# Here's your key to

## An unusual approach to dits and dahs makes for hours of building and code-sending fun in our $17 project.

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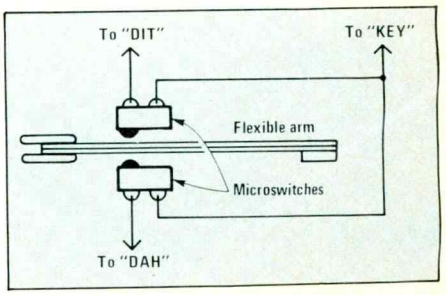
Contributing Editor


Dahditdahdit dahdahditdah—the sound of Morse code; the sound that keeps so many CBers from becoming amateur radio operators. Learning Morse code is really very easy. What's difficult is increasing the speed at which you can send and receive code. And this inexpensive, easy-to-build code practice oscillator is just the thing to make increasing your speed a lot easier.

The big difference between this oscillator and most others you've seen is its automatic keying capability. Just like the modern keyers used by today's active hams, this gem will automatically send a string of dits or dahs for as long as you hold the *paddle* against the appropriate contact.

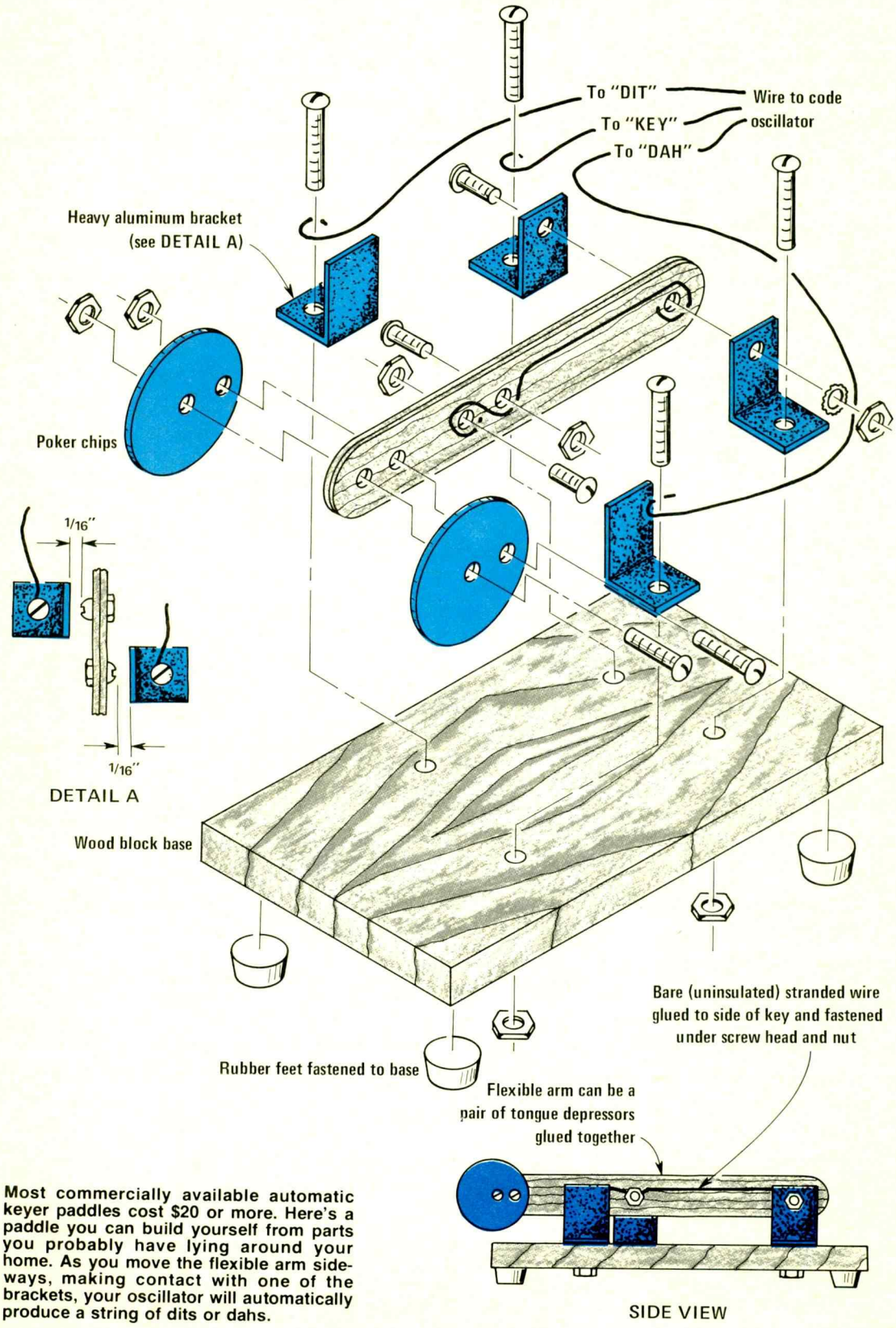
### Learning the sound

The big advantage of using an automatic keyer to increase your speed is that it forces you to recognize the sound of each Morse character. It's no longer a matter of counting how many times you push down the key to form an H. With the keyer, you hold the paddle against the *dit* contact until you hear the sound

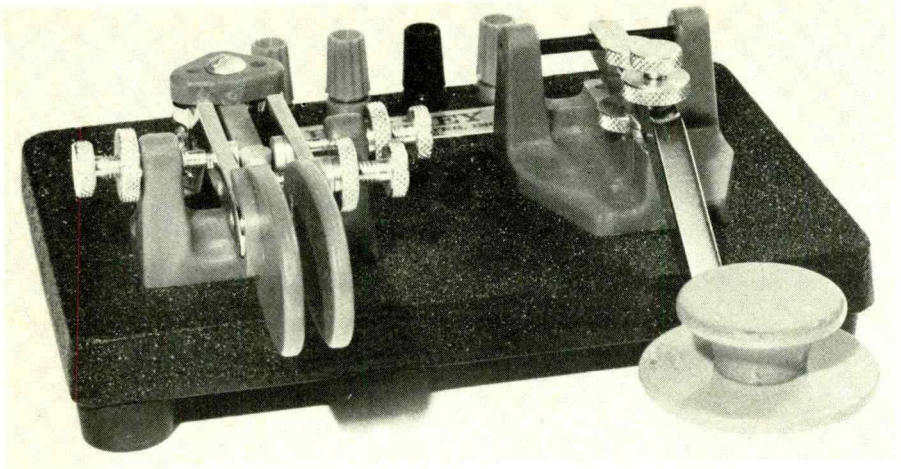



**You can use a pair of microswitches, such as the Radio Shack 275-016 or 017 with their levers removed, and any flexible arm to make a simple keyer paddle.**

# learning the code




Most commercially available automatic keyer paddles cost $20 or more. Here's a paddle you can build yourself from parts you probably have lying around your home. As you move the flexible arm sideways, making contact with one of the brackets, your oscillator will automatically produce a string of dits or dahs.



**If you'd rather not build your own paddle key, you can buy manufactured keys from several sources you'll find advertised in CQ, The Radio Amateur's Journal, and other amateur radio magazines. Among them is this HK-4 Ham Key, which combines both a paddle and a straight key in a single unit, available from Ham Radio Center, 8340-42 Olive Blvd., St. Louis, MO 63132 for $45.**

of the letter H, then release the paddle. If you release it too soon, you'll have formed the letter I or S; if you hold it too long, you'll end up with the number 5. So, you have to learn the sound of each letter.

The circuit consists of two parts: the basic oscillator and the automatic keyer. The basic oscillator, shown above the dashed line in the diagram, can be used with a *straight* hand key if you'd like.

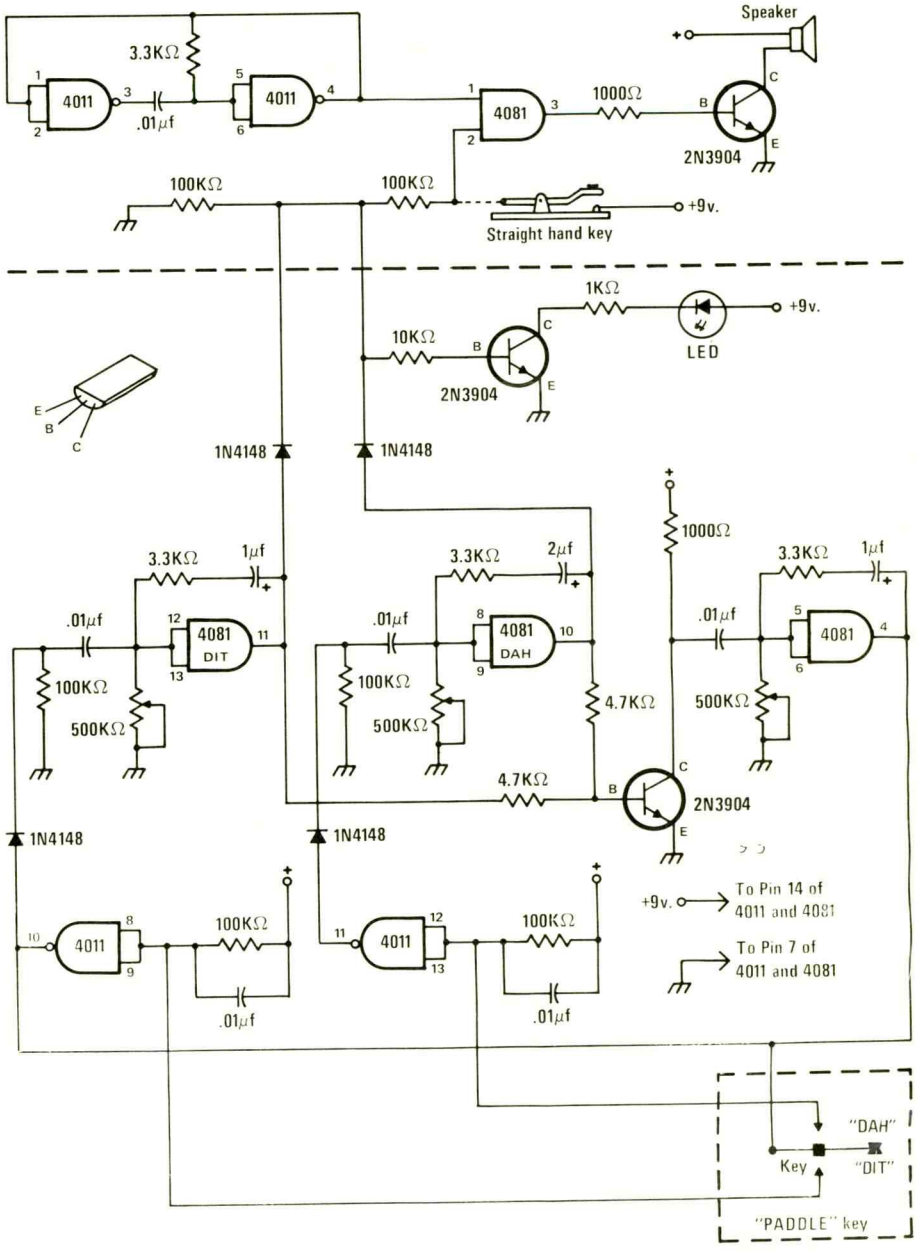
The automatic keyer is designed to be used with a sideways-moving keyer paddle. You can buy keyer paddles from several sources advertised in *CQ, The Radio Amateur's Journal* and other amateur radio magazines.

## An easy paddle

An even simpler paddle can be made using non-electronic parts you can obtain from your local hardware and drug stores. The flexible arm can be made of any material handy, but a pair of tongue depressors glued together should be flexible enough, yet rigid enough to hold its position between the contacts when not in use. The knobs can be made from poker chips. Electrical contact is made when one of the screw heads on the arm is pressed against the facing aluminum bracket. The paddle can be mounted on a block of wood, or any other non-conducting material handy.

The circuit shown contains a visual indicator in the form of an LED, which lights during the period a dit or dah is being sent. If you'd rather not include the LED, you can delete it and the associated transistor without affecting the remainder of the circuit.

Circuit layout is not critical. The finished oscillator can be mounted in a metal cabinet, such as the Radio Shack 270-260 wood grained box shown here, or in any convenient wood or plastic box you have handy.




### Parts list

| Quantity | Description | Radio Shack No. |
|---|---|---|
| 2 | 1000 ohm resistor | |
| 2 | 3.3 k ohm resistor | |
| 3 | 4.7 k ohm resistor | |
| 1 | 10 k ohm resistor | |
| 1 | 33 k ohm resistor | |
| 6 | 100 k ohm resistor | |
| 3 | 500 k ohm controls | 271-210 |
| 6 | .01 uF capacitor | 272-131 |
| 2 | 1 uF tantalum cap | 272-1406 |
| 1 | 2.2 uF tantalum cap | 272-1407 |
| 4 | 1N4148 diodes | 276-1122 |
| 2 | 2N3904 NPN transistor | 276-1603 |
| 1 | 4011 NAND gate IC | 276-2411 |
| 1 | 4081 AND gate IC | |
| 1 | Optional hand key | 20-1084 |
| 1 | LED | 276-041 |
| 1 | battery clip | 270-325 |
| 1 | 9-volt transistor battery (alkaline preferred) | 23-553 |
| 1 | 2-inch speaker | 40-245 |

All resistors are ¼-watt, composition type. All are available from Radio Shack's 271-1300 series.

Radio Shack part numbers are provided because your local Radio Shack store probably will be your chief source of supply. However, all parts used in this project are readily available from the many firms advertising in this issue of Modern Electronics, usually at less cost—though with the usual mail-order delays.