

# Cisco Collaboration Devices with Yamaha ADECIA

Setup guide

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# Introduction

This setup guide has been developed by Yamaha and Cisco. The guide provides comprehensive instructions on how to setup Yamaha's ADECIA solutions with Cisco collaboration devices using a USB connection. The USB will transmit both the audio channel and the mute synchronization command.

This document extends the instructions in the [Cisco Collaboration Devices - Audio Integration - Setup Guide](#) so that a fully working system is achieved.

All devices in the Cisco Board, Desk, and Room Series except Board 55/70/85 support USB audio I/O. These collaboration devices are referred to as Cisco devices in the remainder of this paper.

For additional information please refer to the latest product documentation, FAQs, and user guides available on the Yamaha and Cisco websites.

## Further reading

- [Cisco Collaboration Devices - Audio Integration - Setup Guide](#)
- [Cisco Project Workplace](#)
- [Maintain and Operate Guides for Room Series \(applies also to Desk and Board Series\)](#)
- [Device Configurations for Board, Desk, and Room Series](#)
- [USB microphone support for Desk and Room Series](#)
- [Cisco collaboration devices - Sound Quality blog \(<https://blog.webex.com/collaboration-devices/sound-quality/>\)](#)
- [Webex Certified Partner Ecosystem](#)
- [Yamaha ADECIA solutions](#)

# Installation and configuration

Please refer to the [Cisco Collaboration Devices - Audio Integration - Setup Guide](#) on how to decide where to perform echo cancellation and how to set up the Cisco device accordingly.

## Connectivity

Yamaha and Cisco have tested a typical setup, with a Cisco Codec Pro and a Yamaha RM-CG microphone. Also the Yamaha RM-CR DSP box is part of the setup.

The Yamaha RM-CG microphone is a 4-beam ceiling array microphone with a single Ethernet port that is used both for PoE and audio signal transmission.

The RM-CG microphone and the RM-CR DSP box were connected to a Yamaha switch (SWR2311P-10G). All the Yamaha devices were powered by PoE.

This is Yamaha's suggested ADECIA setup for conference rooms. VXL1-16P speakers are optional and have not been tested by Cisco.

We have tested with the following devices and firmware/software versions. Also the other Cisco devices mentioned in the Introduction support the feature.

| Yamaha              | Firmware version |
|---------------------|------------------|
| Yamaha RM-CG        | 1.7.0            |
| Yamaha VXL1-16P     | 1.7.0            |
| Yamaha RM-CR        | 1.7.0            |
| Yamaha SWR2311P-10G | 1.7.0            |

| Cisco devices | Software  |
|---------------|-----------|
| Codec Pro     | RoomOS 11 |
| Room Kit Mini | RoomOS 11 |

Check for the latest Yamaha device firmware on [https://europe.yamaha.com/en/support/updates/adeicia\\_firmware.html](https://europe.yamaha.com/en/support/updates/adeicia_firmware.html)

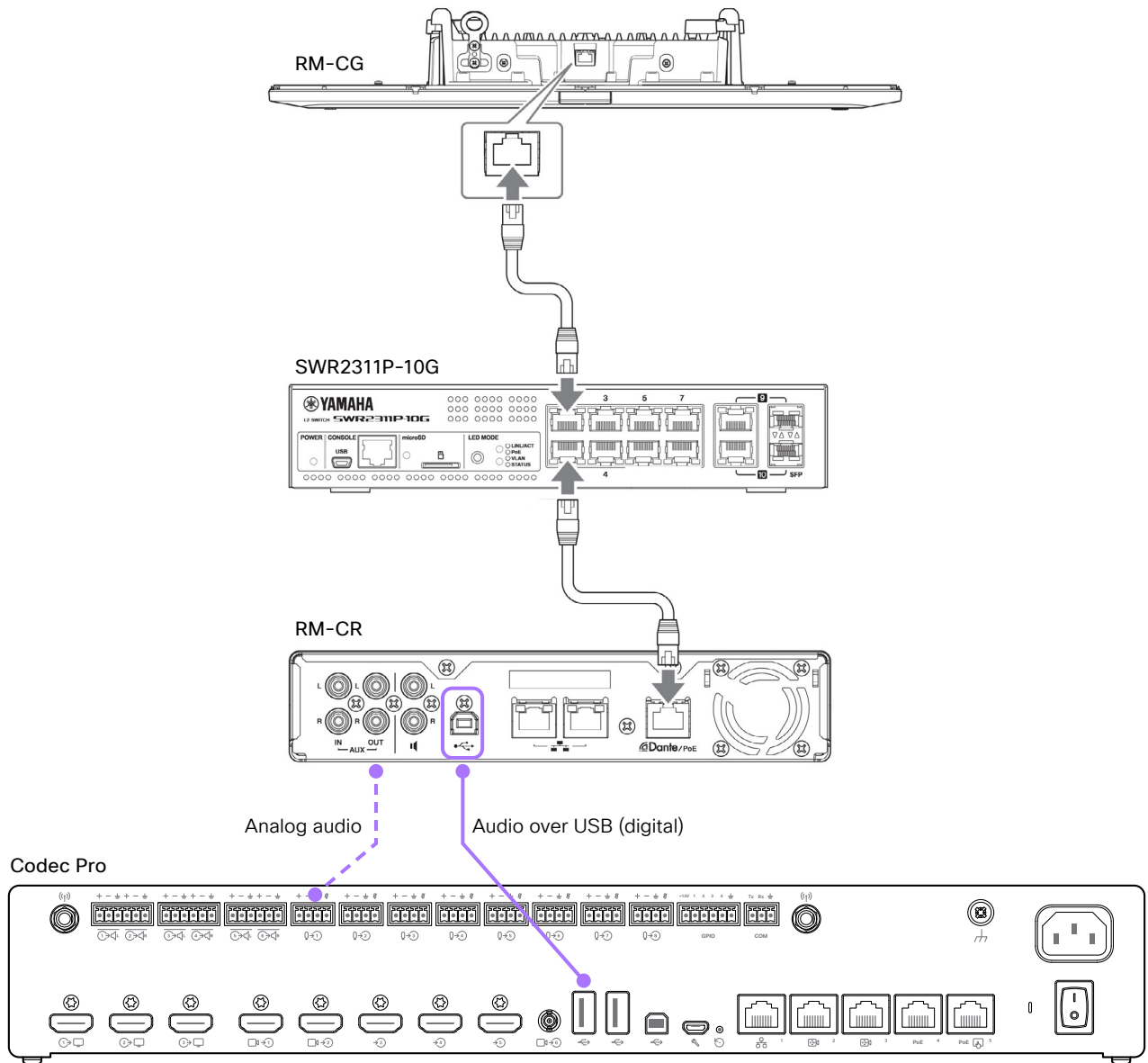


Figure 1: Connecting audio input components via USB

In this configuration (Figure 1) the RM-CR DSP box becomes the centerpiece of the setup.

You can either connect the DSP box's USB-B port to one of the Codec Pro USB-A ports, or the analog outputs of the DSP box to microphone inputs on the Codec Pro. The latter is not covered in this technical paper.

All the audio routing is done in Dante Controller. It is easy to route the RM-CG microphone signal to the USB outputs on the RM-CR DSP box.

Codec Pro is shown in the illustration, but a similar set-up also applies to the other Cisco products.

## Signal routing

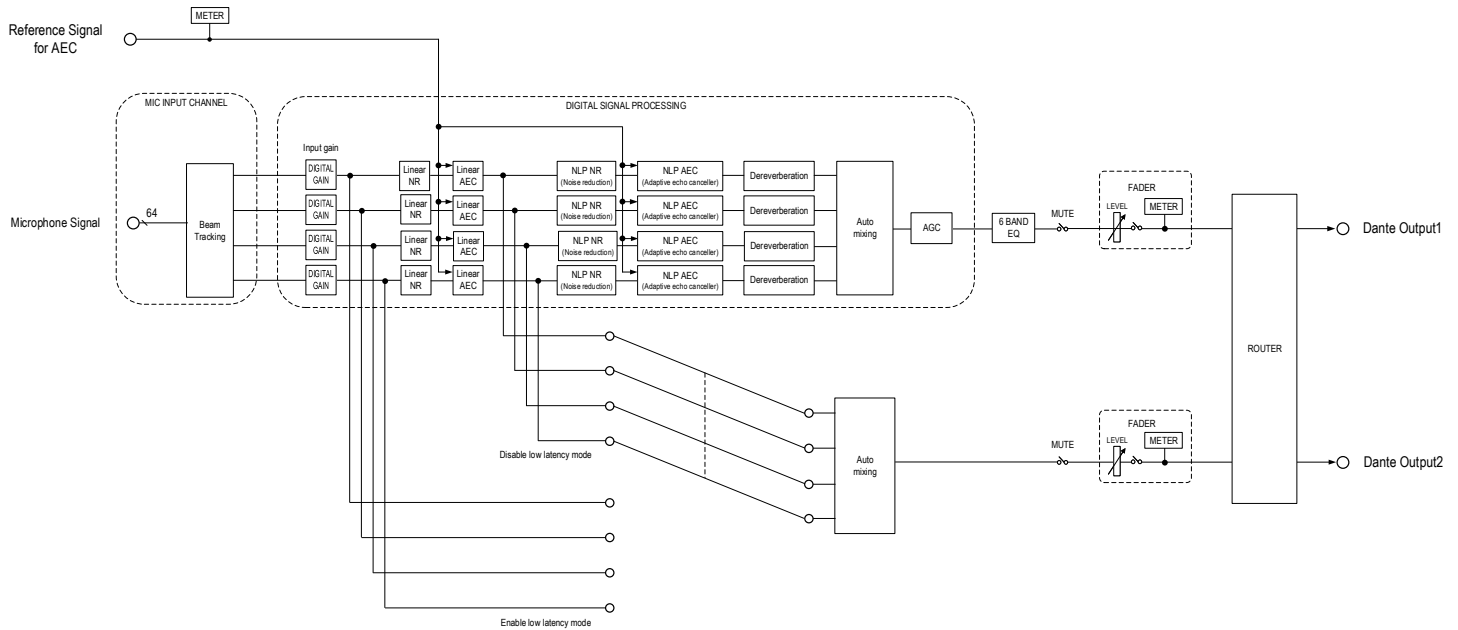


Figure 2: RM-CG internal components, Dante input and outputs

Internally, the microphone (RM-CG) has one Dante input and two Dante outputs (Figure 2). The difference between the two output channels lies in how the audio signal is processed.

- Dante Input 1: Carries the AEC reference.
- Dante Out 1 (Mic channel 1): Transmits the audio signal with AGC + EQ in the signal path.
- Dante Out 2 (Mic channel 2): Transmits the audio signal with neither AGC nor EQ in the signal path.

Note that parameters for processing, such as AEC and EQ, can be adjusted. These settings can be accessed via the RM-CR DSP box web-GUI.

In set-ups without the RM-CR DSP box (microphone in stand-alone mode), the settings can be accessed directly via the RM-CG microphone web-GUI.

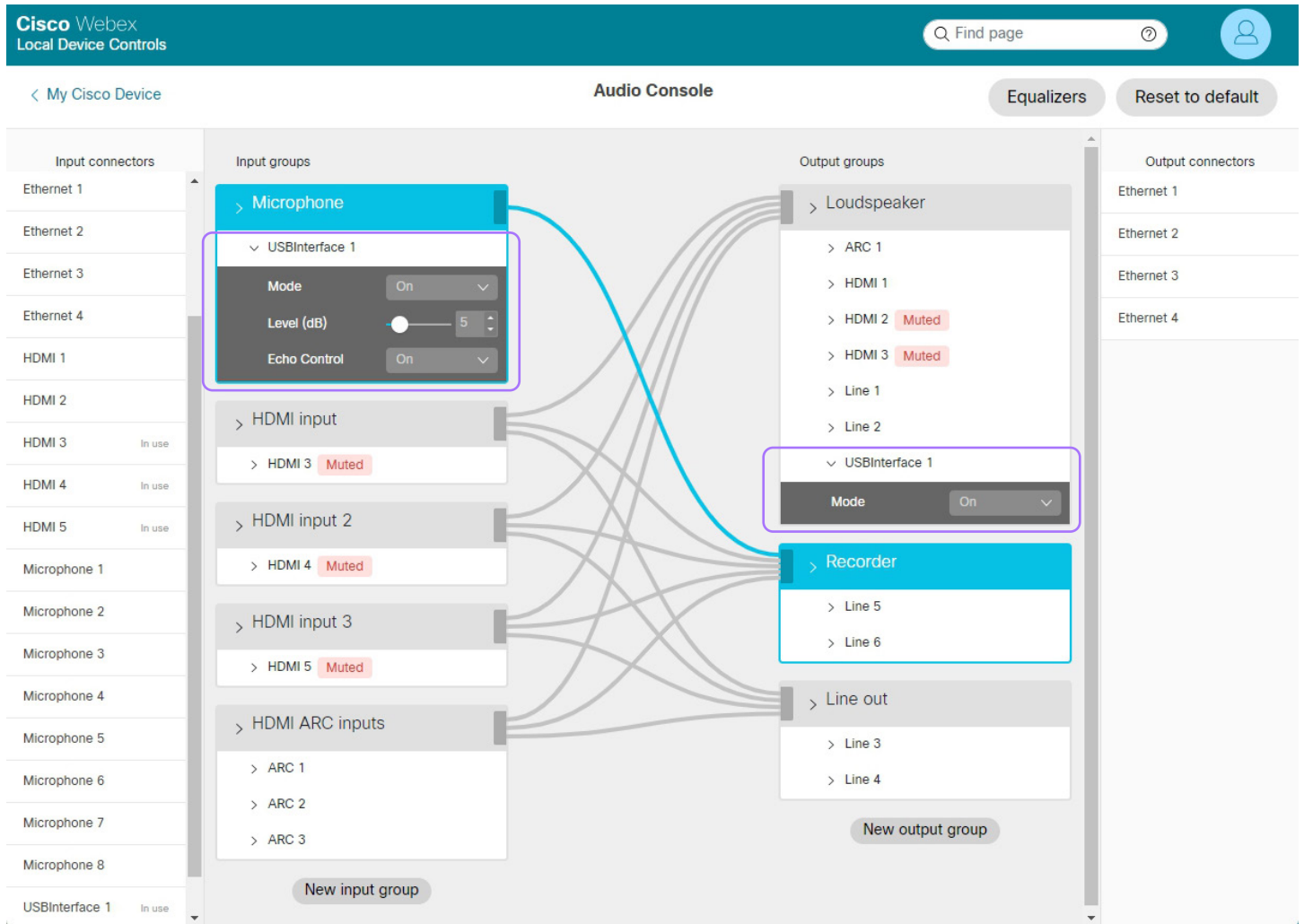


Figure 3: Audio Console in the Codec Pro web interface

On the Codec Pro side, make sure the input and output groups in Audio Console are setup correctly (Figure 3). When using the USB port in the codec, the “USB Interface 1” connector should be both in the Microphone and Loudspeaker groups to receive the microphone signal and send the AEC reference, respectively.

Once this is set up, the final step is to route the desired microphone channel (1 or 2) to the RM-CR DSP box USB out in Dante Controller.

One advantage of having the RM-CR DSP box as part of this configuration is the ability to run Yamaha’s “Audio Tuning” feature, which is only available when the RM-CR DSP box is in place.

To use ADECIA’s echo canceling processing, follow the Yamaha ADECIA ceiling solution [Quick Start Guide](#) to set up audio routing. If you use external analog loudspeakers, please skip Automatic Audio Tuning.



## Configure processing

The RM-CR Device Manager is the web-GUI where it is possible to find processing, networking, and general settings for both the RM-CG microphone and the RM-CR box itself (Figure 5). The list is quite comprehensive and the GUI easy to navigate.

Note that a USB connection from a computer to the setup port of the RM-CR DSP box is needed in order to access the web-GUI at <http://172.16.0.1> (Figure 4)

Audio processing settings for both the RM-CR DSP box and RM-CG microphone are available on the RM-CR web-GUI. Items highlighted in purple can be accessed and modified. Audio Tuning can also be run from here, if needed.

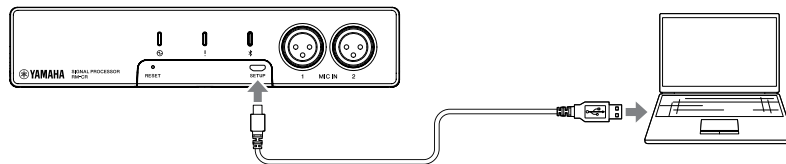


Figure 4: Connecting to the setup port of the RM-CR DSP box

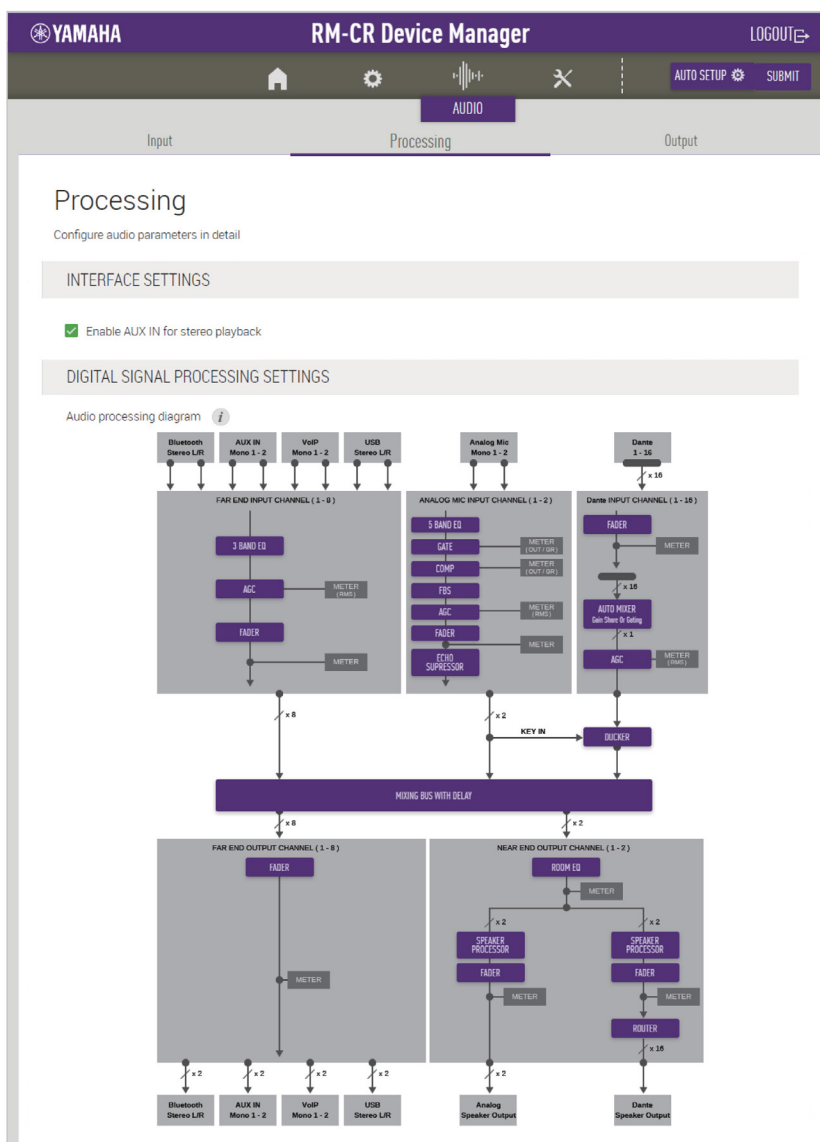


Figure 5: The Yamaha RM-CR Device Manager (web-GUI)

## Configuration without DSP

We recommend including the RM-CR DSP box in the setup, but it is possible to connect the RM-CG microphone using an AVIO Dante to USB adapter instead (stand-alone mode).

When not including the RM-CR DSP box in the setup, you won't get mute synchronization or Yamaha's Audio Tuning feature. This configuration is not documented further in this technical paper.

## Performing echo canceling in the Yamaha peripherals or Cisco device

For considerations to place echo canceling processing either in the Yamaha ADECIA peripherals or the Cisco device, please see the [Cisco Collaboration Devices - Audio Integration - Setup Guide](#).

We strongly recommend you only activate echo canceling in one device, that is only in the Cisco device or only in the peripherals. Doing it in two places may cause artifacts and quality reduction.

Currently, the Yamaha ADECIA only accepts one AEC reference. Sound playback with dynamic multichannel mixing will suffer from degraded AEC performance when using a single reference channel. Therefore, echo canceling in the Cisco device should be considered in that case.

## Loudspeaker options

When using Yamaha RM-CR with any of the Cisco devices, you can use external analog loudspeakers, networked loudspeakers, like the VXL1-16P, and/or the internal loudspeaker of the Cisco device.

VXL1-16P speakers have not been tested by Cisco.

## Network security considerations

To strengthen the protection of media and other networking services, precautions must be taken to minimize these risks.

We recommend precautions such as isolation of the networked audio components from the corporate network and enabling encryption and authentication.

Keep software and firmware of all devices up to date to benefit from functional and security related fixes and improvements.

Check [here](#) for more information.

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