WA3RNC 40 Meter CW Transceiver Quick-Kit

Acrylic 40M Xceiver Assembly
Instructions

Fig. 1

- Covers approximately 7.017 to 7.047 MHz.
- Output is adjustable from 0 to 5 watts with rear panel control.
- 12 dB Rx attenuator switch on rear panel with front panel indicator.
- Sharp 350Hz bandwidth (-6dB) crystal IF filter for single signal reception.
- Receiver sensitivity (MDS) 0.15 microvolts, image rejection 68dB
- Transmitter harmonics and spurs at -55dBC assures FCC compliance.
- Rx current consumption about 35 ma, Tx 400-800ma at 12V input
- PC Board contains 104 machine installed SMT parts, and 17 additional thru-hole parts to allow for complete factory alignment of the transceiver.
- User installs 24 components, and the board is finished and factory aligned.
- Acrylic “Day Glow” cabinet is formed and predrilled.

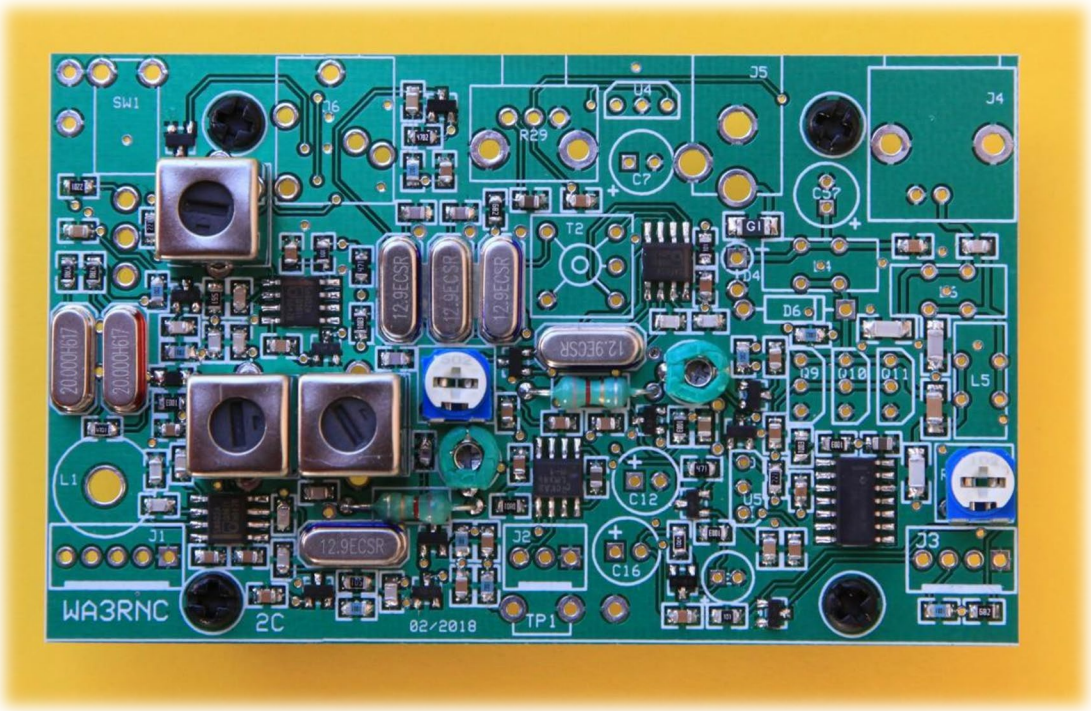


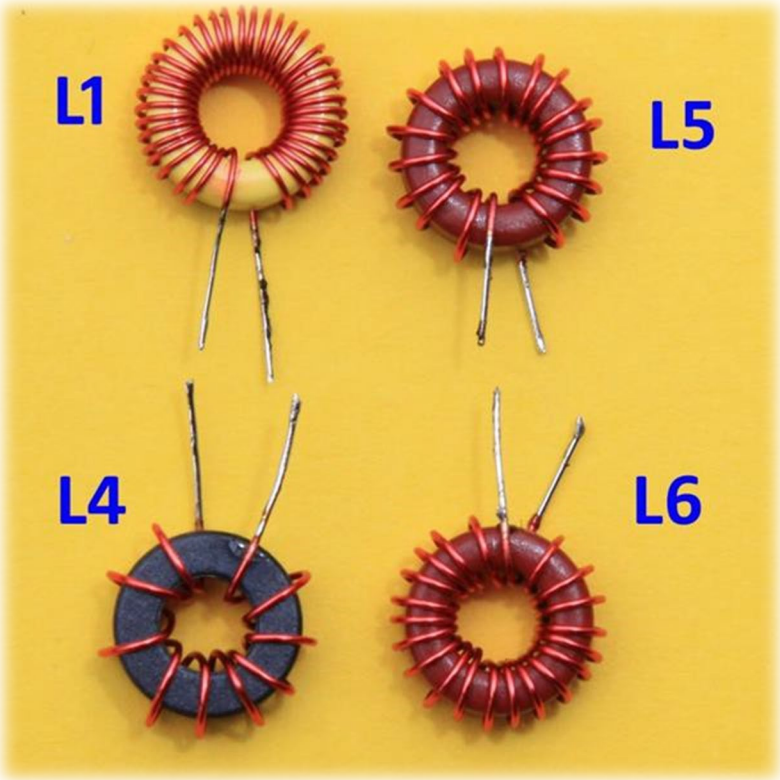
Fig. 2
PC board with factory installed parts. Board is aligned at factory as well. There is no need to tweek any trimmers or coils. Please don't do it.

Parts are separated into 7 packets. The PC board is contained in packet 1. Start assembly with packet 2, which contains the 3 final RF output FETs, the 8 volt and the 6 volt regulators, 1 glass Zener diode, 4 rubber bumpers, and eight nylon standoffs with 3mm screws. Set the bumpers, nylon standoffs and screws aside for later. Install the three BS170 FETs at Q9, Q10, and Q11. Make sure that the parts match the silkscreen outline. Install the FETs so that they sit about ¼ inch above the PC board. Similarly, install the two regulators U4 (LM78L08) and U5 (LM78L06). Form the leads of the glass diode (D6) so that it will install horizontally on the board. The banded end is closest to the RF output FETs. Place this diode no more than ¼ inch above the board. Clip the excess leads and check all solder connections for shorts.

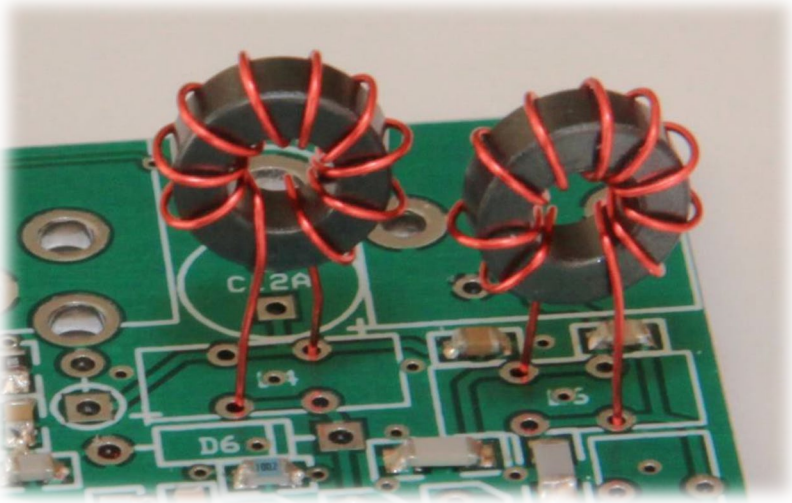
Packet 3 contains five electrolytic capacitors and the transformer T2. The longer lead on the caps is the positive lead. This lead must always attach to the square pad on the PC board. Install 100uF caps at C7, C12, and C12A.

The 47uF cap is installed at C16. The 10 uF cap is placed at C20. Install the transformer at T2. Make sure these parts are down tight against the board. Clip the excess leads and again, double check all solder connections for shorts.

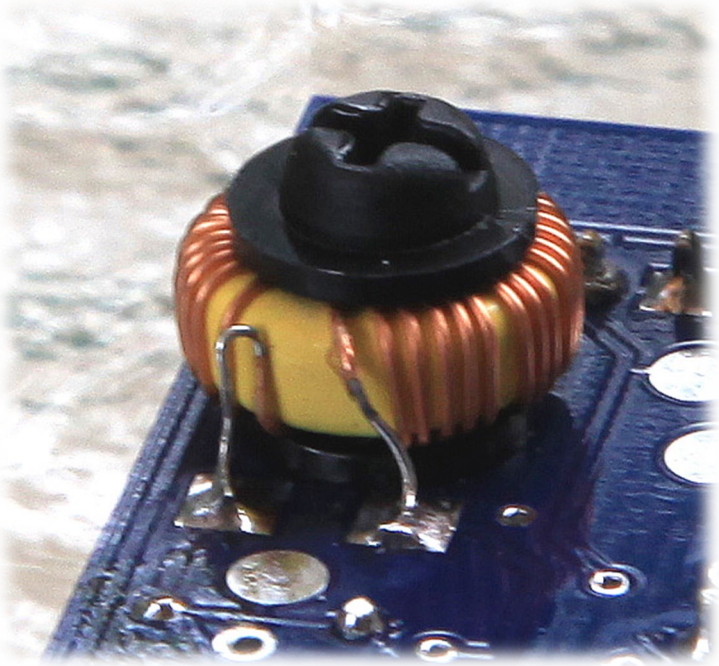
Packet 4 contains the power adjust potentiometer with knob, the three jacks (BNC antenna, DC power, and 3.5mm key), the attenuator switch, and two header pin connectors. Install the BNC connector (J4), the DC power connector (J5), the key jack (J6), power adjust pot (R29), and switch (SW1) making certain that all of these components are down tight against the PC board. Install the knob on the power adjust potentiometer. Install the 4 pin header at J3, and the 5 pin header at J1. **Make certain that the plastic polarity bar of the headers is closest to the board edge.**



Packet 5 contains the four toroid coils, so conveniently pre-wound for you! Remember that toroid coil turns are counted on the inside of the core. Install L4 (all black core with 10 turns) using the holes that better match the coil leads. See the photo below. One toroid is wound clockwise, the other Counter-clockwise. Either will work just fine. Use the mounting holes that



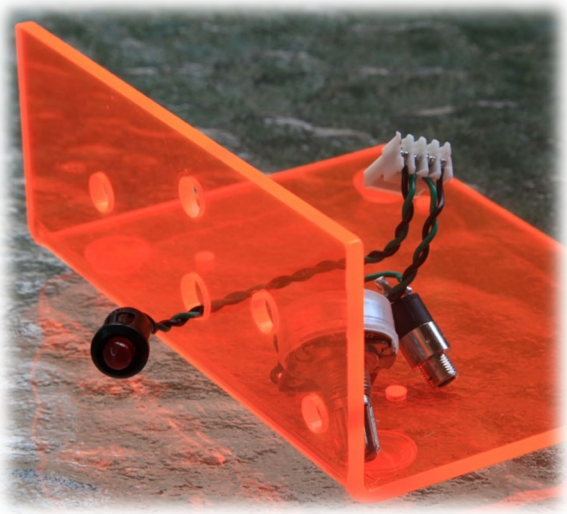
best match the toroids in your kit. Install L5 (red core with 18 turns) and L6 (red core with 21 turns). Keep these toroids tight against the board. L1 (yellow core with 37 turns) is installed on the board bottom and is held in place with the included nylon hardware. Installation may be easier if the leads are soldered to the square pads before securing the toroid with the hardware. Use a plastic washer on both the top and bottom of the core. See the photo below.



This concludes the construction of your PC board. The board has been carefully and completely aligned at the factory, and you are cautioned against trying to adjust or tweek any transformer cores or trimmers. You will not be able to increase power output by attempting these adjustments!

Now install the short nylon standoffs on the bottom of the board by threading the longer ones through the board into the short ones. Do not overtighten. Install the four self-adhesive rubber bumpers on the bottom of the acrylic base.

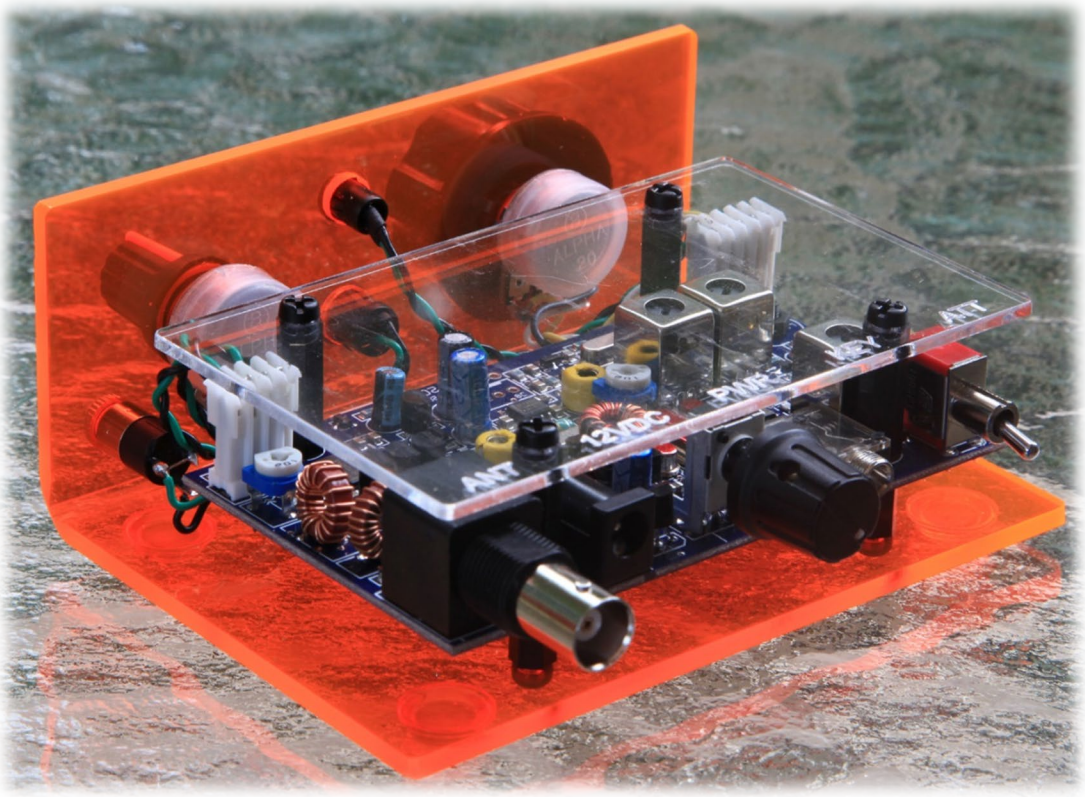
Packet 6 contains the volume control harness including the phone jack and a signal strength LED along with a panel mount holder for the LED. First, insert the LED through the lower center hole in the acrylic panel from the rear. Insert the LED into the holder as far as it will go. Carefully push the holder and LED into the panel taking care not to push the LED out of the holder. Install the volume control and phone jack on the right side as shown in the photo. Carefully tighten the two nuts taking care not to scratch the acrylic panel, and install the volume control knob.



Packet 7 contains the tuning potentiometer and the attenuator indicator LED. Insert the LED through the top center panel hole from the rear and into the LED holder as far as it will go. Carefully push the holder and LED into the panel taking care not to push the LED out of the holder. Install the tuning potentiometer with the supplied hardware on the left side taking care not to scratch the acrylic panel. Install the tuning knob.

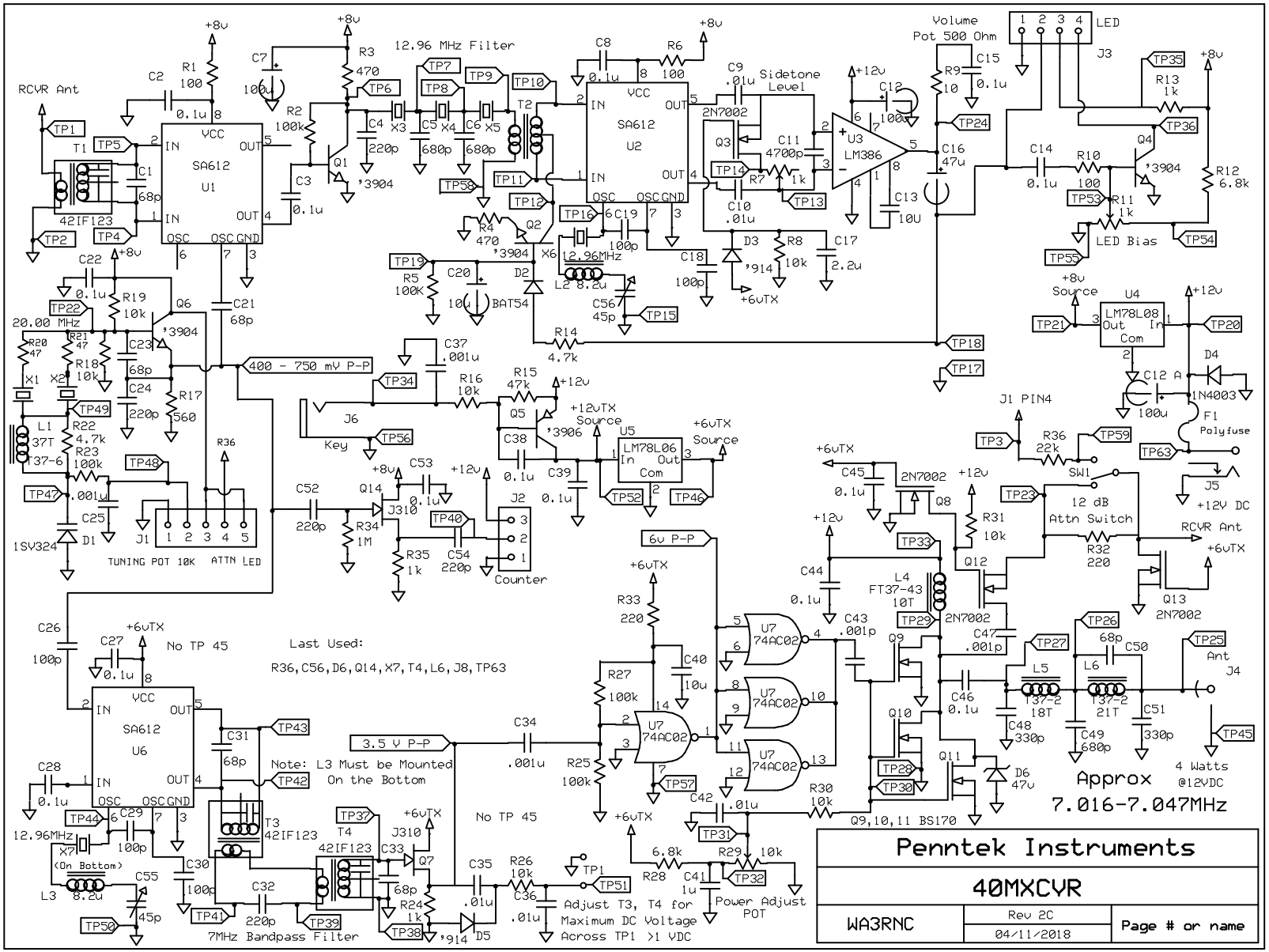
Attach the PC board to the acrylic base with the pin headers facing to the front panel and the switch and jacks toward the rear. Use four of the 3mm plastic screws. Connect the volume control harness connector to the four pin header on the right side of the PC board. Attach the tuning control harness connector to the five pin header on the left side of the PC board. Dress the wires neatly. Note that the connectors will mate only with proper orientation. Install the clear plastic engraved PC board cover using the four remaining 3mm plastic screws.

Assembly is now complete.


ANT
12VDC
PWR
KEY
ANT

Notes on Operation

1) The transceiver operates on 12 to 14 volts DC. The power connector center pin (2.1mm) is positive. Receive current consumption is about 35 ma. Transmitter power consumption is 400 to 800 ma.
2) Transmitter power output is adjustable with the rear panel knob from near 0 to 5 watts. The output impedance is 50 ohms. The final RF output FETs are intended for CW duty cycles. Do not hold the key down for more than a few seconds at high output levels. Please turn the power level down as much as is possible when adjusting an antenna tuner to prevent abuse to the transmitter FETs, and to lessen QRM.
3) The switch on the rear panel is a receiver 12 dB attenuator. When engaged, the small LED is illuminated in the top center of the panel as an indicator. This switch has no effect on the transmitter.
4) The LED at the lower center of the panel indicates the relative strength of the signal. The LED sensitivity can be adjusted with trimmer potentiometer R11. Adjust for a dim glow with no signal. If you wish to disable this LED, turn R11 fully counterclockwise.
5) The transmitter sidetone level will vary as the power is adjusted. The level can be adjusted with trimmer potentiometer R7 if desired. The sidetone you hear is the actual transmitted signal being heard by the receiver.
6) Do not use “mono” plugs for the audio out. Use only a “stereo” connector. Mono plugs will short the audio output and may cause damage to the unit. You may use either type of plug for the key jack.
7) There is no power on-off switch provided. Remember to disconnect the battery or power supply when use is discontinued.
8) Battery or power supply voltage should be maintained between 10.5 and 14.5 volts. Lower voltages may affect stability, and higher voltages may damage components. Understand that lower voltages will reduce RF power output.
9) Do not use unregulated “wall wort” type power supplies. Use only batteries or a regulated supply rated at one amp or greater.


RCVR Ant
12.96 MHz Filter
Sidetone Level
Volume Pot 500 Ohm
LED
LED Bias
20.00 MHz
400 - 750 mV P-P
Key
TUNING POT 10K
ATTN LED
Counter
6v P-P
3.5 V P-P
Last Used:
R36,C56,D6,Q14,X7,T4,L6,J8,TP63
No TP 45
Note: L3 Must be Mounted On the Bottom
7MHz Bandpass Filter
Adjust T3, T4 for Maximum DC Voltage Across TP1 >1 VDC
Power Adjust POT
12 dB Attn Switch
RCVR Ant
+12V DC
Ant
4 Watts @12VDC
Approx 7.016-7.047MHz
Penntek Instruments
40MXCYR
WA3RNC
Rev 2C
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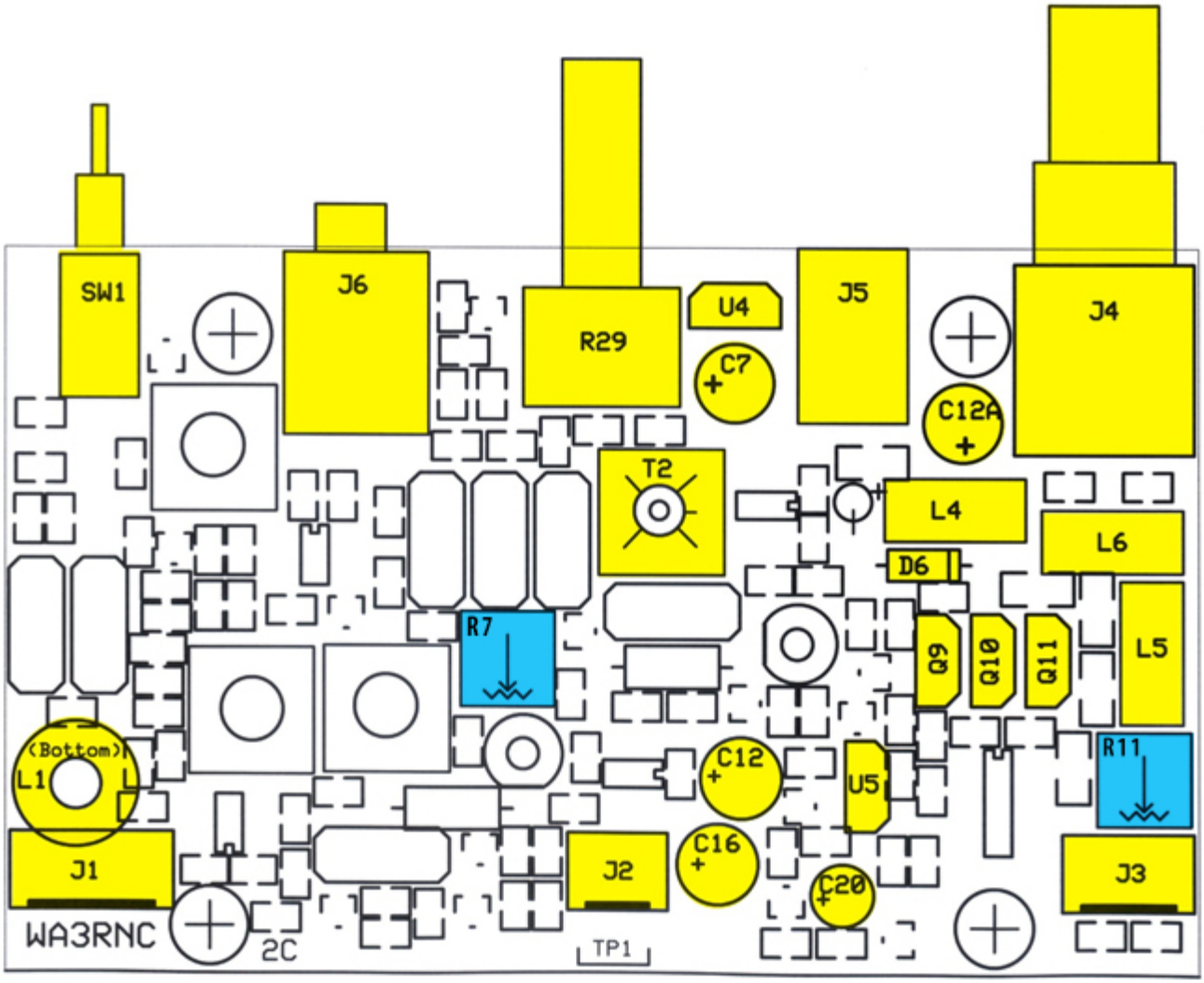

Builder installed parts are shown in yellow

R7 = Sidetone level adjust pot (shown in Blue)
R11 = LED Bias adjust pot (shown in Blue)