

Sonic Bow Tie 3000 Kit Instructions – Big Mess o' Wires

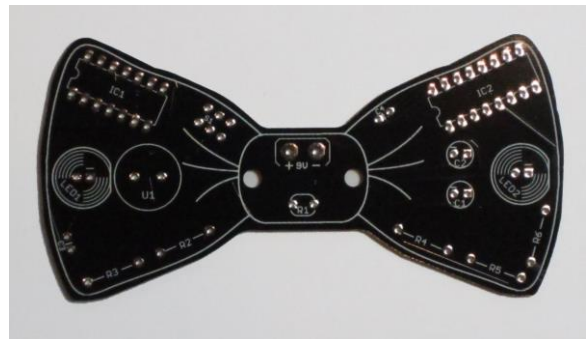
1. Gather Tools

To build the kit, you will need a few common tools for soldering and electronics work:

- Soldering iron
- Solder
- Diagonal cutters or shears
- 9V battery

2. Verify the Contents of the Kit

"bow tie" circuit board



*9V battery clip
red wire is + (positive)
black wire is - (negative)*



IC1

*556 dual timer chip, 14 pins
notch at left side and dot in corner
indicate correct orientation*



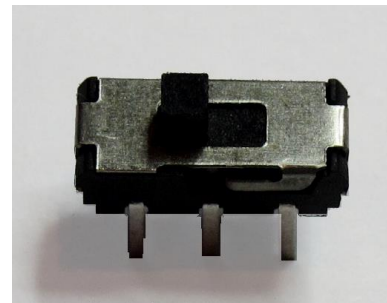
IC2 4520 dual binary counter chip, 16 pins
notch at left side indicates
correct orientation



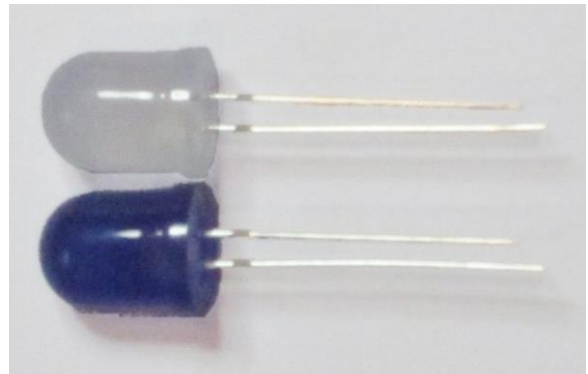
U1 speaker



S1 on/off switch



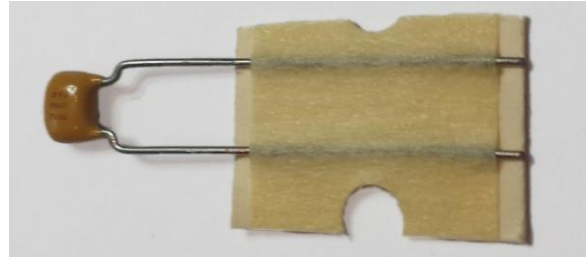
LED1, 10 mm jumbo LED lights (colors may vary)
LED2 short leg is - (negative)



C1, C2 10 uF electrolytic capacitors
short leg is - (negative)



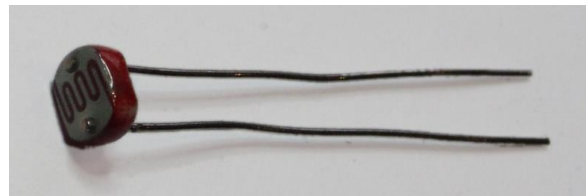
C3 0.22 μ F monolithic capacitor
labeled "224" in tiny letters



C4 0.1 μ F ceramic capacitor
labeled "104" in small letters



R1 photo-resistor



R2, R5 10K ohm resistors
color bands: brown, black, orange, gold



R3 470 ohm resistor
color bands: yellow, violet, brown, gold



R4 33K ohm resistor
color bands: orange, orange, orange, gold



R6 22K ohm resistor
color bands: red, red, orange, gold

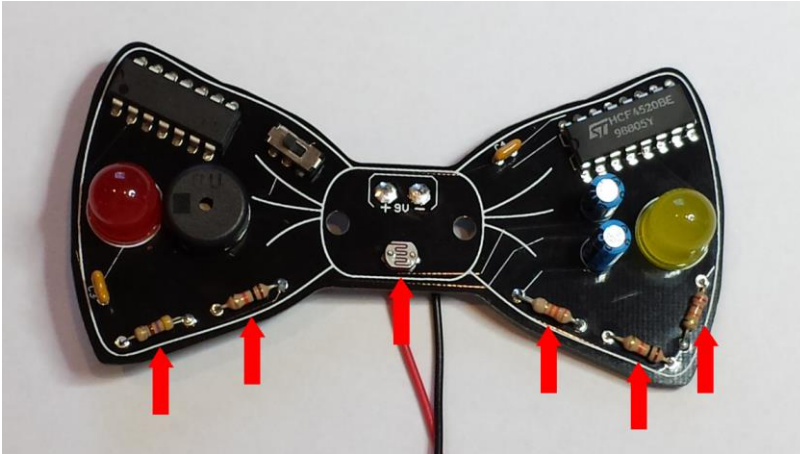


3. Solder the components onto the circuit board.

Use the circuit board labels to identify the correct location and orientation for each component. After soldering, cut off the remaining length of component leg from the underside of the board.

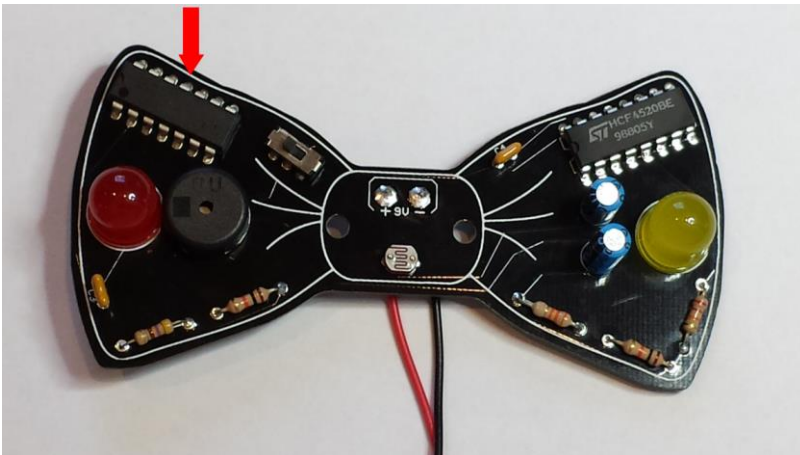
A. Solder photo-resistor R1, and resistors R2, R3, R4, R5, and R6.

The orientation of these parts does not matter.



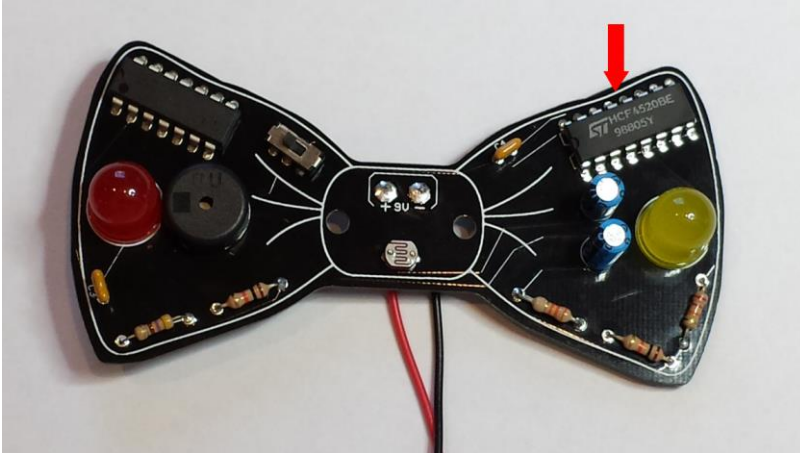
B. Solder IC1, the 556 dual timer.

The notch on the chip should be oriented to the left, matching the outline on the board.



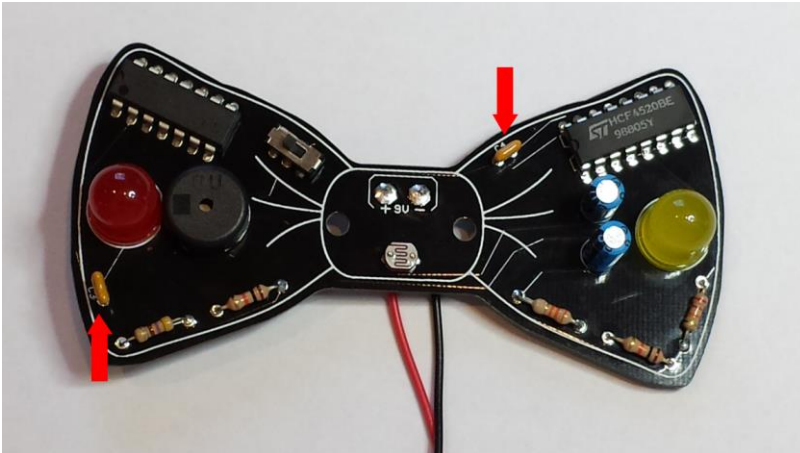
C. Solder IC2, the 4520 dual binary counter.

The notch on the chip should be oriented to the left, matching the outline on the board.



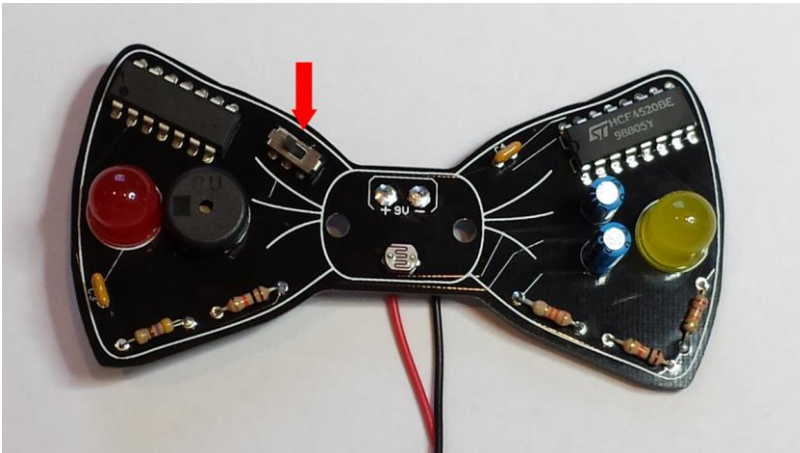
D. Solder the capacitors C3 and C4.

The orientation of these parts does not matter.



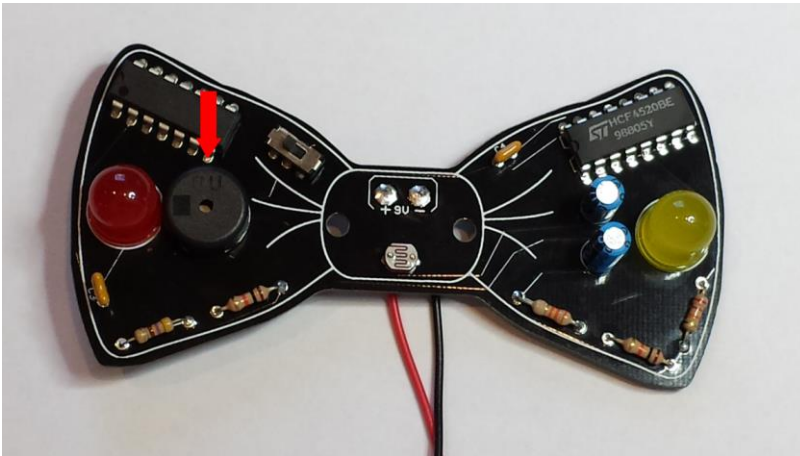
E. Solder the switch S1.

The orientation of this part does not matter.



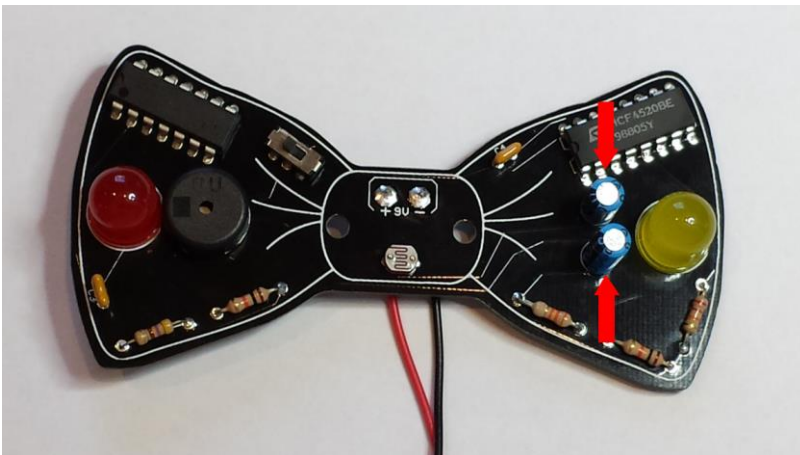
F. Solder the speaker U1.

The orientation of this part does not matter.



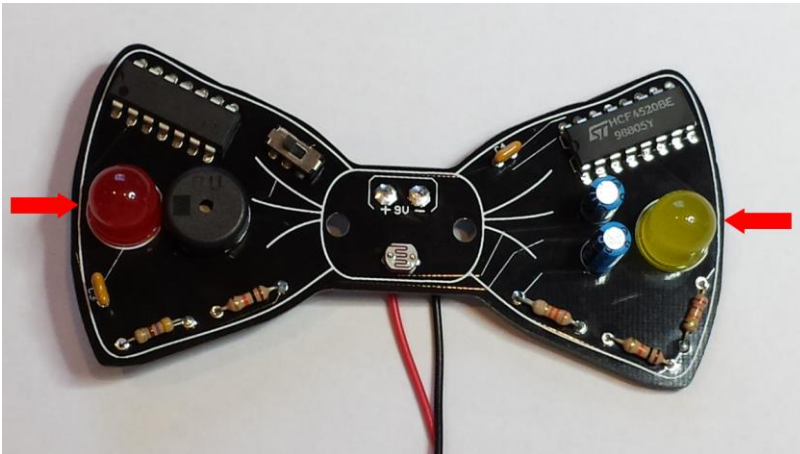
G. Solder the capacitors C1 and C2.

The shorter leg of each capacitor is – (negative), and should go in the hole marked – on the board.



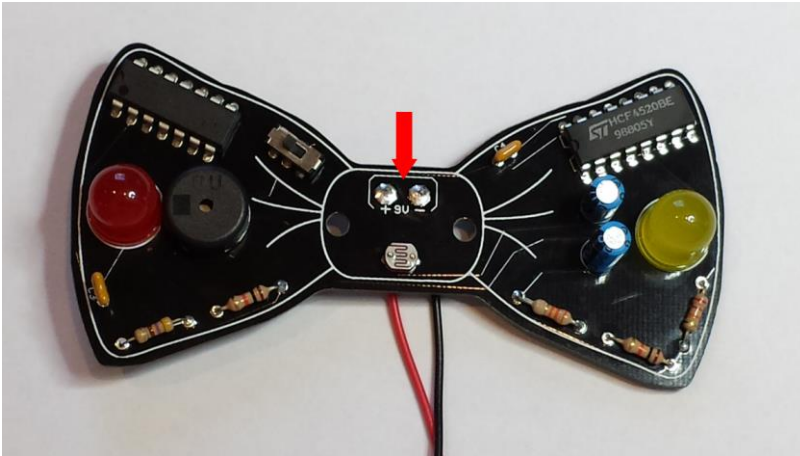
H. Solder LED1 and LED2.

The shorter leg of each LED is – (negative), and should go in the hole marked – on the board.



I. Solder the 9V battery clip.

The red wire should go in the hole marked + (positive) on the board, and the black wire in the hole marked – (negative). Push the wires up from the underside of the board, as shown in the photo.



4. Wear and Usage

Attach a standard 9V battery to the battery clip, and switch on the Sonic Bow Tie. The LEDs will blink, you'll hear a short digital melody played repeatedly. The melody's pitch is determined by the amount of light falling on the photo-resistor R1.

To wear the bow tie around your neck, drop the battery inside your front shirt collar and allow it to hang loose by the red and black wires. Normally this is all that's needed to anchor the bow tie at your collar. If necessary, a length of cord or a shoelace can be passed through the two holes in the center of the circuit board, and tied around your neck.

To wear the bow tie as a ponytail holder, pass a cord or a shoelace through the center holes, and tie it around your hair at the base of your skull. The battery can be dropped inside the rear of your shirt collar, or hidden inside your hair.

The bow tie works best indoors, in a room with moderate lighting. To shift the melody's pitch higher, move closer to a light source, or turn the bow tie to face directly towards the light. To shift the melody's pitch lower, move away from the light source, or shade the photo-resistor R1 with your hand. By waving your hand rapidly above the photo-resistor, a warbling vibrato effect can be achieved.

If you expect to use the bow tie primarily outdoors under sunny conditions, you may wish to bias the pitch lower by replacing C3 with a 0.47 uF capacitor. If the bow tie will be used indoors under dim lighting, you can bias the pitch higher by replacing C3 with a 0.1 uF capacitor.



5. Troubleshooting

If the Sonic Bow Tie 3000 does not work correctly, check for possible assembly errors. Make sure:

- All components are oriented properly
- All solder connections are clean and neat, with no bridges to adjacent pins or holes

6. More Info

For more information, see the Big Mess o' Wires web site at <http://www.bigmessowires.com>