

Dolby Atmos Music Room

BEST PRACTICES FOR MUSIC ROOM CONFIGURATION

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Music Room Specifications

Room Size Considerations

Minimum layout height:	2.4 m (approx. 8 ft)
Minimum layout width:	3 m (approx. 10 ft)
Minimum layout length:	3.5 m (approx. 11.5 ft)
Recommended layout width	5.5 m (approx. 18 ft)
Recommended layout height:	3m (approx. 10 ft)
Recommended layout length:	6.4 m (approx. 21 ft)

For more information visit: [Dolby Atmos Room Dimensions](#)

Speaker Choice and Layout Considerations

A Dolby Atmos Music mix room should be able to monitor at 85 dB SPL at listening position from each speaker with at least 20 dB of headroom.

The response of each channel should extend from 40 Hz at the low frequencies and ideally up to 18 kHz with no greater variation than +/-3dB. We recommend matching the capabilities of your speaker at all locations in order to enable full range frequency response throughout the mix room. If the chosen equipment cannot achieve the desired response, bass management solutions should be deployed as needed.

Speaker height (when measured from floor to acoustic center) should be at ear level for a seated mixer (approximately 1.2m / 4ft). Exceptions can be made in accordance with the exact use of the room, where speakers can be elevated to avoid impediments. Obstructions such as live room windows, patch bays, console bridges, and other obstacles may be avoided, provided the rules for angular separation are followed as defined by the Dolby Home Entertainment documentation are followed.

Mix position is dependent on factors such as equidistant vs. orthogonal room layout, architectural hindrances, and the locations of permanent hardware (such as a console). Since enabling an existing studio to create music in Atmos can present many of these “unmovable” issues, circumvention may be necessary via speaker manipulation (e.g. employing stronger Lrs/Rrs to meet SPL expectation at a forward mix position). Whenever possible, adhere to between 0.4 and 0.6 of the speaker layout length for an equidistant setup, and between 0.5 to 0.7 for orthogonal.

Minimum Specifications

The minimum speaker layout for a Dolby Atmos Music mix room is 7.1.4, i.e., 7 standard plane speakers, 1 subwoofer channel, and 4 top surround speakers.

9.1.4 or 9.1.6 configurations, which utilize “wide” speakers located between the Mains and the Side Wall speakers, are preferred and considered our standard reference designs.

Dolby Atmos Music masters should be mixed and reviewed on a speaker system that can achieve a minimum dynamic range of +20dB over a calibrated reference listening level of 85dBC (the standard calibration of an Atmos system), when measured using untrimmed Dolby Atmos Renderer pink noise as stimulus at every speaker position.

The Dolby Atmos Room Design Tool (also known as the DARDT) is the most useful tool to determine if a particular make and model of speaker will work at any particular speaker location.

For more information on music room specifications visit: [Dolby Atmos Room Design](#)

Calibration

Target Curve

The target curve for Dolby Atmos Music is shown below. Strong adherence to the target curve should be maintained. Although our typical recommended tolerance for tuning against a target is +/- 3.0 dB, we recommend a stricter tolerance of +/- 1.0 dB in relation to the target curve for music. This will ensure better voice matching both between the speakers in the room and in room-to-room translation.

Multi-microphone spatial averages recorded in combination with an audio analyzer software should be utilized for best alignment results. The microphones should optimally be placed at sitting ear height, approximately 117 – 132 cm (46 – 52 inches) from the floor.

Nearfield rooms should use a target curve that is flat from 160 Hz to 1.6 kHz, -1.5 dB per octave from 1.6 kHz to 10 kHz, with a final downward deflection above 10 kHz to -3.0 dB per octave. In this nearfield environment, a +1.0 dB rise below 160 Hz is also utilized, as seen in Figure 1 below.

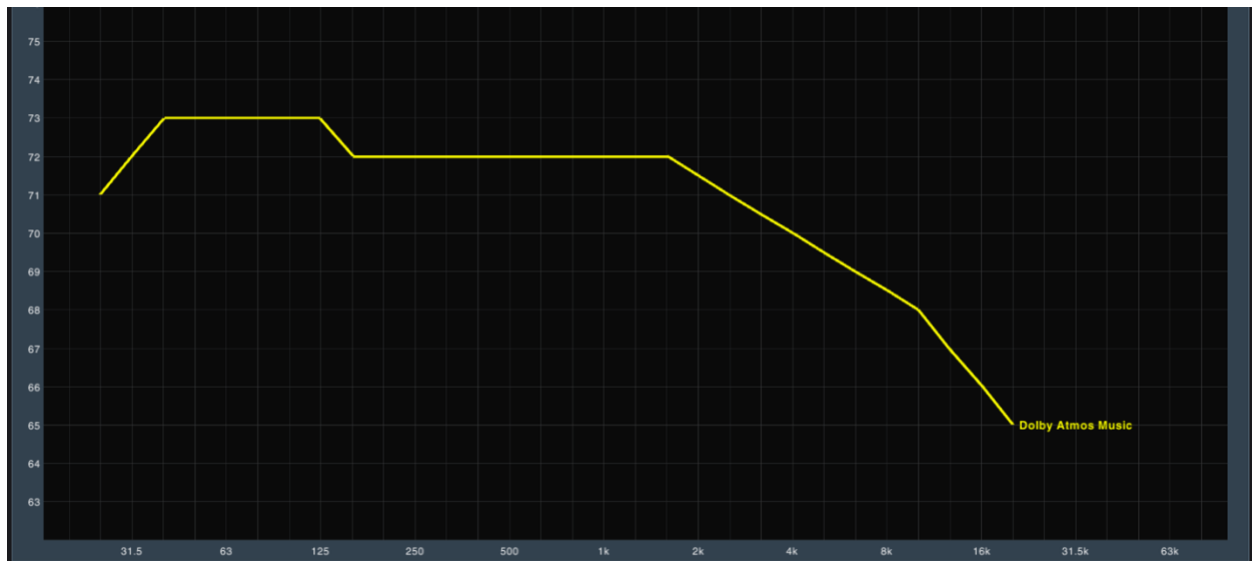


Figure 1: Dolby Atmos Music Curve shown in Rational Acoustics Smaart v8

Reference Level and Headroom Expectations

All measurements below are contingent on Dolby-level pink noise generated from the Dolby Atmos Renderer on any untrimmed speaker output, and the C-weighted SPL. Pink noise is expected to be -20 dBFS but can vary between console meters.

Expected SPL should be 85 dB on every channel, with the exception of LFE (see below). Every output channel should minimally expect to achieve +20 dB of headroom above reference, with better sonic performance realized with +26 dB of headroom per channel.

Acoustic room treatment or corrective speaker equalization may be applied accordingly with reference material used to gauge room coloration.

LFE Considerations

The low-frequency effects channel (abbreviated LFE) reflects an additional 10 dB of in-band gain (as compared to the center speaker) for the frequency range it covers, and measures 89 – 91.5 dB on a SPL meter when using Dolby

Atmos Renderer generated pink noise. Use of an RTA is therefore suggested and a reference datum of 83 dB per 1/3rd octave band.

Multiple LFE cabinets can produce favorable results and might be required to achieve a minimum headroom of +26 dB.

The subwoofer should have a minimum frequency response of 31.5 to 150 Hz. To avoid modal build-up, subwoofers should ideally be placed on the floor and off-center on the LCR plane.

Bass Management

Bass management is necessary when the speaker of choice at any given position in the room results in a limited frequency response compared to the desired target curve. For example, if the overhead speakers do not have the expected response below 80 Hz in comparison with the target curve, bass management should be employed as a means to complete the intended frequency response needed to achieve the target curve at that speaker position.

SPL levels for a Bass Management are contingent on the unit's integration with the full-range portion of the speaker channel it is supporting and will most likely need individual adjustment for each channel. When the full-range portion of the speaker channel is muted, that level will generally be 79 – 81.5 dBC on a SPL meter when stimulated via Dolby Atmos Renderer generated pink noise.

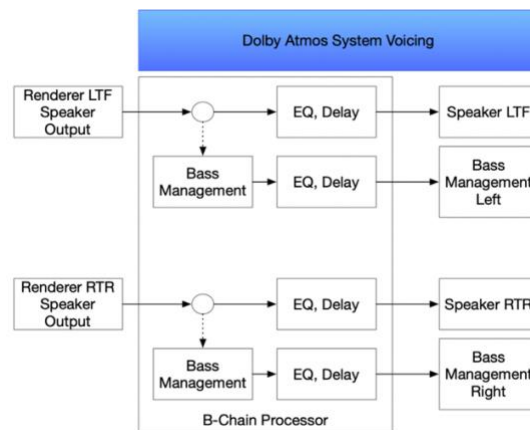


Figure 2 B-Chain Calibration Structure showing Optional Bass Management we recommend a dedicated bass management unit for each side of a room.

System Design

Clocking

Primary word clock for the room should be capable of 96 kHz and 48 kHz operation. “Daisy chaining” word clock reference is not recommended. Instead, deploy a distribution amplifier or use a clock device with multiple clock outputs.

Network Isolation

Communication with the Dolby Atmos Renderer occurs via TCP/IP and should be on network subnets used exclusively for audio control protocols such as EUCON. When using EUCON within the studio, Dolby hardware should run on a separate network switch and subnet to avoid issues with Metadata traffic.

Network communication should be isolated on a per studio basis at minimum.

If Network Audio transport (Dante, AES67) is used, further segmentation of network infrastructure should be implemented.

Workstation Recommendation

At minimum, a Dolby Atmos music room should consist of a source Digital Audio Workstation (DAW) and a Dolby Atmos Mastering Suite consisting of a dedicated workstation to run the Dolby Atmos Renderer software application. This should be configured with an audio interface capable of 128 channels from Source DAW to Renderer.

Other Considerations

While rooms without a dedicated Renderer workstation can mix and master Dolby Atmos Music, they will not be added to our recommended rooms list.

Headphone outputs should be made available at mix position and ideally at client review locations as well.

For more information about system design visit: [Dolby Atmos Renderer](#)

Sample Room Layouts

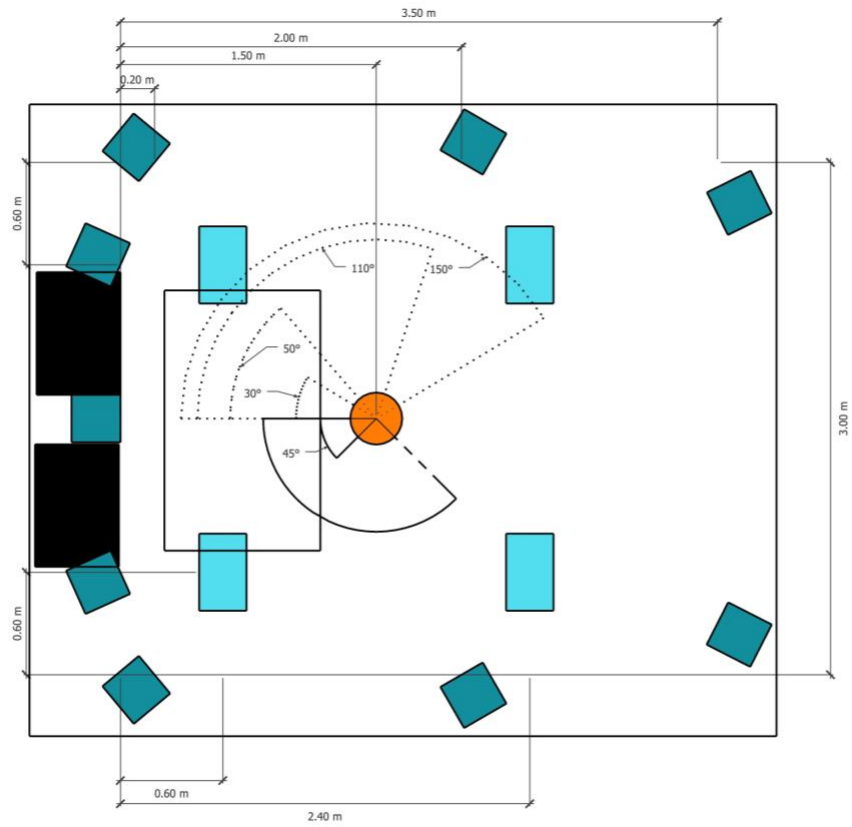


Figure 3: 9.1.4 Dolby Atmos Music Room Layout showing Minimum Dimension

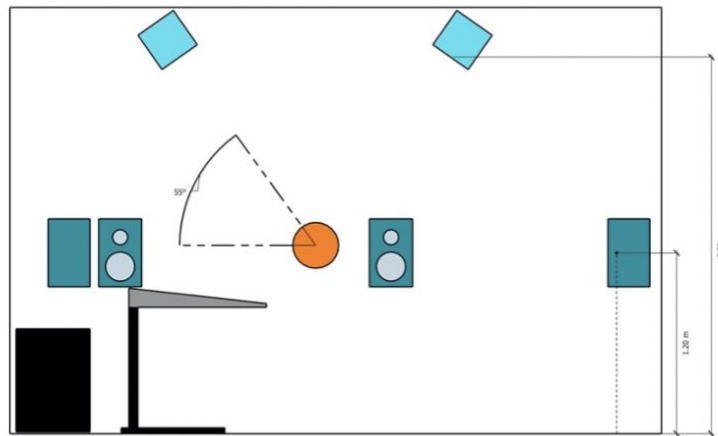
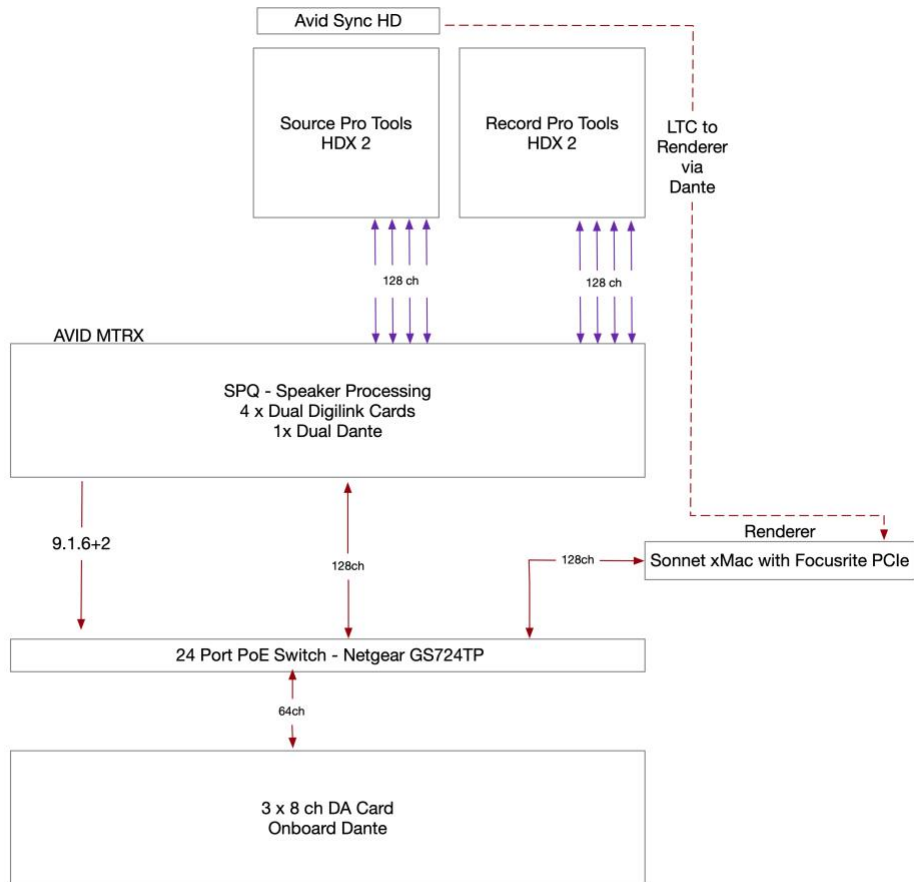


Figure 4 Dolby Atmos Music Room Elevation showing Minimum Dimensions

Sample Signal Flow

The following diagram shows a currently installed and operating music studio with Dolby-compatible gear, other products are available and may be better suited for integration into your studio.

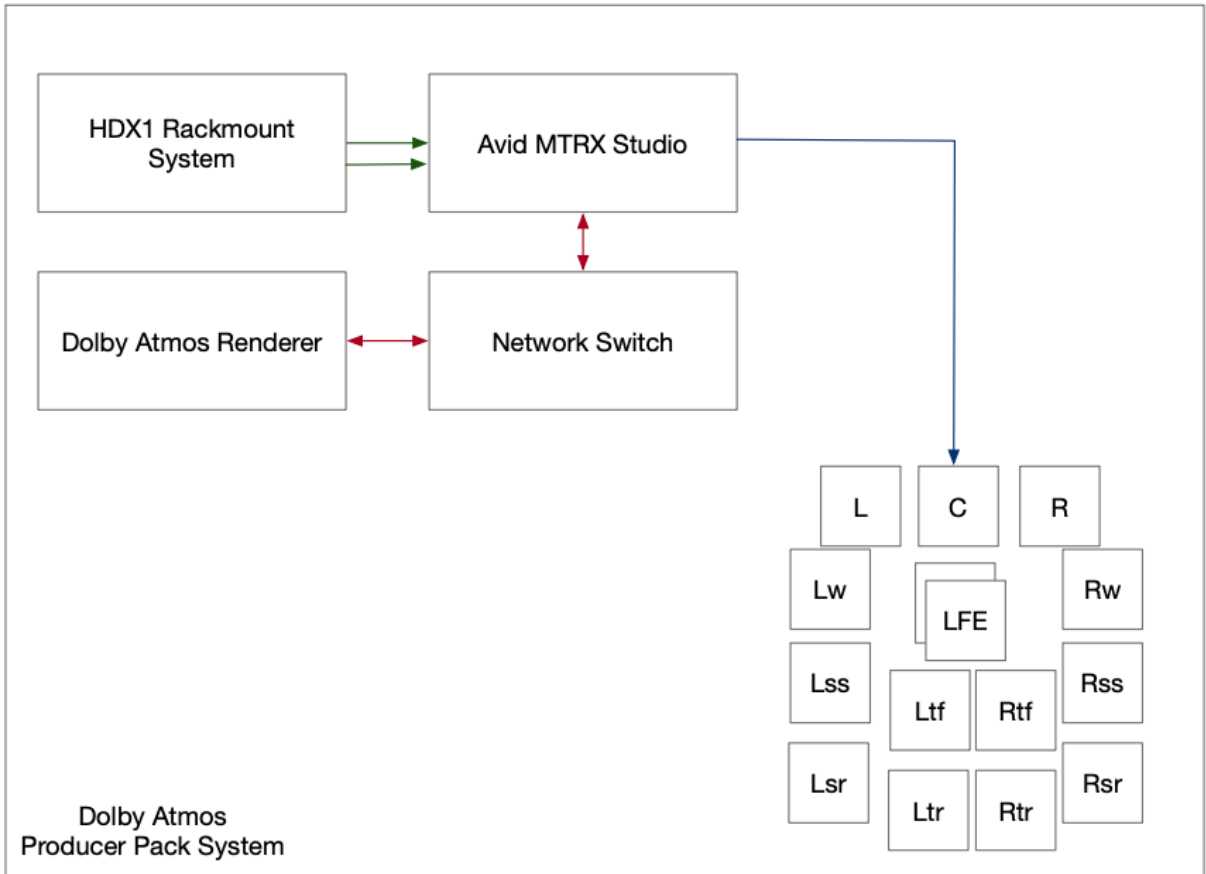


System Description

Dolby Atmos Speaker Configuration: 9.1.6 + 2 Bass management
IO: Avid MTRX with 4 Digilink Cards, Dual Dante Card, Onboard Dante
Renderer: Mac-based Dolby Atmos Mastering Suite with Focusrite PCIe Dante card
Primary Clock: Antelope Isochrone OCX
B-Chain: Avid MTRX SPQ – Avid S6 Monitor Control

Producer Pack Signal Flow

The following diagram shows a currently installed and operating music studio with Dolby-compatible gear, other products are available and may be better suited for integration into your studio.



System Description

Dolby Atmos Speaker Configuration: 9.1.4

IO: Avid MTRX Studio

Renderer: Mac-based Dolby Atmos Mastering Suite with Focusrite PCIe Dante card

For more information about the topics presented in this document, please visit our Dolby Atmos Home Entertainment Studio [Technical Guidelines](#).