

# Electronic Tonalities

Specs...

## What the heck is parallel feed?

Suppose you're the best transformer manufacturer in the world. You've designed and built great Single Ended transformers for all the coolest tubes, 300B, 2A3, 45, 211, etc., etc. But the urge to create has you wanting more and better alternatives.

This was the dilemma faced by Mike LaFevre of MagneQuest a few years back. After several months of study, Mike found a unique solution which had been only lightly addressed in obscure passages of the great electronics texts of the past - parallel feed, also known as shunt feed.

A conventional airgapped single ended output transformer must deal with two types of current flux, DC, which is the direct current from the power supply feeding the plate of the tube, and AC flux, which is the music signal passing from the plate to the primary winding, through the secondary and out to the loudspeaker. These two types of current flux create divergent requirements in the construction of the transformer. It must be capable of handling high direct currents, which requires use of an air gap in the lamination stack and a relatively large core of lamination material to avoid magnetic saturation. This works against the requirements necessary for maximum AC bandwidth, less windings (smaller core means less wire means lower capacitance), high inductance (more easily achieved with interleaved laminations) and high permeability lamination material (for faster, more dynamic response to the AC signal).

Parallel feed addresses this issue by splitting the handling of the two types of current flux between two separate "parallel fed" inductors - an airgapped plate loading choke, which handles the DC from the power supply and loads the plate of the tube, and an capacitor coupled, interleaved parallel feed output transformer which handles the AC signal flux coming from the tube.

The parafeed choke (parafeed is Doc B's lazy mouthed way of saying parallel feed) is air gapped for high resistance to magnetic saturation of the core and built fairly large for good inductance to allow great bass response from the circuit without the compromises necessary for good high frequency response that a designer faces when designing a conventional airgapped SE output transformer. In fact a parafeed choke is designed for good inductance, and hence plate loading, at much lower frequencies than a typical filter choke, which is optimized down to the 50-60Hz mains frequency only.

The parafeed output transformer is interleaved, which gives it tremendously high inductance, on the order of 200-400H with the right core materials. It is also surprisingly small, which allows construction with less wire and hence very low distributed capacitance. The combination of these two features give a parafeed trans tremendous bandwidth. For examples, a TFA-2004 parafeed transformer has been measured at -1dB down at 2 Hz, and a EXO-45 is -1dB at 47 kHz!

The other trick allowed with parafeed transformers depends on the fact that the parafeed output transformer is capacitor coupled to the plate of the tube. With the coupling capacitor blocking DC from going thru the parafeed trans, high permeability Permalloy (50% nickel) laminations may be used. Other manufacturers offer conventional airgapped output transformers with Permalloy lams, but these trannies do not take full advantage of the incredible perm and sensitivity of Permalloy due to the inclusion in those designs of an inductance lowering air gap, which is used in an attempt to avoid operating with the sensitive Permalloy in full saturation. Obviously this airgap works to negate the advantage gained by the high permeability of the Permalloy in the first place! Parafeed operation lets Permalloy operate unfettered by DC flux, and the very high inductance interleaved MagneQuest parafeed transformers will be able to truly take advantage of this sensitivity, yielding vastly superior bass response.

BLAH, BLAH, BLAH! Wotinhell does all this mean?

Well, Mike built a few parafeed trannies and then tried to shop the idea around to several well known designers (who shall remain nameless to avoid embarrassing them). They all told Mike that parafeed wouldn't work. Luckily, Doc B. will try anything, so Mike sent a pair of TFA-2004s to him.

Doc installed them in a parafeed circuit, in place of a conventional air gapped output transformer, and it BLEW HIS MIND (what was left of it).

Bass articulation was out of this world, deep and quick. Dare Doc say it? Yes, it was even faster than push-pull bass, and much more musical than solid state bass.

Top end was fast as lightning, a new level of shimmer was added to the detail.

Midrange was, well, no, how could it be? The TFA-204 that the parafeed arrangement replaced has probably the best conventional SE midrange in the world. The Permalloy parafeed trans was somehow even more real, voices were even more natural, more focused, and even more of the proper scale.

Over the next few months ET was aflood with new parafeed inductors and circuits, using tubes ranging from rare and exotic UX-250's to common little 6DN7s. And they all sounded more articulate, more real, with parafeed. We even made parafeed output line stages, and they blew away any other preamps we'd heard.

And so with the help of VALVE's technical editor, Paul Joppa, we studied, and examined, and designed computer simulations of parafeed circuits, then built those designs and tested them in the real world, to really learn the best ways to utilize this revolutionary and controversial circuit design. In short we became the authority on parafeed, and we now offer parafeed plate loading chokes and output transformers for everything from 45's to 845s, and put out kits like the ParaS.E.X. kit, the best value for the money in tube amps, and Paraglow, the best sounding kit amp in the world.

So, should you try parafeed?

Well, maybe.

But only if you can live with the fact that you'll never want to go back to conventional airgapped SE. It's that good.

