Subject: reverb issue
Posted by cassent5150 on Tue, 23 Mar 2010 12:41:30 GMT
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Re: Reverb issue again!! [message #13233 is a reply to message #13162] Tue, 23 March 2010 08:37
cassent5150
Messages: 49
Registered: August 2009 Member

OK I give up on the reverb board until I can get the tools to check the components. Its like I seen in other postings, the components in the board are not shorted but may still be bad. I can change out transistors all day long but I have no way to tell if the new transistors I'm replacing them with are good. Its like shooting in the dark. So I jerked the reverb board out of a k100-5 I wasn't using and we're back up and running with the K200-5 and it sounds great.

I'm going to put the bad reverb board in the K100 and still try and figure out what the heck is going on with it. The values at Q801 are off at the collector,does anyone know what components might effect that value or things I may do to pinpoint the problem??????

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Steve C

Subject: Re: reverb issue
Posted by chicagobill on Tue, 23 Mar 2010 18:51:08 GMT
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I can understand how you feel, but look at it this way, I believe you have by process of elimination narrowed the problem down to the drive circuit of the reverb board.

That section contains two transistors, three caps and seven resistors. Any one of these components can cause the reverb to fail.

Now that you have the board out of the amp, test every resistor from R824 to R830. Do they all read within 10% of the marked value?

How about the three caps C800, C801 and C802, have you checked these with a cap meter? They are common enough and cheap enough that you could just replace all three for a dollar or two. Are the three caps installed correctly?

As for the transistors, swap them with a set of low noise, generic, high gain replacements. Just be certain that they are installed correctly.

What about the pc board itself? Any cold solder joints? Any broken Traces?

Subject: Re: reverb issue
Posted by stevem on Tue, 23 Mar 2010 20:41:13 GMT
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Over the week end I will pull out my -5 head and check out voltages for you so I can post back, who knows may be the voltages are wrong on the 803 schematic. It would not be the first time, and in all the too few repairs I have do to these boards I have never compared voltages anyway, but like bill posted it would cost all of 8 bucks with shipping cost to replace everything in the drive circuit, so at this point why not.

Subject: Re: reverb issue
Posted by cassent5150 on Thu, 25 Mar 2010 02:57:43 GMT
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Your absolutly right"Why Not?". The little experience I have with overhauling these PC-Boards leaves me with some questions. Like ya'll were saying earlier about exact part # replacements not being all that necessary, what do we substitute for the SE4002 transistors. I dont have the exact NTE-123 on hand, which of the ones I do have are a good replacement 2N2222,2N5088, 2N5089,2N3565 and 2N3567. I do have on hand the exact replacement part # for 2N3638. I've got new caps (electrolitic type), but unlike the ones in the board there is no + mark on them for correct placement. Some of these new caps do have a white mark down one side and I believe one also has -signs running through the white mark to indicate to me the negative pin. The problem is what about the ones without the - sign running through the white mark? I know the resistors are carbon comp resistors (all 100 of them), whats the chance of a resistor giving me these problems? With ya'll's experience, would it be safe to say that the problem is in a bad transistor or cap that would cause this problem? STEVE C

Subject: Re: reverb issue
Posted by cassent5150 on Thu, 25 Mar 2010 03:28:26 GMT
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Well I guess I should've read this before replied to Stevems comment. Sure would be nice to know all the ins and outs of transistors like that. My knowledge for transistors is that there are 2 types NPN and PNP and the ones I work with are 3 pins (Emitter,base and collector). I can find the base OK as the common pin but dont ask me which is the emitter or collector unless its in the board and I have the schematic. I know there's something on them like a flat spot or a dot that suppose to tell you "so help a brother out here!! What is the secret?". You loose me when you start talking High Gain and Low noise, I have a hard time telling a good one from a bad one already, but I did give you a list of the ones I do have that cross to NTE-123. I was clueless about the driver section of the board till tonight. I thought ya'll were talking about the whole board as being the driver. I found out the hard way that the foot switch wire and jack need to be in place for this thing to work. Like an idiot, while i was removing the board from the 100-5 and installing it into the 200-5 that brown footswitch wire broke off the board and I totaly forgot. After soldering the 50 or so wire that go into this board and giveing it a test run I got real frustrated to find that I had no reverb sounds at all now, I'm thinking What the Heck did I do now. Double checking the wires and another cup of coffee later it hit me that that wire wasn't hooked in and of coarse it worked fine

when I soldered that back.
anyway thanks for the reply!!!!! Steve C

Subject: Re: reverb issue
Posted by stevem on Thu, 25 Mar 2010 10:33:23 GMT
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First off I would get a transistor checker at this point.
Parts Express carrys one in a kit form(#320-074) for 29 bucks that would take you all of two hours to build.
The best transistor to use in replacement of the greatlty used SE4002 in Kustoms is the NTE199 or a equivilent, as even a NTE123AP does not have the currect gain of a NTE199 and this may be a problem in some circuits like a reverb driver where alot of current is needed.
A 123AP transistor on avaerage has less than 1/3 the gain of a 199!
Caps that do not have a band or line on one end, or a positive and negitive sign are of the non-electroylitic type and can be install in any postion.

Subject: Re: reverb issue
Posted by chicagobill on Thu, 25 Mar 2010 20:53:59 GMT
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There are many type of transistors and each one has been designed to perform a different function. Some are good for switching, some are good for radios, some are good for high voltage, etc.

The transistors in a Kustom amp (or any guitar amp) are general purpose type transistors. Unlike a radio they don't need to operate at high frequencies, only audio frequencies. They usually don't need to handle really high voltages and they don't really need to work in extreme temperature conditions.

So when picking a replacement transistor you only need to know a couple of things: how much voltage and how much gain. In a Kustom preamp, the voltage can at max be 16vdc, so any transistor rated at 25 volts or better will work fine. As for the gain spec I would suggest a high gain unit rated with an hfe of 200-300.

If you Google search the transistor numbers that you have available, you will find datasheets that contain the basic information that you need to know. They will list the voltage ratings and the dc current gain (hfe) ratings as well. And there will be a package outline drawing that will show you which lead is the base, emitter and collector.

I checked some of the numbers that you listed, and the 2N5088 would be the best choice as the replacement for the SE4002. It is rated at 30 volts, and has a minimum hfe rating of 300. When holding the transistor with the flat side facing you, the leads are EBC.

The original SE4002 transistors cases have a flat spot in the epoxy case that indicates the emitter

lead.

Subject: Re: reverb issue
Posted by cassent5150 on Thu, 25 Mar 2010 22:06:20 GMT
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Fantastic!!! Thanks for the info. Now is that flat spot for emitter true for all those Dome type like SE4002 cases? Is the 2N5088 pin configuration true on all those type cases (EBC with the flat spot faceing me)?

Subject: Re: reverb issue
Posted by cassent5150 on Fri, 26 Mar 2010 00:12:55 GMT
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Thanks stevem for the info. Yes, a transistor tester is a necessity. The NTE-199 I don't have but the 2N5089's I do and the data sheet showed 25 volt with min (hfe) 400 to max 1200 compared to the nte-199 at 50 volt with min (hfe) 400 to max 900. With a working voltage of + or - 8 volts wouldn't the 2N 5089's be a good substitute? Those (little can type) caps I mentioned earlier with the white marks down one terminal side without any - sign in it, would that still be the negative terminal? I can't use them until I know which terminal is negative and which ones positive. Steve C

Subject: Re: reverb issue
Posted by chicagobill on Fri, 26 Mar 2010 16:18:01 GMT
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Most can type electrolytics are marked with some sort of polarity marker. Sometimes the minus sign is kinda hidden in the stripe. Where did these caps come from?

Generally all epoxy cased transistors with a flat spot on their rim have the emitter at the flat spot. As for the TO-92 half flat case, the pinout could be anything, EBC, ECB, CBE, etc. Sometimes the pinout is molded right into the case in small letters.

And yes, the 2N5089 should work fine in the Kustom preamp.

Subject: Re: reverb issue
Posted by cassent5150 on Sat, 27 Mar 2010 00:20:17 GMT
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I got these from Mouser Electronic Supply. They have a broken white line down one side. OK, the transistors that can be pin in all directions is going to be a problem. I don't get it. So if they're not marked and there is no standard for pin position you have to find the data sheet to get it? Guess I

better get the data sheets on the transistors I have on hand.

Subject: Re: reverb issue
Posted by chicagobill on Sat, 27 Mar 2010 16:01:55 GMT
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OK, what brand cap? What is the Mouser part number?
If the line is broken, does it break into minus signs?

Yes, the data sheets will be helpful, also if you get a transistor tester, it may help you to identify the pinouts.

The most common pinout for any American brand TO-92 is EBC. I always assume this is the case, but a quick check with a meter will verify the base and the type (NPN or PNP).

Subject: Re: reverb issue
Posted by stevem on Sun, 28 Mar 2010 14:29:43 GMT
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Here are voltages off of my 803 board in a k200.
My 8 volt + power rail tested at 8.06 vdc.
The - rail tested at -7.87
Transistor voltages below
E~~~~~B~~~~~~~~C
Q800 B+.507 C+3.86

Q801 E -7.0B -6.3 C -.103

Q802 E -.554 C+7.4

Q803 E+8.06 B+7.4 C -1.33

Q804 B+.629 C+4

Q805 B+.6 C+4.17

Q806 B -.7

Q807 B -.7
These voltages where with a known good pan hooked up.

I also noticed from working earlyer in the day on a K100 with a reverb problem that when the recovery side of the reverb circuit is working right, you can unplug the cable from the jack that goes to the output side of the pan and just by placing your finger tip near that jack get alot of hum to come out of the speaker(IE good gain level)and good loud pan crash when you plug the cable

back in and kick the pan around.
This is quite different from what I had for the reverb problem in the K100.
In that amp if you bang the pan around you got a bit of pan crash, but nothing like when the circuit is working normal.
I also found that even though in the K100 I had some gain in the recovery side, it still was not enough to hear any reverb function out of the speaker.
Your problem may lie in the recovery circuit if you do not get a good strong pan crash, or if you tap the end of the rca cable that plugs into the output side of the pan you should get a very loud buzz out of the speaker, and this is regardless of having any of the reverb controls turned up on any of the channels, as the verb output goes right to the output stage driver board.

I hope this helps out!

Subject: Re: reverb issue
Posted by cassent5150 on Sun, 28 Mar 2010 17:24:37 GMT
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These caps in question are Sanyo Brand and the white mark has \ \ \ \ \ through it.

Subject: Re: reverb issue
Posted by cassent5150 on Sun, 28 Mar 2010 17:30:48 GMT
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Fantastic, thanks Stevem I will copy these down and check them against mine when I get it back in the k-100. Both these boards had a good output (very loud spring crash if you messed with the reverb tank), but no signal from any channel was getting through.
Steve C

Subject: Re: reverb issue
Posted by stevem on Sun, 28 Mar 2010 17:33:25 GMT
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On axial type caps, a white or gray ring/band on the end is the neg,
on radial caps a white or gray line on one side is the neg lug.

Subject: Re: reverb issue
Posted by cassent5150 on Sun, 28 Mar 2010 17:36:12 GMT
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OK now thats good info thanks Stevem

Subject: Re: reverb issue
Posted by stevem on Sun, 28 Mar 2010 17:45:45 GMT
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Also on polerized axial type caps the neg end will always be metal, while the positive end will have the lead going into a insulated cap/seal on the end.

Subject: Re: reverb issue
Posted by cassent5150 on Mon, 29 Mar 2010 02:19:00 GMT
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I just put the reverb board back in the k100 and hooked up a good reverb tank and have spring sound loud and clear if you tap on the tank. There is no reverb effect getting through from the preamps. Checking against your readings, most of mine are close or above with the exception of Q-801. I'm way off at the collector. I'm getting -8.8 and +9.0 on the voltage supply lines and the readings I get from Q-801 are E= -7.95 B=-7.24 C= -7.46 there is a resistor and cap hooked to the collector and R829 registers 1.1K and the cap is not shorted. I already replaced the transistors in this section with those 2N5089 and pin them according to the data sheet. My multimeter has a transistor tester of some sort on it. There's a square box for inserting these small 3 pin transistors, the top half for NPN and the bottom for PNP. It gave me a hfe reading in the E/B/C direction of 684. Guess I'll replace that cap and resistor next.

Subject: Re: reverb issue
Posted by stevem on Mon, 29 Mar 2010 10:01:00 GMT
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R829 is testing out fine, but have you pulled out r827 r828 and r830 to test those out?
I wanted to post more yesterday, but did not have time, C800 C801 and C802 are just coupling caps, as such even if they are polerized they can be put in either way although some circuits may pick up less hum noise when
the signal passing out of the cap does so by means of the negitive lead/end.
Have you rang out the foil traces around Q801 to confirm that they are not broken?

Subject: Re: reverb issue
Posted by chicagobill on Mon, 29 Mar 2010 17:03:56 GMT
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stevem wrote on Mon, 29 March 2010 05:01...C800 C801 and C802 are just coupling caps, as such even if they are polerized they can be put in either way although some circuits may pick up less hum noise when...
This is not right.

The polarized caps need to be installed correctly or they will be damaged by the reversed voltage applied to them. Worst case with higher voltages, they will explode. In the case of this circuit, they

will probably just be damaged and either open up or short out.

Subject: Re: reverb issue
Posted by stevem on Mon, 29 Mar 2010 17:08:51 GMT
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Opp`s, thanks bill.
I was thinking in terms of tube circuit coupling caps.

Subject: Re: reverb issue
Posted by cassent5150 on Tue, 30 Mar 2010 01:40:10 GMT
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I will assume that the white mark sides are neg and be sure to put them in right. I did find that I had some of the tantulum type and those do have a + sign on them to show polarity. When I was getting some caps a few weeks ago a guy was getting supplies also. He builds his own boards and everything. He said something about coupling caps as being a bad thing and to get rid of them. Does that make any sense to ya'll. He didn't have anything good to say about the caps I was getting either (the tantelum gum drop looking kind). Steve C

Subject: Re: reverb issue
Posted by chicagobill on Tue, 30 Mar 2010 15:28:00 GMT
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Coupling caps are not a negative thing, but like any component they can go bad and cause problems. Direct coupled circuits have been touted as being the best for years now, but they are far from perfect.

One man's opinion is just that, an opinion. Some like tube amps, some like solid state amps. For me they both have their strengths and both have their weaknesses.

As for the tantalum caps, they were at one time military spec in all high tech electronics. They are better at handling temperature extremes and vibration and they are physically smaller in size than typical electrolytic caps. That being said, they still go bad with age and are more expensive than the traditional caps.

Kustom used tantalum caps in all of their amps, I believe starting with the 200A series. If you want, you can replace a tantalum cap with a standard electrolytic cap.

Subject: Re: reverb issue
Posted by stevem on Tue, 30 Mar 2010 15:38:50 GMT
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Also what that audio builder you bumped into probibly was tyring to relay is this.
Every time a audio signal passes thru a cap its phase will be changed degree wise some what, and this effect will add up as more caps are used in the signal chain.
If this added phase change gets to the point where it gets close to or tops 180 degrees the circut will oscilate, but well before that point the original tone will be shifted also.
Some caps are much better than others at not shifting the phase too much.

Subject: Re: reverb issue
Posted by stevem on Tue, 30 Mar 2010 16:59:33 GMT
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I did a test last night on my 803 board in a k200 to help you find out when yours is working right, and all you will need is a guitar and a rca cable.

I first set my volt meter for low AC volts and tested the output of my guitar with humbucking pickups.
I set the guitar for its neck pickup and jamed a 1st position A cord and saw on the meter a minimum of .085 volts.
I then took the RCA cable and plugged it into the 803 boards RCA drive jack/send to the pan.
I hooked the meter to the tip of the RCA cord and the meters ground probe must connect to the amps chassie, not the RCA cords ground.

I then plugged the guitar into one channel and set the reverb control to max, the volume to the third mark and both the bass and treble to half.
When I did this and jamed that same A cord I would see anywhere form .300 to .590 volts on the meter.
If you get these same results than the reverb send section of your 803 board is fine.
