MARKIV MEMO #261

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To: Recorder Group

From: H. F. Hinteregger

Subject: Determination of Correct Write Voltage Vc: Introduction

PURPOSE
This memo recommends that a single unambiguous analog criterion, stated below, be used to
determine the 'correct' write voltage, Vc, 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 Vc 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, Vc, CRITERION
For a VLBI head used for writing, the CORRECT write voltage, Vc, is the LOWEST that
MAXIMIZES BANDEDGE (shortest recorded wavelength) output.

DEFAULT PROCEDURE For Vc 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.