

HOBBY CORNER

Lotto device

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STATE-RUN LOTTO-TYPE LOTTERIES have become very popular over the last several years. In those games the player picks six lucky numbers between 1 and 40. If those numbers are also selected in the weekly drawing, the player wins all or part of a "jackpot." Some of those jackpots can be quite large; recently a Pennsylvania man won 7-million dollars in that state's game. Of course if the numbers are not chosen the state keeps the player's wager.

The reason we're bringing all of that up is that we recently received a letter from George Rates (NY), who wants a device to help him pick his lucky numbers. What he wants is a device that will randomly light 1 of 40 LED's. We'll devote some time and space to the task this month because it illustrates procedures that can be applied to many other applications as well.

Even if you don't play Lotto, keep your eyes open because the same principles can be used to control any practical number of LED's. Here, though, we'll build a device to control 40 LED's, which we've chosen to think of in terms of four sets of ten each. Of course, you can arrange the LED's in any straight or mixed pattern you desire.

Figure 1 shows a 74145 BCD-to-decimal decoder IC. It has ten output lines that go low sequentially as it is addressed from

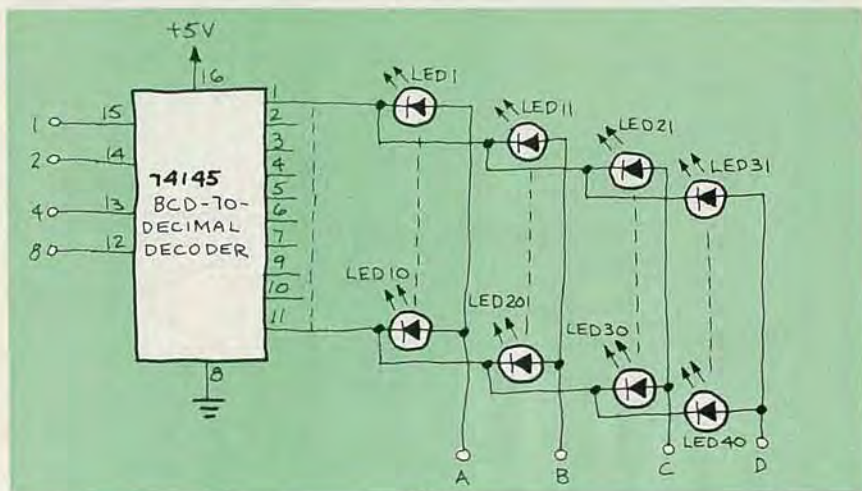


FIG. 1

zero to nine. (Only the first and last lines are shown but the other 8 are connected the same way.) Note that each output line is connected to 4 LED's. In addition, one LED in each set is connected to a line (labeled A, B, C, and D).

Now, if we put +5-volts DC on line A, any of the ten LED's on that line will light when the address line to it from the 74145 goes low. The same applies to the LED's attached to lines B, C, and D.

So far, so good; but we need something to provide the addresses to that 74145. That is taken care of in Fig. 2. It is nothing more than a 555 oscillator driving a 7490 decade counter. Open S1 and the 555 outputs pulses at pin 3. In turn, the 7490 counts those pulses in groups of ten and outputs repeated counts of one to ten (in BCD, of course).

Now, let's test what we have. Connect the output of the 7490 to the input of the 74145. Apply 5 volts to line A and press

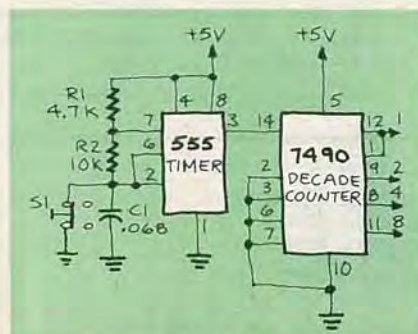


FIG. 2

S1. You should not see anything happening; the values of R1, R2, and C1 were chosen to produce fast pulses and the LED's will be flashing so fast you don't see them. As soon as you release the switch, however, the flashing stops and one of the LED's remains on.

You can slow the rate of the flashes to see what's happening by substituting a larger capacitor for C1. If you do so, be sure not to leave it there permanently because the "random" LED that remains lighted is only random when the LED's flash so fast that you can't stop it where you wish.

Let's stop for a moment and see where we stand. We have one set of ten LED's that flash sequentially so fast that you can't predict which will be on when you release the switch. That's fine, but we're not finished; we must get the other 30 LED's into the act.

Using all 40 LED's is only a matter of switching the 5 volts from line to line. Of course, the switching must be timed just right in order to energize a line as soon as the previous line has finished flashing. There are many ways that can be done, but we're going to use the method shown in Fig. 3.

Note in Fig. 3 that pins 2 and 3 of the 7404 are tied together to pin 8. We want only a count of four and doing that resets the counter to zero when it reaches four. If you are wondering why it resets at four when you need four counts, remember that the count does not start at one, but at zero instead.

AN INVITATION

To better meet your needs, "Hobby Corner" has undergone a change in direction. It has been changed to a question-and-answer form. You are invited to send us questions about general electronics and its applications. We'll do what we can to come up with an answer or, at least, suggest where you might find one.

If you need a basic circuit for some purpose, or want to know how or why one works, let us know. We'll print those of greatest interest here in "Hobby Corner." Please keep in mind that we cannot become a circuit-design service for esoteric applications; circuits must be as general and as simple as possible. Please address your correspondence to:

Hobby Corner
Radio-Electronics
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New York, NY 10003

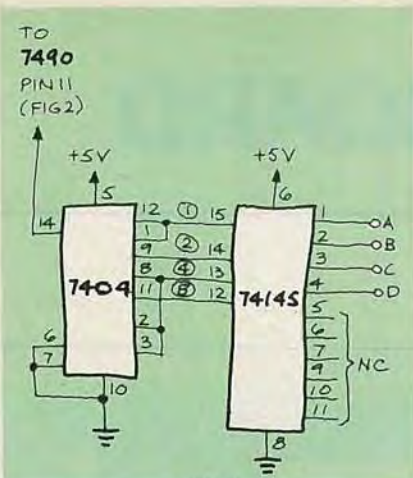


FIG. 3

For the same reason, we are using only the first four output pins of the 74145. In order to synchronize the lines with the LED's, be sure that you drive the 7404 with a signal from pin 11 of the 7490, as shown in Fig. 3.

Now we are all set but for one thing: The output of the 74145 takes the selected line to ground and we want it taken high (remember that we want a positive voltage on the LED lines). That is the reason for the 7404, a hex inverter. It changes the high's to low's and vice-versa. So, we have the selected line going high as we need.

Connect the A, B, C, and D lines from the 7404 to the like-labeled lines from the LED's and that's all there is to it. The flashes run through the first ten LED's, then the second ten, and so on, returning, of course, to the first set of ten after the fourth.

Well, George, get started building. When you are through, each push of the switch will leave a randomly selected LED lighted. Don't forget that you can arrange the LED's in whatever order best suits your needs or whims. **R-E**



"It shouldn't take you long to repair it. Elmo has already laid out all the ground-work for you."