M2™ | M4™

User Guide

MOTU®

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SAFETY PRECAUTIONS AND ELECTRICAL REQUIREMENTS FOR THE M2 AND M4 ("PRODUCT")

CAUTION! READ THIS SAFETY GUIDE BEFORE YOU BEGIN INSTALLATION OR OPERATION. FAILURE TO COMPLY WITH SAFETY INSTRUCTIONS COULD RESULT IN BODILY INJURY OR EQUIPMENT DAMAGE.

HAZARDOUS VOLAGES: CONTACT MAY CAUSE ELECTRIC SHOCK OR BURN. TURN OFF UNIT BEFORE SERVICING.

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRICAL SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR OTHER MOISTURE.

CAUTION: TO REDUCE THE RISK OF ELECTRICAL SHOCK, DO NOT REMOVE COVER. NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

WARNING: DO NOT PERMIT FINGERS TO TOUCH THE TERMINALS OF PLUGS WHEN INSTALLING OR REMOVING THE PLUG TO OR FROM THE OUTLET.

WARNING: IF NOT PROPERLY GROUNDED THE MOTU PRODUCT COULD CAUSE AN ELECTRICAL SHOCK.

IMPORTANT SAFEGUARDS

1. Read these instructions. All the safety and operating instructions should be read before operating the product.
2. Keep these instructions. These safety instructions and the product owner's manual should be retained for future reference.
3. Heed all warnings. All warnings on the product and in the owner's manual should be adhered to.
4. Follow all Instructions. All operating and use instructions should be followed.
5. Do not use the product near water.
6. Cleaning - Unplug the product from the computer and clean only with a dry cloth. Do not use liquid or aerosol cleaners.
7. Ventilation - Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Heat - Do not install the product near any heat sources such as radiators, heat registers, stoves, or another apparatus (including an amplifier) that produces heat.
9. Overloading - Do not overload wall outlets and extension cords as this can result in a risk of fire or electrical shock.
10. Power cord - Protect the product power cord from being walked on or pinched by items placed upon or against them. Pay particular attention to cords and plugs, convenience receptacles, and the point where they exit from the unit.
11. Power switch - Install the product so that the power switch can be accessed and operated at all times.
12. Disconnect - The main plug is considered to be the disconnect device for the product and shall remain readily operable.
13. Accessories - Only use attachments/accessories specified by the manufacturer.
14. Placement - Use only with the cart, stand, tripod, bracket or table specified by the manufacturer, or sold with the product. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
15. Surge protection - Unplug the product during lightning storms or when unused for long periods of time.
16. Servicing - Refer all servicing to qualified service personnel. Servicing is required when the product has been damaged in any way, such as when a power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the product, the product has been exposed to rain or moisture, does not operate normally, or has been dropped.
17. Power Sources - Refer to the manufacturer's operating instructions for power requirements. Be advised that different operating voltages may require the use of a different line cord and/or attachment plug.
18. Installation - Do not install the product in an unventilated rack, or directly above heat-producing equipment such as power amplifiers. Observe the maximum ambient operating temperature listed below.
19. Power amplifiers- Never attach audio power amplifier outputs directly to any of the unit's connectors.
20. Replacement Parts - When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or have the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock or other hazards.
21. Safety Check - Upon completion of any service or repairs to this MOTU product, ask the service technician to perform safety checks to determine that the product is in safe operating conditions.

ENVIRONMENT, HEAT AND VENTILATION

Operating Temperature: 10°C to 40°C (50°F to 104°). The product should be situated away from heat sources or other equipment that produces heat. When installing the product in a rack or any other location, be sure there is adequate space around the product to ensure proper ventilation. Improper ventilation will cause overheating and can damage the unit.

TO REDUCE THE RISK OF ELECTRICAL SHOCK OR FIRE

Do not handle the power cord with wet hands. Do not expose this apparatus to rain or moisture. Do not place objects containing liquids on it.

AC INPUT

100 - 240VAC ~ • 50 / 60Hz • 0.5A max



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UPDATE POLICY

In order to be eligible to obtain updates of the program, you must complete and return the attached Mark of the Unicorn Purchaser Registration Card to MOTU.

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This equipment has been type 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 in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television equipment reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by any combination of the following measures:

- Relocate or reorient the receiving antenna
- Increase the separation between the equipment and the receiver
- Plug the equipment into an outlet on a circuit different from that to which the receiver is connected

If necessary, you can consult a dealer or experienced radio/television technician for additional assistance.

PLEASE NOTE: only equipment certified to comply with Class B (computer input/output devices, terminals, printers, etc.) should be attached to this equipment, and it must have shielded interface cables in order to comply with the Class B FCC limits on RF emissions.

WARNING: changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

CE

Quick Start Guide

Thank you for purchasing an M series USB interface! Follow these easy steps to get started quickly.

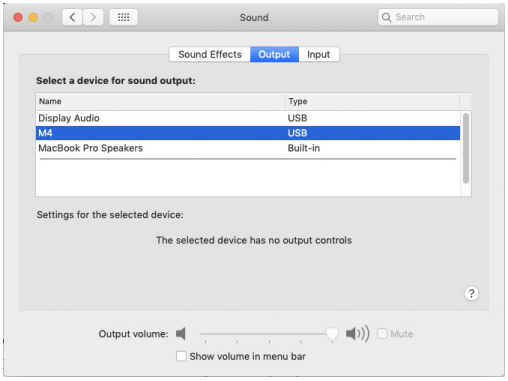
FOR MAC USERS

1 Connect the M2 or M4 to your Mac using the included USB cable.

☛ If your computer has USB-C ports, use a USB-C to USB-C cable (rated for USB2), or a USB-C to USB-A adapter, (both sold separately).

2 Go to the Apple menu and choose *System Preferences*.

3 Click *Sound* and choose the M2 or M4 as the input and output device.



4 Go to Step 5 below.

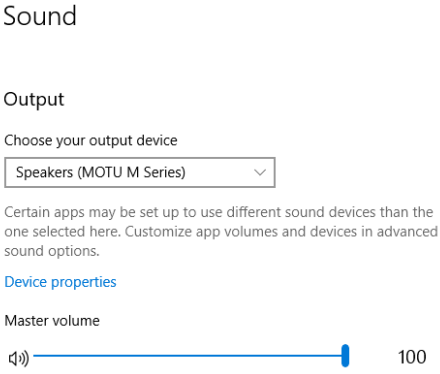
FOR WINDOWS USERS

1 BEFORE you connect the M2 or M4 to your computer, visit *motu.com/m2-start* or *motu.com/m4-start* to download and install the Windows driver.

2 Connect the M2 or M4 to your PC using the included USB cable.

☛ If your computer has USB-C ports, use a USB-C to USB-C cable (rated for USB2), or a USB-C to USB-A adapter, (both sold separately).

3 Go to the Windows Sound Control Panel and choose *MOTU M Series* as the default input and output device.



4 Go to Step 5 below.

FOR ALL USERS

5 Connect speakers and/or a pair of headphones to the M2 or M4 so you can hear your computer's audio output. For speakers, connect them to the outputs on the back panel.

6 You are now ready to start using your M series interface.

7 Visit *motu.com/m2-start* or *motu.com/m4-start* to register your product, download the included software and watch brief how-to videos, including:

- How to connect a mic, guitar, keyboard or other line-level audio source.
- How to use your M series interface with your recording software.

- How to get the most out of your M series interface.

PLEASE REGISTER TODAY

Please visit *motu.com/m2-start* or *motu.com/m4-start* to register your M series interface and gain access to all the software, virtual instruments, loops and sounds that are included with your purchase. Registered users also qualify for technical support and information about software updates, so please register today!

Thank you for taking the time to register your new MOTU product!

FINDING YOUR SERIAL NUMBER

You can find your M series product serial number on the bottom of the unit and the side of the box.

M2 Quick Reference



1. These two XLR/TRS combo jacks accept a mic cable or a quarter-inch cable, balanced or unbalanced, from a guitar or line level source.

2. Use GAIN knob to add up to 60 dB of boost to the input signal. Watch the input level meter in the LCD while adjusting gain. Try to adjust gain as high as possible without clipping, which is indicated by the red rectangle at the top of the meter.

3. The full-color, high-resolution LCD (160x120 pixels) shows full-length meters for all inputs and outputs. An overloaded signal is indicated by a red box at the top of the signal. If you see the red box, reduce the signal level. A blue box around the input channel number indicates that hardware (direct) monitoring (the MON button) is engaged for that channel.

4. Volume control for the MONITOR outputs on the back panel.

5. Volume control for headphone output.

6. Connect your headphones here. This signal matches the signal on the MONITOR outputs on the rear panel, but volume control (5) is independent.

7. Engage the 48V switch to engage phantom power for a condenser microphone connected to the input.

8. Engage the MON (monitor) button to enable hardware (direct) monitoring, which routes the channel's input signal directly to the outputs and pans the mono signal evenly across both outputs (1-2). A blue box appears around the input channel number in the LCD to indicate that hardware monitoring is engage. Press and hold the MON button to engage stereo monitoring for both inputs. In this mode, Input 1 is routed to Output 1 and Input 2 is routed to Output 2, allowing you to monitor in stereo while recording in stereo.

9. POWER SWITCH: You can switch off the M2 and turn it back on without restarting your computer.

10. Connect MIDI gear to these standard MIDI ports.

11. These unbalanced RCA analog outputs mirror the signal on the quarter-inch outputs (12). You can connect them to a second set of speakers or other destination.

12. Connect these balanced, DC-coupled quarter-inch outputs to your studio speakers, PA or other desired audio destination. They can also accept an unbalanced plug.

    Note: the analog outputs are not cross-coupled. Therefore, when connecting them to an unbalanced input, use a TRS plug with the ring disconnected. Not floating the negative terminal will short it to the sleeve ground and cause distortion.

13. Connect the M2 to your host computer with the supplied USB-C to USB-A cable. If your computer has USB-C ports, use a USB-C to USB-C cable (rated for USB2) or a USB-A adapter (both sold separately). The M2 is powered by its USB connection to the host computer.

M4 Quick Reference



1. These two XLR/TRS combo jacks accept a mic cable or a quarter-inch cable, balanced or unbalanced, from a guitar or line level source.

2. Use GAIN knob to add up to 60 dB of boost to the input signal. Watch the input level meter in the LCD while adjusting gain. Try to adjust gain as high as possible without clipping, which is indicated by the red rectangle at the top of the meter.

3. INPUT MONITOR MIX: Controls the balance (relative volume) between computer output (over USB) and live inputs being monitored through the hardware using the MON (monitor) switch (10). Turn it counterclockwise to hear more inputs; turn it clockwise to hear more computer audio.

4. The full-color, high-resolution LCD (160x120 pixels) shows full-length meters for all inputs and outputs. An overloaded signal is indicated by a red box at the top of the signal. If you see the red box, reduce the signal level. A blue box around the input channel number indicates that hardware (direct) monitoring (the MON button) is engaged for that channel.

5. Volume control for the MONITOR outputs on the back panel.

6. Volume control for headphone output.

7. Connect your headphones here. This signal matches the signal on the MONITOR outputs on the rear panel, but volume control (5) is independent.

8. Engages hardware (direct) monitoring for inputs 3-4 on the rear panel. See (10) below for more information.

9. Engage the 48V switch to engage phantom power for a condenser microphone connected to the input.

10. Engage the MON (monitor) button to enable hardware (direct) monitoring, which routes the channel's input signal directly to the outputs and pans the mono signal evenly across both outputs (1-2). A blue box appears around the input channel number in the LCD to indicate that hardware monitoring is engage. Press and hold the MON button to engage stereo monitoring for both inputs. In this mode, Input 1 is routed to Output 1 and Input 2 is routed to Output 2, allowing you to monitor in stereo while recording in stereo.

11. POWER SWITCH: You can switch off the M2 and turn it back on without restarting your computer.

12. Connect MIDI gear to these standard MIDI ports.

13. These unbalanced RCA analog outputs mirror the signal on their corresponding quarter-inch outputs (12). You can connect them to a second set of speakers or other destinations.

14. Connect these balanced, DC-coupled quarter-inch outputs to your studio speakers, PA or other desired audio destination. They can also accept an unbalanced plug. Each output pair is independent and can be found as separate output pairs in your host software.

    Note: the analog outputs are not cross-coupled. Therefore, when connecting them to an unbalanced input, use a TRS plug with the ring disconnected. Not floating the negative terminal will short it to the sleeve ground and cause distortion.

15. These LINE INPUTS accept either a balanced or unbalanced plug. Connect a keyboard or other similar line level audio source.

16. Connect the M2 to your host computer with the supplied USB-C to USB-A cable. If your computer has USB-C ports, use a USB-C to USB-C cable (rated for USB2) or a USB-A adapter (both sold separately). The M2 is powered by its USB connection to the host computer.

CHAPTER 1 Packing List and System Requirements

PACKING LIST

The M2 and M4 ship with the items listed below. If any of these items are not present in the box when you first open it, please immediately contact your dealer or MOTU.

- One M2 or M4 audio interface
- USB-C to USB-A cable
- Safety instruction sheet

SYSTEM REQUIREMENTS

- A 1 GHz Intel-based Mac or Pentium-based PC (or compatible). Faster CPUs are recommended for best performance.
- 2 GB RAM; 4 GB or more recommended.
- macOS 10.11 or later; Windows 7 or later.
- Available high-speed USB 2.0 (or 3.0) port.
- A large hard drive (preferably at least 512 GB).

PLEASE REGISTER TODAY!

Please visit *motu.com/m2-start* or *motu.com/m4-start* to register your M series interface and gain access to all the software, virtual instruments, loops and sounds that are included with your purchase. Registered users also qualify for technical support and information about software updates, so please register today!

Thank you for taking the time to register your new MOTU product!

FINDING YOUR SERIAL NUMBER

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CHAPTER 2 Software Installation

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USB AUDIO CLASS-COMPLIANT OPERATION

Your M Series interface is a USB audio class-compliant device. This means that you can connect it to your Mac (running Mac OS 10.11 or higher) with a USB cable and use it without installing any software drivers. The computer recognizes your M Series interface as a USB audio device and makes its inputs and outputs available to your host audio software. Basic settings, such as the hardware's sample rate, are made in either your host software.

☛ In this scenario, your M Series interface provides basic audio input and output, and no software driver installation is necessary. Use the Mac's Audio MIDI Setup utility to manage your M Series interface audio inputs and outputs for your Mac.

Connection to iOS devices (iPad and iPhone)

Audio-class compliant operation allows you to connect your M Series interface to any iOS device with a standard camera connection kit adapter. The M Series interface then provides multi-channel audio I/O to your audio apps. Use your audio app to configure the number of available audio channels.

☛ For iOS devices with a USB-C port, a USB-C to USB-C cable is required (sold separately).

☛ For iOS devices with a Lightning port, an Apple Lightning to USB3 Camera Adapter is required (sold separately).

DRIVER INSTALLATION

Driver installation is required for either of the following scenarios:

- You are using a PC running Windows 7 or later.
- You are using a Mac and you wish to take advantage of the extra features that the driver provides: lower latency performance and loopback channels (see "Loopback" on page 21).

If neither of the above scenarios apply to you, then you can skip software installation if you wish, and proceed to chapter 3, "Hardware Installation" (page 15).

Download and run the M Series installer

To download the latest M Series installer for Mac or Windows, visit www.motu.com/m2-start (it's the same installer for both the M2 and M4). Follow the directions that the installer gives you.

☛ We recommend that you run the software installer *before* you connect your M Series interface to your computer and power it on. This ensures that all driver components are properly installed in your system.

Industry-leading I/O latency performance

On Mac OS and Windows, the M series driver provides exceptionally low I/O latency performance. For example, with a 32-sample buffer size, an M Series interface operating at 96 kHz produces round trip latency (RTL) performance of 2.5 milliseconds (ms) on Windows and 1.6 ms on Mac OS. RTL is the

measurement of the time it takes audio to pass from an analog input, through a DAW host, to an analog output.

M Series ASIO driver

On Windows, to enable your M Series interface in your ASIO host software, choose M Series ASIO driver.

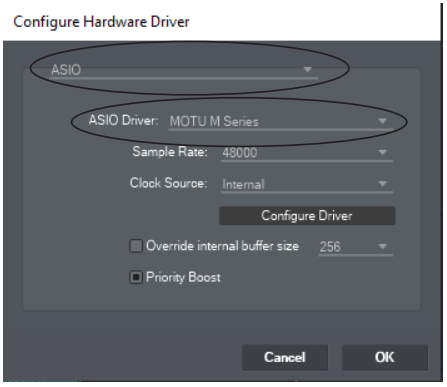


Figure 2-1: Choosing the M Series ASIO driver in Performer Lite on Windows (Setup menu > Configure Audio System > Configure Hardware Driver).

M SERIES CONTROL PANEL (WINDOWS ONLY)

On Windows, you can access the M Series control panel in the Windows Start menu. In Performer Lite, you can access it by clicking the Configure Driver button shown in Figure 2-1.

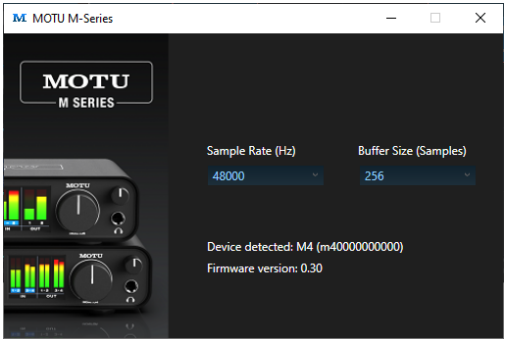


Figure 2-2: M Series control panel.

Sample Rate (Hz)

Choose the desired sample rate (Figure 2-2) for operation with your host software. Make sure your host software matches the sample rate you choose here.

Buffer Size

The Buffer Size setting (Figure 2-2) determines the amount of latency (delay) you may hear when live audio is patched through your Windows audio software. Smaller buffer sizes produce lower latency, with sizes of 256 samples or less producing virtually imperceptible delay. Many host applications report audio hardware I/O latency, so you can see what happens to the reported latency when making adjustments to this setting.

Be careful with very small buffer sizes, as they can cause performance issues from your host software or PC.

☛ At sea level, audio travels approximately one foot (30 cm) per millisecond. A latency of ten milliseconds is about the same as being ten feet (three meters) from an audio source.

MIDI I/O ON WINDOWS

On Windows, the M Series driver installer provides a USB MIDI driver for the M2 and M4. This driver allows you to access the their MIDI input and output ports through its USB connection to the computer. The ports are published in Windows and are available to all MIDI software.

MIDI I/O SETUP ON THE MAC

Core MIDI is the "under-the-hood" component of macOS that handles MIDI services for MIDI hardware and software. Core MIDI provides many universal MIDI system management features, including MIDI communication between your M Series interface and all Core MIDI compatible software.

Audio MIDI Setup is a utility included with macOS that allows you to configure your M Series interface for use with all Core MIDI compatible applications. Audio MIDI Setup provides:

- A "virtual" studio on your Mac that graphically represents your MIDI hardware setup and that is shared by all Core MIDI-compatible programs
- A simple, intuitive list of your MIDI devices whenever you need it in any Core MIDI-compatible program

Launching Audio MIDI Setup

1 Make sure your M Series interface is connected (a USB connection is required) and turned on.

2 Launch the Audio MIDI Setup utility.

This can usually be found in /Applications/Utilities. If it has been moved, just search for *Audio MIDI Setup*.

3 Confirm that the MIDI interface is present in the *MIDI Devices* tab (or window) in Audio MIDI Setup. If the interface does not appear, or if it is grayed out, check your cable connections and click *Rescan MIDI*.

Connecting MIDI devices to the M Series

Once your M Series interface appears in Audio MIDI Setup, you are ready to add devices, indicate how they are connected, and identify properties they may have for particular purposes. This information is shared with all Core MIDI compatible applications.

To add a device in Audio MIDI Setup:

1 Click *Add Device*.

2 Drag on its input and output arrows to draw connections to the M Series interface that match its physical connection.

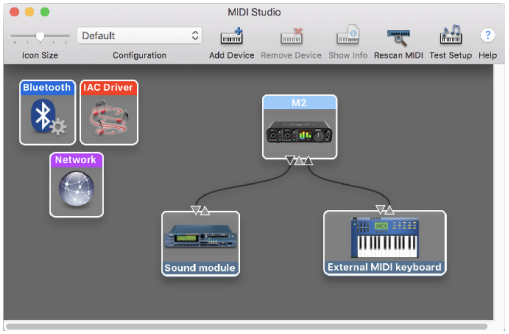


Figure 2-3: Connecting devices to an M Series interface. In this example, a controller keyboard is connected to the M4 MIDI IN, and a sound module is connected to the M4 MIDI OUT.

3 Double-click the device to make settings, such as input and output channels, that further describe the device.

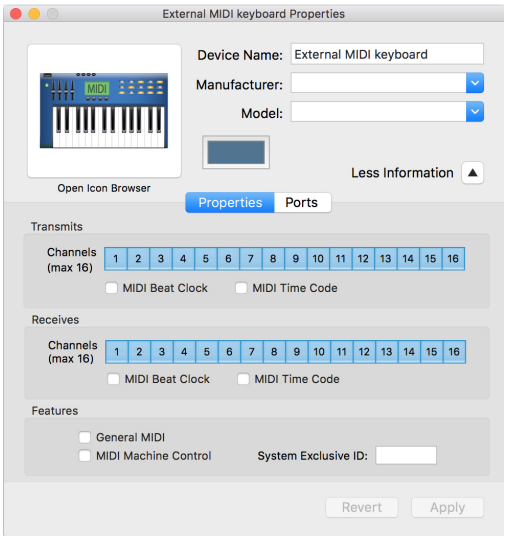


Figure 2-4: Device settings.

4 Repeat the above steps for each MIDI device connected to the interface.

5 When you are finished, quit Audio MIDI Setup.

Your configuration is automatically saved as the default configuration, and it is shared with all Core MIDI-compatible software.

WORKING WITH HOST AUDIO SOFTWARE

For further information about using your M Series interface with host audio software, see chapter 4, “Working with Host Audio Software” (page 19).

CHAPTER 3 Hardware Installation

A TYPICAL M2 SETUP

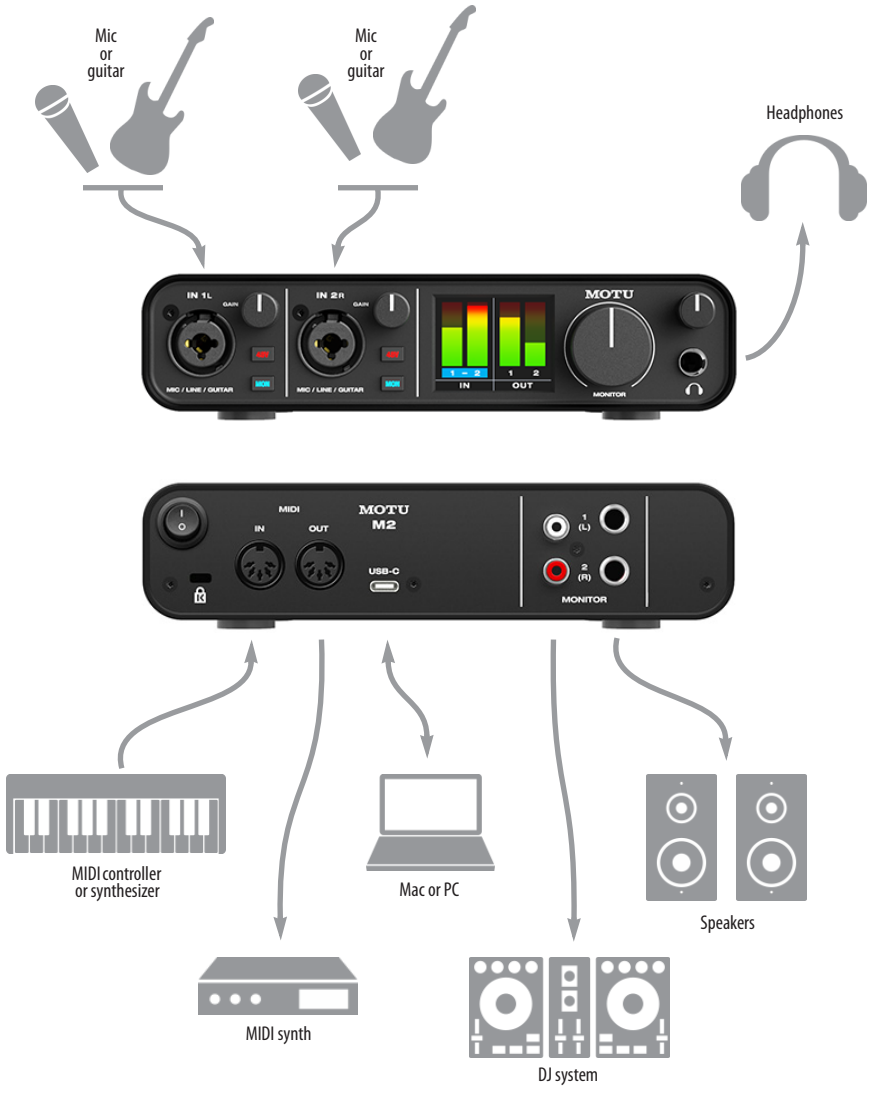


Figure 3-1: A typical M2 studio setup.

A TYPICAL M4 SETUP

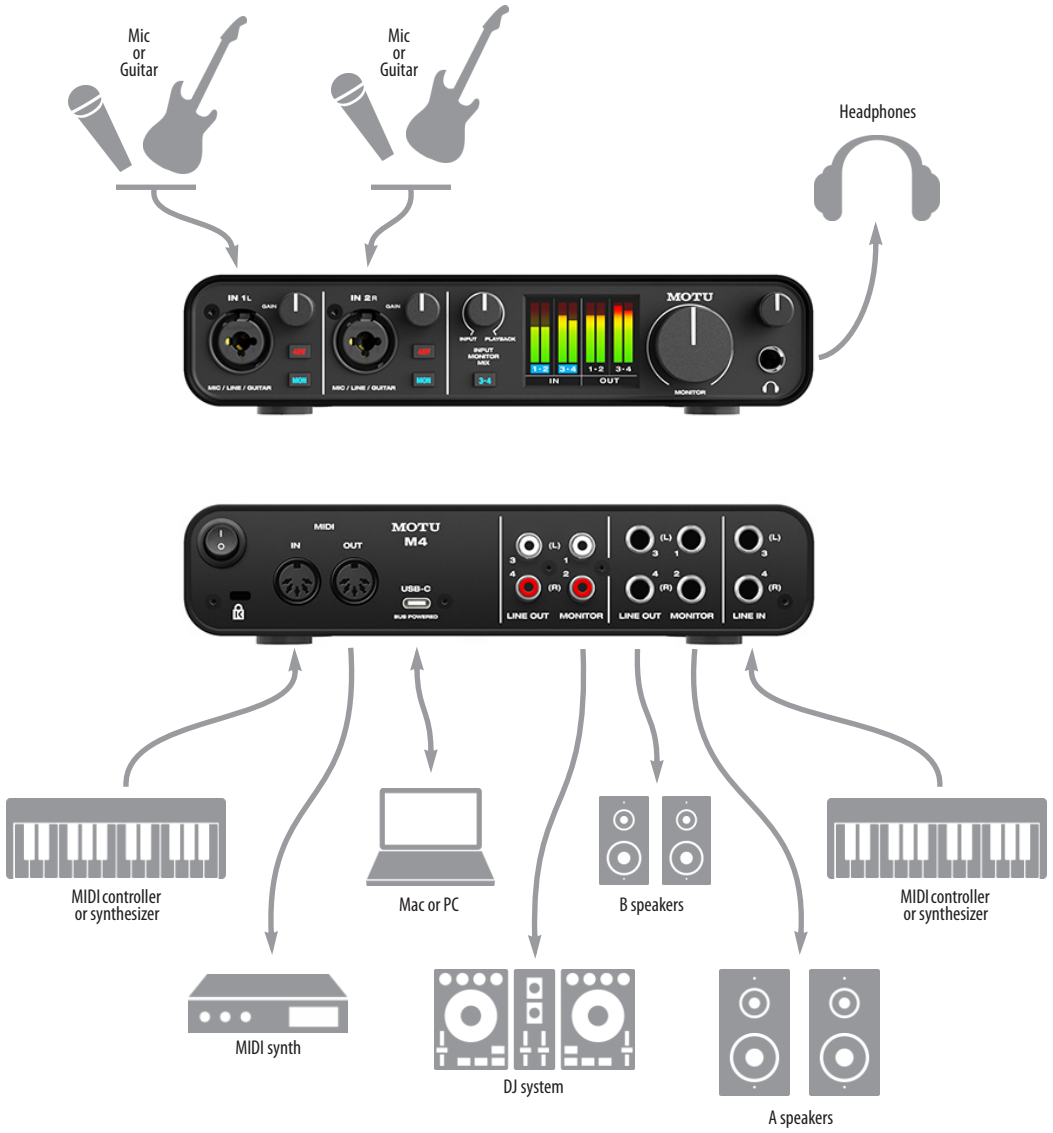


Figure 3-2: A typical M4 studio setup.

AUDIO CONNECTIONS

Here are a few things to keep in mind as you are making audio connections to your M Series interface.

Mic/line/instrument inputs with preamps

Connect a microphone, guitar or line-level analog input to the XLR/quarter-inch combo jacks with either a standard mic cable or a balanced cable with a quarter-inch plug.

☛ Do not connect a +4 (line level) XLR cable to the inputs (because of the preamps). Use a quarter-inch input instead.

Phantom power

If you are connecting a condenser microphone or another device that requires phantom power, engage the corresponding 48V phantom power switch.

Preamp gain

The M series preamps provides 60 dB of gain. Use the front panel trim knobs to adjust gain as needed for each input. Watch the input level meter in the LCD while adjusting gain. Try to adjust gain as high as possible without clipping, which is indicated by the red rectangle at the top of the meter.

Combo jack summary

Use these guidelines for 48V phantom power and trim settings on the two combo input jacks:

Input	48V	Trim
Condenser mic	On	As needed
Dynamic mic	Off	As needed
Guitar	Off	As needed
-10 dB Line level via TRS	Off	As needed
-10 dB Line level via XLR	Off	+12dB
+4 dB line level (TRS only)	Off	Zero

TRS quarter-inch analog inputs and outputs

Quarter-inch analog inputs and outputs are balanced (TRS) connectors that can also accept an unbalanced plug. The outputs are DC-coupled, so they can be used for CV control output.

☛ Quarter-inch analog outputs are not cross-coupled. Therefore, when connecting them to an unbalanced input, use a TRS plug with the ring disconnected. Not floating the negative terminal will short it to the sleeve ground and cause distortion.

Unbalanced RCA outputs

Connect the unbalanced RCA outputs to other gear that has similar unbalanced RCA inputs, such as DJ systems, karaoke equipment or consumer audio devices.

Monitor outs

In a standard studio configuration, the monitor outs are intended for a pair of primary studio monitors, but they can be used as regular outputs for any purpose.

MIDI CONNECTIONS

Connect your MIDI device's MIDI IN jack to the M series MIDI OUT jack (Connection A below). Conversely, connect the MIDI device's MIDI OUT jack to the M Series MIDI IN jack (Connection B).

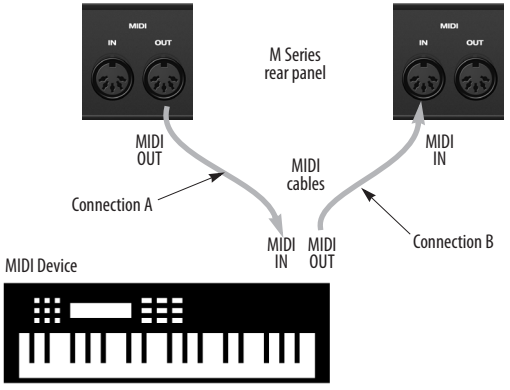


Figure 3-3: Connecting a MIDI device to an M Series interface.

One-way MIDI connections

MIDI devices that do not receive MIDI data, such as a dedicated keyboard controller, guitar controller, or drum pad, only need Connection B shown in Figure 3-3. Similarly, devices that never send data, such as a sound module, only need Connection A. Make both connections for any device that needs to both send and receive MIDI data.

Connecting additional gear with MIDI THRUs

If you need to connect several pieces of MIDI gear, run a MIDI cable from the MIDI THRU of a device already connected to the M Series interface to the MIDI IN on the additional device as shown below in Figure 3-4. The two devices then share the M Series MIDI OUT port. This means that they share the same set of 16 MIDI channels, too, so try to do this with devices that listen to only one MIDI channel (such as effects modules), which makes it easier to avoid MIDI channel conflicts.

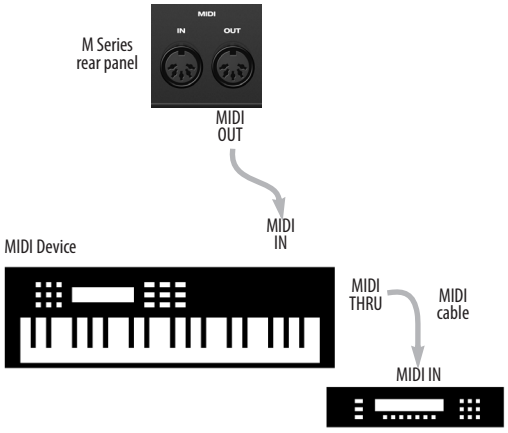


Figure 3-4: Connecting additional devices with MIDI THRU ports.

CHAPTER 4 Working with Host Audio Software

OVERVIEW

M Series interfaces provide multi-channel audio input and output for Core Audio compatible audio applications on the Mac and ASIO compatible applications on Windows, including MOTU's Performer Lite and Digital Performer, Apple's Logic Pro and GarageBand, and other third-party software applications such as Ableton Live, Avid Pro Tools, Cockos Reaper, Propellerhead Reason, Steinberg Cubase and Nuendo, Cakewalk SONAR, PreSonus Studio One, Bitwig, and others.

Performer Lite and Ableton Live Lite are both available as a free download for M Series owners at motu.com. Just log in to your account and go to your Product Registrations tab. For complete information about all of Performer Lite's powerful workstation features, refer to the *Performer Lite User Guide.pdf* found in the Help menu of the Performer Lite application.

Digital Performer, MOTU's state-of-the-art digital audio workstation software, is available separately; for details about upgrading from Performer Lite to Digital Performer, talk to your authorized MOTU dealer or visit motu.com.

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PREPARATION

Install your host audio software first if you haven't already done so, and complete these chapters before proceeding:

- chapter 2, "Software Installation" (page 11)
- chapter 3, "Hardware Installation" (page 15)

CHOOSE THE M SERIES DRIVER

For macOS audio software

For audio software running under macOS, go to the menu item or preference where you choose the audio device (Core Audio driver) you wish to use, and then select the M2 or M4 by name.

For Windows audio software

For audio software running under Windows, go to the menu item or preference where you choose the ASIO driver you wish to use, and then choose *MOTU M Series*.

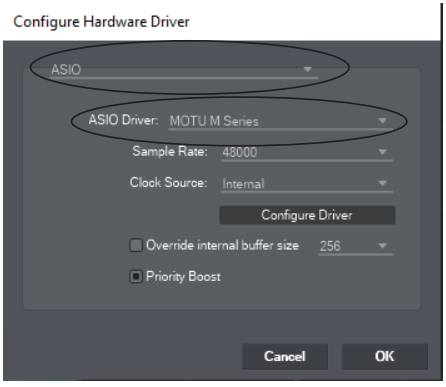


Figure 4-1: Choosing the M Series ASIO driver in Performer Lite on Windows (Setup menu > Configure Audio System > Configure Hardware Driver).

Where to go in popular audio hosts

Here is the location for this setting in various popular audio software host applications:

Host software	Location for choosing the M2 or M4
Digital Performer and AudioDesk	Setup menu > Configure Audio System > Configure Hardware Driver
Pro Tools 9 or later	Setup menu > Playback Engine or Current Engine
Logic Pro	Preferences > Audio tab > Devices tab > Core Audio tab
Garage Band	Garage Band menu > Preferences > Audio/ MIDI > Audio Output/Input menus
Cubase and Nuendo	Device Setup > Devices list > VST Audio System menu
Live	Preferences > Audio tab
Reason	Preferences > Audio preferences
Reaper	Preferences > Audio prefs > Devices

Other audio software

Consult your software's manual for further information.

REDUCING MONITORING LATENCY

Monitoring latency is a slight delay caused by running an input signal through your host audio software and back out. For example, you might hear it when you drive a live guitar input signal through an amp modeling plug-in running in your audio sequencer.

This delay is caused by the amount of time it takes for audio to make the entire round trip through your computer, from when it first enters an input on the M Series interface, passes through the interface hardware into the computer, through your host audio software, and then back out to an output.

Monitoring through the M2 or M4

If you don't need to process a live input with plug-ins, the easiest way to avoid monitoring latency is to disable your DAW's live monitoring feature and instead engage the MON (monitor) switch on the front panel of your M Series interface. Visit motu.com/m2-start (or /m4-start) to watch a video about this feature.

Monitoring through your host audio software

If you *do* need to process a live input with host software plug-ins, or if you are playing virtual instruments live through your MOTU audio hardware, you can significantly reduce latency by adjusting the audio buffer setting in your host audio software, as explained in the next section.

☛ It is important to note that monitoring delay has no effect on the recording, or playback, of audio data from disk. The actual recording and playback is extremely precise, it is only the monitoring of your live input signal which may be delayed.

Adjusting your host software audio buffer

Buffers are small bundles of audio data. Your M Series interface "speaks" to your computer in buffers, rather than one sample at a time. The size of these buffers determine how much delay you hear when monitoring live inputs through your audio software: larger buffers produce more delay; smaller buffers produce less.

Adjusting buffer size on macOS

Under macOS, audio I/O buffer size is handled by the host audio application (not by the M Series Core Audio driver). Most audio software applications provide an adjustable audio buffer setting that lets you control the amount of delay you'll hear when monitoring live inputs or processing them with software plug-ins.

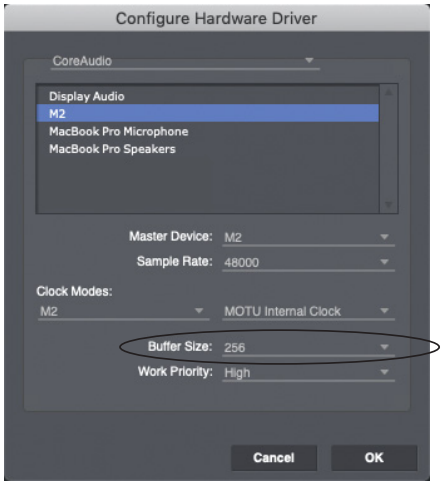


Figure 4-2: In Digital Performer and Performer Lite, choose Setup menu> Configure Audio System> Configure Hardware Driver to open the dialog shown above and access the Buffer Size setting.

Adjusting buffer size on Windows

On Windows, the buffer size is adjusted in the M Series control panel (page 12). Also see "Buffer Size".

Lower latency versus higher CPU overhead

Buffer size has a large impact on the following:

- Monitoring latency
- The load on your computer's CPU
- Responsiveness of transport controls and effect knobs in Performer Lite or other audio software.
- Real-time virtual instrument latency.

The buffer setting presents you with a trade-off between the processing power of your computer and the delay of live audio as it is being patched through your software. If you reduce the size, you reduce monitoring latency, but significantly increase the overall processing load on your computer, leaving less CPU bandwidth for things like real-time effects processing. On the other hand, if you increase the buffer size, you reduce the load on your computer, freeing up bandwidth for effects, mixing and other real-time operations.

If you are at a point in your recording project where you are not currently working with live, patched-thru material (e.g. you're not recording vocals), or if you have a way of externally processing inputs, choose a higher buffer size. Depending on your computer's CPU speed, you might find that settings in the middle work best (256 to 1024).

Transport responsiveness

Buffer size also impacts how quickly your audio software will respond when you begin playback, although not by amounts that are very noticeable. Lowering the buffer size will make your software respond faster; raising the buffer size will make it a little bit slower.

Effects processing and automated mixing

Reducing latency with the buffer size setting has another benefit: it lets you route live inputs through the real-time effects processing and mix automation of your audio software.

LOOPBACK

Use the Loopback input channels provided by the M Series audio driver to capture audio output from your computer. These channels return the signal being sent to Outputs 1-2 back to the computer, as Loopback inputs 1-2, so that you can capture the signal in your host software, stream it to the web or broadcast it with pod casting software. You can include live input signal from the M series interface inputs by engaging the MON (monitor) switches on the front panel.

APPENDIX A Troubleshooting

My MOTU interface isn't showing up in Audio MIDI Setup on my Mac.
Due to the updated architecture of the new macOS High Sierra (10.13) or higher, the system extensions for all newly-installed third-party software will automatically be blocked from running. If your MOTU interface is not showing up in Audio MIDI Setup or your DAW on High Sierra or higher, you might need to enable the driver in your System Preferences. To do so, first download and install the very latest installer for your MOTU M Series interface. After restarting, open System Preferences. Select Security & Privacy. In the General section, click the Allow button. The Allow button will disappear 30 minutes after installation. To display the Allow button, run the installer for the MOTU driver again.

I can't hear computer audio output through my MOTU interface.
In the Sound panel of System Preferences, the M2 or M4 should be selected as the output device.

How do I monitor live inputs?
Please refer to the documentation for the audio application that you are using. If your application does not support input monitoring, you will need to use the hardware monitoring feature in your M Series interface. Please see "Monitoring through the M2 or M4" on page 20.

How do I control monitoring latency?
See "Reducing monitoring latency" on page 20.

How do I factory reset my device?
Power off the unit. Press and hold the Input 1 MON button and while doing so, power on the unit. You should see several small white dots below the MOTU logo on power-up. These dots indicate that the factory reset has commenced. Wait a brief moment. When the normal level meter screen appears, this indicates that the factory reset is complete.

Connecting or powering gear during operation...
It is not recommended that you connect/disconnect, or power on/off devices connected to the M2 or M4 while recording or playing back audio. Doing so may cause a brief glitch in the audio.

CUSTOMER SUPPORT

We are happy to provide complimentary customer support to our registered users. If you haven't already done so, please take a moment to register online at MOTU.com, or fill out and mail the included registration card. Doing so entitles you to technical support and notices about new products and software updates.

TECHNICAL SUPPORT

If you are unable, with your dealer's help, to solve problems you encounter with your MOTU device, you may contact our technical support department in one of the following ways:

- Tech support hotline: (617) 576-3066 (Monday through Friday, 9 a.m. to 5 p.m. EST)
- Online support: www.motu.com/support

Please provide the following information to help us solve your problem as quickly as possible:

- The serial number of your MOTU device. This is printed on a label placed on the bottom of the rack unit. It is also displayed at the bottom of the Device tab in the MOTU Pro Audio Control web app (item #26 on page 13). You must be able to supply this number to receive technical support.

- A brief explanation of the problem, including the exact sequence of actions which cause it, and the contents of any error messages which appear on the screen.
- The pages in the manual that refer to the features or operation of your MOTU Device or AudioDesk with which you are having trouble.
- The version of your computer's operating system.

We're not able to solve every problem immediately, but a quick call to us may yield a suggestion for a problem which you might otherwise spend hours trying to track down.

If you have features or ideas you would like to see implemented, we'd like to hear from you. Please write to the Development Team, MOTU Inc., 1280 Massachusetts Avenue, Cambridge, MA 02138, or use our online suggestion box at www.motu.com/suggestions.

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