VLBA ACQUISITION MEMO #271

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To: VLBA Data Acquisition Group

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Subject: Method of contouring heads for high tape speeds

At low tape speeds any head profile that has a smaller radius of curvature (sharper contour) than the equilibrium contour whose radius R contour given by

$$R = (L + l)/\theta \qquad \textit{(see VLBA Acquisition Memo \#179)}$$

where

L	=	headstep half-length (150 μm nominal)
l	=	characteristic length
θ	=	wrap half-angle

is normally satisfactory. However at high tape speeds, too sharp a contour will promote flying so that it is best to contour the heads for the desired equilibrium radius of curvature. Since

$$l = \left(Y\, t^3/(12T)\right)^{1/2} \qquad \textit{(see VLBA Acquisition Memo \#141)}$$

where

Y	=	Young's modulus (~8×10^5 psi)
t	=	tape thickness
T	=	tape tension / unit width (0.45 lbs at 10")

the thickness of the abrasive tape used for contouring is important. Either use the same thickness tape at the same vacuum as used for operations or change the contouring vacuum to make the characteristic length of the contouring tape equal to that of the operational tape. For example - an excellent contour for operating 16 μm D1K at 7" can be produced by contouring with 25 μm V16B at 20-25". As a counter example, contouring with 13 μm AMPEX lapping tape at 7" will produce too sharp a contour for high speed running of 16 μm tape at vacuum settings less than 12". With proper contouring acceptable head-to-tape contact can be maintained at 320 IPS with headstacks whose headstep half-length is equal to or less than 150 μm at vacuum settings as low as 8". Headstacks with a larger entrance aperture (15 degree approach angle beyond each side of step) can be contoured for operation at 320 IPS and vacuum settings down to 6". Also, tests indicate that the low vacuum contours are reasonably stable and do not degrade significantly with running of the operational tape.