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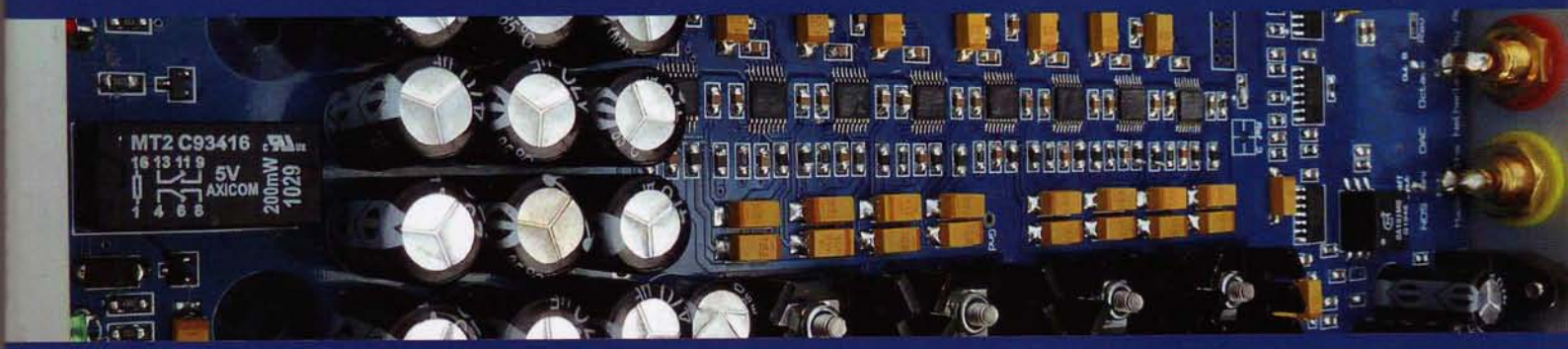

AUDIO REVIEW JOURNAL £12.80 Vol5/No4 OCTOBER - DECEMBER 2011

REVIEWED THIS ISSUE:

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MSB SIGNATURE DAC IV
MSB DIAMOND DAC IV
MSB UNIVERSAL MEDIA TRANSPORT
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JAYS V-JAYS THREE
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ETYMOTIC MC2
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APOLLON AUDIO APACHE
AUDIOSMILE KENSAI/ADVANTAGE
KIMBER TIMBRE, TIMBRE MINI-ZAP
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ElectroMotion

MARTIN COLLOMS EXAMINES MARTINLOGAN'S ELECTROMOTION ESL, AN ELECTROSTATIC HYBRID THAT COSTS LESS THAN YOU MIGHT THINK

MARTIN COLLOMS

Relatively small two-way hybrid speakers, combining moving-coil bass sections with electrostatic midrange and treble units made MartinLogan popular, providing familiar bass power and punch with the audibly less boxy virtues of ingenious, open panel electrostatic technology. A key design was the *Aerius* from the early 1990s, and in a sense this *ElectroMotion ESL* is a reincarnation of that loudspeaker.

The *ElectroMotion* range is ostensibly a simple home cinema package, using this £2,200/pair *ESL* as the left and right channels of a system which also includes conventional box type centre channel and surround units with folded ribbon type high frequency drivers. MartinLogan also has numerous subwoofers in its range to supplement the surround array should this be deemed desirable. Nevertheless as a floorstanding free space full range design, the *ESL* should serve just fine for classic stereo, and that is how we have assessed it.

A key issue with panel speakers is directional response, which is usually constrained acoustically by their panel shape and large area. This is particularly true where they tend become more directional at higher frequencies. MartinLogan has long dealt with this problem by curving their panels to form a section of a vertical cylinder, with a reasonably uniform radiation angle of typically 50 degrees. This helps make the off-axis and room reflected sound signature more uniform.

Substantial height means that the sound does not vary too much with listener height, and the floor and ceiling reflections are more diffuse than with point source cone loudspeakers. The close-to-floor bass unit means that the local acoustic reflection is also well controlled, so the speaker should be easy to place in the room for good results.

MartinLogan claims a high 91dB/W sensitivity together with a 42Hz to 22kHz response (+/-3dB). The curved *ESL* unit is 71cm high and mounted onto a floorstanding bass enclosure. This is driven by a front-firing 220mm paper-pulp cone unit and has a good size floor-facing gas-flowed reflex port.

The whole speaker stands 132.3cm high, is 22.9cm wide and 41.4cm deep, and weighs an easily manhandled 16kg. It admits to 1.6ohm minimum impedance at 20kHz (not uncommon with electrostatics), alongside an overall 6ohms rating. Our woofer enclosure was black gloss finished, adding £300 to the price.

Input connection is by a pair of multi-way push-spring binding posts. (I would have preferred standard screw down binders.) Hard polymer feet are fitted for polished floors; detaching the end caps reveals neat cones with adjustment for levelling.

Technology

An important difference from earlier designs is the way the high internal voltage required by all electrostatics is generated. Originally this was achieved by taking a sample of the amplifier power and multiplying it many times to the thousands of (harmlessly contained) volts needed to help drive the lightweight polyester film diaphragm. Now each speaker has a little switch-mode 15V, 0.4A plug-top DC supply (ours inconveniently came with EU shaver socket pins), delivering permanent micro power that drives an internal high voltage generator to polarise the central diaphragm cleanly. You can't get a shock here, as the surface resistance is naturally so high that you cannot even feel the tiny current flow if you were to make contact (*eg* by stupidly poking a pin through the holes). However, it does mean that it's necessary to have some form of mains supply near each speaker, and the fussier may wish to add some filtering to minimise the RFI footprint from the supplies.

When not in use the speakers automatically turn off in order to extend their life (one second auto turn-on), which is particularly useful in dusty climes. However, the diaphragm is sufficiently robust that the perforated enamelled steel panels may be vacuumed when necessary. In this design the bass driver is fed *via* a passive crossover, and the mid/treble electrostatic *via* the usual crossover and step-up transformer. The latter need not be a large component as the crossover frequency is set to a fairly high c500Hz.

Sound Quality

The tonal balance was not immediately familiar, and some judicious experiment with placement and angling was needed to help reconcile the rather different acoustic behaviours of the two units. That is, the near omni-directional pressure response of the bass units up to 500Hz, and the gradient/velocity dipole response of narrow electrostatic sections that are tall enough also to have some properties of a truncated vertical line source.

Bass that is even, tuneful and of about the right relative quantity is achieved by experimenting with positioning with respect to front and side walls.

System:
Jolida JD *502 BRC*, Apollon *Apache*, Krell *Evo 402e*, Audio Research *Reference 5*, Naim *UntiServe*, MSB *Platinum Signature DAC IV*, Marantz *CD7*, Linn *LP12/Keel/Radikal* Naim *Aro*, *Superline*, Koetsu *Vermilion*.

The comprehensive manual is very helpful in this respect, and the usual room placement for a medium size reflex speaker system was close to correct. The listening seat was located for both best bass uniformity and mid and treble tonal balance, as the tonal balance can vary more than usual with this type of hybrid speaker. However, in some rooms this greater variation may even help to get a better result.

Jockeying the seat fore and aft while adjusting the toe-in as recommended (here about 20 degrees) achieved a good result. While the central listener enjoyed the best focus and depth, adjacent listeners certainly got a poorer deal, which is typical with large panel speakers and dipoles. Since dipoles have a figure-8 pattern of sound radiation, side wall reflections are largely absent, so the room acoustic effects are quieter, and the sound is more intimate and tightly focused on the listener. High sensitivity means that even 15W/ch of power delivers good results and focus was above average.

Although the bass is not particularly tight rhythmically, it is quite dynamic, tuneful and extended, lending stature to the electrostatic section. The lower mid is a touch lean but proper toe-in helps substantially, giving a notably transparent and un-boxy sound, imbued with the kind of subtlety, micro-detail and image depth usually associated with rather more expensive designs. Transients are crisp and quick, fatigue is low, and the design clearly shows a welcome freedom from overhang or ringing.

Lab report

Sensitivity was very close to target and a high 91dB/W/m (referenced to 2m), which is significantly higher than average. Although the specified 1.6ohm at 20kHz impedance looks worrying, the actual musical spectrum rated result was not that bad at a typical 5ohms. There's also a narrow dip to 3.5ohms at 290Hz, which is fortunately associated with low phase shift. At very high frequencies, where the music power is rather lower and hence less taxing, the load falls to 2.5ohms by 12kHz and bottoms out at 1.5ohms at 20kHz, with 72 degrees phase shift; as expected, the panel is clearly a capacitor. Modern amps should not be upset by this load, though one or two might react to it!

At low frequencies the reflex alignment is textbook, and located at 38Hz. I think the manufacturer's 300W maximum rating is ambitious but sinewave tests suggested that 150 to 200W peak program will be tolerated, while as little as 20W/ch will still give decent results. Maximum sound level in a typical room is a healthy 107dB for a stereo pair, so although it's visually slim it can nonetheless deliver the goods, and into larger rooms than expected.

A 32 measurement average for each speaker across eight mike locations in the listening zone showed a smooth and extended response which is well balanced, if just a shade lean in the lower midrange.

The frequency response shows smooth bass tuning, with a power dip of a few dB 200-400 Hz that is not serious. The standard axial response (red) shows a rising trend to 2kHz. However, this is not the design axis, and at 15 degrees lateral (*ie* correctly toed-in) the response is a really good +/-3dB out to 20kHz, and only 5dB down at 30kHz. The high treble is well maintained for a range of angles, varying hardly at all with height or vertical angle. The bass extends to 35 Hz -6dB, and 30Hz sinewave was audible in-room at fair levels and without excessive port noise.

A virtue of panel speakers, especially electrostatic types, is low distortion and the *ElectroMotion ESL* did not disappoint. It certainly sounded clear enough and the analyzer confirmed mid-to-treble distortion values of 0.02% for second and third harmonic and with nothing else present. For example, at 86dB 1kHz the distortion was a very good 0.1% or -60dB, and even at 93dB spl second was held to 0.25%, third to 0.05%, and with no other harmonics. At 93dB and 40Hz the results were also good at 1% second and 0.5% third (inaudible errors), and the bass unit would take a decent 26V (about 90W sinewave) without rattling. Solid output was possible down to 33Hz. We consider that this is a well sorted speaker design.

Electrostatics should also have good energy decay performance, and the waterfall representation of decay with frequency shows its linear phase characteristic. In the upper range at least, the even decay with frequency, the rapid first clearing, and the fairly mild looking later decay field are good results for the technology, and agree well with the encouraging subjective results.

Conclusions

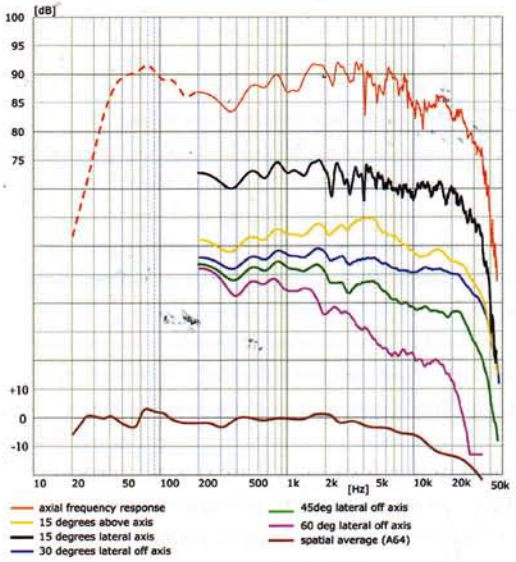
While not really suited to heavy metal or highly rhythmic rock material, this MartinLogan does bring a good taste of the open, free sounding and agile quality of electrostatic technology, and the *ElectroMotion ESL* has undoubted stature and presence in the room. The low frequency balance may be tuned by adjusting the spacing from the wall behind the speakers, while the distinct lack of sideways radiation means that side wall reflections are not a problem and the speaker can be positioned nearer the side walls or and/or used in smaller room to good effect. In this respect it may well offer a significant advantage.

It has an open, crisp sound that's transparent and well detailed. It covers the transition from bass box to open panel mid and top pretty well, and will also effectively partner a number of modestly priced valve amplifiers, showing a pleasing symbiosis. It certainly deserves to be auditioned, and the open panel electrostatic sound that's available at this price level really has to be experienced.

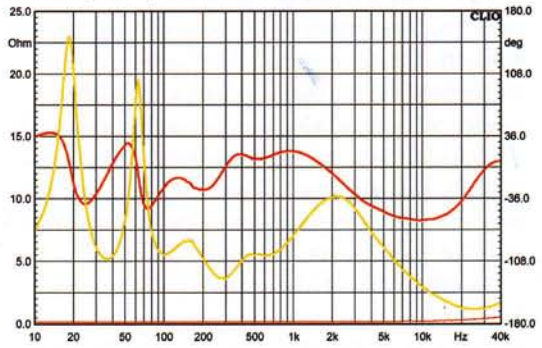
Although these were not available in time for this review, late in the day we have heard that UK models of the *ElectroMotion ESL* and related models will be supplied with locally sourced, linear, regulated, 15V power units, which might well result in a modest extra improvement in sound quality.

Taken overall, this design successfully addresses the several issues presented by a compact electrostatic hybrid concept and deserves recommendation.

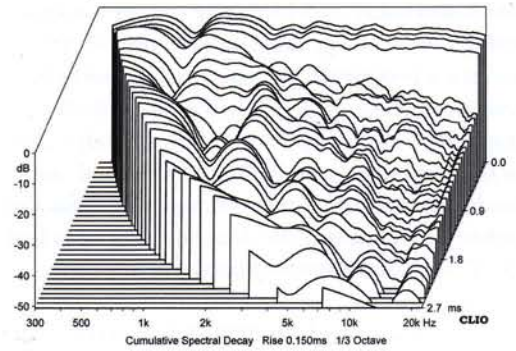
MartinLogan ElectroMotion ESL Frequency Responses



MartinLogan Impedance and Phase



MartinLogan ElectroMotion Waterfall 1/3 Oct



HIFICRITIC Loudspeaker Results

Make	MartinLogan
Model	ElectroMotion ESL
Price	£2,200 - £2,500
Finishes	Veneer, black, black gloss
Size (hxwxd), weight	132.3x22.9x41.4cm, 16kg
Type	Electrostatic hybrid, reflex loaded bass driver
Sensitivity for 2.83V	91dB measured
Amplifier loading	5ohms typical, 1.6ohm min: an average amplifier load
Frequency response, axial	40Hz to 22kHz +/-3.5dB
Frequency response, off-axis	Good+ power response (see graphs and room response)
Bass extension	38Hz for -6dB, 33Hz in-room
Max Loudness, in room	107dBA for a stereo pair
Power rating	15 - 200W
Placement	Floorstanding, near free space