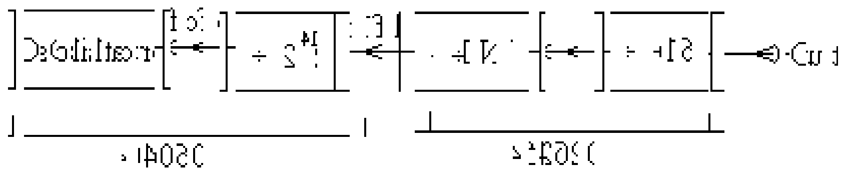
Short Timer

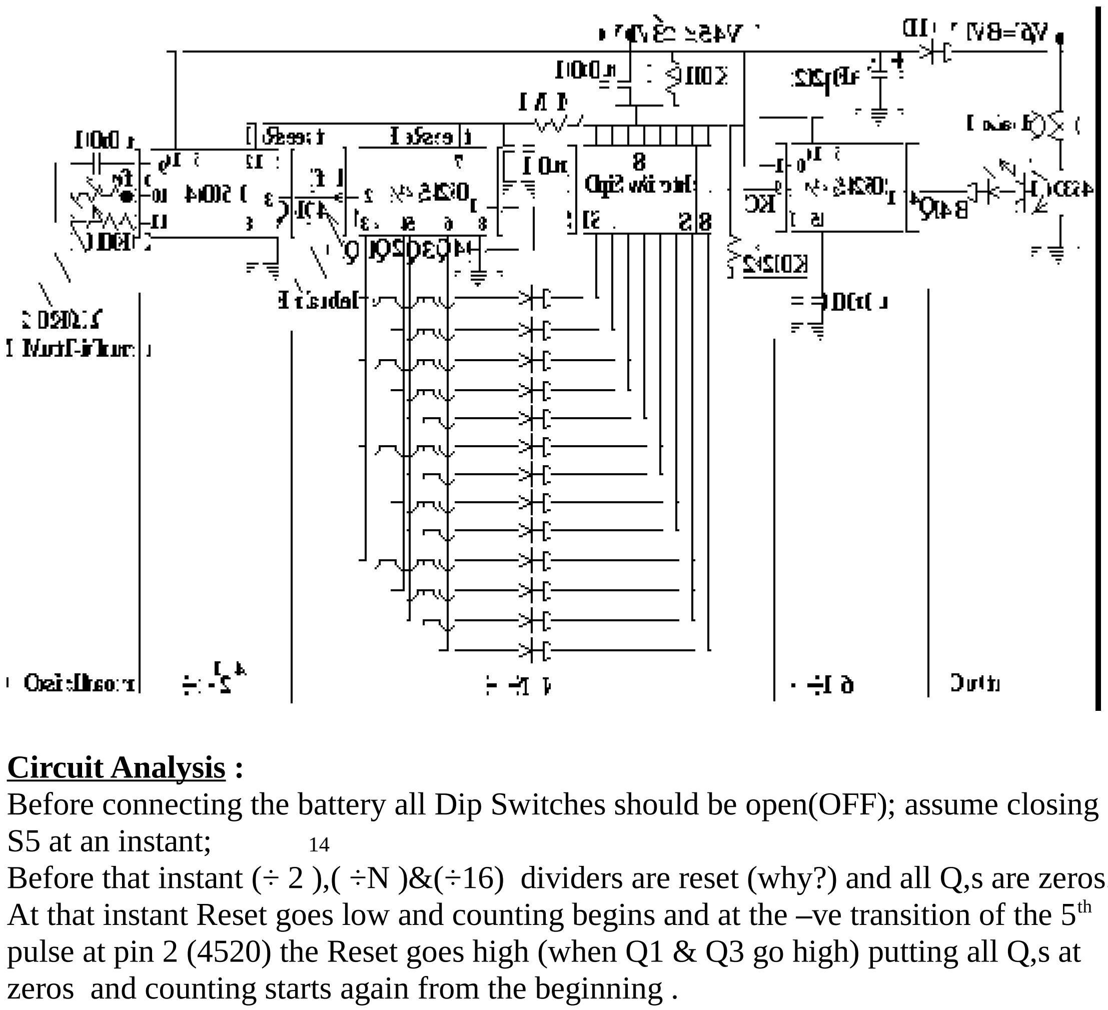


The Out should be either 1 pulse after 10 min.'s for N=1
Or 1 pulse after 20 min.'s for N=2
Or 1 pulse after 30 min.'s for N=3
..
Or 1 pulse after 80 min,s for N=8

The Timer is consist of 4 parts the 1st two are included in 4060 IC and the other two are included in 4520 IC

For N=1; the last divider gives actually 1 pulse every 20 min.'s then we have ;

$$f0 = (1pulse / 20 min) \times 2^{14} \times 1 \times 16 = (2^{18} / 1200) \text{ pulse /sec} = 218.5Hz$$



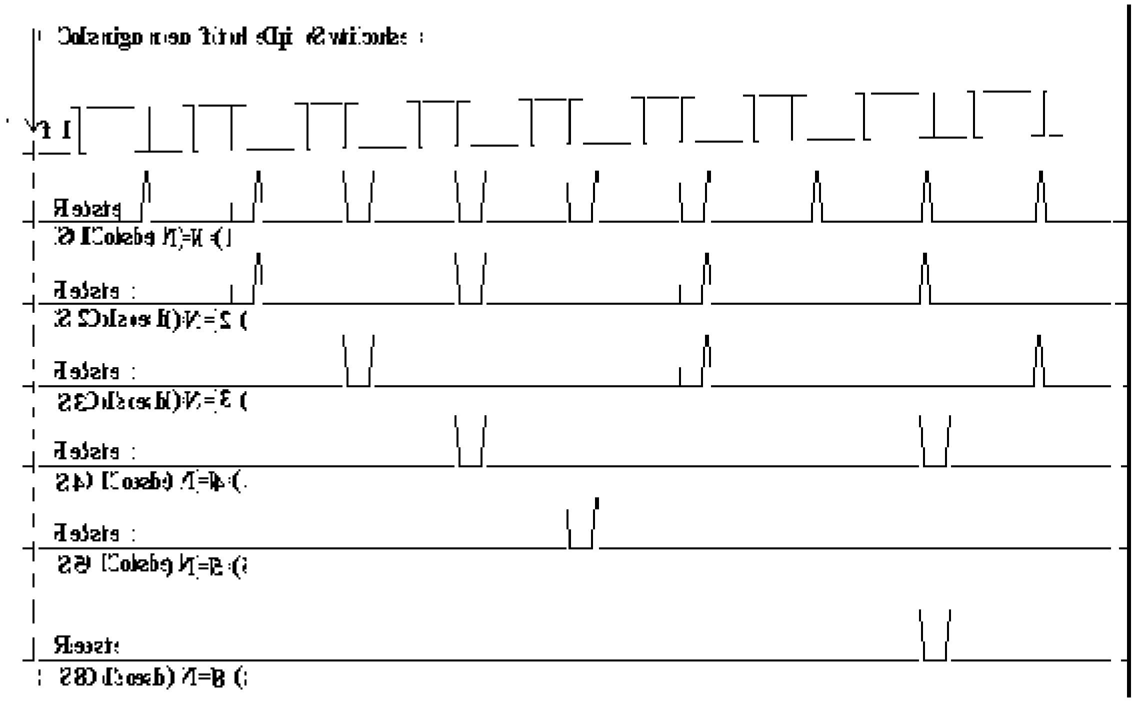
Circuit Analysis :

Before connecting the battery all Dip Switches should be open(OFF); assume closing S5 at an instant;

Before that instant (÷ 2^{14}),(÷N)&(÷16) dividers are reset (why?) and all Q,s are zeros.

At that instant Reset goes low and counting begins and at the –ve transition of the 5th pulse at pin 2 (4520) the Reset goes high (when Q1 & Q3 go high) putting all Q,s at zeros and counting starts again from the beginning .

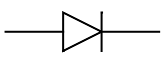
The cycle repeated every 5 pulses of f1 and we could effectively divide f1 by 5 to get 1 pulse after 50 min.'s (compared to 1 pulse after 10 min.'s for N=1 or division by 1) at pin 14 (4520).

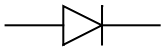
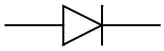


If we closed S8 instead (we should close only one switch) we will get an output at pin 14 (4520) after 80 min.'s from the instant of closing that switch.
 The reset input of the (÷16) is almost low inspite of very short CK pulses.Why?
D1 is used to keep the battery voltage drop (when loaded) out from the timing circuit.
We should adjust the 20 kΩ to get f0 = 218.5 Hz.
When the system is used:
1- All Dip Switches should be in OFF position before connecting the battery.
2- Connect the battery (LED should be OFF),connect the Load, then put one switch to ON position.
3- Go away directly.

Circuit Board for Short Timer

1. On a strip board write from left to right the letters A to X and from up to down the numbers 1 to 13.
2. Cut the board over the holes of number 13 to get (24 holes x 12 holes) board.
3. Cut the board over the holes:
   DFGHIK3/EFGHIJKN7/EJ4/DLM6/BCX8/K10
   DEFGHIJLPQRSTUVWX11
4. Jumpers from Component side:
   CJ3/DK4/PX10/EM3/CK11
5. The components:

Pin1 (4060) Pin 8	DK12	
Pin1 (4520) Pin 8	DK5	
ON1 (Dip Switches) ON8	QX9	
	B5-C7	
D634	ABC10	lay upward with face up
100KΩ	I8-M7	
20KΩ Variable	LMN10	

-LED+	A2-F1	just head comes out of the board to left
-220µF+	LJ1	lay to left and –ve terminal is isolated
220KΩ	KM1	stand with long terminal to K1
100nF	KM8	
100nF	L2-M1	
10nF	H8-K6	
	S8-X7/S7-O8/ TN5/UN4/VN3/WN2/QX1	
	W4-X2/R8-O9/U7-X6/V6-O7/W5-O6	
- Battery +	C12-B4	
Load	B3-B11	

Terminal K of a diode is soldered to I6 and Anode is isolated and soldered to P1.
In one node, one terminal of the following is soldered:
Two jumpers, 1MΩ,10KΩ and 100nF; the other terminals is soldered as follows:

1st jumper	to long terminal of 220KΩ resistor
2nd jumper	P12
1MΩ	J6
10KΩ	D8
100nF	D7

6. Other Jumpers from Component side:
   J8-L9/L5-L12/G6-O1/F6-X5/HN6
7. Jumpers from strip side:
   J5-H8/E5-F12
8. Shorts:
   CD2/CD7/LK4/LK12/PQ12
   Also between the 8-OFF terminals of the Dip Switches
9. The terminals of the battery and those of Load are tied together and fixed to the Board.