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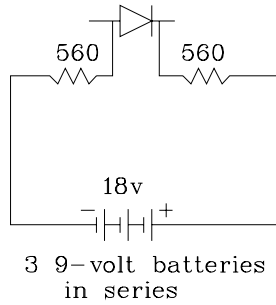
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To: VSRT Group
From: Alan E.E. Rogers
Subject: Antenna lab – a feasibility study

The VSRT interferometer can be used as a sensitive detector of 12 GHz microwaves. This allows students to perform microwave experiments or demonstrations using very weak signal sources. For example, a dipole radiator can be made using an inexpensive noise diode to generate a source even brighter than the CFL used in other VSRT experiments and demonstrations. It is even possible to use the thermal noise from a resistor if the VSRT is located outside in a low noise environment. Thermal noise is used in the calibration method described in memo #06.

Figure 1 shows the circuit of a noise diode coupled to a dipole element. Figure 2 and 3 shows photographs of the noise diode antenna element mounted by piercing a piece of cardboard with pin holes to support the diode and resistors through which the current is supplied from 3 9 volt batteries in series. The dipole can be made into a Yagi antenna by adding wires to form the directors and reflectors. To make this lab more than just a demonstration it is recommended that antenna modeling software (like EZNEC) be obtained to allow the students to compare their measurements with theory. To make the set-up into a more useful instrument the antenna needs to be mounted on a platform which can be rotated by the PC software (as is done in the astronomy experiments of memos 5, 9 & 24). We have not developed this project beyond making simple tests to demonstrate it feasibility.

NoiseCom NC302L noise diode



Notes:

- 1] 560 ohm 1/8w resistors are soldered as close to the diode body and with almost zero lead length where they connect to the diode.
- 2] Diode leads are cut so that the length from end to end is about 0.45 wavelength.
- 3] Diode is available from Noise Com Parsippany NJ

Figure 1. Microwave noise source for 12 GHz

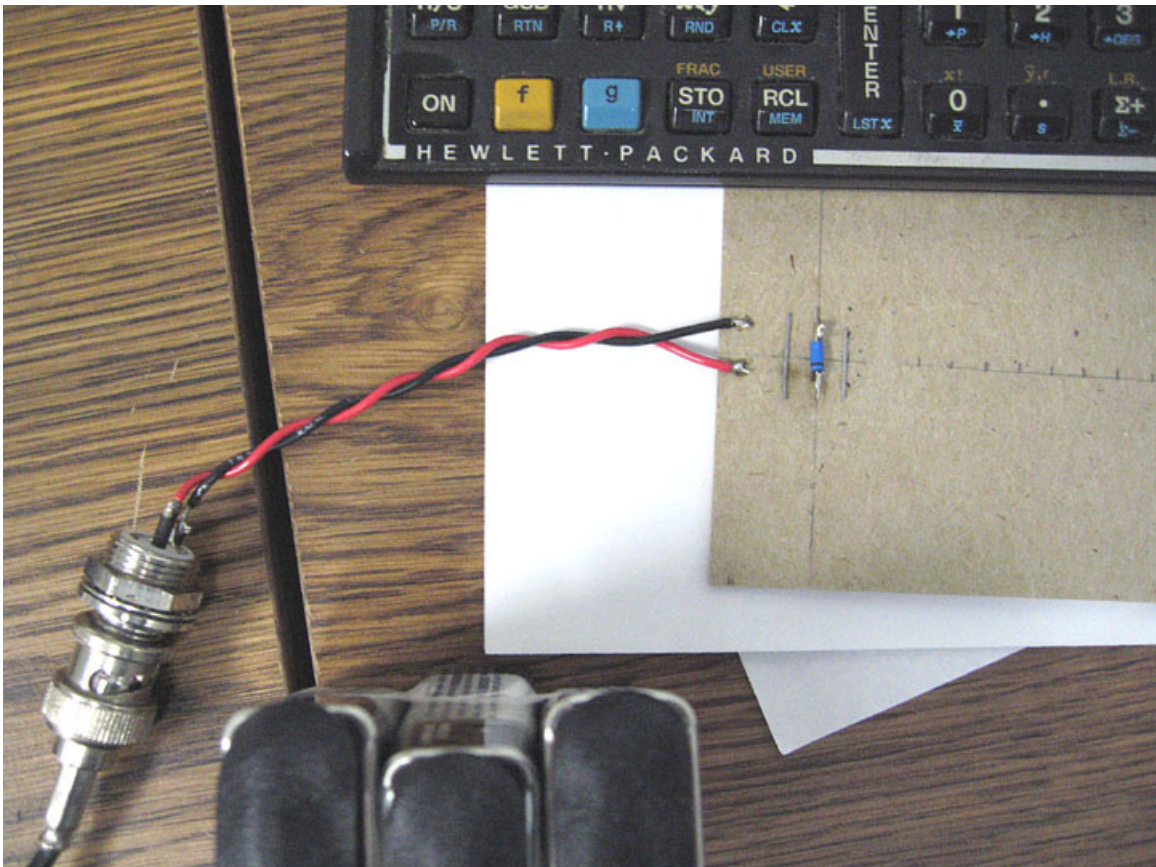


Figure 2.

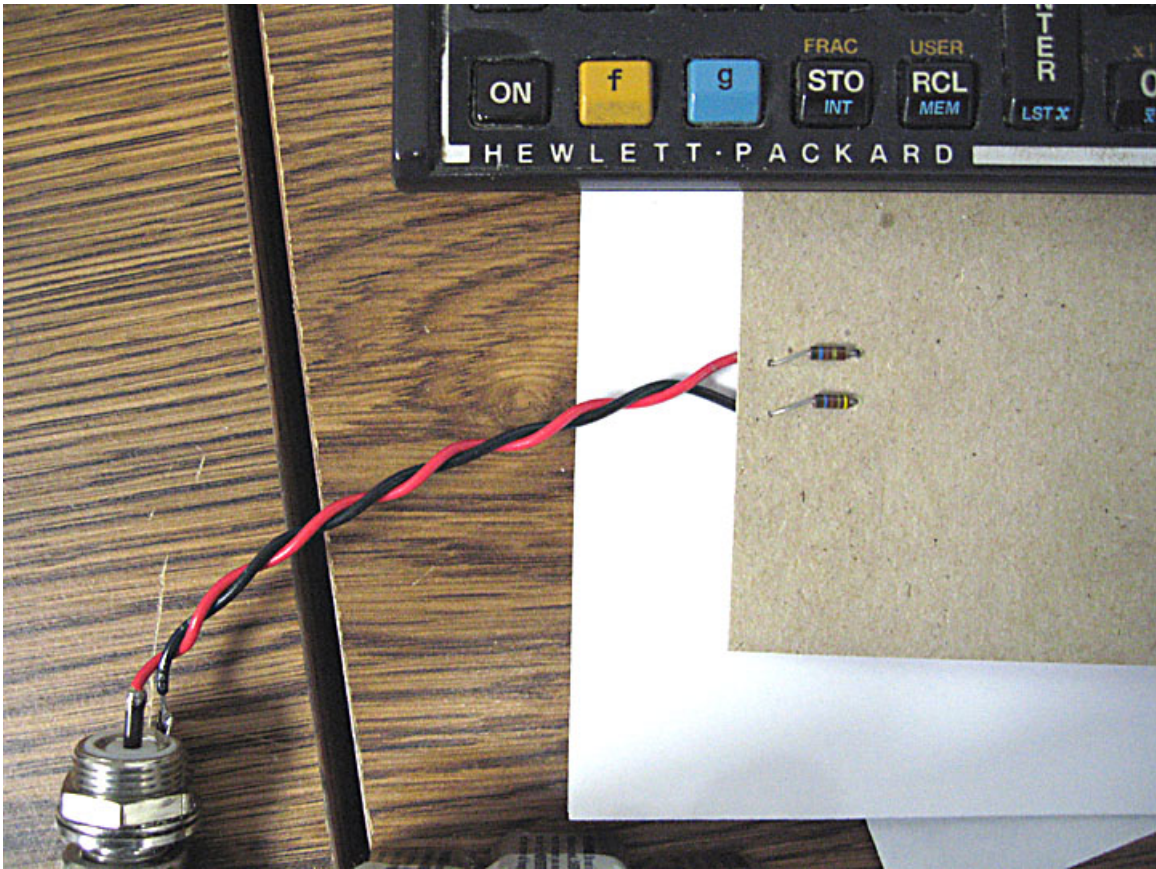


Figure 3.