

SimpleCircuitBoards.com

Multi-Event Timer Relay Board



Here is a board that I developed for someone who set up haunted houses. This person wanted a board that would control 3 separate events – a “Bang Event” that happened as soon as someone triggered the board, a “Show #1” that occurred for a specified period of time and a “Show #2” that occurred for a specified period of time that started after Show #1 finished. He also wanted the board to isolate itself from the triggering event so that it could not be re-triggered until after the last event had completed. So, as you can see, there are actually 4 time intervals – one for Isolation and the other three listed above. See the Timing Diagram below for a diagrammatic representation of all 4 time intervals.

The length of each time interval can be independently controlled with “timing resistors” which are easily replaceable by the User. See below for tables of resistor values and associated time delays. Time delays can range from less than a second to about 25 minutes.

Triggering the board is accomplished by using a normally open momentary switching device (supplied by User).

This board is based on the 555 and 556 Timers and the relays are rated for up to 10 amps. All 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.

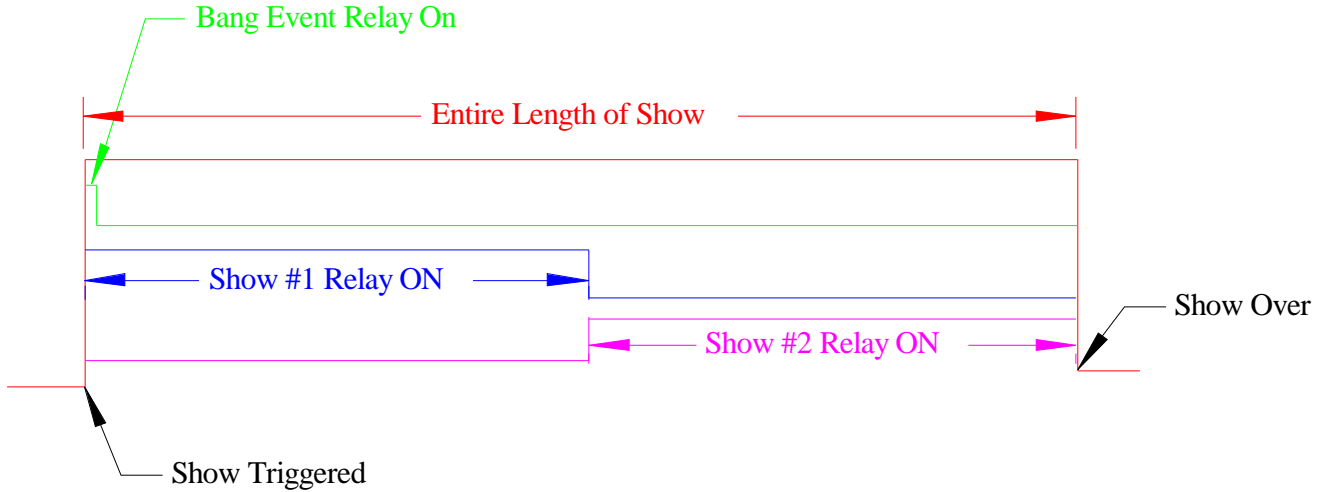
Miscellaneous Information:

- The timing for the overall show length should be set to last until after Show #2 has completed or else the entire show can be re-triggered before the previous show completes. For example if Show #1 lasts for 1 minute and Show #2 lasts for 2 minutes then the overall show length should be set to 3 minutes or longer.
- The Bang Event and Show #1 start simultaneously when the board is triggered.

Specifications:

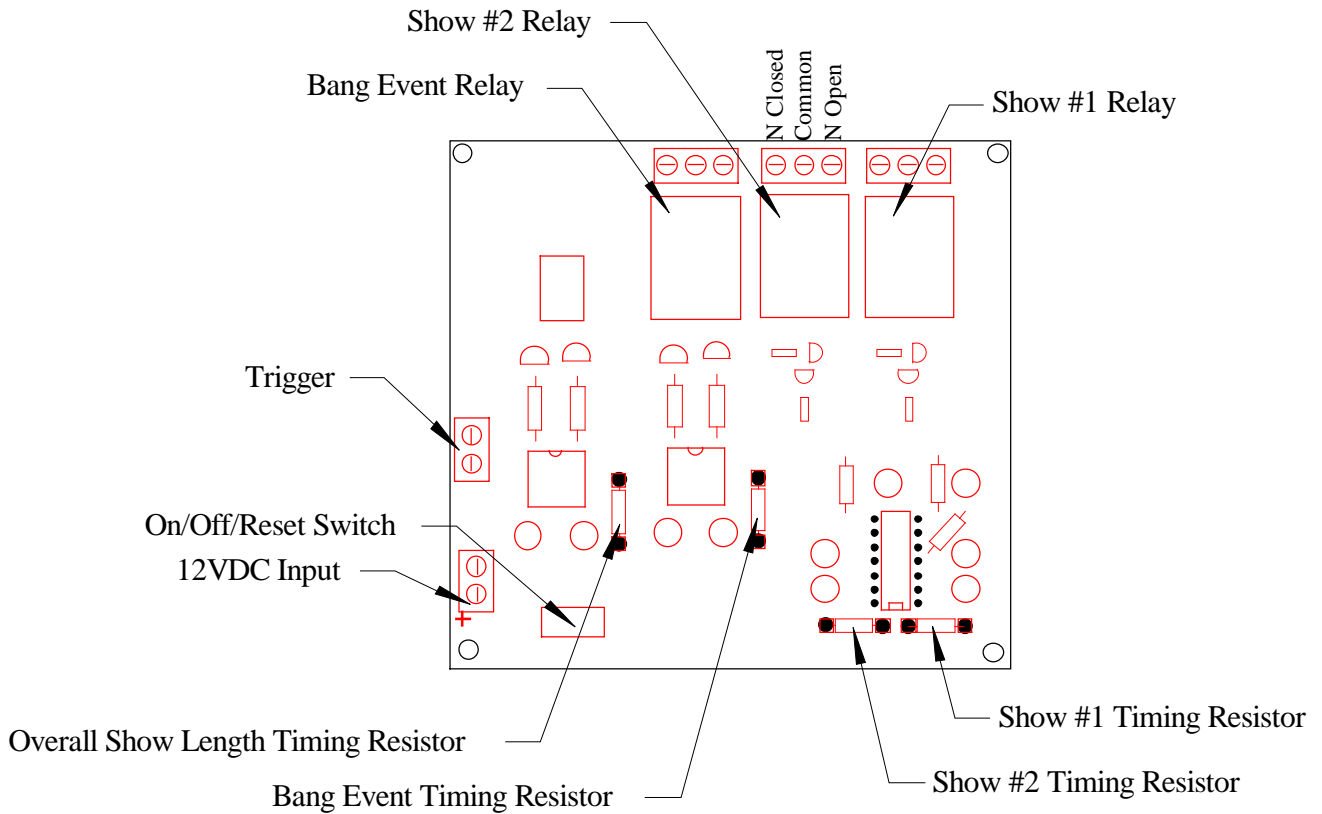
- Input Power: 12 VDC
- Output: NO and NC Contacts
- Relay Rating: 10A Max
- Board Dimensions: 3.75 x 4.0 inches

Timing Diagram



Example Hook-Up

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



Resistor Values / Time Delay* Chart #1

Use this chart for the Overall Show Length and Bang Event

Resistor Value (K)	Seconds	+5%	-5%	Resistor Value (K)	Minutes	+5%	-5%
10 K	2.2	2.1	2.3	220 K	1.02	0.97	1.07
11 K	2.5	2.4	2.6	240 K	1.11	1.06	1.17
12 K	2.8	2.6	2.9	270 K	1.26	1.19	1.32
13 K	3.1	2.9	3.2	300 K	1.40	1.33	1.47
15 K	3.6	3.4	3.8	330 K	1.54	1.46	1.61
16 K	3.9	3.7	4.1	360 K	1.68	1.59	1.76
18 K	4.5	4.2	4.7	390 K	1.82	1.73	1.91
20 K	5.0	4.8	5.3	430 K	2.01	1.91	2.11
22 K	5.6	5.3	5.9	470 K	2.19	2.08	2.30
24 K	6.2	5.8	6.5	510 K	2.38	2.26	2.50
27 K	7.0	6.6	7.3	560 K	2.61	2.48	2.75
30 K	7.8	7.5	8.2	620 K	2.90	2.75	3.04
33 K	8.7	8.3	9.1	680 K	3.18	3.02	3.34
36 K	9.5	9.1	10.0	750 K	3.51	3.33	3.68
39 K	10.4	9.9	10.9	820 K	3.83	3.64	4.02
43 K	11.5	10.9	12.1	910 K	4.25	4.04	4.47
47 K	12.6	12.0	13.3	1.0 M	4.68	4.44	4.91
51 K	13.7	13.1	14.4	1.1 M	5.15	4.89	5.40
56 K	15.2	14.4	15.9	1.2 M	5.61	5.33	5.89
62 K	16.8	16.0	17.7	1.3 M	6.08	5.78	6.39
68 K	18.5	17.6	19.5	1.5 M	7.02	6.67	7.37
75 K	20.5	19.5	21.5	1.6 M	7.49	7.11	7.86
82 K	22.5	21.3	23.6	1.8 M	8.43	8.00	8.85
91 K	25.0	23.7	26.2	2.0 M	9.36	8.90	9.83
100 K	27.5	26.2	28.9	2.2 M	10.30	9.79	10.82
110 K	30.3	28.8	31.9	2.4 M	11.24	10.68	11.80
120 K	33.2	31.5	34.8	2.7 M	12.64	12.01	13.28
130 K	36.0	34.2	37.8	3.0 M	14.05	13.35	14.75
150 K	41.6	39.5	43.7	3.3 M	15.46	14.68	16.23
160 K	44.4	42.2	46.6	3.6 M	16.86	16.02	17.71
180 K	50.0	47.5	52.5	3.9 M	18.27	17.35	19.18
200 K	55.6	52.9	58.4	4.7 M	22.02	20.92	23.12
				5.1 M	23.89	22.70	25.09
				5.6 M	26.24	24.92	27.55
				6.2 M	29.05	27.60	30.50
				6.8 M	31.86	30.27	33.45
				7.5 M	35.14	33.38	36.90
				8.2 M	38.42	36.50	40.34
				9.1 M	42.64	40.51	44.77
				10.0 M	46.86	44.51	49.20

Resistor Values / Time Delay* Chart #2

Use this chart for Show #1 and Show #2 Length

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.

For more information, contact me at:

Info@SimpleCircuitBoards.com