LSR28P Linear Spatial Reference Bi-Amplified Monitor System

Key Features:

- Linear Spatial Reference design based on spatial response measurements and psychoacoustic principles.
- Differential Drive® Technology with dynamic braking for extended low frequency response and low power compression.
- Integrated Bi-amplification with calibrated and variable sensitivities.
- Titanium Composite High Frequency Device with Elliptical Oblate Spheroidal Waveguide and Damped Pole Piece.
- Carbon Fiber Composite Baffle for low cabinet resonance and stable inertial ground.
- Linear Dynamics Aperture Port Design eliminates port noise and reduces port compression.

The LSR28P Linear Spatial Reference Studio Monitor combines JBL's latest in transducer and system technology with recent breakthroughs in psychoacoustic research to provide a more accurate studio reference.

The Linear Spatial Reference (LSR) philosophy is based on a set of design goals that carefully control the overall performance of the system in a variety of acoustic spaces. Instead of focusing on a simple measure such as on-axis frequency response, LSR designs require much better control over dispersion via transducer selection and crossover frequency design. Critical decisions of image placement, EQ, balance and timbre are typically made within +/- 15° vertically and +/- 30° horizontally. This workspace is where the engineer, producer and artist make critical mixing decisions and this is the area that LSR is optimized for superb in room response. By incorporating LSR into the system design requirements, placement rules are relaxed, a more stable stereo image is maintained and off-axis coloration is minimized.

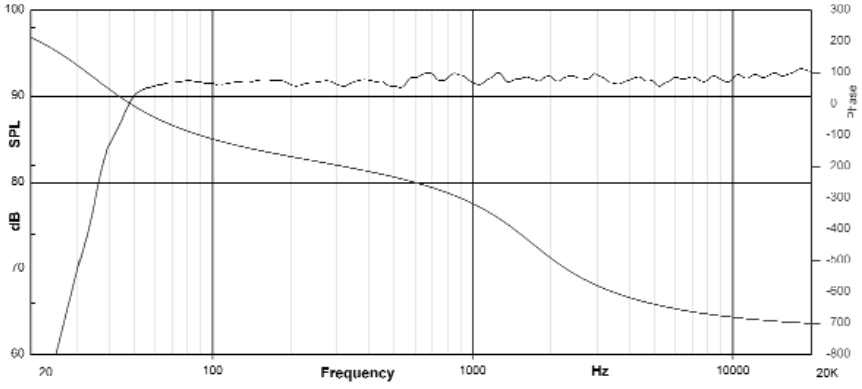
218F Low Frequency Transducer:

The 8" woofer is based on JBL's patented Differential Drive technology. With dual 1.5" drive coils, power compression is kept to a minimum to reduce spectral shift as power levels increase. An added third coil between the drive coils acts as a dynamic brake to limit excess excursion and reduces audible distortion at maximum levels. The cone is made of a carbon fiber composite forming a rigid piston and is supported by a soft butyl rubber surround.

053ti High Frequency Transducer:

The high frequency device is a 1" composite diaphragm integrated with an Elliptical Oblate Spheroidal (EOS) Waveguide with 60 x 100 degree dispersion which is critical to the smooth spatial response required in today's working environments.

Amplitude and Phase



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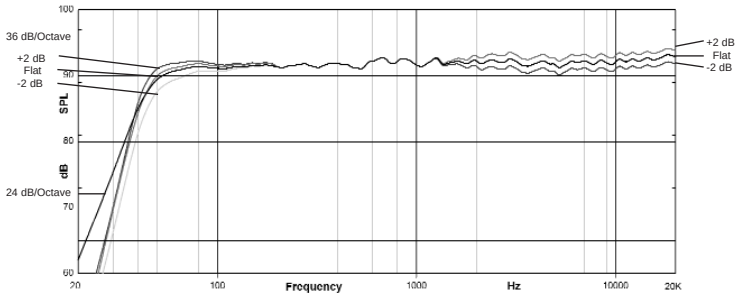
Bi-Amplified Power System:

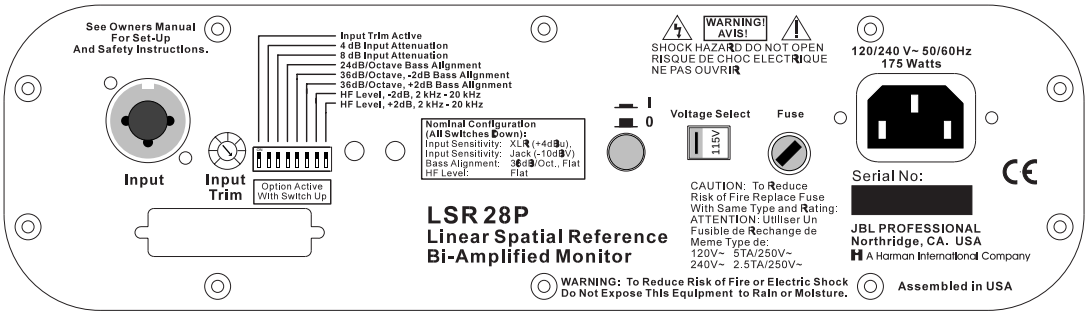
The LSR28P combines two high power amplifiers with an active crossover system which includes over 250 watts of continuous low frequency power and 120 watts for the high frequency. Active crossover circuitry results in a 36 dB/Octave Linkwitz-Riley Electroacoustic response between low and high frequency devices for smooth transition in both the frequency and time domains. This results in exception imaging and a lack of time smear.

User adjustments include level calibration for setting with professional and semiprofessional equipment as well as fine tuning of levels with variable level trim. XLR and 1/4" input connection can be accommodated as well as balanced and unbalanced signals.

The frequency response of bass and treble amplitudes can also be adjusted to compensate for placement and room absorption characteristics. The graph below outlines the various response options.

User Adjustments





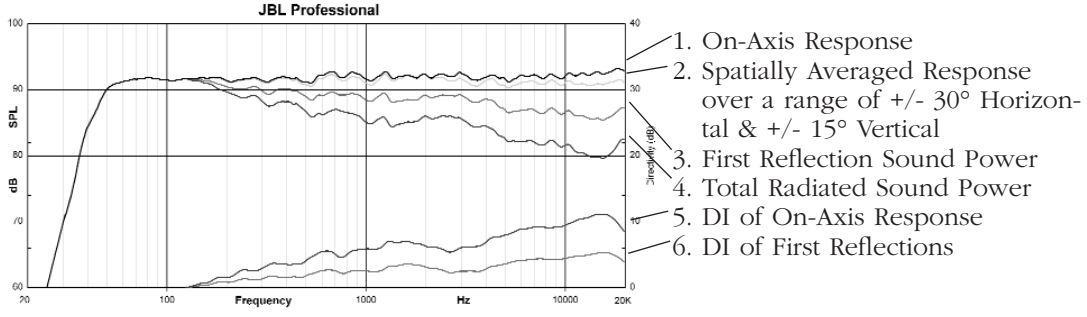
LSR Measurement Techniques:

LSR is the underlying design philosophy that explains why speakers that measure the same, sound different. By going beyond simple on-axis frequency measurement, LSR techniques define the ultimate performance specifications of our monitoring technology—what it will sound like in your room. We go beyond the performance of an on-axis frequency response at one point in space, which other manufacturers use.

LSR uses a technique of measuring a monitor over a sphere that encompasses all energy radiated into the listening room in every direction. This data reflects 1296 times the information of a single on-axis frequency response curve. Using psychoacoustic principles allows the calculation and optimization of the entire sound field heard by the listener - this includes the direct sound field, the reflected sound field and the reverberant sound field. In place of spectral smoothing, which actually conceals data, LSR techniques expose flaws in systems such as resonances, poor dispersion and other off-axis colorations.

The LSR graphic below is a set of Spatially Measured graphs that are at the heart of the LSR philosophy.

LSR28P Response Curves



Specifications:

System:	
Frequency Response (+1, -1.5 dB)[2]:	50 Hz - 20 kHz
Enclosure resonance frequency:	38 Hz
Low Frequency Extension:	User controls set to default
-3 dB:	46 Hz
-10 dB:	36 Hz
Low - High Frequency Crossover:	1.7 kHz 6th-Order Acoustic Linkwitz-Riley
Distortion, 96 dB SPL, 1m:	
Mid-High Frequency (120 Hz - 20 kHz):	
2nd Harmonic:	<0.6%
3rd Harmonic:	<0.5%
Low Frequency (<120 Hz):	
2nd Harmonic:	<2%
3rd Harmonic:	<1%
Maximum SPL (80 Hz - 20 kHz):	>108 dB SPL / 1 m
Maximum Peak SPL (80 Hz - 20 kHz):	>111 dB SPL / 1 m
Signal Input:	XLR, Balanced 1/4" Tip-Ring-Sleeve, Balanced Positive voltage applied to XLR Pin 2 (1/4" Tip) produces outward woofer motion.
Calibrated Input Sensitivity:	
XLR, +4 dBu:	96 dB/1 m
1/4", -10 dBV:	96 dB/1 m
AC Input Voltage:	115/230 VAC, 50/60 Hz (User Selectable)
AC Input Voltage Operating Range:	+/- 15%
AC Input Connector:	IEC
Long Term Maximum System Power:	220 Watts (IEC265-5)
Self Generated Noise Level:	<10 dBA SPL/1 m
User Controls:	
High Frequency Control (2 kHz - 20 kHz):	+2 dB, 0 dB, -2 dB
Low Frequency Control (<100 Hz)	+2 dB, 0 dB, -2 dB
Low Frequency Alignments:	36 dB/octave, 24 dB/Octave
Calibrated Input Attenuation:	5 dB, 10 dB
Variable Input Attenuation:	0 - 13 dB
Transducers:	
Low Frequency Model:	218F
Diameter:	203 mm (8 in.)
Voice Coil:	38 mm (1.5 in.) Differential Drive with Dynamic Braking Coil
Magnet Type:	Ferrite with Integral heat sink
Cone Type:	Carbon Fiber Composite
Impedance:	2 ohm
High Frequency Model:	053ti
Diameter:	25 mm (1 in.) diaphragm
Voice Coil:	25 mm (1 in.)
Magnet Type:	Ferrite
Diaphragm Type:	Damped Titanium Composite
Other Features:	Elliptical Oblate Spheroidal Waveguide
Impedance:	4 ohms

Amplifier:	
Low Frequency:	
Topology:	Class A-B, All Discrete
Sine Wave Power Rating:	250 Watts (<0.1% THD into rated impedance)
THD+N, 1/2 power:	<0.05%
High Frequency:	
Topology:	Class A-B, Monolithic
Sine Wave Power Rating:	120 watts (<0.1% THD into rated impedance)
THD+N, 1/2 power:	<0.05%
Physical:	
Finish:	Black, Low-Gloss, "Sand Texture"
Enclosure Volume (net):	50 liter (1.0 cu. ft.)
Low Frequency Vent:	Rear Ported Linear Dynamics Aperture (Integrated with Amplifier heat sink)
Baffle Construction:	Carbon Fiber Composite
Cabinet Construction:	19 mm (3/4" M.D.F.)
Net Weight:	22.7 kg (50 lbs)
Dimensions (WxHxD):	406 x 330 x 325 mm (16 x 13 x 12.75 in.)

Notes:

All measurements unless otherwise stated made anechoically in a 4π environment at 2 meters and referenced to 1 meter by the inverse square law.

The reference measurement microphone position is located perpendicular to the centerline of the low and high frequency transducers, at the point 55 mm (2.2 in.) below the center of the tweeter diaphragm.

Acoustic loading provided by the listening room increases Maximum SPL capabilities and Low Frequency Bass Extension as compared to stated anechoic values.

Distortion measurements performed with the input voltage necessary to produce the stated "A" weighted SPL level at the stated measurement distance. Distortion figures refer to the maximum distortion measured in any 1/10th octave wide band in the stated frequency range.

JBL continually engages in research related to produce improvement. New materials, production methods, and design refinements are introduced into existing products without notice as a routine expression of that philosophy. For this reason, any current JBL product may differ in some respect from its published description, but will always equal or exceed the original design specifications unless otherwise stated.

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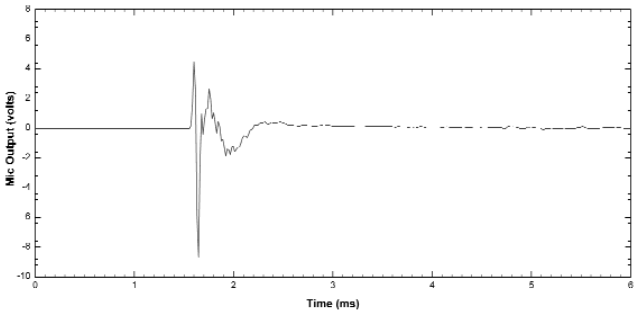
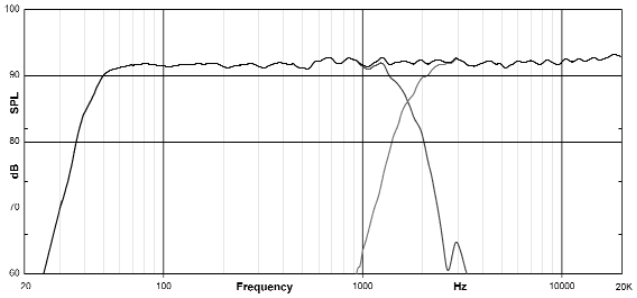
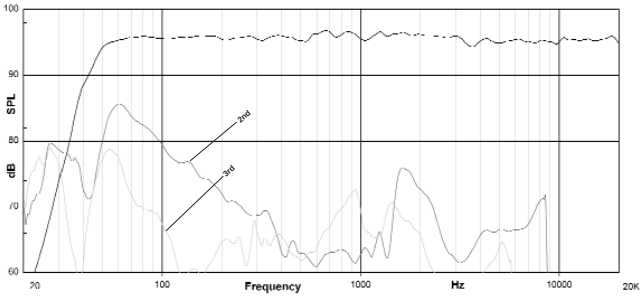
Impulse Response



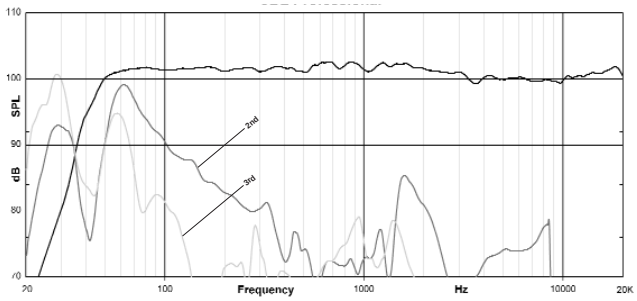
Acoustic Contribution



96 dB/1 m (Distortion raised 20 dB)



102 dB/1 m (Distortion raised 20 dB)



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