Blackbody

Ambient Field Conditioner

The **Blackbody** is unlike any other filter or conditioner. All power filters and conditioners address noise found on wires, but there's another type of noise altogether. Until now, this inconspicuous type of noise has been largely unacknowledged. It is caused by constant electromagnetic interaction between gear and immediately surrounding objects: stands, racks, nearby signal wiring, enclosures, and other objects containing circuitry or not. This type of radiated noise is not confined to wires. The **Blackbody** works by absorbing these reflections, effectively solving the problem. Being the only conditioner of its kind, it offers a level of performance previously unattainable.

Ambient field conditioning A new approach

Until recently, the audiophile community has underestimated the relevance of near field electromagnetic (EM) interaction to audio reproduction quality, specifically to the coloration of sound. While audiophiles generally agree that objects like racks, stands, and footers influence sound quality, it is also widely believed that this influence is only vibrational (mechanical) in nature. According to our own research, a significant source of that coloration is actually not physical in nature, and is due instead to near field EM interaction. After we explain what kind of tests we carried out which led to this conclusion, we'll go on to postulate that indeed any object in the vicinity of your gear's circuitry influences the resulting sound quality to some degree, even without making physical contact with it. We'll then segue into the basics of electromagnetic radiation and how this relates to high end audio. By that point, the problem of EM interaction will be obvious and we'll then explain what makes the Blackbody a uniquely effective and elegant solution—one that offers audiophiles a new level of accuracy in audio reproduction.

? Nearby objects and sound coloration: what's the connection?

How can it be that physical objects, just by being in proximity to your gear's circuitry, influence audio reproduction? How can the mere presence of a component's lid, footers, or stand and the like, audibly color the sound—especially if it never touches the circuitry?

The standard audiophile answer:

To find the link between your circuitry and nearby objects causing sound coloration, an obvious place to start looking would be the influence of speaker vibration. First, through airborne sonic vibration (sound pressure levels in the air produced by moving speaker cones cause nearby objects to resonate like a microphone), as well as structurally coupled vibration through the floor (when your speakers play, their movement also transmits vibrations directly through the walls of the speaker cabinet, through the floor, into your rack, and from there to your components and their circuitry). In both cases, your gear is influenced by speaker vibration that permeates sensitive operating circuitry, creating unwanted microphonic signals there. These parasitic signals are then amplified and degrade the resulting sound quality in an acoustical way from speaker to electronics and back again through the speaker.

Naturally, then, we do all we can to deal with these physical vibrations, hopefully without at the same time introducing objects that degrade audio fidelity in some other way.

Myriad solutions now exist to influence acoustic interaction. The embarrassing thing is, when listening through headphones, they're just as effective.
This makes one wonder: is it really just acoustic interaction?

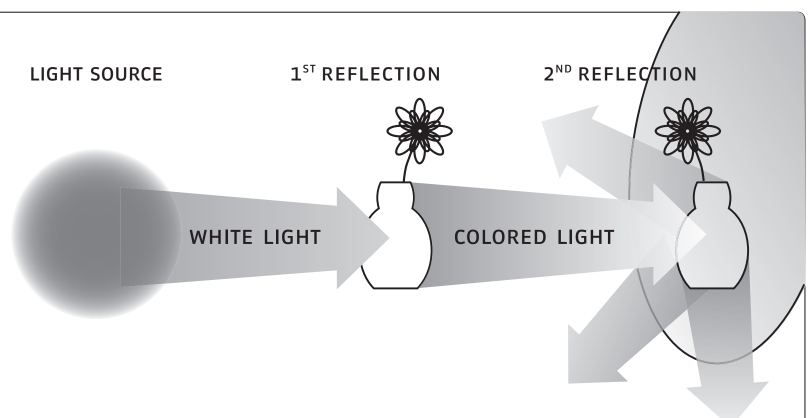
Something we audiophiles have been missing:

While LessLoss acknowledges the role acoustic interaction plays in sound coloration, we also know that this cannot be the entire story. The idea that all of this is due to acoustical microvibration alone is false, because, when the equipment is acoustically isolated, the problem still persists. The headphones test proves it. Using headphones instead of loudspeakers brings the equipment and its surrounding objects into complete acoustic isolation from one another. (If there's a buzzing transformer in your gear, then this becomes a more complicated story of course). Testing under these isolated conditions makes it obvious that while manipulating the objects around the circuitry, and without even any contact between the circuitry and the objects, the varying coloration in sound persists. This can only be due to something inherent in the physical surrounding objects' proximity to the gear. To understand how this works requires a short discourse on the topic of electromagnetic radiation.

EM radiation: the basis for this interaction

EM radiation is energy with electrical and magnetic properties that travels in waves. These waves are produced by moving charged particles. Since all things are made up of charged particles, every object radiates EM energy (unless at absolute-zero temperature). Matter also selectively absorbs and reflects EM energy, and each material's EM absorption and reflection pattern is distinct. All matter has its own fingerprint, a type of pattern called a spectral signature of radiation. These patterns are so distinct, scientists can identify the elements of nature from these unique spectral radiation patterns alone. Even the atmospheric composition of distant planets reveal themselves in this way.

The mirror's own absorption spectrum is at frequencies which we can't see. Everything else, including what we can see, is reflected. When we look at ourselves in the mirror, the color we see in the mirror turns out for our eyes to be the color which our own body has not absorbed. Another name for this is *the absorption and re-emission of EM energy.*



"I radiate everything. I'm a thermonuclear bomb and I've not yet finished exploding.
— SUN

"I absorb everything but green. People say I'm green but I'm actually everything but!
— VASE

"You can't see what I absorb. But nobody bothers to think about that. They're so busy admiring themselves.
— MIRROR

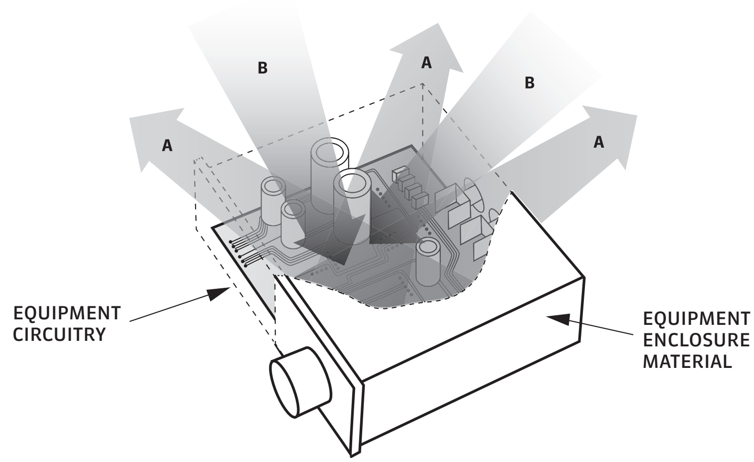
Taken in perspective, we live in a world full of complex EM interaction. Objects absorb and reflect EM energy twenty-four hours a day, and the vast majority of it we don't even see. The things we can see, we see only because the objects in question reflect EM energy at frequencies our eyes happen to be tuned to. Even more peculiar is that EM waves don't always travel in straight lines. Your cell phone, for example, can still communicate with a cell tower, despite the large building standing between your cell phone and the tower. In our world, where EM radiation permeates the physical domain, objects constantly interact in ways we're often completely oblivious to.

So what does EM radiation have to do with hi-fi?

Quite simply, different materials proximate to your circuitry will affect that circuitry. Your component enclosures, equipment rack, scattered CD collection, and all other objects in the room—including the air surrounding your circuitry—are active participants in the shared EM ecosystem. In this mutual network of interaction, the EM radiation emanating from your gear interacts with all other objects' absorption and reflection patterns in a complex fashion, much like the echo and diffusion of sound waves from various objects in a church, only much more quickly, to the point of occurring practically instantaneously.

RELATIONSHIP BETWEEN CIRCUITRY AND ENCLOSURE

Electromagnetic energy interacts differently with each material which is proximate to the radiating circuitry. Absorption and reflection patterns result as a function of the unique qualities of these materials.



A — initial radiation of EM energy

B — re-emission (reflection) of EM energy

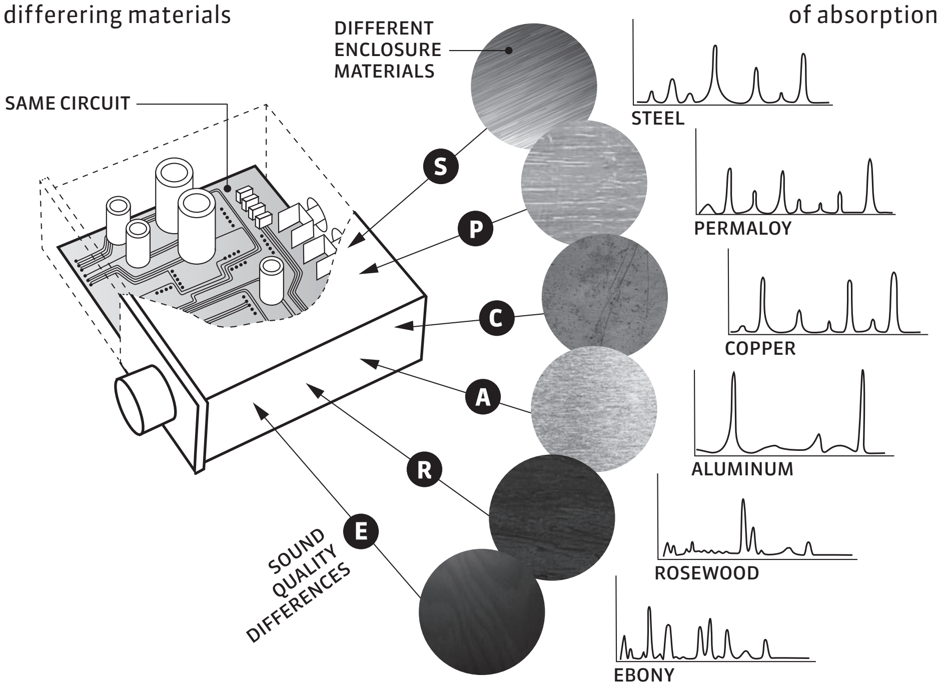
Since objects always selectively absorb and reflect EM radiation, leaving their own spectral signature in the reflection, they affect your component whenever its circuitry "sees" these colored reflections. The coloration we speak of is low level: it does not cause grave distortions such as data-fallout errors (although this can occur with the introduction of too much near-field UV light, for example). But its presence is palpable even with nearby objects which electromagnetically interact with the gear in only a passive way by means of their own reflection. The easiest way to convince yourself of this is to take your entire CD collection and place it all over your system, as close to your electronics as possible. Have a listen. Then remove them as far away as you can. Listen again. When they are moved away, the sound substantially clears up due to the absence of multitudinous and haphazard EM reflections from the discs which were placed all around your gear.

Matter in proximity to audio gear smears the timing and focus of delicate audio signals, raises the perceived noise floor, and adds a distinct coloration which manifests itself as a sort of sonic sameness which simply doesn't go away from recording to recording.

DIFFERENT ENCLOSURE MATERIALS RESULT IN DIFFERENT SOUND COLORATION

The Test: Create six identically sized enclosures from six differering materials

Different sound coloration is due to different spectra of absorption and reflection



This explains what the audiophile community has for the longest time found very puzzling: circuitry enclosures of equal weight, but made of different materials, somehow manage to cause undeniable differences in playback quality. Much emphasis is placed on build quality in high-end audio because all aspects of equipment design influence sound quality. Now, armed with our working theory, we can see that this difference in sound is due to EM interactions between signals and enclosure materials with different spectral signatures. We now have a good explanation for why we have felt the need to introduce talismans, or tweaks of mahogany, tourmaline, smoky quartz, and other such items placed in strategic locations throughout our systems. Typically, this specially balanced configuration in a highly tweaked out listening room takes years of trial and error to achieve. No wonder: there are so many complex EM interactions to account for.

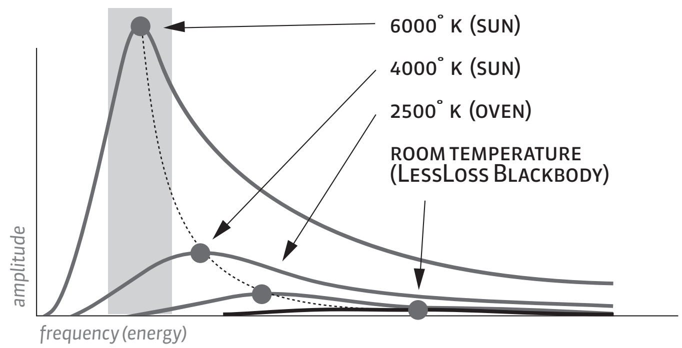
Faced with a clear problem that manifests in such complexity, shouldn't there be a more elegant, more accurate way to control this ambient EM labyrinth of interaction?

Our solution The Blackbody

Now that we have a clear description of the problem, it is not difficult to say what the ideal solution should do. It should prevent EM reflections from interacting with component circuitry signals, just as in our previous example the use of headphones prevented acoustic interaction. This is precisely what the LessLoss **Blackbody** does. It is modeled after the perfect blackbody—a hypothetical object from physics. A perfect blackbody would be an object that perfectly absorbs any EM frequency.

BLACK BODY RADIATION

Black body radiation is a special case of thermal radiation, in which the spectral radiance of electromagnetic energy depends only on temperature. Thus, at room temperature, black body radiation portrays no discernible spectrum.

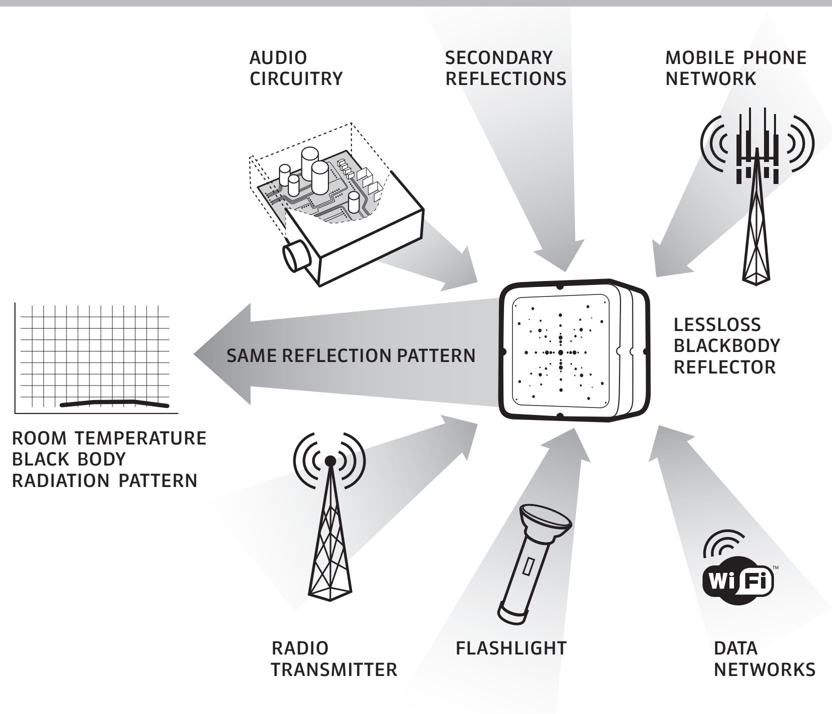


You can see how the blackbody got its name: by absorbing any EM wavelength, and by radiating none in our visible bandwidth, the device is as black as black can be; you might even say it is blacker than black, since it'd be the absence of light radiation altogether. Our version of the blackbody is not wired to gear and contains no batteries or power supply; instead, within the device is a special reflector whose emission pattern approaches that of the ideal blackbody radiator. By creating this near perfect blackbody, we've created a device that, simply by being placed in your gear's ambient EM field, will absorb virtually any EM radiation at that location. There, gear will no longer be able to bounce EM radiation off proximate objects, only to have it return to influence its delicate signals and degrade sound quality. The **Blackbody's** EM radiation pattern lacks a distinct spectral signature, making it impossible for its own radiation to cause sound coloration.

This is not your typical "talisman" tweak. Such tweaks are accompanied by diminishing returns once coloration sets in. The **Blackbody**, on the other hand, is the only object that removes the influence of near-field EM reflections. It lowers the system's noise floor, yet at the same time does nothing to color the sound.

DIFFERENT PATTERNS OF RADIATION RESULTING IN THE SAME SPECTRUM OF REFLECTION OFF OF THE BLACKBODY

The special thing about the Blackbody is that no matter what wavelengths you throw at it, the reflection will always be largely the same. This type of blackness is highly desirable in the proximity of sensitive audio signals, where the most minute coloration is appreciable. Considering the large bandwidth thus influenced, the electromagnetic background noise as a whole is effectively reduced. This purifies the resulting audio.

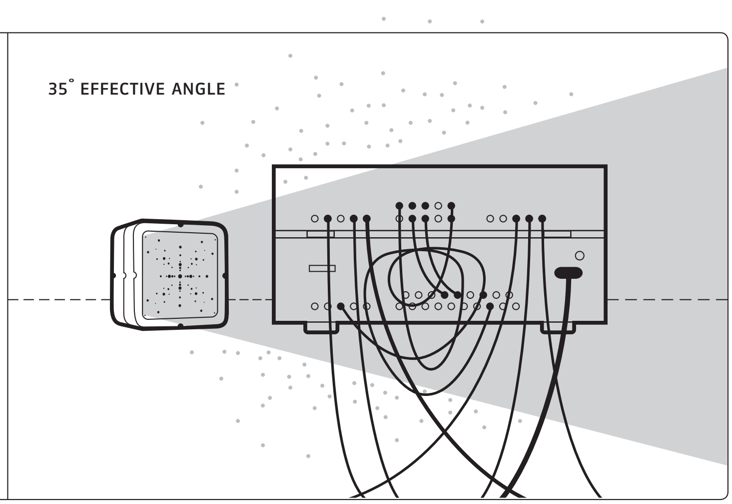


Positioning the unit For top performance

Using a single Blackbody

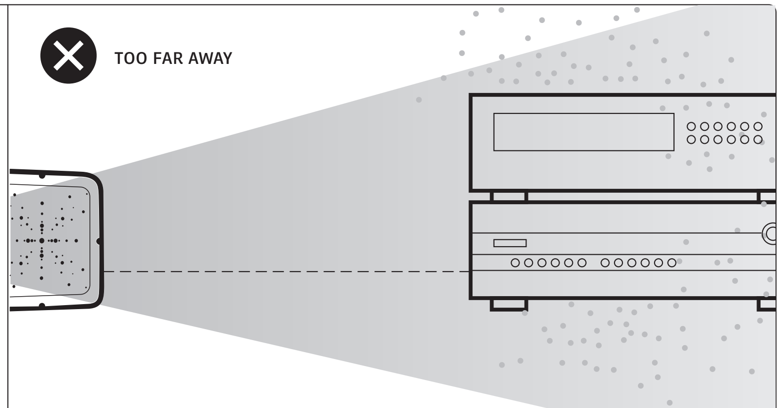
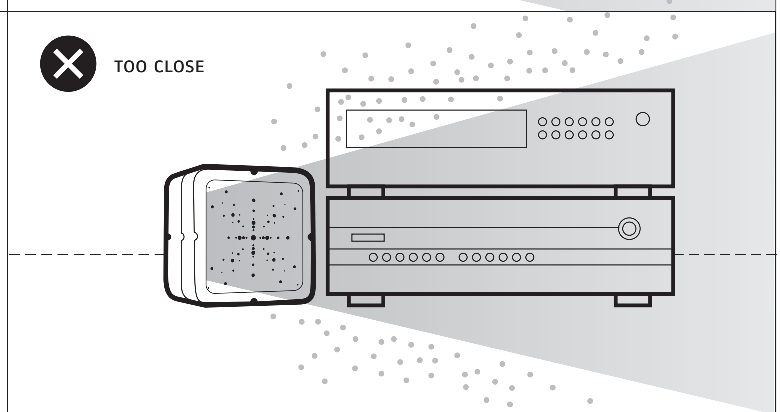
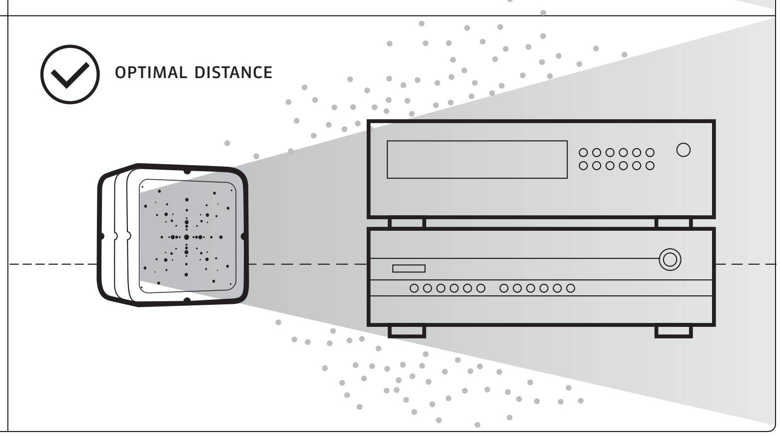
The Blackbody's effective angle is 35° outward from its front side. For optimal performance, use the outer boundaries of this angle as a sort of virtual cone to be placed as tightly as possible around as much component circuitry as possible.

Placing the **Blackbody** near your equipment will condition the ambient field at a 35˚ angle from the front of the unit. Your gear's radiation is transformed here into room-temperature black body radiation, which lowers the noise floor and purifies the sound.



Tips:

- The closer the Blackbody, without excluding main circuitry, the better the results.
- Peek inside your gear to determine the layout of the circuitry.
- Since circuitry configurations vary, trial and error often yields best results.
- A good place to start positioning is 15-40 cm from your components.
- Several Blackbodies can be used in tandem to maximize coverage and effectiveness.

A placement so distant, that coverage intensity is not taken advantage of. Effectiveness compromised.	
Positioning too close for full coverage. Effectiveness compromised.	
Best ratio of proximity and angle. Best coverage yielding maximum effectiveness.	

Just how black is the Blackbody? Read on about our photographic analysis.