# JBL Professional Series
# Model 4355
# Studio Monitor

Four-way system designed for biamplification
Extremely wide-band linear response characteristics
High acoustic output; controlled dispersion pattern
Provision for mirror-imaging

JBL

# The 4355 Studio Monitor

The JBL 4355 is the latest result of an engineering study undertaken to create, regardless of cost, the optimum studio loudspeaker for monitoring recording sessions and for final mixdown of master tapes. A four-way system designed for biamplification, it achieves inherently smooth reproduction from 28 Hz to 20 kHz, controlled high frequency dispersion, and exceptional transient performance. In addition, the 4355 is capable of wide dynamic range with low distortion and of the high acoustic output required for precise reproduction of the original sounds. It is an indispensable tool, not only for mastering and mixdown, but also for subjective analysis of the entire studio recording and reproducing complex.

### Biamplification

The two low frequency loudspeakers are driven independently of the other components in the system. Biamplification offers significant performance advantages in terms of reducing distortion, particularly at high volume levels that would be more likely to overload a single amplifier.

### Low Frequency Loudspeakers

Two 380 mm (15 in) low frequency loudspeakers mounted in a ported enclosure provide accurate reproduction and high power handling at very low frequencies. The use of two drivers allows twice the power input to the low frequency section, resulting in a 3 dB increase in acoustic output. Each loudspeaker is driven by a 100 mm (4 in) diameter voice coil fabricated of edge-wound copper ribbon wire, operating in a magnetic field with a flux density of 1.2 T (12,000 gauss). The 8.5 kg (18⅝ lb) magnetic assembly incorporates JBL's unique Symmetrical Field Geometry (SFG) design that reduces second harmonic distortion to inconsequential levels. Careful choice of suspension elements, taking into account their interaction with the voice coil motion, results in a driver with tight, controlled transient response and complete freedom from dynamic instabilities. A compliant cone termination allows long excursions and damps spurious reflections traveling within the cone material.

### Midrange Loudspeaker

Music fundamentals lying in the region between 290 Hz and 1.2 kHz are reproduced by a 300 mm (12 in) loudspeaker housed in a sealed subchamber and driven by a 100 mm (4 in) edge-wound copper ribbon voice coil. The SFG design of the magnetic structure results in exceptionally low levels of second harmonic distortion. The magnetic assembly weighs 9.5 kg (21 lb) and produces a flux density of 1.2 T (12,000 gauss) in the voice coil gap. The driver achieves high acoustic efficiency and effortless reproduction, even at extreme volume levels.

### High Frequency Compression Driver

Reproduction from 1.2 kHz to 10 kHz is accomplished by a massive compression driver energized by a magnetic assembly weighing 11.3 kg (24⅞ lb). The 100 mm (4 in) edge-wound aluminum ribbon voice coil, suspended in a magnetic field of 1.8 T (18,000 gauss), drives an aluminum diaphragm featuring a three-dimensional diamond pattern surround that provides improved high frequency response and increased reliability. Proper phasing of the wavefront is assured by use of a phasing plug of die-cast concentric exponential horns. The combination of an extremely powerful, efficient magnetic assembly, edge-wound voice coil, and large yet lightweight diaphragm results in exceptional transient response and dynamic range.

### Horn/Lens Assembly

The output of the compression driver is distributed by an exponential horn combined with a slant-plate acoustic lens. The rigid horn casting couples the output of the high frequency driver to the acoustic lens without adding audible resonance or distortion. The 11 plates of the lens, set at an angle of 38° operate in a manner analogous to a divergent optical lens, providing controlled propagation of high frequency energy.

### Ultra-High Frequency Transducer

The highest octave of the audio spectrum is reproduced by a compression driver specifically designed for ultra-high frequency reproduction and dispersion. Its 2 kg (4½ lb) magnetic assembly develops a flux density of 1.65 T (16,500 gauss) and drives a 44 mm (1¾ in) edge-wound aluminum ribbon voice coil. The driver uses a ring diaphragm pneumatically formed of 0.06 mm (0.002 in) aluminum foil stock. Output is directed through a diffraction horn providing 90° dispersion in the plane perpendicular to the diffraction slot while restricting dispersion in the vertical plane to approximately 40°. The device maintains response within a tolerance of ±3 dB to 20 kHz.

### Frequency Dividing Network

The low frequency loudspeakers operate to 290 Hz and require an attenuation rate of 12 dB per octave below and above the crossover frequency. Transition may be accomplished with a JBL 5234A dual channel Electronic Frequency Dividing Network or with one of several electronic crossovers or filtering devices commercially available. A crossover card designed specifically for the 4355 is available for use in the JBL 5234A.

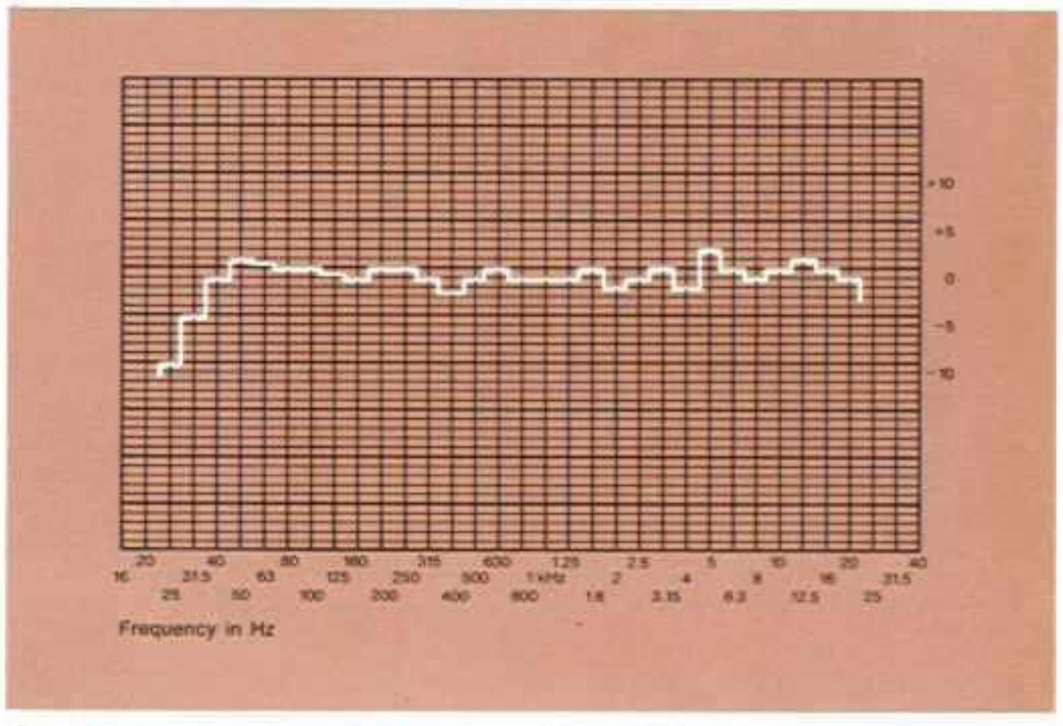
The midrange, high frequency, and ultra-high frequency drivers are regulated by a high-level passive crossover network of the L-C type specifically designed and tested for operation with the transducers of the system. Transition between the midrange loudspeaker and the high frequency compression driver occurs at 1.2 kHz at the rate of 12 dB per octave. At 10 kHz, the ultra-high frequency driver is brought into operation at 18 dB per octave. Level controls are provided.

## Enclosure

The enclosure of the 4355 incorporates two acoustic chambers. The two low frequency loudspeakers are housed in a bass reflex chamber which has an internal volume of 265 liters (9.5 ft³). Proper loading to 32 Hz is accomplished by a distributed port consisting of two large curved tubes. The midrange loudspeaker is mounted in a second, sealed subchamber, 48 liters (1.7 ft³) in volume and designed to prevent acoustical interaction with the low frequency drivers. The subchamber also attenuates output of the midrange unit below 200 Hz, thus reducing unwanted peaks in total system response. The enclosure is constructed of 25 mm (1 in) stock for maximum rigidity with minimum weight. Joints are carefully fitted and heat treated; the enclosure is architecturally braced to prevent unwanted resonances, and the interior surfaces are padded to damp spurious reflections and standing waves within the acoustical chambers.

## Test Parameters

The accompanying graphs and specifications were compiled from measurements made under standard laboratory test conditions. The loudspeaker system was mounted flush in the center of a large, flat baffle in an anechoic environment. A calibrated condenser microphone was suspended at a measured distance from the sound source, sufficiently out of the near field. All associated electronic equipment was checked and calibrated before tests were run.




One-third octave band response of the 4355, taken on-axis with pink noise. Measured response contour of a typical 4355 does not differ by more than 2 dB from the above curve.

**Specifications**

| | | |
|---|---|---|
| Maximum Power Input | | |
| Continuous Sine Wave (290 Hz Biamp Crossover) | | |
| Low Frequency | 300 W below 290 Hz | |
| High Frequency | 150 W above 290 Hz (controls at 0 dB setting) | |
| Nominal Impedance | | |
| Low Frequency | 4 Ω (minimum 3.5 Ω @ 28 Hz & 200 Hz) | |
| High Frequency | 8 Ω (minimum 5.6 Ω @ 9 kHz) | |
| Maximum Sound Pressure Level (SPL)[2] Continuous Program | 126 dB | |
| Frequency Response | | |
| Sine Wave, on-axis | 28 Hz-20 kHz +3, −6 dB<br>31.5 Hz-18 kHz ± 3 dB | |
| Dispersion Angle (Included between 6 dB points from on axis) | | |
| Horizontal | No less than 120° to 12 kHz | |
| Vertical | No less than 40° to 12 kHz | |
| Sensitivity[3] | | |
| Low Frequency | 96 dB SPL, 1 W, 1 m (3.3 ft) | |
| High Frequency | 99 dB SPL, 1 W, 1 m (3.3 ft) | |
| Distortion | | |
| ½ Power, 111 dB SPL at 3 m (10 ft), Single Frequency | 1% or less third harmonic generation from 25 Hz to 1.2 kHz<br>3% or less third harmonic generation from 1.2 kHz to 5 kHz | |
| 1/10 Power, 104 dB SPL at 3 m (10 ft), Single Frequency | 0.6% or less third harmonic generation from 1.2 kHz to 5 kHz | |
| Crossover Frequencies | | |
| Low | 290 Hz electrical, 12 dB per octave | |
| Mid | 1.2 kHz, 12 dB per octave | |
| High | 10 kHz, 18 dB per octave | |
| Low Frequency Loudspeakers | 2235H(2) | |
| Nominal Diameter | 380 mm | 15 in |
| Voice Coil | 100 mm (4 in) edge-wound copper ribbon | |
| Magnetic Assembly Weight | 8.5 kg | 18⅝ in |
| Flux Density | 1.2 T (12,000 gauss) | |
| Sensitivity[3] | 93 dB, 1 W, 1 m (3.3 ft) | |
| Midrange Loudspeaker | 2202H | |
| Nominal Diameter | 300 mm | 12 in |
| Voice Coil | 100 mm (4 in) edge-wound copper ribbon | |
| Magnetic Assembly Weight | 9.5 kg | 20.9 lb |
| Flux Density | 1.2 T (12,000 gauss) | |
| Sensitivity | 99 dB, 1 W, 1 m (3.3 ft) | |
| High Frequency Compression Driver | 2441 | |
| Throat Diameter | 50 mm | 2 in |
| Voice Coil | 100 mm (4 in) edge-wound aluminum ribbon | |
| Magnetic Assembly Weight | 11.3 kg | 24⅞ lb |
| Flux Density | 1.8 T (18,000 gauss) | |
| Sensitivity | 108 dB, 1 W, 1 m (3.3 ft) on 2311/2308 horn/lens | |
| Ultra-High Frequency Transducer | 2405 | |
| Horn Mouth | 79 mm x 18 mm 3⅛ in x 0.725 in | |
| Voice Coil | 44 mm (1¾ in) edge-wound aluminum ribbon | |
| Magnetic Assembly Weight | 2 kg | 4½ lb |
| Flux Density | 1.65 T (16,500 gauss) | |
| Sensitivity (averaged above 8 kHz) | 105 dB, 1 W, 1 m (3.3 ft) | |
| Finish | Oiled walnut | |
| Grille | Dark blue fabric | |
| Net Weight | 120 kg | 265 lb |
| Shipping Weight | 140 kg | 309 lb |
| Accessories | JBL 5234A Electronic Frequency Dividing Network, dual channel<br>JBL 51-5145 crossover card for 5234A (one card required per channel) | |

1. Power amplifier headroom recommendation is 3 dB minimum; i.e., for a 150-watt rating, use a 300-watt amplifier.

2. SPL in dB ref. 20 μPa measured in the reverberant field of a reference room of 85 m³ (3000 ft³) with an average absorption of 18.6 m² (200 ft²). Continuous program rating is defined as 3 dB above continuous sine wave power.

3. Averaged from 500 Hz to 2.5 kHz. Unlike many "theater-type" loudspeaker systems that exhibit a rise in the midrange region, the 4355 is a true monitor providing substantially the same sensitivity through the full range of audible frequencies. Thus sensitivity below 500 Hz or above 2.5 kHz may be considerably greater than that of other systems with higher sensitivity ratings.



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