utilityVCO v111 karltron.com/uVCO 2022-05-18

Step	Qty	Reference(s)	Value	LibPart	Footprint	Note
1	**1**	**C3**	1u	device:C	C_0805	
2	**8**	**C4, C6, C7, C8, C12, C13, C15, C16**	100n	device:C	C_0805	
3	**1**	**C5**	1n	device:C	C_0805	
4	**1**	**C9**	20pF	device:C	C_0805	
5	**1**	**C11**	1nF	SMT OR Throughhole		C0G or CGA , the accumulator should be precise
6	**1**	**C14**	100pF	device:C	C_0805	
7	**2**	**D1, D4**	MMSZ5231B	device:ZENER	D_SOD-123	5v1 important
8	**5**	**Q1, Q2, Q5, Q6, Q7**	MMBT3904	device:Q_NPN_BEC	SOT-23	
9	**2**	**Q3, Q4**	MMBFJ112	Transistor_FET:MM	SOT-23	other jfets probably work
10	**1**	**R1**	1M	device:R	R_0805	
11	**13**	**R2, R12, R13, R16, R17, R22, R27, R28, R30, R38, R42, R45, R53**	100K	device:R	R_0805	
12	**1**	**R3**	470K	device:R	R_0805	
13	**10**	**R4, R24, R26, R29, R32, R34, R35, R47, R48, R66**	10K	device:R	R_0805	r66 sets upper bound of coarse tune
14	**7**	**R49, R51, R52, R56, R57, R61, R62**	2K2	device:R	R_0805	
15	**1**	**R8**	4M7	device:R	R_0805	
16	**4**	**R15, R39, R54, R64**	4K7	device:R	R_0805	
17	**2**	**R14, R43**	47K	device:R	R_0805	
18	**7**	**R18, R19, R20, R21, R55, R58, R63**	470R	device:R	R_0805	
19	**5**	**R23, R33, R37, R46, R50**	1K	device:R	R_0805	
20	**3**	**R25, R41, R67**	0R	device:R	R_0805	r67 sets lower bound of coarse tune
21	**2**	**R31, R36**	100R	device:R	R_0805	
22	**2**	**R40, R44**	22K	device:R	R_0805	
23	**2**	**R59, R60**	47R	device:R	R_0805	
24	**1**	**U1**	TL072	Amplifier_Operatio	SOIC-8	
25	**3**	**U2, U3, U4**	TL074	Amplifier_Operatio	SOIC-14	
26	**1**	**J13**	Conn_02x05_Odd_Eve	Connector_Generic	2x05_Shrouded	
27	**2**	**J9, J10**	Conn_01x10_Male	Connector:Conn_01	1x10_P2.54mm	pcb1
28	**2**	**J11, J12**	Conn_01x10_Female	Connector:Conn_01	1x10_P2.54mm	pcb2
29	**2**	**D2, D3**	1N5819	device:D	DO-41	
30	**2**	**C1, C2**	10u	Device:CP	THT:CP_Radial_D5.0mm	
		insert and align steps 31-33 with faceplate before soldering them				
31	**4**	**RV1, RV2, RV3, RV5**	B100K	device:POT	Pot_Alpha_RD901F	
32	**1**	**RV4**	B2K	device:POT	Pot_Bourns_3296W	
33	**8**	**J1, J2, J3, J4, J5, J6, J7, J8**	JACK_2P	device:JACK_2P	europi:Thonkiconn	

Tempco OPTIONS:
CHOOSE ONE COLUMN

Reference Mark	item Role	Option1	Option2	Option3	Option4
R5	feedback loop offset	2k2 R	2k2 R	2k2 R	1k2 R
R6	feedback loop PTC	0R jump	0R jump	0R jump	1k PTC 7900ppm KTY81/122,112
R9	forward NTC	4k7 NTC 3430K B57621C5472J062	1k5 NTC 3470K MF52A2152J3470	0R jump	0R jump
R65	forward NTC offset	3k3 R	330R	0R jump	0R jump
R11	voltdiv bottom	33k R	8K R	4k7 R	4k7 R

Name	5-NTC	6-NTC	3-None	2-PTC
OUTCOME	0.4	0.4	-4.6	0

read: Sharpens by X cents per octave per degree C increase of ambient

for example, 'None' tempco will go flat by 46 cents (half a note) PER OCTAVE when the ambient temperature changes by 10C