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Subject: K200-B5 reverb questions

Posted by [terminal](#) on Wed, 26 Jul 2017 17:07:13 GMT

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How does the reverb switching work on a PC803 K200-B5 reverb? the schematic shows -6v on the base of Q806 and Q807, but if I do the voltage divider math across R485 R486 and R487 it would seem to be that the base voltage would be -2.2v with the footswitch closed and +1.76v with the foot-switch open. So is the schematic's -6v with the foot-switch closed? (i.e. grounded?).

I'm rehabbing a broken K200-B5 that was broken when I got it.. a previous tech or person inserted a piece of plastic between the foot-switch tip and the switch so the foot-switch is open. When I pulled this plastic out and the amp made tons on noise at high volume.

I also removed Q806 to "open" that transistor switch to ground and got the same noise.

So I'm confused. I figured the NPN would open if the foot-switch was open, but my testing seemed to show the opposite.

BTW: I don't rule out other problems elsewhere in the amp causing this...

Also, with the little piece of plastic stuck in the switch, the amp works. all four channels work.

the amp didn't come with RCA patch cables for the input/output to the tank. Regarding the ground shield on these, should they be connected to the RCA outer cylinder on both ends? or just one end?

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Subject: Re: K200-B5 reverb questions

Posted by [terminal](#) on Thu, 27 Jul 2017 01:02:46 GMT

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did some testing this evening, briefly. with foot-switch open, there is +5.2V at junction of R845 and R846. That nearly perfect for the voltage divider circuit. the base of both Q806/Q807 is +0.5V.

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Subject: Re: K200-B5 reverb questions

Posted by [chicagobill](#) on Thu, 27 Jul 2017 06:22:48 GMT

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I've spent more time working on that board than any other in any of these amps. The circuit is confusing and can do all sorts of ugly things when it wants to. That being said, they do work when they are fixed up.

The basis of the switching circuit is as you figured, Q806 and Q807 ground out either the clean signal or the reverb signal depending upon whether or not the foot switch is grounded. The important thing to remember is that the junction of the two transistor's bases must switch from a

positive voltage to a negative voltage. When the bases are positive the reverb is turned off, and when the bases are negative the reverb is turned on.

What sort of noise are you getting? I guess that there could be some sort of signal feedback loop if one of the switching transistors is either open or not grounding.

There was a revision to the circuit that changed three resistors R836, R837 and R848. Does your board have the new resistor values?

As for the question about the RCA jacks, the ground is intentionally disconnected on the send jack. This eliminates the ground loop caused by having a tank with both in and out jacks grounded to the case.

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Subject: Re: K200-B5 reverb questions  
Posted by [terminal](#) on Thu, 27 Jul 2017 20:36:53 GMT  
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Noise is like a dog or wolf howl. a lot higher than 120Hz, but not a squeal. maybe 600Hz? maybe Q802 in a feedback loop.

I checked voltages on all Q's and everything looked right.

I'm not sure if my board has the R836, R837 and R848 fix. I'll need to look. It's a 1968 amp (a lot has been fixed/repared: maybe 5 or 6 Q's replaced). I need to take a picture of the bottom of the board when I have it lifted. It's hard to follow from the top.

Maybe I had a ground loop with my cables?

Here are some pics:

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Subject: Re: K200-B5 reverb questions  
Posted by [chicagobill](#) on Fri, 28 Jul 2017 05:11:54 GMT  
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Looks like every resistor on the board has been replaced with the exception of the 1% metal film ones. As to the values, I wouldn't know where to start to check if they are all correct or not. I would have to assume that the values are the same as was supplied on the board, but they may or may not have been updated to the newer values.

The two RCA cables are ordinary ones with shields connected at both ends. The one jack on the board has the ground lifted.

There are three signal paths through this board. The first is the straight signal that is mixed through R820-823 and is controlled by Q807. The other two are the reverb straight signal and the reverb delayed signal.

The reverb straight signal is sent through Q805 and the reverb delayed signal is sent through Q800-803. Both of the reverb signals are controlled by Q806.

So depending upon the footswitch either the straight signal is grounded and the two reverb signals are allowed to reach the output stage Q804. Or the two reverb signals are grounded and the straight signal is allowed to reach Q804.

If the amp works with the footswitch turned off (ungrounded) then you know that the problem is on that board. You said that if you remove Q806 the noise happens the same as when the footswitch is turned on (grounded), which would make sense in that the reverb signals would be ungrounded without Q806 out of circuit.

Try grounding the input of the return circuit and see if that stops the howling.

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Subject: Re: K200-B5 reverb questions

Posted by [terminal](#) on Mon, 31 Jul 2017 00:08:07 GMT

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update: I grounded the return rca input, and found the switching all works as it should. With the input grounded, the wolves howling is gone, but there is a lot more 120Hz buzz compared to the clean channel. (that is to say, with the reverb input grounded I can A/B the two circuits and compare clean to clean). I studied the reverb board schematic looking for an electrolytic that might be a power supply filter cap. The only one I saw was C804, so I replaced it but that made no difference... looking at the entire circuit, I think I should have examined C713 & C317 on the power amp board...

As for the howl, I think I'll buy a replacement tank. My tank is suspect.

When they swapped out 90% of the resistors on this board, they also did the same thing to the power-amp board, but --get this-- the 4 preamp boards still have all their original carbon comp resistors!? If they did all this work for noise, you'd think they'd swap out a preamp channel resistors as well., so who knows what and how this happened.

They also replaced the 1N3754 with a FES16JT 1317A mounted to the power transistor plate. Lots of work done on this amp.

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Subject: Re: K200-B5 reverb questions

Posted by [chicagobill](#) on Mon, 31 Jul 2017 04:20:33 GMT

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There's no way to know why the resistors were changed, it could have been to reduce noise or it could have been an attempt to solve the hum and howling problem.

In my opinion the return circuit is badly designed, it has too much gain and unless the foot switch turns it off, the return circuit is always active, even when all of the channel controls are turned all the way off.

I have fixed these before by increasing the drive to the tank and reducing the gain of the return amp. That may work for you as well.

The circuit will hum if the tank is grounded in too many ways. The mounting points should have rubber grommets that isolate the metal case from the mounting bars. There is a wire that is soldered to the tank case that is bolted to the chassis. Try disconnecting this wire and or grounding it at different spots on the chassis. Also be certain that the output side of the tank is mounted away from the power transformer.

I wanted to try adding a low cut capacitor to the input of the return circuit to see if that would reduce the hum coming from the tank.

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Subject: Re: K200-B5 reverb questions  
Posted by [steven](#) on Mon, 31 Jul 2017 09:58:57 GMT  
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Why not do a simple rewire of the foot switch circuit such that it places a short across Reverb return rca jack?

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Subject: Re: K200-B5 reverb questions  
Posted by [terminal](#) on Mon, 31 Jul 2017 12:22:59 GMT  
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I'd like to get the reverb working properly.

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Subject: Re: K200-B5 reverb questions  
Posted by [steven](#) on Tue, 01 Aug 2017 12:02:27 GMT  
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even so that's really the way the verb should be turned on and off so that when it's off you get no Reverb crash no matter how much the Head may be banged around.

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Subject: Re: K200-B5 reverb questions  
Posted by [chicagobill](#) on Thu, 03 Aug 2017 16:52:08 GMT

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I had a chance to review the photo of your board, and it has the corrected values of the mixing resistors which is on the last version of the schematic for this board.

I dug through my notes and found that the last one that I fixed I reduced the gain of the return circuit by changing the 47 ohm resistor to a 470 ohm one and I changed the value of the two electrolytic caps from 10uF to 1uF. I also increased the drive to the tank by replacing the 100 ohm emitter resistor of the drive transistor to the original 47 ohm value.

This may or may not cure your problem, but at least it may lead you to an answer. Good luck.

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Subject: Re: K200-B5 reverb questions  
Posted by [terminal](#) on Mon, 23 Oct 2017 00:21:44 GMT  
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update:

I've been working on the PC803 reverb board quite a bit. When the reverb is switched on, I get a loud hum. If I ground the (-) side of C805, then the noise goes away. With (-)C805 grounded, I can switch reverb on and off, and the clean path switches from going through Q805 to going around it without any noise.

Also, if that (-)C805 ground test is removed and if I ground the input into the tank recovery (i.e. Base of Q802),, I still get noise. So I figured the source of the noise was between the Q802/Q803 area

I started to realize this sounded like a ground loop, so I started studying places where their might be a ground loop. If I lift C804's ground leg, the noise goes away.

I happened to go back and read the reverb memo on the tech page and it points out that the +8 and -8 must be balanced or their will be a hum. So I check the voltages, I've got +7.5V and -9V. Maybe this is my problem. Maybe the issue is all on PC703.

On PC703 I replaced C718 and it got a little better. maybe +7.7V and -8.7V or so. I figure if I replace C713 and C718?? I guess there is a virtual 0V in between the -8V and +8V supplies there. They aren't really referenced directly to ground it seems? they seem to be referenced to each other.. am I uderstanding that correctly?

I lifted a leg of each of R746 and R749 and they measure within 1%. I also check nearly every resistor and transistor on PC803.

WIP! Fun!

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Subject: Re: K200-B5 reverb questions

Posted by [steven](#) on Mon, 23 Oct 2017 14:22:35 GMT

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with the power supply on these 200B amps the negative regulator tracks the positive one.  
So if the positive one has a issue the negative one will never be right either!  
In short the positive one needs to be repaired first.

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