Subject: K250-1 Popping
Posted by ellum68 on Mon, 17 Nov 2008 04:11:20 GMT
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This is a "from the dead" project. I got a basket case K250-1 that was supposed to be for parts. As usual, I started to put the thing back together. I got it to fire up and the upper channel works great. The lower channel has issues. I had to wire a new set of jacks (copied how the upper channel was done). If I turn the volume control up, I will get almost a radio like static, and then it will start a steady popping, almost motorboating kind of noise. I can't remember if I have the bright control out or in, but that will kill the popping noise. I'm still left with faint output and lots of hiss. The only thing done to this channel was repairing a gummed up treble pot. I've pulled and tested every capacitor on the preamp board.

The power switches have been worked over a bit. I used a push button LED setup from Mouser. I have the polarity switch installed and it's LED wired up (2k resistor on the power LED to cut the voltage down). I have the other switch for the power button on backorder. So, I have things hardwired and the power lead to that side has just been taped off.

Subject: Re: K250-1 Popping
Posted by stevem on Mon, 17 Nov 2008 11:30:42 GMT
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Well, Hiss is good, that means you have gain happening.
Are you hearing radio stations, or just radio type static?
That treble control is a 10k pot, is that what you replaced it with?
In removing and replacing that control did you break any board traces?
The good thing about that selectone channel(PC5067) is that its one 14 pin IC is the whole deal, (unlike the other channel with its FET and two other transistors) and if they need to be replaced they can still be had for about 17 bucks, and I would suggest installing a 14 pin scoket also as most times unsoldering that IC more than twice will take out the board traces.
The input jack wiring should be no big deal, just like the upper channel the input goes across C1, with the hot lead feeding the 470 ohm resistor.

Subject: Re: K250-1 Popping
Posted by ellum68 on Mon, 17 Nov 2008 19:44:56 GMT
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Okay, here's the full story with the pot. I had bought a K250-4 last year that needed some work. My repair guy said he needed a new treble pot. I searched high and low, but could not find an exact replacement. I bought this dead K250-1 on eBay so we would have a pot and a better looking cabinet. He got the K250-4 working perfect and gave me back the parts K250-1. It was all there, outside of having a loose "junk" treble pot kicking around there from the K250-4 (pots are the same between the two models). I tore this pot apart, cleaned it, and reassmebled it. I threw a meter on it and it worked perfect. So back in the board it went and here we are.

The traces appear to be in good shape. I really took my time with this board and I'd like to think it shows. I'll try putting a meter on this evening to be 100% sure. Also, it is the bottom board (non-selectone) that is giving the trouble. So it has the transistors on it.

I made an mp3 of what's going on. The conditions are that the top board has the volume fully down. The bottom board (the problem one) has all the EQ controls tuned wide open and the bright switch turned off. What I did was slowly turned up the volume and you will here the startic roll on. I went up maybe 1/3 volume. If I had a guitar plugged in, you would be able to just barely hear. I then turned the volume back down, flicked the bright switch on and began to raise the volume again. I didn't go very loud because the annoying popping noise. Lastly, the first little "thump" you here is the amp powering up. That should give some idea of volume levels here. Thanks

http://www.250r.us/misc/k250.mp3

Subject: Re: K250-1 Popping
Posted by chicagobill on Mon, 17 Nov 2008 21:51:04 GMT
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The symptom that you describe leads me to think that there is a break in the signal path somewhere. The signal that is getting through is via capacitance coupling.

I'd check for open or loose coupling caps. Or as Steve mentioned, a broken board trace.

If you listen to the hiss, does it's character change with the tone or volume controls? This will lead you to where the signal dies.

Is the fuzz board jumper (J1) in place?

Inject a signal (this could just be your finger tip) to the top of the volume control. Do you hear a good buzzing sound? How about if you touch the top of the treble pot?

Let us know what you find out.

Subject: Re: K250-1 Popping
Posted by ellum68 on Mon, 17 Nov 2008 23:24:14 GMT
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Hmmm, tell me more about this "jumper". I think you're on to something. I have nothing hooked up to that three-pin terminal. I'll vouch for the caps. I pulled every one off the board, tested them, and reinstalled with no change. I found out I can do PCB boards though. No burns or pulled up traces!

Subject: Re: K250-1 Popping
Posted by ellum68 on Tue, 18 Nov 2008 00:34:14 GMT
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Got it going! It was that missing jumper. I just soldered the "in" and "out" leads together on the back of the back of board. Man, this things sounds fantastic though. I've got it running against a 4x10" A model cab with Weber California's in it.

Subject: Re: K250-1 Popping
Posted by stevem on Tue, 18 Nov 2008 11:32:37 GMT
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Cool deal and great news!
Its always good to know the full story/ history of a non-working, or troubled amp and bill posted what I was wondering about yesterday. As I was looking at my schematics for the value of the treble pot I to was wondering also if you had that jumper in place!

Subject: Re: K250-1 Popping
Posted by chicagobill on Tue, 18 Nov 2008 17:04:23 GMT
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Glad to hear it's up and running again. There's still a lot of life left in these old workhorses (myself included)!

Steve is right, as I wouldn't have even thought to mention the fuzz jumper if you hadn't told us the entire story of how the board had been removed and used for parts. But like I said, it sounded like a break in the audio path.

Again, glad that it's working again.

Subject: Re: K250-1 Popping
Posted by ellum68 on Wed, 19 Nov 2008 04:35:14 GMT
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Spoke too soon on this one. I got to play it for a bit tonight and get crackle on both channels. The output level is perfect though. It doesn't seem to do it to the lower frequencies. It takes the volume up a little bit for it too start, but nothing excessive.

url]http://www.250r.us/misc/pop.mp3[/url]

Subject: Re: K250-1 Popping
Posted by stevem on Wed, 19 Nov 2008 11:58:22 GMT
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Is crackle do to vibration, or signal level?
Signal wise two places to look would be this.
The output of the selctone tone channel get feed/mixed into the second gain stage of the the non-selctone channels 14 pin IC, So that could be bad.
Next the only other place where you could noise from both channels would be the driver board, so those first two back to back input transistors would be my next thing to check.
Just for kicks mack sure all the lug mounting screws on the top of the can filters are tight!

Subject: Re: K250-1 Popping
Posted by ellum68 on Thu, 20 Nov 2008 04:33:46 GMT
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Okay, here's the latest. I pulled the two transistors on the board and tested them, they are fine. This lead me to rob the lower pre-amp board out of my K250-4 and try things with it installed. This gave no change at all. So, I think we can rule out the pre-amp section of the amp.

What sets this off are bright tones. The telecaster really drives it wild. You have to have the amp's volume up somewhat for the trouble to start and it will be even worse the louder you get. If you roll the tone control back on the guitar, or the EQ on the amp, the problem will stop. I have the amp on the floor, so I don't believe it to by a vibration issue.

The power caps are tight and I tested them out as per the last time you guys you helped me. I'm getting 40v DC and 150~mv AC and rating in the high 5,000uf range.

I need to be more sure on this, but the problem seems to get worse after the amp has been on a few minutes. I was checking voltages and forgot I still had a load hooked and when I hit my probe on the case of the transistor in the heat sink on the far left, I get some static out of the speakers. The other three are silent. I'm about half tempted to drop the power amp board from my 250-4 in there and see what she does.

Subject: Re: K250-1 Popping
Posted by stevem on Thu, 20 Nov 2008 12:09:59 GMT
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Well, everything does unplug so swapping in the other driver board will only be 1/2 hour deal.
Just make sure you note/ write on the chassie near each pair of output transistors the color of the wire of the slip on base and emitter connector, as they shift from the 2 left outputs and the 2 right outputs.
On the amp with the problem you might also just make sure that all the outputs are screwed down tight, and their slip on connectors are making good contack with the base and emitter leads with no excess heat sink compound on them.
Also pulling them out and resistance checking them while making a list to see if any reading of

one is drastily off from the others can be helpfull.
Are they all the same make outputs?

Subject: Re: K250-1 Popping
Posted by chicagobill on Thu, 20 Nov 2008 16:52:47 GMT
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I really don't like the idea of board swaps for troubleshooting, unless you're pulling boards out of dead amps.

I'd be afraid that you'll end up doing some damage to the working board, just for the sake of proving that the problem lies in the power amp, which you have already done.

My guess is that it's some sort of parasitic oscillation in the power amp that's causing your problem. Check all of the caps on the board, like you did on the pre-amp. Also check for any loose connections, bad grounds, etc. Something else to consider is lead dress of all the connecting wire bundles. Kustom did a very good job of routing wires in their amps, so make sure that you don't have input lines too close to outputs, etc.

When you remove the board from the amp, watch out for the small diode that clips into the heatsink, as the leads are prone to breaking off. These diodes are made of unobtainium and will be difficult to replace.

Subject: Re: K250-1 Popping
Posted by stevem on Thu, 20 Nov 2008 17:19:19 GMT
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Darn good point, I forget about those diodes. What I do when ever I am in the Kustoms models with these diodes is place a nice blob of silicone sealer on those leads where they enter the diode so vibration and repair work does not do them in!

Subject: Re: K250-1 Popping
Posted by ellum68 on Fri, 21 Nov 2008 01:02:22 GMT
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"Unobtanium" I started pulling caps on the preamp tonight. Capacitor "C3" that is rated 1uf@35v is showing nothing on my meter. I get .3 ohm resistance across it if that means anything. This cap is the near the input secton of the board. You'll have two transistor that have their emitters connected together to a resistor, than this cap is next in line. I have not pulled the little disc ones yet. Should I even bother? I can't test them all because my meter only goes to one nanofarad.

Subject: Re: K250-1 Popping

Posted by stevem on Fri, 21 Nov 2008 10:57:37 GMT
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If your meter zeros out, you should see no resistance across that 1uf cap so I would say it is leaky and should be changed out.
only very few times have I seen disc caps short, some times they do split open somewhat but is mostly in tube amps with the kind of voltages they have present in them.
Are all your output transistors the same? as I could use more history as to what repairs may have been done to this head, Oh! sorry Energizer as Kustom likes to call them.

Subject: Re: K250-1 Popping
Posted by chicagobill on Fri, 21 Nov 2008 18:39:07 GMT
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ellum68:
I assume you mean the power amp board and not the pre-amp?

Any cap that measures a constant resistance value is bad and should be replaced.

C3 is actually used as a filter cap following the voltage dropping resistor R7-39K. If the cap is shorted, it may have caused R7 to overheat and go off value, so check it with your meter.

Check all of the other tantalum caps C5, C7, C8 as well, because they have been known to fail. The ceramic discs don't fail very often, so leave them for now.

Subject: Re: K250-1 Popping
Posted by ellum68 on Fri, 21 Nov 2008 19:56:22 GMT
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I stand corrected, it is capacitor C8 that is the culprit. All the other tantalums checked fine. Yes Bill, I meant to say power-amp, my apologies. As for repair history, this amp looked untouched when I recieved it. Every screw was where it should be. It seems screws are always missing when others "repair" things. The only things that have been done to it are replacing the treble pot on the lower channel, and replacing power switches that were robbed from it.

Anything else I should check before buying parts?

Subject: Re: K250-1 Popping
Posted by chicagobill on Fri, 21 Nov 2008 20:28:47 GMT
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No, if you've inspected all of the normal things, I'd replace the bad cap and see if it clears up your problem.

I'd probably replace the matching C7-27uF/35v as well as long as I was in there. If one failed, the other is probably near death as well.

Subject: Re: K250-1 Popping
Posted by ellum68 on Fri, 21 Nov 2008 20:41:02 GMT
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Yea, I was thinking of getting a pair as well. The closest I can find from Mouser in a radial style cap are 22uf or 33uf. I can get a 27uf@60v wet tantalum axial mount though. Which one should I go with?

I'm glad I've had this little adventure though. I'm now comfortable replacing componets on these PCBs. I'm thinking I'll replace the first few gain transistors in my B-4 to try to get rid of the ungodly hiss it has. Of course, I want the 250-1 to be done first.

Subject: Re: K250-1 Popping
Posted by chicagobill on Fri, 21 Nov 2008 23:07:29 GMT
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I'd go for the 33's if you can't get 27's.

Subject: Re: K250-1 Popping
Posted by ellum68 on Sat, 29 Nov 2008 03:04:47 GMT
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Got it running tonight. I swapped out those two caps with new ones and the only distortion I get is natural break up at high volume. On a side note, I found some switches that work rather well in this thing. They're Mouser number UB216KKW015C-1JB-RO . They are square, push button, LED lighted switches rated 5amp. They take a lil' work to pull it off, but not bad. You may have to do some very mild filing of the switch opening for them to drop in and use a 2k resistor to knock down the voltage for the lights.

Subject: Re: K250-1 Popping
Posted by Crazy Joe on Sat, 29 Nov 2008 16:41:20 GMT
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Bad tantalum, huh? Probably what's wrong with mine...

Subject: Re: K250-1 Popping
Posted by Crazy Joe on Sat, 29 Nov 2008 17:54:57 GMT

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Oh and by the way, usually you can find shorted tantalums (or other caps, including electrolytics) without removing them. 90% of the time you can just put your meter across them in-circuit and tell right away, because bad ones will measure a couple of ohms or less, and there's almost never enough other circuitry in parallel with them to read a resistance that low (not to mention that most DVM's intentionally don't have enough voltage to turn on a p-n junction, unless you click on the setting with the little diode). Now if a cap has gone *open*, then you usually have to do some signal tracing. Techs, you agree with me?

Crazy Joe

Subject: Re: K250-1 Popping
Posted by stevem on Mon, 01 Dec 2008 11:18:49 GMT
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That be the deal Joe!