

## AR-88 Audio

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The recent posts re: AR88 transformers prompts me to relate an AR-88 story.

A long time ago, I obtained a large Kolster radio cabinet that had been stripped out, and now contained a 15-inch Altec Duplex speaker. These speakers were the standard for recording-studio monitors for many years, and sound really nice. They also cost about 150 bucks in 1950. Think about that.

This cabinet sat in my living room for a long time, as I had no place else to put it. One day I sat my Hallicrafters SX-28 on top of it, plenty of room, and hooked it up. The SX-28 uses push-pull 6V6's and has sophisticated tone controls, so radio collectors just knew they sounded great. I listened to this combination for a week or so. It sounded good, but I wasn't exactly blown away.

So I replaced the Halli with my Hammarlund SP-110 Super-Pro. The difference in audio quality was immediately obvious. It was simply much cleaner. I'd always been curious about the Super-Pro audio circuits. The design was laid down circa 1934-35, and used the same push-pull power pentodes, big-pin 42's migrating to octal 6F6's, found in all the high-end broadcast sets of that era. The rated output was 14 Watts. However, the tubes were connected as triodes in the Super-Pro. This cost them a third 6F6, as a driver, plus a probably-expensive driver transformer, that weren't necessary in a pentode amplifier. I just wrote this off to primitive design, but it was now obvious that these guys knew exactly what they were doing. (Triodes are better than pentodes, unless one uses negative feedback, which was unheard of at the time.) The 'Pro had a variable-bandwidth IF section that made it pretty close to hi-fi when opened up, but more important is the fact that high inter-modulation distortion in the audio stages will make it harder to pick out weak signals in background noise.

I related this story to a communications-receiver-collecting friend of mine. He says "Now try your AR-88." I reply "But Pete, it's only a single ended 6K6!" Pete says "Just try it." So, down came the 70-pound Super-Pro and up went the 100-pound RCA. Again, the improvement in audio quality was obvious to even the most casual observer.

Clearly, the RCA engineers appreciated the importance of clean audio in a communication receiver. But now, in 1940, they had the powerful tool of negative feedback. They designed an amplifier using "global" feedback. The feedback signal is picked off the output transformer secondary, and applied to the cathode of the triode first-audio amplifier. This sort of circuit forces the amplifier output to look almost exactly like the input, flattening frequency response, and correcting nonlinearities in the components inside the loop. It also materially reduces the output impedance of the amplifier which improve speaker damping. (Contrary to popular opinion, a perfect 1:1 match isn't really what you want here. See: "Damping Factor.")

So, the AR-88 family are probably equal to the best tube-based AM receivers ever built. The only real

shortcoming is the inability to put them precisely on frequency, without using an external standard. That gets solved after WWII by the Collins 51J's and R-390's. "If you want to find them, use a Collins. If you want to listen to them, use an AR-88."

Enough,

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