Modulus

The Quarterly Newsletter for Synth DIY

Well folks, Its here again. Sorry about the delay but its worth the wait. This month we have the PCB foil for the relayed ASM VCO, this has a few advantages in this design.

1) The Pots/Switched are mounted direct to PCB, this means very few wires, only those for the sockets.

2) It will take MAT02/SSM2210 or EN2016 transistor array, The best for this application though is the LM394.

3) It will fit in a 9" by 3" panel and will have outputs compatible with the digisound modules, making it ideal to expand an existing system.

The VCF has much the same design philosophy as the VCO. Discrete, readily available parts and all compatible with digisound modules. Currently in the pipeline are an EG (probably dual), Wavescriber (analog wave table), A redesign of the Digisound VCDO, a PPG wavetable osc, Walsh function generator and a frequency multiplier with anti-aliasing filter for the above digital modules.

Things are really starting to some along now. Myself and one other member are doing designs for a lot of the modules, also being helped on the digital (ppg osc) side by someone in the states.

Ok, Here is the VCO, but first a few notes. The outputs that are available are sawtooth, pulse (with modulation). The sync in is a hard sync (not violent, but hard enough). The sync output can be taken from the pulse or saw output.The tempco Resistor should be mounted across the transistor array and as close as possible, maybe even use a thermal conductive glue or resin.

Also, you can choose which type of transistor pair you want to use. You could try and get a MAT02, but I doubt if you'll find one in this country, you could use an SSM2210 available but expensive or you could use an EN2016 (which is four trannys all matched though), Any of these will do the job and all will fit directly to the PCB without any hassle or modifications.

The choice of socket is yours, you can wire in 1/4" if you feel you've got the panel space or use 1/8". Most digisound stuff uses 1/8" sockets but many other systems use 1/4".

The PCB should cut in half along the line shown, this gives two pcbs which are connected with four wires, Three are the from the power supply (taken from main PCB) and the other is the a CV output, labelled as Aux CV.

There are three trimmers, the 100k trimmer is the initial frequency adjustment, the 10k trimmer on the aux cv board will adjust the octave width and should be set so that each of the points 1/2/3/4/5/6 should be 1v apart. The final trimmer is the volts per octave this will take a few adjustments to get right.
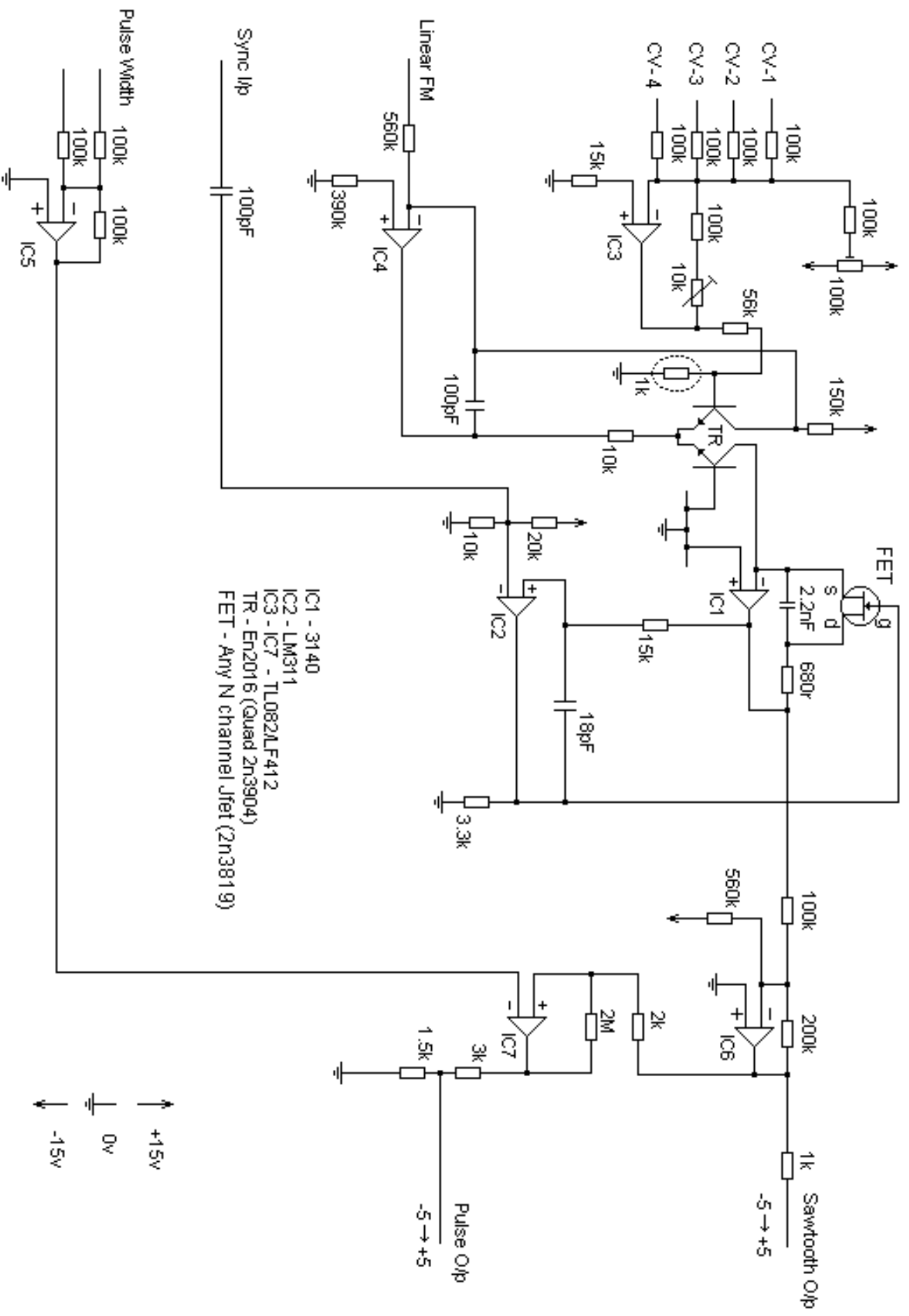
The fine control is fairly coarse and can be decreased by replacing the two 22k resistors on the Aux CV PCB with 100k resistors and even more by changing the pot to 10k.

I would suggest at this point that you use 1% MF resistors for this project and if possible hand match the resistors in the octave select chain on the Aux CV Pcb.
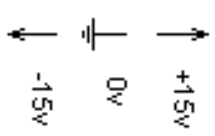
You will see that there are three pictures with this edition of modulus. the first is the CORRECT drawing of Genes VCO (yes folks I bodged it first time round). The next is the PCB layout and the final one is the Component positions.

Also you find a front panel design proposed by Chris Crosskey, this design will accommodate most of the upcoming modules. I would suggest that if you have a digisound synth or something which you are trying to "Expand" that you use a similar design of your own to what you already have. If your starting this from scratch it maybe an idea to use this panel.

And now its time for someone elses' words, these are from Chris Crosskey, on the subject of the front panels.

Pulse Width

100k
100k
100k
100k

IC5

+
−

Sync I/p

100pF

Linear FM

560k

390k

+
−

IC4

CV-1
CV-2
CV-3
CV-4

100k
100k
100k
100k

15k

100k

10k

+
−

IC3

100k

100k

56k

150k

1k

TR

10k

100pF

10k
20k

−
+

IC2

18pF

15k

+
−

IC1

2.2nF

680r

s
d
g

FET

3.3k

IC1 - 3140
IC2 - LM311
IC3 - IC7 - TL082/LF412
TR - En2016 (Quad 2n3904)
FET - Any N channel Jfet (2n3819)

560k
100k
200k

+
−

IC6

1k
−5 → +5
Sawtooth O/p

2M
2k

−
+

IC7

1.5k
3k

−5 → +5
Pulse O/p

+15v
0v
-15v

Common Front Panel

by C Crosskey

In order to try and make it possible to have professionally made front panels without incurring massive tooling expense, I'm putting forward this as my idea of a good design, and I am designing my layouts around it.It will take up to two 160mm high (Euro card turned upright) PCB's mounted copper side inwards, with up to four potentiometers on each board placed at 1.8" intervals. It also has room for up to fourteen sockets/toggle switches/LED's in two rows of four at the top and bottom of the panel, and two rows of three placed between the potentiometers, offset to the edge of the panel. There would only be two sizes of hole, the four corner ones for mounting the panel in the case would be 1/8", all the rest would be 1/4". Where bigger holes are needed for potentiometers etc then they would be hand cut by the owner, using the 1/4" holes as starters. Unused 1/4" holes on any panel can be stopped with hole plugs, A suitable one is available from maplins for 56p per bag of ten. Currently both the VCO and PSU designs fit in this panel (The PSU will need an additional cut-out added for the power inlet), and the following modules will shortly be designed, all of which will fit....

VCF/VCA #1 Oberhiem style 12db State variable VCF and VCA
VCF/VCA #2 Moog style 24db Lo-Pass VCF and VCA
Dual Mixers
Dual ADSR
Ring Mod/Envelope follower/Audio Delay (one panel)
Noise/Dual Sample and hold
VC Patch selector/Dual CV lag/Dual Gate Delay
Dual VC high speed Osc Clock (X32/X16 VCO for hybrid Osc)
Multi jack field
Wavetable oscillator (Uses VCHSO, has VC wavetable selection)
Waveshaper (Dual, giving, sine.triangle and sub osc)
Wave Multiplier (Like digisound module, but different)
Bassvoice (VCO/VCF/VCA, Like 303 on a panel)

The standard VCO should be useable as an LFO, although some board changes might be required, it could lose lots of its inwards controls like octave switching, modulation input and FM input. Keeping the Sync would be a good Idea though, However it might be a dual module when its been layed out.

Chris Crosskey.

Well, As you can see there are a lot of modules in the design stage at the moment, enough for this modular to become a complete system in its own right. I personally can see within a year or so maybe being able to run this as a smallish buisiness supplying "Kits" of parts to build a system.

I will also be trying to arrange a conference sometime next year for the people who read this. How many would be interested in attending/Bringing their synth?

But, in the short term, keep watching this space. As a new module has been designed and has a PCB design it will appear here.

Again, I would like to say to all readers, If you know anyone who enjoys synth DIY, Let them Photocopy this newsletter, and anyone who has something they wish to share, be it building/deigning or even ideas about synths, let me know, write me an article.

Thats all for now..

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