JOYNED
AUDIO.
NETWORK.
TECHNOLOGY.

MU16 Manual

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Welcome to Your JOYNED MU16

Congratulations on your new **MU16 Milan USB Audio Interface** — a powerful, plug-and-play solution that bridges your computer or mobile devices to high-performance Milan networked audio systems.

Milan-AVB is increasingly adopted by leading professional audio manufacturers as a standards-based, deterministic Ethernet audio networking solution designed for interoperability and low latency. Major brands such as Adamson, Meyer Sound, d&b audiotechnik, L-Acoustics, Avid, PreSonus, and others use Milan-AVB across a wide range of products including amplifiers and active speakers for line arrays, digital mixing consoles, stage boxes, audio interfaces, DSP platforms, and network converters. These implementations are commonly found in live sound, fixed installations, and touring systems, where predictable performance, and multi-vendor compatibility are critical. The Milan specification, governed by the Avnu Alliance, ensures that certified devices from different manufacturers can seamlessly interoperate within the same Milan-AVB network, making it a future-proof foundation for modern professional audio systems such as the JOYNED MU16.

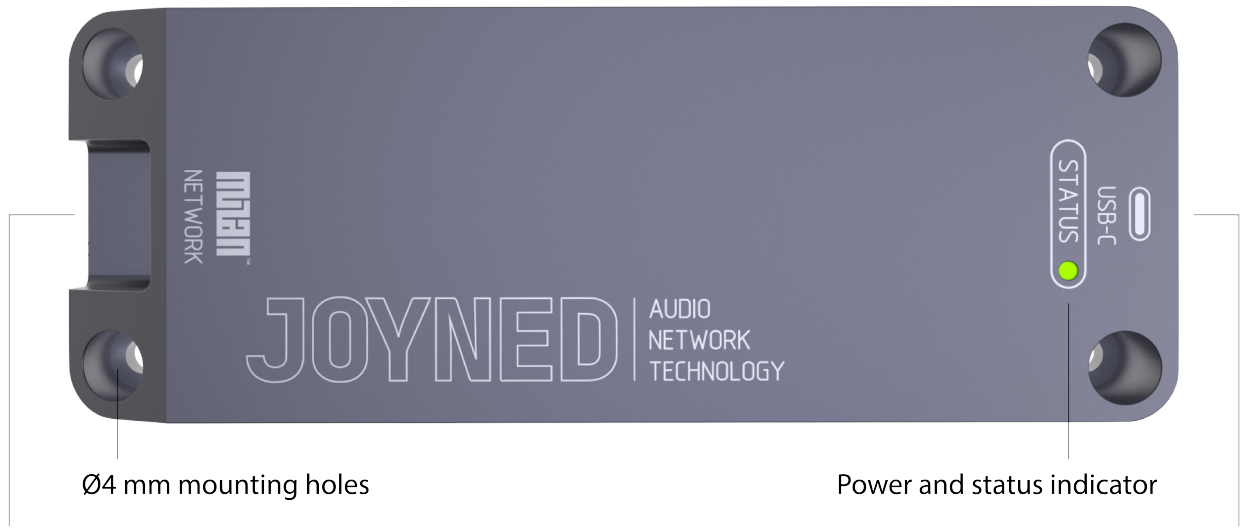
MU16 is fully certified and complies with the Milan-AVB specification. See the official registration here https://avnu.org/product/429/

MU16 - One USB Interface. Audio and Control.

MU16 does 16 channels of 32-bit bit-transparent audio at 96 kHz and 48 kHz between USB and Milan. 4 Milan streams in and 2 streams out. From firmware 5.0.0, MU16 also features a built-in 100 Mbit/s ethernet adapter (NIC) for configuration, control and monitoring of the Milan-AVB network.

MU16 supports macOS, Windows and iOS and needs no drivers installed for neither the USB audio nor the Ethernet Adapter. On Windows, an ASIO driver is available to bridge to professional audio applications like Smaart, LiveProfessor, Pro Tools etc.

MU16 is powered from USB and require only the minimum USB power specifications. Physically, the touring-grade unit features four mounting holes for screws and cables ties to fit the space and needs. The USB-C is a locking type for standard cables and a high quality locking cable is supplied with MU16.



Power and status indicator

- A **constantly lit green LED** indicates that the unit is powered correctly. If the LED does not light up, please check the cable and the power providing unit.
- A **blinking green LED** indicates that the **USB and Milan sample rates are not identical**, in which situation the MU16 will mute. Either change the Milan network sample rate or the computer/project sample rate. Note: A 96kHz-only firmware is available for when running 96kHz on your Windows computer or iOS device.

Getting Started

1. **Connect MU16 to your laptop or iOS device** with the included USB-C cable. Note that correct power is indicated by a constantly lit green Status LED.
2. **Plug the Ethernet cable** into your Milan/AVB network.
3. Use the **MU16 as the ethernet connection** for controlling the Milan-AVB network by using one of the Milan network controller application available e.g. Milan Manager https://milanmanager.com/ .
4. **Set up the Milan streams, the clocking and connections** in your preferred Milan controller application.
5. **Launch your DAW or audio software** — MU16 appears automatically with full channel access.
6. **You are ready to stream and monitor audio** over the network.

A Wide Range of Use Cases

PA Analysis and Measurement

Applications such as Smaart can access signals from the Milan network through MU16 for system alignment, PA analysis and the live show measurements.

With all 16 input and output channels available, engineers can work with multiple measurement positions, reference signals and system outputs from a single compact and truly portable interface.

Outboard VST Processing

MU16 can also connect Milan audio to software-based processing platforms such as LiveProfessor and Waves SuperRack Performer.

Audio channels can be routed from the Milan network into the computer application for VST plugin processing and returned to the network through MU16. This makes it possible to use a computer as a flexible outboard processing system within a Milan-based live sound setup.

MU16 supports extremely low-latency operation. As the optimum settings depend on the specific computer and configuration, users should select and test the buffer size carefully to achieve the best balance between minimum latency and reliable, glitch-free audio performance.

Multichannel Playback, Recording and virtual soundcheck

DAWs such as AVID Pro Tools and Steinberg Nuendo can use the full 16×16 channel configuration for multichannel playback and recording.

Typical applications include live recording, virtual soundcheck, backing-track playback or production workflows requiring direct access to a Milan network.

Immersive Audio Workflows

Immersive workflows built around Adamson FletcherMachine, L-Acoustics L-ISA, d&b Soundscape and Meyer Sound Spacemap Go can all benefit from MU16 as a compact bridge between computer and Milan.

Depending on the system, immersive processing may run directly on the computer or within dedicated processing hardware. In either case, MU16 can transport up to 16 channels of objects, stems or rendered loudspeaker feeds between computer applications and the Milan network.

DAWs such as Steinberg Nuendo and Avid Pro Tools can also use MU16 for immersive production, multichannel playback and recording. This makes MU16 a flexible interface for immersive studio production, pre-production and live sound applications.

Milan controllers

There are currently four main **Milan-AVB controller software tools** available:

1. **Milan Manager** – A free, user-friendly Milan-AVB network configuration, management, and monitoring application for desktops (Windows/Mac) made by L-Acoustics and d&b audiotechnik. More information at https://milanmanager.com/
2. **JOYNED Dash** - JOYNED just launched our new Milan-AVB controller, which has an intuitive and friction free approach with many exiting features. More information at http://dash.joyned.io
3. **Nebra** – A free Milan-AVB control and monitoring platform by Meyer Sound that provides an integrated workspace for device connections, routing, and system health. More information at https://software.meyersound.com/nebra
4. **Hive** – A free open-source controller for inspecting, configuring, and connecting Milan-AVB devices on a network, with precompiled binaries available for macOS and Windows. This is often used by developers due to the deep technical level. More information at https://github.com/christophe-calmejane/Hive

Built-in Ethernet Adapter

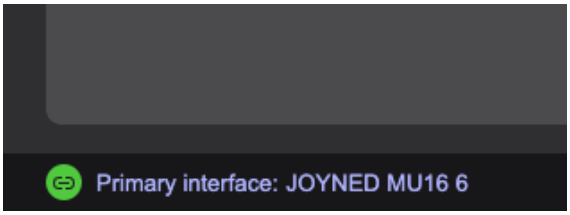
From firmware version V5.0.0, MU16 includes a built-in 100 Mbit/s Ethernet adapter (NIC) for the connected computer or mobile device.

The adapter provides network access through the same USB connection used for audio.
Milan-AVB audio and standard Ethernet network traffic share the MU16 Ethernet connection.
This allows compatible software to configure, control and monitor devices on the Milan-AVB network.

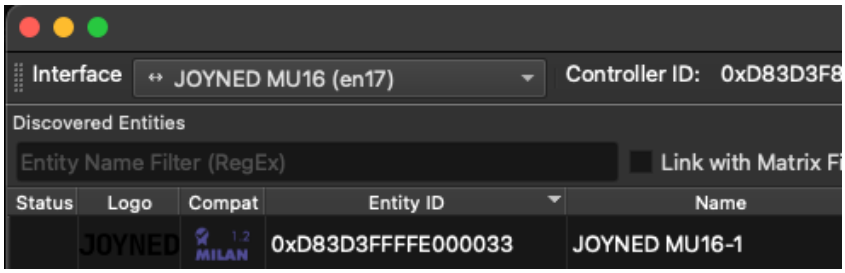
A separate USB-to-Ethernet adapter is therefore no longer required. Only one USB port is required on the connected computer. The connection also uses the existing MU16 network port, avoiding an additional connection to the network switch.

The Ethernet adapter appears to the operating system as a standard network interface without requiring a driver to be installed, similar to the class-compliant USB audio interface.
Its 100 Mbit/s bandwidth is intended for Milan-AVB network configuration, control and monitoring, but other network traffic is handled seamlessly as expected.

Select the MU16 as the ethernet port in your preferred Milan Controller application. See below for Hive and Milan Manager.

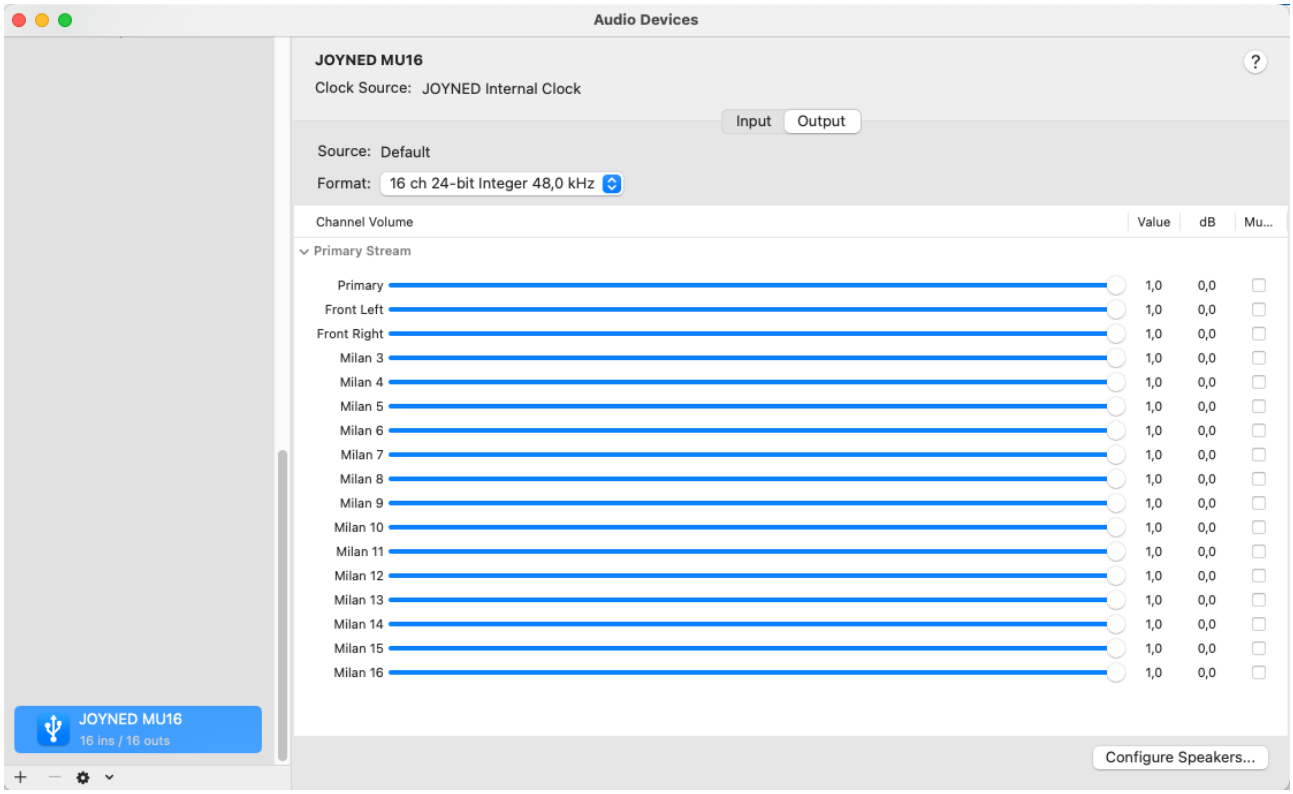


1 Milan Manager



2 Hive

Settings for MU16



macOS

On macOS, the class-compliant MU16 USB audio interface exposes standard parameters through **Audio MIDI Setup**, including **sample rate** to match the audio project and Milan system clock. The **clock source** of MU16 is always showing up as “internal”, and is defined by the Milan side. The USB sample rate should be set manually to match the Milan setup e.g. Milan 96 kHz → USB 96 kHz. If they are not identical (e.g. Milan 96 kHz / USB 48 kHz) the MU16 will mute audio and the status LED will blink.
Audio applications can adjust **buffer size / latency** to balance system performance and real-time monitoring. Input and output **levels and mutes** are typically handled within the DAW or audio application but is also available at system level.

Windows

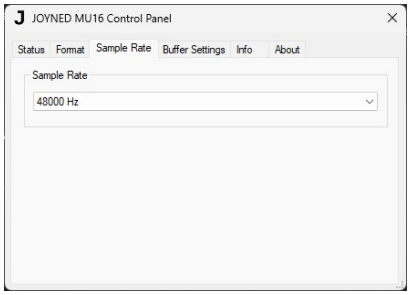
On Windows, the class-compliant MU16 USB audio interface is set up to ensure compatibility with system audio and applications. Go to System - Sound. Chose JOYNED MU16 as input and output.

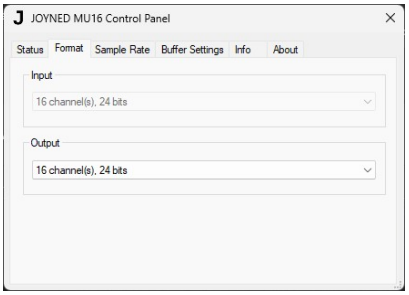
Dedicated Windows ASIO driver

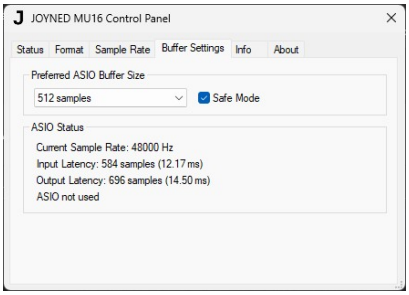
JOYNED has released a dedicated ASIO driver for MU16, expanding its integration with professional audio applications running on Windows 11.

The driver provides access to all 16 input and 16 output channels of the MU16, with selectable 48 and 96 kHz sample rates and adjustable buffer settings. This allows users to utilize the full MU16 feature set on Windows and optimise latency and system stability for their particular computer and application.

Enabling **Safe Mode** (next to buffer settings) gives Windows more time to accommodate scheduling delays, and temporary CPU or USB-bus interruptions. This reduces the risk of clicks, dropouts and stream interruptions, but increases input and output latency. The resulting latency is shown.







Download and install the latest driver: https://joyned.io/pages/resource-hub-mu16

iOS

On iOS, class-compliant USB audio interfaces like MU16 allow the individual audio apps to access **sample rate**, **input/output channel selection**, and **channel count**, enabling mobile recording and playback without drivers. Basic **input monitoring, metering, and level control** are handled inside compatible audio apps.
A couple of App examples: Garage Band records and plays back all 16 channels. Apple Music plays out stereo only.

Note: A 96kHz-only firmware is available for when running 96kHz on your iOS device

Power with iOS

iPhones and iPads are capable of powering the MU16 directly. Should you need not to rely on the battery in the iOS device, there are other ways to power MU16.
Here is an example providing power to an iPad Pro 12.9in (4th generation) while having an MU16 connected and streaming audio. The iPad Pro 12.9in has three contacts on the rear of the chassis for power input.

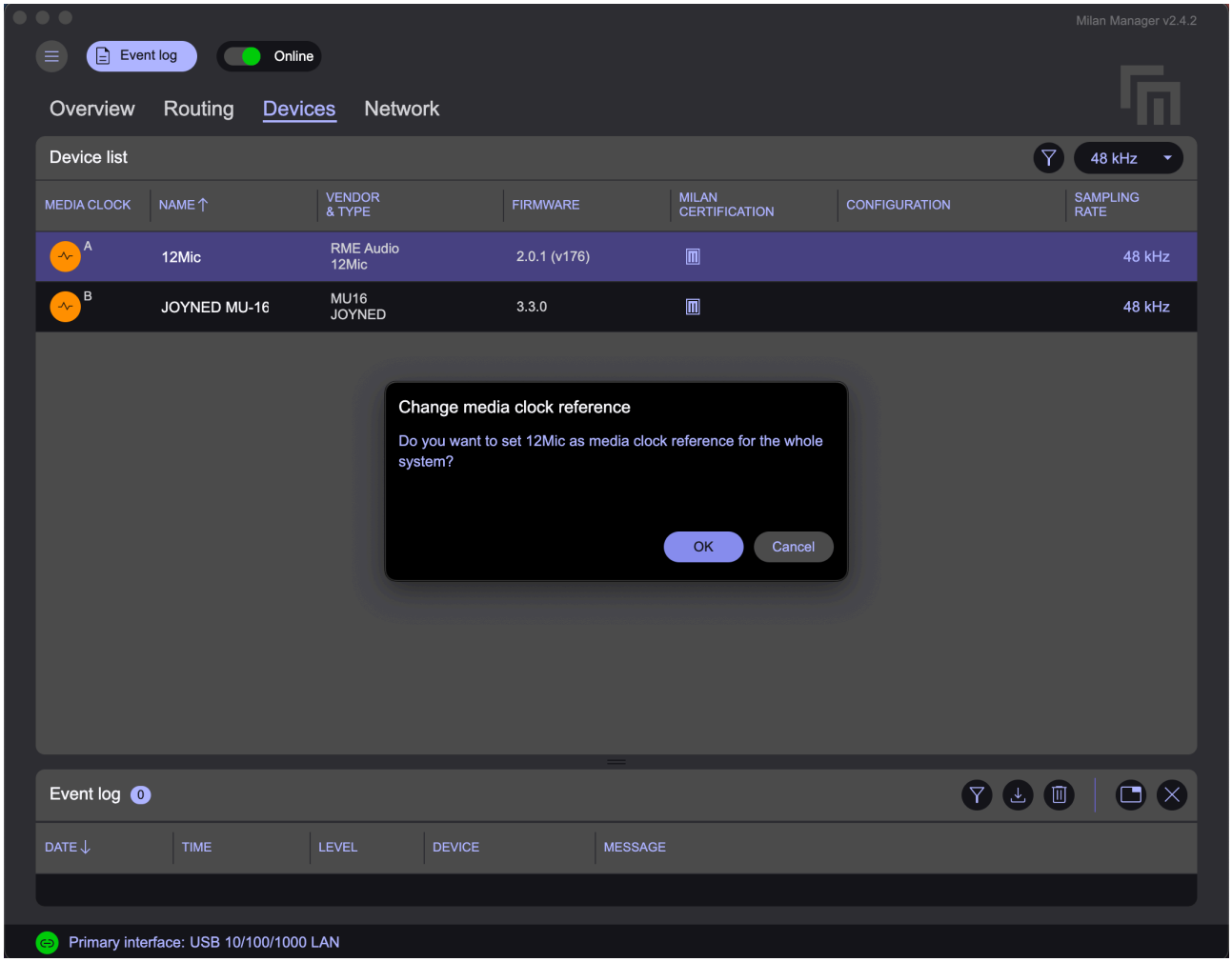
Kuxiu make an adaptor to go from USB-C to a magnetic puck that makes a connection to the contacts. https://kuxiu.com/products/kuxiu-m30-charger-for-ipad

They also make a magnetic charging stand that we have tested as well. https://kuxiu.com/products/x33-pro-max-stand

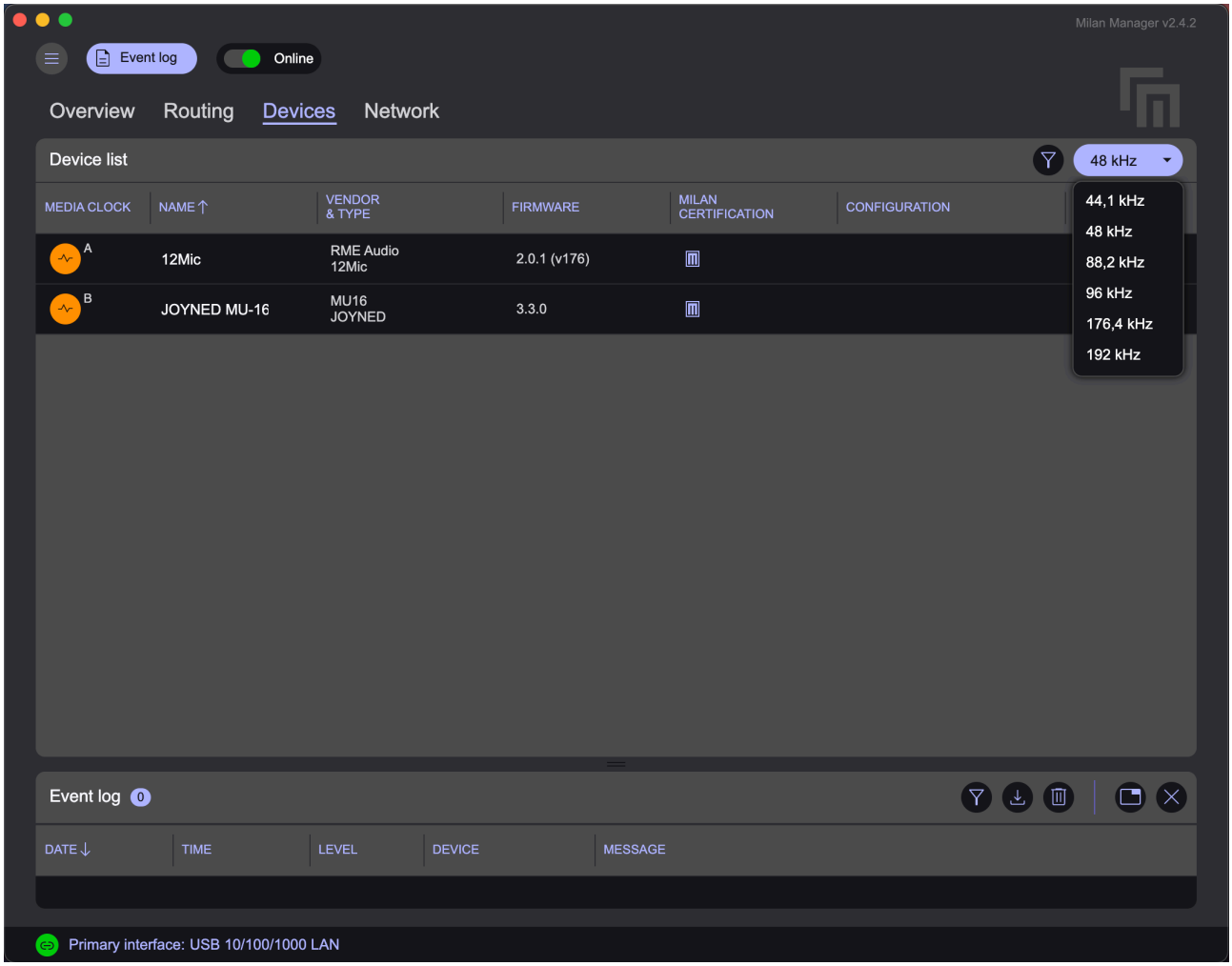
Setting up the Milan side

Setup via Milan Manager is done in a few easy steps. For detailed description of the different Milan Controllers, please refer to the links above.

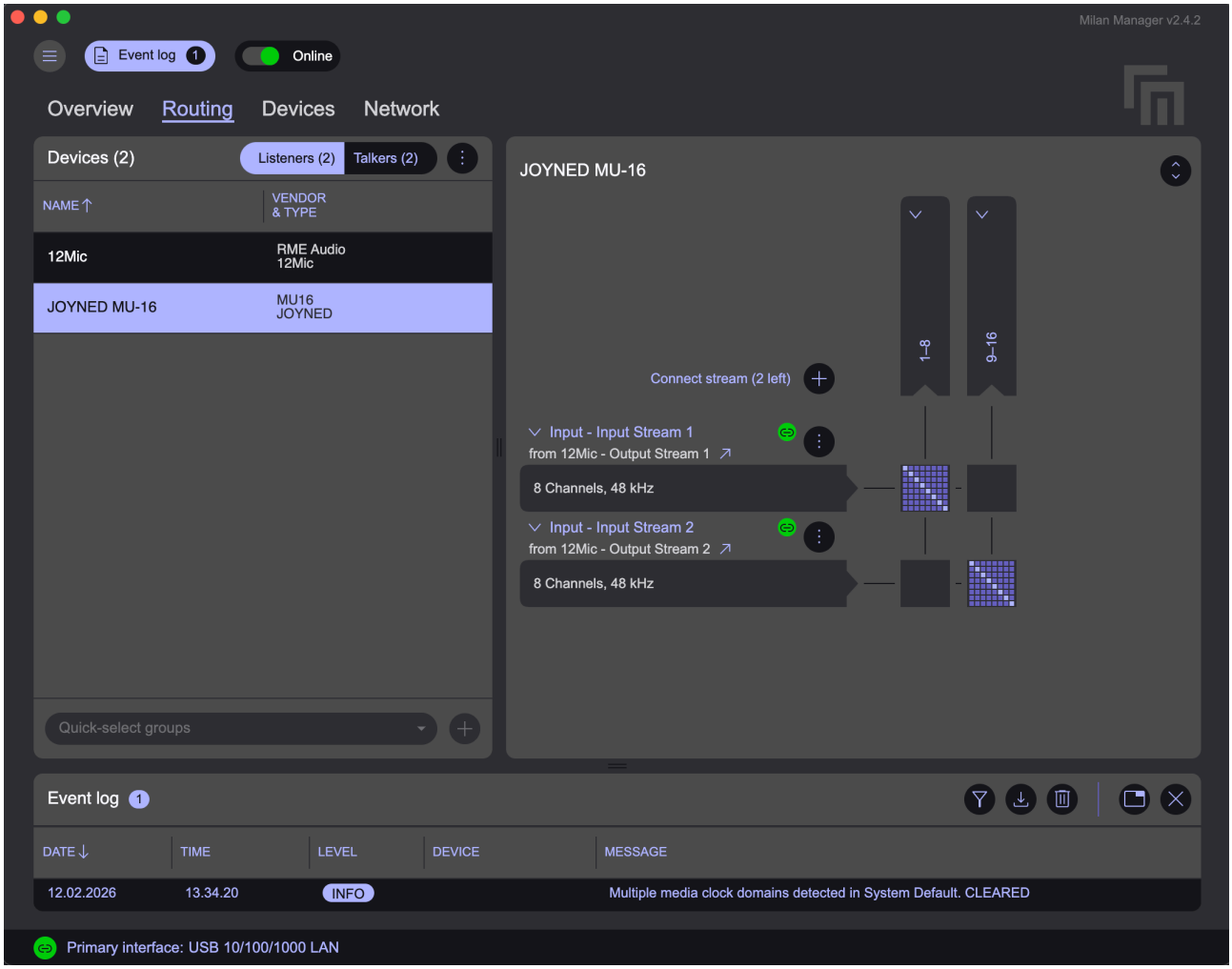
- Chose the Media Clock reference i.e. the overall clock leader on the Milan network.
- Chose the Sample Rate
- Route the channels and streams



3 Setting the Media Clock reference



4 Setting the Sample Rate



5 Route channels and streams

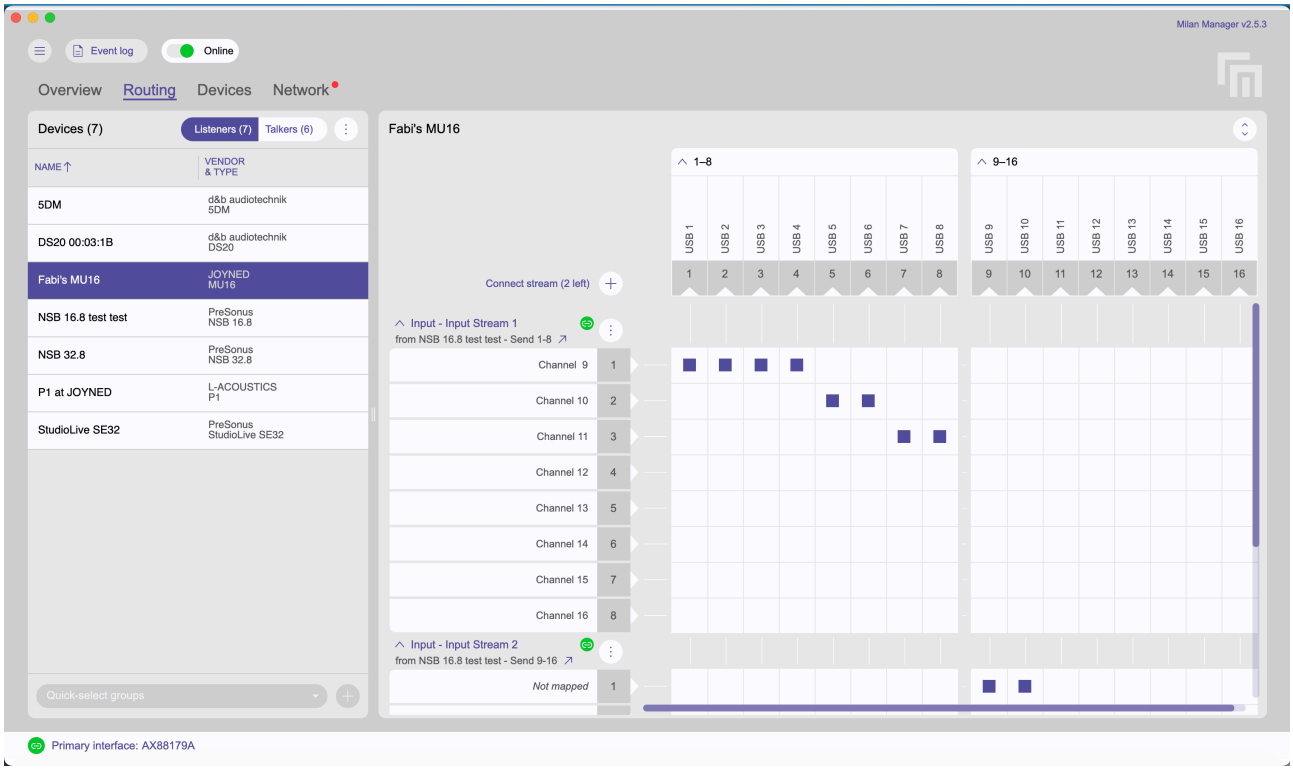
Listener Mapping / Routing

Listener mapping determines which received Milan stream channel is routed to each MU16 USB input channel.

Firmware v4.1.0 or later supports one-to-many mapping, allowing one received channel to feed several USB inputs. For example:

Milan stream channel 1 → MU16 USB inputs 1, 2 and 3
Milan stream channel 2 → MU16 USB input 4

Configure the mapping in Milan Manager or another compatible Milan controller. Connect the MU16 to a stream, open the listener-mapping view and assign each received channel to the required USB inputs.



6 Listener mapping / routing

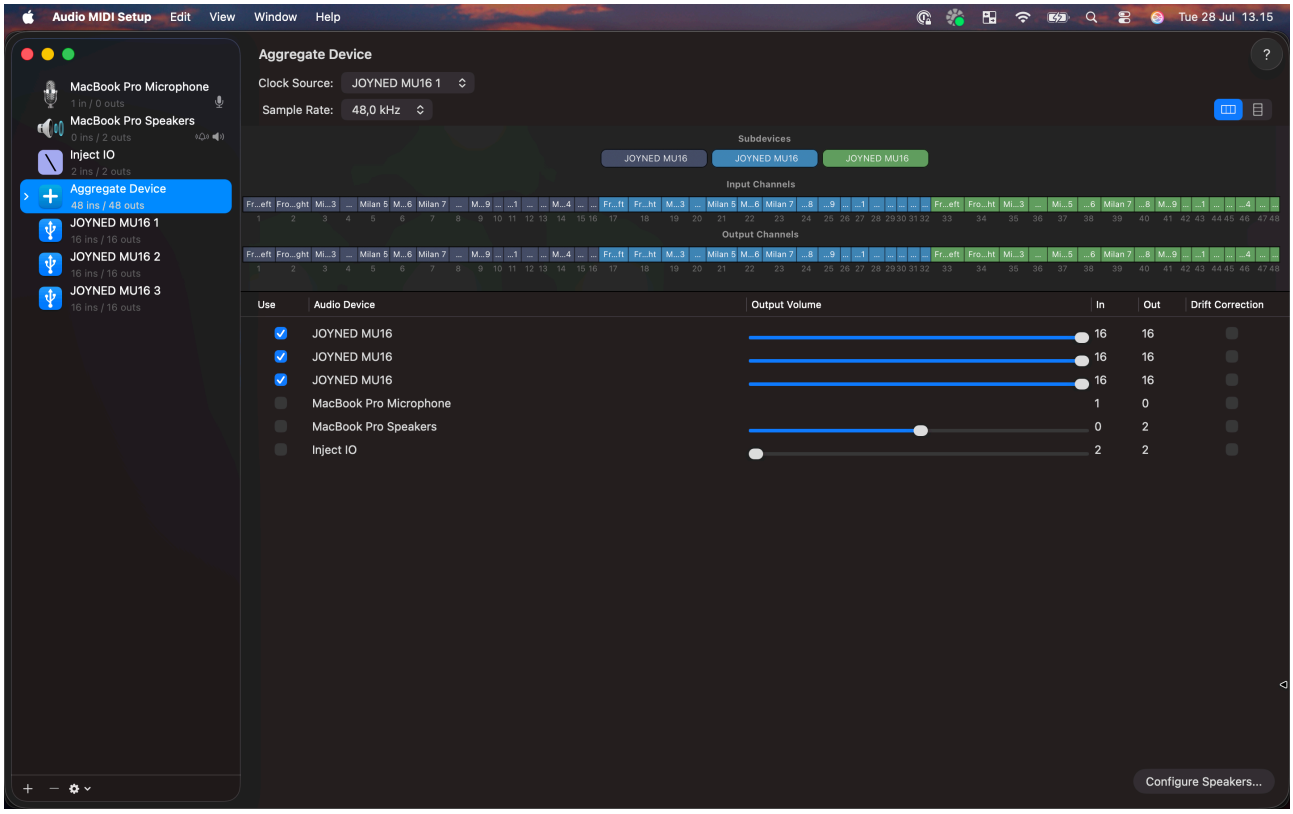
Going Beyond 16×16 Channels on macOS

For live recording, virtual soundcheck, immersive playback, or outboard VST processing, multiple JOYNED MU16 Milan USB Audio Interfaces can be combined into one larger Core Audio interface. For example, three MU16s provide 48 inputs and 48 outputs at 48 or 96 kHz.

1. Connect the MU16 units to your Mac, potentially via a USB hub.
2. Open **Applications** → **Utilities** → **Audio MIDI Setup**.
3. Click **+**, then select **Create Aggregate Device**.
4. Add each MU16 and arrange them in the preferred channel order.
5. Select one MU16 as the clock source and set the required sample rate.
6. Leave **Drift Correction disabled** for all MU16 units. They are already synchronized through the Milan network, preserving bit-transparent audio without software sample-rate conversion.
7. Select the Aggregate Device in your DAW and set the required buffer size.
8. Configure each MU16's streams separately in your Milan controller.

The Aggregate Device combines the USB channels only. Milan routing remains controlled through JOYNED DASH, Milan Manager, or another Milan controller.

Note: Each MU16 consumes around 500mA, 2.5W so depending on the amount of MU16s in the setup, you may need a powered USB hub.



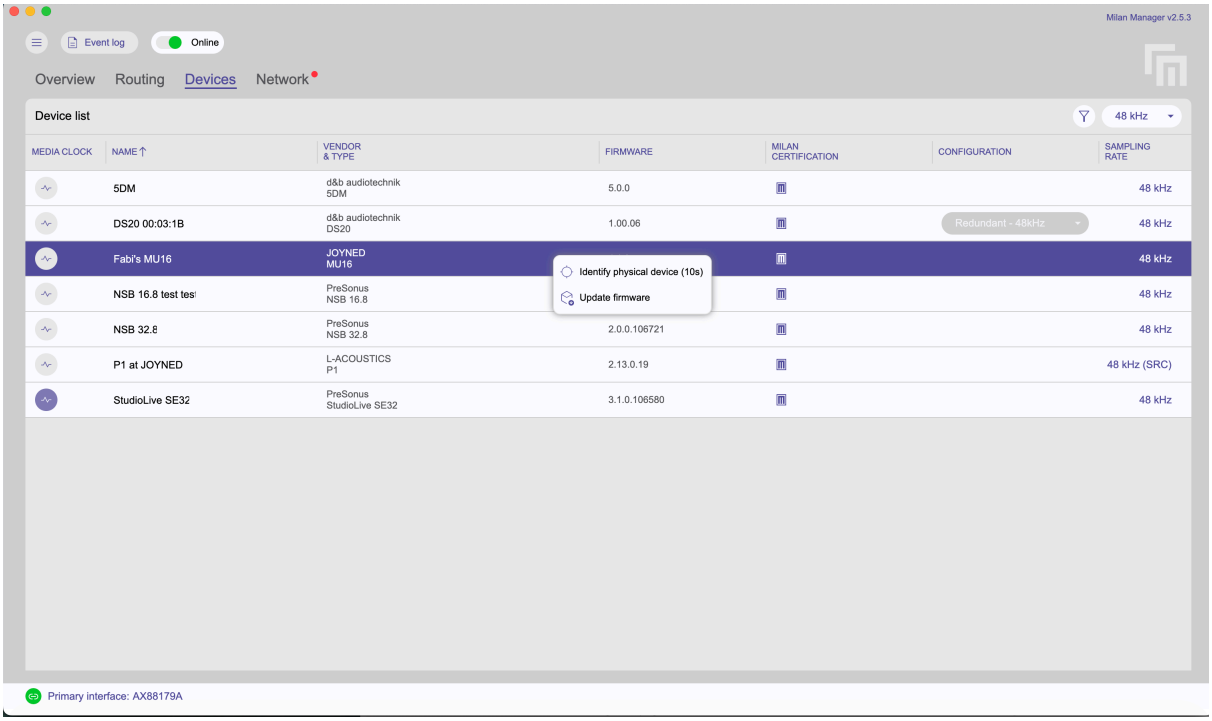
7 Setting up the Aggregate Device on macOS

Firmware Update

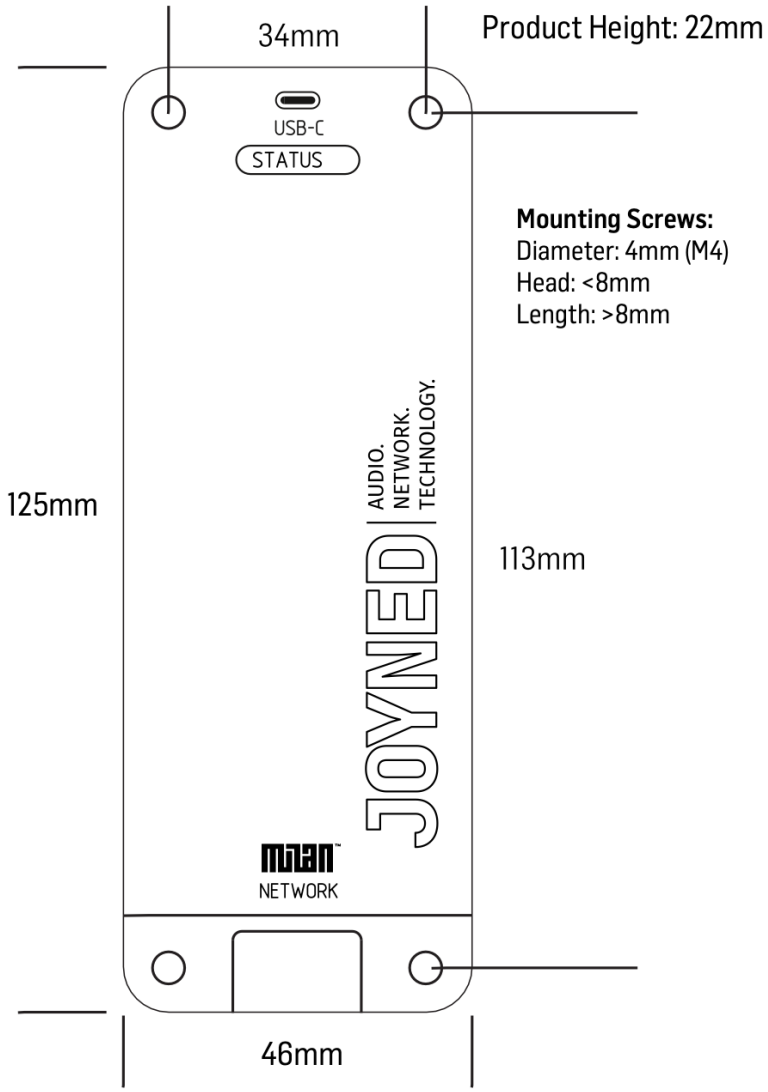
Latest and previous firmware are available at https://joyned.io/pages/resource-hub-mu16
Note: The MU16 is shipping with firmware that covers both 48 and 96 kHz operation. If you need to run 96 kHz with your iOS device or your Windows computer we offer a 96 kHz-only firmware. Available via the link above.

The update is easily done via any of the Milan Controllers on the market.

- Download the firmware file via the link above
- Power on the MU16 by connecting USB and connect it to the Milan network
- Open the Milan controller of choice e.g. Milan Manager
- Go to Devices, and right click on the MU16 for the firmware loader feature in the Milan Manager
- Locate and select the firmware file on the computer
- Press update and wait for it to finish
- We recommend re-powering the MU16 by disconnecting and connecting the USB
- Verify in the intended firmware version in the firmware field on the selected MU16


Milan Manager v2.5.3
Event log
Online
Overview
Routing
Devices
Network
Device list
48 kHz
MEDIA CLOCK
NAME
VENDOR & TYPE
FIRMWARE
MILAN CERTIFICATION
CONFIGURATION
SAMPLING RATE
5DM
d&b audiotechnik 5DM
5.0.0
48 kHz
DS20 00:03:1B
d&b audiotechnik DS20
1.00.06
Redundant - 48kHz
48 kHz
Fabi's MU16
JOYNED MU16
48 kHz
NSB 16.8 test tes
PreSonus NSB 16.8
48 kHz
NSB 32.8
PreSonus NSB 32.8
2.0.0.106721
48 kHz
P1 at JOYNED
L-ACOUSTICS P1
2.13.0.19
48 kHz (SRC)
StudioLive SE32
PreSonus StudioLive SE32
3.1.0.106580
48 kHz
Identify physical device (10s)
Update firmware
Primary interface: AX88179A

Physical and Mounting Information



Frequently Asked Questions

For an updated list, please refer to http://www.joyned.io
Your feedback drives us. We're always listening — share your thoughts with us at info@joyned.at[1]

More information needed?

- Latest firmware

1. mailto:info@joyned.at

- System requirements

are to be found at http://www.joyned.io. And you can write us at info@joyned.at[2]

2. mailto:info@joyned.at