

CW With Your H-T

Need some on-air code practice? Build this handy device and start your own FM CW “net.”

By Donald J. DuBon, N6JRL



Title photo—Assembled, connected and ready to go! When you flip the transmit switch (labeled XMIT on this unit) the H-T goes into the transmit mode. As you work the key, the oscillator generates tones that are transmitted over the air.

* Corrections to this article appear in **September QST Feedback**.
See below.

While teaching Morse code classes here in Dayton, Ohio, I entered into an interesting discussion with one of my students. It turned out that Al, N8PPX, and I shared a common interest: Conducting Morse practice sessions on 2-meter FM. With so many Technicians owning 2-meter H-Ts, this seemed like the best way to provide Morse training for those who were interested in upgrading.

It wasn't long before we combined our ideas and created a simple device that could be used with just about any hand-held transceiver (H-T). It's basically an audio oscillator and keying circuit that allows you to send MCW—*modulated CW*. This is nothing more than audio tones keyed on and off and fed to your transceiver's microphone jack.

On-Air Tests

We quickly cobbled together two of these MCW keyers and decided to try a test on simplex. Before starting the test, we made an announcement on the local repeater and invited others to listen.

Minutes later, Al sent a few lines of code, then I responded. Al's modulation seemed a bit low, but a minor adjustment cured the anemic audio in short order. After a few more minutes of practice, we returned to the repeater to take our lumps!

To our astonishment, we were showered with a barrage of compliments. Al's tones were completely clear and easy to copy. Despite the fact that he was only running $\frac{1}{2}$ W, his Yagi atop a 50-foot tower offered excellent coverage. Even my rooftop beam did

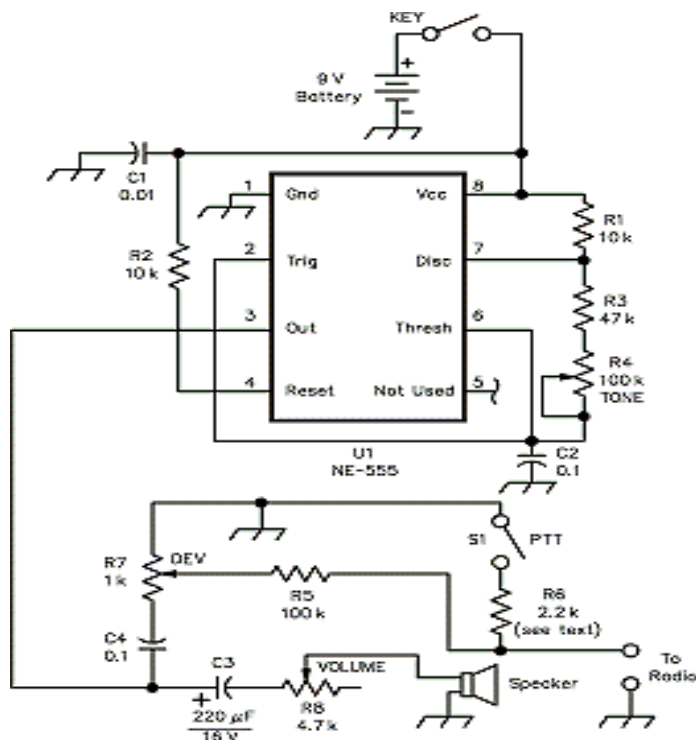
remarkably well. We received reports from all over the Dayton area, and from as far away as Xenia, Ohio (about 35 miles distant).

Of course, many hams began inquiring about the nature of our little gadgets. Larry, KB8SLU, built one of his own and the three of us get together on the air to practice each week. Soon afterward, my assistant code instructor, Chad, KB9GGA, joined us via the same device.

We attended a club meeting a few weeks later and someone mentioned hearing us on the air. Al and I weren't quite prepared for all the attention, but we bravely stepped forward and identified ourselves. Al asked how many members wanted to build keyer/oscillators, too. Hands went skyward throughout the room!

The Circuit

The circuit is simplicity itself (see **Figure 1**). It consists of an NE-555 timer IC and a handful of resistors and capacitors. Not only does it make a good MCW generator for on-air practice, it is ideal for off-air practice as well. (Just listen to the speaker!)



** C2 is .01
Part List is Correct

Figure 1—Schematic of the keyer/oscillator circuit. Radio Shack part numbers shown. Equivalent parts can be substituted.

C1, C2—0.01 mF capacitors (272-131)

C3—220 mF electrolytic capacitor, 16 V (272-1029)

C4—0.1 mF capacitor (272-109)

R1, R2—10 kW resistor (271-1335)

R3—47 kW resistor (271-1342)

R4—100 kW potentiometer (271-284)

R5—100 kW resistor (271-1347)

R6—2.2 kW resistor (271-1325)

R7—1 kW potentiometer (271-280)

R8—4.7 kW resistor (271-281)

S1—SPST switch (275-624)

U1—NE-555 timer (276-1723)

Speaker—273-092

Circuit board—276-148

Case—270-221

Battery leads—270-325

8-pin IC socket—276-1995

Any straight key can be used to key the IC's voltage source (a standard 9-V battery) on and off. When the key is closed, power is applied to pin 8 (Vcc). The IC begins generating a signal at an audio frequency determined by potentiometer R4 (TONE) and capacitor C2. This output signal is coupled through capacitor C4 to potentiometer R7 (DEVIATION), which is used to adjust the audio level to the H-T's microphone input.

An SPST switch, combined with resistor R6, is used to activate the H-T's PTT (push-to-talk) line. This PTT arrangement should work well with many Radio Shack, Yaesu and ICOM rigs that are placed in the transmit mode by bringing the mic/PTT line "near" ground. Omit R6 if your H-T uses a direct-to-ground keying system. (Connect the "hot" side of the PTT line to S1 directly.) In all cases, consult your H-T's manual and wire the mike plug accordingly.

Capacitor C3 couples a portion of the output to a small speaker. Potentiometer R8 (VOLUME) adjusts the speaker audio level.

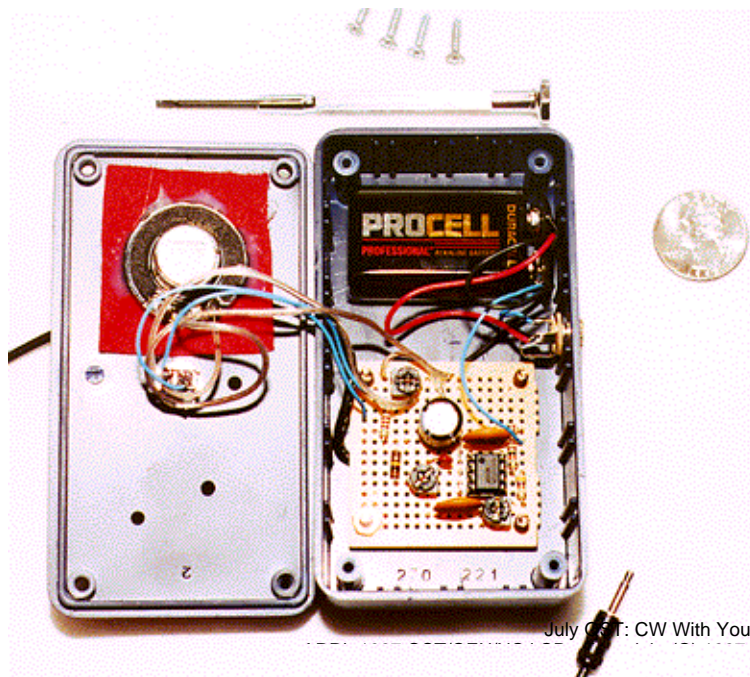
Construction

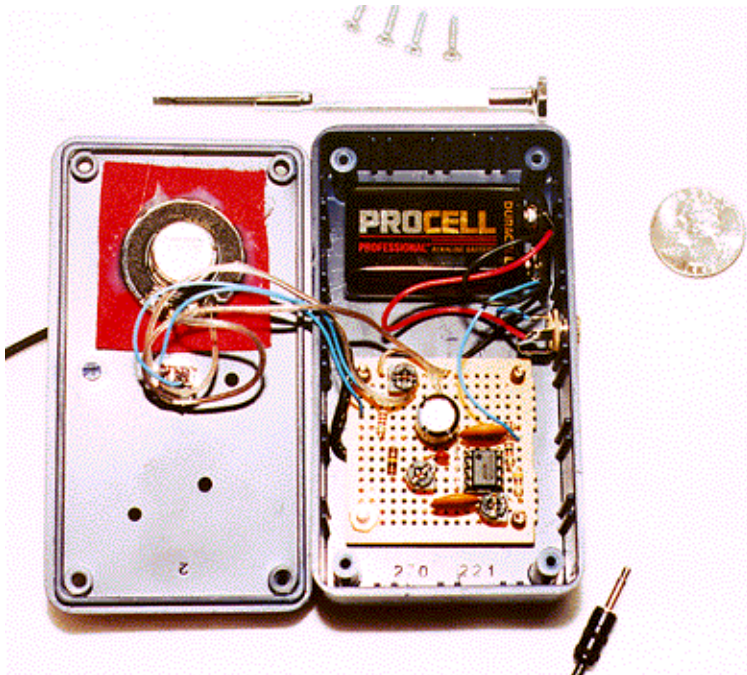
All of the parts for this little project are available at your nearest Radio Shack for less than \$20. You'll only need a single evening to get everything up and running.

The entire circuit can be housed in the plastic case mentioned in the parts list. The circuit board is a generic Radio Shack item and the parts layout is noncritical. The circuit board is large enough to accommodate any additions you'd care to make, such as fancy switches or LEDs.

The tiny speaker was held in place with a small amount of hot glue and a piece of red felt was used as a speaker grill cloth. The circuit board was secured to the case with 4-40 screws and several nuts used as spacers. a 1/8-inch phone jack was attached to serve as the CW key jack. You'll have to purchase the appropriate microphone plug for your radio.

After you've assembled and inspected the unit carefully, plug in the battery and a CW key. Listen to the speaker as you adjust the TONE and VOLUME controls. When you're satisfied that it is operating properly, connect the device to an H-T and set the radio to an unused FM simplex frequency. Using a scanner or another H-T on the same frequency, place switch S1 in the transmit position. If you've wired the mike plug correctly, your H-T should key up. Close the CW key and listen to the tone (turn down the device's speaker VOLUME control so it won't confuse you). Now adjust R7 so that the tone is clear, but not too loud.





An interior view. The battery, speaker and circuit board fit within the case with room to spare.

Enjoy!

Get your friends together and start having fun with FM MCW. It's a terrific way to practice and socialize at the same time. Just remember to use standard FM simplex frequencies and listen for other activity before you begin your practice sessions.

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