

Rainbowkits.com
has many more exciting kits to
choose from that are easy and
exciting to build!



Rainbowkits.com LLC
2238 West US Highway 36
Danville, IN 46122
317-745-5602

www.rainbowkits.com



**You can connect up to
48 LED's to this CL-2 kit
just like lights on a theatre
marquee.**



CL-2

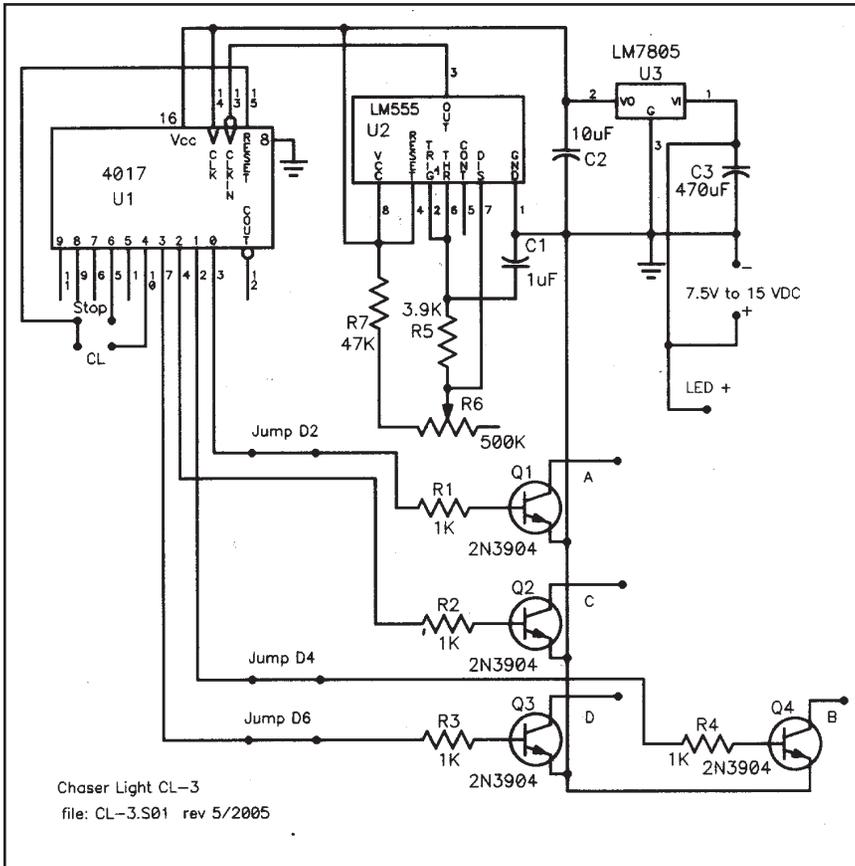
THEORY OF OPERATION

The Chaser light kit uses an LM555 Timer IC to generate a series of clock pulses. The LM555 Timer chip is one of the most popular Integrated circuits ever, it is a highly stable device for generating accurate time delays or oscillation. We use the LM555 Timer in the astable mode. Pins 2 and 6 are connected together, this makes the LM555 free run. C1 charges through R5, R6 and R7 but only discharges through R5. You can change the speed of oscillation by adjusting R5, this changes the chasing speed of the LED's.

The other Integrated Circuit is an HCF4017. The HCF4017 is a decade counter with 10 decoded outputs. This means we only have an output on one pin at a time. We use 4 of these outputs to drive transistors, Q1, Q2, Q3 and Q4. We use output 5 to reset the counter and start the 'chase' over. Each time we put a pulse (from the LM555 IC) on pin 13 the output is advanced to the next output pin. When we power up the circuit we get an output only on pin 3. When we apply a pulse to pin 13 the output is removed from pin 3 and transferred to pin 2, next pulse transfers the output from pin 2 to pin 4, etc.

The transistors Q1 thru Q4 provide the drive current for the LED's, they are like a switch that completes the circuit to ground. Because they are connected to the output pins of the HCF4017 IC only one of them conducts at a time. Your LED's must be connected on 4 separate circuits in the correct order so you experience the chasing effect.

SCHEMATIC



ATTENTION KIT BUILDER

Before soldering board, make sure that you have the ability to completely assemble this kit properly.

RETURN POLICY:

Rainbowkits.com LLC will refund the purchase price on any unopened kit LESS postage and a 15% restocking fee.

NO REFUNDS WILL BE MADE ON ANY KITS THAT HAVE BEEN TOUCHED WITH SOLDER.

Rainbowkits.com LLC will repair any of it's kits sent back for the following costs, which includes return postage to the customer:

NO REPAIR WILL BE LOOKED AT UNTIL REPAIR COST IS RECEIVED.

THE COST TO REPAIR YOUR CHASER LIGHT KIT IS \$20.00

It doesn't work – now what?

If assembled properly all kits work. ALMOST all of the kits we receive for repair have assembly errors.

Here are some of the more common errors we find.

1. Parts in the wrong holes.
2. Solder shorts.
3. Parts in backwards.
4. Parts which are not soldered or have cold solder joints.
5. Wires which are "frayed" and touching other parts.

It is very difficult to objectively check your own work. Have some one else look over your completed kit. This can save a lot of time, frustration and money. If you need technical assistance you are welcome to call or write.

For repair send your kit to:

Rainbowkits.com LLC
2238 West US Highway 36
Danville, IN 46122

Phone **317-745-5602** FAX 317-745-5604

www.rainbowkits.com

*If you must return your kit for repair we must charge for our technicians time. If a part is defective there is **NO CHARGE**. However we cannot warrant the kit builders ability, only the parts.*

TESTING FOR CHASER LIGHT KIT

Be sure you have very carefully checked your work before applying power.

Connect your kit to a power source. This must be between 7.5 to 15 vDC. If something gets hot or smokes remove power immediately. Locate the problem before you apply power again. You may have damaged a component enough that it is defective. Look for solder shorts, (a place where 2 parts of the circuit are soldered together that are not supposed to be connected). Check to see if any part is in backwards. If the LM555 is in backwards it will fail as soon as power is applied and it will have to be replaced. If one of the capacitors are in backwards and you applied power they should be replaced before continuing. If 2 pins on the HCF4017 are shorted, none of the lights will work.

If it doesn't work check for 5 vDC on pins 4 and 8 on U2, and pins 14 and 16 on U1. You should have between 2 and 3 vDC on pin 3 of U2. If you have an oscilloscope you can check to see if you have pulses on pin 3 of U2. The rate of these pulses will vary depending on how you have R5 adjusted. If some of the LED's light but others don't, check the solder on the transistor where the LED that DOES NOT light is connected.

Be sure to double check the jumps. Make sure you put them in the proper location.

If you still can't get it to work, you can return your kit for repair as shown on page 7.

Additional Information

You can connect up to 48 LED's to your kit. Just connect 'every 4th LED to the same circuit.

PARTS LIST

CL-2 Chaser light kit

Resistors;

()	4	R1,R2,R3,R4,	1K resistor (brn,blk,red)
()	1	R7	47 K resistor (yel,vio,org)
()	1	R5	3.9K resistor (org,wht,red)
()	1	R6	500K horizontal trim pot
()	16	R's for light assembly	180 ohm (brn,gra,brn)

Capacitors;

()	1	C1	1 uF cap (note polarity)
()	1	C2	10 uF cap (note polarity)
()	1	C3	470 uF cap (note polarity)

Semiconductors & IC's;

()	1	U1	CD4017 IC
()	1	U2	LM555 IC
()	1	U3	7805 IC

Miscellaneous;

()	1	J1	Screw output jacks
()	4	Q1,Q2,Q3,Q4,	2N3904 transistor
()	1	U1S	16 pin IC socket
()	1	U2S	8 pin IC socket
()	16	LED's	Red (Flat side is -)
()	1	WIRE	assembly wire
()	1	PC BOARD	080-00384

KIT ASSEMBLY INSTRUCTIONS

Separate and identify each component in your kit. Our instructions will lead you through the assembly process in the most logical manor, the parts that are the lowest profile on the board-up to taller parts.

FOR EACH STEP:

1. Find the proper component.
2. Insert the leads so the part is flush with the Printed Circuit Board
3. Solder and cut off excess leads.
4. Check off and proceed to the next step.

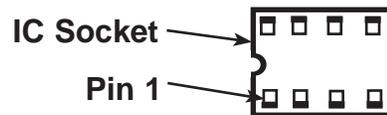
Now lets construct the printed circuit board.

RESISTORS:

- () Insert R1,R2,R3,R4 1K resistor (brn,blk,red)
- () Insert R7 47K resistor (yel,vio,org)
- () Insert R5 3.9K resistor (org,wht,red)
- () Insert R6 500K horizontal trim pot
- () Insert Jump1, 3, 4, 5 Use resistor leads for 4 jumps
- () Insert Chaser Jump2 Use resistor leads for jump

Do NOT insert IC's at this time.

We supply IC Sockets for all IC's. (Note polarity)



- () Insert U1S 16 PIN IC socket for U1
- () Insert U2S 8 PIN IC sockets for U2

CAPACITORS:

- () Insert C1 1 uF cap (note polarity)
- () Insert C2 10 uF cap (note polarity)
- () Insert C3 470 uF cap (note polarity)

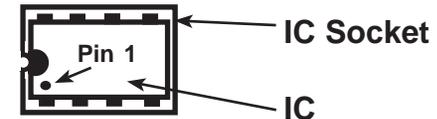
MISCELLANEOUS:

- () Insert Q1,Q2,Q3,Q4, 2N3904 transistor
- () Insert J1 Pin screw output jacks
- () Insert U3 7805 IC voltage regulator

Note: metal side faces outside of PC board

This completes the construction of your Chaser light kit PC board.

Check your work carefully for good soldering practice, check for cold soldering, shorts, and solder bridges, see if you have all parts in the proper place. It's always best to have someone else look it over as well before applying



WATCH POLARITY

If you are satisfied with your construction:

- () Insert in socket U1 CD4017 IC Note pin #1orientation (see drawing)
- () Insert in socket U2 LM555 IC Note pin #1orientation (see drawing)

*Now that the printed circuit board is complete.
The next step is to wire the lights to the PC board*

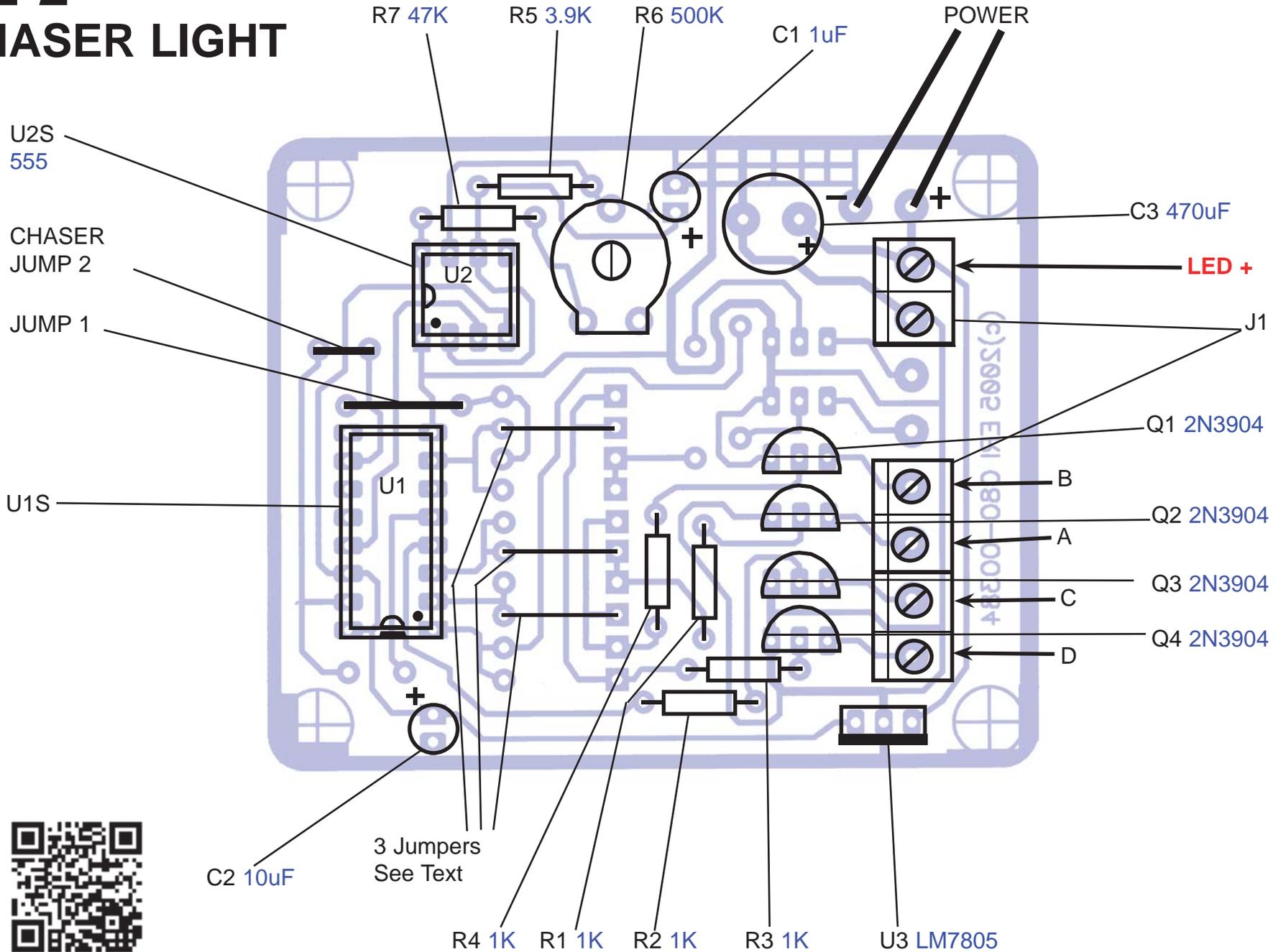
Decide how you want to use the LEDs. Maybe around a picture frame. Where do you want to position the printed circuit board? Cut the wires to the length that will go from the board to the LED position. And now your on your way. Make sure you have good solder connections.

See Wiring Diagram to connect LED to the circuit.

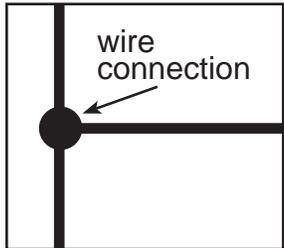
It is a good idea to connect only one LED to each of the 4 circuits until you are sure everything is working. Be sure to connect a 180 ohm resistor in series with each LED. This resistor is shown on the diagram. Resistors are connected to the negative side of the LED ⊖.

Very carefully check your work before applying power.

CL-2 CHASER LIGHT



CL-2 WIRING DIAGRAM



You can connect up to 48 LED's to your kit. Just follow the 'every 4th LED to the same circuit as shown here'.

