Subject: SE 300B Project, Part 13 - The finished amp
Posted by Damir on Mon, 26 Jun 2006 17:25:06 GMT
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Well, I finally put together two AZ50 rectifiers, two 300B and two C3g tubes on the top of the 19"/2HE rack , together with PT (grey box).I wanted compactness of the single chasis stereo amp, but you can see the inside - two PTs, four PS chokes, two grid chokes, 11 big capacitors, two CCS modules, etc. Everything is closer together then I really liked, but I tried my best to somehow put all this together. See the position and orientations of various magnetic components. I added partition in the middle of non-magnetic steel, a little bit of separation between the channels and components, but its main purpose was to strenghten the chasis - it isn`t human how heavy is this amp!The components are hanging upside-down, screwed on the top plate - good for servicing, but not so nice looking of many srew-heads on the top plate...personally, I don`t care. L & R inputs are in the corners, very close to the "Goldpoint" input attenuators and driver tubes - just a few cm of silver wire... On the first picture you can (barely) see the pot for hum balance, and a little socket for monitoring the bias current close to the 300B socket.From the rear you can see the (IMO - nice) location of LEDs for the C3g bias, connectors, switches and pots.The sound is a little more "damped" and less open then breadboarded version, probably not a surprise - monobloc construction and a larger chasis have their advantages. After a few hours of burn-in (listening the music), the sound is a bit better, but I`ll try a few things (Mu-out) again...and again... And one more thing - I relocated the amp to the home where the mains voltage is about 5% lower then in my "workshop"(B+ and B1+, too)...output tubes now biased about -69V (it`s a 69/910 ~76mA), I`ll probably lower Rk`s a little. Expecting update in a week or two...

Subject: Re: SE 300B Project, Part 13 - The finished amp
Posted by Wayne Parham on Mon, 26 Jun 2006 21:03:53 GMT
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Wow, that's awesome, Damir! Great work!

Subject: Re: SE 300B Project, Part 13 - The finished amp
Posted by Forty2wo on Sun, 02 Jul 2006 19:57:04 GMT
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Beautiful, just beautiful. And fast too! It takes me weeks to build a chassis, my DRD 45’s are still on bread boards.I will have to stop by some evening and have a listen. I have made some changes to my 300b amp but it is too hot (34) to run them :0)…John

Subject: Re: SE 300B Project, Part 13 - The finished amp
Posted by Damir on Mon, 03 Jul 2006 11:08:35 GMT
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Hey, thanks...I also worked on high temperature and humidity...huh.The whole saturday afternoon and evening I drilled over 300 holes in the lower cover (ventilation)...first fi 3mm, then enlarge them to 4,5mm, then de-burring...This is more tin-smith then electronic work, haha...When I was finished, I mounted the lover cover (tightly), mounted 5 feets (weight!), and bring the amp in the main room. Just listening the music when I have some time - I`m tired of tinkering :-).The sound is very good, little on the "soft and warm" side, but not too much that we can say "colored"... Clean, detailed, very nice! I think that it just started to "open up". Interestingly, two guys with large experience in the amps building privately suggested me 300h burn-in like their experience. They don`t like the forums, I don`t blame them... I measured 5,7 & 6,6 mV of hum on speaker terminals - not overly good, but probably normal for the stereo amp with very small steel chasis. Most of this hum comes from the AC heating, and a little from electromagnetic interactions. Even shorted input grid on 300B doesn`t change the level of hum. Interestingly, one "Svetlana" tube with the hum pot in the middle shows almost 50mV of humm- large "off center"! I needed large turn of hum pot to find the minimum hum. However, the hum isn`t noticeable in the listening position, but people with very sensitive speakers better use bigger chasis of non-magnetic metal, monobloc construction, partitions, and DC heating like reccomendable option. I`ll do some other measurements, when I find some time. And yes - the amp weights exactly 20 kg ...

Subject: Re: SE 300B Project, Part 13 - The finished amp
Posted by Forty2wo on Mon, 03 Jul 2006 22:01:36 GMT
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As to the hum, that is about what I get with my 300b (TJ) I think you will find you will not get much better unless you go DC on the filament. When I set up my DRD for these same set of tubes the hum was the same. the 45’s are down at 2-3 mV with the exact same wiring setup...John

Subject: Re: SE 300B Project, Part 13 - The finished amp
Posted by horny on Sun, 09 Jul 2006 18:26:23 GMT
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hi very nice work!i am new herethe amp looks like a very nice project for mecan you tell me what the input sensitivity is? i use no preamp only a passive autoformer did anyone try a ec8010 as driver stage ?

Subject: Re: SE 300B Project, Part 13 - The finished amp
Posted by Damir on Mon, 10 Jul 2006 12:08:46 GMT
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Hi, thanks, and welcome to the forum!We need about 50Vrms (70Vp) to "drive" 300B to the full power. With CCS-ed driver triode (and high impedance 300B grid choke as a load), we have the "driver" amplification practically equal to the µ, or theoretical amplification factor (very close).In the case of E180F in triode - A = µ ~ 50, or input sensitivity for the full power is 1 Vrms. Although C3g specs said µ~40, my "Siemens" tubes have µ~50, again - input sens. is 1Vrms. (If we`d have a tube with "right" µ=40 spec, then sens. would be 50/40= 1,25Vrms).D3a has larger amplification, A=µ~75, and then input sensitivity is about 0,7Vrms.Unfortunately, I have no EC8010, and didn`t try them. But, (based on its data) I expect it to be the similar like other high-gm "candidates" above, and others I tried (6C45Pi, E280F trioded).If you have some EC8010 on hands, the best you can do is to try it for yourself. Use CCS, Ia~10mA, Rk=220-250 Ohms bypassed with 220µF (MKP of 100µF at least reccomended) - like your starting point. Beware that this tube has g1 connected on five pins... I`d use grid-stop resistor (say 100...220 Ohms, CC) on every input pin. Based on the specs, you can expect A=µ=60 times, or input sensitivity of 50/60 = 0,83Vrms. Adjust Ia (or Rk if necessary) to have Ua about 200V. Seriously, only you`d can say about "sound" in your system, and like/dislike factors :-).You can expect rel. large input capacitance, unfortunately.Do you have some parts (tubes, transformers, etc.), or you are still in "various schematics" phase?

Subject: Re: SE 300B Project, Part 13 - The finished amp
Posted by horny on Tue, 11 Jul 2006 14:23:20 GMT
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hi Damirthanks i think that i first build it with the ec8010 i will drive the ec8010 at 20 maand use a gridchoke on the 300b the same as you use just for trying try a 10k resistor parallel with the gridchoke and report the sound on this forumi find this better sounding i have various transformers laying around also chokes so i can try different thingsas you say expect large input capacitance with the ec8010what does this mean???give this some roll of in hi or low frequencies?and is there a solution i use no active preamp just a 24 steps autoformer with 8 feet (2 meters)interlink between the autoformer and the amp

Subject: Re: SE 300B Project, Part 13 - The finished amp
Posted by Damir on Tue, 11 Jul 2006 15:08:51 GMT
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Hey, I tried various resistors "across" the grid choke, from 100k-1Meg. It can help a little to damp RCL resonance, and/or to "kill" RF oscillations problems... Sometimes I thought that I hear not much of the difference, but in the end my conclusion was that it somehow "kills" that 3D "sound"

and sounds somehow "flatter" and 2D...huh, too much "audiophile" language... But, I noticed that the grid choke can be a giant pick-up on the input grid, oscillations and unstable work/sound are possible... You must mount it very close to the 300B socket, at least 1-2cm from the chasis, it`s orientation in respect with other magnetic components (OPT) is important... and check for oscillations. Lower values of parallel resistor "defeat" any benefit of the grid choke, IMO ... your 10k in parallel with high impedance of the choke is 10k...but also in the parallel with unecessary choke winding capacitance. And not just that - this grid resistor of 10k is actually in parallel with triode`s load (anode resistor, or CCS when you use anode out), and this resultant driver load is too low.In other words, your driver "sees" just the 10k as a load, parallel with Cw... not too good, IMO.Large input capacitance of EC8010 means that you must be carefull not to use large series resistance (pot) before the tube - HF "roll-off".

Subject: Re: SE 300B Project, Part 13 - The finished amp
Posted by horny on Tue, 11 Jul 2006 15:37:54 GMT
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hi Damir thanks, thats very useful info!i will use the ec8010 with the autoformers these have a dc resistance of 35 ohm and a induction of 180Hwill this work fine then?btw. how much is de input capacitance of de c3g driver?

Subject: Re: SE 300B Project, Part 13 - The finished amp
Posted by Damir on Tue, 11 Jul 2006 16:33:07 GMT
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Unfortunately, I don`t have any experience with TVC - please, try it and report how it worked out! For the input capacitance of CCS loaded (I assume that you use CCS?!) stage, we must "count" on large "Miller" capacitance. Although EC8010 data said Cag=1,9pF, Morgan Jones measured 4,6pF-4,8pF (!), and if it is actually true, you can expect ~ 300pF on the triode input! If you have "Valve Amplifiers 3" - it`s on the page 560 and around... For C3g, data said Cag in triode 2,7pF, let`s say 3pF - then we can expect probably ~160pF of input capacitance.Again, my opinion is to build the 90% of the amp "as is" (PS and output stage, and part of the input stage), then temporarily try EC8010 on its socket and its parts soldered on socket pins. Then try C3g version, with various options (Rk or LED bias, g3 connections...).Only then you`ll know for sure what works for you.

Subject: Re: SE 300B Project, Part 13 - The finished amp
Posted by horny on Fri, 21 Jul 2006 09:19:07 GMT
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hi DamirI build the amp and tryed the C3g and ec8010 first i must say i build the amp with ux245 as output tube. I used the C3g driver stage as you post here and the ec8010 at 150v /20m.The ec8010 is very good more hights and more bass then the c3g but the hights are not sparkeling ,not loose. More like an transistor amp. Very impressive but i think not for a long time. The c3g has more fluidness (sorry for the strange talk) i try to explane sound thats not easy the sound is also more clean and there is a good balance in the whole freq.spectrum So the c3g is staying i like it !!!For me this sounds best but i think that others may like the ec8010 more.Then i tried the ec8010 and the c3g with the same operation points interstage coupled.I have amorphouse interstage tranny's from Tribute audio the opt's are also amorpouse one's from the same builder. The carractre of the tubes is the same now but no there is an naturalnes to the sound its smoother and more relaxed but still dynamic and very very clean. I like the amp most with the c3g driver interstage coupled its also a very simple set up.Robert

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Subject: Re: SE 300B Project, Part 13 - The finished amp
Posted by Damir on Fri, 21 Jul 2006 12:46:19 GMT
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Hey, thank you for your report and congrats! I`m glad that you like C3g, yes - "fluid" is a good word to describe this sound...not too much "punch" and highs, but it depends on the way of bias (LEDs or Rk//Ck) and g3 connection a bit.I think that I understand what you mean with "more bass and highs" but somehow "transistor" sound...boring and hard on the "long run". I have this feeling with 6C45Pi, for example.Maybe (linear and neutral) C3g "uncovers" the real sound of DHT+OPT (output stage) and didn`t add "something" to it?!Anyway, your version sounds interesting, especially with all this HQ "iron". I assume that you breadborded the amp...please, post some pictures when you finish it. Maybe we can put your (interstage) version in the schematics/projects section!?

Subject: Re: SE 300B Project, Part 13 - The finished amp
Posted by horny on Fri, 21 Jul 2006 13:38:34 GMT
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hi Damir yes i think in 2 weeks i am ready with the complete amp then i post a picture from outside and inside cabineti glow the 45 with dc and use Tent labs heaters i have also Machmat heaters and they work also very good maybe better and are cheaper www.machmat.comthe hum is 1mv maybe lowerthis is needed because i use sensitive speakers 110db/1watthere is a picture of the system

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Subject: Re: SE 300B Project, Part 13 - The finished amp
Posted by Wayne Parham on Fri, 21 Jul 2006 14:24:41 GMT
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Very nice!

Subject: Wow! :-)
Posted by Damir on Fri, 21 Jul 2006 19:06:53 GMT
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Hey, if you can find some time in soldering pauses, describe us your system a little - especially the speakers.That`s why I "insisted" on both driver versions breadbording...it isn`t easy to build totally "universal" SET amp...and I "voiced" it on two way rear ported JBL 4208...somewhat different then your horns... Anyway, keep us posted about your progress.

Subject: Re: Wow! :-)
Posted by horny on Sat, 22 Jul 2006 09:56:54 GMT
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hi Damir I build the whole set by myself the speakers are 60cm Oris horns with AER md3 drivers. The woofers are 15 inch bd15 in a b.r cabinet in front hornloaded with 80 cm Oris horns. The woofers are active with a plxxo this is a line level filter direct behind the head amp.So the caractre of the amp is given to the bass unit.As bass amp i use a diy gainclone with very good power supply big trannie and 14 Black gates in super e cap config.My diy dac is one tda 1543 nonoversampling type. the turntable is also diy and weigts 38 kg.(i have a picture if you like)i do it with a link:http://forum.audiofreaks.nl/index.php?topic=6571.0scroll down and you see it you cant see the motor on the pictures its a separate engine behind the turntable driven with a very thin wireStepup trannies are from Tribute Audio and the phono amp is diy. The passive pre amp are 2 (left and right separate)autoformers from Tribute Audio. Cables are all diy. The sound of the speakers can i explane as it are magnifying glassesthe amp that drives them must be very good. Every thing that is not right is direct audible. if you feed them crap you get very much shit If you give them a little hum you get enormouse hum in the room It must be under the 1 mv and this is still a little audible.but with the right aplifier they can sound like heavenvery very detailed with enormouse dynamics and pressure also with 1,5 watt. I have also an diy 300b amp but i like the sound of a 45 more. But thats just my taste

Subject: Re: Wow! :-)
Posted by Damir on Sun, 23 Jul 2006 12:14:15 GMT

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Very impressive...serious and quality DIY stuff! Interestingly, you are "blessed" with many HQ transformers winders in Netherlands (Amplimo, AE, Tribute...), specialised shops and large DIY "comunity", so it seems...Did you use "hum pot", or just directly connected Rk//Ck on the minus pole of the filament? I think that even with DC heating, with pot version you can adjust for lower hum...obviously necessary with 110db/W.

Subject: Re: Wow! :-)
Posted by horny on Sat, 29 Jul 2006 08:59:33 GMT
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hi Damir i have build a 300b amp a year ago and this is with "normal"dc just a schottky bridge and a 10000uf cap and a hum poti get here 1mv hum and it is quiet enough but the the the sound with the heaters from Tentlabs or Machmat is much better see this:
http://www.tentlabs.com/Info/Articles/Heatingmethods.pdfor
http://www.machmat.com/sales/kits/index.htmunder miscelaneous and then vccsregards Robert

Subject: Re: SE 300B Project, Part 13 - The finished amp
Posted by horny on Sun, 13 Aug 2006 09:04:39 GMT
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hi Damir Do you made any updates so far i find the c3g sounds very good but a little thin in the low mids. The deep bass is very good with good punch better than any driver i tryed but voices have a little less bodyi set screen 3 to anode this sounds indeed better than to ground i have not tryed the led bias for the rest is the amp pretty good ,clean not harsh go's deep very detailed and also the bass is very detailed but voices may have more whoomp do you have any idea what i can try?Regards Robert

Subject: Re: SE 300B Project, Part 13 - The finished amp
Posted by Damir on Sun, 13 Aug 2006 21:00:50 GMT
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Hi, you can try the (cheap, red colour) LED bias - schematic and wiring details are here. Center of your loctal socket can be a "local" (driver) grounding point, you can solder the minus pole of your last filter cap (from the driver supply) here, too. From that point, one wire to the one and only star

(chasis) ground point. R1 and R9 are "stopper" resistors and must be non inductive, HQ (say CC or tantalum), and soldered close to the pins. Two red LEDs are connected in series, their leads must be short, too. Of course, CCS version is showed, for interstage version you must make some minor corrections.Interestingly, with my speakers I have almost too much those low mids, ha. Deep bass - yesss!Try this, and please report back...good luck!
http://www.audioroundtable.com/GroupBuild/Projects/SE300B_C3g_driver.jpg

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Subject: Re: SE 300B Project, Part 13 - The finished amp
Posted by horny on Wed, 16 Aug 2006 19:43:40 GMT
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hello DamirI tryed the led and i like it more then a resistor and 220uf Nichicon Muse capacitor The thin sound that i write was because the tubes are new later the sound become fuller and fuller and to full then the amp was a little to dark the led brings it a little on the back right way the sound get also very very clean i like it but other builder maby find it to clean i had 3 to 3,2 volt cathode bias with the 280 ohm resistor and 190v on the anode (c3g)with the red leds i have 3.65 and 210 volt on the anode have i used the wrong leds?can i leave it this way or must i chance it?regards Robert

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Subject: Re: SE 300B Project, Part 13 - The finished amp
Posted by Damir on Thu, 17 Aug 2006 12:45:35 GMT
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There`re various red LEDs, and mostly the cheap and simple ones have lower internal resistance (about 4,3 Ohms with 10mA, and U~1,7V - "Valve amplifiers 3" source). This voltage drop depends a little with current through the LED - I suppose that you used CCS with ~11mA, like me? Specs for C3g are Ua=Ug2=220V max., and you are just fine...and probably you used right LEDs, too.Try to "burn in" your amp a few hours more (a few tens or hundreds h even more desirable:-)) and then decide can you live with this sound like a final version. I`m out of ideas here...you can try various "boutique" cathode resistor(s) bypassed with other types of caps, say 4-5 pcs 22µF MKP in parallel...but for me, red LEDs bias sounds better, and I built the amp (finally) that way - CCS+anode out, g3 on anode, LEDs bias - as I said previously...Did you try interstage version, too with LEDs bias? (Of course, B1+ must be different, about 200-210V + drop into Rw of ITT).Of course, please - post us your findings...

Subject: Re: SE 300B Project, Part 13 - The finished amp
Posted by red on Wed, 01 Aug 2007 11:24:35 GMT
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Hi Damir,I ama also think of building thsi amp as it is VERY well documented and you have obviously spent a great deal of time evaluating the option which really help us folk out here.I currently have most if not all the parts - althought not exactley the same if you get my drift.I currently have a version of Thorstens Legacy amp (but using conventional power supply CLC) but have also got some C3G to try out - I have not really gotten on very well with this and I am not sure why? The highs seem a bit grainy and the bass a little bloaty - I am sure it could be the non regulated power supply which I do not feel really confident in putting togther.Just a quick question before I move to your project - how do you go about determining the value of the grid stopper and do differnt value really have any effect on the sound?Thank Red

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Subject: Re: SE 300B Project, Part 13 - The finished amp
Posted by duderduderini on Thu, 01 Nov 2007 12:12:33 GMT
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Hi DamirI have just discovered this thread and forum. I have stumbled across the concept of driving a 300b with a pentode.2 questions If I may.1. Where would i get the 1700 H grid choke? What specs2. I have the iron for a parallel 300b set ca this driver stage be suitably modified to drive that or do I just use 2 of the 6688 driver stages?ThanksNick

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