



SMT IF Upgrade 2006

Engineering Minutes

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2006-08-24

An engineering meeting was held Thursday afternoon, 24 Aug 2006 to discuss the SMT IF upgrade and the 1.3 mm side-band separating receiver. Attending the meeting were Dr. Lucy Ziurys, David Forbes, Gene Lauria, George Reiland, and Robert Freund. Project status, schedules, 2nd stage low noise IF amplifiers, IF cables and task allocations were discussed.

Mixer/LNA Cartridge -

Gene started the meeting with a progress report on the mixer/LNA cartridges. He stated that Mark had not been able to complete the assembly of both mixer cartridges before starting his vacation. The heat straps internal to the cartridge will be annealed tomorrow by Martin and then the plating process will be started Monday. The 3/16" thick OFHC copper sheets have still not arrived. Gene indicated that he will be contacting the company to expedite the order. Spacers to hold the external portion of a cartridges' LO waveguide are being fabricated. It is expected that all the cartridge parts will be in house by Mark's return after the Labor Day holiday. Currently, September 13 is the expected completion data for the two mixer/LNA cartridges.

Dewar -

Gene reported that John Fitzner's first day was Wednesday. His first task was improving the wiring for the Dewar temperature sensors. He will also be installing the central spider that was recently delivered by Universal Cryogenics and adding heaters inside the Dewar. John was familiar with the card cage, he said that he had originally assembled it some 15 years ago.

Receiver IF Processor -

Dave has evaluated the performance of the Receiver's IF Processor. George has received amplifier quotes from Ciao Wireless.

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LO System -

George reported that he had not had time to finish the evaluation of the Pacific Millimeter Products harmonic mixer and bias tee as a prerequisite to ordering the 8.7 to 13 GHz medium power amplifier. He expects to have the amplifier requisition ready tomorrow. George also reported that he will be starting the mechanical design for the Gunn phase lock chassis.

Dave indicated that an order for various colors of 18, 22, and 24 AWG teflon hook-up wire has been placed.

Receiver IF Processor -

Dave reported on his evaluation of the Receiver's IF Processor. He found that both Miteq AFD4-040080-LM input limiting amplifier exhibited discrete gain jumps and that one amplifier was much worse than the other. He replaced the worst amplifier with a recent purchase to continue his evaluation. He measured the power spectral density of the detected total power and found the 1/f break point to be around 4 Hz. He also stated that the modifications to the front panel digital meter wiring had eliminated the instabilities previously associated with changing digits.

Interim Receiver Selector -

Gene reported that all the electrical drawings for the Interim Receiver Selector chassis have been completed. He will be contacting DowKey again to expedite the shipment of the over due RF transfer switches. There was no response to his first phone call. The 28 volt power supply has arrived.

IF Converter System -

Dave reported that all the parts for the IF Converter microprocessor controller card had arrived. The board will be assembled when Mark's or John's time can be scheduled. George reported that the order for the 100 MHz phase locked from Jersey

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Microwave had been place on August 14 but that no delivery date had been received. He would call to get a date and to request an outline drawing to complete the mechanical drawings of the central section.

Dave stated that drawings for the IF Converter crate were in the Steward machine shop. Some parts were awaiting access to the CNC machine. No completion date was available. George reported that he had finished the mechanical design and drawings for the central section. He showed an AutoDesk Inventor 3-D drawing and described its functions. He indicated that he planned to obtain a quote from Tag Engineering for the fabrication of the metal parts. Nobody had any information on rate schedules or the process to obtain job estimates from the Steward machine shop.

Dave estimated that the assembly of the crate and power supply chassis would require about 1 technician week of time. Interconnecting power cable assembly could begin before all hardware is back from the shop.

Filter Bank IF Conversions -

Dave reported that all parts for the Filter Bank IF conversions have been ordered. He estimated that the conversion would take about 1 week of a technician's time.

IF Power Level Budget -

Bob distributed a "work in progress" Microsoft Excel spreadsheet describing the IF power levels. A discussion followed that determined the noise characteristics of the "2nd" stage IF amplifier. A decision was taken to buy amplifiers with noise figures less than 1.2 dB (92 K) to be used as the input room temperature amplifiers in the Receiver IF Processor. Ciao has a low noise amplifier that meets these requirements. George will write a requisition tomorrow for 5 of these amplifiers.

IF Coax Cables -

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Gene opened a discussion on the performance of low loss, low reflection coaxial cable for the distribution of the IF signals. He pointed out that there are two separate applications, a flexible cable to connect the receiver to fixed locations of the wall, and fixed plenum cables running between floors. He described the need for strain relief where a flexible cable exits the receiver. He identified MegaPhase cable with their Groove Tube technology as a possible candidate for the flexible cable and the smooth outer jacket Times Microwave LMR-4000 cable as a possible candidate for the plenum application.

Task Allocation -

During the discussions, it became apparent that sometime in the middle of September, most of the orders would be arriving. With limited technician resources, task allocation must be carefully planned. A decision was taken to ask everyone to generate their assembly task lists by the next meeting. At that time, the lists would be combined and allocations determined. In the mean time, with Mark on vacation and John planning on working only two days, task assignments were not necessary for next week.

The 6 action items are summarized below:

1. Gene will contact the OFHC copper sheet company to expedite the order.
2. Gene will contact DowKey to expedite the shipment of the over due RF transfer switches.
3. George will call to request a delivery date and outline drawings for the 100 MHz PLL from Jersey Microwave.
4. Everyone shall provide an assembly phase task list.
5. George will write a requisition for all the Ciao IF amplifiers.
6. Bob will finish the IF power level and VSWR budget.

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The 1 decision taken is described below:

1. Purchase low noise amplifiers (less than 100K) for the first room temperature IF stage

Robert