

Re: a single output transformer stereo tube amp ??

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- *From:* "robb" <[some@xxxxxxxxxxxxx](mailto:some@xxxxxxxxxxxxx)>
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"Boborann" <[trottier@xxxxxxxxxxxxx](mailto:trottier@xxxxxxxxxxxxx)> wrote in message  
[news:RcednV1qQN96Od\\_YnZ2dnUVZ\\_v2dnZ2d@xxxxxxxxxxxxx](mailto:news:RcednV1qQN96Od_YnZ2dnUVZ_v2dnZ2d@xxxxxxxxxxxxx)

I bought a Columbia 680 stereo

[snip]

What looked like a traditional Push Pull design is actually fed with a channel per 6L6 and in phase . The output winding is Center tapped and has a speaker attached to each side of the winding. Curious whether anyone has ever seen this and could comment on how common it was

Here are some comments from amplifier group....

mykeymykey wrote ..

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sounds like a cool amp, can you post us a link to the schematic? this type of output was class A, about 12 watts per channel and popular among budget hi fi buffs in the 50s-60s. the output tranny was built like this just to save money and space. its not very unusual but its uncommon to find one in good condition that works. But yes tube amps and questions about them are always welcome here.

po excuse 4 me wrote .....

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Yeah, it's an old trick to get low \$ 'stereo' when 'stereo' only ment 2 speakers, 1 L, 1 r.. I love the way the '3rd' tranz works the OT..Hate to see what it would cost today against \$\$\$ design..hehehehe.

It's almost like old McIntosh tube amps with weird NFB based OT. I got from Ned years ago, a donut OT with a 'screen' tap. NOT

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a tube screen, but an extra winding BETWEEN the pri/sec, that can be...controlled. Also multi-UL taps, just a cool hunk of tranz.

Ned wrote .....

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It's a cheap (but clever) piece of shit, like the rest of the stuff Columbia (apparently) gave away as premiums with record-club memberships.

OK, think about this. Having a single output transformer is cheaper and means no core gap. If one 6L6 is amplifying something the other isn't, the signal appears out of phase on the opposite channel speaker. Feed that back to the input tube of the opposite channel, it cancels itself out, mostly. Not perfect stereo separation, but it's not intended to be, it's intended to give "stereo effect" at the lowest possible cost.

flipper wrote .....

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I'm not real familiar with the topology but it looks like an old matrix stereo amp, a technique that was experimented with back in the 1950's with the idea being 'cheap', or 'economical'. You get a 'stereo' amp from not much more than a PP 'mono'. Saves iron in the OPT even though still SE.

I say 'looks like' because the matrix circuits I've seen inverts one channel, and that one doesn't, so maybe it's either a variation or an even cheaper attempt at a similar concept.

In the ones I've seen it's analogous to analog stereo radio multiplexing the L and R channels for transmission and then demuxing in the receiver. In the 'amplifier stereo' case you have R and -L (the inversion on the ones I've seen) amplified through the amp and then summed (subtracted, actually, since on opposite sides of the CT) at the OPT primary for R+L (this, btw, is 'normal' P-P polarity). Since the OPT center tap is a common mode null it is R-L, ah hah!, so if you then feed that R-L back (the purpose of the second transformer on the CTs) into the main OPT you subtract it out (or add it in, take your pick), opposite polarity on each side of the CT. So on one side you have R+L-(R-L) for 2L and, conversely, R+L+(R-L) for 2R on the other (if all your components were balanced, flawless, and without parasitic capacitance, leakage inductance, etc)

It's likely that the missing 'inversion' on the front end, compared to what I've seen, is taken care of by proper phasing of the OPT and CT feedback but I'm not familiar enough with the topology to be completely sure if it's 'done right' or a dodge.

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But, what the heck and winging it here, that amp looks like both are in phase, at the input, so it'll be R-L in the OPT primaries. Now, that sounds bad, like there's 'nothing' with a common mode (mono) signal, but the second (matrix) transformer is on the primary side CT and will have the signal (and idle) current from both sides going through it, in phase, like a double tube SE, so it's R+L. Ah hah! Taking again the simple case of a common mode (mono) signal, the OPT secondaries 'on the ends' would, in a normal P-P amp, null each other (R-L) but the matrix transformer couples the primary CT R+L signal to the output CT 'adding/subtracting' (depending on which side of the CT you're on) it in. So, bingo, we have  $R-L+(R+L)$  for 2R, again, and  $R-L-(R+L)$  for 2L on the other. Dreadfully crude analysis but it illustrates the basic principle.

From what I've read the matrix amps didn't work terribly well, though

(components aren't flawless), with poor separation but did have the interesting characteristic of sounding louder than normal for the same power rating.