Subject: what in the hell is a 5861?
Posted by PakProtector on Tue, 21 Dec 2004 20:47:11 GMT
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hey-Hey!!!,Meduim sized microwave triode, mu=30, gm of 6 mA/V...that's a lot of gain, and probably a plate Z of 10k at a reasonable operating point.regards,Douglas....damn Thrintun!

Subject: Re: what in the hell is a 5861?
Posted by colinhester on Tue, 21 Dec 2004 21:11:36 GMT
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My mistake. Somehow I got that number stuck in my head. Sorry. The link below is the pre we're thinking of going with.
http://diyparadise.com/simplepreamp.html

Subject: that's what I thought you meant...
Posted by PakProtector on Tue, 21 Dec 2004 21:37:08 GMT
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hey-Hey!!!,Anyway, it is a simple thing. Output Z, as dominated by that itsy-bitsy cap is going to be steep. 5 uF is a good place to start. Then we're still looking at ~3k from the 5687. So, is this good enough? It is my opinion that if you're going to the bother of cutting holes in a chassis, it should be better.A 300-0-300 plate winding and two 12AX4 damper diodes is a good place to start. Feed a choke, like Hammond's 30 Hy/40 mA and 100 uF of motor run cap and if you're past critical current(20 or so mA), you'll have less than a volt of ripple peak-to-peak.Also, what about gain? be sure of the requirement, so as to avoid padding the volume control as a lot of folks have had to do when building with 12AU7's.A single 12B4 is one of my fav's. or get nuts, and pick the 26, or 45, or 10...And then, there is the question of plate loads. Resistive, CCS, or inductive? There are advantages to each to be sure. A single DN2540N5, a gate stoper resistor and a 1k/10 turn pot is one of the simpler ways of doing a CCS. Cost ~$5 depending on sourcing and shipping costs. Cascoding the 2540 is better but a bit more complex as well.regards,Douglas....damned Thrintun!

Subject: Re: that's what I thought you meant...
Posted by colinhester on Tue, 21 Dec 2004 22:06:10 GMT
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The purpoae of this, the first, group build was to give the novice builder, like me, a chance to learn

the basics. For me, this is the place to start and learn from you and others. This hobby is becoming a lost art, and I strongly belive simple projects like this will ensure its continued existance. These projects will offer one the skills to build larger, more complex gear. Considering the unknown financial limitations of those involved, a cost of around $100 (give or take) per build was being recommended This particular preamp was chosen by another member because there is already a wealth of literature on this particluar design. Yes, you are correct, new audio ground is not being broken here. What we are trying achieve is a basis for future projects. The logistics of an internet group build is daunting in itself, muchless without struggling over modifications from the outset. Please, do not mistake me, I am all for "playing" with designs; that is what this hobby is all about. I will build the preamp stock; others will not.Douglas, your knowlege of this science is apparent. To be honest, what I know about tubes could be written on the back of a postage stamp. It is people like you and others that I want to learn from. I truely look forward to future discussions with you....Regards, Colin

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Subject: Re: what in the hell is a 5861?
Posted by Manualblock on Tue, 21 Dec 2004 22:33:29 GMT
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Hi There T; This pre is based on the Audio Note M-7. Maybe you can school us here. The AN version uses 220 power transformer and a C-R-C filter. The one we look at uses a 350-0-350 power trans with a choke loaded filter. The specs on the 5687 go like this;Plate Voltage 250Grid Volt -12.5Amp Factor 16Plate Res. 3k ohmTransconductance 5400 mhoPlate Current 12 maGrid Voltage -19vStarting from this point where would you go in terms of 1. Power Trans2. Filter.Thanks Much for any help you share with us; J.R.(I have a pair of the Bottlehead CCS)

Subject: alright then...
Posted by PakProtector on Tue, 21 Dec 2004 22:41:47 GMT
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Hey-Hey!!!,Seems reasonable...Take a slightly smaller simpler means of doing it.180vac(or thereabouts, there is a 190-0190 Hammond, 2 or 369EX), double for a CT winding or a full bridge on a single...hybrid bridge, SF4007 diodes to ground and a 6CA4 for the forward diodes. The same 30 Hy Hammond, and an eaBay-ed motor run of 240vac rating and ~100 uF.This will get a reasonable B+. The single DN2540N5 with a reasonable heatsink will also allow the use of another output point, namely the source of the MOSFET. You'll have what is effectively a source follower output buffer. This also simplifies the cathode circuit because the triode still sees a constant curent, and no bypass is needed. Use a pot instead of a fixed resistor to set the current. try 10-15 mA.The output coupling cap has already been mentioned. the EX Hammond has 2.5A of 6.3, plenty for a 6CA4 and single 5687. DC can be done with a RadioShack TX and an LM317 should it be required at ~$20 additional.Biasing of ~3 volts ought to give a good operating point, 2-4v is a good place to play. V=iR.so, 2 nine pin sockets, 1 5687, 1 6CA4, 1 369EX(note 370AX

is on sale for $36), 1 157G, one 80-100 uF/240vac motor run oiler, 2 5 uF motor run caps for the output coupling, 2 DN2540N5 mosfets, 510R 1/4 watt carbon comp gate stoppers, 2 1kOhm pots for current set, 4 RCA jacks, 1 stereo volume control (R-S 100k Alps is ~$3), 4 red/20 mA LED's for bias, wire and chassis material.so where are we?regards,Douglas....damned Thrintun!

Subject: Re: alright then...
Posted by Manualblock on Tue, 21 Dec 2004 23:35:21 GMT
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Uggh; Whats a motor run oiler BTW? What you have expressed seems to my uneducated mind as a very steeply regulated power supply; is that correct? If so is this designed to allow the use of a cheaper power trans? Assume we know nothing of engineering slang terms. If you could take some baby steps we would be forever in your debt. The load lines look better at a higher plate voltage. Is there something we missed? What does a full bridge on a single hybrid bridge mean? The Hammond trans coupled with the DC circuit ends up costing more than the 360-360; how is it better? Are you saying the CCS means you no longer need a cathode bypass cap? Thanks Much; J.R.

Subject: Sure, I'll play
Posted by colinhester on Tue, 21 Dec 2004 23:37:36 GMT
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Well, I'm here to learn from the masters, so I'm in. Can you provide a schematic, just to make sure I get it right? Is this of your own design?.....Colin

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Subject: Re: alright then...
Posted by PakProtector on Tue, 21 Dec 2004 23:47:44 GMT
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HEy-hey!!!,Motor run capacitor. GE's 97F series is an example. Metalized polypropylene in veggie oil. Regulated, depends on what youcall regulated. recitfier to an LC filter, runniing at past critical current is pretty well regulated. The recitfier thing. V-0-V allows two forward facing diodes(like tubes). Full bridge it is called. V-V, or 0-V requires a full bridge of four diodes. One can substitute a twin diode like a 6CA4 or 5U4, or 6X4 in place of the two forward facing diodes and use SS for the 'back' side of the bridge.It depends on how you use the CCS. A Bottlehead C4S won't work as a mu-follower style circuit. A mosfet can. if the load (the amp) is connected to the plate, and we're using a CCS as a plate load, the AC current taken by the load leaves a varying current through the valve, and therefore the cathode. Take the output at the source of a mosfet, above the

current setting resistor, and the device will still provide the valve with CC, and supply the AC to the load. If the current is constant through the valve, we don't *REQUIRE* a bypasesed cathode. It may be useful to avoid hum coupling from the heater to bypass but that's another topic.What is a 360-360?regards,Douglas....damned Thrintun!

Subject: Re: Sure, I'll play
Posted by PakProtector on Tue, 21 Dec 2004 23:59:42 GMT
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Hey-Hey!!!,The schematic will have to be a pen and paper deal. I am not skilled with the Electronic methods. Email me and I'll draw it up for you(probably make some copies too, or scan it and pass it around...Own design is an interesting concept. I did not see this exact thing elsewhere in the exact form I will provide you(or anybody who asks) with. I have build a few linestages, and will build a few more before I am done. This is about as simple as I think it can be done and still deliver 'the goods'. If you are going to go DC on the filaments, the Hammond 261C6, E6, and G6 are all capable of running the rectifier, and are a bit cheaper.regards,Douglas

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Subject: Re: alright then...
Posted by Manualblock on Wed, 22 Dec 2004 00:57:49 GMT
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First Thanks for your help. The 360 360 I meant a 360-0-360 CT trans. I always understood the bypass cap on the cathode acted to eliminate the feedback through the cathode resistor. Why is the low plate voltage better for sound on the 5687? I have read that that tube sounds better with higher B+, but the Audio Note runs 200 v on the plate while the modified unit runs 330v. How does mixing tube and SS in the rectification circuit help? I warned you this was baby steps! Thanks again, you see this is such a radical change from the original we have to recharge the Dilithium Crystals.

Subject: Re: alright then...
Posted by PakProtector on Wed, 22 Dec 2004 01:34:26 GMT
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Hey-Hey!!!,As far as voltage goes, there is no sense running up near max ratings. Once comfortable with some of the basics, and the circuit is working as expected, it is safer to push things around a bit. There might be something else to change by then...On the rectifier thing, we need four diodes for a full bridge, since there is no certer tap to ground(the grounded CT, and two diodes is basically two out of phase half wave rectifiers). Two diodes(one at each end) form the

curent path, one with the banded end to the filter, and the other with the un-banded end to ground. We keep the two with the unbanded ends to ground, and put a pair of vacuum diodes in place of the others, with the cathode(the hot part in a valve, banded end for SS) to the filter. It is PN-junction noise free due to the vacuum diodes.this made sense while I wrote it...and still when I read it. I have my fingers crossed.regards,Douglas

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Subject: Let the game begin
Posted by colinhester on Wed, 22 Dec 2004 01:39:36 GMT
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Please scan it and pass it around to those you know are interested (i.e., Wayne, Manualbloc, myself). You might want to make a general posting requesting emails for those whom are interested. Please keep the schematic as clear as possible for us new guys. I'm trusting you on this one.If there are various concepts / variations on the power supply side, please share. How easily are they simulated in PSU Designer? (I think that's the name.) Can we just pick one PS to go through the mathematical work-up? What other parameters of the PS can be calculated and can we discuss why they are important? What should we look for in terms of sourcing parts? I would also like to see theoretical discussion, not entirely by you (way too much effort for one person,) of the signal path. I realize this is old hat for you, but there are new guys (OK, me) out there that really want to learn this stuff. If they are anything like me, hands on is a much easier way to learn.I realize the Holidays are upon us, but I think we can start some of the "thought experiments" anytime.....Colin

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Subject: Re: alright then...
Posted by Manualblock on Wed, 22 Dec 2004 01:39:58 GMT
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You are explainig great; it is starting to seep through the concrete of my skull. Now the 5687; how do you like that tube and how does your circuit sound. How easy and what are possible sticking points to using your iteration?

Subject: Re: alright then...
Posted by PakProtector on Wed, 22 Dec 2004 01:59:32 GMT
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Hey-Hey!!!,I like the 5687 a lot. I will let you know about the next iteration when I have it built. In the mean time, I would caution you about trying Mercury vapor diodes like 816 and 83 until you are a bit more comfortable with the undeside of your own creation.The other sticking points to a

later iteration don't seem like sticking points anymore to me. Build the simplest one and they seem to evaporate with familiarity and practice.The linestage sounds good. I have not listened to it with the single MOSFET plate load CCS in a ling time. It is easy to modify it to a cascode circuit later. The single *IS* simpler and easier to deal with at first. I would not have suggested it if I were not confident in the result.regards,Douglas

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Subject: OrCad and PSpice
Posted by Wayne Parham on Wed, 22 Dec 2004 12:01:29 GMT
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I'd be happy to draw the circuit in OrCad, which makes a nice looking schematic. It also makes it possible to analyze the circuit in PSpice or to generate a printed circuit board layout.

Subject: Re: alright then...
Posted by Manualblock on Wed, 22 Dec 2004 12:30:15 GMT
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Thank you; thanks for your help and a Very Merry Holiday to you and Yours.

Subject: Re: OrCad and PSpice
Posted by PakProtector on Wed, 22 Dec 2004 12:47:47 GMT
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Hey-hey!!!,I am going to draw it on a 2x3 paper with a Sharpie, then photograph it at maximum resolution. Ought to be readable enough.regards,Douglas

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Subject: Re: OrCad and PSpice
Posted by Wayne Parham on Wed, 22 Dec 2004 12:54:08 GMT
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That's cool. The parts count is low, so that should be just fine. When I draw simple circuits like passive crossovers and things like that, I generally do 'em by hand with a paint program or something rather than CAD. Hand drawn schematics add a nostaligic touch too, and that's pretty grrovy for tube amps.

Subject: Some basics :-)
Posted by Damir on Wed, 22 Dec 2004 19:26:30 GMT
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CCS mean Constant Current Source, and you can imagine it like very high AC load resistance (hundreds of kOhms, even MegOhms), connected at the very high B+ supply (kiloVolts). Then our load line becomes horizontal, and in combination with linear tube like 5687 we have very little distortion and amplification about tube mu.Output resistance of the common cathode line stage is load resistor in parallel with tube anode resistance. For 5687, rp