Speed Demon

How fast was that? Find out with this wpm display for Heath's 1410 keyer.

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In the following, I will describe a digital display I added to my Heath 1410 keyer to display the wpm setting of the keyer. The same principle can be applied to other keyers.

First, let's look at what we need to calculate the words-per-minute speed of the keyer. The *ARRL Handbook* gives the following formula for calculating code speed:

words/min = dots/min/25 = 2.4 × dots/sec

From the Heath 1410 keyer manual, we see that for each dot generated (space included), the clock in the keyer generates two pulses. The clock pulse rate is twice the dot rate. If we measure the clock pulses instead of the dots, the formula becomes:

words/min = 1.2 clock pulses/sec

Multiplying the clock pulses/sec by 1.2 is the same as measuring the clock pulses for 1.2 seconds. 1.2 seconds is 72 cycles at the 60-Hz power-line frequency; therefore, if we count the clock pulses for 72 cycles of the line frequency, we are effectively multiplying our keyer clock pulses/sec by 1.2. Thus, by counting the clock pulses from the keyer for 1.2 seconds, we can read the code speed directly on the seven-segment displays.

Referring to the timing diagram in Fig. 1, we see that by dividing the 60-Hz line frequency as shown (first by 6, then again by 6, then by 2, then finally by 2; see Fig. 2) we obtain a 1.2-second gating pulse. We now have the means to time the keyer clock pulses for 1.2 seconds and the count will update each 1.2 seconds. The reset pulse clears the counters 0.6 seconds prior to the counting interval. Send dots and/or dashes for over 2.4 seconds, and the readout will display for 0.6 seconds the speed at which the keyer is set.

Power, the 60-Hz line frequency, and, of course, the keyer clock pulses are all taken from the keyer. Refer to Fig. 3 and the Heath 1410 keyer manual for the fol-

The assembled keyer with the counter modification.

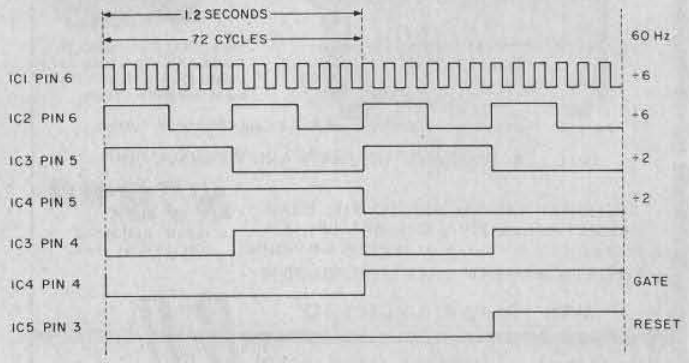
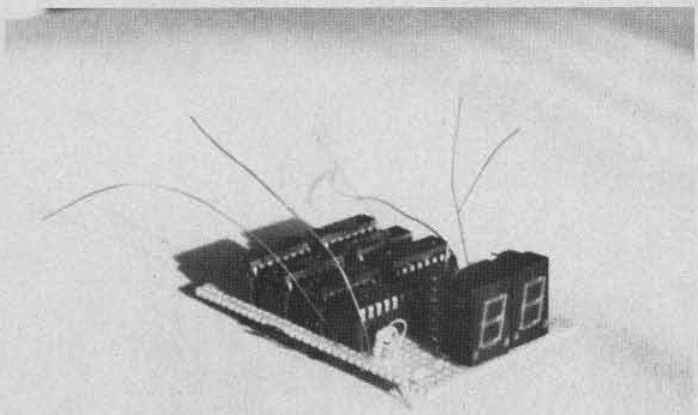
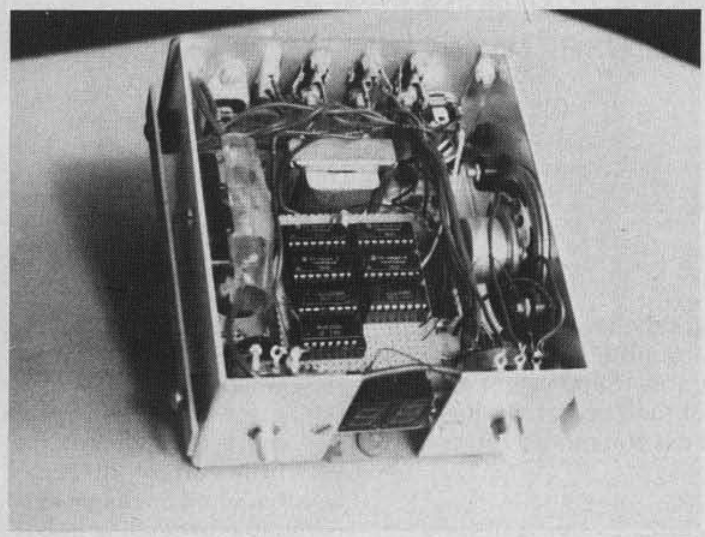


Fig. 1. Timing pulses appearing at various points in the circuit.



The completed counter board before mounting in the keyer.



The counter board is mounted using right-angle brackets and the mounting holes for the removed paddles.

lowing connections. The keyer clock pulse is obtained from point D on the keyer speed control. The 60-Hz signal is obtained from either side of the secondary of the power transformer and ground. The resistor values shown, R1 and R2, are for the Heath keyer. A convenient source for the 5 V dc is the speaker lead that is connected to the 5 V dc supply.

I replaced the neon on-off indicator lamp with an LED. I then connected the inputs of the remaining 1/4 IC5 to pin 12 of IC3 in the keyer, and the output to the LED; see Fig. 2. The LED lights up on the mark portion of the code character.

When sending code, the display of the speed will vary. You are seeing the average speed at which you were sending in that 1.2-second interval.

There are several methods of housing the display. I use a Bencher paddle with my keyer, so I removed the keyer paddles from the keyer and took out the center post. I then mounted a red lens over the opening. The display and circuitry are then mounted behind the lens using the mountings for the removed paddle assembly. ■

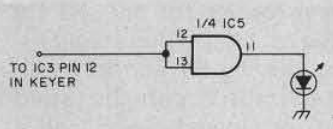


Fig. 2. LED mark indicator for keyer output.

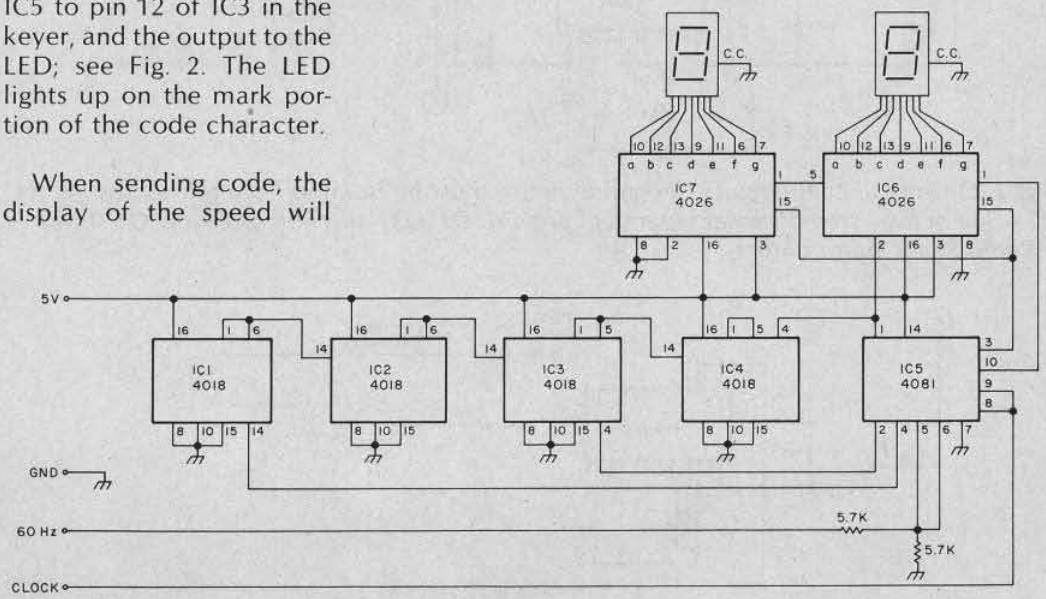


Fig. 3. Code-speed reader for the Heath 1410 keyer.

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