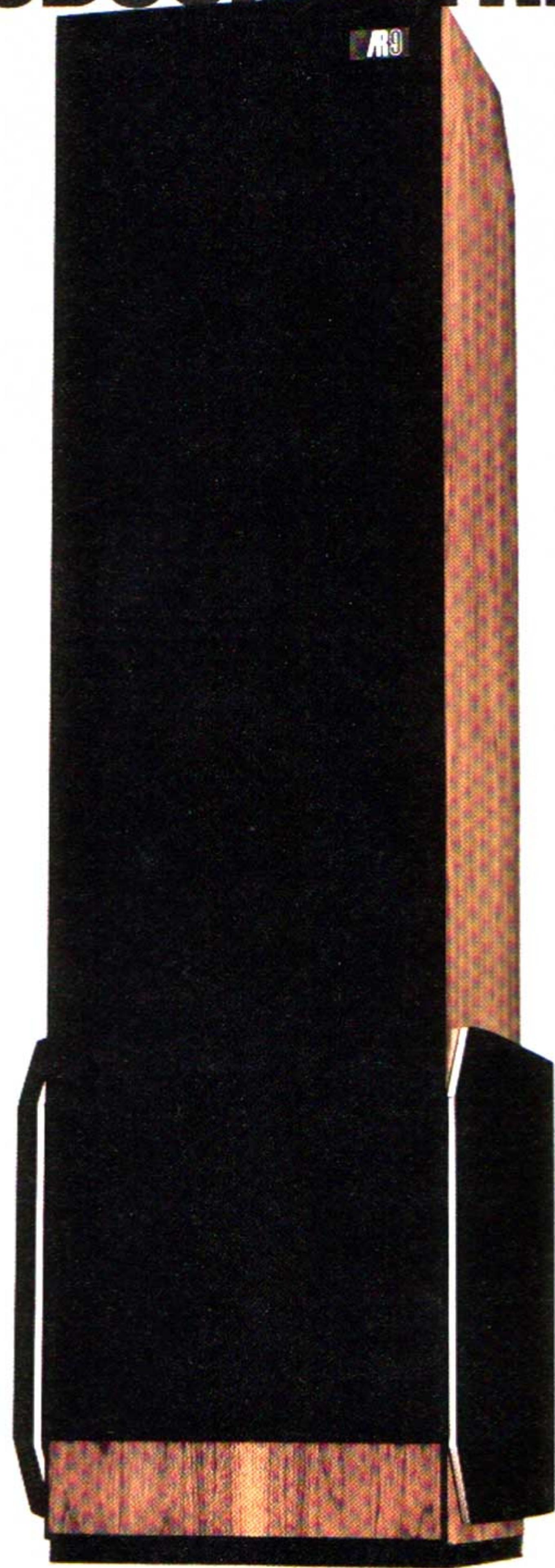


# INTRODUCING THE AR9



# THE AR9: A NEW, 4-WAY, FLOOR-STANDING SPEAKER SYSTEM WITH IMPORTANT DESIGN REFINEMENTS THAT MAKE IT THE MOST PERFECT SOUND REPRODUCER IN AR HISTORY.

**The history of AR has been a history of technical innovation and refinement.**

AR invented the acoustic suspension speaker design which is used today by loudspeaker makers all over the world.

AR invented the dome high range driver which provides excellent dispersion with improved power-handling capability.

AR led the way with liquid-cooled high-range drivers and, in addition, a host of manufacturing and testing procedures all aimed at the perfection of sound reproduction — truth in listening.

Now with the introduction of the AR9, new technical features and design refinements create a startling new level of definition and flat response in a loudspeaker system.

The AR9 is nothing less than the finest, most truthful loudspeaker system we have ever heard or measured. Here are the reasons.

## ELECTRONIC AUTOMATIC TRANSMISSION

Designing good bass reproduction in a sound system must always be a compromise.

The engineer wants a system that will produce strong bass. At the same time he wants the system well enough damped (that is with low Q) to give flat response all across the bass range.

Unfortunately, the laws of physics make these two objectives incompatible for as damping increases, volume falls off. Thus the well-damped system inevitably produces low volume, or as

the engineers put it "rolls off the curve" at some point as frequency goes down.

But now, in the AR9, three design features combine to solve this problem better than it has ever before been solved. For the first time we have a system that is virtually flat down to 28 Hz (see charts below), comes in with a more than acceptably low Q of .5, and reproduces bass frequencies with startling power and clarity.

How have AR designers managed to bend the laws of physics?

First, the AR9 uses two 300mm (12") woofers connected in parallel. At any volume setting each of them moves only half the distance a single driver would have to move to produce the same volume level. Thus the woofers are able to handle more power without distortion or breakup.

Second, a large enclosure (120 liters) is used to create a system with a low resonant frequency.

Third, and the real secret weapon, is a sophisticated new crossover network — an important step ahead in speaker design. This crossover is designed with special circuitry that acts like an automatic transmission and helps control bass response. It allows the system to have maximum damping at the resonant frequency (thus low Q) while maintaining bass output. Above the resonant frequency it shifts electronically to maintain flat response across the bass spectrum.

If all this sounds a bit esoteric, the results are anything but! The AR9 is unique in its ability to pump out tremendous bass with minimum distortion and minimum fall-off in volume at low frequencies. Test instruments are not

required to prove the point. Your ears can hear the difference.

## TWO WOOFERS, SCIENTIFICALLY PLACED

All loudspeaker systems interact with their environments.

Thus any speaker placed next to a wall creates reflective audio images of itself, just as a candle creates a visible image of itself behind the surface of a mirror when placed in front of it.

When a reflected audio image is out of phase with the original created by the speaker itself, the two tend to cancel each other and the result is a dip in the speaker's output. The dip may vary with the size of the speaker and its placement, but in any speaker system with a front-mounted woofer the dip is always present.

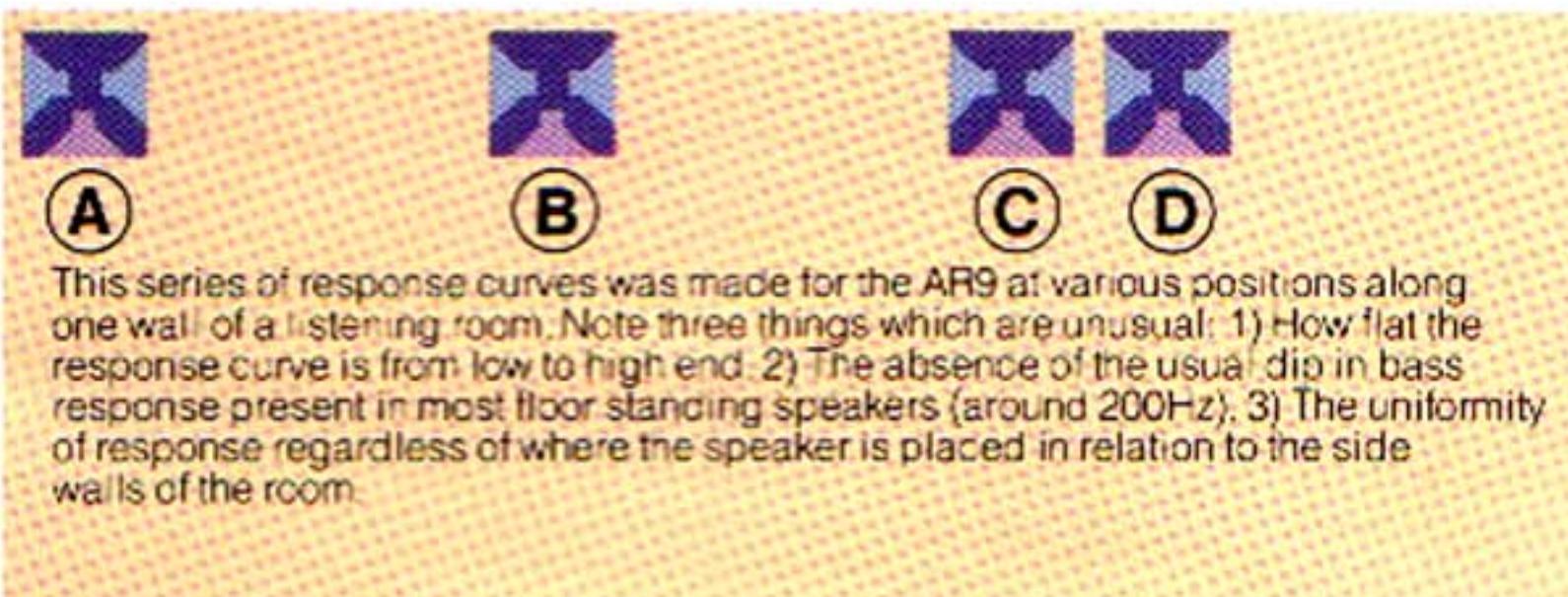
By facing the two woofers of the AR9 sideways instead of directly into the room, the relative position of the reflected image has been changed so that the dip it creates occurs above the 200 Hz crossover frequency of the woofers.

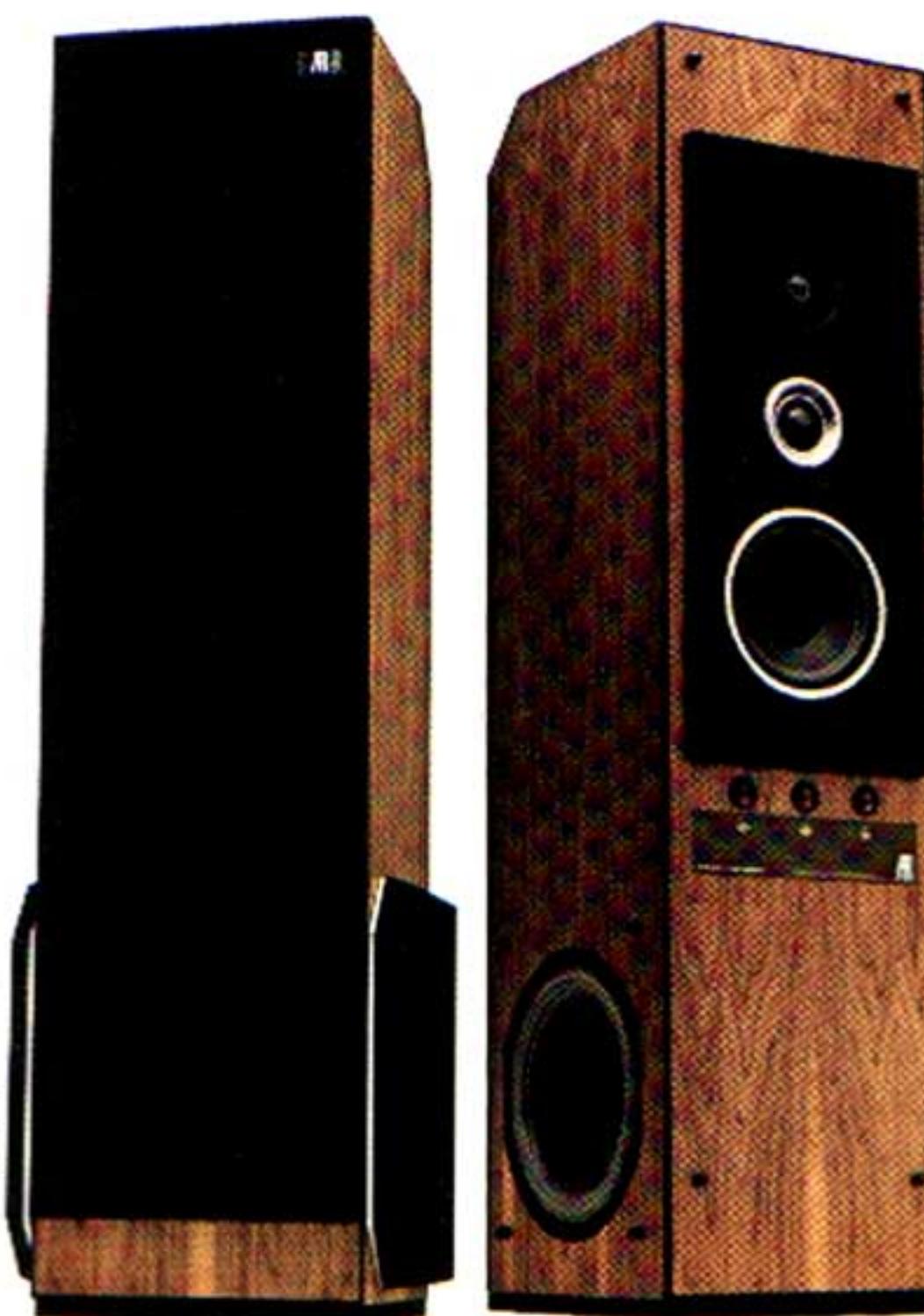
Placement of the low midrange speaker has been calculated so that its inherent dip occurs *below* the 200 Hz crossover frequency.

Thus the dip which cannot be eliminated has been manipulated so that it has no audible consequences — another reason for the startlingly flat and constantly smooth response curves you see below.

## REVISED CROSSOVER NETWORKS

The crossover networks in the AR9 are the most expensive and sophisticated ever used in an AR speaker system.





The circuitry is highly complex and the components are the finest available. (see specifications)

The result is exceptionally smooth and accurate crossover from one driver to the next which makes for exceptional clarity and definition in the sound of the speaker.

The crossover frequencies have also been carefully calculated in the AR9.

The woofers are asked to handle only the range from 20 Hz to 200 Hz thus minimizing problems with woofer placement and eliminating Doppler distortion which can affect bass reproduction when woofers cover a wider range.

A 200mm (8") low midrange speaker covers only the 200 Hz to 1200 Hz range, which not only contributes to a smooth overall midrange sound but allows the next speaker up the line, the upper midrange dome, to be designed for more power-handling capacity.

### IMPROVED STEREO IMAGERY

Unfortunately, the fact that you buy a fine stereo system is no guarantee that you will get a good stereo image.

In fact, the stereo image can be muddied or even destroyed when sound waves from one driver (either direct or reflected) interfere with those coming from the other drivers in the system.

The AR9 has two design features which help minimize this interference and thus help preserve good stereo imagery.

The first of these innovations is an Acoustic Blanket™ which surrounds the array of speakers on the front of the enclosure (the tweeter, the high midrange and low midrange drivers).

This blanket absorbs sound waves which would otherwise be reflected by

the front surface of the enclosure and the edges of the grille.

The laws of physics say that high range drivers will set up interference patterns with one another when they are placed as near to one another as they must be in a speaker enclosure.

These patterns are different at every frequency.

In a system which has high range drivers arrayed horizontally, these interference patterns spread laterally in the room. A listener at any point and at any instant is presented with a different pattern from each of the speakers in a pair. The result is stereo confusion. One "can't quite tell where the violin is."

Putting the high range drivers in a vertical array solves the problem. The interference patterns now spread out in a vertical plane and the listener at any one point and moment hears the same pattern of frequencies from each speaker.

The resulting stereo image is quite precise.

It's worth noting that a multiplicity of drivers compounds the problem of preserving stereo image. The more drivers there are, the more interference patterns are created.

Thus while some makers introduce multiple drivers to improve power handling the AR solution has been to

build the best quality single driver for each upper frequency range we know how to build, with high power-handling capacity.

### OTHER IMPORTANT FEATURES

The upper-midrange driver is a fully sealed energy absorbent dome 38mm (1 1/2") in diameter. It covers the 1200 Hz to 7000 Hz frequency range and maintains the upper end of the range by means of a newly designed semi-horn which gives better acoustic loading above 3000 Hz.

The power-handling capacity of this upper-midrange driver has been improved through the use of a special formula high temperature magnetic fluid. This fluid acts as a heat transfer agent. It has been specially formulated for the AR9 to withstand high temperatures.

New high temperature adhesives and construction materials are also used in both high range drivers in the interest of better power-handling capacity.

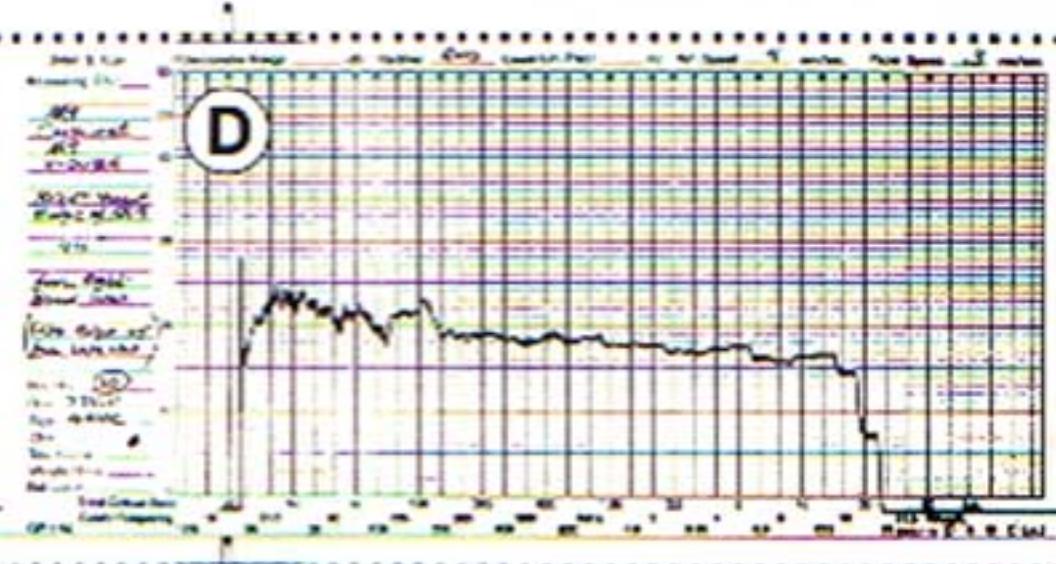
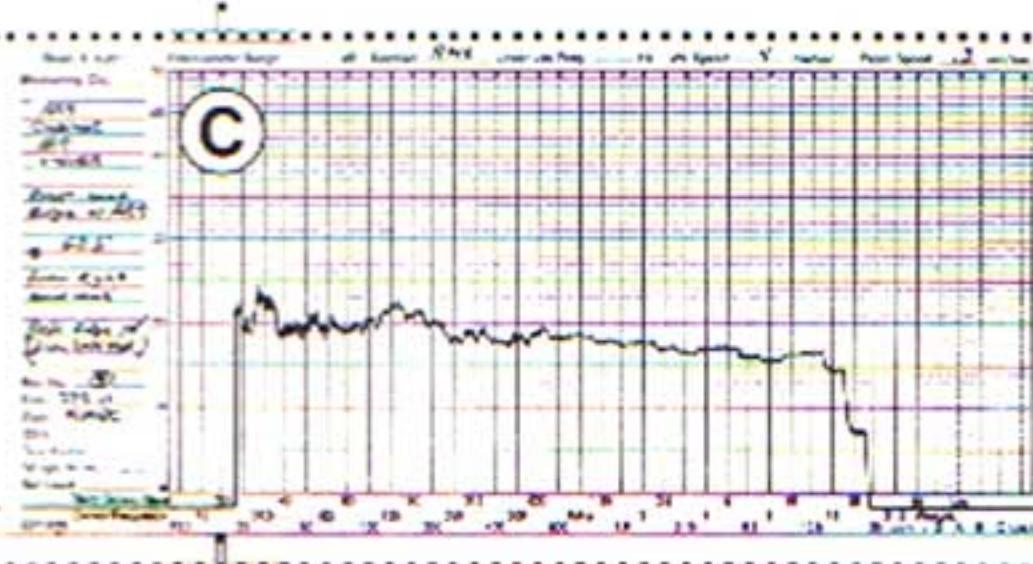
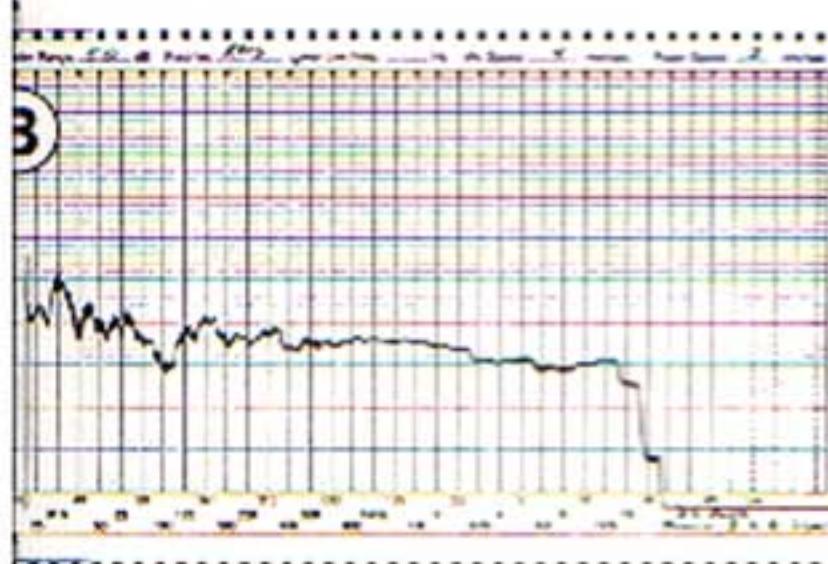
### SUMMARY

The AR9 is the flattest speaker we have ever built with the highest power handling capacity.

Test instruments show, and ears confirm, that it is as close to the optimum speaker system as can be achieved under the present state of the art.

It is a four-way system with five drivers which is capable of being coupled with the finest tuners and amplifiers being built presently.

It has been designed specifically for the enthusiast who has room for a pair of good sized floor standing speakers and wants the best sound money can buy.



# AR9 SPECIFICATIONS

**Drivers**

2 300mm (12") acoustic suspension woofers  
1 200mm (8") acoustic suspension low midrange driver  
1 38mm (1½") dome upper midrange driver  
1 19mm (¾") dome tweeter

**Crossover Frequencies**

200Hz  
1200Hz  
7000Hz

**Impedance**

4 ohms nominal, 3.2 ohms minimum

**Controls**

Three 3-position switches for lower midrange, upper midrange and high range level control

**Efficiency**

1 watt produces 87 dB SPL on axis at 1 meter.

**Power Handling**

May be used with amps capable of delivering up to 400 watts continuous power per channel being driven to clipping 10% of the time on normal music source material.

**Driver Resonance Frequencies**

Woofer in free air—18Hz  
Low midrange in enclosure—175Hz  
Upper midrange—800Hz  
High range—2000Hz

**System Low Frequency Response**

—3 dB at 28 Hz

**System Q at Resonance**

0.5

**Flux Density**

Woofer 9800 gauss  
Low midrange 7800 gauss  
High midrange 13000 gauss  
High range 14000 gauss

**Volume of Enclosure**

120 liters (4.24 cu ft)

**Cabinet Dimensions**

1340 x 381 x 402 mm deep  
(52½ x 15 x 15-13/16)  
including grille panels

**Weight**

59 kg (130 lb) excluding shipping carton.

**Crossover Network**

Half section LC networks on lower midrange and upper midrange units together with full section networks on woofers and highrange unit. Woofers have a bass extension and Q optimising circuit and upper frequency midrange unit has an impedance equalizing network. All capacitors used are computer grade bi-polar electrolytics and all chokes are air cored and wound of No. 17 gauge wire. The acoustic output of the lower midrange, upper midrange, and highrange drivers is controlled by switchable resistive networks.

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**DIN Specifications**

The German DIN standards are generally accepted in Europe as a means of comparing high fidelity equipment and are presented here for that reason. More complete specifications for the AR9 are given above. Frequency range: The limits of frequency range are those frequencies of which response is 80dB lower than the average level, this average level being taken over the range 100 Hz to 4000 Hz. Impedance: The nominal impedance of the system. Sensitivity: The number of watts necessary to produce a sound pressure level of 96 dB at the measuring microphone, the watts being calculated from  $Watts = V^2/R$ , where  $V$  is applied voltage and  $R$  is numerically equal to the stated impedance. Nominal power handling: The number of watts of a specially tailored noise spectrum that the system can withstand for one minute in every three over a total time of 300 hours, the power being based on the nominal impedance. Maximum power handling: The maximum burst of power of no more than 2 seconds duration that the system can withstand at frequencies between 250 Hz and its low frequency limit without audible distortion caused by such factors as limitations of coil or cone movement. All frequency range, and sensitivity measurements were made in a hemispherical anechoic environment at a distance of one meter on the axis of the loudspeaker.

**Frequency Range**

18 Hz—30 kHz

**Impedance**

4 ohms

**Sensitivity**

8 watts

**Nominal Power Handling**

175 watts

**Maximum Power Handling**

275 watts

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