



Version

2017.2.10.6745 ▼

Search

Search

Table of Contents

- [Wwise SDK 2017.2.10 \(../2017.2.10_6745/?source=SDK&id=index.html\)](#)
- [Wwise Help \(../2017.2.10_6745/?source=Help&id=wwise_help\)](#)
- [Installation and Migration Guide \(../2017.2.10_6745/?source=InstallGuide&id=wwise_installation_migration\)](#)
- [The Wwise Project Adventure \(../2017.2.10_6745/?source=WwiseProjectAdventure&id=the_wwise_project_adventure\)](#)
- [Wwise Fundamentals \(../2017.2.10_6745/?source=WwiseFundamentalApproach&id=wwise_fundamentals\)](#)
- [Cube Integration \(../2017.2.10_6745/?source=Cube&id=idm1495318640\)](#)
- [Sample Project \(../2017.2.10_6745/?source=SampleProject&id=idm1496027744\)](#)
- [Wwise Unity Integration \(../2017.2.10_6745/?source=Unity&id=main.html\)](#)
- [Wwise Unreal Integration \(../2017.2.10_6745/?source=UE4&id=index.html\)](#)

Other Documentation

[Wwise Audio Lab \(/library/wal/\)](#)

Understanding HDR

High dynamic range audio (HDR audio) is a technique to design a mix using level values spanning across a very high dynamic range as occurs in nature. HDR is also a run-time system that dynamically maps this wide range of levels to a range that is more suited to your sound system's digital output.

In the real world, the audible dynamic range that spans from the threshold of human hearing to the loudest possible sound in air is several times wider than the dynamic range offered by speakers at game play levels. The role of an HDR system is to collapse or "compress" the whole real life dynamic range, approximately 190 dB, into 96 dB (the dynamic range available for a digital device), and even less in practice due to floor noise levels.

In HDR photography, local tone mapping is applied independently to various regions of an image to

enhance the contrast within each region. HDR audio works in the same way; it performs sound level mapping instead of tone mapping, and does so locally in time. Thus, at any given moment, the system automatically adapts the mapping based on the levels of sounds that constitute the audio scene.

HDR Glossary:

| Term | Definition |
|------------------------|--|
| Decibel (dB) | A logarithmic measure of the level of a sound compared to the level of another sound or an arbitrary reference value. One decibel equals $20 \cdot \log_{10}(A/AR)$ when dealing with amplitude. A difference of +20 dB means that a sound's amplitude is 10 times greater than the reference. |

| Term | Definition |
|----------------------------------|---|
| Decibel full scale (dBFS) | A logarithmic measure of the amplitude of a signal compared with the maximum that a device can handle before clipping occurs. A value of 0 dBFS is thus the loudest sound that can be generated by the digital audio output. 16-bit digital audio output devices range from 0 dBFS down to -96 dBFS. The level of the audio signal coming out of the Master Audio Bus in Wwise should therefore lie between these values. |

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