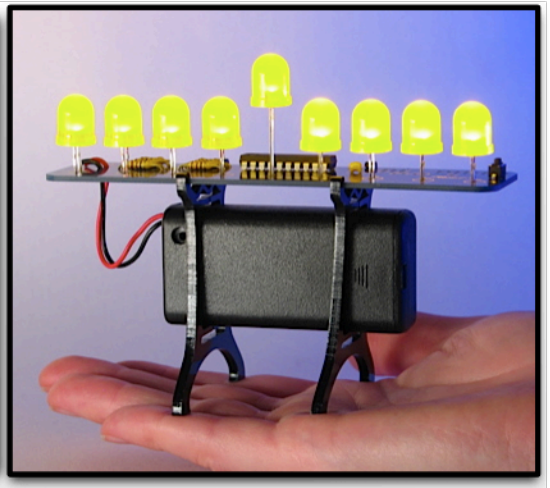
EVIL MAD SCIENTIST LABORATORIES PRESENTS THE

Deluxe LED Menorah Kit



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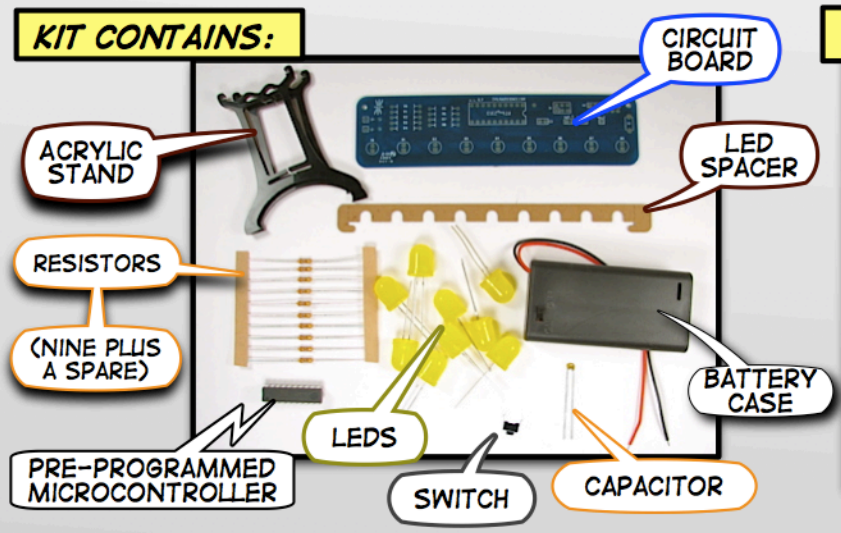
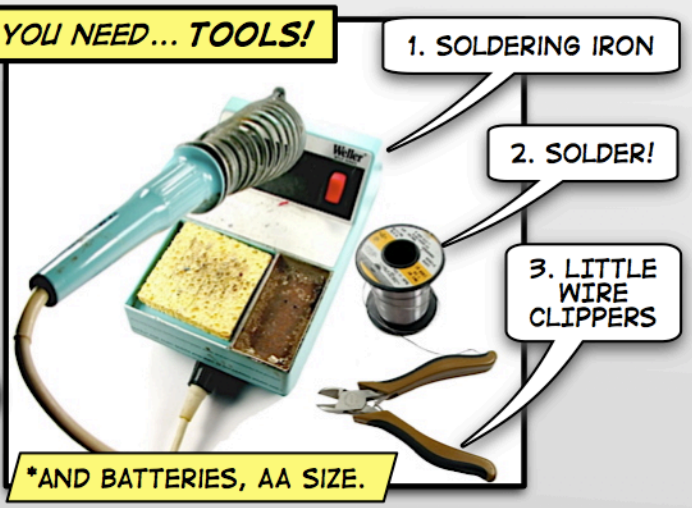
Evil Mad Science

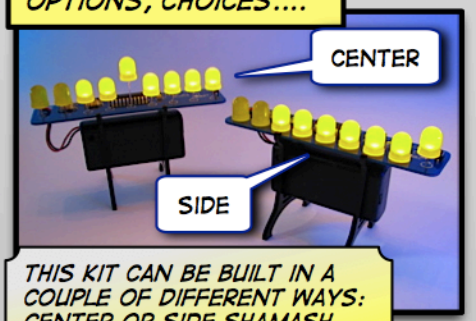
KIT CONTAINS:



YOU NEED... TOOLS!



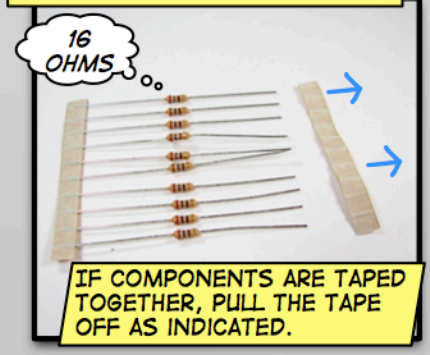
OPTIONS, CHOICES....



THIS KIT CAN BE BUILT IN A COUPLE OF DIFFERENT WAYS: CENTER OR SIDE SHAMASH, LEDS ON-BOARD OR ABOVE.

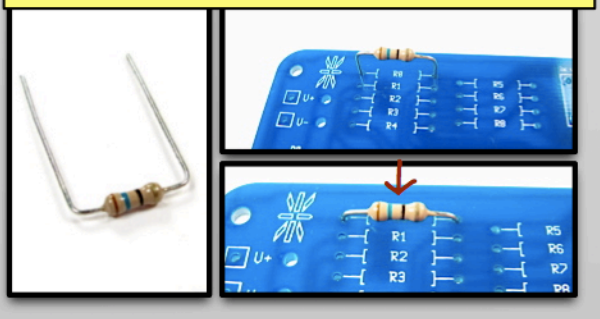
YOU GET TO DECIDE LATER. RIGHT NOW, WE START BUILDING!

1. INSTALL RESISTORS.

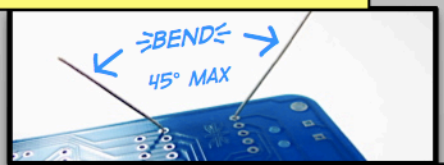


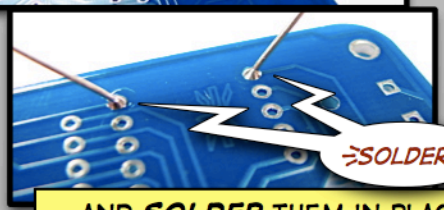
IF COMPONENTS ARE TAPED TOGETHER, PULL THE TAPE OFF AS INDICATED.

BEND A RESISTOR LIKE SO. INSERT IT AT LOCATION R0 OF THE CIRCUIT BOARD, AND PUSH IT FLUSH AGAINST THE SURFACE.

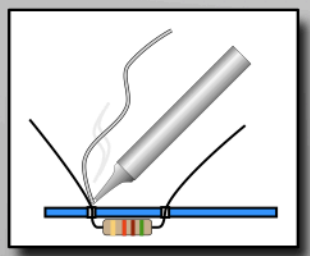


ON THE BACK SIDE, BEND BOTH LEADS OUT...





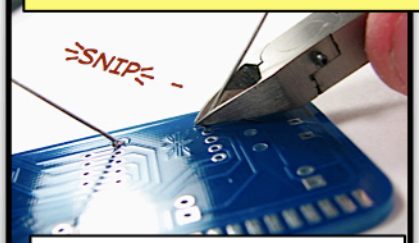
...AND **SOLDER** THEM IN PLACE.



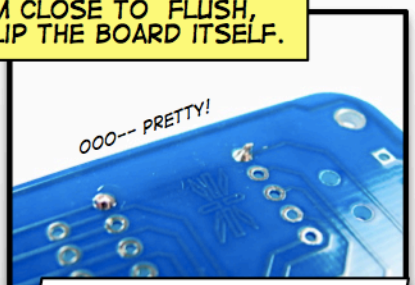
Soldering Hints:

- YOUR TIP SHOULD BE *SHINY* (TINNED). IF NOT, MELT SOME FRESH SOLDER AGAINST IT AND WIPE QUICKLY ON A WET SPONGE.
- PLACE THE SOLDER AGAINST THE JOINT THAT YOU WISH TO CONNECT.
- TOUCH THE IRON TO THE SOLDER AND JOINT FOR ABOUT 1-2 SECONDS (MAXIMUM). COUNT IT OUT: "ONE THOUSAND ONE."
- THE SOLDER SHOULD MELT TO THE JOINT AND LEAVE A SHINY, WET-LOOKING JOINT. IF NOT, LET IT COOL AND TRY AGAIN WITH FRESH SOLDER.

USING THE LITTLE CLIPPERS, TRIM EXCESS LEADS ON THE BACK SIDE. CLIP THEM CLOSE TO FLUSH, BUT NOT SO FAR THAT YOU CLIP THE BOARD ITSELF.

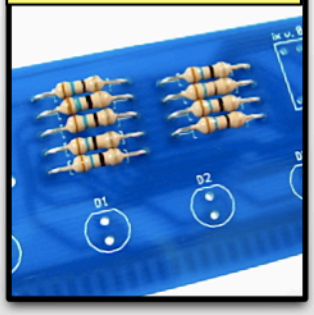


(LEADS CAN FLY-- WEAR EYE PROTECTION!)

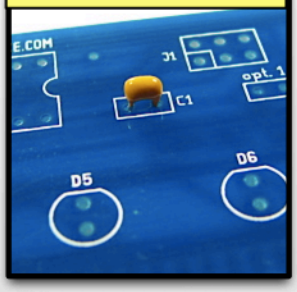


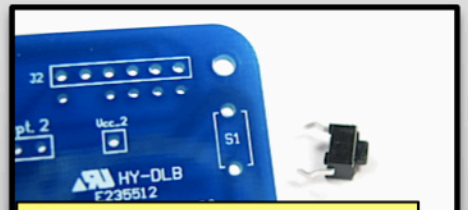
ALSO: SAVE ONE OF YOUR CLIPPED LEADS FOR STEP 6A. YOU MIGHT NEED IT.

REPEAT STEPS TO INSTALL RESISTORS R1-R8.



2. USE THE SAME PROCEDURE TO INSTALL THE CAPACITOR AT C1.

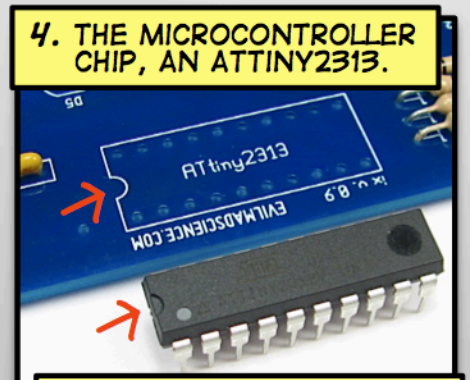




3. NEXT: ADD THE SWITCH AT S1. SNAP IT INTO PLACE AND SOLDER BOTH PINS.

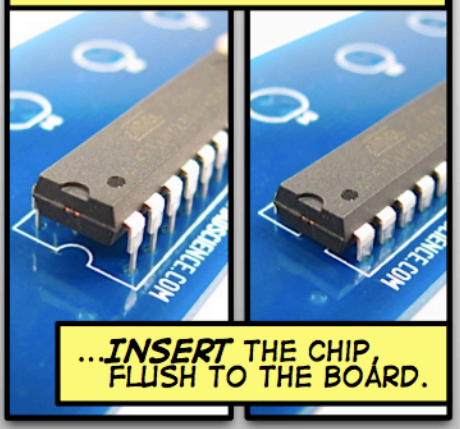
(TRIM THESE LEADS TOO!)

4. THE MICROCONTROLLER CHIP, AN ATTINY2313.



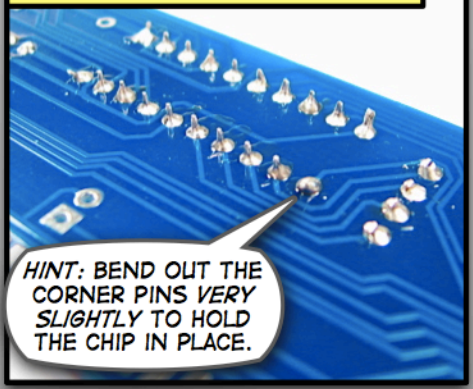
LOCATE THE END WITH THE HALF-CIRCLE SHAPE, BOTH ON THE BOARD AND CHIP.

MATCHING THESE ENDS...



...**INSERT** THE CHIP, FLUSH TO THE BOARD.

SOLDER ALL 20 PINS OF THE CHIP TO THE BOARD.

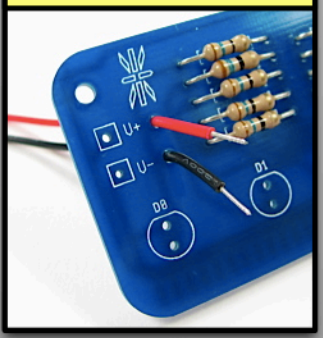


HINT: BEND OUT THE CORNER PINS *VERY SLIGHTLY* TO HOLD THE CHIP IN PLACE.

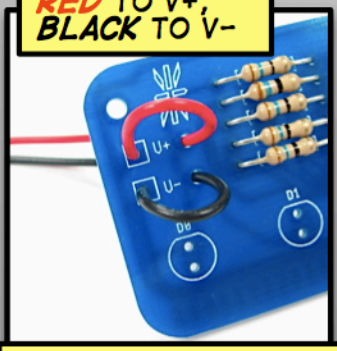
5. BATTERY BOX

(MAY BE 2XAA, FOR USE WITH YELLOW LEDS, OR 3XAA FOR BLUE OR WHITE.)

PULL WIRES THRU THE BOARD: **RED** BY V+, **BLACK** BY V-

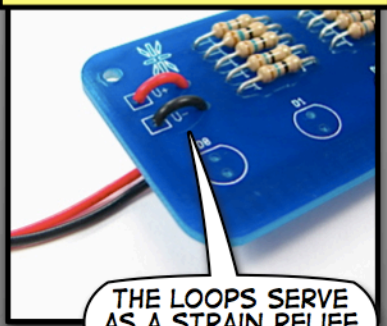


LOOP 'EM: **RED** TO V+, **BLACK** TO V-



SOLDER BOTH WIRES.

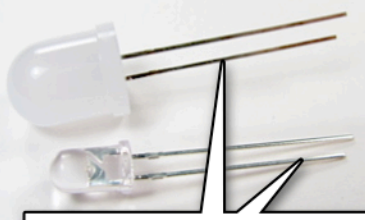
THEN, PULL ANY EXCESS WIRE BACK THROUGH.



THE LOOPS SERVE AS A STRAIN RELIEF FOR THE WIRES.

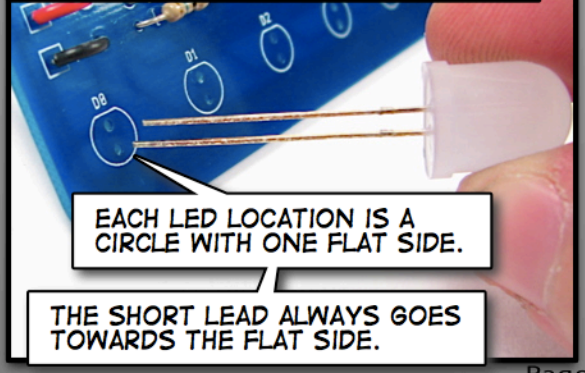
6. LEDS

LEDS VARY CONSIDERABLY IN SHAPE, SIZE, AND COLOR.



IDENTIFY THE SIDE WITH THE ***SHORT LEAD***.

YOU WILL CHOOSE WHERE TO PUT THE LEDS, BUT WATCH THE POLARITY:



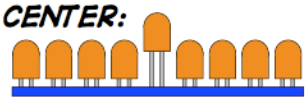
EACH LED LOCATION IS A CIRCLE WITH ONE FLAT SIDE.

THE SHORT LEAD ALWAYS GOES TOWARDS THE FLAT SIDE.

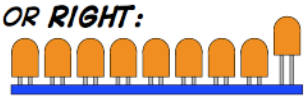
6A. SHAMASH LOCATION

PICK ONE:

CENTER:



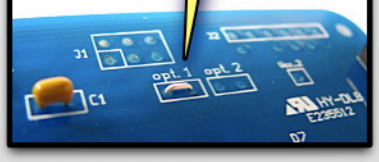
OR RIGHT:



CENTER: GO TO THE NEXT STEP, 6B.

RIGHT: SOLDER A WIRE ACROSS LOCATION "OPT 1."

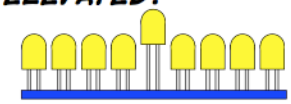
(WIRE = SPARE RESISTOR LEADS FROM STEP 1.)



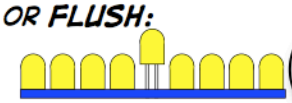
6B. LED ALTITUDE

PICK ONE:

ELEVATED:

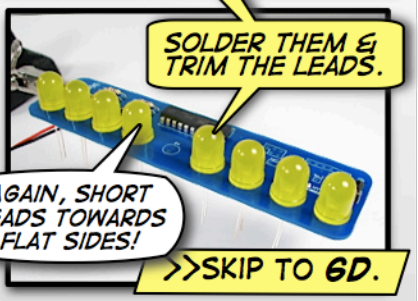


OR FLUSH:



ELEVATED: SKIP AHEAD TO 6C.

FLUSH: ADD ALL LEDS EXCEPT YOUR SHAMASH (D4 OR D8).



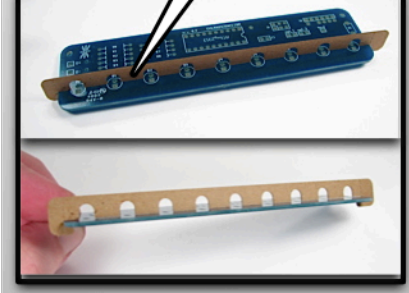
SOLDER THEM & TRIM THE LEADS.

AGAIN, SHORT LEADS TOWARDS FLAT SIDES!

>>SKIP TO 6D.

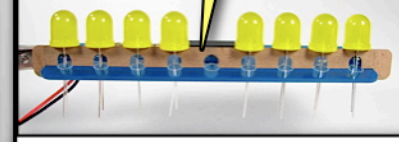
6C. ELEVATED LEDS

MOUNT THE LED SPACER ON THE CIRCUIT BOARD.



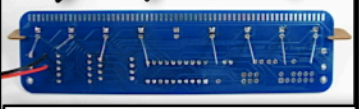
PLACE ALL LEDS EXCEPT YOUR SHAMASH (D4 OR D8).

LEDS STRADDLE THE SPACER, LOOSELY.



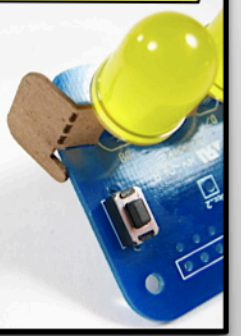
POLARITY MATTERS: SHORT LEADS GO TO FLAT SIDES. (SEE LAST FRAME OF PAGE 2.)

ON THE BOTTOM SIDE, BEND OUT THE LEADS SLIGHTLY, AND SOLDER ONLY ONE PIN OF EACH LED, THE LONG ONE.

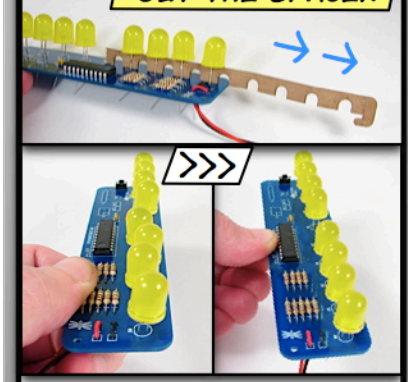


(THIS PROCEDURE IS SO THAT WE CAN ADJUST THEIR POSITIONS.)

BREAK THE TAB ON THE SPACER.

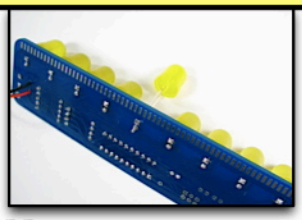


GENTLY WIGGLE OUT THE SPACER



STRAIGHTEN THE LEDS. THEN, SOLDER THE OTHER EIGHT PINS.

6D. ADD THE SHAMASH



ADD THE FINAL LED, WHICH SITS HIGHER THAN THE OTHERS.

SOLDER ONE PIN AT FIRST TO TACK IT IN PLACE.

STRAIGHTEN IT BY HAND, AND THEN SOLDER THE OTHER PIN.

7. THE STAND

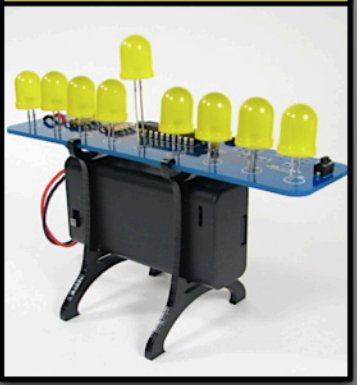
THERE ARE TWO ACRYLIC STAND PIECES.
BE GENTLE WITH THEM.

IF THEY LOOK BROWN AND PAPERY, PEEL OFF THE PROTECTIVE LINER.

HOLD THE BOARD UP SIDE DOWN AND SLIDE ON EACH STAND.

GO SLOWLY AND WATCH FOR OBSTRUCTIONS LIKE UNCLIPPED PINS.

CAREFULLY SLIDE IN THE BATTERY CASE.



CONGRATULATIONS! YOU BUILT IT!

YEP, THAT'S IT. PUT BATTERIES IN THE HOLDER AND SWITCH IT ON.

(AND SWITCH IT OFF TO SAVE THE BATTERIES!)

THE PUSHBUTTON CHANGES BETWEEN NIGHTS. HOLD IT TO TOGGLE BETWEEN LOW-POWER AND HIGH-POWER MODES. HOLD DOWN THE BUTTON AT POWER ON FOR DEMO MODE.

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