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To: Mark IV Development Group

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Subject: Spin Physics Heads at 18 Mb/s

I have discovered that the head stacks manufactured by Spin Physics have more mutual coupling between the heads than the Metrum head stacks. This additional coupling causes unacceptably high error rates when using Spin Physics heads with the current design of the head interface board (HIB) to write tapes at 18 Mb/s/track. With Metrum head stacks this coupling causes marginal performance at this data rate. I have not investigated the effect of this coupling at 9 Mb/s/track.

If the heads were driven by an ideal current source, then the induced current caused by this mutual coupling would be zero. This coupling can therefore be reduced to an acceptable level by increasing the resistance in series with each head. The current design of the HIB has 1 K Ω chip resistors, which can be changed to 2.2 K Ω . I have tested a Head Assembly Module fitted with 2.2 K Ω resistors and Spin Physics heads. The performance is acceptable on the write-only stack and marginal on the read-write stack. Revised drawings for the HIB (4712S00X, X=5,6,7,8) are available in both AutoCad and PostScript format on our ftp site at <ftp://dopey.haystack.edu/pub/mark4/recorder/4712/>, and should be available soon at <ftp://kurp-ftp.hut.fi/pub/mk4/ham/hib/>.

The performance of the read-write stack is worse because of the extra induced current flowing through the junction capacitance of the transistors attached to each head for the reproduce function. The effect of the parasitic capacitance of these transistors could be reduced by putting additional resistors in series with the base inputs of the transistors, but this change would require new artwork for the HIB.

Whenever a head stack is replaced, or at a similar opportunity, all 1 K Ω chip resistors on all head interface boards should be changed to 2.2 K Ω . Also all other components on the write-only boards should be removed. This upgrade is mandatory before using any Spin Physics head stack for writing at 18 Mb/s/track. It is also recommended before writing at 18 M/s/track with any head stack (Metrum). Also, since this mutual coupling is greater for the read-write stack, Metrum head stacks are preferred in the read-write position. Regular or triple-cap does not play a special role here.