PM Foundations ADSR-D v1.0 Assembly Guide

Background

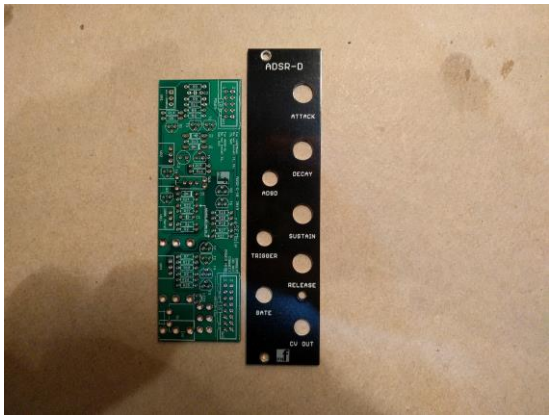
The ADSR-D is a nice vintage style envelope generator (EG) for Eurorack systems. This EG uses all discrete components (no ICs or IC sockets) so it's low cost, fun and easy to build.

The EG can be switched between ADSR and ADSD mode with a front panel push button. In ADSD mode the Delay pot controls the delay and the release parts of the envelope just like some popular synths of the 1970s and 1980s.

This EG outputs an exponential curve and has a re-triggerable gate.

Features:

- 0 to 10V envelope customizable to 5V.
- Exponential envelope curves.
- Gate mode: When gate held, envelope follows ADS stages. When gate released, R stage begins.
- Switch between ADSR and ADSD modes. Push in the button to invoke the Release pot.
- Fun and easy to build with all discrete semiconductors.
- For keyboard controllers with retrigger output, you can reset the envelope to the attack phase.
- 6HP Eurorack with our panel.
- Fits in the reSEMble semi-modular single voice sythesizer.



Introduction

Thank you for purchasing this module! This is an easy build. Some of the pads are quite small and you will need a chisel tip or screwdriver tip soldering iron, 0.5mm solder and the skill to solder these tiny joints. You should use a temperature adjustable solder station set to the correct temperature.

This module is also used in the reSEMble semi-modular synth. **YOU DO NOT NEED TO AND SHOULD NOT INSTALL THE PARTS that are specific to the reSEMble synth**. These parts are not included in the BOM. These are the parts marked on the PCB that are not required and should not be installed:

- SV1 - 16 pin patch connector
- SW1 - optional position for push button switch
- S1 - toggle switch

NOTE 1: With components listed in the BOM the output will be a 10V envelope . **For a 5V envelope instead of a 10V envelope replace R22 with 27K and replace R23 with 4.7K**.

The module is designed and sized for **Eurorack** systems. You will need a 16-10 pin eurorack power ribbon connector with –12/0/+12 which is connected to a synth power supply.

Follow the parts lists, these instructions and the PCB silkscreen text to build the module. You should follow the order of assembly as described below since some components may be soldered underneath other components. There are also parts placement diagrams at the end of this manual.

The module consists of 1 PCB board and a front panel.

Please check and arrange all your parts according to the BOM in readiness for construction.

Constructing the board

Resistors

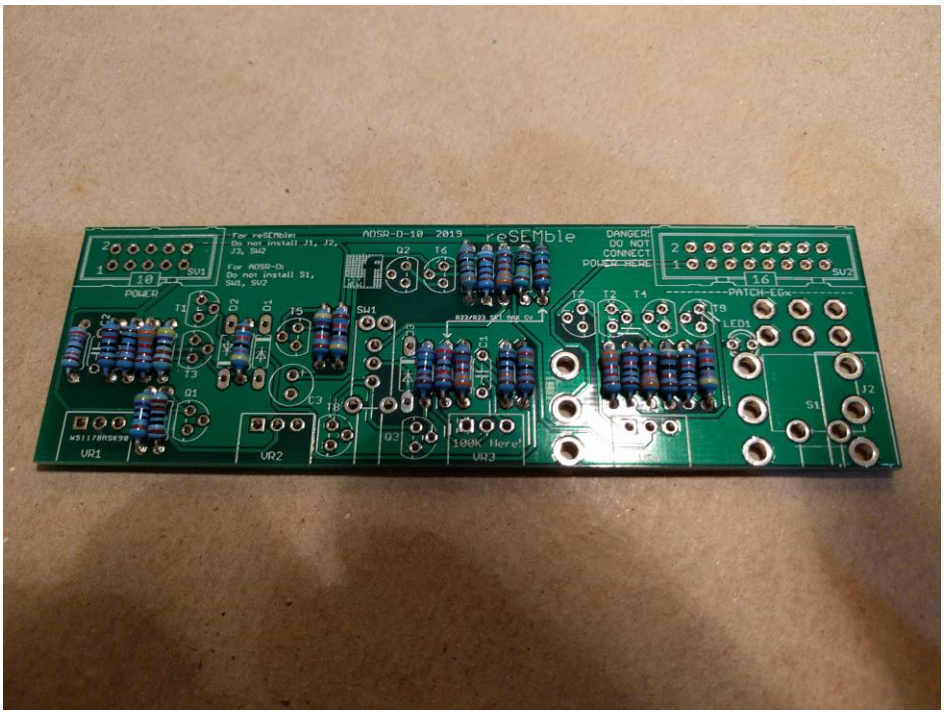
See Note 1 on Page 3.

Arrange the resistors by value on the workbench in the same order as listed in the BOM and install each numbered part for that value before moving onto the next.

Install the resistors on the TOP of the board. Take care not to mix up the following resistors which have similar color codes:

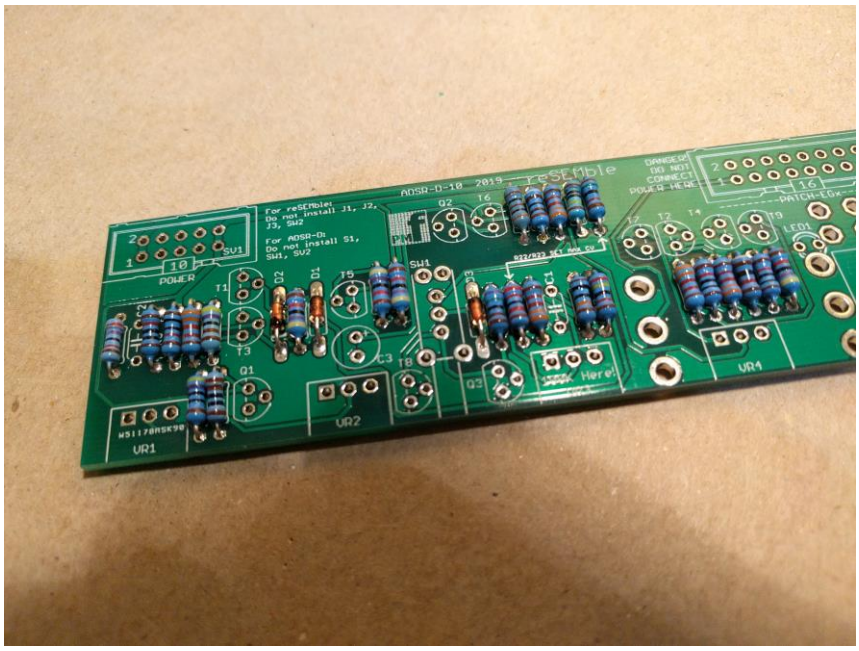
- 9.1k/91k
- 1k/10k/100k/1m
- 4.7k/470r/47k

Solder and clip the leads.



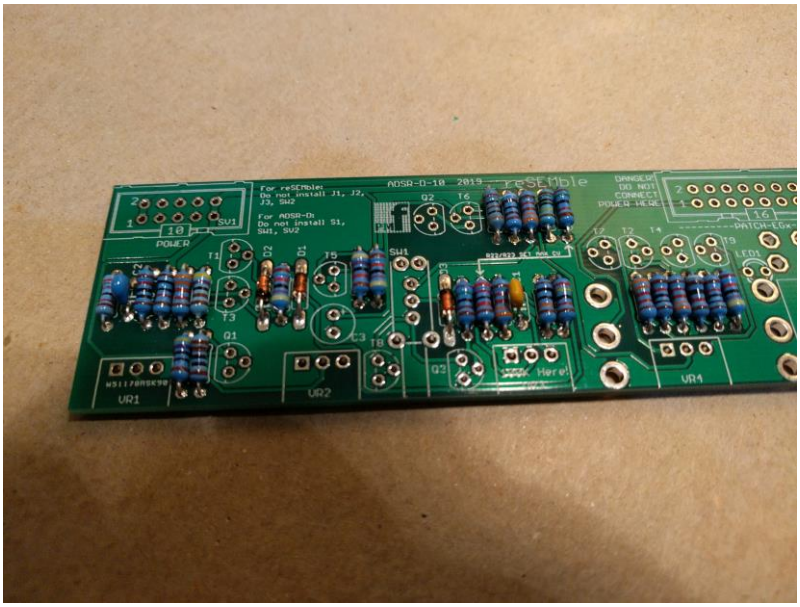
Diodes (but not LEDs)

Install the diodes on the TOP of the board. Align the stripe on each diode with the stripe marked on the board. Solder and clip the leads. Now go back and check the polarity against the silk screen for each diode.



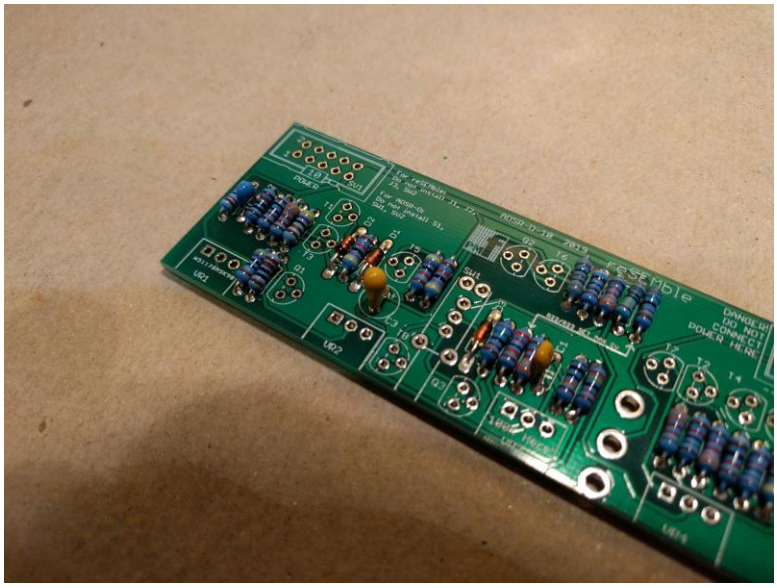
Ceramic capacitors

The 10n capacitor is C1 and is marked 103 and the 1n capacitor C2 is marked 102. The 10n may be smaller than the 1n! Install the capacitors on the TOP of the board. Solder and clip the leads.



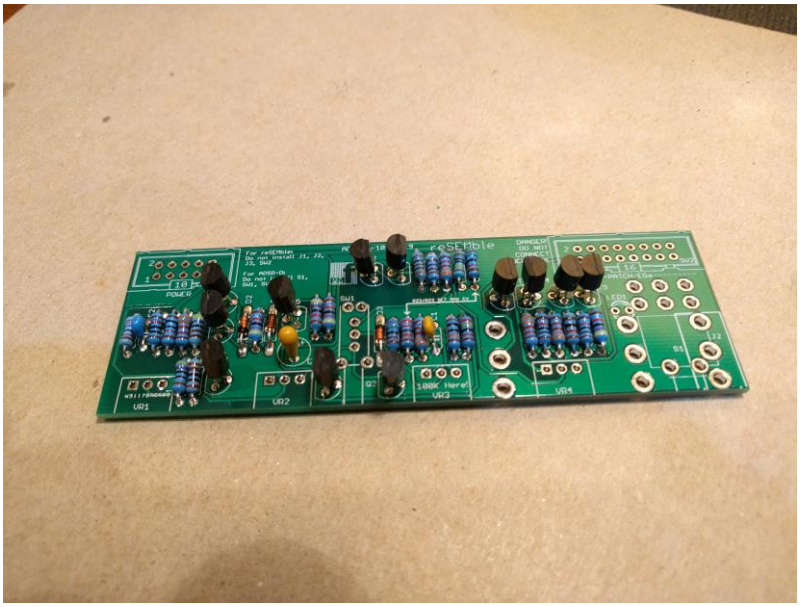
Tantalum capacitor

This is marked C3 on the PCB. Install this on the TOP. Make sure you orient it correctly. The longer lead and/or the lead marked with a + needs to be inserted into the hole that has the “+” marking near it. Leads marked with “-“ go in the board hole WITHOUT the “+”. Solder and clip the leads.



Bipolar Transistors

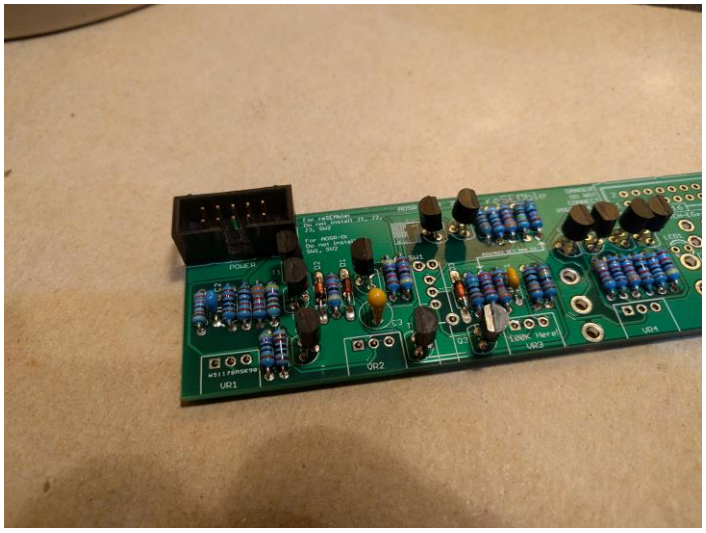
Separate the transistors on the workbench into NPN (2N3904) and PNP (2N3906) . There are nine (9) 2N3904s and three (3) 2N3906s. Install the transistors on the TOP of the board. Do not mix up the NPNs with the PNPs. These are polarized components. Align the outline with the outline on the board. They should be raised off the board surface slightly and at the same height. Solder and clip the leads.



Power socket

Install the 10 pin power socket on the TOP of the board. This must be installed with the correct orientation or the module will be damaged when the power is connected.

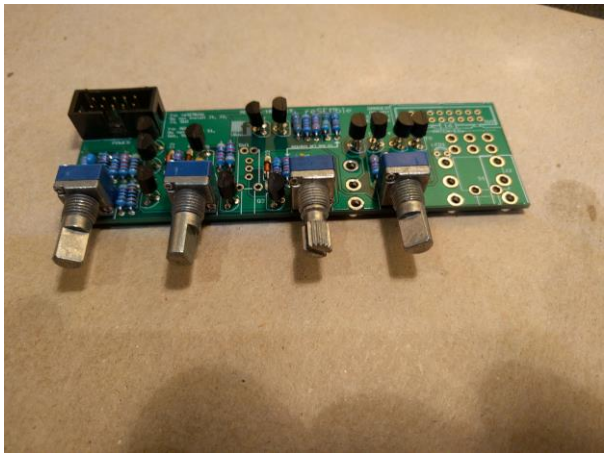
The cut-out in the socket should face the pots, aligning the cut-out with the "10" marking on the board as shown in the photo.



Potentiometers

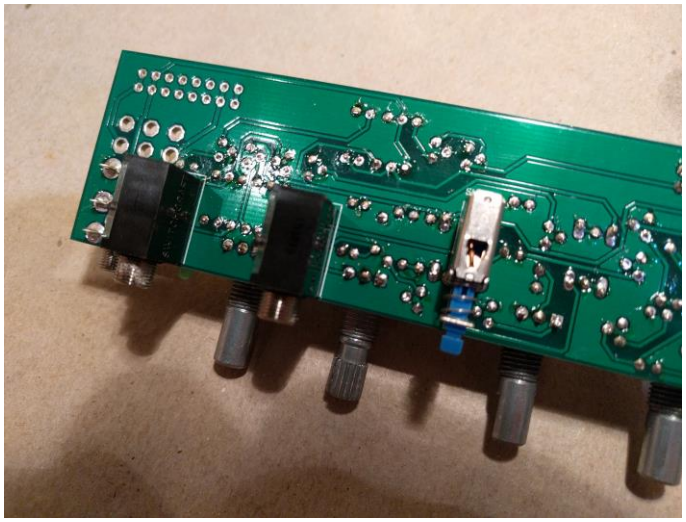
If the pots have positioning lugs on the front, cut these off with a sharp pair of flush cutting pliers. The front of the pot (where the shaft protrudes) needs to be flat. There are three 1M pots and one 100k pot. Do not mix these up.

Carefully align the pots so they are flush with the edge of the board and perfectly upright and tight to the board surface. They must be installed on the TOP of the board. Please ensure they are on the CORRECT SIDE OF THE BOARD before soldering otherwise PCB tracks and pads may be damaged if they are desoldered. See Photo.



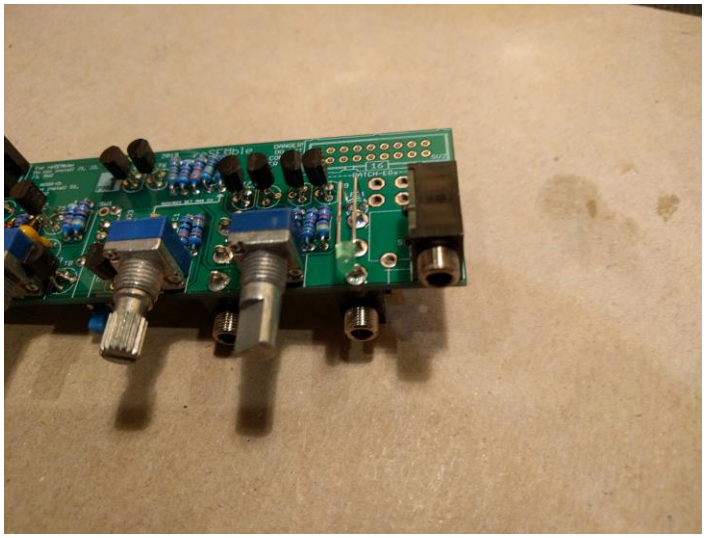
Switch

Insert the switch on the BOTTOM so that the plunger faces the front of the PCB. There are two unused location holes. Tack one pin of the switch, align with the front panel, then solder all the remaining pins and the locating lugs. **The switch is on the BOTTOM, the markings on the top of the board are for the reSEMble variant and it is very important to not install the switch on the wrong side since it is very difficult to remove.** Do not bridge the contacts to nearby components.



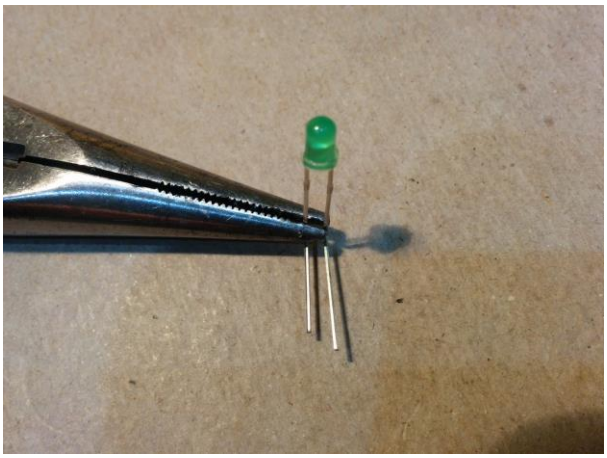
3.5mm Jack Sockets

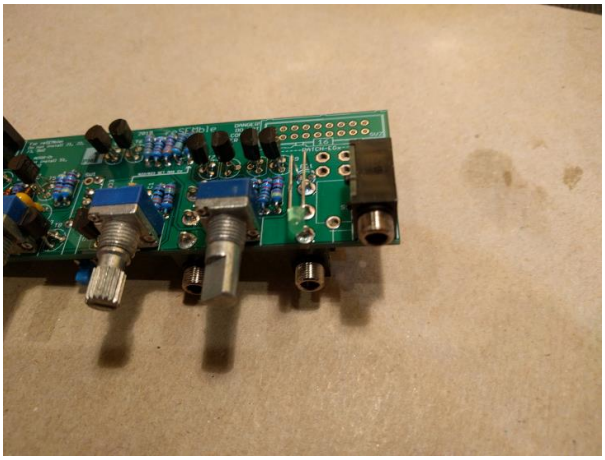
Install the jacks on the TOP and BOTTOM and fully solder each one as you install it. Make sure they are perfectly aligned and tight to the board. Please ensure they are on the CORRECT SIDE OF THE BOARD before soldering otherwise PCB tracks and pads may be damaged if they are desoldered. Do not bridge the contacts to nearby components.



LED

Bend the leads as shown in the photo. The bend is at 14mm from the base of the LED lens. Insert in the TOP of the board with the long lead in the hole marked + and use the panel to align the LED. Solder the LED and clip the leads. The small pads are close to the jack and other nearby pads so watch carefully.





Final assembly

Put washers on the pot shafts. These go on BEFORE the panel and help to keep the panel flat and level.

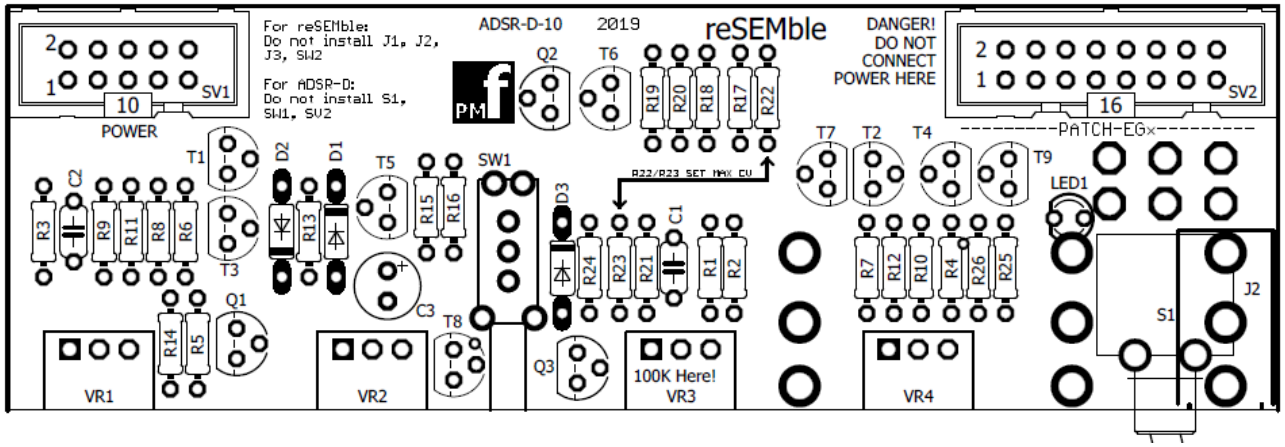
Place the front panel so that the jacks, pots, and LED align with the holes in the panel.

Put nuts on the jacks and pots.

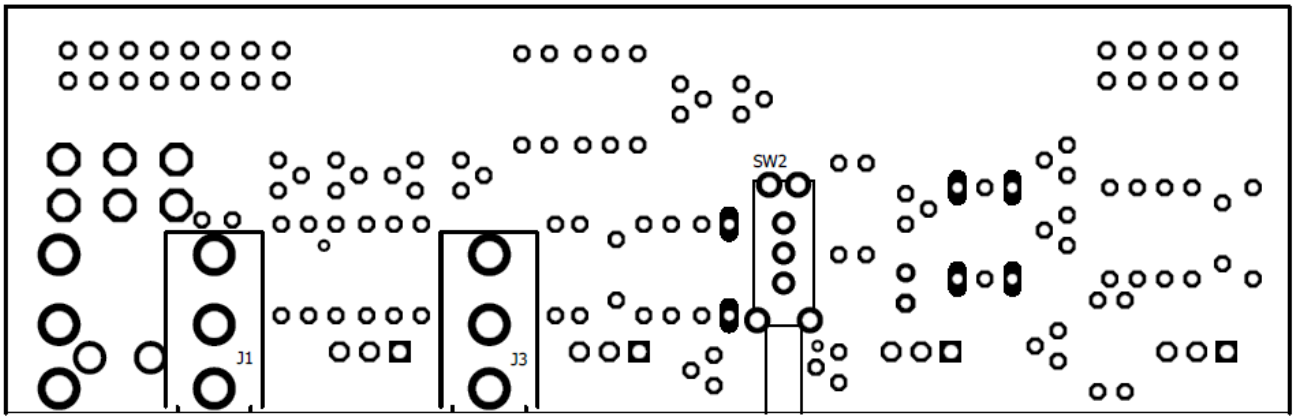
Install the knobs.

Align the square hole in the switch cap with the plunger of the switch and push until it snaps into place.

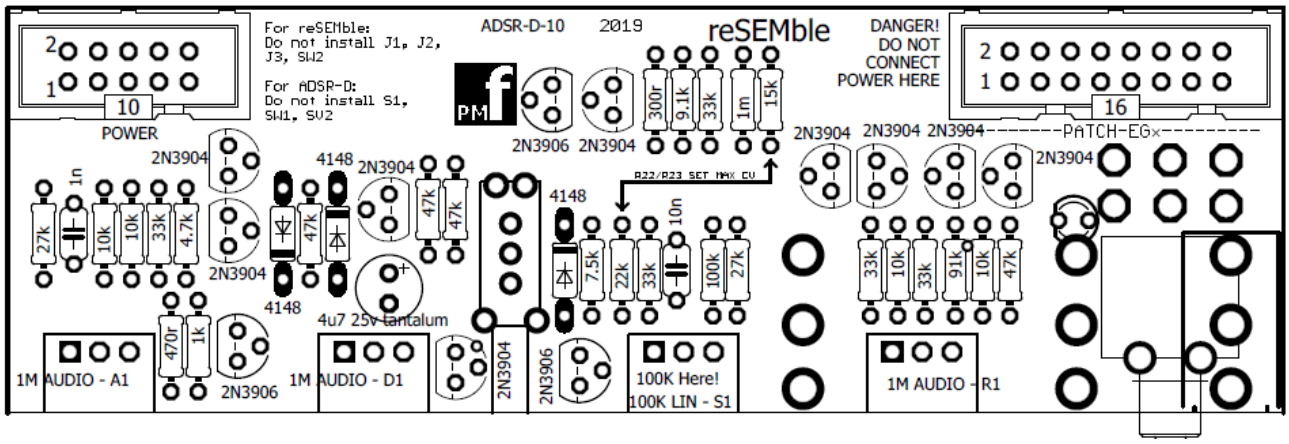
TOP



BOTTOM



VALUES



Testing

You can check the finished PCB against the layout diagram that has the values marked. You can check that each resistor, capacitor, diode and transistor is correctly placed by reviewing the codes marked on the parts against the value son the diagram.

- Monitor the CV output from the CV OUT jack on an oscilloscope or meter.
- Set the A, D, S and R controls to their mid position.
- Repeatedly apply a gate CV from a keyboard controller or Sequencer etc. to the GATE input.
- You should see the voltage increase to the peak value (10V) during the attack period, decrease to about mid-way during the decay period, remain at this SUSTAIN level until the gate is released and reduce to 0 during the RELEASE period.
- If the ADSR button is off (out) the Release control has no affect so both the DECAY and RELEASE curves are determined by the DECAY control.
- During the DECAY and SUSTAIN periods, if a CV is applied to the TRIGGER input the envelope will begin ATTACK from its current voltage level.