

Modulus

Well, Here it is again, Edition 5 of this Newsletter for synth Diy enthusiasts. In this fun packed edition we have two nice circuits for you to add to your ever growing system.

Firstly a Quad VCA, using everyones favourite the CA3046 Transistor array. It uses the CA3046 as a Gilbert multiplier and therefore reducing noise in the output and allowing a larger signal to be fed into it, No noisy CA3080's here!

Secondly an EG, an ADSR, gleaned from one of those old synth_diy books that we all have tucked away in the corner of your loft. Its an RA Penfold design, thanks to Paul Harding for un-earthing the circuit.

Thirdly a Diode Ladder filter, found from somewhere on the net, it looks like its 1v/oct, Ive designed a PCB for it but its not tested yet, so watch out for modulus 6 for the PCB.

We also have an article from Paul Harding about his synth DIY efforts, Thanks Paul, Lets see some more of this kind of thing from you all, If you want to keep modulus going I need stuff to put in...

Dont forget We're on the WWW and still havent had many hits yet...
[Http://www.geocities.com/siliconvalley/park/2707/](http://www.geocities.com/siliconvalley/park/2707/)

News of the PPG module that many of you are waiting for, Its getting closer it'll run from any VCO that can be run 6 octaves up (Our modified Gene Stopp VCO will this). Currently we have the 128 waveforms from the 2.2 on an eprom, this has been no mean feat getting this far, All we now have to do is fathom out the structure of the lookup tables to give the sounds we all know and love from the PPG.

News of the Digisound VCDO module, again, Its nearly there, Schematic is complete and a PCB design is in the pipeline, once done it will be built and tested, probably next issue.

Ok, enough of my waffle, Here's Paul Harding.....

The Trials and Tribulations of Synth DIY Madness

Its now seven months since I first decided to build a modular synth and I now have nine fully working modules. I used to build guitar FX pedals etc when I was about 16 years old, but very quickly got disillusioned building projects from magazines that never really worked properly. I used to dream of building a synth but was too inexperienced in electronics, too young and too poor at the time. I vaguely recall the digisound modules (I was 15 in 1980) but couldnt afford them and disillusioned by hummint fuzz boxes and hissing phasers with very little quitar outpput, I abandoned the idea of ever building a synth.

Later when I was 21 and with an HNC in electronics I realised that most of the magazine circuits I tried to build were appallingly designed anyway.

Haveing spent quite a lot of time in the past few years makeing (mainly) hard dance music in other peoples studios with the same old SH101's, Pro1's, Juno's,etc,etc. I started wishing that I was using a modular synthjust so I could squeeze just a little bit more out of each synth sound. A friend lent me a near complete set of digisound circuits and construction notes only for me to discover that Curtis Electro Music were no more and that anyone with any of these IC's wanted about 5 times their original price, If you were lucky enough to track some down.

The purchase of a kenton PRO4 for my rapidly expanding home studio convinced me that I just had to at least try to build a few synth modules.

I built a wooden box to house 5 modules (maybe to later rackmount it) and adopted the Digisound 9by3 inch panel size but with proper 1/4" jacks to make it compatible with the rest of my studio patchbay straight into the modular synth and visa-versa. Haveing had bad experiences constructing electronic projects before and not really being an electronic design engineer I decided to spend as little as possible until I proved myself that the whole thing was worthwhile.

I started by building a Maplin SSM2044 filterkit which I bought a year previously but had not got around to building. To my total amazement it worked properly first time - The design that is, not my soldering which is fine as I've worked in electronics on and off for years now.

I then built a cheap VCO from a babini book which worked...just.. Followed by a basic envelope generator/VCA module and had myself a very basic minimal single VCO synth that actually worked!.. I was shocked.

The two prototype modules were taken along with the mapling VCF kit (Now modified to include VC resonance Input) into my studio where they have remained ever since, especially as I realised that I could use the VCF and VCA as midi/CV controlled outboard for my other synths. I thne built copies of the digisound modules that didnt use the curtis Ic's, ie. Noise/S&h, ring modulator and three LFOs from the Quad LFO (those 1/4" jacks take up more panel space) all on stripboard. Other than haveing to heavily modify the s&h circuit everything actually worked.

The EG/VCA modub seemed to be in constant use treating the outputs of other synths, this meant that I had to quickly build another (this time a Dual EG/VCA) so I could carry on using the synth. I've now built a box to house 12 modules and the monster synth is well under way now.

None of the modules have been properly painted or lettered yet though because as soon as a working module gets put in the case in the studio, thats it, it somehow becomes indispensable. Especially as I can use each module to make music as soon as I've finished building it.

For some reason the bass from the modular synth sounds much fatter than my SH101 and SH2 synths and with the aid of of the Kenton (again), which is probably the best musical purchase I've made in the last few years, I now have analogue synth sounds with MIDI controllers controlling the filter cut off, resonance, oscillator PWM and I can clock the S&H unit from the kenton too.

I now feel that MIDI/CV converters and sampling/hard disk recording have given a new lease of life to modular synths. The old arguement of not being able to recreate a modular synth sound becomes less important when sampling time now stretches to minutes or more and that MIDI/CV converters enable one to obtain sounds that sweep and pulsate along in perfect sync playing 16th note rhythms at 155BPM!

Technology now gives us the means to coax sounds from these modular synths that their designers could barely have dreamed about

Paul Harding

Ok the Quad VCA, the basic circuit is quite simple, one CA3046 and a couple of opamps, The circuit has been improved upon by Chris Crosskey and has the additional features of input buffering and an CV offset.

The circuit will take 20v pk-pk signal at its input, this is much greater than using a CA3080 and a lot less noise is introduced aswell, It uses a gilbert multiplier (ca3046) to slightly distort the signal so that a larger signal can be fed into the circuit. A 0-10v CV can be fed in to control the gain, this can be offset by upto 5v and therefore overdrive the VCA aswell.

The EG, it works and Ive had reports of it being extremely quick from Paul Harding (who sent me the circuit in the first place). If you want a slower or faster simply replace the main Capacitor or even switch it if you so desire to give fast/slow switchable Eg's.

The VCF, yes a Diode ladder filter, not tested yet, but I know its from a synth of some kind, I think it may be an EMS design, but from which one I dont know, anyone have a clue?

Next Issue, PCBs for the VCF and EG, possibly the PPG module aswell. Im currently working on a PIC based rythm controller (8 channels, 16 steps per channel) with two levels of accent and 128 Leds to show this all. Also in the pipeline is a PIC based "Analogue" sequencer, It'll have a note up/down button, note display (7seg) octave up/down and octave display (7 seg), Gate on/off, Gate length and Velocity (4 levels). Does anyone have any suggestions for additions to these modules?.. memory and song arrange will come with time.

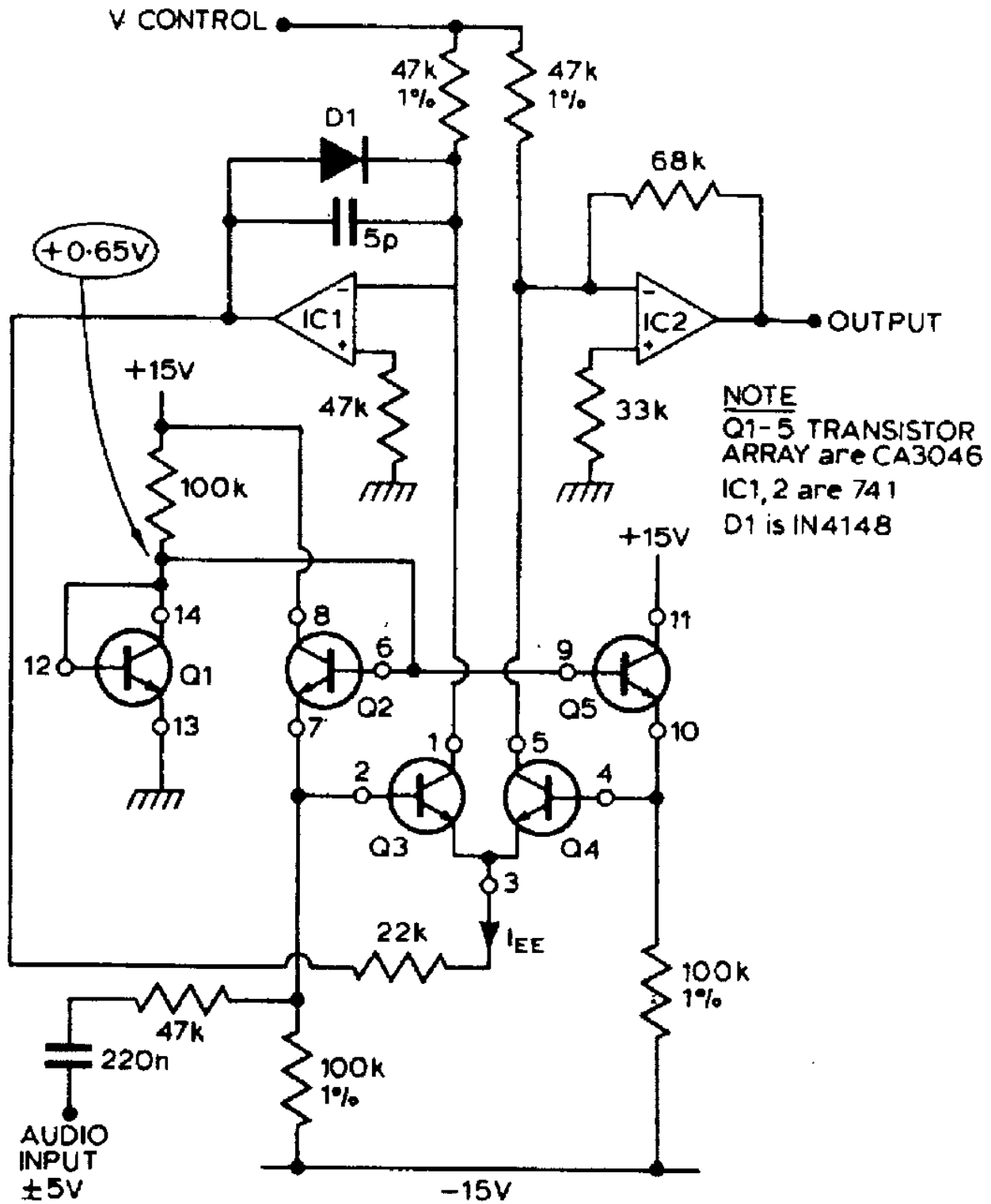
Ok, time for my useud plea, Anyone with any circuits/articles for for me please Email me, and dont forget to tell your friends about our website. Enough for now, enjoy these circuits.

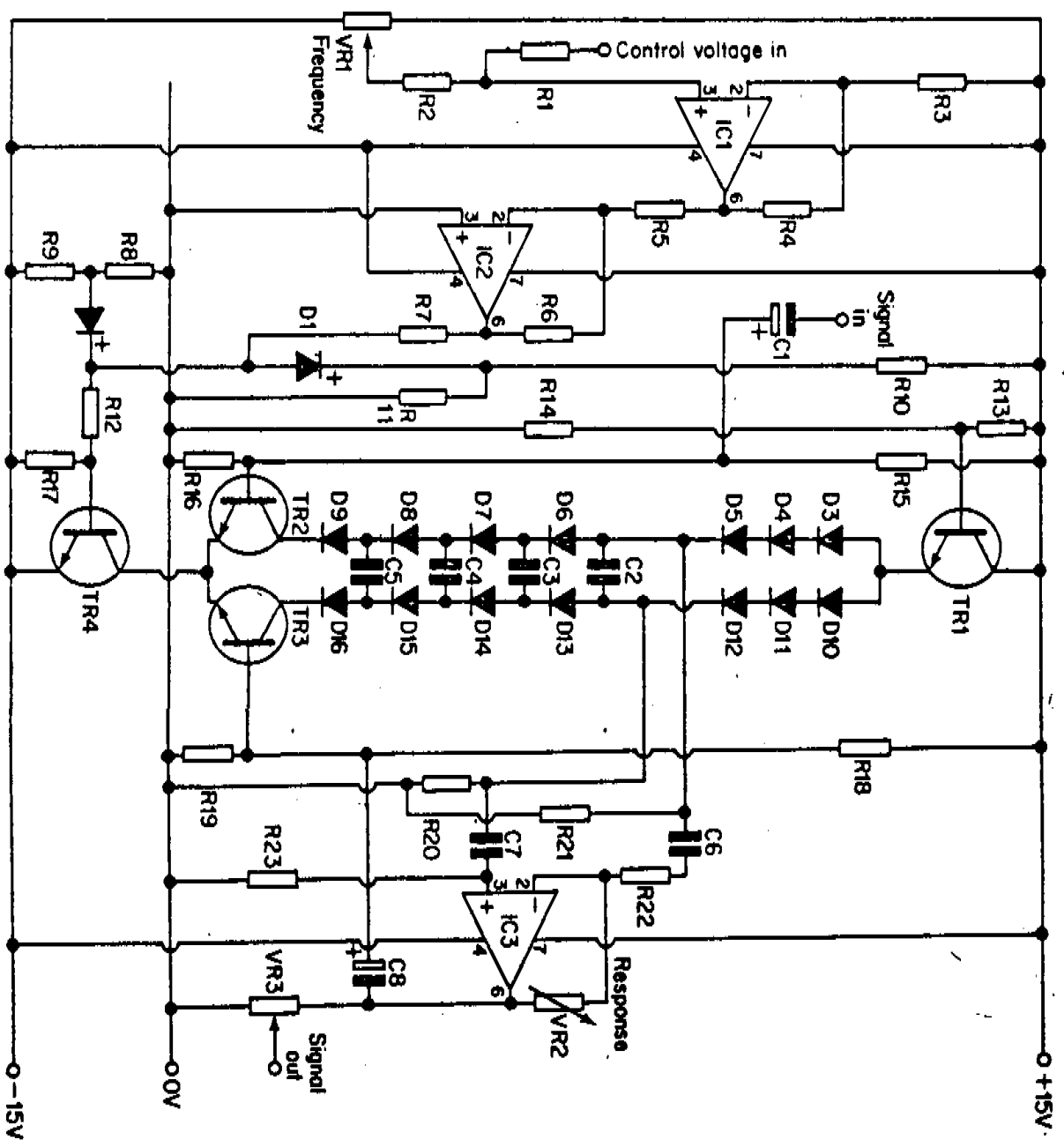
Paul Maddox

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VCA Using CA3046 Array

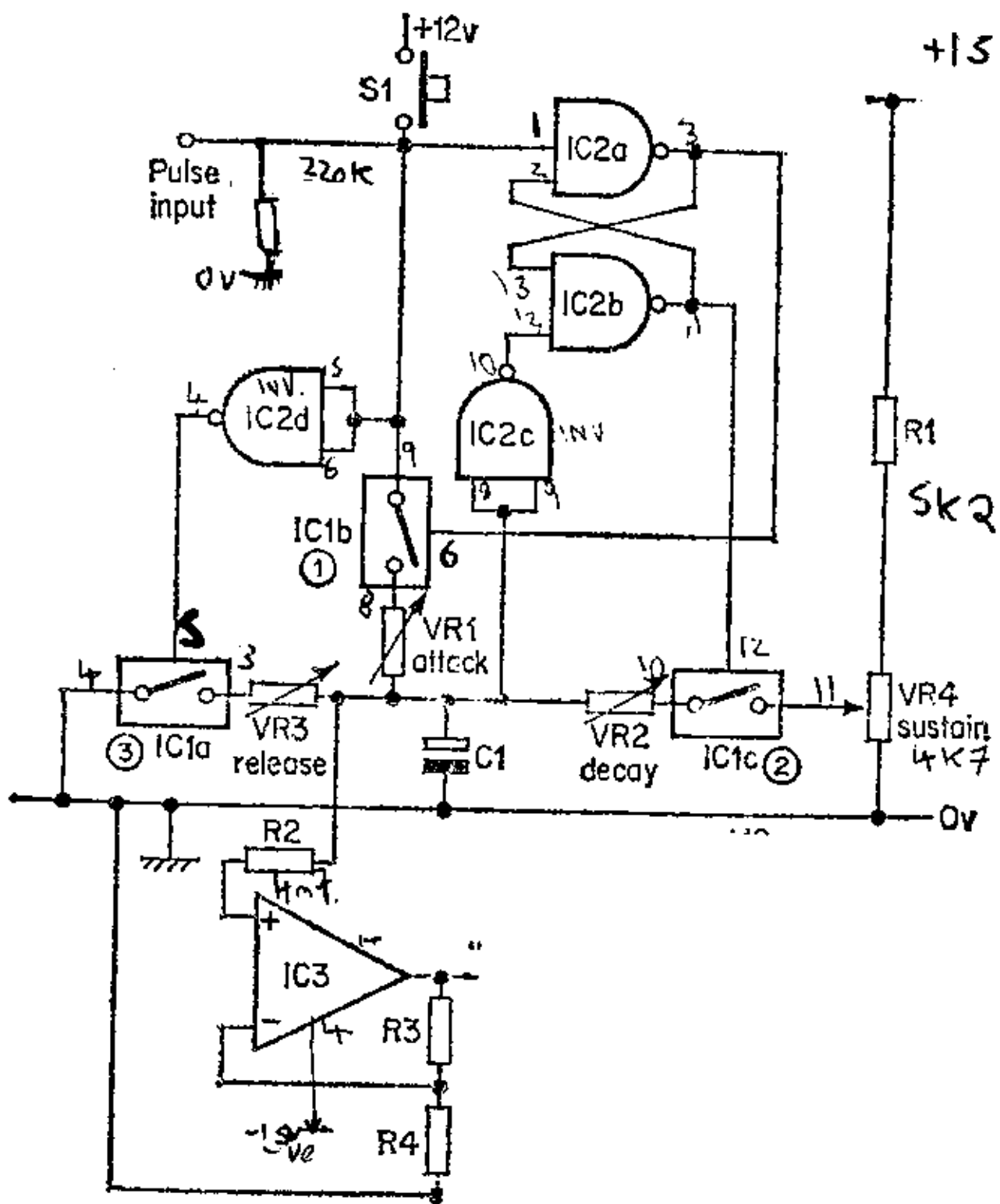


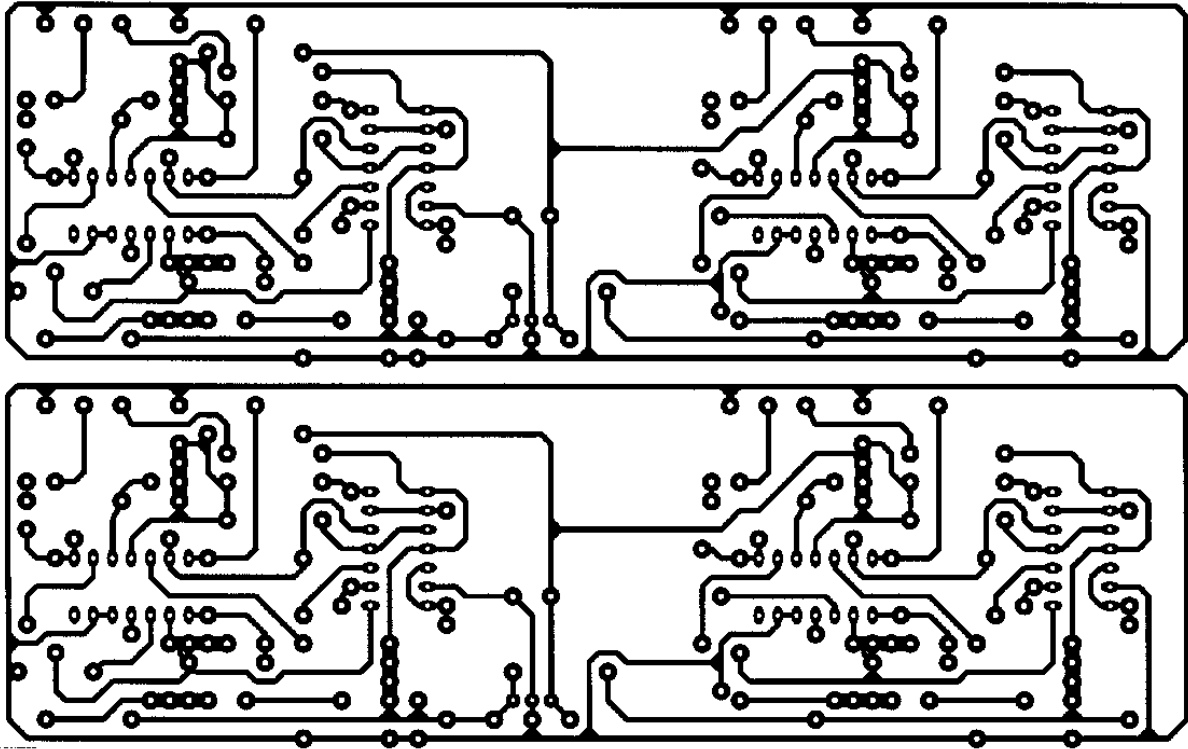


COMPONENTS

- R1 3K3
 - R2 15K
 - R3 33K
 - R4 10K
 - R5 22K
 - R6 10K
 - R7 2K7
 - R8 2K2
 - R9 12K
 - R10 12K
 - R11 3K3
 - R12 12K
 - R13 22K
 - R14 39K
 - R15 12K
 - R16 3K3
 - R17 560Ω
 - R18 12K
 - R19 3K3
 - R20 390K
 - R21 390K
 - R22 56K
 - R23 56K
- All ± 10% 1/4W carbon
- VR1 10K lin.
 - VR2 500K lin.
 - VR3 5K log.
- C1 4.7µF 25V elect.
 - C2 0.01µF
 - C3 0.01µF
 - C4 0.01µF
 - C5 0.01µF
 - C6 0.22µF
 - C7 0.22µF
 - C8 4.7µF 25V elect.
- TR1-TR4 BC109C
 - D1-D16 1N914
- IC1-IC3 741 8 pin d.i.l.

Fig. 3.9 Voltage-controlled filter





File a:\vca2.pcb, Version count 9, Proof print, Solder side, RED
 Windows PCB Designer by Niche Software
 Created 20:39 11 Sep 1996 (Last Saved at 14:11 09 May 1997)

