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Subject: K200B tremolo - "Harmonic Vibrato?" - Fender?

Posted by [Saransk](#) on Fri, 20 Jul 2018 18:15:11 GMT

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While trying to troubleshoot a very low out tremolo on a 303 preamp board, I was struck how familiar the circuit looked. Q314 definitely looks like a "Split-Load" phase inverter, just not a 12ax7.

It finally struck me that it looks a lot like the classic Fender "Harmonic Vibrato" found in several "Brownface" amps.

The classic is the 6G13a Vibrasonic.

While not a perfect match, especially since there is no "dry" signal mix, the layout is very similar.

There could be a "dry" signal mix from Q307 which would alternatively be in-phase/out-of-phase with the main Dry signal. (Q314 is driving both a positive and negative phase signal)

And why is there a set of diodes off the Intensity control - they look like a "clipper" set from an overdrive pedal.

IS there a block diagram of how this circuit works? For the 1960's it is pretty sophisticated, especially since 90% of all Solid State tremolos were of the usual amplitude using an opto-isolator.

I find Kustom used some very sophisticated and well designed circuits, as well as well engineered, in their classic amps. (Ever seen the inside of a Thompson VOX solid state amp- Super Beatle - no wonder they blow up). I think a set of block diagrams or such - like Peavey (another "bulletproof" amp) always used to include would be a great addition.

Back to the bench

Michael

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Subject: Re: K200B tremolo - "Harmonic Vibrato?" - Fender?

Posted by [stevem](#) on Sat, 21 Jul 2018 10:04:13 GMT

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Working on a Thomas Vox amp is a test of your ability to hold back cursing every 2 minutes! The only good thing is like that the early Kustom Frank amps they use a output stage drive transformer ( as did Sunn amps) so trouble shooting them is a snap, just don't short the speakers out as all 3 amps had no protection circuit!

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Subject: Re: K200B tremolo - "Harmonic Vibrato?" - Fender?

Posted by [chicagobill](#) on Sun, 22 Jul 2018 19:24:48 GMT

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Yes, the two circuits are very similar in concept. The Fender uses the two triode sections of a

12AX7, while the Kustom uses two diodes CR300 and CR301.

The straight signal comes from the collector of Q307 and is mixed with the out of phase signal that comes from the emitter.

The clipper diodes at the output of the LFO are limiters, just like in a distortion circuit.

Kustom amps had vibrato as a upgrade from the usual tremolo that was easy to create as you noted with a photoresistor. True vibrato was only available on a few amps at that time.

As for Thomas Organ Vox amps, I find that a lot of the problems with them are caused by the techs that have worked on them before. I own a few and have worked on many of them before. Rough handling of the circuit boards and those stupid wire wrap, solid core wires will always cause problems. But that's just my 2 cents.

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Subject: Re: K200B tremolo - "Harmonic Vibrato?" - Fender?

Posted by [Saransk](#) on Sun, 22 Jul 2018 19:41:27 GMT

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So Far, I've found the "best" way to resolve issues with a Thomas VOX amp, especially if it is to remain a "player" and not just for show, is to use one of the replacement boards that R Keen has designed. Same circuits, just better engineering.

What's great about most of the 100/200 series Kustom amps is that they were designed to be bulletproof. Unless the were abused, etc. most are still workable after some basic maintenance. They are right up there with SAE, Crown, and Peavey amps for rugged and well designed circuits.

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Subject: Re: K200B tremolo - "Harmonic Vibrato?" - Fender?

Posted by [chicagobill](#) on Tue, 24 Jul 2018 15:17:51 GMT

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I agree 100% with both points. R.G. does a lot for the T.O. Vox community with his site, books and replacement boards. And Kustom amps were designed and built to the highest standards for the time.

I've corresponded with R.G. a lot about all things Vox. His reason for building the replacement boards was meant to fix the unfixable, not to repair broken amps. In fact, a lot of his suggestions are how to repair or make the original parts work better. The replacement ideas are really for the missing or too far gone things.

As for Kustom amps, you can see a fairly clear evolution of their design from the early Frankies to the Metal Front amps. This is true not only of the electronics, but of the physical design as well. The Frankies have a fairly thin aluminium chassis that is subject to bending and twisting, especially where the power transformer mounts. The A-series chassis got a little thicker and was better reinforced, but the four corner risers needed to allow for the power transistor mounting still

allowed the power transformer to bend the chassis when dropped. The B-series chassis fixed nearly all of these problems with the power transistor mounting extrusion and the side wall power transformer mounts.

Electronically, the redesign of the circuits made for a better, more useful amp. The Frankie "PA" had four inputs but only 2 sets of controls, and the reverb only worked on 2 of the inputs. None of the effects were switchable on any of the Frankies. The A-series had much better effects and all were switchable, but they need a foot switch to turn them on. The B-series amps no longer required a foot switch, but separated the fx across the two channels.

Kustom amps were very well designed and were very well built. Through the years they have been shunned by the tube only types, but have remained a real workhorse of an amp. Which is probably why there is a board like this one available to all.

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Subject: Re: K200B tremolo - "Harmonic Vibrato?" - Fender?

Posted by [rodak](#) on Tue, 24 Jul 2018 15:54:53 GMT

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Were the metal-faced, slant-front amps an improvement in any way, or were they inferior to the B series plexis? I'm guessing those square, lighted switches are almost impossible to find, and it seems like I heard there were problems with the inter-board connectors (or maybe I'm thinking of something else).

I do prefer the look and features of the B-series, though. I just never warmed up to the metal/slant amps.

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Subject: Re: K200B tremolo - "Harmonic Vibrato?" - Fender?

Posted by [stevem](#) on Tue, 24 Jul 2018 16:47:16 GMT

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Here's some facts for you and I will leave my preference for metal face amps for my Bass playing to the side!

Metal face supremacy facts.

- 1). The power switches can be a problem, but there is a way to get broken ones working again and to keep non broken ones from breaking.
  - 1b) the smaller lamps in the two switches use less current from the power supply so there is more current on hand for greater output head room.
  
- 2) top lid on chassis seals out 99% of dust that makes for the need of getting pots cleaned.
  - 2b) top lids have a schematic glued to them.
  
- 3) the -2 and -4 units with reverb have a reverb lock that saves the 2 springs from breaking during travel.

4) the 2 channels have more tonal range control then any previous model Kustom.

5) the preamps are less noisy when high gains are used.

6) even though the molex inter board connectors can get intermittent after 35 plus years , but it does make for faster and less costly repairs.

7) on units with reverb having the tone control in that circuit is a great feature.

on the 150 series the power supply also uses a choke and as such at high volume levels this 75 watt RMS amp is just about as punchy as any A or B series 200 amp!

9) the module output on the 250 units makes it very easy to drive a separate power amp and added cabinet.

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Subject: Re: K200B tremolo - "Harmonic Vibrato?" - Fender?

Posted by [rodak](#) on Tue, 24 Jul 2018 17:11:04 GMT

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Wow, I had no idea - now you've got me wanting a metal-front amp!

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Subject: Re: K200B tremolo - "Harmonic Vibrato?" - Fender?

Posted by [chicagobill](#) on Tue, 24 Jul 2018 22:40:28 GMT

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I think that the effects on the metal fronts are the best sounding ones, and like the A-series you can have all of the FX on the same channel.

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Subject: Re: K200B tremolo - "Harmonic Vibrato?" - Fender?

Posted by [steven](#) on Thu, 26 Jul 2018 10:03:34 GMT

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Thanks Bill, I forgot that fact and it's a major plus to Boot!