

Inexpensive, Digital Relative Field Strength Meter

by

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No, it is not the world's smallest screen, digital television. It is a digital relative field strength meter (DRFSM) for amateur radio. I have two analogue relative field strength meters, but the availability of new DMMs (digital multimeters) for about \$4 inspired me to build a digital version using a low cost DMM and parts I had on hand. Figure 1 provides the schematic diagram, and pictures 1, 2 and 3 tell the story.



Picture 1, Full View

Frequency Response: HF to Light ???

I've successfully tried the digital field strength meter with HF, VHF, and UHF amateur band signals. It is also sensitive to light! I found this out when using the meter outdoors in bright sunlight. Even without an RF signal present the meter displayed several microvolts with negative polarity. Shielding the DRFSM from the sun with my hand reduced the magnitude of the reading, so the meter had to be measuring light. It took a while for me to recall that one of the properties of a diode is it generates electricity when exposed to light. The four diodes of the DRFSM are little solar panels. If I had been aware of this DRFSM 'feature' while assembling the circuit I would have encapsulated the diodes in black shrink wrap. Afterwards, however, I did not feel like taking it apart, so I made a small diode shade out of black construction paper. Nevertheless, a little light still gets in.

The DRFSM consists of an antenna, a bridge diode rectifier, a capacitor, and a DMM. The bridge rectifier uses four 1N34A diodes. The 0.3 ufd capacitor is a peak integrator and increases the field strength meter's sensitivity by about one-third. I experimented with capacitor values, and found that 0.3 ufd worked better than most (at least for HF), and I already owned several with this value. The DMM's input impedance is 1 megohm. (A10 megohm DMM provided somewhat greater sensitivity.) The TV rabbit ears antenna came from my junk box. Herein is the lesson: never throw out anything mildly neat that could ever be useful.

The DRFSM works very well, although, as with any DMM measurements, transients are difficult to observe. To operate turn on the DMM and set the selector to DC volts at the sensitivity desired.

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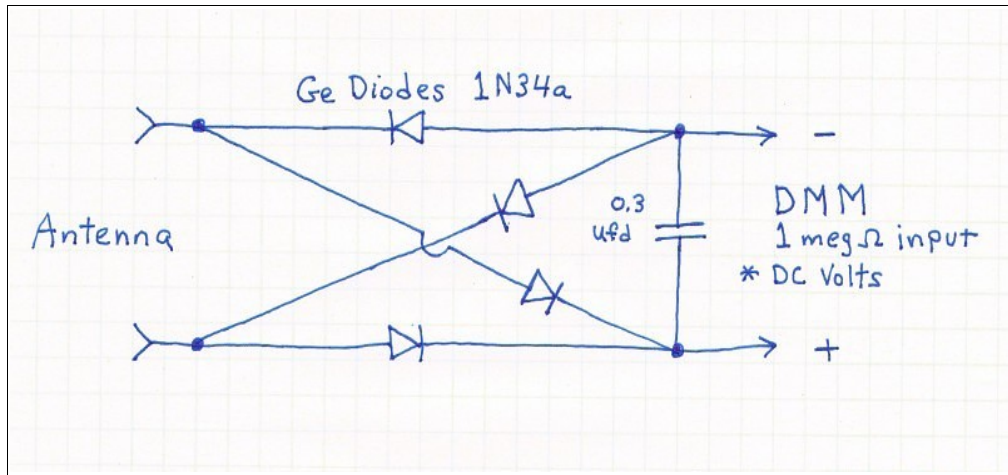
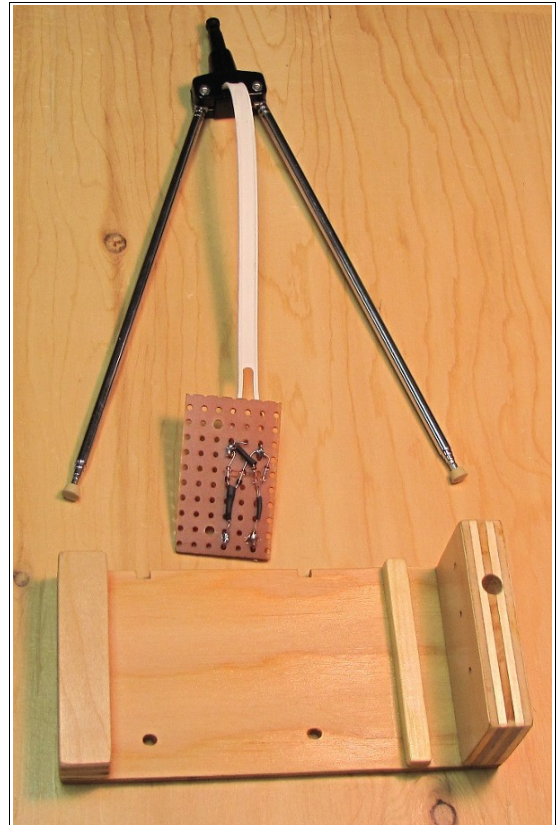


Figure 1, Schematic Diagram



Picture 2, Diode Placement



Picture 3, Parts (except DMM) Ready to Assemble