

VLBA ACQUISITION MEMO #272

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To: VLBA Data Acquisition Group
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Subject: Spacing loss from uneven wear of headstacks

The headstacks have an equivalent spacing loss (physical spacing plus transition length) somewhat larger than reported by several groups who have tested VCRs. For D1-K, we report a value of 0.15 μm . We now think that a large fraction of this is the result of uneven wear of the headstacks for the following reasons:

- 1] Following lapping of the heads we observe "super" short wavelength performance. Both of us have seen as much as a 5 dB increase at 1 micron on a recently lapped headstack. The enhanced short wavelength response is short-lived and is lost in a few passes.
- 2] Close examination of a particular head (A26), after running for an extended period with D1-K at 10" (Figure 1A), and following a subsequent "lapping" with Sony V16-B at 14" (Figure 1B), shows recession of the ferrite and some surrounding spacer material.

We now feel there is sufficient evidence to suggest the following model:

- 1] During normal running, the asperities on the tape preferentially wear down the softer ferrite and epoxy glue line. In addition, there is increased wear on the spacer close to the ferrite because the asperity pressure probably depends on the number in contact within a characteristic bending length for the tape.
- 2] During the lapping, the headstack is worn more evenly for some reason not yet understood.

To some extent the thin tape will follow the uneven wear profile. But the calculation based on the formula given in VLBA Acquisition Memo #256 suggests only half of the 0.2 μm depression of Figure 1A can be accommodated by transverse bending of the tape.

We think it is worthwhile to make an experimental headstack with softer spacer material. The calcium titanate used at present is harder than the ferrite. A material that wears a little faster than ferrite would probably do a good job of ensuring better head-to-tape contact.

Figure 1A - Optical interference pattern between headstack (A26) and glass plate. In this case, the headstack has been worn by 16 μm D1-K at approximately 10". Fringe spacing is about 0.26 μm .

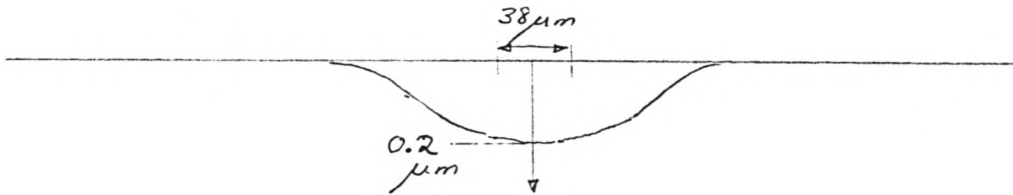
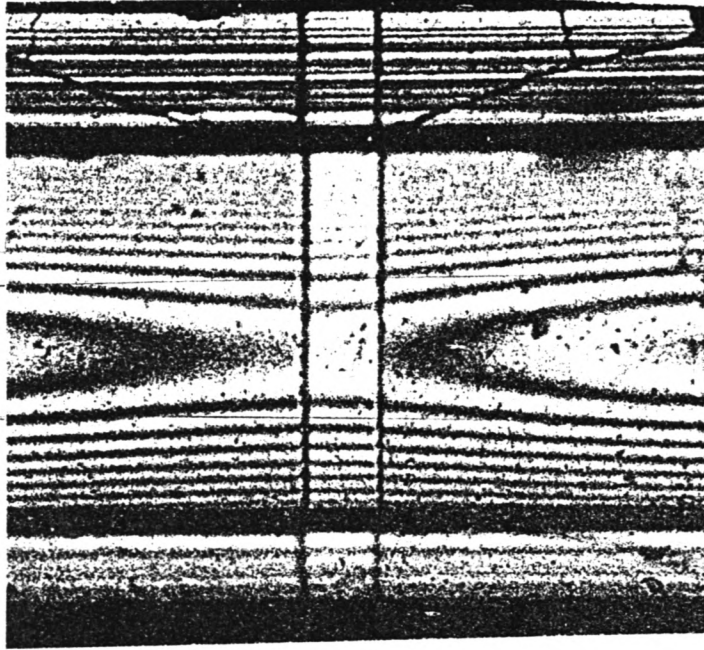


Figure 1B. Same head after lapping with Sony V16B at 14".

