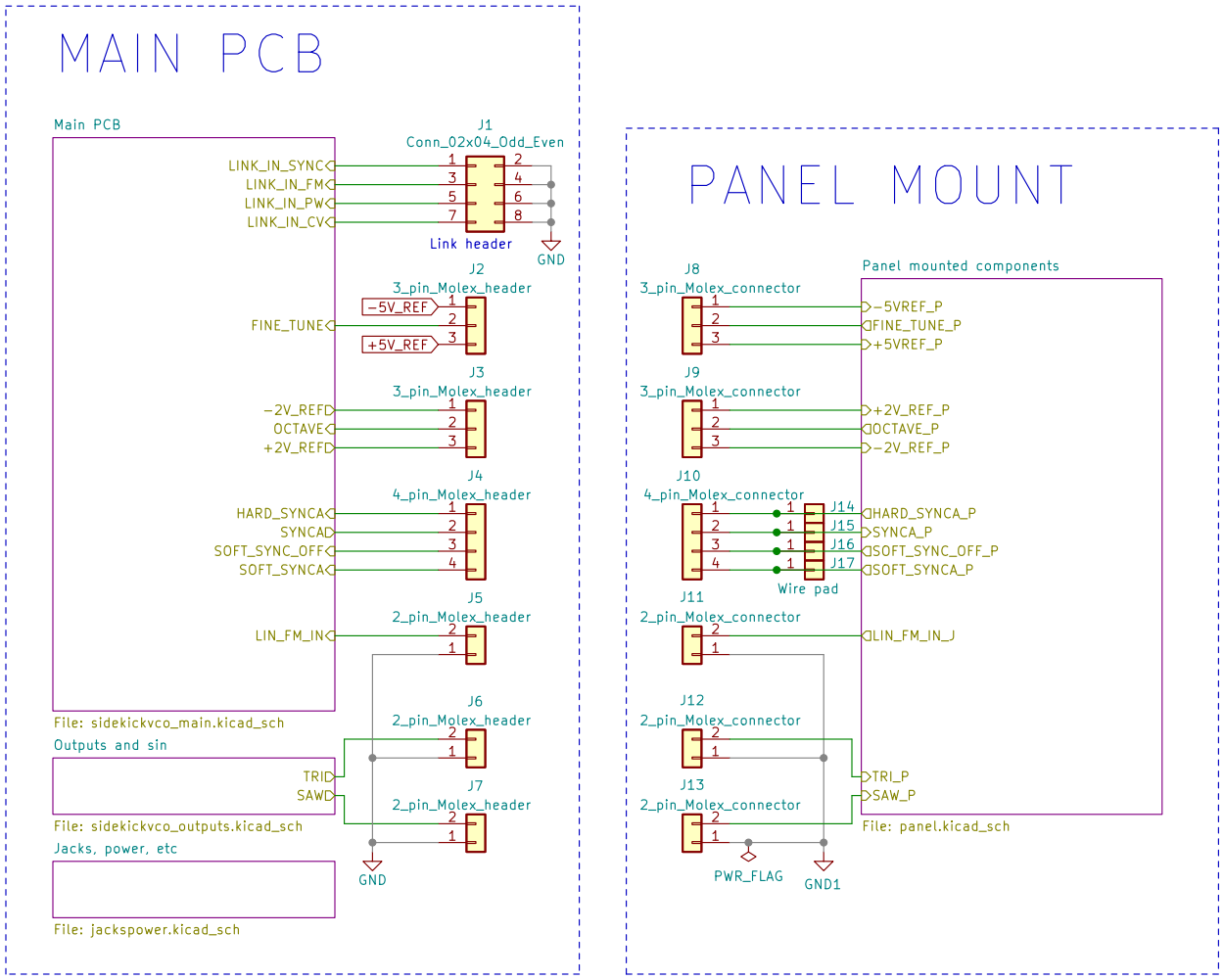


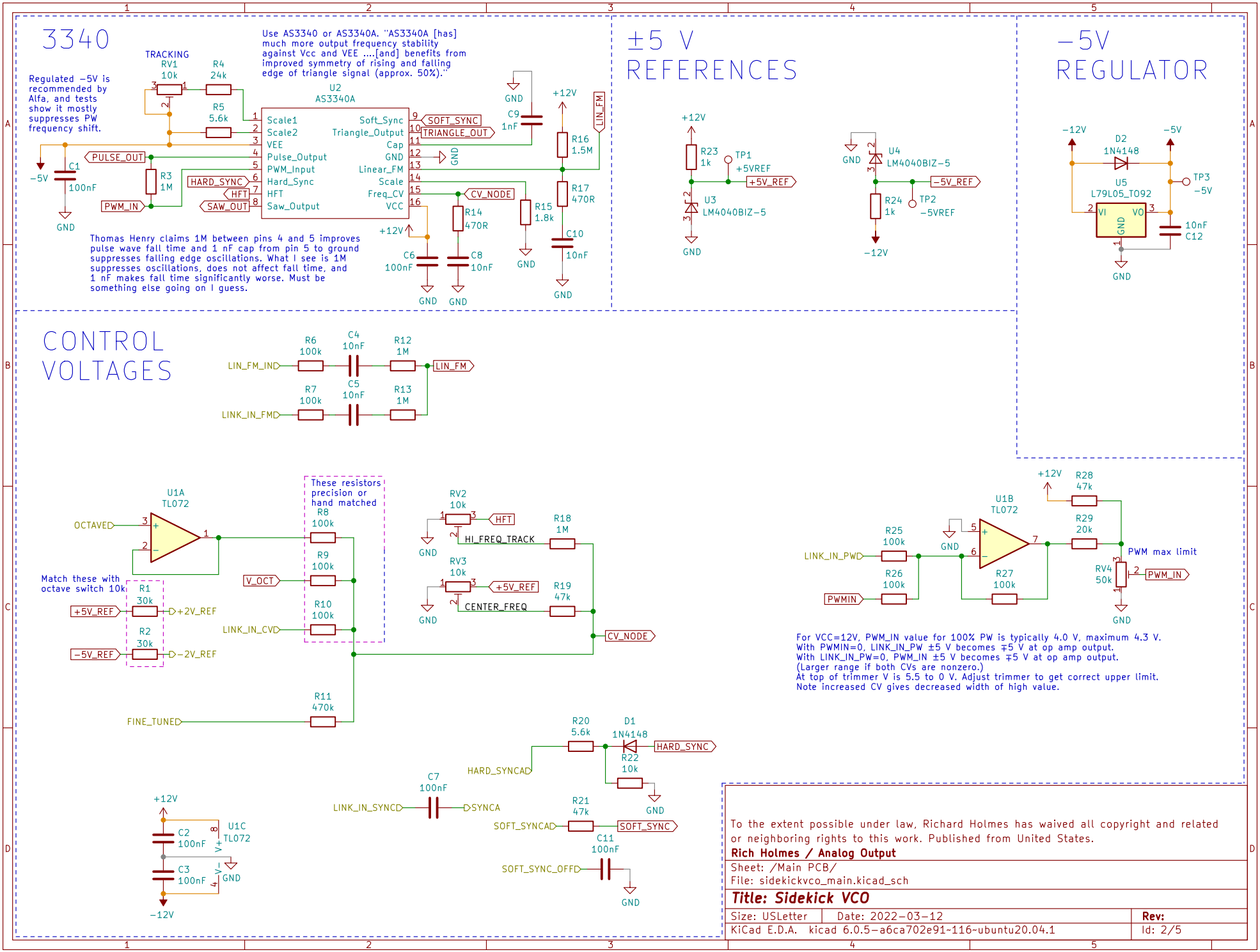

To the extent possible under law, Richard Holmes has waived all copyright and related or neighboring rights to this work. Published from United States.

**Rich Holmes / Analog Output**

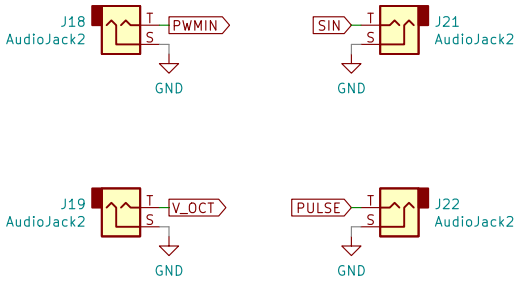
Sheet: /
File: sidekickvco.kicad_sch

***Title: Sidekick VCO***

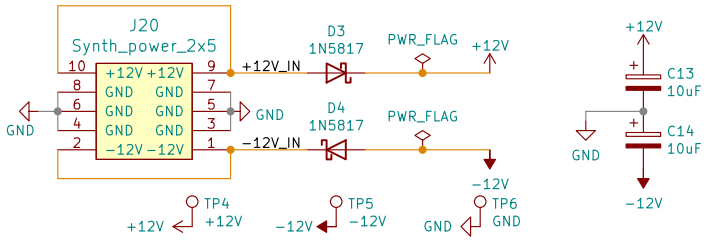
| Size: USLetter | Date: 2022-03-12 | **Rev:** |
|---|---|---|
| KiCad E.D.A. kicad 6.0.5-a6ca702e91~116~ubuntu20.04.1 | | Id: 1/5 |


3340
Use AS3340 or AS3340A. "AS3340A [has] much more output frequency stability against Vcc and VEE ....[and] benefits from improved symmetry of rising and falling edge of triangle signal (approx. 50%)."
Regulated −5V is recommended by Alfa, and tests show it mostly suppresses PW frequency shift.
TRACKING
RV1 10k
R4 24k
R5 5.6k
U2 AS3340A
Scale1
Scale2
VEE
Pulse_Output
PWM_Input
Hard_Sync
HFT
Saw_Output
Soft_Sync
Triangle_Output
Cap
GND
Linear_FM
Scale
Freq_CV
VCC
SOFT_SYNC
TRIANGLE_OUT
CV_NODE
LIN_FM
PULSE_OUT
HARD_SYNC
HFT
SAW_OUT
PWM_IN
C1 100nF
R3 1M
C9 1nF
R16 1.5M
R17 470R
R14 470R
R15 1.8k
C10 10nF
C6 100nF
C8 10nF
Thomas Henry claims 1M between pins 4 and 5 improves pulse wave fall time and 1 nF cap from pin 5 to ground suppresses falling edge oscillations. What I see is 1M suppresses oscillations, does not affect fall time, and 1 nF makes fall time significantly worse. Must be something else going on I guess.
±5 V REFERENCES
R23 1k
TP1 +5VREF
U3 LM4040BIZ−5
U4 LM4040BIZ−5
R24 1k
TP2 −5VREF
−5V REGULATOR
D2 1N4148
U5 L79L05_TO92
TP3 −5V
C12 10nF
CONTROL VOLTAGES
R6 100k
C4 10nF
R12 1M
LIN_FM_IN
LIN_FM
R7 100k
C5 10nF
R13 1M
LINK_IN_FM
U1A TL072
OCTAVE
These resistors precision or hand matched
R8 100k
R9 100k
R10 100k
V_OCT
LINK_IN_CV
Match these with octave switch 10k
R1 30k
R2 30k
+5V_REF
−5V_REF
+2V_REF
−2V_REF
R11 470k
FINE_TUNED
RV2 10k
HFT
HI_FREQ_TRACK
R18 1M
RV3 10k
CENTER_FREQ
R19 47k
CV_NODE
U1B TL072
R25 100k
R26 100k
R27 100k
R28 47k
R29 20k
RV4 50k
LINK_IN_PW
PWMIN
PWM max limit
PWM_IN
For VCC=12V, PWM_IN value for 100% PW is typically 4.0 V, maximum 4.3 V.
With PWMIN=0, LINK_IN_PW ±5 V becomes ∓5 V at op amp output.
With LINK_IN_PW=0, PWM_IN ±5 V becomes ∓5 V at op amp output.
(Larger range if both CVs are nonzero.)
At top of trimmer V is 5.5 to 0 V. Adjust trimmer to get correct upper limit.
Note increased CV gives decreased width of high value.
U1C TL072
C2 100nF
C3 100nF
R20 5.6k
D1 1N4148
R22 10k
HARD_SYNCA
C7 100nF
LINK_IN_SYNC
SYNCA
R21 47k
SOFT_SYNCA
C11 100nF
SOFT_SYNC_OFF
To the extent possible under law, Richard Holmes has waived all copyright and related or neighboring rights to this work. Published from United States.
Rich Holmes / Analog Output
Sheet: /Main PCB/
File: sidekickvco_main.kicad_sch
Title: Sidekick VCO
Size: USLetter
Date: 2022−03−12
Rev:
KiCad E.D.A. kicad 6.0.5−a6ca702e91~116~ubuntu20.04.1
Id: 2/5

## BOARD MOUNTED JACKS




## POWER




ACME GRAF1 Holes

ACME GRAF2 AO logo

ACME GRAF3 CC0 logo

B1 Board

To the extent possible under law, Richard Holmes has waived all copyright and related or neighboring rights to this work. Published from United States.

**Rich Holmes / Analog Output**

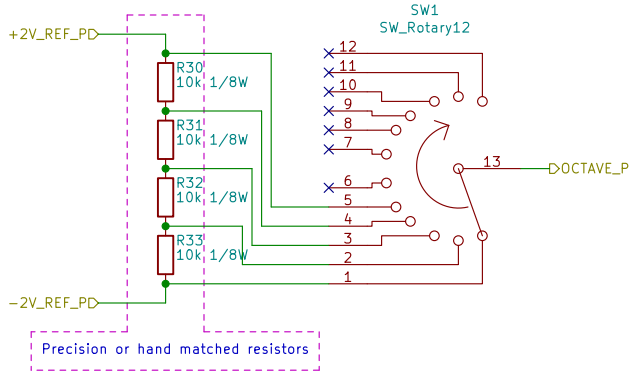
Sheet: /Jacks, power, etc/

File: jackspower.kicad_sch

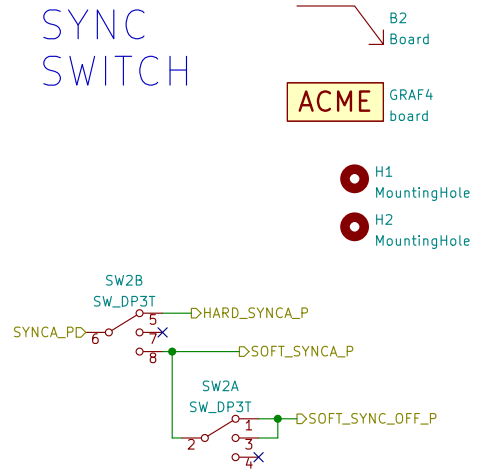
***Title: Sidekick VCO***

| Size: USLetter | Date: 2022-03-12 | **Rev:** |
|---|---|---|
| KiCad E.D.A. kicad 6.0.5-a6ca702e91~116~ubuntu20.04.1 | | Id: 3/5 |

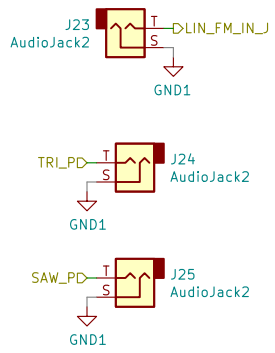
## OCTAVE SWITCH



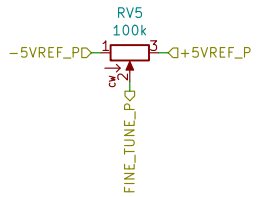

## SYNC SWITCH




## JACKS




## POT




To the extent possible under law, Richard Holmes has waived all copyright and related or neighboring rights to this work. Published from United States.

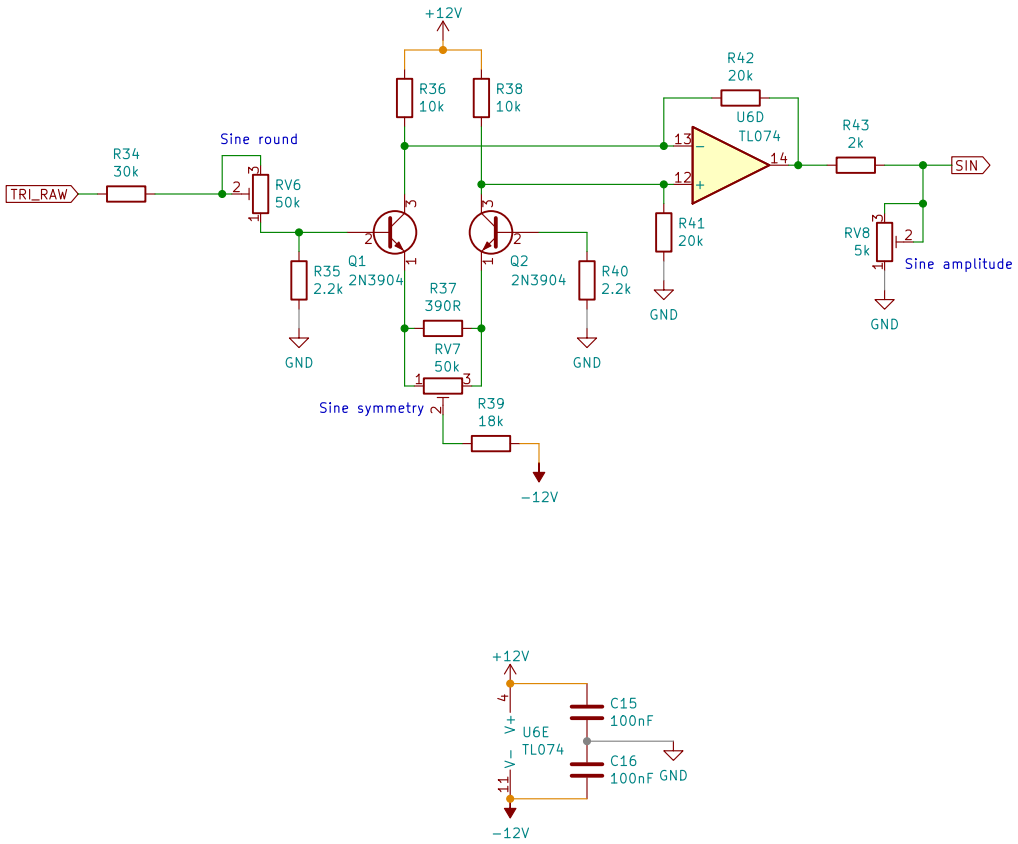
**Rich Holmes / Analog Output**

Sheet: /Panel mounted components/
File: panel.kicad_sch

***Title: Sidekick VCO***

| Size: USLetter | Date: 2022-03-12 | **Rev:** |
|---|---|---|
| KiCad E.D.A. kicad 6.0.5-a6ca702e91~116~ubuntu20.04.1 | | Id: 4/5 |

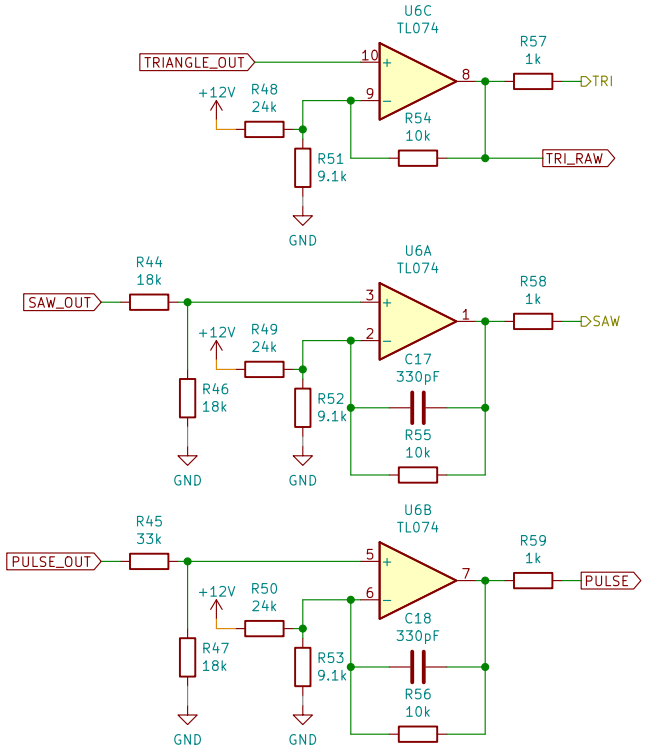
## SINE SHAPING







## OUTPUT CONDITIONING




Kassutronics used 100k feedback resistors and similarly large values for voltage divider resistors. AS3340 datasheet calls for a 51k pulldown on pin 4, so I reduced the voltage divider resistances by a factor ~ (51k/(180k+100k)). Op amp resistances were reduced by a factor of 10. Then stabilization caps were increased more to make 1/(2πRC) ~ 50kHz.

To the extent possible under law, Richard Holmes has waived all copyright and related or neighboring rights to this work. Published from United States.

**Rich Holmes / Analog Output**

Sheet: /Outputs and sin/
File: sidekickvco_outputs.kicad_sch

***Title: Sidekick VCO***

| Size: USLetter | Date: 2022-03-12 | **Rev:** |
|---|---|---|
| KiCad E.D.A. kicad 6.0.5-a6ca702e91~116~ubuntu20.04.1 | | Id: 5/5 |