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Subject: simplifying the Guinevere

Posted by [MQracing](#) on Wed, 05 Oct 2005 12:09:40 GMT

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Hi. Downloaded the G schematic and kept thinking to myself that it be really trick with the use of some ac signal chokes... say in place of the 1meg output resistor. And if one wanted to build a simpler and free version a dc carrying plate choke ought to work on top of the 5687 very well and simplify things at the same time. I do like the simplicity of the diodes on the bottom of the cathode.... though even here an ac signal choke might work. overall a neat design.... yet even with it's as drawn simplicity... it could loan itself to further experimentation.cheers,msl

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Subject: Re: simplifying the Guinevere

Posted by [Manualblock](#) on Wed, 05 Oct 2005 13:52:46 GMT

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Like exactly how would those changes be implemented? I think it would be a great experience to compare the two different ways of implementing the circuit.

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Subject: Re: simplifying the Guinevere

Posted by [Damir](#) on Wed, 05 Oct 2005 18:07:19 GMT

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Wayne said while ago (if I remember correctly) that his version would be with anode choke in the place of CCS, output from 5687 anode. The output resistance is  $r_p$  in parallel with anode load (choke AC impedance), or simplified (if we assume large  $L$  / AC impedance on all "frequencies of interest"), about  $r_p \sim 2,3 \text{ k}\Omega$ . Large resistor parallel to the output is mostly for "cap discharge path" and some load if we use the preamp without amp load.

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Subject: Re: simplifying the Guinevere

Posted by [PakProtector](#) on Wed, 05 Oct 2005 19:06:55 GMT

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Simplifying is usually a good thing. I would like to have your thoughts on the results of more than an order of magnitude increase in its output  $Z$  your plate load choke modification would cause. Experimentation is also good. Any circuit could loan itself to further experimentation, it is in large part why we're here. What property or performance parameter were you improving by changing the cathode load from a low  $Z$  LED to a hi- $Z$  choke? Also, what would the DCR of this choke be? and

a final follow up, how would said parameter change?cheers,Douglas

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Subject: Re: simplifying the Guinevere

Posted by [MQracing](#) on Wed, 05 Oct 2005 23:37:58 GMT

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Hello MB:I'm not 100% sure I understand your question. let me give it a shot.If your asking how difficult would it be to implement say a plate choke on top of the anode of the 5687... answer is (imo) simpler and moreso straightforward than the CCS. Just two wires to hook up. You would need to double check your voltage drop across the plate choke and make sure you get the target plate volts on the anode.re: output impedances see Damir's response. What you would want to aim toward is a minimum of 100 henries imo. all very doable and straightforward. Some folks (though not all) favor the sonics of choke loading the plate vis-a-vis a CCS. On paper the CCS is technically a better solution. It offers much, much higher AC impedance than a plate choke. So... it one of those subjective areas... try both and see which sounds better to you.a high L choke can be substituted for the output resistor.... the claimed advantage here is that the choke offers relatively high AC impedance and less dc resistance than the resistor. Here you want to spec in a very large L for the AC choke. Say a thousand henries min.Again... by the numbers alone the resistor offers a greater ac impedance (1 meg in this case)... but it also has 1 meg of dc resistance. A 1000 henry AC choke would have approx 125,000 ohms of impedance at 20 hertz... while only having say a thousand to four or five thousand ohms of dc resistance....again, I think it's another of the instances of you've got to try it for yourself and "hear out" any differences and which sounds better. all of my suggestions\ideas were offered only as alternate ideas\strategies. the guinevere looks pretty neat as drawn up and is even as drawn up still a doable, practical, rather straightforward line level amp. cheers,msl

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Subject: Re: simplifying the Guinevere

Posted by [Manualblock](#) on Thu, 06 Oct 2005 00:06:37 GMT

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The point originally was to use the Guinevere as a platform for experimentation. Douglas offered several iterations of the original circuit so I am sure he is sympathetic with any and all possibilities. The discussion happening is great stuff. Thanks much and I am looking forward to more of the same.

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Subject: Re: simplifying the Guinevere

Posted by [Damir](#) on Thu, 06 Oct 2005 04:28:38 GMT

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Mu-output in CCS case has low impedance and "insulate" tube from the load. Anode choke version is not really suitable for "driving" amps with low input impedance. We now have impedance of the choke in parallel with amp input impedance like the load for 5687 anode. But, for the higher load (amp input), say 100k, plate choke can be good, simpler, but more expensive solution.

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Subject: Re: simplifying the Guinevere

Posted by [Wayne Parham](#) on Thu, 06 Oct 2005 05:16:26 GMT

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You're right, I had planned to do a version with no solid state components, just a large choke from B+ to anode. I still plan to do that, and have all the parts set aside. But my plate is full with other projects and I never seem to have time.

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Subject: confirmation

Posted by [PakProtector](#) on Thu, 06 Oct 2005 09:12:00 GMT

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yes, I approve of any and all experimentation or use of that circuit for research. I do wish to have an answer from the starter of this thread on the output impedance change. Maybe he didn't realize how the CCS works. I would like to see some good plate load choke circuits. Unfortunately for a reasonable output Z, there is another stage required, or one takes the hit on drive capability. Also, a more general Question: has anybody actually looked at the actual impedance provided by an anode choke? The capacitances from the winding-winding interaction usually give a self-resonance that is too low for my taste. There is no further increase in realized impedance after self resonance, so the choke does not really behave as an infinite load anymore. With chokes, I have found that sonics improve with linearizing the inductive response. The easiest way to do this is with a gap in the stack. A non-linear load provided by a choke at LF, where its reactive and nearly round loadline is nearly equal to plate Z just does not make any reasonable sense to me. Yet! I suspect this is a large part of what bugs me about a lot of SE amps I've heard. Take a 2A3 working into a 2k5 load. Textbook no? Primary L? let's say 10H.  $\Omega * L$  at 20 cps is 1256 Ohms. That's going to be a squiggly mess at LF. Not to mention being more than a bit down on power delivery ability. It's -3dB point won't even come until 40 cps, where the reflected impedance equals the reactive one, and then we'll still be presenting the 2A3 with a load of 1k2 (two 2k5 in parallel). This sort of thing isn't going to start looking OK (let alone good) until a few more octaves have passed under the bridge. Absolutely room for some experimentation with inductive loads I always say. Just realize how they are working and figure a way to keep the less-than-ideal performance from becoming visible. But that's how we work anyway, no? If there was such a thing as my hypothetical SE2A3 OpTx, I'd really like to know how to keep its shortcomings out of sight....cheers, Douglas

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Subject: and a link

Posted by [PakProtector](#) on Thu, 06 Oct 2005 14:53:29 GMT

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to a description of the inductive load line from

VoltSecond:[http://www.siteswithstyle.com/VoltSecond/211\\_Load\\_lines/211\\_LOAD\\_LINE.html](http://www.siteswithstyle.com/VoltSecond/211_Load_lines/211_LOAD_LINE.html)he

covers a lot of it pretty well. cheers, Douglas

inductive load line

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Subject: Re: and a link

Posted by [Manualblock](#) on Thu, 06 Oct 2005 16:38:00 GMT

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Jeez Douglas; If I had ten tutorials like that I could design my own stuff; with your previous contributions of course. Thanks.

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Subject: Re: and a link

Posted by [MQracing](#) on Thu, 06 Oct 2005 16:54:50 GMT

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I remember well working with Voltsec on that paper. Eons ago on another forum at another time... folks were arguing that the L was strictly in parallel with the  $r_{sub p}$  of the tube.... they were essentially looking at the small signal model as VS describes it in his paper. But the moreso appropriate model (talking power amps here which is what this paper addresses) for the primary L is that... in a large signal model the primary L is in parallel with the reflected impedance of the output transformers... I spent much time making these points about the need for L in a large signal model and how to moreso accurately model or describe those interactions and why having a sufficiency of primary inductance was critical... I promise not to ever do those monster threads again...but... what I would like to point out... is that the guinevere is perhaps more appropriately used in a small scale model... and does NOT employ an output transformer... from a small signal model (where you are not delivering power) then the plate choke can be modeled as being in parallel with the  $r_{sub p}$  of the preamp tube... If the  $r_{sub p}$  of the tube is say 2300 ohms... then a plate choke with about 180 henries will have an AC impedance at twenty hertz of approx ten times the magnitude of the  $r_{sub p}$  of the tube... and NOT load the tube in any significant manner. make a long story shorter... plate chokes have been widely used with success... I won't argue the technicals of this with anyone... is it worth a try? You bet. Is it simple to try... mechanically yes... expense wise... no. The CCS will be far less expensive to implement than buying a pair of appropriate plate chokes. But plate chokes are an option and perhaps an attractive SONIC option vis-a-vis a CCS load. cheers, msl

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Subject: Re: and a link  
Posted by [Manualblock](#) on Thu, 06 Oct 2005 17:09:26 GMT  
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Worth it to me; we already have a 3k\$ pre-amp for 200\$; whats to lose?

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Subject: that's the DIY spirit...  
Posted by [MQracing](#) on Thu, 06 Oct 2005 17:48:27 GMT  
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my own personal sense is that the plate choke might be good... and I'd bet even more money on a "grid choke" (ac choke) in lieu of the 1 meg resistor might even be more hip. But, I obviously like iron :=) And AC choke (with as little as say 500H all the way up to 5000H) in parallel with the output capacitor would enable you to reduce the size of the 4.7mfd output coupling capacitor. with the 4.7mfd cap and a 500H ac choke in parallel.... the resonant frequency would be 3.28 hertz. so... say you back off of the cap size and reduce it to 1mfd. then with a 500H choke your resonant freq would be 7.11 hertz. More than a full octave lower than twenty hertz if you take that to be your lowest freq of interest. a 1mfd cap with a 1000 henry choke would get your resonance down to 5.03 hertz. a .47mfd cap with a 1000 henry choke would get your resonance down to 7.34 hertz. increasing the choke's L while keeping the C constant lowers the resonance. the lower the amount of L the larger the C needed for the same resonance point. but the beauty here may be that you could use caps as small as say .22mfd or .47mfd with an appropriately sized ac choke (in the output part of the circuit) and still get response well below the audio band. this may yield sonically even greater improvements than just switching to a plate choke as opposed to using the CCS as drawn. MSL

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Subject: Re: and a link  
Posted by [PakProtector](#) on Thu, 06 Oct 2005 19:11:04 GMT  
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> So then, what is the point where the transition from the unloaded small signal model gets swapped for the power/large signal one? Specifics, and some numeric analysis would be quite useful if you can. What does the transition from small to large signal look like and how is it best described? some detail please. The load is always in parallel with the plate resistance. At what power point does the load start changing the response? This point is valid for an ideal inductance. the self resonance puts limits on deliverable impedance. it is not  $\omega * L$  but is it going to be enough to consider it as that?

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Subject: oops, wrong character used to bracket quotes

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\*\*\*but... what I would like to point out... is that the guinevere is perhaps more appropriately used in a small scale model... and does NOT employ an output transformer... \*\*\*\*So then, what is the point where the transition from the unloaded small signal model gets swapped for the power/large signal one? Specifics, and some numeric analysis would be quite useful if you can. \*\*\*from a small signal model (where you are not delivering power) then the plate choke can be modeled as being in parallel with the  $r_{sub p}$  of the preamp tube... \*\*\*What does the transition from small to large signal look like and how is it best described? some detail please. The load is always in parallel with the plate resistance. At what power point does the load start changing the response? \*\*\*\*If the  $r_{sub p}$  of the tube is say 2300 ohms... then a plate choke with about 180 henries will have an AC impedance at twenty hertz of approx ten times the magnitude of the  $r_{sub p}$  of the tube... and NOT load the tube in any significant manner. \*\*\*This point is valid for an ideal inductance. the self resonance puts limits on deliverable impedance. it is not  $\omega * L$  but is it going to be enough to consider it as that? \*\*\*make a long story shorter... plate chokes have been widely used with success... I won't argue the technicals of this with anyone... \*\*\*What technicals are those? That people have built amps that sound good and happen to have used plate chokes is not a disputed item. Relax...there is no fight here. \*\*\*is it worth a try? You bet. Is it simple to try... mechanically yes... expense wise... no. The CCS will be far less expensive to implement than buying a pair of appropriate plate chokes. But plate chokes are an option and perhaps an attractive SONIC option vis-a-vis a CCS load. \*\*\*Interesting things are always worth trying. short story: know as much about what you are experimenting with in order to get meaningful results. cheers, Douglas

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Subject: the DIY spirit...

Posted by [PakProtector](#) on Thu, 06 Oct 2005 19:30:17 GMT

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There is one point you missed with your suggestion on reducing the coupling cap size. The cap's reactive impedance is in \*SERIES\* with the output Z. So, if you want to deal with a circuit which is very cable sensitive, and incapable of driving low input Z amps( more on that in a minute), then the idea looks a lot more valid. That big cap is there for a good reason. The 1meg resistor is not doing much of anything save providing a means of ref'ing ground to the output. The bulk of this should be done at the amp. Here a grid choke is a good spot to use Iron. They're easy to wind and not too big. No DC, small AC...easy choke to design and execute in Cu and Fe. Before throwing in a large value grid choke, one should be aware of the reasons for employing grid inductances in the first place: grid current! in small doses, but grid current. It is also AC in nature, so the big value grid chokes will not do much better than a resistor in this arena. Curiously, if a low value resistor can be driven by the source, it is likely to be a better option. Tube sources capable of driving few kOhm loads are few and far between. Also to be considered is the effect of exerting this 'effort' to drive a low-numeric resistive load. Does the inductor allow better overall performance? Depends on what it is being driven by, and of course personal preference. There is no argument over the choices made under personal taste. this idea seems foreign sometimes, but it is a good thing to keep in the back of one's mind whilst discussing 'improvements' and 'better'...Like anything else,



design for what is required. When what is required is shrouded in mystery and/or religious fanaticism, good experimental method and analysis from the first principles is required. If you want it done right, do it yourself. Just educate yourself adequately is the unspoken requirement.cheers,Douglas

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Subject: what's next?

Posted by [PakProtector](#) on Tue, 11 Oct 2005 00:13:45 GMT

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simplifying Merli to a SE, para-feed 2A3 amp?So Mike, you deliver this interesting idea for a new linestage circuit, and then can't deliver a well thought out reason past, "plate chokes sound different to some", and "plate chokes are simpler than CCS-es".Keep up the good work if you please, I would like to know what sort of plate choke can deliver the goods. Keep in mind, the Guinevere circuit delivers some very nice numbers to back up her fine sonics.In God we trust. Everybody else: bring data.cheers,Douglas

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Subject: Re: what's next?

Posted by [Wayne Parham](#) on Tue, 11 Oct 2005 04:04:19 GMT

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I was gonna build a Guinevere line stage with plate chokes just so I could have an all valve circuit. But I understand that inductive reactance drops as frequency drops, so the choke has to be huge or it shunts LF. I guess that may make the choke prohibitively large and expensive or bass performance will suffer. I just wish I could find the time to build it, I still have the parts all gathered and ready to build. But my to-do list is soooooo long...

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Subject: Re: what's next?

Posted by [PakProtector](#) on Tue, 11 Oct 2005 14:29:06 GMT

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the whole choke load thing is not a bad idea by itself. What I was hoping to get was MQ's reasons justifying his suggestion. "it is simple" just isn't enough to explain his comments. What the choke offers is far different from what the CCS offers in a few areas. Not that either is better...just better \*WHY\* is what I was after. But I didn't really expect an answer. I don't think he has one, let alone one he'll share.There is obviously room to play with the Guinevere power supply. Hell, it makes some amps look positively weak...cheers,Douglas

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Subject: Re: what's next?

Posted by [MQracing](#) on Tue, 11 Oct 2005 21:34:30 GMT

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Hi Wayne:As you point out, the inductive reactance of a plate choke drops with frequency. So that normally you spec the unit (inductance wise) to deliver X amount of henries so that at your lowest freq of interest it is sufficiently large to do it's job (i.e., provide an impedance load for the anode to work into). Once you have that pinned down (at your lowest freq of interest)... the impedance created by the inductive load increases with frequency and can become substantially large (much larger say than a chosen plate resistor value for a particular application). I think you have all the basics down pat... including the disadvantage of a plate choke being far more expensive than either a CCS or a pure resistor load for the anode. msl

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Subject: Re: what's next?

Posted by [PakProtector](#) on Wed, 12 Oct 2005 01:12:07 GMT

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From Mike: the impedance created by the inductive load increases with frequency and can become substantially large (much larger say than a chosen plate resistor value for a particular application). What sort of self resonance frequency to typical plate load chokes have? you can of course restrict your answer to those which you have experience with. Just to go into another of the downfalls of inductive loading is that once self resonance happens, increasing the frequency yeilds a lower impedance, since the capacitive effects dominate. And the other unanswered questions, like where should one switch from your low signal/near-infinite load model to the large signal/power set of 'rules'? Are you going to address any of this stuff? Or are you just going to attempt to 'simplify' and 'improve' it? I would think that a more detailed explanation of the strengths and pitfalls TX loading would make every one of your points more clear, and the direction you seek to improve visible. cheers, Douglas

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Subject: Re: what's next?

Posted by [MQracing](#) on Wed, 12 Oct 2005 01:56:02 GMT

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Rather than argue theory and psuedo science with you. I say... pick an appropriate plate choke and give it a try. Listen to it. Measure it. Report your findings. The true test is how it sounds, right? Doug... your not going to succeed in trolling me into a technical debate with you. Not even worth your trying to... it won't happen. The net if full of information on plate loading chokes, the theory of their operation, and examples of their use. On the bottlehead site alone is a wealth of info on this subject and on parafeed. I've only recommended a plate choke as an alternative to a CCS. Being careful to point out the advantages and disadvantages of each in my initial post in this thread. Plate chokes have been used in hundreds of circuits and applications without the fridge



blowing up or smoking. I say... give it a try with an appropriately designed plate choke. Bottlehead uses plate chokes routinely in the output stages of their amps, Gordon Rankin of Wavelength audio uses plate chokes in several of his parafeed amps...heck, even Western Electric used plate chokes in the (I forget now) first or second amp they produced commercially. why would I want to argue with you about the technical merits\demerits of this approach?I'm only recommending that folks consider giving it a try... and that it MIGHT sound better to them. msl

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Subject: you don't get it...

Posted by [PakProtector](#) on Wed, 12 Oct 2005 09:08:59 GMT

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MQ: Rather than argue theory and psuedo science with you.Don't worry Mike, I won't be arguing anything with you. Certainly not your pseudo science or theories like you created to explain how the simple wind EX0-173 is the 'perfect phase splitter', and why we had to perfect it....(if you don't remember that particular one, I'll re-publish it for you )MQ: Plate chokes have been used in hundreds of circuits and applications without the fridge blowing up or smoking. I don't recall clamining any such thing. Actually, I did not suggest even an amp built with them would blow up or smoke. It is certainly a risk if one is not careful of CCS design.MQ: I say... give it a try with an appropriately designed plate choke. Bottlehead uses plate chokes routinely in the output stages of their amps, Gordon Rankin of Wavelength audio uses plate chokes in several of his parafeed amps...I have no issue with appropriately designed plate chokes. Please describe what constitutes "apropriately designed" so that one might be able to recognize such a unit. Comming from a manufacturer who claims design capability, this should be no big deal.I have heard what a circuit built with inappropriately designed and expensive Iron sounds like. Even spent time helping a few of their owners to tear it all out in favour of the Guinevere-style CCS. No need to specify the maker, it is not an important bit of information for this discussion.Remember it was you who suggested changing the design, and when faced with questions that required your understandig of how the original works, or what does your proposed modification do, you haven't a clue as to an answer. If you are just trying to get folks to buy MQ Iron, just say so... Please quit accusing me of trying to argue with you. This is a civilized discussion, and nobody is out to get you. Actually, the only person who can truly 'get you' is your self. cheers,Douglas

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Subject: Re: what's next?

Posted by [Damir](#) on Thu, 13 Oct 2005 11:56:36 GMT

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If you didn't buy anode chokes, Lundahl LL1667/15mA is about right for this purpose. It has L=270H and Rw=2k4. You'd need four LEDs in series for the new OP, about 160V/-6,8V/15mA. B+ stays the same, about 200V, but we have some voltage drop "through" Rw.

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Subject: Re: what's next?

Posted by [Wayne Parham](#) on Thu, 13 Oct 2005 13:17:18 GMT

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That's cool, thanks for the tip. Please write to me off-forum, I wanted to write to you a few days ago and realized I don't have your E-Mail address. I think Colin gave it to me, but I've been so busy I misplaced it.

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Subject: Re: what's next?

Posted by [DRCope](#) on Mon, 21 Nov 2005 17:35:47 GMT

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Douglas, As best I can tell, Mike is merely suggesting an alternative approach to one part of the G, which, if memory serves, was a group build project taken up by a DIY community, which is normally open to all sorts of variations. Your tone strikes me as rather combative through this thread. Whether you have an ongoing beef with Mike or dislike mods to your design or both I don't know, but I'd bet no one else here is interested in it. ART was formed to provide a civilized alternative to the edgy and sometimes downright rude "discussion" found elsewhere. This doesn't seem to fit that mold. Why not just let the experimenters experiment without all the vitrole?

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Subject: no worries

Posted by [PakProtector](#) on Mon, 21 Nov 2005 23:06:59 GMT

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For any legitimate experimenter, I offer any support that is asked for. Mike does not fall into any category I'd care to support. If you think his action legitimate, honest, or genuine I suggest you look a bit deeper...I helped him once, and he has taken up a Stalinist, revisionist position on admitting it. It is no big deal, yet he chooses to make it one. I'd rather have helped Uncle Joe, it would have been safer and more profitable for the world as a whole. You are of course welcome to your opinion, and I look forward to discussing it with you. cheers, Douglas

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Subject: Re: no worries

Posted by [DRCope](#) on Mon, 21 Nov 2005 23:37:25 GMT

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Who determine's a participant's legitimacy? From the discussions I've read over the year's on Bottlehead, Mike qualifies in my book, and from the list of weird parts he put up for sale at one

point, I suspect he has done a fair bit of experimenting. From what I could see \*\*in this thread\*\*, he made a harmless, possibly interesting parts sub suggestion. I don't have the time or the inclination, (as I just told you in the private off-line debate you started), to investigate your entire history with Mike. Did I get back on a different bus? This was an audio hobbyist, DIYer kinda place last I checked. Now there are comparison's between one member's debate/discussion style and Stalin's. A bit much, really. I'll take my leave now as this is getting silly in a sadly all too non-Monty Pythonish kind of way.

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Subject: nope, you missed something  
Posted by [PakProtector](#) on Tue, 22 Nov 2005 00:07:27 GMT  
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I was not comparing any discussion style to Stalin. Only the self serving, self praising, history rewriting trait. The critical difference is that Stalin \*WAS\* in charge...rather than only thinking he was. This is a repeat performance on Mike's part. Last time it happened that anybody called him out and said he was wrong, it got labeled 'Jute War'. cheers, Douglas

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