
Subject: Kustom model 600-5 PA

Posted by [LukeM](#) on Tue, 19 Jan 2016 15:23:27 GMT

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Good day, and thanks for this forum. I've always liked the tuck-n-roll Kustom equipment. So far, all I've purchased is one of their US made guitar amps (a KLA-25A, which gets used on a regular basis).

At a recent estate sale, I picked up a model 600 8 channel PA head, and 2 non-Kustom columns. This beast weighs close to 100 lbs!

I took it out of the case (some tears in the material, consistent with the early 70s vintage), took off the metal lid, and looked around.

There are a couple of resistor arrays for the control board (to get + and - 15v from the power supply, and for the lights for POWER and POLARITY). The wires looked pretty burnt, so I replaced the longer runs. I think the zener diodes on the control board are regulating +/-35v down to 15. That seems like a bit of a strain. I may investigate re-configuring the regulator to something a bit more robust. I did shoot some DeOxit on all the controls, and I'll get my friend's 1/4" wire brush to run through all the jacks. Date code on some components reads 1972.

On the power amp boards, I don't see any burnt or stressed stuff. All the TO3 cans look original, with Kustom numbers on them. So far, so good.

Bonus: 2 pages of schematics inside, that may have been glued to the metal top. I tried scanning them, but as old as they are, they didn't come out very good.

No, I haven't powered it up yet.

The column speakers are not tuck-n-roll, and both will need some re-wiring. Looks like both have 2 15" speakers in them. One of the speakers is a Jensen Special Design. The other has a square magnet, and might be a 4 ohm impedance. The other one I haven't been able to look into.

Thanks for letting me babble, and I'll update this as I make progress.

Luke M

Subject: Re: Kustom model 600-5 PA

Posted by [Iowa Boy](#) on Tue, 19 Jan 2016 16:06:17 GMT

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Check out the impedance on those speaker cabinets.....if there was 2 four ohms speakers wired in parallel, you had a 2 ohm load and that's too low for that head. Possible reason for the burnt wires.

By any chance was the stand with the amp? I see there is one on Ebay but think the current bid is around \$200.

Rare find but like Pleat has told me unless they are in mint condition, value wise, not worth much

and like you have already found out, weight a ton. I've always wanted one to add to my collection but haven't found one at a reasonable price yet. As to being a practical application for a sound system.....not a good choice considering the weight to power ratio and only reverb for effect. But they do look cool.....providing you don't have to haul them around. Hope you get it back up and running again.

Subject: Re: Kustom model 600-5 PA
Posted by [LukeM](#) on Tue, 19 Jan 2016 16:16:31 GMT
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Thanks for the reply.

The cabinets will definitely need some re-wiring. They don't appear to be the Kustom originals. From what I've read, you can hang 2 8 ohm cabinets off of each power amp module to get to the recommended 4 ohm load. For testing purposes, I believe my current 8 ohm cabinets will work fine.

Nope, no stand. I could probably rig something up, but I don't really have a need for it as yet. I could see this as a house system for karaoke: 8 mike inputs, no waiting.

The burnt wires were the red and green ones supplying power to the mixer module. Coming off the main filter caps, 2 wires went to a pair of 125 ohm resistors, and then over to the mixer board. This is equivalent to a pre-amp module that would drive the power amp modules.

I have a good amp/guitar mechanic locally whom I can go to for advice on this one. Trouble is, I don't think (at his age) he'd be able to lift this beast onto his workbench.

Luke M

Subject: Re: Kustom model 600-5 PA
Posted by [Iowa Boy](#) on Tue, 19 Jan 2016 17:39:05 GMT
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If I'm not mistaken, the 600 head is made up of 2 300 heads....if its like my 400. Two eight ohm cabinets will work you'll just not get the full power out of the amp. Since you said one speaker was a Jensen, I'm guessing the amp was probably used as a guitar amp and not PA. But who knows who put what in it over time. If it turns out you have a mixture of speaker ohms, you'll need to have the same ohm speakers in each cabinet.....not a good idea to be mixing them. I'd sell the 4 ohm speaker if I was you.....if you run two 16 ohm speakers in parallel you get a 8 ohm cabinet and you could have four cabinets hooked up to this beast; wire up two 8 ohm speakers in parallel and you can run two cabinets. Thing to remember that each amp can't exceed the 4 ohm load limit otherwise the amp can over heat.

I'd keep an eye out for two pairs of 795 speaker cabinets. I use four of these to run my monitors and have replaced the original 16 ohm speakers with 8 ohm wired in series/parallel. Sixteen 8

inch speakers move a lot of air.

Subject: Re: Kustom model 600-5 PA
Posted by [chicagobill](#) on Tue, 19 Jan 2016 17:46:18 GMT
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Welcome to the place.

Yes, not a great unit for modern bands, but it would work well for small clubs, churches or as you suggested Karaoke. Remember that these use high impedance mikes.

The preamp and mixer circuits are both running off of the plus and minus 12 volt power supplied by the two Zener diode circuits. If there is or was a problem in any of the preamp circuits, that could cause too high a current draw. That may be the reason for the overheated wires.

As for lifting it onto the bench, we old farts do have a few tricks for handling these things. And compared to an old Ampeg SVT your 600 is a lightweight.

Subject: Re: Kustom model 600-5 PA
Posted by [LukeM](#) on Tue, 19 Jan 2016 18:04:18 GMT
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Thanks for the input.

Such a helpful group. I moderate a few other boards like this, and it's always nice to get people willing to help. I appreciate it.

I've been working with tube and old SS gear like this for a while. Step one is to get it powered up and running reliably. Then I'll worry about what to do with it after that. I figure for testing it out, I can run one 8 ohm speaker on each side, and keep the volume low. If I do hold onto it, I figure the nominal load on each output is 4 ohms and no lower. I could put some HF horns in the top of these columns, and use it for PA stuff. Or I could pull the speakers, sell them on EBay or here (if that's possible), and put that money toward amp repairs if needed.

Lots of options. I'm only on step B right now.

Luke M

Subject: Re: Kustom model 600-5 PA
Posted by [stevem](#) on Tue, 19 Jan 2016 18:12:22 GMT
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In this web sites technical section we have the schematics for the 600.

Subject: Re: Kustom model 600-5 PA
Posted by [Iowa Boy](#) on Tue, 19 Jan 2016 19:24:31 GMT
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Hey Bil.....are you still using that block and tackle above your bench????

Subject: Re: Kustom model 600-5 PA
Posted by [LukeM](#) on Wed, 20 Jan 2016 01:27:30 GMT
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Can't find the "technical section". NO worries: I'll scan the ones I have and try and clean them up.

I had some time, and examined the speakers in the 2 columns I got with the amp. These are not the tuck-n-roll versions. They probably aren't Kustom at all. All speakers are 15" units. One cabinet has a stamped steel 4 ohm speaker, labeled 1504H20c, 137 739. The other speaker is a Jensen Special Design model C15P, 220743, made in Chicago USA by the Muter Company. I haven't tested these yet, so I need to check for continuity and no tears in the cone or surround. The other cabinet has another 4 ohm speaker, 1504H20C 1376918, and a Realistic speaker model 40-1315A, presumed to be an 8 ohm unit. All the speakers appear to be 100W units. The cabinets don't appear sturdy enough to handle that kind of power: the back panels are maybe 1/4" thick. There's room for horns in them, but the horns would be at the bottom of the cabinet. Not very efficient.

One of the 4 ohm speakers has the solder tab sheared off. I don't know if I can resolder that and epoxy the tab back on. The money may be in the Jensen and Realistic units.

Here's a link to a Dropbox folder, showing pics of the speakers, and some other bits.
dropbox.com/sh/bus0joz3smnlb2r/AABAgTAcwuW55iNeEdKVXyHYa?dl=0
Please let me know if that link doesn't work. I haven't been on Dropbox in a while.

So, what do you think: Wire up everything, and run them until they go *POOF*, or sell the contents and just focus on the PA head?\

Luke M

Subject: Re: Kustom model 600-5 PA
Posted by [Iowa Boy](#) on Wed, 20 Jan 2016 04:27:38 GMT
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Sounds like you got a bunch of junk for speakers other than the Jensen. Someone obviously didn't know anything about mixing ohms in speaker cabinets and were just putting in anything they could get their hands on. In my early days and before I knew any better, I tried Realistic speakers in a PA cabinet. Worst sound I ever heard. Cheap, cheap, cheap.....let me repeat....cheap. (I was in 8th grade so I plead ignorance).

1/4 inch for the back panel is pretty thin. If the cabinets are made of particle board.....don't waste

your money on putting new speakers in them. There's always plenty of old Kustom T&R PA cabinets for sale out there and a lot cheaper than what its going to cost to put in 4 good 15 inch PA speakers. Eminence are going to run you at least \$100 each.....you'll have more in the speakers than the cabinets are worth.

Shop Guitar Center and Music Go Round or check area music stores for some used equipment. Maybe you'll get lucky and find a pair of JBL cabinets for under \$300. Most of them come with horns and have a pretty decent sound. I picked up a pair of JBL Cabarets for \$200 and they have an awesome sound. Word of advice, any cabinet you look at, never assume who ever had it knew what they were doing or what was in it. Always, and I mean ALWAYS take a cordless with you and open the backs to see what is in there for sure. Any seller that won't let you look.....walk. Its always a learning experience when it comes to buy used equipment. Let us know how things turn out.....got my fingers crossed that the 600 isn't toast.

Subject: Re: Kustom model 600-5 PA
Posted by [Kustom_Bart](#) on Wed, 20 Jan 2016 04:37:29 GMT
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The one is easy enough to repair for sure and as long as the realistic speaker is a 4 ohm as well, then wire them up so each cabinet is a 8 ohm total load and that will give you a total 4 ohm load and use them and see how they sound. The Jensens are great sounding speakers.

Subject: Re: Kustom model 600-5 PA
Posted by [Iowa Boy](#) on Wed, 20 Jan 2016 05:46:19 GMT
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How do you get an 8 ohm cabinet if one speaker is an 8 ohm and the other is a 4 ohm in each cabinet? The speakers won't be balanced in the cabinets. I was always told that mixing ohms in a cabinet was a no no.

Subject: Re: Kustom model 600-5 PA
Posted by [stevem](#) on Wed, 20 Jan 2016 11:29:24 GMT
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On the left side of this sites main page in the blue colume you will see the tech section listed. You don't, you get a 2.66 ohm cabinet!
Both cabinets would need to be wired in series.

Subject: Re: Kustom model 600-5 PA
Posted by [LukeM](#) on Wed, 20 Jan 2016 15:40:28 GMT
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You can use dis-similar impedance speakers in various connection scenarios.

There are a few caveats, however:

Almost all amplifier equipment is engineered to drive a specific load. Typically, this load varies from 4 ohms all the way up to 32, depending on the speaker configuration. Since amp makers and speaker makers need each other, they tend to line up to follow demand and supply.

My 600-5 unit is set up to drive 2 8 ohm columns in parallel. Following the rule $R1 \cdot R2 / R1 + R2$, $64/16 =$ a total of 4 ohm load.

If I were to keep 1 8 ohm speaker and 1 4 ohm speaker in one cabinet, depending on the wiring, I would have 12 ohms if they were wired in series, and 2.66 ohms if they were wired in parallel. Neither of these will safely deliver the most power from an amp designed for a 4 ohm load. 12 ohms would deliver approximately 1/3 the audio power, and the 2.66 ohm load would strain the output devices if driven to full power over a long period of time.

The fun starts when you have more than 2 speaker elements for a load:

Assume 4 4 ohm speakers.

Your options are:

4 all in parallel: 1 ohm load

4 wired in series: 16 ohm load

2 wired in series + 2 wired in series, and those pairs wired in parallel: 4 ohm load

2 wired in parallel + 2 wired in parallel, and those pairs wired in series: 4 ohm load

Be advised that wiring speakers in series represents a point of failure, should a connection be broken = no sound/no load.

Sometimes the math is the funnest part.

Luke M

Subject: Re: Kustom model 600-5 PA

Posted by [Iowa Boy](#) on Wed, 20 Jan 2016 18:06:01 GMT

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Nice math lesson. Only problem with wiring speakers in series is that the first speaker takes more of the power than the remaining speakers.....correct? I was always told that you should never wire speakers in series and most articles I have read regarding speaker configuration also said the same thing.

My personal rule of thumb: all speakers the same ohms; two or three speakers are always wired in parallel; four speakers are wired in series/parallel; six speakers....series/parallel configuration. This way you always get the load requirement and peak power out of the amp. Only 4 ohm speaker I would use would be in a sub woofer. You guys all know I am about the BIG speaker cabinets, not the suitcase one's.

My money still says you look for different speakers. The Jensens make a good guitar speaker but not my preference when it comes to live sound. The other two.....unload and get a couple of CTS

or even Selemium speakers. Mis-matched speakers in my book is an accident just waiting to happen and even my old ears can hear an unbalanced speaker cabinet.

Subject: Re: Kustom model 600-5 PA

Posted by [Kustom_Bart](#) on Wed, 20 Jan 2016 19:36:40 GMT

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Thought it said in initial post you have 2 none kustom columns? I thought you were referring to the speakers you were showing the pictures of for those columns, that would be 8ohms per cab and 4 ohm total load. Putting them in a single cab would be 1 ohm or 16 ohm or you could wire it series-parallel or parallel-series and have a lot of fun!

Secondly Iowa Boy, Signal is signal, it doesn't matter how it gets there it travels so fast it can't hurt the initial speaker as the signal moves faster than the speed of sound, much much faster, so the signal is to all speakers before a sound is ever made. Wired signal travels just under the speed of light.

Subject: Re: Kustom model 600-5 PA

Posted by [Iowa Boy](#) on Wed, 20 Jan 2016 22:00:05 GMT

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Lets put this back into perspective: we have two non-Kustom speaker cabinets. Both cabinets have a Jensen 4 ohm speaker in it; one cabinet has an 8 ohm Realistic speaker, the other an unknown assumed 8 ohm speaker as well.

There are only two ways to wire 2 speakers....series or parallel.

An 8 ohm speaker has twice the resistance as a 4 ohm speaker. On a 4 ohm load, the output will be less with an 8 ohm speaker verses a 4 ohm in which case you get the full maximum output.

Anyway you wire two speakers that have dissimilar ohm values, you will NEVER get a balance sound out of the cabinet. The 4 ohm speaker will be the driving one. Doesn't matter how fast the electrons are traveling through the wire, resistance is resistance, and the more resistance the more power loss, and more power loss, less output.

I'm not an electrical engineer but I did take college physics. I see no practical way to use these speakers efficiently. Sure you'll get sound.....but really is that the sound you want?

Subject: Re: Kustom model 600-5 PA

Posted by [Kustom_Bart](#) on Fri, 22 Jan 2016 05:07:59 GMT

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You know I thought of a very clever response to your post, but it just isn't worth it.

Yes, this is real when wiring multiple speakers in a cabinet too! series-parallel or parallel-series

Subject: Re: Kustom model 600-5 PA
Posted by [stevem](#) on Fri, 22 Jan 2016 11:45:31 GMT
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The problem is that even if they where all great sounding drivers , the ones hooked up that are of a lower impedance would be atleast 1/3 louder than the others and would need to be rated for twice the wattage you where running the others at if you where pushing them hard.

Subject: Re: Kustom model 600-5 PA
Posted by [Iowa Boy](#) on Fri, 22 Jan 2016 16:49:40 GMT
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Thank you Stevem.....that is exactly the point I was trying to make.

Subject: Re: Kustom model 600-5 PA
Posted by [Kustom_Bart](#) on Fri, 22 Jan 2016 17:47:35 GMT
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For a pa it doesn't it really matter, if you need to get it going? It will work and not hurt anything and sound fine. Even though Steve is correct with the additional draw on the lower ohm rated driver. that goes without saying. You can make it work and when you pick up a driver of the same impedance then change it out. Here is a really nice link to show you about Series/Parallel wiring.

http://www.colomar.com/Shavano/spkr_wiring.html

Subject: Re: Kustom model 600-5 PA
Posted by [pleat](#) on Sat, 23 Jan 2016 00:09:20 GMT
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Not sure if anyone actually checked out the link to the photo's in this post, but talking about speakers, I'd say none are worth much. Once speaker the terminal posts is completely missing, just the wires from the cone showing. the other speakers may be 35 watts at best. I think two of them are CTS according to 137 code. Not sure who was making the speakers for Radio-Scrap.

I also saw burned sections on what appears to be the master control section, so I think the focus should be if the amp works. The K600 has 4 speaker outputs, two for each internal power amp. Each amp wants 3-4 ohm total load per amp. For testing purposes any speaker from 4 to 16 ohms will work. Once the amp is working as it should be, then determine what the amp will be used for and find speaker cabinets that purpose. I know a Large Kustom collector, in fact the largest

collector, over 400 pieces of Kustom gear. I know he is going to part with a lot of 4x12 PA columns and some other gear later this year.

pleat

Subject: Re: Kustom model 600-5 PA
Posted by [LukeM](#) on Sat, 23 Jan 2016 01:53:12 GMT
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Understood. The red and green wires are from the main power supply, through a pair of 125 ohm resistors, and are regulated by a pair of zener diodes on the main board. If those are fried, I'll probably rig up a pair of +-12 or 15 volt regulator circuits to go in place of what's there. Pretty simple stuff.

For test purposes, I have a couple of PA speakers that will handle the power. I doubt I'll spend the money for genuine Kustom columns, but maybe the next guy will.

Luke M

Subject: Re: Kustom model 600-5 PA
Posted by [stevem](#) on Sat, 23 Jan 2016 11:04:41 GMT
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The shack up into the 80s used Utah made drivers.
In the 70s they where orange frame with a aluminum dome, then in the late 80s they switched over to Ponner brand drivers made in where else , China!
The Orange frame drivers sounded very go and most of them went down to 75 hz and they where rated for 40 watts.

You need to watch out with switching over to a different regulator set up as I have never figured out how much current all 6 preamp sections and the EQ/Reverb section eats up and most regulators are only rated at 1 amp.

I understand your wanting to make something better, but in reality I think just replacing the Zeners is all you need to do as I do not think you will ever drive the amps output stage hard enough to change the 12 volt level that the preamps run on that much, but hey it's your time!