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A transformer coupled output on a circlotron amplifier has many advantages. We can use better triodes than the 6AS7, such as the EL34 and KT88 or the 300B and 2A3. We can stop worrying about damaging the loudspeaker when an output tube shorts out. We can use low impedance loudspeakers. And finally we can stop needless heating our living rooms with 40 output tubes. ([Be sure to read the final e-mail.](#))

(I remember reading an article from the early 60s in Radio Electronics by Crowhurst, I believe, that showed how to use two output transformers per channel in a pseudo McIntosh topology. Remember in the McIntosh, the cathodes saw the same transformer impedance as did the plates.)

Subject: MC Phono Stage

First of all I would like to thank you for your excellent web magazine and the information provided. I have learned a lot about tubes thanks to you. I have build the line stage from September 98 GlassWare tube circuits the Constant Current Draw Grounded Cathode (CCDGC) amplifier topology (grounded Cathode amplifier cascaded into a Cathode Follower) using the **12BH7** and I was wondering if I can place another Cathode Follower from March 99 (using the **12BH7**) after the input connectors and before the 100K potentiometer for having stable input resistance, and not a resistance that depends on the potentiometer's position.

I also sending you a phono stage preamp [schematic](#) I build 4 years ago and I want your opinion about possible modification. Will we see a tube MC phono stage suitable for low output MC cartridges at the near future?

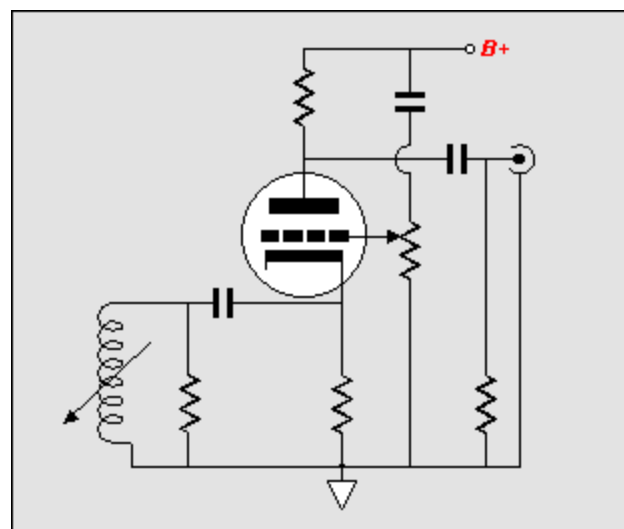
Konstantin T
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The potentiometer presents a constant fixed load on the circuit preceding it, but not to the circuit following it. As the potentiometer's scraper reaches each end of its travel it presents

either zero or the preceding stage's output impedance (usually very low) to the grid of the input tube of the line stage. The worst case increase in impedance occurs at the -6 db position, as the potentiometer's output impedance at this position is one quarter of the potentiometer's total resistance. Adding an extra cathode follower will increase the input impedance that the previous stage sees, but do nothing to increase the high frequency bandwidth of the line stage. Alternatively, adding the cathode follower after the potentiometer will extend the bandwidth of the line stage.

As for an MC phono stage, one thought I have had is that the ground-grid amplifier might be a great choice for an MC phono cartridge.

MC cartridges need to be heavily loaded to control their electro-motive resonances. This is usually accomplished by shunting the cartridge with a low valued resistor or a large valued capacitor. But why not use the ground-grid's low input impedance for this task? The DC offset can be eliminated with a coupling capacitor, albeit a large valued one.



Pre-amp for MC cartridges

The bigger advantage this topology offers is that it can be configured to cancel much of the power supply noise that leaks to the plate. This trick requires feeding some of the power supply noise to the otherwise normally grounded grid.