

MARKIV MEMO #261.2

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
HAYSTACK OBSERVATORY
WESTFORD, MASSACHUSETTS 01886

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Telephone: 978-692-4764
Fax: 781-981-0590

To: Recorder Group

From: H. F. Hinteregger

Subject: Determination Correct Write-Voltage, Vc,: Part 2

ANALYSIS OF BROADBAND TEST RECORDINGS WITH SPECTRUM ANALYZER

0. Prepare tape and drive: as in field instruction.
1. Connect read monitor output of reading tape drive to spectrum analyzer and read power detector [through a resistive power divider and pad] as well as to eye-pattern monitoring scope en route to power divider.
2. For 80/135 ips 'bandedge' read power measurements on thin/thick tape broadband recordings at high/low density respectively, set analyzer
 - center frequency CF = 2.25 MHz,
 - frequency span SPAN = 4 MHz
 - resolution bandwidth RBW = 30 KHz,
 - video bandwidth VBW = 100 Hz,
 - marker for readout MKR = 2.2 MHz.

Log bandedge noise power with tape stopped for at least a few channels, to enable standard SNR checks.

3. For at least two channels with similar stable typical eye patterns, log bandedge read power as function of all write trial voltages for both write directions.
4. Identify the lowest trial write voltage at which the read power is less than 0.5 dB below maximum. This trial voltage is the correct write voltage, in this case evaluated for a single channel, for one write-direction, and for the highest current operational write rate of 9 Mb/s [4.5 MHz].

Note: At this frequency a write-side 'frequency-loss' of about 1 dB with respect to lower write speeds is expected. Adjustment of write voltage for lower write speeds should not be needed, since 10% 'overdrive' is not significant. But a significantly higher correct write voltage will likely be determined for 18 Mb/s Mark 4 operation. It is still unclear whether totally uncompromised 18 Mb/s write performance [equal bandedge output at fixed read speed] can be expected with heads of current design.

5. The correct write voltage should appear to be independent of write direction. If forward and reverse correct write voltage appear to differ by one 10% increment in trial write-voltage, take the higher value to be correct for both directions. If the apparent correct write voltage for reverse differs by 20% or more from the forward value, there is a significant reducible excess write spacing loss in the direction that appears to require the higher write voltage. The write-head may be damaged, dirty, miscontoured, or misaligned. Note anomalous write-channel for action to diagnose/fix.
6. Log bandedge read power for [up to] all remaining channels for both directions and for at least the 3 trial write voltages needed to determine correct write voltage independently for each channel. This is a tedious manual task. As few as 4 channels may be checked if there are no channels with anomalous eye patterns or high error rates and appearance of eye pattern shows no significant trend as a function of channel number.
7. For a new or normally evenly worn headstack the correct write voltage should appear to be nearly the same for all typical [not anomalous] channels. Expect typical channels to have correct bidirectional write voltages spread +/- 10% or less. If spread of typical-channel V_c 's does not exceed 20%, take the highest of up to 3 values to be V_c for the whole stack. Note any significant trend as a function of channel number across the width of the tape, especially if it exceeds 20% p/p, a sign of very uneven wear which calls for identification/rectification of cause. Any individual channel, not part of a trend, that appears to fall outside the 20% spread should also be considered anomalous and investigated.
8. Send $V_w = V_c$ recommendation, analysis data, corrective and diagnostic advice, including when to make next write-test recordings, to field site. File worksheet information in a data base for future reference.