

## Minutes for AMiBA Engineering Telecon

Meeting Date: 17-July-2003

Participants:

Australia: W. Wilson, J. Peterson

USA: D. Kubo, B. Martin, J. Peterson, C.J. Ma, K.Y. Lin

Taiwan: H. Jiang, J. Han, W. Ho, T. Huang, P. Shaw, H. Wang, C.T. Li, M.T. Chen, P. Ho

Minutes Recorder: D. Kubo

[comments from this week](#), [previous weeks comments](#)

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### I. New Action Items:

**AI-17July03-1: Chao-Te/Derek:** Finalize the backplane details for the 1<sup>st</sup> Section and begin detailed design.

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### II. Previous Action Items (still open):

**AI-09July03-1: Chao-Te:** The readout chips (140) will be delivered in September. Bob asked "how are these chips going to be tested in Taipei".

C.T. - Readout die are ready now, packages will be available ~Aug 9<sup>th</sup>, and finished chips will be available around the end of August. New 7-element readout boards will be ready (assembled) at around the same time (end of Aug) for testing of the readout chips. Bob asked that C.T. provide a method/approach to verify the functionality of each chip before installation into the prototype.

Derek suggested that the 1<sup>st</sup> few chips be installed into the prototype for thorough exercising. C.T. also suggested that the 1<sup>st</sup> Readout board be installed into the prototype (will require modification of Xylinx FPGA in Data Acquisition board).

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### III. Closed Action Items (as of this meeting):

**AI-09July03-2: Bob:** Call site bidders to make sure they have all the necessary information (assigned by Paul Ho).

Bob distributed an e-mail answering this. He is expecting 3 bids.

**AI-09July03-3: Derek:** The Hilo technical staff has been putting more effort into supporting the SMA Nov dedication. Determine what impact this has made to the delivery of the correlator.

Derek - 2 week slip of final delivery of Correlator system - will now ship from Taipei to Hilo on Jan 16, 2004. This assessment is based on our current slips due to the extra efforts required by the SMA (Antenna 7/8), and in part due to our (Hilo staff) unplanned effort to reduce the prototype offset during the SARS period.

**AI-02July03-2: Ming-Tang/Chao-Te** - It may be possible to provide noise injection without worrying about the use of the polarizer(?). It was asked that the necessary W/G transitions be fabricated for the prototype telescope. These transitions are to accommodate the parts which will be installed in a different order.

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Ming-Tang via e-mail: "I propose we do the following arrangement for the noise injection scheme:

Noise coupler + square wave guide + OMT, instead of

Noise coupler + 45-twist + phase shifter + 45-twist + OMT

From our measurement, the noise coupler generates noise in both polarizations, although we only send in noise in one polarization only. Thus we will have correlated noise in both receiver channels. Once we fix the phase shifter problem, we can replace the square wave-guide with the phase shifter.

We are asking a shop to provide us with lead time on two square wave-guides for this purpose. Will get back to you with further information on the schedule."

Ming-Tang - repeated noise coupler tests and measured 18-25 dB isolation (10 dB higher than OMT?). Indication is that this alternate scheme (for noise injection) will work. Still planning on doing the cold test of the phase shifter even though may not use it. Estimate 4 weeks before noise coupler is shipped to Hilo (for insertion into prototype).

Bob asked what the next steps should be (be prepared to answer this next week). John Payne is scheduled to try the optical noise injection approach in September.

**AI-02July03-3:** Bob - Paul Ho requested that the master schedule be reviewed and updated every 2 weeks. Pay particular attention to the items which have slipped.

Updated schedule will be distributed via e-mail for everyone to review.

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### **IV. Miscellaneous Discussions:**

**MMIC:** No update, Bob to send another e-mail.

Huei - It appears that all the paer work for the export is well on it's way. \$4k for export license. LNA packaging will take place after the chip is known to work, may need a design iteration.

**Receiver:** Ming-Tang - Still waiting for parts to conduct cold tests (on phase shifter). Will attempt to install the new (see AI-02July03-2 above) noise injection hardware into the prototype (x2) in September.

Cold heads - 2 were received, 1 has been tested, the other is being tested right now. Waiting for waveguide delivery. Also waiting for backend parts (after mixer). Currently not predicting any slips in the final schedule but can't be certain. The integration of the first 2 units will be the determining factor for the schedule. The following units are a replication of these 2.

Ming-Tang - LNA tests in Hilo show that the spectrum (of the new JPL amps) looks OK. W-band CW source was broken so could not perform tone tests.

Phase shifter - waiting for cold test dewer (may not use this anymore).

7-element receiver schedule - Still waiting for waveguide pieces and 1 more cold head (have 1 right now). Decided to nickel plate the inside of the chamber instead of gold plate to save monies but ran into some problems with this change. Change in noise injection scheme does not delay schedule significantly.

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LO/IF: Visited lab and saw hardware. Assemblies look about ½ complete. Looks to be on schedule.

Correlator: Derek - Received 100 DC Amp boards yesterday. Cost was about \$8USD each. Also received the 55 aluminum modules today. Test fit between the board module and correlator module looks good. Plan to hand stuff 2 boards and subcontract the rest.

4x4 quad-pack frame is approximately 75% complete. Last 2 pieces will be fabricated next week. This model will be passed onto Ted in Taipei so that he can base his final design on it. Derek will send out photos once it is assembled.

Peter has finished assembling all 16 1<sup>st</sup> Section IF modules, minus 5 slope EQs and 1 Krytar detector, both of which are on order. We are planning to use the CSO VNA tomorrow to sweep the modules.

Chao-Te - 3<sup>rd</sup> Section power divider - Waiting for the design of the slope EQ (for XY-module) so that they can process everything together. Plan to process next week. IF amplifier design is finalized. Planning to make 4 spares each for the front and rear power dividers.

C.T. tested 003 module, see closed AI-26June03-2 above. Results look good which is fortunate because Marki has delivered 16 modules as of Monday. Design of these 16 modules is identical to SN003 engineering module. Plan to keep the 16 production modules in Hilo until we integrate the DC amplifiers to them, then they will be sent to Taipei.

Derek - Having Peter concentrate on finishing up the assembly of the 1<sup>st</sup> Section IF plug-in modules. We are planning to align and test them next week using the CSO VNA. Also working in parallel to generate the mechanical drawings for the mockup quad-pack frames. Dayton Jackson understands what we are doing and has made some design recommendations. Once we have the frame together with the 16 modules and dummy power dividers (4 front/ 4 rear) we will forward the detailed drawings and photos to Ted in Taipei.

55 DC amplifier modules are currently being fabricated at Dayton Jackson in Hilo. The final revision DC amplifier board should be delivered to Hilo next week. We will hand stuff 2 boards and outsource the rest.

Derek asked whether each of the 55 modules should be carefully characterized when in fact the overall system response for each baseline is what needs characterization. C.T. said he will characterize each module whether the data will be used in the end or not. Jeff P. heavily recommended performing at least rudimentary tests of each module to verify functionality. Troubleshooting at the final integration level is very time consuming.

Platform/Mount: Bob - Ferdinand is at Vertex today. Paul Ho asked again whether the mount/platform could be shipped earlier.

Bob - CMA is proceeding full steam. Center section is almost done and expecting 100% assembled by this weekend. Testing next week, shipping will be delayed by 1 week. Does not affect Vertex schedule. Ted has received the test samples and will have them analyzed.

Vertex - Assembly with platform will take place in the middle to late August. No schedule update.

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DC Power Distribution: Homin - Sent out another package this week. Noise level and switching frequency changes with load. Currently measuring a switching noise of -80 dBm.

Homin - Made a small change with grounding and improved the noise by a small amount. Will send out test results.

Enclosures: See new AI on backplane.

Site Issues/Network: Bob - Bidding is in process. One more bidder was added to the list for a total of 4 or 6. No updates to report.

Dishes: Dr. Ong will send more measurement data to Ted today. Ted has received 4 test coupons from CMA and has forwarded them to Dr. Ong. He will provide a proposal for testing the coupons.

Ted - 60cm measurements look OK. There are still some questions about some measurements definitions. Bob - Will ship the 2 dishes to Hilo at the end of next week. Beam pattern and crosstalk tests will be performed on the prototype. Plan to proceed with the manufacture of the remaining 5 dishes.

2-Element Prototype Issues: Cheng-Jiun - Offset has a strong relation to diurnal cycle and is consistent from day to day. Daytime offset is smaller than night time. Attempting to detect the galactic plane. Detailed discussions deferred for the science meeting.

Derek - Cleaned up correlator box before taking up to ML last week. Phase switch signals are now connectorized at the box interface (no more clip leads). Added 4 IF signal tests points on the side of the box so can easily monitor power of each receiver channel with power meter. Received 5.0688 and 6.0000 MHz TTL oscillators and currently mounting on PCB. Will take up to ML tomorrow to lockup the 2 version2 non-laser cut readout chips. Should be more stable.

Schedule: Paul Ho - SMA dedication is Nov 20. The funding agencies will be present and it would be nice if we could show them some significant items such as the site foundation, mount and platform. Is it possible to accelerate some of these items by a few weeks?