

**VLBA ACQUISITION MEMO # 137**  
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To: VLBA Recorder Group

From: Alan E.E. Rogers

Subject: Draft recommendations for improvement to Model 96 Mechanical Performance

1] Remove input/output posts and return to the use of the Honeywell rollers.

The rollers provide a better means of controlling the entrance and exit of tape into the vacuum columns. If the idlers are adjusted correctly (or we use the new non-adjustable rollers available from Honeywell) the tape will be kept free of contact with the precision plate and the vacuum door until it reaches the turn-around loop. Under high humidity conditions there is too much friction at the fixed posts. Thin (13  $\mu\text{m}$ ) tape doesn't run well on the fixed posts and often folds over.

2] Remove the fixed idler post and return to the use of the idler roller

It has been shown (see Acquisition Memo# 132) that the idler roller provides a threefold reduction in the tracking sensitivity to machine alignment and tape imperfections. The idler also isolates the headstack from tension noise produced by slitting errors. We should try to get an oversized idler to accommodate the symmetric headblock assembly or we should return to the Honeywell asymmetric assembly. Also, we must be sure to get an idler with lower friction bearings to ensure satisfactory operation at 270 IPS.

3] Add hard material inserts in the critical edge contact regions

The tape edge is forced down against the precision plate by the vacuum with a pressure of about 10 lbs/sq" (assuming 0.001" tape and 1 inch contact length) and will eventually wear through the precision plates thin alumina coating. Work is underway to design (with Honeywell's concurrence and guidance) a replaceable hard surface.

4] Measure capstan taper and replace if it doesn't meet specification

The one critical component (apart from grooves worn in the precision plate) which has been found to be furthest from specification is the capstan taper. The taper can be checked by removing the idler and checking the tape angle (see Acquisition Memo #122).

5] Return to the Honeywell half-moon parts

Restore the Honeywell half-moon parts to make it easier to load the tape and adequately clean the critical vacuum column edge contract area.

6] Dummy headblock assembly

A dummy headblock assembly should be used in the lower position to complete the forward-reverse symmetry.

7] Elimination of forward-reverse offset and simpler calibration procedure

With improved performance the forward-reverse offset can be eliminated and all pass locations specified in absolute position of the headstack. This should avoid a lot of confusion concerning offsets. With a transport whose alignments are within specification the machine dependent forward-reverse offset should be smaller than the tape dependent forward-reverse offset and the combination should be less than 30  $\mu\text{m}$ . A simplified calibration procedure should be adopted.

With the above changes in place the intermachine and tape relaxation signatures should be reduced by a factor of 3 or more and should be less than 15  $\mu\text{m}$  peak to peak. The tape-dependent forward-reverse offset should be less than 30  $\mu\text{m}$ . With this level of performance we should be able to operate reliably with the present guard bands of 17  $\mu\text{m}$  between passes in the same direction and 36  $\mu\text{m}$  between forward and reverse passes. Further reduction in guard bands will require active tracking with the ability to compensate for a 10  $\mu\text{m}$  "jog" in the tape which can occur over only 100 feet. [The present peaking operation at the processor being too slow in many cases.]

In short, we should return to the Honeywell configuration of the Model 96 - being sure that the vacuum column height is greater than 1 inch (see Acquisition Memo #124) - a design flaw now recognized by Honeywell and corrected (?) in their newer machines. Also hard surfaces are needed to avoid regular replacement of the precision plate. These are draft recommendations only. Final recommendations will be made following further study and discussion.