Minutes from the meeting of: Wednesday May 16th.
Present: Jonathan, Arpad, Des, Harro
Prepared by: Harro (send errors/fixes/oversights to me so's I can fix them)

Action items of last meeting

Harro: did provide Erlang code to Jonathan to send arbitrary model coefficients

Salvatore: has discussed using real data autocorrelation with Jonathan

Des: did talk with Dmitry re. space VLBI delay/rate values; at the moment the UniBoard delay code does not seem to be able to handle space-VLBI amounts of delay/phase and rates: there is lack of resolution. This can be fixed by allocating more bits for the model-accumulators on the FPGA and sending coefficients with more than 32bits. Both are feasible to do. Jonathan remarked that bufferspace for delaying a signal is limited to 2s at
the moment. For the foreseeable future this may not be a showstopper though.

Jonathan: did not distribute/upload documents to the memoseries wiki yet

Jonathan: informed that the fixed delay values for the test real data were gotten from Aard Keimpema, private communication (e-mail).

Jonathan/Salvatore: the 8-bit UniBoard node identification can and should go
into the header, necessitating another revision of the header of the output data format. UniBoard^2 was discussed - what kind of hardware ID will that have? The header of the output format has a version number so we could easily (re)define a new version of the output packet format should UniBoard^2 implementation differ significantly from the current UniBoard. Also it might be needed to allocate more than one bit for the correlation engine identification. We'll leave that at the discretion of the h/w engineers.

Individual updates

Jonathan: since last week's suggestion of checking autocorrelations it was found that even for simulated data the results are not stable. This was found after tests with real data showed that sometimes the spectra look a bit good but also sometimes not good at all. This effect turned out to be present in simulated data too.

By adding signal taps in the signal path the problem could be narrowed down to a timing error in a single, yet rather complex, module. Jonathan and Salvatore are busy investigating.

One action undertook was to do a full gatelevel simulation. Normal timing analysis is done with "token simulation" which does not do full hardware timing analysis. Maybe this will reveal some clues where the module is failing.

Des: is busy redoing and verifying the quadratic interpolation of model coefficients. A major element in this is checking how accurate the quadratic
interpolation is and if that is accurate enough for our needs.

Harro: is busy cooking up datastructures for translating Bob's data into MeasurementSet

Generic issues

A question re. single memory buffer usage in the front node was raised: why?
Why not use both memory modules? Does it follow from what the EVN correlator
design document sais: "a datasource starts sending data for a one second period, then suspends sending whilst the data is correlated."

Sais Jonathan: no. Currently the front node data receiving system is implemented as a 2s long circular buffer. Datasources start sending data for a particular second. As the buffers for each station fill up past a control software settable threshold the correlator starts correlating. The datasources can keep on sending data; the circular buffers will wrap back every 2s of data. If there is not enough data in the buffers the correlator will suspend correlation until such time that there is again enough data in the buffers (as per the threshold). Care should be taken that the input datarate is not higher than what the correlator can handle or data will be overwritten.
The correlator control software will need to poll the buffer fill levels. A register per databuffer must be made available.

Jonathan asks about the test real data if the phase and -rate are constant over the integration interval. Answers Des: the data was selected such that it would have a (very close to) zero delay rate. The phase and -rate scale with frequency (Des: inform others what the sky frequency of the data is) so
it might be that phase and/or phaserate amount up to a non-zero number. It might be not ignorable.

The suggestion was made to go back to simulated sinusoidal data to test the signal path and correlator rather than try with real data.

Jonathan asks if it is possible to have the offline tool (j2ms2) can be used
to produce realtime plots, as data is coming in. It cannot. Jonathan will evaluate MATLAB to see if it can read data from a socket and thus produce the online plots (to see effect of feeding different delay parameters, see minutes of the previous meeting, action item #1).

If MATLAB can't do this Jonathan will write down what he wants and delegate to Des/Harro for implementation.

Action items

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Jonathan: upload initial versions of correlator architecture and correlator startup documents to the memoseries wiki

Jonathan/Salvatore: update output data packet header with 8-bit FPGA node-id
and possible >1 bit correlation engine id. Update documentation and put on the memoseries wiki

Jonathan: check if MATLAB can read data from (UDP) socket and plot results in real-time. If not delegate plotting program task to Des/Harro

Next meeting
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Thursday May 24th, immediately after the JIVE coffee