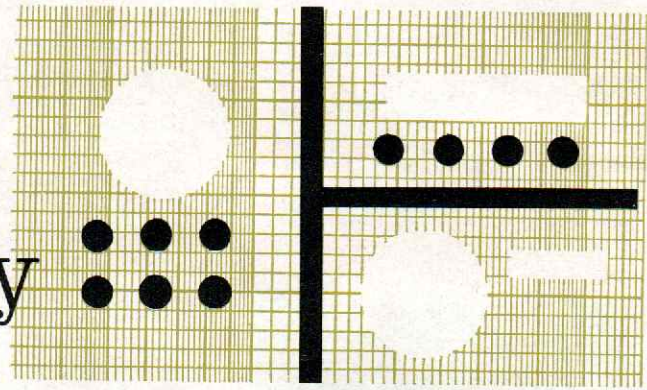


*The consumer's guide
to new and important
high-fidelity equipment*

high fidelity



EQUIPMENT REPORTS

AT A GLANCE: The Acoustic Research AR-3 is a bookshelf-type speaker system (for large, sturdy bookshelves) employing the well-known acoustic suspension woofer used in the AR-1, plus a pair of AR's new hemispherical radiators for middle and high frequencies. The superior transient response and polar distribution of these high frequency speakers, combined with the extremely clear low frequency performance of the woofer, form a speaker system which must be classed with the very finest.

As with other AR speakers, the upper middle frequencies of the AR-3 are somewhat depressed (in the normal setting of the speaker's level controls). This may be the cause of the rather unobtrusive quality of the AR-3, which at first hearing may not be impressive, except for its smoothness. Critical listening to top-quality program material will soon reveal the almost total absence of coloration introduced by the AR-3.

The sounds produced by this speaker are probably more true to the original program than those of any other commercially manufactured speaker system we have heard. On the other hand, the absence of the usual "hi-fi" sound (even good "hi-fi" sound) from this speaker may not appeal to some listeners. We found that some well-informed, experienced listeners were not particularly captivated by the AR-3 sound, while, at the same time, acknowledging its virtues.

The AR-3 is priced at \$216 in mahogany or birch, \$225 in walnut, cherry, or korina, \$203 in unfinished pine.

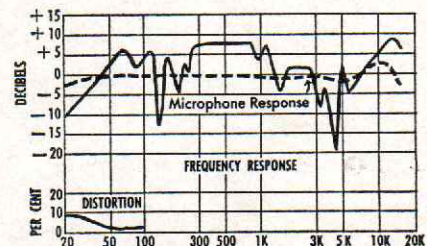
IN DETAIL: The low frequency driver of the AR-3 needs no detailed introduction. In its diminutive enclosure, it goes lower in frequency and has lower distortion than any other speaker system less than ten times its size (we have never found its equal at the very low frequencies below 40 cps). Certainly any speaker which might match it down there could not be easily lifted.

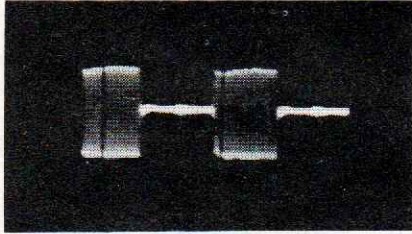
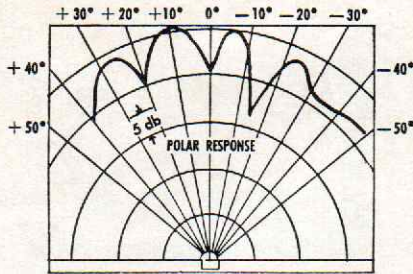
The price paid for this is low efficiency. Relatively large amounts of power are needed to drive an AR-3 (as with the AR-1). In fact, one can safely say that no amplifier which might be used in the home is too powerful for this speaker. Attempts to obtain *room-filling volume* with less than a 30-watt amplifier are doomed to failure, although *ordinary listening levels* can be developed by such an amplifier without difficulty.

The acoustic suspension speaker is strictly a woofer, usable up to 1,000 cps and rolling off above that. The hemispherical dome radiator developed by AR attempts to produce performance at high frequencies rivaling the low frequency performance of the woofer. The midrange speaker is a 2-in.-diameter dome driven by a voice coil of the same diameter. The magnet is a 3.3-lb. Alnico V unit, identical in weight to the one used on the woofer. The high frequency unit, taking over at 7,500 cps, is similar in construction but has 1 $\frac{3}{8}$ -in. diameter and a 1.1-lb. magnet. Each high frequency driver has its own level control.

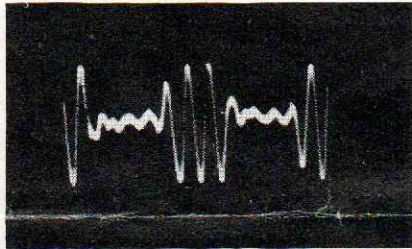
Acoustic Research

AR-3 Speaker System





The 7-kc tone burst is typical of the response of the AR-3 over its entire range.



The 550-cps tone burst shown in photo above illustrates transient response of the woofer.

There are two major advantages to this type of speaker. First, the high frequencies are uniformly dispersed. There is practically no "beaming" effect. Second, the rigid domes, having very small mass, and breakup effects, produce a very smooth frequency response and excellent transient response.

Prior to performing any tests on the AR-3, we listened to it for some time. It was compared against other fine speaker systems, including those with high quality electrostatic tweeters. The listening tests showed beyond doubt that this was a superior speaker system—a match for any composite system we could compare it to. Possibly the only respect in which it failed to match the larger multiunit speaker systems was in "bigness of sound." It is a small box; all of its sound comes from a limited area. The excellent dispersion helps dispel the illusion of smallness, but does not entirely succeed.

The directivity of the AR-3 speakers was virtually undetectable by ear. With white noise (or interstation FM tuner hiss) as a signal, one can walk around in front of the speaker and feel that no significant change occurs in high frequency response over a full 180-degree angle.

When very good program material was used, the realism of the sound was striking. Definition on complex passages and the clean tinkle on percussion sounds suggested unusually good transient response.

With listening tests out of the way, we proceeded to our usual series of measurements, the results of which are shown on the accompanying curves and oscilloscope photos. Considerable interpretation may be required in order to appreciate the story told by these data.

In our earlier test of the AR-2a, which uses the same tweeter as the AR-3, we obtained a rather rough and ragged frequency response curve. This was due to interference effects between radiation from the various speakers, and did not indicate an inherent lack of smoothness. This sort of effect is observed to some extent in any multiunit speaker system, though we have never seen it so pronounced as in the AR speakers. The response of the AR-3 is even rougher than that of the AR-2a, with heavy interference in the 1-kc to 2-kc region and the 3- to 6-kc region. The effects at 150 to 250 cps are ground reflections and diffraction effects (the speaker was lying on its back, facing upward for these measurements).

In the midst of this unpromising response curve are several clues to the performance of the AR-3. From 250 cps to 850 cps the woofer response is almost perfectly flat (we do not record minor fluctuations of less than 2 db). In the proper acoustic environment this range would possibly be extended somewhat. Below 60 cps the response falls at a rate of 12 db/octave. Indoors, particularly against a wall, the lower limit is extended considerably. A second flat portion is found from 1,600 to 2,600 cps. This is the midrange speaker, and once more there are indications that the very flat response would extend further if not for interference effects from the other speakers. From 6,500 cps upward, the response climbs smoothly, all the way out to 15 kc where the microphone calibration ceases. These measurements were made with both midrange and tweeter level controls at the indicated flat positions. Some boost was available on both units, for those who prefer to accentuate the middles or highs.

(Mr. Villchur, Acoustic Research's president, has indicated in a letter to HIGH FIDELITY that he believes the radiators should be tested separately. To be sure, this would result in a much prettier set of curves, and undoubtedly [in this case] would be more indicative of the true performance of the system. We must restrict ourselves, however, to measurements taken from the input terminals of a speaker system, for practical reasons.)

The polar pattern of the tweeter, taken at 8 kc, shows a multilobed pattern, at least 90 degrees wide. At different frequencies the lobes would be distributed differently. The over-all effect is that of the nondirectionality observed in listening tests.

As always, we consider tone-burst pictures to give the best correlation with listening quality. Here the clear superiority of the AR-3 was evident. As the frequency was swept from 1,000 cps upward, there was absolutely no sign of ringing, overhang, or generation of spurious frequencies. If the jagged response curves had been real, instead of due to interference effects, the transient response of the speaker would have been poor. As it was, the scope photo of the 7-kc tone burst is typical of the response of the AR-3 over its entire range. It is well-nigh perfect in this type of transient response.

The 550-cps tone burst shows the transient response of the woofer. It is not quite so perfect as the high frequency speakers, but still far superior to other woofers we have tested.

The low frequency harmonic distortion (on the response curve) is slightly higher than that measured on AR-1 speakers. This results from pushing over 20 watts into the speaker to obtain sufficient output to overcome such surrounding noises as jet airplanes, lawn mowers, etc. In view of this considerable power input, no apologies need be made for the AR-3 having 8% distortion at 20 cps.

H. H. LABS.