

1.04 – Multiband Receive Preselector

By **Kenneth Barbee, Albert Nandin, Liliane Nzukou**

Sponsor: FlexRadio Systems

Motivation

- Currently, the market provides SDR's with the option of two separate frequency ranges.
- This product will add four bands to FlexRadio's existing available bands.
- With more frequency bands in an SDR, FlexRadio can provide the user with a broader range of frequencies to transmit and receive signals.

Project Scope

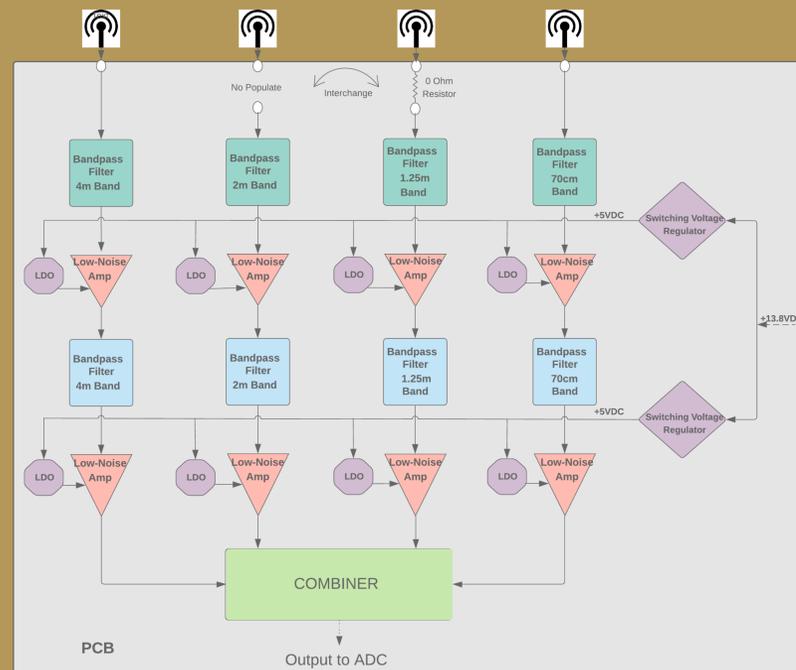
This project involves building and testing a preselector. The preselector would operate at a high performance with low noise, high bandwidth, and minimal signal degradation. To achieve this goal, our team is tasked with:

- Continuing research on optimal filter and amplifier topology.
- Designing the device schematic and layout on a PCB.
- Testing the hardware of the device.

Team Members



Design



- Preselects the 4m, 2m, 1.25m and 70cm bands.
- Amplifies the band of interest while filtering noise.



Requirements

- Capable of receiving 4 frequency bands in the UHF/VHF range simultaneously.
- Capable of filtering and amplifying each band for an optimal signal level presented to the ADC.
- Capable of combining signals and presenting them to the ADC for sampling.
- Capable of providing good noise figure on each specified band without sacrificing linearity.

Performance

- A -13 dB signal will be fed to all four bands; each signal chain has their respected parameters to test and verify

Future Plans

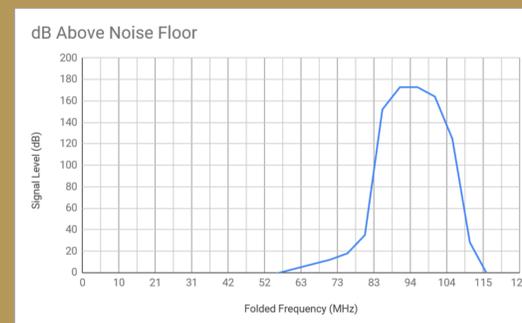
- Design, develop, and manufacture multiple custom PCB's that meet our parameters, boundaries, and constraints.
- Test, analyze, and observe the outputs of the components.
- Test the PCB periodically to analyze results and outputs from our components.

Acknowledgements

- Sponsor(s): Mr. Steve Hicks and Mr. Ed Gonzalez
- Faculty Advisor: Dr. Khan Tarik
- Instructor: Mr. Hinkle

Signal Chain Topology

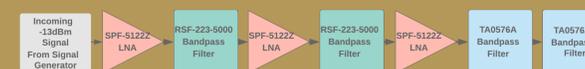
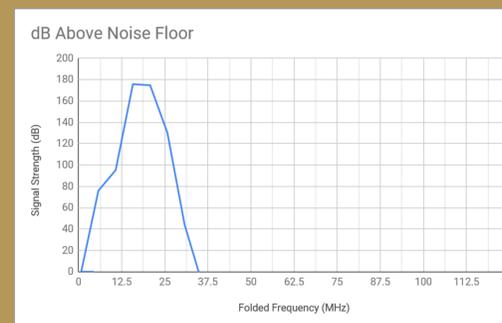
2m Band



A combination of 4 filters and 4 amplifiers were used to obtain:

- Good stopband rejection
- High gain

1.25m Band



A combination of 3 amplifiers and 4 filters were used to obtain:

- Good stopband rejection
- High gain