



SMT IF Upgrade 2006

Engineering Minutes

Author: Robert W. Freund

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An engineering meeting was held Thursday morning, 6 July 2006 to discuss the near term schedules and priorities concerning 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, Martin McColl, and Robert Freund.

The topics discussed were

1. Changes to the schedule,
2. Changes to the baseline plan
3. Project schedule.

Gene started the meeting by proposing a change to how the receiver's card cage would be constructed. He described a plan whereby the existing card cage would be reworked to accommodate the additional electronics instead of completely rebuilding a new unit. His proposal was accepted.

Bob distributed the first version of the Phase III system configuration, containing the upgraded 345 GHz receiver and the ALMA Band-9 receiver. He proposed the addition of 4 - IF monitor ports to the facility total power system. This added capability permits easy monitoring of the IF signals produced on the fourth floor on the fourth floor. A short technical discussion on implementation methods leads to the suggestion that directional couplers be use to supply the monitored signal. Bob's proposal was accepted.

The system configuration of Phase III adds two receivers, a 345 GHz receiver containing the ASIAA mixers and an ALMA Band-9 receiver, and keeps the vintage single polarization DSB 490 GHz Max Planck receiver with its existing frequency convert cascaded to the current filter bank convert. These receivers will each contain their own room-temperature IF amplifiers and total power monitors. Bob will correct the Phase III block diagram. A tentative decision was taking to accept this architecture.

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Gene reviewed the schedule and priorities. The first high priority task is the support electronics that is driven by the card cage. With the re-work decision, the card cage is no longer a priority issue.

The other priority tasks are: 1) the receiver's LO source, 2) 12-Meter IF processor module system, 3) the AOS IF processor, and 4) the receiver's 2-channel IF processor.

George stated that adding an LO for the second 1.3 mm ALMA mixer cartridge would be simple. He explained that two pairs of Gunn oscillators and multipliers are available, one from the original "JT" system, and a second pair from the first ALMA mixer. The plan is to replace one of the original 1.3 mm mixers with the original ALMA mixer and to replace the second 1.3 mm mixer with the new ALMA mixer. Then, a Gunn oscillator and multiplier would be directly attached to the second ALMA cartridge. This design would not require any extensive waveguide additions. The original LO system would be modified with a new waveguide directional coupler to improve performance for dual 1.3 mm and 2 mm band operation.

Lucy instructed everyone to use "IF UPGRADE" on purchase requisitions to identify project purchases.

Discussions turned to the IF Converter System. A proposal was made to change the name from "12-Meter MAC IF Processor System" to the "IF Converter System". The proposal was accepted. A decision was taken to revisit the setting of final deadlines until the arrival of the 10.4 GHz IF Convert Module filters. At that time, the project would be much closer to completion.

George volunteered to mount a search for the PC board layout plans for the "IF Convert Module System" controller. The goal is to send out the controller card layout plans for etching by August 28 and have the board returned by September 1.

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A decision was taken to provide the oscillators in the "IF Converter System" with a signal from a 100 MHz oscillator phase locked to the 10 MHz site standard.

Dave reminded everyone that the "Channel Steering Selector Switch" would not be ready for the fall. Its availability would not be necessary until the installation of the "Facility Total Power System". Channel selection that would normally be accomplished by this instrument could be temporarily achieved by manual means.

Signal level and gain flatness budgets are needed soon so that detailed instrument level design can proceed. July 20 was proposed as a deadline for signal path block diagrams of the three major instruments and power and VSWR budgets for each.

The 7 action items are summarized below:

1. Correct the Phase III block diagram.
2. Mount the definitive search for the "IF Converter System" controller layout plans.
3. Develop the Receiver 4-channel IF Processor block diagram.
4. Develop the Facility Total Power System block diagram.
5. Develop the 345 GHz receiver IF block diagram.
6. Develop a signal path signal power level budget.
7. Develop a signal path VSWR budget.

The 5 decision taken are summarized below:

1. Re-work existing card cage to accommodate additional electronics instead of building a completely new cage.

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2. Add 4 - IF monitor ports to the "Facility Total Power System".
3. The new name for the 12-Meter "MAC IF Processor System" shall be the "IF Converter System".
4. Final deadlines will be decided after the arrival of the "IF Convert System" bandpass filters.
5. Use a 100 MHz oscillator phase locked to the 10 MHz site standard in the "IF Converter System".

A tentative decision was taken to accept the Phase III block diagram.

Robert