

UltraLite-mk5™


User Guide

MOTU®

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SAFETY PRECAUTIONS AND ELECTRICAL REQUIREMENTS FOR THE UltraLite-mk5 (“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 VOLLAGES: 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.

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 supply cord - Protect the product power supply cord from being walked on or pinched by items placed upon or against them.
11. Power switch - Install the product so that the power switch can be accessed and operated at all times.
12. Disconnect - The main power supply 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. Surge protection - Unplug the product during lightning storms or when unused for long periods of time.
15. 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.
16. Power Sources - Refer to the manufacturer's operating instructions for power requirements.
17. 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.
18. Power amplifiers- Never attach audio power amplifier outputs directly to any of the unit's connectors.
19. 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.
20. 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°F). 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 pull on the cord of the power supply when disconnecting it from an AC wall outlet. Grasp it by the power supply unit. Do not expose this apparatus to rain or moisture. Do not place objects containing liquids on it.

DC INPUT

10 - 24V DC • 1.0A max



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Part 1

Getting Started

Quick Start Guide

Thank you for purchasing an UltraLite-mk5!
Follow these easy steps to get started quickly.

MAC USERS START HERE

- 1 Visit motu.com/UltraLite-mk5-start to download and run the *MOTU Gen 5 Installer*.
- 2 Connect the included power supply to your UltraLite-mk5 unit.
- 3 Connect the UltraLite-mk5 to your Mac using one of the included USB cables.
- 4 Choose *Apple menu > System Preferences* and click *Sound* to choose the UltraLite-mk5 as the input and output device.
- 5 Proceed to “For all users” below.

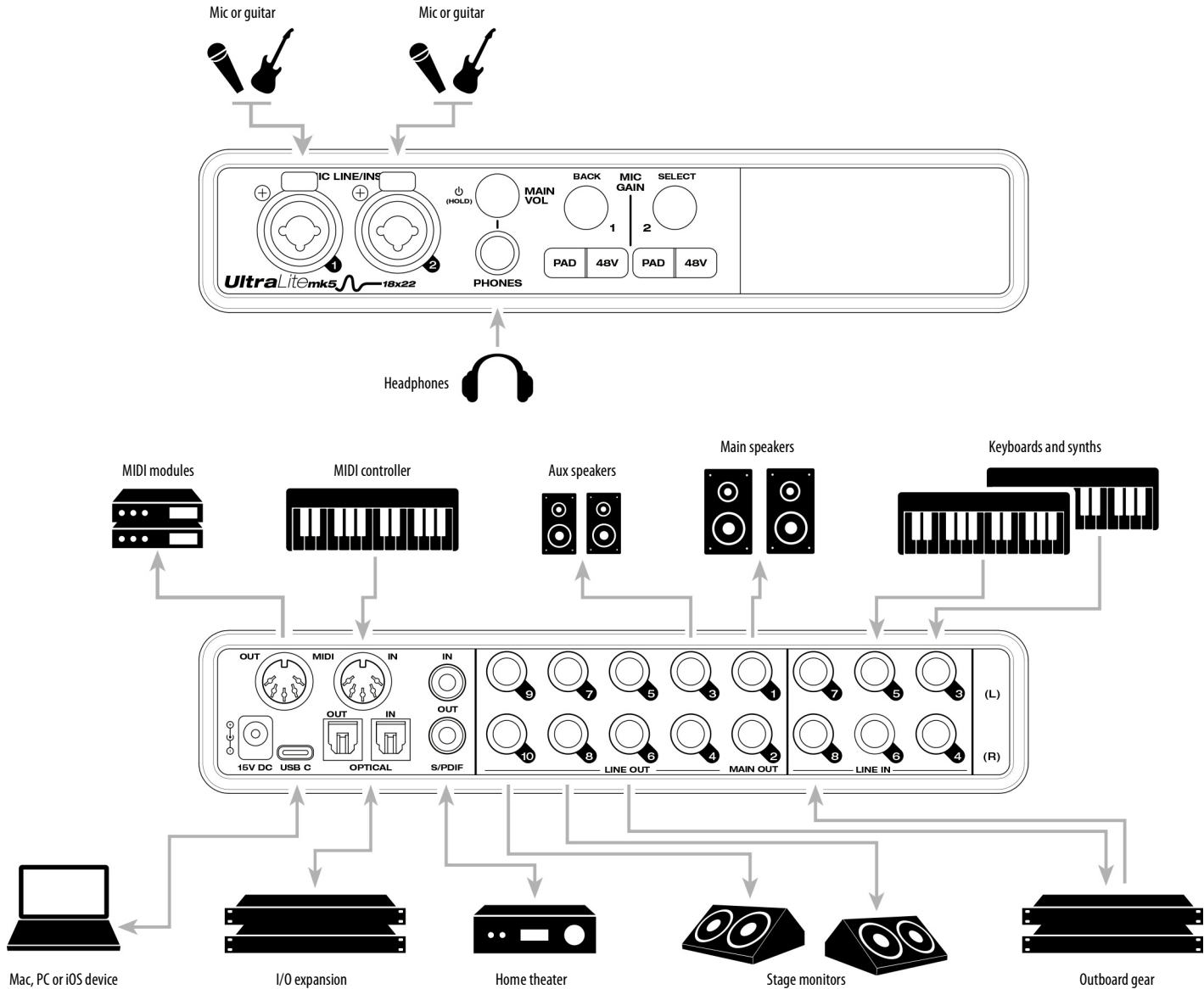
WINDOWS USERS START HERE

- 1 BEFORE you connect the UltraLite-mk5 to your computer, visit motu.com/UltraLite-mk5-start to download and run *MOTU Gen 5 Setup*.
- 2 Connect the included power supply to your UltraLite-mk5 unit.
- 3 Connect the UltraLite-mk5 to your PC using one of the included USB cables.
- 4 Go to the Windows Sound Control Panel and choose UltraLite-mk5 as the default recording and playback device.
- 5 Proceed to “For all users” below.

FOR ALL USERS

- 6 As shown on the next page, connect speakers to the UltraLite-mk5 *Main Outs 1-2*, or connect a pair of headphones to the headphone jack on the front panel, so you can hear your computer’s audio output.
 - 7 You are now ready to start using your UltraLite-mk5 interface.
 - 8 Visit motu.com/UltraLite-mk5-start to register your UltraLite-mk5, download the included software and watch brief how-to videos, including:
 - How to connect a mic, guitar, keyboard or other audio source.
 - How to use the UltraLite-mk5 with your recording software.
 - How to get the most out of the UltraLite-mk5.
- 👉 Register your UltraLite-mk5 to gain access to all the software, virtual instruments, loops and sounds that are included with your UltraLite-mk5 purchase. Registered users also qualify for technical support and information about software updates, so please register today!

A Typical UltraLite-mk5 Setup



UltraLite-mk5 Front Panel



1. These *Mic/Line/Inst* inputs are XLR/TRS combo jacks that accept either a mic cable or a quarter-inch cable, balanced or unbalanced, from a guitar or line input. Use the controls to the right (3) to adjust individual preamp gain, instrument input gain, 48V phantom power, and an optional -20 dB pad for each mic input. Each input includes a *Phase Invert* switch, accessed in the CueMix 5 app. See "Input tab" on page 34.
2. The *Phones* jack accepts a quarter-inch headphone plug. Use the knob above for volume control. The display provides feedback as you turn the knob.
3. Individual *preamp gain*, switchable *48V phantom power*, and optional *-20 dB pad* switches for each combo input. The Precision Digital Gain™ knob provides +74 dB of preamp gain or instrument input gain. Both gain settings are retained independently. Turn the knob to see the gain adjustments in the screen.
4. This portion of the screen displays *level meters* for all analog inputs and outputs. It can also show device settings, using the knobs to the left.
5. This portion of the screen shows *digital I/O activity* (optical and S/PDIF) and MIDI activity (in and out).
6. This portion of the screen displays the current *sample rate* and *clock source*, such as *INT* (Internal clock mode).
7. Push *Select* to enter the menu. Turn *Select* to scroll through menu options. Push again to descend into the sub-menus, if applicable. To choose the current setting, push *Select* a third time. Push *Back* to return to the previous menu level, and do so repeatedly to exit the menu altogether.
8. *Power* and *Volume* control for phones and main outs. Push this knob to toggle between *Phones* volume and *Main Out* volume. The screen provides visual feedback. This setting, along with all front panel settings, can also be adjusted from the CueMix 5 app. The CueMix 5 app also allows you to add additional Line Outs to the Main Volume group, so you can control them all with this knob. See item #2 (*Main Volume Group*) on page 35. Push this knob to power on the unit; push and hold for three seconds to power it off.

UltraLite-mk5 Rear Panel



1. The UltraLite-mk5 operates as a USB *MIDI* interface, allowing MIDI software to communicate with connected MIDI devices through the USB connection to the computer. Connect a MIDI device here using standard MIDI cables. Connect the UltraLite-mk5's MIDI OUT port to the MIDI IN port on the other device. Conversely, connect the UltraLite-mk5's MIDI IN port to the MIDI OUT port on the other device. For further details, see "MIDI connections" on page 25.
2. The *analog ('Line') outputs* provide additional analog output for secondary studio monitors, surround monitoring, sub-mixes or any other desired destination. These connectors are balanced (tip/ring/sleeve), but they also accept an unbalanced plug. They are DC-coupled. Control volume from the CueMix 5 app or your host audio software. For further details, see "Audio connections" on page 22.
3. The *Main Out* pair provides stereo analog output for primary (powered) studio monitors or PA speakers, or any other desired destination. Control volume from the CueMix 5 app or from the front panel volume control.

To hear audio playback from your host audio software on the MAIN OUT pair, assign audio tracks (and master fader) to these main outs. You can also use the CueMix 5 app to route live UltraLite-mk5 inputs here as well.
4. Equipped with very high quality 24-bit 192 kHz converters, these six *line inputs* are balanced TRS (tip/ring/sleeve) quarter-inch connectors that can also accept an unbalanced plug (with the ring disconnected). Use them for keyboards or other line level analog sources. These inputs are equipped with the UltraLite-mk5's Precision Digital Gain™ feature: digital gain that boosts the input level up to +20 dB in 1 dB increments, adjusted from the CueMix 5 app. Each input includes a *Phase Invert* switch, accessed in the CueMix 5 app. See "Input tab" on page 34.
5. These *RCA S/PDIF* jacks provide stereo, 24-bit digital input and output at all supported sample rates (up to 96 kHz). When connecting a source to the input, be sure to set the clock source correctly. See "S/PDIF" on page 24.
6. These *ADAT optical "lightpipe"* jacks provide 8 channels of 24-bit ADAT optical digital I/O at 1x sample rates (44.1 or 48 kHz) and 4 channels at 2x sample rates (88.2 or 96 kHz). They are disabled at higher sample rates. Alternately, they can operate as stereo TosLink (optical S/PDIF) connectors. See "Optical I/O" on page 24.
7. Connect the UltraLite-mk5 to the computer here using the included USB-C-to-C or USB-C-to-A cable. If you are connecting to an iOS device, see "iOS setup (USB-C)" on page 21.
8. This *DC power* jack accepts any standard 15V DC, 1A tip-positive power supply.

CHAPTER 1 About the UltraLite-mk5

The UltraLite-mk5 is an 18 x 22 USB audio interface with mixing, DSP effects, and very high quality A/D/A conversion at sample rates up to 192 kHz for on-the-go mobile audio recording.

Hardware-driven DSP delivers monitor mixes on all analog output pairs, with seven stereo buses and 32-bit effects processing, including EQ, compression and reverb.

The UltraLite-mk5 can operate as an audio interface for a studio workstation (DAW), as a standalone mixer, or as an auxiliary monitor mixing system in the studio or on stage. This chapter provides a brief overview of its main features and characteristics.

Comprehensive I/O

The UltraLite-mk5 provides a variety of analog and digital interconnects, all active simultaneously, designed to provide everything you need for a well-equipped mobile recording studio.

| Connection | Input | Output |
|---|-----------|------------|
| Quarter-inch analog on bal/unbal TRS | 6 | 10 |
| Mic/guitar inputs on combo XLR/TRS | 2 | - |
| Headphone output | - | 1 x stereo |
| S/PDIF digital I/O on RCA | 2 | 2 |
| ADAT optical digital (at 44.1 or 48 kHz)† | 8 | 8 |
| Total | 18 | 22 |

† The UltraLite-mk5 optical connectors support the industry-standard ADAT and TOSLink optical I/O formats, which provide varying channel counts. See “Optical I/O” on page 24 for details about optical bank operation.

All inputs and outputs are discrete. For example, using a mic input does not “steal” an input from the TRS analog I/O bank.

Universal connectivity

The UltraLite-mk5 can connect to a computer that supports high-speed USB 2.0 or later (including USB 3.0, 3.1, etc.) It is USB audio class-compliant, which means that it is iOS compatible and does not require driver installation for USB connection to class-compliant Macs. ASIO and Wave drivers are provided (and required) for operation with Windows 10 or later.

Mic/guitar inputs with preamps

The two front-panel mic/line/instrument inputs are equipped with preamps and “combo” XLR/TRS jacks, which accept XLR microphone inputs or quarter-inch line/instruments inputs. Individual 48 volt phantom power and a -20 dB pad can be supplied independently to each mic input. The Precision Digital Gain™ knobs on the front panel for each mic/instrument input provide up to 74 dB of boost in precise 1 dB increments.

Flexible analog I/O

All quarter-inch analog inputs can accept either a balanced or unbalanced plug. The six line inputs are equipped with digital gain, adjustable in 1 dB increments.

Equipped with renowned ESS Sabre32™ DAC technology, all analog outputs offer trim, also adjustable in 1 dB increments. You can save your trim configurations as a preset for instant recall.

All quarter-inch outputs are DC-coupled, so they can be used for CV control output.

On-board DSP with mixing and processing

The UltraLite-mk5 is equipped with a DSP engine that drives a 24 x 14 monitor mixer, which supplies each analog output pair with a unique monitor mix. Each mix can include any chosen inputs, plus computer output and the separate reverb bus. Effects include 4-band parametric EQ, compression and reverb. The included CueMix 5 app provides easy and intuitive on-screen control of everything.

32-bit processing

The DSP engine has a 32-bit data path with 64-bit (double-precision) data processing, which provides 48 dB of headroom (above full scale) inside the mixer for the utmost in sound quality.

Software control

Control the UltraLite-mk5 on-board mixing and device settings from the CueMix 5 app software running on a laptop or iOS device.

Stand-alone mixing

Connect a tablet to the UltraLite mk5 for complete control of all settings on the road at rehearsals or gigs — great for live sound mixing.

ADAT digital I/O

The UltraLite-mk5 provides 8-channel optical digital I/O. Connect outboard digital processors, digital mixers or other gear: 8 channels at 44.1/48 kHz or 4 channels at 88.2/96 kHz. Alternately, the optical ports can be independently configured to support stereo TOSLink (optical S/PDIF).

The input and output operate independently, allowing you to mix and match optical formats. For example, you could receive four channels of 96 kHz S/MUX input while at the same time sending 96 kHz stereo optical S/PDIF (“TOSLink”) to the output.

S/PDIF

The UltraLite-mk5 rear panel provides S/PDIF input and output in two different formats: RCA “coax” and optical “TOSLink”. The RCA jacks are dedicated to the S/PDIF format. The optical jacks can be used for either TOSLink or ADAT optical, as discussed earlier.

MIDI I/O

The UltraLite-mk5’s standard MIDI IN and MIDI OUT jacks supply 16 channels of MIDI I/O to and from the computer through its USB connection.

High-contrast OLED display

The high-contrast OLED display shows all signal activity at a glance with precise, detailed metering for all I/O. You can access many hardware settings directly from the front panel.

Headphone output

The UltraLite-mk5 front panel provides an independent headphone jack with separate volume control. You can program the phones to mirror the main outs or act as its own independent output.

Rack mount or desktop operation

The UltraLite-mk5 is housed in a sturdy, metal-alloy half-rack enclosure. Rack mounting brackets are available (sold separately) for mounting the unit in a standard 19-inch equipment rack. A separate half-rack coupler kit is also available (sold separately) to join two UltraLite-mk5 units (or similar units) together and mount them side by side in an equipment rack.

Performer Lite

Performer Lite is a full-featured audio workstation software package for Mac and Windows that is available as a free download for you as an UltraLite-mk5 owner. Visit motu.com/download to obtain your copy. Performer Lite provides multi-track MIDI and audio production, over 100 included virtual instruments, automated virtual

mixing, graphic editing, music notation editing, real-time effects plug-ins with crossfades, support for many third-party audio plug-ins, sample-accurate editing and placement of audio, and more.

CHAPTER 2 **Packing List and System Requirements**

PACKING LIST

The UltraLite-mk5 ships 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.

- UltraLite-mk5 audio interface
- USB-C-to-C cable
- USB-C-to-A cable
- DC power adapter
- User guide

SYSTEM REQUIREMENTS

- Intel Core i3 Mac or PC (or AMD equivalent). Faster CPUs are recommended for best performance.
- 4GB RAM; 8 GB or more recommended.
- macOS 10.11 or later; Windows 10 or later. For macOS the optional driver requires 10.13 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 register the UltraLite-mk5 today: visit www.motu.com/register.

As a registered user, you will be eligible to receive free bundled software, technical support and announcements about product enhancements as soon as they become available. Only registered users receive these special update notices, so please register today.

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

CHAPTER 3 **Software Installation**

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USB AUDIO CLASS-COMPLIANT OPERATION

The UltraLite-mk5 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 the UltraLite-mk5 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 or the front-panel menu.

☛ In this scenario, the UltraLite-mk5 provides basic audio input and output, and no software driver installation is necessary. Use the Mac’s Audio MIDI Setup utility to manage the UltraLite-mk5 audio inputs and outputs for your Mac.

Connection to iOS devices (iPad and iPhone)

Audio-class compliant operation allows you to connect the UltraLite-mk5 to any iOS device with a standard camera connection kit adapter. The UltraLite-mk5 then provides multi-channel audio I/O to your audio apps. Use your audio app to configure the number of available audio channels.

SOFTWARE INSTALLATION

If you don’t want to operate the UltraLite-mk5 as a USB audio class compliant device, or if you are using Windows on a PC, install the software as follows.

1 Visit www.motu.com/ultralite-mk5-start to download the latest Mac or Windows Gen 5 installer.

2 Run the installer and follow the directions it gives you.

☛ We recommend that you run the software installer *before* you connect the UltraLite-mk5 to your computer and power it on. This ensures that all driver components are properly installed in your system.

☛ To allow support for a wide variety of platforms, the Ultralite-mk5 appears as a USB Class Compliant Ethernet device (USB-CDC-ECM) in the Network settings for macOS and Windows. This network port is currently used by CueMix 5 to communicate with the UltraLite-mk5 on Windows and iOS, and may support other platforms in the future.

AUDIO DRIVERS

The installer provides a USB audio driver for Mac (CoreAudio) and Windows (ASIO and Wave).

Industry-leading I/O latency performance

On macOS and Windows, the UltraLite-mk5 driver provides exceptionally low I/O latency performance. For example, with a 32-sample buffer size, an UltraLite-mk5 interface operating at 96 kHz produces round trip latency (RTL) performance of 2.4 milliseconds (ms) on macOS. RTL is the measurement of the time it takes audio

to pass from an analog input, through a high-performance DAW host such as Digital Performer, to an analog output.

ASIO Driver support

On Windows, to enable the UltraLite-mk5 in your ASIO host software, choose the *MOTU UltraLite-mk5* ASIO driver, as shown in Figure 7-1 on page 46.

WDM / Wave driver support

On Windows, the MOTU Gen5 driver includes support for WDM (Wave) compatible audio software. See item #8 on page 33.

Host Buffer Size

When connected to a Windows computer, the *Host Buffer Size* menu is available in the Device tab (item #6 on page 33). This setting 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.

Host Safety Offset

When connected to a Windows host, the *Host Safety Offset* menu (item #7 on page 33) also becomes available. This setting allows you to fine tune host latency. Larger offsets allow the driver more time to process audio as it transfers to and from the hardware. Lower settings produce lower

latency, but if you go too low, your host software may experience performance issues. Generally speaking, 64 samples should serve as a good baseline setting. You can then experiment with lower settings from there. Be mindful, however, when reducing the safety offset, as this parameter can have a significant impact on your computer system's performance.

CUEMIX 5 APP

CueMix 5 is an easy-to-use app for macOS, Windows and iOS that gives you complete control over all the settings in your UltraLite-mk5 interface. For details, see chapter 6, “CueMix 5” (page 31).

PERFORMER LITE WORKSTATION SOFTWARE

Performer Lite is an easy to use audio workstation software package for macOS and Windows that lets you record, edit, mix, process, bounce and master multi-track recording projects. Advanced features include over 100 included virtual instruments, real-time effects processing, recording, and much more.

To obtain Performer Lite, visit motu.com to register your MOTU audio interface, download Performer Lite and activate it on your computer.



Figure 3-1: Performer Lite.

WORKING WITH HOST AUDIO SOFTWARE

For further information about using the UltraLite-mk5 with host audio software, see chapter 7, “Working with Host Audio Software” (page 45).

MIDI I/O ON WINDOWS

On Windows, the *MOTU Gen 5 Setup* installer provides a USB MIDI driver for the UltraLite-mk5. This driver allows you to access the UltraLite-mk5’s 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 UltraLite-mk5 interface and all Core MIDI compatible software.

Audio MIDI Setup is a utility included with macOS that allows you to configure your UltraLite-mk5 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 UltraLite-mk5 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 UltraLite-mk5

Once your UltraLite-mk5 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 UltraLite-mk5 that match its physical connection.

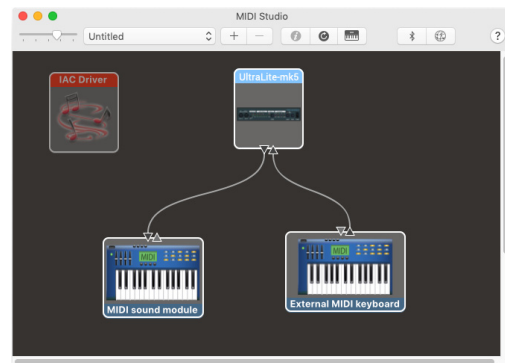


Figure 3-2: Connecting devices to the UltraLite-mk5. In this example, a controller keyboard is connected to the UltraLite-mk5’s MIDI IN, and a sound module is connected to the UltraLite-mk5 MIDI OUT.

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

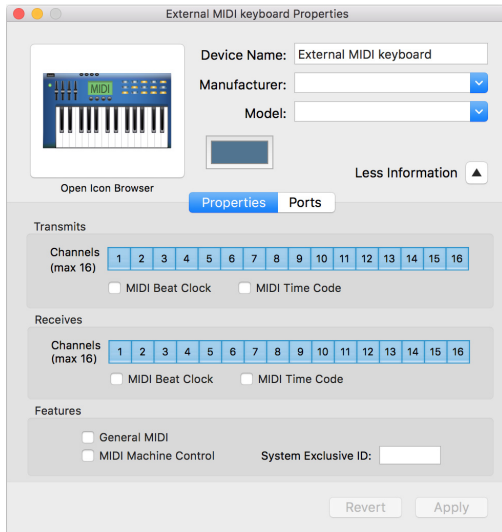


Figure 3-3: Device settings.

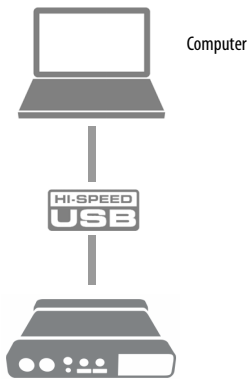
- 4 Repeat the above steps for each MIDI device connected to the interface.
- 5 When you are finished, quit Audio MIDI Setup.

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

CHAPTER 4 Hardware Installation

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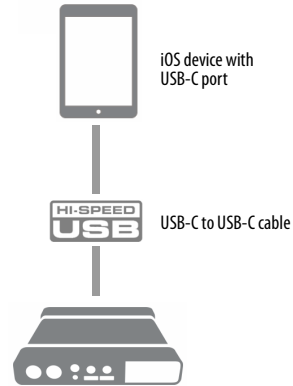
USB AUDIO INTERFACE SETUP



Use this setup if you want to use the UltraLite-mk5 as a USB audio interface for a computer.

- Use the included USB-C-to-C or USB-C-to-A cable.
- Connect to any USB port (USB 2.0 or 3.0) on your computer.
- See “USB audio class-compliant operation” on page 17.
- For Mac or iOS operation, no driver installation is necessary.

iOS SETUP (USB-C)



Use the UltraLite-mk5 as an iOS audio interface, or control it from your iOS device.

- Use this setup for iOS devices with a USB-C port.
- Connect the UltraLite-mk5 directly to the iOS device with the included USB-C-to-C cable.

iOS SETUP (LIGHTNING)



Use the UltraLite-mk5 as an iOS audio interface, or control it from your iOS device.

- Use this setup for iOS devices with a Lightning port.
- For iOS devices with a Lightning port, an Apple Lightning to USB3 Camera Adapter is required (sold separately), as shown above.

A TYPICAL ULTRALITE-MK5 SETUP

See the diagram on page 8 for an example of typical connections to the UltraLite-mk5. The following sections provide important information for achieving best results for each type of connection.

AUDIO CONNECTIONS

Here are a few things to keep in mind as you are making audio connections to your UltraLite-mk5 interface.

Mic/line/instrument inputs with preamps

Connect a microphone to the front-panel XLR/quarter-inch combo jack with a standard XLR mic cable. Connect a guitar or line level input with balanced or unbalanced cable with a quarter-inch plug. Adjust the level with the gain knob for either type of input.

☛ If you connect a +4 dBu (line level) XLR cable to the front-panel inputs, be sure to engage the -20 dB pad switch.

48V phantom power

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

Preamp gain

The UltraLite-mk5 preamps provides 74 dB of gain. Use the front panel detented gain knobs to adjust gain as needed for each input. The front-panel screen provides visual feedback as you turn the knob. Preamp gain is digitally controlled, so you can make fine-tuned adjustments in 1dB increments. You can also adjust preamp gain in the CueMix 5 app. See “Home tab” on page 32.

-20 dB pad

Each mic input (XLR jack) is equipped with a -20 dB pad switch, to accommodate input signals that could overdrive the input. The pad switch

Figure 4-1: UltraLite-mk5 front panel



does not affect the quarter-inch input of the combo jack, which supports line level signals up to +20 dBu.

Combo jack summary

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

| Input | 48V | Pad | Gain |
|----------------------------|-----|-----------|-----------|
| Condenser mic | On | Off | As needed |
| Dynamic mic | Off | Off | As needed |
| Guitar | Off | n/a | As needed |
| -10 dBv line level via TRS | Off | n/a | As needed |
| -10 dBv line level via XLR | Off | As needed | As needed |
| +4 dBv line level via XLR | Off | On | As needed |
| +4 dBv line level via TRS | Off | n/a | As needed |

TRS quarter-inch line inputs/outputs

Quarter-inch line 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 line 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.

Various settings for the line inputs and outputs, such as gain, trim, phase invert, etc. can be accessed in the CueMix 5 app. See “Input tab” on page 34 and “Output tab” on page 35.

Main outs

Like all I/O on the UltraLite-mk5, the main outputs operate as an independent pair (they don’t share signal with any other output pair). In a standard studio configuration, the main outs are intended for a pair of primary studio monitors, but they can be used as regular outputs for any purpose. With adjustable Precision Digital Trim™, they support a wide range of industry-standard reference levels. Main out volume is controlled by the MAIN VOL knob on the front panel: turn it to view volume knob overlay in the display, then push the knob until you see *Main Trim* and turn it to adjust the master volume output.

Analog I/O calibration

All analog inputs and outputs can be calibrated to support a variety of standards, including EBU-R68, SMPTE RP-155, +4dBu, -10dBv, 2vRMS and 1vRMS.

The line inputs are equipped with +1 to +20 dB of digital gain, adjustable in 1 dB steps.

The line outputs, main outs and headphone outs are equipped with a range of digital trim from 0 to -100 dB, adjustable in 1 dB steps.

Trim and gain controls can be accessed in the CueMix 5 app. See “Input tab” on page 34 and “Output tab” on page 35.

Pre/Post Fx switch for line inputs

Each analog input provides EQ and compression. The mic/line/inst inputs include gating. These effects can be applied to the input as needed (items #1 and 2 on page 38). The *To USB Host* menu for each line input (item #4 on page 34) lets you

Figure 4-2: UltraLite-mk5 back panel



choose whether to send the input signal to your host software with or without these hardware effects applied to the signal. If you want to record the signal dry, *without* the effects applied to it, choose *Pre Fx*. If you want to record the signal *with* the effects applied, choose *Post Fx*.

☛ Once the signal is recorded in your DAW with the *Post Fx* option, the effects cannot be removed from the signal.

Optical I/O

The UltraLite-mk5 provides ADAT optical (“lightpipe”) connectors (one input and one output). Together, they provide eight (8) channels of ADAT optical digital I/O at 44.1 or 48 kHz, or four (4) channels of SMUX optical at 2x sample rates (88.2 or 96 kHz).

☛ The optical ports are disabled when the interface is operating at a 176.4 or 192 kHz.

TOSLink (optical S/PDIF)

Alternately, the optical ports can be configured for stereo TOSLink (optical S/PDIF) in the CueMix 5 app (item #5 on page 34). The optical IN and OUT banks can be configured independently.

Choosing a source for the optical output

By default, the audio signal from the optical output comes from your host software (over USB) from any tracks you’ve assigned to the output. Alternately, you can choose other sources, such as the line inputs (when in ADAT mode) or one of the UltraLite-mk5’s mix buses. For further information, see items #5 and 6 on page 35.

Choosing a clock source for optical connections

When connecting an *optical* device, make sure that its digital audio clock is phase-locked (in sync with) the UltraLite-mk5. There are two ways to do this:

A. Resolve the optical device to the UltraLite-mk5

B. Resolve the UltraLite-mk5 to the optical device

For A, choose *Internal* (or anything other than *Optical*) as the clock source in the Device tab (item #3 on page 33). Then configure the other device to resolve to its optical input.

For B, choose *Optical* as the clock source (item #3 on page 33), and configure the other device to resolve to its own internal clock.

S/PDIF

If you make a S/PDIF digital audio connection to another device, the UltraLite-mk5 must be digitally synced with the other device for a clean, click-free digital audio stream between them.

DAT decks and other devices with S/PDIF digital I/O will sync to the UltraLite-mk5 input via the S/PDIF connection itself. Just connect it to the UltraLite-mk5 S/PDIF output connector. When the device records a digital audio signal (from the UltraLite-mk5), it will simply synchronize to the clock provided by the signal.

When you transfer audio from the S/PDIF device into the UltraLite-mk5, you’ll have to resolve the UltraLite-mk5 to its S/PDIF input.

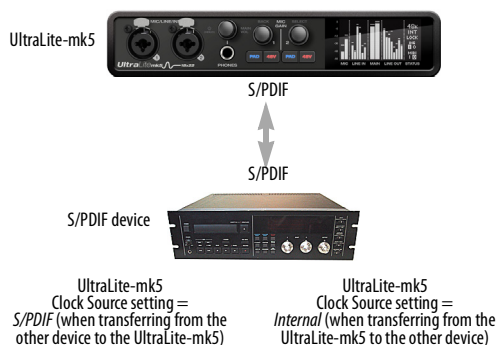


Figure 4-3: The setup for synchronizing a S/PDIF device with the UltraLite-mk5. Sync is achieved via the digital I/O connection itself.

☛ The S/PDIF ports are disabled when the interface is operating at a 176.4 or 192 kHz.

Choosing a source for the S/PDIF output

By default, the audio signal from the S/PDIF output comes from your host software (over USB) from any tracks you've assigned to the output. Alternately, you can choose one of the UltraLite-mk5's mix buses. For further information, see items #8 on page 35.

MIDI CONNECTIONS

Connect your MIDI device's MIDI IN jack to the UltraLite-mk5 MIDI OUT jack (Connection A below). Conversely, connect the MIDI device's MIDI OUT jack to the UltraLite-mk5 MIDI IN jack (Connection B).

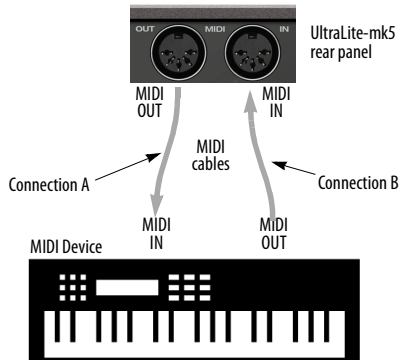


Figure 4-4: Connecting a MIDI device to the UltraLite-mk5.

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 4-4. 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 THRU

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 UltraLite-mk5 to the MIDI IN on the additional device as shown

below in Figure 4-5. The two devices then share the UltraLite-mk5 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.

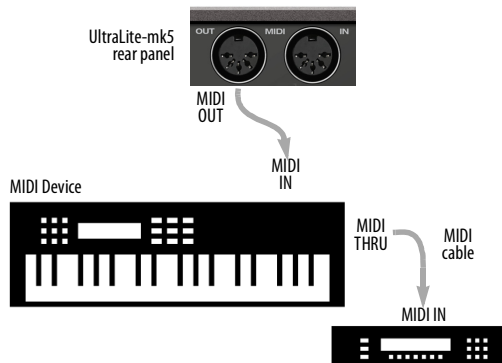


Figure 4-5: Connecting additional devices with MIDI THRU ports

MIDI Thru when operating stand-alone

The UltraLite-mk5 has a MIDI Thru feature for stand-alone operation. This can be enabled from the front panel Settings menu.

Part 2

Using the

UltraLite-mk5

CHAPTER 5 Front Panel Operation

The high-resolution OLED screen displays level meters for all analog inputs and outputs and activity indicators for MIDI, optical and S/PDIF I/O. The screen also provides several menus that provide status information and basic hardware settings.

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- Power.....29
- Channel focus.....29
- Main volume.....29
- Menu Navigation.....30

LEVEL METERS

In its default state when the unit is first powered on, the screen displays level meter activity for all analog audio inputs and outputs (Figure 5-1).

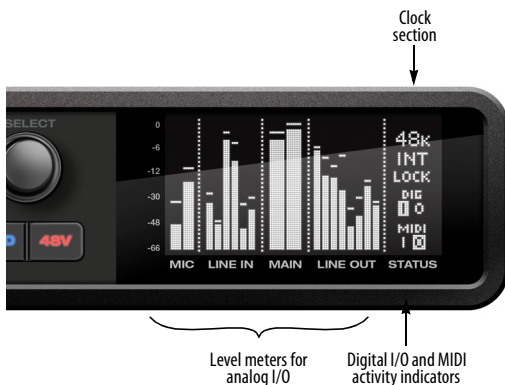


Figure 5-1: Analog metering and activity indicators for MIDI and optical I/O.

Clock

The Clock section of the screen (Figure 5-1) displays the sample rate at which the unit is currently operating, and the current Clock Source

setting (item #3 in the Devices tab on page 33). The Clock Source setting can also be found (and changed) in the front panel screen menu.

PUSH-BUTTON KNOBS

The front-panel knobs (Figure 5-2) are push-button digital rotary encoders. Push the knob for the function labeled in gray.



Figure 5-2: Push the knob to activate the functions labeled in gray.

POWER

Push and hold the power knob (Figure 5-2) to switch the unit on or off. The screen provides feedback as you hold to power down.

CHANNEL FOCUS

When turning a knob to adjust volume or input gain, the screen shows the level setting. A few seconds after you stop turning the knob, the screen returns to the previous display. To temporarily suspend the focus timeout, push the knob while focused. A “pin” icon appears in the screen to indicate that the focused metering will remain on screen until you push the knob again to dismiss it.

MAIN VOLUME

Push the PHONES volume knob (MAIN VOL) to toggle volume control between the phones and main outs. The screen provides visual feedback: a headphone icon appears in the MAIN meter

section when controlling headphone volume. When controlling main volume, the headphone icon is not present in the display].

MENU NAVIGATION

Push SELECT to access the menu, which provides settings and status information.

Turn the SELECT knob to scroll through the menu settings.

Push SELECT to enter the selected sub-menu or to select the currently highlighted parameter.

Push BACK to go to the parent menu.

To exit the menu entirely, push BACK repeatedly until the menu disappears from the display.

| Menu setting | What it does |
|--------------|--|
| Sample Rate | Sets the sample rate for the device. |
| Clock Source | Sets the digital audio clock source for the device. |
| Optical | Specifies ADAT or TOSLink, or the SMUX format when operating at 88.2 or 96 kHz. See “Optical I/O” on page 24. |
| MIDI Thru | When enabled, MIDI data passes directly from the MIDI input to the MIDI output when the UltraLite-mk5 is disconnected from USB (running standalone). |
| Display | Provides timeout options for the display (after 3 seconds, 30 seconds, 30 minutes or off). When timed out, the screen goes dark to preserve the lifetime of the OLED elements. The <i>Screen Saver</i> option lets you choose between a completely dark screen (off) or a pong-like screen saver (on). When the <i>Auto Wake</i> option is on, the screen will wake up when any audio signal is detected on any input or output. When Auto Wake is off, push any button or turn any knob to wake up the display. |
| About | Displays the serial number, firmware version and IP address for the device. |
| Reset | Restores factory default settings. |

CHAPTER 6 CueMix 5

CueMix 5 gives you complete control of all the settings in the UltraLite-mk5. It is a standard software application installed on your Mac or PC when you run the MOTU Gen 5 installer or setup app. It can be found in the Applications folder (Mac) or Start menu under MOTU (Windows).

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RUN THE INSTALLER, GET THE APP

Visit motu.com/ultralite-mk5-start to get the latest MOTU Gen 5 installer or setup and run it on your computer. Visit the Apple App Store to install the CueMix 5 app on your iOS device.

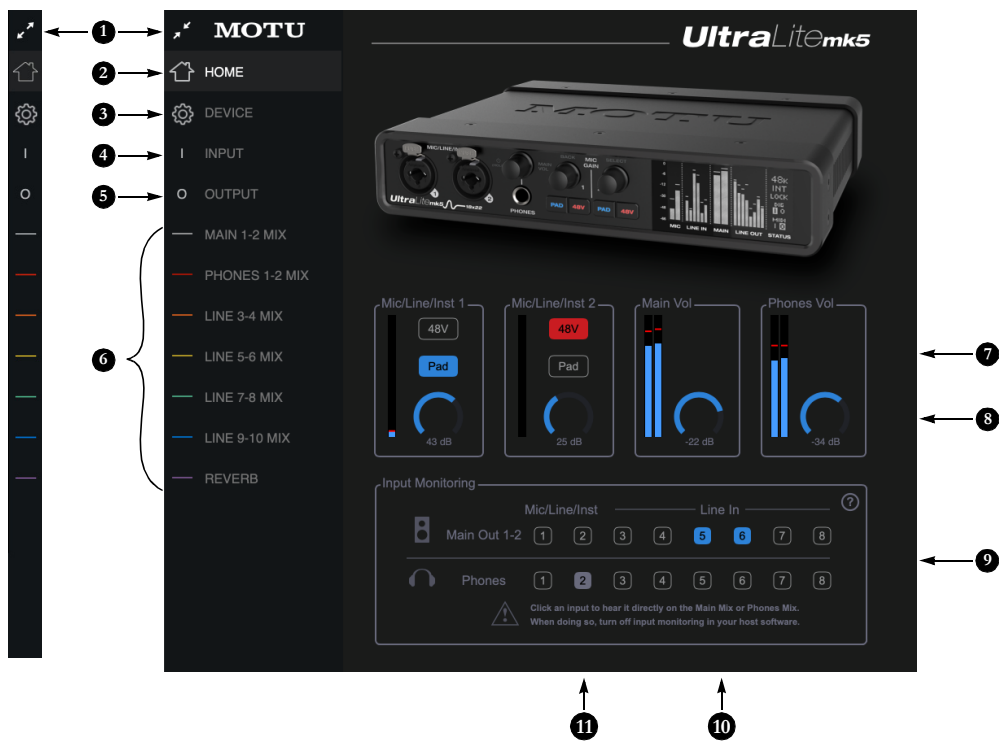
🔍 Look for updated PDF versions of this user guide at the link above, which may document new features and updates to CueMix 5.

MAKE HARDWARE CONNECTIONS

Connect your UltraLite-mk5 to your computer with one of the supplied USB cables. Or connect to your iOS device as follows:

- If your iOS device has a USB-C port, use the included USB-C-to-C cable.
- If your iOS device has a Lightning port, use an Apple Lightning to USB3 Camera Adapter (sold separately), as shown in “iOS setup (Lightning)” on page 22.

HOME TAB



1. Expands and collapses the sidebar.
2. This is the *Home* tab, which provides quick access to basic settings.
3. The *Device* tab provides basic hardware settings, such as the Sample Rate and Clock Source. See “Device tab” on page 33.
4. The *Input* tab provides settings for the UltraLite-mk5’s physical inputs, such as gain levels for the line inputs. See “Input tab” on page 34.
5. The *Output* tab provides settings for the UltraLite-mk5’s physical outputs, such as trim levels for the line outputs. See “Output tab” on page 35.
6. The *Mix* tabs give you access to the on-board mixing and effects. The UltraLite-mk5 is a capable 24 x 14

monitor mixer. Each analog output pair gets its own independent mix consisting of all inputs, computer audio and the reverb bus. See “Mix tabs” on page 36.

7. The *Mic/Line/Inst 1-2* panels give you software control of the settings for those two front panel inputs. You can turn on 48V phantom power if you have a condenser mic connected to the input, or engage the -20 dB pad for line level signals. You can also adjust the preamp gain here. These are the same as the controls on the front panel of the unit.
8. Control the unit’s *Main Volume* and *Headphone Volume* here. These are the same as the controls on the front panel of the unit.

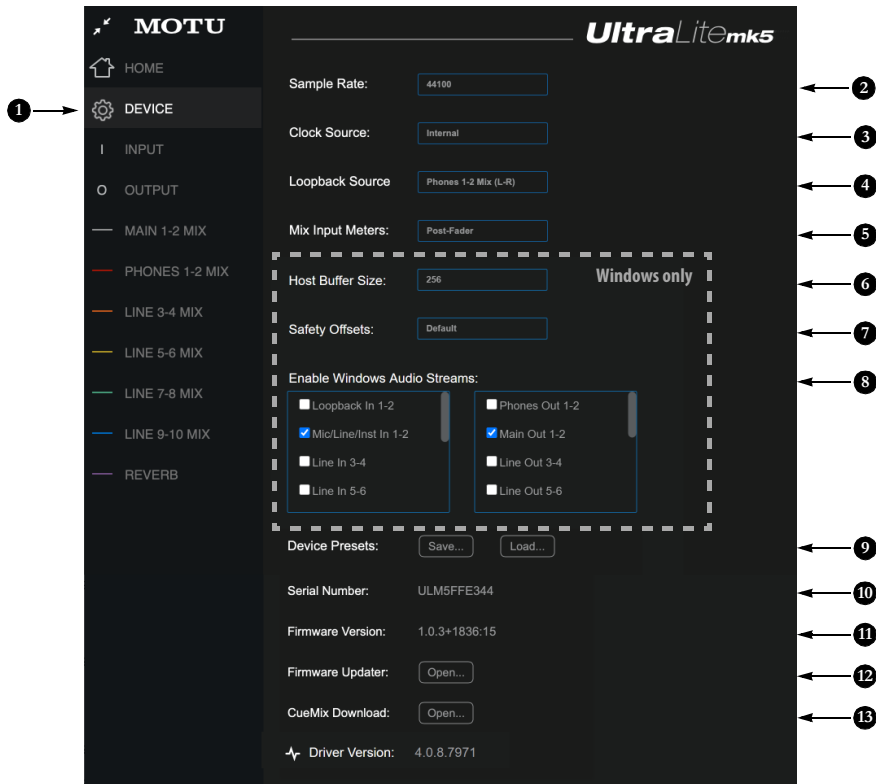
9. The *Input Monitoring* section lets you patch the analog inputs directly to the Main Outs or Headphones. This is near-zero latency monitoring because the computer (USB) is not involved. To hear an input on the Main Outs, click its button in the top row; to hear it on the Headphones, click its button in the bottom row.

If you use this hardware-based monitoring, be sure to turn off the input monitoring feature in your host software. Otherwise, both the UltraLite-mk5 and your host software will send the input signal to the output and the signal will be doubled, which can cause phasing and/or cancellation problems (bad sound). Consult your software documentation for details.

10. Here, *Line Inputs 5-6* have been routed to the main outs. More specifically, by clicking these buttons, their faders in the *Main 1-2 Mix* tab have been set to unity (maximum) gain and mute has been turned off (if it was on). You can further adjust the input’s volume or other settings in its channel strip in the *Main 1-2 Mix* tab.

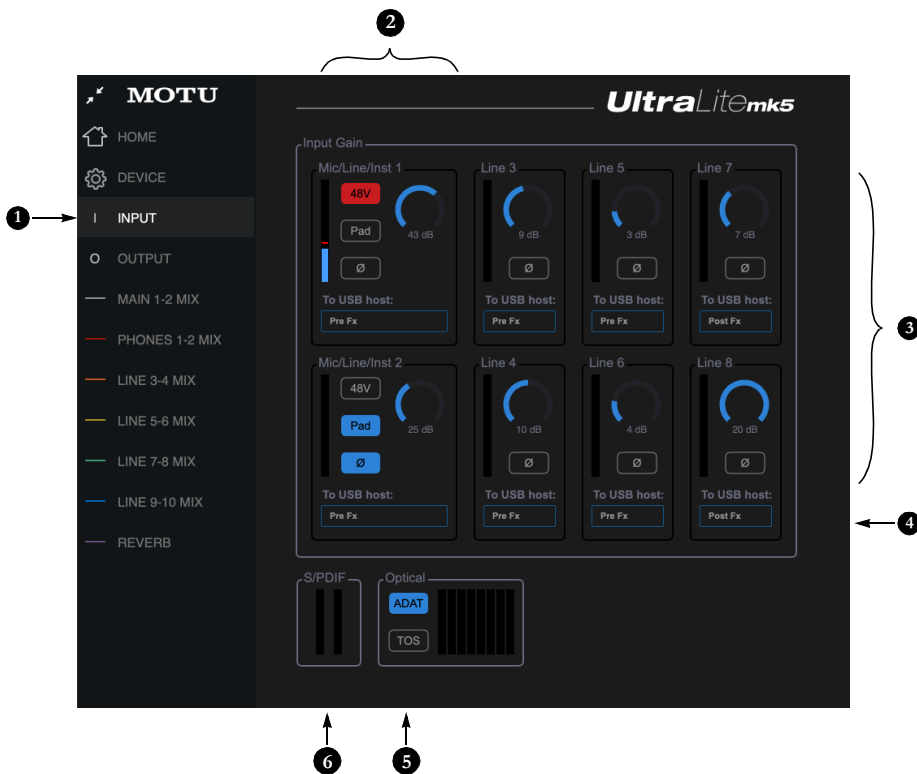
11. Here, the *Mic/Line/Inst 2* input has been routed to the headphones. However, the button is gray because the *Mic 2* channel fader has been lowered (from unity gain) in the *Phones 1-2 Mix* tab. The gray color alerts you that it is no longer being monitored at full scale, or that other channels settings may have been modified (effects added, channel muted, etc.)

DEVICE TAB



1. This is the *Device* tab, which provides basic hardware settings, such as the Sample Rate and Clock Source.
2. Choose the desired *Sample Rate*. Make sure your host audio software is set to the same rate.
3. Choose the *Clock Source*. Your MOTU device will resolve its digital clock to this master source. Set the clock source to *Internal*, unless you have other devices connected to the optical or S/PDIF inputs. If so, see “Optical I/O” on page 24 and “S/PDIF” on page 24.
4. Choose the *Loopback Source* here. This is the stereo signal that will be returned back to the computer on the *Loopback 1-2* channels. See “Loopback” on page 49.
5. The *Mix Input Meters* in the mix tabs can show level before or after the channel fader setting. See “Mix input meters” on page 43.
6. (Windows only) Choose the *Host Buffer Size*. Smaller values reduce latency but increase your computer’s CPU load. See “Host Buffer Size” on page 18.
7. (Windows only) Use the *Safety Offsets* setting to fine tune host buffer latency. See “Host Safety Offset” on page 18.
8. (Windows only) The UltraLite-mk5 supports Windows built-in audio. Choose the *Audio Streams* you wish to use with your Windows audio applications that use built-in audio. These settings do not affect the ASIO driver channels.
9. A *Device Preset* is a ‘snapshot’ of all the settings in the UltraLite-mk5, including all the mixes and all the settings in the CueMix 5 tabs (Home, Device, Input and Output). Use these buttons to save your favorite device configurations for tracking, live gigs, rehearsals, etc.
10. Displays the *Serial Number* of your UltraLite-mk5 unit.
11. Displays the *Firmware Version* currently installed in your UltraLite-mk5 unit.
12. If you wish to update the firmware version in your UltraLite-mk5, click *Open...* to launch the firmware updater app.
13. If you wish to download the latest version of CueMix 5, click *Open...*
14. Displays the *Gen 5 Driver Version* currently installed on your computer for the UltraLite-mk5.

INPUT TAB



1. This is the *Input* tab, which provides access to settings for the UltraLite-mk5 analog and digital inputs.
2. These channel settings for the *Mic/Line/Inst* inputs are the same as those shown in the Home tab (item #7 on page 32) and on the front panel of the UltraLite-mk5, including preamp gain, 48V phantom power and -20 dB pad.
3. Each line input can be digitally boosted up to +20 dB. This allows the inputs to easily accommodate +4 dB and -10 dB reference levels. Each input also includes a *Phase Invert* switch.
4. In the Mix tabs (page 36), each analog input channel strip provides EQ and compression. The mic/line/inst inputs include gating. These effects can be applied to the input as needed (items #1 and 2 on page 38). This *To USB Host* menu for each line input lets you choose whether to send the input signal to your host software with or without these hardware effects applied to the signal. If you want to record the signal dry, *without* the effects applied to it, choose *Pre Fx*. If you want to record the signal *with* the effects applied, choose *Post Fx*. Please note: once the signal is recorded in your DAW with *Post Fx* option, the effects cannot be removed from the signal.
5. Configure the *Optical Input format* for either 8-channel ADAT or stereo TOSLink. At 88.2 or 96 kHz, the ADAT setting supports 4-channel SMUX format. Note that you can choose a different format for the optical IN and OUT ports. See “Optical I/O” on page 47.
6. *S/PDIF Input* level meters are provided here for convenience.

OUTPUT TAB

1. This is the *Output* tab, which provides settings for the UltraLite-mk5's analog and digital outputs.
2. The *Main Volume Group* determines which outputs are controlled by the *Main Out* volume knob on the UltraLite-mk5's front panel (item #8 on page 9, plus the *Main Volume* controls in the *Home* tab (item #8 on page 32) and here in the *Output* tab. For example, if your studio has a pair of main monitors, plus a sub-woofer connected to *Line Out 3*, you could click the *Line Out 3* button to add it to the main volume controls. If you have 5.1 or 7.1 surround monitoring, you can add the surround channels

to the monitor group to be able to control the volume of all surround outputs simultaneously with the *Main Out 1-2* pair is always part of the *Main Volume Group*.

3. Meters and volume control for the *Headphone* out. This is the same as the *PHONES* volume control on the front panel.
4. All analog outs can be *trimmed* (in the DAC) from zero to -100 dB. This can be useful for speaker calibration or other situations where you need a fixed amount of level adjustment for a particular output (or output pair).

5. The *Source* menu lets you choose the source for the *Optical Output*. By default, the source is set to USB channels from your host audio software, as shown above in the menus. However, if you would like to use the UltraLite-mk5 as an ADAT optical expander, choose *ADAT* as the format and choose *Expansion: Line In 1-8* in the *Source* menu. Doing so patches the line inputs directly to their corresponding optical output channel (1 to 1, 2 to 2, etc.)
6. When the *Optical Output* format is TOSLink (TOS), the *Source* menu lets you send any UltraLite-mk5 monitor mix to the optical output.

7. Configure the *optical out format* for either 8-channel ADAT or stereo TOSLink. At 88.2 or 96 kHz, the ADAT setting supports 4-channel SMUX format. Note that you can choose a different format for the IN and OUT. See "Optical I/O" on page 47.
8. By default the *Source* for the RCA S/PDIF output is set to USB channels from your host audio software, as shown in the menu. Alternately, you can send any UltraLite-mk5 monitor mix to the RCA S/PDIF output.

MIX TABS



1. The *Mix tabs* provide an independent monitor mix for each analog output pair. Click a Mix's tab to access the channels for that mix. Then, just bring up the faders for any inputs (3) you wish to hear on that output.

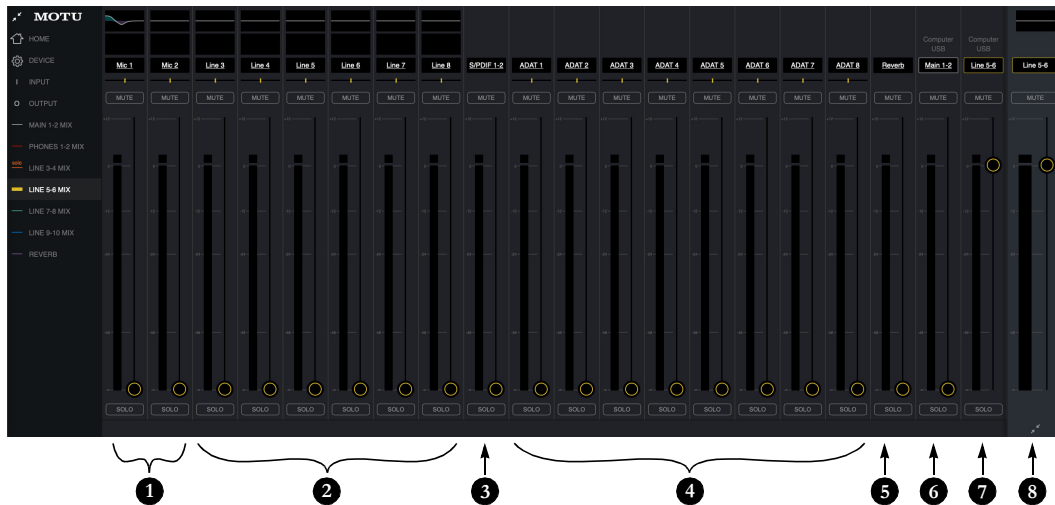
For example, for a live show, you could set up a primary mix for the Main Outs 1-2 going to the venue's front-of-house mixer that consists of live signals from the UltraLite-mk5's inputs (from the band), plus playback from the computer. You could then create a completely different mix for Analog Outs 1-2 feeding stage monitors for the band or an in-ear monitoring system.

2. The *Reverb* tab lets you apply the UltraLite-mk5's built-in reverb to any input signal: just bring up the fader for that input. To hear the reverb mix on an output, switch to the mix tab for that output and bring up the *Reverb* channel fader. Use the fader to control how much of the reverb mix you wish to hear.

3. Available inputs for each mix bus include:
 - The UltraLite's analog and optical inputs
 - Any computer audio being sent to that output pair (available as a channel)
 - The reverb mix (2)

4. This is the *Master Fader* for the current mix, which in this example is the *Line Out 3-4* mix. It controls the overall volume for the mix. It is always visible and pinned to the right side of the window, although you can collapse the strip using the widget at the bottom of the strip. Use the *Clear Solo* button to clear all solos in the mix. When one or more channels are soloed in a mix, the word "Solo" appears next to the mix name in the sidebar on the left to alert you that channels are soloed in the mix (and therefore other channels are muted).

MIX INPUTS



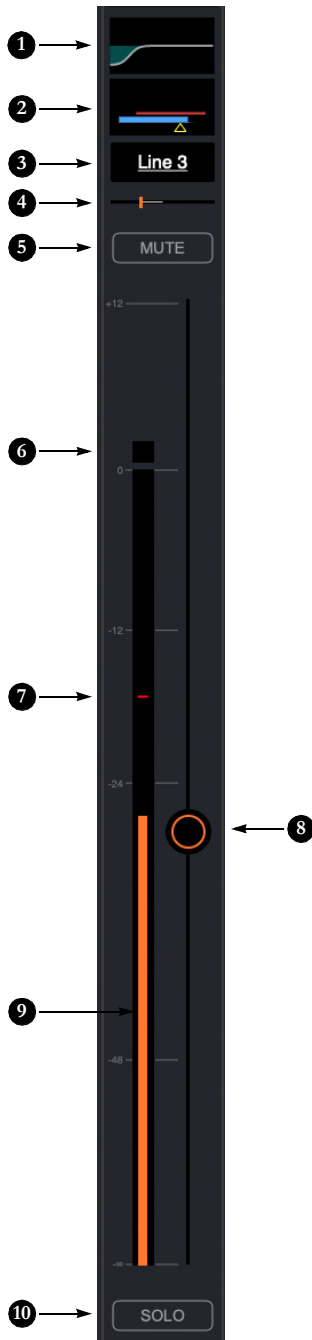
Each mix has the inputs shown here, with a few variations depending on the mix. To hear the input in the mix, just bring up its fader.

1. Each mix can include the signal from the UltraLite-mk5's two front-panel *mic/line/inst* inputs.
2. These are the six *line inputs* on the rear panel of the UltraLite-mk5. All mixes include these channels.
3. To hear the *RCA S/PDIF input*, bring up this fader. All mixes include the *S/PDIF* channel.
4. These inputs represent the UltraLite-mk5's *optical input* channels. If *ADAT* is chosen as the optical format (item #5 on page 34), then you'll see eight channels of *ADAT* input at 1x sample rates (or four channels at 2x rates). If *TOSLink* is chosen as the optical format, you'll see a single stereo channel strip instead of the eight shown here. All mixes include the optical channels.
5. This channel is the *Reverb mix* (item #2 on page 36). When you bring up this fader, you'll hear the entire reverb mix. To adjust the amount of reverb on individual signals, go to the *Reverb* mix tab and make the individual adjustments there. All mixes include the *Reverb* channel, except the *Reverb* mix itself.
6. On the *Main 1-2* channel (*Computer USB*), you'll hear the audio you're playing back from your host audio software, assigned to the UltraLite-mk5's *Main 1-2* outputs. This channel lets you include computer audio in your mix. This channel is available in all mixes, except the *Reverb* and *Main 1-2* mixes.
7. This *Computer USB* channel changes, depending on which mix you are viewing. It represents any computer audio being sent to the mix's output pair from host audio software (over *USB*). In this example, we are viewing the *Line 5-6 mix*, so this channel represents signal being sent to line outputs 5-6 from host audio software over *USB*. By default, this fader is set to full scale so that you'll always hear any computer audio being sent to the mix's output.
8. This is the master fader for the mix (item #4 on page 36).

NOTE: if you want the headphone output to mirror the main outs, go to the *Phones 1-2* mix and bring up the *Main 1-2* fader and mute the *Phones 1-2* channel.

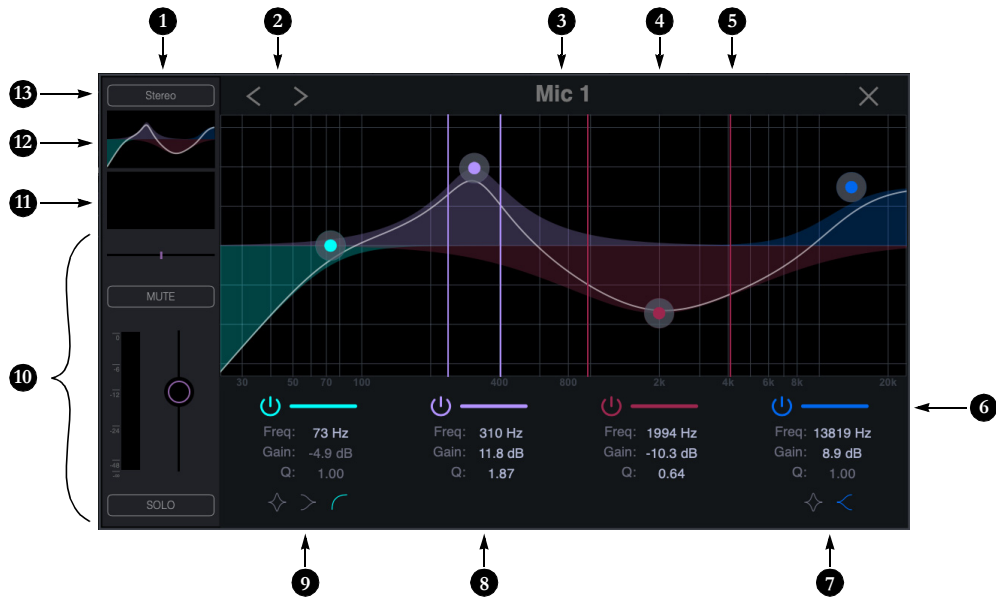
7. This *Computer USB* channel changes, depending on which mix you are viewing. It represents any computer

INPUT CHANNEL STRIP



1. Click this EQ thumbnail to access the parametric EQ and other channel settings. EQ is only available on analog inputs and mix bus master faders. See "Four-band parametric EQ" on page 40.
2. Click this thumbnail to access the *Gate*, *Compressor* and other channel settings. Compression is only available on analog inputs. See "Compressor" on page 41. The Gate is only available on mic/line/inst inputs. See "Gate" on page 41.
3. Click the channel name to access the channel settings, where you can rename the channel and make other channel settings.
4. Panning for mono inputs (such as a mic input). Stereo inputs (such as S/PDIF) do not have a pan control.
5. Channel mute.
6. Clip indicator.
7. The peak/hold indicator shows where the signal has recently peaked.
8. Use the channel fader to control the input level. Double-click to return to $-\infty$. If the fader is already at $-\infty$, double-clicking moves to unity gain (0 dB).
9. By default, the level meter displays the signal level after the fader (post-fader), but they can be changed to pre-fader, if desired. See "Mix input meters" on page 43.
10. Channel solo. When you solo a channel, it mutes all other inputs on the bus (as is customary in a traditional "solo-in-place" model on a mixing console. In other words, there is no separate solo bus.)

CHANNEL SETTINGS



Click any of the items at the top of a channel strip (items #1, 2 or 3 on page 38) to access the Channel Settings shown here.

1. The *Channel Settings Sidebar* displays basic settings for the channel.
2. The *Next/Previous Channel* buttons display the settings for adjacent channels in the mix.
3. Click the *Channel Name* to rename the channel.
4. Drag the *Frequency/Gain* handle for an EQ band to change the frequency and/or gain for the band.
5. Drag the *Q (bandwidth)* handles for an EQ band to change them. The handles are color-coded to match the color of their respective EQ band.
6. *Enables* (or disables) the EQ band.
7. Click the *Notch/Shell* switch to toggle the filter type.
8. Click filter settings to edit them directly. See "Four-band parametric EQ" on page 40.
9. Click the *Notch/Shell/Low-cut* switch to change the filter type.
10. *Basic channel settings* (gain, pan, solo, mute and level meter) are shown here for convenience.
11. Click to access the *Compressor and Gate*.
12. Click to access the *Parametric EQ* settings.
13. The *Stereo Link* button links or unlinks the channel to an adjacent channel for stereo pairing.
14. The Gate processor is available on Mic inputs 1 and 2 only. See "Gate" on page 41.
15. The Compressor is available on all analog inputs. See "Compressor" on page 41.



MIXER EFFECTS

The EQ, compressor, gate and reverb processor in the UltraLite-mk5 are available when operating the unit at 1x and 2x sample rates. At 4x sample rates (176.4 or 192 kHz), the following effects are disabled:

- All input effects
- Reverb

However, all mix bus EQ's (including Phones) remain enabled during 4x operation.

DSP-driven mixing and effects

The UltraLite-mk5 effects are driven by a powerful DSP that delivers 32-bit precision and plenty of bandwidth for no-latency processing. Effects can be applied when operating as an audio interface or as a stand-alone mixer without a computer.

Advantages over host-based mixing and processing

The hardware mixer in the UltraLite-mk5 provides several advantages over mixing and processing in your host audio software:

- No buffer latency. The DSP-mixer provides the same near-zero latency throughput performance as a conventional digital mixer. Effects processing doesn't impact your computer's CPU.
- DSP mixing and routing can be maintained independently of individual software applications or projects.
- DSP-driven mixing can function without the computer, allowing the UltraLite-mk5 to operate as a portable, stand-alone mixer with effects.

Accessing mixer effects

To access the EQ, compressor or gate for a channel, click its thumbnail at the top of the channel strip (item #1, 2 or 3 on page 38).

FOUR-BAND PARAMETRIC EQ

Analog input channels (items 1 and 2 on page 37) provide four bands of center-frequency parametric EQ filtering as shown on page 39. The High and Low bands include shelf filtering options. Master faders provide three bands of parametric EQ.

Enabling EQ bands

Each band has an *enable/disable* button (item #6 on page 39), allowing you to enable as few or as many bands as needed.

EQ filter controls

The EQ filters have three controls (item #8 on page 39):

| Control | unit | range |
|-----------|---------|------------------|
| Frequency | Hertz | 20 to 20,000 |
| Gain | dB | -20.00 to +20.00 |
| Bandwidth | Octaves | 0.01 to 3.00 |

Click a value to edit it numerically. Or drag its corresponding control handle in the graph above. Controls for each EQ band are color-coded.

EQ filter characteristics

EQ is one of the most widely used processing tools and can be applied to many different situations, from minor corrective tasks to creative tone sculpting. The four-band EQ has been designed to be flexible enough to cover a broad range of applications. By adjusting Gain and Bandwidth together, you can emulate the smooth and musical character of classic analog EQ circuits.

Filter types

The Low and High bands offer a shelf option that is similar to those found in most conventional parametric EQs. The Low band also provides an additional low-cut filter option to filter out low frequencies below the frequency setting.

GATE

Mic/line/inst channels 1-2 (item 1 on page 37) provide a *Gate* (Figure 6-1).

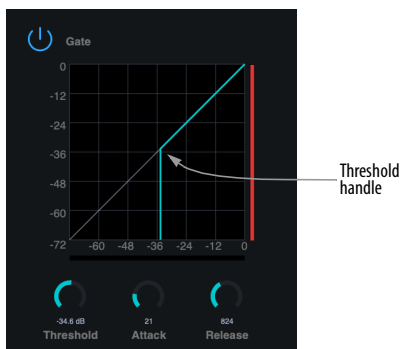


Figure 6-1: The Gate.

To access the gate, click the compressor/gate thumbnail (item #2 on page 38).

The gate silences the signal when the input signal's level drops below the *Threshold*.

The rate at which the gate responds, (opens to let signal through) is determined by the *Attack* parameter. With a short Attack time, the gate will open as soon as the signal crosses the Threshold; with longer Attack times, the gate will gradually open, much like a fade-in.

When the input level falls back below the Threshold, the time it takes for the gate to close (how quickly the signal is attenuated), is determined by the *Release* parameter. Short Release times will close the gate quickly, abruptly attenuating your signal, versus longer release times, which will gradually attenuate your signal, like a natural fade-out.

COMPRESSOR

All analog input channels (items 1 and 2 on page 37) provide a *Compressor* (Figure 6-2).

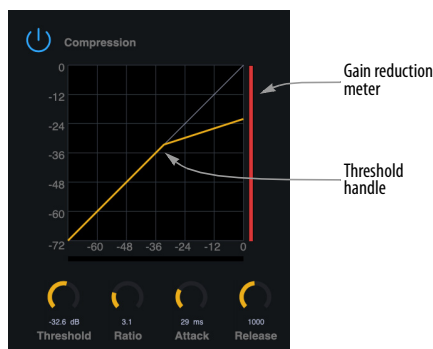


Figure 6-2: The Compressor.

To access the compressor, click the compressor/gate thumbnail (item #2 on page 38).

The *Compressor* lowers the level of the input when amplitude of the signal is above the Threshold. The amount of attenuation is determined by the *Ratio* and the input level. For example, if the input is 6 dB above the *Threshold* and the *Ratio* is 3:1, the compressor will attenuate the signal to 2 dB above the Threshold. When the input level goes above the threshold, the attenuation is added gradually to reduce distortion. The rate at which the attenuation is added is determined by the *Attack* parameter. Likewise, when the input level falls below the Threshold, the attenuation is removed gradually. The rate at which the attenuation is removed is determined by the *Release* parameter. Long Release times may cause the audio to drop out briefly when a soft passage follows a loud passage. Short Release times may cause the attenuation to “pump”, a term used to describe the sound of the compressor when the average input level quickly fluctuates above and below the Threshold. These issues can be addressed by adjusting the parameters. The *Gain reduction meter* (Figure 6-2) displays the attenuation applied by the compressor.

REVERB

To access the reverb settings: go to the Reverb bus tab (item #2 on page 36) and then click the thumbnail at the top of the reverb bus fader, as shown below.

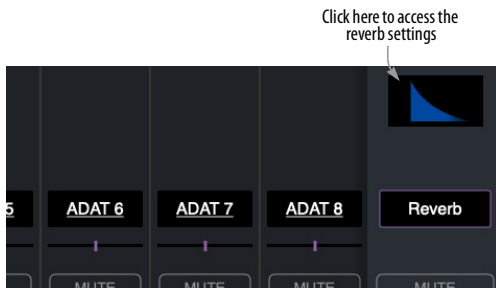


Figure 6-3: Accessing the Reverb processor.

Reverb settings

The Reverb processor (Figure 6-4) provides *Small*, *Medium* and *Large* room sizes, along with *Pre-Delay* (see below), *Damping*, *Decay* (length) and *Width* (stereo image) controls, which you can adjust with the handles on the graph or the settings below.

Predelay

Predelay is the amount of time before the acoustic energy from the source returns to the listener, after reflecting off the surfaces of the listening space. The very first reflections helps you perceive information about the listening space, (size, distance, surface type, etc.) In large rooms, it takes a while (on the order of milliseconds) before the first reflections return to the listener. Predelay is useful for adding clarity, as it delays these reflections, before the onset of full reverberation. For example, with pre-delay added to vocals, the reflections won't start until after the initial sound of a word has been sung.

Routing inputs and groups to the reverb processor

The reverb processor is a single, independent unit that provides stereo reverb. Use the channels in the Reverb mix tab (item #2 on page 36) to route input signals to it. All incoming signals to the reverb processor are merged and processed together. The resulting stereo output from the reverb can then be added into any other mix bus with the Reverb channel strip (item #5 on page 37).



Figure 6-4: The reverb processor.

MIX INPUT METERS

The *Mix input Meters* menu (item #5 on page 33) offers two settings: *Pre-fader* or *Post-fader*. This setting lets you choose whether the input meters in CueMix 5 display levels before or after the signal passes through the fader's gain stage.

☛ Post-fader metering is calculated as the Post-FX send level, plus the fader value. Therefore, if the pre-fader signal goes above zero dBFS, the resulting post-fader meter value will not include the magnitude of the signal above zero dBFS.

SAVING AND RECALLING DEVICE PRESETS

Use the *Save* and *Load* buttons in the CueMix 5 Device tab (item #9 on page 33) to save and recall UltraLite-mk5 device presets to your computer hard drive. A preset saves the entire state of the UltraLite-mk5 interface, including all device settings, mixes and effects settings.

THE CUEMIX 5 IOS APP

CueMix 5 is also available as an app for iOS and allows you to control the UltraLite-mk5 from your iOS device. Simply download it from the App Store. Also see “iOS setup (USB-C)” on page 21 and “iOS setup (Lightning)” on page 22.

CHAPTER 7 Working with Host Audio Software

The UltraLite-mk5 provides multi-channel audio input and output for Core Audio compatible audio applications on the Mac and ASIO or Wave compatible applications on Windows, including MOTU’s Digital Performer and Performer Lite, 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, PreSonus Studio One, Bitwig, and others.

Performer Lite is available as a free download for UltraLite-mk5 owners from their motu.com account page. 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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| Run the CueMix 5 app | 45 |
| Choose the UltraLite-mk5 | 46 |
| Reducing monitoring latency | 46 |
| Loopback | 49 |

PREPARATION

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

- chapter 3, “Software Installation” (page 17)
- chapter 4, “Hardware Installation” (page 21)

RUN THE CUEMIX 5 APP

Before you run your host audio software, launch CueMix 5 to configure your MOTU hardware.

Sample Rate

Choose the desired sample rate for the UltraLite-mk5 (item #2 in the Devices tab on page 33) and your host audio software. Make sure the sample rates for the hardware and software match. Newly recorded audio will have this sample rate.

🔇 Optical and S/PDIF channels are disabled when the interface is operating at a 176.4 or 192 kHz.

Clock Mode

The *Clock Source* setting (item #3 in the Devices tab on page 33) is important because it determines the master digital audio clock for your system.

If you do not have any digital audio connections to your MOTU device (you are using the analog inputs and outputs only), and you will not be resolving your host software to optical or another external clock source, choose *Internal*.

If you have devices connected to the optical ports, see “Choosing a clock source for optical connections” on page 24.

If you have devices connected to the S/PDIF ports, see “S/PDIF” on page 24.

CHOOSE THE ULTRALITE-MK5

Once you've made the preparations described so far in this chapter, you're ready to run your host audio software and choose the UltraLite-mk5 as your audio interface ("soundcard").

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 UltraLite-mk5 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 UltraLite-mk5*. If your host audio software doesn't support ASIO, choose the *UltraLite-mk5 Wave* driver instead.

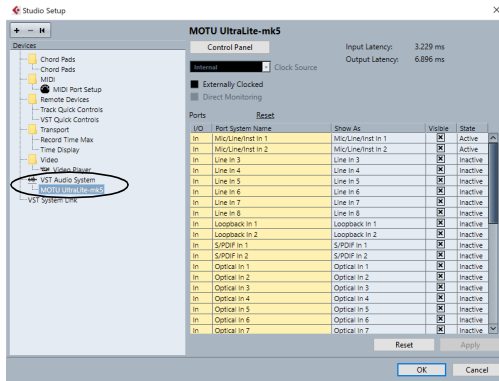


Figure 7-1: Choosing the MOTU Pro Audio ASIO driver in Cubase.

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 UltraLite-mk5 |
|--------------------------------------|--|
| Digital Performer and Performer Lite | Setup menu > Configure Audio System > Configure Hardware Driver |
| Pro Tools | 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 UltraLite-mk5, passes through the interface hardware into the computer, through your host audio software, and then back out to an output.

Monitoring through the UltraLite-mk5

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 use the digital mixer in the UltraLite-mk5 to route the input directly to your

outputs. For details, see “Mix tabs” on page 36. The mixer in the UltraLite-mk5 even provides zero latency effects processing (EQ, compression and reverb), which can be applied to the signal.

Direct hardware playthrough / Direct ASIO monitoring

When managing your live monitor mix through the UltraLite-mk5 mixer, remember to disable your DAW’s live monitoring features, so that you won’t hear record-enabled tracks in your DAW. Also note that the UltraLite-mk5 does not support *Direct Hardware Playthrough* in Digital Performer, or the *Direct ASIO Monitoring* feature (or similar) offered and other DAWs, which lets you control no-latency hardware monitoring from within the host application. Instead, you can use the CueMix 5 app mixer (“Mix tabs” on page 36) to set up these monitor mixes manually.

If you don’t require any effects processing on the input signal (no reverb or compression, for example), all this takes is one click on a fader to route the input being recorded to the output you are using for monitoring.

If you are recording a mono input that you’d like to monitor in stereo, or if you need to apply effects to the monitored signal, you can use the UltraLite-mk5 mixer for that, too. Use the mix tabs and reverb mix (page 36) to apply effects as desired, and perhaps include other channels to the mix.

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. The UltraLite-mk5 “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 UltraLite-mk5 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. Here are a few examples.

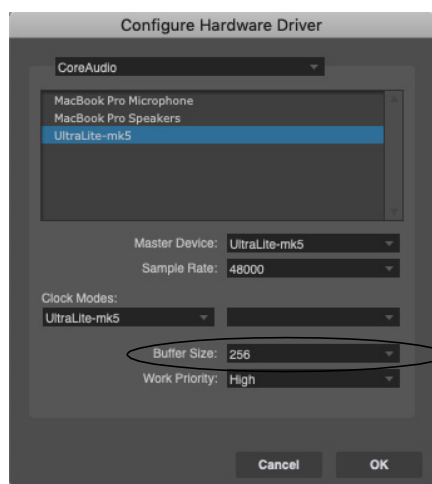


Figure 7-2: In Digital Performer and Performer Lite, choose Setup menu > Configure Audio System > Configure Hardware Driver to open the dialog shown above and access the Buffer Size setting.

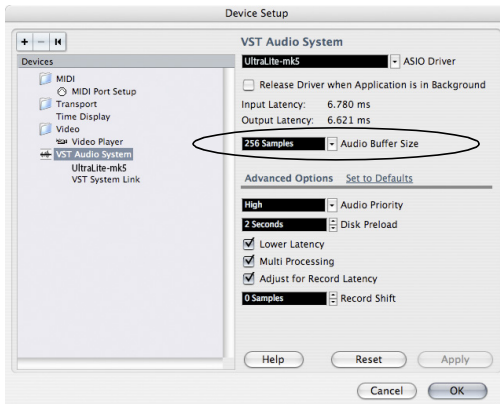


Figure 7-3: In Cubase or Nuendo, choose Devices menu > Device Setup. Select your interface (UltraLite-mk5), then click the Control Panel button to access the window above and the Buffer Size setting.

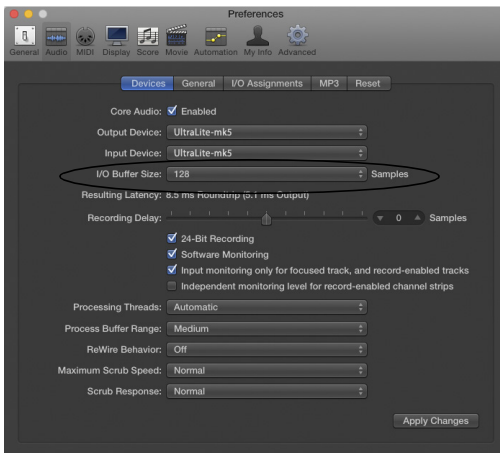


Figure 7-4: In Logic Pro, go to the Audio Driver preferences to access the Buffer Size option shown above.

Adjusting buffer size on Windows

On Windows, the buffer size is adjusted in the CueMix 5 app Device tab (items #6 and 7 in the Devices tab on page 33).

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, Digital Performer 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.

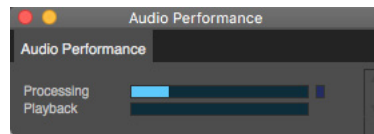


Figure 7-5: When adjusting the buffer size to reduce monitoring latency, watch the 'processor' meter in Digital Performer's Performance Monitor. If you hear distortion, or if the Performance meter is peaking, try raising the buffer size.

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 1-2* input channels provided by the UltraLite-mk5 audio driver to send USB audio output from your computer – or any UltraLite-mk5 mix – back to the computer.

Choose the desired source from the *Loopback* menu (item #4 on page 33).

The loopback channels return the chosen signal back to the computer so that you can capture the signal in your host software, stream it to the web or broadcast it with podcasting software.

Mixing loopback with live inputs and disk tracks

If you need to mix the loopback channels with live inputs, do the following:

- 1** Choose a mix from the Loopback menu.
- 2** Go to the mix tab for that mix (item #1 on page 36) and bring up the fader(s) for the *computer USB* channels you want to hear.
- 3** Bring up the faders for any live inputs you want to add to the mix. When you do so, their signal is mixed with the computer USB channels.

☛ Remember, be careful! When monitoring loopback channels and live inputs, your host software can cause loud feedback loops. Be sure to disable the monitoring of loopback tracks to avoid feedback.

Part 3

Appendices

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 and above), 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, CueMix 5 or your DAW, 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 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 have absolutely no audio input or output happening to or from my interface. Why?

Make sure that the unit has a stable sample rate (the word *LOCK* in the front panel displays will flash if the clock hasn't settled yet). Try setting the unit's clock source to *Internal* if you can't sync to any external clock sources. Check that audio is working with Internal sync, and if so, then work on establishing a stable external clock.

I can't hear computer audio output through my MOTU interface.

In the Sound panel of System Preferences, the UltraLite-mk5 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 mixer in the UltraLite-mk5. Please see "Monitoring through the UltraLite-mk5" on page 46.

How do I control monitoring latency?

See "Reducing monitoring latency" on page 46.

How do I factory reset my device?

Push the SELECT knob to enter the main menu. Navigate to *RESET* and push the SELECT knob twice to reset.

I hear clicks and pops under optical or S/PDIF sync.

Many problems result from incorrect sync settings. See "Choosing a clock source for optical connections" on page 24 and "S/PDIF" on page 24. Whenever there is any unexpected noise or distortion, suspect digital clocking issues.

Clicks and pops due to hard drive problems...

If you have checked your clock settings and you are still getting clicks and pops in your audio, you may have a drive related problem. Set your Clock Source to *Internal* and try recording just using the analog inputs and outputs on the UltraLite-mk5. If you encounter the same artifacts you may want try using another drive in your computer. Clicks and pops can also occur when the drive is severely fragmented or there are other drive-related issues.

Connecting or powering gear during operation...

It is not recommended that you connect/disconnect, or power cycle connected devices 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:

- **Live Chat:** You can connect directly with a technician Monday through Friday between 10 AM and 5 PM Eastern Time.
- **Schedule a call:** You can schedule a callback time to speak with a technician by phone Monday through Friday between 1 PM - 5 PM Eastern time.
- **Support ticket:** You can submit an online support ticket at any time, 24 hours a day, 7 days a week. A technician will get back to you in 1-2 business days.

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 unit. It is also displayed in the display menu and at

the bottom of the Device tab in the CueMix 5 app (item #10 on page 33). 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 Performer Lite 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 use our online suggestion box at www.motu.com/suggestions.

APPENDIX B Audio Specifications

MIC in

| | | |
|----------------|------------------------|--------------------|
| Connector Type | Combo-style, XLR / TRS | Pin 2 hot, tip hot |
|----------------|------------------------|--------------------|

XLR

| | | |
|--------------------------|--------------------------------|-----------------------------|
| Impedance load | 2.8 k ohm | |
| Pad | -20 dB, Switchable per channel | |
| Phantom power | +48V, switchable per channel | DIN 45596 / IEC 61938-P48 |
| EIN | -129 dBu | A-weighted, 20-20k, 150 ohm |
| Dynamic Range | 115 dB | A-weighted |
| THD+N | -113 dB | Unweighted |
| Frequency Response | +0.05 -0.2 dB, 26 Hz/20 kHz | Ref. 1 kHz |
| Max Level In with Pad | +20 dBu | |
| Max Level In without Pad | 0 dBu | |
| Gain range | 0 to +74 dB in 1 dB steps | |

TRS

| | | |
|--------------------|---------------------------|--|
| Description | Balanced or single ended | Suitable for line or instrument (guitar) |
| Impedance Load | 1 meg ohm 2 meg ohm | unbalanced balanced |
| Pad | None | |
| Phantom power | None | |
| Dynamic Range | 115 dB | A-weighted |
| THD+N | -109 dB | -2 dBFS, Unweighted |
| Frequency Response | +0 -0.1 dB, 20 Hz/20 kHz | Ref. 1 kHz |
| Max Level | +20 dBu | Balanced; +18 dBu unbalanced |
| Gain range | 0 to +74 dB in 1 dB steps | |

Line In

| | | |
|--------------------|--------------------------------------|---------------------------------------|
| Connector Type | 1/4" Female, TRS | Balanced/unbalanced, Tip hot |
| Specification | Complies with EBU-R68 / SMPTE RP-155 | |
| Impedance Load | 20 k ohm | balanced |
| Dynamic Range | 120 dB | A-weighted |
| THD+N | -113 dB | 1 kHz, 24 dBu, unweighted, unity gain |
| Frequency Response | ±0.05 dB, 20 Hz/20 kHz | Ref. 1 kHz |
| Max Level In | +24 dBu | |
| Gain Range | 0 to +20 dB | Digitally controlled in 1 dB steps |

Line Out

| | | |
|--------------------|----------------------------|------------------------------------|
| Connector Type | 1/4" Female, TRS | Balanced, tip hot |
| Output Impedance | 220 ohm | Per leg |
| Dynamic Range | 124 dB | A-weighted |
| THD+N | -113 dB | -2 dBFS, Unweighted, 1 kHz |
| Frequency Response | +0, -0.15 dB, 20 Hz/20 kHz | Ref. 1 kHz |
| Max Level Out | +21 dBu | |
| Trim Range | 0 to -∞ (-127) | Digitally controlled in 1 dB steps |

Phones

| | | |
|--------------------|-------------------------|----------------------------|
| Connector Type | 1/4" Female, TRS Stereo | Tip Left, Ring Right |
| Dynamic Range | 118 dB | A-Weighted |
| THD+N | -110 dB | Unweighted, -1 dBFS, 1 kHz |
| Frequency Response | ±0.05 dB, 22 Hz/20 kHz | Ref. 1 kHz |
| Trim Range | 0 to -99 dB, plus mute | 0 to -99 dB in 1 dB steps |
| Max output | 14.4 dBu | Unloaded |

S/PDIF

| | | |
|---------------------|---------------------|--------|
| Connector Type | RCA | |
| Input Termination | 75 ohm | |
| Lock Range | 44.1k/48k, +/- 0.5% | 1x, 2x |
| Input Voltage Range | 0.2 - 0.6 V | |
| Output Drive | 0.5 Vp | |
| Specification | IEC-958/60968-3 | |

APPENDIX C Half-rack Mounting Kit

The *Half-Rack Mounting Kit* (sold separately) lets you mount the UltraLite-mk5 in a standard 19-inch equipment rack. Visit the web store at motu.com to purchase this kit or contact your authorized MOTU reseller.

PACKING LIST

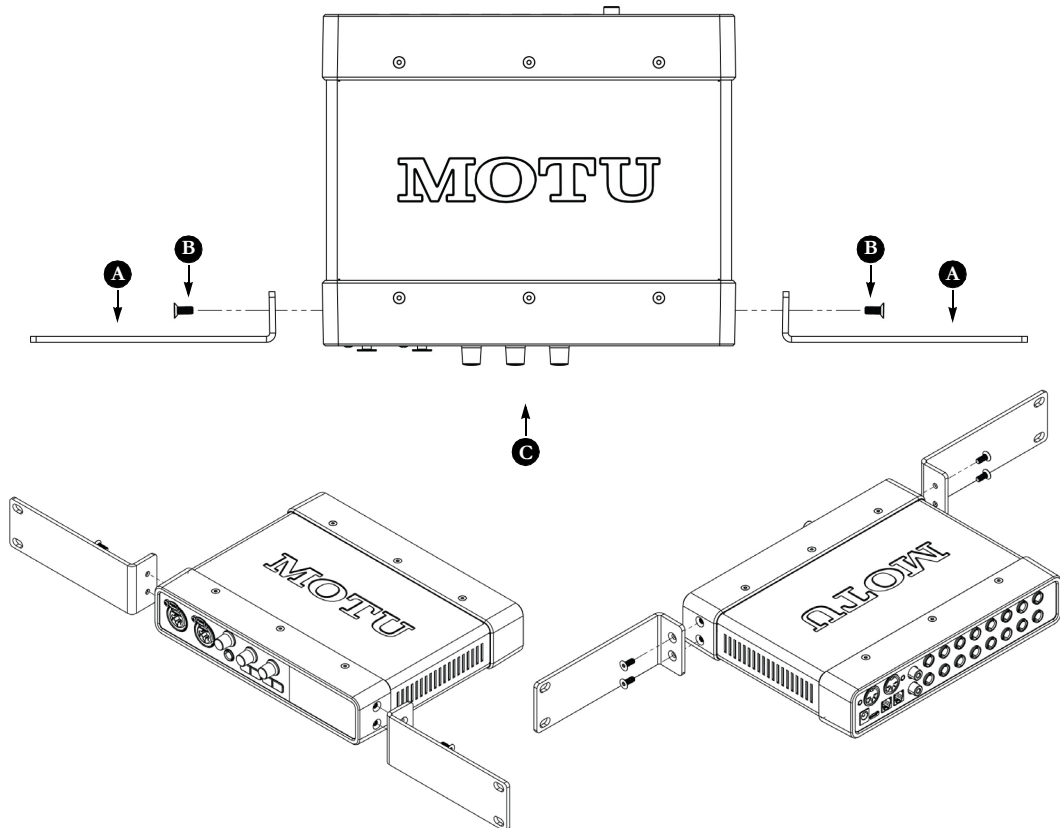
- (2) L-shaped half-rack mounting brackets (A)
- (1) 2.5 mm L-shaped hex wrench (not pictured)
- (1) Instruction sheet (this sheet)

INSTRUCTIONS

Using the included 2.5 mm hex wrench:

- 1** Remove the hex screws (B) on both side panels of the half-rack unit (C).
- 2** Use the removed screws (B) to attach the half-rack mounting brackets (A) as shown.
- 3** Be sure to tighten all screws securely for best results.

Questions? Contact MOTU technical support at motu.com/support.



APPENDIX D Half-rack Coupler Kit

The *Half-Rack Coupler Kit* (sold separately) lets you mount the UltraLite-mk5 side by side with another UltraLite-mk5 (or similar unit) in a standard 19-inch equipment rack. Visit the web store at motu.com to purchase this kit or contact your authorized MOTU reseller.

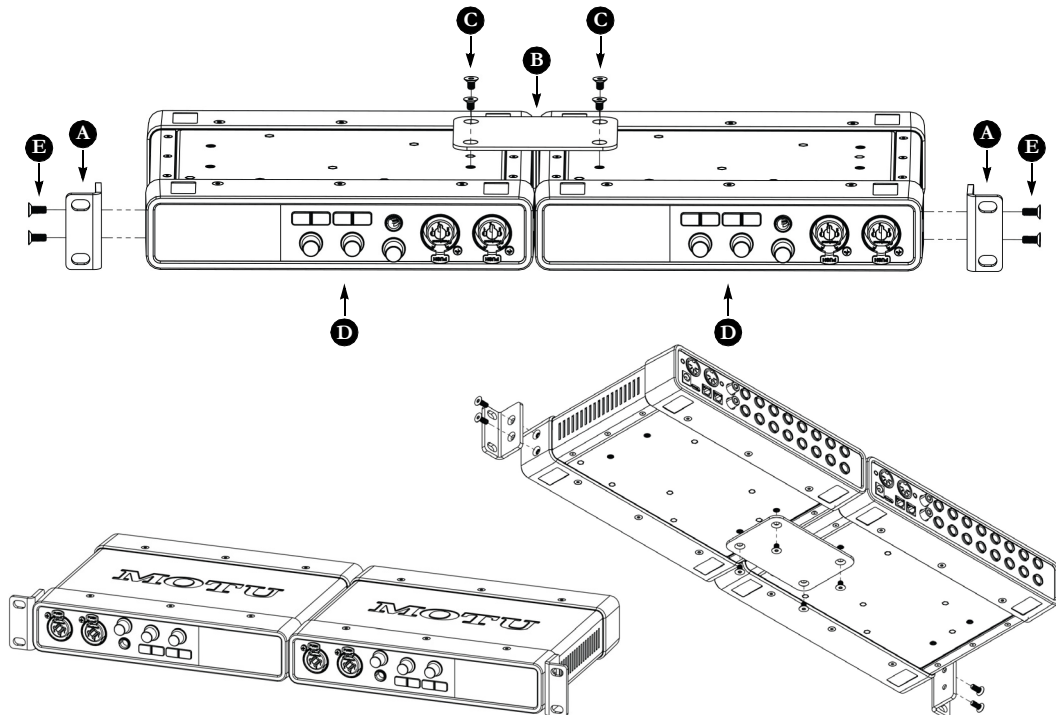
PACKING LIST

- (2) L-shaped rack mounting brackets (A)
- (1) Rectangular joiner bracket (B)
- (4) Hex screws for joiner bracket (C)
- (1) 2.5 mm L-shaped hex wrench (not pictured)
- (1) Instruction sheet (this sheet)

Questions? Contact MOTU technical support at motu.com/support.

INSTRUCTIONS

- 1** On a smooth flat surface, place two half-rack units (D) upside down and side by side. Make sure their front panels are facing in the same direction.
- 2** Using the hex wrench and the four (4) hex screws included with this kit (C), attach the rectangular joiner bracket (B) as shown.
- 3** Using the hex wrench, remove the hex screws (E) on the outer side panels of each half-rack unit (D).
- 4** Use the removed screws (E) to attach the half-rack mounting brackets (A) as shown.
- 5** Be sure to tighten all screws securely for best results.



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