

# MMR40

## CW/SSB Radio Project

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The radio project I built for 75 meters (elsewhere on my website) that was designed by Steve Weber, KD1JV, grew into a 40 meter multimode rig. The ARRL put out a design contest for a CW/SSB transceiver that cost less than \$100 to build. When the design was completed, Steve worked with QRPKITS to put out a complete kit for this radio. The MMR40 kit includes everything but a microphone and a few bits of wire (for the speaker) to have a complete 40 meter transceiver. The price, as of this writing (May 2008), is \$120. For that price you get a very well done circuit board with a good silkscreen overlay for parts placement. The building instructions make easy work of the kit, even for somewhat novice kit builders.



I purchased a kit and then it sat on the bench for a while - life away from the radio bench got in the way... A friend purchased another kit and was nearly complete when I got in gear and built mine. I had to fiddle with the PTO (frequency selector) a bit to get the coverage that I wanted. Everything else went just as the instructions laid out. The radio tuned up into the dummy load at 5 watts running on a sealed lead acid battery. It would put out a watt or two more with a higher voltage power supply, but I intend to use it mostly for battery operation.



Attaching a non resonant random wire antenna, the receiver came to life and there were many signals. I put together a dipole and hung it from the palm tree near the ham shack.

With the antenna at about 12 feet, I answered a loud station, KE7FBY in Spanish Fork, Utah, about 450 miles away. We talked about the kit for a while and he gave me a signal report of 55 and noted that the signal sounded clean. A nice QSL card came in the mail to commemorate the first contact with this radio. I was off and running.

In the first two weeks of using the radio, I have made contacts in 15 US states, including Hawaii, and three DX countries - Canada, Australia, and Panama. The receiver is more sensitive than the transmitter is powerful, so I generally call strong stations. The longest DX to date from my home in Phoenix, AZ is to VK3FADX (yes, four letters in the suffix), Noel in Victoria Australia. It is about 13200 km or 8200 miles away - 2644 km/watt or 1643 mi/watt. The dedicated QRP cw operators strive for 1000 miles per watt and over 1600 miles per watt is pretty good for SSB, given the bottom of the solar cycle is upon us.

To make setting exact frequencies easier, I hooked up my FCC-1 frequency counter (from NorCal) as

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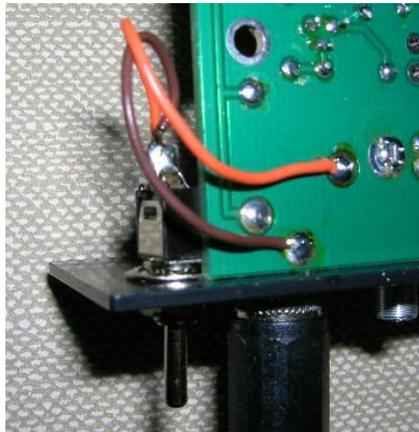
can be seen in the photos. I have ordered a KD1JV digital dial, but it has not arrived yet to be incorporated into the rig. I have operated portable without the counter with no problem - the PTO range is completely within the band. Since one of the uses is to be taken caving underground (a very demanding and rugged environment), some thought will have to be given to mounting the frequency display, if used.

Another possibility is to put the FCC-2 kit onto the FCC-1 counter to have full Direct Digital Synthesis (DDS) frequency control, eliminating the PTO control all together. Again, with the rough conditions in the field around caves, it may be a switchable thing to get back to the more robust PTO, which does drift a bit.



The speaker was mounted onto the case with a generous amount of automotive silicone. I prefer the Ultra Black variety of silicone since it cures rapidly and has strong adhesion.

The microphone that I am using is one that I bought on eBay. It is a speaker microphone, but the transmit switching method used in this radio does not lend itself to using a speaker mic. I rewired the cable inside the mic head to eliminate the speaker and allow proper PTT operation. If the cord had 6 wires instead of 4, I would have enabled the speaker as well, but we use what we have...



Most of the operating that I will be doing is SSB. To allow the cw signal to be used for antenna tuning, I wired a switch across the microphone jack. This shorts the mic element to ground and allows the cw tone generator to function. This is the same action as when plugging a cw key into the connector with a

mono plug. By activating the switch, the PTT keys the transmitter as if it were a cw key. Opening this switch puts the transceiver back into the SSB mode. Using the switch keeps me from having to unplug the mic and plug in a key (or shorted mono plug) to get RF output for antenna matching through the tuner.

This has been a fun project radio and the reports from on the air are encouraging. QRP SSB is not too hard to do, it just takes a bit of patience (don't tell the other station that you are QRP until well into the conversation). I hope to hear you on the air with yours!