nonlinearcircuits

Poultry in Motion build & BOM

This module is a voltage controlled PT2399 delay with sync out. It is not very practical to force the PT2399 to sync with whatever else is going on, so I took the opposite stance and decided everything else has to sync with what the PT2399 is doing.

The sync out is fed to a divider to get 12 stages of sync signal. The sync signal is the delay IC's internal clock, which runs in the MHz range so quite a lot of dividing is done to bring it down to a range suitable for use in modular. It also required a 74HC4040 (somewhat of a 1st with NLC designs) as a regular cmos 4040 cannot cope with anything above a few MHz. I have measured 30MHz from some PT2399s but generally 2-22MHz is typical.

Anyway, the divider can be used separately, so you have a VC Delay and a clock divider on one panel. Or you can ignore the delay and use it all as a VCO with divided outputs (not 1V/oct). Or you can flick the switch and get the egg timer mode, which uses a crystal to generate a second count (0.125Hz, 0.25Hz, 0.5Hz, 1Hz, etc). This is for getting your system to work with BPM type drum machines or just to have a regular count or whatever you think might be fun.

The /8 output is fed into the switch of Delay input1 to ensure it is always spitting out some sounds and the module can run without any inputs

The name comes from one of my favorite albums, the 1st time I tested the proto-type it sounded like an angry chicken so had to go with the theme.

PinM BOM – The Tayda & Mouser part numbers are given as examples

VALUE	QUANTITY	DETAILS
22pF	2	0805 Tayda: A-946 or A-947 SEE NOTES
1nF	2	0805 Tayda: A-944
10nF	2	0805 Tayda: A-3507
47nF	2	0805 Tayda: A-3510
100nF	10	0805 Tayda: A-3511
10uF	6	0805 25V or higher voltage rating Mouser:963-TMK212BBJ106MG-T or similar
RL	12	0805 select to suit panel LEDs
RL (next to vactrol)	1	0805 select to suit vactrol LED
1k	4	0805 see notes
2k2	25	0805
10k	9	0805
15k	2	0805
22k	1	0805
33k	2	0805
100k	10	0805
470k	2	0805 470k* on vactrol is optional, see notes
2M2	2	0805
10M	1	0805
CD4040	1	cmos soic Tayda: A-4160 see notes
CD4060	1	cmos soic, see notes
TL072 or TL082	3	Soic Tayda: A-1139
74HC4040	1	**NOT** cmos, Soic see notes
PT2399	1	soic Tayda: A-1526
BC847	12	NPN sot23 tayda: A-1339
BC857	1	PNP sot23 Tayda: A-1345
LL4148	5	Tayda: A-1213
78L05 or LM78L05	1	thru-hole (Tayda: A-176) **OR** soic (Tayda: A-629) **NOT BOTH**
32.768kHz crystal	1	Tayda: A-1592
vactrol	1	DIY is fine with GL5506/GL5516, LED and some heatshrink, otherwise something like NSL-32 will do.
3mm LEDs	12	
Eurorack 10 pin power connector	1	Tayda: A-198 cut to size
Schottky diodes	2	I use MBR0540 in a sod-123 package. Any with 30V+ and 0.25A+ ratings will do. **dot on PCB indicates CATHODE (stripe on component).**
3.5MM SOCKET Kobiconn style	18	Tayda: A-865 or Thonkiconn Jacks (PJ301M-12) from Thonk, Synthcube or Modular Addict
100k pots	3	Probably best to use T18 (or similar) splined/knurled shaft pots as the spacing is tight. Otherwise : Tayda:A-1848 or A-5513 or A-4729
toggle switch SPDT on-on	1	Tayda: A-5421, A-3662, A-3186, A-4567, A-5389, A-5387 (I haven't tried these but they look right, I get my switches from X-on)
10 Pin 2.54mm Single Row Female Pin Header	4	Tayda: A-1306
40 Pin 2.54mm Single Row Pin Header Strip	1	Tayda: A-197 snap into 10 pin sections, get spares

Additional notes:

1. The chips, resistors, caps are cheapest from Tayda. Schottky diodes, CMOS & 1uF, 10uF 25V 0805 caps from Mouser/E14/Farnell/etc.

2. Join the Nonlinearcircuits Builders Guild on FB: https://www.facebook.com/groups/174583056349286/ and ask questions there if you have any. If you prefer not to FB then email is fine.

3. For some reason pots are somewhat scarce these days. It makes no sense to me, I order 1500 at a time from my regular supplier and get them in 3 weeks. If you want to order a minimum 500 pots @ $0.30 each contact Rita at sales1hongyuan@163.com. Shipping is a bit pricey, but should still work out cheaper than buying from Tayda or elsewhere.

For knurled shaft you want

H09312NA B100K L15KQ-006

9mm single gang knurled shaft B100K rotary potentiometer ,no tab. hardware (nuts+washer) .shaft dia 6.0mm

For regular shaft (note these are 6mm, ask if you want 6.5mm), you want

RV9312NO-SB15A1.5-B104-060 no tab

9mm single gang B100K rotary potentiometer,no tab. hardware (nuts+washer) .shaft dia 6.0mm.

4. If you want the egg timer function to be really accurate, there are holes to install a trimpot rather than a 22pF capacitor. If doing so leave off the 22pF between the holes and install a trimpot around 30-40pF (Tayda: A-2496 or A-2497). Tweak the trimpot with a frequency counter to get it tight. If just using two 22pF, it is still pretty good; I measure 16.0001 Hz (my scope needs to see over 10Hz to get a frequency reading).

5. The 1k* sets the minimum delay time for the PT2399, it is in series with the vactrol's LDR. If the resistance is too low at start-up the PT2399 can lock up, so 1k is a safe value to install. You could try lower but the maybe best to play it safe here.

6. The 470k* helps set the longest delay time and also the operating range of the delay clock (and VCO if using it as such). 470k* is a large value for the PT2399 and it means the delay will get pretty noisy and sound like an engine tearing itself to pieces. If you want your delays to sound fairly nice and clean, try 100k but this will limit the range of the clock.

7. The RL next to the vactrol determines the brightness of the LED in the vactrol. If using a shop one, just shove in 1k. If using a DIY with a bright LED, then 2k2-4k7 should suffice.

8. The crystal is a bit delicate, best to fold it down flat on the PCB once installed so it doesn't get bumped around. On the 3rd proto-type the module put out a high pitched whine, not from the outputs, it was the module itself. This turned out to be the crystal

vibrating; it is easily fixed by moving it a little, press it down harder against the PCB. Worst case you may need to give it a dab of hot glue as a cushion. This only happened with one build, so I guess it is not that common.

9. Mouser part numbers for various ICs (I have not tested all of these):

cmos 4040:

771-HEF4040BTD-T

771-HEF4040BT652

595-CD4040BNSR

prob there are more

Mouser part numbers for cmos 4060:

771-HEF4060BT-Q100J

771-HEF4060BTD-T

595-CD4060BNSR

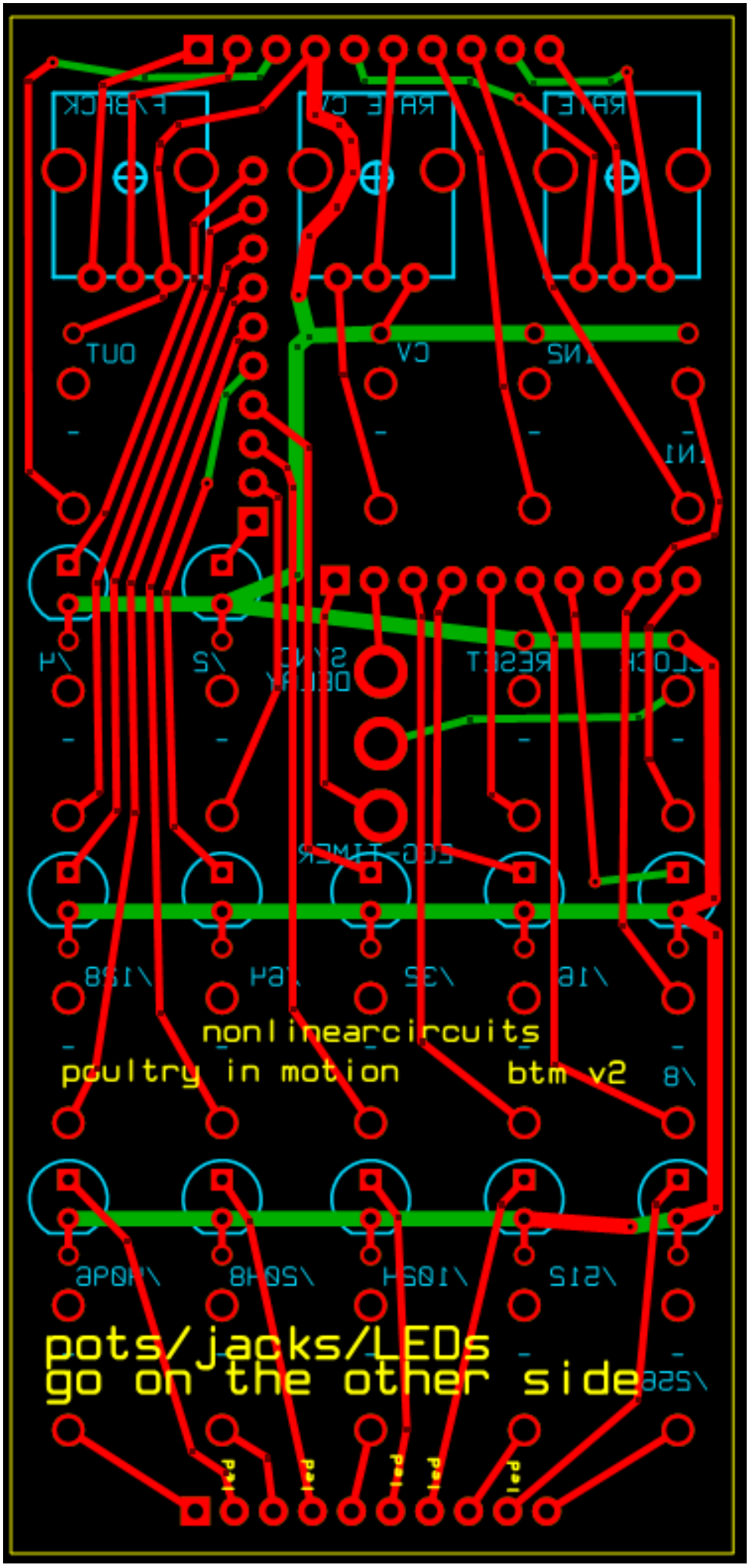
Mouser part numbers for 74HC4040

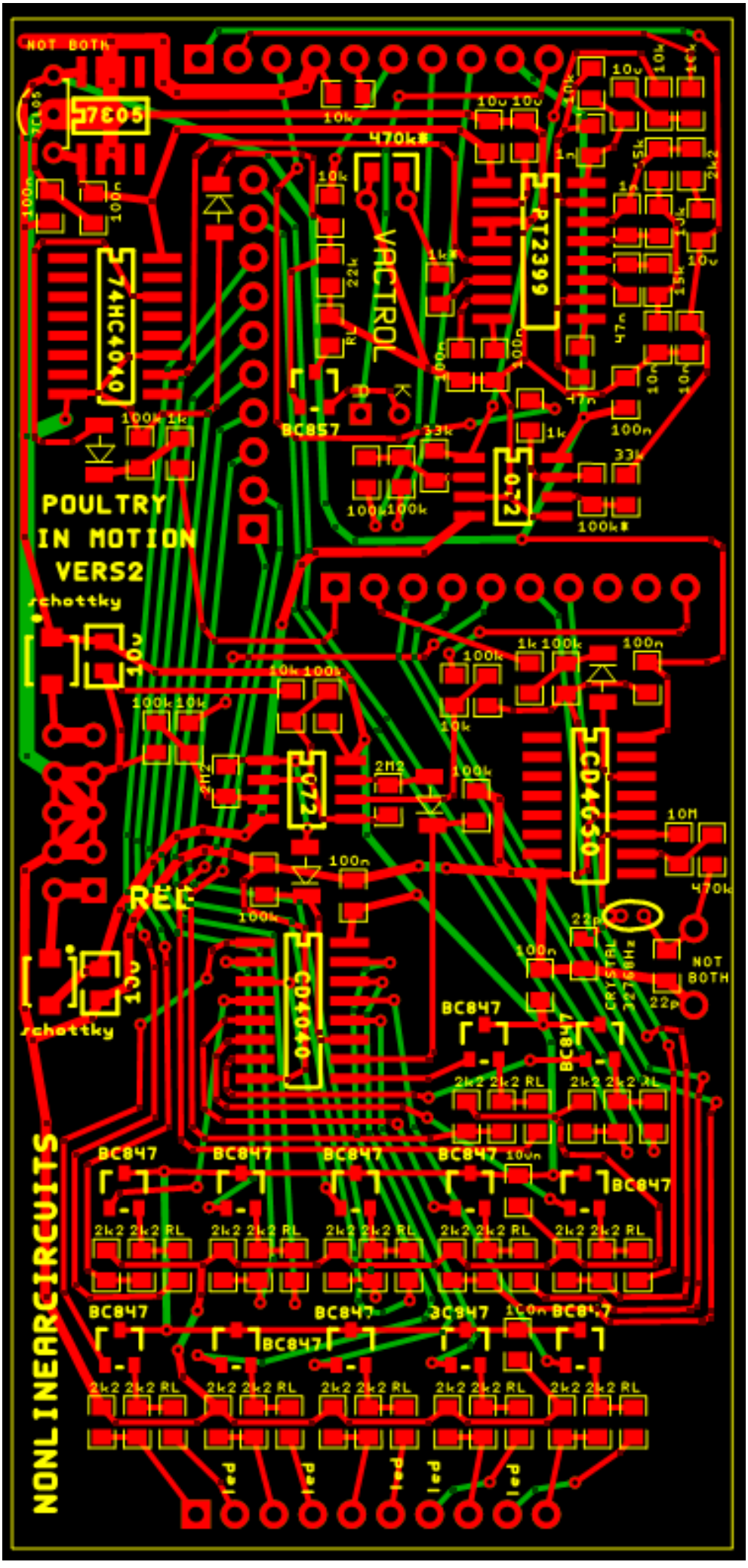
595-SN74HC4040NS

771-74HC4040D-T

595-SN74HC4040NSR

The 74HCT4040 should work too but these are quite popular and hard to get atm.


nonlinearcircuits
poultry in motion
btm v2
pots/jacks/LEDs
go on the other side


NOT BOTH
7805
74HC4040
VACTROL
PT2399
BC857
POULTRY
IN MOTION
VERS2
schottky
CD4650
CD4040
REG
CRYSTAL 32768Hz
NOT BOTH
BC847
2k2 2k2 RL
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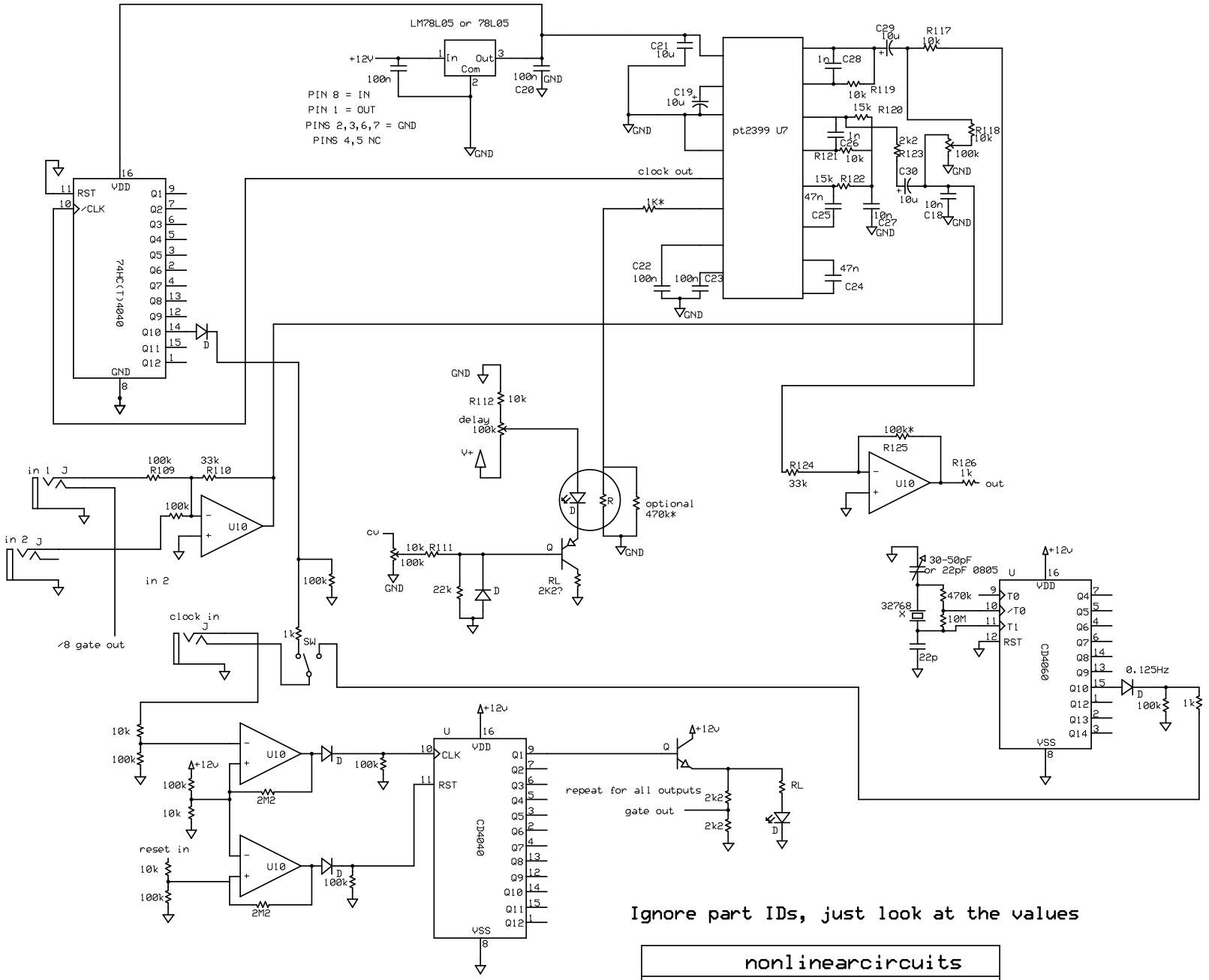
led



Ignore part IDs, just look at the values

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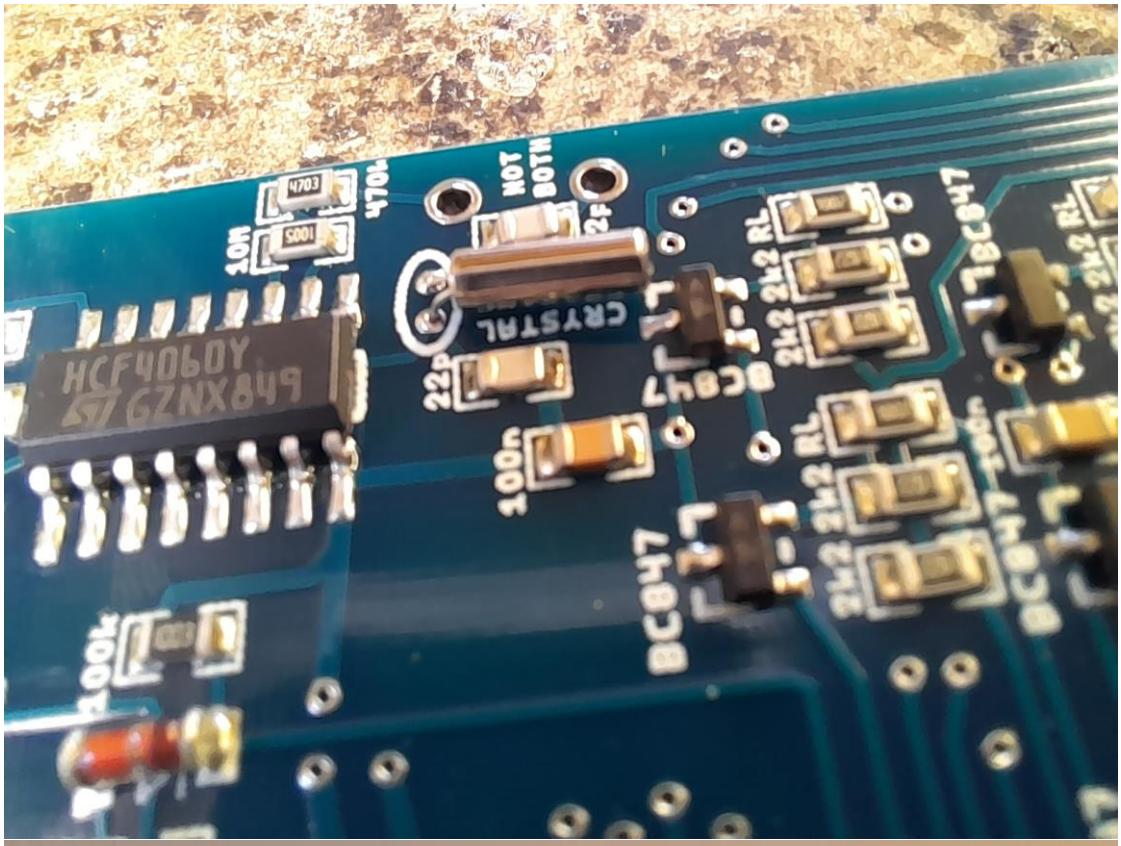
POULTRY IN MOTION		
andrewF	Rev 1.0 6/6/21	Page # or name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CRYSTAL
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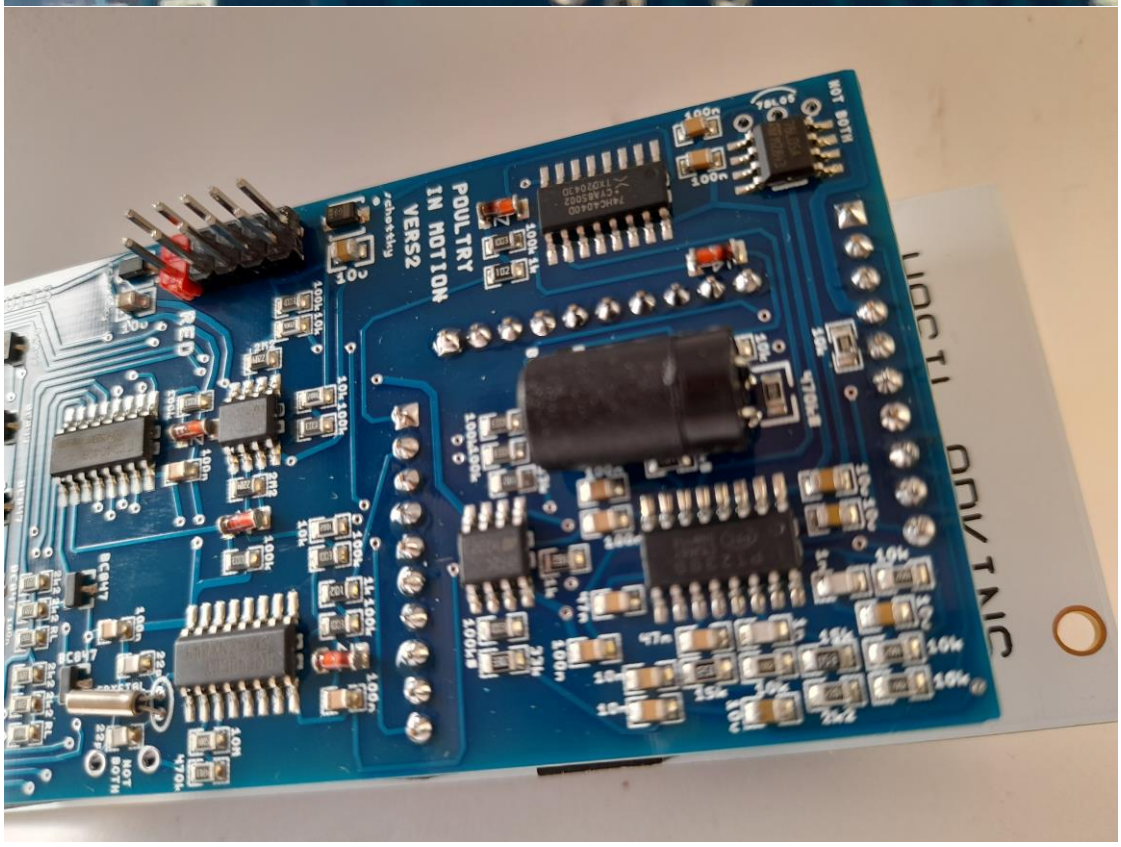
BC847
100n
100k
10M
470k
2k2 RL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IN MOTION
VERS2
NOT BOTH
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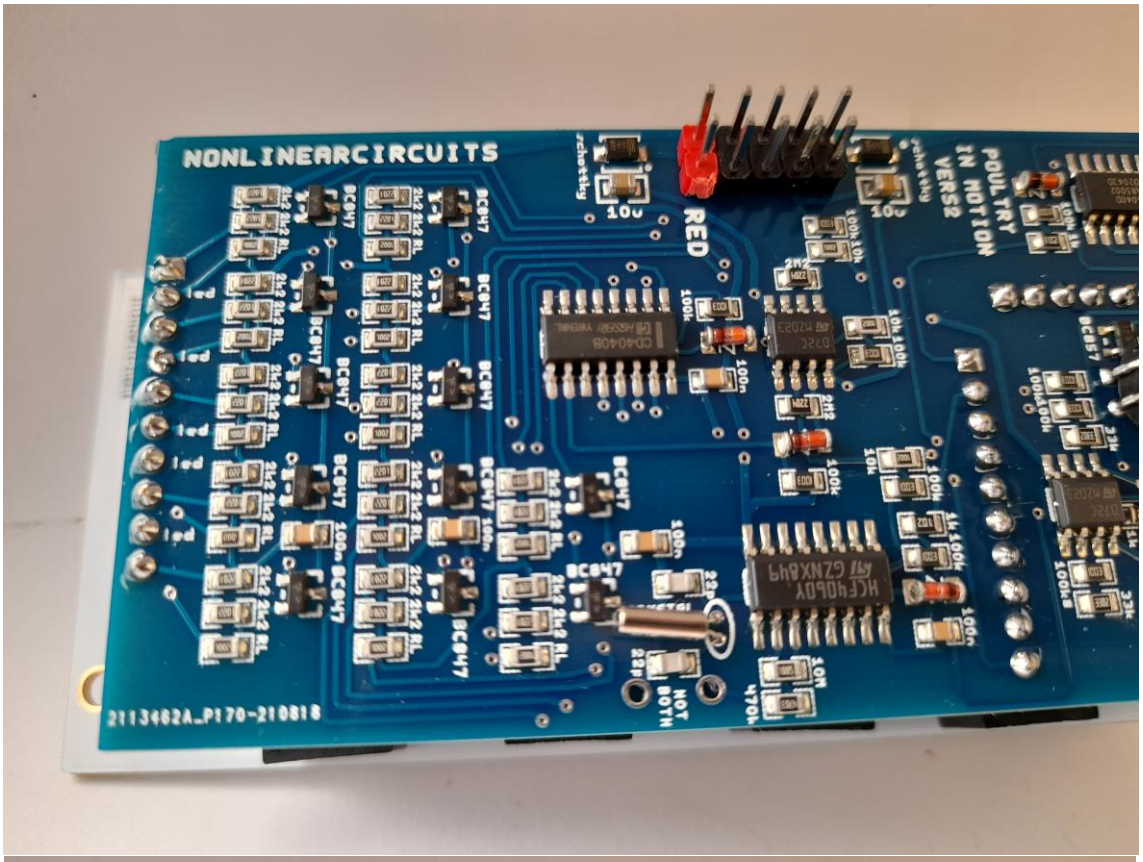
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POULTRY
IN MOTION
VERS2
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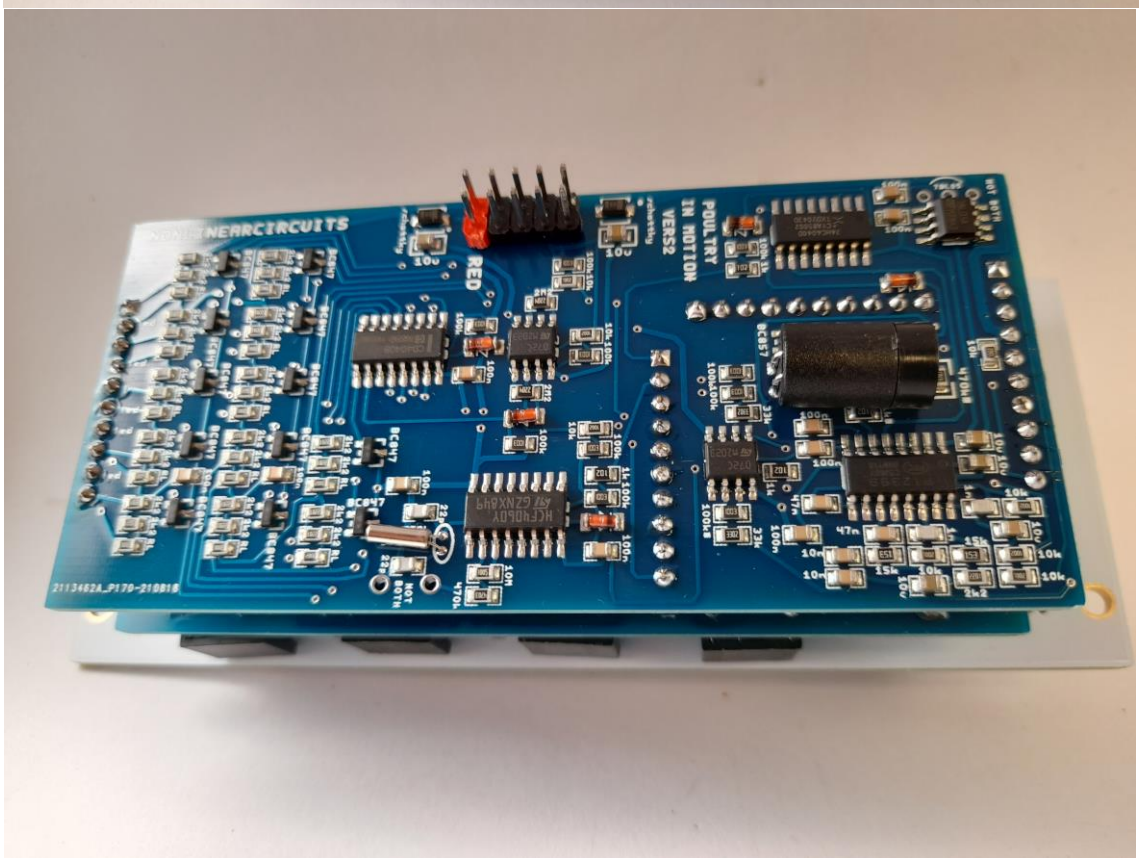
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RED
POULTRY
IN MOTION
VERS2
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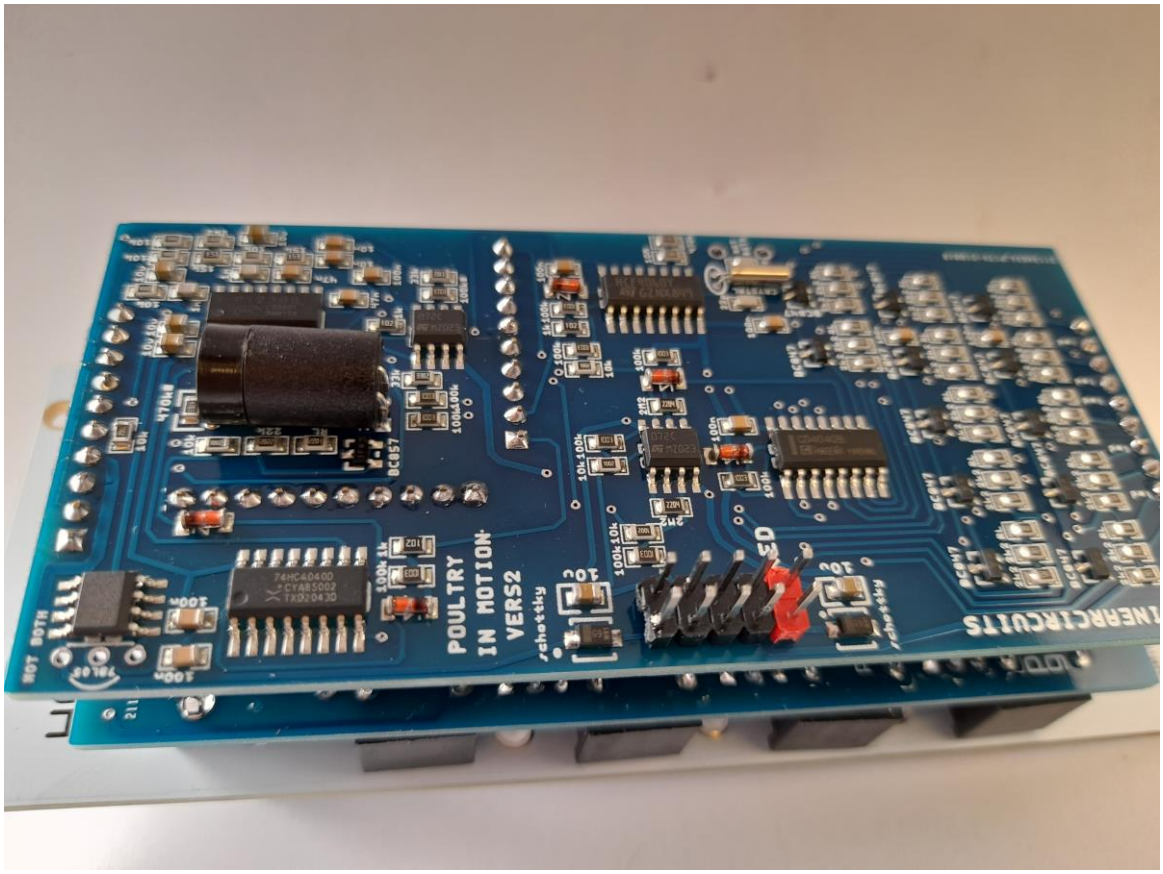
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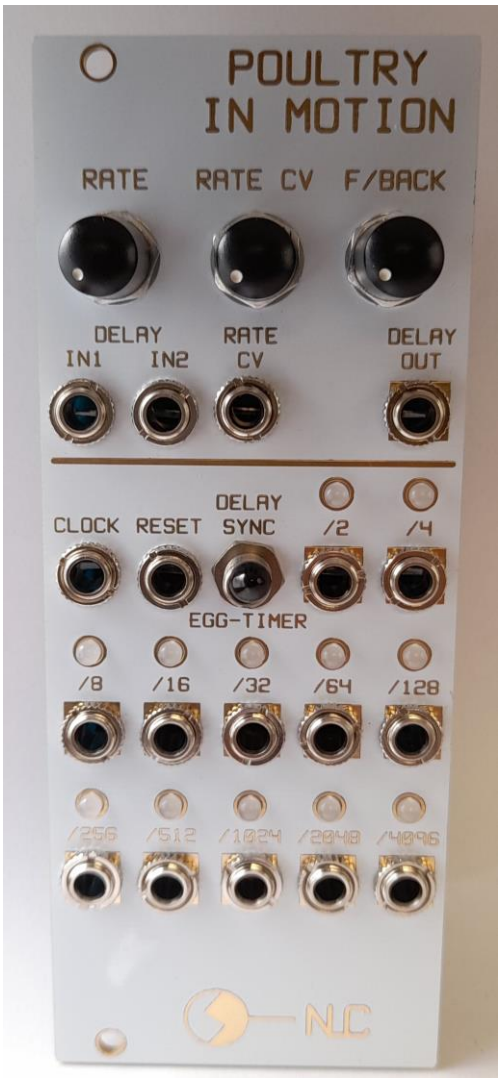
IN MOTION
VERS2
INEARCIRCUITS


POULTRY
IN MOTION
RATE
RATE CV
F/BACK
DELAY
IN1
IN2
RATE
CV
DELAY
OUT
CLOCK
RESET
DELAY
SYNC
/2
/4
EGG-TIMER
/8
/16
/32
/64
/128
/256
/512
/1024
/2048
/4096
NC