

The New Advent Loudspeaker



The New Advent Loudspeaker is a new version of a speaker system that for several years has been the most popular and most imitated speaker in the United States. We have built greater high-frequency energy output into the New Advent Loudspeaker, to reflect improvements that have taken place in recording and broadcasting. But the basic idea behind it is the same.

This brochure is meant to spell out that idea, explain how we carry it out, and hopefully answer questions you may have about the design and performance of loudspeakers.

We think the best way to begin is with a brief description of our company and our approach to designing products.

ABOUT ADVENT.

Advent Corporation was formed in 1967 to develop new kinds of home-entertainment products, both audio and visual, that go well beyond the limits accepted at a given moment and explore new or significantly different approaches to design.

Our most unusual product is Advent VideoBeam® color television - a unique projection-television set that produces a life-size (six foot diagonal measure) color picture. But audio products have been the core of our business and our reputation. They include :

□High-performance loudspeakers for home listening. We have sold more than a million speakers, and the Advent Loudspeaker has accounted for half that total. (It's worth pointing out that those sales have resulted from a minimum of national advertising and a maximum of word-of-mouth advertising from satisfied owners.)

□The first high-performance stereo cassette equipment, introducing the Dolby® system and other innovations to the cassette format.

□The first use of the Dolby system in a separate component for use with stereo music equipment.

□The introduction of chromium-dioxide tape to cassette use. The highest-quality cassette recordings (Advent Process CR/70© Cassettes) ever offered, employing both the Dolby system and chromium-dioxide tape.

□The first moderate-price stereo receiver (The Advent Model 300) designed to compete in every audible respect except total power output with the most expensive amplifiers, preamps, and tuners.

All of our products are developed one at a time (rather than as part of a broad line of models at different prices) when we see opportunities that suit our abilities. We don't try to make everything, and we don't design any product in imitation of anyone else's.

ABOUT SPEAKER DESIGN.

Despite a great deal of advertising to the contrary, it is not

difficult to design a good loudspeaker. The necessary knowledge and materials have been available for quite a while.

But the trick, to our way of thinking, is to produce a speaker that isn't bigger, or more expensive, or more complex than necessary for maximum useful performance - and one that sounds good not just under "ideal" or laboratory conditions but under the widest range of actual conditions in people's homes. That basic approach is very much a part of the design of The New Advent Loudspeaker.

WHAT IS THE NEW ADVENT LOUDSPEAKER?

The New Advent Loudspeaker is based on a premise that is not easy to accept. The idea, based on long experience in the design of high-performance speakers, is that it's possible to produce a moderate-cost speaker system that is nothing less than the right, completely satisfying, no-compromise choice for most people who have a demanding interest in music and sound.

The New Advent is designed to combine the following objectives:

□To fit the highest category of loudspeaker quality, with overall performance that for listening at home is at least the equal - in every audible and useful respect, including total frequency range - of the most expensive speakers available.

□To do that at about half the average cost of the speakers usually considered the best available.

□To be small enough, unobtrusive enough, and uncritical enough in placement to fit easily into a home.

□To produce enough output at low distortion to permit listening to music at satisfyingly loud levels in even the largest living room.

□To be driven comfortably by the majority of good amplifiers and receivers now available, with a loudness reserve sufficient for the most demanding musical material.

□To sound convincing not only on the best recordings but on the great majority of recordings of all kinds.

Our initial interest in speakers was in the category just below the "ultimate" in performance and a long way below it in price -the category in which most serious listeners, feeling that further improvements are not worth the added cost, decide to buy. We knew that we could produce a speaker that would be both significantly better and significantly less expensive than the speakers considered the best value in that category. Our aim was to do that and establish a new point of diminishing returns that would be closer to the highest level of speaker performance.

But as we began to apply some new thinking about old concepts and to take advantage of new materials and manufacturing techniques, it became increasingly

clear that we could provide a really tremendous gain in performance-per-dollar. So much of a gain, in fact, that the difference between something very good and the highest level of performance was essentially non-existent in actual cost. It made no sense, then, to stop short of a speaker in the "best" category.

We didn't stop short of that point. As difficult as it may be to believe of a speaker system of this cost and apparent simplicity, we believe the New Advent Loudspeaker can withstand direct comparison with any speaker system available - of any price, size, or apparent complexity.

HOW IS ALL THIS POSSIBLE?

The performance of the New Advent Loudspeaker is due in great part to some important specifics of design and construction. But the key to all of them, and to the entirely new level of value the system represents, is that it is the only loudspeaker system to exploit the full potential of two-way loudspeaker design, with no attempt to withhold anything for the sake of a more complex, expensive model.

For just about as long as home audio has been of real importance, it has been assumed that the three-way speaker system, which assigns at least one specialized speaker to each of the three segments (low, middle, high) of the frequency range, is a necessity for optimum sound. The two-way system has been accepted as a "good" medium-price expedient, but the idea of extra speakers and further specialization of individual drivers for optimum quality fits in both with the idea of separate, specialized audio components and with the widespread feeling that "more is better." But the superiority of the three-way system is one of those "absolutes" that remain true only so long as no one really challenges them. After a thorough review of modern materials and manufacturing technology, we knew that the old assumption no longer need be true.

The trouble with the concept of the three-way system - a crucial one - is that it's based on the limitations of an earlier generation of loudspeakers. When high fidelity first gained the interest of home listeners, the only suitable speakers available for use in a home audio system were those used in theater and public-address systems. The individual speakers in theater systems were specialized and restricted in range for the purpose of maximum power-handling to fill large public spaces, and they converted to full-range use in home systems only in three-way designs.

As new cone materials and new techniques were developed specifically for home loudspeakers, the need for three-way systems has disappeared. It's simply no longer true that if a woofer is to be able to deliver excellent bass response it will not have enough mid-range output, or that

a tweeter can not combine excellent high-frequency and mid-range response. Nor is it true that the three-way system is somehow capable of wider range or subtler characteristics.

Today's three-way systems fall into three categories:

- Those that sound genuinely excellent.
- Those designed that way because of the severe limitations of their individual (and outmoded) drivers.
- Those that simply throw in an extra speaker or two because it looks better as a selling point.

Of those three, only the second has to be a three-way system.

THE TWO-WAY SYSTEM.

A two-way system has basic advantages, both theoretical and practical, over any other way of designing a full-range speaker system for the home. They include:

- Less interference between drivers than any other practical system, yielding more uniform characteristics over the listening area. A single speaker would be better here in theory but in real use lacks either the range or power-handling required in the "best" category, or both.
- A better transition between drivers than the three-way system, because there is no need to sharply cut off the operating range of any driver. Whether such a cut-off is made for good reasons or simply to satisfy the arbitrary parameters of three-way design, its ill effects are audible.
- One simple crossover network instead of the two more complex networks needed in a three-way system.
- A cost significantly lower for excellent sound than that of an equivalent system of three-way - or any other - design.

Those advantages are important enough in themselves, but there is an overall advantage that seems even more important to us. It is that the simplest feasible approach to an objective produces the best kind of engineering - a concept not too far from the idea that the shortest distance between two points is either a straight line or the one that is straightest under the circumstances. "Over-engineering" is a common problem in audio equipment, and one for which the customer often pays heavily in many ways. Good design to us is represented by the simplest approach that permits reaching an objective without compromise, not by an over-elaboration that makes the buyer pay for "solutions" to non-existent problems.

If the two-way system has effective limitations, they apply to the tremendous power-handling required for use in a theater auditorium or in some laboratory applications. An extra driver provides (all other things being equal) both greater power-handling for these purposes and extra radiating area that is helpful both for radiating power and for dispersing sound over a large public area. But

those are the only significant limitations of two-way design. *They have no importance in the design of the best possible speaker system for use in a home.*

THE SPECIFICS OF THE SYSTEM.

The New Advent Loudspeaker is a "system" in the fullest sense of the term. All of its components, including the cabinet, have been designed from the outset for no other application than this one, and all of them are interdependent.

That interdependence is worth stressing here. The relationship of cabinet size and speaker size, for instance, is critical. If the size of the low frequency driver were increased (all other things remaining equal), the result would be less bass; a larger driver in the same cabinet would raise the effective stiffness of the air in the enclosure, and would establish a higher bass rolloff frequency.

Some other factors are equally important, and we will try to make them clear as we go along.

THE LOW-FREQUENCY SYSTEM.

The operating range of the low-frequency driver extends from the lowest possible frequency of musical importance to the upper crossover point of 1,500 Hz. To achieve this objective, we chose to build the driver on a standard 12-



The Advent Low-Frequency Driver

inch frame that provides at low cost the width and frame depth needed for maximum cone excursion at lowest frequencies and highest power. The piston diameter of the cone combines maximum usable response at 30-35 Hz with a maximum of dispersion in the upper part of the operating range.

The driver's capabilities at lowest frequencies is made possible in great part by an outer suspension design of thermally-formed polyurethane. The suspension, a highly durable and reliable centering design, permits long linear cone motion, yet remains an effective airtight seal that maintains the full operating effectiveness of the system's sealed cabinet. In the acoustic-suspension design used for low frequencies in the system, the mechanical rigidity of conventional suspensions is replaced by a combination of a free-moving suspension and the stiffness of the air trapped inside a sealed enclosure. For optimum performance both at first and over years of continuous operation, the free-moving suspension of the speaker should have no tendency to develop air leaks, however small. The suspension of the Advent Loudspeaker is more effective than any in our experience.

The felted cone of the low-frequency speaker is formed by a low-vacuum process developed to assure high uniformity from speaker to speaker and the proper resistance to the transmission of excess energy through the cone. (The "live" energy-transmitting cone still used in many speaker systems is a prime source of the kind of distortion generally called cone "break-up.") The composition of the cone is as important as any other factor in achieving the smooth operation of the driver in the upper part of its range.

The heavy magnetic structure of the low-frequency driver is designed to provide "critical damping" for the speaker in its specific cabinet volume - that is, the amount of damping that could not be increased without rolling off bass response unnecessarily. (Like everything else in speaker design, the improvements secured from increasing the weight and flux density of a magnet go only so far; increasing beyond that point just rolls off bass response.) Also part of the magnetic system is a double-wound, four-layer voice coil that is significantly longer than the magnetic gap in which it operates. This is to allow a uniform proportion of the coil to stay in the gap at all times, even when cone and voice coil make their longest excursions, and is vital factor in keeping bass harmonic distortion low at even the highest listening levels.

The efficiency of the system has been carefully chosen to provide for reproduction of the lowest usable frequencies with amplifiers and receivers of good quality

and medium power. While efficiency is lower than that of some comparably-priced speakers of more limited range, and will require a slightly higher setting of a volume control for the same acoustic level, it is no more likely to tax the actual power capabilities of the amplifier or receiver used in a home. This doesn't hold for auditoriums or, in many cases, for large (and sometimes noisy) audio showrooms, but it is emphatically so for home listening at even the highest usual loudness levels.

THE HIGH-FREQUENCY SYSTEM.

The high-frequency driver is a new design that is at least as important as any other factor in the performance of the system, and directly responsible for the clarity and defini-

tion of instruments at all loudness levels. Its unique diaphragm is formed in one piece, and is made up of a very small inner dome and an outer rolled ring that serves both as the driver's suspension and as a highly effective radiating surface over half of its area. The design is such that no part of the radiating surface is very far from the voice coil driving the diaphragm, and it combines exceptional uniformity of driving force over the entire surface with the ability to radiate large amounts of high-frequency power.

The rolled ring form of the New Advent Loudspeaker's high-frequency cone not only is a radiating surface but is also a free-moving and linear suspension that permits exceptional cone excursion and power-handling down into

THE NEW ADVENT VS. THE ORIGINAL ADVENT.

In designing a speaker for use in the real world rather than for "ideal" or laboratory performance conditions, one of the most important factors is that the quality of recordings and broadcasts is part of the overall environment in which a speaker must operate. And the most important limitation on total, reliable speaker performance since the beginning of the high-fidelity era has been the high-frequency limitations of recordings and broadcasts. Noise and distortion effects present - on records in particular - have placed a limit on the total amount of high-frequency energy that it has made sense to try to secure from a tweeter.

Almost twenty years ago, for instance, some of us now at Advent were involved in a live-vs.-recorded test of an "ideal" tweeter design that could, and did, sound identical to the live source. But this same tweeter was absolutely unlistenable for actual playback of recordings, particularly LP records. It mercilessly revealed the tremendous residual noise and distortion (from tape hiss, cutter limitations, vinyl imperfections and other factors) present on recordings at high frequencies.

By the time we designed the original Advent Loudspeaker in 1969,

tremendous improvements had been made in recordings and broadcasts. But there were still important limitations, and the total high-frequency energy output of the Advent was carefully balanced to suit that reality and match well with the mixture of new, not-so-new and old LP's in most people's record collections.

In the 1970's, however, two very important improvements have been made in the high-frequency capabilities of recordings and broadcasts:

□ The almost universal adoption of the Dolby system and other noise reduction measures for recordings has reduced background tape hiss and residual "hash" at high frequencies by a tremendous amount. The entry of the Dolby system into FM broadcasting is also beginning to be felt.

□ A new generation of record-cutting equipment has made it possible to put more essentially undistorted output onto records in the 10,000 Hz region. And a new generation of phono cartridges has been designed to take advantage of the opening for cleaner high-frequency response.

These factors add up to more recoverable, usable high-frequency content in source material than ever before - more clean sound above the noise and distortion in the recording process.

With these improvements, and influenced by the fact that most people's record and tape collections now

date mainly from the early 1970's onward, we decided to change the high-frequency capabilities of the Advent Loudspeaker. Also involved in the decision was the knowledge that we could make use of developments like ferrofluid damping for the tweeter to come up with a higher-output design of very high reliability at very little added cost.

The New Advent Loudspeaker, then, can radiate significantly more energy at 10,000 Hz than our original design - more than enough to reveal the cleaner high-frequency output on records. The audible difference is subtle on most recordings (a slightly more open and defined quality) and most noticeable on recordings that have a heavy content of brass, snares, cymbals, and other demanding high-frequency material.

We don't believe that the difference is great enough to make more than a tiny percentage of present Advent Loudspeaker owners want to trade in their speakers. (We don't design any of our speakers, including the least expensive, to make people want to trade them in after the honeymoon, however long, is over.) But the change is the kind we think should be made in a speaker designed to compete in the "best" category without compromise. And we think it will be appreciated by today's and tomorrow's speaker and record buyers.

the mid-range of music. The advantage of a single driver for both mid-range and high frequencies is important, since it avoids all of the disturbing interference effects common to combining separate drivers for those ranges. In addition, by requiring mid-range power-handling in one small speaker, the two-way concept takes the designer in a direction in which he should be going anyway for the sake of high-frequency power-handling.

The driver uses a two-layer voice coil in a relatively heavy magnetic system. The voice coil is suspended in "magnetic fluid" (ferro-fluid) in the magnetic gap. This, plus the use of anodized aluminum for the tweeter voice coil bobbin, allows for highly effective heat dissipation that permits the driver to radiate very high levels in the 10,000 Hz region without danger of thermal damage. (See the box on "The New Advent vs. The Original Advent" for the importance of increased high-frequency energy in this region.) Other factors include a very careful choice of cone size and weight as part of the system concept, to provide enough output and enough efficiency without the need for an overelaborate and overexpensive magnetic structure.

The tweeter assembly is flush-mounted on the front panel to minimize unwanted reflections from the front of the enclosure and consequent response irregularities at ran-



The Advent High-Frequency Driver

dom points in a listening room. To prevent damage to the cone in normal use around a household, it is protected by a special grille behind the grille-cloth itself.

ABOUT HIGH-FREQUENCY POWER, DISPERSION AND OTHER MATTERS

It wasn't generally realized until a few years ago that the effective high-frequency response of a speaker depended on the total amount of high-frequency power radiated in several directions from the speaker-not just along the narrow axis directly in front of the speaker. The sound perceived by a listener across the room from any loud-speaker is made up more of indirect sound reflected from room surfaces than of direct radiation from the speaker. If high-frequency power is not spread out in proper proportion to the more easily-spread middle frequencies of music, the overall sound will range from "overbrilliant" to "raspy," depending on how much high-frequency power is going out along the speaker's axis. It will not sound right under any conditions.

What makes this question of appropriate dispersion a difficult and complex one is that the dispersion itself is not enough. The kind of design chosen for a high-frequency driver, and particularly its diaphragm, must be capable of handling and radiating power - enough of it to provide not only for the tremendous high-frequency content of some kinds of musical material, but also for the loud levels at which many people want to reproduce that material at home.

Many present systems that were designed for good dispersion of high frequencies do not relate it well enough to the requirement for high-frequency power, and some provide their performance only up to the point where the demands of music begin to get heavy. Many systems that do justice to string quartets do not do the same justice to cymbals, snare drums and brass.

THE CROSSOVER AND HIGH-FREQUENCY BALANCE SWITCH.

The single crossover network between low-frequency and high-frequency drivers is a simple LCR design that is also used for "contouring" of electrical input to the requirements of the system's design across the frequency range. The contouring action at various points in the frequency range represents a careful choice of octave-to-octave musical balance based on some fifteen years of experimenting with a wide range of recordings of improving but still variable quality. The overall octave-to-octave balance, a critical concept that no other manufacturer to our knowledge fully explores, was chosen on the basis of exhaustive listening both to recordings and to wide- and narrow-band noise inputs. Although ours is not the only possibly "right" choice, we think you will find it convincing over the widest range of musical material.

A factor that still varies widely in recordings is the overall high-frequency characteristic - a function both of the amount of high-frequency musical material present and of the amount of extraneous noise and distortion present along with (or instead of) it. To provide for the range of characteristics that exists, a three-position switch on the rear panel of the cabinet provides three different high-frequency contours above 2,000 Hz. The three contours were chosen to suit actual conditions, and are more precise and useful than the changes which a simple variable potentiometer on the tweeter can provide. Although the switch was designed for variations in program material, it also can compensate to some degree for extremes of high-fre-

quency reflection or absorption in a listening room.

JUST HOW GOOD IS THE NEW ADVENT LOUDSPEAKER?

We strongly believe that the New Advent Loudspeaker is the equal in useful measurable performance of any system now available at any price, and that it has significant audible advantages over many of the systems widely sold as the "best" on an absolute basis. We realize at the same time that the low price and simplicity of the system will encourage comparing it simply with systems in its general price range, and that there is not much we can do about the understandable human assumption that something costing \$200 must be better somehow than the one pegged at \$100. So we urge you, whether or not you might buy it anyway because "it's great for the money", to compare it under equal conditions of placement and relative loudness, to anything you care to at any multiple of its price.

The low-frequency capabilities of the New Advent Loudspeaker are the usable equal of any speaker's. Specifically, it will reproduce the 30 Hz organ pedal note that begins Richard Strauss's Also Sprach Zarathustra as room-shakingly as one could ask - providing, as in the case of London CS-6609, the note is actually present on the record.

The high-frequency capabilities of the system provide the subtle but audible advantage over many systems of excellent performance and far greater cost. Part of the unstrained clarity and the "open" quality of the system is

due to excellent power response at high frequencies, and part to the simplicity and lack of unwanted interaction between drivers in its two-way design. Whatever the reason for its performance on a particular kind of musical passage, we believe you will be able to hear the difference. It isn't blatant (the system isn't more "brilliant" or "mellow" or just plain louder than another of similarly excellent performance), but a matter of important degrees. The absence of any form of high-frequency stridency or "edginess" is such that you will not be particularly aware of high frequencies at all until a passage with demanding high-frequency content appears. For the most telling indication of the importance of high-frequency power response in the system, we suggest that you listen comparatively, at healthy volume, to a good pop recording with cymbals, brushes, heavy brass, or other instruments of high treble intensity.

There is no objective scale for measuring the much-discussed matter of the lack of audible "coloration," but we believe the New Advent Loudspeaker rates at least as well in that regard as any loudspeaker ever made. The only way we can suggest to judge this critical absence is to note just how quickly you tend to cease listening to the speaker itself and begin to listen to the music.

ABOUT LISTENING TO SPEAKERS IN A SHOWROOM

For meaningful comparisons of the speakers (ours or anyone else's) in a showroom, some simple guidelines will be of great help.

First, speakers should be compared ("A-B'ed") at exactly the same loudness level. If the levels are different, the louder speaker - regardless of its basic quality - will almost always sound better at the instant of comparison. One convenient way of doing this in a showroom that doesn't permit the levels of stereo pairs of speakers to be matched for an A-B comparison, is to readjust the volume control at the instant of comparison. Another way is to listen

monophonically to one speaker against one competitor, with each on different channels of a stereo amplifier and with the amplifier's balance control set to equalize the output of the two speakers.

The speakers should be side-by-side so that you hear only the differences between the speakers and not a combination of speaker and room placement differences. It is not always possible to arrange for this in a showroom.

However, you should be aware that speakers with widely disparate placements, such as one on the floor and one on a shelf, or one in a corner and one away from a wall, cannot be meaningfully A-B'ed. In fact, two identical speakers so placed will sound considerably different!

Rapid switching comparisons from

moment to moment can be helpful in defining low-frequency and high-frequency range differences between two speakers on the same material.

However, you will also find it helpful to listen to each speaker for periods of a minute or more on the same musical passage so that balance and the subtleties of a recording can be genuinely evaluated.

"A-B-C" comparisons, in which three speakers are compared at once, are useless. It simply isn't possible to remember the basic sound of system "A" by the time you get around to "C." Compare two speakers at a time, and then compare your favorite against another.

SPECIFICATIONS

POWER REQUIREMENT
15 watts RMS per channel.

IMPEDANCE
8 ohms.

DIMENSIONS
14" x 26" x 11.5 " deep

WEIGHT
47 lbs.

CABINET CONSTRUCTION

The cabinet of the New Advent Loudspeaker is constructed of non-resonant particle board finished in genuine walnut veneer with a solid walnut front molding

The New Advent Loudspeaker is also available in a "Utility" cabinet of non-resonant particle board finished in walnut-grain vinyl.



ADVENT

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