



Hear It. See It. Feel It.



Experience Dolby® Volume

Dolby® Volume provides a consistent volume level across all sources and content, and a reference-quality listening experience at any volume level. More than 40 years of engineering experience in noise reduction, perceptual audio coding, and related psychoacoustic technologies have resulted in the development of Dolby Volume, an advanced technology that provides a transparent solution to volume leveling and equalization.

A Consistent Problem

The biggest annoyance for home viewers and listeners has been the significant differences in volume levels as they switch between channels or sources on their televisions and in their home entertainment systems. Variances in volume levels in DVD and Blu-ray Disc™, digital music files, compact discs, and broadcast entertainment programming each compound the problem, resulting in viewers reaching for their remote controls to adjust volume.

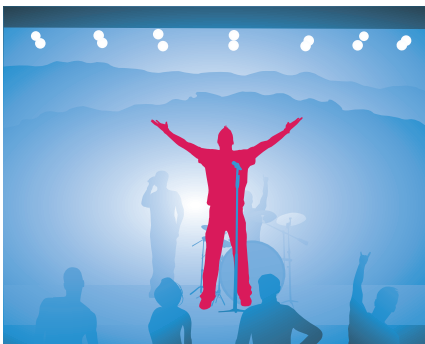
Once the volume is turned down, a second problem arises. Human hearing is sensitive to human voices at all sound levels. At lower volumes, people can decipher mid-range sound, but high- and low-frequency sounds are lost. Adding to the complexity is the fact that most content that people listen to or watch is rich with sounds that have different levels—and these levels need to be balanced with the main content.



ORIGINAL MIX LEVEL



VOLUME DOWN



WITHOUT DOLBY VOLUME
Sound elements disappear.



VOLUME DOWN



TYPICAL LOUDNESS CONTROL
Disproportionate sound with some sound elements disappearing.



VOLUME DOWN



WITH DOLBY VOLUME
Sounds just right using Auditory Scene Analysis and Loudness-Domain Processing.

Listening to music at the mixed-reference level, instruments, vocals, and background music can be heard at the correct level and ratios. Once the volume is turned down, the vocals and other mid-range elements are apparent, but elements of the original content are gone. In a movie or TV show, ambient elements that really set the mood and tone disappear. The entire original intent is lost.

Over the years there have been several attempts at solving these problems experienced by consumers.

Background

Volume processing, or dynamic range compression, is based on the simple idea of creating a consistent volume level by attenuating loud signals and amplifying quiet ones. While it sounds simple, it's actually an extremely difficult exercise.

Previous volume management solutions simply adjusted signals based on their amplitude characteristics, which resulted in very audible artifacts or side effects. Systems either reacted too fast—creating pumping effects—or not fast enough to sudden changes in

volume. During quiet scenes, these solutions were blindly raising the volume level, bringing the noise floor to an audible and unacceptable level.

In a more sophisticated attempt to solve these artifacts, some manufacturers introduced forward-looking algorithms. These algorithms have the ability, through small delays, to know what will happen to the amplitude of the audio signals ahead of time. While forward-looking algorithms might help in some instances, the system can easily be defeated by a simple piano chord

decaying, or by the sound of a car driving away. In these examples, forward-looking algorithms will “see” quieter upcoming signals and will progressively apply amplification to a sound that should normally fade away, changing or even destroying the intended effect.

Reducing the listening volume to an acceptable level results in a loss of dynamic range and surround ambience, particularly at low-volume listening levels. Solving this by applying fixed equalization, a simplified pseudo-psychoacoustic technique, as a function of the volume control, results in ambient sounds still falling below the threshold of hearing or appearing quieter than they should compared to the main content. Thus some sounds are too quiet and others, too loud. A rich audio mix will instead sound unbalanced and out of proportion. Compression and expansion techniques have also been employed in attempts to address volume leveling, but these have resulted in undesirable pumping and breathing artifacts.

Simply turning up the surround channels while reducing the signal levels of the front channels is not a solution either, as rear channels are often employed by sound designers to reproduce musical themes—in addition to recreating dramatic surround effects. Artificially elevating the volume of the surround channels will seriously compromise the critical balance between front and rear channels during musical interludes. The unexpected musical swells that can occur during these events surely cause listeners to reach for the volume control!

A Groundbreaking Approach to Volume Processing

There is fundamentally only one way for a system to properly reduce all artifacts: it must interpret sound, just as humans do. This is what Dolby Volume does.

Understanding what comprises a scene from an audio perspective is crucial to avoiding artifacts. Research engineers at Dolby have spent years developing an algorithm capable of listening to elements of audio signals. This intelligence is achieved through a technique called auditory scene analysis, which gives Dolby Volume the ability to know when important auditory events occur. Dolby Volume understands when a word begins and when it ends, when a piano chord is being played and the way it ends, when a car approaches and when it drives away. Dolby Volume analyzes and distinguishes audio background and foreground elements to insure their perceptual balance is properly maintained.

With such a powerful technique built in, only Dolby Volume can deliver a perfectly consistent listening experience minus any artifacts, while maintaining the integrity of the artist’s intent. These ingredients make Dolby Volume the most sophisticated volume leveling and volume modeling feature available today.

When integrated into products such as digital display devices, A/V receivers, home-theater-in-a-box (HTIB) systems, and stereo music systems, Dolby Volume lets listeners select a preferred listening level and enjoy all of their entertainment sources at the same preset volume level without having to reach for the remote control every time they switch between sources or programs.

In addition to enabling consistent playback volume levels from a variety of content and input sources, Dolby Volume provides the listener with the same vibrant audio performance at all playback levels. The result is a more consistent and enjoyable listening experience than previously possible.

The Preferred Volume, All the Time

Dolby Volume maintains system playback volume at the same preferred level across all sources, from progressive programming and channel selections on a TV set or set-top box or between connected sources such as CD, DVD, or Blu-ray Disc players, audio

DOLBY VOLUME BENEFITS

Consistent volume across all content, programs, and input sources

Reference-quality listening experience at any volume level

Eliminates need to constantly adjust volume

Can be adjusted to personal preference and listening conditions

Full, rich, and consistent experience at all volume levels

Improved surround perception at low volume levels

No artifacts or audible side effects



or videocassette players, MP3 players, or other playback devices. When integrated into a set-top box, television set, or A/V receiver, Dolby Volume lets the listener set the playback volume once and not have to touch the volume control again.

The highly sophisticated loudness-domain processing engine of Dolby Volume measures, analyzes, and maintains volume levels based on how people perceive sound. It examines a variety of audio parameters to maintain consistent playback levels whether switching between channels or between multiple source inputs. A sophisticated combination of spectral-based loudness analysis techniques enable it to quickly and properly correct level differences without creating compression artifacts or undesirable pumping in the audio signal.

In addition, Dolby Volume lets the listener control a program's dynamic range. For example, with the volume turned down for late-night viewing, dynamic range can be adjusted so that dialogue remains clear, and loud effects or music passages with a wide dynamic range retain their impact and timbre without waking up the family.

A Reference-Quality Listening Experience at Any Volume Level

At high or low levels, Dolby Volume guarantees a listening experience that includes all the dynamics of the original mix.

Dolby Volume models the complex nonlinearities of loudness perception, compensating for the human ear's changing sensitivity as gain levels are increased or decreased. Advanced psychoacoustic-based signal analysis and processing properly balance all frequencies, maintaining all the nuances and impact of the program material regardless of playback volume level. Importantly, Dolby Volume applies independent loudness adjustments to different frequencies and channels only when needed. The integrity of the overall mix remains intact; spectral and spatial balances are fully maintained.

Flexibility

Integrating Dolby Volume into hardware products can be as simple as providing a variety of preset user selections, or a hardware manufacturer may choose to allow users to set their own preferred levels.

In addition, Dolby Volume signal processing may be assigned to individual inputs on an A/V receiver, based on user preference. For example, a consumer may choose to apply the Dolby Volume solution to playback of CDs or MP3 files, where dynamic range and gain levels may vary dramatically by program selection. Similarly, the consumer may choose to leave Dolby Volume off when listening to reference grade recordings or when they want to experience the full dynamics of a motion picture soundtrack.

A New Way to Deliver Added Value to Hardware Products

Dolby Laboratories is recognized as the worldwide authority in high-quality audio signal processing, and Dolby Volume is the result of more than four decades of research and understanding of the complex dynamics of human hearing. Embraced by enthusiasts and casual listeners alike, Dolby Volume offers an unprecedented level of listening consistency and listener satisfaction, providing a new and unique solution for differentiating home entertainment products.

In addition to A/V receivers, HTIB systems, sound-bar products, and stereos, Dolby Volume can also be integrated into TV sets and set-top boxes. Dolby Volume works with any input signal, analog or digital, with any service (cable, satellite, terrestrial, and IPTV), and on any program source.



Dolby Laboratories, Inc.

100 Potrero Avenue, San Francisco, CA 94103-4813 USA T 415-558-0200 F 415-863-1373

dolby.com

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