

# SMD Star Intro to SMD workshop – VHS, July 2014

Thanks for coming out tonight for the smd star workshop. This is the 9<sup>th</sup> SMD workshop I've run at vhs and it's possibly the simplest. With these notes you should have also received components and a photo. Please read this right through before starting.

First a word on safety. You're using lead based solder. Lead is somewhat poisonous. Please don't consume food or drink while you're working and wash your hands with soap afterwards. Please use some form of eye protection while soldering, solder splatters can cause permanent damage to your eyes.

To make identifying the components easier many of them are colour coded. The colours are shown in the parts list later in these notes along with the component values and their schematic reference. Using the colour codes, the photo(s) and the markings on the pcb silkscreen you will match up the components with their location and solder them in place. A suggested order of assembly is given below, this is based on height of the components and their proximity to each other. Most of the components can be installed in either orientation, exceptions to this are noted in both the order of assembly below and the parts list on the reverse.

If you haven't looked the suggested youtube video, please do so now. It shows a technique I suggest for mounting SMD components - [http://www.youtube.com/watch?v=P\\_6XJR3D27Y](http://www.youtube.com/watch?v=P_6XJR3D27Y) or search for "I (heart) SMT vancouver.hackspace.ca". The basic strategy I used it use a little solder to hold the part in place, solder the other pins and then touch up the first pin.

When soldering always remember accurate placement is important. It is easy to move components around when only one pin is soldered. If in doubt ask for advice before soldering more than one pin.

## Parts list

Qty	Value	Package	Colour	Parts	Description
1	BATTERY_2032	BATT2032		BATT1	BATTERY CLIP
2	10uF	C0805K	Black	C1, C2	CAPACITOR, European symbol
1	SA555DR	SO08		IC1	General purpose bipolar Timer
1	4017D	SO16		IC2	COUNTER/DIVIDER
				LED1, LED2, LED3, LED4, LED5, LED6,	
8		LED-805		LED7, LED8	Light Emitting Diode
1	10k	M0805	Blue	R1	RESISTOR, European symbol
1	4.7K	M0805	Pink	R2	RESISTOR, European symbol
1	220R	M0805	Red	R3	RESISTOR, European symbol
1	BADGE_CLIP	BADGE_CLIP		U\$2	

\* check polarity

## Suggested order of assembly

1. Start by taping the board to the table, as per video I suggest working with the vhs logo on your left or right so you can hold the part in one hand and the soldering iron in the other.
2. Do the resistors first - R1, R2 and R3. Note the colours of the tape they are contained in and the colour of their location in the photo. Resistors can be installed in either direction. Note that you have lots of spares in your parts kit to recover from accidents.
3. Next solder the capacitors – C1 and C2. Capacitors can be installed in either direction. I suggest rotating the pcb 90 degrees for C2.
4. Next solder the 555 timer IC – IC1. It is important to match the orientation in the photo, the writing needs to be facing in the same direction. Like the resistors and capacitors, add a little solder to the pad closest to your soldering iron before adding the component. Then, with the soldering iron heating the pad with solder place the IC and move it around until all 8 pins are aligned. Have someone check your alignment before soldering any more pins, the part needs to be flat on the board with all pins touching the surface and centred in their pads. Once you're sure the part is the right way around and all pins are good, solder a pin on the opposite side from the one you started with then solder the rest. You'll probably need to come back to touch up the first pin once all the others are soldered.
5. Repeat 4 for IC2, check the orientation with a neighbour.
6. The last part on this side is the LEDs. They need to be installed in the correct direction. On the back of the LED is a small T, there is a matching T on the PCB.
7. For the parts on the back of the PCB you will need a big tip on you soldering iron as they need a lot of heat. Turn the board over and tape it back down. You will also need thicker solder to avoid wasting the fine stuff.
8. Start with the battery connector, the + symbol goes in the centre of the PCB so you can insert the battery from the edge. The same principle applies, tin one of the pads, hold the part in place and apply a lot of heat to the top of the tab until it sinks into the solder. Once it is attached, apply more heat and move it into place. Repeat for the other side.
9. The button clip is the same as the battery connect, tin the pad, apply a lot of heat once attached, move it into place.

## Schematic

