

**A Simple Method to convert the Ten-Tec 1208 6 meter Transverter
to use a 28 MHz IF and add the Push To Talk feature.
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I have been on 6 meters for a long time using a KLM-661. It is an analog vfo transceiver with 10 watts out. I have had a lot of fun with it over the years. Recently I noticed that it had started to show its age by drifting a lot. I did not know my operating frequency very closely either. I needed to upgrade my 6 meter system with a transverter to use with my synthesized 28MHz SSB/CW rig.

I bought 3 Ten-Tec 1208's. One came from a close friend. I bought 2 others for parts. One came from an auction site and another at a hamfest. I ended up with 3 manuals. 2 of the 1208's worked OK and the one from the hamfest did not.

I started searching for information on how to convert the Ten-Tec 1208 to use a 28MHz IF. The conversion to a 28MHz IF involves changing the crystal oscillator and the receive IF post amplifier. All of the other stages of the 1208 do not need to be changed or modified and stay the same.

I started looking on-line at various articles about mods and converting the Ten-Tec 1208 for use on other frequencies and IF frequencies. I got a few 22MHz crystals on E-Bay and some coils and pico range capacitors that I would need. I decided to try changing one of the 1208's to 28 MHz IF.

I removed the capacitors and coils and replaced them with the values that I had worked out. I got the conversion work done and it all worked. I was amazed. It worked great on the air.

I looked at the parts that I had removed and realized that there was a simpler way to do the conversion and that if I followed specific steps I could do the conversion using some of the existing parts in the 1208 with only a few new parts: 3 capacitors and one hand wound coil and a crystal.

28 MHz conversion procedure:

Step 1. Inspect the boards for solder bridges and bad solder connectors. Correct any suspected connections.

Step 2. Test the 1208 with a 14MHz transceiver before you start to make sure it is operational for transmit and receive. A low power, 5 watt output, 14MHz transmitter and general purpose receiver will work.

Step 3. Parts removal and replacement requires using a small tip soldering iron and solder sucker.

New parts required:

Crystal: 22.000 MHz

Disk capacitors: C8 220pf
C16 150 pf
C18 270pf

Inductor: L7, 0.8uH, 15 turns of #22/24 enameled wire wound on a 5/16 drill bit shank.
1 inch piece of small diameter solid bare wire

Remove C17 and set aside.

Remove C15 47pf and save.

Remove C7 120pf and save.

Install C7 120pf in C15 position.

Install C15 47pf in C7 position.

Remove R34.

Remove L8.

Install solid wire jumper in L8 position.

Remove C8 and set aside.

Install new 220pf in C8 position.

Remove C16 and set aside.

Install new 150pf in C16 position.

Remove C18 and set aside.

Install new 270pf in C18 position.

Remove Y1 36.000MHz crystal and set aside.

Install 22.000000MHz crystal in Y1 position.

Remove L7.

Install new hand wound coil in L7 position.

Step 4. Power on the unit and spread or squeeze together L7 for peak 22MHz signal at TP5.

Step 5. Connect a 28 MHz transceiver or receiver. Adjust L3 for best received signal tuned to 6 meter signal source. Adjust L11 and L12 in 50MHz preamp section for best signal.

Step 6. Adjust C22 for 22.000000MHz at TP5. If the frequency will not adjust up to 22.000MHz, then remove C23 and re-adjust.

Step 7. Do the transmit alignment procedure for the 1208 starting at page 34 and 35 of the manual. Even though all three units worked when I tested them before I did the conversion, doing the transmit alignment helped.

The failing unit did not work was because it had been way over driven on 14MHz. The 4 220 ohm 2 watt input power dummy load resistors had been very over heated. They were ashy white colored. The colored bands were blackened and the circuit board underneath them was discolored. The 2 input switching pin diodes D5 and D6, p/n BA482, were ruined by the excessive power.

Ten-Tec released T-Kit Technical Bulletin #1208-0695-3 in June of 1995 and included it with the newer kit assembly instructions. It changes the parts list for D5 and D6 to 1N4007. I replaced D5 and D6 with 1N4007 diodes and it worked fine. The 4 dummy load input resistors were OK even after being over heated so bad.

The 1208 is also designed to be used concurrently with a 28MHz transceiver. It can be switched out of the line so that you can operate on 28MHz with the transceiver or switched in and used on 50MHz.

The 1208 uses a DPDT toggle switch for the coax input and output switching. The soldering around the DPDT coax switch is very close and I had a problem on the third unit with bad solder connections in that area. That was why I removed the DPDT coax switch from it and also the other units. I saved the parts if I wanted to put them back in. I rerouted the coaxes to the output and input female PL-259 connectors.

I had a problem with one unit when I tried to adjust the frequency to 22.000000MHz. C22 would turn, but did not change the frequency. The adjustment screw was mechanically stripped. I replaced the 10 – 60pf variable capacitor with a new one and it worked fine.

PTT Modification:

The Ten-Tec 1208 uses a RF input sense circuit to trigger transmit mode using switched diode T/R circuits. I wanted to add a PTT feature to the 1208 because I wanted to use it to drive an amplifier and switch higher power coax relays. I had also noticed that when I worked my friend on six, his signal would drop out between words and sometimes between syllables. I started looking for a PTT circuit and could not find schematics. I decided to design and build my own.

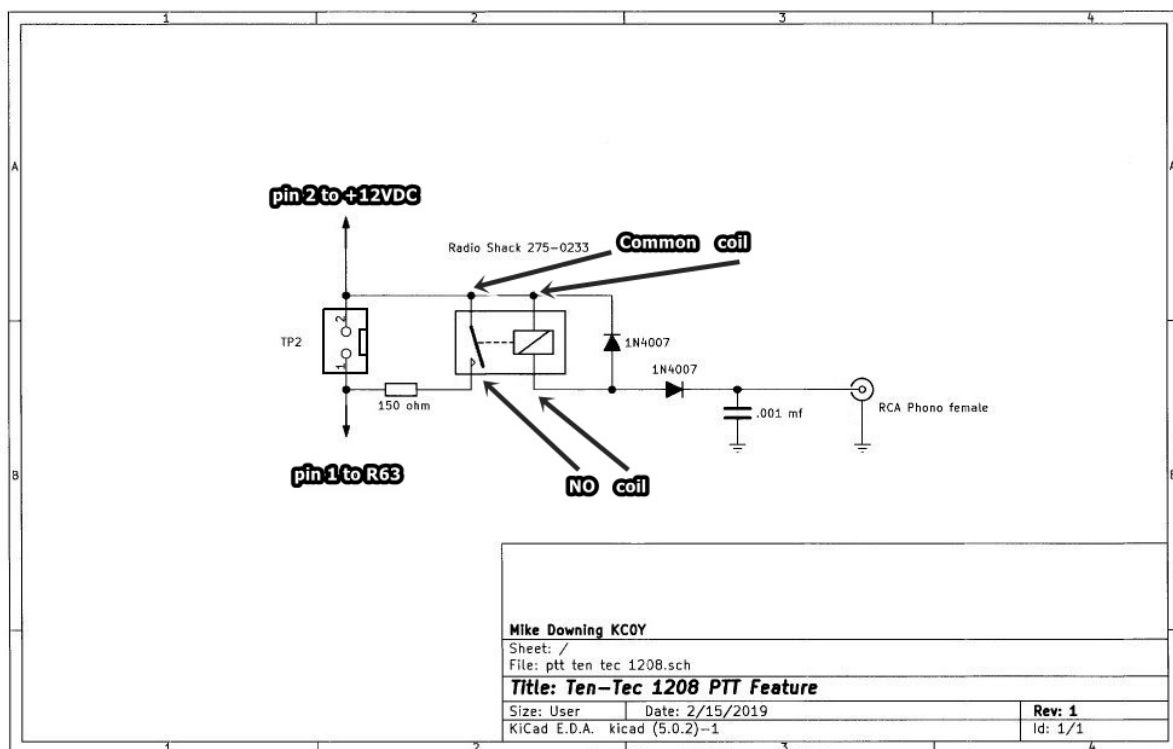
This is what I did. The Ten-Tec 1208 has Test Point #2, TP2, built into the circuit board. The construction instructions have you make a test jumper using a supplied connector and a ¼ watt 150 ohm resistor installed across the terminals. With power applied, you

install the test jumper and the transverter goes into transmit mode. There is a test procedure in the manual that involves measuring voltages across test points 3 and 4 to verify the voltage transition from receive to transmit.

I used a Radio Shack #275-0233 12vdc NO reed relay to connect the resistor across the TP2 pins. You can also use a Hamlin HE 3621A1210. The Hamlin reed relay has a built in back EMF diode across the internal coil.

TP2 is a polarized 2 pin terminal. Pin 1 is connected to the open end of R63 of the T/R switching logic. Pin 2 is +12vdc.

Here is the schematic:

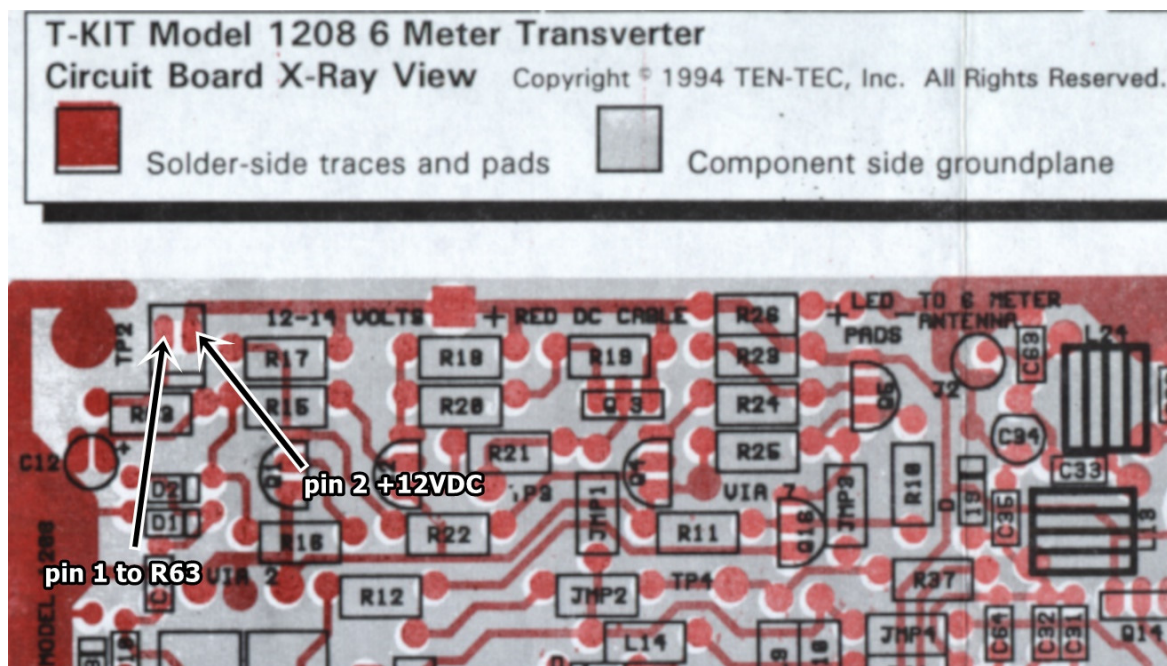
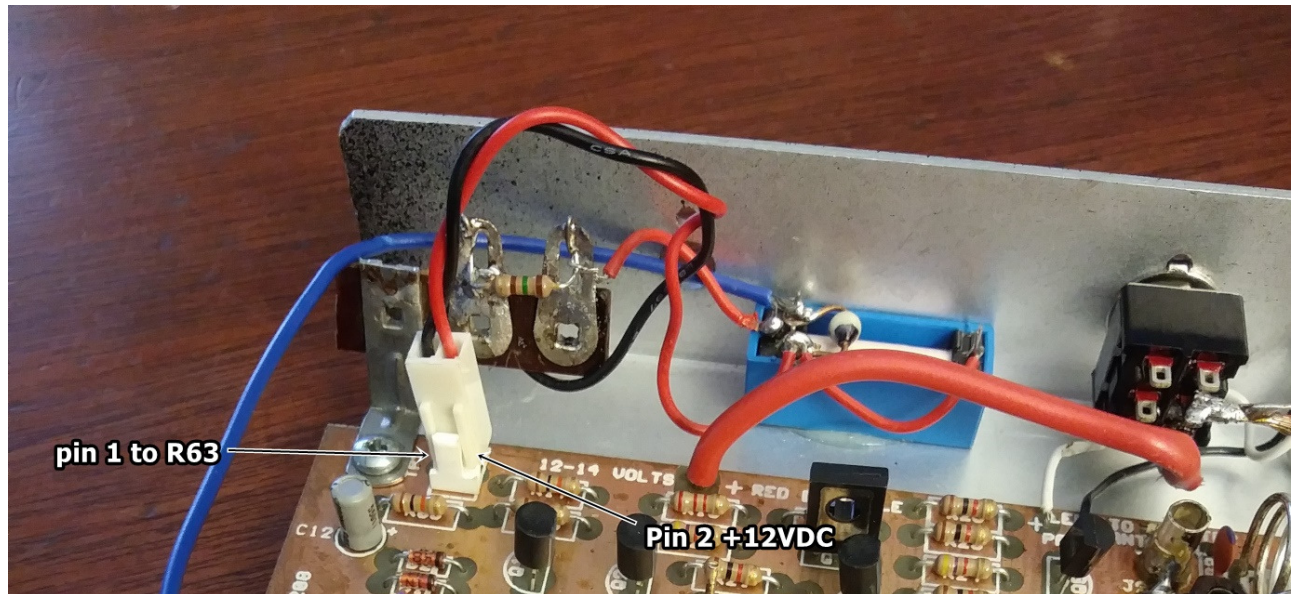


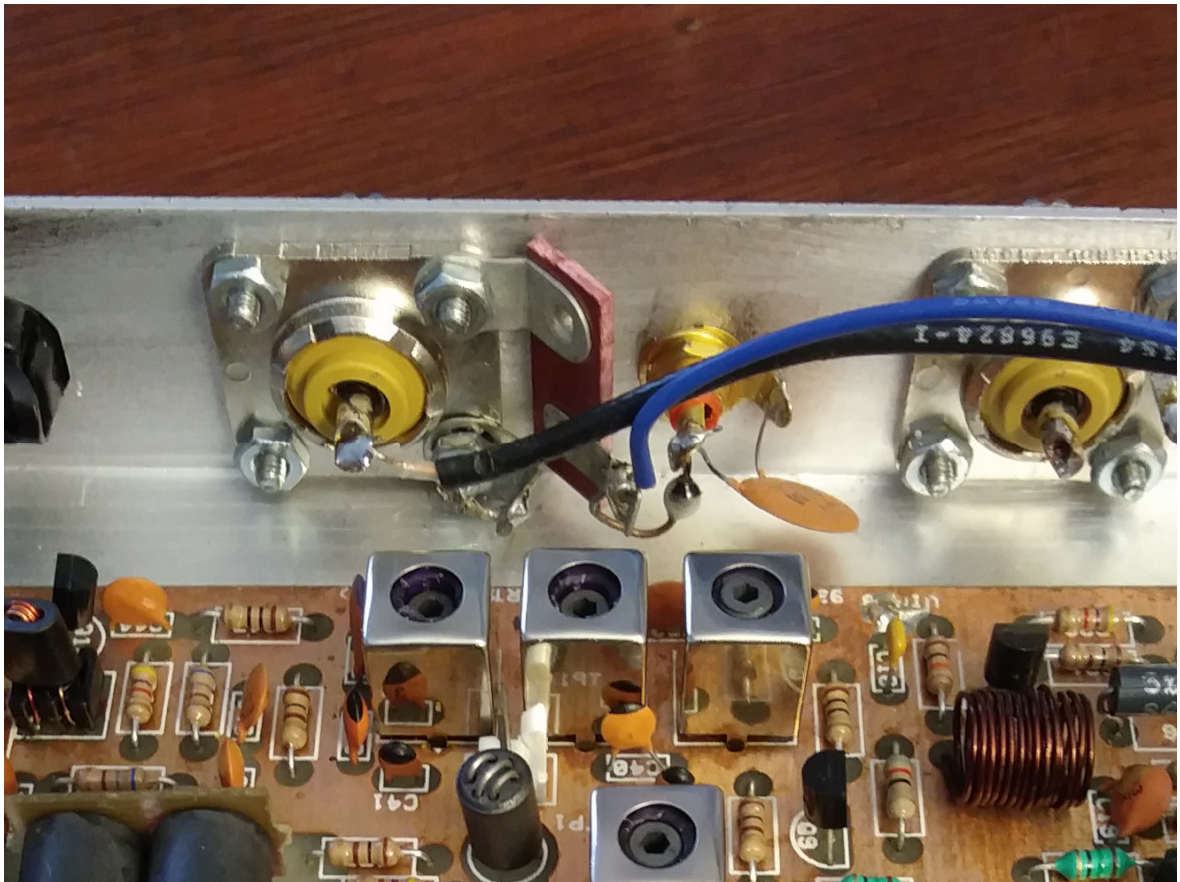
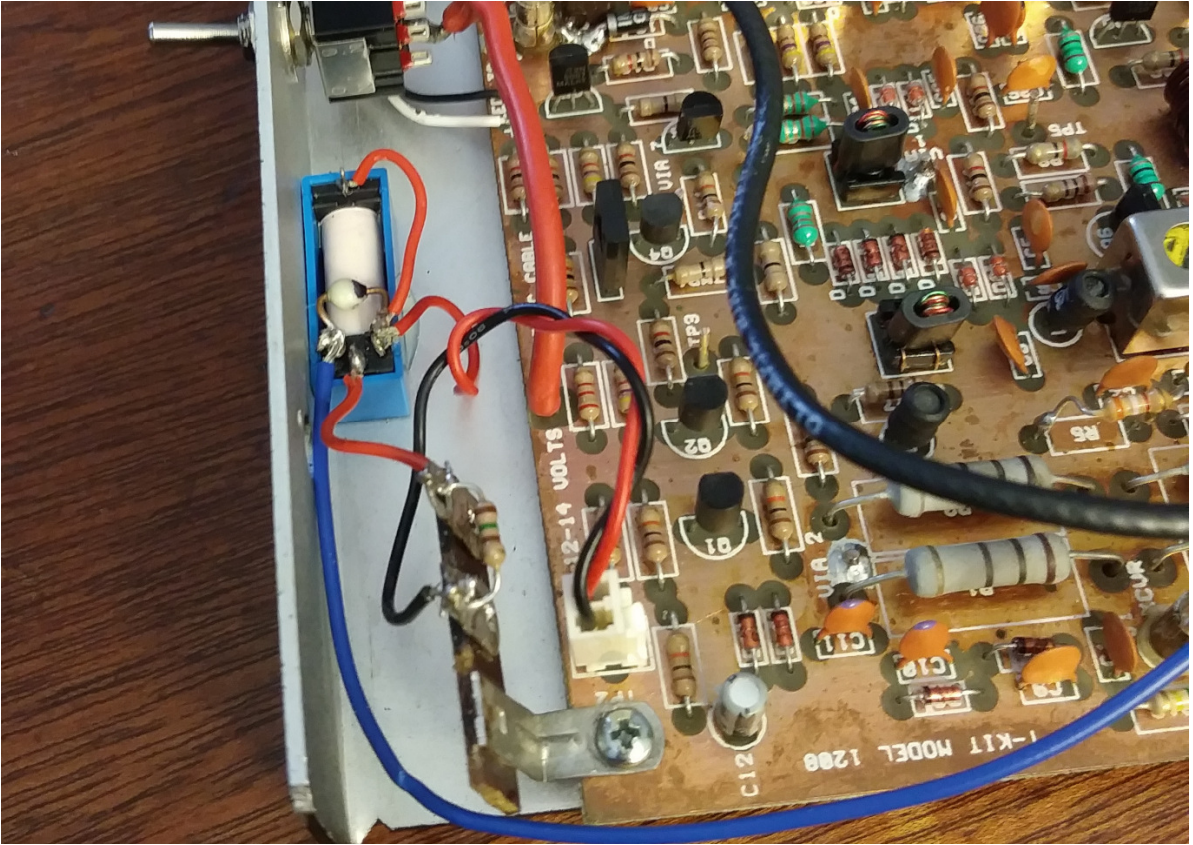
Grounding the center conductor of the RCA phono jack causes the 1208 to switch into transmit mode.

I found a polarized plug with 2 inch wires to plug into TP2 on an old PC motherboard fan cable.

I mounted the Radio Shack reed relay next to the chassis wall using silicon caulk. The Hamlin HE 3621A1210 can be stuck to the side of the chassis wall with silicon caulk or general purpose adhesive.

The 3 position solder terminal strip is held in position by one of the board mounting screws. The 2 position terminal strip is held in place by one of the coax fitting mounting screws.





Parts list:

Radio Shack 12vdc NO reed relay p/n 275-0233 or Hamlin HE 3621A1210
1N4007, qty 2
dual pin PC board plug with 2 inch cable or 2 single pin plugs with 2 inch wires for TP2
150 ohm ¼ watt resistor
RCA female phono plug single hole mount
3 lug solder terminal strip with one tab for screw mounting
2 lug solder terminal strip with one tab for screw mounting
.001 mF 1kv ceramic disk bypass capacitor
10 inch length of insulated wire
general purpose adhesive or silicon caulk for reed relay mounting

The PTT feature works so nice.

I have used all three of the Ten Tec 1208's on the air and get good signal reports. I limit the 28MHz RF input to 5 watts maximum and the output of the 1208 is about 8 watts on 50MHz. Even with longer duration transmit usage using SSB and CW during contests or rag-chewing the unit stays cool.

On FT8 or other 15 second duty cycle digital modes, the 2SC1971 final output transistors and the 2SC1970 driver transistor measure 100 to 104 degrees Fahrenheit. This makes the heatsink and case feel warm, but the devices are well within their safe operating range. The receive mode current for the unit is about 140 ma and 2.2 Amps during transmit.

BAMA, The Boat Anchor Manual Archives has a reference for Ten-Tec 1208 documents. The Files section has the PDF file of the schematic and X-Ray of the circuit board. The Technical Service Bulletin 1208-0695-3 is in the Parent Directory:

<http://bama.edebris.com/manuals/tentec/1208/1208-0695-3>