

# AUDIO UPDATE

## Audio evaluations—A non-mystical approach

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**M**y wife knows far more about computers than I do. In fact, she was working with them professionally in the days when punch cards were the only way to go. Furthermore, she won a science award in high school, regularly use-tested and wrote up VCR's for a home-video magazine, and 14 years ago asked me to marry her. Obviously, an intelligent, clear-thinking young woman ...

You can imagine my shock when she came home one day with over \$100 worth of Estee Lauder cosmetics. She had bought into the female illusion that cheap chemicals in expensive bottles will deliver or restore youth and beauty.

What relevance has all this to the subject of audio?

Large numbers of intelligent audiophiles continue to seek dreams in expensive containers uninfluenced by cynics such as myself who tell them that they are deluding themselves and depleting their bank accounts for no objective reason. There is no scientific evidence that super-expensive equipment objectively performs better—although they might hear it that way—than the run-of-the-mill products owned by ordinary mortals such as you and me.

### Objective/subjective truth

The concept of "objective" is a key confusion block in most audiophile discussions. Music, an audiophile would argue, is a subjective experience, not an objective one. I agree, but *objective reality* exists, and real-world events impinging on our senses are the sources of all of our subjective experiences.

Note that I'm not claiming that an audiophile's subjective experience of quality doesn't exist. I'm saying that the special qualities experi-

enced are usually not being produced by the objective electronic performance of the equipment under evaluation, but reside entirely in the perceptions of the listener. I suspect that other qualities of an amplifier, e.g., its cost, weight, and manufacturer's reputation, might be largely responsible for the superior sound heard by the devout audiophile.

This leads me to question the ethics and good sense of the subjective reviewers who recommend high-end equipment that costs thousands of dollars more than conventional products but which, in truth, sound no better. Happily, there is a way to bypass the "Yes, I hear it, even if you don't" problem. It involves changing the question from "Can you hear the improvement?" to "Can you hear an error signal?"

### Nullification

Many years ago, David Hafler, of Dynaco fame, invented a sort of poor man's four-channel system. It consisted essentially of an additional speaker (or a pair of series-connected additional speakers) connected directly across the two hot, or positive, terminals of the amplifier in use. Connecting a speaker in such a fashion feeds it a signal containing only the differences (including those of amplitude and phase) between the two stereo channels. Since out-of-phase "hall ambience" sound is a good part of the difference between the channels on many recordings, feeding it to separate speakers located toward the rear of the listening room provides a worthwhile listening enhancement at very low cost.

Keep in mind that the additional "ambience" speakers are silent when there is no difference between the channels—such as would

occur if a mono signal were fed simultaneously to the two channels of a perfectly balanced stereo amplifier.

At some point it occurred to Hafler that the ability to nullify identical signals by a "hot-to-hot" speaker connection could be useful in amplifier testing. A circuit (see Fig. 1) was devised that, in effect, electrically compares the signal going into the amp under test with the signal coming out of it. After adjustment for level differences (using R1) and phase shift, any residual sound that's heard in the null speaker represents the difference between the amplifier's input and output signals. Because the signal (if any) at the null speaker is always much lower in level than the normal program, the normal speaker has to be moved out of listening range to keep its output from overwhelming that of the null speaker.

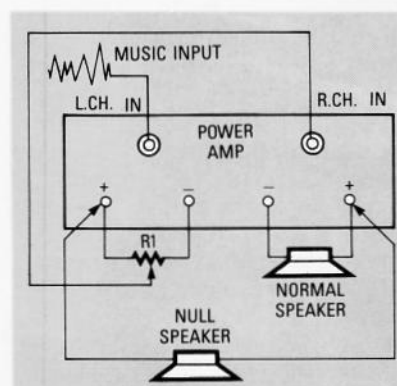


Fig. 1—Circuit for extracting whatever audible differences exist between the input and output of an amplifier.

A perfect amplifier would produce zero signal at the null speaker. In practice, the signal produced is usually low enough so that the error it represents is totally masked during conventional playback by any well-designed conventional amplifier. If