Subject: Troubleshooting a 250 model 1 Bass amp
Posted by Byteviolator on Tue, 25 Jun 2019 00:00:58 GMT
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Power amp PC5065
Selectone pre-amp PC5067
Pre-amp PC5066

Hello all,
I gigged alot with this amp in the 80s and I vaguely remember using it around 95/96, since then its been collecting dust. Last week I hooked it up and and would hear a kind of rapid ticking sound from the Selectone with the volume on max. Extremely low output if I used the bottom pre-amp maxed out. (I used a drum machine on the input and I got a very low brap/brap type of sound)
I started by replacing the 4500uf filter caps with 4700uf 80V. After jiggling the P5 connector on PC5065 I now have no output on the selectone and the same low output on the lower pre-amp.
If I remove the P5 connector from the power amp I measure 38V at the output jack. Is this normal since there is no input? Should I connect an external signal to the power amp board ORN/BLK wire (J1)to test it?
I also tried to connect the output of PC5066 to an external amp and got nothing out of it.
What would be the best way to start troubleshooting this amp now?

Thanks for reading and any ideas would be greatly appreciated.

Subject: Re: Troubleshooting a 250 model 1 Bass amp
Posted by stevem on Tue, 25 Jun 2019 10:08:56 GMT
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Hello and welcome!

You should have come here first before doing anything trouble shooting wise to the to the amp, as these are not like tube amps with just a positive power supply , they run on a + and - supply.

1) the two main filters that you replaced rarely go bad and even if they do the amp still works but with 120 HZ hum coming out of the speaker (s).

2) you shot yourself in the foot by unplugging that 3 wire connector on the 5065 output driver board and then turning the amp on!
That board gets its needed ground connection from that plug and without the ground you blew up some Transistors , hence the 38 volt power supply reading you now have on the speaker jack!

Do you know how to test Transistors, as that's the point your at now?

I am going to be on vacation for a few days so I can really help you with this repair but Bill who is a great member on this site can help you out for sure !

Subject: Re: Troubleshooting a 250 model 1 Bass amp
Posted by Byteviolator on Tue, 25 Jun 2019 21:04:01 GMT
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Hi Steve,

Thanks for your input. I think I may have overestimated my troubleshooting skills!
1) The two main filters are a easily reversible fix, they are still in place.
2) Should I start with Q1 on the 5065 and work my way through or start with the power transistors Q10 - Q13?
3) Should I also be looking at the caps on 5065.
4) With the 3 wires connected to the 5065, I'm measuring about 43mV on the output jack when the amp is on

I've changed the power cable to a 3 pronged because I was getting zapped while unplugging the input jack and holding the chassis (should have taken that as a warning to slow down)

Thanks again

Subject: Re: Troubleshooting a 250 model 1 Bass amp
Posted by Byteviolator on Tue, 25 Jun 2019 21:19:29 GMT
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Hi Steve,

Thanks for your input. I may have vastly overestimated my troubleshooting skills!

I don't know if my last message was sent so..
1) The two main filters are an easily reversible fix. They are still in place
2) Should I start with Q1 on the 5065 or start testing the power transistors Q10 - Q13 first?
3) With the 3 wire connector plugged in to 5065 I measure about 43mV on the output jack when the amp is on

I've also replaced the power cable with a 3 pronged cause I was getting zapped while holding the chassis and unplugging the input jack.

Thanks again for your help

Subject: Re: Troubleshooting a 250 model 1 Bass amp
Posted by chicagobill on Wed, 26 Jun 2019 17:29:35 GMT
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Yes, welcome to the place.

With 43 mV dc on the output there is probably nothing major wrong with the power amp. Please

try and refrain from changing parts to try to find a fix to the problem. It will only waste time money and may cause additional problems that will confuse the actual repair.

Good thinking on trying to send the output of the preamp to another amp. Now try and send a signal into the power amp and see what you get. There is a jack on the back of the chassis that connects to the input of the power amp through a 560 ohm resistor. Plug your drum machine in there nad see if the sound from the speaker is loud and strong.

If you look at the schematic for this amp, you should note that both of the preamp signals route through the first channel board, PC5066. So if both channels are dead or weak, I would start by checking that board first.

There is an IC chip at the output of the board IC1 that could be the problem. Try this, keeping all connector in place, read the dc voltage on the orange wire that connects the output of the preamp board with the input of the power amp (pin 3 of the power amp connector). There should not be any voltage there or at least just a few millivolts.

Good luck.

Subject: Re: Troubleshooting a 250 model 1 Bass amp
Posted by Byteviolator on Wed, 26 Jun 2019 20:04:24 GMT
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Hi Bill,

On the orange wire I measure -1.45V
I got no output when I connected a signal to the module jack. However, doing a continuity test I've noticed that the blue wire connected to the jack is grounded to the chassis along with the ground side of the jack. Is this normal? Maybe the module jack is shorted?

Thanks so much for your help

Subject: Re: Troubleshooting a 250 model 1 Bass amp
Posted by Byteviolator on Wed, 26 Jun 2019 20:38:07 GMT
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Some success at least. I've straightened out the issue with the module jack and the power amp seems to be working well (loud and strong). I still have very low and distorted output from all 4 input jacks but now we know where to look. I'll wait for your advice before proceeding.

Thank you

Subject: Re: Troubleshooting a 250 model 1 Bass amp

Posted by Byteviolator on Thu, 27 Jun 2019 11:37:34 GMT
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I'm pretty sure I read the voltage correctly the first time, with the module jack fixed I now measure -10.4 on the orange wire.
The Selectone board has a few traces where the solder is missing in places, but when I test end to end for continuity the ends connect. Does the solder need to be continuous on a PCB trace for the 5066 to work properly, does the etched trace still conduct? Is there a way I can send a photo? The 'insert an image' icon does nothing.

Thanks

Subject: Re: Troubleshooting a 250 model 1 Bass amp
Posted by chicagobill on Thu, 27 Jun 2019 19:47:05 GMT
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There shouldn't be -10 volts on the output of the preamp board. The cause could be a bad opamp or a power supply problem. Have you tested to see that both plus and minus 12 volt supplies are working correctly?

The 12 volt supplies are created by Zener diodes and large dropping resistors that are located in the middle of the chassis. The resistors are black wirewound types that are bolted to the chassis and the two Zener diodes are connected to a small terminal block that has wires that go to the preamp boards. You should measure about 12 plus and minus at the two terminal points.

If the two supplies are there and working, then the next step would be to test the output chip. If you look at the schematic for the 5066 board, you will see two triangles marked I1A and I1B. This is the output chip. There are two sections to it, thus the A and B designations. You will need to carefully measure the voltage on each of the input and output pins of the chip. The output of the board comes from pin #1 so I'd start there. The input pins for that section of the chip are at pins #5 and #6. Pin #5 is grounded, so there should not be any voltage there, and there should be little or no voltage on pin #6. If you get voltage readings on either pin 1 or 6, the chip is probably bad.

As for the solder question, the traces will conduct with or without being "tinned" with solder. Unless there is a sign of major corrosion to the copper trace there is nothing to worry about.

Good luck.

Subject: Re: Troubleshooting a 250 model 1 Bass amp
Posted by Byteviolator on Fri, 28 Jun 2019 01:03:17 GMT
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I have plus and minus 11.66V on the terminal points so the supply looks Ok.
Lots of issues with the ICs however

PC5066

1. -11.48V 14. 11.73V
2. 13. -10.72V
3. 12.
4. 11.
5. 10.
6. .09V 9. -.33V
7. -11.72V 8. -8.23V

PC5067

1. 3.08V 14. 11.66
2. 13. -11.22
3. 12.
4. 11.
5. 4.2mV 10.
6. .22V 9.
7. -11.66 8. -.69

Could other components cause these weird measurements or am I looking at 2 bad ICs?

Thanks for your help.

Subject: Re: Troubleshooting a 250 model 1 Bass amp
Posted by chicagobill on Fri, 28 Jun 2019 03:50:05 GMT
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Some of those voltages are suspicious looking.

Before we get into changing chips, have you cleaned all of the connectors on the Molex plugs? Have you checked the pc pins for broken or cold solder joints? A bad ground connection on one of the boards could cause a floating voltage on one of the chips, so clean the connectors and see if that changes anything. I usually spray a little DeoxIt on the connector pins and plug in and then remove the connector a few times to burnish the contacts. On the 5066 board there is a three pin connector with a loop of wire that takes the place of the fuzz circuit bypass. Make sure that that plug is there and well connected.

I've also seen wires come out of the crimped connectors and make intermittent contact as well, so be sure to check that.

If all connectors are good, then changing chips would be the next step.

Subject: Re: Troubleshooting a 250 model 1 Bass amp
Posted by Byteviolator on Sat, 29 Jun 2019 00:28:37 GMT
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Ok I will check and clean the connectors. I have a fast drying electronic equipment cleaner that says it removes oxides. Should I just by a can of Deoxit

I've measured the voltage at R16 & R15 9.8V which seems to be expected. At R16 and R17 and pin 1 of Q3 I measure -.7V, the schematic indicates 7.1V (If I'm reading that correctly). Could the IC or the pots bring this voltage down? If R17 connects the transistor side to the IC side, could I isolate the transistors from the IC to verify Q3? Or is R17 and everything after it needed the test Q3 voltages?. Or would you forget about all that and change the chips?

1)Is there a replacement I can use for the IC?
2)Is an op-amp short causing -10.72V on pin 13 and -11.48V on pin1?
3)Have you seen two blown op-amp ICs in the same amp before?
4)Could an input have caused this?

Here are the voltages in a more readable format.
PC5066
1. -11.48V
2.
3.
4.
5.
6. .09V
7. -11.72V
8. -8.23V
9. -.33V
10.
11.
12.
13. -10.72V
14. 11.73V

PC5067
1. 3.08V
2.
3.
4.
5. 4.2mV
6. .22V
7. -11.66
8. -.69
9.
10.
11.
12.
13. -11.22
14. 11.66
Thanks again

Subject: Re: Troubleshooting a 250 model 1 Bass amp
Posted by chicagobill on Sat, 29 Jun 2019 04:15:43 GMT
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I use DeoxIt, but any control cleaner should work for cleaning the connector pins. Most times just removing and replacing the plug will clean up the connectors.

I can't tell if the voltage on the mosfet Q3 is correct or not. The tone controls and IC should not be a factor in lowering the voltage as all of the voltages should be blocked by the tone and coupling caps.

I have never seen one of the mosfet transistors go bad, but that doesn't mean anything. I would look to a bad chip or two. The later version of those chips is an XR4739, which is also no longer made. NTE used to sell a replacement which was a remarked XR4739, but it will cost a lot of money.

What I typically do is rewire the board to take a modern 8 pin dual opamp like a 4558 or a 4560, etc. I use an 8 pin socket to make future replacement easy or to allow for changing chips for best performance.

Whatever way you decide to go, I would replace the one on the 5066 board first and then move to the 5067 once the 5066 is fixed.

Shorted opamps will show up as voltage on input or output pins. The thing to watch out for is that a voltage applied to an input pin will also show up as a voltage on an output pin. I usually test the chip by removing it from the board and reading the voltage on the empty pc points. If mystery voltages disappear, then I pretty much know that the chip is shorted. If the voltages remain, I will look for where they are coming from. If the chip is okay I will replace it using a socket to help reduce any possible damage to the chip from soldering.

By the way, these output voltages are only true for chips that are powered from bipolar power supplies. When a chip is powered from a single sided supply, the inputs will be biased to 1/2 the power supply voltage to fool it into working without the second supply.

Subject: Re: Troubleshooting a 250 model 1 Bass amp
Posted by Byteviolator on Mon, 01 Jul 2019 15:25:01 GMT
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Hi Bill,

Thank you so much for your help. I've replaced the op-amps on both pre-amp boards and now the amp works and sounds great, the sound is incredible! I installed 8 pin sockets, used the 4558 and rewired the board in that section. The original filter caps are in place. Do I need to keep it powered on for a few hours to reform the caps or is that unnecessary? Next I want to get the lights in front to work.
Thanks again for your time and advice.

Subject: Re: Troubleshooting a 250 model 1 Bass amp
Posted by stevem on Mon, 01 Jul 2019 16:17:55 GMT
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Are you by any chance playing Bass thru the amp with active Pickups?

Subject: Re: Troubleshooting a 250 model 1 Bass amp
Posted by chicagobill on Mon, 01 Jul 2019 17:17:21 GMT
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Great news! Glad that you were able to revive it.

The front lamps in the switches are #335 bulbs. The front blue lens assemblies pull out and the bulbs are screwed in underneath. You might find it easier to replace the bulbs if you get a short piece of rubber tubing or heat shrink that can be pressed over the bulb's glass for a better grip.

The important warning here is that the power switches are made entirely of plastic. Plastic that has become very brittle from age. The threaded mounting sleeve that holds the switch to the metal bracket will break off from the body of the switch making the switch inoperative. So do not stress the wires or pry too hard to get the lens off as the plastic will break. If the plastic breaks, you can use two cable ties to secure the switch assembly to the mounting bracket, but be aware that the switches are difficult if not impossible to replace.

Congrats again on the repair.

Subject: Re: Troubleshooting a 250 model 1 Bass amp
Posted by Byteviolator on Mon, 01 Jul 2019 19:29:29 GMT
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Twenty five years I did a project and ran my sampler through it, I may have blown the op-amps then and forgot about the amp till lately. I now have a bass with active pick-ups. Is there something I should be careful with now?

Subject: Re: Troubleshooting a 250 model 1 Bass amp
Posted by stevem on Tue, 02 Jul 2019 10:11:06 GMT
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I play Bass also besides guitar and have both active and passive Basses.
I find that my Carvin Bass with a 18 volt active system drives these preamps very easily and I must keep the Baaees volume down a good amount.
My other Active Bass with EMG pickups and only a 9 volt system I only need to keep turned down a tad.

The other reason I ask is that in these K150 and K250 heads the factory made a change and

added more gain to the 5066 preamp to better please guitar player by changing some resistors.

The change came about in Nov 1971 during the first production run and became permanent there after.
I have several of these amps and I find that my two early amps are better for my active Basses since I jump my amps two channels with a short cable.

This info might interest you?!

And no, these metal face amps are not as easy to blow the first gain stage out due to big signal levels as are the a plexiglass face amps.
On those a input signal of over 1 volt can pop them!

Subject: Re: Troubleshooting a 250 model 1 Bass amp
Posted by Byteviolator on Tue, 02 Jul 2019 21:11:20 GMT
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Do you know which bulbs are in the 2 red lamps at the back of my 250? If they are GE-335s I will take them to install in front. I found a ge-335 source on Ebay, 10 for $15 US plus $15 US shipping, so I'm looking at $40 CDN for 8 extra bulbs & they are unavailable on Mouser. Do you know of any replacement Bulbs? If not I'm thinking about wiring white LEDs in the GE-335 sockets behind the blue covers.

Subject: Re: Troubleshooting a 250 model 1 Bass amp
Posted by chicagobill on Wed, 03 Jul 2019 00:07:09 GMT
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Red lamps on the back? I don't know what you are referring to.

I just bought some #335 bulbs from Mouser a few weeks ago.

Edit: I just checked, they have 380 in stock. part # 606-CM335. $1.49 each, 10- $13.00

Subject: Re: Troubleshooting a 250 model 1 Bass amp
Posted by Byteviolator on Wed, 03 Jul 2019 02:07:24 GMT
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Wow! Thanks for that. Not sure which Mouser I was looking at now.
My amp has two small red pilot lamps near the top in a single file above the module jack. I thought it was a factory install, though I couldn't find them on the schematic. I may have to open it up and see how they are wired up & hope the front lamps weren't rewired

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Subject: Re: Troubleshooting a 250 model 1 Bass amp
Posted by stevem on Wed, 03 Jul 2019 09:38:18 GMT
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The Red lights are 100% not original!

I am now very interest where they are wired up to ?

Subject: Re: Troubleshooting a 250 model 1 Bass amp
Posted by Byteviolator on Thu, 04 Jul 2019 21:51:37 GMT
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Steve,
The pilot lights are wired in parallel to white on the power switch and black on the polarity.
I installed the 355's, the sockets were empty. I don't why some would drill two holes to install pilot lights rather than replace the bulbs. Maybe they wanted to go dark.
This amp looks and sounds great! The blue lights on black, nice touch!
Thanks again everyone

Subject: Re: Troubleshooting a 250 model 1 Bass amp
Posted by stevem on Fri, 05 Jul 2019 10:55:00 GMT
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Great to hear for us and you, lol!