

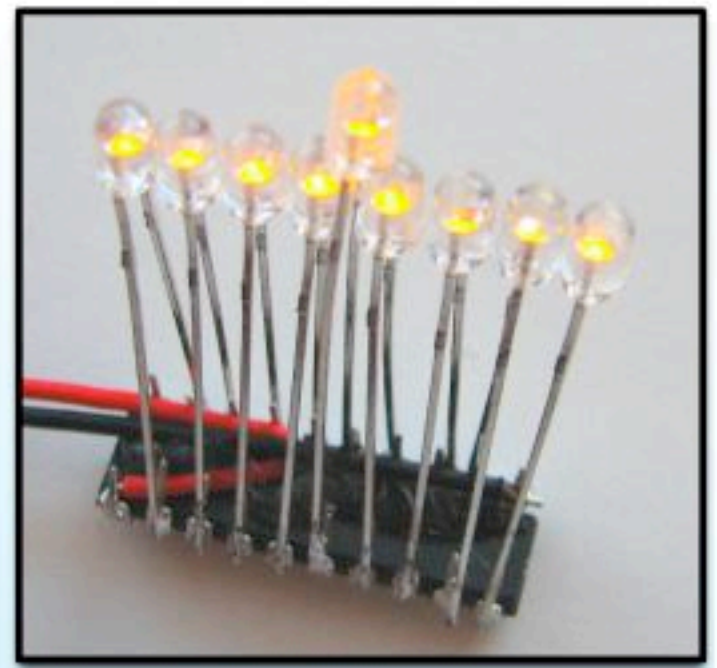
Evil Mad Scientist Laboratories

MAKING THE WORLD A BETTER PLACE, ONE EVIL MAD SCIENTIST AT A TIME

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HOLIDAY ELECTRONICS PROJECTS: MINI LED HANUKKAH MENORAH

SUPPORT: [HTTP://WWW.EVILMADSCIENTIST.COM/ARTICLE.PHP/HEPSUPPORT](http://WWW.EVILMADSCIENTIST.COM/ARTICLE.PHP/HEPSUPPORT)



KIT CONTAINS:

3 X AA BATTERY CASE W/ SWITCH

NINE LEDS

PRE-PROGRAMMED ATTINY2313 MICROCONTROLLER

YOU NEED: SOLDERING IRON, SOLDER

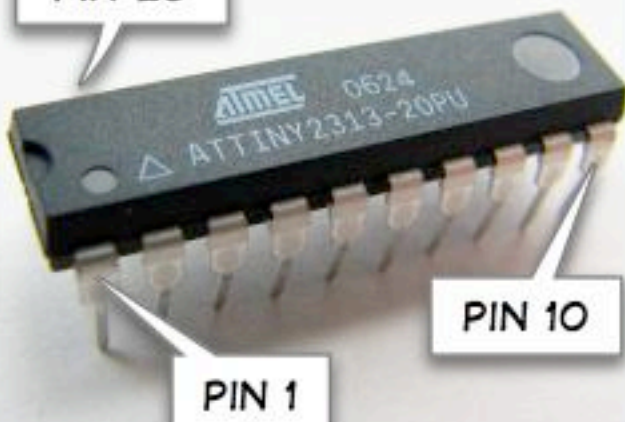
ALSO HELPFUL:

WIRE STRIPPERS, LITTLE CLIPPERS

AND HOT GLUE GUN

MICROCONTROLLER: 20 PINS

PIN 20



PIN 10

PIN 1

FLIP CHIP OVER

WIRES FROM BATTERY BOX

PIN 1

PIN 10

PIN 20

CAUTION!

YOU WILL BE SOLDERING DIRECTLY TO THE PINS OF THE CHIP. TAKE CARE NOT TO OVERHEAT IT!

IF YOU DON'T MAKE A GOOD CONNECTION IN LESS THAN ONE SECOND OF SOLDERING, LET IT COOL DOWN BEFORE TRYING AGAIN!

SOLDER BLACK WIRE TO PIN 10 AND RED WIRE TO PIN 20



OPTIONAL, BUT A GOOD IDEA: FIX WIRES IN PLACE WITH HOT GLUE; SERVES AS A STRAIN RELIEF.



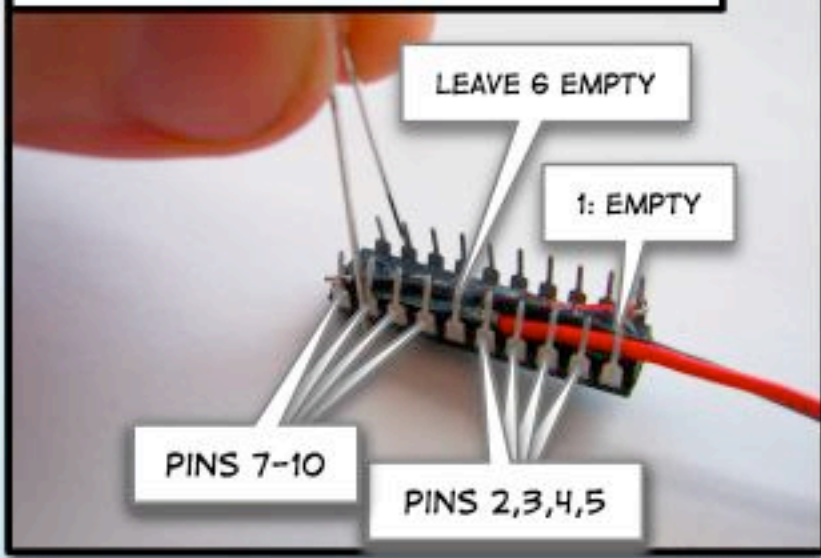
IDENTIFY LEADS OF LEDS:

LONG LEAD: ANODE (+)

SHORT LEAD: CATHODE (-)

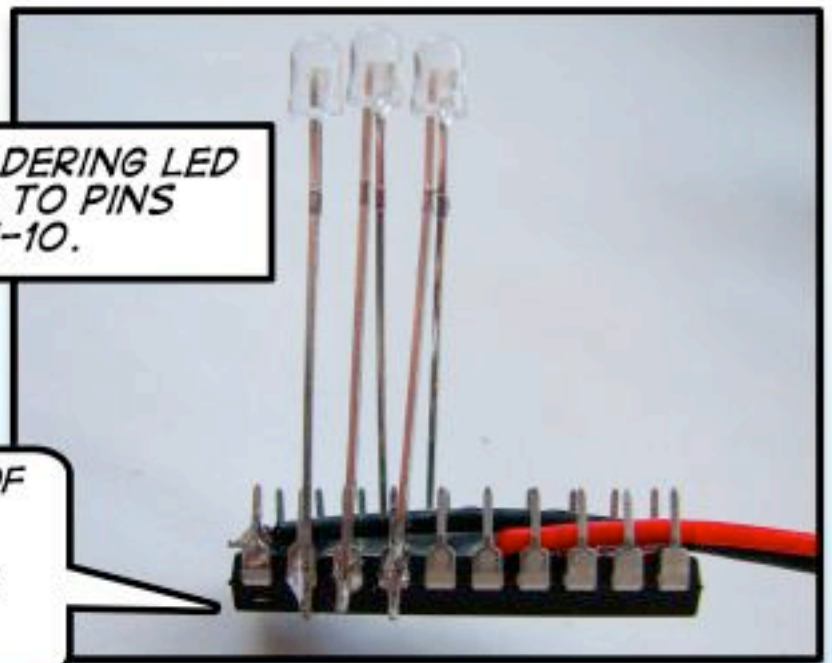


OBSERVE WHERE THE CATHODES OF THE LOWER EIGHT LEDS WILL GO:



BEGIN SOLDERING LED CATHODES TO PINS 2-5 AND 7-10.

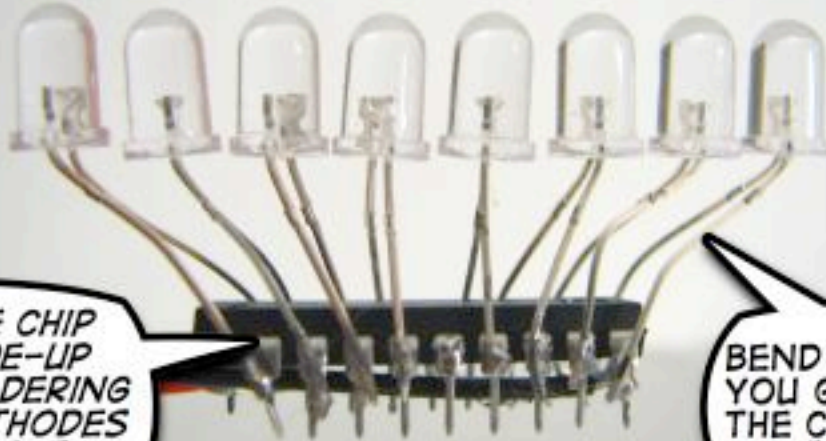
KEEP ENDS OF LED LEADS FLUSH WITH THE BOTTOM OF THE CHIP AS YOU GO.



OPTIONAL VARIATIONS:

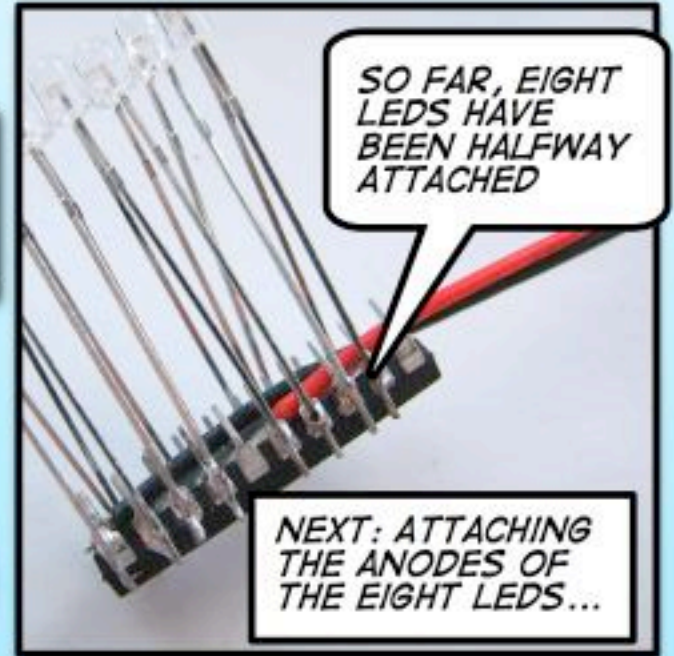
YOU CAN...

TURN THE CHIP RIGHT-SIDE-UP BEFORE SOLDERING THE LED CATHODES TO PINS 2-5 AND 7-10.



FOR LARGER LEDS, LIKE THESE WHITE ONES...

BEND THE LEADS AS YOU GO OUT FROM THE CENTER TO KEEP THE "CANDLES" LEVEL



HINT: TO SOLDER THE LEDS IN A STRAIGHT LINE, LAY THEM FLAT AND HOLD THEM DOWN WITH SOMETHING (LIKE THIS WIRE-STRIPPER HANDLE!)

NOW SOLDER THE ANODE (REMAINING PIN) OF EACH LED TO THE PIN DIRECTLY ACROSS THE CHIP

SOLDER THE 9TH LED, WHICH SITS ABOVE THE OTHERS

CATHODE TO PIN 6, ANODE TO PIN 15

LAST STEP:

PIN 1 IS LEFT UNCONNECTED; YOU CAN CLIP IT OFF IF YOU LIKE.

TRIM AWAY EXCESS WIRE & LOOSE ENDS

NOW GET SOME BATTERIES!

YES, THAT'S IT. PUT THREE AA BATTERIES IN THE HOLDER AND TURN IT ON.

THE LED MINI-MENORAH CHANGES ITS DISPLAY (DAY 1, DAY2,...) EACH TIME THAT IT IS SWITCHED OFF AND BACK ON.

AFTER EIGHT CYCLES, IT THEN GOES INTO DEMO MODE, WHERE IT INCREMENTS THE DAY ONCE PER SECOND.

