

Technical Talk

By Julian D. Hirsch



● HOW TO JUDGE LOUDSPEAKERS:

Why do so many people shopping for their first good component system doubt their own ability to tell good sound reproduction from bad? I can only guess that, having been exposed for years to the miserable sounds produced by most TV receivers and portable phonographs, their critical judgment goes askew when first exposed to clean, wide-range sound. However, I am less concerned with the root causes of this situation than with trying to show how anyone can learn to tell a good speaker from a bad one and, further, how to identify the more common aberrations that affect the sound of many speaker systems.

In deference to those who "know what they like," I will refrain from imposing my own standards of sound quality on others. But I am assuming that many others of my readers are genuinely confused by the claims and the counter-claims made for various speakers and are therefore looking for someone to guide them out of the sonic maze.

Buyers are often advised to attend live concerts and become familiar with their sound as part of the preparation for selecting speakers for a home music system. Such listening experience is always a good idea, even after your system is in operation, *but* do not expect to hear any close similarity between the sounds in the concert hall and those produced by your audio system, no matter how good or expensive it may be. The best you can hope for is a reasonably convincing illusion that the sounds you hear *could* have existed in some hypothetical hall.

Should you use the finest available demonstration records (or even master tapes, if you are lucky enough to have access to them) as a basis for judging speaker quality? They are useful for demonstrating some of the ultimate capabilities of speakers, but unless you plan to listen to this sort of material most of the time, it would be a mistake to base your speaker selection only on such

atypical program material. From time to time I play some of my best recorded programs just to see how they sound through some speaker under test. As a rule, the result reinforces my belief that the specific recording used has much more influence on the quality of the sound heard than does the speaker itself—but that is another, somewhat hassle-filled story (see the Hodges-Balgalvis "Hot Platters" article in the April 1976 issue).

If you do most of your listening to FM radio or to ordinary commercial records and tapes (as I do), you should use these sources to assess a speaker's quality. Sometimes they will reveal weaknesses that might go undetected with more spectacular demonstration programs. For example, I am sensitive to the kind of mid-bass coloration that gives the male voice a heavy, unnatural quality. Few musical demo records will show this up, simply because there are no speaking voices on them. The voices of many male FM station announcers, however, make an ideal "test signal" for speaker mid-bass smoothness (say, from 80 to 200 Hz). Accurate reproduction of the voice is a severe test of a speaker's quality. Unfortunately, such accuracy is not necessarily related to the size, the price, or even some of the audio measurements usually applied to loudspeakers to judge their *musical* quality. You should be aware, however, that the voice quality

on some FM stations is already unnatural and therefore a poor tool with which to check a speaker.

What about the deep bass? It may come as a surprise to learn that it is a rare recording that contains much energy below 50 Hz. A speaker system capable of useful output at frequencies between 30 and 50 Hz is usually costly in dollars, bulk, weight, and/or the amplifier power required to drive it (though not in *all* these factors simultaneously, of course, since there can be a considerable trade-off between them). So, unless you are a pipe-organ or bass-drum aficionado, do not place too much emphasis on the low bass of a speaker system as compared with its all-important mid-range performance. (Incidentally, a great deal of what some people think of as "bass" is really at frequencies from 60 to 100 Hz, well within the capability of most small and inexpensive speaker systems. A uniform—"flat"—energy output in this frequency range is much more important than an additional octave of very low bass response.)

The mid-range (200 to 2,000 Hz, give or take a few hundred cycles) is the most important part of the frequency range simply because most of the fundamental frequency content (and quite a bit of the harmonic structure) of music falls within it. If it is reproduced unevenly, a variety of unpleasant colorations can be added to the sound. Nasality, boxiness, honkiness, and some other qualities not as easily described come to mind. To further complicate matters, almost every speaker system has one or two crossovers in this frequency range, and the possibilities for response aberrations from this source have been well publicized. However, aside from phase shifts in the crossover region, it is an indisputable fact that without a smooth middle a speaker cannot convincingly produce "natural" sound from *any* program.

Most of what we perceive as "highs" are in the frequency range of 2,000 to

Tested This Month



McKay Dymek AM Tuner
Sonus Phono Cartridges
Nikko 7075 AM/Stereo FM Receiver
Dual 510 Manual Turntable

10,000 Hz. This is the portion of the spectrum that is often eliminated by the neophyte's misusing his treble tone controls to convert a wide-range program to a reasonable facsimile of typical "AM quality" (apologies to the few, but ardent, boosters of AM as a high-quality medium—but I did say "typical"). Once more, smoothness is the quality to listen for in this range. A peak anywhere in the upper treble will impart a shrill and unpleasant quality to any program. A response "hole" is much less obvious unless it is unusually wide and deep. Sometimes the response is fairly smooth but slopes upward or downward as the frequency increases. It may not be heard as a high-frequency aberration per se, but altering the octave-to-octave balance of sound can give an impression either of thin bass or heavy, warm bass. Fortunately, this sort of response error is often correctible by tone controls (it is one of the few that are).

If the sound quality changes significantly as you walk back and forth in front of a speaker, it has inadequate dispersion. The speaker does not have to be

an "omni" to cover a normal listening area with a fairly uniform sound field, but it should have a reasonably constant output over an angle of at least 90 degrees facing into the room. Curves and measurements can be used to describe this property, but moving about and listening (to the high frequencies) yourself is the easiest and the best test.

Finally we come to the *extreme* highs, the frequencies that are absent from most available program material, and if present are often attenuated by the speaker itself. To me, frequencies above 10,000 Hz are the icing on the multilayer cake of high-fidelity music reproduction. The basic flavor and nutrition are in the cake itself and can be enjoyed and appreciated without the icing, but a little sweet plus-10-kHz topping certainly does add to enjoyment of the whole thing.

The sparkle and "liveness" contributed by the uppermost audible octave is easy to hear when it is added to or subtracted from the sound, but it is often not particularly obvious *without* that comparison, even to experienced listeners. It

is, further, interesting to note that the presence or absence of the highest frequencies can be detected by many people who, by standard audiology tests, have a considerable hearing loss in that frequency range.

Having gone through the frequency spectrum from end to end, I will now suggest that you avoid judging a speaker entirely on such a piecemeal basis. Instead, listen for overall balance, a sense of smoothness, and the absence of any special emphasis on a portion of the frequency range. A good speaker should not sound bassy, bright, dull, "forward," or thin. Ideally, it should be so neutral that the listener can forget it is there. Once in a while a good speaker may emit a floor-shaking thud or an airy transparent tinkle as a reminder of its capabilities and the content of the program, but most of the time you should be able to enjoy the sound without analyzing the process that created it. Leave that job to a spectrum analyzer. Your ears, with very little practice, can be more revealing than a laboratory full of instruments. Listen, and enjoy!