

Date: Sat, 02 Nov 2002 01:18:42 -0500
From: harrybissell
Subject: Re: VCF2

Hiya kids.

I just finished hosing some 2SC3381 dual transistor pairs into my VCF2. WAY big improvement over unmatched trannies.

I (like someone else) found I was unable to get the VCO to scale with the 500 ohm T2 trimmer. I made it 5K (because I can...) and now I can get 1V/oct... otoh I bet I just fvcked up the tempco (so what who cares...) This let me remove the "zener" (really LED) stabilizer I added to the 220uF cap.

Date: Fri, 22 Nov 2002 20:55:46 -0500
From: harrybissell
Subject: Re: VCF-2F Experiences?

j_inform3r wrote:

> I just ordered the VCF-2F and I'm really psyched to work on it
> once it arrives. How do you guys like this module? I got it mainly
> for the VCA but the VCF should be a blast as well. Is the VCA
> discrete?
> Thanks,
> John
>

Hi John:

I have the VCF2e (an earlier and similar unit). The VCF is the classic Moog Ladder. I'd recommend using matched transistors in the ladder if you can handle it (I made the 2SC3381 fit, but it isn't dead easy so decide if you're up for it)

The VCA in the 2F could be used alone, and have manually controlled resonance in the VCF... or you could use the VCA to have VC Resonance (that would be my choice).

The VCA is an OTA based design (not discrete). The VCA5b (iirc) IS a discrete VCA that works well (better IMHO).

H^) harry

Date: Fri, 22 Nov 2002 23:51:07 -0500
From: harrybissell
Subject: Re: VCF-2F Experiences?

The VCA is not similar to the Mini in any way. Its a Moog ladder clone.

The VCF2e was a Ladder VCF with an envelope follower... a sort of MoogerFooger clone. The VCA was a resonance control here.

The 2f was a next generation, so you could have a VCF with VC resonance or use that section as a VCA instead. My take would be to do the VC resonance and get a VCA board to be a VCA.

I'm still using the PAiA 2720 VCAs from 1974.

The VCA5b is similar in design (transistor pair as two quadrant multiplier)... Bet they could benefit from a matched pair...

H^) harry

NOTE; AM NOT SURE IF THIS REFERS TO VCF2F OR BASSACE...

Date: Wed, 26 Feb 2003 11:56:53 -0800 (PST)

From: male man

Subject: bassace errors

here are some (minor) errors i found on the bassace documentation.

VCF2F:

-R10 NOT tempco. should be a regular 1k.

-R37 not listed.

-R8 not right... i think it should be 330k?

also why are the holes for R19 so HUGE? is there something i should know about this part?

thanks,

Date: Thu, 27 Feb 2003 16:09:43 -0000

From: "darkboneus "

Subject: VCF2f Ladder question

I'm trying to troubleshoot my transistor ladder filter. It is exactly the same as the vcf2e except that the final stage uses a 3080. If I put a headphone probe on pin 1 of the 3046, I can hear the input signal clearly. It is louder than when I put the probe at the junction of the positive side of the 220uf and the 1k resistors, where it is barely audible. I have tested the voltages at the bases of the transistors as they go up the ladder. from the bottom to the top, the voltages(roughly) measure pin 4 of 3046: +3.4v, base of Q6 :+5v, base of Q4 + 6.8, base of q2:+8v. (remember these are ballpark voltage readings.) The voltage measured at pins 2 and 3 of the 3080 (corresponds to pins 3 and 4 of 13600 in vcf2f pdf) is about +7.8v on each. When I listen for signal on pin 6 of the 3080, I get nothing. faint. With the frequency knob turned up completely, the audio is most audible on pin 1 of the 3046. If I put the headphone probe on the emitters of the other transistors in the ladder, the signal grows weaker and fainter as I get closer to the top. On pin 5 of the 3056, I get no audible signal whatsoever. I am completely out of ideas. I have checked my work several times now and I have used several 3046s and 3080s, just to be sure that it isn't the ICs. I think what I need is a little synopsis of how this circuit works. How does the audio travel through it. How exactly does the transistor ladder function? I'm hoping that someone here will be kind enough to help me out.

Thanks alot.

-Rob Carrier

Date: Sun, 30 Mar 2003 15:53:37 -0000

From: "lammspam"

Subject: Moog VCF2F various questions

1) The PDF as posted at <http://www.ele4music.com/vcf2f/vcf2f-b.pdf> is hard to read. Specifically, when I zoom in or try to print, the values and parts designations become hard to impossible to read, munged, blurry and smeared.

I am not seeing this same issue on other pages. Does anyone know a way to fix? Or another location where the PDF is better scanned? I am using a modern, high-resolution graphics card a print setup. I don't think this is an issue w/ my hardware or OS.

2) I do not see a value for R37, although I see it in the board layout and silkscreened on the PCB. Does anyone know the value for this part? Am I looking at it and just missing it?

3) I see the power filter caps (C2, C1) listed as .1 ceramic. Is this sufficient? I would think in this location 10uF to 20uF polarized electrolytic or equiv would be a better choice. .1 ceramic/mylar is more commonly used to bypass right by the IC V++ and V--(eg: it would be used there on the 13600, which in my experience definitely needs very DC-ish DC to operate correctly) Does anyone have experience with this and can advise?

4) Is there a link anyone can suggest along the lines of "building the VCF2F"--you know, building hints, wiring layout, what I learned, how it sounds, how to customize, MP3 samples, etc? Or should I just go through the archive bit by bit looking for what I can find?

Thanks in advance for everyone's help.

--CL

Possibly posted by Charlie Lamm? - date unknown

I have finally gotten around to building this, after the PCB sitting on my bench for quite a long time, and here what I have found.

a) R23, which controls amnt of feedback, seemed to be the wrong value for me. The value in the schematic, 470K, didn't do much. with this value the VCF would not oscillate, no matter what, and had no audible "Q" to speak of. 150K was what I ended up using. This sounded best to my ears but a lot of values seemed to work, eg, if you want a whole lot of oscillation, especially in "sharp" mode, try 80K or so. Also, I had to adjust R5-7 and R1-4 to accommodate the Peak to Peak and CV's of my particular setup; you may have to as well.

b) I never got the VCF2F, when it oscillates, to come anywhere close to 1V/octave ("in tune"). After some messing with R10, T2, R20, etc etc., I gave up; the best I could get was about 4V = 1.5x pitch, no where near what I needed to play rock and roll riffs. It would be cool to be able to use this as a 1V/octave oscillator, but modifying the linear-->log section to fix this is way beyond my electronics skill level; if anyone else has fix, let me know.

c) The built in VCA works backwards; the more CV it sees, the more it attenuates. So inverted CV's or whatever work the way you'd expect, but don't expect to just plug in your AR and go. I ended up leaving the VCA not wired to the front panel, but if you need a voltage controlled ducker, this works.

Overall, once I corrected the R23 value, this became a very good sounding filter, with a good snarl and wahh factor, and lots of good resonance when cranked up. IMO if you want a super-quick-n-easy-to-build low pass filter that sounds good, build this one, and just leave off all the VCA stuff.

???

Hi, sorry for my poor english
i'm building the vcf2f filter. The question is: in the pcb under i.c. marked u2 there is a place for a component (as for a resistor) marked "t.c." (I think t.c. = "thermal contact"). What is this? I think that this is a contact for tempco resistor but in the schematic this is marked R10 that is in another place in pcb.
second question:
Have you some tips for modifications or for mistake about this module (vcf2f).

Thank you
Simone from Rome

tomg
Posted-02/17/2004: 6:43:08 PM

it's for a 1K tempco resistor for temp compensation ... but any 1K will do

SynthModules USA
Posted-02/19/2004: 7:44:29 PM

Does this mean there are two (2) locations for tempco resistors on the VCF 2f PCB? R10 AND the TC locations? OR... is R10 supposed to be a standard 1k resistor and the tempco should go at the TC location?

tomg
Posted-02/19/2004: 8:24:03 PM

R6 and R25 are 1K if tempcos are not used. If tempcos are used they go in the places marked TC and should be in thermal contact with the 3046, leave the spaced marked R6 and R25 empty. R10 is part of vcols pulse width converter????

tomg
Posted-02/19/2004: 8:25:27 PM

Ether or... 1K tempco in TC space or 1K resistor in R10 space. Not both.

Unknown poster.

Just finished building it. In case anyone is interested:

--If you can't get enough resonance/Q change R23 to 150K or so. Lower values give more resonance.

--I couldn't make the filter, in osc mode, scale to 1V/octave has anyone else succeeded?

--The VCF is a ducker; 0V CV for approx unity +3V for about -65db?

Anyway, didn't work the way I thought. From the design this appears to be a feature, not a bug?

tomg

Posted-11/11/2003: 7:20:32 PM

Hummm.. it sounds like one (or more) of the ladder transistors is shorted (open, bad or otherwise not working).

Tom

charlie@charlielamm.com USA

Posted-11/22/2003: 4:12:44 PM

Thanks for the advice...

I assume you mean since I had to change the resonance value AND the thing won't scale, I have a bad transistor somewhere.

I see diode drops across each B->E for each of the 6 transistors.

I figure if a transistor were completely blown, I wouldn't see this.

If I go between each E -> C I see -1.6V across the first, -3.2V across -4.8V as I go to the bottom of the ladder, then move to each Emitter. This for "both sides" of the ladder (both sides behave the same.)

I have done a visual inspection of the traces, etc. and they look fine.

can you suggest other tests to do to determine which one is NG?

tomg 89

Posted-11/23/2003: 06:32:19 AM

Here are some measurments out of my notebook. They might give us a clue then again they might not...? Voltages are bottom-up the ladder.

Emitter voltages

min	max	cutoff (0 to +12)	
-17.7mV	96.7mV	base	npn expo
0.6	.715	base	npn expo
2.3	1.7	collector	npn expo
2.352	2.212	emitter	pair
3.8	3.7		
3.3	3.22		
6.7	6.8		
8.2	8.1		

Divider voltages
2.9 ____ at bias (+ side of 220uF cap)
4.3
5.8
7.3
8.7

Tom

Edited by - tomg on 11/23/2003 06:35:25 AM

charlie@charlielamm.com
Posted-12/04/2003: 5:40:53 PM

Thanks so much for the info!!! I will test this ASAP...I really appreciate this sort of troubleshooting info, thanks for digging in your notes, the data is very useful...

--CL

charlie@charlielamm.com
Posted-12/04/2003: 5:48:22 PM

Oh yeh and a few more things about this VCF...since it's more fun to think about VCF's than to do my real job.

to make the VCA go from ducker to normal operating mode, or whatever you want to call it.

so 0V CV means minus 90db and +5 means +6db or whatever.

instead of the other way around...one could just cut the traces and switch the + and - ins on the VCA part of the 13600 OTA (U2, 1/2 pins 13,14) right? I haven't tried this, but, I figured that would work.

maybe someone who has done this could weigh in?Also, to use this the VCA as voltage control rez, I would think you'd substitute the entire VCA circuit for C10 and the resonance pot...has anyone tried this? I can't think of why this wouldn't work. Someone emailed me this once to ask, and I didn't know, but maybe it'd be good to have this. Has anyone done this?

darkbone
Posted-03/17/2004: 09:19:09 AM

Hello. I just built a VCF2f and am having some troubles. I'm no good with transistors. Can anyone tell me how I can check to see if a tranny is bad? So basically, my filter is working, but I get no resonance whatsoever. I replaced Q8 and I still have no luck. When I turn the resonance knob, I get the tiniest variation in volume, but it's almost unnoticable. I'm also having a weird issue with the VCA as well. It seems to be distorting the signal even when it is at it's lowest volume and when I open up the VCA, I get a ton of ground noise, or at least what sounds like ground noise. I replaced the 13600 and that wasn't the problem. I have looked at all of my part values and I can't seem to find anything. I was wondering if perhaps C10 could be the problem? I used a polarized electrolytic, but on the scematic, it doesn't indicate polarity. Is this a mistake? Any help or hints would be greatly appreciated. For every three sucessful modules I build, I always get one of these that plagues me for weeks on end. -Rob

unease4u

Posted-03/17/2004: 11:57:38 AM

I had EXACTLY the same problem with the filter resonance! The filter worked well except that I could just get a tiny amount of resonance. I figured that some of the capacitors were bad so I desoldered them in order to test them with a multimeter. When I put them back the filter was totally dead :- (I get no output at all. I guess I killed the capacitors while trying to test them. I'm going to order new parts and give it a new try soon (I ordered the filter as a full kit so all the parts were from EFM).

One thing that puzzled me a bit was the two grounds. These are connected together on the VCF2f but in my Paia 9700s they are separated so that there is one module ground and one signal ground (earth). Signal ground is connected to the input jacks only and not to the modules ground. Maybe I did something wrong when trying to achieve the correct "star-grounding" of the Paia.

darkbone USA

Posted-03/17/2004: 6:46:04 PM

I just jumped R25 and Lo! I got resonance. Now on to the next piece of the puzzle.

The sound in the filter sounds a bit distorted to me. Also, only the top 10% of the resonance knob actually does anything. The filter won't self oscillate if the switch is in Sharp mode, only in smooth. Will playing with the value of R25 increase the range that I get on the resonance knob? Any ideas as to why I had to jump R25? Thanks.

-Rob

unease4u

Posted-03/18/2004: 08:25:46 AM

Hmm, I have to try that! Seems strange that you have to do this. Lots of other people must have built this filter and had the same problem? Someone else here on the board that actually built this thing without problems?

charlie@charlielamm.com

Posted-03/18/2004: 10:30:27 AM

Guys, the problem is that the feedback loop design in this filter isn't buffered. So the impedance of whatever you hook the VCA into (a VCA, another filter, a mixer, etc) affects that amount of resonance you get out of the filter. This explains why jumping R25 "helped" and may explain some distortion issues you have after your mod.

To correct this, you can do a few things; reduce the value of a resistor in the feedback chain (R23--reduce it, but don't get rid of it), or, better yet, buffer the output of the filter, which, IMO, should have been part of the design to begin with.

I have built a simple buffer for mine out of some junk parts I had lying around, and it helped greatly with these problems, although it did raise

the noise floor of the filter somewhat. I have sent this circuit fragment to Tom for posting on the "files" part of this site, but alas, no response.

Thus, to see the fragment, go here:

<http://www.charlielamm.com/synth/vcf2fbuffer.pdf>

Re: your VCA issues. I would forget about using the VCA on this filter; there are some bugs in it (like: more CV LOWERS the attenuation--oops!) and IMO you'd do better with a lower noise design anyway. I ended using an external VCA based on an SSM2164.

Hope this helps.

--CL

yusson France

Posted-03/18/2004: 11:41:52 AM

Well if the issue is the output buffering, I suggest that you use the "left-over" output buffer of U2 : make sure that pin7 and pin8 of U2 are not connected to ground (I have no VCF2F PCB to check this !) disconnect C9 from pin5 -U2, then connect pin5-U2 to pin7-U2, connect a 10 k resistor between pin8-U2 and the negative power rail and finally connect C9 to pin8-U2 ... A lot of work but it might worth it ! BTW, I am waiting for two back-ordered VCF2F, therefore I haven't tried this mod yet ! Hope this helps

Edited by - yusson on 03/19/2004 03:43:19 AM

unease4u 16 Posts

Posted-03/19/2004: 03:13:19 AM

Thank you Charlie and Yusson for clearing this up! It seems very strange that the "left over" buffer was not already used in the PCB design! I'm not sure what method I'm gonna try, adding a small extra board for the buffering or modifying the board as Yusson suggested.

cheers!

/Tommy

www.unease.se

yusson France

Posted-05/07/2004: 2:54:37 PM

Hi

I eventually received my two VCF2F boards, assembled and tested them. They work quite right, though showing some unstability due to the non buffered output of the VCF : the misbehaviour is a tendency to auto-oscillate at ultrasonic frequencies whatever the value of resonance !

This auto-oscillating behaviour disappears as soon as I put my finger close to the ground of the circuit...

Therefore I applied the mods I suggested in a previous message, that is using the "left-over" buffer of the LM13600. And this completely cures the unstability and ultrasonic auto-oscillations. Now the filters are real fine and have that typical Moogish sound.

yusson France
Posted-05/10/2004: 08:35:35 AM

Hi

I have put together a quick and dirty page dedicated to mods to the VCF2F board in order to improve the stability of the filter.

Check it at

<http://www-timc.imag.fr/Yves.Usson/personnel/SDIY/Modular/>

There, click on the Moog-VCF button or access it directly at :

<http://www-timc.imag.fr/Yves.Usson/personnel/SDIY/Modular/EN/MOOGVCF>

Cheers
Yves

unease4u
Posted-05/12/2004: 09:41:41 AM

Thanks a lot Yusson! I'm going to try this with my filter as soon as I get more time for some soldering :-)

unease4u
Posted-05/23/2004: 09:02:27 AM

I've now tried the mod that Yusson proposed and it worked really well! But I still have some problems with the resonance. With the original values of the resistors R23, R25 I get a little too much resonance. I get self oscillation on most settings of the resonance pot and even with the pot set for lowest resonance I get still get a noticable resonance. When I switch to the "sharp" mode I get self oscillation all the time, however I set the resonance pot. Yusson, did you try the sharp setting on your filters? Maybe you have used some other resistor values for R23 or R25? Do you think lowering the value of the added 10kOhm in resistor would help?/Tommywww.unease.se

yusson France
Posted-05/23/2004: 10:49:49 AM

Hi Tommy

Well, that was the behaviour I had before using the left-over buffer.

After the mod it disappeared. Still, I quite agree about the resonance

range. Do not change the R23 value, neither the 10k added resistor.

Personnally I use a 470kOhm resonance pot, this way I have the full resonance range from low resonance to oscillating. I also increased R25 to 47k in order to reduce the self oscillating range. Ideally one should use an antilog pot for resonance control, however this the kind of pot nearly impossible to find !... I am not using the so-called sharp mod that is mainly aimed at overdriving the filter (IMHO a filter must not be overdriven ! I'd rather use a waveshaper for that purpose). Yves

Note: there is a file "vcf 2fbuffer.pdf, showing an alternative buffer circuit. There is no forum stuff that I can find about it.