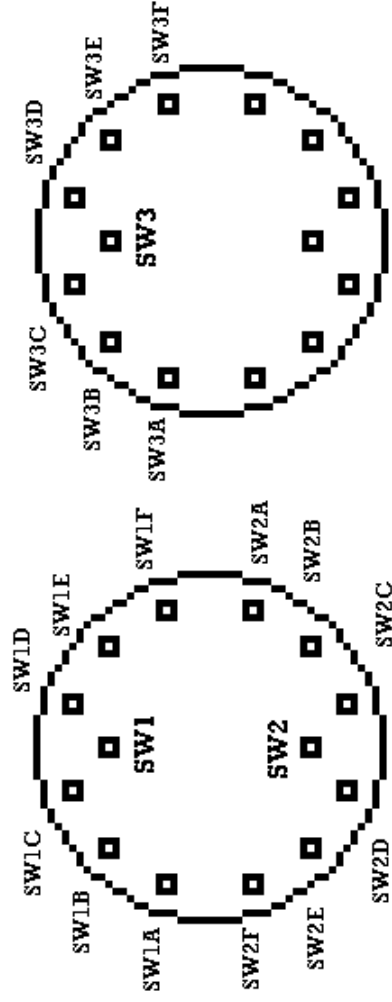


Multiband Converter







Switch Connection Diagram

Parts List

Ceramic Disc Capacitors

- c1 20 pf marked "20"
- c2, c5 120 pf marked "121"
- c3, c17 47 pf marked "47"
- c4 220 pf marked "221"
- c6 560 pf marked "561"
- c7 100 pf marked "101"
- c8 820 pf marked "821"
- c9 330 pf marked "331"
- c10 1500pf marked "152"
- c11, c13, c14, c15, c18, c19, c20 0.047 μ f small tubular capacitor marked "473"
- c16 82 pf marked "82"

Electrolytic Capacitor

- c12 330 μ f cylindrical electrolytic capacitor

Inductors

- l1, l2, l6 2.7 μ h color coded "red violet gold"
- l3, l7 4.7 μ h color coded "yellow violet gold silver"
- l4, l5 22 μ h color coded "red red black silver"

Resistors

- r1 100k color coded "brown black yellow gold"
- r2 200 color coded "red black brown gold"

- r3 100 color coded "brown black brown gold"

Diodes

- d1 1n4004 Black diode marked 1n4004
- d2, d3 1n914/1n4148 Tiny clear/red diode

Integrated Circuits

- u1 7806 Three terminal ic in a to-220 package (has a metal tab with a hole through it)
- u2 sa612an 8 pin ic

Potentiometer

- vtr1 20k chasis mount potentiometer

Crystals

- x1 27 MHz hc-49
- x2 20 MHz hc-49/s
- x3 12.96 MHz hc-49/s
- x4 9 MHz hc-49/s
- x5 6 MHz hc-49
- x6 5 MHz hc-49

Instructions

I. Assembly

Step 1: Place all of the parts on a white sheet of paper and check everything against the parts list. If anything is missing or you have any questions please contact me and I'll get the correct part to you.

Step 2: Place the board foil side down on the table and orient as shown in the layout diagram.

Step 3: Install the capacitors one at a time starting with C1. First find the capacitor on the layout diagram then refer to the parts list to find the correct value. Once you've found the right capacitor install it as shown on the layout diagram by putting the leads through the holes on the top side of the board, bending them outward slightly to hold it in place, turning the board upside down, soldering it in place, and clipping the excess leads. Some capacitors may fit snugly, gently rock these capacitors into place, it's ok if you can't get all of the capacitors seated firmly against the board. Be sure to observe proper polarity when installing C12.

Step 4: Install the inductors as shown on the layout diagram by bending one lead back over the body of the inductor and standing the inductor on end. Bend the leads and solder them into place just like the capacitors.

Step 5: Install the resistors, standing them on end just like the inductors.

Step 6: Install the diodes, be sure to observe proper polarity as indicated by the cathode stripes on the diodes and the layout diagram.

Step 7: Install U1 as indicated on the layout diagram with the metal tab facing the outside of the board and solder it into place.

Step 8: Solder the 8 pin ic socket into place with the notched side facing u1 and install u2 by plugging it in the socket as shown in the layout diagram.

Step 9: Install the crystals as shown on the layout diagram.

Step 10: Connect the potentiometer VR1 with insulated wires, length is not critical. With the shaft facing you and the pins facing down the pin on the left should be connected to the pad labeled "ccw" on the layout diagram, the pin on the right should be connected to the pad labeled "cw", and the center pin should be connected to the pad labeled "s".

Step 11: Connect the power leads and antenna connectors. Be sure to observe proper polarity when connecting the power leads as reversed polarity will damage a number of parts on the board.

Step 12: Install J1 using one of the excess leads from one of the other components as a jumper between the 2 pads.

Step 13: This will conclude the onboard component portion of the assembly process, you should have no components left over, if you do check the board and the layout diagram for parts you've forgotten to install. If, after a thorough inspection everything seems to be in order, you may place the extra components to the side and continue to the testing section.

II. Testing

Step 1: First select a band you would like to test the converter on. This should be a band where you know you'll be able to hear some strong signals at the time of testing.

Step 2: Decide whether you'd like to use a cb or an am broadcast radio for your initial testing.

Step 3: Select a filter and a local oscillator crystal for your desired input and output bands from the chart below.

Filters (sw1/sw2 connections)

- a=10/13/17/15
- b=20
- c=40
- d=75/80
- e=160 (see note 1)
- f=external filter/atu (see note 2)

Local oscillator crystals (sw3 connections)

For CB radios (26.965-27.405)

- a=lw (aprox. 0-0.405, see note 2)
- b=40 meters (aprox. 6.965-7.405)
- c=20 meters (aprox. 14.005-14.445)
- d=17 meters (aprox. 17.965-18.405)
- e=15 meters (aprox. 20.965-21.405)
- f=13 meters (aprox. 21.965-22.405)

For AM broadcast radios (0.530-1.700)

- a=10 meters (aprox. 27.530-28.700)
- b=15 meters (aprox. 20.530-21.700)
- c=20 meters (aprox. 13.490-14.660)

- d=30 meters (aprox. 9.530-10.700, see note 2)
- e=40 meters (aprox. 6.530-7.700)
- f=80, 49 meters (aprox. 4.470-3.300, 5.530-6.700, see note 3)

Step 4: Connect short lengths of wire to sw1, sw2, sw3 the sw1, and sw2 connections for your band of choice, and the sw3 connection for the local oscillator crystal needed to give the desired output frequency.

Step 5: Connect the sw1 wire to the sw1 connection wire from the previous step, a simple splice will do. Do the same with sw2 and the sw2 connection and sw3 and the sw3 connection.

Step 6: Place the board on a non conductive surface and connect the power leads to a 7.5-15 volt dc power supply or battery making sure to observe proper polarity.

Step 7: Connect the converter to an antenna and radio and try tuning around. If you hear signals from the band of your choice disconnect the power and go on to connecting the rotary switches, if not skip to the troubleshooting section.

III. Connecting the rotary switches

Disconnect the splices you made in the testing section and connect the rotary switches by matching the designators in the layout diagram and the designators in the switch diagram with insulated wires. Keep the wires short, especially on sw3 as long wires may prevent oscillation at higher frequencies. Be sure to allow enough wire to mount the switches to the chassis.

IV. Using the Converter

Step 1: Connect an antenna to the antenna jack and connect either a CB radio or AM broadcast receiver to the radio jack.

Step 2: Using the chart in the testing section, select an input filter and local oscillator crystal with the rotary switches. If Wired as shown, the switches will count backwards from "f" to "a" as you rotate them clockwise.

Step 3: Tune around on the radio connected to the converter. If a signal is between channels on your radio you can bring it into tune by adjusting VR1.

V. Trouble Shooting

Here are a few hints to getting the converter working if the results of your initial testing are less than optimal.

Nothing will work without power so it's a good idea to check the power supply first. Measure the voltage on pin 8 of U2 relative to ground. If you measure something between positive 5.9 and 6.1 volts dc your power supply is working fine, otherwise you have a power supply problem. If this is the case you can try checking the supply voltage, it should be at least 7 volts and no more than 15 volts dc, you might also double check the polarity on the power supply connection, make sure that U1 is properly oriented, and inspect your solder connections in the area of U1.

If You've determined that the problem isn't in the power supply and you have an hf receiver or a frequency counter it's possible to check the functionality of the sa612 by either listening for the local oscillator on a receiver tuned to the frequency of the selected crystal or connecting a frequency counter to pin 7 of the sa612 through a large resistance. When listening for the local oscillator it may be necessary to adjust the fine tuning control (VR1) or even tune up or down a few KHz on the receiver.

If you need additional assistance please contact me and I'll be more than happy to help.

VI. Notes

1. The 160 meter filter is supplied for those who use this kit with a 10 meter radio. To receive the 160 meter band set the filter switch to the 160 meter filter (e) and the local oscillator switch to the 27 MHz crystal (a) and tune your 10 meter rig between 28.800 and 29.000 MHz.

2. In the design process it was realised that some bands that filters were not provided for could be received by bypassing the filter section and using an antenna tuner (atu) as an external bandpass filter. To do this set the filter switch to position f and adjust your antenna tuner for the clearest signal.
3. Because the 5 MHz local oscillator is higher in frequency than both the 80 meter band and the am broadcast band, tuning will be reversed. This means that as you tune up in frequency on your am broadcast radio you will be tuning down in frequency on the 80 meter band.
4. "Audio amp" The audio amp portion of the board is included to allow use of the converter as a direct conversion receiver on the local oscillator frequencies. If you are interested in adding the audio amplifier contact me I will provide you with instructions.

VII. Contact Information

If you have any questions about this kit or suggestions for kits you would like to see feel free to contact me, my email address is support@cycle24kits.com