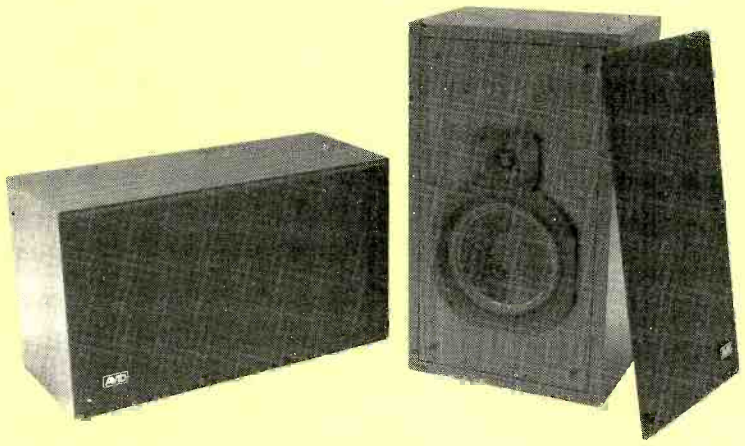
preferred listening level. In this case, the specified cartridge response was ±1.25 dB; this was met at the low temperature, and it improved to ±1 dB at room temperature and to a very impressive ±0.5 dB at the high temperature (although most people would not appreciate even this remarkable flatness in such a tropical ambient temperature!). We also noted that the output between 5,000 and 8,000 Hz did not change with temperature, so the rest of the spectrum could be said to hinge about this upper-midrange band.

Our conclusion from these tests is that cartridge response *does* change somewhat with temperature, and in a manner that is not always predictable (it is probably due in most cases to changes in the properties of the elastomeric damping materials in the cartridge, which modify the effect of the internal cartridge resonances on its response). These effects are not likely to be obviously audible, since A-B tests are not very feasible because of the surprisingly long thermal time constant of a phono cartridge (as much as a couple of hours for complete stabilization). Still, even these small changes can matter to a cartridge manufacturer who is claiming an unusually close response tolerance. However, a manufacturer will usually specify the temperature at which the measurement was made, such as 20 degrees C, and most home environments do not differ much from that value.

Probably the most interesting thing we learned from this test was that at least some cartridges, seemingly such delicate devices, can withstand the abuse of being baked at upwards of 150 degrees F without apparent damage or change in any characteristics, since our three sets of room-temperature measurements (before, during, and after the temperature cycling) were absolutely identical. So, if you can listen to your system in reasonable comfort, don't worry about the effect of temperature on the phono response; your cartridge is probably more rugged and stable than you are! □

Equipment Test Reports

By Hirsch-Houck Laboratories



Avid Model 110 Speaker System

AVID CORPORATION describes its loudspeaker systems as being designed for "minimum diffraction." This means that in addition to meeting the usual criteria of wide range, smooth frequency response, and good dispersion, the speakers are so constructed that the cabinet edges and other acoustic discontinuities close to the drivers have a minimal effect on the polar response, thereby preserving the imaging accuracy of the systems over their full frequency range.

The Model 110 is Avid's smallest and least expensive "minimum-diffraction" speaker system. It is a two-way, bookshelf-size unit whose 8-inch acoustic-suspension woofer crosses over at 2,500 Hz to a 1-inch soft-dome tweeter with 6-dB-per-octave crossover slopes. The Avid 110 is moderately efficient and is recommended for use with amplifiers rated at between 15 and 100 watts output. The rated frequency response is 48 to 20,000 Hz ±3 dB, with no specification of the test conditions.

The particle-board enclosure of the Avid 110 is finished in walnut-grain vinyl on all visible surfaces, including the front board on which the speakers are mounted. They are normally covered by a dark-brown cloth grille that is retained by plastic fasteners, but even with the grille removed the speaker presents an attractive and finished appearance. The grille assembly plays an important part in the operation of the system, however, and should normally be left in place. The drivers are mounted as close to each other as possible, and each is surrounded by a plastic ring that extends about ⅜ inch in front of the mounting surface. The tweeter ring is flared to provide a horn-like matching section between the dome and the surrounding air. Avid states that this "optimum-dispersion coupler" reduces diffraction and improves dispersion.

The cloth grille is mounted on a ⅜-inch-thick wooden board, cut out to fit closely around the front extensions of the tweeter and woofer. This eliminates the usual discontinuity between the edge of a speaker driver and either the mounting board or the grille structure; the radiating surfaces thus terminate, in effect, at the actual front surface of the grille. The edges of the grille are also rounded to reduce diffraction at the enclosure edges.

The Avid 110 is 21⅜ inches high, 12¼ inches wide, and 9⅜ inches deep. It weighs 28 pounds. Avid covers it with a five-year *full* warranty, paying shipping costs both ways if service is needed and supplying shipping cartons if the original ones are not available. Price: $145 each.

● ***Laboratory Measurements.*** The averaged frequency response of the two speakers as measured in the far field of the listening room was very smooth and free of the midrange irregularities that are typical of "live room" measurements. Similarly, the close-miked woofer frequency response was notably flat and smooth up to the 1,000-Hz upper limit of our measurement.

Splicing the two curves resulted in an unusually flat and smooth frequency-response plot, varying only ±0.5 dB from 150 to 2,500 Hz and with its ±3-dB limits at 43 and 20,000 Hz. There was no ambiguity in splicing the curves, which overlapped for more than one octave with negligible error.

The high-frequency dispersion was good, though not significantly different from that we have observed in other speakers using 1-inch dome tweeters. The low-frequency distortion with a 1-watt input (based on an 8-ohm impedance) was a negligible 0.5 per cent from 100 Hz to below 50 Hz, rising to 2.5 per cent at 40 Hz and 11 per cent at 30 Hz. Increasing the drive level to 10 watts resulted in typical distortion readings of 2.5 per cent down to 50 Hz and 7.5 per cent at 40 Hz.

The impedance of the Avid 110 averaged

(Continued on page 38)