



Audience ClairAudient 2+2 Loudspeaker

A Single-Driver Solution

Dick Olsher

It's safe to say that the BBC invented the mini-monitor speaker in the 1970s with its design of the LS3/5A, which was intended for monitoring television broadcasts in mobile control rooms. It was the little box speaker that could! The design became commercially popular due to its tonal fidelity over the vocal bandwidth and its outstanding soundstaging and imaging performance. This two-way design was often imitated but not seriously outperformed, that is, prior

to the introduction of the ClairAudient 2+2. The idea of chopping up the musical spectrum and feeding it to a set of specialized drivers may at first seem elegant from an engineering standpoint. However, the difficulty lies in the acoustical realm. The problem of trying to blend the output from drivers spread out on a baffle without significant interference effects is far from trivial. Multi-driver designs sacrifice coherence, an attribute which correlates highly with imaging excellence. The most



Driver Details

The motor is a patented XBL2 design that originated with Dan Wiggins, now at Acoustic Development International. The objective is to create a flat BL curve over as wide a range of excursion as possible using two or more voice-coil gaps. I should note that BL denotes the force factor on the cone and is the product of the magnetic flux density and voice-coil wire length in the gap. This technology is said to combine the best attributes of both underhung and overhung voice-coil designs. Here the voice-coil winding is only 4.4mm long, yet the linear voice-coil travel (Xmax suspension limited) is 6.5mm one way. The end result is reduced inductance for wider bandwidth, lower moving mass (only 2.5 gram total) for increased efficiency, and reduced distortion over a wider dynamic range. Obviously, this technology is ideally suited for wide and full-range drivers.

coherent multi-driver design is, of course, a two-way, but nothing competes with a full-range driver.

The 2+2 uses a total of four identical 3" full-range drivers connected in a parallel configuration. Models with driver configurations of 4, 8, 16, or 32 drivers are also available, though for small rooms the 2+2 is probably optimal. The cone is an aluminum/magnesium composite with a butyl rubber surround, and the magnet is neodymium (see sidebar for the technical details). There are no crossovers; the drivers are connected directly to the power amplifier. A driver's step response is always degraded by crossover networks, and as Audience's John McDonald will surely tell you, the best crossover is no crossover! He tells me that the 2+2 is the result of many years of development and perseverance to a long-held dream. "The idea was... instead of working around conventional design limitations like disparate drivers and crossover networks... to not have those work-around problems in the first place. The vision was to have a highly resolving, highly coherent, highly dynamic, low-distortion one-way loudspeaker. Over the years we tried a great many approaches. Approximately three years ago I threw in the towel, thinking that it was not possible to achieve our goal. At the time we were using already available full-range drivers. However, those drivers could not do the entire job that we envisioned. We then set out to design a better loudspeaker driver."

It would be fair to characterize the 2+2 as two speakers in one. That is, two two-driver systems in one. Two of the four full-range drivers are mounted on the back baffle to produce a bipole radiator since the front and back drivers are radiating in-phase. McDonald acknowledges that a monopole 2-driver speaker is also a possibility and will likely be manufactured as well. To my mind, however, the bipole configuration is most advantageous. If two-channel audio is to survive in a surround-sound world, dipole or bipole designs represent the best bet for creating a soundfield that approximates that of a live event. The most convincing illusion of being there cannot be created when the recording's ambient information is produced strictly in the plane of the speakers. That's pretty much the experience of listening inside an anechoic chamber. A uniform power response, at least in the critical midband, is essential to coupling ambient information into the listening room and more completely immersing the listener in the original soundfield. And a dipole or bipole midrange has a much better chance of achieving such a power response than does a midrange monopole.

The cabinets are manufactured in California of 13-layer Baltic birch plywood. The interior is said to present no parallel surfaces to the backwave. This is a well-damped bass-reflex design with a box tuning of about 55Hz. A 6-inch passive radiator is used to eliminate port chuffing

SPECS & PRICING

Nominal impedance: 4 ohms
Sensitivity: 87dB in free space and 90dB in-room
Max RMS continuous power per speaker: 100W
Max RMS continuous output per pair: 113dB
Weight: 16 lbs.
Dimensions: 8" x 14.5" x 10.25"
Price: \$5000

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 line preamplifiers; Pass
 Labs XA.30.5, deHavilland
 Electric Amplifier Company
 KE-50A, Lamm Industries
 M1.2 Reference, and JWN 807
 power amplifiers; FMS Nexus-2
 interconnects; FMS Nexus and
 Audience Au24e speaker cable



noise and potential pipe resonances. The front and rear plinths are said to be CNC-machined from aircraft-quality aluminum for enhanced driver mounting rigidity. OFCC copper wire is used for all internal wiring and wire-harness solder joints are cryogenically treated. Finally, high-quality Cardas binding posts are used (my favorites).

Proper setup is essential for maximizing performance. The owner's manual recommends that the speakers be oriented so that the passive radiators face each other toward the inside, and that's exactly what I did. The manual also discusses toe-in options. One of the recommended options is pointing the speakers directly at the listening seat, which worked best for me. Be sure to experiment in this regard as there is some beaming in the treble range above 12kHz. You may therefore find it desirable to intersect the speaker axes slightly in front of the listening seat, although the slight treble lift did not bother me with tube amplification. Listening height is also critical and stand height comes into play. The manual recommends a stand height of 28 inches, which ought to work well in most applications. Ideally, the ears should be located at a height that places them exactly between the two front drivers. That's the sweet spot. There is interference between the drivers above about 4kHz at listening positions that are *not* substantially equidistant from both drivers.

The impedance magnitude is quite flat over the frequency range 200Hz–20kHz, making the 2+2 eminently suitable for tube amplification. Due to its decent sensitivity, 30 to 40Wpc of tube power proved to be an adequate reserve for my medium-sized listening room. The marriage of tubes with the 2+2 was responsible for fully fleshing out the 2+2's imaging potential. Tubes also helped beef up the lower midrange, partially making up for the 2+2's slightly lean tonal balance, as well as imbuing the midrange with a sensuous feel for phrasing and emotion. The baffle-step effect is an issue for all mini-monitor designs; here the bipole design helps fill in the lower midrange, but I could have used 2 to 3dB more output in the upper bass range in the octave from 100 to 200Hz.

Don't let the 2+2's size fool you. In-room bass extension measured flat to about 55Hz, more than respectable for a mini-monitor. But it's not all about bass extension—the key is quality. Bass lines were precise and well defined. Backed by a quality front end, the 2+2s resolved bass details that other speakers fuzz over. The combination of a small well-damped enclosure and rigid cone drivers

gave the impression of quick, tight bass, unobscured by the time signature of cabinet resonances. The lean balance mentioned above was most noticeable with the Pass Labs XA30.5 power amp. Instruments rich in sonority, such as piano and organ, were most affected. The sustain pedal lavishly used by Chopin was slightly emaciated.

The 2+2 consistently sounded coherent to the max, speaking as it does with one voice. The consequence was a magical soundstage, exceedingly wide and deep. In fact, I've yet to experience better layering of depth perspective. Image solidity was nothing short of spectacular. In particular, the vocal range was projected palpably with a reach-out-and-touch-someone transparency. I'm convinced that this level of performance is partly a function of the bipole radiation pattern which helps generate a uniform power response over the vocal band from 200Hz to 4kHz. Even massed voices in a church acoustic were readily resolvable as was the reverberant signature of the recording venue. The 2+2 proved quick at the point of attack, and transient decay was well controlled and easy to follow clear down to the noise floor of the recording.

Midrange textures were presented with a low-distortion signature and were capable of assuming vivid colors and a natural sweetness approaching that of the real thing. And while the upper treble lacked the finesse of a ribbon tweeter, the lower treble was well behaved, blissfully without the gratuitous brightness and hyped-up detail that characterize so many dome tweeters. As a consequence, the timbre of female voice was reproduced with admirable realism. The dynamic range from soft to loud was quite persuasive, with minimal compression in evidence even at moderate listening levels. This puppy can rock without fear of driver damage. Resolution of microdynamic nuances was excellent (8 out of 10) and responsible for retrieval of most of the music's emotional content. An essential attribute for music reproduction is rhythmic drive, and the 2+2 did its thing with an emphatic boogie factor. Musical lines were propelled forward with superb verve (a perceptual attribute that is impossible to measure but easy to discern).

The ClairAudient 2+2 is by far the most enjoyable, musically compelling mini-monitor I've auditioned to date. It crushes other mini-monitors at their own game, yet can play louder with lower distortion and power compression. There is little to complain about and much to rave about. In the mini-monitor genre it sits well above a crowded field. A sonic gem that demands a serious audition. Highly recommended! **tas**

Audience A3S Drivers

The heart of every Audience Loudspeaker System

Audience was founded on the belief that a significantly better performing loudspeaker could be built. To accomplish this goal, Audience never considered conventional designs and focused instead on the best and only real solution - the most advanced full range driver possible.

The A3S driver used in our loudspeakers is the product of more than 11 years of research and development. It is both elegant and technologically advanced, delivering the high resolution and fast response of electrostatic designs with the full dynamics and frequency range of the best cone/piston based dynamic speaker systems. The A3S has an exceptionally flat response from 85 Hz to 20 kHz +/- 2.5 dB. In actual loudspeaker application, Audience loudspeakers are achieving responses in some cases +/- 2 dB to 20 Hz. No other single driver available today can deliver this kind of performance.

The A3S achieves such remarkably low distortion performance by eliminating the shortcomings that are commonly found in dynamic drivers. The cone itself is made of an extremely strong and light titanium alloy and the concave dust cap is made of a proprietary material which provides constrained layer damping to control cone break up at high frequencies. The total moving mass is a remarkably low 2.5 grams.

Combining the ultra-low mass cone with a largely oversized patented motor, featuring a neodymium magnet and proportionately large voice coil, yields a driver with uncommonly accurate reproduction capability. The A3 delivers 12mm of usable cone excursion with less than 1 dB compression at levels up to 95 dB SPL.

While to some a driver may appear simple, in truth it is a complex mechanical design combining a number of different elements with very complex interactions. The cone and motor are two of the most obvious components; however, Audience has given careful attention to the other key components, as well. The basket and surround are both unique and proprietary. The patent-pending "S"-shaped surround minimizes unwanted diffraction and permits large cone excursions while maintaining uniform resistance in both directions which results in far lower harmonic distortion levels.

Allowing for large linear excursions, the A3S spider was designed with special materials and is of a size usually associated only with much larger drivers. Pole piece venting is also unusual. Vents of this size are usually only seen on subwoofers or other considerably larger drivers. The large vent supports high volume air flow which cools the voice coil and results in superior power handling. The large vent has radiuses on both ends which prevents turbulence thereby ensuring cleaner distortion-free performance.

For many manufacturers, the basket is simply a structure in which to place the active driver parts. For Audience, the challenge was to create a resonance-free support for the active driver components. The patent-pending A3S basket is the product considerable research and refinement using state-of-the-art Finite Element Analysis. It is obstruction-free with no trapped air spaces and has no mechanical resonance problems.

The Audience A3S driver is the ultimate in small full range driver design.



The Unprecedented Power of One

The Astonishing Audience A3S

ONE WAY → Full Range

High Performance Loudspeaker Driver

- 12 mm usable excursion
- 25 watts continuous power handling
- 84.9 db efficiency
- 2.5 grams total moving mass
- Extremely low inductance dual voice coils
- Less than 1 db distortion at 95 db SPL

The HEART of every
ClairAudient Loudspeaker