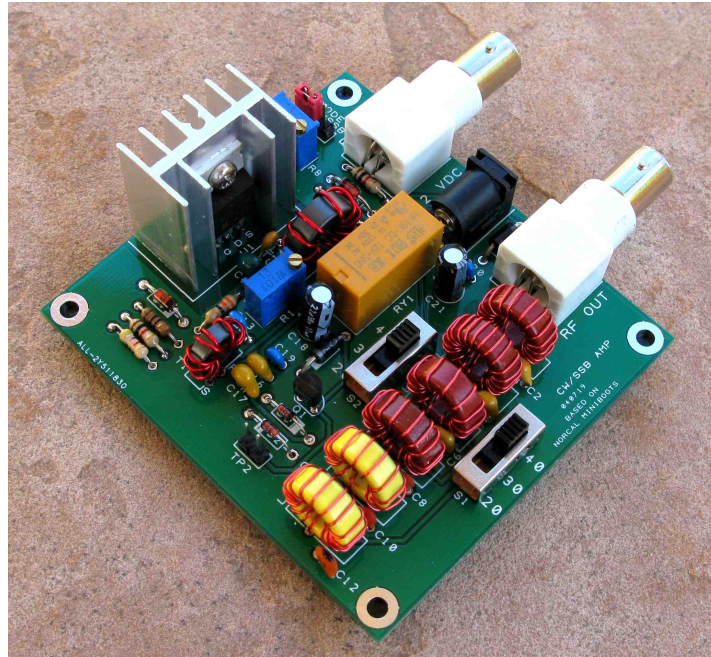


Miniboots 40/30/20m 10Watt QRP Amplifier



Parts List

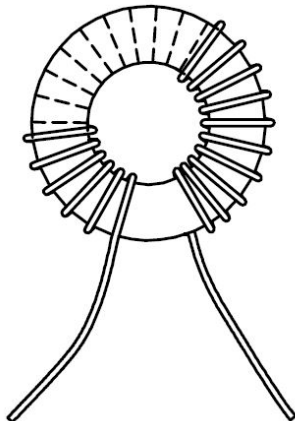
- 1 – PCB, Gerber files supplied
- 1 - U1, IRF510 mosfet, Tayda# A-088
- 1 – Q1, 2N3904 transistor
- 1 - D1, 1N4742 zener diode, 12V 1W, Tayda# A-504
- 2 - D2,3, 1N4148 diode
- 1 – D4, 1N4004 diode
- 1 – D5, 1N4733 zener diode, 5V 1W, Tayda# A-169
- 1 – D6, 1N5817 diode
- 3 – C1,3,10, 330pF mono capacitor
- 1 – C2, 680pF mono capacitor
- 1 – C4, 68pF mono capacitor
- 2 – C5,7, 220pF mono capacitor
- 1 – C6, 560pF mono capacitor
- 1 – C8, 47pF mono capacitor
- 2 – C9, 11, 150pF mono capacitor
- 1 - C12, 33pF mono capacitor
- 5 – C13,19,20,22,23, .01uF mono capacitor
- 1 – C14, .1 mono capacitor
- 1 – C15, .33uF capacitor
- 2 – C16,17, .001uF mono capacitor
- 1 - C18, 2.2uF electrolytic capacitor
- 1 – C21, 100uF electrolytic capacitor
- 1 - R1, 100 ohm, 1/2W trimpot, Tayda# A-5117
- 1 – R2, 33 ohm resistor (orange-orange-black-gold)
- 1 – R3, 2.7K resistor (red-violet-red-gold)
- 1 – R4, 10 ohm resistor (brown-black-black-gold)
- 2 – R5,7 1K resistor, (brown-black-red-gold)
- 1 - R6, 4.7K resistor, (yellow-violet-red-gold)
- 1 – R8, 10K, 1/2W trimpot, Tayda# A-586
- 4 – L1,2,3,4, T37-2 toroid (red)

- 2 – L5,6, T37-6 toroid (yellow)
- 1 - L7, T50-43 toroid (black)
- 1 – T1, T37-43 toroid (black)
- 1 – RY1, DPDT 12V relay, MPJA# 32559 RL, (HK19F-DC-12V-S-H-G), or Tayda# A-1170
- 2 - S1,2, 2P3T slide switch, Tayda# A-5117
- 2 – J1,2, Female BNC pcb style
- 1 – J3, 12V power jack, 2.1mm, pcb style
- 2 – TP1,2, 1x2 .1” spaced inline pin header
- 1 – MODE, 1x3 .1” spaced inline pin header
- 2 - .1” spaced Berg connector (jumper)
- 1 - 22awg magnet wire
- 1 – 26awg magnet wire
- 1 – TO-220 heatsink, Tayda #A-1486
- 1 – 4-40 x .38L screw and nut
- 4 – Self adhesive rubber foot 3/8” dia.

Install the smallest components first. Be careful of the polarity sensitive capacitors and diodes. Long leads on the electrolytics are “+”. Match the outline silkscreen for the bands on the diodes. A heatsink must be used for the IFR-510. You can use it without an insulating washer and spacer, but be careful not to short anything against the heatsink, as it is not at ground potential.

Winding the toroids

- [] Wind L1-6 toroids it in the direction shown in the graphic below and it will align with the pcb holes, When you are sure of the turn count, trim the leads to ~1/2” and tin them before soldering it standing up on the board, centered on the silkscreen outline. Sometimes it is helpful to take a picture and count the turns on the screen. Use the table below for the values and core material.



LOW PASS FILTER VALUES

	40M		30M		20M
C1	330pF	C5	220pF	C9	150pF
C2	680pF	C6	560pF	C10	330pF
C3	330pF	C7	220pF	C11	150pF
C4	68pF	C8	47pF	C12	33pF
L1	T50–2, 16T	L3	T50–2, 12T	L5	T50–6, 12T
L2	T50–2, 19T	L4	T50–2, 16T	L6	T50–6, 16T

- [] Wind L7, FT50-43 (black) in the direction shown above with 10 turns #22 AWG magnet wire. When you are sure of the turn count, trim the leads to ~1/2" and tin them before soldering it standing up on the board, centered on the silkscreen outline.
- [] Wind T1 in the direction shown above with 6 turns #22AWG magnet wire. With another piece of wire colored with a marker wind 4turns over the top of the first winding. The 6 turns are the primary of the transformer and are inserted in to the holes marked "P" The 4 turn winding is the secondary of the transformer and are inserted into the "S" marked holes of T1.

Setup and Operation

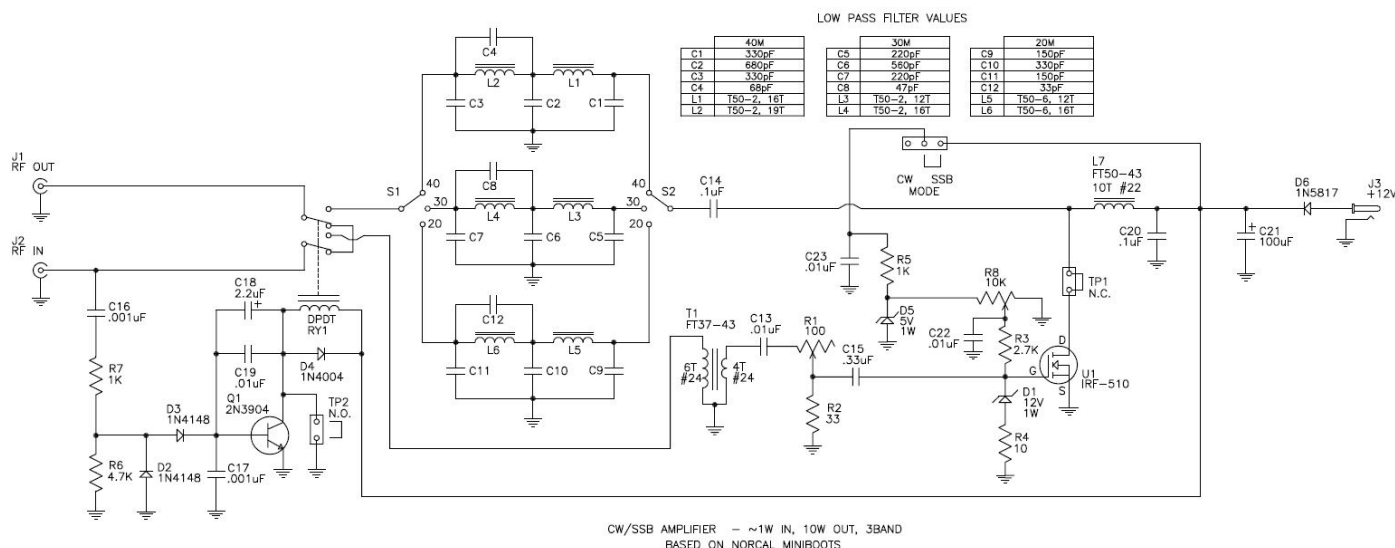
IRF510 Bias setting for SSB

The IRF510 must be biased for linear operation to use with SSB. To set the bias, first turn the adjustment on R8 fully counterclockwise. It is a 25 turn potentiometer, and there is no stop at the end. After a while you get to the minimum value. The idle current of the IRF510 must be set to 100mA, measured between the two pins at TP1. There should be no RF input to the amplifier while setting the bias. The relay, RY1, must be energized to do this by placing the Berg connector (jumper) on TP2. Apply 12.0 to 13.8 VDC power and slowly advance the adjustment on R8 clockwise, until you get a reading of 100mA between the two pins. That is the point for linear operation. Remove the power, remove the TP2 jumper and place on TP1. There is no bias adjustment for CW. Select the correct jumper position at the "MODE" block for CW or SSB operation.

Output Power Adjustment

The amplifier is designed for max. 1W input, and 10W output. Adjust R1 the "Drive" potentiometer for the output power you wish. Do not exceed 10W output. Be sure to switch both S1 and S2 when changing bands. Further circuit details and modifications can be found with a "Norcal Miniboosts" web search.

With a 13.8V supply, the power output with ~1W input is 10W on 40m and 30m, and 8W on 20m.



[illegible]