

## Práctica 18: Circuitos multivibradores

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No. de lista: 3

### Cálculos del punto 1

T(s)	$t_1(s)$	$t_2(s)$	C(f)	$R_1(\Omega)$	$R_2(\Omega)$
1	.7	.3	1000 u	1440	430
5	3	2	200 u	4.7 k	14k
200 m	15.246 m	184.75 m	100 u	2445	220
10	4	6	820 u	10k	10 k
8	4	4	100 u	560	560

1-  
 $T = t_1 + t_2$   
 $t_1 = 0.693(R_1 + R_2)C$   
 $t_2 = 0.693(R_2)C$   
 $t_1 = t_2 + 0.3$   
 $t_1 = 0.693(R_1 + R_2)1000\mu f$   
 $t_2 = 0.693(R_2)1000\mu f$   
 $t_1 = T - t_2 \quad t_1 = 1 - 0.3 \rightarrow t_1 = 0.7s$   
 $R_2 = \frac{t_2}{(0.693)C} \rightarrow R_2 = \frac{0.3}{0.693(1000)} = R_2 = 432.9\Omega$   
 $R_1 = \frac{t_1}{(0.693)C} + R_2 \rightarrow R_1 = \frac{0.7}{0.693(1000)} + 432.9$   
 $R_1 = 1440\Omega$

2-  
 $5 = t_1 + t_2$   
 $5 = 0.693(4.7k + R_2)200\mu f$   
 $t_2 = 0.693(R_2)200\mu f$   
 $t_2 = T - t_1 \quad t_2 = 5 - 3 \rightarrow t_2 = 2s$   
 $R_2 = \frac{t_2}{(0.693)(200\mu f)} \therefore \frac{2}{1.386 \times 10^{-4}} \rightarrow R_2 = 14430.01\Omega$

3-  
 $200ms = t_1 + t_2$   
 $t_1 = 0.693(R_1 + 220)100\mu f$   
 $t_2 = 0.693(220)100\mu f$   
 $t_2 = 0.693(220)(100 \times 10^{-6}) \therefore t_2 = 15.246ms$   
 $t_1 = T - t_2 \quad t_1 = 200ms - 15.246ms$   
 $t_1 = 184.75ms$   
 $R_1 = \frac{t_1}{(0.693)(100\mu f)} + R_2 \therefore R_1 = \frac{184.75 \times 10^{-3}}{(0.693)(100 \times 10^{-6})} + 220$   
 $R_1 = 2445\Omega$

4-

$$10 = t_1 + 6$$

$$t_1 = 0.693 (R_1 + 10k) C$$

$$6 = 0.693 (10k) C$$

$$t_1 = T - t_2 \rightarrow t_1 = 10 - 6 \rightarrow t_1 = 4s$$

$$C = \frac{t_2}{(0.693)(10k)} \rightarrow C = \frac{6}{(0.693)(10000)} = 865 \mu F$$

$$R_1 = \frac{t_1}{(0.693)(C)} + R_2 \rightarrow R_1 = \frac{4}{(0.693)(865)} + 1015$$

$$R_1 = 10000 = 10k$$

5-

$$5 = 4 + 1$$

$$4 = 0.693 (R_2 + 500) C$$

$$1 = 0.693 (500) C$$

$$C = \frac{t_2}{(0.693)(R_2)} \rightarrow C = \frac{4}{(0.693)(500)} = 100 \mu F$$

$$R_1 = \frac{t_1}{(0.693) C} + R_2 \rightarrow R_1 = \frac{1}{(0.693)(100)} + 500$$

$$R_1 = 500 \Omega$$

## Cálculos del punto 3

T(s)	C(f)	$R_a(\Omega)$
2	1000 u	1.8k
2	200 u	9k
2	100 u	18k
2	180 u	10 k
2	3200 u	560

1-

$$t_a = 1.1 (R_a) C$$

$$1 - 1/2 = 1.1 (R_a) (1000)$$

$$R_a = \frac{t_a}{(1.1) C} \rightarrow \frac{2}{(1.1) (1000 \times 10^{-6})} = 1818 \Omega$$

2-

$$2 = 1.1 (R_a) (200)$$

$$R_a = \frac{t_a}{(1.1) C} \rightarrow \frac{2}{(1.1) (200 \times 10^{-6})} = 9090 \Omega$$

$$3- 2 = 1.1(R_a)(100)$$

$$R_a = \frac{t_a}{(1.1)C} \rightarrow \frac{2}{(1.1)(100 \times 10^{-9})} = 18,181 \mu A$$

$$4- 2 = 1.1(100)(C)$$

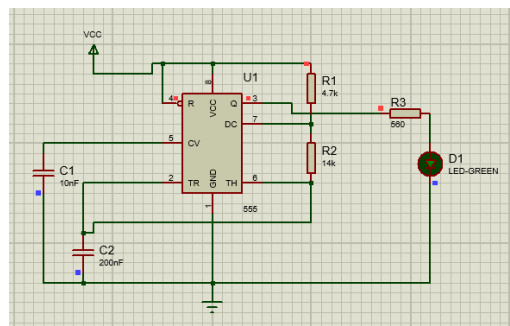
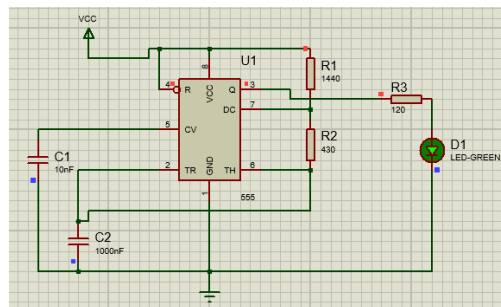
$$C = \frac{t_a}{1.1(R_a)} \rightarrow \frac{2}{1.1(10000)} = 181 \mu F$$

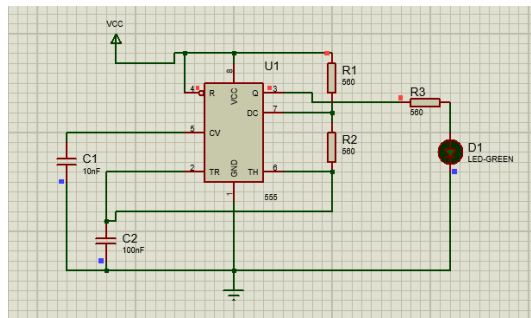
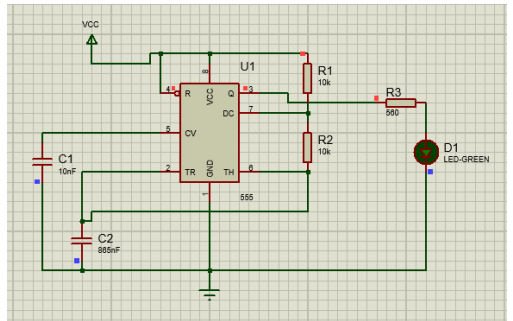
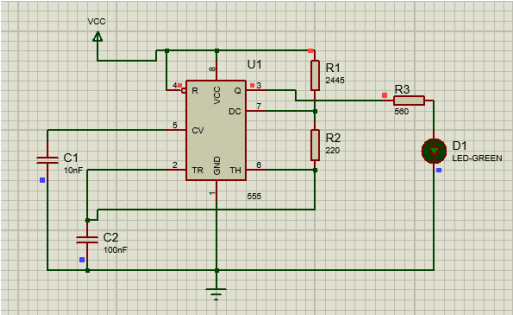
$$5- 2 = 1.1(560)C$$

$$C = \frac{t_a}{1.1(R_a)} \rightarrow \frac{2}{1.1(560)} = 3246 \mu F$$

## Capturas de Proteus

*Circuito astable*





## Circuito monoestable

