

**VLBA ACQUISITION MEMO #224**  
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To: VLBA Data Acquisition Group

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Subject: "Self" tests of DAR and REC

Introduction

Memo #77 describes some of the tests which can be performed on the DAR and REC as a means of ensuring that the system is working and will yield high quality data at the correlator. Ultimately the data buffer can be used to obtain real time fringes on strong sources. However, the real time fringe software is not yet available. In the meantime significant quality checks can be made using the "mini" decoder in the recorder and the quality analysis module in the formatter. Also the VLBA will have a phase calibration system and the phase cal tones can also act as test signals which are useful in system checks. This memo describes some simple tests which can be automatically performed remotely without operator intervention.

Bypass verify

Use mini decoder to verify time, track # ID on all tracks assigned. Report back errors. This check can be rapidly performed at any time the recorder is either recording or stopped. [The check cannot be performed during tape positioning as data may be overwritten.]

Bandpass verify

Use the mini decoder to capture some data from each assigned track, perform software autocorrelation and transform to bandpass. Bandpasses can be obtained to within 10% with about 1000 bits correlated for each of 8 lags. Report anomalous bandpass shapes. This check can be performed at any time the recorder is either recording or stopped.

Phase cal verify

Use the quality analyser to measure phase cal tones reporting back results. Those VLBA sites which do not yet have phase cal injected into the front end could use the I.F. phase cal injection scheme used at network sites. This check can be performed at any time the quality analyser has been set up for phase cal extraction and the recorder is either recording or stopped.

Recording quality verify

Use the quality analyser to check playback times, track ID, phase cal tones and error counts on each recorded track. This check can be performed during some change or other break in observing schedule. This check should be performed for every recorded pass in both directions.

### Zero-baseline tests or pretest

A zero-baseline test is one in which artificial fringes are obtained from a single station. NASA and other geodetic VLBI users have used this test for verifying a newly manufactured recorder and electronics rack. Traditionally this test has been made by leaving the odd-numbered baseband converters set as if being used in an experiment. The even-numbered converters are then set to the same sequence as the odd. Thus converters 1 and 2, for example, will be looking at the same frequency band and their outputs should be perfectly correlated. The correlation phase however, while repeatable, will be arbitrary since no two converters have exactly the same cable lengths. While zero-baseline tapes are processed at the correlated they can be also checked at the station by performing the same checks as given above.