

I built many tube amplifiers: single ended; self inverting push pull; and push pull.

I liked my recent push pull designs.

Then I wanted to build another circuit . . . balanced amplifiers are many decades old.

But I did not have a way to do that for my music playback systems.

I did not want to have to build a stereo preamp with un-balanced input, and balanced output.

Much of my listening to music is from CD recordings.

So, I purchased a CD player that had balanced outputs (XLR connectors with differential signals out).

That was 3 or 4 years ago. Finally this year I built a pair of mono-block balanced amplifiers.

Mono-block amplifiers? Some think I do it to get channel separation, that is not my reason.

I like mono-blocks . . . they are lighter than stereo amplifiers, easier to build, to move, and to find a place to put them.

I like 2 stage amplifiers, whether they are single ended, self inverting push pull, or push pull.

I decided to use an ECC82/12AU7 dual triode for the input/driver duty, and a pair of 5881 beam power tubes for the output.

I like the simplicity of indirect heated cathodes, so did not use DHT (Direct Heated Triodes) for the output tubes; but I did use the beam power tubes in Triode wired mode.

I like low power amplifiers.

Most of my loudspeakers have minimum impedance of about 6 Ohms. I chose a Hammond 5k plate to plate 15Watt push pull output transformer. With 6 Ohms on the 4 Ohm tap, that makes the primary about 6600 Ohms.

How to bias? I usually use individual self bias resistors with individual bypass caps for each cathode (very important in most of my amplifiers).

But I wanted to use very well matched tubes, so that I could use a single self bias resistor for the input/driver cathodes, and a single self bias resistor for the output tube cathodes.

I wanted to do an experiment to see how well that simple circuit might work.

I also did not use any bypass caps across those self bias resistors.

With no bypass cap, any signal voltage variation across the self bias resistor is a form of local negative feedback in that stage; also there would be no bias shift, because there is no bypass cap to charge or discharge during the signal swings.

Balanced Volume control; It had to use 7 resistors.

2 Grid return resistors to ground (located at the XLR input).

2 Series resistors, part of the shunt volume control.

1 50k potentiometer, the rest of the shunt volume control.

2 grid stopper resistors, one for each input grid.

I did not use negative feedback around 2 stages, and no negative feedback from the output transformer primary or secondary.

The input stage common self bias resistor; the output stage common self bias resistor; and the 5881 100 Ohm resistors from the screens to their respective plates; are all Local negative feedback. The 100 Ohm from 5881 screen to plate is Triode mode operation.

The power supply B+ uses a choke input filter, just like most of my other amplifiers (some are modified to use a low capacitance before the choke).

That covers the design ideas I had for these amplifiers.