

ELECRAFT N-GEN WIDEBAND NOISE GENERATOR

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Introduction

The Elecraft N-gen is a wideband noise source that is useful for a variety of receiver alignment tasks. It can be used in conjunction with a software program such as Spectrogram to align IF filters in the K2 or in other receivers. It can also be used to align the RF stages in Elecraft XV Transverters or other HF, VHF, and UHF equipment.

Note: The N-gen does not generate repetitive pulse noise, so it cannot be used to test pulse-type I.F. noise blankers such as the Elecraft KNB1 or KNB2.

Specifications

| | |
|-------------------------|---|
| Power Requirement: | 9V battery or external 12 to 15 volts DC |
| Current Consumption: | Approximately 25 ma. |
| Excess noise output: | Approximately 35 dB (typical; varies with characteristics of D2) |
| Bandwidth output level: | +/- 3 dB from 100 kHz to 500 MHz |

Assembly

- Perform an inventory of all parts in the kit (see **Parts List** on page 2).
- Install R1 (200_), R2 (150_), R3 (1K_), R4 (47_), and R5 (560_) in the positions indicated on the PC board silkscreen.

CAUTION: Before handling semiconductors in the following steps (diodes and MAR-1 amplifier IC), put on an anti-static wrist strap or touch a grounded metal surface often during assembly.

- Install D1 and D4 (1N4148) in the indicated positions. The diodes must be installed in the correct direction. The banded end of the diode is to be inserted into the hole with the square pad. D1 and D4 are 1N4148 diodes and are very similar in appearance to D2 a 1N5235B. If necessary, use a magnifying glass to identify the diodes.
- Install zener diode D2 (1N5235B).
- Install 0.01uF (103) mono caps at C1, C2; a 0.047uF (473) mono cap at C3; and a 10pF (10J or 100) mono cap at C4.
- Install the LED at D3. The longer lead goes to the square pad. Two locations are marked as D2 on the Rev A board. The location in the upper right corner should have been designated as D3.
- Install the MAR-1 at U1. Note that the MAR-1 has one lead cut at a slant. This is the input lead. Align this lead toward the center of the board as indicated on the silkscreen. If the board has a hole in the center of the pattern for U1, fit the body of U1 into the hole. Otherwise, just center U1 in the pattern so the leads reach the solder pads.
- Install J1, J2, and SW1.
- Install the battery holder. Use 4-40 x _ inch pan head machine screws, lock washers and nuts.
- Install the 4 mounting feet in the corners on the underside of the PCB.

Test

CAUTION: Whenever you use the N-gen with a transceiver, you must prevent accidental transmit, which could damage parts on the N-gen. Disconnect all keying devices (key, paddle, microphone). Reduce the transceiver's power level to the lowest possible. In the case of a K2, rotate POWER fully counter-clockwise.

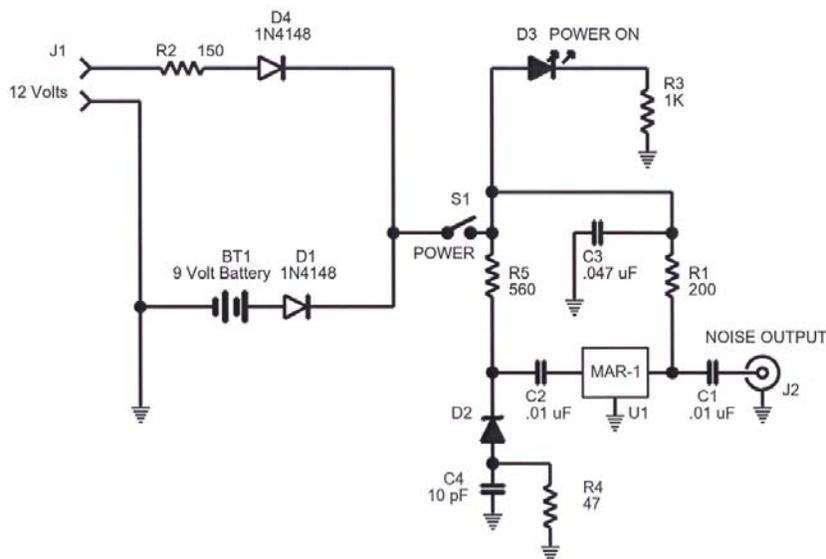
- Install a standard 9-volt battery into the battery holder.
- If you plan to test the N-gen using a transceiver, disable transmit as described above.
- Connect the N-gen to the antenna input of a receiver or transceiver.
- Place SW1 in the "ON" position.
- The LED should light and there should be a substantial increase in the noise output of the receiver.

Parts List

Note: Resistor color codes and typical capacitor markings are shown in parentheses.

| | |
|---|--|
| R1, 200 ohms 1/4 watt (red, black, brown) | R4, 47 ohms 1/4 watt (yellow, violet, black) |
| R2, 150 ohms 1/4 watt (brown, green, brown) | R5, 560 ohms 1/4 watt (green, blue, brown) |
| R3, 1000 ohms 1/4 watt (brown, black, red) | |
| C1, C2, .01uF mono ceramic (103) | D1, D4, 1N4148 |
| C3, .047uF mono ceramic (473) | D2, 1N5235B |
| C4, 10 pF ceramic (10J or 100) | D3, Red LED |
| S1, Miniature DPDT Switch | U1, MAR-1 MMIC |
| J1, 12 volt power connector | (2) 4-40 pan-head machine screw |
| J2, BNC output connector | (2) lock washer |
| J2, BNC output connector | (2) 4-40 nut |
| N-gen PC board | (4) rubber feet |

Circuit Details



The schematic of the N-gen is shown above. Noise generated within Zener diode D2 is amplified by wideband monolithic amp U1. U1 is internally biased to present a 50-ohm load at the output.