



SMT IF Upgrade 2006

Engineering Minutes

Author: Robert W. Freund

2006-08-03

An engineering meeting was held Thursday afternoon, 3 Aug 2006 to discuss the SMT IF upgrade and the 1.3 mm side-band separating receiver. Attending the meeting were David Forbes, Gene Lauria, George Reiland, and Robert Freund. ARO management was not represented. The topics discussed were;

1. A proposal to relocate the "Channel Steering Selector"
2. Current project status and schedule.

Bob started the meeting by proposing relocating the Channel Steering Selector chassis from the third floor to the fourth. In particular, he suggested incorporating the functionality inside the Facility Total Power instrument. His motivation was to utilize the existing gain in the Facility Total Power chassis to compensate for the losses in the Channel Steering Selector. This design change would then permit the elimination of the input amplifier in each of the IF Converter modules. A long technical discussion followed. The group decided not to accept the proposal. Block diagrams for Phase II, III, and IV will remain unchanged. The group did decide to add an input impedance matching attenuator into each IF Converter module. A gain and power level budget is still required.

Gene reported on the status of the project. He stated that the 10.4 GHz and the 4 to 8 GHz bandpass filters had finally been ordered. He indicated that the Steward Business Office endorsed the expenditure of an additional \$ 500.00 to expedite the delivery time of the 10.4 GHz bandpass filters. The delivery is now scheduled for September 11. A mechanical sample of the 10.4 GHz bandpass filter was shipped to the vendor.

Gene summarized progress on the cartridges; Mark Metcalfe had completed the wiring harness and the cartridge plates had returned from plating. He described two options for flexible heat straps, the "Omega", based on a design by Martin McColl that requires an electro-discharge machining operation and another that uses a laminate of about 20 sheets of 0.005" thick OFHC copper. Gene preferred the later design because of cost considerations. He had received quotes for the machining and plating of the central spider.

Page 2 of 4	SMT IF Upgrade 2006	Doc: Engineering Minutes Date: Thursday Aug 03, 2006
-------------	---------------------	---

Gene indicated that John Fitzner still had not been hired. John might be meeting with Tom Folkers on Friday.

The completion date for the LO system is currently set for October 4 and is set by the delivery of the WR-12 E-band waveguide coupler. There is some uncertainty regarding this delivery. George has volunteered to contact the vendor to obtain a delivery confirmation. Another item with a long lead time delivery is the 10.8 GHz bandpass filter used in the phase lock system.

Dave reported on the IF Converter System task and stated that the mechanical design of the power supply chassis was nearly finished. He had started designing the base plate and side plates of the IF Converter crate. He stated that the controller card PC board layout artwork had been submitted to a vendor and the PC boards had already been fabricated. The PC boards were being shipped today. George stated that the 7.1 GHz and 15.4 GHz DROs had been ordered. The 7.1 GHz DRO is needed to modify the AOS signal processor.

Dave reported on the modifications to the Filter Bank IF Processor. He stated that the RF relays had been order. However, orders for the power dividers had not yet been placed.

There was a short discussion as to the best type of coax cable to use to interconnect the IF signals between equipment and between floors. No decision other than a "Helix" type cable with type "N" connectors should be used. An action item is to select the cable and then to place an order.

George returned to the status of the IF Converter System. He reported that Dave, Bob and himself had met on Tuesday and decided upon the basic design for the IF Converter crate, the hardware that holds the four IF Converter modules along with some miscellaneous electronics. From that meeting there were three action items; investigate the power supply to phase noise isolation of the phase comparator ICs, determine the warranty period for Acopian and Power One analog power supplies, and determine the altitude ratings for analog power supplies from these same two companies. He reported that the manufacturer of the phase comparator chip, Analog Devices, does not specify the power supply to phase noise isolation.

Page 3 of 4	SMT IF Upgrade 2006	Doc: Engineering Minutes Date: Thursday Aug 03, 2006
-------------	---------------------	---

Because the IF Converter System crate will be assembled from machined parts and it is not a standard off-the-shelf item, there was a short discussion on the hourly rates of various machine shops. No one knew the rate for the Steward shop. An action item was to obtain this information.

From the action item list from last week, George stated that the power level for the selected 100 MHz phase locked oscillator was sufficient to drive its loads.

The 3 action items are summarized below:

1. Bob will produce an IF power level budget.
2. Select the IF interconnecting cable and place an order.
3. Obtain the hourly rate scale for the Steward Observatory machine shop.

The 1 decision taken is described below:

1. Add an impedance matching attenuator at the input to each IF Converter Module

Robert