MXA901-R

Ceiling Array Microphone

User guide for Shure MXA901 ceiling array microphone with IntelliMix DSP. Learn to use control software, install in many types of ceilings, and adjust coverage

Version: 0.3 (2024-H)

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MXA901-R
Ceiling Array Microphone

New in Firmware 6.2

Download firmware updates with Shure Update Utility.

- Improve automixer gating with the speech gating threshold and remove noise with enhanced noise filtering.
- Device web application now uses HTTPS
- New "automatic" setting options for noise reduction and the AEC's non-linear processing level. Processing adjusts in real time to changes in the acoustic environment.

General Description

Our sleekest ceiling array microphone yet, the MXA901 provides superb AV conferencing audio in a discreet and stylish 13.5-inch round form factor that complements any interior design. Single-Zone Automatic Coverage™ technology captures talkers clearly with no setup. Use one MXA901 in smaller rooms or multiple units in larger spaces. Onboard IntelliMix® DSP delivers echo- and noise-free audio, while next-generation array architecture ensures natural speech and enhanced directional pickup.

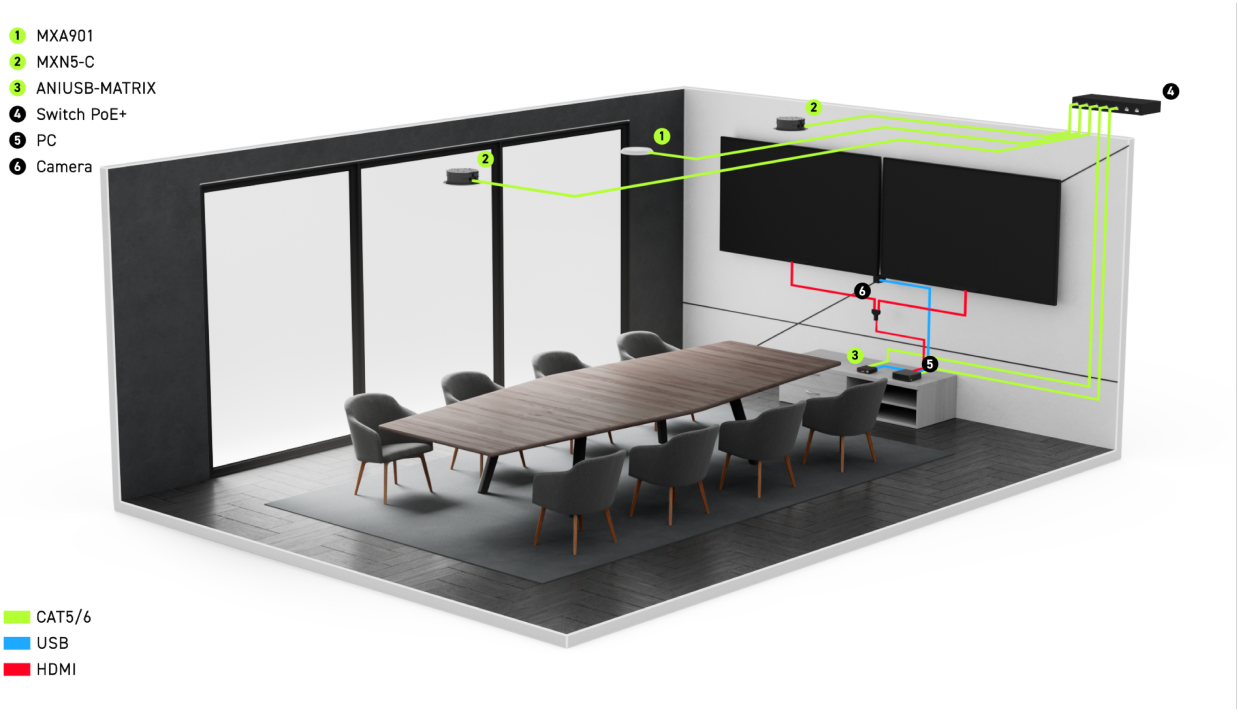
Features

- Single-Zone Automatic Coverage technology captures audio from a 20 by 20-foot (6 by 6 meter) area out of the box
- Onboard IntelliMix DSP with acoustic echo cancellation, noise reduction, automatic mixing, automatic gain control, and EQ for echo- and noise-free audio
- Round 13.5-in. diameter (34 cm) form factor with white, black, or aluminum finish
- On-ceiling mounting bracket included; versatile options for on-ceiling, in-ceiling, pole, rod, or suspension mounting available
- Shure Designer System Configuration software for easy setup and configuration
- Embedded web application for setup flexibility
- LED status bar with configurable colors and brightness
- Dante and AES67 audio networking protocols

Getting Started

Videoconferencing Room Equipment

Your Microflex® microphone is one part of a complete room system for videoconferencing. It's helpful to think about all the parts of your room system as you get started setting up the microphone.



Medium room equipment example

A standard room includes some or all of this equipment:

- Microphone(s)
- DSP or other processor
- Loudspeakers (networked or analog)
- Computer with videoconferencing software
- Network switch
- Camera
- Other accessories such as table mute buttons, tablets to control meetings, and other peripherals

The Microflex Ecosystem offers a complete portfolio of networked audio solutions that can be precisely tailored to your needs.

What Software Do I Need to Set Up This Microphone?

Install this software on a computer that connects to the same network as the microphone:

- **Control software** to adjust microphone settings. This microphone has 2 options:

  Option 1: Shure Designer

  - Use for managing lots of Shure devices in 1 place
  - Control Shure devices and route audio between them
  - Create rooms to manage devices and design coverage

  Option 2: Web application (open using Shure Update Utility)

  - Use to manage each Shure device separately
  - Control each device individually with its web application
  - Route audio using Dante Controller
- **Dante Controller** to send audio signals to other Dante devices. Not necessary if you're only routing audio to Shure devices in Designer.

- **Shure Update Utility** to update firmware on Shure devices and open device web applications (download at shure.com/suu)

MXA901 Designer Setup Example

This example uses Shure Designer 6.0 software to set up an MXA901, an ANIUSB-MATRIX, and 2 MXN5-C loudspeakers. You might use Designer if:

- You're managing many Shure devices in different spaces
- You're routing audio between many Shure devices

You can use other combinations of devices with the MXA901, but the setup process in Designer is similar.

After completing this basic setup process, you should be able to:

- Access the MXA901 in Designer
- Route audio and adjust DSP settings
- Understand the basic workflow for working with devices in Designer

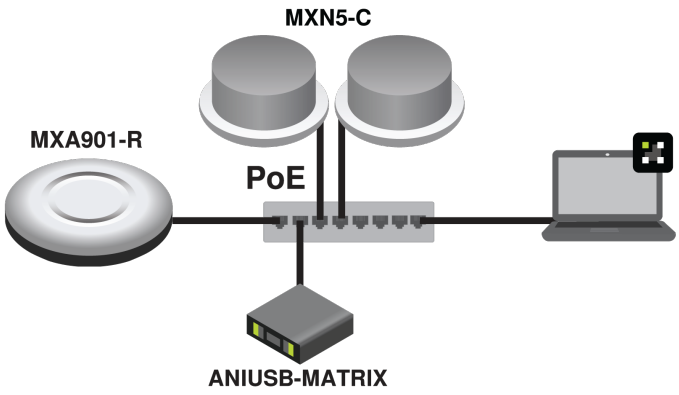
This example uses:

- Cat5e (or better) Ethernet cable
- Network switch that provides Power over Ethernet (PoE)
- Computer with Designer 6.0 or newer (download at shure.com/designer)
- Computer with videoconferencing software
- ANIUSB-MATRIX
- 2 MXN5-C loudspeakers

Step 1: Install and Connect

The MXA901 has a 20 x 20-foot (6.1 x 6.1 m) coverage area. The maximum recommended mounting height is 12 feet (3.7 m).

The microphone intelligently adjusts coverage for all talkers in the coverage area. IntelliMix DSP ensures a clear signal for the far end with AEC, noise reduction, and more.



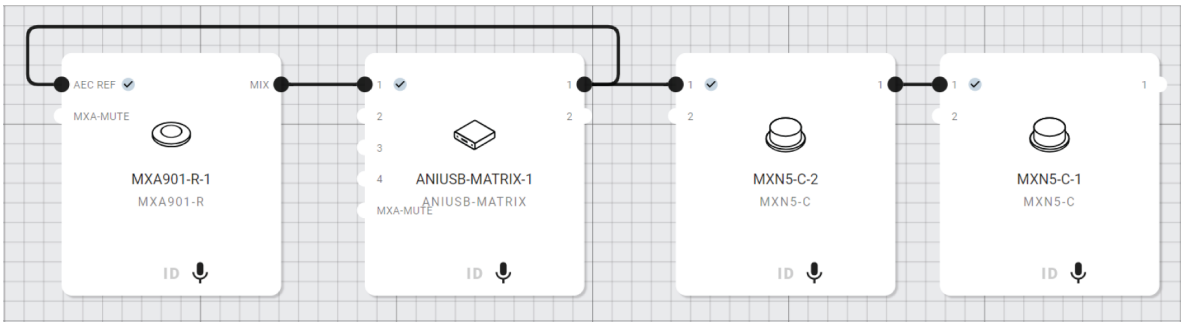
1. Install the MXA901 and other devices. Connect all devices to PoE ports on the network switch using Ethernet cable.
2. Connect the computer running Designer to the same network.
3. Open Designer. Check that you're connected to the correct network in `File` > `Designer preferences`.
4. Open a new design and drag the devices into the design.

Step 2: Route Audio and Apply DSP

The easiest way to route audio and apply DSP is with Designer's auto route feature. This feature routes audio signals, applies DSP settings, turns on mute synchronization, and enables LED control for connected devices.

1. Select Auto route. Designer makes the following routes:
   - MXA901 to ANIUSB-MATRIX
   - ANIUSB-MATRIX USB output to computer with videoconferencing software
   - ANIUSB-MATRIX Dante output to MXA901 AEC reference and MXN5-C loudspeakers

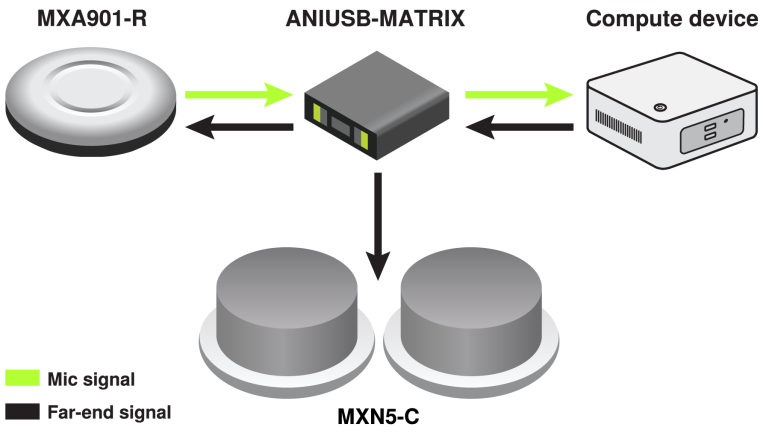
   You can also route audio manually in Designer or use Dante Controller.



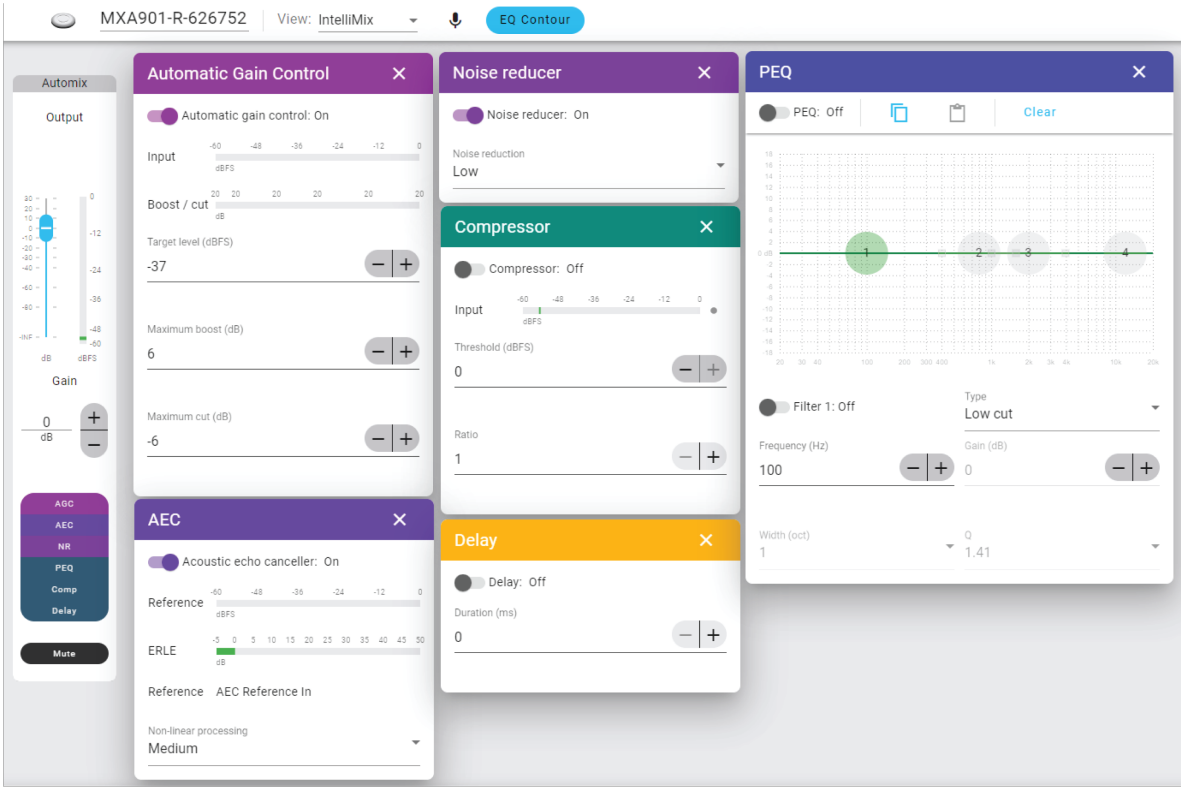
2. Check the audio routes, matrix mixer routes, and other settings to make sure they fit your needs.
3. Select Deploy and connect to send the settings to the installed devices. Designer walks you through associating the design devices with the online devices.

Step 3: Listen and Adjust

1. Connect the computer with videoconferencing software (such as Zoom or Microsoft Teams) to the ANIUSB-MATRIX's USB port.



2. Open the videoconferencing software on the computer connected to the ANIUSB-MATRIX. In the settings, choose the ANIUSB-MATRIX as the speaker and microphone.
3. Place a test call with the whole system and have the far-end caller tell you how your microphone signal sounds. Make gain, EQ, or DSP adjustments in the MXA901's IntelliMix tab.



4. If needed, move the microphone's coverage area in the room's Coverage tab.

   You can also listen to the microphone signal directly using a Dante headphone amp to help make adjustments.

MXA901 Web Application Setup Example

This example uses device web applications and Dante Controller to connect an MXA901 and an ANIUSB-MATRIX. You might use web applications and Dante Controller if:

- You don't have many Shure devices to manage
- You need to route audio to third-party Dante devices

You can use other combinations of devices with the MXA901, but setup process is similar if you're working with web applications and Dante Controller. After completing this basic setup process, you should be able to:

- Open the MXA901's web application
- Route audio and adjust DSP settings
- Understand the basic workflow for working with device web applications and Dante Controller

This example uses:

- Cat5e (or better) Ethernet cable
- Network switch that provides Power over Ethernet (PoE)
- Computer with Shure Update Utility and Dante Controller software
- ANIUSB-MATRIX

Step 1: Install and Connect

The MXA901 has a 20 x 20-foot (6.1 x 6.1 m) coverage area. The maximum recommended mounting height is 12 feet (3.7 m).

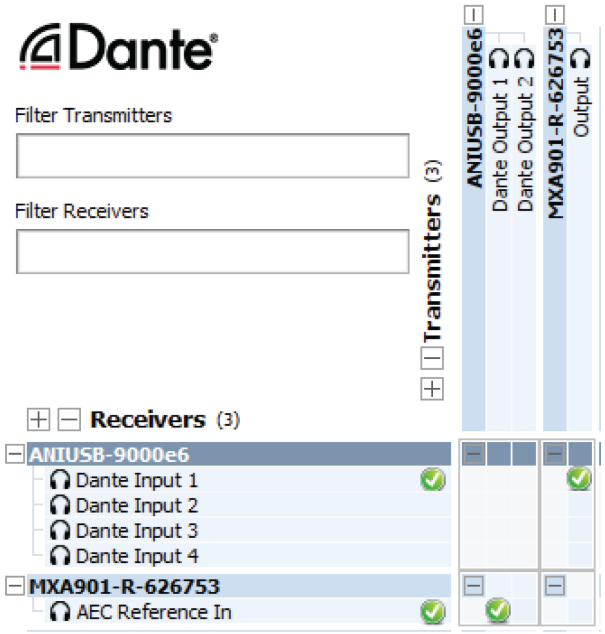
The microphone intelligently adjusts coverage for all talkers in the coverage area. IntelliMix DSP ensures a clear signal for the far end with AEC, noise reduction, and more.

1. Install the MXA901 and other devices. Connect devices to PoE ports on the network switch using Ethernet cable.
2. Connect a computer with Shure Update Utility and Dante Controller software to the same network.
3. Open Shure Update Utility. Find the MXA901 in the list of online devices and double-click to open the microphone's web application.

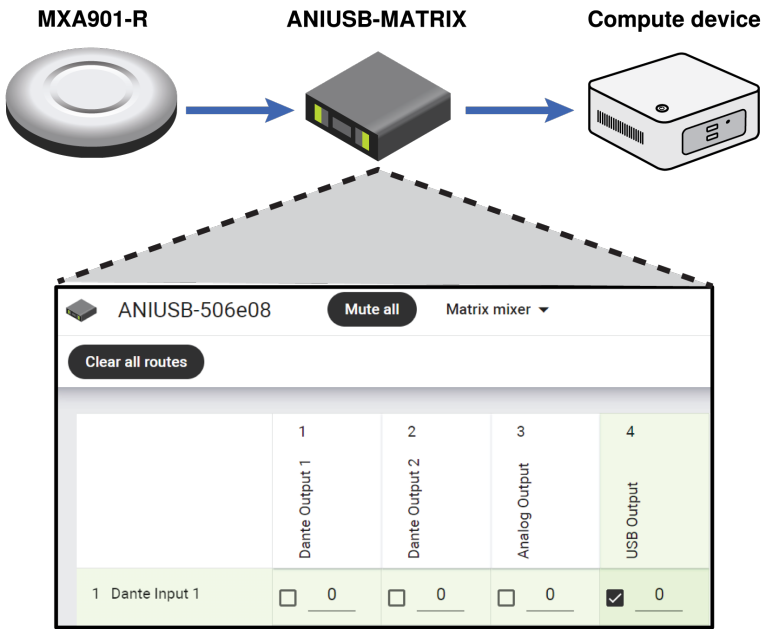
Step 2: Route Audio

Use Dante Controller to route audio to and from other Dante devices. We'll route the MXA901's microphone signal to an ANIUSB-MATRIX for this example.

1. Open Dante Controller and find both devices in the list of transmitters and receivers.
2. Make these routes:
   - MXA901 automix output to ANIUSB-MATRIX input
   - ANIUSB-MATRIX output to MXA901 AEC reference input. The AEC reference signal is usually the same one that feeds the room's loudspeakers.



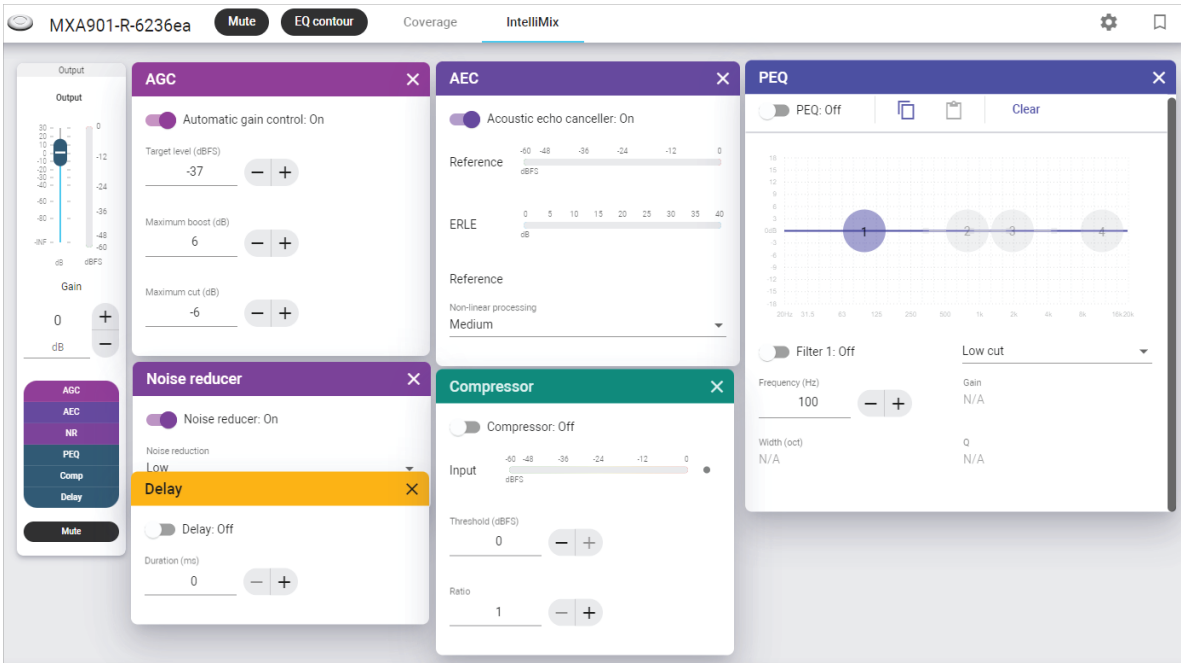
3. Send audio from the ANIUSB-MATRIX to other sources using the ANIUSB-MATRIX's matrix mixer. Open the ANIUSB-MATRIX web application with Shure Web Device Discovery. A common destination is a computer connected by USB with videoconferencing software (such as Zoom or Microsoft Teams).



4. In your videoconferencing software, select the correct microphone and loudspeaker sources.

Step 3: Listen and Adjust

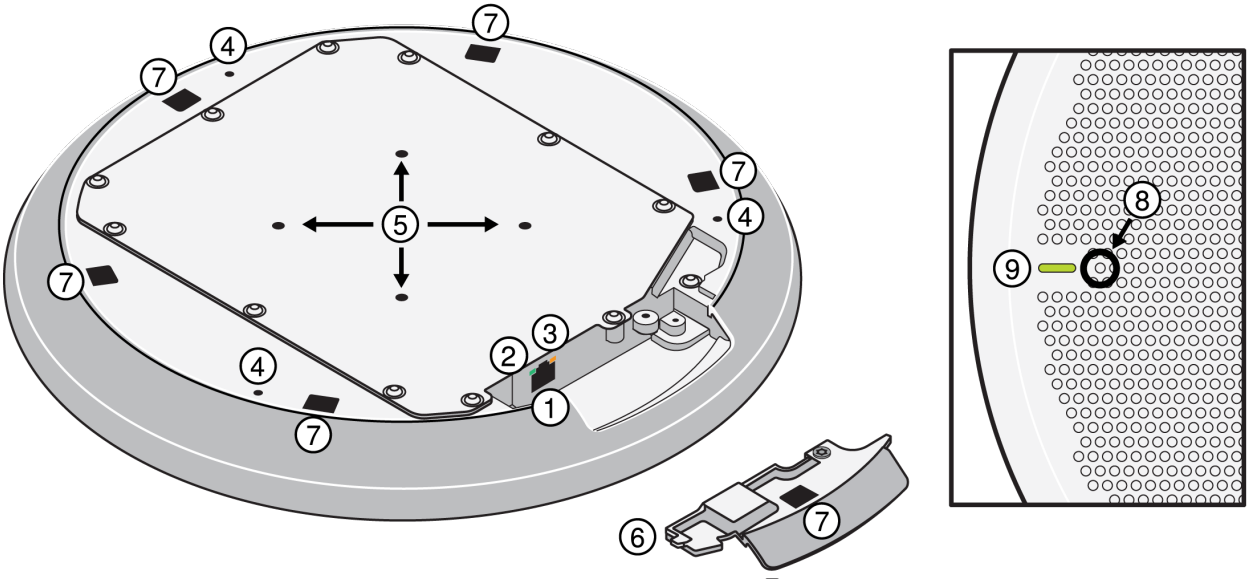
1. Place a test call with the whole system and have the far-end caller tell you how your microphone signal sounds. Make gain, EQ, or DSP adjustments in the MXA901's IntelliMix tab.



2. If needed, move the microphone's coverage area in the Coverage tab.

   You can also listen to the microphone signal directly using a Dante headphone amp to help make adjustments.

MXA901-R Parts



1. RJ-45 network port
2. Network status LED (green)
   - Off = No network link
   - On = Network link established
   - Flashing = Network link active
3. Network speed LED (amber)
   - Off = 10/100 Mbps
   - On = 1 Gbps
4. Eyelet screw holes for suspension mounting
5. VESA MIS-D mounting holes (75 mm square)
6. Removable cover for network port
7. Holes for pole mount and Gripple mount cover clips
8. Reset button
9. Mute status LED

Customize LED color and behavior in the control software: `Settings` > `Lights`.

MXA901 Mute Status LED Default Settings

Microphone Status	LED Color/Behavior
Active	Green (solid)
Muted	Red (solid)
Hardware identification	Green (flashing)
Firmware update in progress	Green (progresses along bar)
Reset	**Network reset:** Red (progresses along bar)

Microphone Status	LED Color/Behavior
	Factory reset: Triggers device power-up
Error	Red (split, alternate flashing)
Device power-up	Blue (moves quickly back and forth across bar)

Note: *If LEDs are off, they will still turn on when the device powers up or when an error state occurs.*

If the MXA901 is in a room that uses Designer's call status feature, the mute status LEDs are off when not in a video-conferencing call.

Power Over Ethernet (PoE)

This device requires PoE to operate. It is compatible with **Class 0** PoE sources.

Power over Ethernet is delivered in one of the following ways:

- A network switch that provides PoE
- A PoE injector device

Model Variations

SKU	Description
MXA901AL-R	Aluminum round microphone
MXA901B-R	Black round microphone
MXA901W-R	White round microphone

Optional Accessories

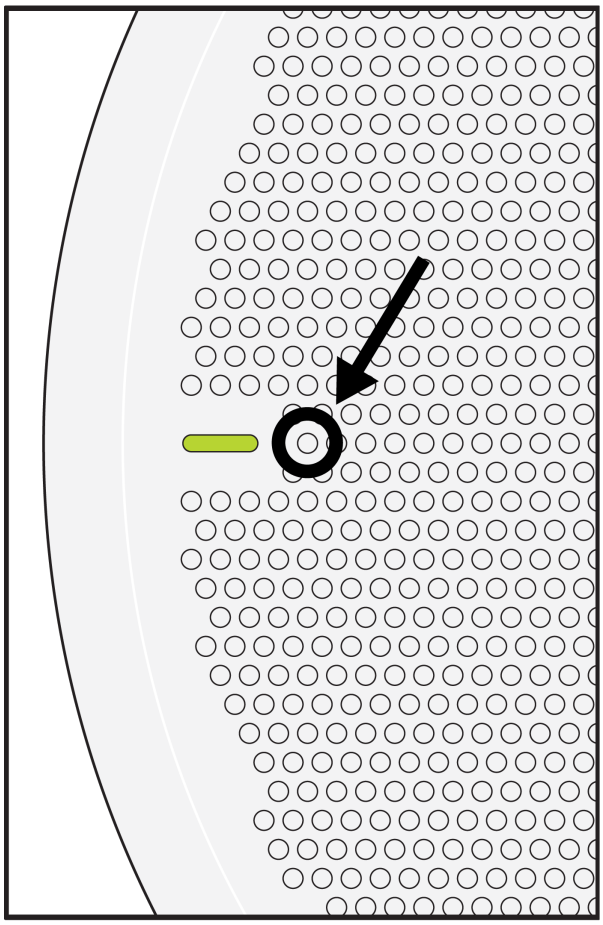
- A901B-R-GM: Gripple suspension mount kit with black cover
- A901W-R-GM: Gripple suspension mount kit with white cover
- A901B-R-PM-1.5IN: 1.5-in. pole mount kit with black cover
- A901W-R-PM-1.5IN: 1.5-in. pole mount kit with white cover
- A901B-R-PM-3/8IN: 3/8-in. pole mount kit with black cover
- A901W-R-PM-3/8IN: 3/8-in. pole mount kit with white cover
- A901-R-TB tile bridge kit
- A901-R-HCM ceiling mount

What's in the Box

Array microphone	MXA901-R
Hardware kit with: **Network port cover** **Surface mount** **Round VESA bracket** **M4 screws (4)**	RPM901-R-INSTALL KIT

Reset Button

The reset button is behind the grille. To push it, use a paper clip or other tool. You can also use the control software to reset the device.



Reset Modes

- **Network reset** (press for 4-8 seconds): Resets all Shure control and audio network IP settings to factory defaults. Red LED along bar.
- **Full factory reset** (press for more than 8 seconds): Resets all network and configuration settings to the factory defaults. Blue LED along bar.

MXA901 Control Software

There are 2 ways to control the MXA901:

1. Use Shure Designer software
    - Control all Shure devices in one place
    - Route audio to and from Shure devices

2. Access the MXA901's web application with Shure Update Utility
    - Control 1 microphone at a time
    - To route audio, use Dante Controller software

Control Devices with Shure Designer Software

To control this device's settings, use Shure Designer software. Designer enables integrators and system planners to design audio coverage for installations using MXA microphones and other Shure networked devices.

To access your device in Designer:

1. Download and install Designer on a computer connected to the same network as your device.
2. Open Designer, and check that you're connected to the correct network in `File` > `Designer preferences`.
3. Click Online devices. A list of online devices appears.
4. To identify devices, select a device and click ID in the Properties menu. Double-click the device to open the settings.

From here, you can add devices to designs or online rooms and route audio to other Shure devices. Learn more at shure.com/designer.

You can also access device settings using Shure Web Device Discovery.

Open the Web Application with HTTPS

This device's browser-based web application uses an HTTPS connection for confidentiality and authenticity. HTTPS encrypts most information sent between the device and the web application.

To open the web application:

1. Open Shure Update Utility and check that you're connected to the same network as the device.
2. Double-click the device's IP address to open the web application in your browser.
3. The web application uses self-signed certificates. You may see a warning message in your browser the first time you open the web application. Click Advanced and select the option to trust the connection.

To control HTTPS settings, go to `Settings` > `Services` in Designer or the web application.

Available in firmware 6.2 and newer

Firmware Updates

Firmware is embedded software in each component that controls functionality. Periodically, new versions of firmware are developed to incorporate additional features and enhancements. You can install firmware using Shure Update Utility.

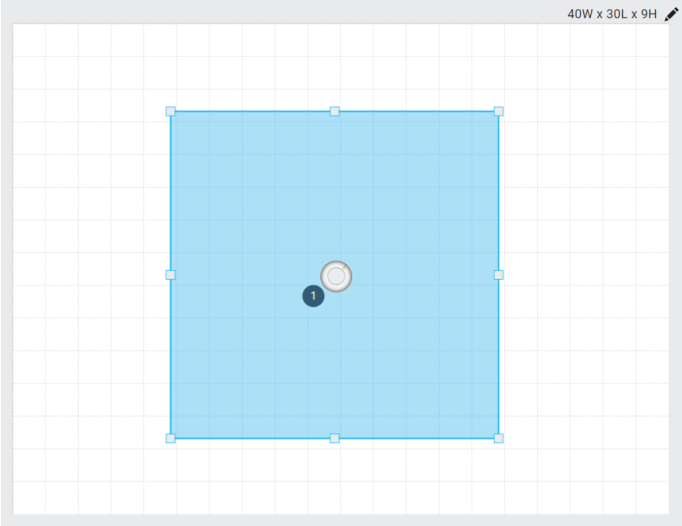
Download Shure Update Utility at shure.com.

MXA901 Coverage

The MXA901 uses Single-Zone Automatic Coverage technology. There is one 20 x 20-foot (6.1 x 6.1 m) coverage area that captures every talker in it with minimal configuration.

To access microphone coverage settings:

- **Designer:** Add the microphone to a room and go to Coverage.
- **Web application:** Go to Coverage.



Any talker in the blue coverage area has microphone coverage. Click and drag to move the coverage area up to 4 feet (1.2 m) in any direction.

The MXA901 provides 1 automixed output with IntelliMix DSP for the far end. For most rooms, all you need to do is install the microphone above the coverage area and route the audio signal using Shure Designer software or Dante Controller.

Tips for Great Coverage

- Move the coverage area to match where people sit in the room.
- If using multiple MXA901s in a space, set up the coverage areas so they don't overlap.

How Much Space Does the MXA901 Cover?

The MXA901's microphone coverage area is set at 20 x 20 feet (6.1 x 6.1 m). For most rooms, Shure recommends:

- Maximum distance from talker to microphone: 16 feet (4.9 m)
- Maximum mounting height: 12 feet (3 m)

The maximum distance from talker to microphone and maximum mounting height also depend on your room's acoustics, construction, and materials. Acoustically treated rooms that are less reverberant generally sound better and help improve your microphone signal.

Note: This microphone has fixed array height and talker height settings. Array height = 9 feet (2.7 m). Talker height = 4 feet (1.2 m).

Using Autofocus™ to Improve Coverage

This microphone uses built-in Autofocus technology to fine-tune microphone coverage in real time, even if meeting participants lean back or stand up. On microphones that show steerable lobes for coverage (such as the MXA710 or MXA920), you'll see the lobes moving in the coverage map as participants change positions. Autofocus only responds to in-room sound sources.

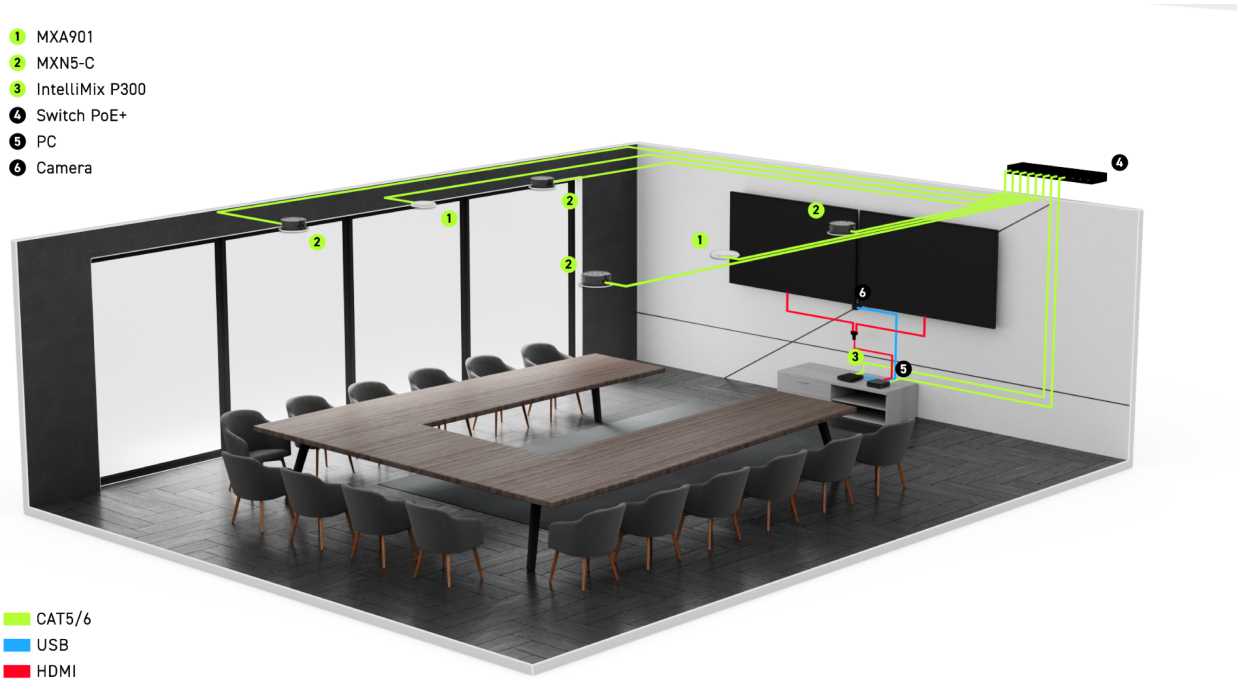
To turn Autofocus on or off, go to: `Coverage` > `Select device` > `Properties` > `Coverage`.

Important: Always route a reference signal to the microphone's AEC reference in channel to take full advantage of Autofocus. You should set up this reference signal even if you're using a separate DSP or direct outputs (on applicable microphones).

Use Case: 2 MXA901s in a Room

In larger spaces, you can use multiple MXA901s to pick up all talkers. This example uses:

- 2 MXA901s
- 4 MXN5-C loudspeakers
- 1 P300



Tips for Working with Multiple MXA901s

- Use Designer so that you can see the coverage area for each microphone on the same coverage map.
- Set up coverage areas so that they don't overlap.
- Route microphone signals to a processor with an automixer. The automixer mixes the signal from each MXA901 based on who is talking.
  - Shure options: P300 or a PC with IntelliMix Room software
  - The ANIUSB-MATRIX works best with 1 microphone because it doesn't have an automixer.

Use Designer's Auto Route

Designer's auto route speeds up the process of connecting systems with 1 audio processor and at least 1 microphone. Auto route also creates mute control routes in rooms with MXA network mute buttons. When you select Auto route, you can direct Designer to:

- Create audio routes and mute control routes
- Adjust audio settings
- Turn on mute synchronization
- Enable LED logic control for applicable devices

The settings are optimized for your particular combination of devices. You can adjust settings further, but auto route gives you a good starting point. Auto route works with any device in Designer.

To use auto route:

1. Place all relevant devices in a design.
2. Select Auto route. Designer optimizes microphone and DSP settings for your equipment combination.

   If you remove or add devices, select Auto route again.

   Note: The auto route process clears any manual routes you may have made in your design.

After auto routing a room, check and adjust settings to fit your needs. You may need to:

- Delete unnecessary routes.
- Check levels and adjust gain.
- Check that AEC reference signals are correctly routed and received in a test call.
- Fine-tune DSP blocks.
- Adjust your processor's matrix mixer routes.

If you want to auto route an online room, turn on online room editing in `File` > `Designer preferences`.

Note: Changes to an online room may cause audio to briefly drop out.

Refer to Designer's Troubleshooting section for help with routing.

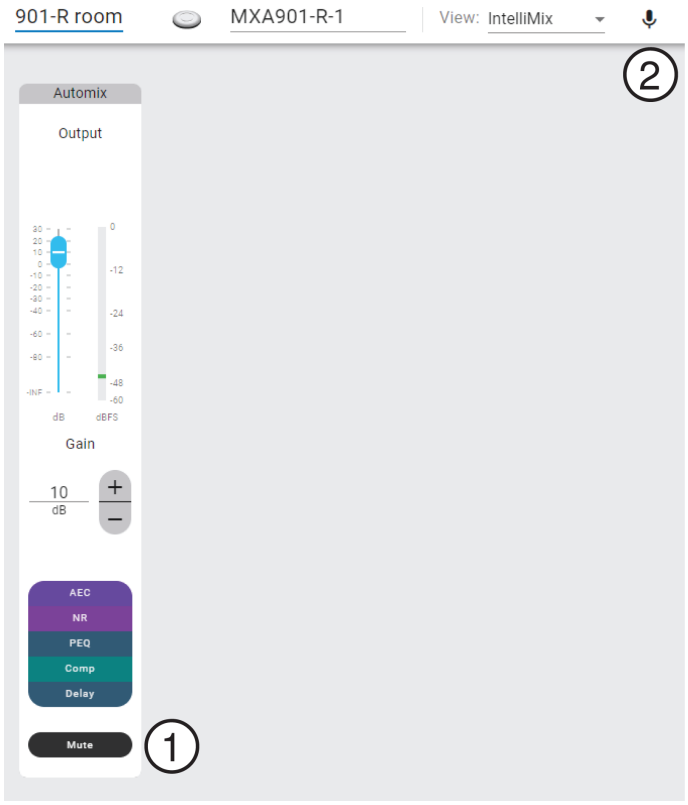
Adjust Microphone Levels

To adjust microphone gain, open the MXA901 in the control software and go to IntelliMix.

1. Make a test call with your videoconferencing software.
2. Talk in all parts of the coverage area at a normal speech volume and have someone on the far end listen to your signal. Adjust gain as needed. The coverage area gain fader is post-gate.
3. Adjust EQ settings as needed. You can use EQ to improve speech intelligibility and control problematic frequencies in a room (such as a low-frequency rumble caused by HVAC systems). You can also make changes to IntelliMix DSP blocks here.
4. If needed, listen to the microphone signal directly using a Dante headphone amp or with Dante Virtual Soundcard.

Mute the MXA901

The MXA901 has 2 mute points:



1. **IntelliMix output mute:** Mutes the IntelliMix output channel
2. **Device mute:** Mutes the microphone. This mute button also changes the mute status LED. The mute icon on Routing page is for device mute.

Speech Gating Threshold and Enhanced Noise Filtering

Speech gating threshold and enhanced noise filtering work together to enhance the microphone's sound.

- **Speech gating threshold:**
  - Improves automixer gating
  - Focuses on speech sources over noise sources
- **Enhanced noise filtering:**
  - Removes noise from the automix output signal
  - Is designed for noises that are inside a microphone’s coverage area but that are not located next to a person talking

Examples of noise include:

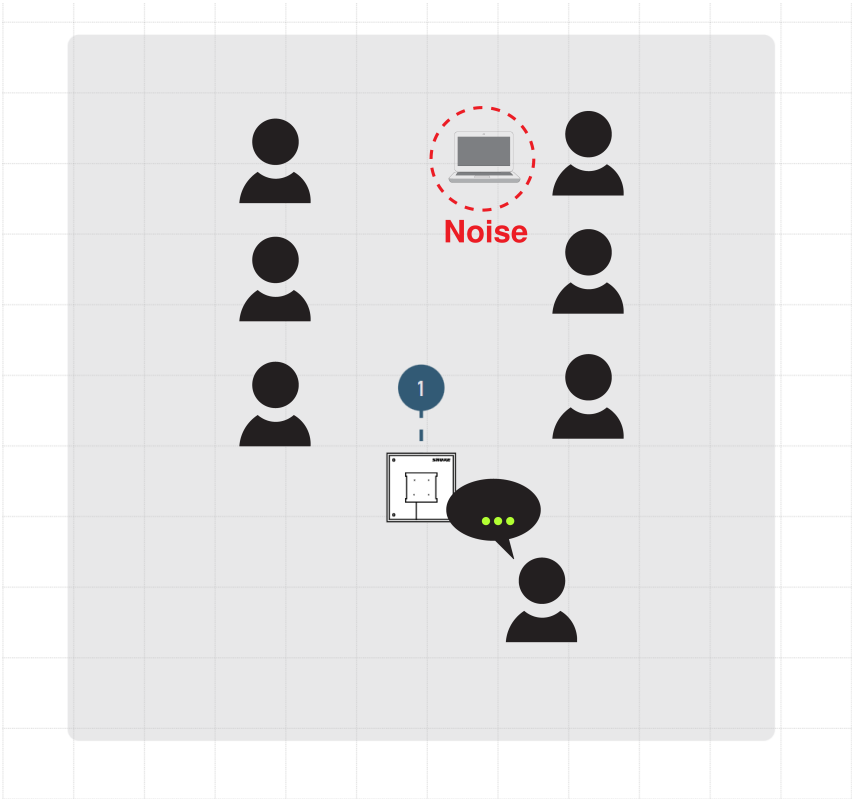
- Shuffling papers across the table from a person talking
- Keyboard across the table from a person talking
- Loud food container across the table from a person talking

Shure DSP Features for Noise

DSP Feature	Purpose	Available in:
Noise reduction	Removes constant background noise (such as HVAC)	All devices with IntelliMix DSP

DSP Feature	Purpose	Available in:
Enhanced noise filtering	Removes noise sources that: Are in the microphone's coverage area Are not immediately next to a person talking. Example: If a person talking opens a bag of chips, you will still hear the bag.	Firmware 6.2 and newer for: MXA710, MXA901, MXA902: On or off settings MXA920: Low, medium, or high settings
AI denoiser	Removes any noise, even noise that happens immediately next to a person talking	IntelliMix Room software

In this example, enhanced noise filtering removes loud typing sounds happening on one end of the coverage area and focuses on the person speaking.



To use speech gating threshold and enhanced noise filtering:

1. In the microphone's control software, go to `IntelliMix` > `Properties`. Scroll down to turn on the 2 settings.
2. Make a test call. Have someone on the far end tell you how the signal sounds and adjust as needed.

Note: If the microphone is routed to IntelliMix Room and you're using the AI denoiser feature, turn off enhanced noise filtering.

How to Install the MXA901

There are many ways to install the MXA901 to get great coverage in small- to medium-sized meeting rooms.

Installation Best Practices

- Don't place the microphone behind obstructions.
- Coverage depends on your room's acoustics, construction, and materials. Take these into consideration when planning.
- For most rooms, Shure recommends 12 feet (3.7 m) as the maximum mounting height.

Mounting Options

- Surface mount accessory (included)
- 1.5-in. NPT pole
- 3/8-in. threaded rod
- Suspend from ceiling
- Drywall ceiling
- Ceiling tile
- VESA mounting device

Install the MXA901-R on a Ceiling

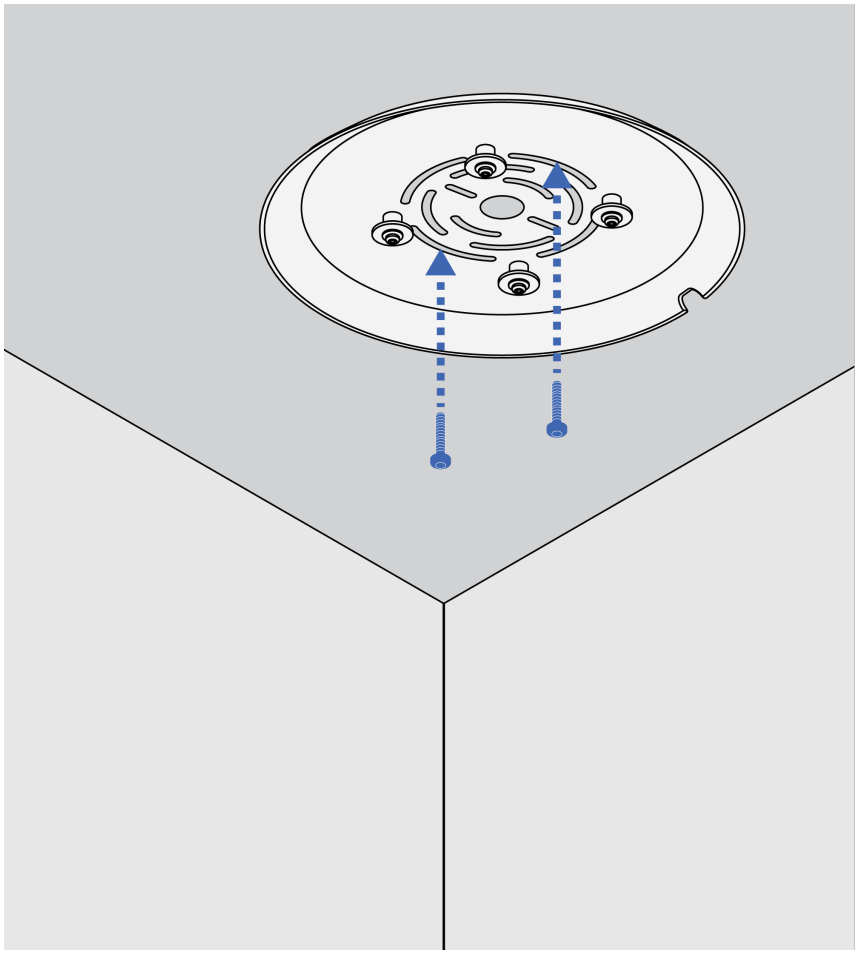
Use the included surface mount to attach MXA901-R microphones to junction boxes or wood ceiling joists. You can route the Ethernet cable through the hole in the center of the mount or out the side.

To get started, you will need:

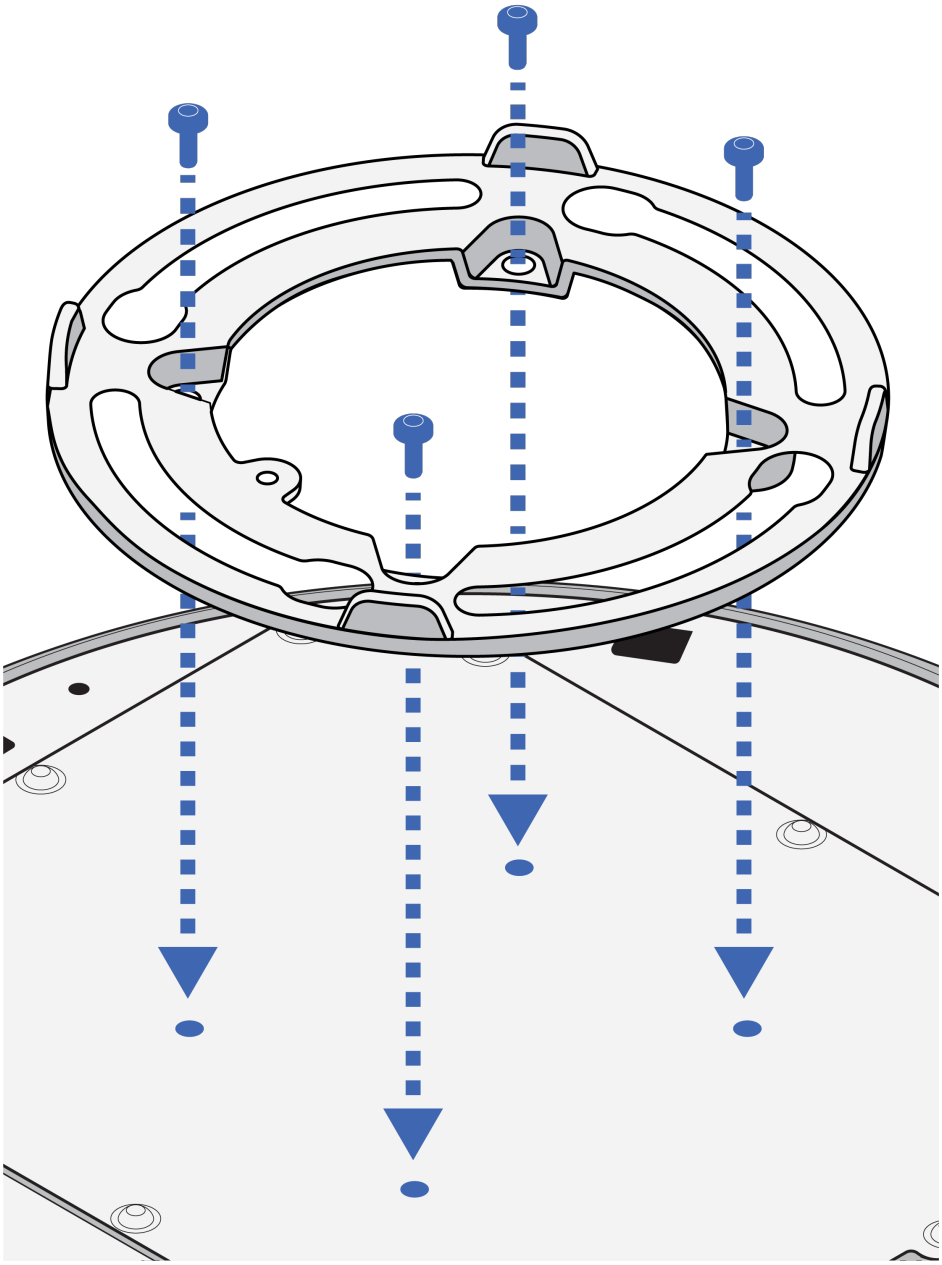
- Surface mount
- Round VESA bracket
- M4 screws (4)
- Screws to attach surface mount to ceiling (drywall anchors not recommended)*
- Ethernet cable*

*Not included

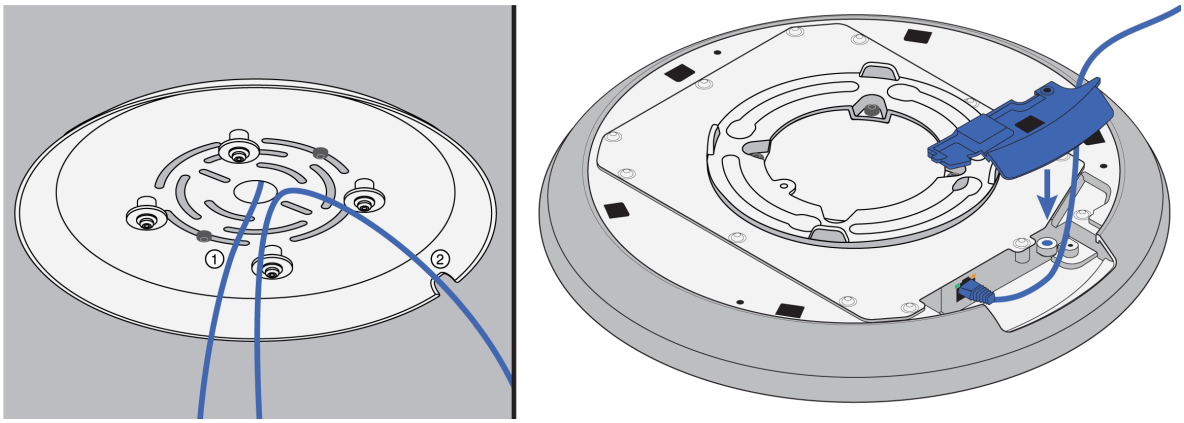
1. Install the surface mount on a junction box or wood ceiling joist using a minimum of 2 screws. Follow any local regulations.



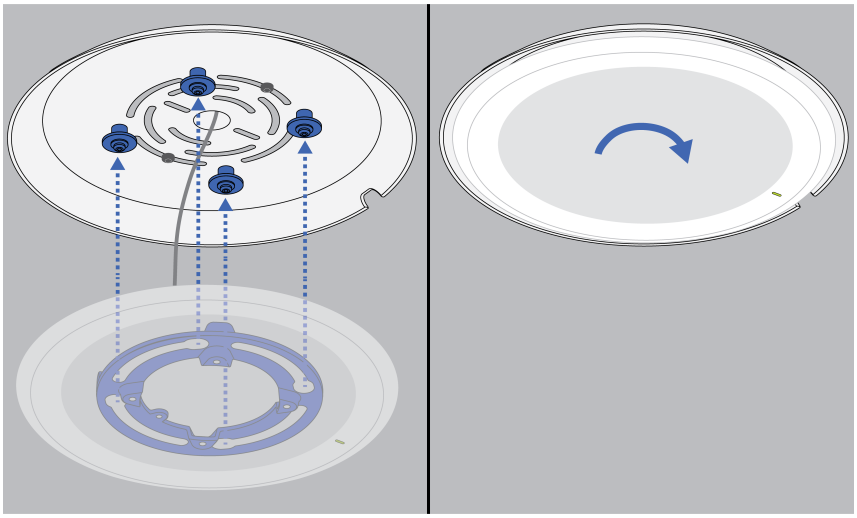
2. Attach the round VESA bracket to the microphone using the 4 included M4 screws.



3. Route the Ethernet cable. The cable can route through the hole in the surface mount (1) or out the side (2). Connect it to the microphone and install the network port cover.



4. Align the 4 openings on the round VESA bracket with the 4 posts on the surface mount. Lift the microphone into the surface mount and turn it to the right until it's fully secured in the surface mount.



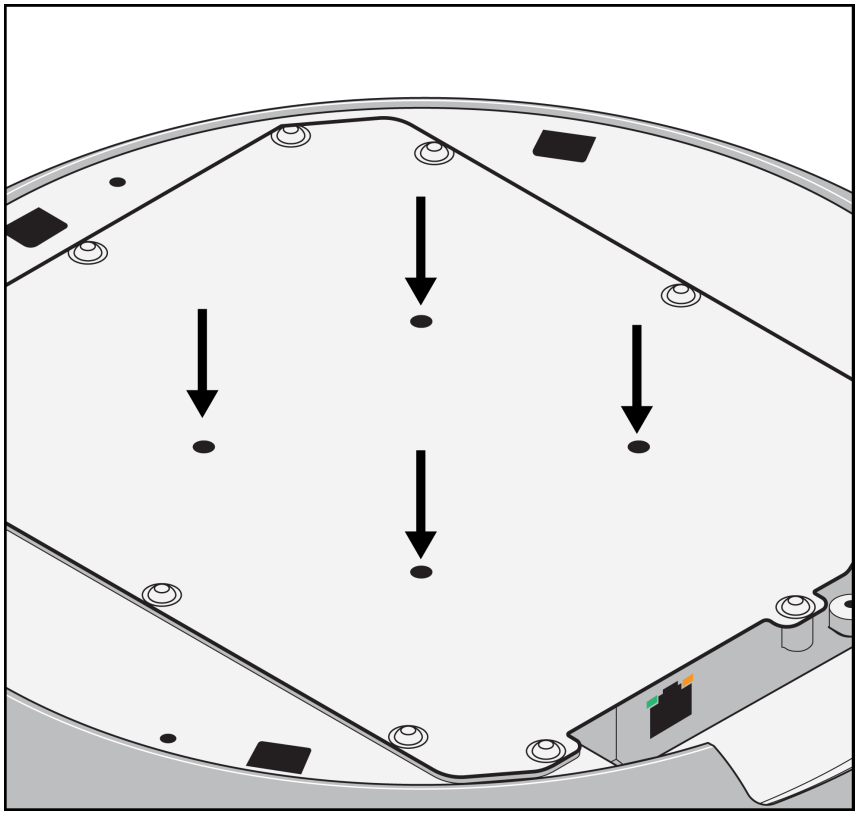
Tip: The microphone rotates 90° clockwise to lock into position. Use this as a guide to plan how to orient the mute status LED in your space.

5. To remove the microphone from the surface mount, turn it all the way to the left and lift it down.

To adjust the microphone's LED position:

1. Remove the microphone from the surface mount.
2. Slightly loosen the screws holding the surface mount in place.
3. Rotate the surface mount to the desired position and tighten the screws again. Reinstall the microphone to check the LED's position. Repeat as needed.

VESA Standardized Mounting



The rear plate has 4 threaded holes for attaching the microphone to a VESA mounting device. The mounting holes follow the VESA MIS-D standard:

- Screw specification: M4 thread (hole depth = 9.15 mm)
- Hole spacing: 75 mm square

Follow any local regulations when using VESA mounting devices.

Dante Channels

The MXA901 has:

- 1 automix output with IntelliMix DSP
- 1 AEC reference input

IntelliMix DSP

This device contains IntelliMix digital signal processing blocks that can be applied to the microphone's output. The DSP blocks include:

- Acoustic echo cancellation (AEC)
- Automatic gain control (AGC)

- Noise reduction
- Compressor
- Delay

To access, go to the IntelliMix tab.

DSP Best Practices

- Apply DSP blocks as needed. Run a test of your system without DSP, and then add processing as needed to fix any issues that you hear in the audio signal.
- Unless you encounter video that lags behind audio, set delay to off.

Acoustic Echo Cancellation

In audio conferencing, a far-end talker may hear their voice echo as a result of a near-end microphone capturing audio from loudspeakers. Acoustic echo cancellation (AEC) is a DSP algorithm which identifies the far-end signal and stops it from being captured by the microphone to deliver clear, uninterrupted speech. During a conference call, the AEC works constantly to optimize processing while far-end audio is present.

When possible, optimize the acoustic environment using the following tips:

- Reduce loudspeaker volume
- Position loudspeakers farther from microphones
- Avoid pointing loudspeakers directly at microphone coverage areas
- If the microphone is providing AEC on the automix output, turn off AEC on the processor. Designer's auto route applies these settings automatically.

Select a Reference Signal for AEC

To apply AEC, provide a far end reference signal. For best results, use the signal that also feeds your local reinforcement system.

- **P300:** Go to Schematic and click any AEC block. Choose the reference source, and the reference source changes for all AEC blocks.
- **MXA710, MXA901, MXA910, MXA920:** Route a far-end signal to the AEC Reference In channel.
- **IntelliMix Room:** Go to Schematic and click an AEC block. Choose the reference source. Each block can use a different reference source, so set the reference for each AEC block. When stereo audio is on, you can set different left and right channel reference sources as needed.

Designer's auto route process automatically routes an AEC reference source. However, you should check that Designer chooses the reference source you want to use.

Note: Always send an AEC reference signal to microphones with AEC processing, even if you are using a separate DSP for AEC. Designer's auto route feature automatically creates these routes.

AEC Settings

Reference Meter	Use the reference meter to visually verify the reference signal is present. The reference signal should not be clipping.
ERLE	Echo return loss enhancement (ERLE) displays the dB level of signal reduction (the amount of echo being removed). If the reference source is connected properly, the ERLE meter activity generally corresponds to the reference meter.

Reference	Indicates which channel is serving as the far end reference signal.
Non-Linear Processing	The primary component of the acoustic echo canceller is an adaptive filter. Non-linear processing supplements the adaptive filter to remove any residual echo caused by acoustic irregularities or changes in the environment. Use the lowest possible setting that is effective in your room. **Low:** Use in rooms with controlled acoustics and minimal echoes. This setting provides the most natural sound for full duplex. **Medium:** Use in typical rooms as a starting point. If you hear echo artifacts, try using the high setting. **High:** Use to provide the strongest echo reduction in rooms with bad acoustics, or in situations where the echo path frequently changes. **Auto (default)*:** For best results, use this setting. The non-linear processing level automatically adapts to changes in the acoustic environment.

* Auto setting available in firmware 6.2 and newer for MXA920, MXA902, MXA901, and MXA710

Noise Reduction

Noise reduction significantly reduces the amount of background noise in your signal caused by projectors, HVAC systems, or other environmental sources. It is a dynamic processor, which calculates the noise floor in the room and removes noise throughout the entire spectrum with maximum transparency.

Settings

Options: Low, medium, high, or auto*

The noise reduction setting reflects the amount of reduction in dB. For best results, use the auto setting so that the noise reduction level adapts to changes in the acoustic environment.

* Auto setting available in firmware 6.2 and newer for MXA920, MXA902, MXA901, and MXA710

Automatic Gain Control (AGC)

Automatic gain control automatically adjusts channel levels to ensure consistent volume for all talkers in all scenarios. For quieter voices, it increases gain. For louder voices, it attenuates the signal.

Enable AGC on channels where the distance between the talker and the microphone may vary, or in rooms where many different people will use the conferencing system.

Automatic gain control happens post-gate (after the automixer) and does not affect when the automixer gates on or off.

Target Level (dBFS)

Use −37 dBFS as a starting point to ensure adequate headroom and adjust if necessary. This represents the RMS (average) level, which is different from setting the input fader according to peak levels to avoid clipping.

Maximum Boost (dB)

Sets the maximum amount of gain that can be applied

Maximum Cut (dB)

Sets the maximum attenuation that can be applied

Tip: Use the boost/cut meter (not available on all microphones) to monitor the amount of gain added or subtracted from the signal. If the meter is always reaching the maximum boost or cut level, adjust the input fader so the signal is closer to the target level.

Delay

Use delay to synchronize audio and video. When a video system introduces latency (where you hear someone speak, and their mouth moves later), add delay to align audio and video.

Delay is measured in milliseconds. If there is a significant difference between audio and video, start by using larger intervals of delay time (500-1000 ms). When the audio and video are slightly out of sync, use smaller intervals to fine-tune.

Compressor

Use the compressor to control the dynamic range of the selected signal.

Threshold

When the audio signal exceeds the threshold value, the level is attenuated to prevent unwanted spikes in the output signal. The amount of attenuation is determined by the ratio value. Perform a soundcheck and set the threshold 3-6 dB above average talker levels, so the compressor only attenuates unexpected loud sounds.

Ratio

The ratio controls how much the signal is attenuated when it exceeds the threshold value. Higher ratios provide stronger attenuation. A lower ratio of 2:1 means that for every 2 dB the signal exceeds the threshold, the output signal will only exceed the threshold by 1 dB. A higher ratio of 10:1 means a loud sound that exceeds the threshold by 10 dB will only exceed the threshold by 1 dB, effectively reducing the signal by 9 dB.

Parametric Equalizer

Maximize audio quality by adjusting the frequency response with the parametric equalizer.

Common equalizer applications:

- Improve speech intelligibility
- Reduce noise from HVAC systems or video projectors
- Reduce room irregularities
- Adjust frequency response for reinforcement systems

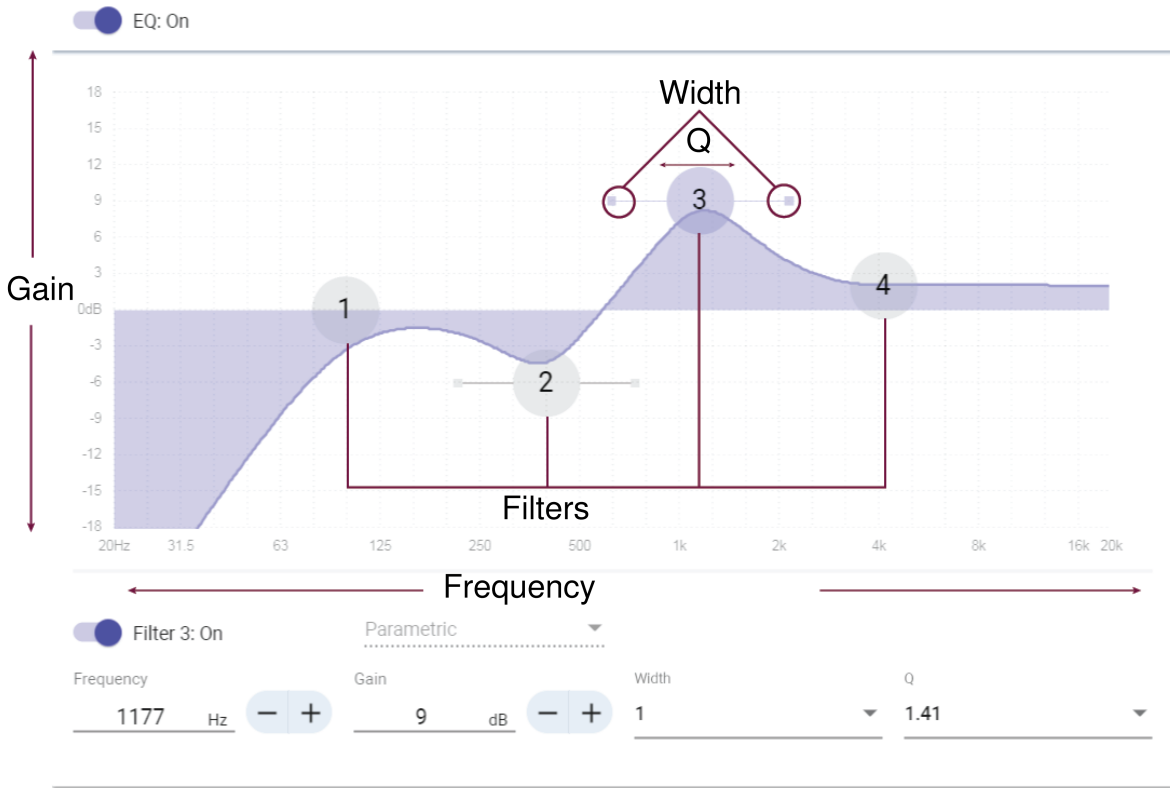
Setting Filter Parameters

Adjust filter settings by manipulating the icons in the frequency response graph, or by entering numeric values. Disable a filter using the checkbox next to the filter.

PEQ Filter Settings

Setting	Function
Filter Type	Only the first and last band have selectable filter types. **Parametric:** Attenuates or boosts the signal within a customizable frequency range **Low Cut:** Rolls off the audio signal below the selected frequency **Low Shelf:** Attenuates or boosts the audio signal below the selected frequency

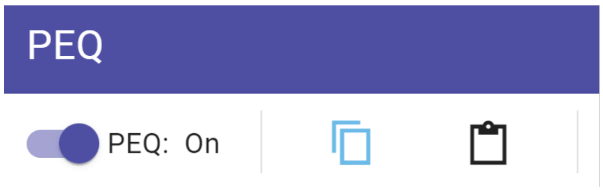
Setting	Function
	High Cut: Rolls off the audio signal above the selected frequency **High Shelf:** Attenuates or boosts the audio signal above the selected frequency
Frequency	Select the center frequency of the filter to cut or boost
Gain	Adjusts the level for a specific filter (+/− 18 dB)
Q	Adjusts the range of frequencies affected by the filter. As this value increases, the bandwidth becomes thinner.
Width	Adjusts the range of frequencies affected by the filter. The value is represented in octaves. **Note:** The Q and width parameters affect the equalization curve in the same way. The only difference is the way the values are represented.



Copy and Paste Equalizer Channel Settings

Use to quickly apply the same PEQ setting across multiple channels.

1. Select the PEQ of the desired channel.
2. Click copy.
3. Select the channel to apply the PEQ setting to and click paste.



Equalizer Applications

Conferencing room acoustics vary based on room size, shape, and construction materials. Use the guidelines in following table.

Uses for EQ

EQ Application	Suggested Settings
Treble boost for improved speech intelligibility	Add a high shelf filter to boost frequencies greater than 1 kHz by 3-6 dB
HVAC noise reduction	Add a low cut filter to attenuate frequencies below 200 Hz
Reduce flutter echoes and sibilance	Identify the specific frequency range that "excites" the room: 1. Set a narrow Q value. 2. Increase the gain to between +10 and +15 dB, and then experiment with frequencies between 1 kHz and 6 kHz to pinpoint the range of flutter echoes or sibilance. 3. Reduce the gain at the identified frequency (start between −3 and −6 dB) to minimize the unwanted room sound.
Reduce hollow, resonant room sound	Identify the specific frequency range that "excites" the room: 1. Set a narrow Q value. 2. Increase the gain to between +10 and +15 dB, and then experiment with frequencies between 300 Hz and 900 Hz to pinpoint the resonant frequency. 3. Reduce the gain at the identified frequency (start between −3 and −6 dB) to minimize the unwanted room sound.

EQ Contour

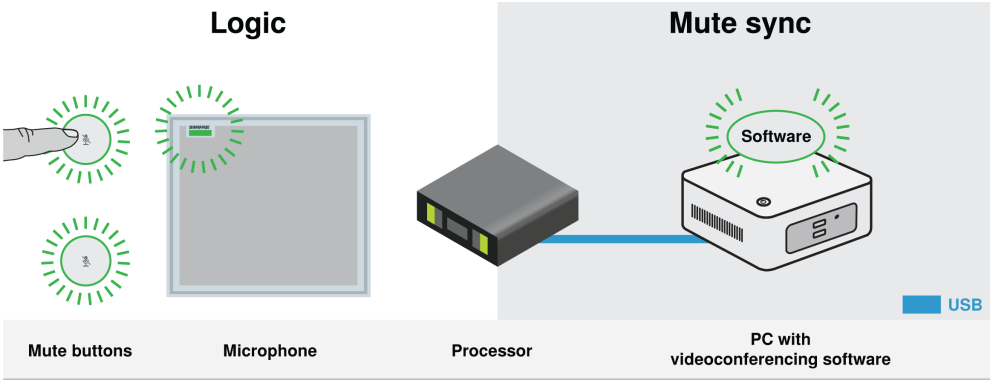
Use the EQ contour to quickly apply a high-pass filter at 150 Hz to the microphone's signal.

Select EQ contour to turn it on or off.

Mute Sync

It's important to be able to see if a room is muted or unmuted during a call. You want devices to show the same mute status as the videoconferencing software. Shure devices use logic and mute sync to make this happen.

- **Logic:** Aligns mute status across Shure devices in the room. The processor (such as a P300, IntelliMix Room software, or an ANIUSB-MATRIX) is the controller.
- **Mute sync:** Aligns mute between the processor and the videoconferencing software, which is on a computer connected to the processor by USB. The processor's automix output is muted or unmuted to change the mute status of the system.



When mute sync is working correctly, you can mute a device (mute button or microphone mute button) or the videoconferencing software to mute the room.

To use mute sync:

1. In Designer, create audio and mute control routes between devices in the room.
2. Connect a computer with videoconferencing software to the processor's USB port.
3. Turn on mute sync and logic:
   - Processors: `[Your device]` > `Settings` > `Mute control`
   - Microphones without physical mute button: Logic is always on
   - MXA310 and MXA mute button: `Settings` > `Logic control` > `Mute control function` > `Logic out`

Designer's auto route process configures all necessary mute sync and logic settings for you.

Compatible Shure Logic Devices

- P300 (Also mutes supported soft codecs connected by USB)
- ANIUSB-MATRIX (Also mutes supported soft codecs connected by USB)
- IntelliMix Room software (Also mutes supported soft codecs connected by USB)
- MXA901
- MXA902
- MXA910
- MXA920
- MXA710
- MXA310
- Network Mute Button
- ANI22-BLOCK
- ANI4IN-BLOCK
- Logic-enabled MX microphones connected to ANI22-BLOCK or ANI4IN-BLOCK
  - MX392

- MX395-LED
- MX396
- MX405/410/415

For help with specific mute sync implementations, see our FAQs.

Encryption

Audio is encrypted with the Advanced Encryption Standard (AES-256), as specified by the US Government National Institute of Standards and Technology (NIST) publication FIPS-197. Shure devices that support encryption require a password to make a connection. Encryption is not supported with third-party devices.

In Designer, you can turn on encryption for all devices in a room: `[Your room]` > `Settings` > `Audio encryption`.

To activate encryption in the web application, go to `Settings` > `Audio encryption` > `Enable encryption`.

Important: For encryption to work:

- All Shure devices on your network must use encryption.
- Disable AES67 in Dante Controller. AES67 and AES-256 cannot be used at the same time.

Set Up the 802.1X Protocol for a Device

Select Shure devices support the IEEE 802.1X port access protocol for network authentication.

Important: To use the 802.1X security protocol with Shure devices, set the network switch to multiple host authentication. You must also make accommodations to allow the audio network interface to connect to the network. The audio network interface doesn't support the 802.1X protocol.

Setting up 802.1X is a two-part process.

To set up 802.1X, you will need:

- Details about your authentication server's EAP method
- Any required credentials or certificates for that method, for example:
  - MD5 and PWD
    1. User ID and passphrase
  - TLS and PEAP
    1. User ID and passphrase
    2. Certificate (with certificate types) in the .PEM format
- Any passwords to access the devices if they are password locked

Step 1: Configure Settings on Test Network

1. Connect the device to your test network and discover it using Designer.
2. Initialize the device if necessary. Open the device and go to `Settings` > `Network` > `802.1X`.
3. Choose your EAP method from the menu.
4. Enter any required credentials and load any necessary certificates.
5. Press Save to save the 802.1X settings to the device.
6. Enable 802.1X and select Reboot later.

Step 2: Connect to a Credentialed Network

1. Connect your device to the credentialed network.
2. Ensure that Designer is connected to the credentialed network.
3. Go to `Settings` > `Network` > `802.1X` and enable 802.1X. Reboot the device for the 802.1X settings to take effect.
4. If the device doesn't appear in Designer after the reboot, reconnect to the test network and check all 802.1X settings for the selected EAP method.

Turn Off or Clear 802.1X Settings

You can turn off 802.1X settings temporarily, or clear them from the device. Open the device and go to `Settings` > `Network` > `802.1X`

- **Disable**: Click the 802.1X switch to turn off 802.1X settings. Click the switch again to enable 802.1X.
- **Clear**: Click Clear 802.1X settings to remove 802.1X settings from the device.

Note: Resetting to factory default clears all 802.1X settings.

Change 802.1X Settings

You may need to change a device's 802.1X settings if the enterprise's 802.1X settings are changing. The best way to do this is to change the 802.1X settings on the devices, and then make changes to the authentication server.

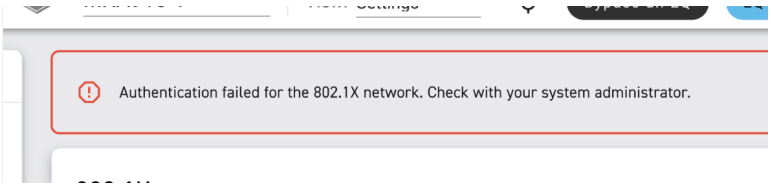
To change device settings:

1. While still connected to the credentialed network, find the device in Designer and go to `Settings` > `Network` > `802.1X`.
2. Make changes and click Save.
3. Make any changes to the authentication server.
4. Reboot your devices. The devices should connect to the credentialed network with the updated 802.1X settings.

Troubleshooting 802.1X Setup Issues

If the device doesn't appear in Designer on the credentialed network, there's a problem with the device's 802.1X settings. To troubleshoot, take the device off the credentialed network and connect it to the test network. You can make any necessary changes to the 802.1X settings, and then reconnect to the credentialed network.

If you attempt to enable 802.1X on a device, but the authentication fails, you will see this notification:



If this occurs, check with your system administrator.

Networking Best Practices

When connecting Shure devices to a network, use the following best practices:

- Always use a "star" network topology by connecting each device directly to the switch or router.
- Connect all Shure networked devices to the **same network** and set to the **same subnet**.

- Allow all Shure software through the firewall on your computer.
- Use only 1 DHCP server per network. Disable DHCP addressing on additional servers.
- Power on the switch and DHCP server before powering on the Shure devices.
- To expand the network, use multiple switches in a star topology.
- All devices must be at the same firmware revision level.

Switch and Cable Recommendations for Dante Networking

Switches and cables determine how well your audio network performs. Use high-quality switches and cables to make your audio network more reliable.

Network switches should have:

- Gigabit ports. 10/100 switches may work on small networks, but gigabit switches perform better.
- Power over Ethernet (PoE) or PoE+ ports for any devices that require power
- Management features to provide information about port speed, error counters, and bandwidth used
- Ability to switch off Energy Efficient Ethernet (EEE). EEE (also known as "Green Ethernet") may cause audio dropouts and problems with clock synchronization.
- Diffserv (DSCP) Quality of Service (QoS) with strict priority and 4 queues

Ethernet cables should be:

- Cat5e or better
- Shielded

For more information, see our FAQ about switches to avoid.

Device IP Configuration

This Shure device uses 2 IP addresses: one for Shure control, and one for Dante audio and control. For most installations, the Shure control and Dante audio IP addresses should be in the same subnet range.

- **Shure control**
  - Carries data for Shure control software, firmware updates, and third-party control systems (such as AMX or Crestron)
- **Dante audio and control**
  - Carries Dante digital audio and control data for Dante Controller
  - Requires a wired, gigabit Ethernet connection to operate

To access these settings in Designer, go to `[Your device]` > `Settings` > `IP configuration`.

Note: Refer to our FAQ if you're using Shure profiles on NETGEAR M4250-series switches.

Setting Latency

Latency is the amount of time for a signal to travel across the system to the outputs of a device. To account for variances in latency time between devices and channels, Dante has a predetermined selection of latency settings. When the same setting is selected, it ensures that all Dante devices on the network are in sync.

These latency values should be used as a starting point. To determine the exact latency to use for your setup, deploy the setup, send Dante audio between your devices, and measure the actual latency in your system using Audinate's Dante Controller software. Then round up to the nearest latency setting available, and use that one.

Use Audinate's Dante Controller software to change latency settings.

Latency Recommendations

Latency Setting	Maximum Number of Switches
0.25 ms	3
0.5 ms (default)	5
1 ms	10
2 ms	10+

QoS (Quality of Service) Settings

QoS settings assign priorities to specific data packets on the network, ensuring reliable audio delivery on larger networks with heavy traffic. This feature is available on most managed network switches. Although not required, assigning QoS settings is recommended.

Note: Coordinate changes with the network administrator to avoid disrupting service.

To assign QoS values, open the switch interface and use the following table to assign Dante®-associated queue values.

- Assign the highest possible value (shown as 4 in this example) for time-critical PTP events
- Use descending priority values for each remaining packet.

Dante QoS Priority Values

Priority	Usage	DSCP Label	Hex	Decimal	Binary
High (4)	Time-critical PTP events	CS7	0x38	56	111000
Medium (3)	Audio, PTP	EF	0x2E	46	101110
Low (2)	(reserved)	CS1	0x08	8	001000
None (1)	Other traffic	BestEffort	0x00	0	000000

Note: Switch management may vary by manufacturer and switch type. Consult the manufacturer's product guide for specific configuration details.

For more information on Dante requirements and networking, visit www.audinate.com.

Networking Terminology

PTP (Precision Time Protocol): Used to synchronize clocks on the network
DSCP (Differentiated Services Code Point): Standardized identification method for data used in layer 3 QoS prioritization

IP Ports and Protocols

This list may change with new firmware releases. Current IP ports and protocols:

Shure Control

Port	TCP/UDP	Protocol	Description	Factory Default
21	TCP	FTP	Required for firmware updates (otherwise closed)	Closed

Port	TCP/UDP	Protocol	Description	Factory Default
22	TCP	SSH	Secure Shell Interface	Closed
23	TCP	Telnet	Not supported	Closed
53	UDP	DNS	Domain Name System	Closed
67	UDP	DHCP	Dynamic Host Configuration Protocol	Open
68	UDP	DHCP	Dynamic Host Configuration Protocol	Open
80*	TCP	HTTP	Required to launch embedded web server	Open
443**	TCP	HTTPS	HTTPS/device API/camera tracking	Closed
2202	TCP	ASCII	Required for 3rd party control strings	Open
5353	UDP	mDNS†	Required for device discovery	Open
57383	UDP	SDT (unicast)	Required for inter-device communication	Open
8023	TCP	Telnet	Debug console interface	Closed
8180	TCP	HTML	Required for web application (legacy firmware only)	Open
8427	UDP	SLP†	Required for inter-device communication	Open
64000	TCP	Telnet	Required for Shure firmware update	Open

*These ports must be open on the PC or control system to access the device through a firewall.

**Some firmware supports HTTPS. HTTPS isn't available for all devices.

†These protocols require multicast. Ensure multicast has been correctly configured for your network.

Refer to Audinate's website for information about ports and protocols used by Dante audio.

Digital Audio Networking

Dante® digital audio is carried over standard Ethernet and operates using standard internet protocols. Dante provides low latency, tight clock synchronization, and high Quality-of-Service (QoS) to provide reliable audio transport to a variety of Dante devices. Dante audio can coexist safely on the same network as IT and control data, or can be configured to use a dedicated network.

Compatibility with Dante Domain Manager

This device is compatible with Dante Domain Manager software (DDM). DDM is network management software with user authentication, role-based security, and auditing features for Dante networks and Dante-enabled products.

Considerations for Shure devices controlled by DDM:

- When you add Shure devices to a Dante domain, set the local controller access to Read Write. Otherwise, you won't be able to access Dante settings, perform a factory reset, or update device firmware.

- If the device and DDM can't communicate over the network for any reason, you won't be able to control Dante settings, perform a factory reset, or update device firmware. When the connection is reestablished, the device follows the policy set for it in the Dante domain.
- If Dante device lock is on, DDM is offline, or the configuration of the device is set to Prevent, some device settings are disabled. These include: Dante encryption, MXW association, AD4 Dante browse and Dante cue, and SCM820 linking.

Refer to Dante Domain Manager's documentation for more information.

Dante Flows for Shure Devices

Dante flows get created any time you route audio from one Dante device to another. One Dante flow can contain up to 4 audio channels. For example: sending all 5 available channels from an MXA310 to another device uses 2 Dante flows, because 1 flow can contain up to 4 channels.

Every Dante device has a specific number of transmit flows and receive flows. The number of flows is determined by Dante platform capabilities.

Dante Flows for Shure Devices

Dante Platform	Shure Devices Using Platform	Transmit Flow Limit	Receive Flow Limit
Brooklyn II	ULX-D, SCM820, MXWAPT, MXWANI, P300, MXCWAPT	32	32
Brooklyn II (without SRAM)	MXA920, MXA910, MXA902, MXA710, AD4, AD600, APXD2	16	16
IP Core	MXA920-V3, MXA902-V3, MXA901	32	32
Ultimo/UltimoX	MXA310, ANI4IN, ANI4OUT, ANIUSB-MATRIX, ANI22, MXN5-C	2	2
DEP	ANIUSB-MATRIX-V3	2	2
DAL	IntelliMix Room	16	16

Learn more about Dante flows in our FAQs or from Audinate.

AES67

AES67 is a networked audio standard that enables communication between hardware components which use different IP audio technologies. This Shure device supports AES67 for increased compatibility within networked systems for live sound, integrated installations, and broadcast applications.

The following information is critical when transmitting or receiving AES67 signals:

- Update Dante Controller software to the newest available version to ensure the AES67 configuration tab appears.
- Before turning encryption on or off, you must disable AES67 in Dante Controller.
- AES67 cannot operate when the transmit and receive devices both support Dante.

Shure Device Supports:	Device 2 Supports:	AES67 Compatibility
Dante and AES67	Dante and AES67	No. Must use Dante.
Dante and AES67	AES67 without Dante. Any other audio networking protocol is acceptable.	Yes

Separate Dante and AES67 flows can operate simultaneously. The total number of flows is determined by the maximum flow limit of the device.

Sending Audio from a Shure Device

All AES67 configuration is managed in Dante Controller software. For more information, refer to the Dante Controller user guide.

1. Open the Shure transmitting device in Dante Controller.
2. Enable AES67.
3. Reboot the Shure device.
4. Create AES67 flows according to the instructions in the Dante Controller user guide.

Receiving Audio from a Device Using a Different Audio Network Protocol

Third-party devices: When the hardware supports SAP, flows are identified in the routing software that the device uses. Otherwise, to receive an AES67 flow, the AES67 session ID and IP address are required.

Shure devices: The transmitting device must support SAP. In Dante Controller, a transmit device (appears as an IP address) can be routed like any other Dante device.

Paint MXA901 Microphones

The grille of MXA901 microphones can be painted to blend in with a room's design. Shure recommends using professional painters.

Important: Before painting, order the RPM907 painting parts kit.

Required equipment (not included with MXA901):

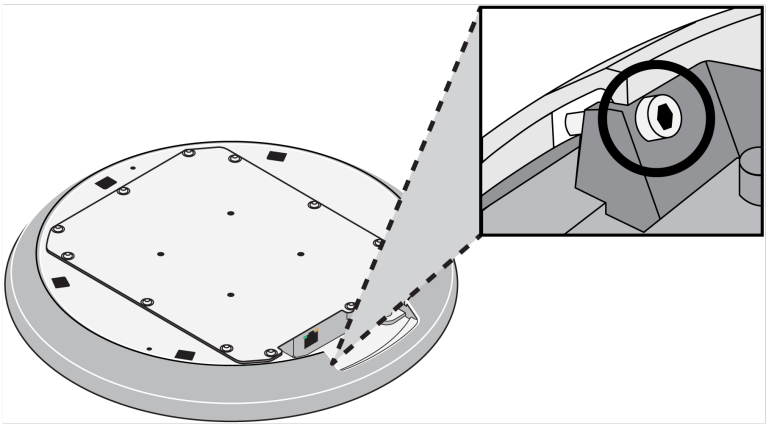
- RPM907 painting kit with:
  - Replacement grille fabric
  - Adhesive strips
  - LED lightpipe
  - Hex wrench
- Adhesive thinning solvent

Definitions:

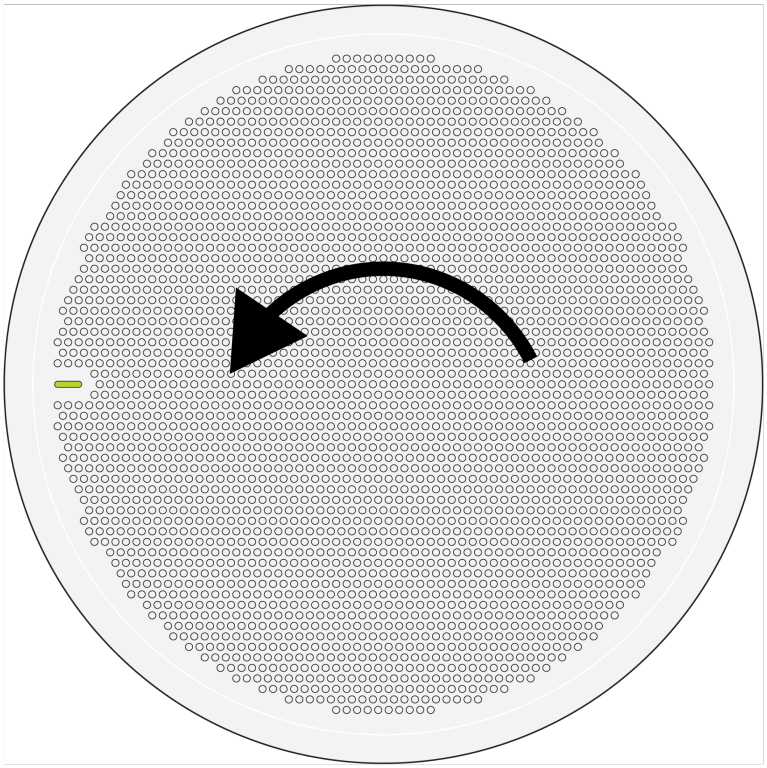
- **Back panel:** Back part of MXA901 with mounting attachment points. Circuit board is attached to back panel. The back panel can't be painted.
- **Grille:** Detaches from back panel. The grille can be painted.

Step 1: Remove the Grille

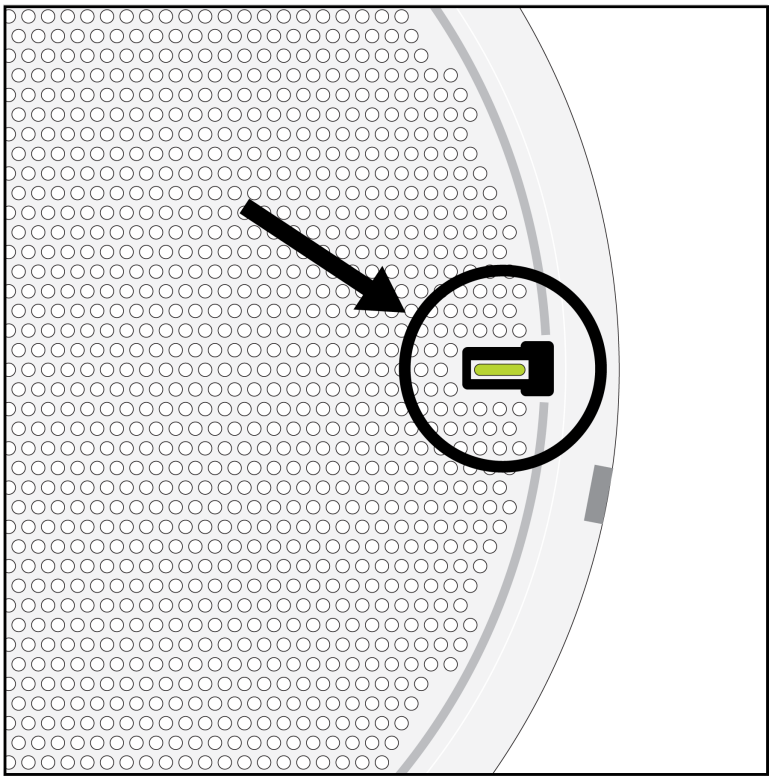
1. Set the MXA901 on a work surface with the grille facing down. Use the hex wrench to loosen the set screw. You can leave the set screw in place or remove it.



2. Turn the microphone over. Twist the grille counterclockwise. Gently lift the grille off the back panel. Set the back panel aside until finished with painting.



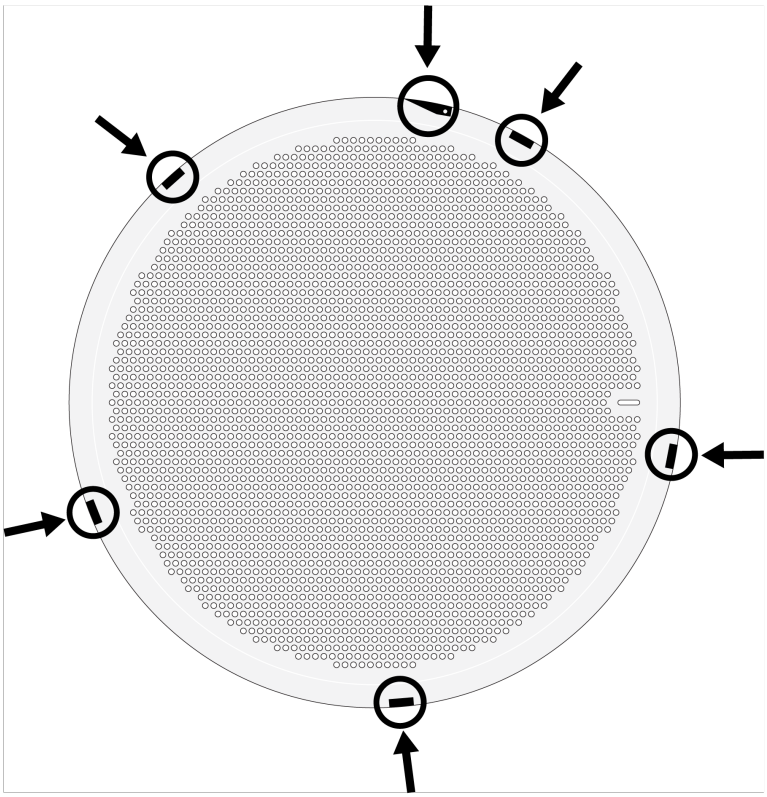
3. Remove the grille fabric using your fingers or a dull tool. The grille fabric is attached with adhesive.
4. Remove the LED lightpipe. The lightpipe is attached near the edge of the grille. It may be easiest to push in the LED lightpipe from the front of the grille.



5. Use thinning solvent to remove all adhesive on the grille.

Step 2: Prep and Paint the Grille

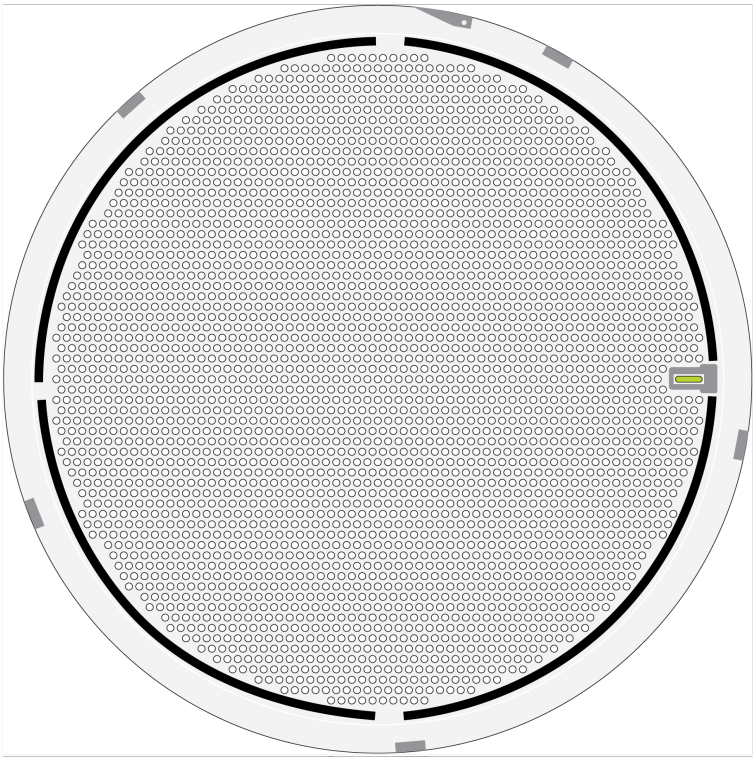
1. Mask any bare metal areas including the tabs and the area near the lightpipe. The back panel with the circuit board can't be painted.



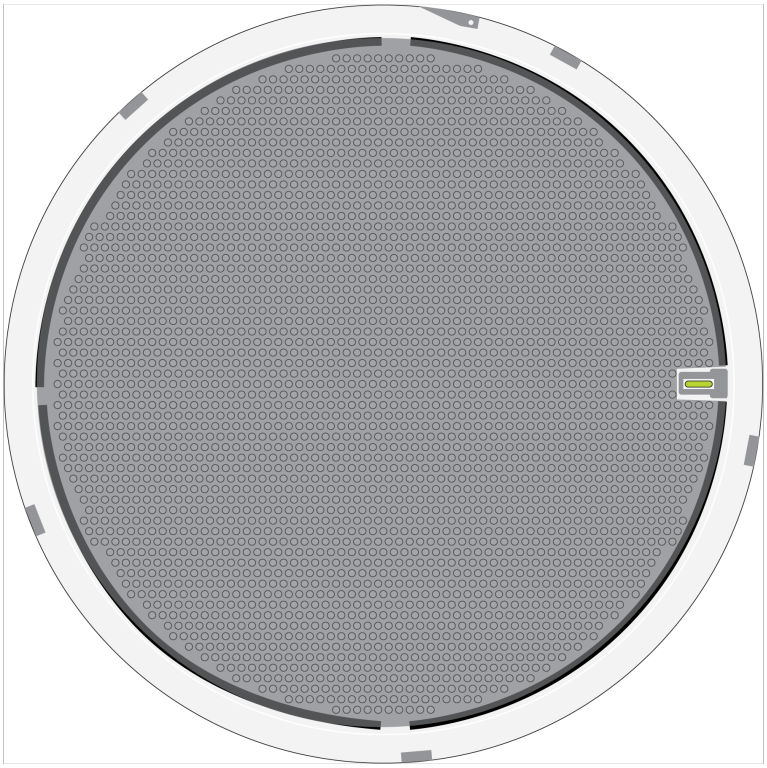
2. Paint the grille. Let paint dry completely before reassembling the microphone.

Step 3: Reassemble the Microphone

1. Install the new lightpipe so the adhesive is near the edge of the grille.
2. Install the 4 adhesive strips near the grille holes. Don't cover grille holes with adhesive.

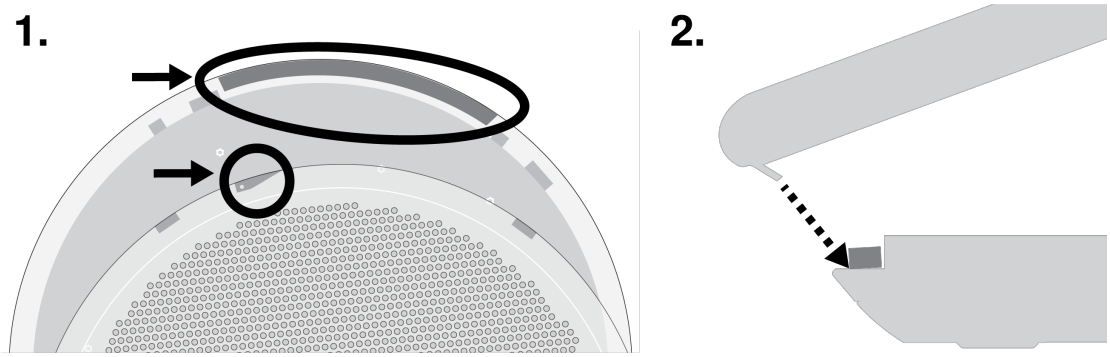


3. Align the new grille fabric and attach it to the adhesive strips. The fabric should cover all grille holes.



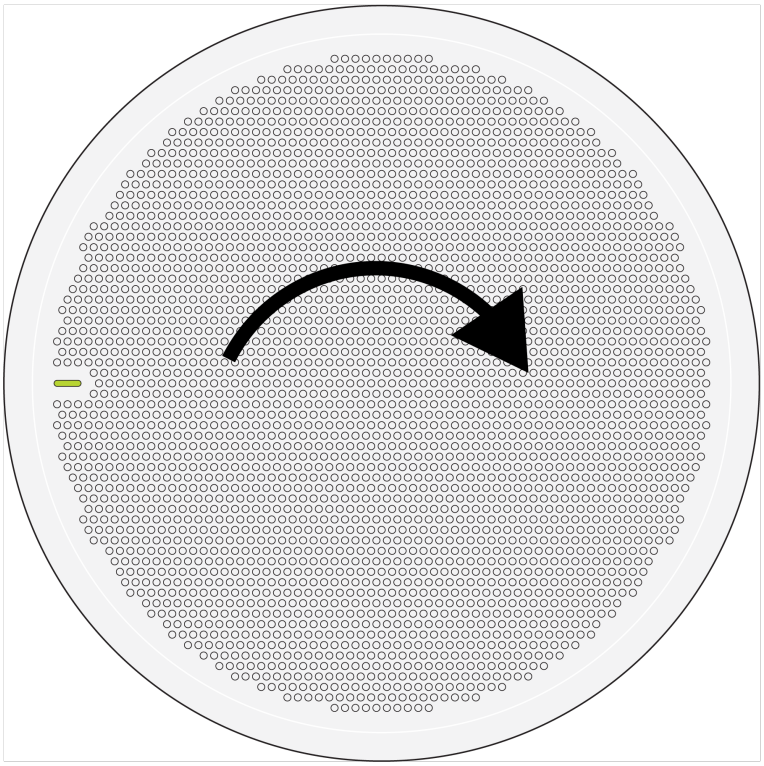
4. Place the back panel so that the board is facing up. Find the long piece of white foam on the edge of the back panel and the angled tab with a hole. Tuck the tab under the piece of foam.

Important: Be careful not to cut the foam with the tab. Doing so may cause acoustic issues.



The other 5 tabs should fit smoothly into the openings. Check around the mic to properly seat the tabs.

5. Turn the grille clockwise until it doesn't turn anymore.



6. Tighten the set screw. This screw doesn't screw into anything. It prevents the grille from moving back and forth.

Use Command Strings

This device receives logic commands over the network. Many parameters controlled through Designer can be controlled using a third-party control system, using the appropriate command string.

Common applications:

- Mute

- LED color and behavior
- Loading presets
- Adjusting levels

A complete list of command strings is available at:

shure.com/docs/commandstrings/mxa901-r.

Troubleshooting

MXA901 Troubleshooting

Problem	Solution
No microphone signal or signal is quiet/distorted	Check cables. Verify that output channel isn't muted. Check that output levels are not set too low.
Microphone sound quality is muffled or hollow	Check that coverage area is positioned correctly and mic output levels are sufficient. Use EQ to adjust frequency response.
MXA901 does not power on	Check that MXA901 is plugged in to a PoE source. Check network cables and connections.
MXA901 doesn't show up in Designer	Ensure that MXA901 has power. Make sure MXA901 is on the same network and subnet as PC. Turn off network interfaces not used to connect to the device (such as Wi-Fi). Check that DHCP server is functioning (if applicable). Reset the device if necessary. Refer to no online devices FAQ for more help.
MXA901 doesn't show up in Shure Web Device Discovery	Ensure that MXA901 has power. Check that Shure Web Device Discovery is updated. Make sure MXA901 is on the same network as PC. Check that DHCP server is functioning (if applicable). Reset the device if necessary. Refer to the devices don't appear FAQ for more help.
Flashing red error LED	In the web application, go to `Settings` > `General` > `Export log` to export the device event log. Use the event log to get more information, and contact Shure if necessary.

Problem	Solution
No lights	Go to `[Your device]` > `Settings` > `Lights`. Check if brightness is disabled or if any other settings are turned off. If the microphone is in a room using Designer's call status feature, mute status LEDs are off when not in a call.
Web application lags in Google Chrome browser	Turn off hardware acceleration option in Chrome.

Additional Resources

- Shure Knowledge Base FAQs
- Command strings for Shure devices
- Shure API documentation
- Shure Enterprise Networking Troubleshooting Checklist
- Training from the Shure Audio Institute
- Shure Systems YouTube channel

Download Shure Software

- Shure Designer
- Shure Update Utility
- Shure Web Device Discovery
- Software and firmware archive

Specifications

General

Coverage Area Size

20 x 20 feet (6.1 x 6.1 meters)

Coverage Type

Single-zone automatic

Power Requirements

Power over Ethernet (PoE), Class 0

Power Consumption

10.1 W maximum

Control Software

Shure Designer or web application

Cable Requirements

Cat 5e or higher (shielded cable recommended)

Connector Type

RJ45

Plenum Rating

UL2043 (Suitable for Air Handling Spaces)

Dust Protection

IEC 60529 IP5X Dust Protected

Operating Temperature Range

−6.7°C (20°F) to 40°C (104°F)

Storage Temperature Range

−29°C (-20°F) to 74°C (165°F)

Audio

Microphone Elements

85 MEMS

Frequency Response

100 Hz to 20 kHz

AES67 or Dante Digital Output

Channel Count	2 total channels: 1 automix output, 1 AEC reference in channel
Sampling Rate	48 kHz
Bit Depth	24

Sensitivity

at 1 kHz

−4.4 dBFS/Pa

Maximum SPL

Relative to 0 dBFS overload

98.4 dB SPL

Signal-To-Noise Ratio

Ref. 94 dB SPL at 1 kHz

67.1 dB A-weighted

Latency

Does not include Dante latency

33.5 ms

Self Noise

26.9 dB SPL-A

Dynamic Range

71.5 dB

Built-in Digital Signal Processing

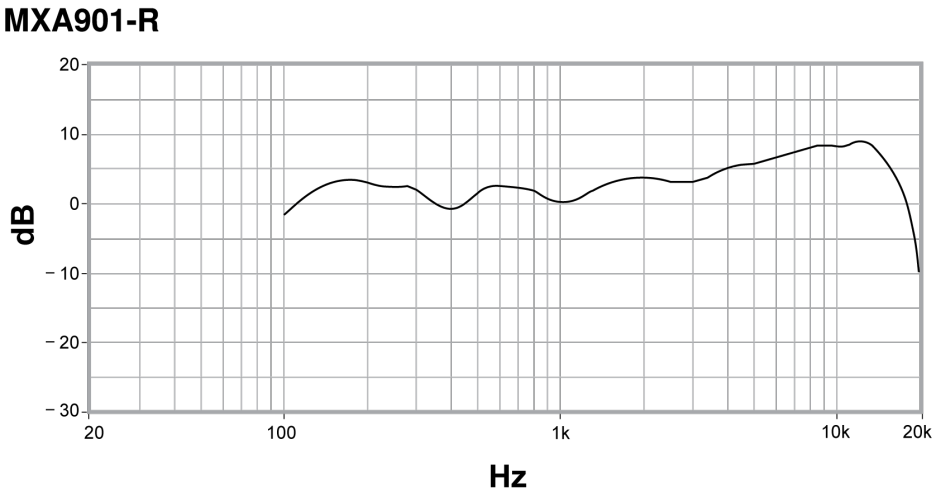
Automatic mixing, acoustic echo cancellation (AEC), noise reduction, automatic gain control, compressor, delay, equalizer (4-band parametric), mute, gain (140 dB range)

Acoustic Echo Cancellation Tail Length

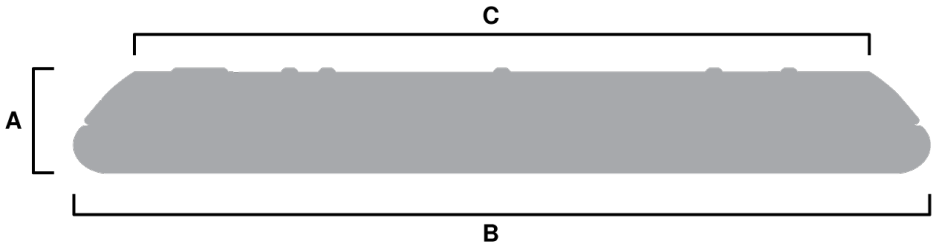
Up to 250 ms

MXA901-R Frequency Response

Frequency response measured directly on-axis from a distance of 6 feet (1.83 m).



Dimensions



MXA901-R:

- A (Height): 1.64 in. (41.66 mm)
- B (Circumference): 13.5 in. (342.9 mm)
- C (Smaller top circumference): 11.61 in. (294.89 mm)

Weight

5 lb. (2.3 kg)

Important Safety Instructions

1. READ these instructions.
2. KEEP these instructions.
3. HEED all warnings.
4. FOLLOW all instructions.
5. DO NOT use this apparatus near water.
6. CLEAN ONLY with dry cloth.
7. DO NOT block any ventilation openings. Allow sufficient distances for adequate ventilation and install in accordance with the manufacturer's instructions.
8. DO NOT install near any heat sources such as open flames, radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat. Do not place any open flame sources on the product.
9. DO NOT defeat the safety purpose of the polarized or grounding type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wider blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. PROTECT the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. ONLY USE attachments/accessories specified by the manufacturer.
12. USE only with a cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.



13. UNPLUG this apparatus during lightning storms or when unused for long periods of time.
14. REFER all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
15. DO NOT expose the apparatus to dripping and splashing. DO NOT put objects filled with liquids, such as vases, on the apparatus.
16. The MAINS plug or an appliance coupler shall remain readily operable.
17. The airborne noise of the Apparatus does not exceed 70dB (A).
18. Apparatus with CLASS I construction shall be connected to a MAINS socket outlet with a protective earthing connection.
19. To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.
20. Do not attempt to modify this product. Doing so could result in personal injury and/or product failure.
21. Operate this product within its specified operating temperature range.
22. Follow local regulations and consult qualified personnel if the product installation or relocation requires construction work. Choose mounting hardware and an installation location that can support the weight of the product. Avoid locations subject to constant vibration. Use the required tools to install the product properly. Inspect the product periodically.

⚠	This symbol indicates that dangerous voltage constituting a risk of electric shock is present within this unit.

⚠	This symbol indicates that there are important operating and maintenance instructions in the literature accompanying this unit.

Important Product Information

The equipment is intended to be used in professional audio applications.

Please consider the environment, electric products and packaging are part of regional recycling schemes and do not belong to regular household waste.

Dante is a registered trademark of Audinate Pty Ltd.

Introduction to EMC

Electromagnetic Interference (EMI) is any signal or emission, radiated in free space or conducted along power or signal leads, that endangers the functioning of radio navigation or other safety service or seriously degrades, obstructs, or repeatedly interrupts a licensed radio communications service. Radio communications services include but are not limited to AM/FM commercial broadcast, television, cellular services, radar, air-traffic control, pager, and Personal Communication Services (PCS). These licensed radio services, and unlicensed radio services, such as WLAN, ZIGBEE or Bluetooth, along with unintentional radiators such as digital devices contribute to the electromagnetic environment.

Electromagnetic Compatibility (EMC) is the ability of items of electronic equipment to function properly together in the electronic environment. While this equipment has been designed and determined to be compliant with regulatory agency limits for EMI, there is no guarantee that interference will not occur in a particular installation.

Shure products are designed, tested, and classified for their intended electromagnetic environment. These electromagnetic environment classifications generally refer to the following harmonized definitions:

- Class B products are intended for use in residential/domestic environments but may also be used in non-residential/non-domestic environments.

  Note: *The residential/domestic environment is an environment where the use of broadcast radio and television receivers may be expected within a distance of 10 m from where this product is used.*

- Class A products are intended for use in non-residential/non-domestic environments. Class A products may also be utilized in residential/domestic environments but may cause interference and require the user to take adequate corrective measures.

EMC conformance testing is based on the use of supplied and recommended cable types. The use of other cable types may degrade EMC performance.

Regulatory Information for Class B EMC Products

CE Notice

Hereby, Shure Incorporated declares that this product with CE Marking has been determined to be in compliance with European Union requirements.

The full text of the EU declaration of conformity is available at the following site: https://www.shure.com/en-EU/support/declarations-of-conformity.

UKCA Notice

Hereby, Shure Incorporated declares that this product with UKCA Marking has been determined to be in compliance with UKCA requirements.

The full text of the UK declaration of conformity is available at the following site: https://www.shure.com/en-GB/support/declarations-of-conformity.

FCC Notice

This equipment has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference with radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference with radio or television reception, which can be determined by turning the equipment off and on, you are encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the antenna of the radio/television receiver.
- Increase the separation between this equipment and the radio/television receiver.
- Plug the equipment into a different outlet so that the equipment and the radio/television receiver are on different power mains branch circuits.
- Consult a representative of Shure or an experienced radio/television technician for additional suggestions.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Notice: The FCC regulations provide that changes or modifications not expressly approved by Shure Incorporated could void your authority to operate this equipment.

For information regarding responsible party and other matters relating to FCC compliance, please contact Shure Incorporated, 5800 W. Touhy Avenue, Niles, Illinois 60714-4608 U.S.A. shure.com/contact

Canada, ISED Notice

Notice: The Industry Canada regulations provide that changes or modifications not expressly approved by Shure Inc. could void your authority to operate this equipment.

This Class B digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Environmental Regulatory Information

Waste Electrical and Electronic Equipment (WEEE) Directive



In the European Union and the United Kingdom, this label indicates that this product should not be disposed of with household waste. It should be deposited at an appropriate facility to enable recovery and recycling.

Registration, Evaluation, Authorization of Chemicals (REACH) Directive

REACH (Registration, Evaluation, Authorization of Chemicals) is the European Union (EU) and the United Kingdom (UK) chemical substances regulatory framework. Information on substances of very high concern contained in Shure products in a concentration above 0.1% weight over weight (w/w) is available upon request.

Recycling Information

Please consider the environment, electric products and packaging are part of regional recycling schemes and do not belong to regular household waste.