

MARK IV DAS PERFORMANCE CHECK LIST

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This check list can be used to verify proper operation of all of the modules and cables after a Mark IV upgrade. This list can also be used to check the system after a part has been replaced. Before these tests can be performed, the system must be fully configured and calibrated, with the correct *equip.ctl* and *head.ctl* files. This list can be used for a final acceptance test.

POWER SUPPLIES

Measure the DC level and AC ripple in all power supplies. Record the results in the station log book.

BASIC FORMATTER TESTS

1. Enter
 `form=a,8`
 `form4=/status.`

The response should be

`.../form4/0x0016 0x0000 0x92XX 38 1 8000 11 0 0 0`

or

`.../form4/0x8016 0x1004 0x92XX 38 1 8000 11 0 0 0`

where **xx** is the correct rack ID for the station. If the Rack ID is wrong, press the **RESET** button on the front panel of the Formatter and try again.

2. Check that the Formatter time agrees with GPS time at the one-second level. If it does not, use *fmset* to adjust the Formatter time.
3. Check that the FS clock is correct to better than 1 second. If it is not, enter the command `sy=run setcl offset &`. This command should also be issued whenever the Formatter time is reset.
4. Using a counter with time interval measurement accuracy better than 1 μ s, measure the time interval between the Formatter **CLOCK 1PPS** BNC and a GPS receiver or the maser.
5. Check that the Formatter/GPS/maser 1pps offsets are consistent with other recent measurements.
6. Move the cable to the to the **HOUSE 1PPS** BNC to verify that this signal is present, then put it back on the one that really counts: **CLOCK 1PPS**.

TAPE RECORDER CHECKS

Perform the recorder tests in the **Recorder Performance Tests** document

(ftp://dopey.haystack.edu/pub/mark4/DAS/reccheck.ps).

VIDEO CONVERTER TESTS

Check that the video converter power levels are in the proper range. Adjust the IFD/IF3 attenuation to give USB and LSB power readings of 0.1-2.0 on the front-panel meter of each VC, with the 10-dB attenuators in. If readings of 0.1-2.0 can not be achieved in all VCs, as a temporary measure the lower limit can be relaxed to 0.05, or small (1-3 dB) SMA attenuators can be added to the inputs to the stronger VCs. Do not use large (> 9 dB) attenuators on the VC inputs, as those VCs without attenuators are liable to saturate.

The schedule *4chcklst.snp* is provided to help perform the following tests on the Video Converters. This schedule performs an end-to-end system test and checks for incorrect or defective cable connections.

Before running this schedule, connect the **CH A** and **CH B DECODER DATA** outputs to a dual-trace oscilloscope via two 10-KHz viewing filters. (Or one viewing filter can be moved back and forth between the **CH A** and **CH B** outputs of the Decoder.) Connect the external trigger input of the oscilloscope to the **FRAME SYNC** BNC on the Decoder.

For each VC, this schedule checks that the LO will lock over the full design frequency range (100-500 MHz).

Then it sets the VC frequencies to all common frequency sequences used at the station and enables you to measure the frequency of each VC LO with a frequency counter and compare against the correct value.

Finally, it performs an end-to-end system test. It enables phase cal in only one side band and allows you to look for the presence of the phase cal signal in the bit stream from that channel, and the absence of phase cal in the bit stream from the image channel. This test will verify that all cables are properly connected, except the ones going to the head stacks.

When the schedule halts and instructs you to do so, trigger the oscilloscope with the **FRAME SYNC** signal from the Decoder and examine the base-band phase-cal signals in the **CH A** and **CH B DECODER DATA** outputs. Phase cal should be present with the proper amplitude in the desired channel and down at least a factor of 10 (20 dB) in the image channel.

Phase cal should be stable in phase relative to the **FRAME SYNC** signal.

ZERO-BASELINE TESTS

Mount a blank thin tape, and run the *zbtests* schedule. This schedule runs for about 30 minutes and records several passes to check the over-all performance of the system using all 64 tape heads on the two head stacks and over a wide range of Formatter modes and data rates.

While these passes are being recorded, phase cal should be visible at both Decoder **DATA** outputs, except during the 320 ips scan and the long, slow 15 ips scan. The phase cal signals should be stable in phase relative to the **FRAME SYNC** signal from the Decoder.

The schedule includes two parity checks, both performed at 80 ips, the first one to check a forward pass recorded at 320 ips and the second to check a reverse pass recorded at 160 ips. During each parity check, observe the eye patterns on an oscilloscope and look for unstable or low amplitude, a closed eye, or other anomalies. Phase cal will not be visible with a 10 KHz viewing filter during these checks; but you should be able to see it at 5 KHz with a spectrum analyzer.

Return this zero-baseline fringe test tape to the Haystack correlator via the quickest means for prompt evaluation.

REFERENCES

All related files and documents are available on the internet, in directory

`ftp://dopey.haystack.edu/pub/mark4/DAS/`

form4 command syntax `mk4vocab.text`

Recorder Performance Tests `reccheck.*`

Video Converter Tests `check1st.snp`

Zero-Baseline Tests `zbtests.snp`

Zero-Baseline Procedures `zbtests.prc`