



Technical Brief

The Polk Audio SurroundBar® 9000 Instant Home Theater™



Specifications

Bar Components	5- 2 1/2" midwoofers 3- 1/2" silk dome tweeters
Subwoofer	Wireless 8" downfiring long throw woofer automatically pairs with bar
Lower/Upper -3dB Limit	45 Hz - 20 kHz
Peak System Power	510W - 45 x 8 channels and 150W subwoofer
Inputs	Two optical, two 1/8" analog
Dimensions	bar: 3 3/4" h x 44 5/8" w x 2 1/4" d sub: 13 1/2" h x 12" w x 13 1/2" d
Backup Remote Control	on/off, bar volume, subwoofer volume, mute, source selection, learn
Included Cables & Accessories	-6' digital (Optical) cable -1/8" to 1/8" analog cable -1/8" female to dual RCA male adapter - two removable rubber feet adjustable along the bar length

Finish: satin black bar & subwoofer

MSRP: \$849

Design Goals

The foremost design goal for our best Instant Home Theater system was to create dynamic range, system clarity, and bass response of equivalent component home theater system with the ease of hookup and use consumers expect of a powered soundbar system. Specifically this includes:

- Provide superior center channel intelligibility and off-axis enjoyment.
- Play all 5.1 audio channels from DTS or Dolby Digital sources augmented by our proprietary SDA® technology to create a broad, deep and tall sound field that extends along the side walls and overhead with a high degree of specificity.
- Match an atypical (for a bar) 80Hz high pass with 80Hz low pass of the sub. This is normal for component home theater systems and results in minimal localization of the sub and superior blending between both speakers.

System Description



The system consists of a 44 5/8" amplified bar incorporating 5 - 2 1/2" convex dome drivers and 3 - 1/2" silk dome tweeters, each driven by its own amplifier channel. The powered wireless subwoofer is an MDF 3/4" thick cabinet with a downfiring 8" long throw composite PP cone with rubber surround. A backup remote control is included.

Enclosure & Grille

The enclosure is ABS + PMMA (Polymethyl methacrylate), an additive that's commonly known as Plexiglass. It adds rigidity, torsional strength and higher damping factor to the enclosure so it's more acoustically "dead" and less resonant.

The grille frame is molded ABS with cutouts for the drivers and tweeters so no lattice grille interferes with each driver's output. This frame is then covered with acoustically transparent grille cloth.

Midwoofer/High Frequency Drivers

- 5 - 2 1/2" mid-woofers – Center, L&R, Surround L&R
- 3 - 1/2" silk dome tweeters – Left, Center, Right



High excursion 2 1/2" mid-woofer

Installation Options

- The bar comes with two rubber feet that can be easily removed and re-installed anywhere along the length of the bar to allow installation directly in front of any TV, regardless of the type of stand provided.
- Keyhole slots located 24 1/2" apart allow either onwall installation or attachment to an aftermarket display mount and center channel bracket.

Technologies

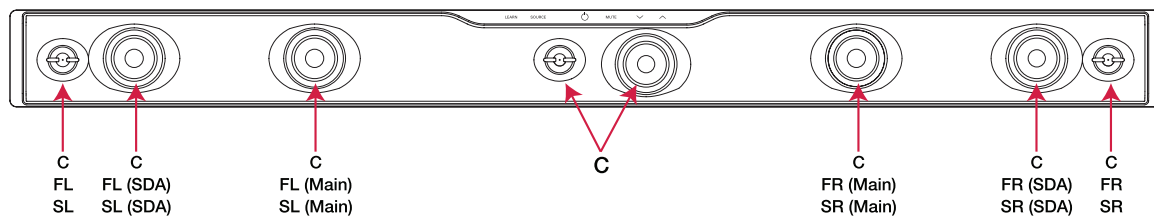
8 Channel Amplifier

Each of the 5 mid-bass drivers and 3 tweeters is driven by a dedicated amplifier channel. High and low pass filters are handled electronically with no passive componentry in the signal path. This reduces phase shift and lowers distortion inherent in all passive crossover networks.

Most noticeable is the greater dynamic range that individual amplifiers provide, adding an effortless character that may be appreciated as an enhanced sense of realism.

Digital Signal Processing (DSP)

What channel does each of the 8 drivers play?



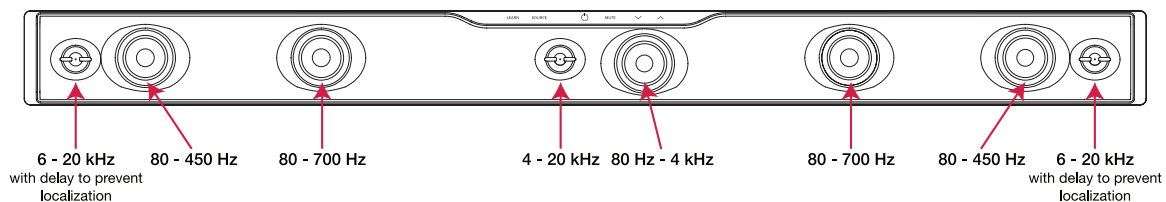
Note: All 5 - 2 1/2" midbass drivers share 80 - 200 Hz passband -Full Complement Bass Drive

We have incorporated the most powerful DSP engine ever used in our amplified Surroundbars capable of 160 MIPS (millions of instructions per second) including 58 discrete DSP blocks for delay, frequency shaping, crossover points, signal mixing and parametric compression. Amplitude smoothing addresses even minor irregularities of all active drive units. SRS HD4 and our proprietary SDA surround technology are actively controlled to an even greater extent than our SurroundBar360 of 2010, providing strong image localization cues and a greater sense of ambience and space.

Optimized Center Array™ (OCA)

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Every driver and tweeter contributes center channel information at varying amplitudes and frequencies.



All five 2 1/2" drive units contribute to the center channel performance in a sophisticated, amplitude tapered cascaded array design. The SB9000's OCA progressively low-passes the outer and inner driver pairs to mitigate undesirable constructive and destructive interference that otherwise would result in off-axis frequency response irregularities. These "venetian blind" (technically known as comb-filtering) effects alter vocal reproduction for different seating positions. OCA controls off-axis amplitude response by appropriately limiting each mid-bass driver's passband for minimal interference for off-axis seating locations as follows: outer and inner driver pairs reproduce center channel information from 80 - 450Hz and 80 - 700Hz respectively while

only the center driver plays center channel program material through the upper midrange all the way up to its crossover point with the center tweeter (80Hz - 4kHz). Meanwhile, the outer tweeters are also employed as “super tweeters” (6kHz – 20kHz) for center channel material in addition to serving their primary duties in the reproduction of Front (FL/FR) and Surround (SL/SR) channels. So as to avoid unwanted localization, the outer tweeters’ acoustic output is appropriately delayed.

OCA results in an unprecedented clarity and intelligibility of center channel information over a very wide listening area. Even listeners far to the side hear vocal reproduction and other center information with similar tonal balance to on-axis listeners. Everyone hears natural sounding, clear dialog, musical instruments and center-channel effects that are firmly anchored to the screen.



Dolby Digital & DTS Decoding

Both optical inputs can decode *and reproduce* Dolby Digital 5.1 and DTS 5.1 program material. Many bars may decode but few will play back all of the discrete channels as intended for optimal surround performance and fidelity.

Full Complement Bass (FCB)

All five 2 1/2" drive units reproduce the summed L/C/R/SL/SR channels over the 80Hz to 200Hz passband, in addition to serving their normal duties as centers, surrounds (main/SDA), lefts (main/SDA) or rights (main/SDA). FCB provides the equivalent surface area of a 5 1/4" mid-bass driver to give the lower midrange and upper bass tonal richness and speedy transient response, ensuring that no single driver is overtaxed since all share the demanding 80-200 Hz band equally. The low 80 Hz crossover point, achievable by employment of FCB, effectively eliminates localization of the subwoofer.

SDA® Surround

SDA Surround is a two-channel technology originally developed by Polk which was intended to overcome a fundamental problem of stereo reproduction known as Interaural Crosstalk (see Figure 1) when listening to 2 separate loudspeakers. SurroundBar SDA Surround technology utilizes the same basic principles but expands it to produce a precise image that wraps around the listener from a single bar type speaker. SurroundBar technology uses techniques similar to those used in noise canceling headphones to cancel out the sounds that tell your brain where the speakers are actually located. The technology then replaces those with sounds that, to your ears and brain, are indistinguishable from actually having sound

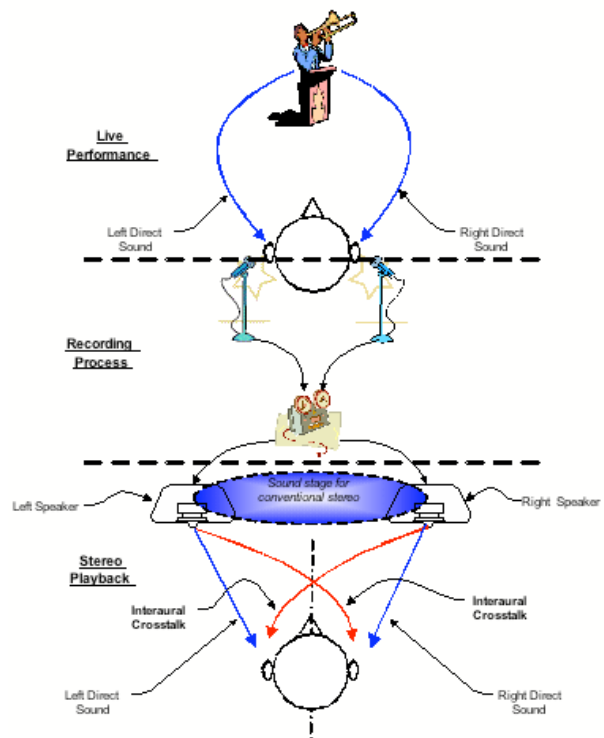


Figure 1

sources all around you. As far as you are concerned there really are sounds all around you. This technology requires no reflecting surfaces or special speaker placement. It works well in virtually any room of any size or shape and delivers a surround sound experience for almost all listener locations (see Figure 2).



Figure 2

Smartbar™ Remote Control Learning

Probably the most appreciated feature by consumers is that they can use their TV or cable remote control to operate our SurroundBar. Simply teach the remote codes for volume up/down, power on/off, and mute directly from your favorite remote to the SurroundBar.

1. Press and hold the “Learn” button on the SurroundBar until the LED blinks orange. This puts the SurroundBar into learning mode.
2. Tap the “^” button (volume up) on the SurroundBar several times until the LED will stop blinking and remain orange.
3. Press and hold the TV remote “Volume Up” button for one second and then release for one second. Continue this sequence until the LED on the SurroundBar blinks green.

Repeat steps 1-3 to program Volume down, Mute and Power.

Wireless Powered Subwoofer

Our 5/8” thick MDF cabinet houses an 8” downward firing long throw driver and a 150W peak (75wrms) amplifier. Our engineers, employing computer modeling, designed a flared J-Port that optimizes laminar airflow and eliminates port noise. The subwoofer can be placed up to 50’ from the bar.

Just find the most convenient place for the subwoofer, plug it in and it pairs automatically with the bar.



J-Port Design