



FACULTAD DE INGENIERÍA



Práctica 7

Diseño DigitalModerno

*Diseño y construcción de un semáforo
utilizando pequeña escala de integración
(SSI)*

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Material requerido





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Especificaciones:

El semáforo contará con tres luces con la siguiente duración encendidas:

- ❖ *La luz roja 30 segundos*
- ❖ *La luz ámbar 15 segundos*
- ❖ *La luz verde 15 segundos.*



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Diagrama de bloques





Diagrama de estados

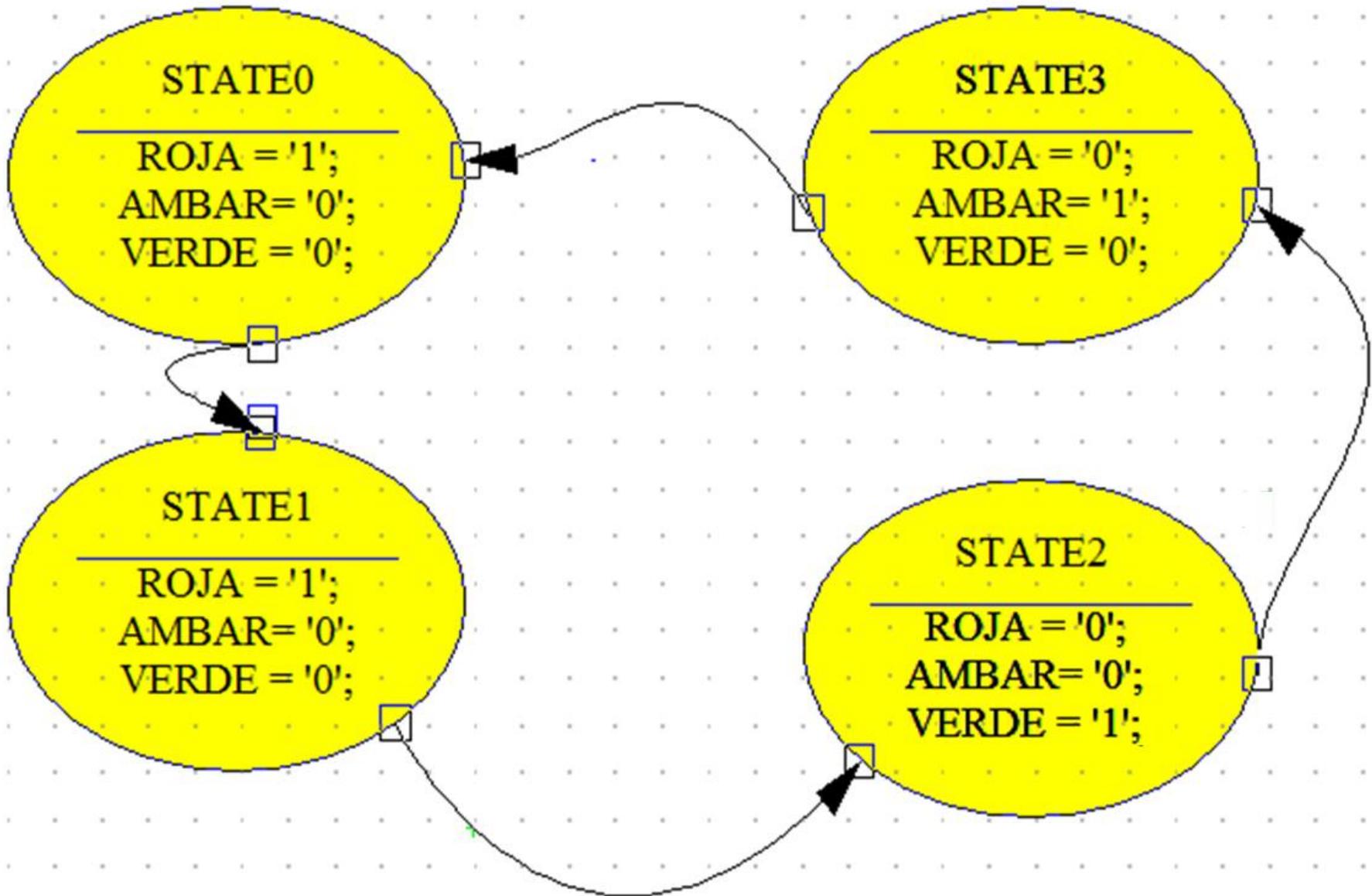




Tabla de transición de estados



Estado presente	Estado siguiente	Salidas R A V
$S_0 = 00$	01	1 0 0
$S_1 = 01$	10	1 0 0
$S_2 = 10$	11	0 0 1
$S_3 = 11$	00	0 1 0

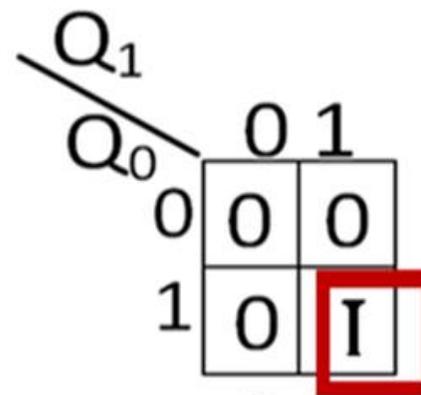
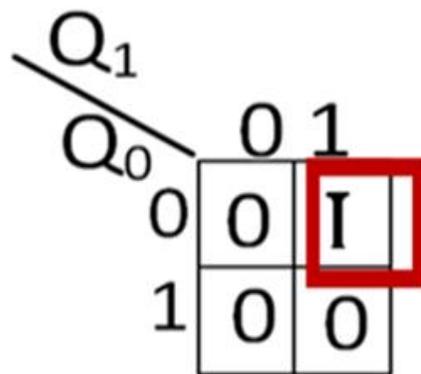
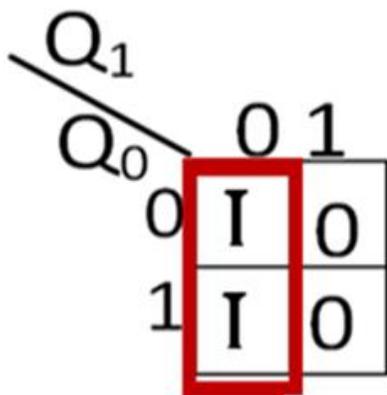
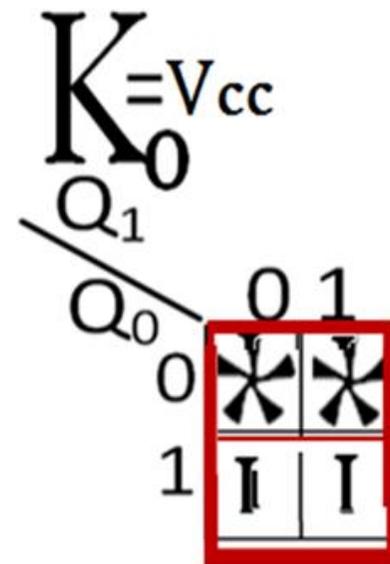
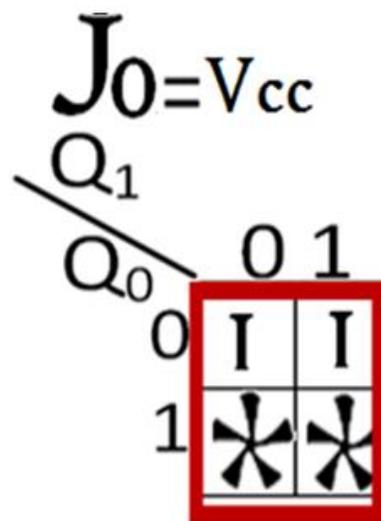
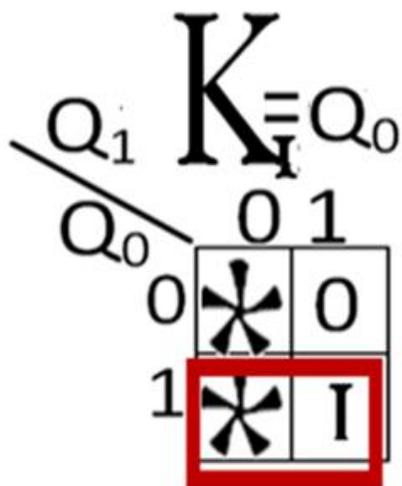
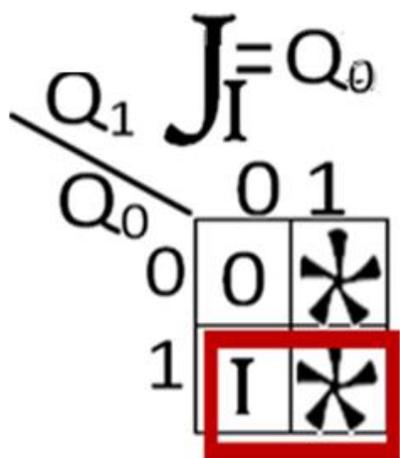


Tabla de transición de estados codificada

Estado presente $Q_1 Q_0$	$J_1 K_1 J_0 K_0$	Salidas $R A V$
$S_0 = 00$	$0* \quad 1*$	$1 \ 0 \ 0$
$S_1 = 01$	$1* \quad *1$	$1 \ 0 \ 0$
$S_2 = 10$	$*0 \quad 1*$	$0 \ 0 \ 1$
$S_3 = 11$	$*1 \quad *1$	$0 \ 1 \ 0$



Mapas de Karnaugh



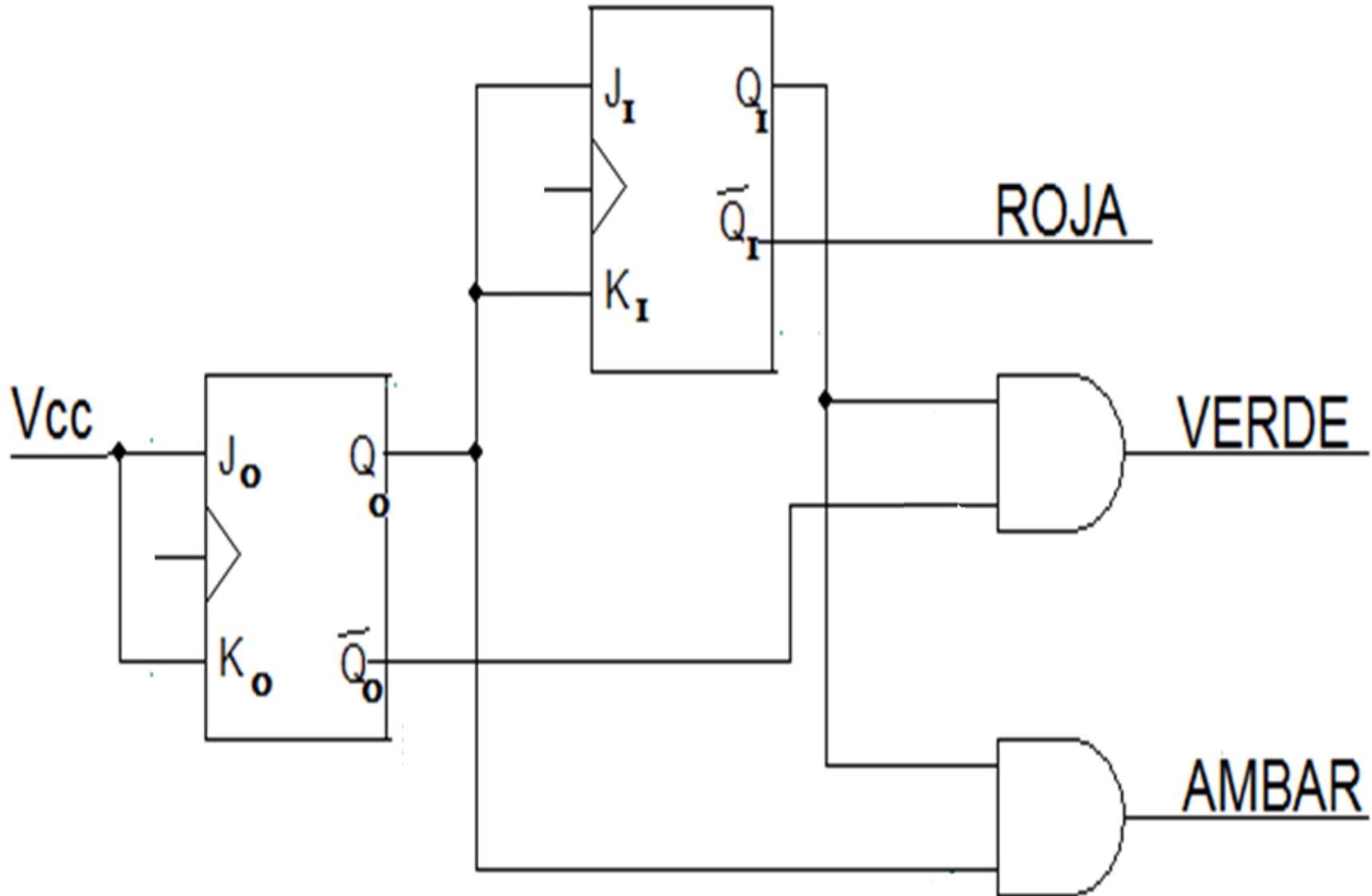
roja = \bar{Q}_1

verde = $Q_1 \bar{Q}_0$

ámbar = $Q_1 Q_0$



Circuito lógico



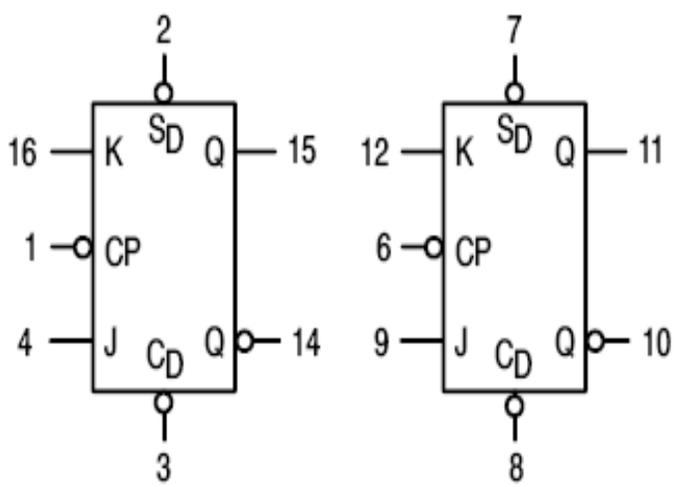


SN74LS76A

Dual JK Flip-Flop with Set and Clear



TRUTH TABLE

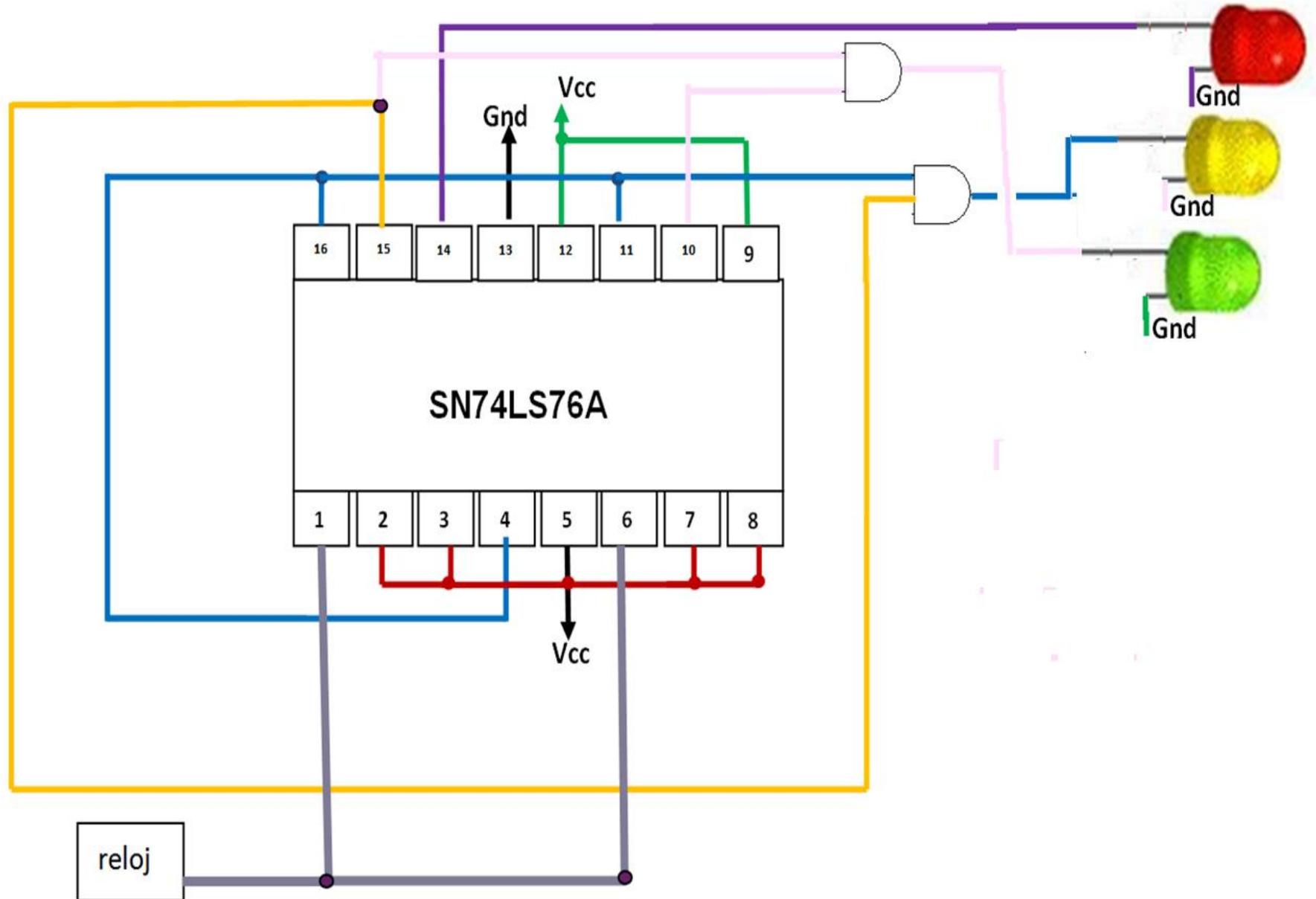


V_{CC} = PIN 5
GND = PIN 13

OPERATING MODE	INPUTS				OUTPUTS	
	\overline{S}_D	\overline{C}_D	J	K	Q	\overline{Q}
Set	L	H	X	X	H	L
Reset (Clear)	H	L	X	X	L	H
*Undetermined	L	L	X	X	H	H
Toggle	H	H	H	H	\overline{Q}	Q
Load "0" (Reset)	H	H	L	H	L	H
Load "1" (Set)	H	H	H	L	H	L
Hold	H	H	L	L	Q	\overline{Q}

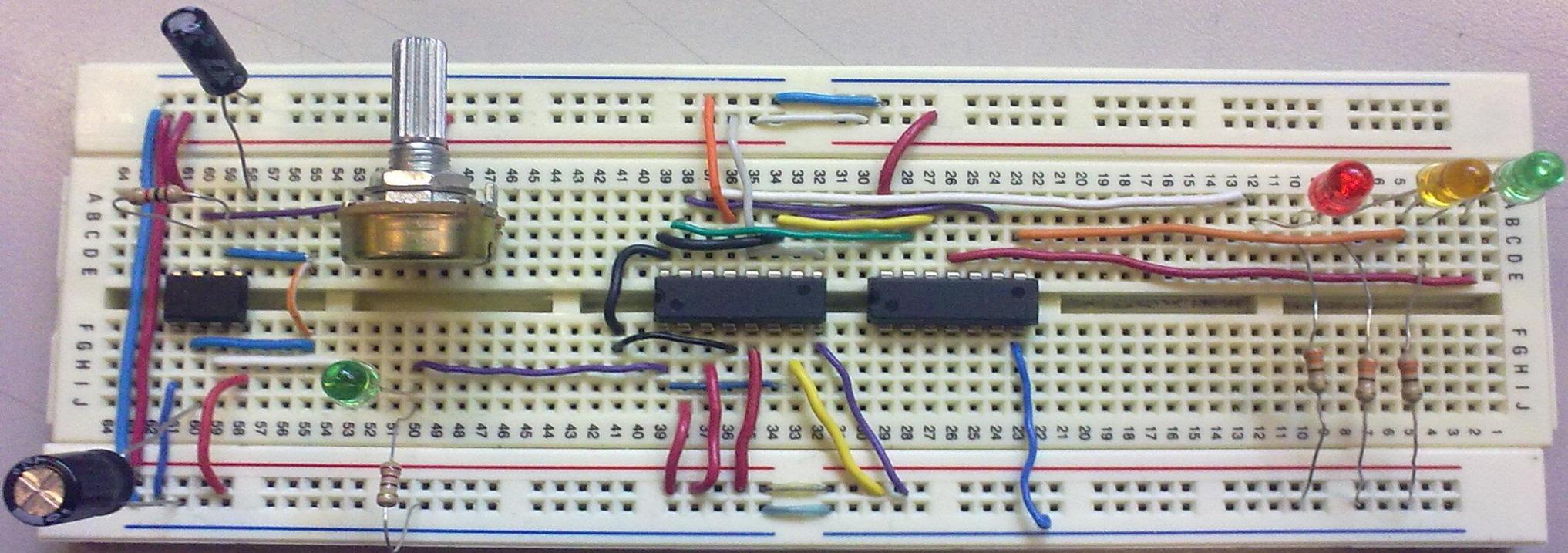


Diagrama eléctrico

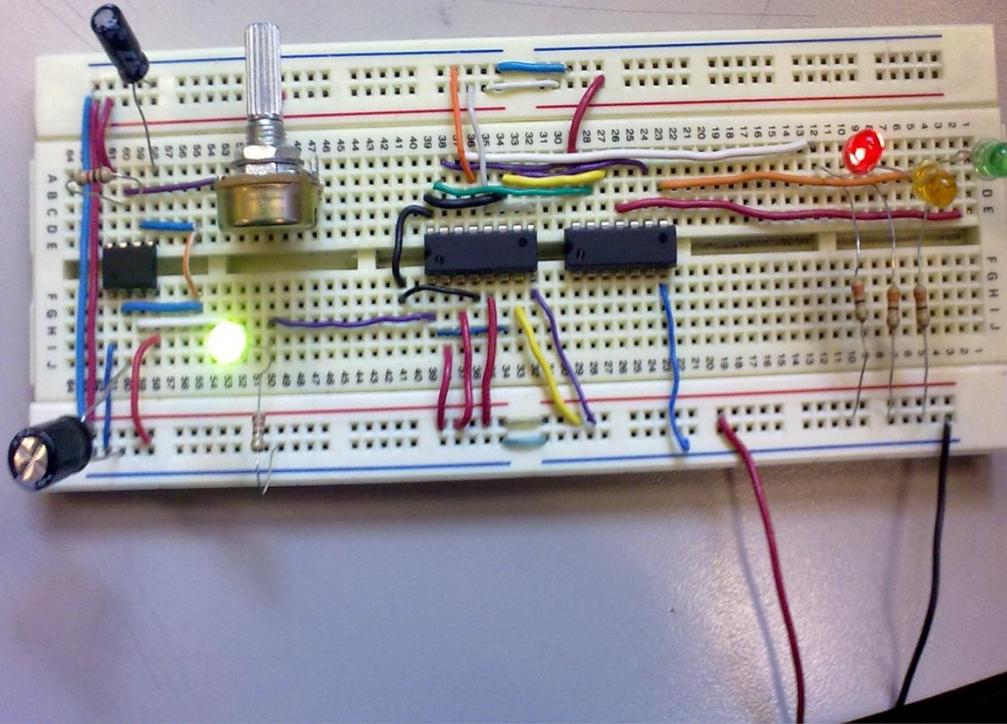




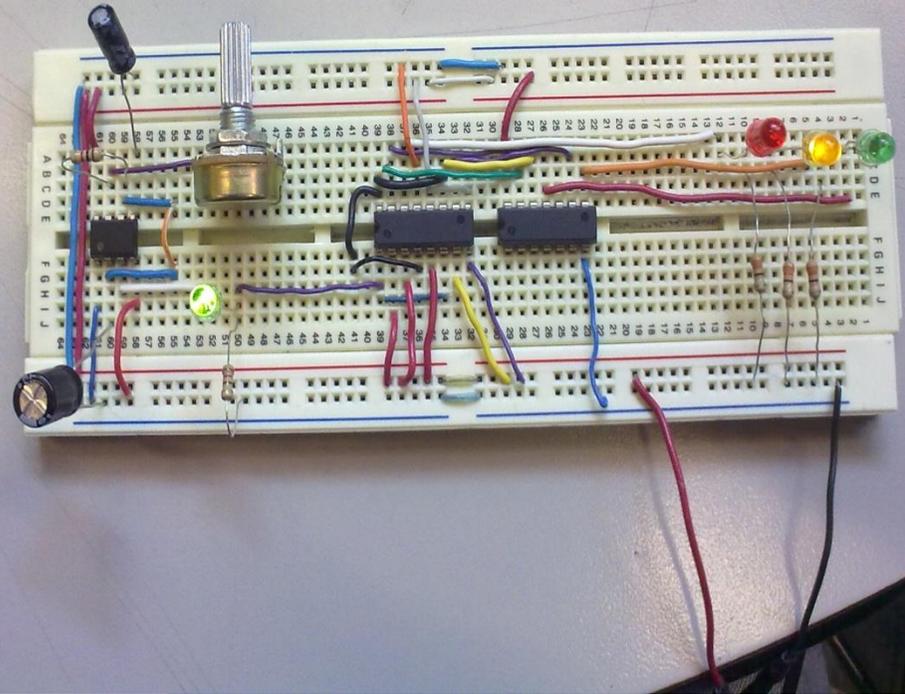
Fotografía semáforo apagado



Luz roja prendida



Luz ámbar prendida



Luz verde prendida

