QRP Sidetone Companion

And part-time code practice oscillator.

by Charles D. Rakes KI5AZ

If you're a QRP enthusiast who enjoys building and operating small QRP transmitters, and you're doing so without the benefit of a built-in sidetone generator, take a look at our QRP Sidetone Companion and part-time code practice oscillator. This inexpensive, easy-to-build project can add a pleasant sidetone to almost any QRP transmitter, and serve double duty as a code practice oscillator for a soon-to-be ham.

Five transistors, a few capacitors and resistors, and an IC occupy a small PC board measuring 7/8" x 2-1/4". All of this along with an on/off switch, two phono jacks, a speaker, and a 9-volt battery, share space in a small plastic cabinet from Radio Shack. If you don't have a junk box to scrounge from, you can end up with ten dollars or less in the project by prudent component shopping.

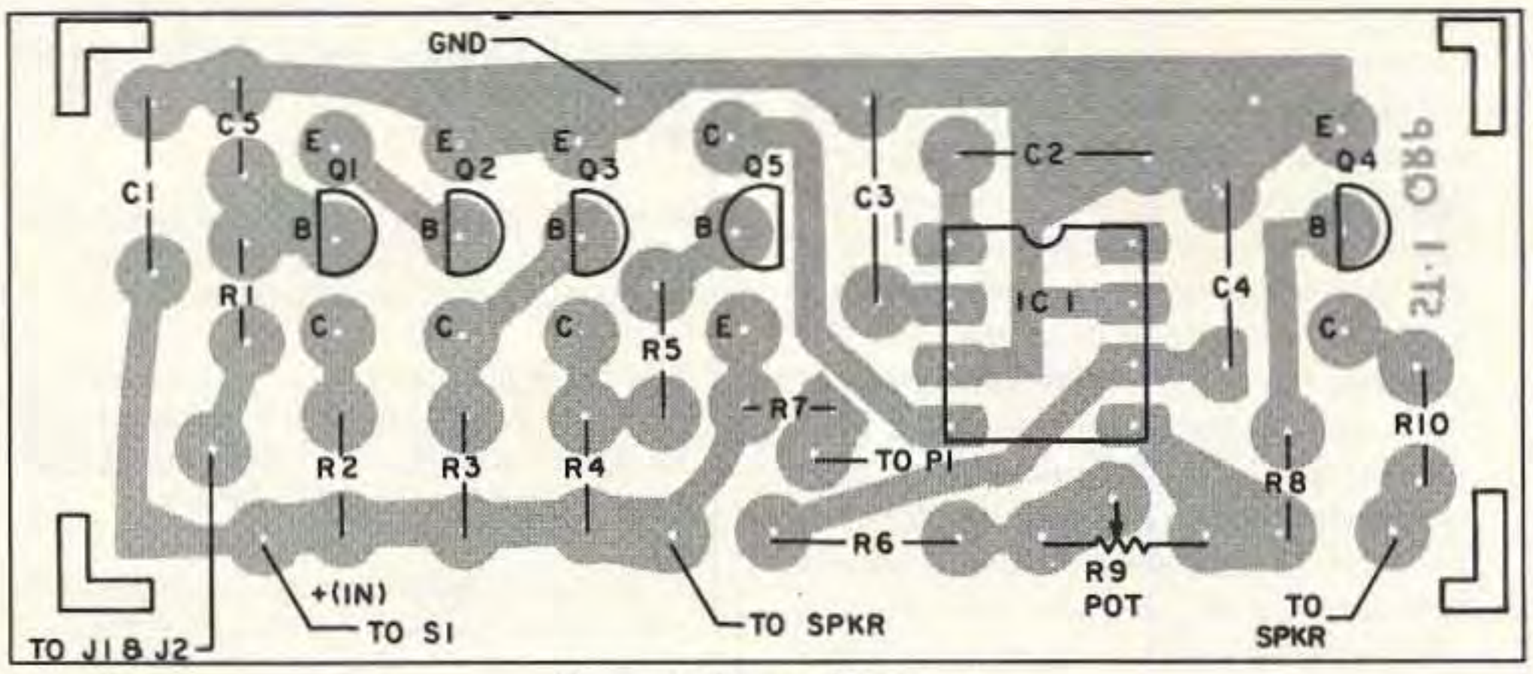

Figure 3. Parts placement.

The Inner Workings

To see how the circuit goes, take a look at the schematic diagram in Figure 1. The circuit is designed to operate with most any QRP transmitter that uses a positive keying voltage (most do). Two phono jacks are wired in parallel with the center conductors connecting to the base of Q1 through a 680k resistor. C5 eats any stray RF that might come in on the key leads. The positive keying voltage turns Q1 on. The emitter of Q1 is direct coupled to the base of Q2, turning it on also. Q3 is direct coupled to the collector of Q2, and when Q2 is on, Q3's base is clamped to near ground level, turning it off. With no current flow through R4, Q5 remains off.

By closing the key, the positive voltage at the base of Q1 disappears, turning Q1 and Q2 off; this allows Q3 and Q5 to turn on, bringing up the plus supply voltage to pin #4 of the 567 PLL IC. The 567, connected in an audio oscillator circuit, produces an audible tone signal that drives Q4. Q4's collector supplies audio to the speaker through a current-limiting resistor, R8. R9 sets the sidetone's frequency.

Three transistors are used in the front end to isolate the sidetone's circuitry from loading and falsely keying the QRP transmitter. For even greater isolation, R1 can be increased to 1 megohm. This will only be necessary if the sidetone circuit is used with a super-sensitive keying circuit—which isn't likely, but with Mr. Murphy lurking around every corner, anything is possible.

The part-time code practice oscillator is activated by inserting P1 into either J1 or J2, and a key in the remaining jack. If you like to fiddle with the sidetone's frequency, drill a 1/4" hole in the cabinet directly over R9, and adjust away.

Building the Sidetone Companion

The easy way is to use a PC board and follow the component placement drawing in Figure 2. As you position each part on the board, double-check its value and electrical location against the circuit diagram in Figure 1. In any case, the circuit is non-critical, and can be built breadboard style and housed in anything you like.

The circuit board is cut to slide into the groove in the side of the cabinet. The telephone headset (speaker) is located at one end of the cabinet, hot-glued in place. The power switch, the two phono jacks, and the plug are located along one edge of the cabinet. The battery fills the other end. Using the companion, plug the key into one of the jacks and run a jumper from the other jack to the "key" input of the transmitter. Flip S1 on, and hear what you are sending. Good QRPing! 73

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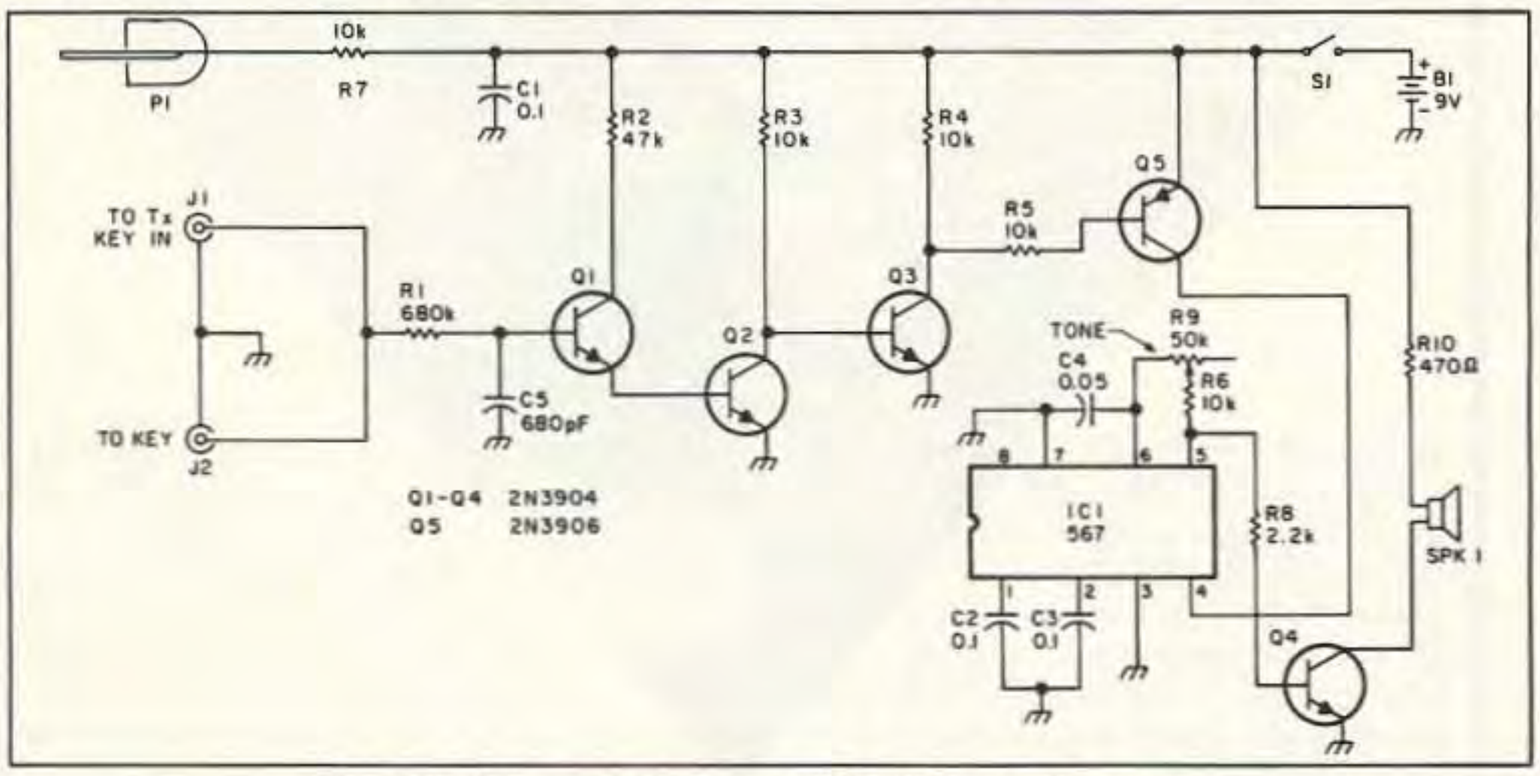

Figure 1. Schematic diagram of the Sidetone Companion.

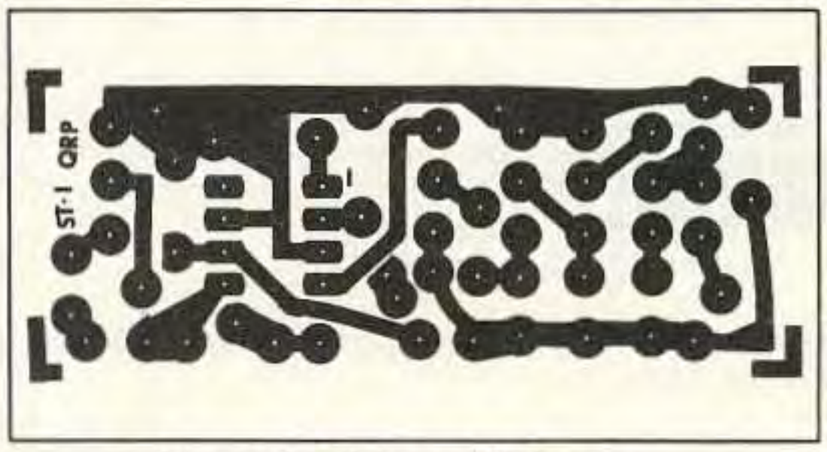

Figure 2. PC board foil pattern.

Parts list

B1	9-volt transistor battery	R8	2.2k 1/4W resistor
C1,2,3	0.1 µF 50-volt disc ceramic capacitor	R9	50k mini trim pot (vert)
C4	0.05 µF 100-volt mylar capacitor	R10	470-ohms 1/4W resistor
C5	680 pF 100-volt disc ceramic	S1	Mini SPST toggle switch
Q1,2,3,4	2N3904 NPN transistor	Spk-1	Headset removed from old telephone or a mini 8- or 16-ohm speaker
Q5	2N3906 PNP transistor		
IC-1	567 PLL IC	Misc.	Cabinet, wire, battery snap, hot glue, etc.
J1,2	Phono jacks		
P1	Phono plug		
R1	680k 1/4W resistor		
R2	47k 1/4W resistor		
R3,4,5,6,7	10k 1/4W resistor		

A printed circuit board and all of the parts for it are available for $8.95 plus $1.00 shipping from: KRYSTAL KITS, P.O. Box 445, Bentonville AR 72712. Tel. (501) 273–5340. You will need to furnish the cabinet, switch, jacks, plug, speaker, battery, and any part not on the PC board.