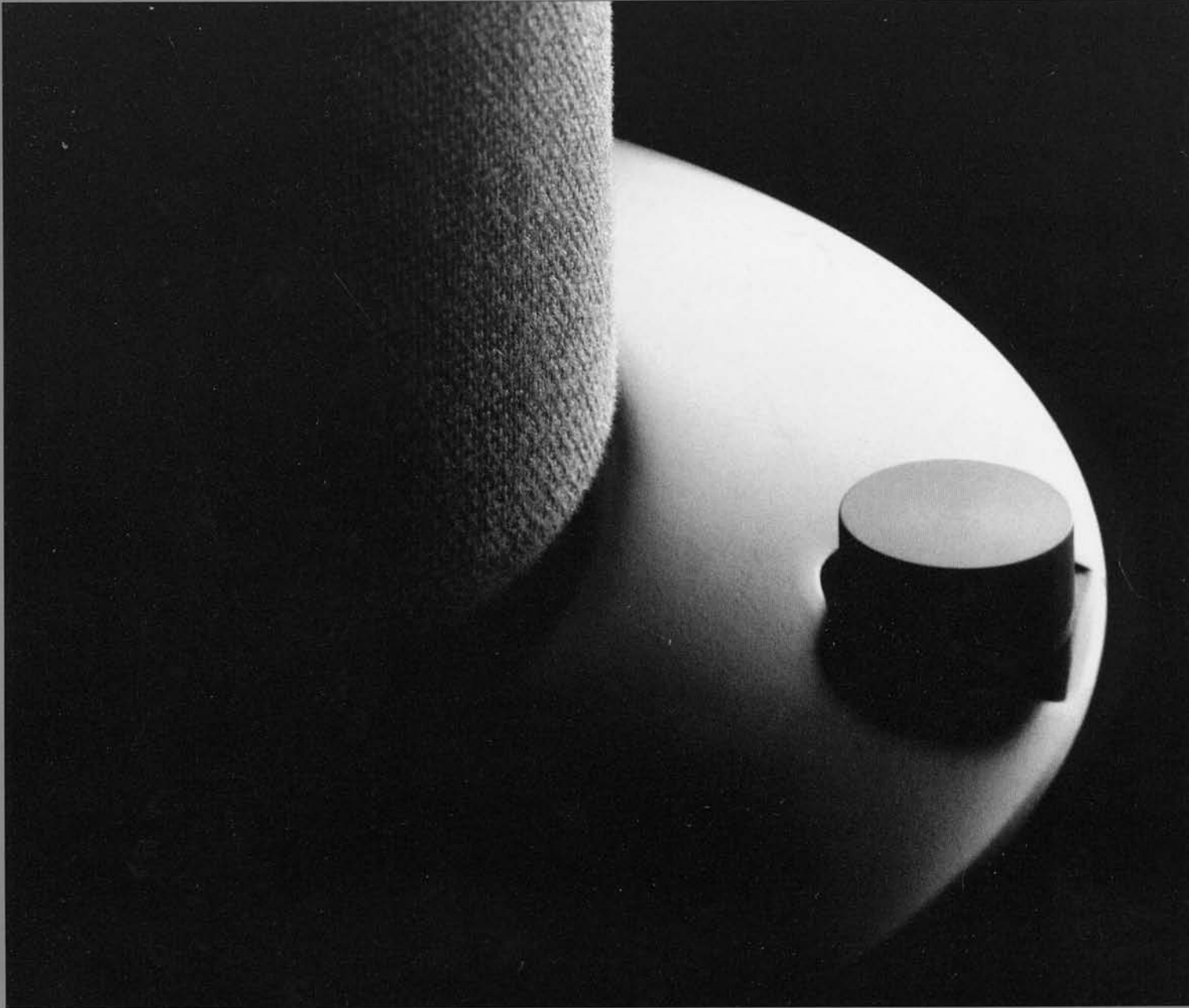


PhantomAcoustics Shadow: A New and Unique System for Controlling Objectionable Low Frequency Room Characteristics

Unlike passive "traps" and foam panels, the Shadow *actively* suppresses the high pressure zones that support room resonance

The Shadow incorporates a new electronic/acoustic servo design created by Nelson Pass which is presented in a graceful column form styled by René Besné. Because this new servo system actively responds to room

pressure, the PhantomAcoustics Shadow significantly outperforms low frequency passive absorbers



It is widely recognized that the sound of any audio system is affected by the room in which it is played, as every room has an individual sonic "signature" that interacts with the sounds generated in it

As home audio systems have become more and more accurate in their playback capability, room characteristics have assumed a greater proportion of contribution and importance to the perceived sound. Anyone who has had the

opportunity to audition a loudspeaker under different environmental conditions will be familiar with the change in sonic character that room effects can cause.

The characteristics which make up a room's individual "signature" are determined by the room's acoustic boundaries and are arbitrarily divided into two broad categories:

excessive high frequency reflections which produce areas of unnatural brightness in the upper sound range;

and low frequency resonance which can cause the effect of either reduced or bloated bass reproduction in different room areas.

The phenomenon in both cases is the reflection or absorption of sound energy by room boundaries. Both effects may be controlled through the use of absorptive materials, but while reflective problems are easily addressed with reasonable amounts of material, the dimensions of absorptive material necessary to

control low frequency effects usually makes this passive approach impractical.

The furnishings and drapes of an average room are generally sufficient to control objectionable high frequency reflections. The pressure waves which constitute a room's resonant modes are, however, only marginally affected by these items. As a result, bass clarity is compromised in a room which has not been specifically designed to have non-resonant characteristics.



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The PhantomAcoustics Shadow is an active system for controlling a room's low frequency resonances

By substituting an active acoustic circuit in the place of a large passive absorptive structure, the Shadow concentrates great efficacy in a small, attractive column. In its columnar form, the Shadow allows application of active control directly to the primary high pressure zones that support a room's resonant modes. *The effect is much as though the room boundaries had been physically removed.*

Imagine sawing a hole in your wall about six feet wide behind and into the ceiling and floor above and below a Shadow column for a visualization of the acoustic effect. Do this in the four corners at the speaker end of the room—where pressure buildup is greatest—and you have substantially altered the room's ability to function as a resonant enclosure (or, for that matter, a shelter).

The PhantomAcoustics Shadow was created to be a far more practical alternative to the chain saw. Use of a Shadow will "clean-up" room effects that would otherwise mar bass reproduction and will increase the perceived clarity in a music system's low frequency performance. Generally, the smaller and more "box-like" the room, the more obvious the improvement will be throughout the room.

In most cases, a pair of Shadows, placed in the corners at the loudspeaker end of a room, are sufficient to control primary resonant modes of the room

Operation of the Shadows is completely automatic and self-contained, requiring no interconnection with any other component in the audio system. *As soon as its power supply is turned on, a Shadow will counteract any low frequency pressure in its vicinity.* In cases of extreme low frequency room activity a second pair may be considered for use in the opposite corners of the room.

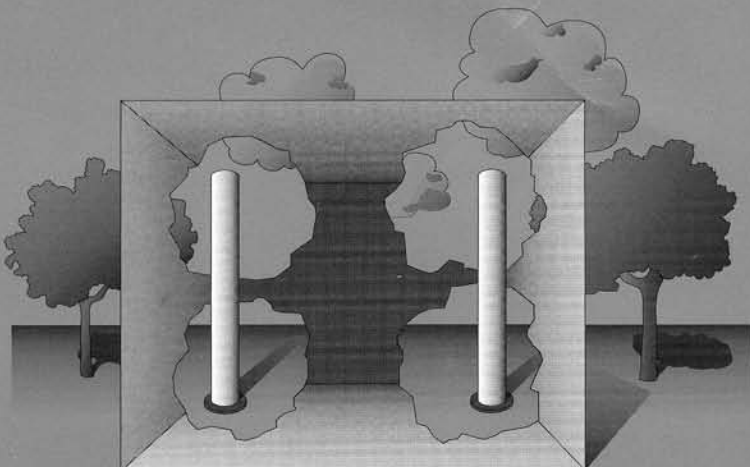
It should be noted that a Shadow has a dispersive shape, is covered with absorptive material, and therefore will passively have a sonic effect—principally above 200 Hz. In addition, its transducers will also react in a passive manner when the unit is not under power. Therefore, when making an in-versus-out comparison it will be necessary to remove the Shadows physically, not simply turn them off.

Beyond the suppression of room resonance, the PhantomAcoustics Shadow can provide a significant benefit to the operation of full range "planar" type loudspeakers such as electrostatics. Speakers of this type have an inherent problem in establishing low bass reproduction because they radiate sound into the room both front and rear, and the rear waves are 180 degrees out of phase with the front. At lower frequencies, where the wavelengths are long, they tend to "wrap around" the speaker and cancel each other out. By placing a Shadow behind such a speaker, much of the low frequency wave radiated to the rear can be absorbed. As a result, bass energy produced by the panel is substantially increased.

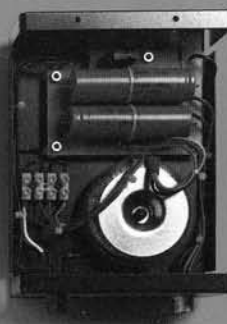
In addition, when a Shadow is used with a planar loudspeaker in this way, it is often possible to place the speaker closer to the rear wall than would otherwise be the case.

The PhantomAcoustics Shadow is specifically designed to make no sound of its own

It merely senses low frequency pressures and nullifies them by introducing a counteractive pressure. Under demonstration, it has even been shown to respond to the opening or closing of a door across the room. In its primary use for controlling room resonances during music reproduction, the Shadow will greatly enhance the listening experience. Serious music listeners will appreciate the PhantomAcoustics Shadow as providing an important sonic improvement through a new, sophisticated, cost effective approach.



2 **The effect is much as though the room boundaries had been physically removed**



3 **Substantial power** for the PhantomAcoustics Shadow is provided by a high reserve toroidal transformer whose output is smoothed through 36,000 microFarads of capacitance.

Shadow Technical Data

Description: Self-contained active system for controlling low frequency room resonance effects and consisting of two independent active suppression modules mounted in a single column.	Each module is made up of a condenser microphone, servo-amplifier, and transducer. Power for the modules is provided by a source external to the column. Available only in column pairs (four modules, two supplies).
Suppression factor:	90% energy reduction @ 50 Hz at a single module.
Suppression bandwidth:	30 Hz through 200 Hz.
Dimensions and weight:	Overall height (adjustable feet fully retracted): 83.5 inches. Column diameter: 9.5 inches. Base diameter (floor footprint): 15 inches. Weight: 45 pounds.

PhantomAcoustics products are supplied with a limited 1 year warranty. Because PhantomAcoustics is constantly researching new technology and materials, the option is reserved to implement design refinements and/or modifications into ongoing production without notice or obligation.

For a technical description of active low frequency acoustic control see the technical paper by Nelson Pass "The Control of Low Frequency Room Resonance Through the Application of Active Suppression Means." This paper is available at your PhantomAcoustics dealer or by writing to **InConcert**, 12919 Earhart Ave., Auburn, California 95603.

PhantomAcoustics

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