

# LSR4312SP

## Linear Spatial Reference Powered Subwoofer

### Key Features:

- ▶ Self-powered subwoofer for stereo and multi-channel surround sound production.
- ▶ RMC™ Room Mode Correction system measures and automatically compensates for low frequency standing waves and boundary conditions
- ▶ Harman HiQnet™ Network Protocol enables system-wide control of volume, input selection, solo and subwoofer settings without the need for external speaker controller.
- ▶ Shielded 12" transducer with neodymium motor structure for exceptional low-frequency response and superb power-handling.
- ▶ 450 Watts of amplification
- ▶ Five channel bass management system with selectable cross over frequencies
- ▶ Six Balanced analog inputs with selectable +4 dBu / -10 dBV sensitivity.
- ▶ LFE Input with selectable low pass filter and +10 dB Gain setting
- ▶ AES/EBU, S/PDIF digital input
- ▶ Wireless remote control and LSR4300 Control Center Software enable control from the listening position.\*
- ▶ Front panel meter with variable brightness displays Subwoofer output in dBFS.
- ▶ Built-in handles facilitate optimum positioning.

The LSR4312SP Powered Subwoofer is designed for critical production monitoring applications where accurate, extended low frequency response and high SPL are a requirement.

### 432G Low Frequency Transducer and Amplification

The Model 432G 12-inch transducer uses a powerful neodymium magnet with an under-hanging aluminum voice coil for extended linearity under high drive conditions. The magnetic gap depth is 28 millimeters, and the coil depth is 19 millimeters, permitting high acoustical output at very low frequencies. Stray magnetic flux is very low, and under normal conditions of floor placement of the subwoofer there will be no interference with CRT-type monitors. Heat sinking elements have been placed close to the magnetic gap in order to draw out heat as efficiently as possible. The LSR4312SP incorporates a 450 watt continuous power amplifier that provides correct



drive levels for optimized frequency response. Amplification is class A/B in an all discrete topology.

### Comprehensive feature set for Surround Sound production

The subwoofer selectively derives its signal from a dedicated LFE low frequency effects input, and/or the Left, Center, Right, Left Surround, Right Surround analog bass management inputs. Left, Center, Right, Left Surround, Right Surround balanced analog outputs are provided to send a full-range signal to each of the main channel speakers. When used in a system with the LSR4326P and LSR4328P Studio Monitors, a high-pass filter in the main channel speakers is set according to the cross-over frequency selection, 50 Hz, 80 Hz, or 120 Hz, in the subwoofer. The LFE input includes a selectable low pass filter which can be set to full range, 120 Hz, 80 Hz, or 50 Hz, and a +10 gain feature for film applications. A two channel input is provided in AES/EBU and S/PDIF format to receive a digital LFE source or signal from an outboard processor.

### Front Panel, Remote and Software control of all Subwoofer functions

An advanced front-panel user interface allows control of system functions such as volume, solo, input selection, calibration of the RMC system, bass management on/off, bass management crossover settings, LFE low-pass filter selection, and brightness level of the meter and buttons. A front panel meter display shows the subwoofer output level in dBFS. All subwoofer functions can be controlled using a wireless remote control or LSR4300 Control Center Software. This allows adjustment of all parameters without leaving the mix position.\*

### System Network Features

The LSR4312SP Subwoofer utilizes the Harman HiQnet™ network protocol that allows centralized control of a multi-channel system from a from any speaker's front panel, wireless remote control, or computer via a standard USB and LSR4300 Control Center Software (\*). The network is configured using supplied CAT5 cable and by setting a DIP switch on each the subwoofer and each speaker. Harman HiQnet also enables synchronized RMC calibration of all speakers on the network. During the calibration process, the subwoofer level is balanced to the rest of the system and polarity is automatically set.

\* Use of the RMC calibration microphone, wireless remote, and LSR4300 control center software requires LSR4312SP is networked in a system with one or more LSR4328P or LSR4326P Studio Monitors.

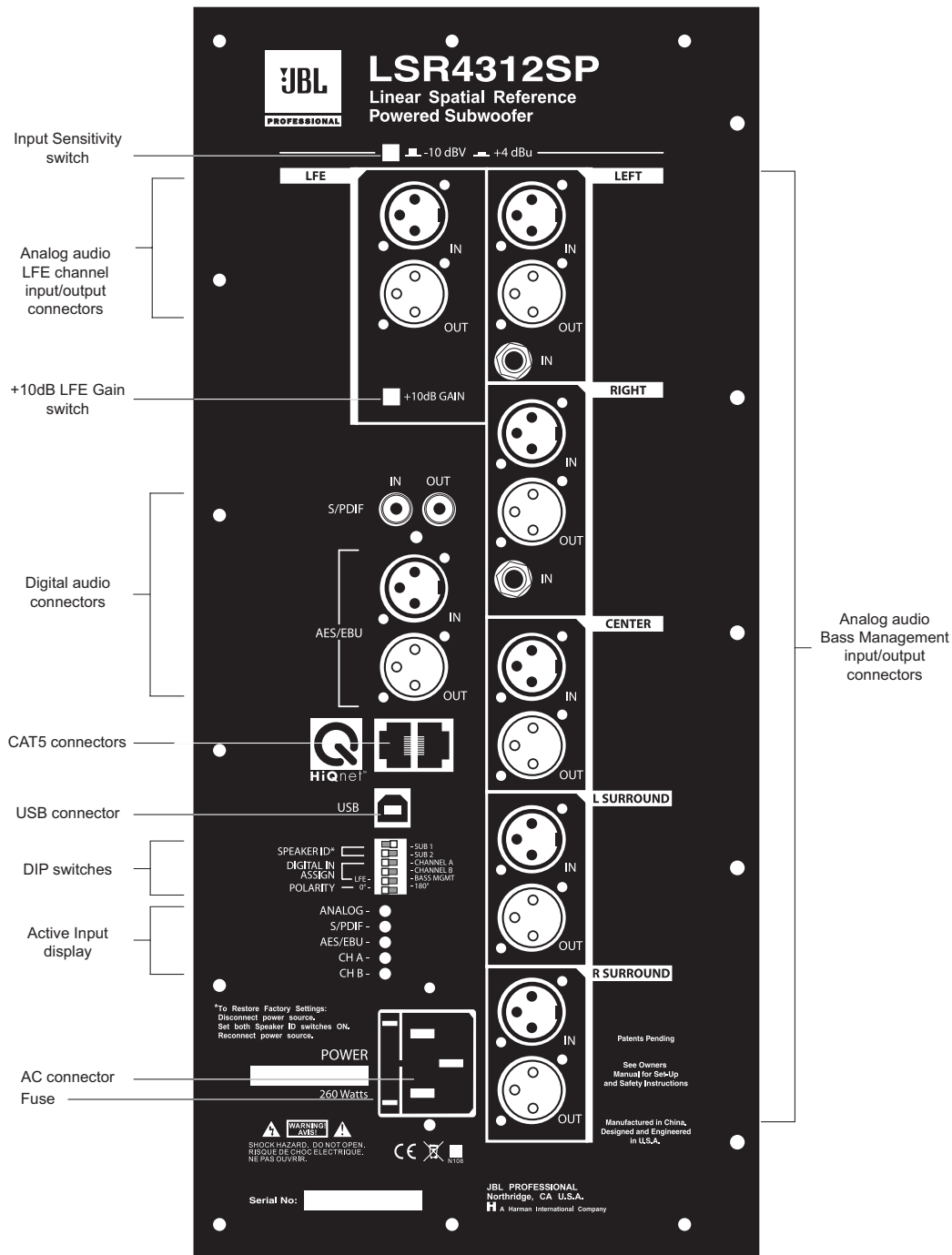
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## Automated RMC™ Room Mode Correction System

Room modes” (sometimes called “standing waves”) can produce low frequency resonance that gives a misleading impression of bass response at the listening position. RMC™ (short for “Room Mode Correction”) in the LSR4312SP Subwoofer analyzes the in-room frequency response measured at the listening position and automatically applies a corrective filter to minimize low frequency resonance. When the calibration mic is connected to a networked LSR4326P or LSR4328P the RMC analysis is initiated in the LSR4312SP Subwoofer and the RMC system applies a parametric filter at any of 73 frequencies (1/24th octave centers) between 20 Hz

and 160 Hz, with a variable Q from 1 (1-2/5 octave bandwidth) to 16 (1/11 octave bandwidth), with 3 to 12 dB of attenuation. When bass management is engaged, the subwoofer applies corrective filters below the crossover frequency and the LSR4326P and LSR4328P speakers apply corrective filters above the crossover frequency.

During the RMC calibration process, the subwoofer level is trimmed in 0.5 dB increments so it is balanced to the rest of the system. At the same time, polarity is automatically set to ensure the output of the subwoofer is in phase with the main channels at the mix position.



# Specifications:

<b>System:</b>	
Frequency Response (-6 dB):	27 Hz – 250 Hz
Enclosure Resonance Frequency:	27 Hz
Low Frequency Extension:	
-3 dB:	29 Hz
-10 dB:	24 Hz
Bass Management Crossover ON:	Digital Crossover – Selectable: 50 Hz, 80 Hz, 120 Hz -4th order Linkwitz-Riley
Distortion, 96 dB SPL 1 M	
Low Frequency (<80 Hz)	
2nd Harmonic:	<1.5%
3rd Harmonic:	<1.0%
Maximum Continuous SPL:	116 dB SPL / 1m
Maximum Peak SPL:	125 dB SPL / 1m (40 Hz - 80 Hz)
Low Frequency Model:	432G
Diameter:	300 mm (12 in)
Voice Coil:	65 mm (2.5 in)
Magnet Type:	Neodymium self-shielded
Cone Type:	Polymer coated paper fiber
Impedance:	2 ohms
<b>Amplifier</b>	
Topology:	Linear
Sine Wave Power Rating:	450 watts (<1% THD into rated impedance)
THD + N, 1/2 Power:	<0.08%
AC Input Voltage:	120 VAC, 60 Hz Model LSR4312SP; 230 VAC, 50 Hz Model LSR4312SP/230
AC Input Voltage Operating Range:	+/- 10%
AC Input Connector:	IEC
Self-Generated Noise Level:	<10 dBA / 1 m tonal artifact-free noise floor using analog input
1/8TH Power Rating:	25 watts
Full Power Rating (100 hrs. IEC pink noise, 6 dB crest Factor):	200 watts
Wattage Rating:	AC at 1/8th power IEC Pink Noise 140 watts
Maximum Current:	AC at maximum power output (audio) 120W AC line 4.2A 230W AC line 2.1A
System Protection:	Short-term peak limit circuit in DSP prevents amplifier clipping Long-term thermal protection circuit prevents system damage caused by overheating
Fuse Value:	8A, 250V AC Time Lag, Model LSR4312SP 4A, 250V AC Time Lag, Model LSR4312SP/230
<b>Inputs / Outputs</b>	
<i>Analog</i> L, C, R, LS, RS, LFE Male XLR IN:	Selectable +4 dBu/-10 dBV input sensitivity; Input Impedance 10K ohms. Positive voltage applied to XLR pin 2 produces outward woofer motion
L, C, R, LS, RS, LFE Female XLR OUT:	XLR Balanced loop-through pin 2 hot
Left, Right ¼-in top-ring-sleeve IN:	Balanced or unbalanced, Selectable +4 dBu/-10 dBV; Input impedance 10K. Positive voltage applied to ¼" tip produced outward woofer motion
AD Converters:	96 kHz, 24 Bit, 64x Over sampling
Calibrated Input Sensitivity, Analog XLR & ¼":	
+4 dBu:	94 dB SPL / 1 m
-10 dBV:	94 dB SPL / 1 m
<i>Digital</i> Male XLR IN:	AES/EBU(IEC60958)
Female XLR OUT:	AES/EBU(IEC60958)
Female RCA IN:	S/PDIF (EIAJ CP1201)
Female RCA OUT:	S/PDIF (EIAJ CP1201)
Digital Input Sample Rates:	96 kHz, 88.2 kHz, 48 kHz, 44.1 kHz, 32 kHz. Tolerance: +/- 3%
Digital Input Word Length:	24 Bit
Network Connection:	RJ45 IN, RJ45 OUT
Network Protocol:	Proprietary Harman HiQNet™ Protocol using RS485
Computer Interface:	USB Type 1

<b>User Controls</b>	
Front Panel Controls:	Power ON, SOLO, RMC, BASS MANAGEMENT ON, BASS MANAGEMENT CROSSOVER, LFE FILTER, SUBWOOFER LEVEL, INPUT, +/- (system volume, parameter increment/decrement).
RMC:	Start, Bypass
RMC Calibration Functions:	RMC Filter: 73 Frequencies (1/24th octave centers) between 20 Hz to 160 Hz, with a variable Q from 1 (1.4 octave bandwidth) to 16 (1/11th octave bandwidth, and from 3 to 12 dB of attenuation. RMC Trim: +/- 9 dB in .25 dB increments RMC Polarity: 0 degrees, 180 degrees
BASS MANAGEMENT XOVER	Selectable frequencies: 50 Hz, 80 Hz, 120 Hz
LFE FILTER:	Selectable low pass frequencies: 50 Hz, 80 Hz, 120 Hz, NONE
INPUT Selection:	Analog (XLR / ¼") S/PDIF Channel A, Channel B, Channel A+B AES/EBU Channel A, Channel B, Channel A+B
SUB LEVEL Control	+/- 7.5 dB in .5 dB increments
+/-	Default: System Volume Control: 0 dB to -∞ dB Secondary functions: Increment/decrement value of selected function
Rear Panel Controls:	L, C, R, LS, RS Analog Input Sensitivity +4 dBu/-10 dBV LFE Input +10 dB Gain applied to Analog and Digital inputs
DIP switches:	
SW1: SUB 1 ID	
SW2: SUB 2 ID	
SW3: Digital Input Assignment Channel A	
SW4: Digital Input Assignment Channel B	
SW5: Digital Input Function: LFE or Bass Management	
SW6: Polarity 0 degrees or 180 degrees	
Additional Controls accessible via LSR4300 Control Center Software:	DIM (-12 dB at full volume), System MUTE, SAVE / LOAD Configuration RMC Trim
<b>Display</b>	Front Panel Display: 31 LED Segments for dBFS and indication of settings
Front Panel Meter:	-70 dBFS to 0 dBFS plus CLIP
Rear Panel Indicators:	5 LEDs indicate selection of Analog, S/PDIF, AES input and digital channel A or B
<b>Physical</b>	Finish: Dark graphite
Handles:	Two, flush mounted on sides
Low Frequency Vent:	Bottom ported linear dynamics aperture
Baffle Construction:	Injection-molded structural ABS
Enclosure Construction:	25 mm (1 in) MDF; 50 mm (2") MDF woofer baffle
Net Weight:	29.5 kg (66 lbs)
Dimensions (WxHxD):	406 mm x 502 mm x 489 mm (16" x 19.75" x 19.25")

## Notes:

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

The reference measurement microphone position is located perpendicular to the centerline of the low frequency transducer.

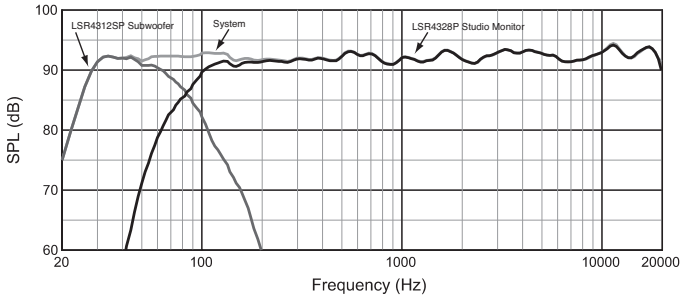
Acoustic loading provided by the listening room increases maximum SPL capability and low frequency bass extension as compared to stated anechoic values.

Distortion measurements performed with the input voltage necessary to produce the stated A-weighted SPL 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.

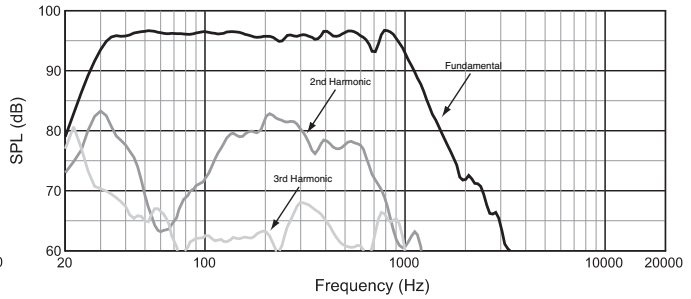
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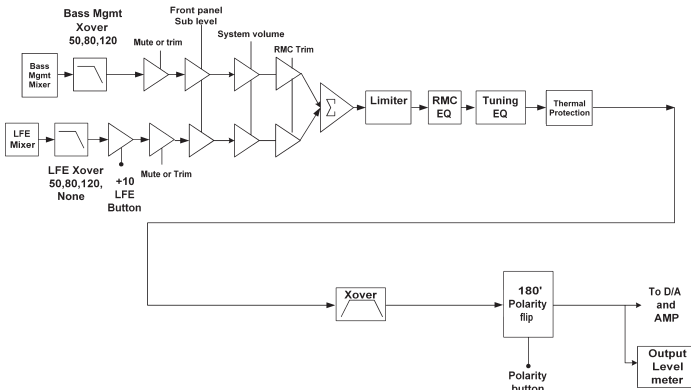
## Frequency Response



## 96 dB/1 m (Distortion raised 20 dB)



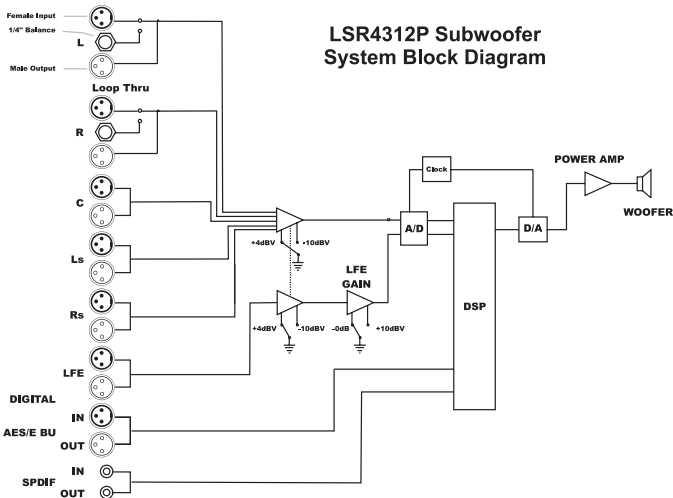
## LSR4312P Subwoofer Signal Processor Overview



When networked with LSR4328P and LSR4326P Studio Monitors, the RMC system in LSR4312SP Subwoofer can be calibrated and subwoofer settings can be externally controlled using a wireless remote control and LSR4300 Control Center Software. The LSR4300 Accessory Kit, provided in the LSR4328P/PAK and LSR4326P/PAK includes these required items: Wireless Remote Control, LSR4300 Control Center Software, RMC Calibration Microphone & Mic Clip, USB Cable, two AA Batteries, 2 Network Termination Plugs



## LSR4312P Subwoofer System Block Diagram



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SS LSR4312SP  
CRP 5M  
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