



DIY BUILD INSTRUCTIONS – PLITKA BTN MASHR (ARCADE BUTTON MANUAL TRIGGER/GATE)

First off, thank you for your purchase of the PLITKA BTN MASHR DIY Kit. If you are a DIY Synth novice, you have selected a great module to advance your skills. It is not as simple a circuit as the DISPRS or DIOD OR, but still very doable. If you are a veteran (or, as we like to say at Tsyklon Labs - "Hero of Synthesizer DIY"), then this kit will be super fun.

First, let's make sure that you have everything on hand before we heat up the iron. The tools you will need are as follows:

- Soldering Iron and Solder
- Wire Cutters
- Needle Nose Pliers
- Knurled Nut Tool (Xicon 382-0006) or Small Pliers for tightening 3.5mm knurled nuts
- Wire Strippers that can strip the wire that you have chosen below.
- Wire of your choosing - Solid 24awg or 22awg works well

You will need the following parts to finish your build:

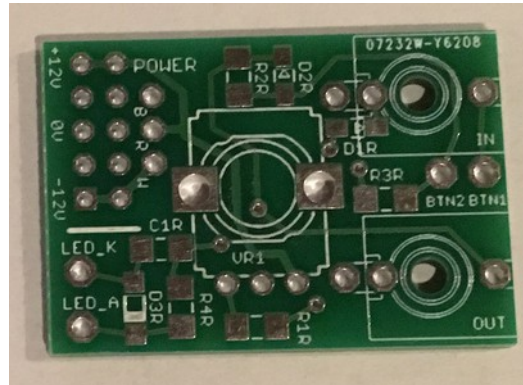
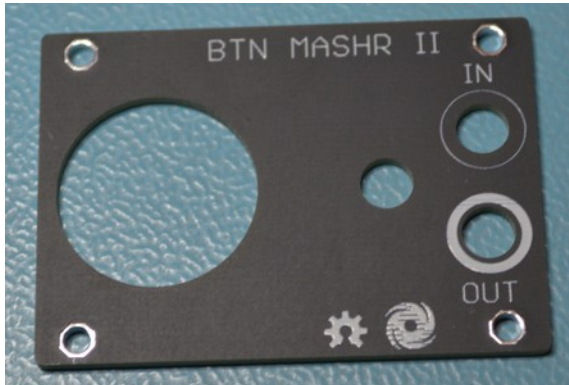
Qty	Part Description	PCB Component ID	Part Number	Vendor
2	3.5mm Inline Jacks (Thonkiconn Style)	IN_SIGNAL, OUT_SIGNAL	PJ30IM-I2	Various
2	3.5mm Knurled Nuts	IN_SIGNAL, OUT_SIGNAL	3.5mm Knurled Nuts	Various
1	20k Ω , 1/4w, 1% Metal Film Resistor (I206)	R1	CRCWI20620K0FKEA	Mouser
2	470R, 1/4w, 1% Metal Film Resistor (I206)	R2, R4	CRCWI206470RFKEA	Mouser
1	10k Ω , 1/4w, 1% Metal Film Resistor (I206)	R3	CRCWI20610K0FKEA	Mouser
1	100nF, 50V, MLCC, Capacitor (I206)	C1	CI206CI04M5RACTU	Mouser
2	IN4148 Small Signal Diode (SOD-323F-2)	D1, D2	IN4148WS	Mouser
1	IN4733 5.1V, 1W Zener Diode (SOD-I23-2)	D3	IN4733AW-TP	Mouser
1	PCB Mount, Vertical, 100k Ω Linear Pot	VR_PULSE	RV09AF-40-20K-B100K	Mouser
1	2x5 Male 0.1" Pin Header	POWER (OPTIONAL)	M20-9720546	Mouser

These jacks are available from Thonk, Modular Addict, Synthrotek, and Erthenvar. Most vendors sell the nuts with the jacks, but check to be certain you have all of the parts that you will need.

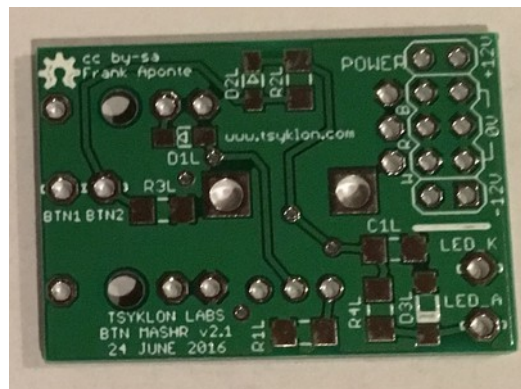
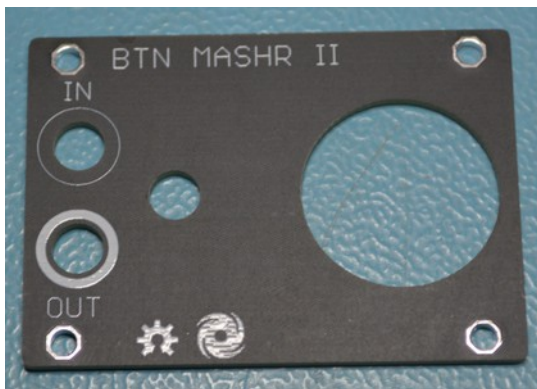
Before getting started with your build, take a careful look at the PCB. This is a two sided PCB – meaning, it can be assembled so that the Arcade Button of the module is either on the Left or the Right side. You will see markings such as R3R and R3L. The “R” and “L” suffixes designate the side of the PCB to add the components to. Place a components on the “R” pads to have the Arcade Button on the Right side of the module and the “L” pads to have the Arcade Button on the Left side of the module. The only tricky parts are the jacks, pot, and power connector – the side with the silkscreen prints for those components is the “L” side. The other side is for “R” components.

This build document will show the step by step building process for the Left side – but there will be pictures of the Right side build for clarity and reference. Got it? Good. Time to build.

1) First, take a look at the Front Panel and PCB to make sure that everything looks good (printing, traces, etc.):



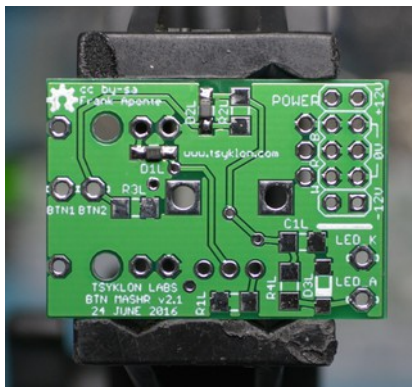
2) And then the reverse side of both:



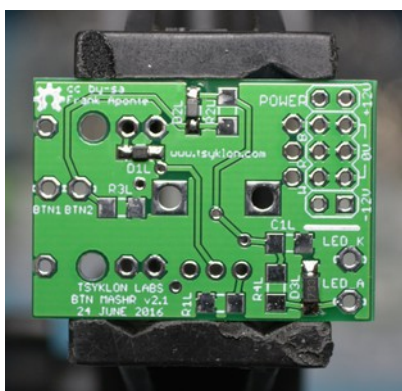
If you don't have a lot of experience with SMD soldering, do yourself a favour and watch this video from Adafruit. Seriously, watch it:

<https://www.youtube.com/watch?v=QzoPxvIM2qE>

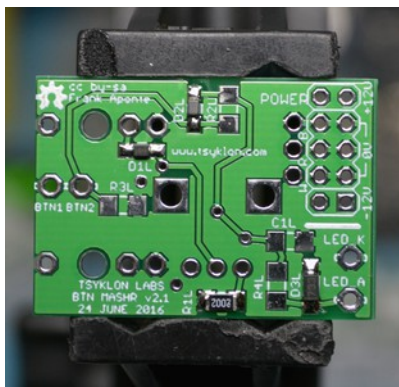
3) As a reminder, this process will be for a Left side build, so be sure to place the parts on the pads with the "L" suffix. Begin by soldering diodes D1L and D2L [2 x IN4148] to the PCB:



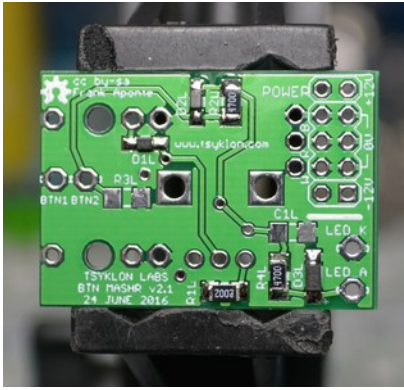
4) Next, solder diode D3L [1 x IN4733] to the PCB:



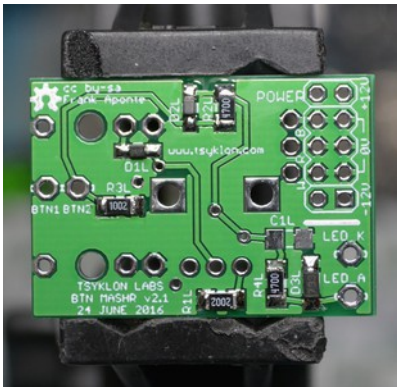
5) For the next step, solder resistor R1L [1 x 20kΩ] to the PCB:



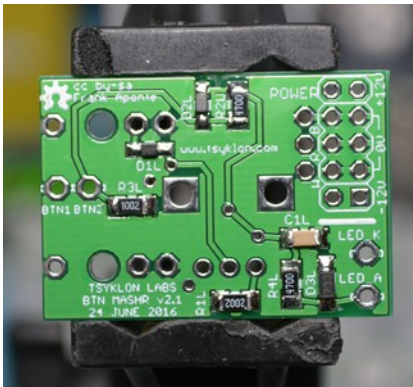
6) Then, solder resistors R2L and R4L [2 x 470R] to the PCB:



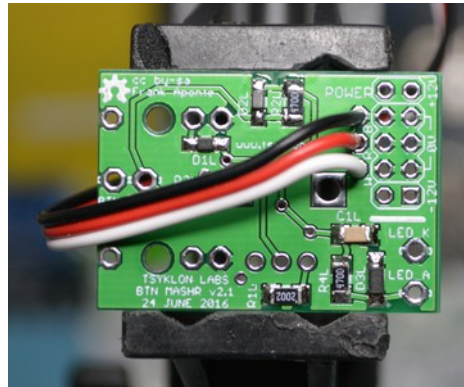
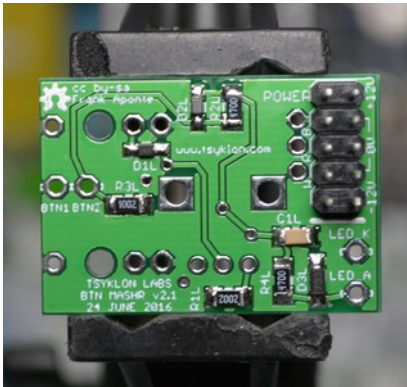
7) Next, solder resistor R3L [1 x 10kΩ] to the PCB:



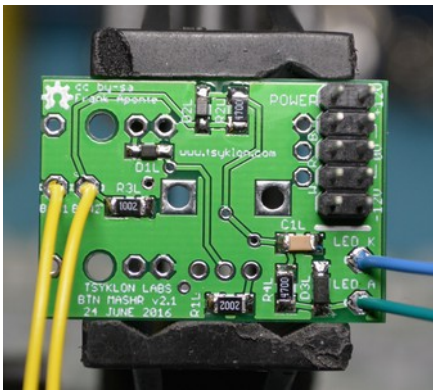
8) For the last of the SMD components, solder capacitor C1L [1 x 100nF] to the PCB:



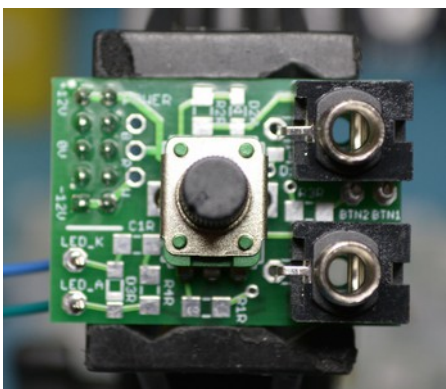
9) If you are going to power your BTN MASHR module from a standard Eurorack power system, install the 2x5 POWER Header and solder to the PCB. If you use the PulpLogic style Futaba cable system power instead, install the cable. Be sure to connect the white [-12VDC] wire to the **W** pad, the red [+12VDC] wire to the **R** pad, and the black [0VDC] wire to the **B** pad:



10) Before soldering the jacks and potentiometer to the PCB, connect the wires for the Arcade Button. These will be inserted through the "Back" of the PCB – the side with the SMD components. Use 3 - 4 inches (74 - 100mm) of wire for each of the four connections:



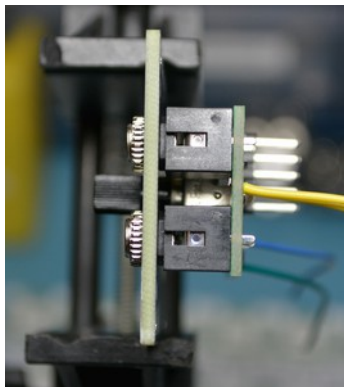
11) Install the potentiometer and jacks into the front side of the PCB - DO NOT solder them at this time. Note, the ground pin for the jack is the one outside of the molded plastic part of the jack. This is the pin that goes towards the center of the PCB:



12) Once you have the potentiometer and jacks seated, install the front panel and then the jack nuts. This will keep everything together while you solder the pins to the PCB. Tighten the nuts until they are snug - no need to go crazy tight on them. If you are using pliers instead of a Knurled Nut Tool, be careful not to scratch the front panel:



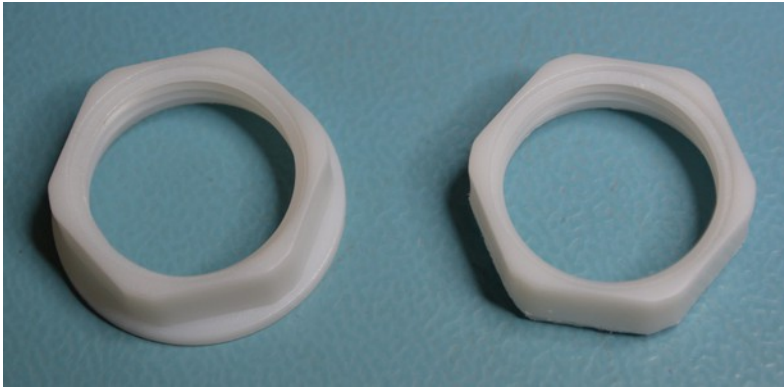
13) Once last check/adjustment before soldering - double check that the pot and both jacks are still seated against the PCB. If so, you are good to go. If not, jiggle the pot and jacks (technical term) to make sure that they are seated. You may need to loosen the nuts a little bit to get it right - but do not forget to re-tighten them!



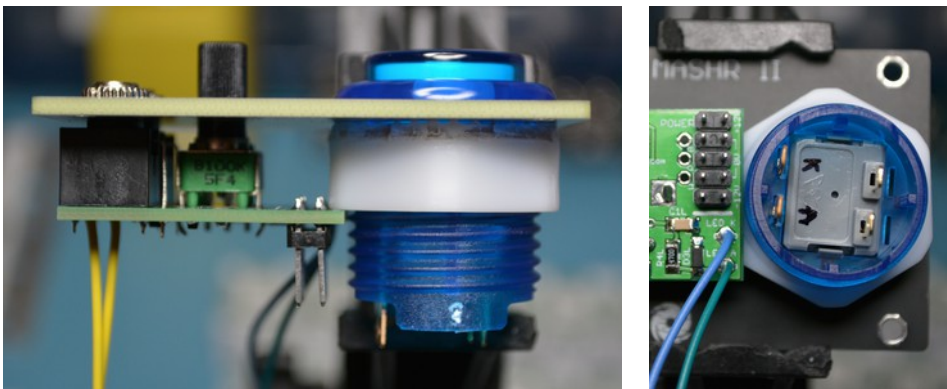
14) Solder the pot, jacks, and LED to the PCB. Once soldered, you can do a final tightening of the jack nuts. Do not forget to clean up the flux - if that is what you are into:



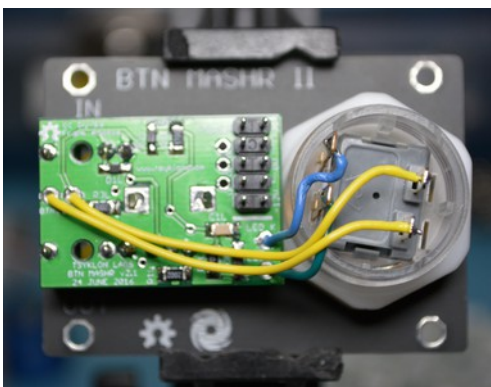
15) Prepare the nylon nut for the Arcade Button by cutting off the flat, round section. It is soft plastic, so regular duty wire cutters work well. The overall thickness of the but must stay the same, so only cut off the "washer" part of the nut as shown below:



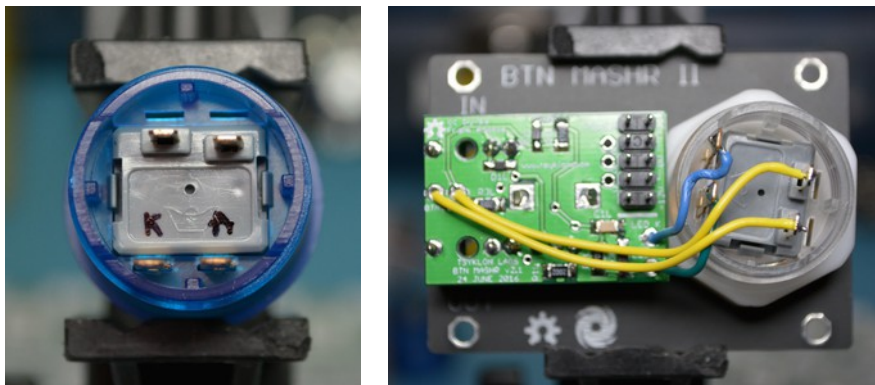
16) To install the Arcade Button, slide the nylon nut with the formerly washer side against the back of the Front Panel and tucked just under the PCB. Then, thread the button in through the front side of the Front Panel as show below. Also, be sure to keep one of the flat edges of the nylon nut parallel to the side of the Front Panel:



17) Next up are the final connections for the Arcade Button. Route, strip, and solder the two wires from the BTN1 and BTN2 terminals on the PCB to the Arcade Button contacts [the yellow wires in the picture below]. There is no polarity on the Arcade Button contacts, so it doesn't matter which wire goes to which terminal – just be tidy with your wiring:



18) Lastly, route, strip, and solder the two wires from the LED_K and LED_A terminals on the PCB to the Arcade Button LED. Unlike the button contacts, the LED is polarized, so be sure to connect the LED_A PCB pad to the Anode terminal [the green wire in the picture below] and the LED_K PCB pad to the Cathode terminal on the Arcade Button LED [the blue wire in the picture below]. Take notice of which terminal is the Anode and which is the Cathode from the picture of the Arcade Button terminals below:



19) NOTE: For the Left Arcade Button build, the potentiometer increases the voltage of the trigger output when turned clockwise [away from the Arcade Button]. For the Right Arcade Button build, the potentiometer increases the voltage of the trigger output when turned anti-clockwise [again, away from the Arcade Button]:



20) That's it! Job well done, Udarnik! Enjoy the fruit of your labors - get patching!

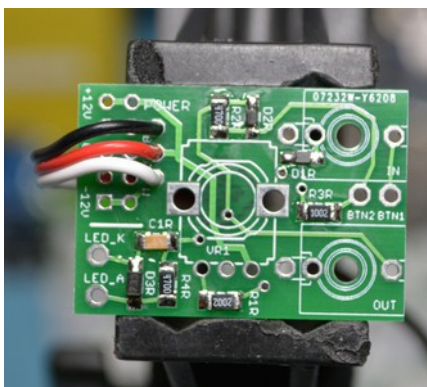
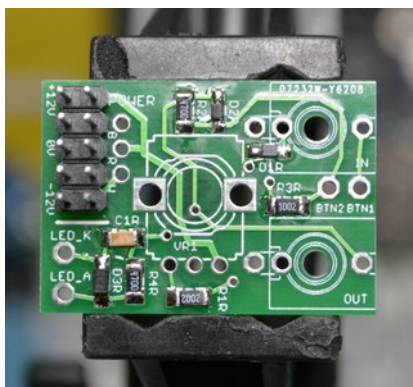
[but definitely continue on to the next page if you are building a right handed BTN MASHR]

2) Below are a few reference pictures of the component installation for a Right handed build:

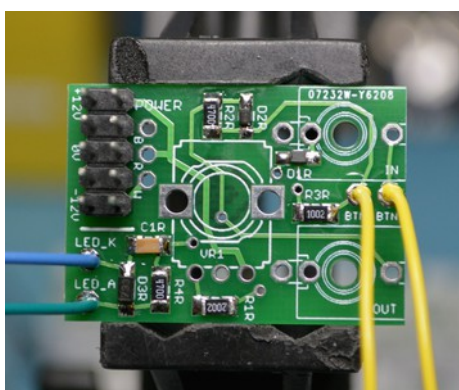
A) PCB with all SMD components installed:



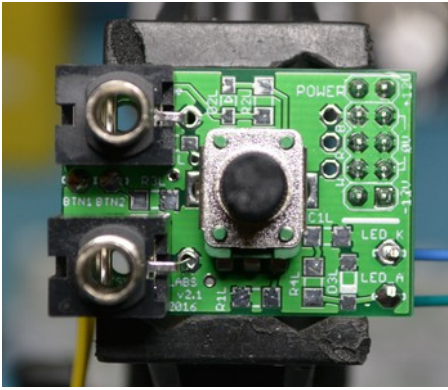
B) Power Connectors [both options – standard Eurorack Power header and PulpLogic Futaba cable]:



C) Arcade Button connection wires installed:



D) Jacks and Potentiometer installed:



E) Final installation of Arcade Button wiring:



F) That is it. You are ready to patch and trigger, Comrade!



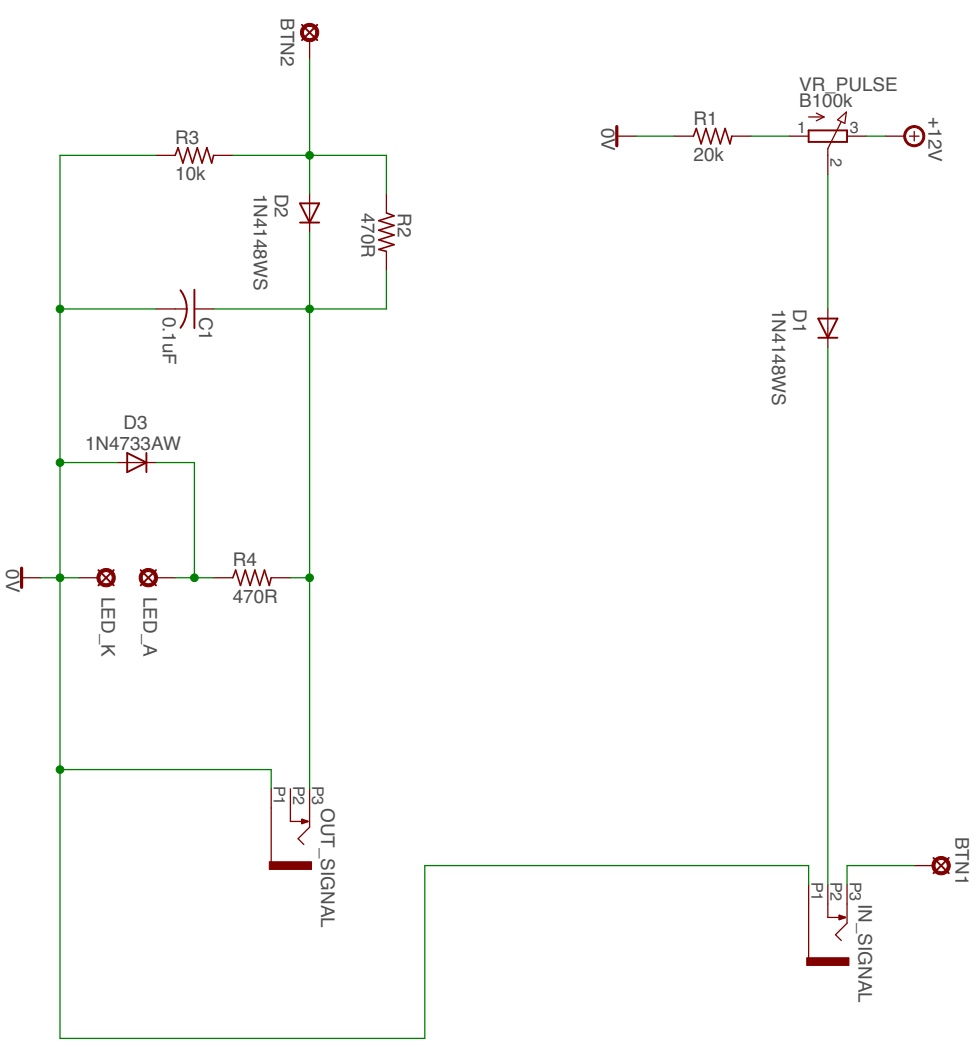
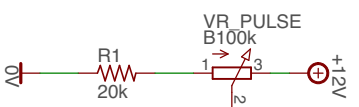
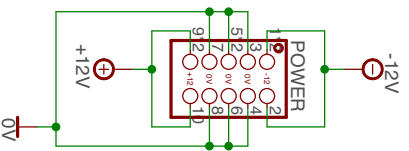
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INTERPRETING COMPONENT DESIGNATIONS FOR TSYKLON LABS MODULES

As much as possible, we have tried to be very consistent with how our components are labeled on our Printed Circuit Boards [PCBs]. Aside from being consistent component to component, PCB to PCB, and module to module within our own products – we have also done as much as possible to be consistent with standard naming conventions used by other module designers. The table below lists component types and their designations. We will use 000 in place of the identification numbers normally used so that you can see what the component number will look like. Most prefixes are one to two characters long, but can occasionally be three characters.

COMPONENT ID	EXAMPLE	COMPONENT TYPE
R	R000	Resistor
C	C000	Capacitor
PB	PB_RESET	Push Button
SW	SW_INVERT	Switch [Toggle]
VR	VR000	Variable Resistor [Potentiometer or Trimmer]
LED	LED000	Light Emitting Diode
D	D000	Diode
Q	Q000	Transistor [BJT, FET, or MOSFET]
IC	IC000	Integrated Circuit
MHDR	MHDR_NBL	Male Header
FHDR	FHDR_NBL	Female Header
FB	FB000	Ferrite Bead
XTAL	CLK_XTAL	Quartz Crystal
REG	IOVREG	Voltage Regulator
PF	PF000	Resettable Poly Fuse
POWER	POWER	Power Header [2x5 or 2x8]
L	L000	Inductor

With regard to the numeric part of the component designation – 100 series numbers are for the PCB closest to the Front Panel. 200 series numbers are the next PCB behind the first, 300 series belong to the PCB behind that. While it would make sense that 400 series component numbers are for the next PCB behind that, in some cases those components are on the PCB for the expander module. Make sense? Great, go forth and build!



TSYKLON LABS

DOCS: <http://tsyklon.com/pj/itkka/>
 SKU : Bm Mashr DIY Schematic v2.1

DATE: 24 JUNE 2016

Sheet: 1/1