Mark 5B FAQ

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The Mark 5B system is nearing initial deployment. In this short article we will attempt to answer some basic questions:

1. What is Mark 5B?
2. Who needs Mark 5B?
3. How can I upgrade my Mark 5A to Mark 5B?
4. How do I interface a Mark 5B to my existing data-acquisition system?
5. Is there any compatibility between Mark 5A and Mark 5B?
6. How will Mark 5B recordings be correlated?
7. Where can I get a Mark 5B? How much does it cost?

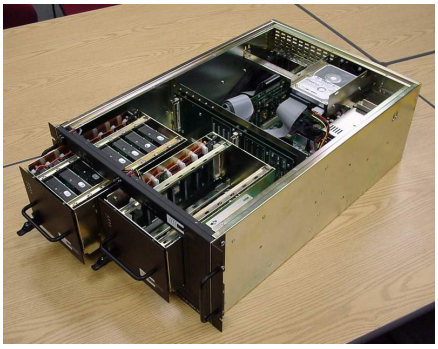

Figure 1: Mark 5B looks identical to Mark 5A

What is Mark 5B?

Mark 5B is similar to Mark 5A, except that Mark 5B supports a VSI-H interface (see http://web.haystack.edu/vsi/index.html). It uses the same chassis and the same disk modules, but requires a Mark 5B I/O interface PCI board instead of the Mark 5A. The maximum data rate is still 1024 Mbps.

A major difference is that the Mark 5B has a built-in formatter so that an external formatter is unnecessary. The Mark 5B directly accepts unformatted sampler data in VSI-H format; the data are formatted and time-tagged within the Mark 5B.

Who needs Mark 5B?

If you currently have a Mark 5A system, you probably do not need Mark 5B. The only exception to this rule is that, if your current formatter is limited to less than 1024 Mbps, using the Mark 5B may allow you increase your maximum date rate to 1024Mbps. The prime example is the VLBA, where the VLBA samplers can generate 1024Mbps of data, but the VLBA formatter is limited to 512Mbps; using the Mark 5B will allow a VLBA system to increase its data rate to 1024Mbps.

There are three other cases where Mark 5B may be the best choice: 1) New VLBI stations can avoid the expense of an external formatter with the use of Mark 5B, though a suitable

VSI-H interface must be provided, 2) the new digital-back-ends (DBEs), some of which may be in use by the end of 2006, have built-in VSI-H outputs that interface directly to Mark 5B, and 3) if you are currently using a Mark 4 formatter, it may be possible to upgrade the available aggregate data rate from 1024Mbps to 1792Mbps – see below.

How can I upgrade my Mark 5A to Mark 5B?

Upgrading a Mark 5A to a Mark 5B requires removing the Mark 5A I/O interface and I/O panel and installing a Mark 5B interface card. In addition, a small panel with an array of 8 tri-colored LEDs is installed in a cutout in the lower-right of the front panel. Of course, a software upgrade is also required.

How do I interface a Mark 5B to my existing data-acquisition system?

There are two answers, depending on whether you currently use a Mark 4 formatter or a VLBA formatter. If you have a Mark 4 formatter, a non-reversible upgrade/modification to the Mark 4 formatter is available to create two VSI-H outputs; for a DAS with 14 BBCs, this will increase the maximum recordable data rate from 1024Mbps to 1792Mbps using two Mark 5B recorders in parallel. If you have a VLBA formatter, the formatter is discarded and replaced by a Metsahovi VSI-C board which translates VLBA sampler data to a VSI-H format (http://kurp.hut.fi/vlbi/instr/boards/).

Is there any compatibility between Mark 5A and Mark 5B?

A single compatibility path between the Mark 5A and Mark 5B will be available: The Mark 5A system is being upgraded with new Xilinx code, dubbed 'Mark 5A+', to allow Mark 5B recordings to be re-played on Mark 5A+ units; the Mark 5B data will be transformed into VLBA-track-format data at the output of the Mark 5A+. No new hardware is required to upgrade a Mark 5A to a Mark 5A+.

How will Mark 5B recordings be correlated?

Using a Mark 5A+ playback system at a correlator, a Mark 5B recording can be correlated just like a Mark 5A recording. Alternatively, an interface box has been designed that allows the Mark 5B to directly connect to a Mark 4 correlator; this approach has the advantage of completely bypassing the troublesome Mark 4 Station Units, though a considerable amount of software upgrade work is required support this new configuration. We expect that the Mark 4 correlators at MPI, USNO and Haystack will support direct Mark 5B playback within the next few months.

Where can I get a Mark 5B? How much does it cost?

The Mark 5B can be ordered from Conduant Corp starting 1 April 06. A complete Mark 5B system without disk modules will cost ~$20,000. Cost for a Mark 5B I/O interface board to upgrade a Mark 5A to Mark 5B will cost ~$2500. VSI cables will be available for ~$200 each. Haystack Observatory will accept a one-time-only order for kits to upgrade a Mark 4 formatter to VSI-H compatibility; the deadline for participating in this one-time-only order is 30 Sep 06 and the cost will be ~$2000. A commercial supplier for

these upgrade kits will be available following the Haystack one-time-only build. Upgrading a VLBA system for VSI-H compatibility requires a VSI-C board available from Metsahovi for ~600 Euros.