Simple CW IDer

Automatic operation for repeater or fox . . .

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For the past few years I've been involved with a 2 meter foxhunting group. Customarily, the winner of the hunt becomes the fox (hidden transmitter) for the next hunt. Being the fox is a lot of fun, but it can also cause some problems. What does one say for two hours straight? What type of transmitter should be used? Usually an HT is not suitable as a hidden transmitter, because of its low power and short battery life. Therefore, most people hide in their cars and use their mobile rigs. This makes for some very interesting hunts. But what if a portable transmitter was available that could run continuously and unattended for portable operation?

In a surplus electronics store, I found an old solid state Genave transmitter that was set up for data telemetry operation on the 150 MHz band. After being the fox a couple of times and running my five-hundred-dollar Yaesu dual-bander almost continuously, I found a use for that old telemetry transmitter. It did not have a microphone preamp since it was originally used for telemetry. Rather than build a preamp for it, I built a CW IDer. This solved the problem of what to say while hiding, and allowed unattended operation in a small portable and very "hideable" package.

Photo A. Inside of the hidden transmitter. CW Identifier board is in lower right of the photo.
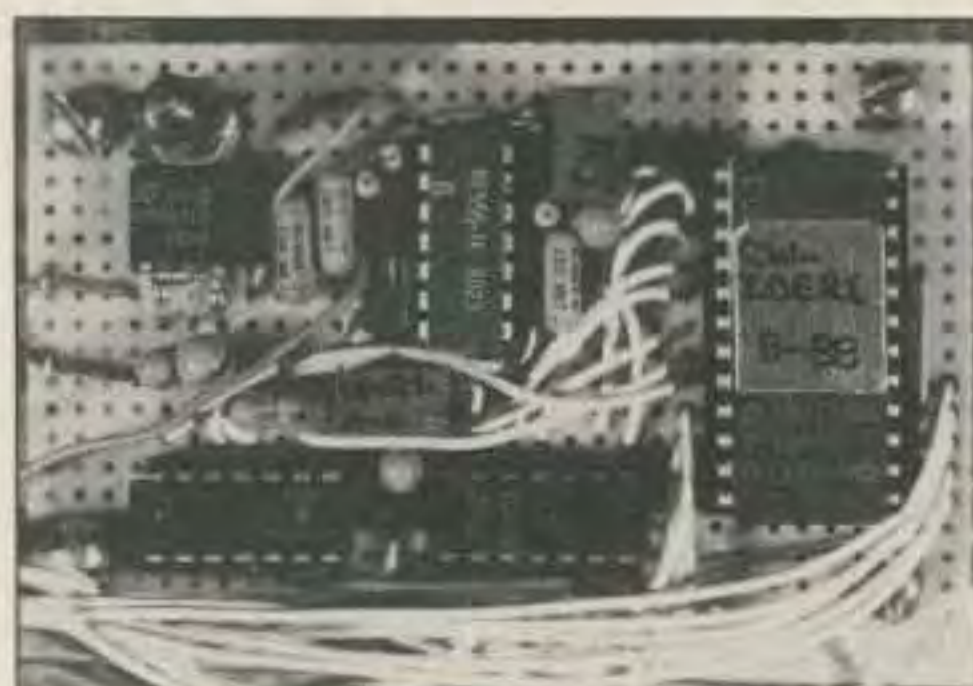
Photo B. CW hidden transmitter identifier.

Photo C. Hidden transmitter in enclosure with heat sink for continuous duty operation.

The CW Identifier

Several members of the foxhunting group might use the portable hidden transmitter, so it should have several call letters available on the CW identifier. I built the identifier with TTL LS logic circuits. I used a dual 555 timer for CW rate and a 1 kHz audio oscillator (see Figure 1). The design is based on a 2716 EPROM (Erasable Programmable Read-Only Memory). One half of the 556 feeds two 7493 ripple counters (or one 74393), giving a binary output counting from 00 Hex to FF

Hex, or 256 counts. The eight outputs from the ripple counter are connected to the address lines A0 to A7 on the 2716. A8, A9, and A10 are not used so they are tied to ground. The ripple counter steps the 2716 through the first 256 addresses and continues to loop indefinitely.

In this application, the eight data lines on the 2716 are analogous to an 8-track magnetic tape, where all eight tracks are parallel to each other. Only one "track" or data line is read at a time. This allows you to program eight different CW calls or messages into the PROM. For our foxhunting, we programmed eight callsigns followed by "hidden transmitter." We used a ten-position rotary switch to select one of the eight data lines, one position for continuous tone, and the other position for no tone. The selected data line is connected through the rotary switch to pin 4 of the 556, enabling the 1 kHz audio oscillator. R6 and C5 filter the square wave from the 556 using a first order low-pass with a corner frequency
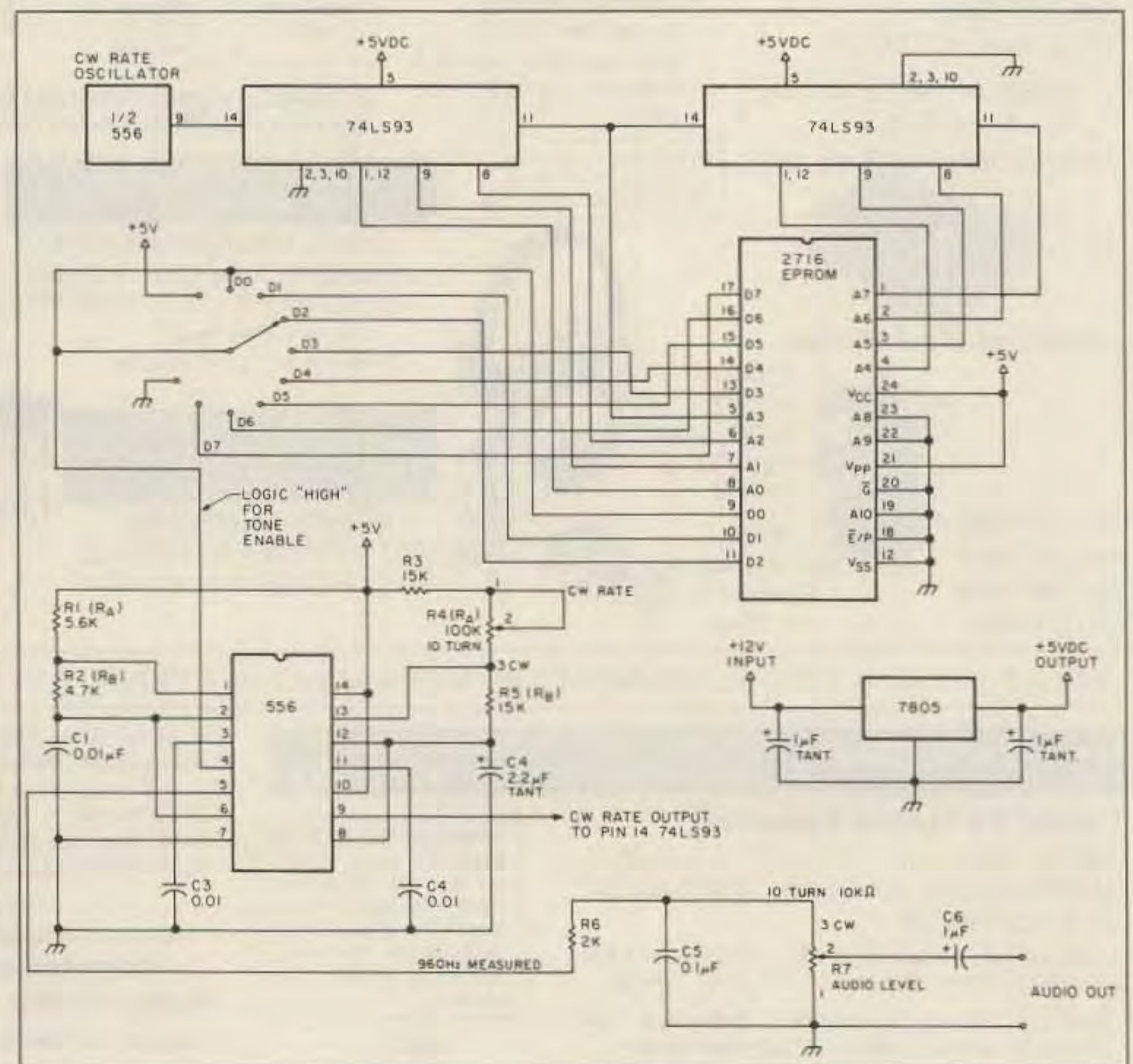

Figure 1. Hidden transmitter CW identifier schematic diagram.

Figure 2. An example of how to derive data words for PROM programming. (Only the first 14 address locations are shown.)

ADDRESS (HEX)	DATA LINES (BINARY) D7 D6 D5 D4 D3 D2 D1 D0	DATA LINES (HEX)
0 0		0 0
0 1		0 0
0 2		F F
0 3		D 5
0 4		F F
0 5		2 A
0 6		F F
0 7		0 0
0 8		A E
0 9		A E
0 A		F F
0 B		5 I
0 C		5 I
0 D		0 0
0 E		F F
0 F		E F
1 0		F F
1 1		1 0
1 2		F F
1 3		4 5
1 4		F D
F E		
F F		

Call letters (columns): KB0J, N0FDA, WD0E, NC0B, WB4ETT, K0ELM, WN0EHE, N0FVG

Figure 3. Repeater identifier schematic diagram.

of 800 Hz, providing an audio output closer to a sine wave. R4 allows adjustment of the CW rate and R7 provides a wide range of audio output. The 7805 voltage regulator provides +5 volts to power all circuitry. The completed hidden transmitter with CW IDer is shown in Photo A.

The transmitter has been heat-sinked for continuous duty operation at a rated power of 10 Watts. One knob near the S0-239 connector allows for continuous power selection from 200 mW to 10 Watts (transmitter modification by WB4ETT and N0FVG). The other knob selects one of the eight programmed CW call letters. A terminal strip lets you connect a battery, with external PTT and audio, if desired.

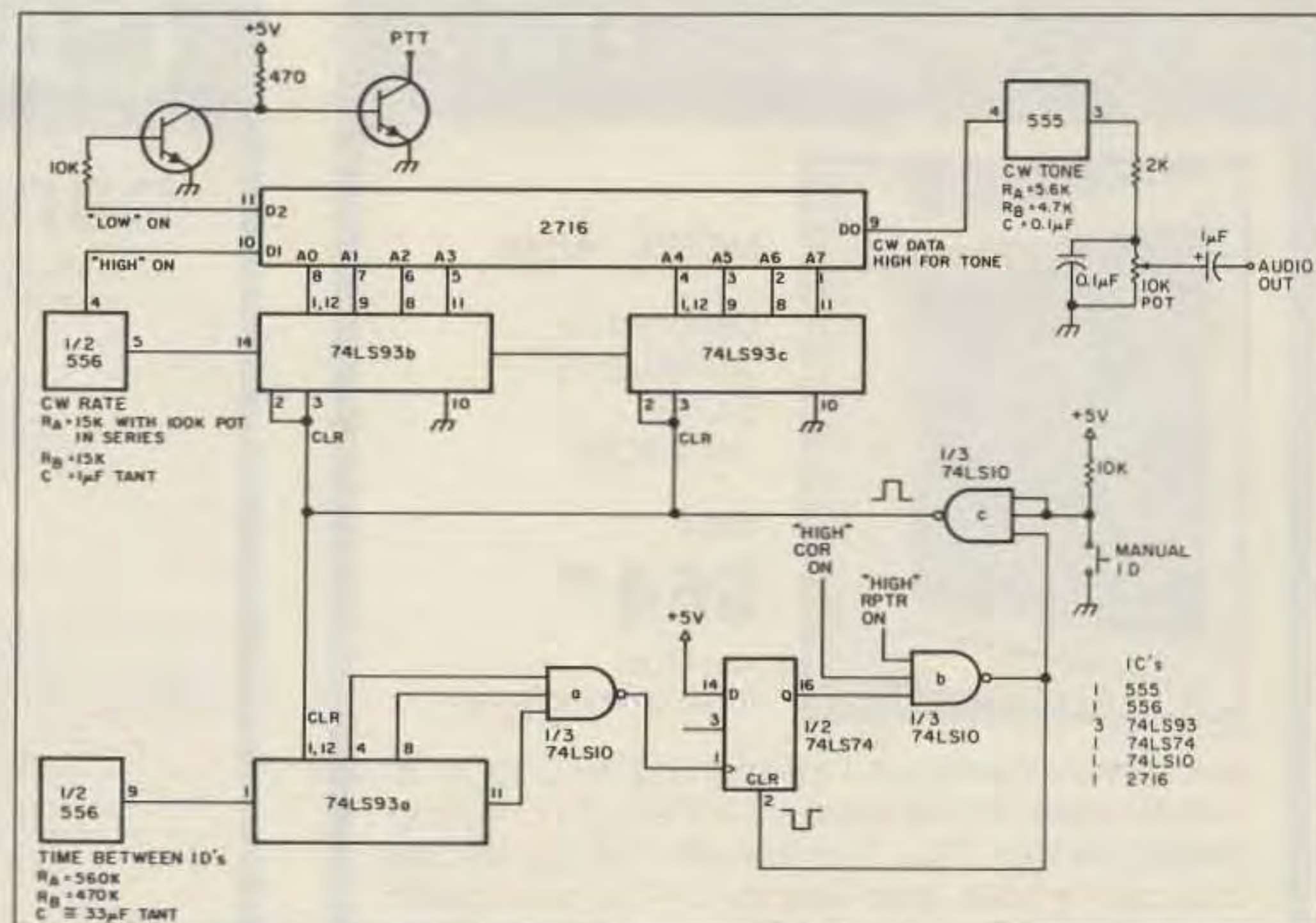## Programming the PROM

You should set up a list (as in Figure 2) to program the PROM. Enter the message for each data line vertically, using one location for a dot and three locations for a dash. After you have entered all messages, you can calculate the hexadecimal value for each address. Then you can program the first 256 addresses of the 2716 using any type of PROM programmer.

A Repeater Identifier

With additional circuitry, you can make a repeater identifier (see Figure 3). You use one data line (D0) for CW data information, again gating the audio oscillator. You can use the other data lines for control functions. D1 enables the CW rate oscillator when an ID is in progress. D2 keys the repeater transmitter. TTL logic inputs are provided for "COR present" and "repeater on."

Circuit Operation

One half of the 556 timer provides clock pulses to the 7493(A) and the 7410(a). In ten minutes the D flip-flop (7474) is clocked, causing Q to go high. If the repeater is on and COR is present, the output of the 7410(b) goes low, resetting Q to a low state and providing a high pulse output from 7410(c). This clears all ripple counters and starts the ID sequence.

When the ID is completed, D1 goes low to prevent further clocking of the 2716. All circuitry remains in this state until another ten minutes passes and the D flip-flop is set again. If Q is set, it remains set until the "repeater on" and "COR present" lines are both high, at which time the ID sequence is again initiated.