

SMT Dummy Load Kit Assembly Manual v 1.0a 5-3-22

Four State QRP Group

Kit Designed by David Cripe, NM0S

For many builders this kit might be your first introduction to working with surface mount parts. The extra large SMT parts used in this kit make it easy and a great learning experience as well.

Step 1 – Surface Mount Parts

There are two methods most commonly used to mount surface mount parts by hand. Because the surface mount parts in this kit are larger, either method works fine and should be easy, even for a first-time SMT experience.



The first method is using your regular soldering iron and solder to mount them. Be sure to use a small tip to be sure to apply the solder only where it is needed. To use this method, simply place a small amount of solder on one pad of each surface mount part, leaving the other bare. Place the part on the board and using tweezers, bring the part in line with the pad that has the solder on it while heating that pad with the iron. You should be able to align the part so it is even between the two pads while the solder is melted and lifting the iron from it will allow the solder to cool.

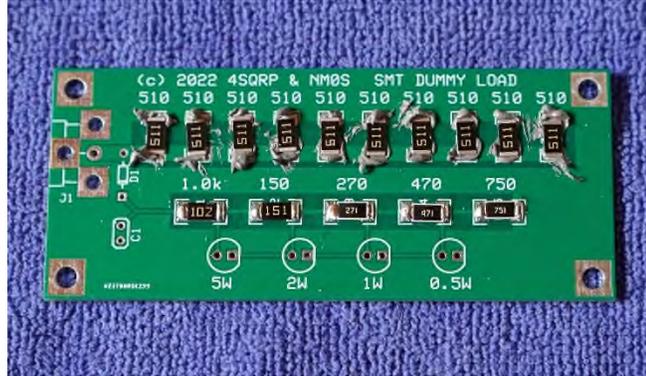


Next, simply apply solder to the other pad using just enough solder to securely mount that side of the part. You can “touch up” the solder on the first pad if needed to remove excess solder or add solder.

The second method of SMT installation is to use solder paste, which is a grey paste of solder and flux mixed together often dispensed in a syringe. Look online for 63/37 rosin flux no clean solder paste sold in a syringe. The most common sources are made by MG Chemicals or ChipQuik.



Put a dab of solder paste on each pad and then use tweezers to place the parts on the pads. The paste will hold them relatively stable. Don't be concerned if a little paste oozes out and looks a bit sloppy.



Using an embossing heat tool (find at Hobby Lobby, Michaels or other craft store, **NOT** a hardware store paint stripper gun!) hold the tool above the parts to be heated about 2 inches and be patient. The paste will first become glossy, and might spread over the board farther than you might want. Don't worry! As you continue to heat it, the flux separates from the solder and the solder quickly retracts towards the part and becomes silvery and while it does that, it straightens the part through the surface tension of the liquid solder and flux. MAGIC! Let the board cool thoroughly before touching it or moving it after you have soldered it in this manner. In this kit, you may solder all the SMT parts at once or in groups using this method. Simply hold the heat gun over a couple of parts and once they look finished, slowly move the heat to the next parts in line. Use alcohol to clean the excess flux from the board after using this method. 91% alcohol does the job quickly.



Using either method, start the SMT installation with the five values on the lower row. The 1.0K ohms resistor is marked "102", 150 ohms is marked "151", 270 ohms is marked "271", 470 ohms is marked "471" and 750 ohms is marked "751".

Follow that row with the installation of the top row of 510 ohm resistors, each marked "511".

Step 2 – LEDs

The four LEDs all install facing the same direction. Place the flat side of each LED facing the right and double check to be sure each is in correctly before soldering.

Step 3 – Signal Detector parts

Install diode D1 with the black stripe facing the same way as the marked diode stripe on the board closest to C1 and install the disc capacitor C1 next to the diode.

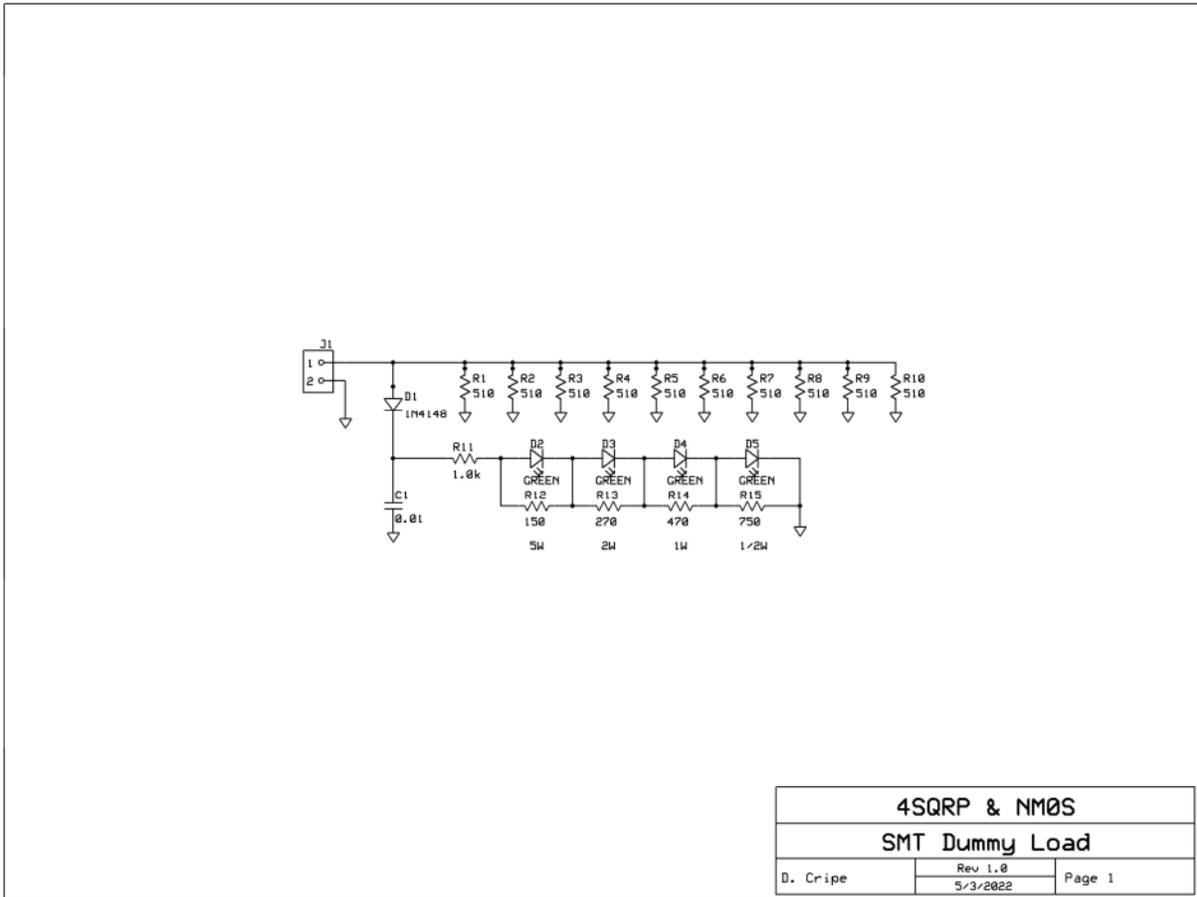
Step 4 – BNC Connector

Turn up the heat on your soldering iron to perform the installation of the BNC connector. This connector has a lot of metal which draws the heat away from the connection. Solder just the center pin

first to be sure you have the connector mounted straight. It is easier to move it if you need to reheat just the center conductor. Once you are satisfied the connector is straight, solder the 3 mounting pins using enough solder and heat to make a firm connection. Lightly sanding these mounting pins before mounting the connector will allow for a better solder connection. Be sure to allow enough time for the heat to flow the solder and make good adhesion to the pins and the PC board.

Inspect your work and test it using an ohmmeter by checking the resistance between the center pin of the BNC and the ground part of the connector. You should see about 51 ohms resistance.

Connect your QRP RF power source and see which LEDs light up to determine your approximate RF output power level.



Manual written by Joe Eisenberg, KONEB