

SMSG (S Meter Signal Generator)

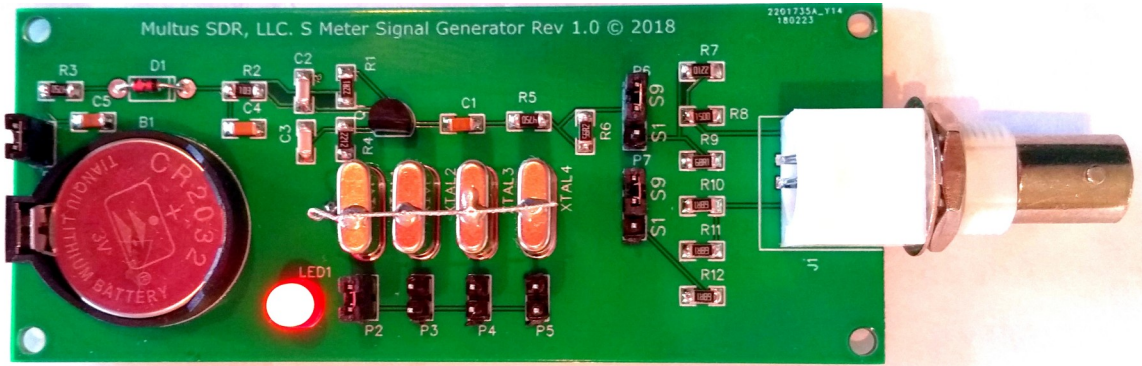


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SMSG (S Meter Signal Generator)

Overview:

This project provides a signal generator that provides a S9 or S4 RF signal (jumper selectable) at one of four amateur radio bands (jumper selectable). The four bands are 80M,40M,30M and 20M. The SMSC is useful for testing and calibrating the S Meter of a receiver. It particularly useful for calibrating the S meter of SDR host applications such as HSDR or any other SDR host application that permits S meter calibration. The SMSC is battery power via a supplied CR2032 button cell.

This project is based on a device originally offered by the NorCal QRP Club. The NorCal S9 Signal generator is no longer offered for sale.

Specifications:

Output Impedance:	50 Ω
Output Level:	S4:1.6uV (-103dBm) S9:50uV (-73dBm)
Amplitude Accuracy	S4: +/- 3% S9: +/- 3%
Output Frequency:	80M (3.686MHz) +/- 30ppm 40M (7.040MHz) +/- 50ppm 30M (10.116MHz) +/- 30ppm 20M (14.070MHz) +/- 30ppm



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Please check the parts inventory against the bill of materials. Contact Multus SDR regarding missing parts.

All support for the mWattmeter-III is located at our support forum: [Support](#)
Please join the group.

Also, please read the ECN and Errata documents in the files section before starting assembly for important information that may supersede the contents of this assembly document.

DO NOT ATTEMPT TO REMOVE INTEGRATED CIRCUITS EXCEPT WITH A HOT AIR TOOL. YOU WILL DAMAGE BOTH THE IC AND CIRCUIT BOARD.

What you will need:

Tools:

Illuminated magnification

Soldering iron with 1/32" tip

Flux core solder, 0.020" or 0.015"

Solder flux, pen or syringe

Electronics multi-meter

SMT tweezers

Wire cutters

Emery cloth (or paper).

X-ACTO Knife or other very sharp cutting instrument

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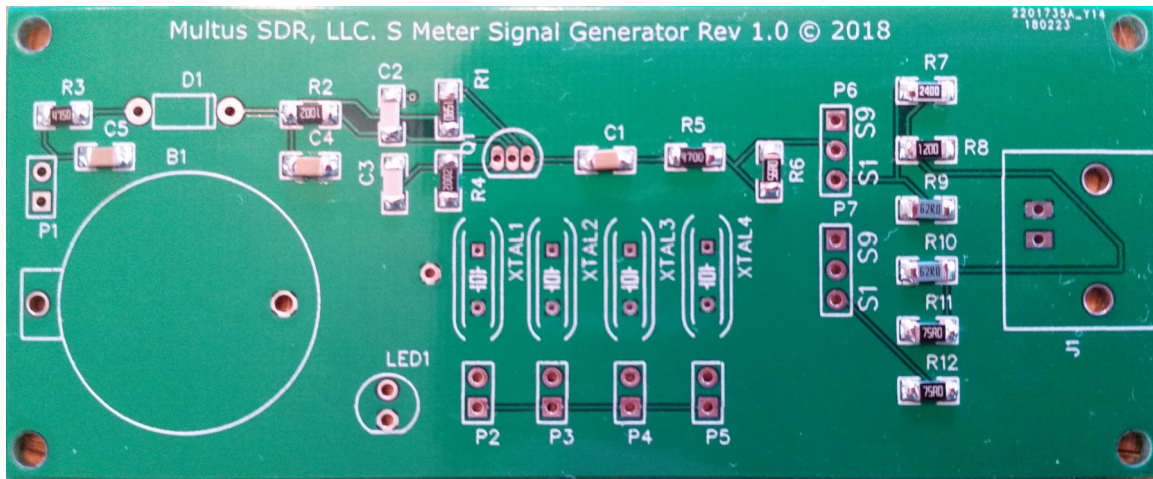
Assembly:

The SMSG is an easy to build kit and for an experienced builder will take about two to three hours to complete.

NOTE: Use only an X-ACTO knife or other very sharp pointed instrument to remove the components from the component sheet. There is a good chance the component will stick to the tape that secures it to the paper sheet. Simply grasp the component with tweezers and gently pull it off the tape.

□ 1. Install SMD components

All SMD components are clearly marked on the silk screen on the PCB. Installing the SMD components first allows for easier construction as the PCB will lay completely flat. Remove the components from the component sheet one component at a time and install in the appropriate place on the PCB.

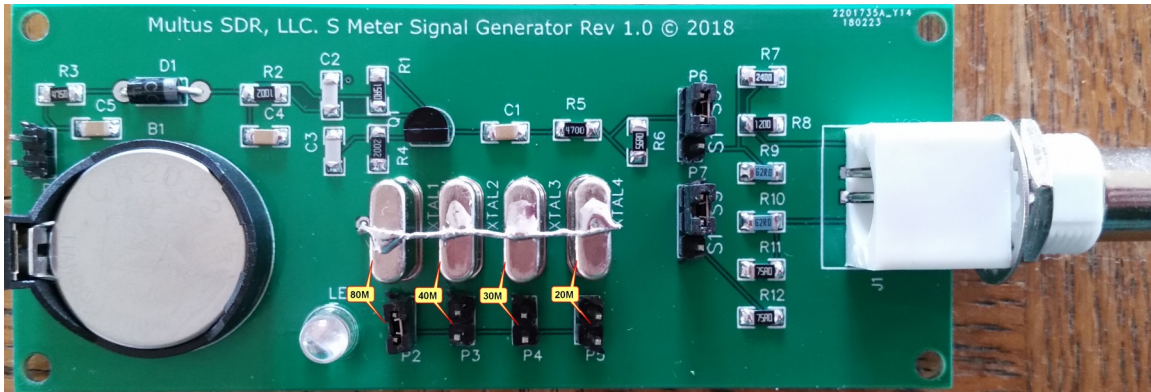


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□ 2. Install through hole components.

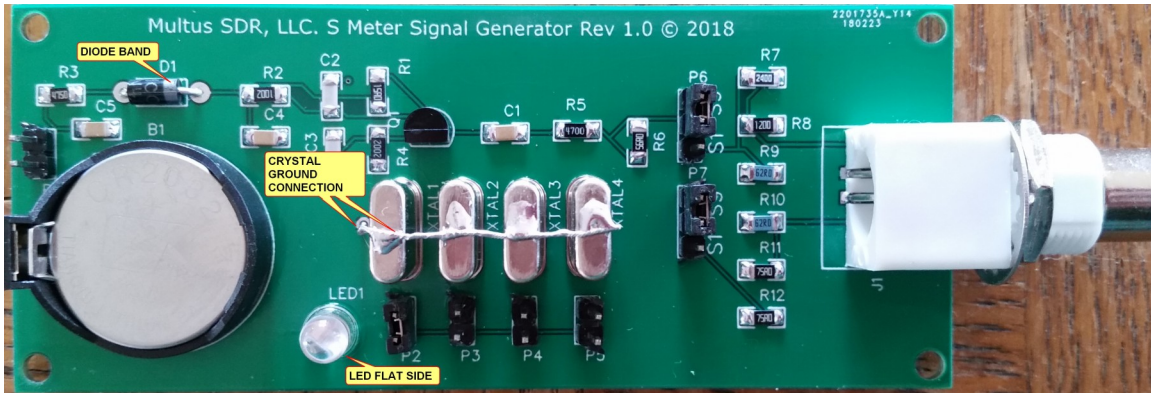
Now install the through hole components. These components include the battery holder, diode D1, transistor Q1, four crystals, five (5) two pin headers, two (2) three pin headers, LED and the BNC connector. Refer to the illustrations below.

1. Install the crystals from left to right starting with 80M. The frequency is marked on the crystal.
80M: 3.686MHz, 40M: 7.04MHz, 30M: 10.116MHz, 20M: 14.07MHz



2. Using emery cloth, gently rough up the top surface of the four crystals.
3. Locate the hook up wire included with the kit and solder one end to the ground attachment point to the left of the 80M crystal. Now position the remaining wire over the top of the crystals. Solder the wire to the tops of the crystals.
4. The LED has flattened surface on one side. This denotes the cathode of the LED. Install the LED with the flattened surface towards the bottom of the PCB as presented in the illustration below.
5. The diode is installed as presented in the illustration below.
6. Install the pin headers and BNC connector.

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The assembly of the SMSG is now complete.



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□ 3. Power up and Operation

- 1) Insert the supplied battery into the battery holder. The positive side (+) of the battery faces out (opposite from the PCB). Install a jumper on the P1 header. The LED will illuminate.
- 2) Select the band of operation by placing a jumper on one (and only one) of P2 (80M), P3 (40M), P4 (30M) or P5 (20M).
- 3) Place jumpers on the S9 position of headers, P6 and P7.
- 4) Attache the SMSC to a receiver or transceiver and tune to the band previously chosen.
- 5) Make note of the S meter reading. If the S meter is properly calibrated, it should indicate a signal strength of S9 (+/- 3dBm). If not, the S meter needs calibrated. Procedures for calibrating the S meter are dependent on the receiver / transceiver or SDR host application and is outside the scope of this manual.

NOTE: A fresh new battery is required for the SMSG to produce the proper specified output voltage levels. The battery will provide approximately eight (8) hours of usage. After this period of usage has elapsed, replace the battery. Measuring the voltage at R1 may be used to determine if the battery is supplying sufficient power. With the Multus SDR silk screen positioned at the top, measure the voltage at the top of R1. The voltage level should be 1.4V (+/- 5%).

Enjoy your new S Meter Signal Generator.