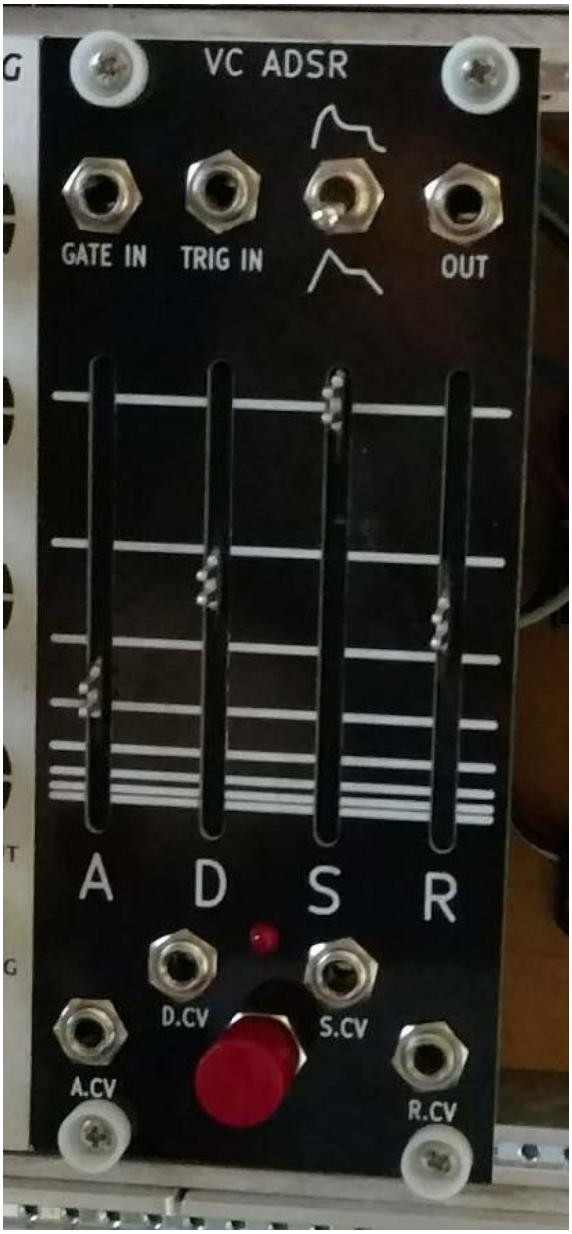
Befaco VCADSR V1.1
Assembly Instructions

2017 Dave Hamara



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Assembly Instructions

The back PCB assembly is very straightforward (Figure 1). Just remember that you only have 12mm of clearance between the 2 boards, so you don't want anything sticking up any farther than necessary. There IS room for low-profile machined sockets (listed as OPTIONAL in the BOM) if you like socketing your chips.

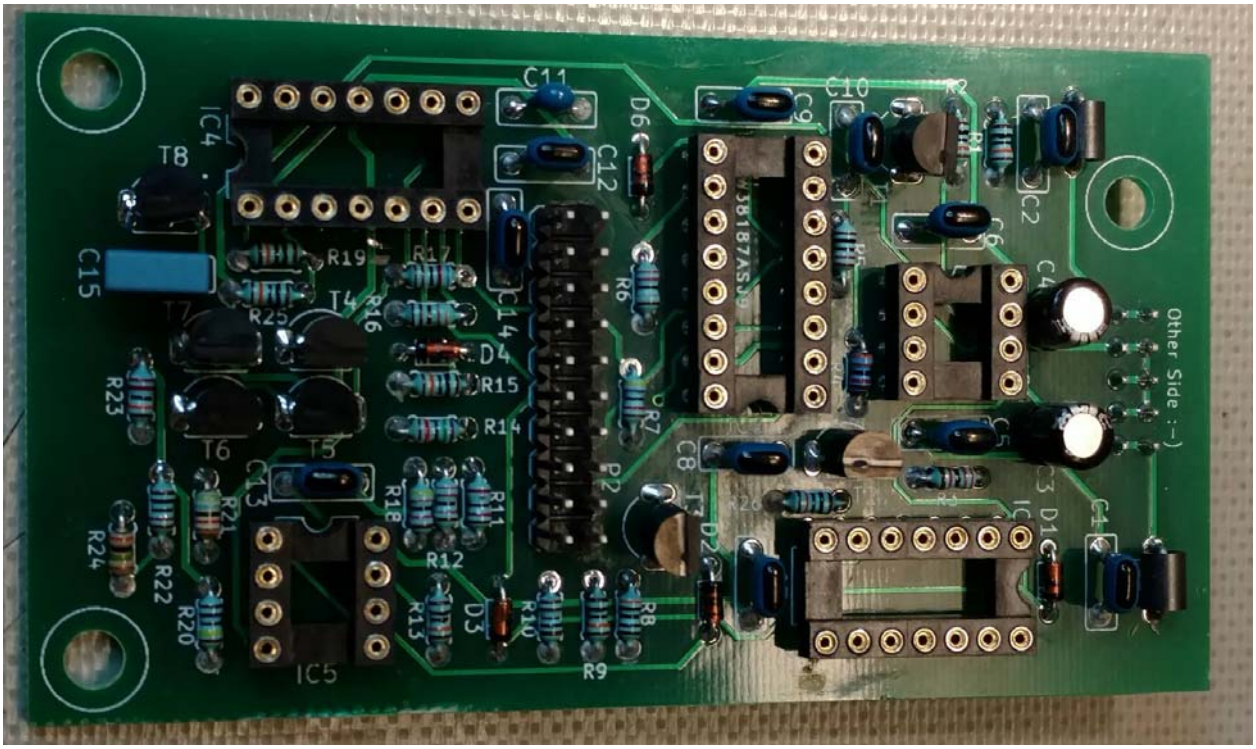


Figure 1: Assembled BACK PCB. Mount T1 - T8 close to the board

Assembly of the front PCB to the panel is a little tricky, because the pins for the inter-board connector J8 and some of the resistors stick up underneath the sliders, so the sliders can not be mounted flush with the PCB (a holdover from the original Befaco design that I will rectify in a future version someday)

The process is as follows:

1) Install all components (resistors and J8) on the bottom side of the front PCB (Figure 2)
2) Trim the leads on the top side as short as possible
3) Place all of the top side components except the LED on the board, but do not solder
4) If you use the pushbutton switch in the BOM, I found that putting the lock washer under the panel works best. Likewise, put the keying washer upside-down on the toggle switch (see Figure 3)
5) Install the panel, and install and tighten the nuts on the jacks and switches

6) Gently separate the PCB from the panel by a couple mm, keeping the sliders flush with the panel, so you have good clearance between the bottom of the sliders and the resistor and J8 leads. Keep the PCB and panel parallel to each other. (Figure 4)
7) Solder the jacks and switches. Note that the jack and pushbutton pins will probably not be sticking very far through the PCB - this is OK, as the primary strength of the solder joints are inside the slots anyway.
8) Press the sliders flush against the front panel and solder their pins
9) Remove all the nuts, remove the panel, and place the LED in its proper location in the PCB (watch the polarity)
10) Reinstall the panel
11) Flip the assembly panel side down, and use the LED's leads to guide it into the hole in the panel. It will not fall through the panel due to the lip at the bottom of the LED. Press the LED as far into the hole as it will go, then solder and trim the leads.
12) Not strictly necessary, but I also trimmed the leads on the sliders, as some of them *can* interfere with parts on the back PCB, depending on how straight and low you installed everything on the back PCB.

Since the PCB supports are a bit of a pain to unlock, this is a good time to just plug the back board and front board together for a test before installing the supports, just in case you need to fix anything. The power connector on the back PCB should be at the top.

Finally, install the PCB supports into the front PCB (Figure 5 - note that the one at the top might need to be twisted back and forth a bit to get it to lock - I didn't leave quite enough clearance for the little "wings" to flip out). Then snap the back PCB on, and you are done.

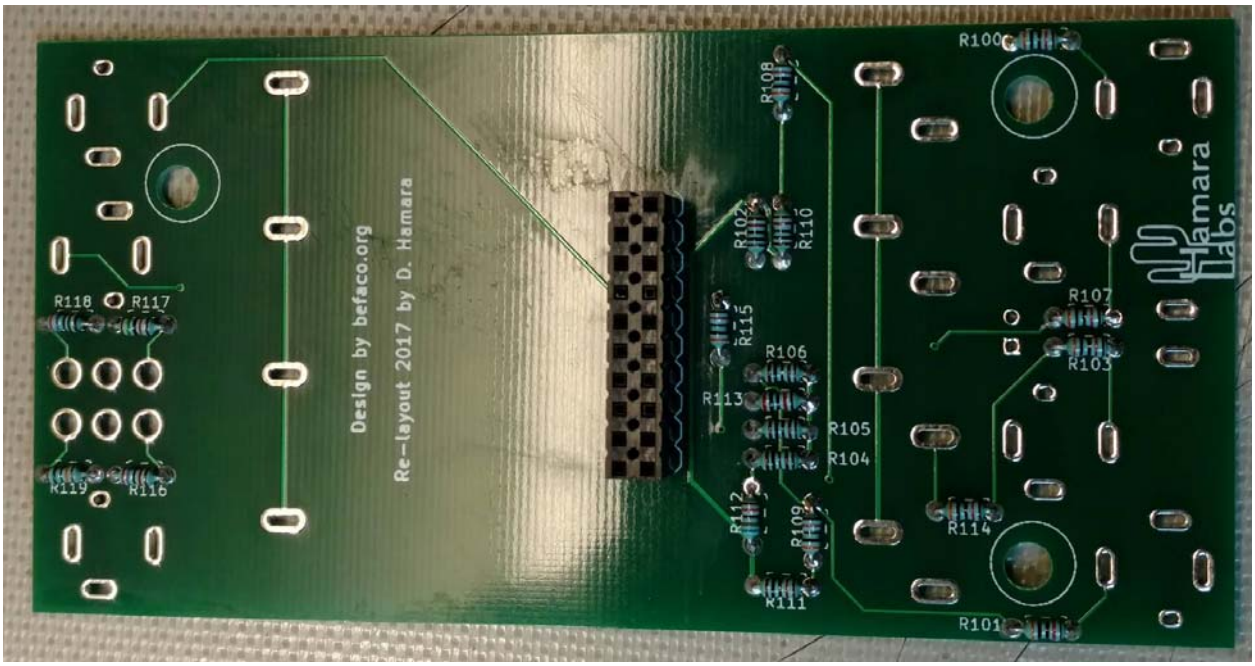


Figure 2: Bottom side components on the FRONT PCB

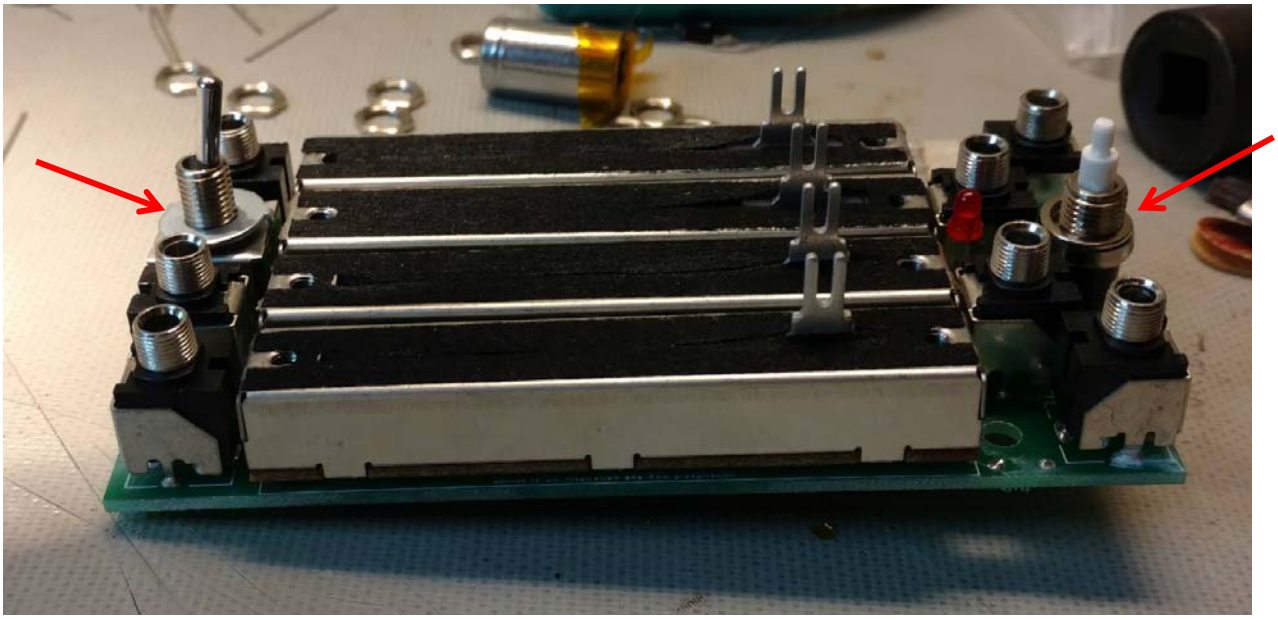


Figure 3: Place the washers on the toggle and pushbutton switches UNDER the panel for a better fit

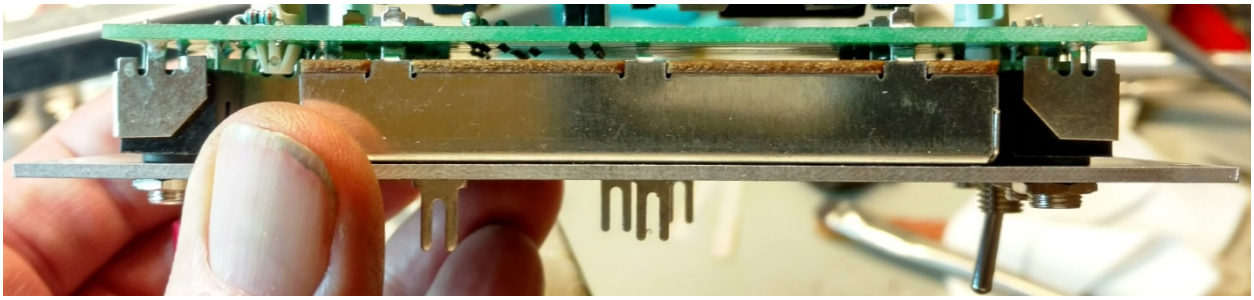


Figure 4: Panel-mounted components sit a couple mm above the PCB

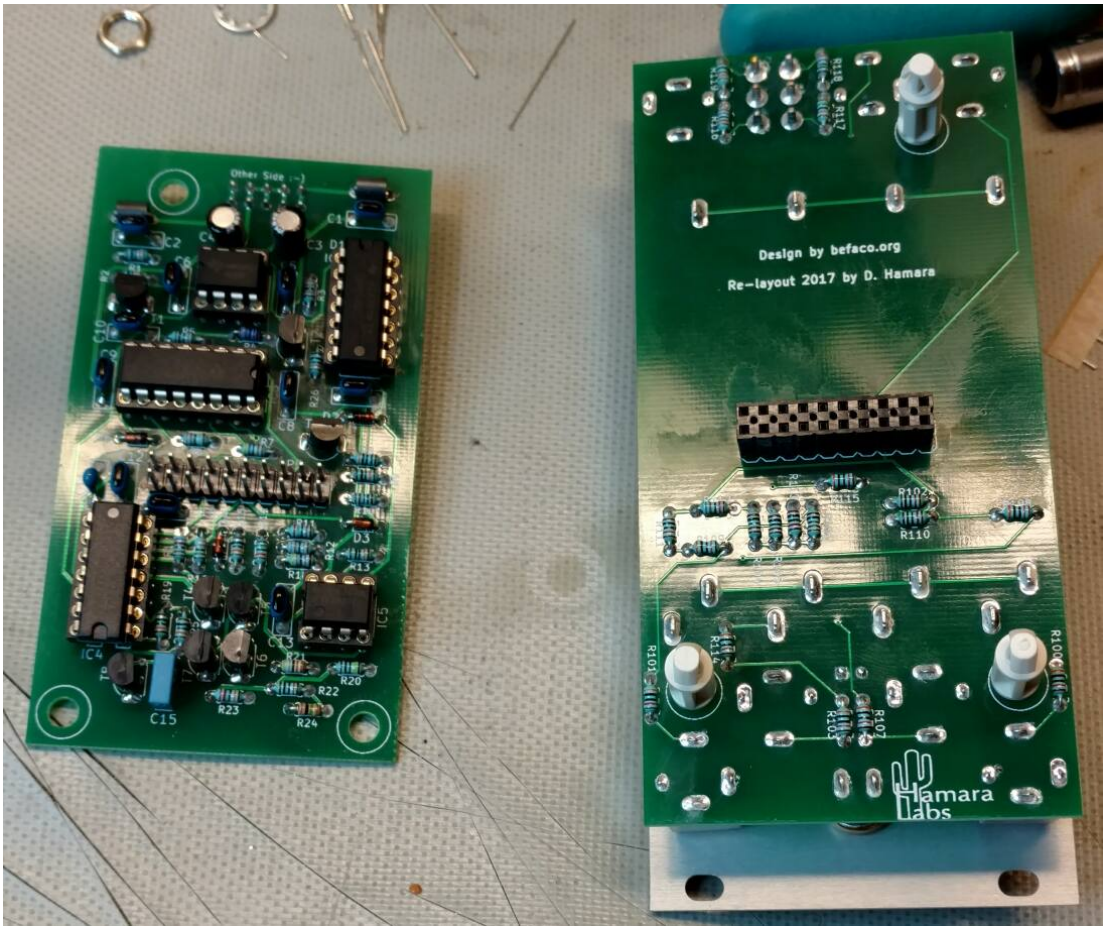
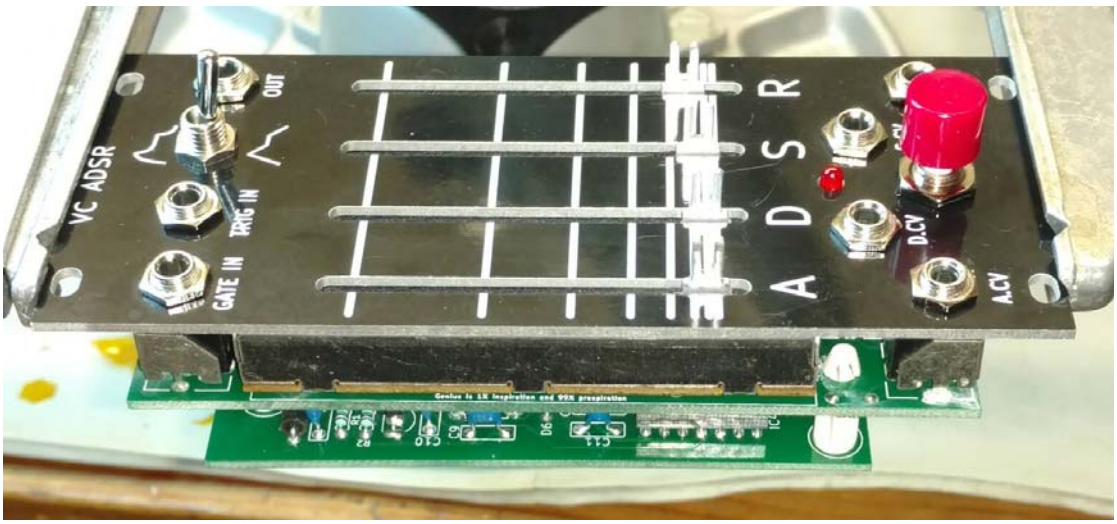
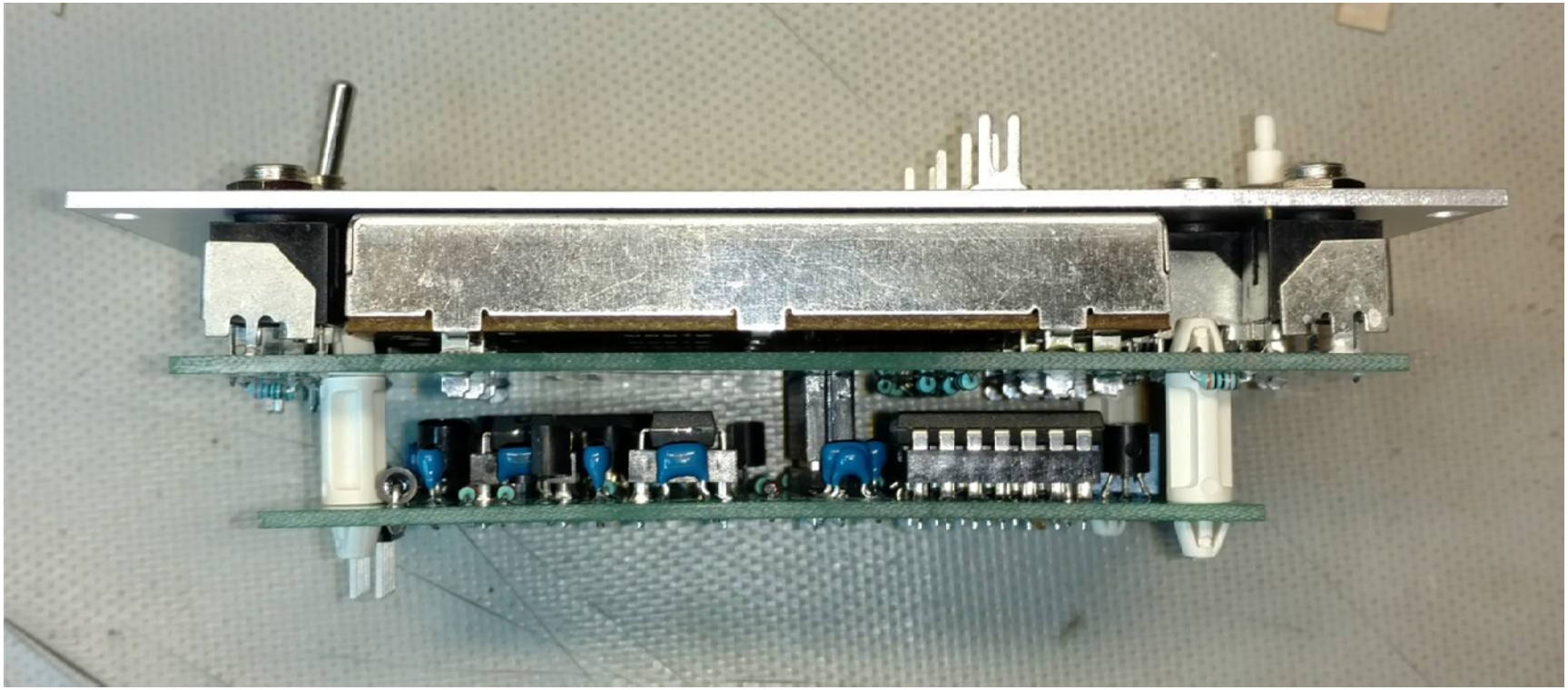
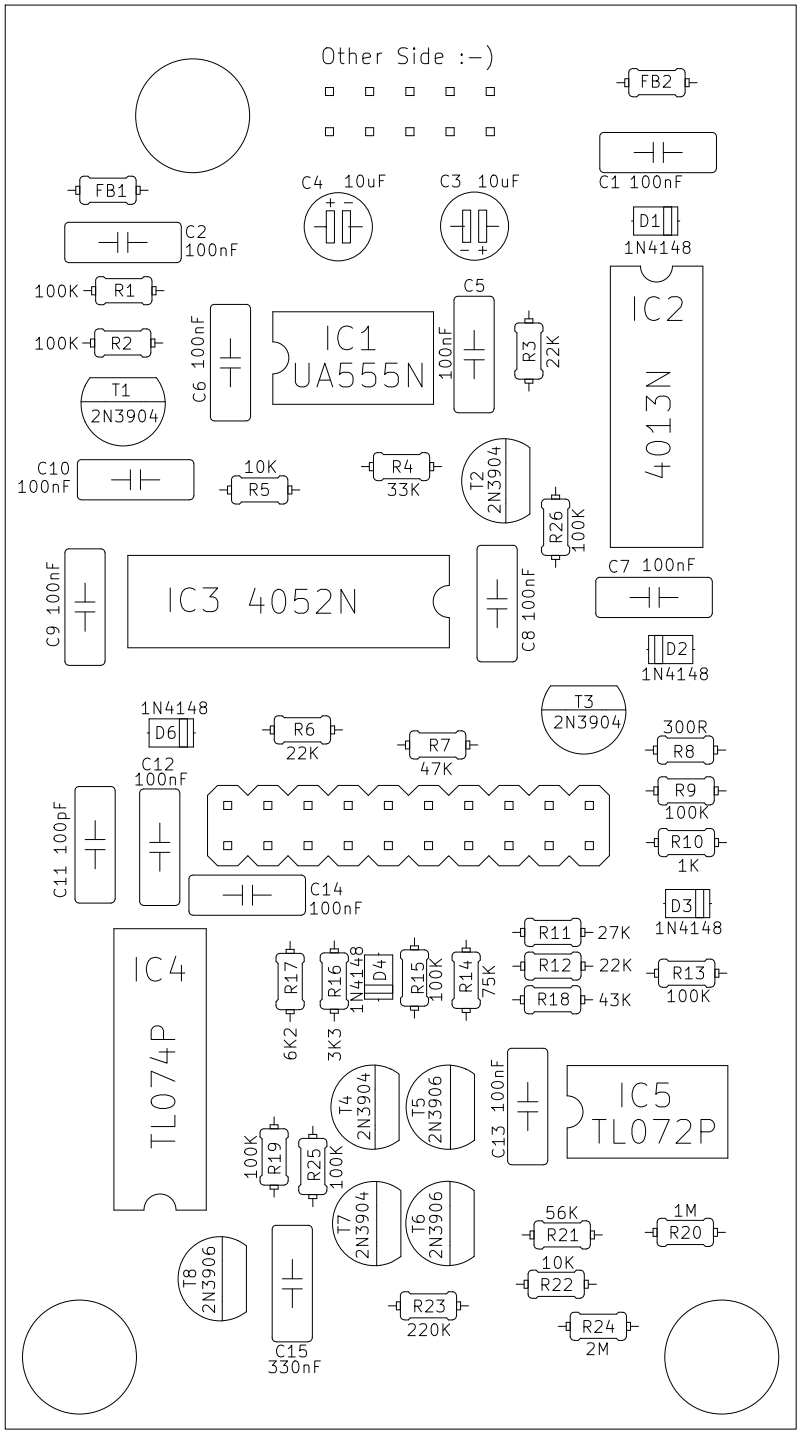


Figure 5: Final assembly - mate the back PCB to the front PCB






Other Side :-)
FB1
FB2
C1 100nF
C2 100nF
C3 10uF
C4 10uF
D1 1N4148
100K R1
100K R2
C5
C6 100nF
IC1 UA555N
100nF
R3 22K
IC2 4013N
T1 2N3904
C10 100nF
10K R5
R4 33K
T2 2N3904
R26 100K
C7 100nF
C9 100nF
IC3 4052N
C8 100nF
D2 1N4148
1N4148 D6
R6 22K
R7 47K
T3 2N3904
300R R8
C12 100nF
R9 100K
C11 100pF
R10 1K
C14 100nF
D3 1N4148
R11 27K
R12 22K
R18 43K
R13 100K
IC4 TL074P
R17 6K2
R16 3K3
1N4148 D4
R15 100K
R14 75K
T4 2N3904
T5 2N3906
C13 100nF
IC5 TL072P
100K R19
R25 100K
T7 2N3904
T6 2N3906
56K R21
1M R20
T8 2N3906
10K R22
R23 220K
R24 2M
C15 330nF

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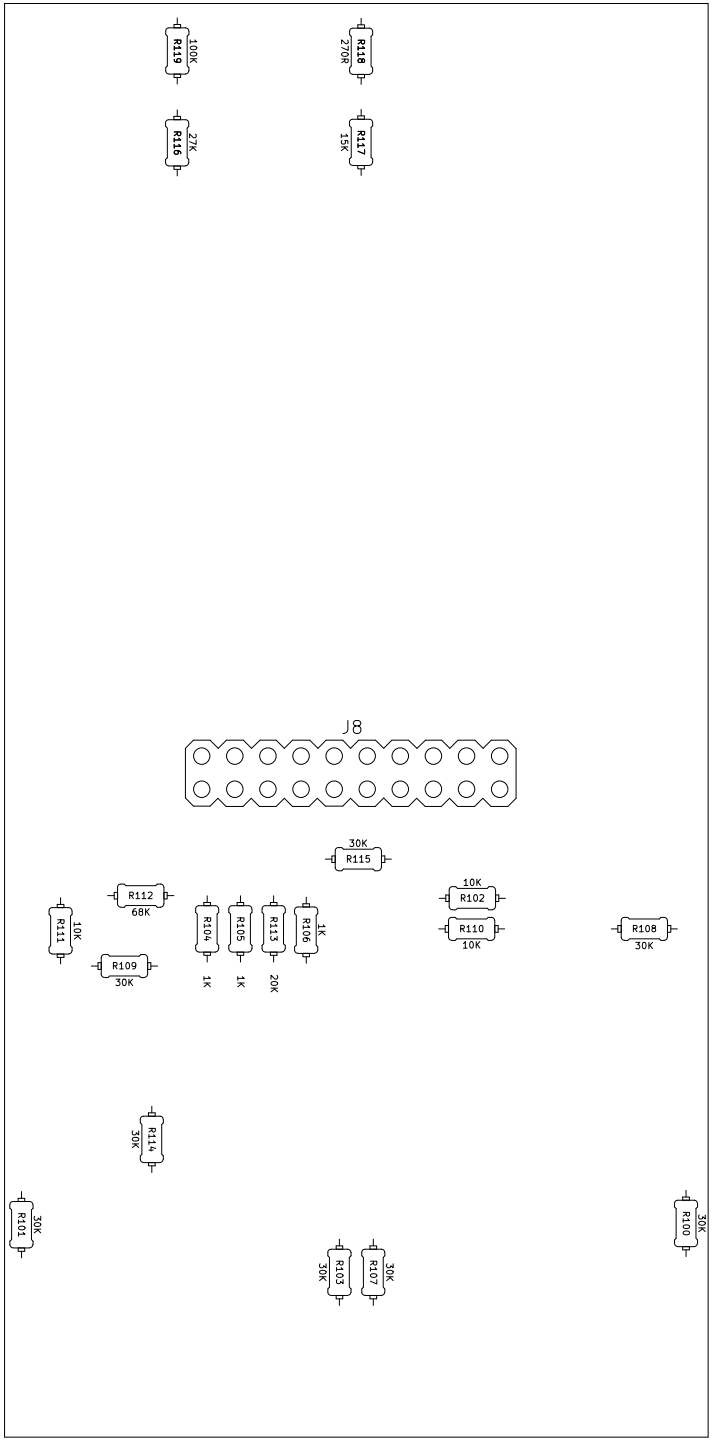
R118
270R
R117
15K
R119
100K
R116
27K
J8
R115
30K
R112
68K
R111
10K
R109
30K
R104
1K
R105
1K
R113
20K
R106
1K
R102
10K
R110
10K
R108
30K
R114
30K
R101
30K
R103
30K
R107
30K
R100
30K

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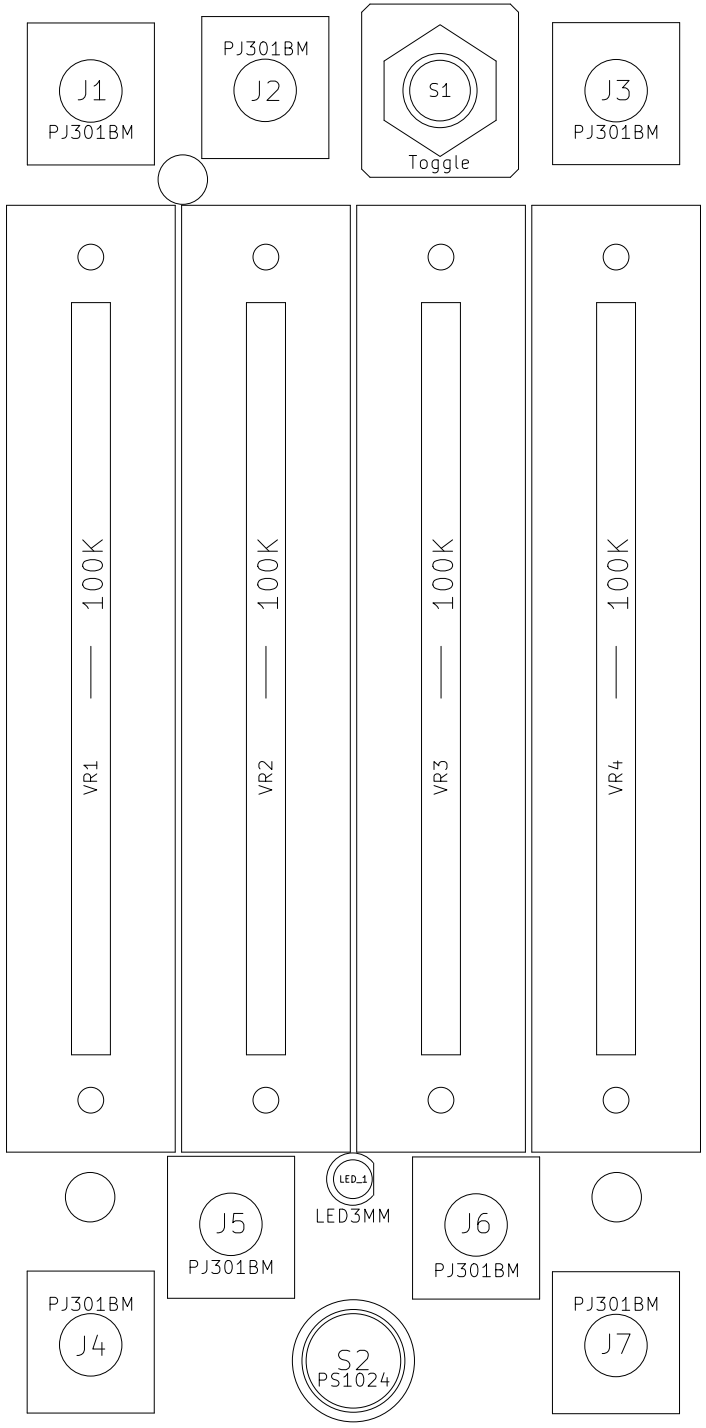
J1
PJ301BM
PJ301BM
J2
S1
Toggle
J3
PJ301BM
100K
VR1
100K
VR2
100K
VR3
100K
VR4
LED_1
LED3MM
J5
PJ301BM
J6
PJ301BM
PJ301BM
J4
S2
PS1024
PJ301BM
J7

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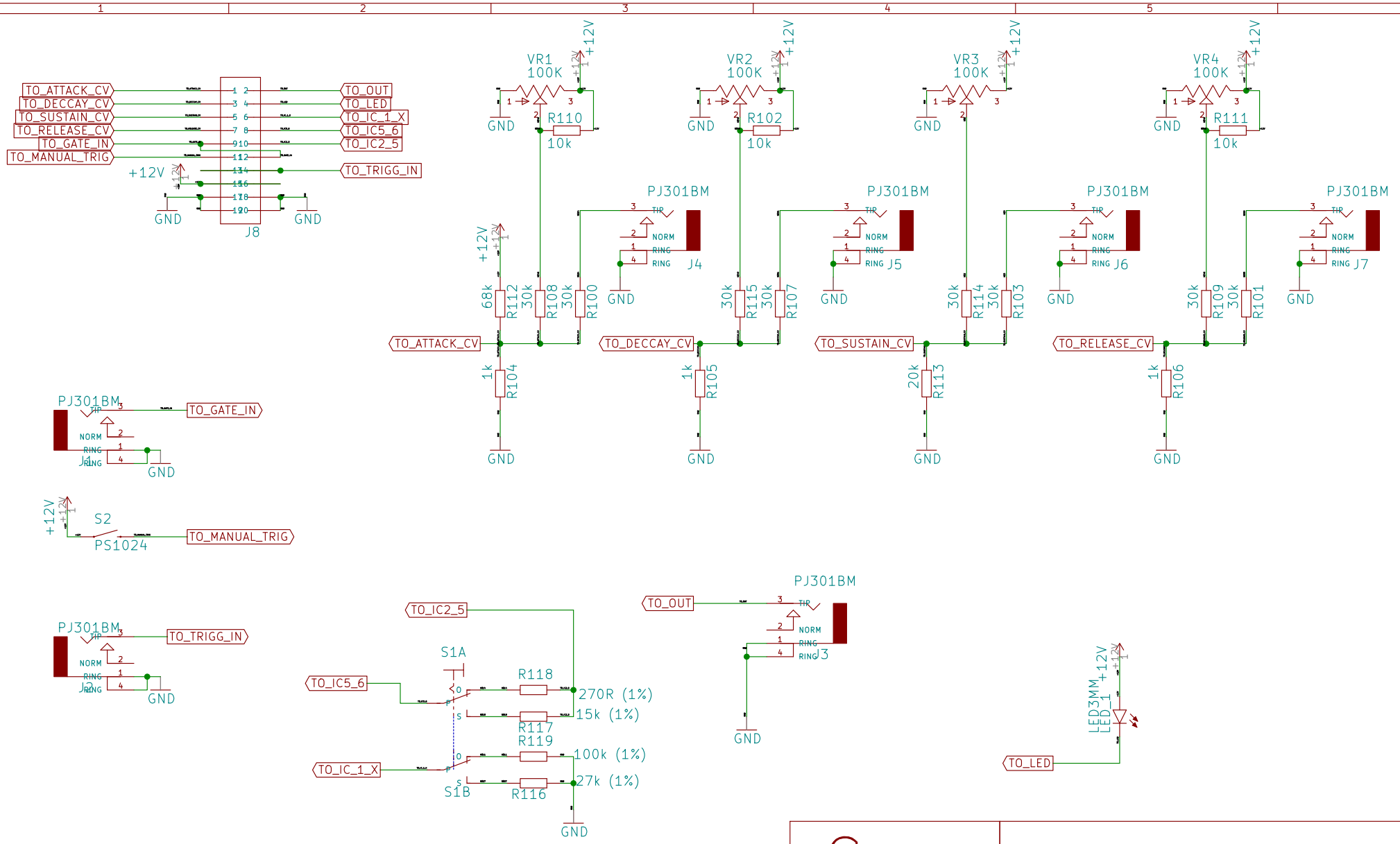
	A	B
Decay/sustain	0	0
Release	0	1
Attack	1	0
Release	1	1

Change R8 to 1K

Hamara Labs	ADSR_BACK.sch
	Sheet: / File: ADSR_BACK.sch
	Engineer: Dave Hamara
	Size: A3 | Date: 2017-07-27 | **Rev: 1.1**
	KiCad E.D.A. kicad 4.0.5 | Id: 1/1



Befaco VCADSR Front PCB

Sheet: /		
File: ADSR_FRONT.sch		
Engineer: Dave Hamara		
Size: A4	Date: 3 JUL 2017	**Rev: 1.1**
KiCad E.D.A. kicad 4.0.5		Id: 1/1

Quantity Back	RefDes Back	Quantity Front	RefDes Front	Total Quantity	Value	Misc	Description	Vendor1	Vendor part 1	Vendor Link 1	Vendor 2	Vendor part 2	Vendor Link 2	Vendor 3	Vendor Part 3	Vendor Link 3	Vendor Link 3a
11	C1,C2,C5,C6,C7,C8,C9,C10,C12,C13,C14			11	100nF	±50V	Radial ceramic cap, 5mm	Mouser	594-K104K15X7RF53H5	http://www.mouser.com/ProductDetail/Vishay-BC-Components/K104K15X7RF53H5/?qs=sGAEpiMZZMtKoKD5vZ6NDCV8M5MbCCv3HG9ywdcfu5%3d				Tayda	A-218	http://www.taydaelectronics.com/0-1uf-50v-multilayer-ceramic-capacitor.html	
1	C11			1	100p	±50V	Radial ceramic cap, 5mm	Mouser	75-1C20C0G101J050B	http://www.mouser.com/ProductDetail/Vishay-Sprague/1C20C0G101J050B/?qs=sGAEpiMZZMtKoKD5vZ6NDeK1Ce9hOcZ3Ub3GM5c%3d				Tayda	A-531	http://www.taydaelectronics.com/10-x-100pf-50v-ceramic-disc-capacitor-pkg-of-10.html	
1	C15			1	330nF	±50V	Radial poly cap, 5mm (C0G ceramic will work)	Mouser	871-B32529C334K189	https://www.mouser.com/Search/ProductDetail.aspx?R=B32529C334K189virtualkey871.B32529C334K189				Tayda	A-566	http://www.taydaelectronics.com/0-33uf-100v-5-polyester-film-box-type-capacitor.html	
2	C3,C4			2	10uF	≥35V	Radial Aluminum, D=5mm, L=7mm, lead = 2mm	Mouser	667-EEA-GA1V100H	http://www.mouser.com/ProductDetail/Panasonic/EEA-GA1V100H/?qs=%2fha2pyFadui0A%252fsbdeTaQ2o5TNaxUQ8YTkrdt%2fbVSmmqmLaiCBwkk%3d%3d						This one is tough, they only have the taller version	
															THP		9995
8	R1,R2,R9,R13,R15,R19,R25,R26	1	R119	9	100K		1/8W, 3.3mm length, or SMT 0805 (Front only)	Mouser	270-100K-RC	http://www.mouser.com/ProductDetail/Xicon/270-100K-RC/?qs=sGAEpiMZZMu61qfTUdNhG0T8NRN%2fRayYP90ec1qO0Q%3d	Digikey	RNF18FTD100KCT-ND	https://www.digikey.com/products/en?keywords=RNF18FTD100KCT-ND	Tayda	A-3825	http://www.taydaelectronics.com/r-100k-ohm-1-8w-1-metal-film-resistor.html	
2	R5,R22	3	R102,R110,R111	5	10K		1/8W, 3.3mm length, or SMT 0805 (Front only)	Mouser	270-10K-RC	http://www.mouser.com/ProductDetail/Xicon/270-10K-RC/?qs=sGAEpiMZZMu61qfTUdNhG%2fRrCwbNOkz90JCHcGlaXeg%3d	Digikey	S10KCACT-ND	https://www.digikey.com/products/en?keywords=S10KCACT-ND	Tayda	A-3795	http://www.taydaelectronics.com/r-10k-ohm-1-8w-1-metal-film-resistor.html	
1	R7	1	R117	1	15K		1/8W, 3.3mm length, or SMT 0805 (Front only)	Mouser	270-15K-RC	http://www.mouser.com/ProductDetail/Xicon/270-15K-RC/?qs=sGAEpiMZZMu61qfTUdNhG0T8NRN%2fRayln3G1bBDXsE%3d	Digikey	RNF18FTD15K0CT-ND	https://www.digikey.com/products/en?keywords=RNF18FTD15K0CT-ND	Tayda	A-3803 (A-3093)	http://www.taydaelectronics.com/r-15k-ohm-1-8w-1-metal-film-resistor.html	http://www.taydaelectronics.com/50-x-smd-chip-resistors-15k-ohm-1-8w-1-0805.html
1	R8, R10	3	R104,R105,R106	4	1K		1/8W, 3.3mm length, or SMT 0805 (Front only)	Mouser	270-1K-RC	http://www.mouser.com/ProductDetail/Xicon/270-1K-RC/?qs=sGAEpiMZZMu61qfTUdNhQyvSWXXuEh8pTaB6C%2fdTuvOM%3d	Digikey	RNF18FTD1K00CT-ND	https://www.digikey.com/products/en?keywords=RNF18FTD1K00CT-ND	Tayda	A-3772 (A-3065)	http://www.taydaelectronics.com/r-1k-ohm-1-8w-1-metal-film-resistor.html	http://www.taydaelectronics.com/50-x-smd-chip-resistors-1-0k-ohm-1-8w-1-0805.html
1	R20	1	1M	1	1M		1/8W, 3.3mm length, or SMT 0805 (Front only)	Mouser	270-1.0M-RC	http://www.mouser.com/ProductDetail/Xicon/270-1.0M-RC/?qs=sGAEpiMZZMu61qfTUdNhG1YZfeqdZ2mzuvSGBR6JCnkA%3d	Digikey	RNF18FTD1M00CT-ND	https://www.digikey.com/products/en?keywords=RNF18FTD1M00CT-ND	Tayda	A-3854	http://www.taydaelectronics.com/r-1m-ohm-1-8w-1-metal-film-resistor.html	
		1	R113	1	20K		1/8W, 3.3mm length, or SMT 0805 (Front only)	Mouser	270-20K-RC	http://www.mouser.com/ProductDetail/Xicon/270-20K-RC/?qs=sGAEpiMZZMu61qfTUdNhG01KAIFMH2rJE%2fwU1671ts%3d	Digikey	RNF18FTD20K0CT-ND	https://www.digikey.com/products/en?keywords=RNF18FTD20K0CT-ND	Tayda	A-3807 (A-3096)	http://www.taydaelectronics.com/r-20k-ohm-1-8w-1-metal-film-resistor.html	http://www.taydaelectronics.com/50-x-smd-chip-resistors-20k-ohm-1-8w-1-0805.html
1	R23			1	220K		1/8W, 3.3mm length	Mouser	270-220K-RC	http://www.mouser.com/ProductDetail/Xicon/270-220K-RC/?qs=sGAEpiMZZMu61qfTUdNhG15Sr3RBOPs2%2bXemqcOEdKw%3d	Digikey	S220KCACT-ND	https://www.digikey.com/products/en?keywords=S220KCACT-ND	Tayda	A-3836	http://www.taydaelectronics.com/r-220k-ohm-1-8w-1-metal-film-resistor.html	
3	R3,R16,R12	3	22K	3	22K		1/8W, 3.3mm length	Mouser	270-22K-RC	http://www.mouser.com/ProductDetail/Xicon/270-22K-RC/?qs=sGAEpiMZZMu61qfTUdNhG%2f2bVtGQoaeiFJuxOs8eQG5cg%3d	Digikey	S22KCACT-ND	https://www.digikey.com/products/en?keywords=S22KCACT-ND	Tayda	A-3808	http://www.taydaelectronics.com/r-22k-ohm-1-8w-1-metal-film-resistor.html	
		1	R118	1	270R		1/8W, 3.3mm length, or SMT 0805 (Front only)	Mouser	270-270-RC	http://www.mouser.com/ProductDetail/Xicon/270-270-RC/?qs=sGAEpiMZZMu61qfTUdNhGs2g9h6oX6uaDKLtTe%2fs7K8o%3d	Digikey	S270CACT-ND	https://www.digikey.com/products/en?keywords=S270CACT-ND	Tayda	A-3758 (A-3051)	http://www.taydaelectronics.com/39709-dup-r-5-1-ohm-1-8w-1-metal-film-resistor.html	http://www.taydaelectronics.com/50-x-smd-chip-resistors-270-ohm-1-8w-1-0805.html
1	R11	1	R116	2	27K		1/8W, 3.3mm length, or SMT 0805 (Front only)	Mouser	270-27K-RC	http://www.mouser.com/ProductDetail/Xicon/270-27K-RC/?qs=sGAEpiMZZMu61qfTUdNhGSDCLhfQWu4NJ1Ikcww%2fvQ%3d	Digikey	S27KCACT-ND	https://www.digikey.com/products/en?keywords=S27KCACT-ND	Tayda	A-3810 (A-3099)	http://www.taydaelectronics.com/95833-dup-r-12-4-ohm-1-8w-1-metal-film-resistor.html	http://www.taydaelectronics.com/50-x-smd-chip-resistors-27k-ohm-1-8w-1-0805.html
1	R24			1	2M		1/8W, 3.3mm length	Mouser	299-2M-RC	http://www.mouser.com/ProductDetail/Xicon/299-2M-RC/?qs=sGAEpiMZZMu61qfTUdNhG%2fZbOAOBcdhSuGjf%2fgnYpqVzY8%3d				Tayda	A-3858	http://www.taydaelectronics.com/90282-dup-r-12-4-ohm-1-8w-1-metal-film-resistor.html	
		8	R100,R101,R103,R107,R108,R109,R114,R115	8	30K		1/8W, 3.3mm length, or SMT 0805 (Front only)	Mouser	270-30K-RC	http://www.mouser.com/ProductDetail/Xicon/270-30K-RC/?qs=sGAEpiMZZMu61qfTUdNhG%2fTeoq2tHfjaxZqcpo9Ak%3d	Digikey	S30KCACT-ND	https://www.digikey.com/products/en?keywords=S30KCACT-ND				
1	R4			1	33K		1/8W, 3.3mm length	Mouser	270-33K-RC	http://www.mouser.com/ProductDetail/Xicon/270-33K-RC/?qs=sGAEpiMZZMu61qfTUdNhG3Nx2NkvtL4FD9655QZAP%252bI%3d	Digikey	RNMF14FTC33K0CT-ND	https://www.digikey.com/product-detail/en/stackpole-electronics-inc/RNMF14FTC33K0/RNMF14FTC33K0CT-ND/4770675	Tayda	A-3812 (A-3100)	http://www.taydaelectronics.com/83014-dup-r-12-4-ohm-1-8w-1-metal-film-resistor.html	http://www.taydaelectronics.com/50-x-smd-chip-resistors-30k-ohm-1-8w-1-0805.html
1	R16	1	3k3	1	3.3K		1/8W, 3.3mm length	Mouser	270-3.3K-RC	http://www.mouser.com/ProductDetail/Xicon/270-3.3K-RC/?qs=0x0aLJ2FD7%2f66ocvCCTj4Qg%3d%3d	Digikey	S3.3KCACT-ND	https://www.digikey.com/products/en?keywords=S3.3KCACT-ND	Tayda	A-3812	http://www.taydaelectronics.com/r-33k-ohm-1-8w-1-metal-film-resistor.html	
1	R18	1	43K	1	43K		1/8W, 3.3mm length	Mouser	270-43K-RC	http://www.mouser.com/ProductDetail/Xicon/270-43K-RC/?qs=sGAEpiMZZMu61qfTUdNhGIBOOUhR2Vvah1oiw0Kk4rM%3d	Digikey	S43KCACT-ND	https://www.digikey.com/products/en?keywords=S43KCACT-ND	Tayda	A-3783	http://www.taydaelectronics.com/5342-dup-r-5-1-ohm-1-8w-1-metal-film-resistor.html	
1	R7	1	47K	1	47K		1/8W, 3.3mm length	Mouser	270-47K-RC	http://www.mouser.com/ProductDetail/Xicon/270-47K-RC/?qs=sGAEpiMZZMu61qfTUdNhG3eQrhC5rV9q5hbd2qsB90g%3d	Digikey	S47KCACT-ND	https://www.digikey.com/products/en?keywords=S47KCACT-ND	Tayda	A-3816	http://www.taydaelectronics.com/93428-dup-r-12-4-ohm-1-8w-1-metal-film-resistor.html	
1	R21	1	56K	1	56K		1/8W, 3.3mm length	Mouser	270-56K-RC	http://www.mouser.com/ProductDetail/Xicon/270-56K-RC/?qs=sGAEpiMZZMu61qfTUdNhG22hzN2G59e3tOwuRmC%2fl1%3d	Digikey	P56.0KCACT-ND	https://www.digikey.com/products/en?keywords=P56.0KCACT-ND	Tayda	A-3817	http://www.taydaelectronics.com/29252-dup-r-12-4-ohm-1-8w-1-metal-film-resistor.html	
		1	R112	1	68K		1/8W, 3.3mm length, or SMT 0805 (Front only)	Mouser	270-68K-RC	http://www.mouser.com/ProductDetail/Xicon/270-68K-RC/?qs=sGAEpiMZZMu61qfTUdNhGx2ajd8vbzXvdk2Y%2f7qdPAE%3d	Digikey	S68KCACT-ND	https://www.digikey.com/products/en?keywords=S68KCACT-ND	Tayda	A-3819	http://www.taydaelectronics.com/39013-dup-r-12-4-ohm-1-8w-1-metal-film-resistor.html	
1	R17	1	6k2	1	6.2K		1/8W, 3.3mm length	Mouser	270-6.2K-RC	http://www.mouser.com/ProductDetail/Xicon/270-6.2K-RC/?qs=sGAEpiMZZMu61qfTUdNhGzu9JZBMdQTQfhvS69Dq8%2fMI%3d	Digikey	S6.2KCACT-ND	https://www.digikey.com/products/en?keywords=S6.2KCACT-ND	Tayda	A-3821 (A-3109)	http://www.taydaelectronics.com/79833-dup-r-12-4-ohm-1-8w-1-metal-film-resistor.html	http://www.taydaelectronics.com/50-x-smd-chip-resistors-6k8-ohm-1-8w-1-0805.html
1	R14			1	75K		1/8W, 3.3mm length	Mouser	270-75K-RC	http://www.mouser.com/ProductDetail/Xicon/270-75K-RC/?qs=sGAEpiMZZMu61qfTUdNhGlkL9wLhfOUuTqe0u%2fbc%2fs%3d	Digikey	S75KCACT-ND	https://www.digikey.com/products/en?keywords=S75KCACT-ND	Tayda	A-3790	http://www.taydaelectronics.com/27101-dup-r-5-1-ohm-1-8w-1-metal-film-resistor.html	
														Tayda	A-3822	http://www.taydaelectronics.com/75k-ohm-1-8w-1-metal-film-resistor.html	
5	D1,D2,D3,D4,D6			5	1n4148		Small Signal Diode, DO-35	Mouser	512-1N4148	http://www.mouser.com/ProductDetail/ON-Semiconductor-Fairchild/1N4148/?qs=sGAEpiMZZMtohtEBLtfvkvBU6cp6%252b2x6caGtiBohzX0%3d							
5	T1,T2,T3,T4,T7	5	2N3904	5	2N3904		TRANSISTOR, NPN, TO92	Mouser	512-2N3904TA	http://www.mouser.com/ProductDetail/ON-Semiconductor-Fairchild/2N3904TA/?qs=sGAEpiMZZMu4v8NqS5lLqpBa8%2fMLtlL4				Tayda	A-157	http://www.taydaelectronics.com/1n4148-switching-signal-diode.html	
3	T5,T6,T8			3	2N3906		TRANSISTOR, PNP, TO92	Mouser	512-2N3906TA	http://www.mouser.com/ProductDetail/ON-Semiconductor-Fairchild/2N3906TA/?qs=sGAEpiMZZMtAabcSxQOt1OzvBuE3qcI				Tayda	A-111	http://www.taydaelectronics.com/2n3904-npn-general-propose-transistor.html	
1	IC1	1	UA555N	1	UA555N		Timer	Mouser	595-NE555P	https://www.mouser.com/Search/ProductDetail.aspx?R=NE555Pvirtualkey59500000virtualkey595-NE555P				Tayda	A-117	http://www.taydaelectronics.com/2n3906-general-propose-pnp-transistor.html	
1	IC2	1	4013N	1	Dual Flip Flop			Mouser	595-CD4013BE	https://www.mouser.com/Search/ProductDetail.aspx?R=CD4013BEvirtualkey59500000virtualkey595-CD4013BE				Tayda	A-249	http://www.taydaelectronics.com/ne555-ic-555-timer-dip-8.html	
1	IC3	1	4052N	1	Dual 4-1 analog mux			Mouser	595-CD4052BE	https://www.mouser.com/Search/ProductDetail.aspx?R=CD4052BEvirtualkey59500000virtualkey595-CD4052BE				Tayda	A-556	http://www.taydaelectronics.com/cd4013-4013-ic-cmos-dual-d-flip-flop.html	
1	IC4	1	TL074P	1	Quad op-amp			Mouser	595-TL074CN	http://www.mouser.com/ProductDetail/Texas-Instruments/TL074CN/?qs=sGAEpiMZZMtCh3enSjNABVXXWoIdAXLCwoUCxMTuRhxw%3d				Tayda	A-1150	http://www.taydaelectronics.com/cd4052-4052-cmos-multiplex-demultiplexer-ic.html	
1	IC5			1	TL072P		Dial op-amp	Mouser	595-TL072IP	https://www.mouser.com/Search/ProductDetail.aspx?R=TL072IPvirtualkey59500000virtualkey595-TL072IP				Tayda	A-1138	http://www.taydaelectronics.com/tl074-quad-operational-amplifier-j-fet-pdip-14-tl074cn.html	
		1	LED_1	1	LED3MM		3mm (T1) LED (any one will do)	Mouser	859-LTL-4221	http://www.mouser.com/ProductDetail/Lite-On/LTL-4221/?qs=sGAEpiMZZMuNnYE89WUp7E/BQBhOZenGzKcpGe3kJs%3d				Tayda	A-0117	http://www.taydaelectronics.com/tl072-low-noise-j-fet-dual-op-amp-ic.html	
														Tayda	A-261	http://www.taydaelectronics.com/led-3mm-red.html	
2	FB1,FB2			2	Ferrite Beads		BEAD ON LEAD Z=68 OHM @ 100MHz	Mouser	623-27430011J2LF	http://www.mouser.com/Search/ProductDetail.aspx?R=27430011J2virtualkey62300000virtualkey623-27430011J2LF							
															They dont sell ferrite beads apparently.		
		4	VR1,VR2,VR3,VR4	4	100K		Befaco_VCADSR_SLIDER	Ali Express		https://www.aliexpress.com/item/Free-Shipping-10pcs-B50K-B100K-Potentiometer-Audio-Slide-Pot-Resistor/1670003362.html							
		1	S2	1	PS1024		SPST Pushbutton Switch	Mouser	612-PS1024AL-RED	http://www.mouser.com/Search/ProductDetail.aspx?R=PS1024AL-REDvirtualkey61200000virtualkey612-PS1024AL-RED							
		1	S1	1	Toggle		DPDT miniature toggle switch	Mouser	108-1MD1T2B3M2QE-EVX	http://www.mouser.com/Search/ProductDetail.aspx?R=108-1MD1T2B3M2QE-EVXvirtualkey12040000virtualkey108-1MD1T2B3M2QE-EVX	Digikey	EG2400-ND	https://www.digikey.com/product-detail/en/e-switch/100DP1T1B1M2QEH/EG2400-ND/378869	Tayda	A-5051	http://www.taydaelectronics.com/pb-11d02-push-button-panel-mount-spst-no-pb-11d02-th100.html	<-- might work depends on size.
		1	J8	1	Header		10x2 female 0.1" pitch header, 8.26mm high	Mouser	517-929852-01-10-RB	http://www.mouser.com/Search/ProductDetail.aspx?R=929852-01-10-RBvirtualkey51750000virtualkey517-929852-01-10-RB				Tayda	A-4568	http://www.taydaelectronics.com/mini-toggle-switch-dpdt-on-on.html	
		7	J7,J1,J2,J3,J4,J5,J6	7	PJ301BM		PJ301BM-JACK-slots	Thonk	PJ301BM	https://www.thonk.co.uk/shop/3-5mm-jacks/				Tayda	A-1690	http://www.taydaelectronics.com/2x10-pin-2.54mm-double-row-female-pin-header.html	<-- the mouser part is nicer because it looks like they break cleaner, but these are similar
1	P2			1	Header		10x2 male 0.1" pitch header				Digikey	S2011EC-10-ND	https://www.digikey.com/product-detail/en/sullins-connector-solutions/PRPC010DAAN-RC/S2011EC-10-ND/2775284				
1	P1			1	power		5x2 male 0.1" pitch header				Digikey	S2012EC-05-ND	https://www.digikey.com/product-detail/en/sullins-connector-solutions/PREC005DAAN-RC/S2012EC-05-ND/2774889	Tayda	A-198	http://www.taydaelectronics.com/2x40-pin-2.54-mm-double-row-pin-header-strip.html	
														Tayda	A-198	http://www.taydaelectronics.com/2x40-pin-2.54-mm-double-row-pin-header-strip.html	
3	H1, H2, H3			3			PCB support, 12mm	Mouser	534-8848	http://www.mouser.com/SearchProductDetail.aspx?R=8848virtualkey53400000virtualkey534-8848							
1				1			Front PCB	HamaraLabs									
1				1			Back PCB	HamaraLabs									
1				1			panel	HamaraLabs									
	OPTIONAL																
2	IC1, IC5			2			Low profile 8-pin DIP socket		575-343308	http://www.mouser.com/ProductDetail/Mill-Max/115-43-308-41-003000/?qs=sGAEpiMZZMs%2fih%2fkjph1tvt1%2fmEPT%2fXqHmgJTF1vt5Ac%3d							
2	IC2, IC4			2			Low profile 14-pin DIP socket		575-893314	http://www.mouser.com/ProductDetail/Mill-Max/115-93-314-41-001000/?qs=sGAEpiMZZMs%2fih%2fkjph1tvt1%2fmEPT%2fXqYHmnEsJuuak%3d							
1	IC3			1			Low profile 16-pin DIP socket		575-393316	http://www.mouser.com/ProductDetail/Mill-Max/115-93-316-41-003000/?qs=sGAEpiMZZMs%2fih%2fkjph1tvt1%2fmEPT%2fXqyMPB%3dxvLA%3d							
													total parts				
													kit cost				