LETTERS

Output Transformers

Sir:

The output transformer transient which occurs in a class AB or B amplifier when one tube cuts off has been traced to leakage inductance between the sides of the primary winding. Accordingly, a bifilar transformer has been utilized in the McIntosh design to produce an efficient, high-fidelity amplifier. I would like to offer a few thoughts on the solution of this problem without a special output transformer.

Remote cutoff output tubes could approximate class B operation without the necessity for cutoff. Nominally such an amplifier would operate in class A, in fact. Considerable third harmonic distortion would be generated by the more-than-usually curved characteristics of these tubes, but it could be overcome by feedback. Unfortunately there are no remote cutoff tubes available at present with ratings in the 6V6-6L6 range, but for those interested in experimenting with the scheme, the tube handbook indicates that a pair of 6AB7s will deliver about 3 watts in this service under the following conditions:

$E_b = 300$ v; $E_{sg} = 200$ v; $E_c = -5$ v; quiescent $i_p = 5$ ma per tube.

The same result could be achieved with ordinary tubes by compressing the negative driving swings at the grids of the output tubes. A crystal diode circuit might be designed for this purpose.

An amplifier of the sort I suggest would, like all class B amplifiers, be characterized by low quiescent plate current. At full load the plate current would roughly double. But since full output is required only during transient peaks, the additional current could be supplied by the output filter capacitor, so that the power supply need be designed only for quiescent conditions or a little above. A regulated supply would also be of help in this connection, and would offer a number of other advantages, including a reduction in power supply feedback, maintenance of screen voltages, and possible elimination of the filter choke.

Joseph M. Diamond,
Moore School of Research,
University of Pennsylvania,
Philadelphia 4, Penna.

Listener Preference Tests

Sir:

I would like to list a few observations about listeners to and listening tests of wide-band audio systems, hoping that they might be of some interest to audio men.

1) Many listener tests appear to verify the contention of some engineers who have pointed out that conducting a scientifically controlled test does not necessarily guarantee a set of scientific deductions.

2) It has often been said that the "average" listener doesn't "appreciate" wide-band audio. The writer's experience has been that what the average listener fails to appreciate is not so much the wide-band signal but the high price tag. We never heard anybody claim that a $10 speaker was better than a $150 unit.

3) Listener tests keep harping on the "average" listener. Statisticians have pointed out repeatedly that no such individual exists; but if one did, he would be truly a fantastic creature.

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4) Wide-band enthusiasts are usually assumed to have a common likeness—a liking for maximum bandwidth, period. Audio customers are no different from any other customers and have infinitely varied physiological and mental differences. What is "brilliant" to one set of ears may be "tinny" to another, *ad infinitum*. Distortion is a complex problem and individuals are complex people so it is self delusion to over-simplify wide-band audio by merely talking about "average" listeners and simple sine-wave distortion. Furthermore, human ears develop their own individual distortion effects too.

5) Talk about "pleasing" vs. "realistic" sound reproduction is not very realistic. Distortionless audio does not exist and what is pleasing to a Congo native may not be so to a U. S. school teacher. If an engineer modifies an audio signal in an attempt to make it pleasing to certain "conditioned" ears, he's an artist and not an engineer. His main job is to reduce distortion effects.

6) Why are most listener tests "one-shot" affairs with strange equipment in strange locations? Only repeated listenings with familiar program material on familiar equipment is of any real value.

7) Why pick up John Does off the streets or choose temperamental musicians for "average" listener-test subjects? Does a movie star qualify as an expert movie critic? Do coffee and perfume manufacturers pick up people from the streets to "test" their products? (*According to some display advertising, Yes.* Ed.) The writer's contention is that trained audio engineers should do all the listener testing, with the assistance of capable musicians with technical training.

8) Why are such claims made as "distortionless" reproduction and "the reproduced signal cannot be distinguished from the original?" Anyone who has ever heard the thundering power of a grand organ's bass or the ethereal beauty of its treble knows different, as does anyone who has ever heard the strike tones of reed instruments, cymbals, and drums at close range.

Ted Powell,
42 Nassau Road,
Great Neck, L. I., N. Y.

Musician's Amplifier Senior

Sir:

I do not doubt that the "Musician's Amplifier Senior" will have as good a reception as its smaller brother and the designers are to be commended as much for their archeological work in resurrecting the 845 and returning it to its rightful position as for their electronic design.

I would like to point out that in the construction of the power supply it is essential that the filter reactors be connected in the high side and not in the ground leg as shown. If connected in the circuit as originally shown there will be a hum component that is not filterable. This is due to the electrostatic capacitance between the transformer secondary and ground, as shown by Terman and Pickles in "Note on a cause of residual hum, etc.," *Proc. IRE*, Vol. 22, p. 1040, 1934.

C. H. W. Nason,
Robles del Rio,
California