Amateur Radio Project

A Simple Electronic Keyer for Sending Morse Code

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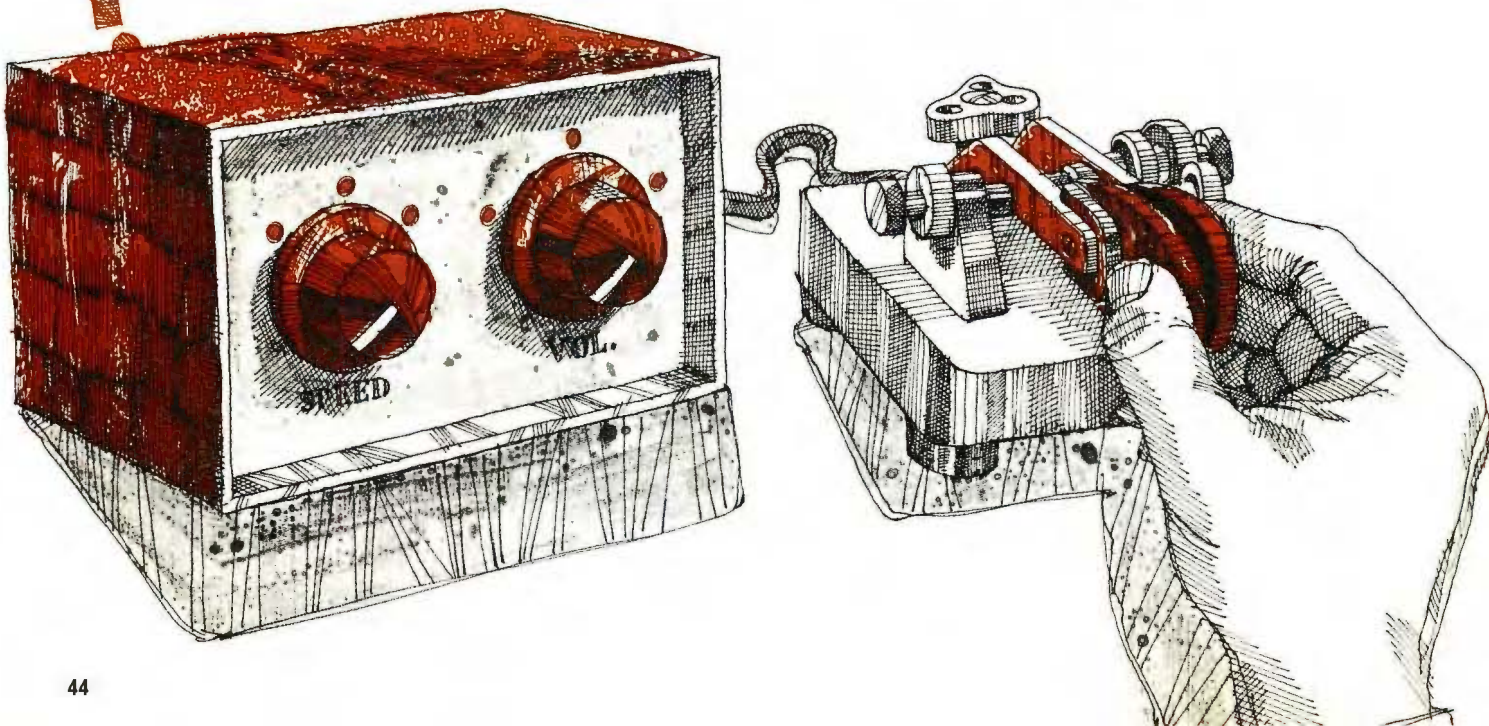
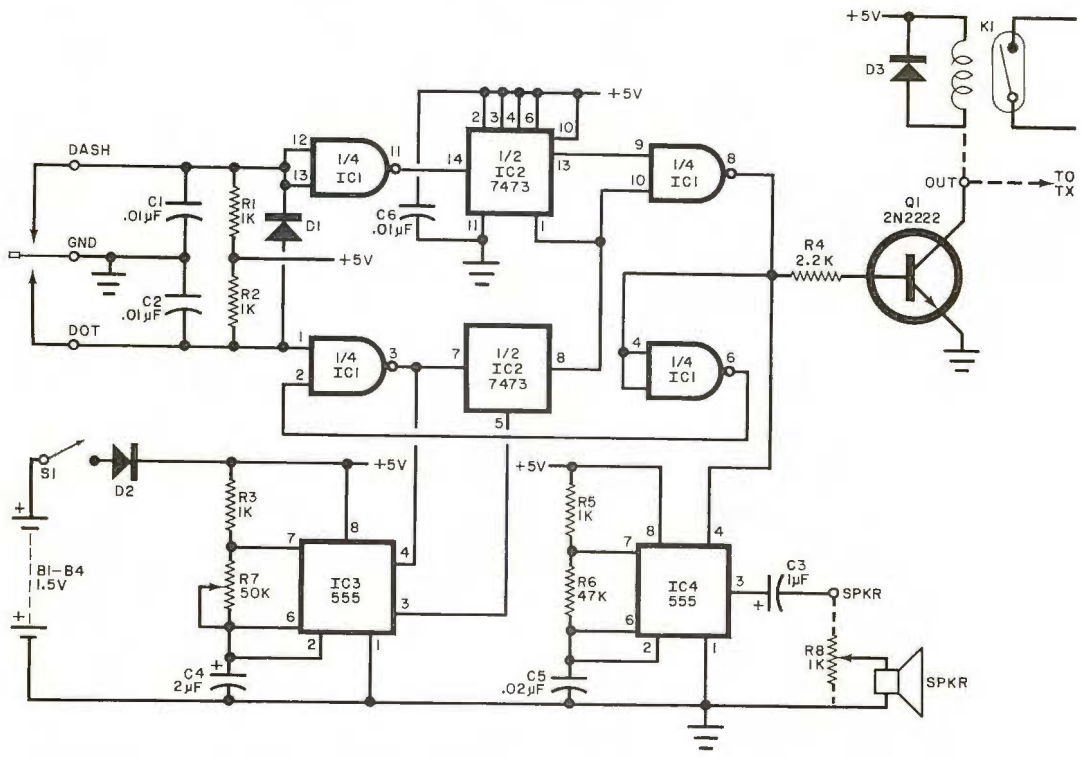
ONE WAY for the CW radio operator to send almost perfect Morse code is to use an electronic keyer. Most commercially available keyers are relatively expensive, but it is easy to build a low-cost keyer using TTL devices and a pair of 555 timer IC's.

The keyer features a variable clock (speed) rate and a side-tone oscillator. It can be used to key a CW transmitter or as a CPO (code-practice oscillator). The circuit operates from any conventional 5-volt dc source. Since it draws only 40 mA of current, it can even be battery powered, providing many hours of operation from ordinary penlite (AA) cells.

Quad 2-input NAND gate *IC1*, as shown in the schematic diagram, eliminates most of the diodes commonly used in other keyer circuits and





Relay circuit is for negative-grid keying, and slide-tone oscillator for code practice.

PARTS LIST

B1,B2,B3,B4—1.5-volt cell
C1,C2,C6—0.01-μF disc capacitor
C3—1-μF, 16-volt electrolytic capacitor
C4—2-μF, 16-volt electrolytic capacitor
C5—0.02-μF disc capacitor
D1,D2,D3—Silicon rectifier diode
IC1—7400 quad 2-input NAND gate IC
IC2—7473 dual flip-flop IC
IC3,IC4—555 timer IC (can be a dual-timer IC)
K1—Reed relay (Potter & Bromfield JR1000 or similiar)
Q1—2N2222 transistor
R1,R2,R3,R5—1000-ohm, ½-watt resistor
R4—2200-ohm, ½-watt resistor
R6—47,000-ohm, ½-watt resistor
R7—50,000-ohm, reverse-log taper potentiometer
R8—1000-ohm potentiometer
S1—Spst switch
SPKR—8-ohm speaker
Misc.—Perforated or printed circuit board; suitable metal chassis box; battery holder; control knob; paddle assembly; hookup wire; solder; machine hardware; etc.
Note: Etched and drilled printed circuit board available for $3.50 from: William Vancura, 4115 35 Ave., Moline, IL 61265

provides a TTL-level signal for the remainder of the circuit. Dual flip-flop *IC2* generates the dashes and dots in a 3:1 ratio, with the spaces being one-dot wide. Timer *IC3* serves as the system clock generator, with potentiometer *R7* acting as the speed control. Timer *IC4* generates an audio signal when gated, producing a side tone so that you can hear what you are sending.

Output transistor *Q1* is required if you intend to use the circuit to key a transmitter. If negative grid keying is desired, add reed relay *K1* to the circuit as shown. This relay isolates the keyer circuit from the voltages used in the transmitter.

The circuit can be assembled on a piece of perforated board, using a point-to-point wiring technique. Or you can design a printed circuit board. There is nothing critical about parts placement or lead routing.

If you prefer, you can substitute a dual-timer IC for the separate *IC3* and *IC4* timers shown. Speed-control potentiometer *R7*, which mounts on the front panel of the chassis box in which the keyer is to be housed, should have a reverse-log taper to improve linearity. The side-tone oscillator can be adjusted to produce a desired tone in the speaker.

If you plan to use the keyer with a transmitter, the circuit must be housed in a grounded metal chassis box to reduce the possibility of r-f interference. You can easily fabricate a paddle keyer. Mount it so that the contacts are inside the box, with the paddle arm exiting through a slot in the box. Make certain that the paddle arm moves freely, without contacting the metal chassis box.

After assembling the keyer, check out its operation in both the transmit and CPO modes. ◈

"You should listen more carefully, dear. Mother only called you a lazy CB."