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SOUND; Active Speakers Feature A Harmonious Relationship

By HANS FANTEL

SO-CALLED ACTIVE speakers have been sounding off in increasing numbers, calling attention to their distinctly offbeat precepts. These speakers include their own amplifier, making the customary external amplifier or receiver unnecessary.

Nobody expects a massive shift toward this design approach. The traditional way of designing speakers and amplifiers as separate units is too firmly entrenched. But the arguments in favor of integrating amplifier and speaker have an undeniable logic. Like the speakers themselves, they merit an open ear.

A leading proponent of active speakers is Bob Stuart of Meridian, a British concern that has been making such speakers for years. His designs derive from the recognition that it is difficult for any single audio component to span the entire audible spectrum. The basic physical requirements differ in the various tonal ranges. This fact is dramatically illustrated in the design of string instruments. It takes four kinds - violin, viola, cello and contrabass - to encompass the whole range, even though all four of these instruments are similar in form and function. In loudspeaker design, a similar - if less elaborate - functional division is often observed by using different speaker elements for treble and bass: woofers for the lows and tweeters for the highs.

Mr. Stuart believes that this division of labor, based on different physical requirements, should be extended to the amplifier itself, with separate amplifiers serving the upper and lower ranges.

One advantage of this approach is that the whole spectrum of frequencies can be split into highs and lows before the signal is routed to the separate treble and bass amplifiers. This is contrary to the common practice of making the split after amplification, yet is theoretically preferable because it results in fewer distortive alterations of the sound.

Going a step further, advocates of active loudspeakers believe that the amplifiers should not only be tailored for a particular frequency range but also take account of the peculiarities of a particular speaker. In their view, the amplifier and speaker should be specifically made for each other like lock and key. That way, according to this line of thought, they can properly respond to each other.

This argument has been put forth rather dauntingly, with elaborate formulas expressing such factors as impedance and phase shift. But it is simpler to envision the relations between amplifier and loudspeaker by imagining the amplifier to be a musician and the loudspeaker to be the instrument. For example, a pianist adjusts his touch continuously to the response of the piano, and the action of a certain piano may be more congenial to a particular artist than others. According to the theory of active speakers, a similar mutual attunement should be obtained between amplifier and speaker.

Such thinking contravenes the present norm of designing amplifiers to accommodate a broad assortment of different loudspeakers. But the case for the active speaker (i.e., the integrated speaker/amplifier combination) has been bolstered by several considerations. For example, the amplifier can be designed to counteract resonance problems encountered with a particular speaker or its enclosure. Moreover, energy transfer between amplifier and speaker can be made more efficient. That way, an amplifier with relatively low wattage - as long as it is working with a specific and highly congenial speaker - can be made to equal or surpass the performance normally expected from a far more powerful amplifier.

The idea that amplifier and speaker must dovetail in their attributes naturally leads to the idea of combining amplifier and speaker into a single unit. A true paragon of this concept is Meridian's Model M30, whose surprisingly compact 7 x 15 x 12-inch dimensions contain two 70-watt amplifiers to drive the

woofers and the tweeter, respectively. The price of \$1,625 may seem a bit steep for a pair of speakers, until one stops to consider that a staggering 280 watts of amplification (4 x 70 watts) is thrown into the bargain. As for the sound, it certainly lends support to the underlying design ideas. Its clarity and trueness of timbre create an impression of sheer musicality rarely matched by any speaker.

Another approach to active speaker design is exemplified in the Beolab Penta. Shaped as a slender pentagonal column with sides of satin-finished stainless steel, it stands 65 inches tall with only five inches a side at its base. The column contains four woofers, four midrange units and a tweeter powered by a 150-watt amplifier in its base. Although the Beolab Penta is intended as part of a complete sound system (the Beosystem 5500 by Bang & Olufsen of Denmark), it may also be used with other components and carries a list price of \$3,000 a pair.

With no amplifier or receiver needed to drive them, these speakers are usually connected directly to a pre-amplifier, which contains the necessary operating controls. Many such units are available, often from the same concern that makes the speakers.

The rather costly models mentioned so far are the major exemplars among active speakers and clearly strive to show the principle at its best. However, several economy speakers have also been designed with built-in amplifiers that enable them to outperform expectations based on size and price. Cases in point are the Acoustic Research Powered Partners (\$340 a pair) and the Bose RoomMates (\$229 a pair). They have been reviewed previously in this column and bear sonorous witness that even in the lower price brackets, the principle of the active speaker has proved its merit.