Subject: A pentode on the input circuit...
Posted by coyote on Thu, 09 Dec 2004 19:08:35 GMT
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Hi All,Here is a subject that could be interesting:What are the advantages and cons of using pentode tubes on the input circuit?I understand that it is not the favored design right now but Classics like QUADs etc. did use that design...hum...The gain from the pentode is certainly interesting...But are we then amplifying noise ?To reverse the design to triode would be easy enough...I'm thinking of pentode feeding 300b's...Would like to see a discussion on this...Somehow I have to thank someone who posted 'a taste of tubes' recently...lol Cheers,a,

Subject: Re: A pentode on the input circuit...
Posted by kyle on Thu, 09 Dec 2004 20:37:32 GMT
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Thorsten L. thinks that an EL84/6bq5 is the best driver for a 300B. I've tried a 6sj7 and a 6l6 both of which worked fine but the 6sj7 sounds a little "wirey" or grainy, 6l6 was pretty good. I have another project on the go right now but the EL84 driver is on deck.

Subject: Re: A pentode on the input circuit...
Posted by metasonix on Sat, 11 Dec 2004 08:23:26 GMT
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Pentodes work very well as inputs or as drivers.However, the TYPE of pentode used is a critical issue. If you look back at vintage audio circuits, you'll find that prior to 1945 in professional mixing consoles and such, the 6J7 was most commonplace. 6SJ7s were also seen postwar. These types were chosen for low distortion, not necessarily low noise. After 1950, 12AX7 types were becoming more popular. One thing that didn't help the pentode was a minor noise source, that screen-grid tubes have and triodes don't--called partition noise. In well-made tubes this only increases the noise figure by a few dB. However, that was enough to make engineers militate against pentodes. (Plus, and more important, 12AX7s were cheaper to use than any pentode by the late 50s. You can get more raw voltage gain from a 12AX7 than any pentode.)Yet even after 12AX7s, pentodes were still being seen in audio gear occasionally. The Marantz 8B amp used 6AU6s on its input stages (they do happen to be low distortion). The H-K Citation II used 12BY7 video pentodes, also very linear. Both classic amps, worth a lot of dough today. The EF86, one of the few small pentodes intended especially for audio preamps, was very popular in European hi-fi after 1956. Most often it's seen as an input gain stage or in phono preamps. It had low partition noise, low distortion, and a built-in shield.But it was always more costly than other tubes, so its use faded out.This is all becoming academic anyway, as I don't know of any small pentodes still being made. Not enough demand. Svetlana's EF86 was the last.Does that help at all?

Subject: Re: A pentode on the input circuit...
Posted by coyote on Mon, 13 Dec 2004 16:07:02 GMT
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Good afternoon Metasonix,Thanx for the information.Here is an amp i am considering, i am attracted by the desing and a bit scared by the Pentode! My knowledge in amp design is lacking...I am comparing this with the famous AN kit-1.
http://audionotekits.espyderweb.net/kit1.html(as a project.)Any toughts!?http://www.hificollective.co.uk/kits/300bcrtdes.htmlEF86, The Input ValveHere I have used a pentode as the input valve, V1/V2, the venerable EF86 which was developed as a low microphony audio type. A pentode can deliver high gain from a single stage, allowing an amplifier with only one gain stage before the output valve. I have used two 100k resistors (R21/R22 and R23/R24 in series to give a 200k anode load for the EF86, this gives fairly high gain at the expense of a high stage output impedance, which will be similar to the anode load resistance. I deliberately used two resistors in series to reduce the voltage across them. Too high a voltage across a resistor will cause it to become non linear with respect to the signal voltage. This phenomena is particularly pronounced with carbon resistors but it is present in all types. The screen dropper resistor has a constant DC voltage across it and the screen voltage is bypassed by C23/C24 so there isn't so much of a problem there. R25/R26 and C21/C22 are conventional biasing components. The EF86 could just about drive the familiar 300B (V5/V6) directly, but the high impedance drive causes very hard clipping when the output valve grid reaches 0V and draws grid current. regards,a,

Subject: Resistors
Posted by Wayne Parham on Tue, 14 Dec 2004 05:00:33 GMT
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Your description of the behavior of resistors immediately set me into a little thought experiment. I'm wondering what situations we might expect to find a problem from a particular resistor. My thinking is that if I use a part that is sufficiently large for heat dissipation and of good quality, the resistor is probably one of the least problematic components in the circuit.In particular, I'm thinking about how much non-linearity one might expect from a resistor. It seems to me that it is much easier to make a good resistor than a good active component, because a resistor is simpler. I guess I'm just thinking outloud here, about what might constitute acceptable performance from a resistor compared with say a tube or transistor in the same circuit.The thought experiment goes something like this:A resistor is a conductor or semiconductor that is made in specific dimensions to provide specific resistance. A simple example would be a copper wire having "X" ohms per foot used to form low resistance values by cutting the length of wire to make the resistance required. This is basically what's done with semiconductors too, in that a substrate or cake is formed with dimensions that provide the resistance needed.When a voltage is applied to a resistor, current flows though it. This causes power dissipation in the device, and if it is sufficient to raise the temperature of the device, this is likely to cause a change in its resistance. Depending on the material, the change can be up or down.Most materials become more resistive as temperature rises, and this tends to limit current. Materials that become more conductive as temperature rises

can enter thermal runaway because increasing current raises temperature which increases current even more, raising temperature even more, and so on. But in either case, if a temperature rise causes a change in resistance, then there is non-linear current flow. When the device is pushed hard enough to change temperature, it changes its value slightly, making the current flow through the device disproportionate to the voltage across the device.But most devices I can think of are pretty well behaved in this regard, especially when they aren't run hot. If I use a 1/4 watt resistor at 1/4 watt, for example, it begins to heat up and change its value. That's probably pushing it too far. I might be better off using a 1/2 watt or 1 watt part instead. I might even use a larger power value device to make it even more solid, if I really think I need it.Back to the example of the wire, I can use a large guage conductor that is very long or a shorter piece of thin wire and obtain the same resistance reading at very low current levels. But as current rises through the small wire, its resistance changes long before there is a change in the larger wire.Another example is the tube filament that glows bright when cold, then resistance rises as it heats up and limits current. The tube glows bright on initial startup and then relaxes back to a dimmer glow. But a thick bar of copper can be made that is long enough to have the same resistance as the filament. It would be virtually rock solid in resistance value when used at the same current level that was heating the thin wire enough to make it glow and change value.So I guess what I've concluded is that the real issue here is heat. It isn't the resistor that's bad, it's the heat that is dissipated by the device. If it's large enough to dissipate the heat, it's going to work well. I think it's pretty easy to get a resistor large enough in power handling to be stable, and then it shouldn't be one of the components I'd be worried about. Seems to me the best thing is to use good ones and make 'em big enough.

Subject: Re: A pentode on the input circuit...
Posted by metasonix on Fri, 17 Dec 2004 05:42:31 GMT
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>http://www.hificollective.co.uk/kits/300bcrtdes.htmlIt is a passable circuit, though it runs that EF86 quite hard....I'd suggest a 330k plate resistor for it, then adjust thecathode resistor to get about 1/2 the supply voltageon the EF86 plate. Some kind of turn-on delay for the platesupply is recommended.I don't really agree with direct coupling without some kind of safetycircuit or overload protection. Andy Grove is an OK designer though his circuits don't really qualify as safety-conscious. Not reallysuitable for a rank beginning DIYer.I'd recommend some kind of fuse or current limiter in the plate supply or in the 300B's cathode circuit.
http://www.hificollective.co.uk/kits/300bcrtdes.html

Subject: Re: A pentode on the input circuit...
Posted by PakProtector on Sun, 19 Dec 2004 12:39:54 GMT
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Hey-Hey!!!,The pentode can do quite a good job. Free from Miller capacitance issues. The g2

supply is critical, *VERY* critical I suspect. The load line must be done quite carefully so as not to run through the curves through below thte horizontal(or comparatively so)plate lines. With reasonable B+ this usually means a fairly low resistor values. 20k-40k depending on there you put the g2 voltage.regards,Douglas

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Subject: Re: A pentode on the input circuit...
Posted by Fred on Tue, 21 Dec 2004 14:58:19 GMT
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I see that the diyhifisupply Lady Day now has an optional WE91 circuit. The driver is the 310A pentode (not a "small" pentode but a pentode nonetheless). I guess this will be a Svet 310A, this gives single driver stage and 500mV input sensitivity. Wonder how it sounds?
