

**VLBA ACQUISITION MEMO #283**  
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To: VLBA Data Acquisition Group  
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 Subject: Preliminary tests of new and experimental headstacks

1] D41-Zircon spacers

An experimental headstack was made with Zircon spacer material. The following equivalent spacing loss (see VLBA Acquisition Memo #184) was measured by recording and playing back square waves with wavelengths of 1 and 0.5 microns (with record current optimized for strongest 1 micron output):

| Condition of Headstack  | Ratio 1/0.5 micron dB | Equivalent spacing $\mu\text{m}$ assuming 0.3 $\mu\text{m}$ record depth |
|---|-----------------------|--|
| After lapping with Sony V16B at high tension - see VLBA Acquisition Memo #271 | 22                    | 0.16   |
| After many days of running with D1-K  | 25                    | 0.22   |

The uneven wear (see VLBA Acquisition Memo #272) is clearly a serious problem with the hard Zircon spacers.

2] D-47 - Photoceram spacers

This experimental headstack is the opposite of D41 in that the spacer is expected to wear faster than the ferrite thereby maintaining good head-to-tape contact with the gap. The results of the 1 to 0.5 micron performance ratio test are as follows:

| Condition of Headstack             | Ratio 1/0.5 micron dB | Equivalent spacing $\mu\text{m}$ |
|------------------------------------|-----------------------|----------------------------------|
| After lapping with Sony V16B       | 20 (Sony D1-K)        | 0.14                             |
| After 1 day running with Sony D1-K | 19 (Sony D1-K)        | 0.12                             |
| With Ampex D1                      | 16 (Ampex D1)         | 0.06                             |

The gap null on this headstack, which was made with the new Hitachi gap bars, was found at 0.32 micron wavelength or a physical gap of  $0.32/1.11 = 0.29$  micron.

3] D-39

This is a standard head with new Hitachi gap bar. The gap null was found at 0.3 micron or  $0.3/1.11 = 0.27$  micron physical gap length. The spread in gap null from measurements of 5 heads in the stack was  $\pm 0.01$  microns. The results of 1 to 0.5 micron performance ratio:

| Condition of Headstack             | Ratio 1/0.5 micron dB | Equivalent spacing $\mu\text{m}$ |
|------------------------------------|-----------------------|----------------------------------|
| After lapping with Sony V16B       | 22                    | 0.16                             |
| After 1 day running with Sony D1-K | 21                    | 0.15                             |
| With Ampex D1                      | 18                    | 0.10                             |

The superior performance of the headstack with Photoceram (glass) spacers may warrant a change to the use of softer spacers provided it can be shown that the corresponding reduction in head life is acceptable.