

Date: Fri, 15 Nov 2002 10:38:26 +0000  
From: Yves USSON  
**Subject: Wildcat parts**

Hi

I received my Wildcat board yesterday and I am eager to start assembling it. Looks very promising.

I have a few questions for Tom concerning certain parts :

In the slide glide module :

- I have difficulties to find the 2N5460 P-FET transistor, is the 2N5461 P-FET (that I can get easily) a good substitute ?

In the power supply :

- What characteristics should I use for the heat sinks of the power regulators ? 30K/W, 15K/W or 5K/W ?

- What power do you recommend for the 24V transformer (20VA or more) ?

Thanks for your answers

---

Date: Sun, 17 Nov 2002 22:19:49 -0800  
From: "tomg"  
**Subject: Re: Wildcat parts**

> is the > 2N5461 P-FET (that I can get easily) a good substitute?

Yes

> In the power supply : - What characteristics should I use for the heat  
> sinks of the power regulators ? 30K/W, 15K/W or 5K/W ?

You don't need much...I left room on the board for those 1" x 1 1/4" bolt on jobs...

> -What power do you recommend for the 24V transformer (20VA or more) ?

I'm using a 2A radio shack transformer.

Tom

---

Date: Mon, 13 Jan 2003 10:32:20 +0000  
From: Yves USSON  
**Subject: Wildcat typos**

Hi all

This week end I started to populate my wildcat PCB with resistors and diodes and I came across some typos either in the wildcat assembly document or on the component serigraphy of the PCB.

VCF1 : On the schematic diagram there are 3 resistors labelled R35, and one can find two R35 on the serigraphy of the PCB. - the first R35 is 100K and is connected to input H and is correctly labelled on the PCB - the second R35 is 10K and connected to capacitor C13 and pin 8 of U2, in fact it correspond to R25 on the serigraphy of the PCB. - the third R35 is 2K7

and is connected to capacitor C11, R13, R18 and R19, it appears also on the PCB as R35 and is located beside C11. This resistor must be renamed R40 on the schemo. The BOM also contains typos : add R40 to the list, beside R14 (2.7k) R23 appears twice in the BOM once as 1K and the second time as 33K, the second is wrong and must be corrected to R24.

Staircase generator

BOM R13 (270ohm) is missing in the BOM D1 (zener 4V7) is missing in the BOM

That's all for today, I hope this will help you ☺

---

Date: Mon, 13 Jan 2003 10:47:41 +0000

From: Yves USSON

**Subject: Wildcat delay modules**

Hi all

I am a bit puzzled by the delay modules of the wildcat. I am not sure that I understand how it works.

The aim of such modules is basically to produce a delayed gate signal on its output when receiving a gate voltage on its input. The delay is depending on the value of C2, P1 and R1. I understand that the mosfets act as switches working in opposite, one is closed when the other is open and conversely. These control the charge and discharge of C2, alright.

What puzzles me is the configuration of the OPA. It is configured as a voltage subtractor and not as a Schmidt trigger (what I would expect!). Could someone explain this to me? The output signal wont be a on/off gate signal.

The other point that is not clear is the role of C1....

Thanks for your comments ☺

---

Date: Thu, 16 Jan 2003 10:21:34 +0000

From: Yves USSON

**Subject: Wildcat typos, continued.. for TomG**

Hi Tom

VCF3-BOM

R25 (10K) is listed with the 1k resistors

C3,C4, these are referenced 470pF in the BOM and not reported on the schemo. Is 470pF the actual value?

> I am a bit puzzled by the delay modules of the wildcat. I am not sure  
> that I understand how it works.

The aim of such modules is basically to produce a delayed gate signal on its output when receiving a gate voltage on its input. The delay is

depending on the value of C2, P1 and R1. I understand that the mosfets act as switches working in opposite, one is closed when the other is open and conversely. These control the charge and discharge of C2, alright.

---

Date: Mon, 27 Jan 2003 10:47:02 +0000

From: Yves USSON

**Subject: HELP WITH WILDCAT VCO**

Hello all, hi Tom

I have finished populating my Wildcat PCB and I started to test some modules this week end. I tested the PSU first (pretty obvious!) and it works fine, gives me +12 and -12v alright. I connected VCO 1 but was not that successful ! No oscillation whatsoever. In fact I manage to trigger oscillation by placing my finger above some resistors, the 50HZ noise adds sufficient perturbation to start up the oscillation. However the shapes are not those expected: no saw wave but something in between pulses and truncated saw... Playing with the trimmers did not improve the shapes.

I checked the solders and component implementation and I have doubt about the J112s. I suspect a crossing of the Drain and Source pins in Tom's design. I wonder if I did burn my J112s ?

I also noted that the U6 is missing in the BOM and is not referred to in the schema : I guess it is a CA3080 (hopefully I have a bunch of these in my drawers).

Tom could you give us some clues : such as voltages that one should obtain at given test points. It would help me a lot.

Another weirdness (with no consequence IMHO) is that unused pins of CA3046 are connected to pin 3 of the exponential current source. I'd expect to have these pins grounded instead (connected to pin 4).

Also there is a discrepancy between the trimmer numbering in the schema and on the PCB serigraphy.

I look forward to your comments... ð

---

Date: Tue, 28 Jan 2003 06:22:43 -0000

From: "metamaticdiy "

**Subject: Re: HELP WITH WILDCAT VCO**

Hi Yves,  
(comments inline)

> I tested the PSU first (pretty obvious!) and it works fine, gives me  
> +12 and -12v alright.

Good start! Haven't quite gotten the -12V working on mine; I'm suspecting a bad component somewhere.

> I connected VCO 1 but was not that successful <snip>  
> no saw wave but something in between pulses and truncated saw...

Hmm... is pad N connected to -12V? Tom may have other suggestions, but that's where I'd look first. Pad N is the sync input; unless there's an oscillator to sync to, it needs to see -12V.

> Playing with the trimmers did not improve the shapes. <snip> 3080  
> (hopefully I have a bunch of these in my drawers).

As the VCOs seem to be largely based on the VCO4, the CA3080 would be the likely choice for U6. It's part of the waveshaping portion of the circuit, I believe.

The odd thing I've noticed on my Wildcat involves envelope generator 1... when power is applied, Q3 makes a popping noise and emits smoke, which I'm supposing is not what it ought to be doing... It doesn't affect envelopes 2 through 4, and as soon as Q3 pops, the negative rail shorts to ground. Any suggestions as to where I went wrong?

Thanks, Rich

---

Date: Tue, 28 Jan 2003 11:06:32 +0000  
From: Yves USSON  
**Subject: Re: HELP WITH WILDCAT VCO**

Hi Rich

> Hmm... is pad N connected to -12V?

I did check this but did not improve things. I even suppress the sync FET but still get the same behaviour.

> when power is applied, Q3 makes a popping noise and emits smoke

Looks to me as a solder bridge somewhere. I would check that resistor R5 is not shunted (that is collector is not directly connected to +12V). I would also replace Q3 with a new tranny... The fact that the negative rail shorts to ground suggests that the track of the PCB for Q3 and R5 of ADSR must be checked thoroughly! I'll do this tonight !

Good luck !  
Yves ð

---

Date: Tue, 28 Jan 2003 19:23:11 +0100 (MET)  
From: Yves Usson  
**Subject: WILDCAT! DON'T POWERUP YOUR EG's**

Hi Wildcat kit owners

I checked the tracks of ADSR eg of the wildcat board and there is a BIG MISTAKE ! I you power up these you will certainly burn Q3 and the 555 IC, just as what happened to Rich!!!!.

The collector pin of Q3 is to be connected to R4 and pin 4 of U1 (555).

Unfortunately pin 4 has a track connecting it with the -12V rail

(Ouch!!!!). Cut this track with an Xacto knife. Then if you want your ADSR to work you have to connect the collector of Q3 to diode D5 !

There are maybe other bugs I check the rest of the EGs and let you know...

Gee from now on I shall systematically check the tracks of this board before connecting a module!

Date: Tue, 28 Jan 2003 18:54:34 -0000  
From: "metamaticdiy "  
**Subject: Re: WILDCAT! DON'T POWERUP YOUR EG's**

Hi (and thanks) Yves,

Wow, I was just about to post the same information. I was home on my lunch hour, and decided to spend the time troubleshooting the Wildcat (and yes, I am a geek, thanks).

Should be an easy fix... luckily, I had the foresight to socket all ICs, and removed them before powering up the Wildcat, so all I did was fry some transistors (they make a louder noise than you might think).

Thanks, and please let us know if you find anything else.

Rich

---

Date: Tue, 28 Jan 2003 20:07:32 +0100 (MET)  
From: Yves Usson  
**Subject: Re: Re: WILDCAT! DON'T POWERUP YOUR EG's**

Hi Rich

Forget about connecting diode D5 directly to Q3's collector there's a track doing it, I just missed it.

Now I will concentrate on the VCO, the problem could also be a wrong track... Do your VCO's work correctly ?

Yves

---

Date: Fri, 31 Jan 2003 02:42:48 -0000  
From: "metamaticdiy "  
**Subject: More Wildcat EG Errata**

Hi list,

For those working on their Wildcats, I've found another error on the PC board layout, in addition to the errant connection between pin 4 of U2 and the collector of Q3 that Yves pointed out. there's a trace connecting pin 6 of U1 (the 555) to pin 2 and 6 of U2. This is incorrect. Pin 6 of U1 should connect to pin 3 of U2. I'm cutting the trace between pin 6 of U1 and the jumper connecting pin 2 and 6 of U2, and putting a short insulated jumper wire between U1 pin 6 and U2 pin 3.

I'm populating the Wildcat board as my budget and schedule allows, so I haven't looked at the VCOs yet.

And before anyone starts complaining too loudly, remember there were the early version PC boards, and were priced accordingly. Given the low price, it's an amazing deal, even considering the time spent troubleshooting and modifying the board.

Rich

Date: Fri, 31 Jan 2003 04:10:30 -0000  
From: "metamaticdiy "  
**Subject: Re: More Wildcat EG Errata**

> Hi list,  
>  
> For those working on their Wildcats, I've found another error on the PC  
> board layout, in addition to the errant connection between pin 4 of U2  
> and the collector of Q3 that Yves pointed out.

Oops... that would be the connection between the negative rail and pin 4  
of U1. The connection between U1 pin 4 and the  
collector of Q3 is perfectly fine, and should be left as it is.

Rich

---

Date: Fri, 31 Jan 2003 18:40:50 -0000  
From: "metamaticdiy "  
**Subject: (Final?) Wildcat EG Errata**

Hi again,

Just took another look at the Wildcat EG, and R7 is connected to the +12V  
rail at both ends. Cut the short run between pin 8 of U1 and R7, and that  
should be the end of it.

Also, please note that Q2 on the schematic corresponds to Q3 on the board,  
and vice versa.

Rich

---

Date: Fri, 31 Jan 2003 18:50:07 -0000  
From: "metamaticdiy "  
**Subject: WARNING - ERROR IN LAST POST**

Hi again,

DO NOT cut the trace between pin 8 of U1. Instead, cut the trace between  
the +12V rail and pin 8 of U1.

Rich

---

Date: Sun, 23 Feb 2003 14:54:09 +0100 (MET)  
From: Yves Usson  
**Subject: VCO of Wildcat**

Hi all

I have found track bugs in the VCO modules of the Wildcat ! The base of Q3  
is connected to C5 ! Cut the track between the base of Q3 with an Xacto  
knife the connect the base of Q3 to the track connecting R34, R26 and R15.

Pins 6 to 12 of LM3046 must be connected to the ground of the PCB: remove the strap located at the end of U2 and connect a wire between pin 6 the track connecting R9 (CTP) and R21.

For those interested I will post pictures of the PCB mods.

---

Date: Sun, 23 Feb 2003 15:01:11 +0100 (MET)  
From: Yves Usson  
**Subject: Repost : Wildcat VCO's**

Hello all

As I said in an older message my VCOs were not working on my wildcat board. Checking the tracks of the PCB I came accross some uncorrect tracks!

As I said previously the pins 6 to 14 of the LM3046 must be connected to ground instead of to pin 3 ! This has not significant impact though. Remove the strap located close to U2 and put a wire between pin 6 and the the track connecting R9 (CTP) and R21.

More annoying, the base of Q3 is connected to capacitor C5 and to the J112's. Cut out the track between base of Q3 and C5 then connect the base of Q3 to R34 (track connecting R34, R26 and R15). For those interested I will post images of the PCB mods.

After these track surgery, the VCO oscillates right. Now I have to tune this right.

I am quite surprised though, wildcat boards have been released since last october and there were not much messages concerning PCB or schemo bugs. Are we, Rich (metamaticdiy) and I, the only one trying to have the Wildcat working and experiencing troubles ?

---

Date: Sun, 23 Feb 2003 21:51:06 -0000  
From: "metamaticdiy "  
**Subject: Re: Repost : Wildcat VCO's**

Hi (and thanks) Yves,

Thanks for solving the Wildcat VCO issue for us. As I wrote earlier, I've been assembling the Wildcat as time and budget allows... the envelopes caught my attention early, as nothing else on the board smoked when I connected power!

If I can, I'll summarize the Wildcat EG fixes again; Cut the trace between the +12V rail and pin 8 of U1 (the 555), cut the trace between -12V rail and pin 4 of U1, and cut the trace between pin 6 of U1 and pin 6 of U2 (leave the connection between pin 2 of U2 and pin 6 of U2 intact, however... then connect pin 6 of U1 to pin 3 of U2. Also, on the wiring diagram, reverse the connections to the sustain pot from pads d and g.

Regarding the question of people actually building the EFM boards, I echo Dave's statement... I buy the boards while I can, and populate them as budget permits (one reason I use IC sockets... semiconductors tend to move around from board to board... damn, poverty sucks :) ).

After the local tax authorities and the IRS take their annual pound of flesh, I'll start work on the filters....

Rich

---

Date: Sat, 01 Mar 2003 15:09:25 -0000  
From: "yussonfr "  
**Subject: Wildcat VCO FET switch**

Hi

I am still wondering if the J112s are correctly connected on the wildcat PCB. I would expect the source (S pin) of the NFET be connected to the expo current drain, and the drain (D pin) be connected to the +6 volt line (set by the voltage source at pin 7 of U5). From what is indicated in the J112 datasheet (TEMIC), the source pin is the middle pin, from the PCB it seems that the middle pin is the drain pin !... One also can see such a discrepancy on the J112 pinout shown in the VCF4d/4e documentation where the middle pin is alleged to be the drain. What do you think, is there any expert around that can give an answer (Tom what are your advices ?) before I try to cross the drain and source pin ?

By the way I tried the VCO the way it is and it oscillates between 6 Hz and 17 kHz but shows some unstability. It tends to stop oscillating under 60 Hz and needs some pin tickeling of the FET to restart oscillation.

Thanks for your help

---

Date: Sun, 02 Mar 2003 13:09:11 -0000  
From: "yussonfr "  
**Subject: Wildcat VCO waves**

Hello all

The quality of the VCO output signals can be improved with a small change. Looking with a scope at the sawtooth signal (or to the triangular signal) at high frequency (>1KHz) one can see a brief glitch pulse (few microseconds) located somewhere in the middle of the slope of the sawtooth. If one plays with the PW pot this pulse moves along the slope. In fact this due to the loading of the second half of the LM393 dedicated to PW modulation. Curiously, the switch transistor of the LM393 is connected trough R31 (2k2) to the 6V reference that feeds the integrator cap of the VCO. The consequence is that the switching of the output transistor induce a brief but intense current draw from the 6V reference. The other consequence is that after voltage division by R32 and R33, the square output voltage swing is not symmetrical : high level +1v and low level -2V !

To cancel this parasite glitch out, remove R31 and connect a 10k resistor between pin 8 (+12V rail) and pin 1 (collector of the inner tansistor) of the LM393 IC. After this small modification the glitch disappears and the square output voltage swings between -2V and +2V.

Cheers



Date: Sat, 8 Mar 2003 21:50:54 +0100 (MET)  
From: Yves Usson  
**Subject: WEL (or Wildcat Errata List) Stair-case module**

Hi

Here is an update of my list of errata concerning the Wildcat modules:

The staircase generator

R12 must be changed to 20k in order to have equally spaced voltage steps.

Tom forgot to draw tracks to connect pins 2,3,6 & 7 to ground : make a solder bridge between pins 2 & 3, make a solder bridge between pins 6 & 7, solder a wire between pin 3 and pin 10 solder a wire between pin 6 and pin 10

Tom put a track connecting pin 1 and pin 11. Cut this track with an Xacto knife just beside pin 11, check with a multimeter that pin1 is no longer connected to pin 11, then solder a wire between pin 1 and 12.

When done with these mods the staircase generator works fine.

I have also checked the noise generator and there is no bug and it works nicely.

I will post also some mods to apply to the VCO circuit in order to obtain a better symmetry for the triangle signal and obtaining a purer sine signal.

Stay tuned

Cheers

---

Date: Sun, 9 Mar 2003 00:54:01 +0100 (MET)  
From: Yves Usson  
**Subject: Wildcat Ring Modulator**

Hi

I have just finish the Wildcat's ring modulator and it works fine, no wrong tracks.

Cheers

---

Date: Mon, 10 Mar 2003 22:45:37 +0100 (MET)  
From: Yves Usson  
**Subject: Wildcat Sample&Hold**

Hi all

I have checked and tested the sample and hold module of the Wildcat and there is no bug. It works fine, although it should be renamed a track and hold module.

Cheers

Date: Sat, 15 Mar 2003 15:28:05 +0100 (MET)  
From: Yves Usson  
**Subject: WEL (or Wildcat Errata List) VCF3-SVF**

Hello

Here comes a new errata. This time it concerns VCF3 (and also VCF2) Tom wrongly drew a track between R7 and R9 (schemo labelling) and pin 4 of the LM13600 (I use a LM13700 instead and it's OK) instead of drawing it between R7 and R8 (schemo labelling) and pin 3 of the LM13600. Note that R8 and R9 are swapped on the PCB serigraphy (no harm there since they are the same value!).

Cut with an Xacto knife the track between R7 and R9 (schemo labelling) the closest as possible to R9(schemo labelling). Then connect with a wire the track coming from R7 to R8(schemo labelling)-pin 3 of the LM13600.

After this correction the SVF works fine.

The same error was made for VCF2 : I have not yet corrected it therefore stay tuned ...

Cheers

---

Date: Sat, 15 Mar 2003 15:28:11 +0100 (MET)  
From: Yves Usson  
**Subject: Wildcat noise generator**

Hi

I checked the spectrum of the wildcat's noise generator and noticed there is some unwanted 100Hz signal superimposed to the flat white noise spectrum. I guess this is due to the high gain of the amplifier stages which amplifies some PSU residual 100Hz. Joined are two GIF files showing the noise spectrum, and second the spectrum of the noise generator when the noise source (transistor Q1 has been removed) one can see very well the 100Hz signal and its overtones.

How can I suppress this 100Hz buzz ? I already tried to increase the value of C1, then I add a decoupling capacitor between pin 8 and 4 of the TL072 IC. Unfortunately this did not reduce this 100Hz signal.

Thanks for your advices

---

Date: Sat, 15 Mar 2003 12:04:54 -0500  
From: harrybissell  
**Subject: Re: Wildcat noise generator continued**

Assuming that the circuit is the same as the SBM ... (I don't KNOW that...) and that you are on a 50Hz AC mains...

I'd suggest you look at the following points...

1) The 4.7K resistor in the collector of the second tranny goes directly to the supply.

I'd split that resistor into two series 2.2K resistors... and bypass the center point to ground with a large cap (big enough that the RC kills the 50Hz... Better still... maybe use a 1K and maybe 10V zener diode to stabilize this point.

2) I'd add a small resistor in series with the 10uF cap feeding the first opamp gain stage... maybe a 1K. This will lower the gain a little, but will increase the frequency response of the opamp stage (which will be limited by gain/bandwidth product....

Hope this helps. If the Wildcat schems are on the web let me know and I'll check them out.

H^) harry

---

Date: Sat, 15 Mar 2003 18:26:29 +0100 (MET)  
From: Yves Usson  
**Subject: Re: Wildcat noise generator continued**

Hi Harry

Thanks for your suggestions. You are right the noise generator is the same as in the SBM. I shall try to split this 4k7 resistor and add a capacitor at the break point as you said. Clearly that's the only point for improvement.

By the way I am not using a 2N3904 for Q1 but selected instead an old BC109 I had in my drawing that provides me with a higher noise level.

Cheers

---

Date: Sat, 29 Mar 2003 13:05:44 +0100 (MET)  
From: Yves Usson  
**Subject: (WEL) Wildcat errata list : VCF2**

Hi

I am testing VCF2 (aka MS20 like filter) of the Wildcat and found inconsistencies between the schematic and the PCB. Actually the filter does not work if the following mods are not applied. In the schematic the output signal (low-pass mode) from the darlington buffer of the first OTA (pin 8) is directed to non-inverting input of the second OTA (pin 14). On the PCB in fact this signal is directed to the inverting input (pin 13).

Here is the list of PCB mods for the VCF2 : with an Xacto knife cut the track between R10 and R11 (serigraphy labelling) connect with a small wire R11 to R9-pin14. Now the filter works although not perfectly. There is a correct frequency sweep, but the resonance is far from being impressive ! I don't understand why since I checked the original lowpass filter section of the MS20 and there is no significant difference with VCF2.

I look forward to your suggestions  
Cheers

Date: Sat, 29 Mar 2003 13:07:12 +0100 (MET)  
From: Yves Usson  
**Subject: VCF2 resonance (for Tom Gamble)**

Hello All, Hi Tom

I am trimming VCF2 of the Wildcat and after correcting the PCB I managed to have it working (see my Wildcat Errata List postings). However, I only get a very low resonance ! I don't understand why, I checked the original lowpass filter section of the MS20 and there is no significant difference with VCF2.

I tried to reduce the value of R17 (down to 100 ohms !) and only increased distortion but not resonance. I disconnected the limitation diodes with no success. I increased the value R6 and once again I only increased clipping (distortion) but not resonance.

Has someone a suggestion about that ? I checked all my solders. I changed the active components (LM13660,LM13700,TL071) with no improvement.

Cheers

---

Date: Sun, 30 Mar 2003 14:22:45 +0100  
From: Yves Usson  
**Subject: Wildcat LF01-2**

Hi all

I have just checked the two LFOs of the Wildcat and they are working fine. No bugs no mods...

Cheers

---

Date: Sat, 5 Apr 2003 00:35:22 -0800  
From: "tomg"  
**Subject: WildCat Fix-List**

I have tested everything but I may have missed something.  
Tom

VCO 1-3

- o Cut base of Q3 free from C5 then connect to R15,R26,R34 junction.

VCF1

- o R40 - 100K. o R35 - 2.7K.
- o R24 - 33K. o Cut R14 free from pin-8 then connect to pin-9.
- o Cut R37 free from +V then connect to -V.
- o There are 2 R35s change R35 at pad-G to R40

VCF2

- o R23 was 100K change to 47K.

VCF3

- o Cut R7 free from U2 pin-4 then connect to U2 pin-3.

## MIDI INTERFACE

- o Q3-Q6 were 2N3906 change to 2N3904.
- o +/- 12V was reversed - Cut the two traces to the right of C9. Connect the +12 trace to U11 pin-8, connect the -12 trace to U11 pin-4.
- o Q1 is reversed, the emitter should connect to +5V
- o Connect U4 pin-8 to +5V (Q1 emitter)

## Noise

- o C3 was 47pF change to 33pF (Change not Required).
- o C5 is not labled. It is located to the right of U1 pin-1.

## LFO 1&amp;2

- o Wiring diagram was incorrect.

A - Right terminal LFO2 Width J - Sq out LFO1 B - Left terminal LFO2 Width  
K - Right terminal LFO1 Rate C - Tri out

LFO2 L - NA D - NA M - NA E - NA N - Left terminal LFO2 Rate F - Tri out  
LFO1 O - Sq out LFO2 G - Right terminal LFO1 Width P - Right terminal LFO2  
Rate H - Left terminal LFO1 Width I - Left terminal LFO1 Rate

## Delay 1&amp;2

- o drill an extra hole on the left side of the bottom header this now becomes E,F,G,H,I,J,K. Cut F free from E.
- o Connect E to U1 pin-1. F to U1 pin-5 Cut K free from ground then connect to U1 pin-8.

## Staircase Generator

- o Wiring diagram was incorrect. B were C reversed.
- o Connect U1 pin-2,3,6,7 to ground (U1 pin-10)
- o Cut U1 pin-1 free from U1 pin-11 then connect to U1 pin-12.

## Sample &amp; Hold

- o Remove R4 or change. Was 1M change to 10M (R4 not required).

## VCA 1-4

- o R3 was 1M change to 100K o R6 was 100K change to 75K
- o Adjust T1 for +5V at the wiper (R3).

## EG 1-4

- o Cut U1 pin-4 free from -12V trace.
- o Cut U1 pin-8 free from +12V trace.
- o drill an extra hole on the right side of the bottom header This becomes H,I,J,K.
- o Connect K to U2 pin-6

---

Date: Sat, 5 Apr 2003 10:40:17 +0100

From: Yves Usson

**Subject: Re: WildCat Fix-List**

Hi Tom

>I have tested everything but I may have missed something. > >Tom

Concerning VCO1-3 remove R31 and connect a 10k resistor between pin 8 (+12V rail) and U4-pin 1 After this small modification the parasitic glitch disappears from the saw wave and the square wave voltage swings between -2V and +2V instead of (-2V,1V). To improve the symmetry of the triangle wave : change R20 to 51K To make the sine purer : change R36

to 840ohm (reduces distorsion) and add a small 100pF cap in parallel to R39 (cancel out a 1MHz parasitic damping sine : only visble with a good scope but this ultrasonic overtone might be creating a lot unwanted alias audio tones when fed in the ring modulator!)

Concerning VCF2 cut the track between R10 and R11 (serigraphy labelling !) connect R11 to R9-U1pin14 There is a correct frequency sweep, but the resonance is far from being impressive ! I don't understand why since I checked the original lowpass filter section of the MS20 and there is no significant difference with VCF2. Any suggestion Tom ?

Concerning the Staircase generator R12 must be changed from 10k to 20k in order to have equally spaced voltage steps.

Sample & Hold R4 = 1M works fine on my system.

Cheers

---

Date: Sat, 5 Apr 2003 03:28:49 -0800  
From: "tomg"  
**Subject: Re: WildCat Fix-List**

Hello Yves, Thank you very much. I'll make changes to the board. Especially the VCO mods. So...is your WildCat completely functional now except for VCF2?.... I'm not sure about your res problem but we will find and fix it. Got any pictures? I love to see pictures...:)

Tom

---

Date: Sat, 5 Apr 2003 12:23:06 +0100  
From: Yves Usson  
**Subject: Re: WildCat Fix-List**

Hi Tom

Well I have all the components installed on the board and I am testing the modules one after the other. Up to now I have checked the VCOs, VCF3 and VCF2, the Ring modulator the Staircase Generator, the Sample&Hold, the LFOs and the noise generator modules. VCF1 is waiting a bit since I have to build a small transistor matching circuit before. This week-end I shall concentrate on the VCAs and the MIDI2CV modules.

I can send a picture of my assembled PCB but I have no cabinet and no panel yet...

---

Date: Sat, 5 Apr 2003 14:44:35 +0100  
From: Yves Usson  
**Subject: Re: WildCat Fix-List**

Ooops! I have just checked my page and immediately saw a big bug in the schemos : the inverting and non-inverting pins of the OP amps have been swapped. I shall correct this as soon as possible. The PCB drawing is correct, verified and operational (I built 8 of these).

Date: Sat, 5 Apr 2003 17:27:53 +0100  
From: Yves Usson  
**Subject: Wildcat noise generator**

Hello

A while ago I posted a message concerning the spectrum of the noise generator. The white noise was "contaminated" by a 100Hz residual signal and its overtones.

Harry Bissell suggested to insert a low-pass filter in the positive supply of Q2. I tried this and the best result was obtained by modifying the schematic like this : I inserted a 470 ohm resistor between the +12V rail and R4 and put a 25 microF electrolytic capacitor between their junction and the ground rail.

I join two pictures : the first one (noisespect.gif) shows the spectrum obtained with the original configuration (R4 4k7) and the second (noisefilter.gif) the spectrum with the 470 ohm resistor and the 25uF cap.

Thanks very much to Harry for his very efficient solution !

---

Poster and date unknown  
**Subject: Wildcat S&H module**

Hi

I played a bit with the Sample & Hold module of the Wildcat and I confirm that removing R4 improves greatly its "hold" function. The "sample" function can greatly be improved by correcting the value of R3 from 4k7 to 470 ohm which was probably the intended value. Or you can simply by-pass it (that's what I did): remove R3 and replace it by a small wire.

The sampling quality can also be improved by removing R5, changing R6 to 22k or 10k and adding a differentiating capacitor (15nF should do) at the trigger input.

Cheers

Paul

---

Date: Sun, 6 Apr 2003 12:14:24 -0700 (PDT)  
From: Brandon Daniel  
**Subject: Wildcat w/minijacks?**

Anyone have any idea what would be involved with building a wildcat with minijacks instead of bananas? What kind of approach would be best to handle grounding all of the jacks?

also for Tom: will there be enough behind-the-panel space using the overlays to use minijacks? I know they require more space than bananas, so...

yeah, anyhow.

thanks for any help.

-Brandon

Date: Sun, 06 Apr 2003 15:28:32 -0400  
From: Dave Magnuson  
**Subject: Re: Wildcat w/minijacks?**

I don't have a wildcat, but here's what I would do..

I'd put a ground bus bar somewhere in the case and wire jacks directly back to the bus bar... then the ground bar connects directly to the power supply ground. This is pretty close to a "star ground".

You could probably group a few grounds together at the panel before running them back to the bar... for example the grounds for "glide in" and "glide out" could probably be connected at the jacks, then a single wire runs back to bus bar. I would avoid connecting CVs and audio jacks for obvious reasons.

Obviously if your jacks are metal, and your faceplate is metal all of the jacks will be interconented by the metal chassis... luckily most of the patching will probably be between different sections of the wildcat, so it probably won't be an issue. (and if it became a problem you could try adding nylon washers around your jacks).

Isn't grounding fun?  
Dave

---

Date: Sun, 06 Apr 2003 16:08:23 -0400  
From: harrybissell  
**Subject: Re: Wildcat w/minijacks?**

Bananna jacks take MORE space behind the panel actually...should be no problem. There might be some side to side spacing issues... but that might be OK too.

Depends on what type of minijax you use....

H^) harry

---

Date: Sun, 6 Apr 2003 15:27:04 -0700 (PDT)  
From: Al Koury  
**Subject: Re: Wildcat w/minijacks?**

Why even bother grounding the jacks? All the CV and audio signals are referenced to the same circuit ground on the PCB, right? Just use a metal case and star-ground your power supply and Wildcat PCB and any other PCBs you may have, WITHOUT connecting the ground (sleeve) contact on the jacks to the PCB. The sleeve contact will touch the metal chassis, so the shielding in your patch cables will work as intended (shorting the shield to safety ground.) The output from your VCA or final mixer or whatever you're using as an audio output to connect to other equipment, will need to be isolated from the chassis, though, using plastic jacks, nylon washers or whatever, and must have a ground wire from the PCB to the sleeve lug.

PS: Just make sure you don't have multiple paths to safety ground. You should only have one (the star) from the power supply's ground straight to the point where the AC ground wire touches the chassis.



Date: Sun, 6 Apr 2003 20:03:00 -0700  
From: "tomg"  
**Subject: Re: WildCat Fix-List**

I did make this correction and sorry I did leave it off the fix-list. I checked just to make sure and it does seem to function correctly. There is a ton of resonance, oscillates like a banshee. Hummm....I don't know right off hand....Do you see a signal on the opamp side of C3? Is it variable with the res pot?

I'll do a fix list Part-2 after it's all assembled and working in a day or so.  
Tom

---

Date: Mon, 07 Apr 2003 01:57:58 -0000  
From: "Phil Peery"  
**Subject: Re: matching transistors**

Thanks everyone. I used the circuit on Harry's site, breadboarded it out, and went with the "no drafts" method. I do really like the circuit on Scott's page at lot, it even comes with a PCB layout! When my bench is totally setup after our move, I will make the board. I went through my parts box and out of 65 tranny's, I have about 24 or 25 that are within under 1 to 2 percent of each other. So I am set for some testing.

Regards,

Phil

---

Date: Mon, 7 Apr 2003 14:11:28 +0100  
From: Yves Usson  
**Subject: WildCat VCF2 resonance**

Hi Tom

Well as you suggest I checked the signal at the output of U2 (pin 6) and I have a signal here with the same shape and phase as the output signal. The amplitude at pin 6 varies with a gain going from 2.5 down to 0 when the wiper of the pot is rotated from output N to ground. Still I have no resonance ! I will check that no track is broken. IC have been checked many times (I just swap them with those of VCF3) and they are OK. I tried LM13600 and LM13700 with the same result.

I am puzzled !

Cheers

Date: Mon, 7 Apr 2003 16:11:59 +0100  
From: Yves Usson  
**Subject: WildCat VCF2 resonance-solved !**

Hi Tom

I have resonance at last. In fact when I cut the track I made it at the wrong point. Thus the signal from U1 pin-8 through R8 was wrongly directed to U1 pin-13 (inverting input) instead of U1 pin-14 !!!

Gee! it was so obvious and I couldn't see it. Sometimes I feel so dumb...

Well, I obtain high resonance and oscillation too !

Cheers

---

Date: Mon, 7 Apr 2003 22:43:02 +0100  
From: Yves Usson  
**Subject: WildCat Fix-List VCA**

Hi Tom

I am working on the setting of the wildcat VCAs

In the fix list you say

>VCA 1-4  
>o R3 was 1M change to 100K  
>o R6 was 100K change to 75K  
>o Adjust T1 for +5V at the wiper (R3).  
>

Are you sure you mean R6 ? R6 is the resistive load of the LM13700 darlington buffer and 10k seems to be the normal value.

Don't you mean R9 instead of R6 : when I test the VCA with a triangle input signal (+3V-3V) and no control voltage, there is a +1.2V-1.2V triangle signal at the output. In order to cancel out this signal when there is no CV I need to reduce the value of R9 down to 50k (the residual triangle output signal is +5mv -5mV. Then the VCA behaves nicely.

Cheers

---

Date: Tue, 8 Apr 2003 03:20:14 -0700  
From: "tomg"  
**Subject: Re: WildCat Fix-List VCA**

Yes.... I ment R9....oops...:) Glad you figured it out. 50K may be just a tad too low....You might want to split the difference and try 62K.

Tom

Date: Thu, 10 Apr 2003 10:18:59 +0100  
From: Yves USSON  
**Subject: WildCat Fix-List VCA**

Hi Tom

I have applied your fix list to the VCAs

R3 was 1M change to 100K R9 was 100K change to 75K

It works but I must say that I am not impressed by the poor dynamics : I measured a 36dBm dynamic only when varying the CV from 0V to 12V. This means that one can still hear a faint sound (signal bleedthrough) for a 0V CV. Furthermore there is voltage bias superimposed to the signal : it is a null bias for 12V CV and something like -1V bias for for 0V CV. Trimming T1 doesn't help very much, it just creates distortion (assymetry). I tried to put a 22k resistor between +12V and the linearizing internal diodes of the LM13600 : this resulted in a ... 36dBm... dynamic (no improvement) a slight reduction of maximum gain, a complete reduction of the distortion (playing with T1 only changes the offset bias and doesn't create distortion).

Another solution I want to try is to reduce R9 to 50k (to diminish signal bleedthrough) and reduce R7 to something like 75k or 68k in order to increase the voltage swing at the base of Q1. My goal is to reach at least a 50dBm dynamics.

What do you think of these mods ?

Cheers ð

---

Date: Thu, 10 Apr 2003 05:07:56 -0700  
From: "tomg"  
**Subject: Re: WildCat Fix-List VCA**

Tell you what....try increasing R1 to 220K before you do that. At 0v my scope is clear. There is a tiny offset voltage... but hey, otas do not make the best vcas...These will do though. If it kills too much of the signal increase R5 to 47K or better.

Tom

---

Date: Thu, 10 Apr 2003 17:38:08 -0700  
From: "tomg"  
**Subject: Re: WildCat Fix-List VCA**

Forget this...sorry....

> Tell you what....try increasing R1 to 220K before you do that.  
> At 0v my scope is clear. There is a tiny offset voltage... but hey,  
> otas do not make the best vcas...These will do though. If it kills  
> too much of the signal increase R5 to 47K or better.

Do what I said....

>I have applied your fix list to the VCAs >R3 was 1M change to 100K  
>R9 was 100K change to 75K  
>It works but I must say that I am not impressed by the poor dynamics :

Then replace R10 with a 33K.... Sorry I missed that one...

Date: Fri, 11 Apr 2003 00:12:09 -0400  
From: harrybissell  
**Subject: Re: WildCat Fix-List VCA**

I have not been following the WildCat stuff too closely... does the VCA use the two-transistor (pair) current source ?

If so... adding a resistor from the OTA Gm bias pin to the negative rail will allow it to go to full cutoff. There is a couple nA leakage in the current source. This applies to the OTA based filters as well...

If it isn't the same current source... I'll stfu

H^) harry

---

Date: Fri, 11 Apr 2003 03:40:59 -0700  
From: "tomg"  
**Subject: WildCat Fix-List - Part 2**

Second time through - 04/11/03

I'll be making the changes this weekend and should be clear to take orders for the rev2 boards next week. Maybe kits too.

Tom

VCO 1-3

- o Cut base of Q3 free from C5 then connect to R15,R26,R34 junction.
- o Change R20 from 75K to 60K (27K and 33K in series) - 04/11/03
- o Remove R27 - 04/11/03 o Change R28 from 22K to 82K - 04/11/03

VCF1

- o R40 - 100K.
- o R35 - 2.7K. o R24 - 33K.
- o Cut R14 free from pin-8 then connect to pin-9.
- o Cut R37 free from +V then connect to -V.
- o There are 2 R35s change R35 at pad-G to R40

VCF2

- o R23 was 100K change to 47K.
- o Cut R8 free from U1 pin-14 then connect to U1 pin-13 - 04/11/03

VCF3

- o Cut R7 free from U2 pin-4 then connect to U2 pin-3.

MIDI INTERFACE

- o Q3-Q6 were 2N3906 change to 2N3904.
- o +/- 12V was reversed - Cut the two traces to the right of C9. Connect the +12 trace to U11 pin-8, connect the -12 trace to U11 pin-4.
- o Q1 is reversed, the emitter should connect to +5V
- o Connect U4 pin-8 to +5V (Q1 emitter)

Noise

- o C3 was 47pF change to 33pF (Change not Required). o C5 is not labeled. It is located to the right of U1 pin-1.

## LFO 1&amp;2

- o Wiring diagram was incorrect.
  - A - Right terminal LFO2 Width
  - J - Sq out LFO1
  - B - Left terminal LFO2 Width
  - K - Right terminal LFO1 Rate
  - C - Tri out LFO2
  - L - NA
  - D - NA
  - M - NA
  - E - NA
  - N - Left terminal LFO2 Rate
  - F - Tri out LFO1
  - O - Sq out LFO2
  - G - Right terminal LFO1 Width
  - P - Right terminal LFO2 Rate
  - H - Left terminal LFO1 Width
  - I - Left terminal LFO1 Rate

## Delay 1&amp;2

- o drill an extra hole on the left side of the bottom header this now becomes E,F,G,H,I,J,K. Cut F free from E.
- o Connect E to U1 pin-1. F to U1 pin-5 Cut K free from ground then connect to U1 pin-8.

## Staircase Generator

- o Wiring diagram was incorrect. B were C reversed.
- o Connect U1 pin-2,3,6,7 to ground (U1 pin-10)
- o Cut U1 pin-1 free from U1 pin-11 then connect to U1 pin-12.
- o R12 was 10K change to 20K - 04/11/03

## Sample &amp; Hold

- o Remove R4 or change. Was 1M change to 10M (R4 not required).

## VCA 1-4

- o R3 was 1M change to 100K
- o R6 was 100K change to 75K
- o Adjust T1 for +5V at the wiper (R3).
- o R10 was 10K change to 33K - 04/11/03

## EG 1-4

- o Cut U1 pin-4 free from -12V trace.
- o Cut U1 pin-8 free from +12V trace.
- o drill an extra hole on the right side of the bottom header This becomes H,I,J,K.
- o Connect K to U2 pin-6

Tom

Date: Wed, 16 Apr 2003 09:22:29 +0100  
From: Yves USSON  
**Subject: WildCat Fix-List VCA**

Hi all

I eventually obtained the dynamic range I expected from the Wildcat's VCAs by increasing the value of R8. Now the output signal level is (for an sine input signal +2.5,-2.5 Vpp) : -51dBm for CV 0V and +6dBm for CV 12V, thus gives a total dynamics of 57dBm.

So my final change list is

R3 was 1M change to 100k R8 was 1k change to 2.2k R9 was 100K change to 75k R10 unchanged (10k) Set voltage at wiper of T1 to 0.193 V

There is still a problem of voltage offset (something like -1.5V output for 0V input). This is not a problem for modulating audio signals because in this case would add a decoupling capacitor at the output but remains annoying for controlling DC signals.

Cheers ð

---

Date: Sun, 20 Apr 2003 10:15:21 +0200  
From: Yves Usson  
**Subject: Wildcat MIDI - Error**

Hi Tom

I have just found another unlisted error in the MIDI interface of the Wildcat. The consequence of this error is not big and only has an effect on the MIDI-THRU line... R6 should be connected between +5V and base of Q1, but was mistakenly connected between +5V and the collector of Q1. To fix this : cut the trace between R6 and R7, connect R6 to base of Q1.

Cheers

---

Date: Mon, 21 Apr 2003 14:12:06 +0200  
From: Yves Usson  
**Subject: Re: Wildcat MIDI - Error**

Hi all

I made a big mistake in one of my previous message forget about what I said about U10, leave it alone it is correctly polarized. One should check twice before posting a message ! Well I fried a TL074 !

Cheers

Hi Tom

I have a little problem with the MIDI interface of the Wildcat. I just can't obtain the -10.56V reference at pin-7 U8 . The closest value I can get is -10.42V. As a consequence, the pitch CV varies as 0.970 V/octave. The voltage measured at LM336Z is 5.005V.

What can I do to improve that. I already tried to change the value of R26 (I tried 33k, 51k, 56k and 68k) with no success. I wonder if the trick is to replace T1 (50k) by a 15k resistor in series with a 22k trimmer.

What do you think Tom ?

---

Date: Tue, 29 Apr 2003 18:30:31 +0200  
From: Yves Usson  
**Subject: solved my problem with Wildcat MIDI**

Hi

I eventually solved my problem of V/octave tracking with the MIDI interface of the Wildcat. The solution came from the RXCV-PRO kit I assembled in the meantime. In the small part kit Tom provides a LM358 dual OPamp for the voltage reference instead of the TL072 listed for the wildcat MIDI interface. In the RXCV-PRO I had no problem to obtain a nice V/octave tracking but with a -10.69V ref value instead of -10.56V (as suggested by Tom). Well I simply tried to substitute the TL072 in the Wildcat by a LM358N and CHAZAM IT WORKS !!!!! I don't understand exactly why (may be this has to do with input impedance of those circuits or null offsetting ? can a OPA guru of the list give me an explanation ? By the way I tried with different TL072 IC and I always had the same problem). Anyway if you get into the same problem I recommend that you do the same sub : use a LM358N for U8 instead of the TL072.

---

Date: Wed, 30 Apr 2003 08:46:28 -0400  
From: Dave Magnuson  
**Subject: Re: solved my problem with Wildcat MID**

I'm just totally guessing here, but I know TL072 output doesn't go rail-to-rail. Perhaps -10.56V is too close to the negative 12V rail, and the TL072 can't quite get there.

Dave Magnuson

---

Date: Wed, 30 Apr 2003 16:45:06 +0200  
From: Yves Usson  
**Subject: Re: solved my problem with Wildcat MIDI**

Hi Dave

You are guessing right. Harry Bissel confirmed that in a private post.

Date: Thu, 8 May 2003 06:51:45 -0700  
From: "tomg"  
Subject: **The WildCat boards are on order..**

Finally.....I think I got it all done. I hope so anyway because they will be here in about 3 weeks. I ordered 10 pieces because they are so expensive. If there more than 10 orders I can bump it up for about 10 days. After that we will have to reorder.  
They are \$149.00 each and that includes about \$20 worth of parts.  
16F84 PIC 7826 DAC 3 3046s 3 Tempcos  
The new documentation is not finished but should be tomorrow...within a day or two anyway if you want to wait and see what it is you are buying. Because it's not ready yet here is the introduction from the manual. There are some cost estimates you might want to look at before ordering.

#### Introduction

It has taken me almost a year to complete the WildCat. The biggest reason for this is the WildCat is a revision 3 board and I really got slow right there at the end. I'm actually proud of the WildCat and tired of it at the same time. It was designed, assembled and tested twice before becoming a stock item so that a WildCat builder could at least count on the PC-board being right. This makes it cost a little more than the usual EFM project. It is also a huge board. At 14 3/4" X 10" it almost completely covers a 6r rack panel leaving just enough room to mount a power switch and transformer. The WildCat can be completely assembled on a single panel and housed in a SKB 6r effects rack. The average cost to complete a WildCat including the SKB case, 6r panel and panel drill- guide/overlay is in the \$725.00 dollar range. The PC-board and all of the small parts could run as much as \$300.00 dollars so you can see that there is not really a cheap way to build a WildCat unless you have an amazing parts selection to start with. What you get for your money is 28 modules in a pretty small case. If it costs, let's say \$725.00 dollars to complete. That works out to about \$25.00 a module. Not bad considering you get the case thrown in too. If you have a case, so much the better. That's another \$90 bucks you don't have to spend. All of the WildCat modules are versions of proven designs that we have offered for a number of years that have been especially redesigned to complement each other in this modular system. Although we suggest using banana jacks and plugs with the overlay there is no reason you can't use 1/8th or even 1/4" jacks if you choose enclosed or small form jacks. Be sure to buy a few for sizing before committing to a particular style. The WildCat was designed to be a little easier to assemble than you would expect for project of this size. The major problem associated with putting a modular together is the wiring of the controls. The WildCat uses common computer ribbon cable connected with in-line PC-board connectors and headers. These are arranged in a logical way to make wiring fairly easy. The modules themselves are arranged on the board to be pretty much in line with their panel controls with the exception of the output module. The PC-board can be removed from the panel by simply unplugging the headers and removing the screws. Of course you can skip the connectors and solder the cables directly from the board to the controls and save your self about \$100.00 bucks in the bargain but it makes it a mess to remove and if it needs to be returned for repair I won't work on it without headers installed.

Tom



Date: Sun, 01 Jun 2003 19:56:39 -0000  
From: "Steve"  
**Subject: Wildcat PS**

Anyone here who is going to go the Wildcat route.. make sure you order a 24vCT transformer, not a 12vCT like I did..  
Whoops!!

~Steev

---

Date: Wed, 18 Jun 2003 09:52:03 -0000  
From: "yussonfr"  
**Subject: Wildcat page updated**

Hi Wildcat builders

I have updated my page dedicated to the Wildcat rev\_1. Check the noise generator mods. This page is still under construction and I will add soon more stuff concerning the VCO, the Moog-VCF and so on.

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

then select the EFM-Wilcat button.

I've received my Wildcat-rev2 board today. Yes I am building a second Wildcat ! Looks like addiction, does'nt it ?

Cheers

---

Date: Sat, 21 Jun 2003 00:09:46 -0000  
From: "toneboy22"  
**Subject: Re: Wildcat page updated**

Hi Yves,

looks 2 me like your 50Hz power is not rugged enough. the zener mod will fix the noise module, but what about the rest of the Wildcat?? full-wave rectified 50Hz is 100Hz. add more caps to the rectified voltage, and add linear regs (i like LM317s, LM337s).

The WildCat seems to me to B a Gnome on steroids.

AFN tone

---

Date: Sat, 2 Aug 2003 15:19:07 +0100  
From: Yves Usson  
**Subject: Wildcat REV2 board bug report for ADSRs**

Hi all,

For those of you who purchased the REV2 board of the Wildcat : the output pin K has been mistakenly connected to the +12V power rail (i.e. track

coming from pin K is connected to U2-pin 7) It is supposed to be connected to pin 6 of U2. Cut the track coming from pin output K before U2-pin 7, then connect output K to U2-pin6 with a wire.

There is also another discrepancy between the schematic and the PCB. U1-pin 6 (threshold pin of 555) is actually connected to U2-pin 6 (output of ADSR) instead of being connected to C5. This is not a problem since the ADSR will behave normally.

Cheers

---

Date: Sat, 2 Aug 2003 15:29:16 +0100  
From: Yves Usson  
**Subject: Re: Wildcat REV2 board bug report for ADSRs**

Hi all

The track error I mentioned in my previous message is valid only for EG-3 and EG-4. There is no need to correct EG-1 and EG-2 which have correctly drawn.

Cheers

---

Date: Thu, 23 Oct 2003 11:45:25 +0200  
From: Yves Usson  
**Subject: Wildcat crosstalk VCF1/VC03**

Hi

I noticed a crosstalk between between the VCF1 (moog-ladder) and VC03. When listening to the output of VCF1 at high resonance while feeding it with no signal (or a low signal such that of the noise generator) one can clearly ear the signal of VC03. Signals from VC02 and VC01 cannot be eared. Since VCF1 and VC03 are neighbours on the PCB, I suspect some crosstalk. Have someone else noticed that before. What can I do to cure this ? Decoupling capacitors ? Replace the straps to the power supply rails with ferrite beads ?

Thanks for your comments  
Yves Usson

---

Date: Thu, 23 Oct 2003 05:07:24 -0700  
From: "tomg"  
**Subject: Re: Wildcat crosstalk VCF1/VC03**

humm... Well I'm not sure. Let's try shielding. Take a small piece of copper clad board (2 sided would be better) about 1" by 4". Scrape a little solder mask off in a couple of places between the osc and vcf and solder it between them. I'm almost sure it's radiating instead of riding on the ps. You have that great scope don't you?..... Do you see anything on the vcf rails anywhere?

Tom

posted by Yves Usson - date unknown

Hi Tom

OK I'll try shielding with copper clad board and see what I get... I will also check the VCF power rails with my scope. I'll let you know about that

Cheers

Yves

---

posted by Yves Usson - date unknown

Hi Tim

VCF2 & VCF3 only have a single trimmer to set the minimum frequency. You just have to set it by ear. What you can do is to feed the input of the VCF to the sine output of a VCO with the frequency set to 30 Hz and listen to the Lowpass output, set the freq pot of the VCF to its minimum value and the resonance to its minimum. Next, play with the trimmer such that the sine signal just cancels. And it's pretty alright. Then check that when using a sawtooth signal you have the full harmonic range with the freq pot set to max.

For the VCA I suggest you check my Wildcat page since I had to modify some resistor values to trim it properly.

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

The setting must be done with a scope (dual trace if possible). Feed the VCA input with a sine signal (1kHz) from one of the VCO. Connect (in AC mode) one channel of your scope to the VCA input and the other channel to the control voltage input to 12V.

Because the OTA are connected as invertors (conversely to what is shown in the schematic !!!) the traces will be in opposite phase. Therefore you must switch on the invert switch of channel two and play with the input gain of the channels in order to superimpose the two traces. Now you have to play with the trimmer in order to reduce distortion and have the output sine fitting best with the input sine. And that's it.

The setting of the RM is a bit more complicated because it must be fed with low amplitude signal a few 100mV maximum otherwise there is a high distortion, but maybe it's what you're looking for ?

Cheers

---

Posted by Yves Usson - date unknown

Ok I tried to set a calibrating procedure for the Ring Modulator and I figured out that some modifications were to be made to Tom's design to have this module behaving like a standard Balanced modulator that is with low distortion and good carrier nulling and modulation nulling.

As I said in a previous message both the carrier and modulation signal must be attenuated in order to be compatible with the input levels recommended for the MC1496 (LM1496) IC if I refer to the datasheet (Motorola MC1496 B) and the Philips application note AN189. Considering

sine signals the carrier and modulation must not exceed 300mV rms. Also you may trim the value of R8 set to 5k6 by Tom and which controls the gain of the Gilbert cell. In the datasheet and AN189 this value can be set from 0 (bypass) up to 1k.

Here is my calibration procedure :

unsolder R8 and replace it by a strap (maximum gain !).

Use a sinewave generator with a -2.0v to 2.0v peak signal rather than the VCO sinewave.

We need a very pure sinewave. Set the frequency of the generator to 1kHz.

Connect this signal to input 1 (pin A) of the RM through a 470k, you should have +/-180mV signal at pin8 of U1.

Connect the signal to input 2 (pin D) of the RM through a 470k, you should have +/-180mV signal at pin4 of U1.

Connect this sine signal to channel 1 of your oscilloscope (2v/square)

Connect the output (pin E) of the RM to channel 2 of your scope

Set 2v/square base of your scope to 0.1ms/square

Now play with the trimmers T1 and T2 alternatively in order to observe on channel 2 of your scope a sinewave with a -0.2V to 0.2V peak amplitude and a frequency that is twice that of the input sinewave (result of the squaring of the input sinewave :  $\sin^2(f)$  -->

And there it is...

I hope this will help you.

Yves Usson