

Minutes for AMiBA Engineering Telecon

Meeting Date: 12-Sept-2003

Participants:

Australia: Mike Kesteven, Warwick Wilson

USA: Bob Martin, F. Patt, Jeff Peterson, Derek Kubo, Kyle Lin, John Payne, P. Ho

Taiwan: C.T. Li, H. Jiang, T. Huang, P. Shaw, M.T. Chen

USA Dial-in = 1-800-653-5390, 6668081#

Minutes Recorder: C.T. Li

[previous weeks comments](#)

I. New Action Items:

II. Previous Action Items (still open):

AI-14Aug03-1: Warwick - Become directly involved with offset issue (assigned by Paul H.)

Kyle/Derek - Have taken some data about the offset. Will send the latest results to Warwick for further comment.

Kyle - Don't have new test results yet.

Warwick - From the recent test results, which show quite large RMS (~ 400), it seems correlators have been driven very hard, that might cause the non-linearity in the correlator. Suggest testing the offsets with different IF power.

Kyle - Offsets also changed as swapping two IF inputs with the same IF power.

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

IV. Miscellaneous Discussions:

MMIC:

Huei/Bob - Export license decision seems to be soon. Wrote a paper about SiGe multiplier, and liked to have Warwick and Paul Roberts comment.

Receiver:

Ming-Tang - have new feed horns and vacuum windows coming in next few weeks (vendors sent them out few days ago). Like to test the new quartz vacuum windows. Have cooled down receivers with plastic windows, looked for alignment change. It seems that we're able to make it stable during cool-down. Not sure if it's necessary for each receiver to get through thermal cycles. Received 3 more OMTs in Taipei. Should be able to ship receiver(s) by the end of Sept.

Eugene - Have 7 mixers ready. Need Johnson to wire-bond more for 7 elements.

Ming-Tang - Checking on mechanical alignment between room and cold temperatures. It doesn't have any problem to reach the right temperature. Need few weeks to do several other tests.

LO/IF:

Ming-Tang - Got two IF/LO modules from Prof. Chu. Reviewing their documents and will feedback to them. Will perform some tests with these two modules.

Production LO source will come later. Currently use a synthesizer to generate the 21 GHz signal. Had machine shop to make another set of (stiffer) supporting structure for IF/LO modules.

Minutes for AMiBA Engineering Telecon

Correlator:

Derek - Received the remaining of Marki modules. We have all 55 modules now. Fully assembled DC amplifier boards were shipped yesterday. Will integrate the board with its housing and put them together with correlator modules. Will power up the DC amplifier, adjust the DC offsets, then ship them over to Taipei. Waiting for some parts (pads) for 1st section IF modules.

C.T. - Looking for outside vendor to sub-contract the MMIC packaging for the rest of 30 units. Finished the schematic designs of 2 interface cards between data acquisition card and tp, xy modules, as well as readout boards. Still have 3 PCBs left for schematic design, including 2 back planes. Wish to finish it by end of this month. Got processed readout boards back. Mark is putting together one unit. Also have Prof. Chiehuh's (EE) student test the new batch readout chips. They worked as designed after taking few set of data.

Ted - Have sent out another drawing of a quad pack correlator frame with tighter tolerance requirement to machine shop.

C.T. - Planned to send design of another two PCBs (tp & xy) to outside firm for detailed layout. Mark and I will work on the other 4 PCBs design then. We plan to have all of the designs finished by the end of this month.

Platform/Mount:

Bob - will have a telecon later today.

Bob - Some pictures of the mount came in, showing 6 jackscrews mounted. The entire mount assembly is working on wiring. Philippe is going again next week to check on it. For platform modification, have managed to zero in on design last week. Bob Romeo ordered some material. From October 6th to 17th, Bob Romeo will go to Vertex to work on Platform modification, assembly, and mounting platform onto the mount. Testing probably won't start until 20th of October.

Calibration System:

Ferdinand/John Payne/Jeff Peterson - Will generate a pdf file describing the noise injection / calibration system for Paul Shaw to post it on the web that everybody can look into that and comment on it. The whole thing has become possible because of high-power, noise-wise? Transmitter, centered around wavelength of 1.5 micron. If you take that and shot it onto a photo-detector, then you get a broadband noise output over the range the photo-detector is designed to cover. With the output of photo-detector matched to a WR-10 waveguide, you got a potentially appealing calibration source for projects like AMiBA or ALMA. NEL (sub-company from NTT) will start marketing the photo-detectors. The pre-production unit is about \$27,000 per unit. The price will drop drastically when they go to production. Digital data communication bandwidth is now 60 GHz. Discovery Semiconductor in New Jersey offers photo-diodes with a 60-GHz data bandwidth. Have two of these components in Hilo from Germany, which have V-type connectors on it, then V-type to WR-15 transition, then WR-15 to WR-10 transition. That would be our first test. What RAL in Cambridge actually does is that they take the square-T? detectors apart, then put an E-field probe on the diodes. Fix-tuned back-short might be desirable for our uses. We are not power starving. Wait for the polarization scrambler. Just to see if it works, we can go up the mountain and hang the probe over the 30-cm dishes. Would like to see if V connectors with 60 GHz bandwidth photonic detectors actually work in W-band.

Minutes for AMiBA Engineering Telecon

Ferdinand - Sent out an email about the calibration specs. It is to be faster with the calibration system than any atmospheric change. For the calibration system, got few components, few more in order. At this point, we are not ready to put that onto the telescope. There are still few components missing, like the polarization scrambler, which should be there in next two weeks. It's also important to check the cross-talk or coupling between two dishes. We have the possibility to use either photonic or coaxial approach.

Mike - If you were doing point source study, then the calibration is very important. For CMB, substitutional? calibration, e.g. against Jupiter, would in fact suffice, given the way we're looking at very weak signal, and a fractional change of magnitude of the signal. It certainly has to be an attempt to. However, wouldn't see it's such a high priority. In the perspective of very rapid change of calibration, if centered the frequency of phase switch, then we're in trouble, doubt the calibration would pick it up either. It's important to characterize receivers, we do need the calibration system. My suspicion is if receiver's long-term anchored within, say, within 2 or 3%, that is minor perturbation on the CMB final results.

DC Power/ Distribution:

Homin - Plan to mount the DC converter board in the opposite way. Joshua is making custom-made heat sinks that can be attached to the box. The last step would be to put a shield around. Once the DC converter board is reversed, the PCB will likely act as a shield. Finished the design of (receiver) back plane. Need to verify if the I/O ports of cards from Australia as designed. If so, will make another batch of back planes. For the layout, move some of the analog connectors to the central, far away from the DC converter. For back plane mounting, the new back plane will have two options to fit in either VME? Standard or Eurocard standard by cutting the board short along the V-groove.

Enclosures:

Site:

Bob /Ferdinand - Had more discussion with the architect and how to set that in line. Filled out the PO with Neil Harrison. Got hooked up with an interested contractor. Took him up the other day. Will meet with him tomorrow morning and go over the cost and detailed information. Sent out electrical drawing to Paul Shaw for him to circulate around.

Bob /Ferdinand - Have been Trying to look for area to re-design. Tried to look for alternative of how to break this up, and keep the cost down. Ferdinand got another quotation for excavation. Don't understand why the price is so high. Mountain work is most formidable. Looking into renting our equipment with the driver/operator. Will drive over to Kona to visit a big rental place.

Dishes:

Ferdinand - For the testing of 60-cm dishes, have an idea how to test our dishes by using antenna 8. The idea is to mount the 60-cm or any other dish behind the sub-reflector, with the transmitter on Subaru. The distance between antenna 8 and Subaru is couple of hundred meters. We are somewhere in the far field. Have to build a mechanical structure to hold the dish, feed horn, LO, down-converter, maybe a second down-converter, and a total power detector. Then bring the DC power down, feed into antenna data system. All the softwares are there for beam map. Will have antenna 8 for 2 to 3 weeks to do this.

2-Element Prototype Issues:

Schedule: