Minutes from the meeting of: Thursday May 10th.
Present: Salvatore, Des, Harro
Prepared by: Harro (send errors/fixes/oversights to me so's I can fix them)

Generic issues
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* getting fringes

Based on emails Jonathan sent to Salvatore and Harro, Jonathan is working on getting fringes out of the Uniboard. As
far as we can tell without Jonathan being present the cross correlation works for sinusoidal, simulated, data but is
failing for real data.
Jonathan is working on playing with the zero'th order delay coefficient (let it cycle through a number of values) to
see if a fringe can be detected. Harro will provide Jonathan with Erlang code to facilitate this.

A suggestion the three attendees came up was: look at the autocorrelation spectrum of real data; a bandpass shape
should be visible in this data. If the autocorrelation does not yield this something else is fishy. Wouldn't want to
mark this as a direct action item, maybe Jonathan could comment on this.

Another suggestion made was: verifying that the correct station is delayed (there's a 50% to a 100% chance of picking
the wrong station).

Thirdly: the dataset Jonathan has been provided with was chosen such that the rate is zero (for all practical purposes)
but there is still a non-zero constant delay.
Question: who provided this number to Jonathan? Des sais he didn't. Is it in the correct units and sign?

This fixed delay must be applied correctly to the correct station or else a fringe will certainly not be seen.

Individual updates
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Salvatore:
Working on changing variables into signals in the VHDL. This may resolve timing issues (and already has fixed some) in

the designs. There are about 12 left but it is heavily dependant on the individual "variable" how difficult it is to
change it to signals. Some are trivial and some are very complex.

Put in a possible fix for incidental DDR module initialization failure in the cornerturner module of the backnode.
Incidentally one of the two DDR modules wouldn't get
intialized. "Incidental" is undefined, it is uknown how often
this happens, so it's impossible to tell how quickly it is known if the fix actually solves this issue.

Des:
Finally spoke with Sergei about the delay model for the JIVE UniBoard based correlator ("Bob"). Certain aspects now
make more sense, others just as little as before. Des will update his document and spreadsheet and inform us when a new
version is available.
Still needs to talk to Dmitry re. details of delay/rate estimates for space VLBI, though Sergei seems to have said that
"2 seconds (max) should be enough for everybody".

Made the decision to go with ordinary quadratic splines rather than follow SFXC's Akima splines for interpolating
between CALC model points. This requires the model code to generate two extra model values - one one sampling time
before the beginning of a correlation and one one sampletime after the end of the correlation.
The motivation is that the Akima spline and the quadratic spline agree to roughly machine precision to the actual model
values as computed by CALC. Husein Özdemir investigated this but forgot to ask the really important question: which
precision do we actually *need*. Des is still working on that last question.

Harro:
Working on offline software to translate Bob's data to aips++ MeasurementSet format. The MeasurementSet is the
dataformat that is used by JIVE to store intermediate correlated data in. The support scientists do their evaluation,
flagging and checking on this data, before the correlated data gets exported to the end user. Other meta-data (weather,
phase-cal, statistics, etc) is also collected in the MeasurementSet such that it can be exported with the visibilities.
Mostly working on linking Bob's indices to physical quantities like time, position and frequencies.

In decoding the output of Bob's data it was found that we seem to have allocated far too many bits for the node
identification. When a backnode outputs a packet of data containing a small header. Inside the header there are fields
that indicate exactly which backnode (which one on which uniboard - for use with >1 UniBoard systems) sent the packet.
In total 16 bits are reserved to identify the uniboard (backplane, really), node number and correlation engine number.
The Uniboard hardware ID is a PIO register that contains 8-bit node-id, fully identifying which uniboard (5 bits
backplane id), front- or backnode (1 bit) and which node (2 bits). On top of that we need 1 bit to determine which
correlation engine sent the data. This would free up another 7 bits for future use. Given that we had already used up
10 bits from the reserved 16, this would be a welcome addition.

Given that the content of the packet header has already changed once (using up 10 of the "reserved" bits) the document
describing the format should be updated and placed on the wiki/distributed.

The document describing the correlator configuration and startup sequence would also be welcomed very much.

Memoseries

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The attendees thought it would be a good idea to start a Memoseries for Bob: a simple, numbered, list of documents
containing all/most knowledge of the UniBoard correlator system. Jonathan's Correlator document would be prime
candidate for #1 in the series. Des's already legendary model document would certainly fit in nicely.

A corner of a wiki will be hijacked to contain just this numbered list of documents and revision history.

Next meeting

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As next week's Thursday happens to be Ascension day and hence a public holiday we propose to follow the JIVE coffee,
which is held on Wednesday rather than Thursday. Let's meet after JIVE

coffee Wednesday May 16th.

Action items
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Harro: provide Erlang code to Jonathan for sending model coefficients to the Uniboard
Salvatore: discuss autocorrelation of real data with Jonathan
Harro: find a spot in the wiki for the memoseries and inform the congregation
Jonathan: distribute updated/new documents