

Advanced Multi-beam Spectrometer for the GBT

Design Review

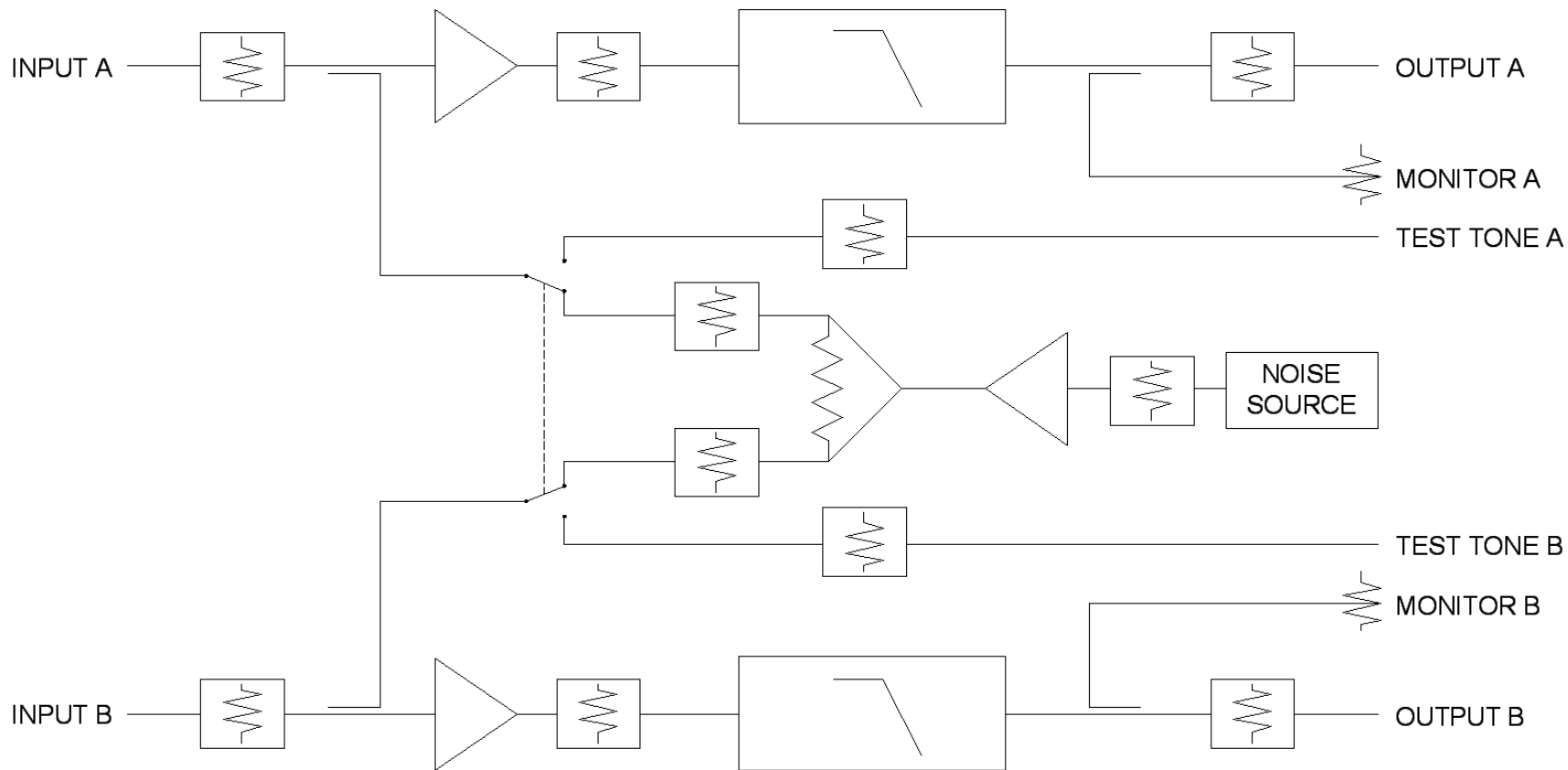
January 31, 2011

Analog IF Interface

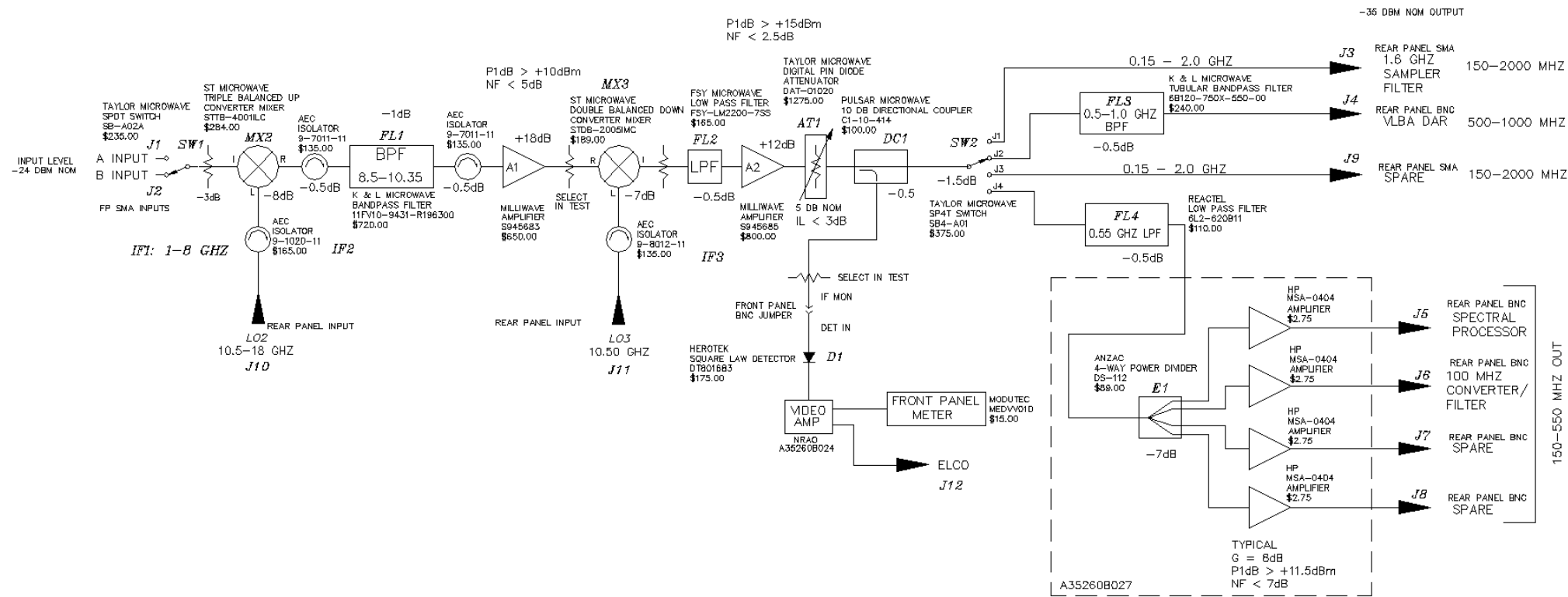
- Configuration
- Levels
- Anti-Aliasing
- Installation

Sample Clock Distribution

- Configuration
- Levels



GBT Converter Module:



RF Levels

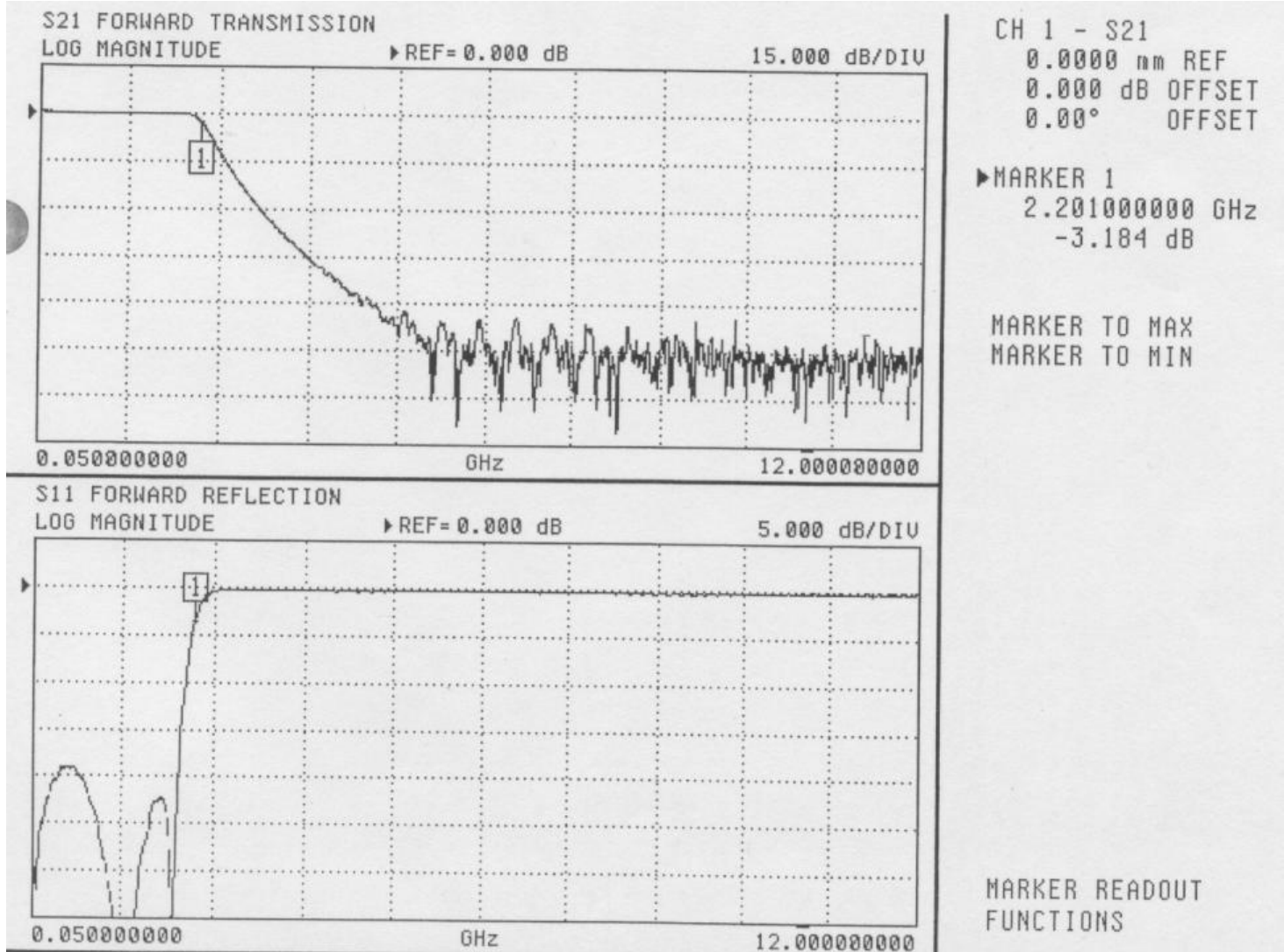
- **ADC Input: +2 dBm FS**
- **CM Output: -35 dBm, 150-2000 MHz**
- **Attenuation, Filter losses**
- **Estimated Gain: ~50 dB**
- **Inexpensive, difficulty in narrowing the choices.**

IP3 (Third Order Intercept Point)

- **Original Specification: > 31 dBm 4 dB of loss between last amplifier and ADC.**
- **New Estimate: >35 dBm 8 dB of loss due to filter, monitor coupler, attenuators.**
- **IP3 calculated for cascaded gain-loss-gain stages.**

Anti-Aliasing Filter

Converter Module 2200 MHz LPF Response:



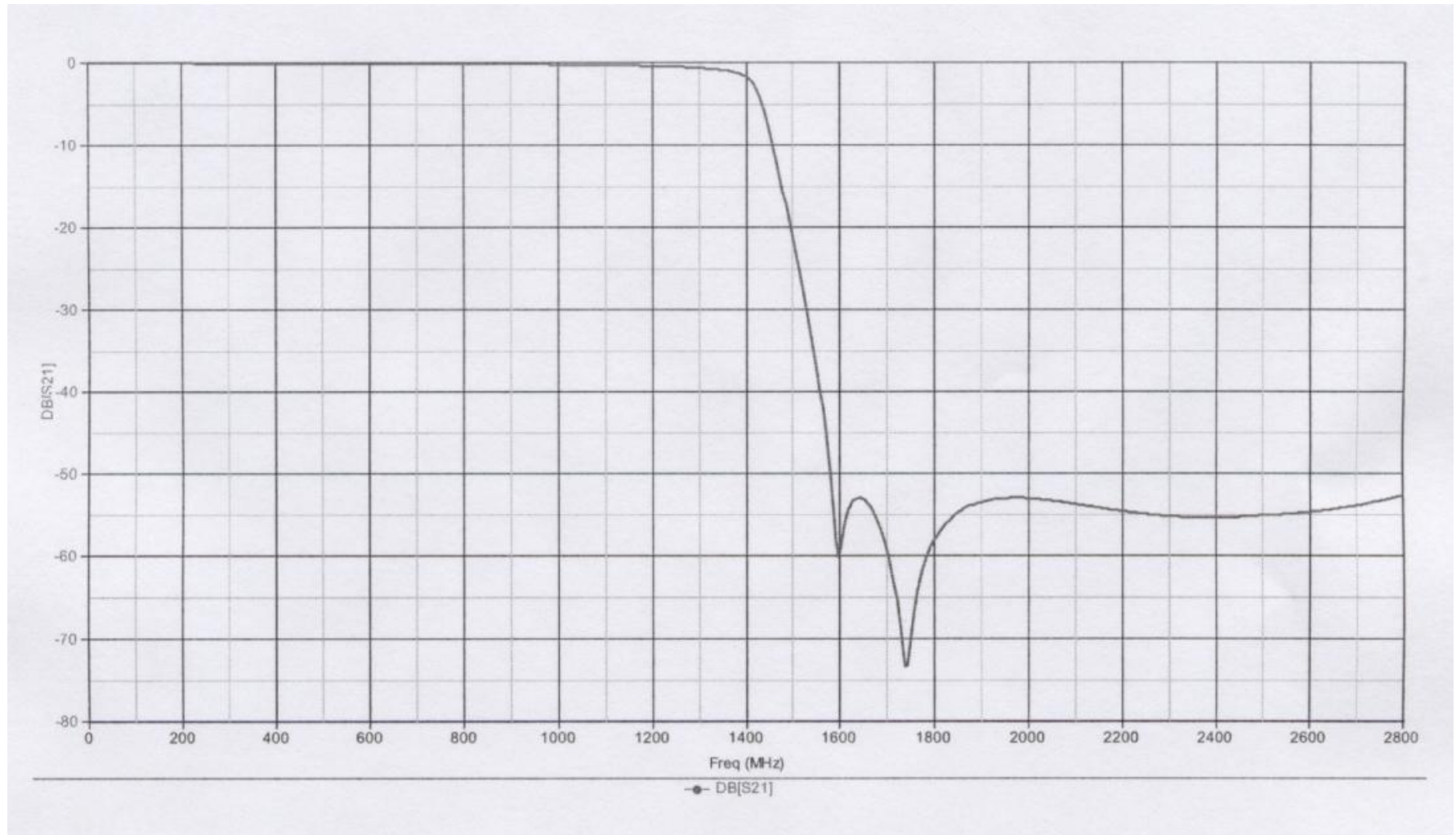
Anti-Aliasing Filter Specification:

- **-3 dB cutoff at 1400 MHz**
- **-20 dBc at 1500 MHz**
- **-50 dBc at 1600 MHz**
- **Pass band ripple < 1.0 dB**
- **Surface mount or solder pin package**

Quotations

- **Range from \$94 ea/20 (fails spec by 2 dB) to \$474 ea/20**

Typical Response:



Installation

- **19" Rack mounted, 1U enclosure containing two interfaces, four channels.**
- **All inputs, outputs, control bit inputs front panel mounted**
- **Rear panel power supply connections**
- **One IF interface between two ROACH chassis**
- **Four sets of ROACH pairs with IF Interfaces in one rack with IF Int. Power Supply**
- **1 PPS and Clock Distribution between ROACH 4 and ROACH 5**

IF Interface Questions, Comments, Etc?

Sample Clock Distribution

- **Valon 5007 Synthesizer referenced to GB 10 MHz generating ~1500 MHz**
- **Attenuator to adjust levels if required**
- **Narrow band amplifier to achieve ~20 dBm**
- **12-way splitter, 8 outputs used initially, unused outputs terminated**
- **Each ROACH chassis has 2 way splitter**
- **Deliver 0 dBm to ADC Clock Input**

