Subject: K200B-2 tremolo is weak and pops when switched
Posted by Saransk on Fri, 20 Jul 2018 17:44:25 GMT
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Have to turn up the Intensity to 9 or 10 (Doesn't go to 11) to hear it
Looking at the circuit it looks a lot like the "Harmonic Tremolo" in some "Brownface" Fenders - 6G13a for example
Q314 looks like a "Split Load" Phase Inverter.

The oscillator seems to work and all the electrolytic caps have been replaced.
Here's where I am
1 - Q314 is weak/bad - it drives the effect.
2 - Q313 is weak/bad - it appears to be the oscillator output.
3 - CR302/CR303 diodes (look like overdrive clippers) are bad - shunting signal
4 - CR300/CR301 diodes - they connect (mix) the effect with the main signal.

I hate troubleshooting by replacement but without a scope or a function diagram "low" effect is hard to diagnose.

As for the "pop" when switching off, I assume either/both Q315/Q316 aren't working. They are suppose to cut out to prevent transiants across R343, and if they don't ground the signal you get a turn-off transiant.

Any other ideas or am I on the correct path here?
Thanks in advance
Michael

Subject: Re: K200B-2 tremolo is weak and pops when switched
Posted by stevem on Wed, 25 Jul 2018 11:43:06 GMT
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And your + and - 8 volt rails in the amp are within .30 vdc of each other?

Subject: Re: K200B-2 tremolo is weak and pops when switched
Posted by Saransk on Mon, 06 Aug 2018 01:14:09 GMT
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Replaced Q315/Q316 but no joy.
When I turn the tremolo on, there is about 4 VDC at the switch
I've gone through the complete circuit and checked it out
The +8/-8 rails are within .1 volts of each other.
There is voltage, small (milli-volts) voltage at both transistors where it should be 0 volts.
Also, the voltages at Q310 are off as well.
All of the capacitors (electrolytic) have been replaced

One odd thing, when I tried to read the voltage at R343 I heard a hum out of the speaker (like a hum injection).
Cannot figure out how that could happen

Right now, other than replacing all of the tremolo transistors, I'm stumped as to where the 4 volts is coming from at the switch (no wonder it pops)
Unfortunately there doesn't seem to be a description of the circuit and how it is switched.

Any ideas on what isn't quite right?
Thanks
Mike

Subject: Re: K200B-2 tremolo is weak and pops when switched
Posted by stevem on Mon, 06 Aug 2018 09:53:45 GMT
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Please note that as stated on the kustom schematics for the 1968 and up B type amps that all voltages shown are with all the Controls up full, with no signal and no load.

Subject: Re: K200B-2 tremolo is weak and pops when switched
Posted by Saransk on Mon, 06 Aug 2018 17:21:56 GMT
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I know that voltages are in the "Operating" condition

What I can't figure out from the 303 Board schematic is where the approx. 4 volts that I read on the gray wire "Off" terminal could be coming from.
I appears to be getting the correct -.66 volts at the junction of Q315/Q316
I did not check the voltages at Q310 as the oscillator seems to be working.
It almost seems like there is a short across R349 (27K at Q310's Base), but wouldn't that kill the oscillator?

There are a lot of connections to ground and Kustom did not use a dedicated ground from the 303 board to a ground point. Could that be part of the issue? The board itself works to the ground but there is a difference between the 303 board and "GROUND"

I've been taking voltage reading with my black lead clipped to the chassis

Everything else seems to be working well, aside from the "gentle whispering of carbon composition resistors" except for the pop when switching off the tremolo.
I had a Marshall 18 watt head that did the same thing - apparently it took Marshall a couple of tries and various resistors and cable locations to kill most of the voltage that was on the "Off" line.

I think I'll start around Q310 and see if anything is really amiss

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Subject: Re: K200B-2 tremolo is weak and pops when switched
Posted by chicagobill on Mon, 06 Aug 2018 17:48:35 GMT
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Q315 and Q316 are the switching transistors for the vibrato. They will either ground out the straight signal path (Q316) or the vibrato signal path (Q315) depending upon the voltage at their bases.

When the vibrato is turned on, their bases are held low (negative voltage) by the resistors R369, R370 and R371. When the vibrato is turned off, the voltage at the bases will go positive and the two transistors will change state and ground the vibrato signal and unground the straight signal.

Normally these will not cause a weak effect. Much more likely no effect or not being able to turn off the effect.

Subject: Re: K200B-2 tremolo is weak and pops when switched
Posted by chicagobill on Mon, 06 Aug 2018 19:04:36 GMT
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Q310 is a switch to turn off the oscillator when the vibrato is turned off. The base is held low by the same voltage that holds Q315 and Q316 bases low. When the switch is thrown the bases are all turned high because the switch turns off the negative voltage by grounding the junction of R370 and R371.

So when the vibrato is turned off, the LFO is turned off and the audio from the vibrato circuit is grounded and the straight signal from the output of the bright boost circuit is ungrounded, thus turning off the effect.

Subject: Re: K200B-2 tremolo is weak and pops when switched
Posted by Saransk on Mon, 06 Aug 2018 20:36:14 GMT
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I really appreciate the clarification of the Tremolo switching but it doesn't answer the problem of the loud "pop" when it gets switched off.
Somewhere, the switch line is getting a dc voltage potential on it, as opposed to the low number on the schematic.
Having replaced the Q315/Q316 pair, I'm beginning to suspect that Q310 is the culprit.
Somewhere, there is voltage getting on the switching line and causing the pop.

Funny how this seems to be an issue with both tube and early solid-state amps - I've seen early Marshalls, VOX's and Thompson-Vox amps with either 1 Meg resistors across the switch or other additions, often not on the factory schematics, to kill a loud "pop" when the effect is switched off.
There is a lot of discussion about 18 watt Marshall amps with the original tremolo and the switching issue on-line.

I wonder if trying to kill both the oscillator and the output with the switch, the system switching is

more complex than needed.

Subject: Re: K200B-2 tremolo is weak and pops when switched
Posted by chicagobill on Mon, 06 Aug 2018 23:33:44 GMT
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The vibrato switch buss is connected to the junction of R370 and R371. These two resistors are part of a voltage divider network that also includes resistor R369. One end of the resistor string is connected to the +8 volt supply and the other end is connected to the -8 volt supply.

There is normally a voltage on the switch buss until it is grounded by the front panel switch or by the footswitch.

The audio noise is caused by the switching of the transistors Q315 and Q316. One or both are probably switching into the circuit a partially charged coupling cap. Some make more noise than others. I always wondered if using an fet in place of the bipolars there would make them switch quieter.

Subject: Re: K200B-2 tremolo is weak and pops when switched
Posted by Saransk on Thu, 23 Aug 2018 17:38:58 GMT
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Kustom 200B-2 Tremolo - 1
Owner - 0

I am defeated by the Tremolo circuit on the #303 board. Initially weak, with a loud "pop" when switched off, I have carefully worked through the circuit from the switching back. Not only did I not get rid of the switch pop, but now I have a loud swishing/crashing noise that is "downstream" from the preamp controls. I could not get the voltages in the Tremolo circuit (No signal/No output/Full on) to read correctly. There seemed to be some oscillation in a couple of places that I couldn't track down such as the base of Q311.

Thinking I had installed a transistor incorrectly, I have been removing the tremolo transistors to see where the sound stops - to no avail.
Q315/316 - noise. then Q314, then Q313 - no real noise until I shut the tremolo off? Then it was like something got "turned on."
I pulled the ends of R365/366 to disconnect the circuit from the main audio - or so it looks like it on the schematic. Still noise.

It's not the power amp as if I disconnect the 303 board the amp is very quiet, even with the volume on the other preamp board turned up.
So what in the world is causing the noise when Q314 is effectively disconnected? The only thing I can see that might (and it's pretty slim) be making noise is the connection from Q307's emitter which ties into the Tremolo lines through the 2 .1uf capacitors.

At this point I'm ready to pull the board and do a complete replacement of all of the transistors, but I'd like to know what has gone wrong.
Any help would be greatly appreciated.