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Build This Simple Electronic Keyer

One of the nicest little projects we've seen.

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 single 556 dual-timer IC.

The keyer features a variable clock speed rate and a sidetone 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 penlight (AA) cells. For a longer span of time, C or D cells can be used. A power supply is included if you want to run it off house current. See **Fig. 2**.

How it works

Quad 2-input NAND gate IC1, as shown in the schematic, eliminates most of the diodes commonly used in other keyer circuits and provides a TTL-level signal for the remainder of the circuit. Dual flip-flop IC2 generates the dits and dahs in a 3:1 ratio, with the spaces being one dit wide. Timer IC3A serves as the system clock generator, with potentiometer R7 acting as the speed control. The second timer IC3B generates an audio tone signal when gated, producing a sidetone so that you can hear what you are sending out.

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. Another way you can go is to use an optical isolator instead

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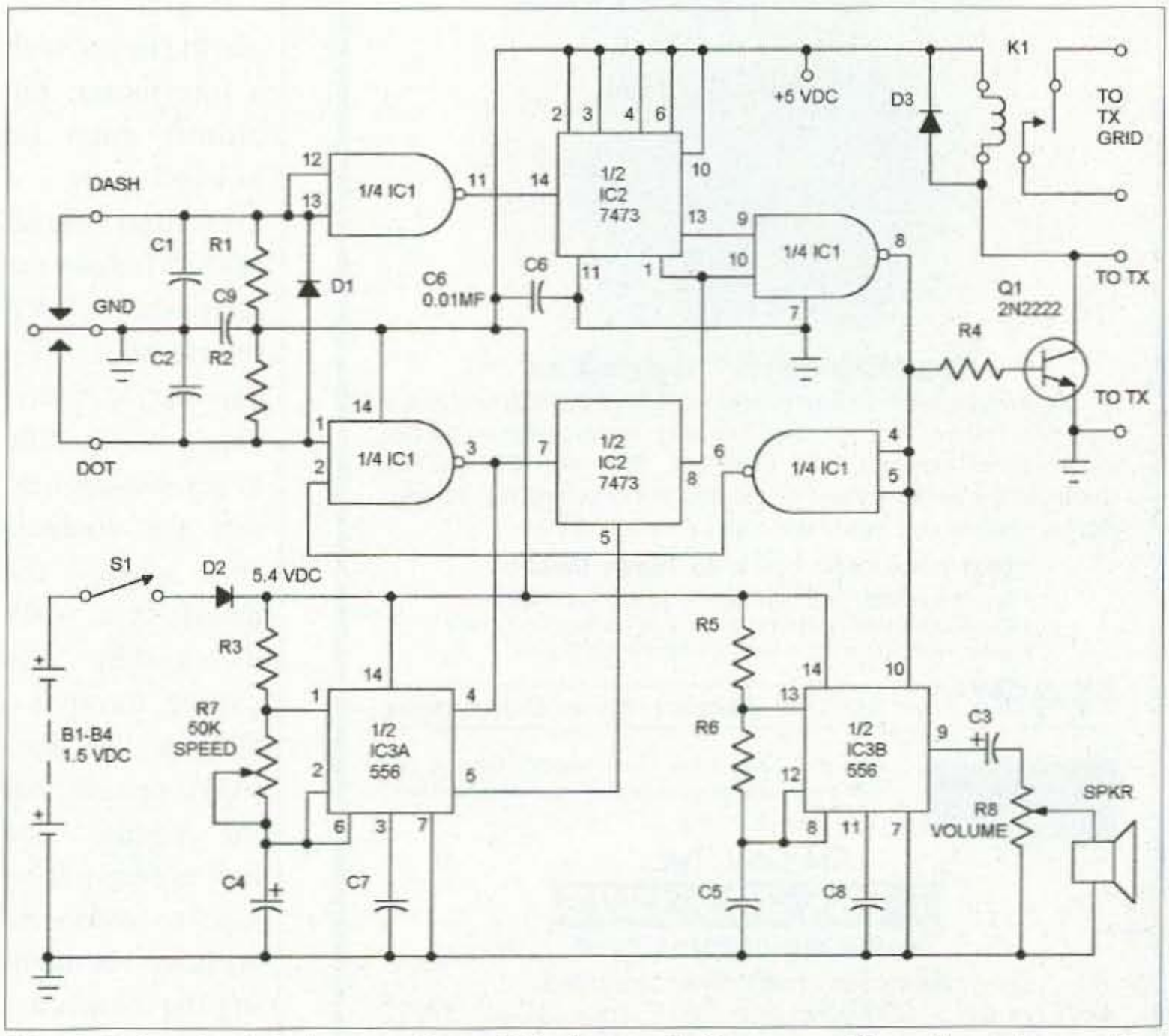

Fig. 1. *Relay circuit is for negative-grid keying, and sidetone oscillator for code practice.*

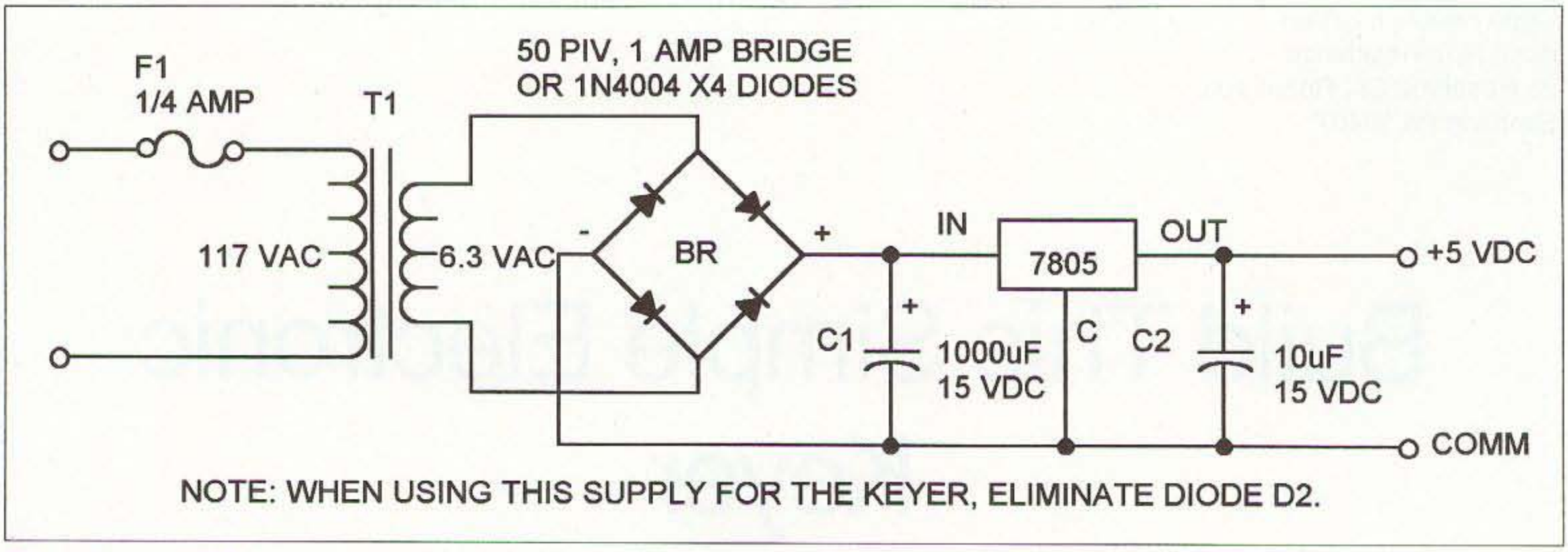

***Fig. 2.** Power supply.*

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of the relay, but it would be too much to explain here.

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 two separate 555s for the 556 IC3. Speed control potentiometer R7, which mounts on the front panel of the chassis box in which they keyer is to be housed, should have a reverse-log taper to improve the linearity of the keyer. The sidetone 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 case to reduce the possibility of RF interference. You can easily fabricate a paddle keyer. Mount it so that the contacts are inside the metal box, with the paddle arm exiting through a slot in the box. Make certain that the paddle arm moves freely from side to side and without contacting the metal case box.

Part No.	Description
B1–B4	1.5 V cell
C1, C2, C6–C8	0.01 µF disc capacitor
C3	1 µF 16 WVDC electrolytic capacitor
C4	2 µF 16 WVDC electrolytic capacitor
C5	0.02 µF disc capacitor
C9	0.1 µF disc capacitor
D1	1N4148 or 1N914 diode
D2, D3	1N4001 diode
K1	Reed relay 5 V coil
Q1	2N2222A transistor
SPKR	8 Ω speaker
S1	SPST switch
R1–R3, R5	1k 1/4 W resistor
R4	2.2k 1/4 W resistor
R6	47k 1/4 W resistor
R7	50k reverse log taper pot, front panel
R8	1k pot, front panel
IC1	7400 quad 2-input NAND gate IC
IC2	7473 dual flip-flop IC
IC3	556 dual timer IC
Miscellaneous: Perforated or printed circuit board; suitable metal case or box; battery holder; 2 control knobs; paddle assembly; hookup wire; solder; machine hardware, etc.; IC sockets; 4 rubber feet or rubber pad or metal plate; heat sink for Q1.	

***Table 1.** Parts list.*

After assembling the keyer, check out its operation in both the transmit and CPO modes. 73