

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
HAYSTACK OBSERVATORY

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TO : Mark IV Development Group

FROM : Dan Smythe

SUBJECT : Pass Locations

The Mark IV tape recorder will have two write heads for writing a total of 64 tracks. We expect this tape recorder to be used in two modes: a 64-track (1 Gb/s) mode using both head stacks, and a 32-track (500 Mb/s) mode using one head stack. When writing 64 tracks per pass, 6 passes will fit on the tape with Mark IIIA track spacing. If the spacing between stack #0 and stack #1 is kept constant at 165 μm , then the pass locations are as shown in the upper figure, and are the same as the first 6 passes of Mark IIIA Mode A. The pass locations for the 32-track mode are the same as Mark IIIA Mode A, as shown in the lower figure.

A Mark IIIA tape recorder with a Mark IV formatter can be used to record 28 tracks of Mark IV data at 16 Mb/s per track for a data rate of 448 Mb/s. The Mark III Write Electronics (but not the I/O Assembly) has been tested with a prototype formatter at this data rate and works as well as the prototype Mark IV recorder. Note that this bit rate requires running the recorder at 320 IPS at a density of 56 KFCI. The higher bit density requires the improved magnetic coating found only on thin tape, which requires re-contouring of the head stacks. The re-clocking circuits in the I/O Assembly need to be tested to check their ability to run at 18 Mb/s. If necessary, these circuits could be bypassed, by replacing the chips with jumpers.

For the 2 Gb/s Mark IV-A recorder with 128 heads on 4 stacks, two passes in each direction require a guard band between passes in the same direction of 5 μm or less in order to keep the forward-reverse guard band above 10 μm . Otherwise, only three passes, two forward and one reverse, will fit on the tape. George Peck has reported satisfactory performance with a 5 μm guard band in VLBA Memo #119. If the tracks are put too close together, tracking at the correlator will get more difficult, because the dip in signal between tracks will go away. Several references in the literature show that side erasure will not occur until the guard band goes below 2 μm .