

Moonnoise detector

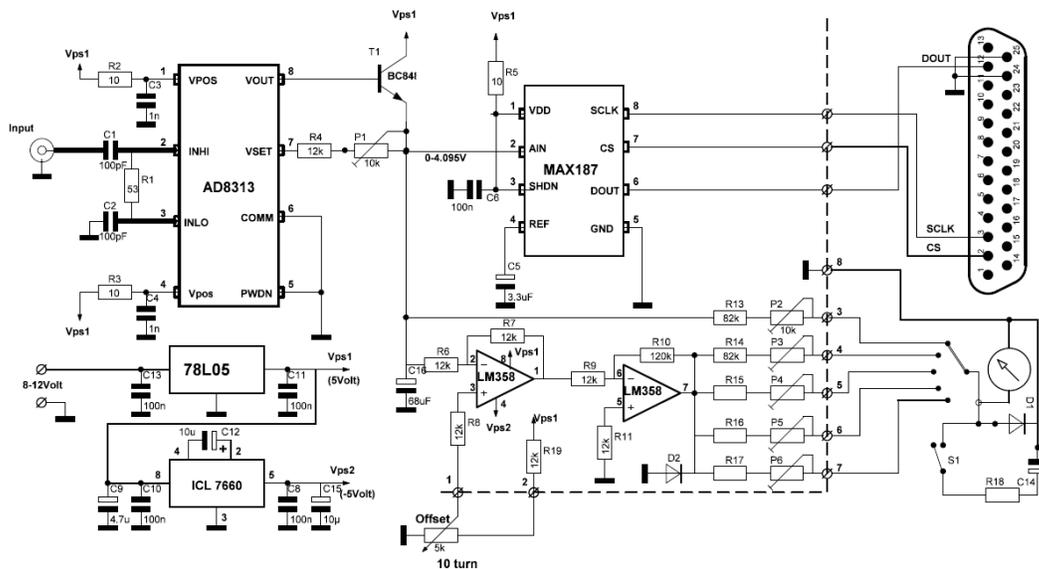
J.A.Kappert PA0PLY

Based on the Total power project for Radio Astronomy applications, a second version was build to be used for Moonnoise detection on 10Ghz

The system layout consists of a LNB which converts 10Ghz moonnoise to a low frequency range 900-1900MHz. This RF signal will be fed to a RF detector IC (AD8313). The resulting DC signal is Connected to a series of differential op-amps to create an off-set adjustment and 4 different scales

The Dc signal is also fed to a digital signal using a MAX187. This digital signal can be used to connect to the RS232 port of a computer.

Using a differential amplifier for the DC line, one will be able to zero the environmental noise and thus apply more gain in the DC chain to the analogue meter-circuit. Using the LNB block converter, the detection of the moon noise will be much easier once a full-scale value of 1dB can be used.



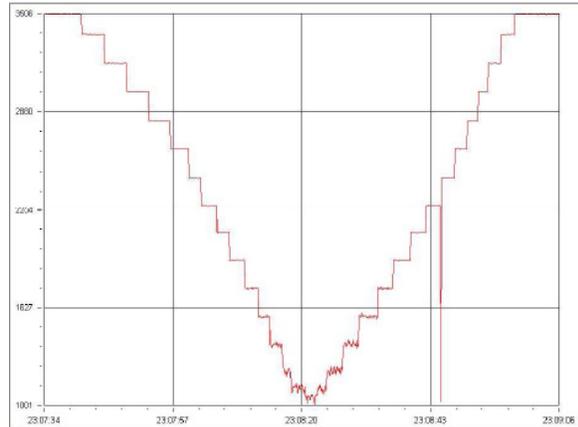
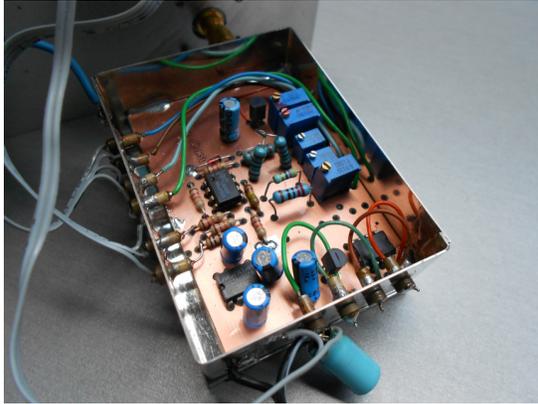
Schematic Moonnoise detector

The reason to select the AD8313 RF detector from Analog Devices is following:

Specifications:

- Frequency range: 0.1 -2.5GHz min.
- Dynamic range: 70dB
- Accuracy: +/- 1.0dB over 65dB

Based on these specifications the RF signal from a LNB can be fed directly to the RF detector without the need for converters. After the construction of the PCB, the circuit is calibrated in order to get a meaningful figure during measurements. A signal generator on 1400MHz was used, while the RF output was stepped in 5dB steps starting from 0dBm to -70dBm and back to 0 dBm. The result is shown in below graph. The RF detector was set to 40mV/dB.



Moonnoise detector

Another useful application of this version will be a “normal” power meter function with a frequency range up to 2.5GHz.

Overlooking the various applications of this circuit, it is a useful circuit and hopefully gives people a push forward to start experimenting.

Kind regards,
Jan Kappert, PAOPLY