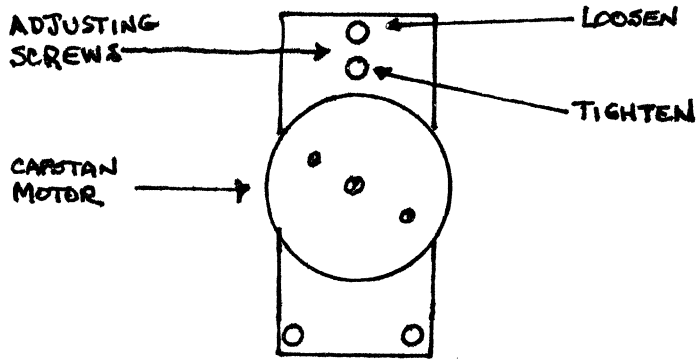
While depressing guide spring and monitoring ring on scope,



Loosen and tighten screws slightly (as marked) to increase ringing to approximately minimum value of 15%.

2) Excessive Ringing Action (more than 25%)

Loosen and tighten screws slightly (as marked, opposite of prior action).



Decrease skew ringing to approximately 15%. When ring is correct, make sure both screws are tight and secure from their pushing and pulling action.

C. Upon satisfactory completion of above and tape is still moving FWD, depress the spring loaded chrome washer on the lower chrome guide. (See Drawing at 3A.)

D. The skew ringing should again increase to between 15 and 25% marks. If it does not fall in this range, then proceed as follows:

1) No Ringing Action (or less than minimum)

A) Stop Drive = Push Reset Switch

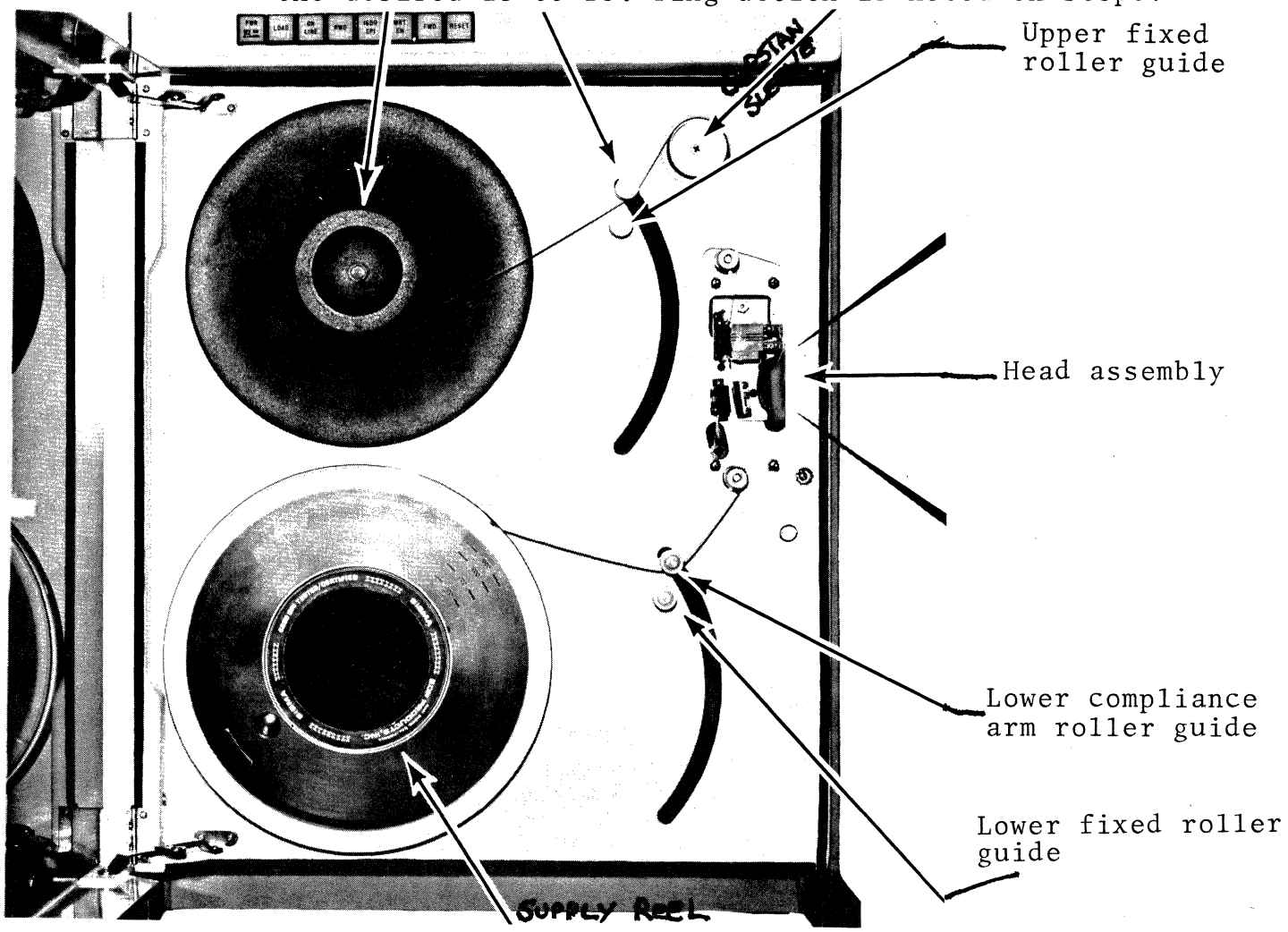
B) Push PWR Switch = to Off

C) Remove the lower fixed roller guide by unscrewing (from rear) the screw that retains guide. (Use 2.5MM Allen wrench.)

DO NOT REMOVE SCREW

Instead, allow the screw to stay in hole and gently, from front lift out the Delrin roller. Extreme care should be taken since there may be shims at the base of roller mount. These shims will either be resting on screw or sticking to base of metal frame.

D) Using a micrometer, decrease the total (there may be 2 or 3 shims) width of the shims in .002 steps until the desired 15 to 25% ring action is noted on scope.



E) To restart drive (without going into rewind in mid-tape)

1. Push Power SW = ON

2. Push Load SW = Drive starts in FWD

3. Immediately push RESET (for test mode) tape stops

4. Push Forward = Tape runs at normal speed.

2) Excessive Ringing Action (more than 25%)

A) Increase shims on same guide in .002 steps until correct percentage is noted on scope.

B) Upon completion of above, recheck ringing on both chrome guides with tape in FWD direction and touch up accordingly since there is interaction between adjustments. Also recheck the azimuth screw adjustment for minimum possible skew.

4. SKEWING RINGING ACTION (REVERSE)

A. Run skew tape in REVERSE (WRT EN pushed). Depress the spring loaded chrome washer on the upper chrome tape guide.

B. The skew waveform should increase on scope once again from normal to between the 15 and 25% marks. If it does not fall in this range, then proceed as follows:

1) No Ring Action (or less than minimum)

A) Follow step 3.D.1 except decrease shims from upper (Delrin) fixed roller guide in .002 steps until skew ringing falls in the 15 to 25% range.

2) Excessive Ringing Action (more than 25%)

A) Follow step 3.D.2 except increase shims from upper fixed guide to correct range.

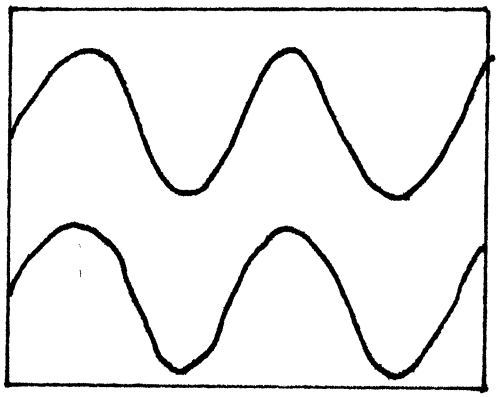
C. While tape is moving in Reverse, depress the spring loaded washer on the lower chrome guide. In most cases there will be no ringing action; however, ringing up to 15% is permissible.

5. CONCLUSION

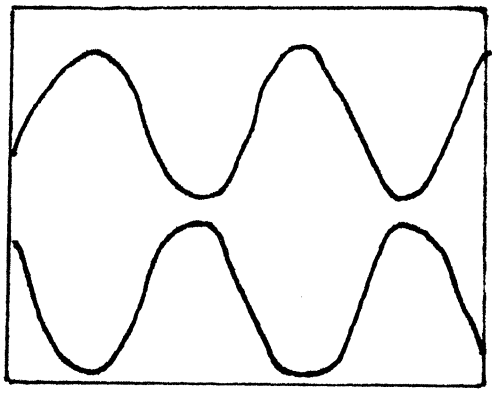
A. Recheck skew azimuth adj. and ringing action in both Forward and Reverse on Upper and Lower chrome guide. Ascertain that skew is 10% or less (lesser % is desirable) and that ringing action falls in its 15-25% range (with exception of lower guide in Rev.). Allow tape to run in Forward.

B. Connect one channel of scope to TP6 at location 14-K (read input TP for Track 7) and the other channel of scope to TP7 (loc. 14-L). Display both signals (18 KHz @ 45 ips) on scope and ascertain that both sine waves are in phase

IN PHASE



OUT OF PHASE
(FALSE AZIMUTH)



C. Keep one scope channel on TP6 and switch other scope channel to each read channel (TP7 through TP14) while monitoring for in phase condition. If one or more channels are out of phase (approximately 90°), then the head azimuth is set on a false Azimuth. Readjust head azimuth screw (may require turning screw a number of turns in either direction) until an in phase condition exists and recheck skew.

D. This concludes the mechanical read skewing in field locations.

WRITE DESKEW ADJUSTMENT

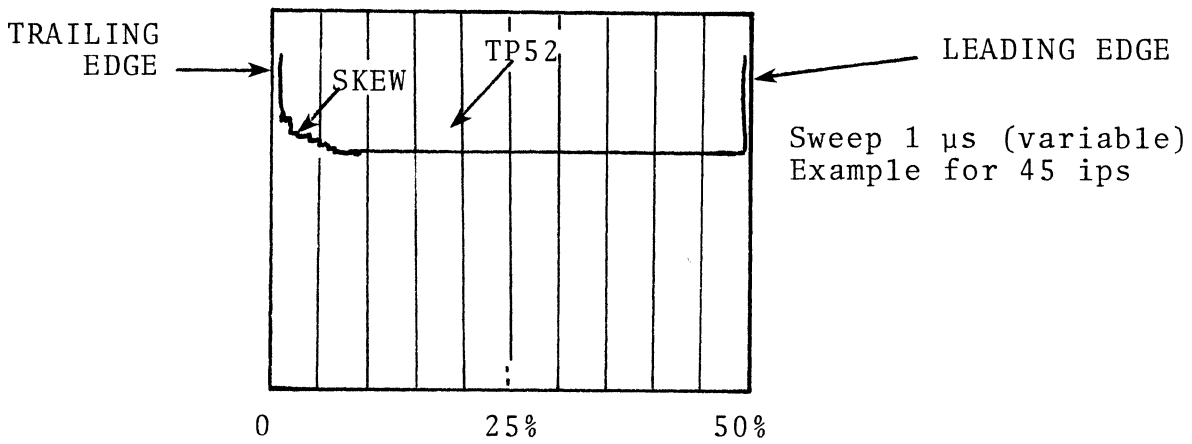
1. PRELIMINARY

A. Write deskewing in the field should normally be rechecked under the following conditions:

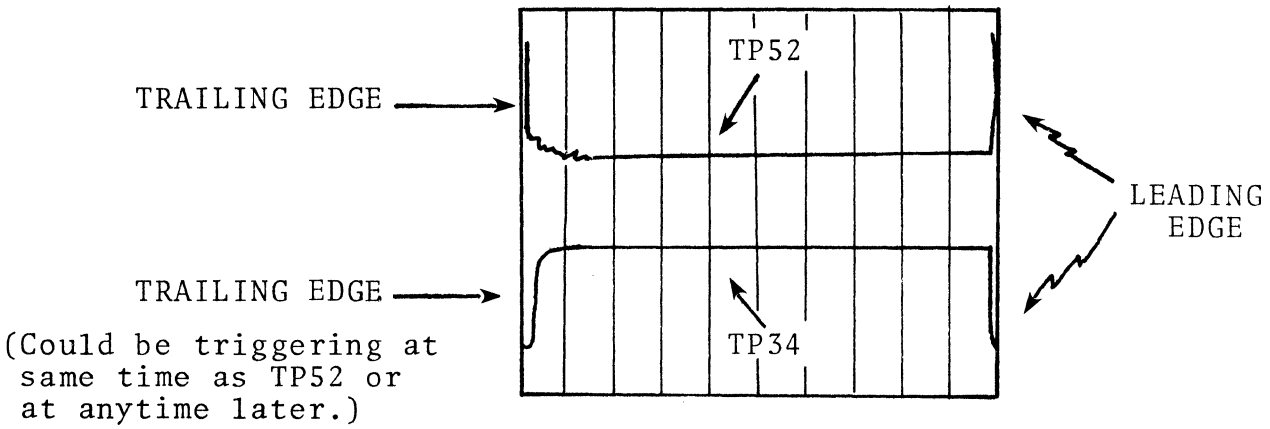
1) Replacement of a magnetic head.
2) Replacement of one or both compliance arms.
3) Replacement of capstan motor.
4) Changing of shims in roller guides.
5) Adjusting of head azimuth position.
6) Questionable data, especially in NRZI.
7) Failure to interchange written tapes between various drives.

2. PROCEDURE

A. Operate drive with skew tape in Test Mode and in FWD direction (E10-11, E16-18). Connect channel one of scope to TP52 and adjust scope waveform as in skew procedure (see below) using sweep variable adjustment. However, instead of 1 volt per division, use 2 volts per division and adjust scope position to display waveform on upper portion of scope face.

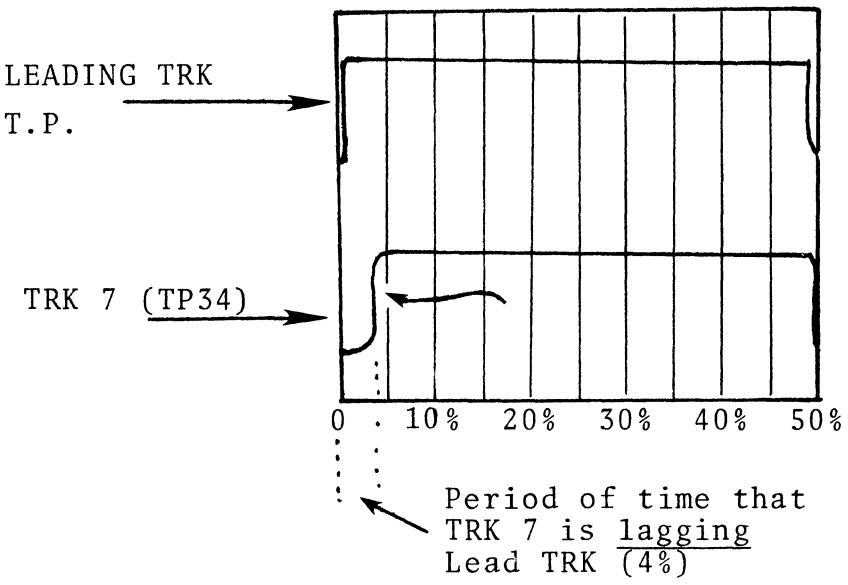


B. Connect Channel two of scope to TP34 (location 8-K). This is essentially the Read output from Track 7 and position waveform on lower portion of scope face. Switch scope mode to chop. Waveforms should appear as follows:



C. TP34 through TP42 is the last stage for each track (7-6-5-4-3-2-1-0 and P) in that order. Trigger scope on Channel 1 of scope and switch Channel 2 of scope to each of the track TP's to determine which track is appearing first. Most of the time either of the end tracks (on head), these being Track 4 or Track 5, will be the leading track. The waveform for these tracks will also be somewhat jittery so close scrutiny should be adhered to.

D. Once the leading track has been determined, move the scope Channel 1 probe from TP52 to that TP and the Channel 2 probe to TP34 (if 34 is leading track then move Channel 2 probe to TP35). Switch the slope adjustment on scope from - to + and waveform should appear as follows: (Trigger holdoff if available on scope, should be increased to maximum stability of waveforms.)



E. Move the Channel 2 probe to each track TP and record on a pad of paper the amount each track lags from the lead track. See example below:

1 - TRK 4 (Lead track in this example)
2 - TRK 7 - 4%
3 - TRK 6 - 5%
4 - TRK 5 - 2%
5 - TRK 3 - 10%
6 - TRK 2 - 5%
7 - TRK 1 - 0%
8 - TRK 0 - 7%
9 - TRK P - 3%

TYPICAL EXAMPLE

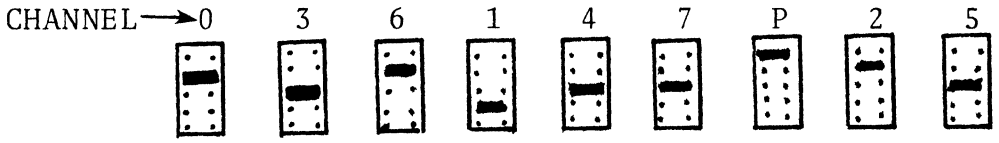
F. The above is performed only in Forward direction. Upon completion unload skew tape and replace with a normal tape with Write ring in.

G. Move blue jumper, at location 4-V, from 39-40 to 43-44 (top 2 positions). This allows the microprocessor to generate a Write signal in test mode. (For those drives with no I/O P.C.B. Pin C of J112 must be grounded.)

H. After tape has loaded and is at BOT, press RESET (to enter test mode) then FWD (to move tape) and finally push ON-LINE (to generate NRZI Write data). Turn SCOPE INTENSITY to nearly full CW direction (max.). Switch vertical mode of scope from chop to ALT.

I. Channel 1 scope probe should still be on lead TRK and return Channel 2 probe to TP34 (TRK 7).

J. At location 4-M through 4-T there are a group of 9 blue jumpers as follows:



(Typical Example Jumpers may be in various slots)

Each of these jumpers will vary the time that its respective channel (as marked) will clock data to the Write head. There are 5 positions for each track.

K. By moving the jumper within a channel, you are electronically deskewing that track on the Write head. The purpose is to match the Write head to the Read head. The Read head characteristics have already been recorded on paper during step E.

L. Match each track to the same lagging as recorded during the Read section (step E). To do this simply remove jumper for that particular track and move it to the next lower pins. This will increase the lag, raising jumper to a higher level will decrease lag. In many instances the exact lag cannot be attained; try and get to as close as possible.

M. Upon completion rewind tape to BOT, press RESET, FWD and ON-LINE and make a short recording. Rewind once again to BOT. Return jumper at 4-V to 39-40. Switch slope on scope to minus and move Channel 1 scope probe to TP52. Verify that skew portion of waveform is 10% or less in FWD and reverse of that portion of tape just written.

N. Return E10-11 to E10-12 and E16-18 to E16-E17. This completes the Write deskewing portion.