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Description

UHF Amateur Radio Satellite Amplifier and Filter description

UHF Amateur Radio Satellite Amplifier and Filter, model LNAU-0436-648, is a 436 MHz LNA and Filter combined into a single device. It provides the signal conditioning needed to improve UHF Ham Satellite downlink signals: it does so by filtering the signals twice, by adding 16 dB of gain (40 times magnification), and providing a low Noise Figure of 1.5 dB to the receiving system. The output filter is very sharp, completely removing unwanted signals outside the immediate vicinity.

The LNAU-0436-648 has built-in protection against unintended large RF power levels at either connector. It can survive up to 2 Watts of continuous in-band power at either port; however, while large RF power is present, the Amplifier will either operate at reduced capacity, or disconnect itself, depending on the magnitude of the injection. This makes the LNA very robust. Most preamplifiers will not survive input signals larger than 10 mW (milliWatts). This feature is unique to our LNAU-xxxx-648 family of Low Noise Amplifiers. Variants for other bands and applications are available.

Proper Installation of 436 MHz LNA and Filter

This **436 MHz LNA and Filter**, like any other preamplifier, should be connected directly to the antenna, or as closely as possible, keeping the length of the connection short. This minimizes the loss of the input, and therefore the receiving system's Noise Figure. This also means that the sensitivity of the receiver is maximized. Once the LNA contributes its gain, 16 dB or 40 times magnification in this case, the output can be connected to the receiver through a long coaxial cable, if needed, without impairing sensitivity.

For the amplifier to operate, DC power must be provided at the output SMA (Gold) connector. To provide such power through the coaxial cable, a Bias Tee is generally needed, for example our model **BIT-1500-385** (https://www.antennas.us/store/p/269-BIT-1500-385-Bias-Tee-50-6000-MHz-SMA-F.html). Normally, the Bias-Tee is located near the receiver and has 3 terminals: one RF Output/Input, one DC input and one common RF + DC port,. The common port is the one that should be connected to the LNA's output. Some transceivers and receivers have an embedded Bias-Tee and can supply DC power to the coaxial cable directly, simplifying the connection.

Integration with Software Defined Receivers (SDR)

SDRs are designed to cover a broad range of frequencies, making them vulnerable to large signals over the entire spectrum to a certain degree, depending on the design's sophistication. Most low-cost SDRs have very simple front-ends (the input circuit), which further exasperates the receiver's ability to handle a polluted RF band. Within close spectral proximity to APT Weather Satellite emissions, there are signals belonging to the Civil Aviation users (118-136 MHz), which can be large near airports; Amateur Radio 2 meter sources (144-146/148 MHz), such as repeaters, Earth-Moon-Earth (EME) and DX (distance) stations, VHF Commercial and Marine Radio users, as well as Television channels 7-13. Some of the signals listed can be very large at some locations: TV broadcasts can emit upwards of 1 MegaWatt EIRP (1 million Watts Effective Isotropic Radiated Power), EME transmissions can be as large as a TV broadcast, however, they are highly directive. The other examples are more moderate, unless one is unlucky to be located near a source.

The LNAU-0137-648 serves to clean-up the spectrum in addition to amplifying the desired signals. The output filter is particularly sharp and narrow, eliminating most of the signals cited above. The louder APT Weather Satellite signal and the quieter background makes the SDR operate effectively and at its peak performance. Under these conditions, the quality of the SDR becomes less distiguishable (you cannot tell much of a difference between the results of a low-cost SDR or a high-end receiver).

When the LNA is used with an RTL-SDR USB dongle, please pay attention to the version number V2 and below will require that you open the dongle's housing and solder a jumper to engage the internal Bias Tee. For version 3 (V3) dongles, you will need to run batch file command (download batch ZIP file here (https://github.com/rtlsdrblog/rtl-sdr/releases/tag/v1.1)):

rtl_biast -b 1 <--turns bias tee ON (Windows)

rtl_biast -b 0 <--turns bias tee OFF (Windows)

For other operating systems, consult the Features Guide (https://www.rtl-sdr.com/rtl-sdr-blog-v-3-dongles-user-guide/), Feature 2: Software Selectable Bias Tee.

LNAU-0436-648 Technical Specifications

- Frequency range: 435-438 MHz
- Gain: +16 dB
- Nominal Impedance: 50 ohm (RF) IN/OUT
- Normal Operating Input RF Power: 1 mW (+0 dBm)
- Survivability Input RF Power: 2 Watts CW in-band
- VSWR: 2.0
- Noise Figure: 1.5 dB
- IIP3: +6 dBm (4 mW)
- P1dB: +10 dBm (10 mW)
- Current: 10 mA
- Supply Voltage: 3.3-15 VDC (internally regulated)
- Connector: N Male (Input) / SMA Female (Output + DC)
- Dimensions: L 51 mm (2.0") x OD 28 mm (1.1"), not including connectors
- Mounting: Direct mount
- Operating Temperatures: -40°C to +85°C
- Weight: 150 g / 0.33 lbs
- Shipping Weight: 200 g / 0.44 lbs
- Color: Black (body) and Gold (connectors)

NOTES:

- Specifications and prices are subject to change without notice

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Availability, specifications & prices subject to change without notice

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