L-ACOUSTICS

One Space. Endless Experiences.

HYRISS

INTRODUCTION TO

Hyper Real Immersive Sound Space

About HYRISS

Introducing HYRISS, or Hyperreal Immersive Sound Space, a groundbreaking audio solution redefining how we interact with sound in designed environments. HYRISS fuses artistic vision and engineering excellence, empowering architects, designers, and engineers to craft captivating spaces that sound as extraordinary as they look. Designed for the places where we live, work, and play, HYRISS transforms static environments into dynamic auditory masterpieces, tailored to every experience.

At its core, HYRISS harnesses cutting-edge L-Acoustics technology to deliver concert quality sound through discreet in-wall speakers and powerful spatial audio processing. Whether you're creating a serene atmosphere for relaxation or hosting a private dance party, HYRISS adapts seamlessly to your needs. With its ability to envelop listeners in three-dimensional soundscapes and dynamically alter room acoustics, HYRISS transcends traditional boundaries, elevating any space into a temple for the ears.

Sound is Essential

Sound plays a crucial role in our lives, influencing how we design our environments. The acoustic landscape of a space, known as a soundscape, includes natural elements, alongside human-made sounds such as noise, music, and conversations, which influence the auditory experience. The spatial characteristics of a space also matter, determining how sounds interact with the physical environment.

Existing Solutions

Designing spaces and systems to accommodate diverse uses of sound is rarely perfect. For instance, traditional home cinemas often occupy an entire room and serve only a single function. Similarly, deeply focused music listening with well-designed sound systems deliver excellent audio to specific areas, but passive listening may result in sound unintentionally filling spaces as desired.

Creating memorable experiences also requires tailored acoustic solutions. Each scenario demands a unique approach to acoustic design. Traditional design often supports one acoustic characteristic, such as cinema sound, but this approach is far from ideal for other uses, like violin practice or recitals.

HYRISS Solution

HYRISS features a seamlessly integrated, three-dimensional mesh of high-performance speakers distributed throughout a space, often concealed within the architecture itself. Coupled with advanced signal processing and cutting-edge technologies, HYRISS transforms traditional sound and acoustic capabilities into a cohesive, unified system.

Unlike conventional sound formats such as stereo or surround sound, HYRISS supports all types of audio content, providing a versatile canvas for designers to position sound precisely where it is needed. The technology remains invisible, ensuring a clean aesthetic while enhancing the sensory experience. With HYRISS, architects and designers can create environments that engage multiple senses, giving users complete control over their personalized soundscape.

Introduction to this Handbook

Welcome to the HYRISS Design and Application Handbook, a comprehensive guide to planning, designing, engineering, installing, and integrating the HYRISS audio and acoustic solution by L-Acoustics. This manual has been created to support users at every stage of their HYRISS project journey.

Purpose:
The primary aim is to empower architects, designers, acousticians, sound professionals, system integrators, and end users with the knowledge and tools needed to achieve exceptional results.

Planning: Strategies to assess project requirements and choose the ideal HYRISS configurations.

Designing: Guidelines for architecture and acoustics, system layout, and optimizing HYRISS for specific environments.

Audio visual integration: Guidance and system details to ensure seamless deployment. Insights on interfacing HYRISS with third-party systems, workflows, and networked audio solutions.

Flexible Use
Recognizing the diversity of applications for HYRISS, this handbook has been designed for flexibility. Chapters and sections can be referenced independently or as part of the larger process. Whether you're approaching this from a systems perspective or focusing on specific areas like tuning or deployment, this guide ensures that HYRISS performs at its full potential.

L-Acoustics and its certified partners are available for guidance throughout the HYRISS design and integration process.

Versatile Deployment of HYRISS in Built Environments

HYRISS is designed to enhance sound experiences across a wide range of spaces in the built world.

Residential Spaces: Transform a single great room into a multifunctional space suitable for listening, watching movies, performing, relaxing, meditating, and entertaining.

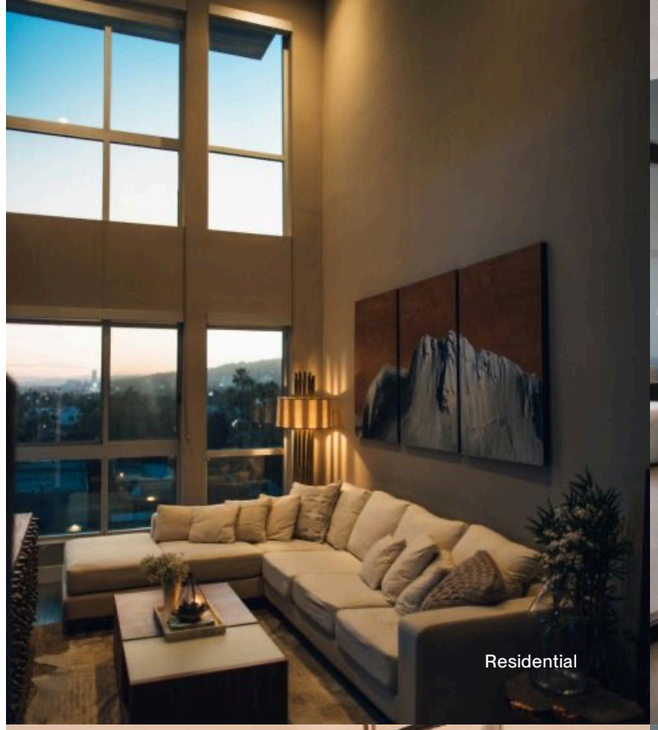
Corporate Environments: Create dynamic spaces for presentations, entertaining clients, training sessions, demonstrations, focused work, or relaxation; enhancing employee productivity and customer engagement.

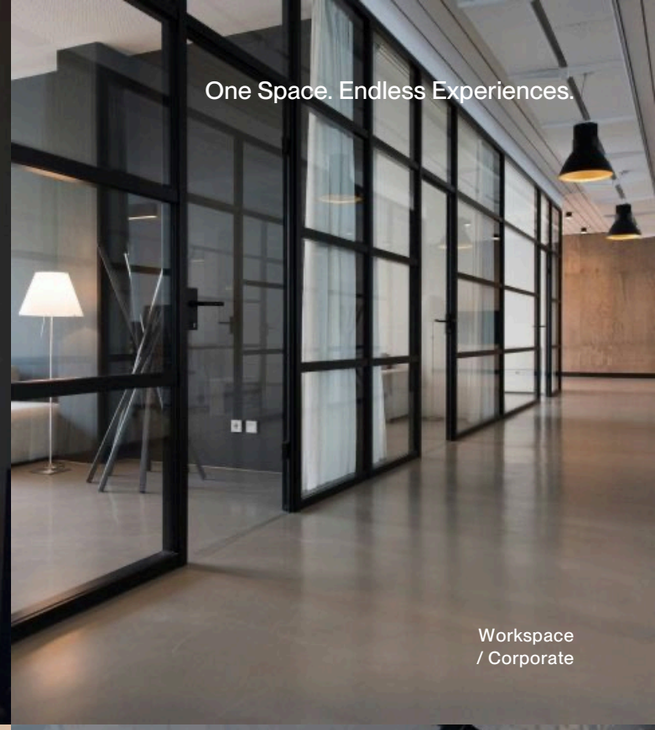
Hospitality: In restaurants, adjust to meet customer needs, whether creating an intimate dining experience or a lively atmosphere for entertainment. In hotels, create flexible spaces for presentations, events, training, and relaxation, ensuring that every guest experience is tailored and memorable.

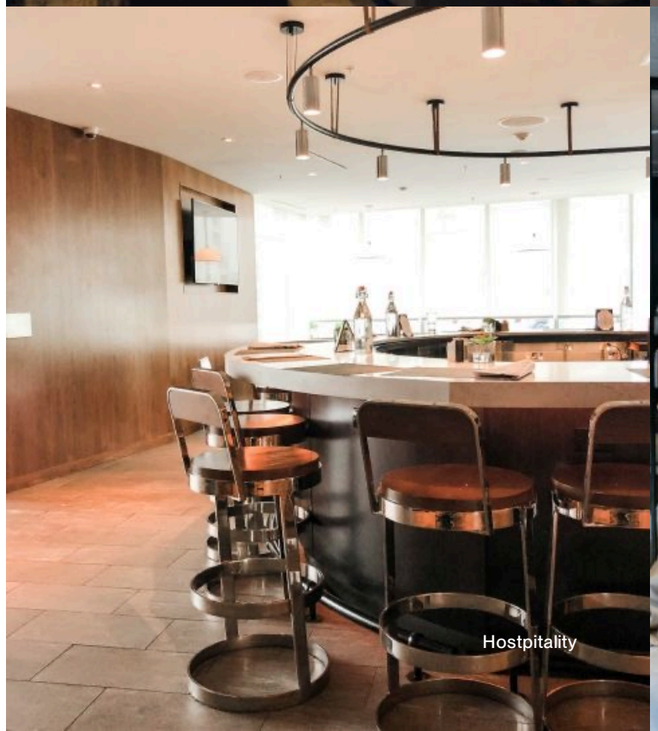
Retail: Soundscaping enhances the customer experience by providing a flexible auditory backdrop that can adapt to daily sales activities, special events, and changing customer needs throughout the day.

Wellness: Build spaces that transition from quiet relaxation to high-energy workout environments, promoting a holistic approach to health and well-being.

Interior vs. Exterior: HYRISS may be designed for interior and exterior spaces, though certain acoustic aspects of the solution are limited outdoors.







Collaboration Across Professionals in HYRISS Projects

HYRISS projects leverage the expertise of multiple design, engineering and integration professionals to deliver optimal solutions for clients.

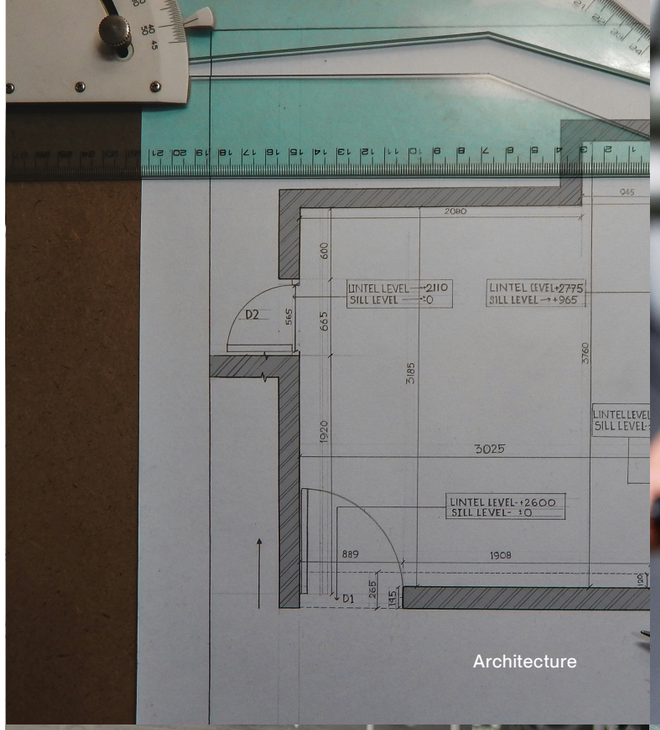
Architects and Interior Designers - Lead the project: HYRISS offers architects and interior designers a unique opportunity to enhance their concepts by incorporating the auditory sense—a gateway to well-being and entertainment.

Acousticians: The expertise of acousticians improves the performance of spaces where sound and hearing are central to the design. Beyond their traditional roles in industrial and public venues, acousticians play a vital part in promoting well-being by ensuring that acoustic properties are optimized and integrated into the environment.

Sound Designers: Utilize the unique and extensive audio and acoustical tools within HYRISS to create dynamic soundscapes.

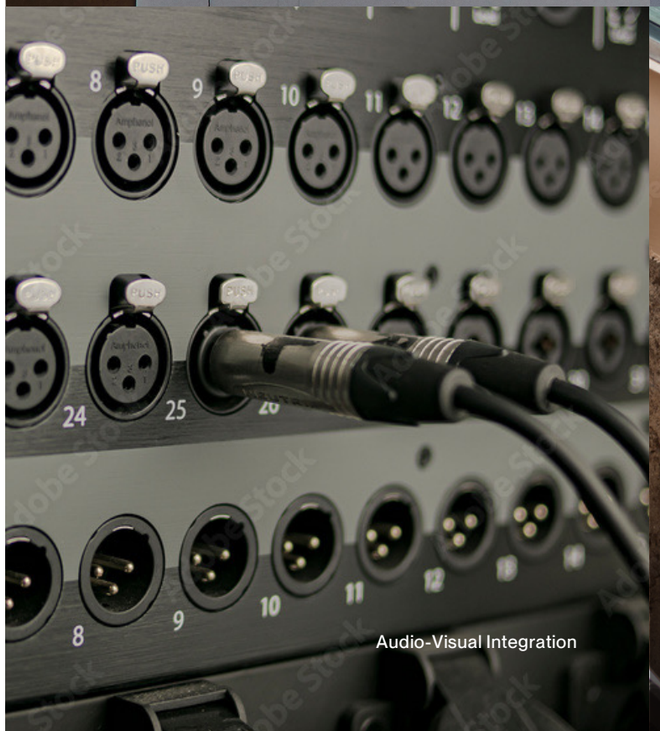
Audio Visual Integrators: Audio Visual Integrators play a crucial role in implementing HYRISS technology. Their responsibilities include designing control systems, infrastructure, technology, and 3rd party equipment. Certified L-Acoustics partners provide the system integration.

L-Acoustics and its Certified Partners are available for guidance throughout the HYRISS design and integration process. Providing planning and design support for HYRISS systems, providing essential calibration and tuning to ensure optimal performance.



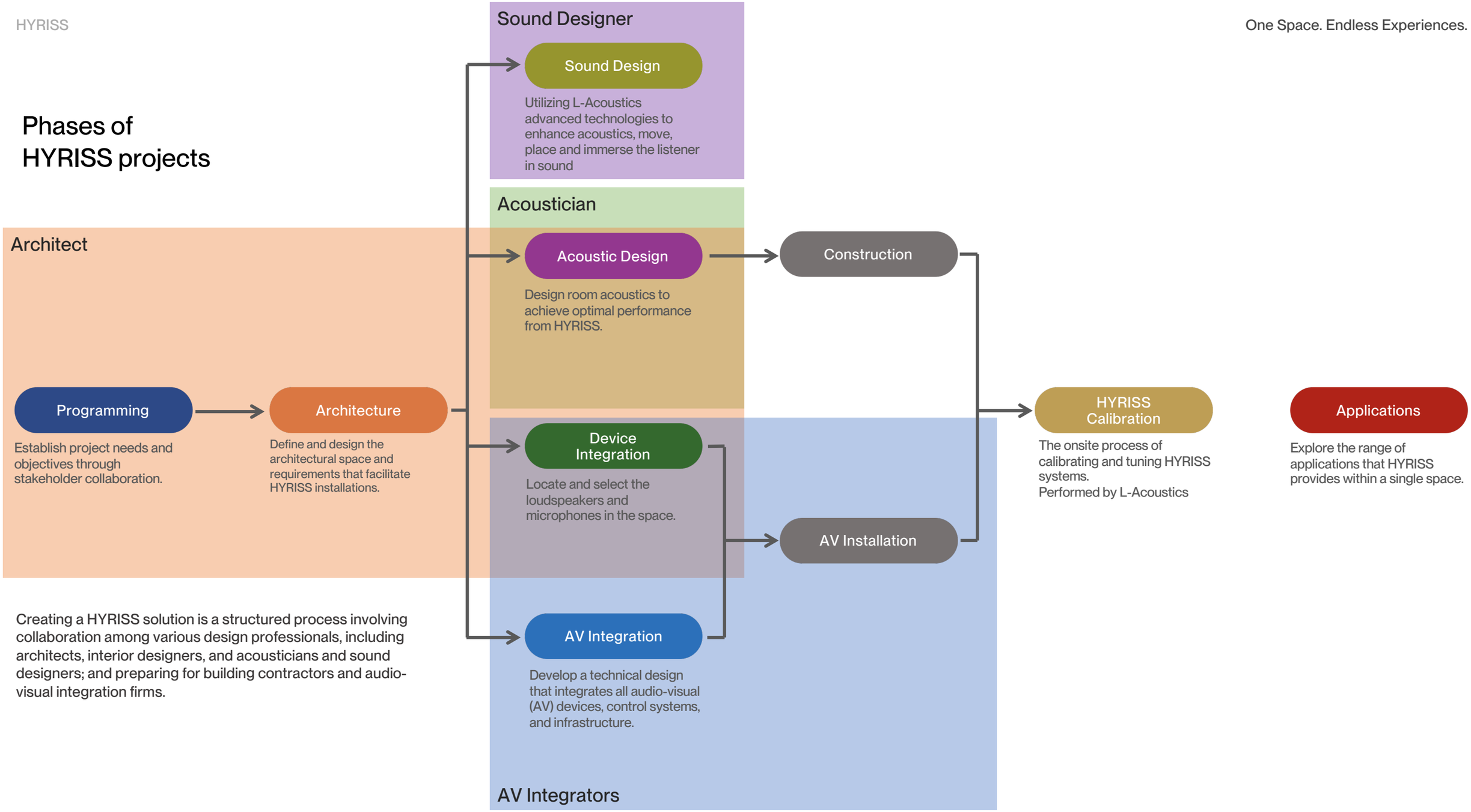
Architecture

Acoustics


Audio-Visual Integration


Building

Phases of HYRISS projects



Creating a HYRISS solution is a structured process involving collaboration among various design professionals, including architects, interior designers, and acousticians and sound designers; and preparing for building contractors and audio-visual integration firms.

Programming

Introduction to Programming

The HYRISS project programming process mirrors architectural programming, serving as the foundational step to define and understand the needs, objectives, and constraints of a project before design begins.

HYRISS stands out as a highly adaptable solution for sound, acoustics, and soundscaping. Its flexibility enables it to respond effectively to unforeseen or unplanned needs. While thorough planning remains essential, stakeholders can trust that HYRISS will accommodate future requirements.

HYRISS programming emphasizes collaboration with stakeholders to identify priorities and challenges. This process culminates in a program document that details spatial needs, application preferences, technical specifications, and budgetary constraints. By addressing these elements early, programming minimizes design revisions and ensures a thoughtful and efficient project trajectory.

HYRISS
Programming

Clarify the functional, performance, and technical requirements for HYRISS:

Desired Functions:

- Relaxed Listening: This includes passive listening to music and curated soundscapes for meditation or relaxation.
- Viewing: Will the user want to watch films, videos, or other visual content? Should this be in one location or multiple? What sound-for-picture formats need to be considered?
- Acting: This involves live performances or presentations by the user.
- Gaming: Will gaming occur in the space, and at what scale? Do users want to game collaboratively?
- Deep Listening: Focused listening to music and other content, aiming to emulate the experience of a recording studio or live concert.
- Live Performing: Accommodating live music performances, from a child's violin practice to ensembles of acoustic and amplified music. Identifying the range of performances.
- DJ and Club-like Usage: Does the stakeholder wish to recreate a nightclub atmosphere?

Additional Programmatic Questions:

- Determine if the client prefers the hardware and acoustic treatment to be concealed.
- Understand the emotional journey the user wishes to create.
- Integrate the sound programmatic requirements into the overall architectural programming.

HYRISS offers flexibility beyond initial programming, allowing for the accommodation of missed functions and evolving user needs within the space.

Performance Goals of HYRISS Systems

All HYRISS systems offer flexibility in both function and performance, but they are classified into two categories based on their target peak performance. This classification relates to the maximum volume and frequency response of the system, ensuring coverage across the range of human hearing.

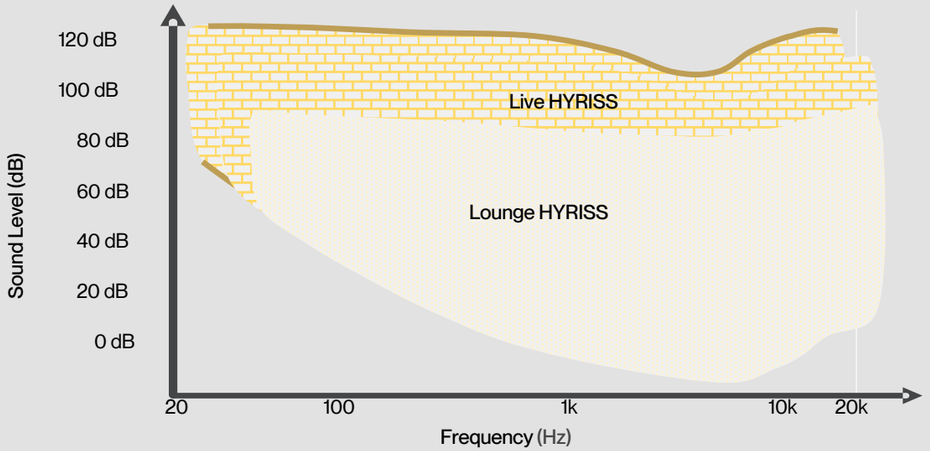
Lounge HYRISS: This category provides optimal sound volume and frequency response for various applications, including:

- Relaxed Listening
- Television and Video Viewing
- Acting
- Gaming
- Target SPL: At least 99 dBA

Live HYRISS: Designed for maximum sonic performance, this category achieves sound volumes that reach the upper limits of human hearing and offers an extended frequency response that includes the lowest audible frequencies.

Live HYRISS incorporates all the performance goals of Lounge HYRISS and adds capabilities for:

- Cinema and Film Viewing
- Deep Listening
- Extreme Gaming
- Live Music Performances
- DJing in Clubs
- Target SPL: At least 105 dBA



HYRISS Budgeting

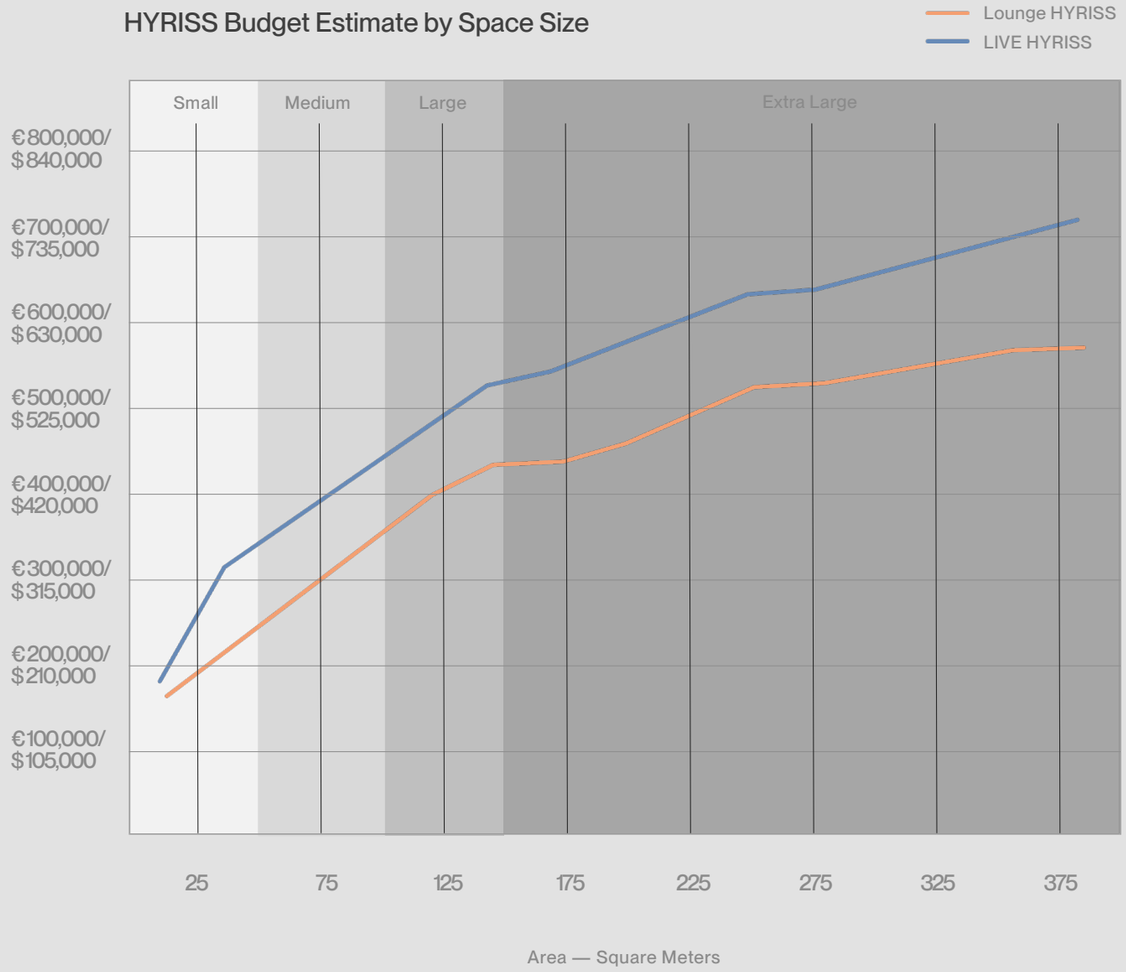
HYRISS is a bespoke Audio-Visual solution, with no two implementations are the same. However, early budgeting is feasible using this guide by applying a cost per square meter for either of the two HYRISS performance categories.

Note that this is an estimate. Variables in room shape and ceiling height will affect the design and the budget. Additionally, this estimate applies only to L-Acoustics supplied products and services. The Audio-Visual designer must account for additional costs, including budgeting for necessary third-party devices and integration.

HYRISS Sizes

To simplify the design process and loudspeaker selection, we classify HYRISS solutions into four sizes based on the area of the space they are designed for. Utilize the table below to fit your project into these general size classifications.

Small	25m² - 50m²
Medium	50m² - 100m²
Large	100m² - 150m²
Extra Large	150m² - 500m²



Architecture

Architecture and HYRISS

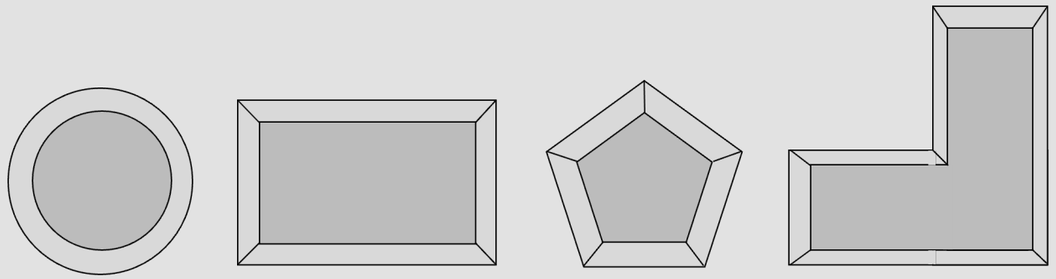
HYRISS is a versatile and highly adaptable solution for sound, acoustics, and soundscaping. It is suitable for a wide range of environments, from homes to retail, hospitality, corporate, educational spaces, or any area where flexible and dynamic sound environments are needed.

Architects, following this guide, can design and specify spaces optimized for sound and hearing with little need for outside guidance.

HYRISS can be implemented in spaces ranging from small rooms to large areas up to 500 m². It accommodates simple and complex room geometries, from standard rectangular layouts to curved and intricate shapes. Architectural features such as windows and unique design elements are seamlessly integrated into the system.

HYRISS may be designed for interior and exterior spaces — though certain acoustic aspects of the solution are limited outdoors.

Spaces up to 500 m2
can be design with HYRISS



Wide variety of room shapes
can be accommodated by HYRISS

Integrate HYRISS Devices in Harmony with Architecture

Architects and interior designers have a wide range of possibilities to either conceal or celebrate the prominent features of HYRISS and acoustic treatments. This thoughtful integration not only enhances the aesthetic appeal of the space but also ensures optimal audio performance.

Key Strategies for Integration:

- Acoustically Transparent Fabric: Utilize specialized fabrics that allow sound to pass through while concealing devices behind them, applicable to walls, ceilings, or decorative panels.
- Architectural Millwork: Use millwork or architectural features to house loudspeakers and microphones, covering them with acoustically transparent materials that match the surrounding decor.
- Artwork and Murals: Create custom artwork or murals that serve as acoustic panels, hiding devices while enhancing the visual appeal of the space.
- Equipment: HYRISS processing, control and amplifying equipment may be located remotely in appropriately conditioned closets, equipment rooms, or mechanical spaces.
- L-Acoustics loudspeakers are engineered with hardware that allows for installation within walls and ceilings, offering flexible mounting options that integrate smoothly with the architecture.

Sound Isolation

The soundscape begins with creating silence—a quiet environment that we rarely experience. This foundation allows the design of a soundscape tailored to everything we do. Silence serves as the blank canvas for soundscaping and is achieved through effective sound isolation.

Creating effective sound isolation in buildings begins with understanding the paths through which sound travels. Sound can move through air (airborne sound) and materials (structure-borne sound), requiring strategic approaches to block or dampen these transmissions. Attention to construction techniques is equally important. Floors, ceilings, and walls should be designed with layered assemblies that include insulation and sound-damping layers. Floating floors, resilient channels, and acoustic clips can reduce structure-borne sound by isolating surfaces. Pay close attention to joints, as improper sealing can negate the benefits of even the best materials. For spaces located in noisy environments, such as urban areas, additional measures like vibration isolation pads or double-wall constructions can further enhance sound isolation.

Key construction techniques and materials for sound isolation include:

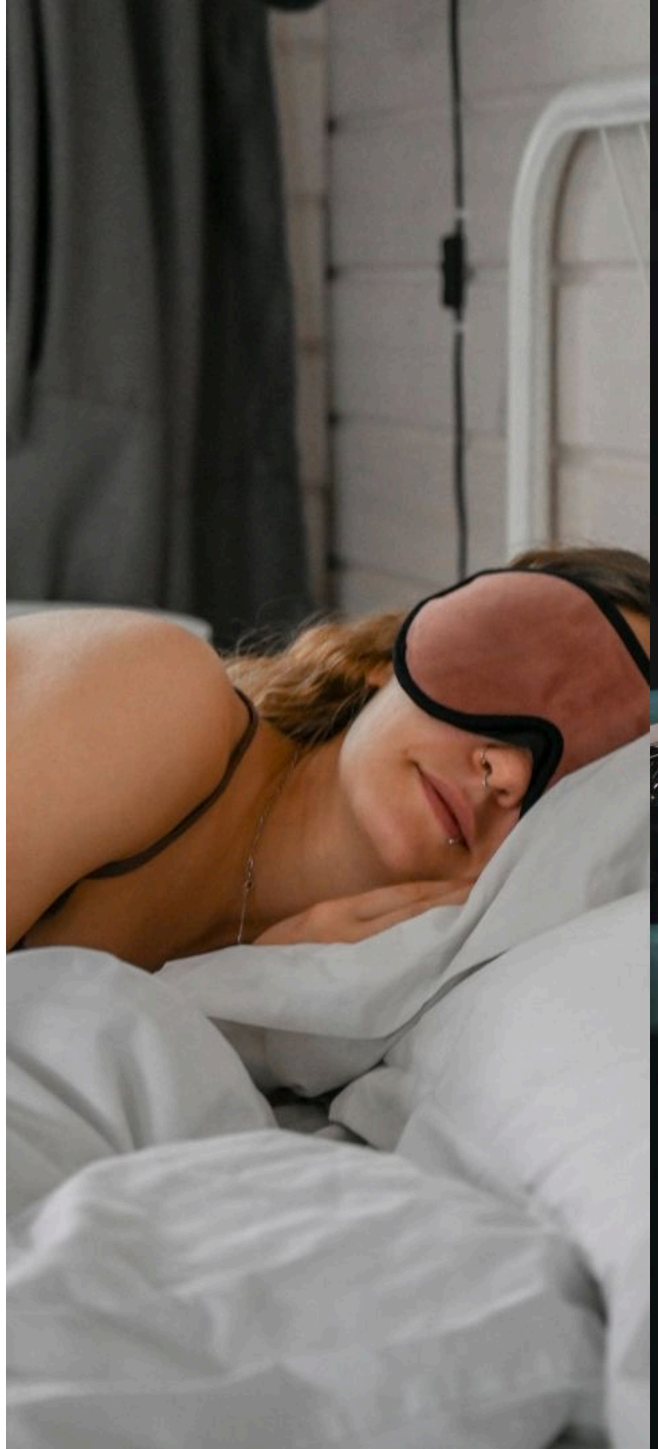
Dense materials to block low frequencies:

- Brick
- Concrete
- Cement
- Stone

Decoupling techniques, such as constructing a "room within a room," help minimize sound transmission. The use of resilient materials, such as drywall or resilient isolators and channels, reduces structure-borne sound transmission.

Loudspeaker isolation, achieved through specialized mounts, to reduce vibration transfer and sound leakage to adjacent spaces.

Targets: Spaces optimized for HYRISS should have a low internal noise level (NR25 or NC23)



Acoustics

Architectural Acoustics

The architectural designer has control over a room's acoustics by managing sound isolation and reverberation to suit the intended experience. The consultation of an acoustician will help achieve the desired acoustic performance for the space.

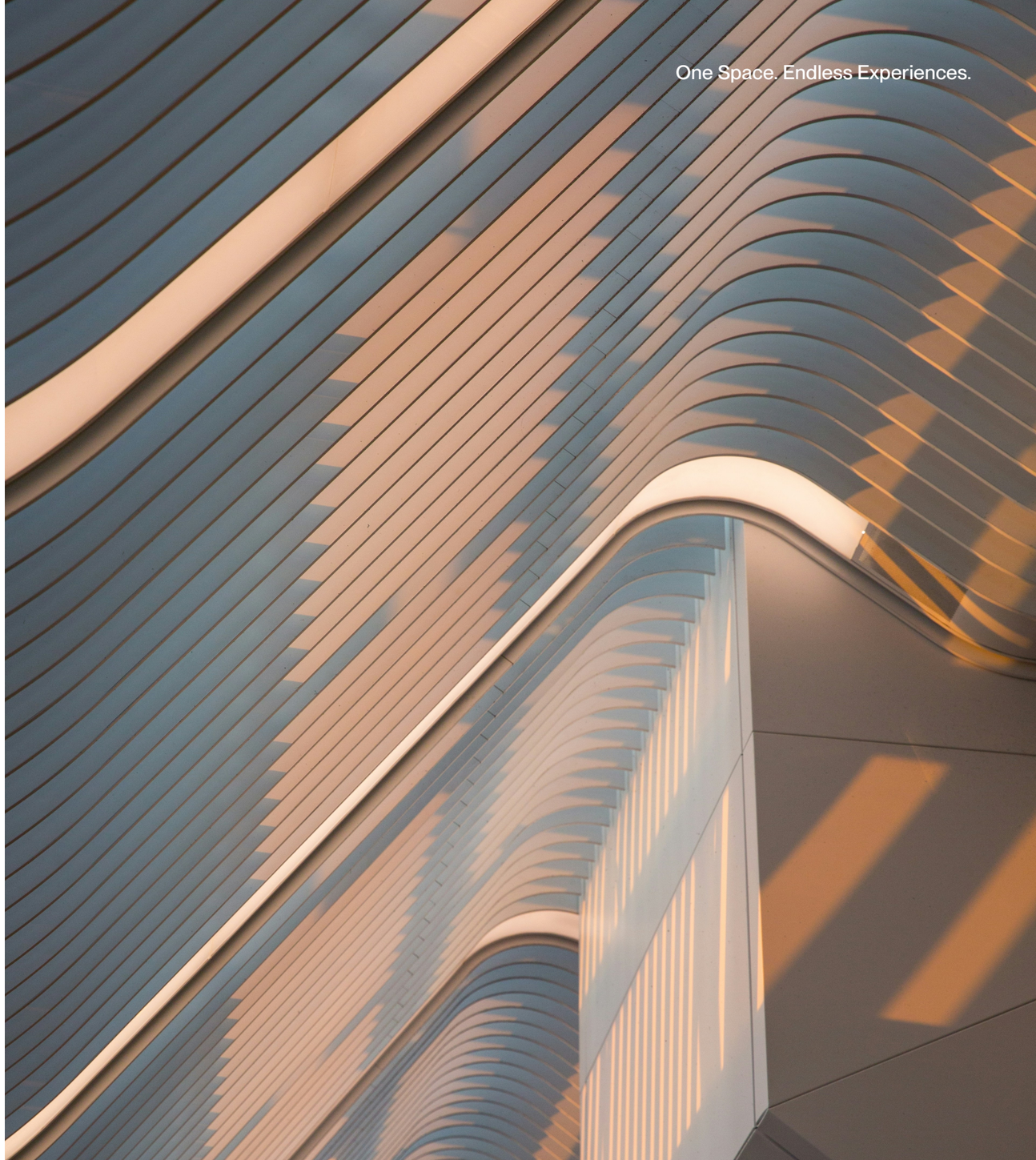
HYRISS, incorporates technologies to enhance acoustical reflections and reverberation that are tailored to increase engagement—whether by recreating the energy of a stadium for watching sports or mimicking the grandeur of a concert hall to support music performances and instruments. Acoustics profoundly influence how we interact, enabling voices to carry clearly across a room or remain close and intimate.

Architectural acoustics encompass two key areas:

Sound Isolation – Preventing sound transmission between spaces.

Room Acoustics – Optimizing the internal sound quality of a space to suit its function. This includes managing:

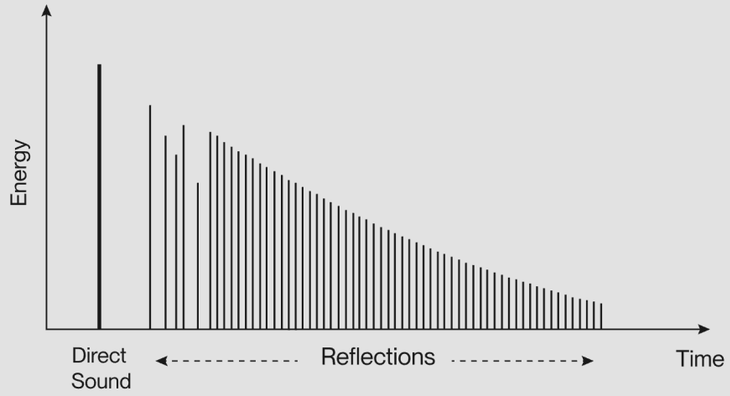
- Acoustic reflections, such as early reflections and reverberation.
- Negative acoustic characteristics, like flutter echoes, modal effects in low frequencies, and unwanted reverberation, which can impact sound clarity and naturalness.



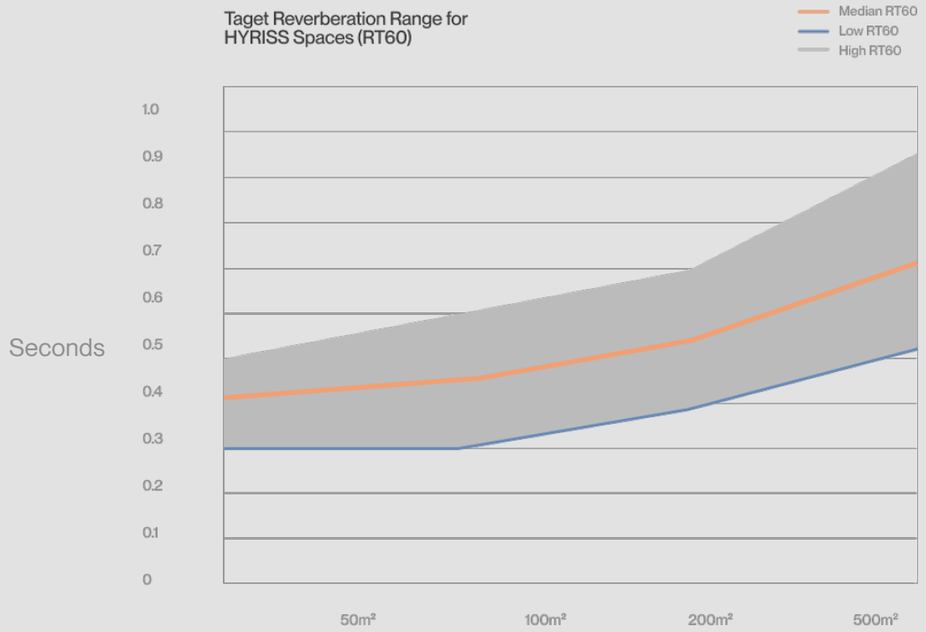
Room Acoustics Reverberation

Room acoustics refers to how sound behaves within a space, influenced by factors like room size, shape, and surface materials. A key metric is RT60 — the time it takes for sound to decay by 60 decibels after a source stops — which determines the room's reverberation characteristics. To maximize HYRISS's performance—both in sound playback and its unique ability to enhance a room's acoustics for specific functions—the room's physical acoustics should be carefully optimized.

Lowering the room's reverberation time is necessary to ensure clarity, control, and adaptability for various uses. The target reverberation for HYRISS spaces is a function of the room's size. Smaller spaces will be less reverberant than large spaces. The lower graph indicates the optimal range of reverberation for a given space as measured by floor area.



A sound begins with the direct sound coming from the source followed by the acoustic reflections that follow



How to Control Reverberation

HYRISS benefits from spaces with lower reverberation. Controlling reverberation in a room involves using materials and techniques that absorb sound, preventing excessive acoustic reflections and improving clarity.

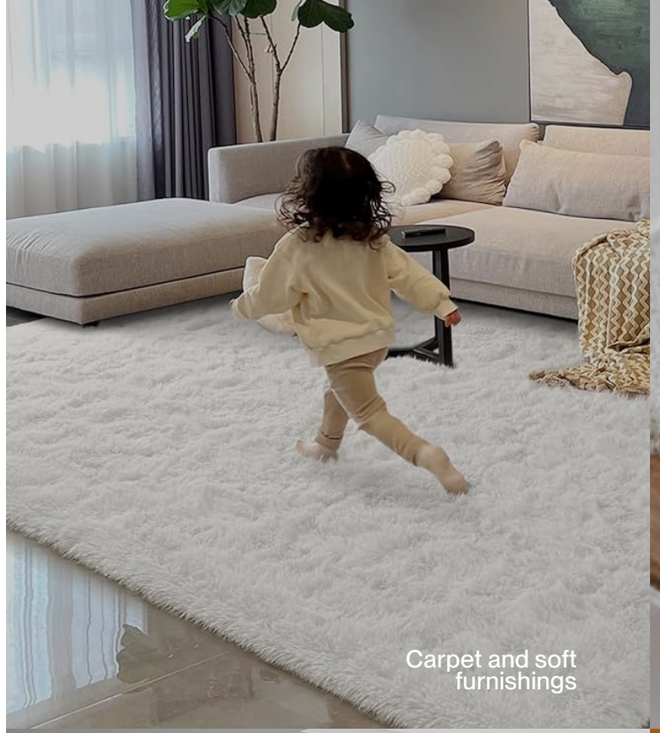
Acoustic panels are a solution, typically made from compressed fiberglass, reused cellulose, wool, rockwool, or recycled cotton. These materials effectively absorb sound across a range of frequencies and can be fabric-wrapped for aesthetic customization, blending seamlessly into various design styles.

Another effective option is acoustic plaster, which is a specialized acoustical transparent plaster applied over acoustically absorptive materials to create a smooth finish while maintaining sound-absorbing properties. This method is ideal for spaces requiring both functionality and a refined appearance.

Additionally, perforated materials such as micro-perforated or large-perforated wood and metal panels offer a combination of sound absorption and visual appeal. These products use strategically designed perforations to allow sound waves to pass through and be absorbed by an underlying layer, reducing reverberation without sacrificing design flexibility.

Carpeting and soft furnishings also reduce reverberation.

For optimal results, distribute these materials throughout the space. Focus on walls, ceilings, and other reflective surfaces to address key problem areas. Combining different materials and techniques can create a balanced acoustic environment tailored to the room's specific needs and intended uses.



Carpet and soft furnishings

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Acoustic plaster systems

Fabric wrapped acoustic absorption panels

Perforated acoustic wood paneling

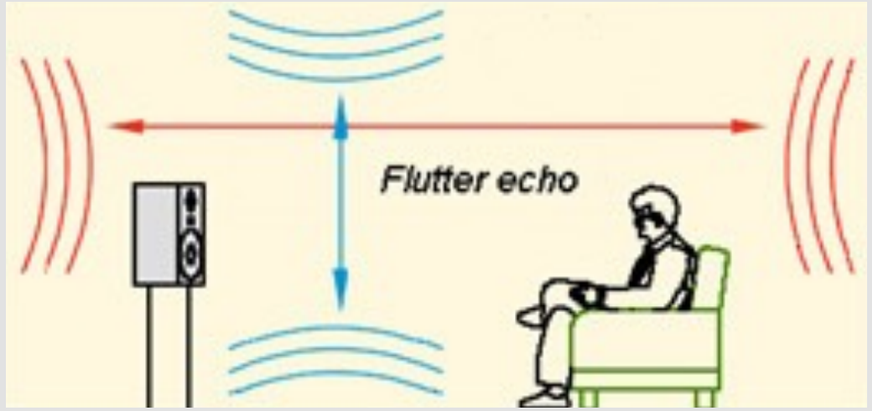
Acoustic Flutter

Acoustic flutter is a disruptive phenomenon that occurs when sound waves reflect off parallel surfaces, creating rapid echoes that can muddle audio clarity. This effect is particularly prevalent in spaces with hard, flat surfaces. Flutter echoes can mask important sounds and diminish intelligibility, making it difficult for listeners to fully engage with the audio content.

To identify the sources of acoustic flutter, one effective approach is to conduct a listening test in the space. By clapping hands or using a sound source, you can pinpoint areas where echoes are most pronounced. Observing the room's geometry is also crucial; look for parallel walls, flat ceilings, and hard surfaces that may contribute to flutter. Once the sources are identified, targeted diffusion strategies can be implemented to address the specific areas causing issues.

Various diffusion techniques can be employed to mitigate acoustic flutter. For instance, bookshelves filled with books can act as effective diffusers, scattering sound waves in multiple directions. Similarly, coffered ceilings—which feature recessed panels—can disrupt parallel reflections and enhance the acoustic quality of a room. Wall faceting, where surfaces are angled or irregularly shaped, also helps to break up sound waves and reduce flutter.

Additionally, commercially available diffusion panels, designed specifically for this purpose, can be strategically placed in a space to further enhance sound distribution.



Acoustic flutter caused by parallel surfaces

Methods of acoustic diffusion

Diffusion panel

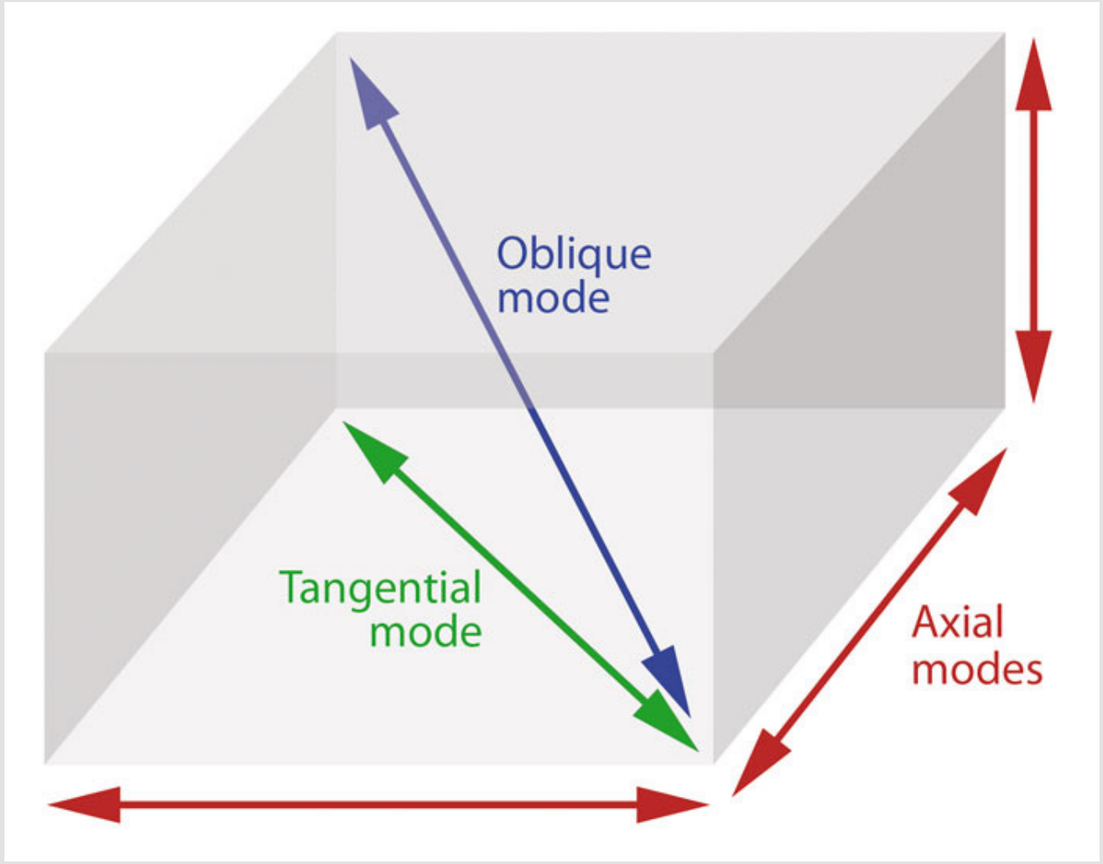
Coffered ceiling

Bookshelves and millwork

Low Frequency Acoustic Control

Low frequencies in room acoustics present significant challenges, especially in smaller spaces. One major issue is the occurrence of room modes, which arise when sound waves resonate at specific frequencies determined by the room's dimensions. These modes lead to certain frequencies being overly pronounced while others are diminished. This imbalance affects the clarity of music and speech and detracts from the overall listening experience.

To combat these challenges, L-Acoustics utilizes an advanced technology minimizing the need for the physical acoustic approaches discussed above. This technology allows for greater flexibility in sound design.



Device Locations

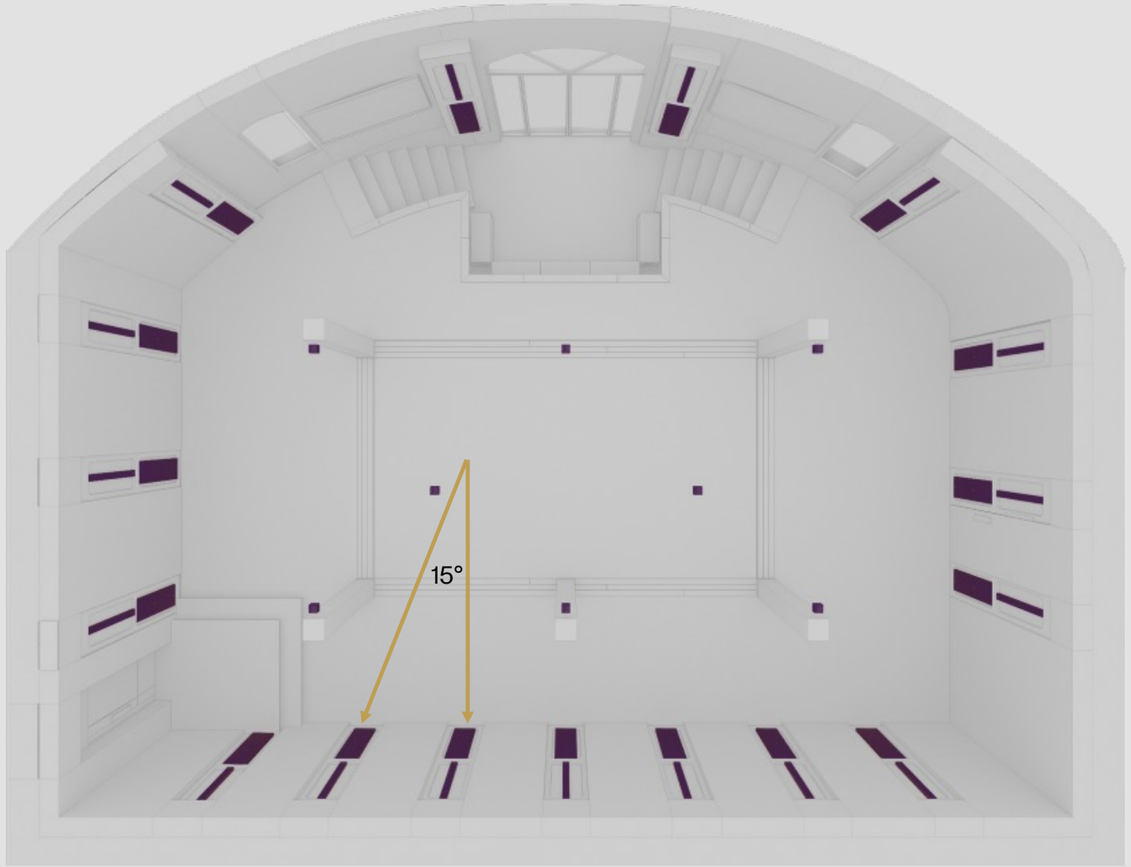
Spatial Resolution Theory

HYRISS is designed to create an immersive auditory experience that enhances the listener's connection to sound. Immersion in sound is crucial for engaging audiences, whether in deep music listening, live performances, cinematic experiences or realistic soundscapes. Effective sound localization—our ability to determine the direction and distance of sound sources—plays a vital role in this experience.

The mechanisms the brain uses for localization differ between horizontal and vertical planes, with a maximum acceptable error of less than 7.5° in the horizontal plane and up to 30° in the vertical plane. This variance highlights the importance of spatial resolution in creating immersive soundscapes that feel natural and believable.

Given the larger listening area in a HYRISS solution compared to traditional stereo or cinema surround systems, we often refer to an average spatial resolution. This capability not only enhances the auditory experience but also ensures reproducibility across the entire listening area.

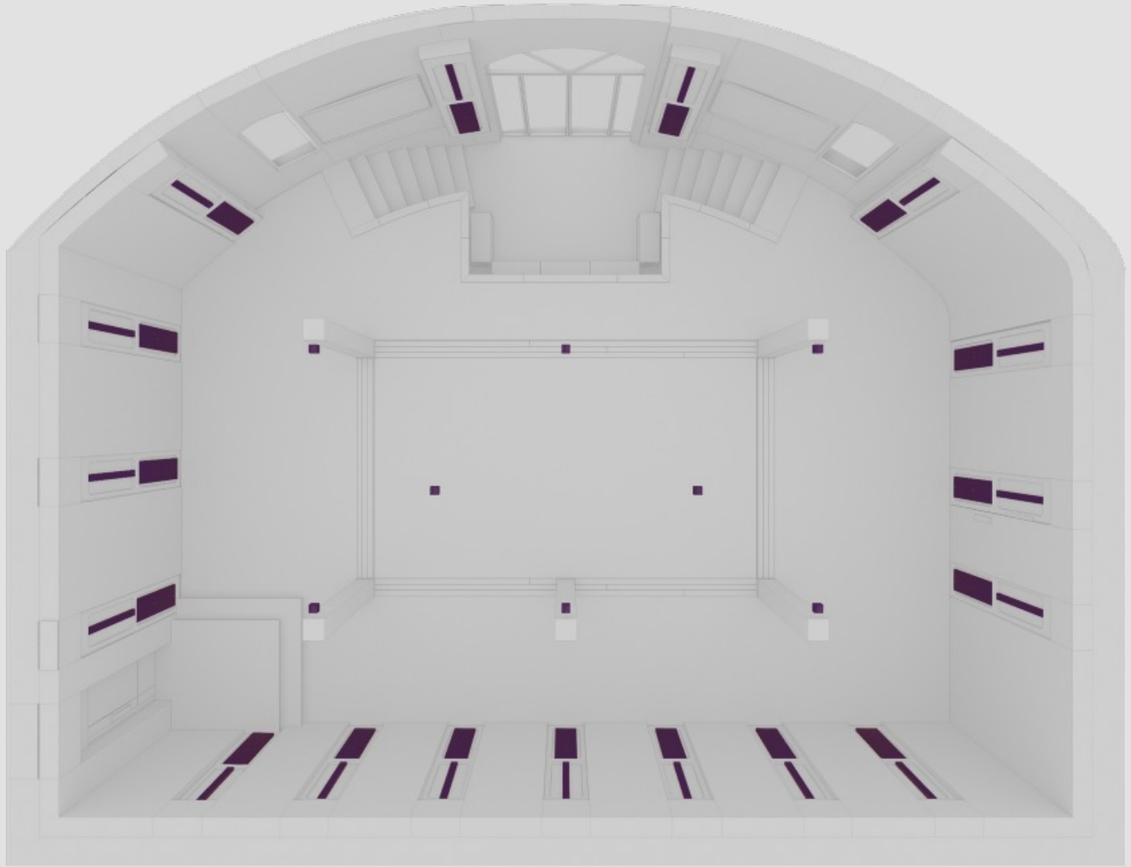
In the context of HYRISS loudspeakers, optimal spatial resolution is achieved with main speakers providing a precision of 15°. With a proprietary phantom image algorithm, it is possible to reach an impressive target of 7.5°. Exceptions to this rule occur when accommodating windows and other architectural obstacles. Overhead speakers, on the other hand, maintain a resolution of 30°.



Design Flexible Spaces with HYRISS

To create the most flexible audio environment, HYRISS designs surround the entire space. The system allows for some flexibility in loudspeaker design to accommodate architectural elements. Here's how to effectively surround the space with loudspeakers:

- **Select a Reference Point:** Start mapping from a chosen reference point on the walls, such as the center of a long side or the cinema center.
- **Determine Loudspeaker Placement:** Choose the distance between each full-range loudspeaker, ranging from 1.5 m to 2.5 m, depending on the size of the space, with large spaces using the larger separation distance.
- **High-Frequency Driver Elevation:** Position the loudspeaker's high-frequency drivers at an elevation of 1.5 m to 2 m above the finished floor.
- **Adapt to Architecture:** Adjust the exact positions of the loudspeakers to fit the architectural features of the space such as windows and doors.
- **Optional Speaker Placement:** Consider placing a loudspeaker under or above the centerline of each screen for optimal cinema sound.
- **Select Loudspeaker Type:** Determine the type of speakers based on the HYRISS grade and the size of the space. (refer to chart later in this document)
- **Front Wall Configuration:** Ensure that one wall has a minimum of five speakers on the front wall to maintain compatibility with L-Acoustics L-ISA playback technology.

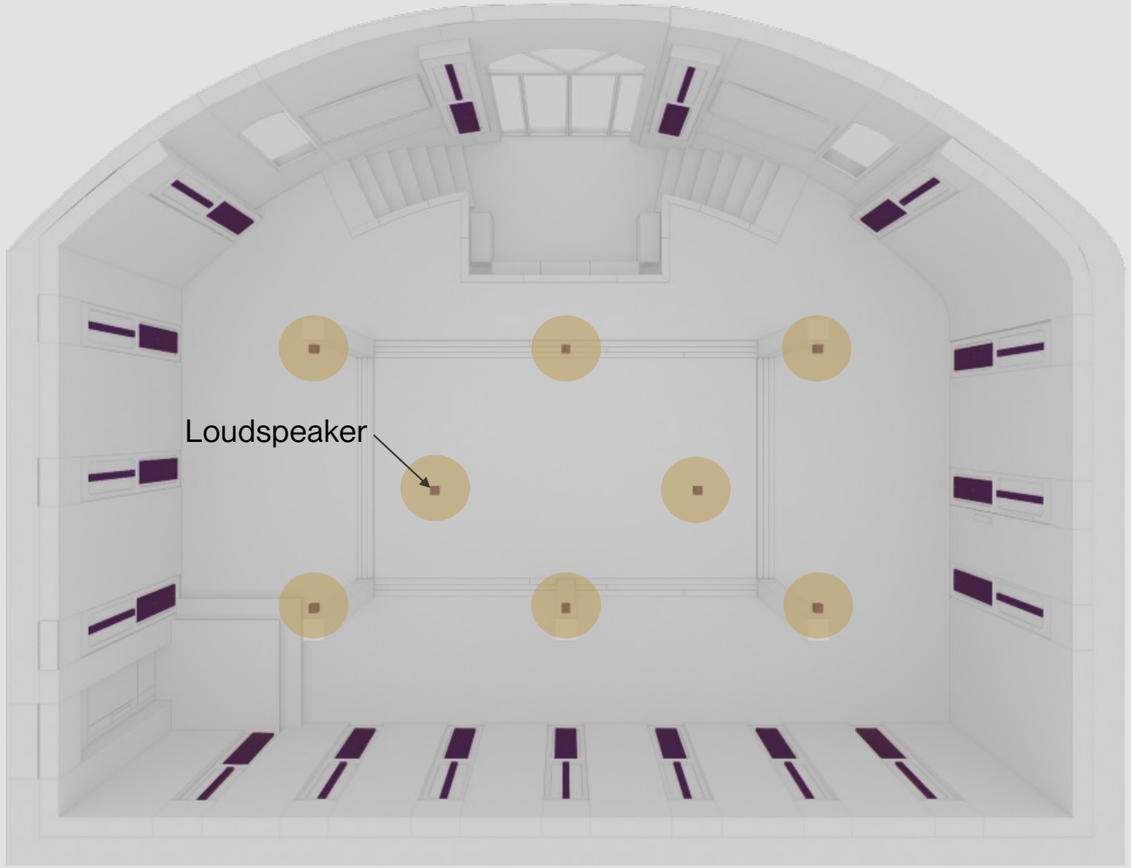


Overhead Loudspeaker Requirements for HYRISS

HYRISS designs require overhead loudspeakers. However, since human hearing has better horizontal resolution than vertical, fewer overhead loudspeakers are needed.

Key Requirements for Overhead Loudspeakers:

- **Even Distribution:** Ensure that the loudspeakers are distributed evenly throughout the space.
- **Space and Ceiling Height Considerations:** The exact number of loudspeakers depends on the size of the space and the height of the ceiling. Higher ceilings require fewer loudspeakers for a given ceiling area than lower ceilings because the angular distance between the loudspeakers at the listener's point of reference is what matters.
- **Starting Point for Placement:** For ceiling heights below approximately 3 m, a good starting point is one speaker per 3 m².
- **Avoid Wall Projection:** Ensure that the nominal directivity pattern of the loudspeaker does not project onto the walls. Keep the loudspeakers positioned away from the walls.



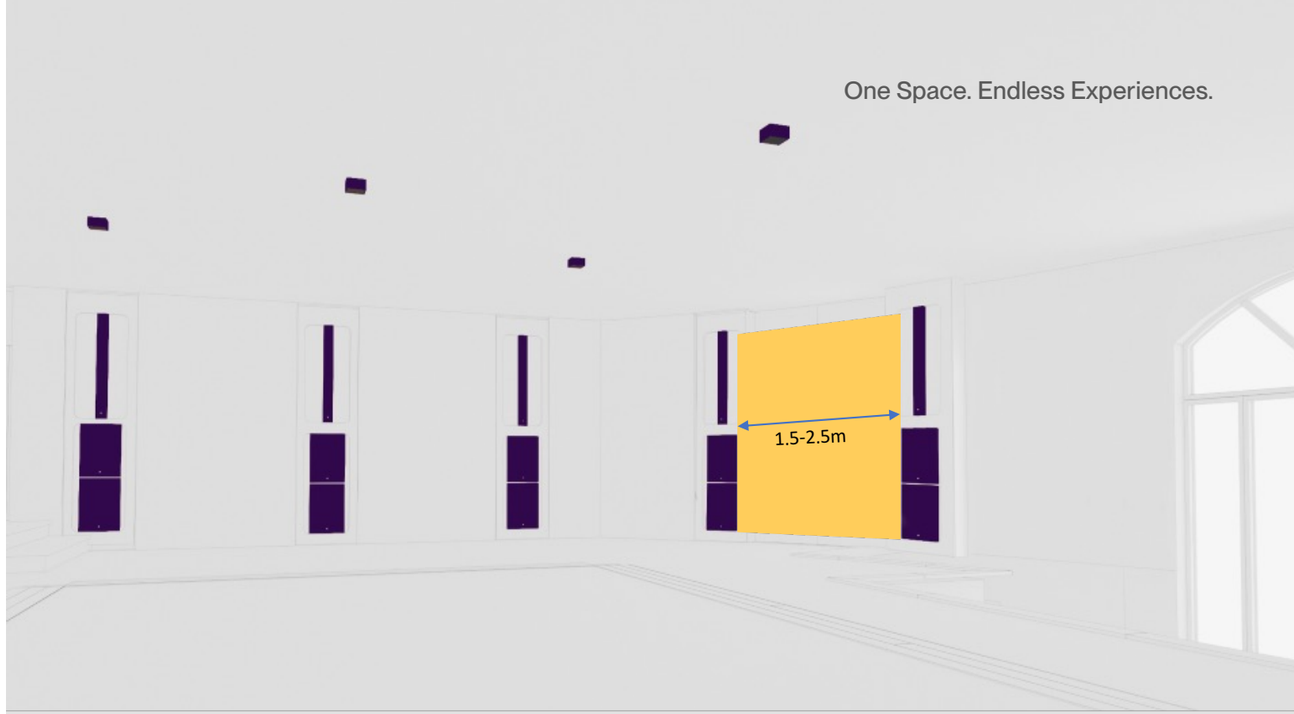
Flexibility in Loudspeaker Design with HYRISS

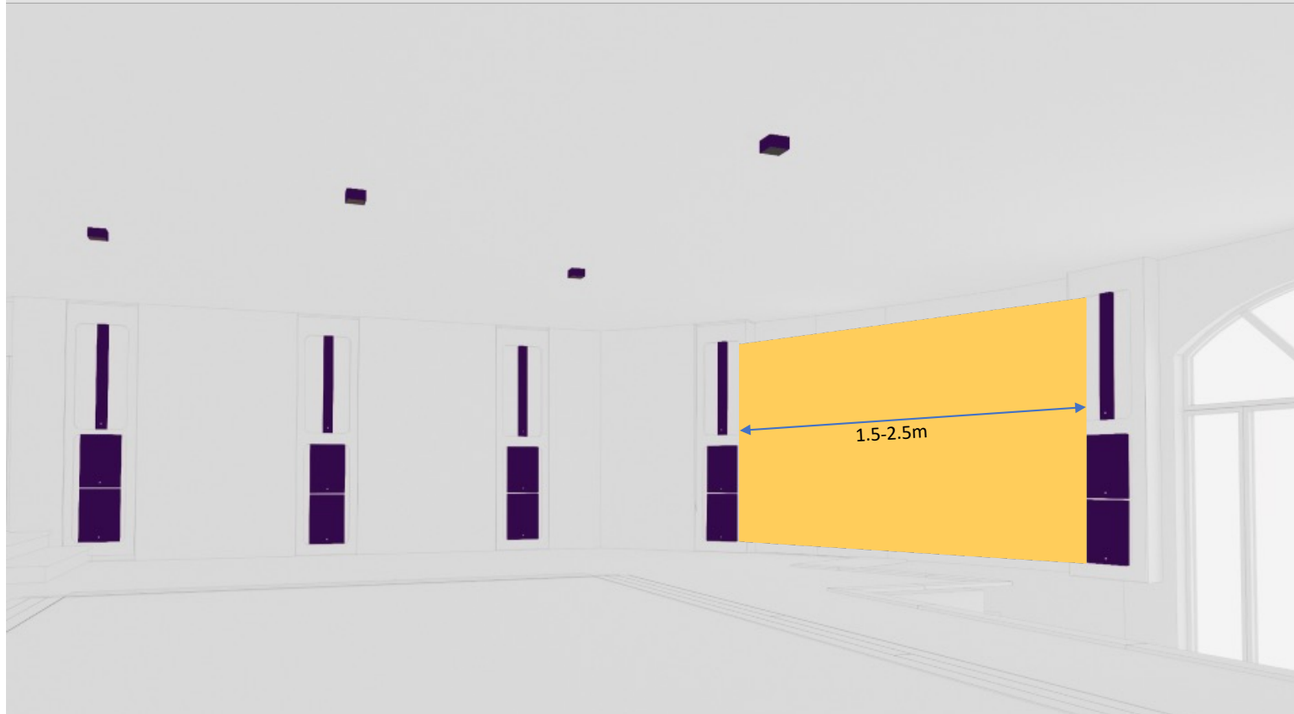
HYRISS offers flexibility in loudspeaker design, accommodating various architectural features such as windows, doors, millwork, and both direct-view and projection video screens.

Adjusting Loudspeaker Positions

If a loudspeaker (either main or overhead) cannot be positioned according to the regular spacing guidelines:

- **Relocate the Loudspeaker:** You can move the loudspeaker to a more suitable location.
- **Remove if Necessary:** If relocation isn't possible, you may need to remove the loudspeaker.
- **Maintain Distance:** When adjusting, ensure that the minimum spacing is at least 50% of the nominal spacing.
- **Reorganize for Efficiency:** Consider reorganizing the loudspeakers to minimize gaps in coverage.
- **Corner Placement:** Avoid placing loudspeakers in or close to a corner.



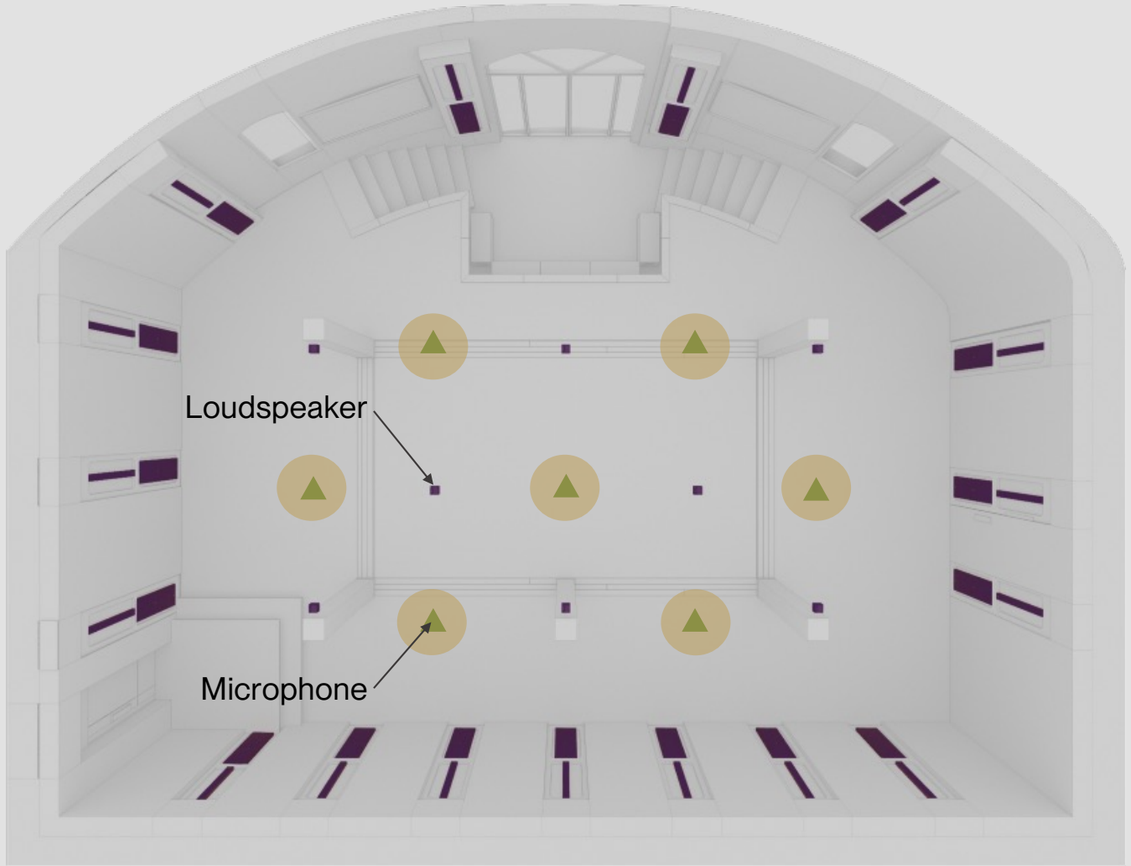


Microphone Placement
Enhancing Room Acoustics with HYRISS

A unique feature of HYRISS systems is the ability to enhance room acoustics for various applications within the space. This is achieved using L-Acoustics' Ambiance technology, which employs distributed microphones to capture sounds in the room, which are then processed to create appropriate acoustic enhancements through the space's loudspeakers.

Microphone Installation Guidelines

- **Number of Microphones:** Install between 8 and 32 microphones in the ceiling. Lower ceiling heights require a higher density and closer spacing of microphones compared to higher ceilings. A good starting point is one microphone for every 3 m² of the Ambiance zone for ceiling heights below approximately 3m.
- **Even Distribution:** Ensure that microphones are distributed evenly throughout the space.
- **Maximize distance to loudspeakers**: Ensure microphones are located as far from each ceiling loudspeaker as possible.
- **Avoid Noise Sources:** Do not place microphones near noise sources such as ventilation systems, video projectors, or other machinery.
- **Microphone Types:** Use either Schoeps CCM 4 or Audix SCX10 (a more cost-effective option), both with an equivalent noise level of less than 20 dB(A).
- **Processor Connection:** All microphones should be connected to L-Acoustics P1 processors.
- **Design Support:** Collaborate with an L-Acoustics designer or a qualified acoustician for optimal design.



Loudspeaker Selection

Once the locations and performance criteria of the loudspeakers have been determined, a loudspeaker selection is needed. The project will define the requirements during the programming phases. In this section, we will explore the various factors to consider when selecting loudspeakers.

HYRISS systems can be classified into four general sizes and two performance categories. This classification is helpful in determining the appropriate types of loudspeakers required for each application.

HYRISS Performance Categories

- **Lounge HYRISS:** This category provides optimal sound volume and frequency response for various applications with a target SPL of at least 99 dBA
- **Live HYRISS:** Designed for maximum sonic performance, with a target SPL of at least 105 dBA. This category achieves sound volumes that reach the upper limits of human hearing and offers an extended frequency response that includes the lowest audible frequencies.

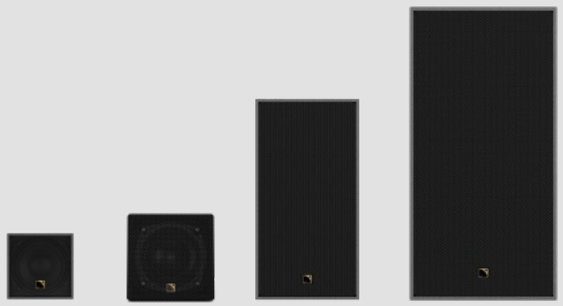
HYRISS Sizes

To simplify the design process and loudspeaker selection, we classify HYRISS solutions into four sizes based on the area of the space they are designed for.

Small	25m² - 50m²
Medium	50m² - 100m²
Large	100m² - 150m²
Extra Large	150m² - 500m²

Space Size	Category	Main Loudspeaker	Extra Subwoofer	Overhead Loudspeakers
S (25m² - 50m²)	Lounge	X4r + SB6r	SB10r	X4r
	Live	X8i + Sb10r	—	X4r
M (50m² - 100m²)	Lounge	Soka + Sb10r	—	X4r
	Live	Soka + (2)Sb10r	—	5XT
L (100m² - 150m²)	Lounge	Soka + Sb10r	—	X4r
	Live	Soka + (2)Sb10r	—	5XT
XL (150m² - 500m²)	Lounge	Soka + (2)Sb10r	—	X6i
	Live	Syva + Syva Low	Syva Sub	X6i

Full Range Axisymmetric / Point Source



X4i 5XT X6i X8i

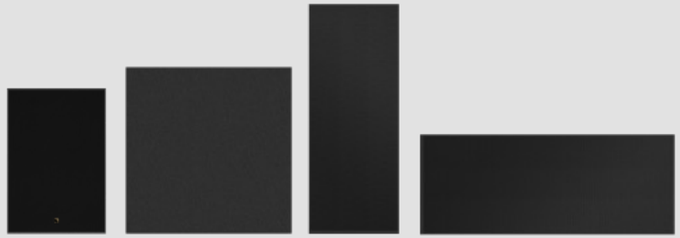
- Wide 110° Coaxial directivity
- For listening distance below 3 m
- Bandwidth up to 20 kHz
- Max peak SPL up to 129 dB per speaker

Full-Range Colinear Line Sources

Soka Syva

- Focused vertical directivity down to 26°
- Wide horizontal directivity up to 140°
- For listening distance exceeding 3 m
- Bandwidth up to 20 kHz
- Max peak SPL up to 137 dB per speaker

Subwoofers



Sb6i Sb10i Syva Low Syva Sub

- Reinforce the LF contour
- Auto Control LF
- Extend the bandwidth, down to 20 Hz
- Max peak SPL up to 129 dB per speaker

HYRISS Installation Examples

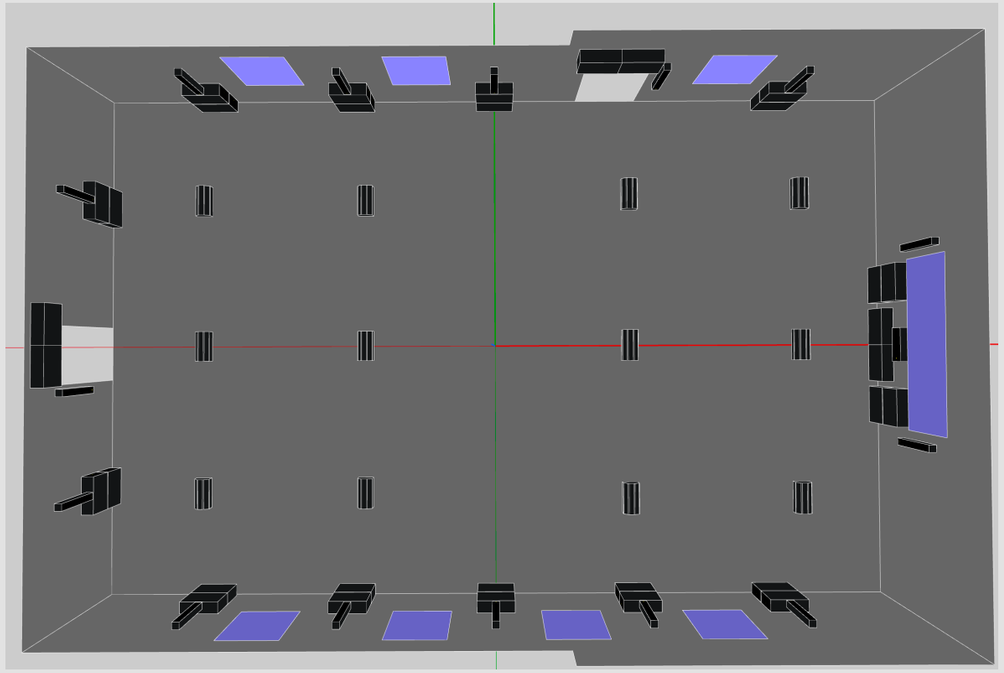
HYRISS is a tailored solution designed to deliver the optimal sonic experience across a diverse range of spaces. In the previous sections, we provided detailed guidance on the design and specifications necessary for creating effective HYRISS environments.

In this section, we present two illustrative examples of HYRISS installations. These examples showcase the strategic placement of devices and the integration of L-Acoustics equipment. While these installations serve as references, it's important to remember that each design will be unique to your specific space and requirements. Use these examples as a starting point to inspire your own customized solutions.

HYRISS Installation Example
Live Large

This installation is designed for a medium-sized space with a target performance classification of HYRISS Live. It supports a variety of applications, including cinema, music, gaming, deep listening, live music performances, and DJing in clubs, with a target sound pressure level (SPL) of at least 105 dBA.

To ensure an aesthetically pleasing environment, all acoustic absorptive materials, loudspeakers, and microphones are concealed behind acoustically transparent fabric.



HYRISS Installation Example
Live Large

Wiring

Recommended speaker cables 2 x 2.5 mm² (max length depends on speaker type)

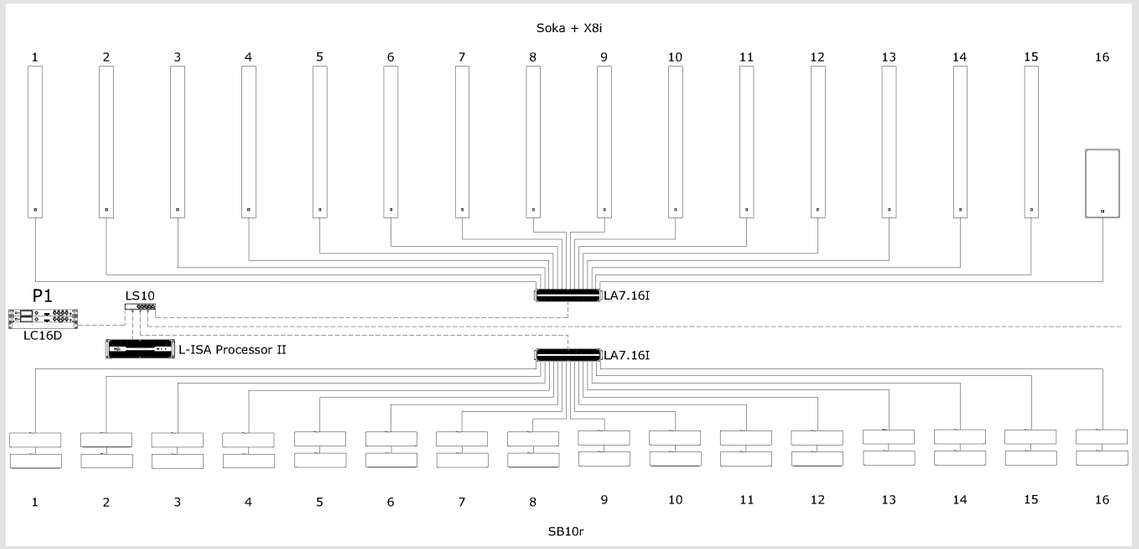
Recommended network cables CAT6A (max length = 100m)

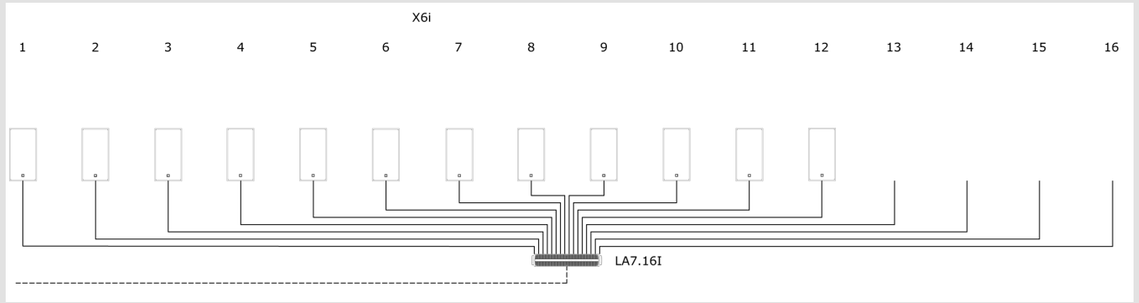
Speaker Connections

Screw terminal for X4r

Terminal block with push-in for SB10r and SB6r

Terminal block on LA7.16i





HYRISS Installation Example
Live Large

This table presents a list of all the L-Acoustics products necessary to implement this solution effectively. It's important to note that this example only includes third-party audio and video sources or control systems that integrate directly with HYRISS - displays, other systems and infrastructure are not included here.

This system is approximately €335,000

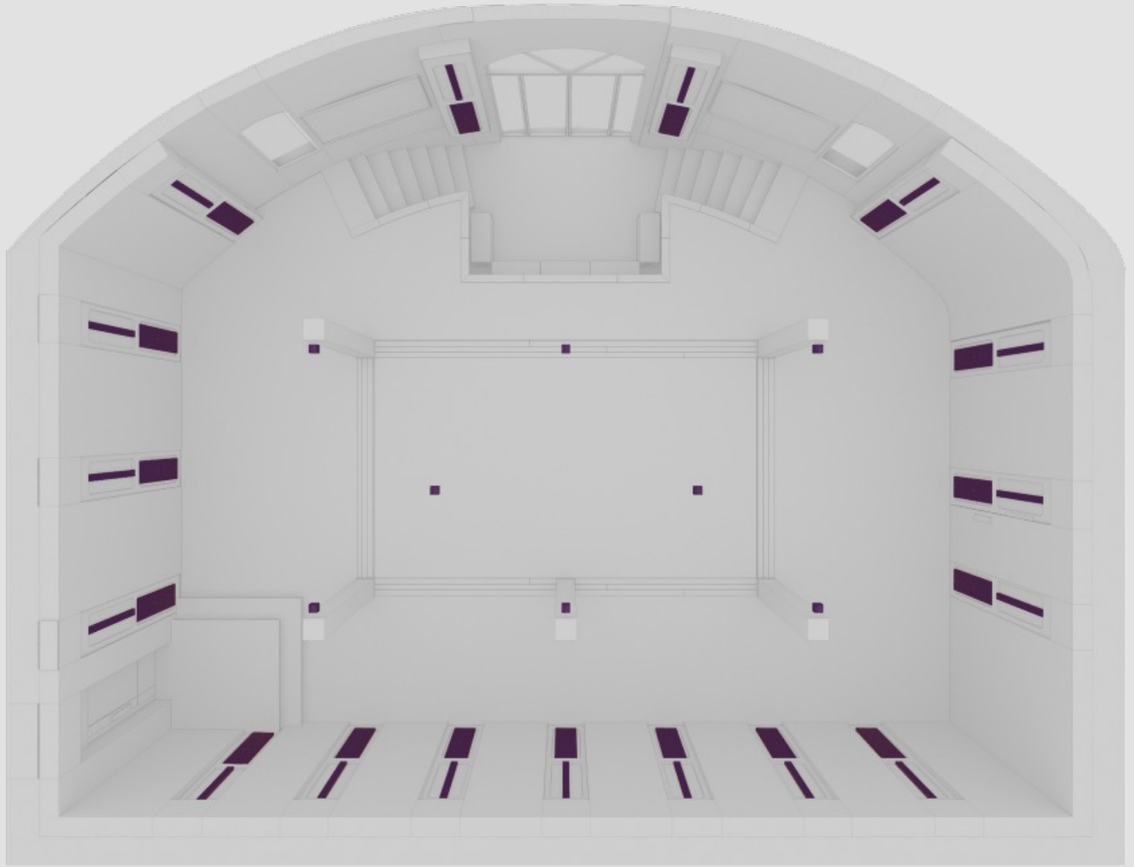
Excluding VAT – December 2024 – MSRP - L-Acoustics equipment only: not including 3rd party source devices,, 3rd party control system, microphones, cables and installation

	Quantity	Product	Application
L-Acoustics	15	Soka	Wall Loudspeaker
	1	X8i	Main Screen center Channel Loudspeaker
	32	SB10r	In-wall Subwoofers
	12	X6i (Ceiling)	Ceiling Loudspeaker
	3	LA7.16i	Amplified Controller
	1	L-ISA Processor II	Core Processor
	2	P1	Microphone Input Interface
	2	LC16D	Audio Format Converter
	5	LS10	AVB Network Swtich, Avnu-Certified
	1	L-ISA PLayer	Audio Playback
	1	Bubble Deck	Audio Playback Interface
3rd Party	8	Schoeps CMC6 + MK4	Microphone
	1	Q-SYS Core Nano	Control System Core
	1	Apple iPad	Control Interface
	1	Storm Audio ISP Elite Mk3 AES / EBU	Audio Visual Processor
	1	Kaleidescape Strato V	Movie Player / Server
	1	Bluesound Node	Streaming Music Player
	1	Rithum Switch Pro	Hard-wired System Controller
	1	Apple TV 4k	Media Player
	1	Cisco C1000-24P-4G-L	Network Switch
	1	Gude 8035	Power Distribution Unit

HYRISS Installation Example
Live Large

This installation is designed for a Large-sized space with a target performance classification of HYRISS Live. It supports a variety of applications, including cinema, music, gaming, deep listening, with a target sound pressure level (SPL) of at least 105 dBA.

To ensure an aesthetically pleasing environment, all acoustic absorptive materials, loudspeakers, and microphones are concealed behind acoustically transparent fabric.



HYRISS Installation Example
Live Large

Wiring

Recommended speaker cables 2 x 2.5 mm² (max length depends on speaker type)

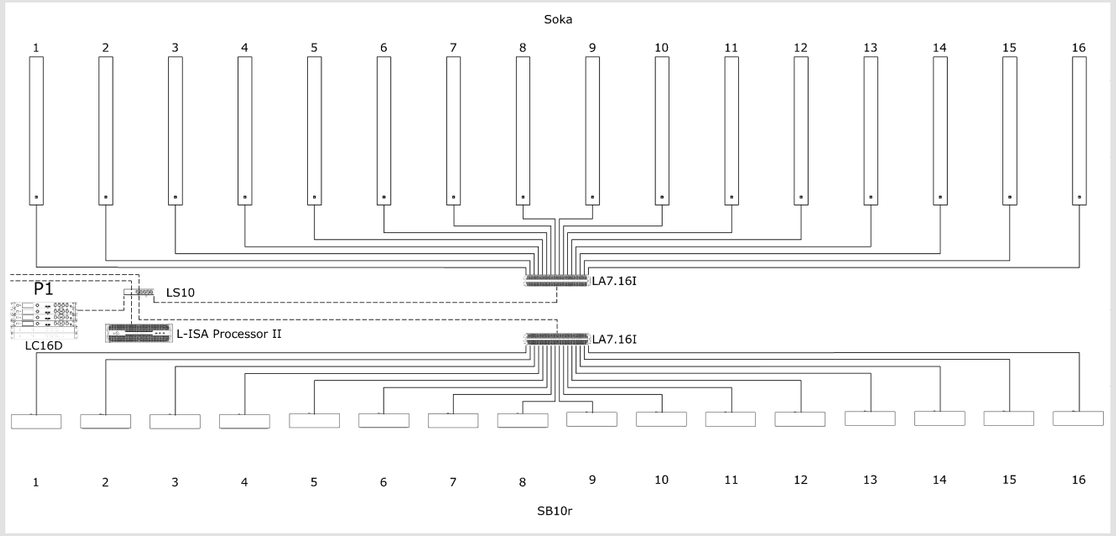
Recommended network cables CAT6A (max length = 100m)

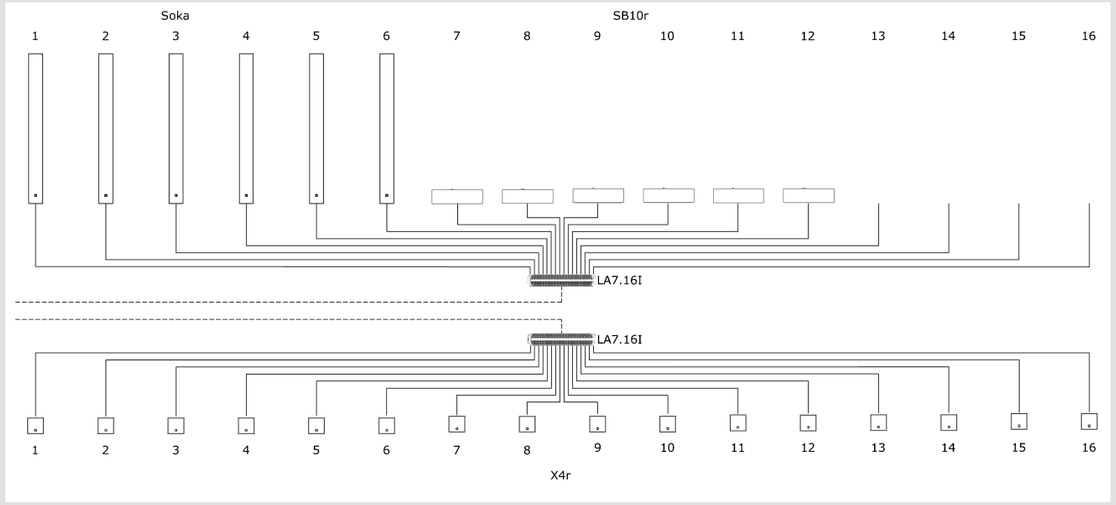
Speaker Connections

Screw terminal for X4r

Terminal block with push-in for SB10r and SB6r

Terminal block on LA7.16i





HYRISS Installation Example
Live Large

This table presents a list of all the L-Acoustics products necessary to implement this solution effectively. It's important to note that this example only includes third-party audio and video sources or control systems that integrate directly with HYRISS - displays, other systems and infrastructure are not included here.

This system is approximately €405,000

Excluding VAT – December 2024 – MSRP - L-Acoustics equipment only: not including 3rd party source devices,, 3rd party control system, microphones, cables and installation

	Quantity	Product	Application
L-Acoustics	18	Soka	Wall Loudspeaker
	36	SB6r	In-wall Subwoofers
	5	Syva Sub	Subwoofers
	8	X4i (Ceiling)	Ceiling Loudspeaker
	3	LA7.16i	Amplified Controller
	1	L-ISA Processor II	Core Processor
	2	P1	Microphone Input Interface
	2	LC16D	Audio Format Converter
	5	LS10	AVB Network Swtich, Avnu-Certified
	1	L-ISA PLayer	Audio Playback
	1	Bubble Deck	Audio Playback Interface
3rd Party	8	Microphone AKG C562 CM	Microphone
	1	Q-SYS Core Nano	Control System Core
	1	Apple iPad	Control Interface
	1	Storm Audio ISP Elite Mk3 AES / EBU	Audio Visual Processor
	1	Kaleidescape Strato V	Movie Player / Server
	1	Bluesound Node	Streaming Music Player
	1	Rithum Switch Pro	Hard-wired System Controller
	1	Apple TV 4k	Media Player
	1	Cisco C1000-24P-4G-L	Network Switch
	3	Gude 8035	Power Distribution Unit

Audio Visual Integration

Audio-Visual (AV) Integration

An independent audio-visual designer or a design-build integrator will craft the complete system, including upstream audio and video devices, as well as the control systems and infrastructure for signal transport and power.

3rd party AV devices and system design include:

- Video screen and projection
- Audio and video content and streaming sources
- Audio-Visual system signal control and management
- Audio-Visual control system and user interface

The Audio-Visual design shall design an integrated solution including these infrastructures:

- AVB-Milan
- AES
- network-based control infrastructure
- analog infrastructure
- Power systems

Control System Design

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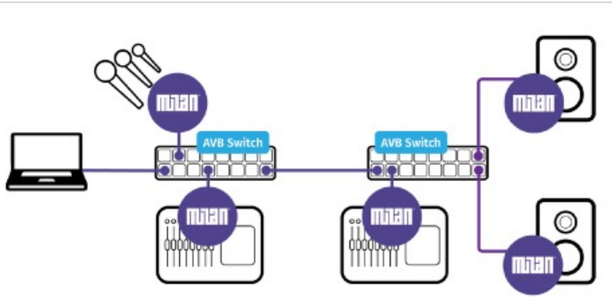
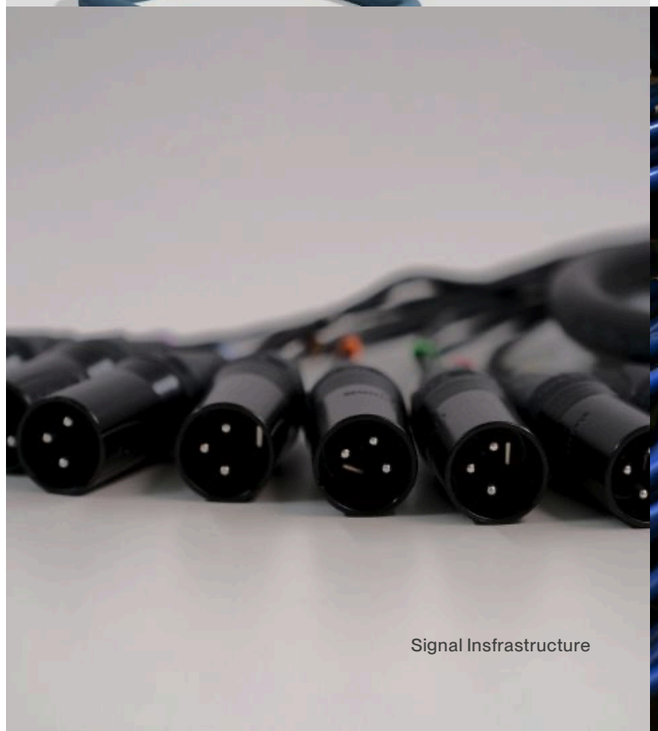
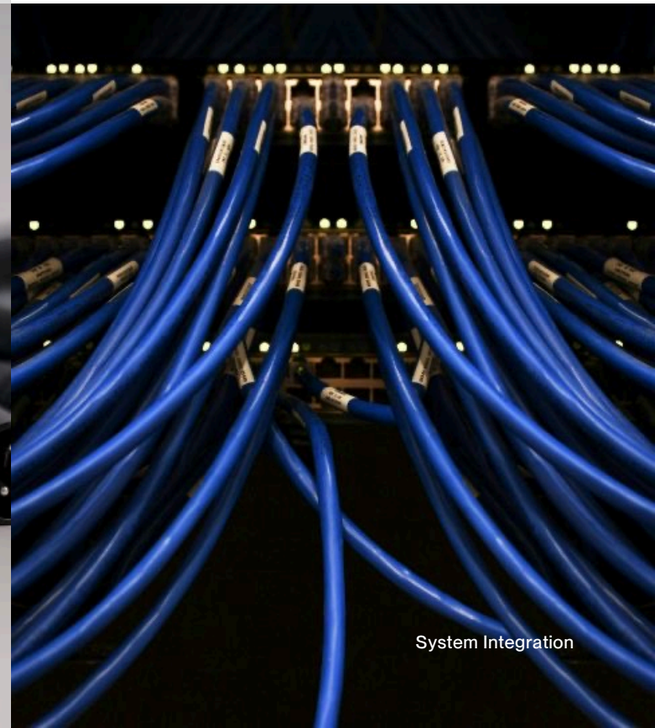


AVB - Milan Infrastructure



Signal Insfrastructure



System Integration

Recommended Devices for Integration into HYRISS Systems

L-Acoustics recommends the following devices for seamless integration into HYRISS systems. While other devices may be used, they have not been tested by L-Acoustics for compatibility and integration.

High-Resolution Music and Video Streamers

These devices are the sources for local and streamed audio, music, video, and filmed content:

- Bluesound Node
- Apple TV
- Kaleidescape

AV Processor

This upstream device provides AV content source management and surround sound decoding as needed:

- Storm Audio ISP MK3

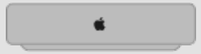
Signal Converters

L-Acoustics manufactures the following signal converters for integration, supporting analog, AVB, MADI, and AES/EBU formats:

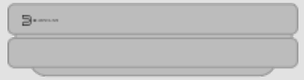
- L-Acoustics P1
- L-Acoustics LC16D

Note: The third-party devices listed have been tested as of December 2024.

Apple TV



Bluesound Node

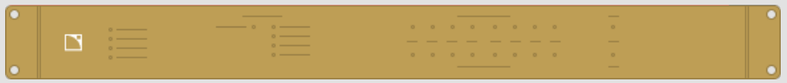


Kaleidescape

Storm Audio ISP Mk3

P — 1

LC16D



Recommended Control and Infrastructure for HYRISS Systems

L-Acoustics recommends the following devices to ensure effective control and infrastructure integration within HYRISS solutions:

Main Network Switch

- **Cisco C1000-24P-4G-L:** This Power over Ethernet (PoE) switch is essential for network connectivity but is not suitable for AVB signal transport.

AVB Bridge

- **L-Acoustics LS10:** This device is specifically designed for AVB signal transport.

Electrical Power Management

- **Gude 8035**: This power management solution helps maintain stable electrical supply and distribution.

Third-Party Control Systems

Integration with third-party control systems is required for the end user to control and manage HYRISS. Recommended options include:

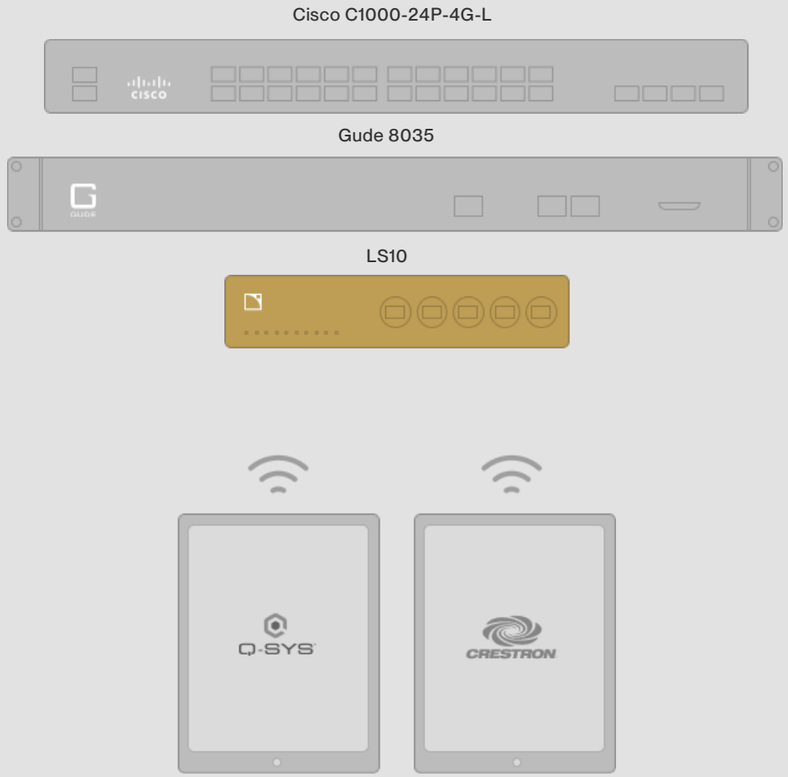
- Q-SYS
- Crestron

Hard-wired Control System

L-Acoustics recommends implementing a wired control system as a backup to the wireless control. This ensures reliable management of the system in the event of Wi-Fi failure.

- We recommend the Rithum Switch Pro (PoE) for this purpose.

Note: The third-party devices listed have been tested as of December 2024.



Integration and Installation of HYRISS

HYRISS is an integrated solution designed to seamlessly blend with the fabric of the building. The installation process must be carefully coordinated among various building trades and managed by experienced project management professionals. In accordance with the architect's specifications, installed devices and acoustic treatments will be integrated into both remodels and new construction projects.

L-Acoustics recommends engaging well-qualified professionals, including:

- Building Contractors
- Electrical Contractors

HYRISS requires integrators who meet specific qualifications. The installation and commissioning of the system must be carried out by certified integrators, whose details can be found on the L-Acoustics website at https://www.l-acoustics.com/partner/find-a-partner/

The HYRISS system will be calibrated by L-Acoustics factory personnel or certified specialist providers. Calibration services include:

- HYRISS System Calibration
- Ambiance Acoustic System Calibration
- Anima System Calibration

L-ACOUSTICS

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Sound Design

Ambiance
Acoustic Enhancement

HYRISS leverages technologies developed by L-Acoustics for professional applications. A key feature of HYRISS is its ability to control the acoustics based on the intended function of the space.

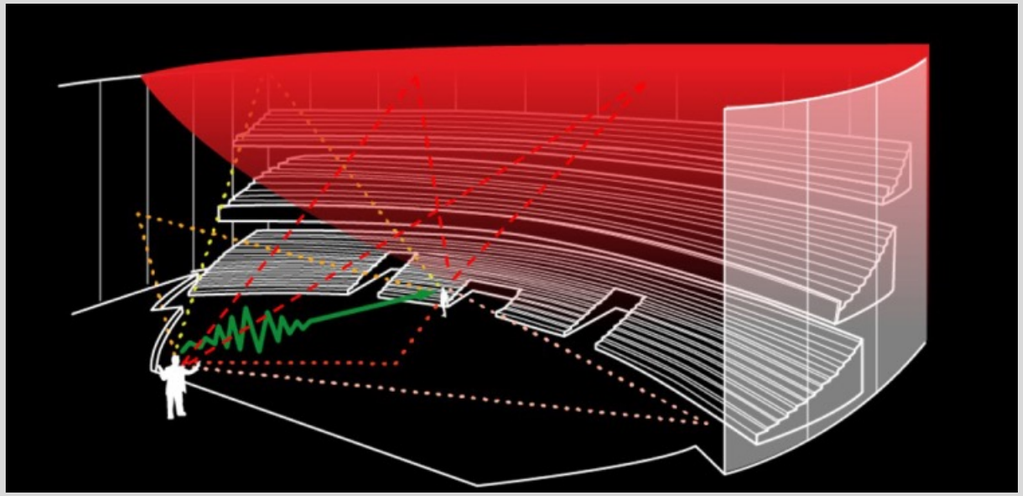
L-Acoustics' Ambiance Technology, is a hybrid acoustic enhancement solution that integrates both in-line and regenerative acoustic technologies. This allows for a complete transformation of a space's acoustic properties to meet diverse needs.

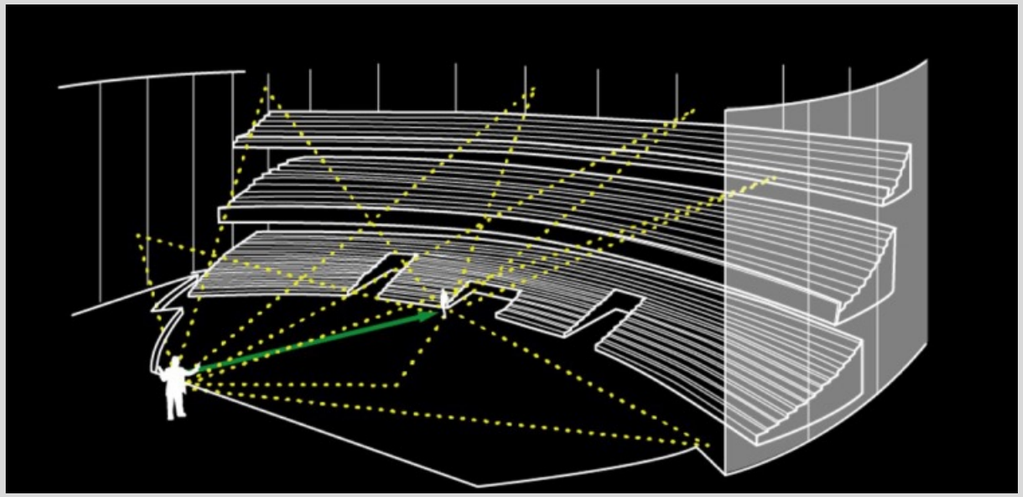
With just the touch of a button, HYRISS can enhance the acoustics to support various functions, including but not limited to:

- Live acoustic music, akin to a recital hall
- Lively acoustics for dining experiences
- Engaging soundscapes for watching sports
- Reduced reverberation for cinema
- Enhanced vocal clarity for acting, presentations, or speeches

Ambiance utilizes an array of strategically placed microphones to capture the existing acoustic energy within the space. These signals are processed through the integrated L-ISA Room Engine, enabling designers to tailor the extended reverberation time (RT60) while managing additional acoustic energy through early reflections and reverberation. The Room Engine employs a patented multi-channel reverberation engine, empowering users to shape a venue’s acoustic identity through customized Ambiance Signatures by precisely adjusting reflections.

Ambiance is calibrated and tuned by L-Acoustics as part of the HYRISS services package.

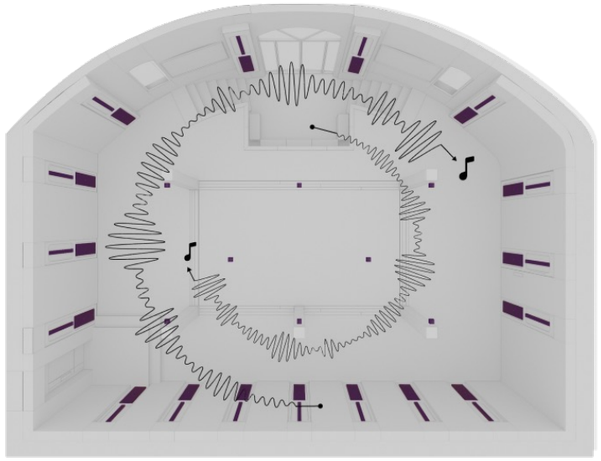




Anima
Engage With the Space

HYRISS allows for precise sound positioning of sound within the space as well as adding motion effects to the source material. From the control interface, move sound to one location in the space or distribute that sound across the whole space. At the heart of this innovation is Anima, a creative technology that allows the user to engage with the space. Transforming ordinary sound and music into extraordinary experiences.

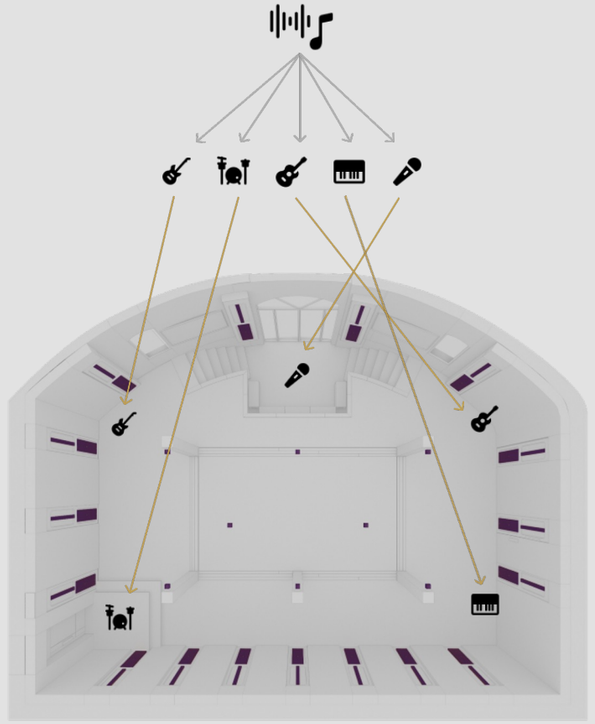
Anima is calibrated and tuned by L-Acoustics as part of the HYRISS services package.



Content Separating Technology
Engage With the Content

HYRISS allows the user to engage with the content, by employing cutting-edge technologies that separate the elements of audio content, allowing for precise sound positioning of individual elements of the source sounds within any space. By leveraging advanced algorithms and machine learning within the L-ISA II Processor, even the simplest tracks are elevated to thrilling concert-like experiences, ensuring that every listening session feels premium and engaging.

Separating Technology is calibrated and tuned by L-Acoustics as part of the HYRISS services package.



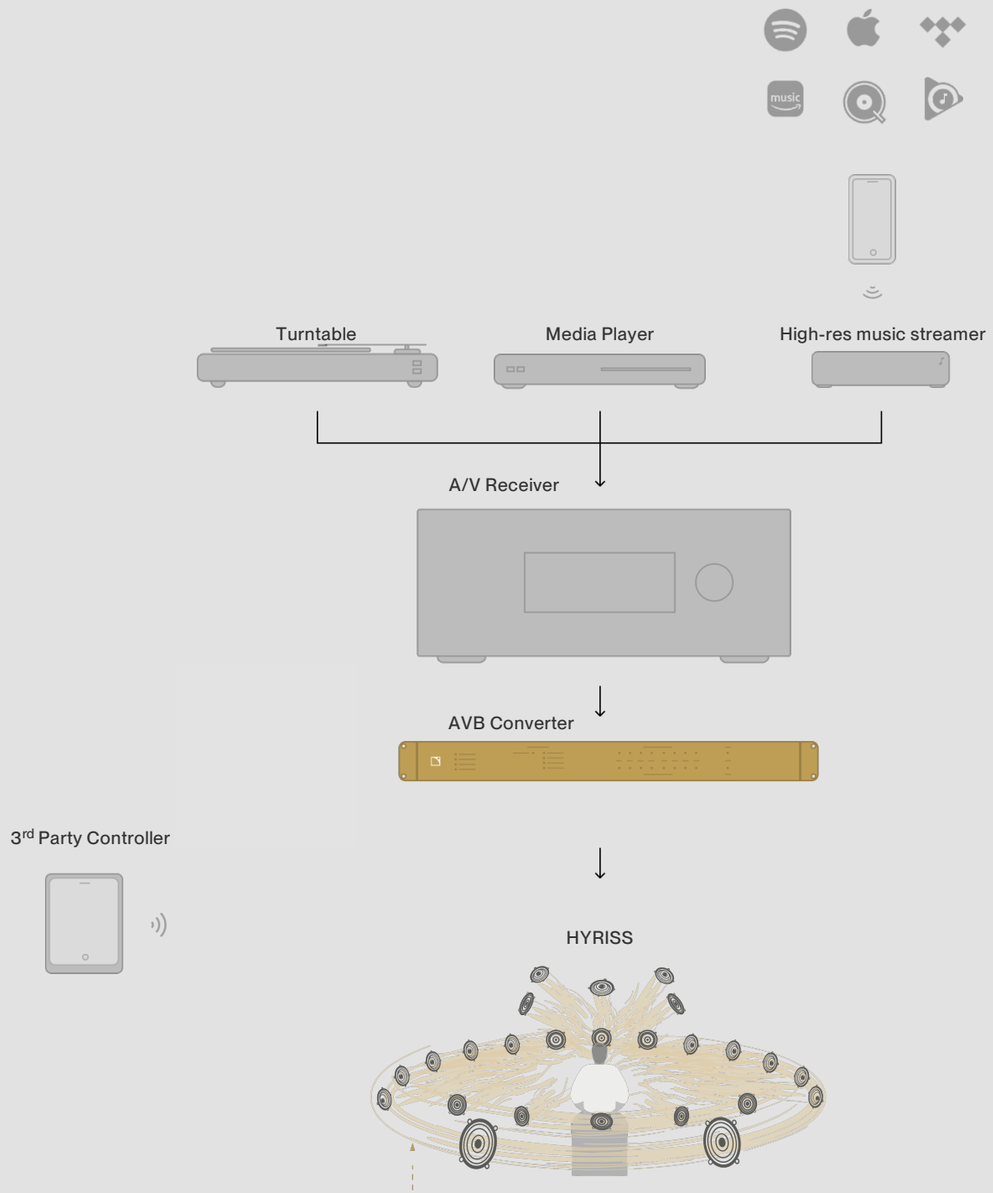
Applications

Relaxed Listening

HYRISS offers a variety of applications, including Relaxed Listening, which encompasses the casual enjoyment of spoken word, soundscapes or music. This experience can also include passive listening, where the audio serves as a background ambiance rather than a focal point. Typically, the listening volume is set at a moderate level, with sources coming from streaming services, local content storage, or physical media. One of the standout features of HYRISS is its ability to position audio content anywhere within the space, allowing for a truly immersive or location focused listening experience.

Relaxed Listening is part of:

- Lounge HYRISS
- Live HYRISS



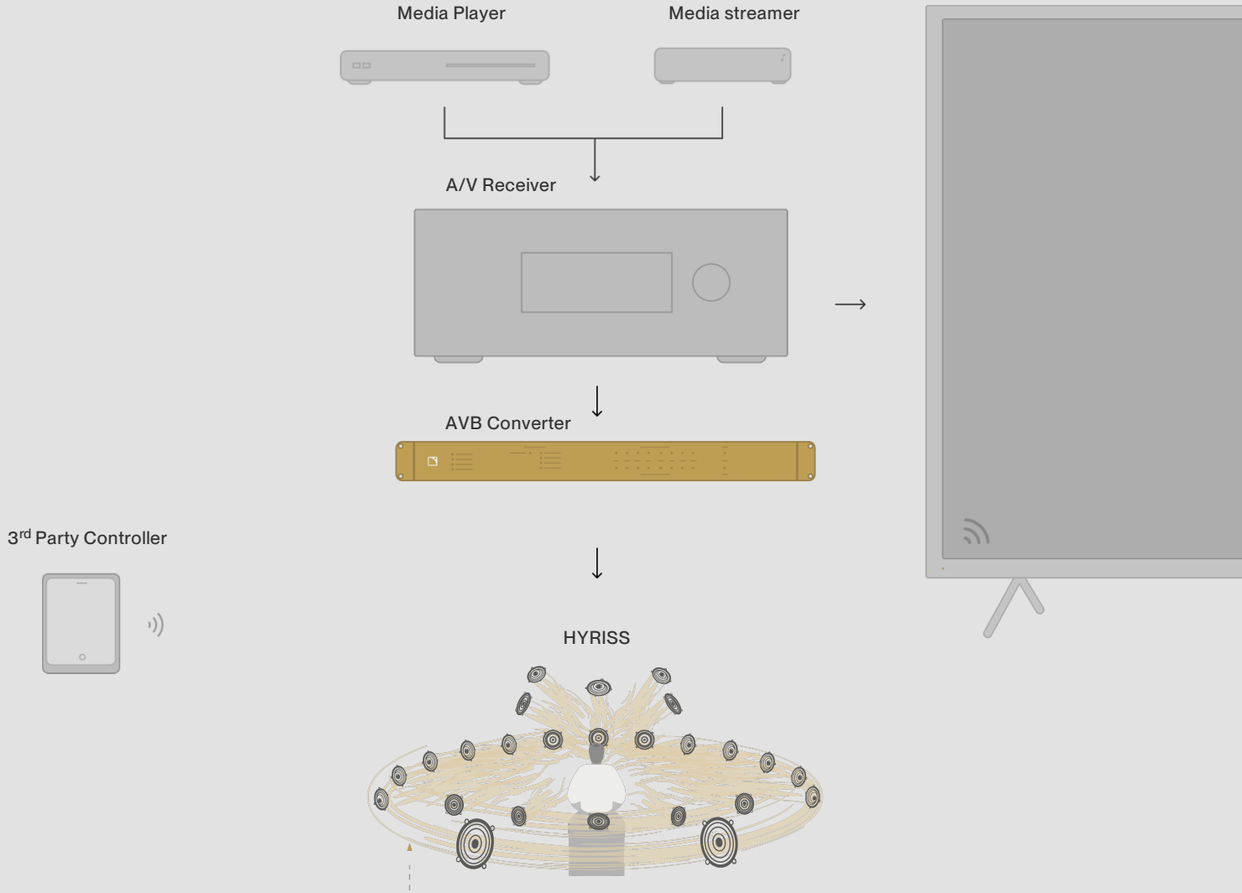
Television and Video Viewing

HYRISS offers a range of applications, including Television and Video Viewing, which encompasses casual experiences with television and video, and content. The sound for this content is expertly managed by HYRISS, supporting all current audio formats.

Acoustics are optimized for each viewing experience, providing low reverberation for films and livelier acoustics, like a stadium atmosphere, when watching sports with friends. Additionally, HYRISS allows for flexible sound placement, enabling audio to be positioned not only near the viewing source but throughout the entire space.

Television and Video Viewing is part of:

- Lounge HYRISS
- Live HYRISS



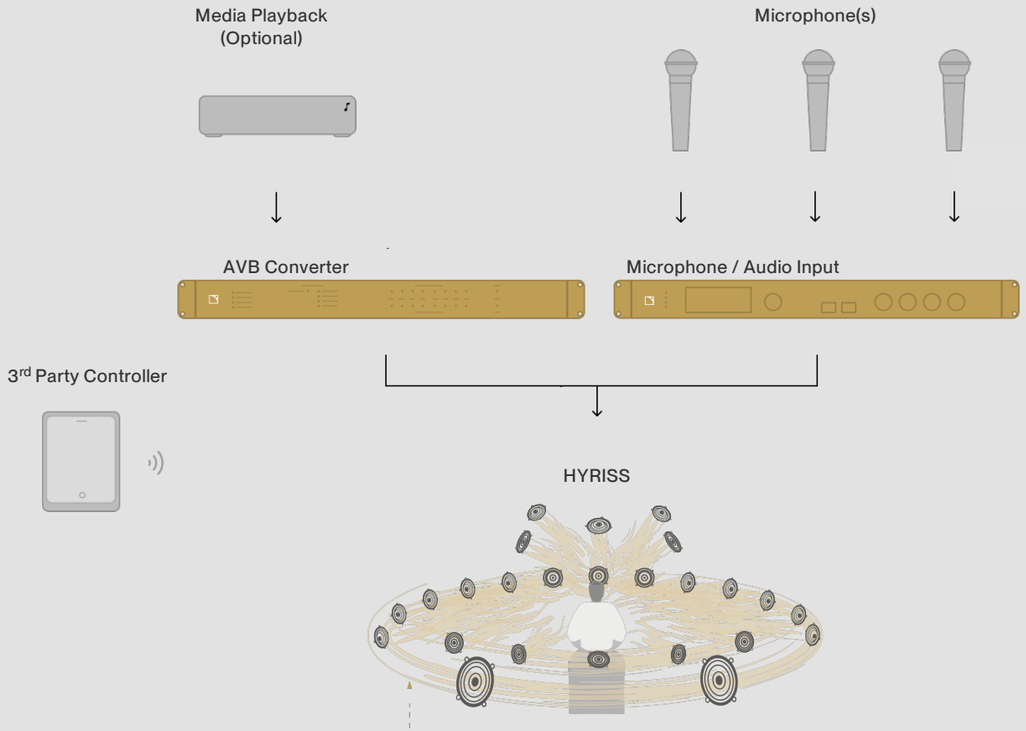
Acting

A HYRISS space supports various ways to engage with friends, colleagues, or even an audience. The acoustics are optimized to enhance the spoken word, whether you're presenting a scene from a play or delivering a business speech.

Acting may also be performing Karaoke, where the sound system and the acoustics support the fun. Additionally, other sound technologies allow for music and effects to enrich the performance.

Acting is part of:

- Lounge HYRISS
- Live HYRISS

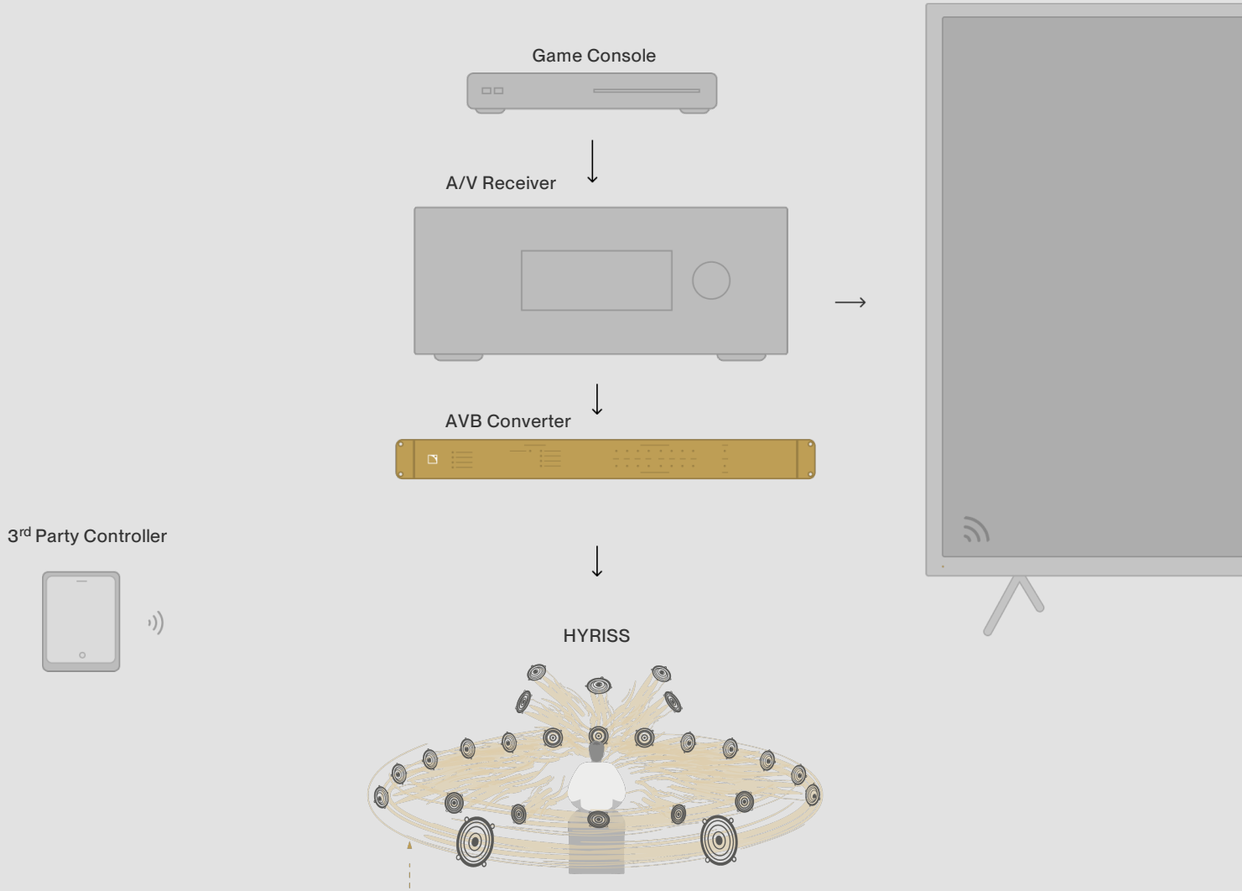


Gaming

Whether you’re playing solo or with a group, HYRISS provides an immersive sound solution that enhances your gaming experience. HYRISS adapts to your location within the space, allowing you to move the immersive sound to wherever you are playing.

Gaming is part of:

- Lounge HYRISS
- Live HYRISS



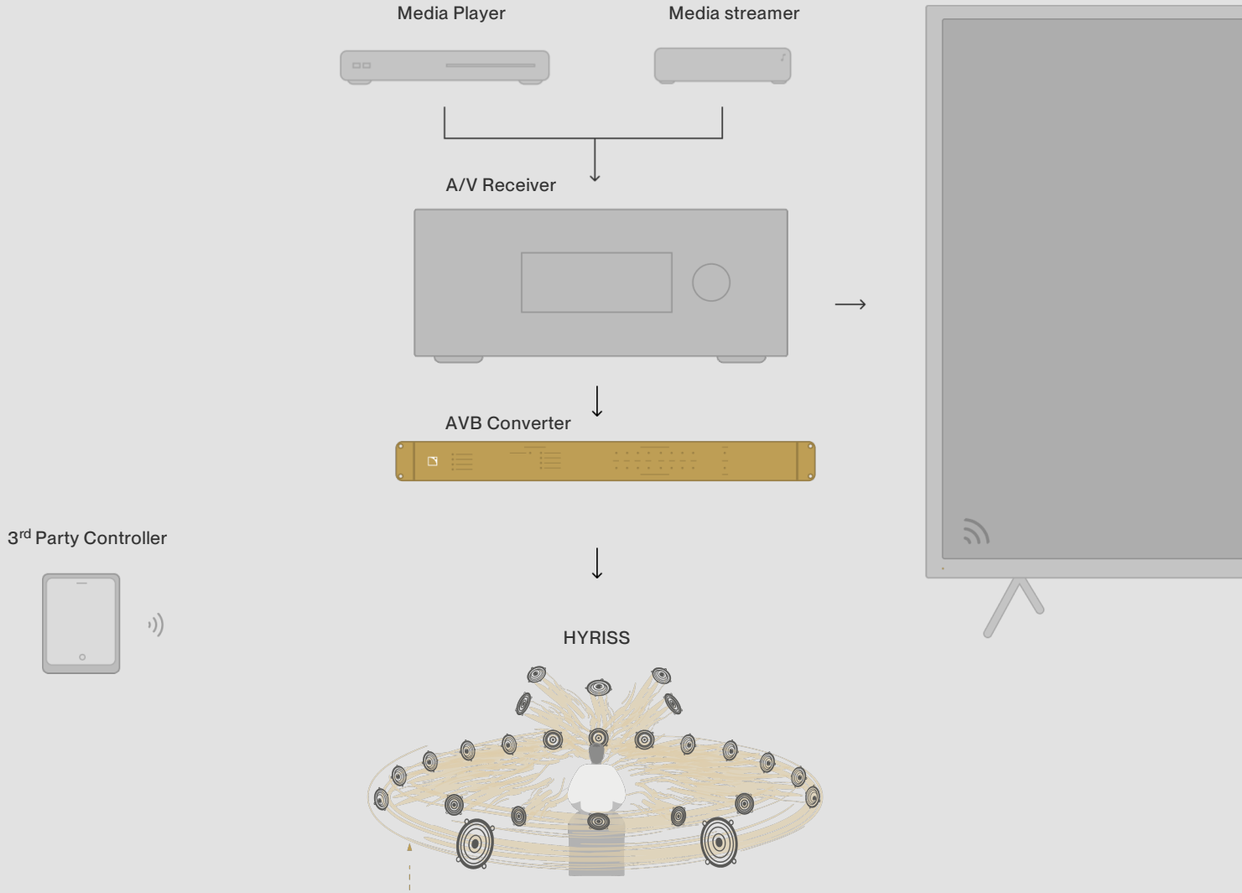
Cinema and Film Viewing

HYRISS offers a range of applications, including Cinema and Film Viewing, which encompasses both focused experiences with cinema and film content. The sound for this content is expertly managed by HYRISS, supporting all current audio formats, including advanced 3D audio, such as Dolby Atmos.

Acoustics are optimized for each viewing experience, providing low reverberation for films and livelier acoustics, like a stadium atmosphere, when watching sports with friends. Additionally, HYRISS allows for flexible sound placement, enabling audio to be positioned not only near the viewing source but throughout the entire space.

Cinema and Film Viewing s part of:

Live HYRISS

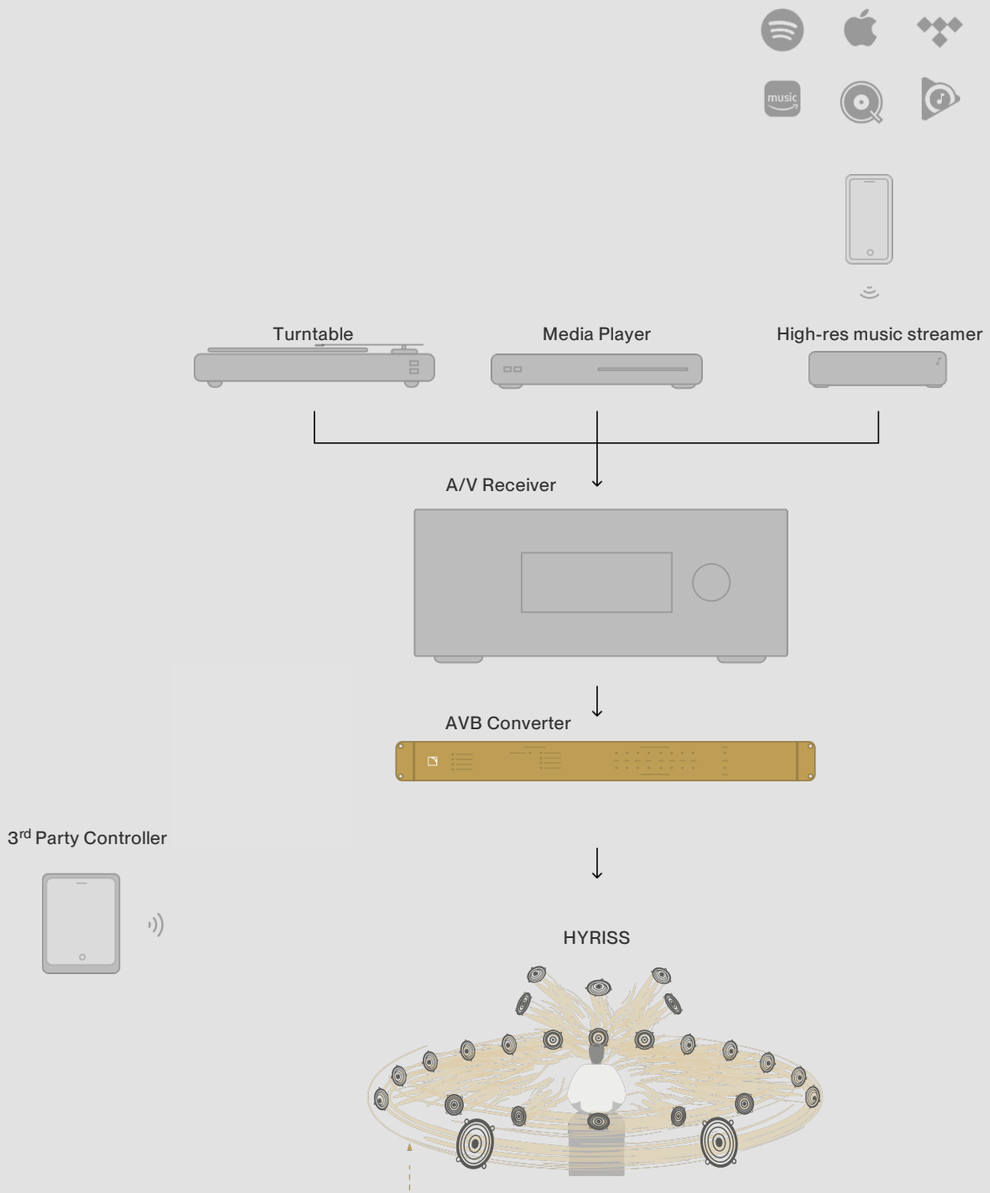


Deep Listening

HYRISS offers a range of applications, including Deep Listening. This focused experience allows users to listen to music or other recorded and broadcast content as if they were in the recording studio or at a live concert. The sound is full-bandwidth and can be loud, delivering music as clear as the studio and as the artist intended. Deep Listening may also spatialize music beyond stereo, either in the original format or utilizing L-Acoustics spatial technologies. HYRISS Deep Listening is as good as, or better than, being there.

Deep Listening is part of:

Live HYRISS

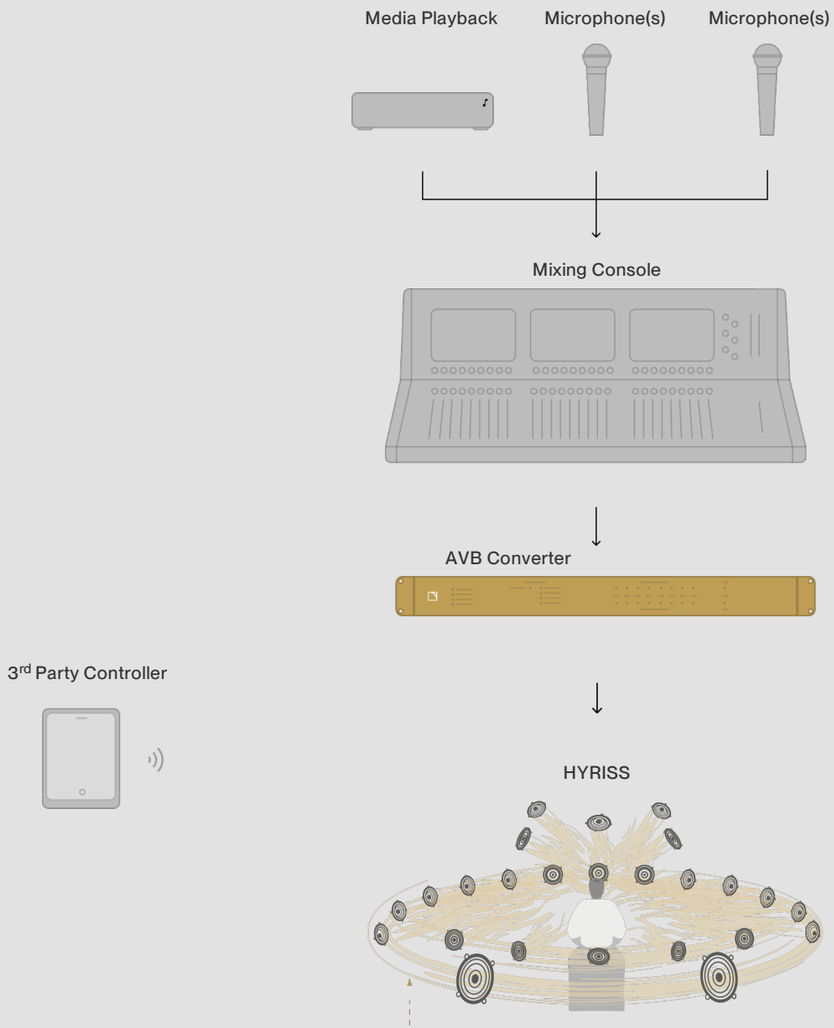


Live Performing

HYRISS offers a range of applications, including Live performing. The system is powerful enough to handle everything from heavy metal riffs to solo violin recitals. Its acoustics adapt to each performance, emulating the ambiance of a concert hall, arena, or music club. HYRISS accepts inputs from professional sound equipment, allowing for mixing and sound design tailored to the specific needs of the performance.

Live Performing is part of:

Live HYRISS



DJing Club

HYRISS offers a range of applications, including DJing. The system has the power and frequency response to create an immersive club experience, supporting inputs from DJ rigs. HYRISS employs advanced spatial technologies to add motion to the sound and delivering bass that keeps the adrenaline pumping.

DJing is part of:

Live HYRISS