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To: Mark 5 Development Group

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Subject: Mark 5B DIM Stand-alone testing

This memo describes how to test a Mark 5B Data Input Module (DIM) using its built-in test vector generator (TVG). The only equipment required to perform these tests is a Mark 5B system configured as a DIM.

Refer to the Mark 5B command set documentation for documentation on the commands used and for more information on the Mark 5B system.

[www.haystack.mit.edu](http://www.haystack.mit.edu) -> Technology -> VLBI -> Mark 5 -> Software Documentation  
-> Mark 5B command set

### **Testing strategy**

Testing of the Mark 5B DIM is broken into three separate tests:

1. Test StreamStor system

Tests basic functionality of the StreamStor (SS) disk subsystem

2. Initial bank testing

Tests rudimentary functionality of Banks A and B

3. Test with internal tvg

Record a small amount of data on from internal Mark 5B test vector generator (TVG) and perform a software check of the recorded data.

## Test 1 - Test StreamStor disk subsystem

With Bank B unlocked, insert a known-good 8-disk module into Bank A and turn the key switch to 'Locked'.

Then login as `oper` and run `sstest`.

**WARNING!** This command will erase any modules mounted in your system.

`sstest` is a quick basic test of the StreamStor disk subsystem, and the drives mounted in Bank A. After about a minute or less, if all is well, it will report

```
*Getting Device Info
Board Type: ...
.
.
.
***Basic Confidence Test Completed***.
```

If a problem is found, `sstest` will return with an error message; but sometimes it just gets stuck and never returns.

Next, insert a known-good 8-disk module into Bank B and turn the Bank B key switch to 'Locked', turn the Bank A key switch to unlocked, and repeat `sstest` for Bank B.

If you have a Mark 5B+, and it reports

```
Board Type: AMAZON-P
```

instead of

```
Board Type: AMAZON-VP
```

then you have a Board Type that is NOT VLBI-compatible, and you will need to convert it to an Amazon-VP. Contact Conduant or Haystack for instructions.

### Note:

This test verifies some aspects of the operation of the StreamStor board and is entirely independent of the Mark 5B IO board. The FPDP jumper cable between the StreamStor board and the Mark 5B IO board need not be present.

## Test 2 - Initial bank testing

Next start the `dimino` program with `LLogr` to create a script log file with time tags. The default directory for the files created by `disk2file` command is the directory you were in when you started `dimino`. A convenient place for these files is the `/data/` directory. A good place for the script log files is the user's `script` directory.

```
cd /data
dimino -m0 |& LLogr >>& ~/scripts/$1.script &
```

To see the debug output from `dimino`, use the Linux `tail` command.

```
tail -f ~/scripts/$1.script
```

Then open a new terminal screen with `Ctrl-Alt F2` and run `tstdimino`.

The `tstdimino` program accepts Mark 5B commands at a `'>'` prompt and sends them to the `dimino` server program:

For more information on Mark 5B commands, see p. 23 of the Mark 5B System User's Manual, which can be downloaded from

<http://www.haystack.mit.edu/tech/vlbi/mark5/operations.html>

Test that both Bank A and B appear to initialize properly<sup>1</sup>:

With Bank B unlocked, insert a known-good 8-disk module into Bank A and turn the key switch to 'Locked'. You should observe the following:

1. 'Locked' and 'Power' LED's should illuminate quickly; all 'activity' LED's on the module should illuminate (for all buses with installed disks).
2. 'Activity' LED's should extinguish one-by-one from top to bottom; this should progress smoothly, with perhaps a slight hesitation between 2/3 and 4/5, and take no more than a few seconds. If this process stalls or significantly hesitates, there may be a problem.
3. The 'Ready' LED should illuminate, signifying the module is ready to be used. A blinking 'Ready' LED indicates that the module needs to be erased.
4. The 'Selected' LED should illuminate indicating it is the active module.
5. Read the VSN – enter `'VSN?'` or `'bank_set?'`

Turn the key switch to 'Off', wait for the 'Power' light to extinguish, and give the disks a few seconds to spin down. Remove the module, place it in Bank B and repeat the test.

### Note:

This test verifies only some aspects of the operation of the StreamStor board and is entirely independent of the Mark 5B IO board. The IO board must be in place for the `dimino` program to be happy, but the FPDP jumper cable between the StreamStor board and the IO board need not be present.

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<sup>1</sup> Disk bank management is described in detail on pp. 27 & 28 of the Mark 5B System User's Manual, available at <http://www.haystack.mit.edu/tech/vlbi/mark5/operations.html>.

### Test 3 - Test with internal test vector generator

This test uses the internal test vector generator (TVG) as a data source for test recordings on both Banks A and B.

Requirements: Standalone Mark 5 B DIM with a scratch module ready and selected in Bank A.

This test does not require an external data source.

#### Procedure

1. *protect=off* Required before any *erase* command.  
(Ignore any error messages.)
2. *reset=erase* Erase the disk module
3. *clock\_set=32:int:32* Set internal clock generator to 32 MHz
4. *mode=tvsg:0xffffffff* Set to 32-bit TVG mode
5. *record=on:tvsg1024* Record tvsg data (1024 Mb/s aggregate rate) for 30 s or so  
Observe that the disk activity LED's on front of module;  
they should show roughly equal activity.
6. *record=off* Turn recording off
7. *scan\_check?* Check data.

The last 5 parameters returned should be something like

*:TVG-32-1 : 916 : 2009y085d18h55m13.0000s : 30.0s : 1024.000 : 0 ;*

The *916* before the date is the date code in the Mark 5B header at the beginning of the scan on the disk pack. The calendar date *2009y085d* is calculated from this number, which can never be larger than 999, and rolls over to 0 every 999 days. *dimino* assumes that the data was not recorded in the future, but at some time in the last 999 days.

8. Unlock Bank A, wait for the 'Power' light to extinguish, give the disks a few seconds to spin down., move the module to Bank B, and set key switch for Bank B to 'Locked' to select it. Wait for the module to initialize and repeat steps 3-9 with the disk module in Bank B. This test verifies that both banks write and read properly at data rates up to 1024 Mb/s.

If both banks pass these tests, then you have tested all of your DIM except the VSI and 1PPS inputs.