DEFINITIVE TECHNOLOGY

Studio Monitor Series Driver Technology

A Vastly Superior Midrange Driver

The midrange is where 90% of sound information exists. The quality and accuracy of the midrange driver is the single most critical factor in a speaker's overall performance and your long-term listening satisfaction. The best bass and highs in the world will do you little good without excellent midrange reproduction.

That's why Definitive engineers have always put extra care into the design and materials of our midrange drivers. While most brands use stamped steel baskets (the speaker's frame), Definitive has always used cast aluminum baskets. Cast AL baskets are more rigid and less prone to "ringing" (vibration of the basket material) that adds distortion and colors the sound. Steel baskets interfere with the magnetic field that controls the movement of the cone, while non-magnetic Aluminum does not. All of the magnetic Gauss (strength) is focused in the voice coil gap instead of being wasted in magnetizing a steel basket. The benefit to you is a driver



that plays louder, with life-like dynamic impact and vanishingly low distortion.

Definitive's midrange drivers feature injection molded butyl rubber surrounds instead of the cheap foam surrounds often seen in lesser brands of speakers. Butyl rubber lasts decades whereas foam surrounds stiffen (changing their sound) and eventually rot away. Definitive's drivers will sound consistently great over decades of use. But most of all butyl rubber surrounds absorb cone resonance – for lower distortion, more natural midrange sound reproduction. Definitive's speakers have always been known for their clear, natural midrange-voices are full, perfectly intelligible and lifelike.

A More Linear Motor Means Better Sound

The figure to the right is a graph of the BL Product of the 5-1/4" BDSS driver used in the StudioMonitor 65. BL Product is the product of the motor's magnetic flux density times the length of voice coil in the

gap. Put more simply it is a measure of the motive force applied to the driver cone. The important thing isn't whether vou have more or less BL Product, but whether the force is applied uniformly. In these graphs the center "0.0" vertical line represents the cone at the center "rest" position. To the left of center line is forward cone movement; to the right is backward cone movement. In this kind of graph, you're looking for a symmetrical curve, centered on the "0.0" line. You can see that the Definitive driver's BL Product is symmetrical and linear - the same amount of force is applied in both forward and backward travel. The net result is far less distortion for better inner detail and clarity.



The chart below compares the distortion of two 5-1/4" drivers, one Definitive and another from a well-respected speaker brand, both tested with high power signals (40V). The Definitive driver is clearly better in delivering high output, low distortion sound.

	Definitive BDSS driver	Driver X
Db - distortion factors representing	0.5 %	22.2%
contribution of		
nonlinear force factor		
DI - distortion factor representing	4.1 %	7.2%
contribution of nonlinear		
inductance		
Dc - distortion factor representing	0.0 %	16.4%
contribution of nonlinear		
compliance		

Patented BDSS Technology

Definitive was awarded US patent number 7684582 for our innovative Balanced Double Surround System (BDSS) driver design. The original BDSS driver set new standards for wide-bandwidth accurate frequency response, broad dispersion, low distortion and maximum detail retrieval. In a BDSS driver the cone is supported by specially tuned soft rubber surrounds at both the outer and inner edges. The double surrounds allow the cone to have longer excursion (move farther) with lower distortion.





As output is a function of both a cone's diameter and excursion, the higher excursion BDSS system brings the benefit of higher output from smaller drivers. The 3-1/2'' driver used in many Definitive models has the output and dynamic range of a typical 4-1/2'' driver, the 4-1/2'' driver has the output one would expect from a 5-1/4'' driver and so on through the line. More sound, lower distortion, smaller size.

But now we've made this remarkable driver even better by improving the phase plug located at the center of the driver. "What does a phase plug do anyway" you might ask? Higher frequencies radiate from the driver near the center of the cone. If the short high frequency waves radiated from one side of the cone (**Figure A**) meet the same sound waves from the other side of the driver (and they will), those sound waves will interfere to cancel and reinforce each other. The result is uneven frequency response and poor off-axis performance. The phase plug prevents those short high frequency wavelengths from interfering with each other (**Figure B**). The benefit is flatter, smoother high-frequency response both on- and off-axis.

The new phase plug is called the Linear Response WaveguideTM which serves to smooth the driver's frequency response and improve off-axis response and dispersion as illustrated in the graphs below.





Frequency response of driver with conventional phase plug: @ 0° (green), -15° (red) and -30° (yellow). Notice the severe high frequency roll-off at 30 degrees off axis.



Frequency response of a BDSS driver with LRW phase plug: @ 0° (black), -15° (blue) and -30° (red). Even 30 degrees off axis the response is at most only 3dB down from the on-axis response.