
Subject: K100-7 no sound

Posted by [spforster](#) on Wed, 06 May 2009 00:38:23 GMT

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Hi, I'm trying to repair a k100-7 for a buddy. Unfortunately, things seem to have gone from bad to worse with my attempts. When I started out with it, I could at least get sound out of the left channel. I traced down a bad transistor in the right channel, replaced it, and when I tried it out, I still had no sound on the right channel, and the left channel was very distorted and at low volume. So then I started messing with the power amp board, trying to test some components, and snapped off the thermal bias diode (duh!). I've replaced that with a 1N4148 small signal diode and now - no sound at all! I get a thump out of the speakers when I turn it on, and that's it.

After checking out just about everything on the power amp board, I can't find a problem. Now, I'll admit that I have much more experience repairing tube amplifiers, but I think that I'm testing the silicon properly (using a DMM with a diode test function).

Any ideas? I suppose if anyone has a schematic for the power amp board with voltage test points on it that might help me get somewhere. Any suggestions on where I should start? TIA for your help!

Best,

Shane

Subject: Re: K100-7 no sound

Posted by [stevem](#) on Wed, 06 May 2009 10:16:30 GMT

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Hearing a thump thru the speakers at turn on is a good thing! once this happens do you measure any dc voltage at the output jack, if so that is a bad thing, but you did not mention any hum thru the speaker(s) so I tend to think your output stage is ok.

The blue wires coming off each preamp board are the signal feed to the driver/output stage, so you inject a test signal into that point on the power amp board.

is this a 4 channel PA head, if so give me the PC number off of the face (front panel mounted side) of the board as I may have a schematic for it.

The k100 preamps run off of a regulated +/- 8 volts,so any more than about a .5 volt difference in these two voltages could mean power supply problems.

To narrow things down you can unsolder the red and green wire from each channel to see if that unloads the others.

Let us know what you find, and in any case let me know the PC board number of what you have, I can atleast fax or mail you a copy of the output and power supply stage.

Subject: Re: K100-7 no sound

Posted by [spforster](#) on Wed, 06 May 2009 19:32:15 GMT

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Thanks for the reply stevem! The amp is a 2 channel guitar combo amp. I made a few more measurements:

First, there's no DCV present at the speaker jack.

I measured -37.4VDC and +38.1VDC at the big screw terminal filter caps, WRT ground.

The preamp boards are getting +7.7VDC and -7.6VDC, does this seem too low? With the preamps out of circuit I get the same voltage readings.

I don't have a signal generator, but I scoped about 2V P-P waveform on the blue output wire when I play an A on my guitar, volume all the way up on the left channel, and there's no output on the right channel with the same test.

I also unhooked the transformer from the rectifier and measured 59.4VAC on it's output. With the xformer hooked up to the rectifier, but with the output of the rect. unhooked, I get 53.0VDC

I have a schematic for the PC1100 right channel preamp board, but not for the PC1000 left channel board or for the PC900 output board.

It sounds like the voltage to the preamps is too low? The imbalance in the DC supply (-37.4 vs. +38.1VDC) seems problematic too? I'm sorry for my ignorance as to the fundamentals of how solid state amps work, but where do you think I should go from here? Also, if I'm going to inject a signal into the output board, what kind of amplitude are we talking about?

Thanks for your help!

Shane

Subject: Re: K100-7 no sound

Posted by [chicagobill](#) on Wed, 06 May 2009 22:13:43 GMT

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Welcome to the board Shane.

spforster wrote on Wed, 06 May 2009 14:32 First, there's no DCV present at the speaker jack.

That's good, but I think if there was any to start with you'd have heard a hum.

spforster wrote on Wed, 06 May 2009 14:32 I measured -37.4VDC and +38.1VDC at the big screw terminal filter caps, WRT ground.

The preamp boards are getting +7.7VDC and -7.6VDC, does this seem too low?

These voltages all seem close enough to work correctly.

Troubleshooting a Solid State amp is no different than working on a tube amp. You need to isolate the problem to a specific part of the amp and then fix that circuit. I always start with the power supply, then check the power amp and then the pre-amps. Your power supply is working well enough for now, so I'd suggest checking the power amp next.

Try taking your guitar signal and jumper it to the input of the power amp. Or just touch your finger to the input cap, do you hear a hum through the speaker? You just want to see if it is passing a clean signal, so you could use the output from an iPod or similar device to drive the power amp.

Once you've checked the power amp, move on to each of the pre-amps. My first suggestion would be to check all of the transistors. Then check for off value or open coupling caps in the signal

paths.

Hope this helps. Bill

Subject: Re: K100-7 no sound
Posted by [spforster](#) on Wed, 20 May 2009 21:34:18 GMT
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I tried jumpering a signal into the power amp input and got nothing, so that narrows it down to the power amp section.

As I said before, I have gone through and checked all the transistors and resistors and today I checked the caps and I can't find a bad component. I guess I'll have to go in and check again.

Subject: Re: K100-7 no sound
Posted by [chicagobill](#) on Wed, 20 May 2009 22:10:50 GMT
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A few questions for you.

How are you checking the caps?

What voltage readings are you getting on the output transistors?

On one of the transistors you should have +38 volts on the collector (the case), on the other you should have -39 volts on the emitter (I think the yellow wire).

Subject: Re: K100-7 no sound
Posted by [stevem](#) on Thu, 21 May 2009 10:30:02 GMT
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Do you have another amp, or even a stereo amp two jump the signal off of any channel(the blue wires) into so you can hear if either preamp is working?

When I have problems like this(fixing one problem and making another) I go back and retrace my steps and I find something I inadvertantly did wrong, like messin up a solder connection on one componet while I was reinstalling one I had taken out for testing, or snapping a lead off a coupuling cap.

So go back and tripple check what you first did when you dove into the amp.

Is that temp diode installed right?

Subject: Re: K100-7 no sound
Posted by [spforster](#) on Fri, 22 May 2009 00:12:00 GMT
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First let me say thanks to everybody that's sticking with me on this and trying to help, I really appreciate it!

To check the caps, I was desoldering them from the board and using the capacitor test function on my DMM. For a couple caps whose values were outside my meter's range, I could only test for resistance.

I measured -37.3V and +38V on the output transistors, which seems close to specs.

I found a schematic for the power board, so I may just go and order all new caps - it's only a handful anyway. Maybe I'll get new resistors while I'm at it. I would order some silicon too, but it seems like all the transistors and diodes were checking out fine, and I'd rather keep the old stuff if it's still functioning.

Subject: Re: K100-7 no sound
Posted by [stevem](#) on Fri, 22 May 2009 10:14:28 GMT
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Most of the caps that fail in kustoms are the tantalum or ceramic disc type, the orange drop types never seem to fail at the voltages they are run at in these amps.

On a cap with a DC voltage on one side you can just unsolder the down stream end and check if it is passing any DC, if it does, even like .150 mv than its bad.

Any transistors that were unsoldered or changed before you got to work on it would be suspect for not being installed right also.

At this point you need to confirm that either of the preamps are outputting signal and that the driver/ poweramp section is working.

For the preamp unsolder the blue wires from the output stage and one at a time hook them up to a voltmeter(hot to blue wire and black to chassis ground) set to low A/C volts (below 10 volts) and play some guitar thru that channel, you should read about .500 mv if I remember right with all the channels controls full up.

And like what was said before you can drive the output stage with a headphone output by hooking either the tip or ring connection to the driver input, and the longer sleeve portion of the jack to chassis ground.

Subject: Re: K100-7 no sound
Posted by [stevem](#) on Fri, 22 May 2009 10:20:54 GMT
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You can also drive each preamp with a headphone output, just hook up a A/C volt meter so you set its output to be at no more than .200 mv average, and like I said the preamps output can be sent into a stereo's input so you can hear if its clean or breaking up.

If the preamp is working normal it will be driving the stereo loud and distorted, if the preamp is not working right the stereo's output will be low and distorted.

Subject: Re: K100-7 no sound
Posted by [chicagobill](#) on Fri, 22 May 2009 15:24:25 GMT
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What Steve sez is right, isolate the problem and then dive in!

As you may or may not know, with the exception of a few part values almost all Kustom power amps share the same design. Some have more output transistors and a few have circuit tweaks, but the basic circuit is the same from one model to another. The original design dates back to the late fifties and has been used by a lot of guitar amp companies through the years.

Testing the caps with your meter is fine, as long as none of the coupling caps has gone open circuit, you should be okay.

Now that you have a schematic, check voltages as listed there and see how your amp compares. The voltages should be close, but don't stress minor differences. I'd only worry about the left side of the schematic as everything on the right side from Q9 on is the low voltage regulator section.

I never suggest complete shotgun replacement of parts, as it will just as often cause more problems than it cures. Double check anything that you removed and replaced earlier. It's always possible that a solder bridge may have been created or a pc trace could be damaged while doing the earlier work.

Keep us informed as to your progress.

Subject: Re: K100-7 no sound
Posted by [spforster](#) on Fri, 22 May 2009 22:20:47 GMT
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Ok, I tried checking out the preamp and power amp sections using the inputs and outputs both [chicagobill](#) and [stevem](#) suggested and here are my results:

1 Preamps. My testing method was a regular guitar plugged into the input and the output (blue wire) routed to the input of a small bass amp combo. The right channel produced sound, but at an even lower volume than the guitar produced plugged into the bass (testing) amp by itself. The left channel had a very strong signal and was much louder through the bass amp. This pretty much backs up what I was originally reading off my oscilloscope from the beginning and it also tells me that replacing the defective transistor I found on the right channel preamp didn't fix the problem. But, the bright side is that it seems that the left channel preamp is good.

2. Power Amp. I piped both a guitar signal and then the headphone output signal from my ipod into the point where the blue preamp input wires solder into the board. Neither produced an output that I could hear through the speaker. Then, on a whim, I connected my input wire to the other side of the input resistor (R900 or R901 on my schematic, same point) and got a reasonable volume, but heavily distorted output from the speaker.

Not being very knowledgable on the operation of this circuit, but going off of the schematic, I

would think that Q900, the first transistor connected to the preamp input, would be suspect at this point? Any other ideas? Thanks guys!

Shane

Subject: Re: K100-7 no sound
Posted by [chicagobill](#) on Sat, 23 May 2009 15:23:48 GMT
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OK, so now you know that there is a problem with the right pre-amp and with the power amp. I'd work on the power amp first and then get the pre-amp working.

I think the input/mixer resistors should be 47K, what do yours measure?

When you injected the signal into the power amp did you unhook the blue pre-amp wires?

Measure the voltages on the first transistor. There should be somewhere around +6 volts on the collector and +0.7 volts on the base. The emitter is grounded, so there should be no voltage there.

Subject: Re: K100-7 no sound
Posted by [stevem](#) on Tue, 26 May 2009 10:28:25 GMT
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First off note that all voltages with this era Kustoms are taken with ALL CONTROLS FULL UP, AND NO SIGNAL AND NO LOAD ON THE OUTPUT SIDE OF THE AMP.

At what voltage level was the ipod signal at you where driving into the mixer transistor?

Due to the impedance of the ipod you may have to do like Bill posted and disconnect both blue preamp output wires to drive the output stage the right way.

If your speaker you are testing thru is 8 ohms and can handle 50 watts rms, or 100 watt peak, drive the output stage with your ipod again with a meter set for AC volts across the speaker, the ipod should have enough output for you to see some 18 volts (more at 4 ohms, less at 16 ohms) on the meter. If so I would be inclined to say that the output stage is ok.

Its good to know you have a O-scope you may need it to find out what and where clipping is taking place in the circuit.

You might see if you can down load some test tones to your pod which would help out a fair amount.

What part number is that Q900 transistor?

Subject: Re: K100-7 no sound
Posted by [spforster](#) on Sat, 06 Jun 2009 21:52:47 GMT
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Alright, back to work on this one! The input/mixer resistors are 68K and measure out to 69~70K.

The tests I did before were with the blue wires disconnected.

This time I've downloaded a 1000Hz test tone into my ipod. I'm injecting this signal at the power amp input (where the blue wires are normally connected - they are disconnected for this test). On the oscilloscope, I get a pretty clean looking sine wave at the speaker output and my DMM reads ~10VAC on the output when I turned it up, with still a little more gain leftover. I do, however, hear some static sounding noise that is always present on the speaker output. Even with everything disconnected from the power amp input (blue wires, test leads), and the amp at idle I still get this static noise.

Also, I tried injecting the 1000hz signal into the left channel preamp (the one that checks out good) and I get a decent looking waveform from the output, as long as I keep the volume down on the ipod. But, when I hook this preamp signal back up to the power amp input, I get almost nothing on the preamp output and the waveform is really badly distorted.

I was able to measure .6VDC on the base of Q900 and 4.3VDC on the collector, which is very close to what my schematic indicates.

So now I'm a bit confused. The left channel preamp works ok by itself, the power amp seems to work ok by itself, but together they hardly work at all? It seems to me that there's still got to be a problem with the power amp, since I'm still getting the noise and there seems to be some attenuation of the input signal (I'm sure my ipod's output is much higher than the guitar amp's preamp output and that's why I can get the higher output from the power amp when I'm driving it with the ipod).

Should I just start checking all of the voltages listed on my schematic for the power amp?

Thanks!

Subject: Re: K100-7 no sound
Posted by [stevem](#) on Mon, 08 Jun 2009 10:08:17 GMT
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I will try tonight to get into one of my 100s to get some preamp to driver audio signal output measurements for you, but one thing to note is that all voltages on Kustom schematics are with taken with no speaker load, no input, and all controls full up.

You also need to pin down where the noise is coming from, does your test tone out of the pod look clean on the scope? if so than is it the preamp adding in the noise, or the output stage? It sounds like the output of the preamp may be getting loaded down by the input impedance of the driver stage.

Measure how the much the preamp signal drops with a meter set for ac volts between being unloaded and feeding the driver stage, then if you can feed the preamp into a stereos input and see if the same thing happens.

Subject: Re: K100-7 no sound
Posted by [stevem](#) on Tue, 09 Jun 2009 10:07:21 GMT
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Ok, I took apart my K100-8 last night to get you some info on what a normally functioning amp will do.

I put a 1k test tone at .153mv output into the channel with no reverb
I had already unsoldered that preamps blue wire from the driver board.
I then set the bass and treble controls to half, and nailed the volume, the preamp put out 5.87 volts.

I then soldered the wire back into the driver board, hooked the amps up to a 8 ohm load and with that same .153mv input signal the amp put out 19.17 volts, or 45.92 watts RMS, the peak output voltage was 27.16, or 92.20 watts.

I hope this info helps you pin down whats not up to snuff in that head, so let us know!

Subject: Re: K100-7 no sound
Posted by [stevem](#) on Tue, 09 Jun 2009 10:11:51 GMT
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Now I am thinking that I should have also got the powersupply voltage measurements off of the powersupply rails at the rms and peak wattge output points for you so you could better judge what your amp is doing.Let me know and I will go back in and record them.

Subject: Re: K100-7 no sound
Posted by [spforster](#) on Tue, 16 Jun 2009 01:53:31 GMT
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Ok, so I'm back on track. With the 1kHz test tone, I tried to replicate your test, stevem. I was able to produce ~.150-.153VAC from my ipod (I assume you meant .153VAC, or 153mVAC), the volume control is a bit touchy, go figure its an iTouch! I really need to get a signal generator. Anyway, I measured 1.33V on the preamp output, with the bass and treble controls half way and volume all the way up. I turned bass, treble, and volume all the way up and measured 5.48V. This test was with the blue wires disconnected. When I soldered the blue wire back in place, manipulating the preamp's volume control I measured up to ~24V on the speaker output (8 ohm, 50W speaker - I don't have a load plate). I wasn't willing to go any higher though there was plenty of headroom.

Plugging a guitar into the amp now I get a reasonably loud/clean tone. The only problem I still have, besides the other non-functional preamp is that there is quite a lot of noise. There is your normal, though relatively loud hiss, which I'm not overly concerned about at this time. But there is also a static noise, that sounds as best I can describe like a light rain falling on a piece of cardboard. That noise is always present, independent of any volume controls, and with the blue wires connected or disconnected, so I assume its a fault of the power amp. Could this maybe be a carbon comp resistor being noisy somewhere in the circuit?

Thanks!

Shane

Subject: Re: K100-7 no sound

Posted by [terminal](#) on Sat, 20 Jun 2009 03:43:22 GMT

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I have a similar problem. I have a K100-1. it has two preamps. when I got it, the right side (reference from facing the amp from the front). did not work. no volume at all. the left side sounded great, and I played it several times without trouble.

the left side has failed now as well. I get some volume out of the output speaker, but it is very quiet. when I roll the volume all the way up, when it gets to about 8/10 the volume tapers off to silence.

I have a signal generator and an o-scope.

left channel: on the volume pot, I get signal on the "input" outside "lug", but never on the center lug.?? this was the channel that was working. a failed pot? perhaps...

right channel: no signal at the "input" lug at all., I don't have a schematic, but I guess its a ceramic cap or a transistor before between the input jack and the volume pot.

in addition, here are voltages I'm seeing at the power transistors:

left transistor (once again, from the front facing the back of the chassis):

red wire: 0vdc

blue wire: -38vdc

yellow wire: -38vdc

right transistor:

red wire: +39vdc

blue wire: 0vdc

yellow wire: 0vdc

how do these voltages look?

Subject: Re: K100-7 no sound

Posted by [terminal](#) on Mon, 22 Jun 2009 02:38:30 GMT

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I pulled the blue/yellow pair plugs off the output transistors and both of them test the same resistances from collector to base and emitter, and base to emitter, (in both directions), so I think the output stage is ok.

Subject: Re: K100-7 no sound
Posted by [stevem](#) on Mon, 22 Jun 2009 10:20:08 GMT
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Heres a reply for both of you.

On teh k100-7 you will need to use your o-scope set for a low voltage to trace down source of the idle noise. My guess is it a transistor, since what you are discribing is called shot noise ay least in teh electron tube world.

Sometimes these problems can be traced down with a hair dryer and a can off freeze spray, as heating a noise semiconductor will make it act up more and then cooling it changes the noise fast to confirm the failing part..

Treminal.

The voltages on your output transistors should ba as such.

The out put that gets feed off of the positive voltage rail(the red wire off of one main filter can) should be this

red full power supply voltage.

Blue, plus .6

Yellow plus .1

The output power off of the negative power rail should be this.

Yellow, full - power supply voltage.

blue a little less since that is feed thru a 100 ohm resistor.

red, -.1

I dought a volume control has gone open on you, you more likly than not have a failed preamp transistor.

Subject: Re: K100-7 no sound
Posted by [terminal](#) on Mon, 22 Jun 2009 15:37:28 GMT
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Stevem,

thanks for the reply. I'll pull the circuit board and start troubleshooting with my signal generator and o-scope. I should be able to find the bad transistor in time.

do you have a schematic for the K100-1 ?

I hope the transistors are relatively easy to come by.

Subject: Re: K100-7 no sound
Posted by [spforster](#) on Mon, 14 Mar 2011 21:02:55 GMT
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Long time, no update on this project! I have finally been able to track down the bad transistors: 5 SE4002's that I replaced with NTE 123AP. Now I get good volume out of both channels!

My only problem at this point is that there is still a bit of random popping noise that occurs constantly. The noise is not affected by changes in any controls on the front panel. I assume the problem is isolated to the driver, power supply, or power amp circuit. Any common causes of this type of problem?

I'll be putting the scope back on it tomorrow!

Thanks,

Shane

Subject: Re: K100-7 no sound
Posted by [chicagobill](#) on Mon, 14 Mar 2011 21:56:21 GMT
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Welcome back!

Failing resistors or caps or transistors can all make noise. If you have a scope, try monitoring the power supply lines and see if there are any visible spikes when you hear the noises. If there are, trace them along the supply busses til you get to the source.

Subject: Re: K100-7 no sound
Posted by [stevem](#) on Wed, 16 Mar 2011 21:54:45 GMT
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At this point Shane I would start by replacing all the transistors in the driver/output stage other than the 2 metal cased drivers and the two outputs and see what noise reduction results you get, since this is no more than 3 bucks in semiconductors its worth just shot gunning it to hopefully be done with it!

If those fail to due the trick then replace both drivers.
