Subject: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Mon, 24 Aug 2015 18:21:18 GMT
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Quote:I'm still thinking that there is something loose in there. So that we are all on the same page, post the pc board numbers that you have in the amp.

It may be best to start a new thread in the repair section, as this one has gotten long and a bit off track here and there.

New thread. Continued conversation from
http://www.vintagekustom.com/FUDforum/index.php?t=rview& goto=23706#msg_23706

Ill get the pc board numbers as soon as I get home.

Thanks again for all the help.

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by pleat on Mon, 24 Aug 2015 19:02:56 GMT
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Given you've stated the amp is a K150-6 the board numbers are PC5032, PC5035 and PC5036 which are found on the technical page of this site.
pleat

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Mon, 24 Aug 2015 19:06:12 GMT
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Awesome, thank you for looking those up

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by chicagobill on Mon, 24 Aug 2015 21:07:08 GMT
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PC5032 is the one for the power amp. I'd start by pushing on a few things on the power amp board to see if anything is loose.

Do you feel confident in working on an amp that is plugged in and turned on? There are things inside the amp that can hurt you, so if you don't feel confident, please refer servicing to a qualified tech.

Alternatively you can pull out the board and inspect the soldering on the bottom side without having it plugged in. How are your soldering skills?

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by stevem on Tue, 25 Aug 2015 10:27:53 GMT
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Thanks for moving this to the repair section gang!

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Sun, 30 Aug 2015 17:42:51 GMT
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I checked all of the components on pc5032 and all seem to be solid. There definitely seems to be something loose as it has worked a few more times and each seems to be right after moving the amp chassis around. Today I fired it up and it worked for about 2 minutes and then went back to making the humming noise.

I'm pretty good with soldering, but usually it's replacing a visible bad cap. Other than seeing a leaky cap I'm not very good at locating bad components. I'm probably going to have to take it someone here local, just not sure who works on things like this in my area. You guys know of any good techs in the Huntington or Charleston WV area?

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by chicagobill on Sun, 30 Aug 2015 18:12:54 GMT
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Have you tightened the screws on top of the two main filter caps? How about the wires going to the power transistors?

You can also try pushing on different components, using a wooden stick while amp is on to see if you can find something loose.

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by stevem on Mon, 31 Aug 2015 10:38:35 GMT
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Take a good close look at the two rectangular 5 watt resistors mounted near each square metal heat sinked cased drive transistor on the output board.
You may need to unsolder one end to see the non lettered bottom, but if that bottom side shows any signs of cracking then replace it as it may be going intermitantly open on you.

If you replace any then steep up to a 7 watt version if you can.

Also note that the any other small metal cased transistor needs to be looked at close too, as back then there leads tended to snap off at the bottom of the transistor if the factory instlled them bent up.

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Wed, 12 Feb 2020 00:13:59 GMT
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Resurrecting this project after a few years of letting it sit.

I have tried all of the above suggestions and my multi-meter is still showing -27V on the output jack.

So far I can't find anything that is loose or visibly wrong with it such as an exploded cap. I even took out the two big blue filter caps and after dusting them off they look brand new.

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by chicagobill on Wed, 12 Feb 2020 19:52:46 GMT
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Welcome back.
Visual inspection of electronic parts is a good thing to do, but not all bad parts will show signs of burning, leaking, etc.

If I recall correctly, the amp would sometimes work but usually just hummed and the speaker cone would extend and stay there. These are signs that there is dc voltage on the speaker and that there is some intermittent connection that is causing it.

You have visually inspected all of the components and the wiring and have not found anything that looked questionable.

Did you ever try flexing, tapping or knocking on the power amp board to see if you could either cause the problem to start or to stop from a mechanical stimulus? Often doing that will point you in a direction to investigate for a cold solder joint or broken component lead, etc.

If the problem does not respond to a physical movement, you will have to move on to testing parts and wires, etc.

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Wed, 12 Feb 2020 22:32:53 GMT
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Thank you again for all the help so far.

I'll fill you in on the progress that I made last night.

After trying the amp again and verifying that it still had 27 volts DC showing on the output jack I went back through all of the previous suggestions.

I turned the amp on and using a wooden probe I pushed around on all of the components on the poweramp board and various other wired connections throughout the chassis.

That didn't seem to affect it.

Then I unhooked and removed the two big blue filter caps and reinstalled. I tested them while they were out and they tested fine.

That didn't seem to affect it.

I removed transistors Q18 and Q19 and tested them with multimeter. They tested at 585mV when testing base to collector and base to emitter. I then reinstalled them.

That didn't seem to affect it.

I came home today and saw your post and went to check on it again.

This time when I fired it up to verify if the 27V was still there so that I could begin testing and it metered at 0V.

So I hooked the speaker back up and tried it and it worked perfectly. That lasted for a good 5 minutes and then it made a popping sound and resumed the hum.

The 27V is now back on the output jack.

I don't know if this matters or not but I tested the monitor jack that is on the back panel and it does not have 27V on it.

I tried again manipulating the poweramp board and components with the wooden probe and so far no luck.

Thanks

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Thu, 13 Feb 2020 03:54:14 GMT
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Went back out this evening after letting it set for about 5 hrs. Checked the voltage and it said 0.

Plugged up the speaker and it played great for another 5 mins then went out again. So I'm thinking it is something to do with it heating up.

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by stevem on Thu, 13 Feb 2020 11:40:09 GMT
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A negative D.C. Voltage like you have would kind of point me to Q8 going leaky .

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Thu, 13 Feb 2020 23:25:34 GMT
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Well we officially have a pattern. Three days in a row now when the amp is cool it will turn on an play for approximately 5 mins. Then it makes a popping noise and goes back to the hum.

I was able to find Q18 and Q19 pretty easy because they were separate from the board. Can you point me to Q8.

Thanks

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Fri, 14 Feb 2020 01:11:27 GMT
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Okay found Q8. How can you tell if it has gone leaky?

Thanks

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by stevem on Fri, 14 Feb 2020 11:44:04 GMT
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Well I may have jumped the gun some!

Since you found 18 and 19 swap those and see if when the amp acts up you get a positive 27 volts showing up.

When you do this be sure the slip on connectiors go back on the right way and that the mica insulators are good and then check that the red wire is not shorted to the chassis which would

mean that the transistor case is .

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Mon, 17 Feb 2020 04:04:03 GMT
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Okay was out of town this weekend and finally am getting back to this.

5 days in a row now after letting the amp sit over night it works great for 5 mins.

I swapped 18 and 19 as you suggested and I'm still getting the same behavior. I discovered why I was getting the negative voltage reading. I had the two probes reversed when I hooked them to the speaker leads to test. So swapping 18 and 19 had no impact on the voltage being positive or negative. Just changing the leads made it positive.

I think Q18 and Q19 are good. I've taken them out prior to the problem and test them with my DMM and they test fine. They I've taken them out once the DC voltage appears on the output jack and they test the same. I would love for them to be the problem as they are easy to take in and out but I'm thinking it's some other component that decides to stop working 5 mins into being powered on.

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by chicagobill on Mon, 17 Feb 2020 17:38:51 GMT
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Are you using a light bulb limiter with this amp?

One way to find a thermally sensitive component is to use a freeze spray type product. Use it to carefully spray individual components until you find the one that is acting up.

Alternatively you can start reading voltages on the different parts of the circuit when the amp is working and then is not working to see where voltages go wrong when it warms up. Again this requires you to take readings with the amp plugged in and turned on, so be careful.

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by stevem on Tue, 18 Feb 2020 11:08:10 GMT
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Another thing to try is heat.

Take a hair dryer hold a plastic funnel over it and apply the heat to the heat sink area where the output Transistors and bias diode are until that area feels noticeably warm, but not burn your

finger hot.

Next turn on the amp and see if it's already acting up, if not then move on to the circuit board, but if it foes act up then let it cool down and then before you play the amp again for 5 minutes pull that bias diode up out of its clip and see if the issue does not happen or is delayed a bunch.

Take great care pulling that diode up out of its clip because it's leads are very fragile!

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Fri, 21 Feb 2020 02:16:46 GMT
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Thanks for the tips guys.

I do not have a light bulb limiter but I'm building one this week.

Traveling the next couple of days but I will try the thermal tricks when I get back.

I also have some better test leads coming in for my DMM so that I will feel more comfortable checking things while the power is on.

Tried another experiment today. I might not mean anything but if I leave the amp unplugged over night I can then plug it up and check the voltage on the output and it will be 0V. Then when I turn it on a play for 5 to 6 mins it always stops working.

I tried another experiment today. I plugged it up and checked that there was 0V on the output jack and then left it and didn't turn it on. I came back later which would have been well past the 6 min mark and the 27V was showing on the jack. So it apparently doesn't have to be on to stop working, it just needs to be plugged up.

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by stevem on Fri, 21 Feb 2020 11:18:57 GMT
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Corry it's good that your trying to think about this from all angles, but Your deduction in your last paragraph is wrong.
The amp can only produce 27 volts of D.C. Once it's turned on.

Have safe travels and let us know about these other check out when you do them.

Subject: Re: K150-6 pumps out DC voltage when powered on.

Posted by corybrown on Sat, 22 Feb 2020 02:20:18 GMT
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You are correct, I explained that incorrectly. The amp is switched on when I detect the 27V on the output jack. I meant it simply being plugged up for a period of time would cause the problem to happen when switched on. Initially I thought that it was happening after a period of being on and actively using it. Once it fails the only way to get it back is to leave it unplugged for several hours. I'm not sure how long it takes but overnight works.

So if left off over night I can come in and plug up the amp and then turn it on to test it and there will be 0V on the output jack.

The following two scenarios are repeatable.

1. I can play the amp for 5 to 6 mins and it will work fine and then the hum starts. Retest and the 27V is on the output jack.

2. I don't use the amp but leave it plugged up and then come back after several minutes and retest and the 27V is on the output jack.

Thanks

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by stevem on Sat, 22 Feb 2020 11:28:37 GMT
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27 volts D.C. On the output should be making for a dam loud hum / buzz coming out of the speaker, in fact that much voltage can take out the speaker(s) depending on what they are!

Try this simple swap that should take all of 5 minutes.

Swap the 2 big + and - power supply rail filter cans and see if your D.C. Voltage on the output jack changes over to a negittive 27 volts.

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Sat, 22 Feb 2020 16:20:38 GMT
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Oh yeah the hum is very loud and the speaker cone locks into place when it's happening. As soon as that hum starts I kill the power.

That's why I check for the voltage fist. If it's 0 then I hook up the speaker and it works great till it fails. Then I kill power and hook up the DMM in place of the speaker and there is the voltage.

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by stevem on Sun, 23 Feb 2020 11:30:22 GMT
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Well if swapping around the main filter cans does not produce any changes , and seing as your tryied out already swapoing the 2 output transistors , then the only other place I can see you getting a + 27 volts from is if transistor Q4 is the one goingi leaky after 5 or so minutes.

Q4 is one of the ones in the heat sink on that 5033 board.

Also you should rig up a away to hook up another speaker to the amp or get a big 25 watt resistor in series with your amps speaker to stop harm coming to it!

27 volts applied to that speaker is equal hitting it with over 90 watts and if it's a original CTS driver it's not made to handle that much power!

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Tue, 25 Feb 2020 00:58:19 GMT
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Okay I tried swapping the big filter caps and had the same behavior. Worked find for a few minutes and then pop and hum.

I double checked the power amp board in this unit says PC 5032 Rev 1. So would it be Q5 or Q6 that you think could be the problem?

I also am using the speaker from another 8ohm cabinet that I have.

Thanks

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by stevem on Tue, 25 Feb 2020 12:20:33 GMT
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Forgive my oversite here, but you have a early model K150, and I have been looking at the schematic for a late K150 model with the 5033 board.

The early model 150s like yours still use the K100s +8 and -8 volt regulator sections and preamp section, so besides Q5 maybe going bad as the issue, something in that + 8 volt regulator circuit could be the bottom line on your issue maybe?

To narrow this down when the amp acts up check to see if your + 8 volts (red wire to preamp boards) is still 8 volts when you have that 27 volts on the output.

By the way you do not need to keep a speaker load hooked up once the issue starts, this will save your ears and speakers!

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Tue, 25 Feb 2020 14:47:33 GMT
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Yeah, I unplug the speaker any time the hum comes back. I really only have it plugged in when I'm checking to see if it's working and how long it will work.

I got some better rated test leads and will check those when I get home this evening.

Thanks again.

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by stevem on Tue, 25 Feb 2020 17:17:53 GMT
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The wires that can give you a wall line voltage shock are the white and black ones and the white ones with a black strip.

If you go across the green and red wires on the main caps then you can a 90+ volt shock .

The 40 volts out of each main filter can will not harm you.

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Fri, 28 Feb 2020 02:28:29 GMT
View Forum Message <> Reply to Message

Okay. I finally got to take some measurements when it was acting up.

Red wire at filter can +43V
Green wire at filter can -43V

Red wire from input board to power amp board +8V
Green wire from input board to power amp board -8V

Q12 at the collector +43V
Q16 at the collector -8V

Q5 at the collector +43V
Q6 at the collector -43V

I'm not sure which one on the bracket is Q18 and which one is Q19 but when looking down at the bracket from behind the chassis
Left transistor Red Wire +43V Blue wire -27V yellow wire -27V
Right transistor Red Wire +27 Blue wire -43V yellow wire -43V

Not sure what else to measure. Does that give you any ideas?

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by chicagobill on Sun, 01 Mar 2020 06:03:38 GMT
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The left power transistor is Q18 and the right one is Q19.

Those voltages are what you would expect with -27 volts on the speaker output, but they do not point to any cause for the circuit malfunction.

If you look at the schematic, there are voltages listed for a number of different points in the circuit. Do you think that you could follow the schematic enough to test some of those posted voltages?

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Sun, 01 Mar 2020 16:45:39 GMT
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I'm working on reading the schematic. Took a picture of the board and I'm documenting what component is what from the schematic.

I see several voltages listed such as the -8 and +8 and -34 and +34.

I see several other plus and minus numbers but not sure which ones are voltages.

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by chicagobill on Sun, 01 Mar 2020 21:15:10 GMT
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There is a pictorial diagram of the board on the schematic sheet that shows the basic position of the transistors. This will help you to figure out what components are where.

The schematic has voltages marked at most of the important circuit points, usually at transistor connections. Any voltage will have a plus or minus sign in front of it and most but not all will include a V for volts.

Due to the case heatsinks, the two driver transistors Q5 and Q6 do not have leads that can be seen from the top of the board. The way to get these voltage readings, is to measure at points on the board where the transistors connect to other components. For example, the bases of Q5 and

Q6 connect to the ends of the three diodes that form the bias setting circuit.

Be very careful with your meter leads while probing the circuit board. It's fairly easy to short two component leads together while trying to get a reading. If you have access to clip on meter leads, you could clip on the lead with the amp turned off and then turn on the amp to get the voltage reading.

My point is that you can cause additional damage to the circuit if you accidentally short something together while you are taking voltage readings. This is where you might want to look into using a light bulb limiter to help minimize the risk.

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Mon, 02 Mar 2020 17:51:39 GMT
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Built my light bulb limiter yesterday.

I took a picture of the board and identified 80 of the 83 components. I'll have that finished today and will start testing for those voltages. I do have access to the clip on leads and will be very careful.

Thanks for the tips.

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Tue, 03 Mar 2020 01:55:02 GMT
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I think I've identified everything correctly. Now it's time to measure voltages.

Let me know if you see anything I've labeled incorrectly.

Thanks

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Tue, 03 Mar 2020 03:07:18 GMT
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Okay I took a bunch of measurements.

Q1 B = .6V C = 5.79V
Q2 E = .6V C = -33V
Q3 E = .6V C = -34V

Q4 C = -34V E = -34V B = -34V
Q5 -27V at CR1
Q6 -27V at CR2
Q7 B = -26V E = -26V C = -144mV
Q8 B = -26V E = -26V C = -26V
Q9 B = 7V E = 7V
CR10 E = 7V
Q11 B = 9V E = 9V C = 43V
Q12 B = 9V E = 8.62V C = 43V
Q13 B = 8.62V E = 8.5V C = 9.68V
Q14 B = -.6V C = -9.2V
Q15 B = -8.5V E = -9.2V C = -42V
Q16 B = -41V E = -41V C = -8V
Q17 B = -8.5V E = -8.5V C = -9V
Q18 B = -26V E = -26V C = 42V
Q19 B = -42V E = -42V C = -26V

Q4 and Q12 stood out as having funny values compared to how I was reading the schematic.

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by stevem on Tue, 03 Mar 2020 11:06:21 GMT
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Well from what you posted Q 4 looks to be shorted or have a bad solder connection or a broken intermittent lead connection off of it which I have seen before in these types of Transistors.

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Tue, 03 Mar 2020 12:16:25 GMT
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That looks like RCA 38735. Is there a modern equivalent to that?

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by stevem on Tue, 03 Mar 2020 12:42:49 GMT
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A NTE brand part number NTE128 is one of the replacements, or the newer plastic version NTE128P.

Either way on install leave the leads long as they help to act as a heat sink.

Thetre are many other plastic pack TO-220 types you can use but thetre fatter leads will make you have to drill out the holes in the circuit board bigger.

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Tue, 03 Mar 2020 14:13:12 GMT
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Thank you. Parts have been ordered. I'll keep you posted on the results.

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Fri, 06 Mar 2020 23:59:42 GMT
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Well the new Q4 came in today. Replaced it and sadly it did not fix the problem. I now have -20V instead of -27V so I guess we are going in the right direction.

The only other component that had funny measurements was Q12 but I didn't order any of those. I did unsolder it and remove it from the board and tested it with DMM and it tests good.

So where to next?

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by stevem on Sat, 07 Mar 2020 11:18:32 GMT
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I am not sure, I will go back and review the voltage measurements you posted.

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Sun, 08 Mar 2020 02:25:20 GMT
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Ok. I went through and took a measurement at every point on the board. It's probably overkill but I've got to find this thing.

Component In Out
R1 47K 169mV .6V
R2 47K 193mV .6V
R3 82.5K 1% .6V 5.7V
R4 221K 1% .6V -8.5V
R5 2200 5.7V 8.5V
R6 4700 5.7V 5.7V
R7 33K 42mV 0V
R8 39K 42.85V 20.67V
R9 39K 20.68V .6V
R10 4700 -28V -34V
R11 3900 -34V -34V
R12 1820 1% -1.9V -2.2V

R13 33K -1.9V -20V
R14 2200 42V 14V
R15 2700 14V -19V
R16 97.6K 1% -2.3V -20.9V
R17 4700 -21V -33V
R18 470 -28V -21V
R19 470 -33V -34V
R20 470 -34V -43V
R21 1K -20V -21V
R22 100 -20V -21V
R23 1K -20V -21V
R24 100 -42V -42V
R25 820 5% -21V -21V
R26 .5 5W -21V -21V
R27 267 1% -21V -21V
R28 .5 5W -21V -21V
R29 267 1% -21V -21V
R30 820 5% -21V -21V
R31 100K -21V 109mV
R32 18K 43V 9.7V
R33 1200 7.6V 8V
R34 4700 8.5V 7.6V
R35 10K 7.6V 0V
R36 1K 9.1V 8.6V
R37 4.7 8.6V 8.5V
R38 10K 1% 8.5V -.6V
R39 8.25K 1% -8.5V -.6V
R40 18K -42V -9V
R41 1K -42V -42V
R42 4.7 -8.5V -8.5V
R43 510 109mV 109mV
C1 0.005 5.7V 0V
C2 0.33 5.7V 42mV
C3 1.0 35V 20.6V 0V
C4 33 15V -1.9V 0V
C5 27 35V 14V -21V
C6 27 35V -21V -33V
C7 47 PF -28V -27V
C8 0.005 -34V 0V
C9 47 PF 42V 9.7V
C10 47 PF 9.7V 7.6V
C11 33 15V 7.6V 0V
C12 33 15V 8.5V 0V
C13 47 PF -9.2V -.6V
C14 47 PF -9.2V -42V
C15 10 15V -.6V -8.5V
C16 33 15V -8.5V 0V
CR1 1N3193 -19V -20V

CR2 1N3193 -20V -22V
CR3 1N3754 -22V -21V
CR4 FD111 -19V -113mV
CR5 FD111 -21V -21V
Q1 PET8002 B .6V C5.7V E 0V
Q2 2N4249 B 42mV C-28V E .6V
Q3 2N4249 B -2.3V C -34V E .6V
Q4 38735 B -28V C -28V E -34V
Q5 38736 B-19V C 42V E -20V
Q6 38737 B -21V C -42V -21V
Q7 2N3567 B -21V C -113mV -21V
Q8 2N3638 B -21V C -21V E -21V
Q9 PET8002 B 7.6V C 9.2V E 7.5V
Q10 CR10 SZ51218 7V 0V
Q11 2N3567 B -9.7V C 43V E 9.1V
Q12 36892 B 9.1V C 43V E 8.6V
Q13 PET8002 B 8.6V C 9.7V E 8.5V
Q14 2N3638 B .6V C 0V E -9.2V
Q15 2N3638 B -9.2V C -42V E -8.6V
Q16 36892 B -42V C -8.6V E -42V
Q17 2N3638 B -8.6V C -9.2V E -8.5V
Q18 36892 B -20V C 42V E -20V
Q19 36892 B -21V C -42V E -43V

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by chicagobill on Sun, 08 Mar 2020 05:09:17 GMT
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Q8 voltages are off, have you tested it out of circuit?

Q12 is part of the low voltage power supply and has nothing to do with the power amp problem.

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Sun, 08 Mar 2020 20:28:29 GMT
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I took Q8 out of circuit and it tests fine. I also read that Q8 was compatible with the NTE 129 that I just bought. I had an extra so I swapped it in and got the same measurements as with the original Q8 in place.

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by chicagobill on Sun, 08 Mar 2020 23:43:46 GMT
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I thought that you replaced Q4 with an NTE128.

I'd try using the NTE129 to replace Q6 and see what happens.

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Mon, 09 Mar 2020 01:41:56 GMT
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Well that's a good call. I've been out there working on it this evening and realized that Q4 was an NPN and I had replaced it with a PNP. That's on me. Stevem recommended nte128 and like an idiot I bought nte129. My old Q4 tested fine now that I have it out of the board so I put it back in and checked all of my measurements again.

Measurements that make me scratch my head are the collector of Q4. The schematic shows -3.7 at Q4s collector but I'm getting -33V. There is a node at that point between Q4 collector, C7 and R18. Should it be -33V on both sides of C7 or could it be a typo on the schematic?

The other one is CR4 where it goes into the collector of Q7. All of the other diodes have the same voltage on both sides but CR4 has -25V on one side and -256mV on the other side and that -256mV is going into the collector of Q7. Should it be like that?

I'll try the Q6 swap tomorrow evening.

Here are my measurements after putting Q4 back

Component In Out
R1 47K 169mV .6V
R2 47K 193mV .6V
R3 82.5K 1% .6V 5.7V
R4 221K 1% .6V -8.5V
R5 2200 5.7V 8.5V
R6 4700 5.7V 5.6V
R7 33K 38mV 0V
R8 39K 42.85V 20.67V
R9 39K 20.68V .6V
R10 4700 -33V -33V
R11 3900 -34V -34V
R12 1820 1% -1.9V -2.2V
R13 33K -1.9V -26V
R14 2200 42V 11.4V
R15 2700 11.4V -19V
R16 97.6K 1% -2.3V -26V
R17 4700 -26V -33V
R18 470 -33V -27V
R19 470 -33V -33V
R20 470 -34V -42V
R21 1K -26V -26V

R22 100 -25V -26V
R23 1K -25V -26V
R24 100 -42V -42V
R25 820 5% -26V -26V
R26 .5 5W -26V -26V
R27 267 1% -26V -26V
R28 .5 5W -26V -26V
R29 267 1% -26V -26V
R30 820 5% -26V -26V
R31 100K -26V 109mV
R32 18K 43V 9.7V
R33 1200 7.6V 8V
R34 4700 8.5V 7.6V
R35 10K 7.6V 0V
R36 1K 9.1V 8.6V
R37 4.7 8.6V 8.5V
R38 10K 1% 8.5V -.6V
R39 8.25K 1% -8.5V -.6V
R40 18K -42V -9V
R41 1K -42V -42V
R42 4.7 -8.5V -8.5V
R43 510 109mV 109mV
C1 0.005 5.7V 0V
C2 0.33 5.7V 38mV
C3 1.0 35V 20.6V 0V
C4 33 15V -1.9V 0V
C5 27 35V 11.4V -26V
C6 27 35V -26V -33V
C7 47 PF -33V -33V
C8 0.005 -33V 0V
C9 47 PF 42V 9.7V
C10 47 PF 9.7V 7V
C11 33 15V 7V 0V
C12 33 15V 8.5V 0V
C13 47 PF -9.2V -.6V
C14 47 PF -9.2V -42V
C15 10 15V -.6V -8.5V
C16 33 15V -8.5V 0V
CR1 1N3193 -25V -25V
CR2 1N3193 -25V -26V
CR3 1N3754 -26V -26V
CR4 FD111 -25V -256mV
CR5 FD111 -26V -27V
Q1 PET8002 B .6V C5.7V E 0V
Q2 2N4249 B 38mV C-33V E .6V
Q3 2N4249 B -2.3V C -34V E .6V
Q4 38735 B -33V C -33V E -34V
Q5 38736 B-25V C 42V E -25V

Q6 38737 B -26V C -42V -26V
Q7 2N3567 B -26V C -256mV -26V
Q8 2N3638 B -26V C -26V E -26V
Q9 PET8002 B 7.6V C 9.2V E 7.5V
Q10 CR10 SZ51218 7V 0V
Q11 2N3567 B -9.7V C 43V E 9.1V
Q12 36892 B 9.1V C 43V E 8.6V
Q13 PET8002 B 8.6V C 9.7V E 8.5V
Q14 2N3638 B .6V C 0V E -9.2V
Q15 2N3638 B -9.2V C -42V E -8.6V
Q16 36892 B -42V C -8.6V E -42V
Q17 2N3638 B -8.6V C -9.2V E -8.5V
Q18 36892 B -20V C 42V E -20V
Q19 36892 B -21V C -42V E -43V

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Mon, 09 Mar 2020 01:56:04 GMT
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Went ahead and pulled Q6 from the board. It tested fine. I didn't try swapping with the nte129 that I have because it doesn't have the heat sink.

Thanks

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by stevem on Mon, 09 Mar 2020 09:55:26 GMT
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How are you testing these Transistors ?
If you are using just a ohm meter test then that does not rule out that they maybe braking down when powered up.
I would try replacing CR5 with a common 1N1007 or even a 1N1004 will cut it.

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Mon, 09 Mar 2020 12:38:13 GMT
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Testing the transistors with the DMM. Diode setting and testing B to E, B to C, E to B, C to B and C to E.

But I see what you are saying by breaking down once powered up.

Can Q5 and Q6 be removed from the heatsink and the heatsink then be re-used?

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Mon, 09 Mar 2020 15:59:50 GMT
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Just ordered some more parts.

I have NTE128 to replace Q5.
NTE129 to replace Q6
1N1007 to replace CR5.

I'll let you know how it goes.

Thanks

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by chicagobill on Mon, 09 Mar 2020 16:54:39 GMT
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You may have figured the problem out already. The voltages around Q4 are off, especially at the collector. The collector should have about -3 volts there and not the -33 volts that you have.

That would lead me to believe that the transistor is breaking down when hit with the full voltage of the circuit or that C7 is shorted. As you don't have the correct replacement for Q4, remove C7 and see what happens.

As for the CR4 question, that diode is part of the limiter circuit. That -25 volts is being blocked by the diode and with a negative voltage being applied to Q7 base and emitter, I would expect the transistor to be turned fully off, preventing any voltage from showing up at the collector.

The power amp does not need the limiter circuit there to operate, so you could remove both CR4 and CR5 from the circuit for testing.

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Sat, 14 Mar 2020 21:40:34 GMT
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Well got the new parts in. I replaced CR4 and CR5 and still the same behavior.

I have the replacements for Q5 and Q6 buy I'm curious about the heatsinks. Is there a way to remove the heatsink so it can be re-used?

Thanks

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by chicagobill on Sun, 15 Mar 2020 01:58:59 GMT
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Yes, there is a way to reuse the heatsinks, but it is not a simple job.

For testing, you don't need to have the heatsinks on the replacement transistors. The amp will need the heatsinks if you drive the amp hard and for an extended period of time.

Did you try testing Q4 or removing C7?

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Sun, 15 Mar 2020 14:51:42 GMT
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I have tried so many things I'm losing track.

Q4 has been replaced with a brand new nte128.

I tested with Q7 out of the circuit and experience the same behavior.

I tested with CR4 and CR5 out of the circuit and with replacement parts 1n4d004 and also tried NTE177. Same behavior.

Last night I took out Q5 and Q6 and put in NTE128 and NTE129 and again same behavior.

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by chicagobill on Sun, 15 Mar 2020 17:55:16 GMT
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Again, did you test or remove C7 the small cap next to Q4?

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Sun, 15 Mar 2020 23:05:20 GMT
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I am so sorry. I misread your post before and I thought you meant Q7. I just now removed C7 and we are back at 0V on the output.

It's not a stable 0V it keeps bouncing between 0V and -.25V. Not sure if that's a problem.

Thanks

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by stevem on Mon, 16 Mar 2020 10:06:24 GMT
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That small amount of D.C. Is normal.

Now get some top hat type slip on heat sinks for those Transistors.

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by chicagobill on Mon, 16 Mar 2020 20:10:03 GMT
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So the cap was shorted. Good to know that you found the problem.

So let's see, have you reinstalled all of the original transistors again? Is the amp keeping fairly stable and not going into failure mode? How does the amp sound?

If the amp is sounding good and staying stable, I'd just replace the bad cap and call it good. The cap is a ceramic cap 47 pf (picofarad) and rated at 100 volts or higher.

The fluctuating 1/4 volt on the output is fairly normal and may go away or lessen once C7 is replaced.

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Mon, 16 Mar 2020 22:56:37 GMT
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Can you point me to that part somewhere I can order it. I searched for that description and didn't get anything.

"Now get some top hat type slip on heat sinks for those Transistors."

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by stevem on Tue, 17 Mar 2020 11:46:01 GMT
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Mouser electronics part number 532-322505B00.
Once you install these place a dab of silicone sealer down in the hole to keep it held onto the Transistor.

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Sat, 21 Mar 2020 15:34:47 GMT
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Thank you I'll look at getting some of those ordered.

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Sat, 21 Mar 2020 15:57:22 GMT
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Okay well the new part for C7 came in. I got 47p 100V 10% from newark.

I also reinstalled all of the old components and installed this new capacitor to replace c7. We are indeed stable and it is no longer going into fail mode.

However I just noticed in my meddling that I broke the leads off of CR3. I was warned against this and now I've done it.

What is the replacement part for that?

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by stevem on Sat, 21 Mar 2020 16:26:29 GMT
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It's a 1N3754.
Electronic parts outlet in the Netherlands has some for E7.50 each.

Do not operate the amp without atleast a 1n1004 or 7 in its place .

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by chicagobill on Sat, 21 Mar 2020 19:10:07 GMT
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stevem wrote on Sat, 21 March 2020 11:26It's a 1N3754.
Electronic parts outlet in the Netherlands has some for E7.50 each.

Do not operate the amp without atleast a 1n1004 or 7 in its place .
E7.50, Ouch!

A long time ago I started to test other diodes to use as a replacement for these diodes. Generally little glass diodes like 1N914 or 1N4148s seemed to work the best. The problem comes in mounting them in a way to get them to react to the heat of the output transistors.

If you don't want to buy the expensive NOS one, get a 1N914 type and solder two thin wires to the

ends. Heat shrink the connections so that there is no chance of shorting out to the heat sink. Then using as thin a bead of silicon glue as you can, glue the diode to the center of the heat sink near the clip that held the original diode. Then run the wires to the pc board making sure that you keep the correct polarity.

This diode string ties the lower half of the power amp to the upper half. If the diode string breaks circuit, the upper half of the circuit turns fully on and will cause the power amp transistors to fail. So don't run the amp without the diode in place.

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Sat, 21 Mar 2020 19:26:29 GMT
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stevem wrote on Sat, 21 March 2020 12:26It's a 1N3754.
Electronic parts outlet in the Netherlands has some for E7.50 each.

Do not operate the amp without atleast a 1n1004 or 7 in its place .
I tried googling this but I'm having no luck. Do you have a link?

I have some 1n914. I'll play around with those.

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Sat, 21 Mar 2020 20:42:51 GMT
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Okay I took the 1n914 and added some wire and heat shrunk everything so it wouldn't touch the heat sink. Then I placed the 1n914 in the same bracket that the original CR3 was in. I laid it in there with it kind of looped around it as seen in the attached photo.

Now when I turn it on I don't get the dc hum any more but I get a ton of static.

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by chicagobill on Sun, 22 Mar 2020 00:10:18 GMT
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The way that you have the diode mounted looks fine. I will assume that the polarity is correct.

As for the static, might be totally unrelated to the diode. Describe what it sounds like. Do the controls have any effect on the sound of the static?

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Sun, 22 Mar 2020 16:24:47 GMT
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It sound like when you have a scratchy pot but it's full blast and continuous. The controls seem to have no effect on it.

Thanks

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by stevem on Mon, 23 Mar 2020 10:06:25 GMT
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The 2 blue wires on the left end of the output driver board are the audio inputs from each channel / preamp so if you remove them one at a time you can then narrow down if it's one of the channel preamps , or the output driver board

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by stevem on Thu, 26 Mar 2020 10:59:39 GMT
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If you have not located a diode yet let me know as I have found that I have a spare original one.

Subject: Re: K150-6 pumps out DC voltage when powered on.
Posted by corybrown on Sat, 28 Mar 2020 01:12:10 GMT
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Thank you for the offer. I did find two on ebay for $10. I've paid for them and just waiting on them to ship. I'm hoping to get back to this some this weekend.

Thanks