Dolby Atmos for the home:

Sound bar setup guide

December 2017

Since its introduction in the movie theatre in 2012, Dolby Atmos® has revolutionized cinema sound and reinvigorated the home entertainment experience. Major Hollywood studios and studios worldwide are partnering with Dolby to create Dolby Atmos cinematic presentations, and a substantial portion of first-run feature films created today employ Dolby Atmos soundtracks.

Dolby Atmos introduces the concept of object-based audio, in which sounds are represented as individual objects that can be positioned anywhere within the space, above and around the listener.

In real life, sounds come from all around us, including overhead. Having the ability to re-create overhead sounds is a key element in making Dolby Atmos sound so realistic. If we see a helicopter take off on screen and then hear its blades cutting through the air above our heads, the experience makes us feel like we're really in the scene, and not just a casual observer.

Two approaches to Dolby Atmos in sound bars

Sound bars with upward-firing elements

This approach relies on the integration of upward-firing Dolby Atmos enabled speakers into the top of the sound bar. These speakers use the reflectivity of the ceiling to direct overhead sound effects and ambience above the listener. The addition of these speakers is one of the easiest ways to identify a Dolby Atmos enabled sound bar.

To accomplish the same goal, some Dolby Atmos enabled sound bars may incorporate stand-alone Dolby Atmos speaker modules instead of built-in upward-firing speakers. These modules are designed to be positioned to the left and right sides of the sound bar. Sound bars that include wireless surround speakers may also include Dolby Atmos drivers in their surround speaker design.

As with traditional sound bar designs, a Dolby Atmos enabled sound bar will incorporate left and right primary speakers, and may include a center speaker and even surround speakers located on the sides of the sound bar.

Figure 1. Dolby Atmos enabled sound bar 3.1.2 configuration

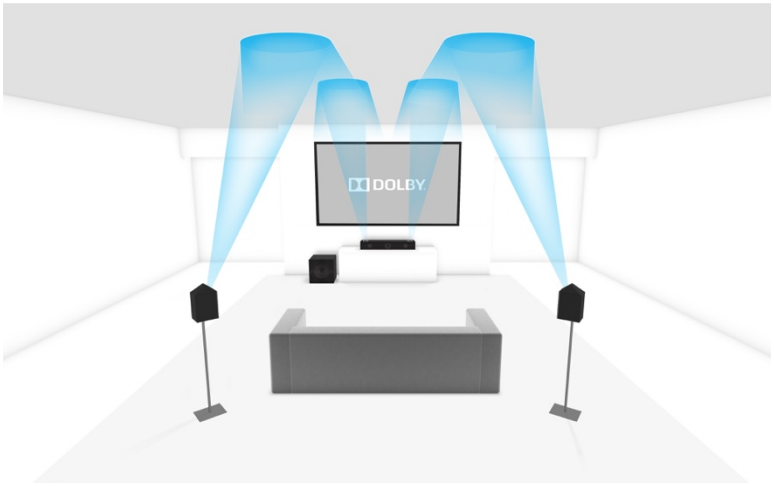

Figure 2. Dolby Atmos enabled sound bar with wireless speaker 5.1.4 configuration

Sound bars with virtualized Dolby Atmos sound

Dolby Atmos virtual processing leverages Dolby's deep understanding of human audio perception to simulate an immersive audio experience while using fewer speakers. For height effects, virtualization is used to create the sensation of overhead audio while sound is being played only from listener level speakers (no upward-firing elements). For systems without discrete surround speakers, virtualization of surround effects is employed to create enveloping, 360-degree audio without speakers behind or to the side of the listener. Dolby can support a number of output configurations with the height virtualizer, using 2 to 7 listener-level output channels to create the sensation of either 2 or 4 overhead speakers. Sound bar designs using virtualized Dolby Atmos can be found in 2.1-channel and 3.1-channel configurations, as well as in 5.1-channel designs that use wireless surround speakers.

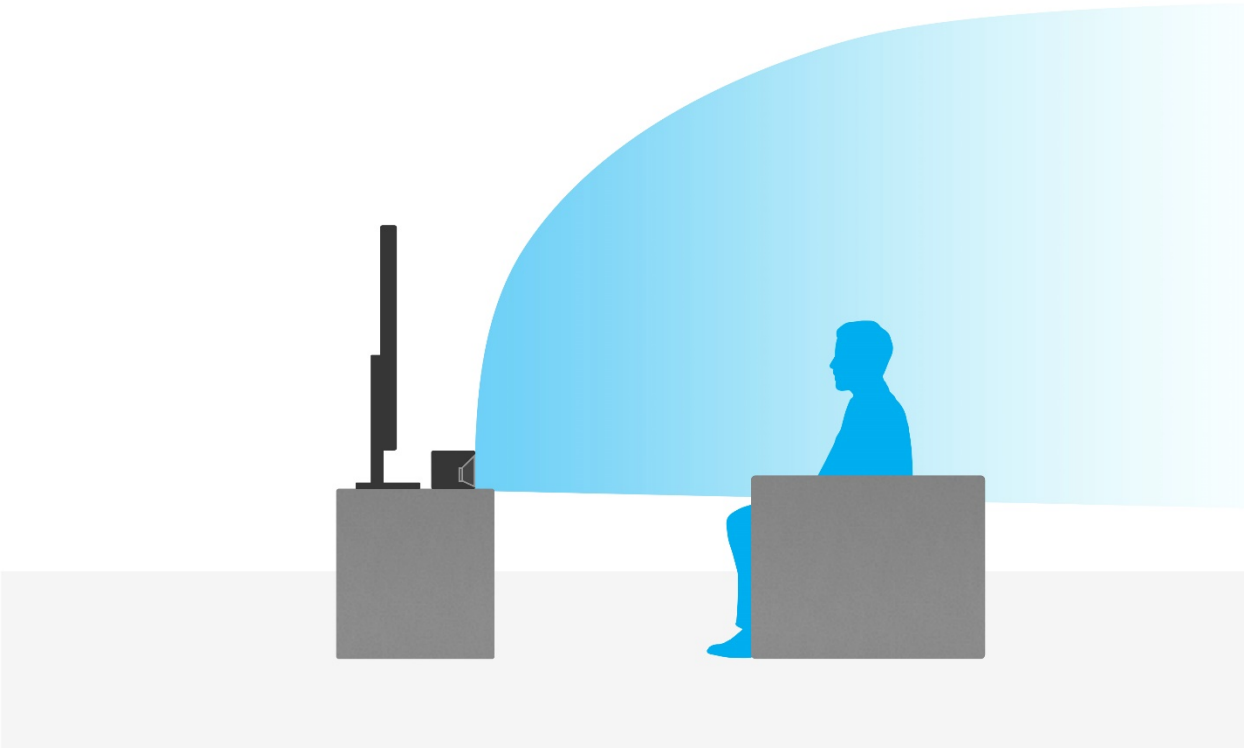

Figure 3. The immersive virtual Dolby Atmos experience

Ensuring the best playback experience from a Dolby Atmos enabled sound bar

Here are some guidelines to ensure the best listening performances from a sound bar with Dolby Atmos.

Setup guidelines for Dolby Atmos enabled sound bars with upward-firing elements

For optimum playback performance with dramatic overhead effects, mount the Dolby Atmos enabled sound bar at, or slightly above, a seated listener's ear level. You can place the sound bar on a console in front of the TV display or on a shelf or wall underneath the TV. The upward-firing Dolby Atmos drivers in the sound bar must have clear line-of-sight access to the ceiling. For best results, avoid mounting the sound bar in a cabinet or underneath a soffit, as this will disrupt the reproduction of the overhead layer of sound that is essential to the three-dimensional Dolby Atmos experience.

When possible, position the sound bar in front of the TV display so that the screen does not disrupt or interfere with the direct pathway of the overhead sound.

The ceiling surface is also an important contributor to the performance of a Dolby Atmos enabled sound bar. The ideal ceiling height is between 7.5 and 12 feet (2.3 and 3.66 meters). The ceiling should be constructed of an acoustically reflective material, such as wallboard, plaster, hardwood, or any rigid,

non-sound-absorbing material. For optimal playback, the ceiling should be flat. A shallow vaulted ceiling will provide acceptable performance.

The performance of the Dolby Atmos enabled speakers is so robust that a popcorn-finished ceiling, chandeliers, and can-style lighting do not interfere with or negatively impact the effect. It is best to avoid ceilings with acoustic tiles, as these tend to absorb the overhead sound of a Dolby Atmos playback system.

If the sound bar has built-in side-firing (surround) speakers, for optimal performance you should ensure that the sound from these speakers is in the direct line of sight with the side walls and that the speakers' first reflection to the listener is unobstructed by furniture or other sound-absorbing materials.

For an ideal playback experience, a Dolby Atmos enabled sound bar should be located at least 4 to 5 feet (1.2 to 1.5 meters) from the listener's seated position. Avoid sitting too close to the sound bar, and avoid positioning the sound bar so low that you are looking down on the top of the sound bar, as this will disrupt the sonic effect.

Setup guidelines for sound bars that deliver a virtual Dolby Atmos experience

For ideal results, place the sound bar below your television at approximately ear level and orient the seating position so that it directly faces the television. Avoid placing any obstructions between the sound bar and the listening position. The Dolby height virtualizer is extremely flexible and does not require any special room considerations to work. All viewers within the seating area will experience an enhanced height sensation that previous sound bars do not provide.

Additional features

Dolby® Surround virtualization technologies, when available, enable a wider and deeper "sweet spot" than was previously available from surround-enabled sound bar products. People sitting directly behind and alongside the primary listener can also enjoy a high-quality immersive experience.

Finally, be sure to turn on the Dolby Surround upmixer, if available, when listening to stereo and multichannel content that has not been encoded in Dolby Atmos. The Dolby Surround upmixer will provide a more lively and immersive soundstage and bring new life to playback of your channel-based music and movies collections.

Bringing content into your Dolby Atmos enabled sound bar

Dolby Atmos object-based audio can be delivered via Dolby Digital Plus™, Dolby TrueHD, and Dolby Metadata-enhanced Audio Transmission (Dolby MAT). A Dolby Atmos enabled sound bar is designed to support Dolby Atmos content (when available) and to play back from a wide variety of sources including:

- Blu-ray Disc™ media with Dolby TrueHD and Dolby Digital Plus soundtracks
- File-based and over-the-top streaming media formats supported by Dolby Digital Plus
- Cable, terrestrial, and direct broadcast systems supported by Dolby Digital Plus
- Video game consoles that support Dolby Atmos content through Dolby MAT transport

Playback of content that has not been encoded in Dolby Atmos

The new Dolby Surround upmixer, when available, also enables all your channel-based content that has not been mixed for Dolby Atmos to take advantage of the speaker array employed in a Dolby Atmos system. Engaging the Dolby Surround upmixer during playback of DVD-Video, Blu-ray™, broadcast, PCM, stereo broadcast, or music sources enables a richer, deeper, and more immersive listening experience than is possible from traditional playback systems.

Making connections: Audio bitstream out

A Blu-ray player that fully conforms to the Blu-ray specification can play a Dolby Atmos encoded movie without a firmware update. The Blu-ray player will need to be connected to the Dolby Atmos enabled sound bar via HDMI® and set internally to support audio bitstream out.

Note that many Blu-ray players default to secondary audio (also referred to as "mix" mode), a playback configuration in which third-party content is mixed with the primary soundtrack and then output as a Dolby Digital or another channel-based signal. You must disable this feature to ensure proper decoding and playback of Dolby Atmos content.

Over-the-top (streamed) Dolby Atmos content can be delivered to the sound bar over an HDMI connection from a Blu-ray player, set-top box, video game console, or digital media adapter (DMA). Be sure to set the output setting for all of these devices to bitstream out.

Cable systems that offer video on demand or pay-per-view services may support Dolby Atmos content. Be sure to adjust the output setting of the cable box to support bitstream output. (The default setting on many set-top boxes is stereo PCM.)

If you are not sure whether your sound bar is receiving and properly decoding Dolby Atmos content, check the display of the sound bar. If it is receiving and decoding Dolby Atmos, you will see an on-screen display or an illuminated indicator light.

In the future, console video games connected to your Dolby Atmos enabled sound bar via HDMI will support Dolby Atmos decoding and playback. For the titles available today, you will need a PC with an HDMI connection to enjoy Dolby Atmos game playback.

In all of the above examples, the current HDMI specification (v1.4 and later) fully supports transmission of Dolby Atmos encoded audio.