AUDIO UPDATE

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The Audio Answerman strikes again!

BECAUSE THIS COLUMN IS WRITTEN FOR the casual hi-fi user, rather than the dedicated audiophile, all the column topics—including the following Q's and A's—are chosen to be helpful and/or informative. For this month's column, I've chosen two questions, one practical and the other mostly theoretical. Let me know how you feel about this format.

Recording Balance

Q. *When I'm recording a disc or FM program on my cassette deck, I notice that the right- and left-channel recording-level indicators seldom read the same. Sometimes one is higher; sometimes the other. Should I try to balance the channels using the recording-level controls, or simply let things fall as they may? On some of my dubbed tapes the right-to-left balance seems just fine; on others, the sound seems to come mostly from one side or the other. Is there any way to make sure that things are adjusted correctly?*

A. First of all, keep in mind that properly adjusted stereo recording-level indicators show exactly the same readings only when identical signal voltages are fed to them by the source or by the tape being played. Given the normal signal variations between the right and left channels of a wide-range stereo recording, the readings should coincide frequently, but momentarily.

Over the years, I've occasionally encountered recordings and FM programs that, for one reason or another, sounded off-center, and I'm sure that a recorder's meters would have confirmed what I heard. But on the vast majority of recordings, the signal levels in the two stereo channels will provide a balanced sound stage and average out to about the same reading on both meters.

There's an easy way to check the internal balance of your recording circuits. With your record-level controls set similarly, feed a mono signal simultaneously into both channels and check for identical meter indications. If you can't get a mono signal at the tape-output jacks by switching your preamp to mono, and if you can't switch your tuner to mono, you will need to use a single-male/double-female Y connector. When plugged into your amplifier's right or left tape-output jack, it will provide the same mono signal source to both tape-input channels.

Assuming that you find a balance problem within your recorder, clean and demagnetize its heads and, most important, try recalibrating its recording-bias controls—assuming that its instruction manual tells you how. (I fixed an unbalanced Nakamichi by doing just that.) If those suggestions don't help, call or drop a note to your recorder's manufacturer explaining the problem and the steps you've already taken to handle it. He may be able to assist you over the phone, or at least provide the address of the nearest authorized repair shop.

Although the question is about lack of recording balance, it

wouldn't hurt to point out that an audible right-left system unbalance can come about through misadjustment of speaker-system midrange controls. Because the ear is most sensitive to mid frequencies (4 kHz or so), a pair of speakers whose midrange-level controls are adjusted differently will sound unbalanced. Objectively, one will be playing louder than the other despite the fact that the same signal level is fed to both.

Reflected speaker sound

Q. *I've read several articles about live-end/dead-end listening rooms, in which the loudspeaker end of the room is heavily damped with acoustical absorption material and the listener's end is fairly reflective. That is said to improve a speaker's response and imaging properties. Can such a setup be used with speakers that intentionally reflect sound from the rear walls, such as electrostatics, planars, or conventional speakers with rear-firing radiators?*

A. Ideally, a loudspeaker's sound-radiation pattern—which, indirectly, is what we are talking about here—should be designed with a particular recording-microphone setup in mind. Since that is impractical given the variety of recording practices, the best that the speaker designer can do is to design a system that will present a reasonable stereo image with most program material and in most of the rooms in which it is likely to find itself. In a conventional listening room, the speaker sound that reaches a listener's ears consists of the direct sound from the drivers plus a large amount of early- and late-arriving reflections bounced from the walls, floor, and furniture. If a speaker's immediate environment has sufficient acoustical absorption, most of those early reflections will be soaked up or severely attenuated. The late-arriving reflections from the more distant walls will be relatively unaffected. The advocates of such an arrangement state that its advantages include the preservation of accurate directional cues and instrumental detail.

Speakers designed to radiate multidirectionally or with strong rear radiation obviously shouldn't be installed in a non-reflective location, since they intentionally use the adjacent walls to deliver large percentages of reflected (and, therefore, delayed) sound to the listener's ears. As noted by German acoustic researcher Helmut Haas in 1951, as long as the interval between the delayed and direct sounds doesn't exceed 40 to 50 milliseconds, the ear fuses the two into a single event. The delayed sound is heard as an echo only when the 50-millisecond delay is exceeded.

An unexpected psychoacoustic effect of delays of between 5 and 30 ms is to "expand" the perceived sound source. Not only does the sound increase in volume, but it also takes on—in Haas' words—a "pseudostereophonic quality." (That pseudo-stereo effect probably accounts for the widened sound stage provided by a popular speaker design that employs eight small rear drivers and one forward-facing one.) Incidentally, a speaker system's sound reflected from a nearby rear wall has little in common with the reflections in a concert hall from walls perhaps 50–100 feet away—despite the efforts of some manufacturers to imply that their deliberatively reflective speakers mimic the acoustics of concert halls.

For good reasons, open-back dipolar and omnidirectional systems (which have included some of the best speakers on the market) and rear-radiating speaker systems are necessarily more placement-critical than conventional forward-radiating types. The problem is to arrive at a spacing from adjacent surfaces that enables the reflected energies to make a positive—rather than destructive—contribution to the sound and stereo image perceived by the listener.

Which type of speaker design is the best? My feeling is that as long as recording techniques (and room acoustics) are not standardized, most otherwise well-designed systems will sound good on most recordings. In truth, speakers that radiate substantial energy rearward have special installation constraints, but their advocates will tell you that they are more than worth it. **R-E**