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## Cascading Timer Relay Board

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Here is a board with two 10A relays that, when triggered, will activate one relay for a specified time and then activate another relay for a specified time. Each relay's ON time can be independently controlled with "timing resistors" which are easily replaceable by the User. See below for a table of resistor values and associated time delays. Time delays can range from less than a second to about 25 minutes. Once the second relay's time has expired both relays will remain off until the board is triggered again. Triggering the board is accomplished by using a normally open momentary switch (supplied by User).

This board is based on the 556 Timer and the relays are rated for up to 10 amps. Both relays have Normally Open (NO) and Normally Closed (NC) terminal connections.

An LED indicates when the NO contacts of the relay are closed.

The board requires 12VDC for operation. Other voltages are available upon request.

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### Miscellaneous Information:

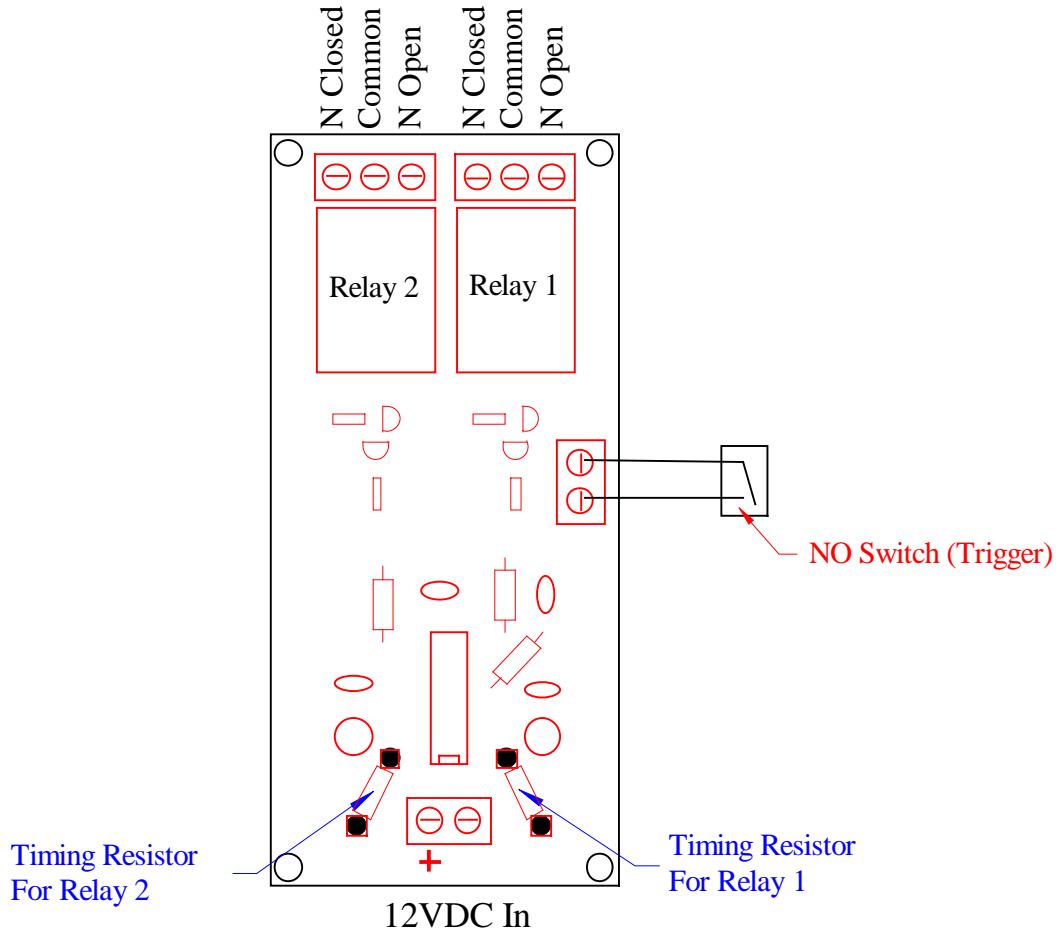
- The first relay activates as soon as the trigger occurs but timing begins as soon as the trigger is interrupted. For example, if you have a timing resistor installed to give an ON time of 10 seconds for the first relay and you hold the trigger switch down for 5 seconds, that relay will be activated for 15 seconds total. The second relay will activate as soon as the first relay times out.

### Specifications:

- Input Power: 12 VDC
- Output: NO and NC Contacts
- Relay Rating: 10A Max
- Board Dimensions: 1.75 x 4.0 inches

**Example Hook-Up**

Below is an example of how this board might be hooked up:



## Resistor Values / Time Delay\* Chart

Resistor Value (K)	Delay			Resistor Value (K)	Delay		
	Seconds	+5%	-5%		Minutes	+5%	-5%
10 K	1.4	1.3	1.5	220 K	0.52	0.49	0.54
11 K	1.6	1.5	1.6	240 K	0.56	0.54	0.59
12 K	1.7	1.6	1.8	270 K	0.63	0.60	0.67
13 K	1.8	1.7	1.9	300 K	0.71	0.67	0.74
15 K	2.1	2.0	2.2	330 K	0.78	0.74	0.81
16 K	2.3	2.1	2.4	360 K	0.85	0.80	0.89
18 K	2.5	2.4	2.7	390 K	0.92	0.87	0.96
20 K	2.8	2.7	3.0	430 K	1.01	0.96	1.06
22 K	3.1	2.9	3.3	470 K	1.11	1.05	1.16
24 K	3.4	3.2	3.6	510 K	1.20	1.14	1.26
27 K	3.8	3.6	4.0	560 K	1.32	1.25	1.38
30 K	4.2	4.0	4.4	620 K	1.46	1.39	1.53
33 K	4.7	4.4	4.9	680 K	1.60	1.52	1.68
36 K	5.1	4.8	5.3	750 K	1.76	1.68	1.85
39 K	5.5	5.2	5.8	820 K	1.93	1.83	2.02
43 K	6.1	5.8	6.4	910 K	2.14	2.03	2.25
47 K	6.6	6.3	7.0	1.0 M	2.35	2.23	2.47
51 K	7.2	6.8	7.6	1.1 M	2.59	2.46	2.72
56 K	7.9	7.5	8.3	1.2 M	2.82	2.68	2.96
62 K	8.7	8.3	9.2	1.3 M	3.06	2.90	3.21
68 K	9.6	9.1	10.1	1.5 M	3.53	3.35	3.70
75 K	10.6	10.1	11.1	1.6 M	3.76	3.57	3.95
82 K	11.6	11.0	12.1	1.8 M	4.23	4.02	4.44
91 K	12.8	12.2	13.5	2.0 M	4.70	4.47	4.94
100 K	14.1	13.4	14.8	2.2 M	5.17	4.91	5.43
110 K	15.5	14.7	16.3	2.4 M	5.64	5.36	5.93
120 K	16.9	16.1	17.8	2.7 M	6.35	6.03	6.67
130 K	18.3	17.4	19.3	3.0 M	7.06	6.70	7.41
150 K	21.2	20.1	22.2	3.3 M	7.76	7.37	8.15
160 K	22.6	21.4	23.7	3.6 M	8.47	8.04	8.89
180 K	25.4	24.1	26.7	3.9 M	9.17	8.71	9.63
200 K	28.2	26.8	29.6	4.7 M	11.05	10.50	11.61
				5.1 M	11.99	11.39	12.59
				5.6 M	13.17	12.51	13.83
				6.2 M	14.58	13.85	15.31
				6.8 M	15.99	15.19	16.79
				7.5 M	17.64	16.76	18.52
				8.2 M	19.28	18.32	20.25
				9.1 M	21.40	20.33	22.47
				10.0 M	23.52	22.34	24.69

\* Above time values are calculated and are approximate. You may have to experiment a little to get the exact time you want. Use ¼ watt resistors – available at any electronics supply store (i.e., Radio Shack). The +/- 5% Values above show approximate range expected when using 5% resistors.

**Disclaimer:**

These boards are designed for educational use only. In no circumstances should these circuit boards be used in critical situations where failure could mean injury or property damage.

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