
Subject: Kustom studio 4 valve, valve replacement
Posted by [jorisg](#) on Sat, 19 Jan 2013 15:07:53 GMT
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Hi to all,

I just purchased a nice looking Kustom studio 4 valve amp, sounds is not that great though. Checked the valves and these seem quite a mess, they are all 6L6 GC valves but of different brands..... Can somenody advice me which brand of valves and which type of 6L6 to use as replacement?

Thanks a lot for the help!

Joris

Subject: Re: Kustom studio 4 valve, valve replacement
Posted by [Kustom_Bart](#) on Sat, 19 Jan 2013 17:25:28 GMT
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Get a matched set of JJ or Ruby tubes. Get on E-bay and find them is your cheapest bet. Matching them is important and then biasing them once they are in is important as well. Biasing them is important as the new tube may run hotter or colder than the old ones. Biasing them correctly will make your amp sound the best as well.

Subject: Re: Kustom studio 4 valve, valve replacement
Posted by [jorisg](#) on Sat, 19 Jan 2013 18:05:02 GMT
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Thanks Bart!

I understand that it is just a matter of taste!

Subject: Re: Kustom studio 4 valve, valve replacement
Posted by [PxDxBx](#) on Mon, 21 Jan 2013 17:06:06 GMT
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I completely rebuilt my 4 valve (Custom Kustom). I recapped the tube driver board and upped the current value on the cathode resistors (which had burned open). I strongly suggest checking/replacing (at the very least) the 4 cathode resistors and the 2 resistors on the output of the driver board with higher current value flameproof resistors for protection.

I pulled the single bias adjustment pot off of the driver board and mounted it in a box on the back of the amp. I also mounted 5 bannana jacks in the box tapped from the 4 cathode resisors & ground. With this setup, I can adjust the bias without disassembling the amp; I just have to jack-in

with my voltmeter and dial it in. It takes a little fumbling around with Ohm's Law to get the cathode current right. You'll need an accurate resistance measurement of the cathode resistors. I also measured the plate voltage, but this is not for the faint of heart, as it idles @ ~480v

I installed a matched quad of JJs, which makes it easier to bias, because it only has a single adjustment pot. They're worth the extra \$\$\$\$. I biased conservatively @ ~38ma. I use a processor, so I'm not trying to run the tubes blazing hot (and unnecessarily shorten their life). It sounds great and has enough crank to drown out a drummer. Pd

Subject: Re: Kustom studio 4 valve, valve replacement

Posted by [jorisg](#) on Tue, 22 Jan 2013 09:11:33 GMT

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Hi Pd,

Thanks for the lengthy explanation! Great info that I will definitely use! Next to that I have a problem with the 1st channel, it sometimes does not give any sound, just wiggling the main volume of channel 1 makes it work again. Then sometimes while playing the sound just dies, same procedure then brings back the volume.... faulty pot? Thanks again for the help!

Subject: Re: Kustom studio 4 valve, valve replacement

Posted by [Kustom_Bart](#) on Tue, 22 Jan 2013 20:07:04 GMT

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It could be the pot or a bad solder joint at the pot or near it.

Subject: Re: Kustom studio 4 valve, valve replacement

Posted by [jorisg](#) on Wed, 23 Jan 2013 09:07:41 GMT

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I will start by cleaning the pot! What is the best way to open up the pre-amp.... laying down the cabinet on it's side and then loosening the 4 screws holding it to the cabinet? sorry never done this before!

Thanks again!

Subject: Re: Kustom studio 4 valve, valve replacement

Posted by [PxDxBx](#) on Wed, 23 Jan 2013 17:37:28 GMT

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If you remove the rear wood panel of cabinet (if it still has one; mine didn't) and loosen the 4 screws on the top of the cab, the whole preamp will slide out of the back. I had a similar issue on

ch2. I took it apart to clean the pot(s), which were pristine. There was no wear at all on the pots, which is impressive for a 30+yr old amp. It turned out to be a cracked solder joint. My suggestion is to re-flow the solder joints on the offending pot and then test it while you have it apart. Its easier than opening up the pot to clean it. The pre is completely enclosed, so there isn't much dust that gets in.

Subject: Re: Kustom studio 4 valve, valve replacement
Posted by [Kochens](#) on Thu, 24 Jan 2013 08:06:12 GMT
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Hey Jorisq, be aware that tube-amps have high voltage inside and you have to take care.

Subject: Re: Kustom studio 4 valve, valve replacement
Posted by [jorisg](#) on Thu, 24 Jan 2013 09:04:00 GMT
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Great Guys, many thanks for the advise and for the cautions! I will bring the amp to a repair shop, not that handy with a soldering iron I could easily make things worse!

Will keep you informed!

Subject: Re: Kustom studio 4 valve, valve replacement
Posted by [steven](#) on Thu, 24 Jan 2013 14:50:16 GMT
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For my buck I always use Groove tubes output tubes.

There testing and burn in process is far better than other 3rd party sellers and they not only match for current, but the test each tubes output at 3 different frequency inputs and as such there matched tubes sing and sustan far better than tubes that do not go thru there matching process. For those of you folks who have a signal generator try this test some time with a fixed bias tube amp and what you think are matched tubes.

First set the idle current, next pump in a 400 hz tone and record each output tubes current draw, do this again with a 1k tone and a 3 to 4k tone.

now look at the results, any difference in the amount of current being draw means that the duty cycle of the wave form will be different from top to bottom, this also means that the tubes are phase canceling which will change the tone of the note being played and worse than that cutting into the sustain of the note(s)!

Many times I have helped players out who thought that there axe had dead spots (some do) when it was there amps output stage that was at fault!

Also along these lines is using a balanced phase inverter tube in the amp and tweeking the value of its plate load resistors as to truly bet that tube balanced in regards to the A/B drive signal that it hiits the output tubes with.

Just some furthur tips for ya!

Subject: Re: Kustom studio 4 valve, valve replacement
Posted by [PxDxBx](#) on Thu, 24 Jan 2013 20:59:52 GMT
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As far as not being handy with a solder iron, here's the trick:

- 1) Buy a solder iron
- 2) Buy some solder
- 3) Get some wire (both stranded & solid core)
- 4) Get an old circuit board or project board
- 5) Heat up the iron
- 6) Make blobs till you get good at it

It's really that simple. Everyone who plays with electronics should learn how to solder. Practice tinning wires, soldering wires to the board, and soldering wires to each other (end to end). Most repairs come down to fixing a loose connection, which is easily solved by re-soldering the joint. Once you get the tools, it will only cost you the electricity to heat up the iron and penny's worth of solder... or you can pay someone \$75 to do the same thing.

Just my \$0.02

pd

Other things to collect as your financial situation allows:

Wire strippers

Needle nose pliers

Hemostats

Diagonal & flush cut pliers

Desoldering pump

Third hand (the thing with the alligator clips & magnifying glass, arguably the most time saving tool you can own)

Subject: Re: Kustom studio 4 valve, valve replacement
Posted by [joring](#) on Thu, 24 Jan 2013 21:53:39 GMT
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THanks for the explanation and perhaps you are right...just afraid that I will damage more than I will repair

I already do have an solder Iron somewhere and I believe also some solder..... Will give it a go this weekend! and..... will let you know the outcome

thanks for all the advice!

Subject: Re: Kustom studio 4 valve, valve replacement
Posted by [PxDxBx](#) on Fri, 25 Jan 2013 04:29:53 GMT
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Just re-flow (melt) the 3 solder joints on the pot, and add a tiny bit of solder if needed. Sometimes fresh solder will help it melt faster. Make sure that you use a pencil-type iron, not a gun (it's overkill). You really can't hurt the pot. The pots are old-school heavy duty ones. Just keep the solder where it belongs and you won't have any issues. Avoid big blobs; less is more. A desoldering pump or bulb helps if you get too much solder on the joint. You can just melt the solder and suck it up.

Subject: Re: Kustom studio 4 valve, valve replacement

Posted by [jorisg](#) on Fri, 25 Jan 2013 07:51:14 GMT

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Ok, Will buy a solder pencil, since the only thing I have is an old style/type of solder gun! Will take some pictures just for your enjoyment

If all is well I will receive new tubes/valves this weekend as well! By the way, I was amazed when I opened up the back of this amp, was like a time capsule! All looked so neat and original! That for an amp of over 30 years old, incredible!

Subject: Re: Kustom studio 4 valve, valve replacement

Posted by [PxDxBx](#) on Sat, 26 Jan 2013 02:21:00 GMT

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It's a great amp, built with quality parts. I snap up old electronics whenever I get the chance, because they are easily repaired. You could spill a beer in this amp and just unplug it and let it dry; it would be fine. If new stuff breaks, most of the time, you just throw it over your shoulder and buy a new one. The traces and components are too small to repair with average tools. Old stuff rocks!

Subject: Re: Kustom studio 4 valve, valve replacement

Posted by [jorisg](#) on Sat, 26 Jan 2013 08:41:00 GMT

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Couldn't agree more. Also vintage equipment looks so good compared to new stuff! Will start working on the amp and keep you all posted! Thanks for the help!

Subject: Re: Kustom studio 4 valve, valve replacement

Posted by [stevem](#) on Sat, 26 Jan 2013 15:44:06 GMT

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You can make the amp perfectly safe to work on and drain 99% of the amps 480 VDC supply by turning on JUST THE STANDBY SWITCH and waiting 3 minutes for the filter caps to unload, this

can be done with the amp plugged in to the AC outlet or not, but only solder parts in and out of the amp with power cable unplugged!

Subject: Re: Kustom studio 4 valve, valve replacement

Posted by [jorisg](#) on Sun, 17 Feb 2013 22:12:35 GMT

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Hi guys, I have finally found some time to upload pictures of the complete cleaning process of my Kustom Studio 4 Valve. Amazing how everything looked at the inside, like a time capsule! Cleaned all the pots and all contact and replaced the mismatch of valves with 4 brand new ones! Andall working like a charm! just have some minor cracks on one pot.... to be continued

These are the old valves

New valves installed and inside cleaned

http://i1094.photobucket.com/albums/i451/joogie/DSC_6496_resize_zps59007ebd.jpg
Pre amp taken out the cabinet for good cleaning!

Prints all look in good shape

And everything back together again, and an exciting moment when the power goes on...will it all still work? Yes!

Subject: Re: Kustom studio 4 valve, valve replacement

Posted by [stevem](#) on Tue, 19 Feb 2013 14:19:54 GMT

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With the way those pots are mounted you will probably have to unsolder that one least pesky one to get a good amount of cleaner in it to get it working as good as possible.

If cleaning it in this way will not get it up to snuff, than as a last ditch attempt you can take it apart by unfolding the 4 lock tabs with a diagonal cutter.

When you do this bend them back slow and try not to put a sharp fold in the metal as this can make that lock tab snap off when you go to fold it back closed.

Once you get the pot open and take out the shaft section(some pots will not let you do this without removing a C clip at the end of the shaft) and then take a look at the black resistive carbon trace on the front terminal plate of the pot.

If you see deep worn spots anywhere(this happen mostly at either end of the pots travel)then the pot is shot and will need to be replaced.

Note that when putting a pot back together the shaft needs to be set near what would be 12 noon, notice the stop tab on the back metal case of the pot.

You should clean and lube all the pots, even the ones that make no noise now to avoid wearing grooves in the carbon traces.
Try not to get too much cleaner/lube on the circuit board as sometimes a coating of such will make for small frying bacon type noises all on its own.

Should this happen you can wash down the board with rubbing alcohol and a 1" paint brush, just make sure to let the board dry off in a way that will not let the stuff get into other pots, connectors or tube sockets.

Subject: Re: Kustom studio 4 valve, valve replacement
Posted by [PxDxBx](#) on Tue, 19 Feb 2013 21:15:50 GMT
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Did you re-bias for the new tubes?

Subject: Re: Kustom studio 4 valve, valve replacement
Posted by [jorisg](#) on Wed, 20 Feb 2013 11:01:11 GMT
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Hmmmm, no I did not

No idea how to do this, and since I am only playing at home, with very low volume, I was hoping that this would not be such a bad thing

Subject: Re: Kustom studio 4 valve, valve replacement
Posted by [steven](#) on Wed, 20 Feb 2013 14:42:57 GMT
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You should be fine as JJ tubes are very close to spec in regards to pull matched idle current, like within 10 to 12% from what I have seen.
If you ever need/ start to play the amp louder then do this test.
Do this at night time, kill the lights in the room and play/crank the amp while looking at the power tube, play for 3 to 5 minutes while looking at the big gray steel plate structures inside the tubes(s).
As long as this plates do not start glowing red your OK bias wise for any condition that could hurt

the tubes.

Subject: Re: Kustom studio 4 valve, valve replacement

Posted by [jorisg](#) on Wed, 20 Feb 2013 15:26:31 GMT

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Thanks for the suggestion and will do! Look very much forward to the reaction of my neighbours though

Subject: Re: Kustom studio 4 valve, valve replacement

Posted by [PxDxBx](#) on Fri, 22 Feb 2013 00:56:13 GMT

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I run a matched set of JJs and they run within a couple of mA of one another. The existing bias setting *may* be okay IF the previous tubes were of a very similar current draw. If they run too hot, it'll shorten the life of the tubes (and/or fry the cathode resistors). If they 'red plate', they'll burn out very quickly. If they run too cold, it can foul the tubes. They run in the neighborhood of 250 deg F (121 C) when biased correctly. You certainly don't want them getting any hotter.

When it comes to bias, it doesn't really matter how loud the amp is turned up, because it is an adjustment of 'quiescent current', which is how much current flows through the tubes when they're at idle (when there is no sound being amplified). It's like the idle speed on a car. You don't want it to idle at 4000 rpm, nor do you want it at 100. Changing the tubes is like changing the carburetor. You might be OK without adjusting it, but it won't necessarily be at its peak performance.

If you don't feel comfortable doing it yourself, it might be worth having it done. If you don't mind the taking the gamble and it runs OK, then you might not have any problems with it as is.

Just my \$0.02 (sorry for the length)

pd

Subject: Re: Kustom studio 4 valve, valve replacement

Posted by [Kustom_Bart](#) on Fri, 22 Feb 2013 02:11:38 GMT

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I agree, you can't change tubes without biasing them, period. I have done it just to see what it does and 99% of the time (unless you are changing type of tubes) they bias cold, I have found. This makes the amp really BLAH! Biasing is simple using a digital volt meter and the proper bias tool and basic math.

Subject: Re: Kustom studio 4 valve, valve replacement

Posted by [jorisg](#) on Fri, 22 Feb 2013 07:50:47 GMT

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Thanks guys for your advice in this, ok you convinced me and I will look into this and either bring the amp to a repair shop or try to tackle it myself!

Thanks

Subject: Re: Kustom studio 4 valve, valve replacement
Posted by [Kustom_Bart](#) on Fri, 22 Feb 2013 16:03:54 GMT

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Do some searching on the net and you will find a couple of different ways to do it and good instructions too. I figured it out and I am an idiot....LOL! Let me do some digging and I will see what I have for links for biasing I will add them here.

Here is one using the Cathode Method <http://aga.rru.com/TechTips/disp.cgi?file=LV/BiasAdj.tt>

Helpful calculator <http://www.webervst.com/tubes1/calcbias.htm>

Kit to build your own bias right tool <http://www.tubedepot.com/bt-biasrite.html>

instructions on how to use the bias right tool If you send me your e-mail address, I can send them to you as I have them in MS Word format and can't get them on photobucket...lol!
