# Minutes for AMiBA Engineering Telecon

Meeting Date: 8-May-2003

Participants: <u>Australia:</u> W. Wilson <u>USA:</u> D. Kubo, C.J. Ma, K. Umetsu, B. Martin, J. Peterson, F. Patt, P. Shaw Taiwan: H. Jiang, J. Han, W. Ho, T. Huang, C.T. Li, E. Hwang, K. Lin, H. Wong

Minutes Recorder: D. Kubo comments from this week, previous weeks comments

#### I.<u>New Action Items:</u>

AI-8May03-1: Chao-Te - Follow up with Ming-Tang on how to proceed with fixing the current phase shifter problem.

AI-8May03-2: Ming-Tang - Contact Prof. Chu and report status of the IF/LO boxes (1 per receiver) and the master LO distribution box.

AI-8May03-3: Bob - Summarize progress made during Boulder trip in e-mail.

<u>AI-8May03-4:</u> Chao-Te - Proceed with putting together a correlator PC in Taipei to thoroughly test the readout chips. It is necessary to test the chips in the same manner and condition that we plan to use them.

AI-8May03-4: Cheng-Jiun - Summarize the results of running the readout chips at 8 MHz and distribute via e-mail.

<u>AI-8May03-4:</u> Paul Shaw - The Mauna Loa Observatory staff has expressed a concern about SARS in relation to the constant number of rotating visitors from Taipei. Please generate an e-mail about what is being done in Taida and recommendations on what we (AMiBA staff) should do here in Hawaii to prevent the possibility of spreading the virus.

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

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

<u>AI-1May03-1:</u> Warwick - Provide comment on Ming-Tang's phase shifter and noise coupler reports.

Warwick sent out an e-mail describing his thoughts on the measurement results. The phase error is probably caused by the thickness of the solder which is an uncontrolled parameter in the assembly process. It seems that this phase error (deviation from 90 deg.) can explain the 3 dB amplitude imbalance. One possible solution is to use tuning screws to correct the phase.

AI-1May03-2: Derek - Complete phase measurement of Marki 002 module.

Derek distributed a test summary package for the Marki 002 module. Phase deviation from linear phase ranges between +/-15 (best lag) and +/-20 deg. (worst lag) over the 2-18 GHz band.

<u>AI-1May03-3:</u> Derek - Talk to Paul S. about potential cost upper of correlator module.

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Derek and Paul had a discussion on this subject. Latest bid from Meridian is \$1365/ for qty of 55. Verbal bid from Marki is \$1800 for same qty. Derek will try to have Marki lower the price to be closer to Meridian.

AI-1May03-4: Derek - Determine next step for Meridian 4-lag SN002 module. Need to give Rapadas instructions for design changes on the next module.

AMiBA has paid Meridian \$6500 for the NRE of the two 4-lag modules. In addition the cost of each 4-lag module is \$1950 and we have received 1 of 2 modules (no payment made yet). Derek suggested we wait 2 weeks to make a decision on whether to proceed with the 2<sup>nd</sup> Meridian module. If the Marki 002 module proves to be a good solution then we can cancel the 002 module and close out the contract with Meridian. If the Marki prototype results are unacceptable then we will have to provide Jeff Rapadas with instructions on how to improve the design. See correlator discussion below on terminated mixer progress.

AI-6Mar03-1: Bob - Ask Fred L. if he can help AMiBA with the TRW InP MMIC testing problem. Can't export to Taipei for testing. Also contact Todd Gaier in regard to telling him our MMIC delivery needs.

Bob has contacted Paul Clintworth at TRW (NG). Paul believes that going the route of a temporary export is easier (?) and will pursue the paper work for this. Paul has asked whether we want the wafer diced and Huei will respond via e-mail with "yes". Also are on wafer tests desired? Huei's answer to this was "no". E-mail cc should include Ming-Tang and Bob.

### IV. Miscellaneous Discussions:

MMIC: Received JPL package (Ferdinand has it).

MTC - Still waiting for LNAs to be delivered from JPL to Hilo.

<u>Receiver:</u> Ferdinand - submitted RFQ for CTI cold head (a while back) and received a quote. Taipei needs to get an official quote from their end to compare prices.

MTC - Tested phase shifter and noise coupler and sent out preliminary reports. Phase shifter appears to be about 73 degrees (instead of 90) and there is a power imbalance of around 3 dB (between polarizations). Warwick was not surprised about the phase imbalance (dependent on dielectric thickness) but was surprised about the 3 dB power imbalance. He will look at the report and provide comment (see AI at top).

MTC - Combined test with phase shifter + noise coupler was not good as expected. Jeff P. commented that the devices will be used at 10K (?) but has been tested at 300K. He also thought that S11 tests could be useful for diagnosis.

LO/IF: See AI assigned to MTC above.

MTC - Prof. Chu is ahead of schedule. Prof. Chu making enough LO/IF assemblies for the 7-element system but will be delivering only 2 by this summer. Homin commented that the assembly will require the same voltages as before but more current.

<u>Correlator</u>: Jeff P. - Still proceeding with terminated mixer development. If the Marki approach does not pan out then this may provide an alternate solution for the Meridian 002 correlator module.

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Chao-Te - Ordered 140 (packaged) readout chips. The new version will have the option of either locking the internal PLL (by connecting 2 pins) or running it open loop by injecting an external bias voltage. Bob was concerned that we still have an offset (of ~5-10) which we don't understand and can't remove. See AI above to Chao-Te.

Derek - Will have a video conference with Ted after this meeting on the mechanical design of the correlator frame.

Bob asked what the next step should be for the correlator. Derek - Working with Marki to see what he can do about the price and possibly flattening the responsivity at the low end. The decision on whether to purchase 55 modules from Marki also hinges on the comparison tests results between the Meridian and Marki modules in the prototype telescope.

Jeff P. - Duroid board for terminated mixer is in fab. Will install diode ring then package the mixer into a housing. Estimate to complete is 2 to 3 weeks.

Derek - Currently testing the Marki 002 module. Responsivity verses frequency averages around 125 Vrms/W with a variation of 4 dBpp over 2-18 GHz. Most of the variation is caused by the response below 5 GHz (5-18 GHz is fairly flat). Input 1 dB compression point is about -5 dBm for all 4 lags. Next things to do are: a) phase measurement; b) add DC amp module and re-test; c) install on prototype and characterize SNR.

<u>Dishes:</u> Ted - Dr. Ong will provide exact delivery date within the next few days. Current plan is to have all components fabricated in the middle of May, followed by measurements of the primary and secondary mirrors.

<u>Platform/Mount:</u> Bob/Ferdinand - telescope foundation pad and infrastructure pad (for container) - design for the foundation is expected to be 75% complete by May 16 and 100% complete by May 28. This will allow us to go get bids from contractors in Hilo.

<u>DC Power Distribution:</u> Homin - will be performing noise test comparisons of his latest DC-to-DC converter board against a linear power supply.

Homin - Next version of DC-to-DC converter board is ready(?) for testing. Waiting for Ferdinand's spectrum analyzer to characterize.

<u>Site Issues/Network:</u> Ferdinand - contacted HELCO (Hawaiian Electric & Lighting Co.) about the installation of a 100KVA power connection. They asked him many questions that he could not answer such as: a) is an additional transformer needed?; b) what is your estimated electrical consumption over the next 3 years; c) what is your building permit number?; etc.

Derek (for Ferdinand) - Just performed more surveying tasks at ML. Planned locations for platform and container will not interfere with existing MLO tests.

<u>2-Element Prototype Issues:</u> none

Schedule: none

Enclosures: none