

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 in a Mark IV rack with a Mark 4 Decoder and a Mark 5A recorder. This list can be used to check the system after a module has been replaced or repaired. Before these tests can be performed, the system must be fully configured with the correct *equip.ctl* file. This list can be used to help find the problem with a malfunctioning system.

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`
`form.`

The response should be

```
...hh:mm:ss/form/a,8,1:1,off,,3,pass,41,0xx,okay
```

where **xx** is the correct rack ID for the station. If the Rack ID is wrong, or if it does not say **okay** at the end, try the **form** command again. Note that with a Mark 5A recorder, the rack ID must be an even number.

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 &`.
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.
5. Check that the Formatter-to-GPS 1pps offset is 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 signal that really counts: **CLOCK 1PPS**.

VIDEO CONVERTER TESTS

Check that the video converter power levels are in the proper range. Adjust the IFD and 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 *4chk1st.snp* (*vchk1st.snp* for VLBA4 racks) 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.

For each VC, this schedule checks that the LO will lock over the full design frequency range (100-500 MHz) (500 to 1000 MHz for a VLBA4 rack).

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 Local Oscillator 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, including the ones going to the recorder.

When the schedule halts and instructs you to do so, examine the base-band phase-cal signals displayed in the Field System response window. 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.

MARK 5A Gb/s TESTS

The schedule *chk1024.snp* (*vchk1024.snp* for VLBA4 racks) is provided to verify operation of the Mark 5A recorder at a data rate of 1024 Mb/s. This schedule records three 4-minute scans:

1. 4 channels to 32 tracks at 512 Mb/s
2. 8 channels to 64 tracks at 512 Mb/s
3. 8 channels to 64 tracks at 1024 Mb/s

If the 3rd scan indicates that there is a problem with the system when operating at 1024 Mb/s, then the first two scans can help to help find the cause of the problem with the system. This schedule uses the setup for the IVS geodetic R&D sessions and requires 14 VCs or BBCs. If you have only 8 BBCs, use *vchk1g8.snp*. Each scan performs the following tasks:

1. While idle, uses the Mark 4 Decoder `decode4` command to log the aux data and errors on all tracks. The track numbers in the aux data can be used to check the wiring from the Formatter to the Mark 5A recorder.
2. Records a 4-minute scan.
3. Uses the `mk4=scan_check?` query to check the scan.
4. Uses the `mk4=track_check?` query to check each track on the recording.
5. While playing back the scan, logs the aux data and errors on each track

At the end, the schedule uses the `mk5=get_stats?` query to report the response-time performance statistics for each disk drive in the module.

REFERENCES

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

Files that do not require a recorder are in

`ftp://web.haystack.mit.edu/pub/mark4/DAS/`

Sampler Statistics `chksamp.snp` with `chksamp.prc`

Phase Cal `chkpcal.snp` with `chkpcal.prc`

form4 command syntax `mk4vocab.txt`

Files that require a Mark 5A recorder are in

`ftp://web.haystack.mit.edu/pub/mark5/SNAP/`

Video Converter Tests `4chk1st.snp` with `4chk1st.prc`

Base Band Converter Tests `vchk1st.snp` with `vchk1st.prc`
(with only 8 BBCs use `vchk1st8.snp` with `vchk1st8.prc`)

Mark 5A Gb/s Tests `chk1024.snp` with `chk1024.prc`,
(with VLBA4 rack use `vchk1024.snp` with `vchk1024.prc`)
(with only 8 BBCs use `vchk1g8.snp` with `vchk1g8.prc`)