ELbow V2 (Experimental) Assembly Guide

Congratulations on purchasing the ELbow V2 Kit by macetech LLC! This is a limited run of an experimental product, and we'd greatly appreciate any feedback you may have.

The ELbow makes it easy to program and play back custom sequences on six channels of electroluminescent wire, strip, or panels. Once you assemble this kit, you'll be able set up new sequences at any time, without a computer or writing code!

This is a medium-difficulty through-hole soldering kit. Please make sure you have good solder and soldering equipment, go slowly to avoid mistakes, and feel free to stop at any time to ask us questions.
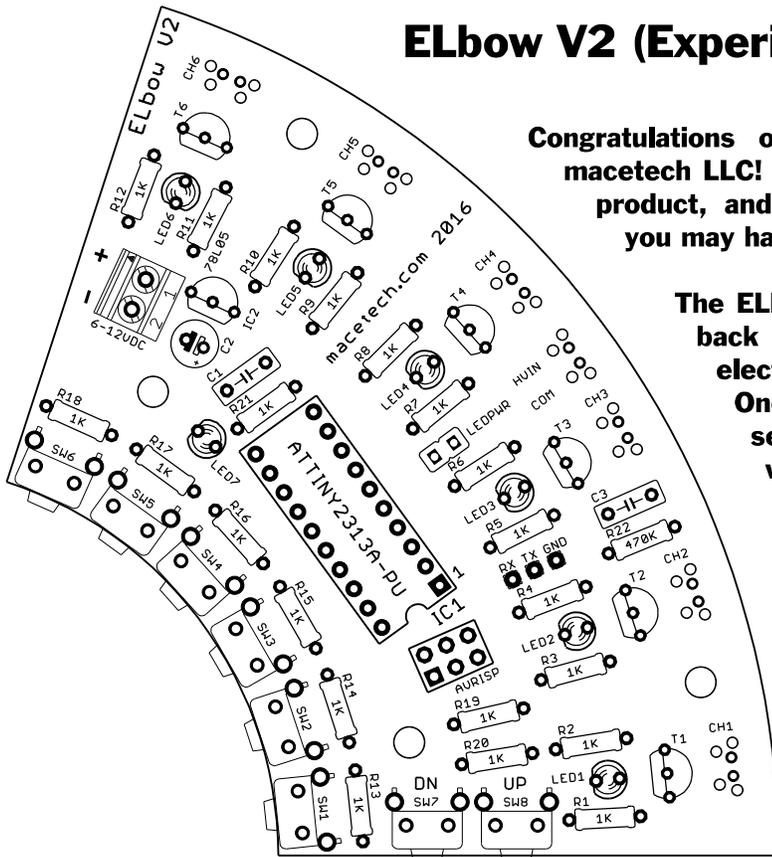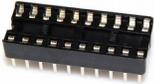
Happy soldering!

Photo	Name	Assembly Notes
	IC1 socket DIP 20-pin	One end of the socket is notched; align this notch with the notch marked on the silkscreen (closest to the IC1 name and IC1's square pad).
	IC1 ATtiny2313A	Carefully plug the ATtiny2313 into the socket after the socket has been soldered. Align the notch on the IC with the notch on the socket. You may need to (carefully) straighten the pins first. One method is to press the IC sideways on the surface of a table and slowly apply force until the pins are straight.
	T1, T2, T3, T4, T5, and T6 BT131 sensitive triac	Solder the BT131 triacs in place. Match the flat side of the triac with the flat side on the silkscreen markings.
	IC8 78L05 regulator	Solder with the flat side matching the flat side on the silkscreen markings (facing C2). The pads may not exactly match the pin positions. It's OK to bend the pins slightly and leave some space between IC8 and the PCB.

	C1 0.1μF ceramic capacitor	Install either direction (polarity does not matter). C1 is located near IC8 and C2.
	C2 10μF aluminum capacitor	Install with the short lead (or black stripe) facing away from the + mark in the silkscreen (black stripe will be closer to the LED7 marking).
	C3 100pF ceramic capacitor	The 100pF capacitor helps load the circuit to reduce any instability while using some types of EL inverters.
	R1 through R21 1kΩ resistor	The 1kΩ resistors are marked with brown-black-red stripes.
	LED1, LED2, LED3, LED4, LED5, LED6, and LED7 Red T1 (3mm) LED	Solder with the flat side of the LED facing the flat marking on the silkscreen (the flat side will face the LED name).
	SW1, SW2, SW3, SW4, SW5, SW6, SW7, and SW8 Tactile switch	Solder with the button facing out from the PCB's edge
	CH1, CH2, CH3, CH4, CH5, CH6, HVIN, and power 3.5mm terminal block	Solder with the wiring ports facing out from the PCB's edge. Optionally, solder wires or other connector styles to the PCB. The solder pads are designed fit several different connector pin pitches.
	AVRISP and LEDPWR 0.1" headers and jumper block	Soldering the AVRISP connector is optional, but required if you have an AVR ISP adaptor and want to program your own code on the ELbow. The LEDPWR jumper is needed to supply power to the LEDs (removable in case the LED light is not needed or distracting).

Wiring up the ELbow

Connect a source of power to the power connector (marked 6-12VDC). Match the positive and negative power wires to the (+) and (-) markings on the PCB. Recommended power source is between 6V and 12V (a 4xAA cell battery pack with integrated switch works well).

Since the ELbow includes status LEDs, you can test and program patterns without EL wire. If you don't want to connect your EL wire yet, skip to "Using your ELbow" below.

Attach a high-voltage EL wire inverter to the HVIN connector. If you're using separate battery-powered inverters, polarity does not matter; but if you're using the same power source, you may need to swap the HVIN terminals to get it to work (some inverters are not isolated). Keep in mind that small, battery-powered EL wire inverters are usually intended to power a short length of EL wire (about 2-3 meters); if the EL wire is dim, you may need to get a more powerful inverter.

Connect your EL wires to CH1 through CH6.

Using your ELbow

Turn on your power source. If you have EL wire connected, also turn on your EL wire inverter. LED7 should turn on and glow steadily. LED1 through LED6 should be displaying a preprogrammed sequence, and if you have EL wire connected and powered, it should be turning on and off in the same sequence.

RUN mode:
- The ELbow starts up in RUN mode (LED7 is on steadily).
- Click SW7 and SW8 (the two side buttons) to change the speed of the sequence.
- Click SW1 through SW6 to select one of six available sequence slots for playback

PROGRAM mode:
- You can edit each of the sequence slots individually.
- To edit a sequence, hold down the button corresponding to that sequence (for example, hold down SW1 to edit sequence 1).
- LED7 will blink slowly indicating PROGRAM mode, you can now release the button.
- The first frame in the sequence will be displayed. You are now editing the first frame.
- SW7 and SW8 will step through the current sequence.
- Click SW1 through SW6 to toggle each channel to the state you want for each frame.
- Playback will loop at a special "end of sequence" frame (you do not have to use all available frames for each sequence).
- When an "end of sequence" frame is selected, LED7 will blink quickly.
- You can set a new "end of sequence" frame by holding down SW7 or SW8.
- To exit PROGRAM mode, hold down the button corresponding to the channel you're currently editing. LED7 will stop blinking and the ELbow will be in RUN mode.