

MARKIV MEMO #261

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To: Recorder Group

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Subject: Determination of Correct Write Voltage V_c : Introduction

PURPOSE

This memo recommends that a single unambiguous analog criterion, stated below, be used to determine the 'correct' write voltage, V_c , for a VLBI head. This criterion guarantees that the magnetic medium is not 'overdriven' at 'bandedge' which has the shortest recorded wavelength and therefore implies 'sub-saturated' long-wavelength recording. This memo is followed by two related memos (261.1, 261.2)

REDUCTION OF V_c WITH HEAD WEAR:

This 'correct' write voltage is expected to decrease as head efficiency increases. Head wear, by increasing gap reluctance as depth of gap is reduced, gradually increases head efficiency. With current VLBI head design, efficiency typically increases by a factor of about 2 from the new to the nearly worn-out condition.

PROPER DETERMINATION AND PERIODIC REDETERMINATION:

At long intervals therefore, a few times in the life of the head, proactive redetermination of correct and reduction of write voltage is recommended -- before symptoms of even only 'mild overdrive' appear.

CORRECT WRITE-VOLTAGE, V_c , CRITERION

For a VLBI head used for writing, the CORRECT write voltage, V_c , is the LOWEST that MAXIMIZES BANDEDGE (shortest recorded wavelength) output.

DEFAULT PROCEDURE For V_c DETERMINATION

memo#_ Part 1: Broadband Write with 3 or More Trial Voltages

memo#_ Part 2: Bandedge Read Analysis with Spectrum Analyzer

The default procedure requires neither:

1. the capability to make 'all ones' monochromatic bandedge recordings which is not yet consistently implemented, nor
2. new field system procedures and software to evaluate bandedge response with measurements of total read power as a function of write voltage.

Until both are available at any given site, broadband write-voltage test recordings are recommended. But a spectrum analyzer is needed to determine V_c . V_c should be redetermined a few times in the wear life of a head, about every 1000 hours of tape motion, as requested by configuration and maintenance management. Unless a spectrum analyzer is available at the field site, the test recordings must be shipped with trial-write documentation to a central maintenance facility for correct write voltage, V_c , [re]determination according to Part 2. Where/when 'all ones' [monochromatic bandedge] V_c test recordings are possible, the broadband read power detector in the tape drive, rather than a spectrum analyzer, should be used to determine V_c at the field site with the automated FS read capability, with or at first without more automated and complete analysis similar to that in default Part 2.