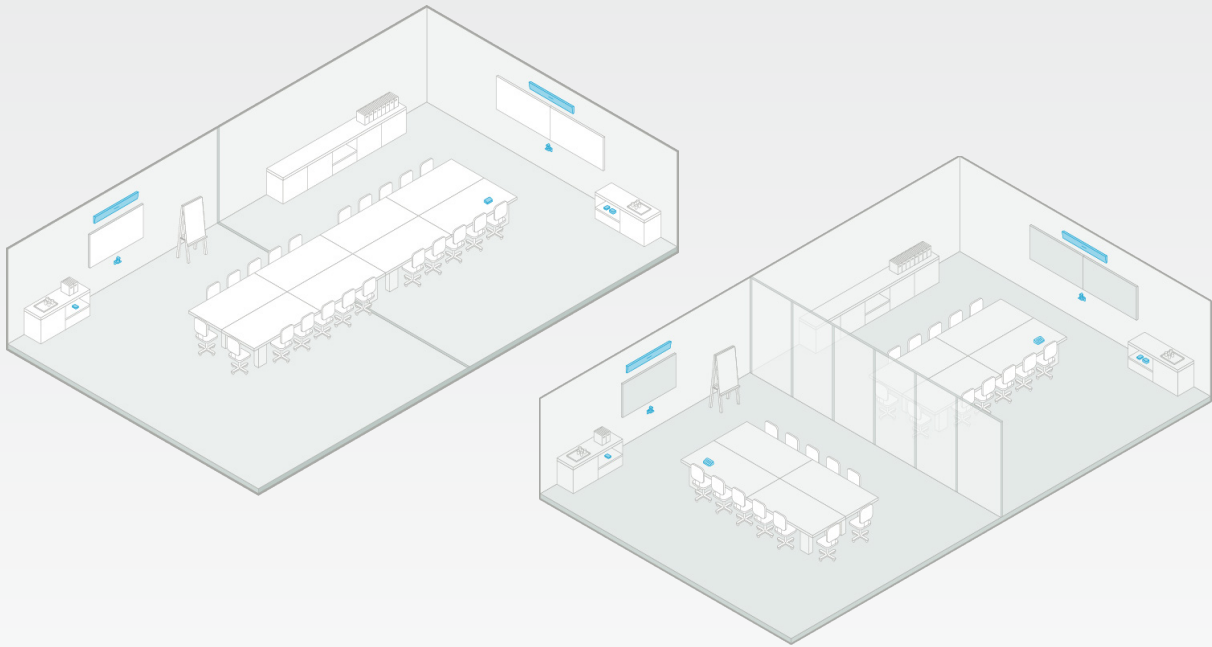


SETTING UP DIVISIBLE ROOMS

Nureva® HDL310 and HDL410 systems



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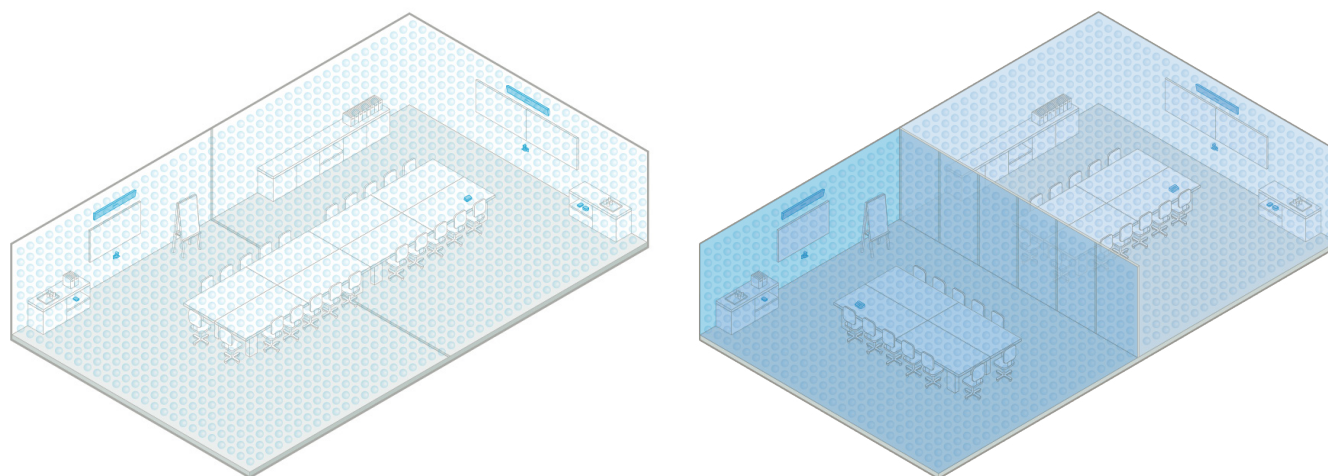
Introducing versatile audio for divisible rooms

Flexibility for changes in usage has increasingly become a requirement for large meeting rooms and classrooms. In keeping with this trend is a growing demand for divisible room solutions.

A divisible room is a large space that can be divided into two or more smaller rooms. Typically, it has movable partition walls that are extended to divide the space and retracted to open it up.

Nureva® audio systems provide a convenient and cost-effective way to equip divisible rooms. An HDL310 system is used in each divided space, and then two HDL310 systems are quickly converted to a single HDL410 system to cover the combined space.

Microphone Mist™ technology — at the core of each Nureva system — contains all the acoustic modeling and optimization algorithms required for when room setups change, so no retuning is needed. The audio system adapts to divided or combined rooms by recalibrating the virtual microphone matrix to fit the room configurations.

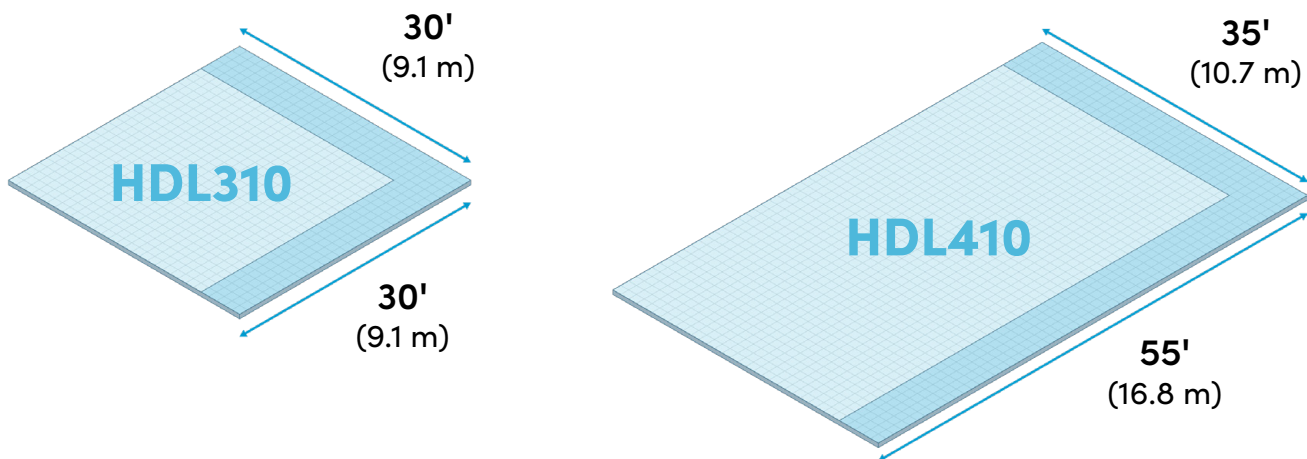


This guide provides an overview of how Nureva HDL410 and HDL310 audio systems can be installed in various types of divisible rooms.

Divisible room size limits

For full-room microphone pickup, maximum room sizes are recommended for each Nureva system. When the room is divisible, the recommended maximum dimensions of the combined space differ slightly from those for a standard room.

HDL pro series – Maximum room dimensions



When the two microphone and speaker bars in an HDL410 system are working separately in a divisible room (as two HDL310 systems), the recommended maximum room dimensions take into consideration the two divided spaces. Therefore, the recommended maximum combined room size is 30' x 55' (9.1 x 16.8 m).

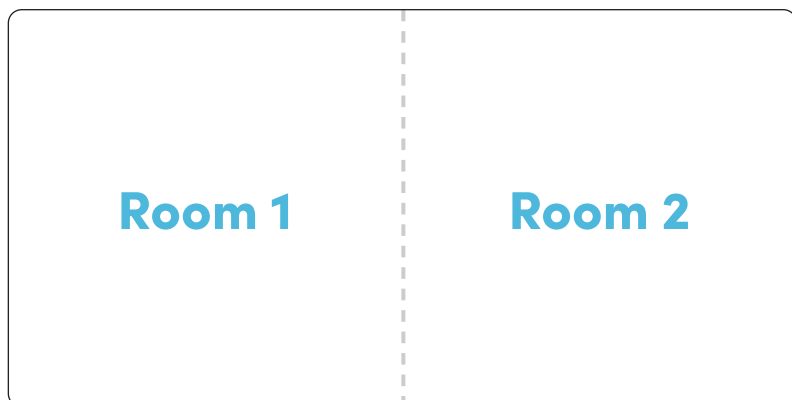
However, it's worth considering whether full-room microphone pickup is required. Sometimes, Nureva systems are used in slightly larger spaces than recommended and still provide mic coverage to the main meeting or presenting areas.

The basics: Dividing one room into two

One extra-large room divided into two is the most common type of setup for a divisible space – and it's the easiest. Learning the basics outlined in the five steps below will provide a solid foundation of knowledge before tackling more complex divisible spaces.

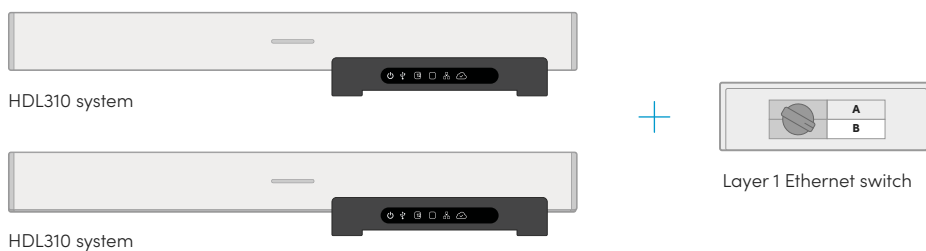
In this example, two HDL310 systems are used with a layer 1 Ethernet switch (the manual type of switch that's inexpensive), so there's no need for software programming. As a manual operating system, this setup can be tried out and put into real-world use or serve as a proof-of-concept demonstration.

The goal is to provide audio coverage for a combined extra-large room with an HDL410 system. When the space is divided, each smaller room will be covered by an HDL310 system. The addition of the manual network switch makes it easy and cost-effective to transition between the HDL410 and HDL310 systems.



The maximum recommended size of each smaller room is 30' x 30' (9.1 x 9.1 m).
For the combined room, the maximum recommended size is 30' x 55' (9.1 x 16.8 m).

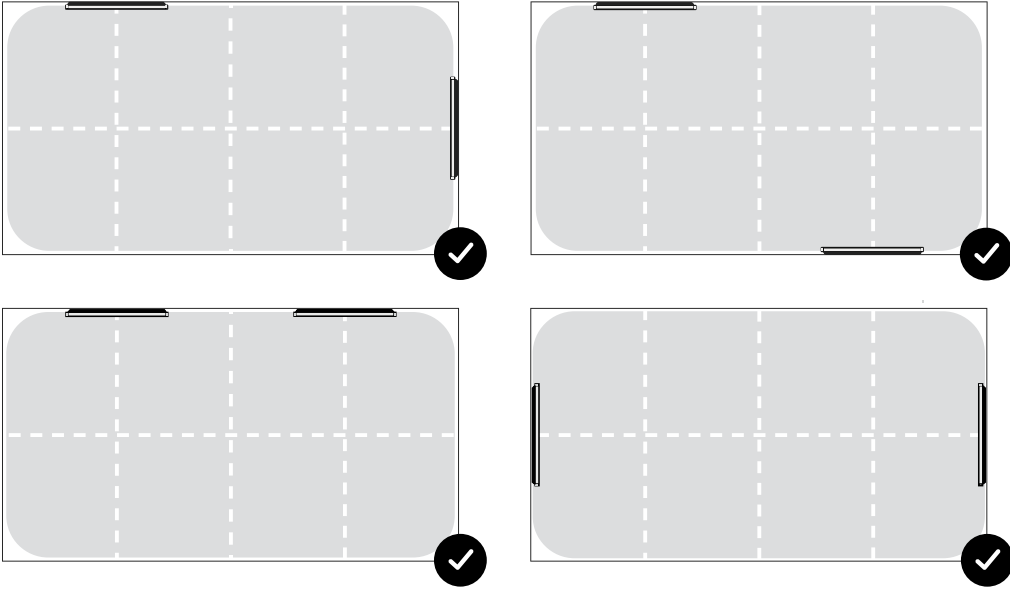
Solution components



Step 1: Positioning the microphone and speaker bars

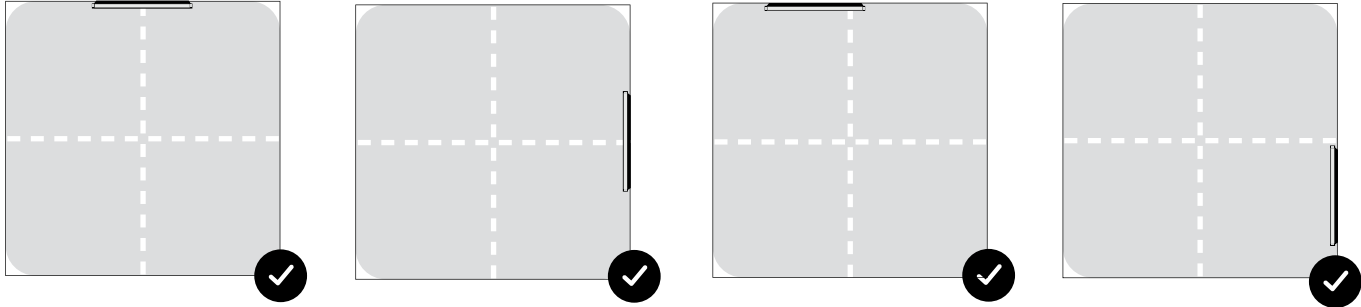
The first step is deciding where to position the two microphone and speaker bars in the extra-large combined room. The HDL410 installation guide suggests four options.

HDL410 coverage



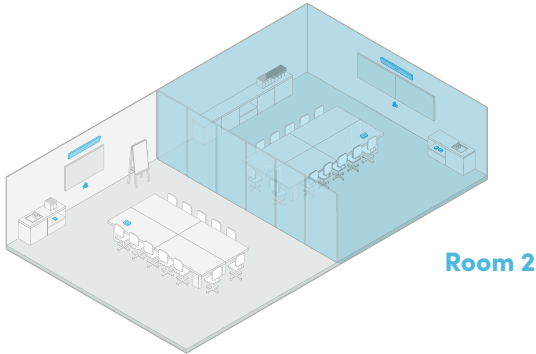
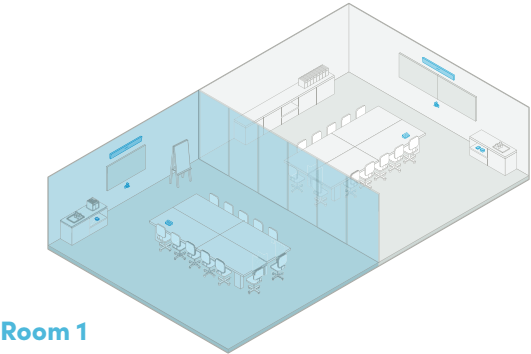
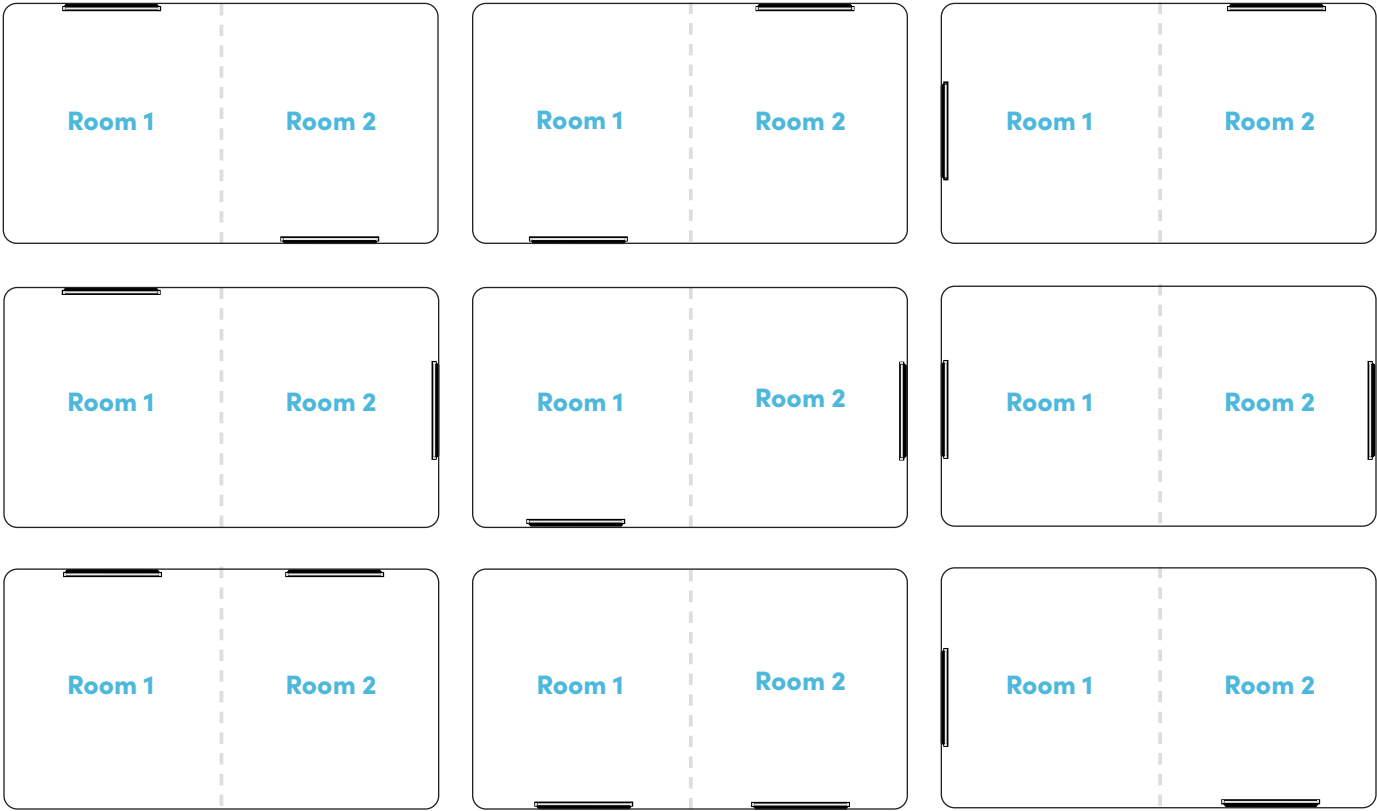
Next, the positioning of the microphone and speaker bars will need to be considered so they can each function as an HDL310 system.

HDL310 coverage



TIP: It's important to check the HDL310 installation guide for advice on avoiding incorrect positioning of the single microphone and speaker bars to be used in the divided spaces.

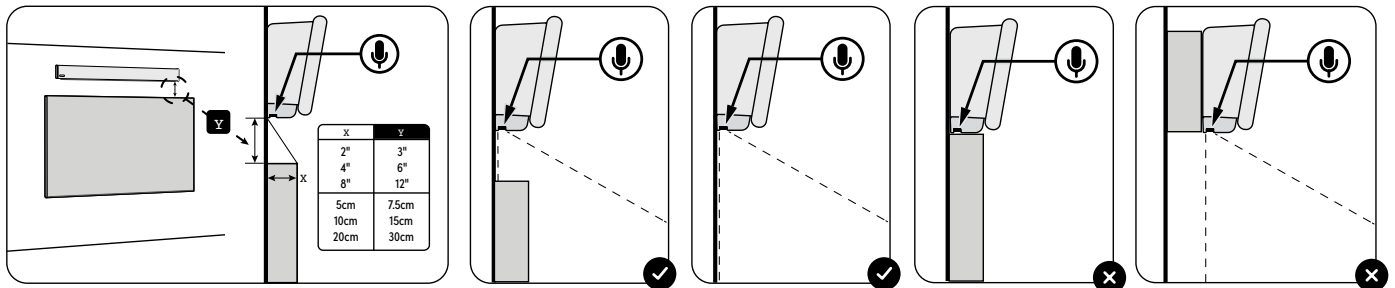
When a room is divided into two, all nine of the examples that follow are viable options.



Next, consider the room layout and furniture arrangement – noting where there are doors, windows, monitors, HVAC vents, fans and other sound sources.

Although Nureva audio systems have the patented Intelligent Sound Targeting feature, which preemptively identifies and ignores persistent noise in real time, it's important to avoid placing the microphone and speaker bars too closely to noise sources like vents and fans.

If the microphone and speaker bars are being installed atop a display or fixtures on a wall, be sure to leave enough space underneath them.



The clearance is calculated as a 3:2 ratio. The object's depth (the X value) is multiplied by 1.5 to see how much space is needed between the microphones and the object below (the Y value).

Example:

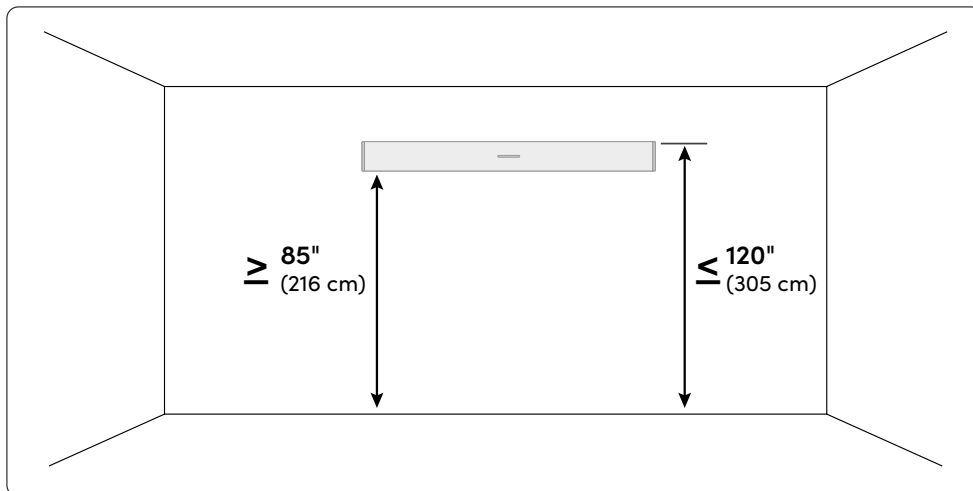
An LCD display is mounted below the microphone and speaker bar.

Depth (X) = 3" (7.6 cm)

$3 \times 1.5 = 4.5$

The microphone clearance (Y) is 4.5" (11.4 cm).

Correct positioning of the microphone and speaker bars will ensure optimal voice pickup and clarity in both the combined and divided room configurations. Also, be mindful of the installation height.



Step 2: Adding a network switch

The key additional component needed for Nureva's basic divisible room solution for two spaces is a layer 1 Ethernet switch. When dividing and combining the spaces, this physical layer switch is used to change the connections between the microphone and speaker bars and the connect modules. Using a layer 1 switch minimizes network latency, which is critical for the systems' real-time audio processing. It also maintains Power over Ethernet (PoE) delivery to the microphone and speaker bars over the Ethernet cable.

With a manual switch, the basic requirements are:

- Layer 1 (physical layer)
- Two-way A/B switch
- Minimum of 100 Mbps data rate
- Ability to pass PoE power
- Three RJ45 ports

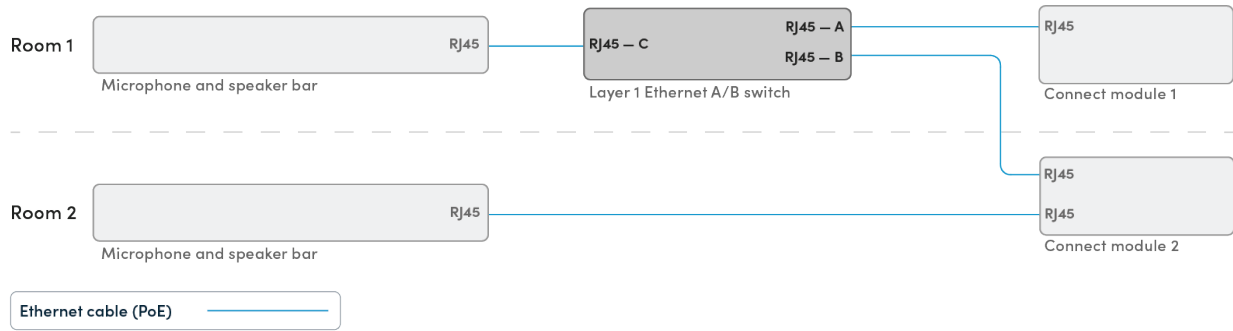
Many compatible layer 1 Ethernet switches are readily available. We've successfully tested this model:

[Manual switch box SB-034](#)

Step 3: Connecting the cables

Next, the cables need to be connected for the divisible room setup.

Wiring diagram



System combination	Switch	Unused
Both rooms divided	A	—
Both rooms combined	B	Connect module 1

Two HDL310 systems are shown in the wiring diagram above – one for each divided space. Each system covers a smaller meeting room with one microphone and speaker bar and one connect module.

The wiring diagram also shows the connections for an extra-large combined room. An HDL410 system is created using the same two HDL310 microphone and speaker bars with only one of the connect modules.

Step 4: Recalibrating the system

Recalibration involves the system playing audible tones to analyze the reconfigured room's acoustics and optimize its digital processing parameters for the best possible audio performance.

It's imperative that Nureva audio systems are recalibrated whenever the room configuration changes. For example, changing from one combined room to multiple divided spaces and rearranging furniture are situations that would require recalibration.

With the HDL410 and HDL310 systems, recalibration happens automatically when the connect module detects a configuration change in the microphone and speaker bars (for example, when one is removed or added). Therefore, the microphone and speaker bar connections should be switched only when the space has been reconfigured.

Also, it's crucial to ensure the room is quiet during the recalibration process, without any music, conversations or other sounds beyond normal ambient noise.

If the sound insulation is insufficient, particularly in the partition wall, the calibration tones for one room might be audible in the other room. If this happens, manually starting the recalibration for the two systems will be required in each divided room individually after the automatic recalibration process is complete.

Manually starting the recalibration process can be done using the remote control. The sequence is:

- Press F4 five times in quick succession. A single blue light will appear on the microphone and speaker bar.
- Press the Mute button on the remote control. The Nureva audio system will enter recalibration mode.

Step 5: Dividing or combining a room

When dividing or combining a room, follow this procedure:

1. Divide or open the room by moving the partition wall.
2. After completing the physical room changes, adjust the network switch to the position for that room configuration.
3. Ensure the system recalibrates and the room is quiet. Manually trigger recalibration if needed.

RECOMMENDATION:

Label the network switch to show the divided and combined room positions.

The next two sections provide guidance for divisible rooms that are more complex and for automating the controls for divisible rooms.

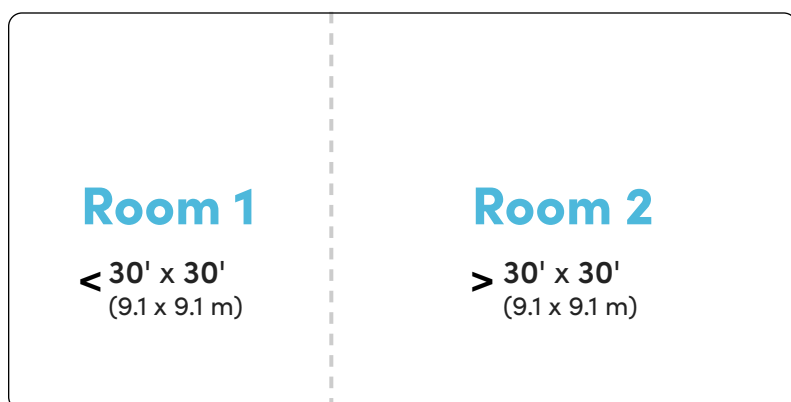
When divisible rooms are more complex

Not all divisible rooms are as straightforward as a basic single space separated into two, and some will even require three or more microphone and speaker bars to cover all the divided spaces.

The setup process for more complex spaces is similar to that outlined in the previous section. It still involves positioning the microphone and speaker bars, connecting the cables and adding one or more layer 1 Ethernet switches.

Example: Dividing into two rooms of different sizes

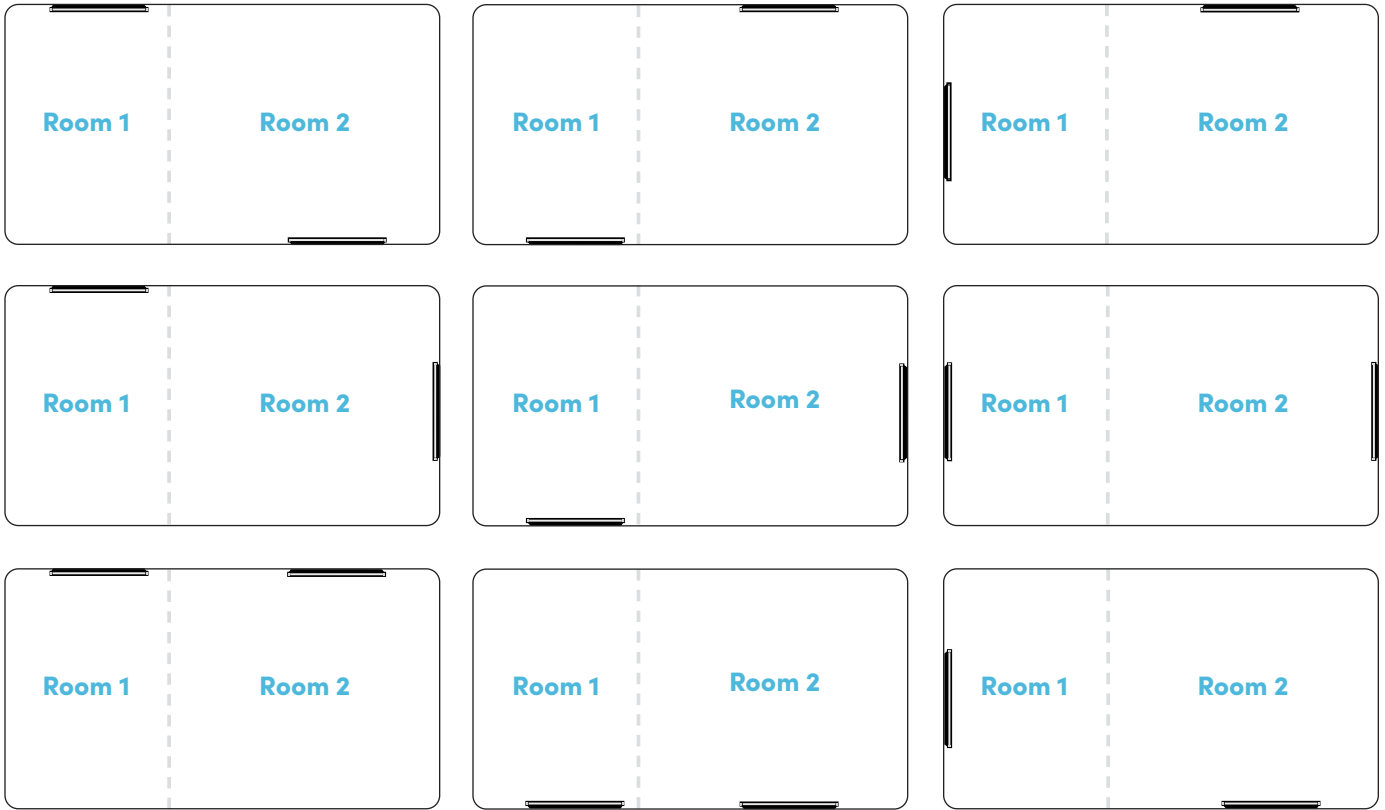
Sometimes, an extra-large room will be divided into two rooms of different sizes. It's important to consider the maximum coverage areas provided by Nureva audio systems for both the combined room and each divided space. The goal is to deliver full-room microphone pickup in each of the spaces.



It's usual for an HDL410 system to cover an extra-large room and for it to function as two HDL310 systems in the divided spaces, with a microphone and speaker bar in each space. However, if one of the divided spaces exceeds the maximum room dimensions of 30' x 30' (9.1 x 9.1 m), then three microphone and speaker bars will be needed.

When dividing an extra-large room into two spaces of different sizes, the first step is positioning the two HDL410 microphone and speaker bars for the combined area.

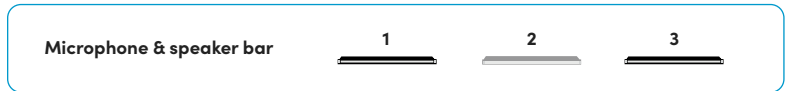
All nine of the examples that follow are viable options.



The next step is to consider the microphone and speaker bar placement in the smaller room, which is within the maximum dimensions recommended for the HDL310 system. Placement on any of the walls, except for the partition wall, is possible.

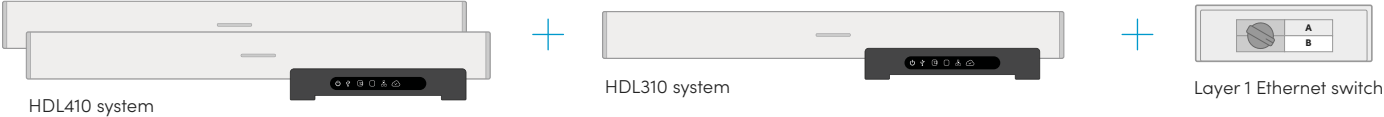
Then, the larger divided space needs to be considered. This space is too large for an HDL310 system with a single microphone and speaker bar, so it will require an HDL410 system with two microphone and speaker bars.

Following the placement recommendations in the HDL410 installation guide provides 12 possibilities.



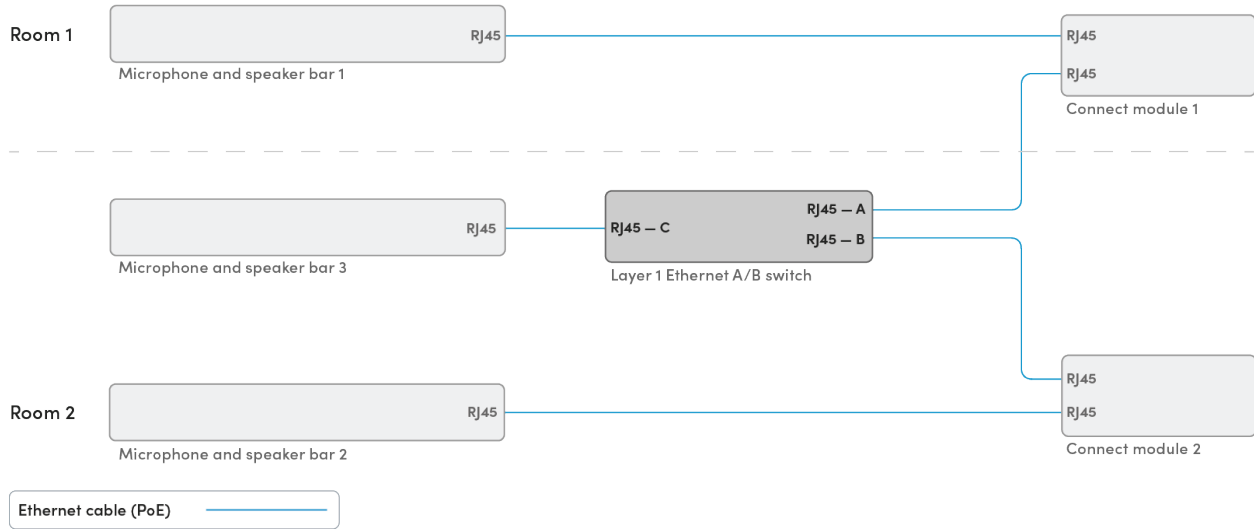
The final placement of the microphone and speaker bars will need to allow for individual room features like doors, windows, displays, HVAC vents, furniture, wall decorations, etc.

Solution components



A total of three microphone and speaker bars and two connect modules will be in use when the room is divided. When the room is combined, two microphone and speaker bars and one connect module will be in use.

Wiring diagram



System combination	Switch	Unused
Both rooms combined	A	Connect module 2 Microphone & speaker bar 2
Both rooms divided	B	—

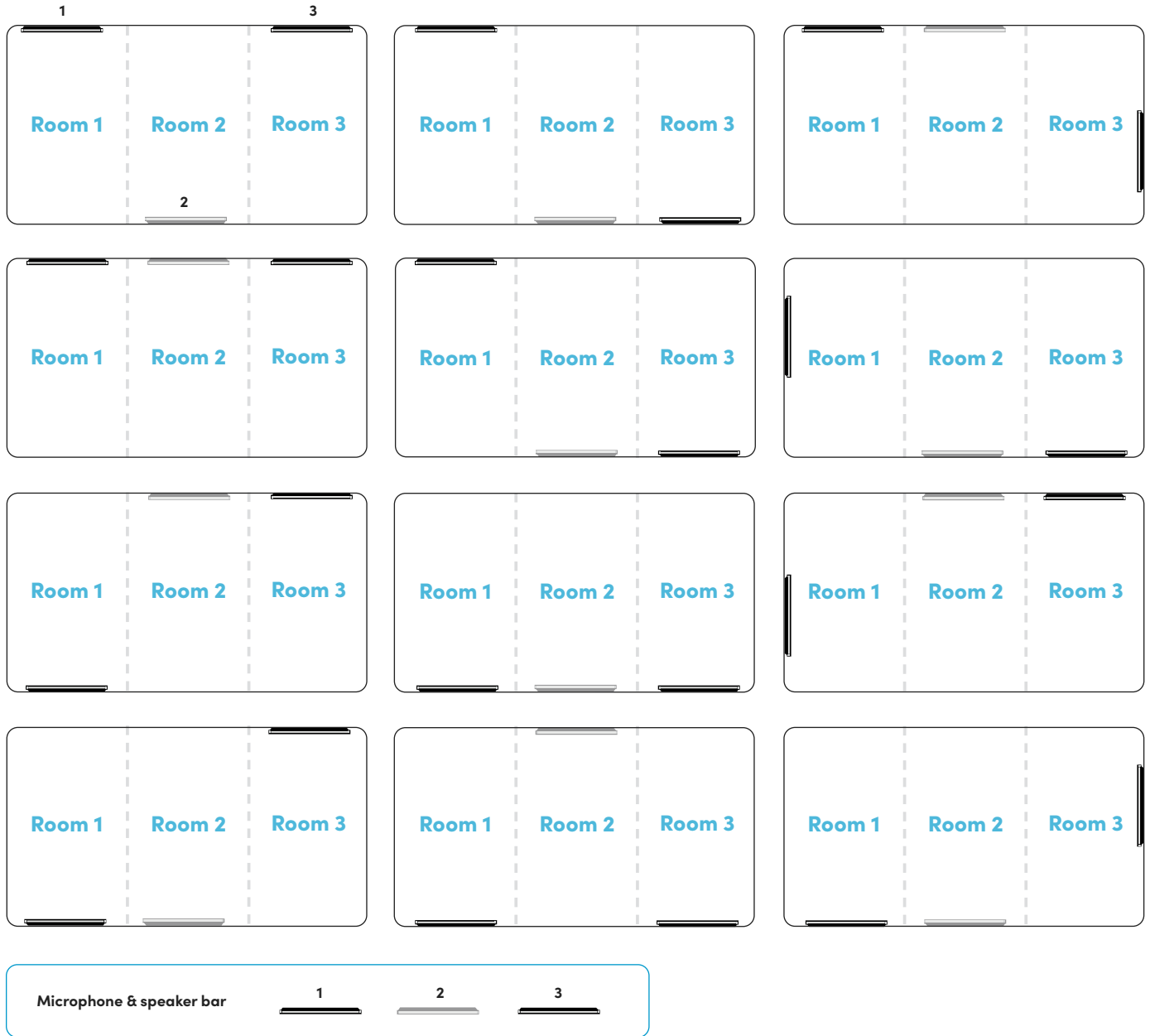
Example: Dividing into three rooms

A divisible room can be split into three smaller spaces – each equipped with an HDL310 system. The room configurations are then highly flexible, with the options of having one extra-large space, three individual rooms of a similar size and two spaces formed from combinations of the three smaller rooms.



Potential microphone and speaker bar positions

When dividing an extra-large room into three spaces, an individual HDL310 system is placed in each divided area.



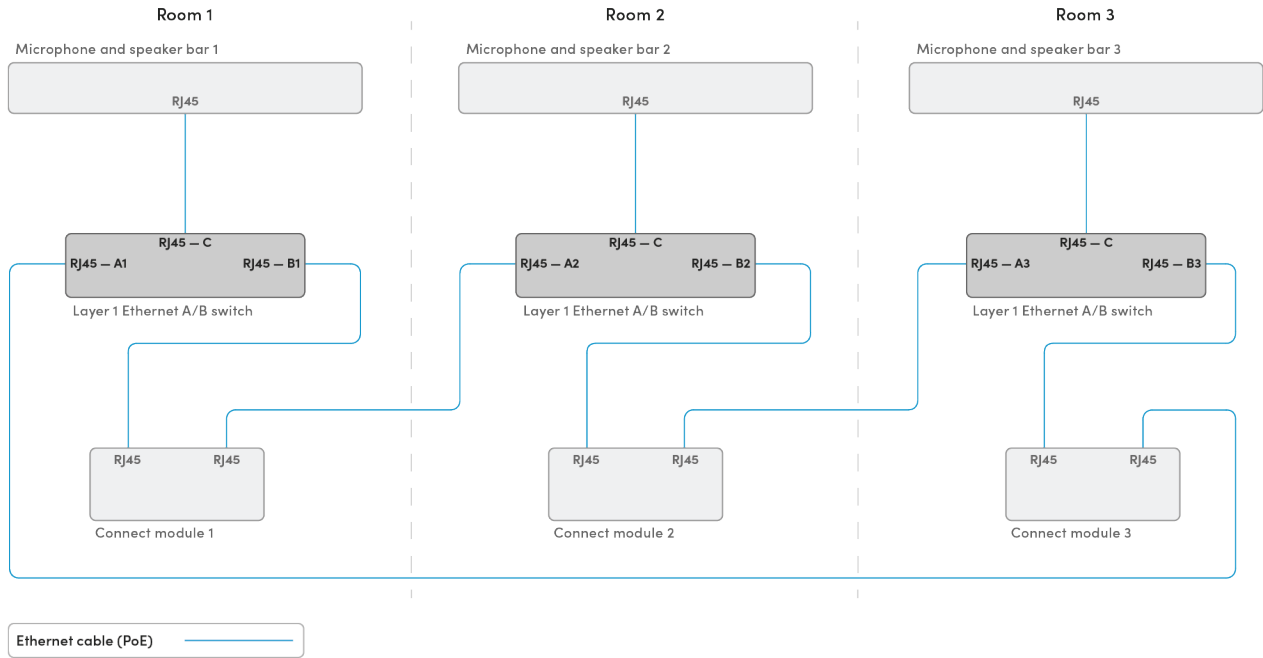
When two of the HDL310 systems are used together as an HDL410 system, the placement of those two microphone and speaker bars will also need to be taken into consideration as they will work together as one system.

Solution components



A total of three microphone and speaker bars and three connect modules will be in use when the room is fully divided. When the spaces are combined into one room, two microphone and speaker bars and one connect module will be in use.

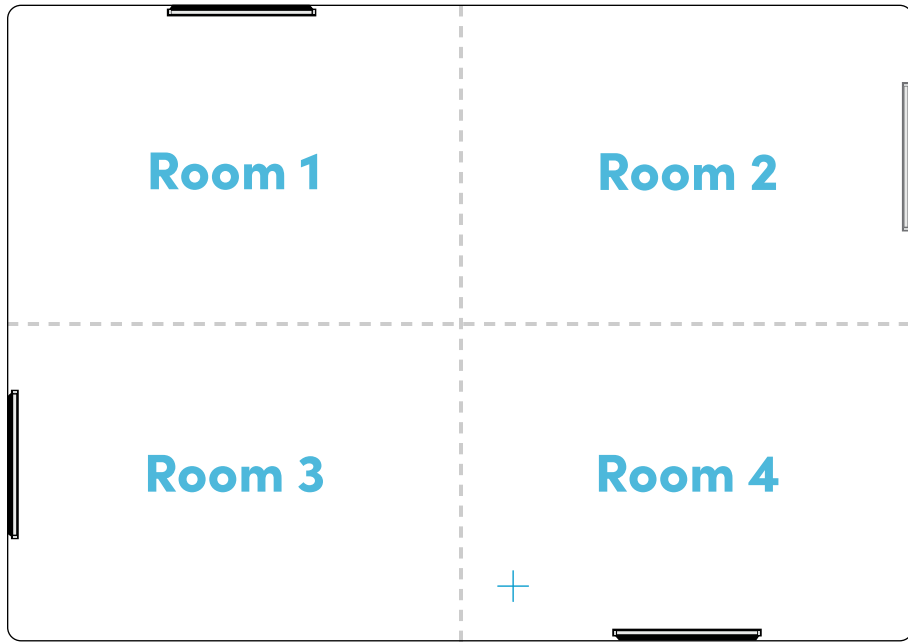
Wiring diagram



System combination	Room 1 switch	Room 2 switch	Room 3 switch	Unused
All rooms divided	B1	B2	B3	—
All rooms combined	A1	—	B3	Connect modules 1 & 2 Microphone & speaker bar 2
Rooms 1 & 2 combined Room 3 divided	B1	A2	B3	Connect module 2
Rooms 2 & 3 combined Room 1 divided	B1	B2	A3	Connect module 3

Example: Dividing into four rooms

It's possible to divide one extra-large space into four smaller rooms within the recommended HDL310 and HDL410 room sizes. This type of divisible space gives the flexibility of using one extra-large space, four smaller areas or two combined areas (rooms 1+2 and 3+4).

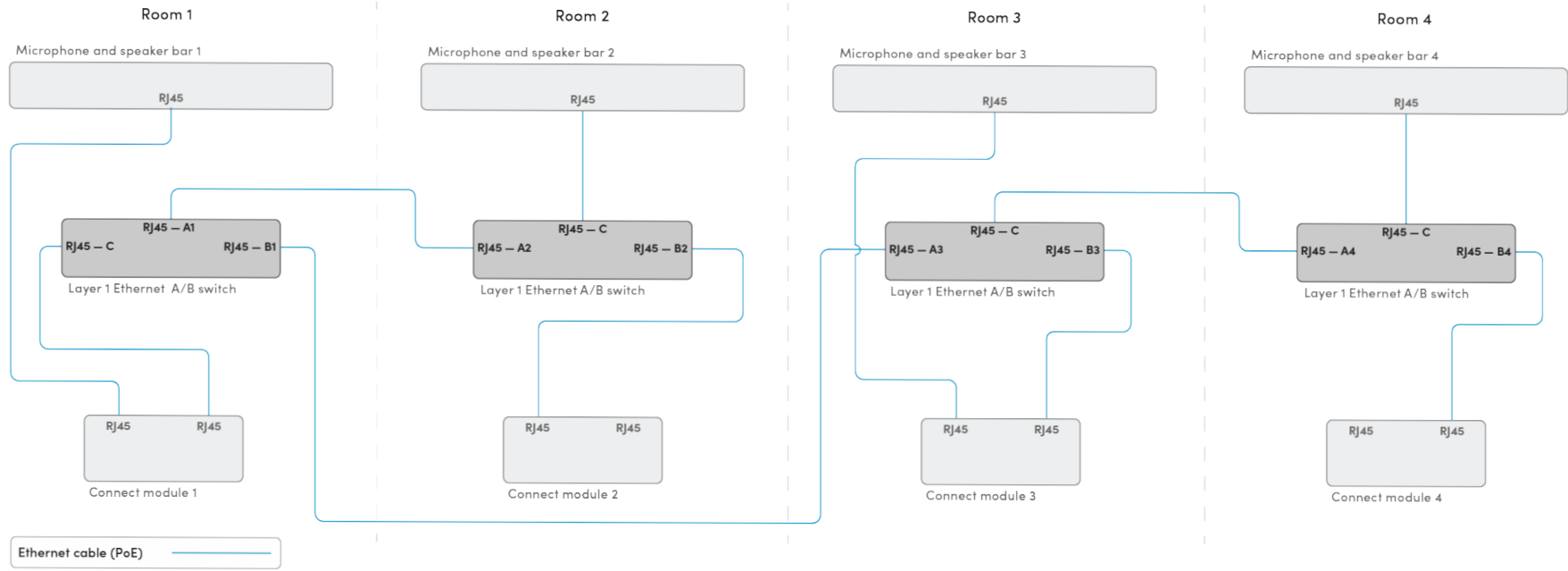


Solution components



A total of four microphone and speaker bars and four connect modules will be in use when the room is fully divided. Four Ethernet switches will be required.

Wiring diagram



System combination	Room 1 switch	Room 2 switch	Room 3 switch	Room 4 switch	Unused
All rooms divided	—	B2	—	B4	—
Rooms 1 & 2 divided Rooms 3 & 4 combined	—	B2	B3	A4	Connect module 4
Rooms 1 & 2 combined Rooms 3 & 4 divided	A1	A2	—	B4	Connect module 2
Rooms 1 & 2 combined Rooms 3 & 4 combined	A1	A2	B3	A4	Connect modules 2 & 4
All rooms combined	B1	—	A3	A4	Connect modules 2, 3 & 4 Microphone & speaker bars 2 & 3

More on recalibration of the HDL410 and HDL310

Earlier in this divisible rooms guide (see [The basics: Dividing one room into two](#)), recalibrating the system is the fourth step outlined in the process.

With the Nureva HDL410 and HDL310 systems, recalibration happens automatically when the connect module detects a microphone and speaker bar has been added or removed.

However, in certain scenarios, additional recalibration of individual systems will be required:

1. In complex room setups and operations involving multiple switches, there are situations where microphone and speaker bars are disconnected or reconnected and the system remains operating as an HDL410 or HDL310 device. In these cases, recalibration is still required but may not be automatically triggered, and the recalibration will need to be initiated manually.
2. If the sound insulation is insufficient, particularly in the dividing wall, the calibration tones for one room might be audible in the other room. In these cases, manually starting recalibration will be required in each room individually after the automatic recalibration process is complete.

Manually starting the recalibration process can be done using the remote control. The sequence is:

- Press F4 five times in quick succession. A single blue light will appear on the microphone and speaker bar.
- Press the Mute button on the remote control. The HDL310 or HDL410 will enter recalibration mode.

Also, refer later in this divisible rooms guide to [Audio configuration using Nureva local control API](#).

How to integrate with automation control

Since divided rooms often have motorized partitions and other electronically controlled devices, it sometimes makes sense for the audio equipment controls to be automated as well. Also, manually switching more than three network switches for different room layouts can lead to errors.

Nureva's divisible room solution can be integrated with an AV control system for automated operation.

Automated tasks and sequencing

Two automation tasks are typically required:

- Operating network switches after the room change is completed
- Triggering recalibration

Both of these automated tasks are made possible by integrating Nureva audio systems with an AV control system.

In divisible room configurations that require manually starting recalibration, the AV control system can be programmed to trigger recalibration. The routine practice of manually starting recalibration one room at a time can be set up with the Nureva local API. [See Audio configuration using Nureva local control API.](#)

Controllable layer 1 network switch

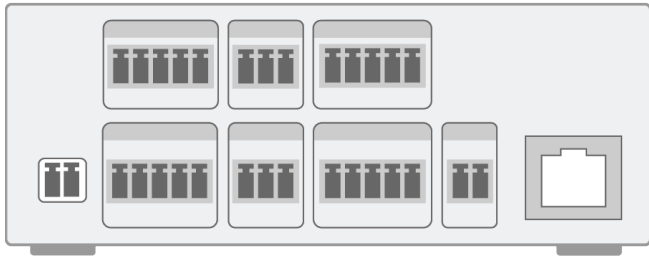
In the divisible room examples provided earlier in this guide, manual layer 1 Ethernet switches are included in the setups. However, to enable automation, controllable layer 1 Ethernet switches can be used instead of manual switches. An example of a suitable switch is the [L-Com® CAT 6 A/B Network Switch](#).



Layer 1 Ethernet switches can be controlled through relays, serial ports and IP interfaces. Both latching and non-latching types are available. For reliability, latching models that maintain the state through power failures are preferable over non-latching models, unless a fully redundant power source is provided.

AV control systems

The AV control system is integral to automating changes to the audio system in the divisible room. One example of a suitable AV control system is the [Extron® IPCP Pro 250](#) — it's a versatile, high-performance model designed for centralized AV control. Functions like motorized dividing walls, displays, computers, video streaming devices and lighting settings are all wired and programmed into the controller.



To integrate the Nureva divisible room solution with this type of AV control system, control of the layer 1 Ethernet switches needs to be added. The Extron IPCP Pro 250 series of controllers have RS-232, relay and LAN ports that can all be used to control the switches required for divisible rooms.

When setting up the automatic control process, it's important to ensure the switching of the microphone and speaker bars occurs after the room dividing panel has been placed in the correct position. This is required for recalibration of the audio system to run properly. When a controlled triggering of recalibration is needed, the Nureva local APIs can all be used by the controller to initiate this process.

Audio configuration using Nureva local control API

Nureva's APIs are available through the Nureva Developer Toolkit.

Nureva's audio device control API allows third-party control systems to adjust audio settings such as speaker volume and microphone mute.

The following manufacturers have developed integrations that allow control of Nureva audio devices via the local area network:

- Extron
- Crestron®
- Q-Sys™

[Local control system integrations](#)

Recalibration can be set up for one HDL310 or HDL410 device at a time to follow the automatic recalibration process.

Instructions and reference codes:

[Recalibrate device](#)

Further automation of the audio system controls is also possible with the Nureva local control API.

For example, in a combined room, the speaker volume could be set to maximum, but in the divided rooms the volume could be lowered a little. Speaker bass and treble settings could also differ, depending on the room configuration.

Instructions and reference codes:

[Change speaker volume](#)

[Adjust treble and bass](#)

Information on the IP address and port number is available in this article:

[Local control API prerequisites](#)

We are Nureva

We believe that amazing things happen when people come together. They imagine greater possibilities, create better solutions and find greater joy in how they work and learn. It's why we create and support truly original solutions that make it astonishingly easy for our customers to connect and collaborate no matter where they are.

Connect

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