

MicroBook™

User Guide

MOTU

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SAFETY PRECAUTIONS AND ELECTRICAL REQUIREMENTS

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 POWER PLUGS WHEN INSTALLING OR REMOVING THE PLUG TO OR FROM A POWER SOURCE.

IMPORTANT SAFEGUARDS

1. Read instructions — All the safety and operating instructions should be read before operating the MicroBook.
2. Retain instructions — The safety instructions and owner's manual should be retained for future reference.
3. Heed Warnings — All warnings on the MOTU MicroBook and in the owner's manual should be adhered to.
4. Follow Instructions — All operating and use instructions should be followed.
5. Cleaning — Unplug the MOTU MicroBook from the computer before cleaning and use a damp cloth. Do not use liquid or aerosol cleaners.
6. Power Sources — This MOTU MicroBook should be operated only from the type of power source indicated on the marking label.
7. Power-Cord Protection — Power-supply cords should be routed so that they are not likely to be 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 MOTU MicroBook.
8. Lightning — For added protection for the MOTU MicroBook during a lightning storm, unplug its power supply from any wall outlets. This will prevent damage to the MOTU MicroBook due to lightning and power line surges.
9. Servicing — Do not attempt to service this MOTU MicroBook yourself as opening or removing covers will expose you to dangerous voltage and other hazards. Refer all servicing to qualified service personnel.
10. Damage Requiring Service — Unplug the MOTU MicroBook from the computer and refer servicing to qualified service personnel under the following conditions.
 - a. When the power supply cord or plug is damaged.
 - b. If liquid has been spilled or objects have fallen into the MOTU MicroBook.
 - c. If the MOTU MicroBook has been exposed to rain or water.
 - d. If the MOTU MicroBook does not operate normally by following the operating instructions in the owner's manual.
 - e. If the MOTU MicroBook has been dropped or the cabinet has been damaged.
 - f. When the MOTU MicroBook exhibits a distinct change in performance, this indicates a need for service.
11. 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.
12. Safety Check — Upon completion of any service or repairs to this MOTU MicroBook, ask the service technician to perform safety checks to determine that the product is in safe operating conditions.

ENVIRONMENT

Operating Temperature: 10°C to 40°C (50°F to 104°F)

AVOID THE HAZARDS OF ELECTRICAL SHOCK AND FIRE

Do not handle the power supply, or power cables with wet hands.

CAUTION: DANGER OF EXPLOSION IF BATTERY IS REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY MANUFACTURER. DISPOSE OF USED BATTERY ACCORDING TO MANUFACTURER'S INSTRUCTIONS.

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Update Policy

In order to be eligible to obtain updates of the program, you must register the software at motu.com.

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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.



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Quick Reference: MicroBook Front Panel



1. Plug in your dynamic or condenser mic here. If your mic cable has a standard male XLR connector, use the female XLR-to-TBS adapter included with your MicroBook. **IMPORTANT:** be sure to use the included adapter, or make sure that the adapter you use is wired as shown in Appendix B, "Mic Adapter Pin-outs" page (51).

Use the on-screen CueMix FX software to engage the 20 dB pad and/or 48V phantom power (for a condenser mic), if necessary.



Make sure 48V power is turned **OFF** BEFORE plugging anything in to the mic input. Only engage 48V power when a device

that requires it is plugged in. Never enable 48V power when a tip/sleeve (unbalanced) plug is connected to the mic input.

2. Plug in your guitar here using a standard quarter-inch guitar cable. This input is designed with the high-impedance characteristics necessary to properly handle both passive and active guitar pickups. To make your guitar sound and "feel" even more like it is plugged directly into a actual guitar amplifier, consider using MOTU's ZBox guitar impedance adapter (sold separately), which simply goes between your guitar cable and this input (no extra cable needed).

3. When this power LED flashes, it means that the MicroBook has USB bus power and it is establishing communication with the computer. When the LED glows steadily, the MicroBook is ready to go. If the power LED continues to flash and never goes solid, see Appendix A, "Troubleshooting" page (49).

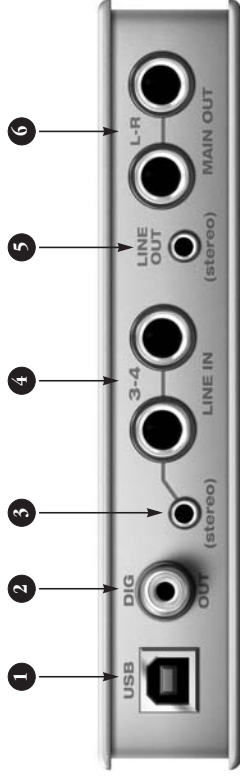
To obtain your product serial number, see "Obtaining your MicroBook serial number" on page 14.

For volume control, launch CueMix on your computer and use these

4. This is a standard eighth-inch "stereo mini" headphone jack. Use the on-screen CueMix FX software mixer to control its level, independently from other output pairs.



Quick Reference: MicroBook Rear Panel



1. The MicroBook is powered by its USB connection to the computer.
2. This stereo, 24-bit S/PDIF digital output mirrors the Main Out.
3. This eighth-inch "stereo mini" jack serves as an alternative input for Line Inputs 3-4. For example, you can plug in an iPod or CD player here, instead of using the quarter-inch jacks to

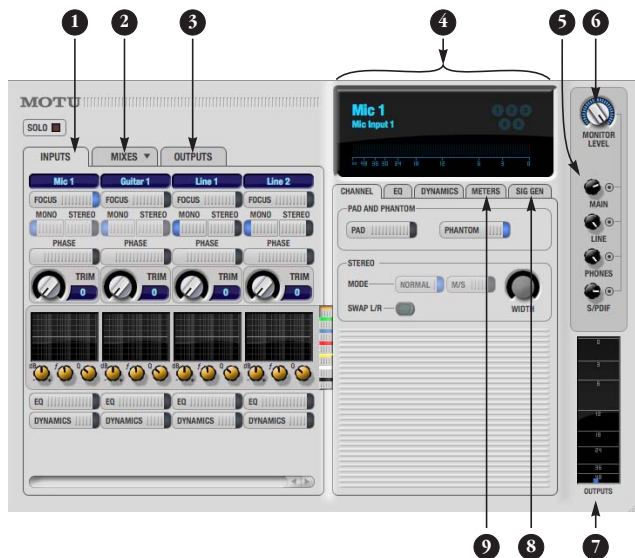
- the right. DO NOT plug a cable into this mini jack at the same time as the quarter-inch jacks.
4. These two analog inputs are balanced TRS (tip/ring/sleeve) quarter-inch connectors that can also accept an unbalanced plug. These inputs (3-4) do not have mic pre-amps, so they are best used for synthesizers, drum machines, effects processors, and other devices with line level

5. This eighth-inch "stereo mini" jack serves as a stereo line level analog output that is completely independent from the Main Out (to the right).

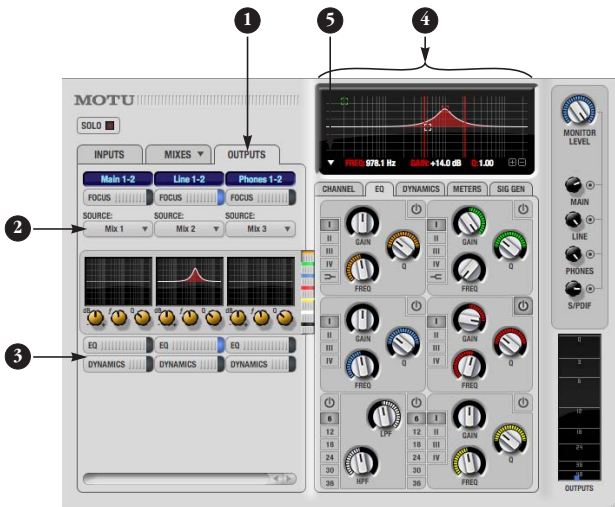
6. These two balanced, quarter-inch jacks serve as the MicroBook's main outputs. You can connect them to a set of powered studio monitors and then control the volume from CuelMix FX software. You can hear the output of your audio software on these Main Outs, and also use CuelMix FX to monitor live MicroBook inputs.

Quick Reference: CueMix FX

Launch CueMix FX (in your Mac Applications folder or in the Windows Start menu under Programs>MOTU>CueMix FX) to control the MicroBook. This chapter gives you a quick overview. For further details, see chapter 7, “CueMix FX” (page 39).



1. Input settings include trim level, mono/stereo toggle, EQ and dynamics. For more input settings (pad, phantom power, etc.) click the Focus button and go to the Channel tab.
2. The MicroBook provides five different stereo mix busses. Use the Mix tab to mix sources (inputs, host computer audio, etc.) for each mix bus. See “The Mixes tab” on page 43.
3. Output settings include choosing what you will hear on each output (a mix bus, inputs, host computer audio, or a signal generator), EQ, and dynamics. See the next page, or “The Outputs tab” on page 44 for more info.
4. Click a focus button (in the Inputs, Outputs, or Mixes tabs) to view individual channel settings here in the Channel, EQ and Dynamics tabs.
5. Control the volume of the MicroBook’s outputs here.
6. Assign outputs to the Monitor group (via the buttons) and control them all here.
7. Monitor Group metering.
8. Signal Generator tab provides settings for white/pink noise and a sine wave generator.
9. Meters for all ins/outs/busses.



1. Click the Outputs tab to access settings for the MicroBooks outputs. For example, you can choose one of five different mixes for each output.
2. Choose the audio source for each output pair from these menus. The MicroBook gives you a lot of flexibility, as shown in the menu to the right. You can choose one of the five mixes, which let you mix inputs with computer audio. Or you can choose an input or computer audio directly (the *From Host* option). A mix can go to as many outputs as you want.

Choosing Sine, White, or Pink produces a sine wave or white/pink noise from the MicroBook's signal generator (item 8 on the previous page).



3. If you want to apply EQ or dynamics processing to the output, click here to enable it and then adjust settings in the channel section (4).
4. Adjust output settings in the EQ and dynamics tabs here. In the EQ tab, click the power icon to enable an EQ band and then either adjust its knobs or drag its settings directly in the graph above.
5. Use this menu to access the sonogram waterfall, real time FFT display, and other diagnostic tools. See "Audio analysis tools" on page 47.

CHAPTER 1 About the MicroBook

Obtaining your MicroBook serial number

The MicroBook holds its serial number electronically in the unit itself. To obtain the serial number, follow the hardware and software installation instructions in this booklet, and then do the following:

- 1 Launch the CueMix FX software.
- 2 Choose Devices menu > MicroBook > Setup.

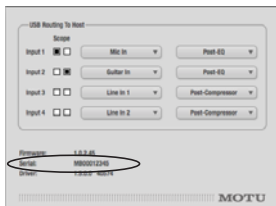


Figure 1-1: The Setup window.

3 The serial number is shown at the bottom of the Setup window, as shown in Figure 1-1.

Overview

The MicroBook is a USB audio interface for Mac and Windows with on-board effects and mixing that offers four inputs and eight outputs for recording and playback at industry standard sample rates of 44.1 or 48 kHz. All inputs and outputs can be accessed simultaneously. The MicroBook consists of a light and small aluminum alloy-encased interface that connects directly to a computer via a standard USB cable.

The MicroBook offers the following main features:

- 4-input, 2-output bus-powered “plug-and-play” USB audio interface for Mac and Windows.
- 4 x 8 physical input/output channels.
- 10-bus digital mixer to route and mix live inputs with live computer tracks.
- Preamp-equipped mic input with Precision Digital Trim™, 48V phantom power, and 20 dB pad.
- Guitar input with 20 dB pad and Precision Digital Trim.
- Stereo line level analog input on balanced quarter-inch (TRS) or stereo mini connectors.
- Stereo line level analog main outs on balanced quarter-inch (TRS) connectors.
- Stereo eighth-inch “mini” line-level out.

- S/PDIF digital out on RCA (duplicates Main Out).
- Headphone output on an eighth-inch stereo “mini” jack with independent volume control.
- Operation on all analog and digital I/O at standard sample rates of 44.1 or 48 kHz.
- Digitally controlled analog trim for the mic and guitar inputs.
- Digital trim for all outputs.
- CueMix™ FX no-latency mixing and monitoring with EQ and dynamics processing.
- 7-band parametric EQ and compression.
- Test tone and white/pink noise generator.
- Advanced audio analysis software tools, including FFT “waterfall” display, oscilloscope, X-Y plot, and phase torch.
- Compatible with all current and recent generation Macs and PCs.
- Mac and Windows drivers for across-the-board compatibility with any audio software.
- Includes AudioDesk™ full-featured audio workstation software for Mac OS X, USB cable, and mic cable adapter.

With a variety of I/O formats, dedicated mic and guitar inputs, and no-latency mixing and processing of live input, the

MicroBook is a complete, portable “studio in a box” when used with a Mac or Windows computer.

Precision Digital Trim™

The MicroBook’s mic and guitar inputs are equipped with digitally controlled analog trims with up to 51 dB and 32 dB of boost, respectively, using the included CueMix FX software for Mac OS X and Windows. This allows you to fine-tune trim settings for optimum levels.

Different trim configurations can then be saved as files on disk for instant recall.

16-bit and 24-bit recording

The MicroBook system handles all data with a 24-bit signal path, regardless of the I/O format. You can record and play back 16-bit or 24-bit audio files at any supported sample rate via any of the MicroBook’s inputs and outputs.

CueMix FX mixing and effects

All MicroBook inputs and outputs can be routed to the on-board CueMix FX 10-bus (5 stereo) digital mixer driven by hardware-based DSP. The mixer allows you to apply no-latency EQ and dynamics processing to inputs, outputs or busses directly in the MicroBook hardware, independent of the computer. Input signals to the computer can be recorded wet, dry, or dry with a wet monitor mix (for musicians during recording, for example).

Effects include parametric EQ and compression/limiting. Standard compression provides conventional threshold, ratio, attack, release, trim, and

knee controls. The 7-band parametric EQ is modeled after British analog console EQs, featuring four filter styles (gain/Q profiles) to effectively cover a wide range of audio material. Low-pass and high-pass filters are also supplied with slopes that range from 6 to 36 dB.

The MicroBook's flexible effects architecture allows you to apply EQ and compression on every input and output.

Mac audio software

The MicroBook system includes a standard Mac OS X CoreAudio driver for multichannel I/O with any audio application that supports CoreAudio, such as the included AudioDesk software and Digital Performer.

Windows audio software

The MicroBook ships with standard Windows drivers that allow you to record, edit, play back and mix your MicroBook projects using your favorite Windows audio software.

CHAPTER 2 Packing List and System Requirements

PACKING LIST

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

- One MicroBook
- One USB cable (Type A to Type B)
- One mic cable plug adapter
- One MicroBook Mac/Windows User Guide
- One cross-platform *Universal Audio Installer* disc
- MicroBook product registration card
- One peel-off sheet of rubber feet

MAC SYSTEM REQUIREMENTS

The MicroBook system requires the following Mac system:

- PowerPC G4 1 GHz Power Mac or faster CPU (including PowerPC G5 CPUs and all Intel processor Macs)
- At least 256 MB (megabytes) of RAM; 512 MB or more is recommended
- Mac OS X version 10.5 or 10.6; 10.5.6 or later is required.
- A large hard drive, preferably at least 100 GB

WINDOWS SYSTEM REQUIREMENTS

The MicroBook system requires the following Windows system:

- Pentium 4 1 GHz Pentium CPU (or AMD equivalent) or faster
- At least 256 MB (megabytes) of RAM; 512 MB or more is recommended
- Windows 7 or Vista
- A large hard drive, preferably at least 100 GB

PLEASE REGISTER TODAY!

Please register your MicroBook today. There are two ways to register.

- Visit www.motu.com/register to register online

OR

- Fill out and mail the included product registration card

As a registered user, you will be eligible to receive 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.

You need your MicroBook serial number to register

To register your MicroBook, you need your unit's serial number. See "Obtaining your MicroBook serial number" on page 14.

Mac users: be sure to register AudioDesk

If you are a Mac user, be sure to register the included AudioDesk software, which must be registered separately. You can do so online at motu.com/register. Doing so will allow you to be eligible to receive technical support and announcements about AudioDesk software enhancements as soon as they become available.

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

OBTAINING YOUR MICROBOOK SERIAL NUMBER

The MicroBook holds its serial number electronically in the unit itself. To obtain the serial number, follow the hardware and software installation instructions in the next two chapters, and then do the following:

- 1 Launch CueMix FX.
- 2 Choose Devices menu> MicroBook> Setup.

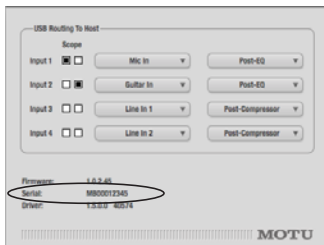


Figure 2-1: The Setup window.

- 3 The serial number is shown at the bottom of the Setup window, as shown in Figure 2-1.

CHAPTER 3 Installing the MicroBook Hardware

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WINDOWS USERS: INSTALL THE SOFTWARE FIRST

If you are using the MicroBook with a Windows computer, installation goes much more smoothly if you install the MicroBook software before you connect the MicroBook hardware. Proceed to chapter 4, “Installing the MicroBook Software” (page 21) first, and then return to this chapter to then proceed with the hardware installation.

CONNECT THE MICROBOOK INTERFACE

- 1 Plug the MicroBook USB cable (included) into a USB socket on the computer as shown below in Figure 3-1.
- 2 Plug the other end of the USB cable into the MicroBook as shown in Figure 3-1.



Figure 3-1: Connecting the MicroBook to the computer.

CONNECT AUDIO INPUTS AND OUTPUTS

Here are a few things you should keep in mind as you are making input and output connections to other devices.

Mic input with preamp

Connect a dynamic or condenser microphone to the mic input (Figure 3-2) with a standard mic cable. If the cable has a quarter-inch plug, connect it directly. If it has a male XLR plug, use the female-XLR-to-quarter-inch adapter included with the MicroBook.

☛ The mic cable adapter supplied with the MicroBook is wired specifically for the MicroBook mic input, so do not use a substitute, unless you are certain it is wired as shown in Appendix B, “Mic Adapter Pin-outs” page (51).

☛ Do not connect a +4 (line level) input to the mic input (because it will overdrive the preamp).

Phantom power

If you are connecting a condenser microphone or other device that requires 48V phantom power, you can enable phantom power for the mic input using the MicroBook’s CueMix FX software (Figure 3-4). See “Input settings” on page 17.



☛ Make sure 48V power is turned OFF *before* plugging anything in to the mic input. Only engage 48V power

when a device that requires it is plugged in. Never enable 48V power when a tip/sleeve (unbalanced) plug is connected to the mic input.

20 dB pad

If the input signal is still too hot with the trim turned all the way down, engage the 20dB pad button in the CueMix FX Channel tab (Figure 3-4). See “Input settings” on page 17.

Guitar input

Plug in your guitar to the guitar input (Figure 3-2). For ultra-realistic sound and feel when producing guitar tones with virtual guitar processing software (amp modeling, cabinet modeling, virtual effects pedals, etc.), consider using MOTU’s ZBox guitar impedance adapter (sold separately), which adds proper impedance characteristics that cannot be modeled in software. Visit motu.com for details.

Line level inputs

The quarter-inch analog line level inputs 3-4 (Figure 3-3) are balanced (TRS) connectors that can also accept an unbalanced plug. Alternately, you can use

Figure 3-2: MicroBook front panel



the eighth-inch stereo mini plug for line level input (from an iPod or other source).

Do not use the stereo mini input and quarter-inch inputs at the same time. If you are using the mini jack, unplug the quarter-inch jacks. If you are using the quarter-inch jacks, unplug the mini jack.

Trim

The mic and guitar inputs are equipped with 51 dB and 32 dB (respectively) of digitally controlled analog trim (boost). The line inputs can also be trimmed. You can adjust the trim level for each input in the MicroBook's CueMix FX software. See "Input settings" on page 17.

Input metering while adjusting trim

In the CueMix FX software, use the long-throw, horizontal input level meter at the top of the channel settings section (Figure 3-4) to calibrate the level.

Input settings

To access input channel settings such as 48V phantom power, pad and trim, launch the MicroBook's CueMix FX software and follow this procedure:

1 Click the Inputs tab (as shown on page 7).

2 Click the Focus button for the desired input channel.

3 Click the Channel tab (Figure 3-4) to access the channel's input settings.



Figure 3-4: Input settings in CueMix FX.

Main outs

In a standard studio configuration, the main outs (Figure 3-3) are intended for a pair of studio monitors, but they can also be used as outputs for any purpose. The quarter-inch main outs are calibrated to produce a +4 dBu line level output signal.

Line out

You can use the eighth-inch stereo mini line out jack for output to desktop speakers or any other line level destination.

Figure 3-3: MicroBook back panel



Digital out

The S/PDIF RCA “digital out” connector provides stereo digital audio output to another device: the S/PDIF output always mirrors the Main Outs.

BUS POWER

Bus power requirements

The MicroBook draws all the power it needs from the USB bus connection to the computer. However, the USB connection to the computer must meet all of the requirements discussed below.

USB adapter products must be powered

If you are using a USB adapter or hub (a third-party product that supplies one or more USB ports to your computer), it must have direct access to a power supply:

■ **PCI USB cards** — If you plan to connect the MicroBook to a PCI card and run the MicroBook under bus power, the PCI card must have a direct connection to the power supply harness inside your computer. This is the same power supply harness to which you connect internal hard drives, CD/DVD drives, etc.

■ **PCMCIA, Cardbus or ExpressCard slot adapters** — If you plan to connect the MicroBook to a PC card, Cardbus or ExpressCard USB adapter (inserted in the card slot in your laptop), it must provide a powered connection and it must also have its own power supply. Most commonly, these types of products have a DC power adapter that plugs into an AC wall outlet. As you can see,

however, this situation does not allow for remote battery operation, as the card adapter requires AC.

Examples of bus-powered operation

Here are a few typical examples of bus-powered MicroBook operation:

Bus power from a desktop computer

Your desktop computer is running off of its usual AC power connection, and the MicroBook draws power from the USB cable connected to the computer. There are no limits to running time.

Bus power from an AC-powered laptop

This scenario is identical to the desktop situation described above: the laptop is powered by AC, the MicroBook is powered via the USB bus and there are no limits to running time.

Bus power from a battery-powered laptop

The laptop is being powered by its own battery, and the MicroBook is being powered by its USB connection to the computer, so the laptop battery is supplying power to both the laptop and the MicroBook. This is the most compact and portable operating scenario. Running time is determined by the capacity of the laptop battery. For extended recording sessions, bring extra, fully charged laptop batteries.

A TYPICAL MICROBOOK SETUP

Here is a typical MicroBook studio setup. This rig can be operated without an external mixer. All mixing and processing can be done either in the MicroBook, in the computer with audio software, or both. During recording, you can use the

MicroBook's CueMix™ FX mixer to apply EQ and compression to what you are recording and monitor it via the main outs, headphone outs, or any other output pair. You can control everything from the included CueMix FX software.



Figure 3-5: A typical MicroBook studio setup.

CHAPTER 4 Installing the MicroBook Software

MAC SOFTWARE INSTALLATION

To install the MicroBook software:

- 1 Insert the MOTU Universal Installer disc and launch the installer.
- 2 Follow the directions that the installer gives you.

What does the installer do?

The installer checks the computer to make sure it satisfies the minimum system requirements for your MOTU interface. If so, the installer proceeds with the Mac OS X installation. Drivers are installed, along with the CueMix FX application.

WINDOWS SOFTWARE INSTALLATION

Before you connect the MicroBook audio interface to your PC and turn it on, insert the MOTU Audio installer disc and run the MicroBook Installer. This ensures that all the MicroBook components are properly installed in your system.

If Windows asks you to locate the drivers

If you've already connected the MicroBook to your computer and switched it on, Windows probably issued an alert notifying you that the MicroBook requires drivers, followed by another window asking you to locate the drivers on disk. If this happens:

- 1 Cancel the driver search.

- 2 Switch off the MicroBook.
- 3 Run the MicroBook Software Installer as instructed in the next section.

Installing the MicroBook software

To install the MicroBook software, insert the MOTU Audio installer disc and follow the directions it gives you on your computer screen. Also be sure to read the Read Me file for installation assistance.

CUEMIX FX

The CueMix FX application provides a mixing console that gives you control over the MicroBook's on-board mixing, EQ and dynamics processing. It also provides access to all MicroBook settings. For details, see chapter 7, "CueMix FX" (page 39).

AUDIODESK WORKSTATION SOFTWARE (MAC ONLY)

AudioDesk is an advanced digital audio workstation software package for the MicroBook that lets you record, edit, mix, process, bounce and master multi-track digital audio recording projects. Advanced features include real-time 32-bit effects processing, 24-bit recording, and much more.

See the *AudioDesk User Guide* PDF manual for details.

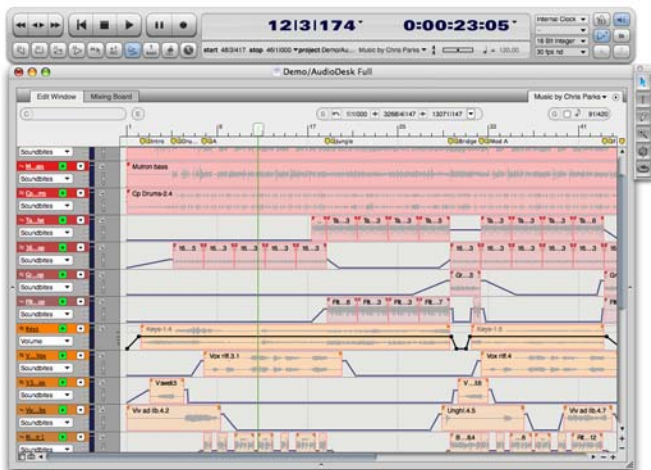


Figure 4-1: AudioDesk for Mac OS X.

CHAPTER 5 Mac OS X Audio Software

OVERVIEW

The MicroBook provides audio input and output for all Mac OS X Core Audio applications, including AudioDesk, Digital Performer, Apple's Logic Pro, Logic Express, SoundTrack Pro, and GarageBand. Other third-party software applications are also supported, such as Ableton Live, Propellerhead Reason, Steinberg Cubase and others.

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INSTALLING THE MICROBOOK MAC OS X DRIVERS

To install the MicroBook's Mac OS X audio drivers, just run the installer on the MOTU Audio installer disc as detailed in chapter 4, "Installing the MicroBook Software" (page 21).

RUNNING CUEMIX FX

Before you run your host audio software, launch CueMix FX to configure your MicroBook hardware. Running CueMix

FX confirms that the MicroBook hardware is connected, powered up, and functioning normally. It also lets you configure the MicroBook's inputs and outputs. For a quick overview, see chapter , "Quick Reference: CueMix FX" (page 7). For further details about the MicroBook settings, see chapter 7, "CueMix FX" (page 39).



Figure 5-1: CueMix FX.

CHOOSING THE MICROBOOK DRIVER

Once you've made the preparations described so far in this chapter, you're ready to run your audio software and enable the MOTU MicroBook Core Audio driver. Check the audio system or audio hardware configuration window in your software. There will be a menu there that lets you choose among various drivers that may be in your system. Choose the MOTU MicroBook from this menu, as discussed in the following sections.

AudioDesk

Choose the MicroBook as your audio input/output device by choosing *MOTU Audio System options > Configure Hardware Driver* from the Setup menu. This window shows MicroBook settings such as sample rate and clock source.

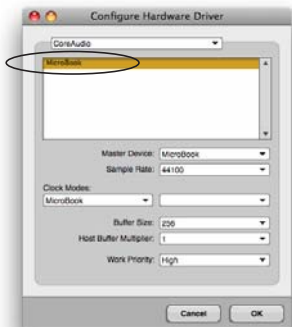


Figure 5-2: Enabling the MicroBook in AudioDesk.

Exchanging projects with Digital performer

To open AudioDesk Version 3 (or Version 1 or 2) files in Digital Performer, just use DP's *File menu > Open* command. (No conversion is required beforehand in AudioDesk.) To export a Digital Performer project to AudioDesk, use *Save A Copy As* in Digital Performer's File menu and choose the *AudioDesk 3.0* file format. Then open the resulting AudioDesk 3.0 document in AudioDesk.

Digital Performer

Choose the MicroBook as your audio input/output device by choosing *Configure Audio System > Configure Hardware Driver* from the Setup menu. This window shows MicroBook settings such as sample rate and clock source.

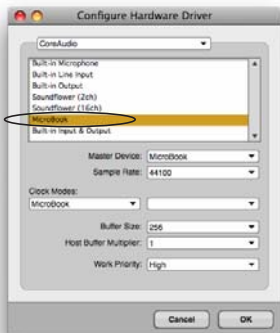


Figure 5-3: Enabling the MicroBook in Digital Performer.

Exchanging projects with AudioDesk Digital Performer can exchange projects with AudioDesk. To open an AudioDesk project in Digital Performer, open it in same way you would a DP project. To export a project to AudioDesk, use DP's *File menu > Save A Copy As* command and choose the AudioDesk 3.0 file format.

Logic Pro and Logic Express

In Logic Pro and Logic Express, go to the Preferences window, click the *Audio* tab, click the *Drivers* tab and click the *Core Audio* tab as shown in Figure 5-4. Choose the *MOTU MicroBook* from the Driver menu. For information about the *I/O Buffer Size* setting, see “Adjusting the audio I/O buffer” on page 34.



Figure 5-4: Enabling the *MicroBook* in Logic Pro or Logic Express.

Soundtrack Pro

In Soundtrack Pro, access the preferences window, click the *Recording* tab and choose *MOTU MicroBook* from the *Input* and *Monitor* menus as shown below in Figure 5-5.

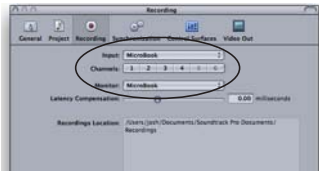


Figure 5-5: Enabling the *MicroBook* in Soundtrack Pro.

Garage Band

In Garage Band, go to the *Audio/MIDI* preferences and choose *MOTU MicroBook* from the *Audio Output* and *Audio Input* menus (Figure 5-6). For information about the *Optimize for* setting, see “Adjusting the audio I/O buffer” on page 34.



Figure 5-6: Enabling the *MicroBook* in Garage Band.

Cubase and Nuendo

Go to the *Devices* menu and choose *Device Setup*. Click the *VST Audio System* item in the *Devices* list and choose *MOTU MicroBook* from the *Master ASIO Driver* menu as shown below in Figure 5-7. Activate the inputs and outputs within Cubase or Nuendo as usual. For information about the *Audio Buffer Size* setting, see “Adjusting the audio I/O buffer” on page 34.



Figure 5-7: Enabling the *MicroBook* audio driver in Cubase.

Managing inputs and outputs

To manage MicroBook inputs and outputs, select *MOTU MicroBook ASIO* in the left-hand section (Figure 5-8).



Figure 5-8: Working with MicroBook inputs and outputs in Cubase or Nuendo

Live

In Ableton Live, access the preferences window and click the *Audio* tab. Choose *CoreAudio* from the *Driver Type* menu. Choose the *MOTU MicroBook* from the *Input Audio Device* and *Output Audio Device* menus (Figure 5-9). For information about the *Buffer Size* setting, see “Adjusting the audio I/O buffer” on page 34.



Figure 5-9: Enabling the MicroBook in Live.

Reason and Record

In Propellerhead Reason and Record, go to the Preferences window, choose *Audio* preferences from the menu and choose *MOTU MicroBook* from the *Audio Output* menu as shown below in Figure 5-10. For information about the *Buffer Size* setting, see “Adjusting the audio I/O buffer” on page 34.

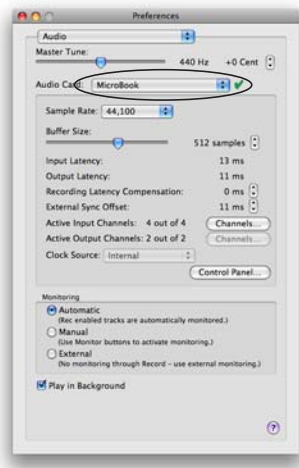


Figure 5-10: Enabling the MicroBook in Reason.

Other audio software

For other audio applications, the procedure is similar to that shown above. Consult your owner’s manual for further information.

SAMPLE RATE

Choose the desired overall sample rate for the MicroBook system and your host software. Newly recorded audio will have this sample rate.

CLOCK SOURCE

Some host software may have a “clock source” setting. For the MicroBook, there is only one choice for clock source: *Internal*.

BUFFER SIZE

Most host applications provide a *Buffer* setting, which can be adjusted to reduce the delay — or *monitoring latency* — that you hear when live audio is patched through your host software. For example, you might have a mic, guitar, and MIDI synth connected to the analog inputs of the MicroBook. If so, you will often be mixing their live input with audio material recorded in your host software. See “Monitoring live input” below.

INPUTS AND OUTPUTS

Once you’ve enabled the MicroBook’s Core Audio driver, MicroBook audio inputs and outputs will appear in your host software wherever audio inputs and outputs are listed.

PROCESSING LIVE INPUTS WITH HOST-BASED EFFECTS PLUG-INS

If you patch a live input (such as a microphone or guitar) through a plug-in effect in your host software, you might hear a slight delay. There are several ways

to reduce this delay. For details, see chapter 7, “Reducing Monitoring Latency” (page 33).

WORKING WITH CUEMIX FX MIXING AND EFFECTS

The MicroBook provides powerful external mixing, EQ and compression, which you can operate hand-in-hand with your host’s mixing environment. For example, the MicroBook can serve as a monitor mixer routing channels to musicians, or it can serve as an integrated extension of your host’s mixing environment. If you program a MicroBook mixing and processing configuration that goes hand in hand with your host project, be sure to use the configuration export features in CueMix FX to save the MicroBook settings as a file in your host project folder for instant recall of all settings. See chapter 7, “CueMix FX” (page 39) for complete details.

☛ In Digital Performer, you can set up your MicroBook configuration file as a DP startup clipping so that it automatically loads when you open the project. Refer to the *Digital Performer User Guide* for details.

24-BIT OPERATION

Your MicroBook hardware fully supports 24-bit recording with host software that also supports 24-bit operation. Consult the documentation for your host software for further information about enabling 24-bit operation.

MONITORING LIVE INPUT

There are two ways to monitor live audio input with a MicroBook:

- 1 Through the computer
- 2 Via the MicroBook CueMix FX hardware mixer

Figure 5-11 below shows method #1, which allows you to apply host-based effects processing via plug-ins in your audio software. See the next section,

“Adjusting the audio I/O buffer” for details about how to reduce or eliminate the audible monitoring delay that the computer introduces.

Figure 5-12 on page 29 shows method #2. CueMix FX hardware-based monitoring lets you hear what you are recording with no monitoring delay and no computer-based effects processing. Rather, input is routed directly to an output, either with or without MicroBook-based effects processing (EQ or compression). See

1. Live input (from mic, guitar, etc.) enters the MicroBook.

2. Mic signal goes immediately to the computer.

3. Mic signal is ‘patched thru’ back to the audio interface with host-based plug-in effects, if any.

4. Mic signal (with plug-in processing, if any) is routed to the main outs (or other outputs that you’ve specified in the software).

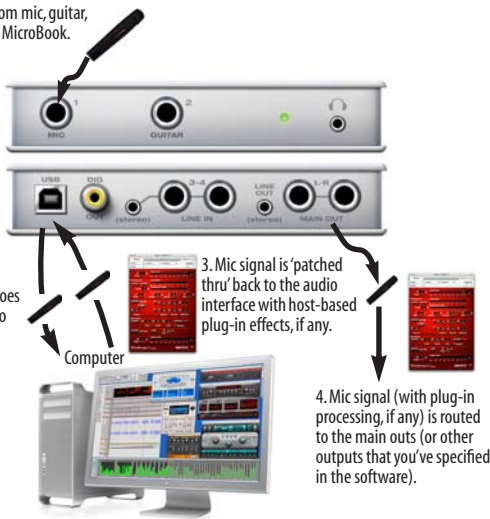


Figure 5-11: There are two ways to monitor live audio inputs with a MicroBook: 1) through the computer or 2) via CueMix FX hardware monitoring. This diagram shows method 1 (through the computer). When using this method, use your host software’s buffer setting to reduce the slight delay you hear when monitoring the live input, but don’t lower it too much, or your computer might get sluggish.

“CueMix FX hardware monitoring” later in this chapter for details on how to use CueMix FX with your audio software, or with CueMix FX.

If the material you are recording is suitable, there is a third way to monitor live input: use both methods (Figure 5-11 and Figure 5-12) at the same time. For example, you could route guitar to both the computer (for an amp model effect) and mix that processed signal on the main outs with dry guitar from CueMix FX.

ADJUSTING THE AUDIO I/O BUFFER

A *buffer* is a small amount of computer memory used to hold data. For audio interfaces like the MicroBook, buffers are used for the process of transferring audio data in and out of the computer. The size of the buffers determines how much delay you hear when monitoring live inputs through your audio software: larger buffers produce more delay; smaller buffers produce less.

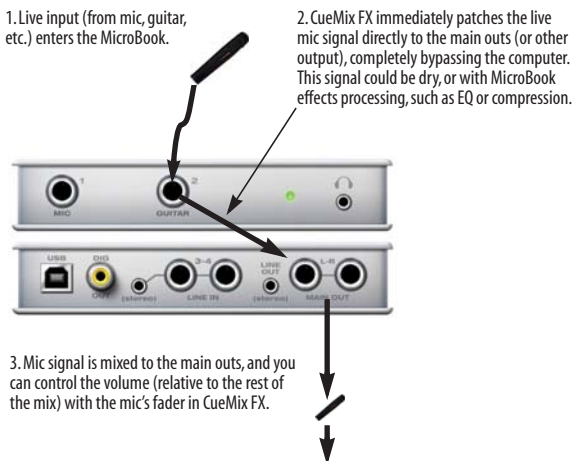


Figure 5-12: This diagram shows the signal flow when using CueMix FX no-latency monitoring. Notice that this method does not process the live input with plug-ins in your audio software. Instead, you can apply MicroBook effects, such as the EQ and/or compression.

Under Mac OS X, audio I/O buffer size is handled by the host audio application (not the MicroBook 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. Below are a few examples. For more examples, see chapter 5, "Mac OS X Audio Software" (page 23).

Digital Performer

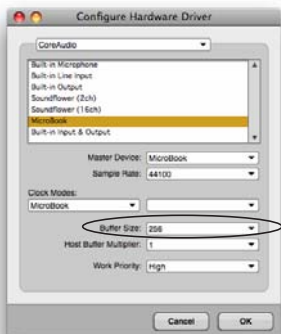


Figure 5-13: In *Digital Performer* and *AudioDesk*, choose *Setup* menu > *Configure Audio System* > *Configure Hardware Driver* to open the dialog shown above and access the *Buffer Size* setting. Refer to your *Digital Performer* or *AudioDesk* user guide for information about the *Host Buffer Multiplier* setting.

Cubase

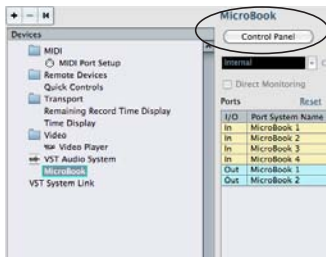


Figure 5-14: In *Cubase* or *Nuendo*, choose *Devices* menu > *Device Setup* and select the *MicroBook* to access the window above and the *Audio Buffer Size* setting (via the *Control Panel* button).

Logic

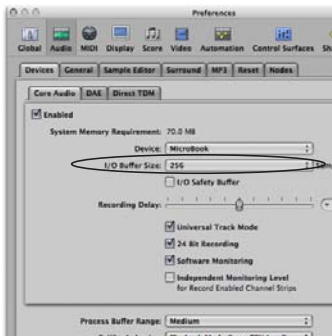


Figure 5-15: In *Logic Pro* or *Logic Express*, go to the *Audio Driver* preferences to access the *I/O Buffer Size* option shown above.

Lower latency versus higher CPU overhead

The buffer setting has a large impact on the following things:

- Patch thru latency
- The load on your computer's CPU
- Possible distortion at the smallest settings
- How responsive the transport controls are in your host audio software

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 patch thru latency, but may 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.

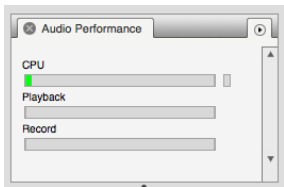


Figure 5-16: When adjusting the buffer size to reduce monitoring latency, watch the 'processor' meter in *Digital Performer* or

AudioDesk'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, but barely enough to notice.

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.

CUEMIX FX HARDWARE MONITORING

The MicroBook has a more direct method of patching audio through the system. This method employs the MicroBook's *CueMix FX* digital mixer. When enabled, *CueMix FX* activates hardware patch-thru in the MicroBook itself. *CueMix FX* has two important benefits:

- It completely eliminates the patch thru delay (reducing it to a small number of samples — about the same amount as one of today’s advanced digital mixers).
- CueMix FX imposes no strain on the computer.

The trade-off, however, is that CueMix FX bypasses your host audio software. Instead, live audio inputs are patched directly through to outputs in the MicroBook itself and are mixed with disk tracks playing back from your audio software. This means that you cannot apply host-based plug-ins, mix automation, or other real-time effects that your audio software provides. But for inputs that don’t need these types of features, CueMix FX is the way to go.

On the other hand, if you really need to use the mixing and processing provided by your audio software, you should not use CueMix FX. Instead, reduce latency with the buffer setting (as explained earlier in this chapter).

Using CueMix FX

The CueMix FX software manages your monitor mix and runs side-by-side with your host audio software.

CueMix FX allows you to create up to five separate MicroBook stereo mixes, or any other desired routing configurations. These routings are independent of your host audio software. For complete details, see chapter 7, “CueMix FX” (page 39).

CHAPTER 6 Windows Audio Software

OVERVIEW

The MicroBook includes an ASIO driver that provides multi-channel I/O with ASIO-compatible hosts such as Cubase, Nuendo, SONAR, Live, Reason, and more.

A standard Windows audio driver is also included for multi-channel audio input and output for any audio application that supports Windows multimedia audio drivers.

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ABOUT THE ASIO DRIVER

ASIO is an acronym for *Audio Streaming Input and Output*. The MOTU MicroBook ASIO driver provides multi-channel audio input and output for any audio application that supports ASIO drivers.

Attention: other software users

A number of popular ASIO-compatible applications are shown in this chapter. However, the basic procedures are the same and can be easily applied to any ASIO-compatible software. Just follow the general descriptions at the beginning of each main section in this chapter. Consult your software documentation for details about each topic, if necessary.

ABOUT THE WINDOWS AUDIO DRIVER

The MOTU Windows audio driver allows the MicroBook to provide multi-channel audio input and output for any audio application that supports Windows multimedia audio drivers.

Attention: other software users

SONAR is used for the Windows driver setup examples in this chapter. However, the basic procedures are similar and can be easily applied to any Windows multimedia driver-compatible software. Consult your software documentation, if necessary.

INSTALLING THE MICROBOOK WINDOWS DRIVERS

To install the MicroBook's Windows audio drivers, just run the installer on the MOTU Audio installer disc as detailed in chapter 4, "Installing the MicroBook Software" (page 21).

RUNNING CUEMIX FX

Before you run your host audio software, launch CueMix FX to configure your MicroBook hardware. Running CueMix FX confirms that the MicroBook hardware is connected, powered up, and functioning normally. It also lets you configure the MicroBook's inputs and outputs. For a quick overview, see chapter , "Quick Reference: CueMix FX" (page 7).



Figure 6-1: CueMix FX.

For further details about the MicroBook settings, see chapter 7, "CueMix FX" (page 39). The following sections provide a brief explanation of each MicroBook setting for use with a number of popular Windows audio applications.

CHOOSING THE MICROBOOK DRIVER

Once you've made the preparations described so far in this chapter, you're ready to run your audio software and enable the MOTU MicroBook ASIO or Windows multimedia driver. Check the audio system or audio hardware configuration window in your software. There will be a menu there that lets you choose among various drivers that may be in your system. Choose the MOTU MicroBook ASIO or Windows multimedia driver from this menu.

Cubase and Nuendo

To activate the MicroBook driver in Cubase or Nuendo, go to the Device Setup window, choose *VST Audio System* and select *MOTU MicroBook ASIO* from the *ASIO Driver* menu (Figure 6-2). Make the other settings in the dialog as need for your system.

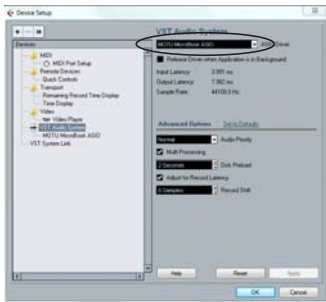


Figure 6-2: Activating the MicroBook ASIO driver in Cubase and Nuendo.

Managing inputs and outputs

To manage MicroBook inputs and outputs, select *MOTU MicroBook ASIO* in the left-hand section (Figure 6-3).

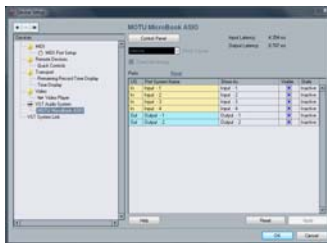


Figure 6-3: Working with MicroBook inputs and outputs in Cubase or Nuendo.

Live

In Ableton Live, access the preferences window and click the *Audio* tab. Choose *ASIO* from the *Driver Type* menu. Choose the *MOTU MicroBook ASIO* from the *Audio Device* menu (Figure 6-4).



Figure 6-4: Enabling the MicroBook in Live.

Reason and Record

In Propellerhead Reason and Record, go to the Preferences window, choose *Audio* preferences from the menu and choose *ASIO MOTU MicroBook ASIO* from the *Audio Card Driver* menu as shown below in Figure 6-5.

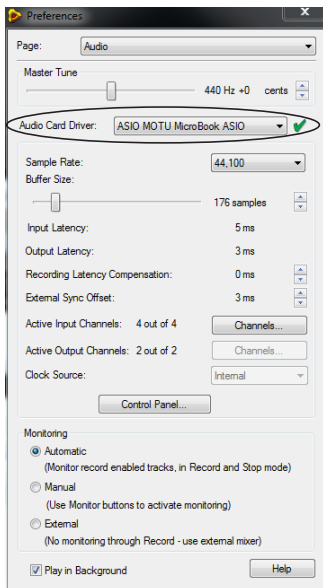


Figure 6-5: Enabling the MicroBook in Record.

SONAR

ASIO driver activation

Go to Options menu > Audio and select the Advanced tab. Choose *ASIO* from the *Driver Mode* menu:

- 1 Choose *Audio* from the Options menu.
- 2 Click the *General* tab.
- 3 Choose *ASIO* from the Driver Mode menu, as shown in Figure 6-6.

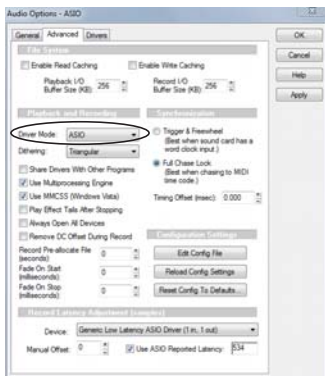


Figure 6-6: Enabling the ASIO driver in SONAR.

- 4 Click the *Drivers* tab.
- 5 Check the MicroBook inputs and outputs that you wish to use, and uncheck the ones you don't, as shown in Figure 6-7.

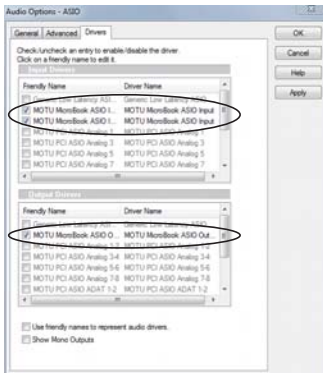


Figure 6-7: Activating the MOTU audio ASIO driver in SONAR by highlighting MicroBook inputs and outputs.

• You can only use one audio interface at a time under ASIO. To use multiple audio interfaces, use the Windows multimedia driver as described below.

Windows multimedia driver activation

As an alternative to the MicroBook's ASIO driver, you can use the MicroBook's Windows multimedia driver.

To activate the MicroBook Windows multimedia driver in SONAR choose *WDM/KS* instead of *ASIO* from the Driver Mode menu, as shown in Figure 6-6.

Other audio settings in SONAR

There are a few other settings in SONAR that impact MicroBook operation:

1 In the Audio Options window, click the *General* tab.

2 Choose a MicroBook input and output for recording and playback timing as shown below in Figure 6-8. It doesn't matter which input or output you choose.

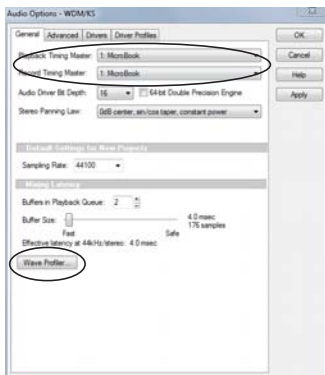


Figure 6-8: Make sure you have chosen a MicroBook input and output for the playback and recording timing master settings.

If you are using the WDM/KS driver, go to the General tab and click the Wave Profiler button to run the Wave Profiler. This process chooses the optimum settings for the MicroBook hardware.

SAMPLE RATE

Choose the desired overall sample rate for the MicroBook system in your host audio software. Newly recorded audio will have this sample rate.

CLOCK SOURCE

Some host software may have a “clock source” setting. For the MicroBook, there is only one choice for clock source: *Internal*.

INPUTS AND OUTPUTS

Once you've enabled the MicroBook's driver, MicroBook audio inputs and outputs will appear in your host software wherever audio inputs and outputs are listed.

WORKING WITH CUEMIX FX MIXING AND EFFECTS

The MicroBook provides powerful external mixing, EQ and compression, which you can operate hand-in-hand with your host software's complete mixing environment. For example, the MicroBook can serve as a monitor mixer routing channels to musicians, or it can serve as an integrated extension of your digital audio workstation's mixing environment. If you program a MicroBook mixing and processing configuration that goes hand in hand with your digital audio workstation's project, be sure to use the file save features in CueMix FX to save the MicroBook settings as a file in the same folder as your digital audio workstation's project file for instant recall of all settings. See chapter 7, “CueMix FX” (page 39) for complete details.

24-BIT OPERATION

Your MicroBook hardware fully supports 24-bit recording capabilities. Simply enable 24-bit operation as instructed in your digital audio workstation's manual. The MicroBook always supplies a 24-bit data stream.

CHAPTER 7 CueMix FX

OVERVIEW

CueMix FX is a cross-platform software application that provides graphic, on-screen control for the MicroBook's flexible CueMix FX on-board mixer and effects processing.

For more information

For complete information about CueMix FX, refer to the CueMix FX PDF manual, which is placed on your hard drive by the MicroBook installer.

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A 10-BUS MIXER WITH EQ AND COMPRESSION

All MicroBook inputs and outputs can be mixed and controlled by the on-board CueMix FX 10-bus (5 stereo bus) digital mixer driven by hardware-based DSP.

The CueMix FX mixer allows you to apply no-latency EQ and dynamics to inputs and outputs directly in the MicroBook hardware, independent of the computer. Input signals to the computer

can be recorded wet, dry, or dry with a wet monitor mix (for musicians during recording, for example).

Effects include:

- 7-band parametric EQ modeled after British analog console EQs
- A standard compressor with conventional threshold, ratio, attack, release, and gain controls

The MicroBook's flexible effects architecture allows you to apply seven bands of EQ and compression on every input and output simultaneously.

CUEMIX FX VERSUS HOST MIXING

CueMix FX provides several major advantages over mixing and processing in your host audio software:

- CueMix FX has no buffer latency. Thanks to the MicroBook's DSP chip, CueMix FX provides the same throughput performance as a digital mixer.
- CueMix FX mixing and effects processing imposes no processor drain on the computer's CPU.
- CueMix FX routing can be maintained independently of individual software applications or projects.

CUEMIX FX INSTALLATION

CueMix FX is installed with the rest of your MicroBook software.

CUEMIX FX BASIC OPERATION

Here is a brief overview of the *CueMix FX* mixer.

Five stereo mix busses

CueMix FX provides five stereo mix busses: Mix 1, Mix 2, Mix 3, and so on. Each mix bus can take any number of inputs and mix them together into a

single stereo audio stream that you can then assign to any MicroBook output pair — or combination of output pairs — that you choose. For example, Mix 1 could go to the headphones, Mix 2 could go to the main outs, Mix 3 could go to a piece of outboard gear connected to analog outputs 3-4, and so on. You can also assign a mix to multiple output pairs. For example, you could assign Mix 1 to the Main Out, Phones, and Line Out.

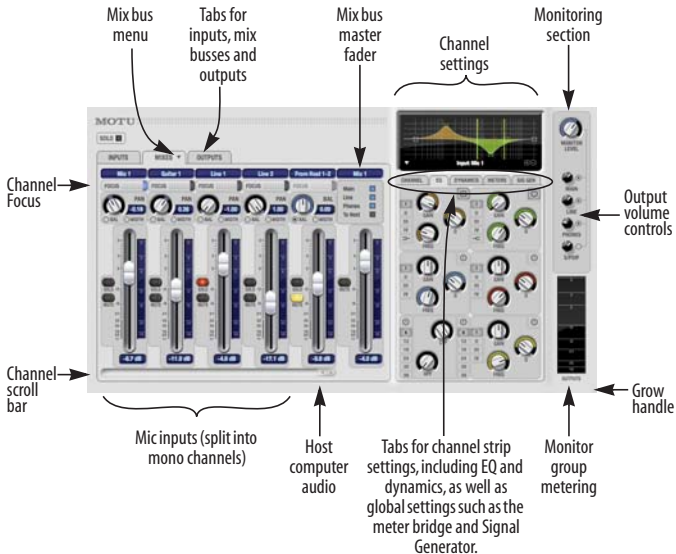


Figure 7-1: CueMix FX is a virtual mixer that gives you control over the MicroBook's on-board mixing features.

Viewing one mix bus at a time

CueMix FX displays one mix bus at a time in the *Mixes* tab (Figure 7-1 on page 40). To select which mix you are viewing, choose it from the mix bus menu. The mix name appears above the mix bus master fader, where you can click the name to change it.

Each mix bus is independent

Each mix bus has its own settings. Settings for one bus will not affect another. For example, if an input is used for one bus, it will still be available for other busses. In addition, inputs can have a different volume, pan, mute and solo setting in each bus.

Input channels

The *Inputs* tab (Figure 7-2 on page 42) gives you access to settings for individual MicroBook inputs (or input pairs), such as phase, trim, EQ and dynamics processing. These settings are applied to the signal before it goes anywhere else (to a mix bus or the computer).

Output channels

The *Outputs* tab (Figure 7-4 on page 44) gives you access to settings for each MicroBook output pair, including EQ and dynamics processing. These settings are applied to the signal just before it is sent to the output.

Channel focus and settings

Click the focus button for a channel (Figure 7-1) to view channel-specific parameters in the Channel Settings section of the CueMix FX window (Figure 7-1). Separate tabs are provided for channel-specific settings (channel strip, EQ and dynamics), plus the global meter bridge and signal generator.

Output volume controls

The *Monitoring* section (Figure 7-1) provides independent volume control for all of the MicroBook's outputs. The *Monitor Level* knob at the top of the monitoring section lets you control multiple outputs simultaneously: just enable the button to the right of each volume knob you wish to include in the Monitor Level group.

Other features

CueMix FX offers many additional features, such as extensive metering, graphic editing of certain effects parameters, monitor grouping and more. For complete information, refer to the CueMix FX PDF manual, which is placed on your hard drive by the MicroBook installer.

Widening the CueMix FX window

To view more input faders at once, resize the window.

THE INPUTS TAB

Click the *Inputs* tab (Figure 7-2) to access and control all of these input channel settings for each MicroBook input or

input pair. Use the Focus button (Figure 7-2) to access the Channel, EQ, and dynamics tab settings for each input.

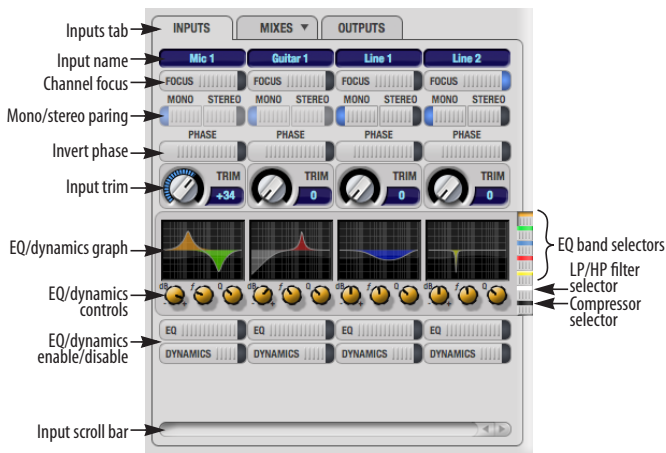


Figure 7-2: The Inputs tab.

The Channel tab.



The EQ tab.



The Dynamics tab.



THE MIXES TAB

Click the *Mixes* tab (Figure 7-3) to gain access to the MicroBook's five stereo mix busses. The Mixes tab displays one mix bus at a time: choose each mix from the *Mix bus menu* in the tab itself. Each fader represents an input to the mix, except the fader on the right, which is the master fader for the mix. To assign each mix to a MicroBook output, visit the *Outputs* tab.

From Host 1-2

Inputs consist of physical inputs on the MicroBook interface (mic, guitar, etc.), but there is also a stereo input channel for

From Host 1-2. This is the audio playing from your host audio software. By bringing up this fader, you can combine live inputs (mic, guitar, and line 1-2) with any audio from the computer.

Stereo grouping

The input channel strips in the Mixes tab can represent either a mono input channel or a stereo pair. This is controlled by their grouping in the Inputs tab. So if you want to change the configuration from mono to stereo, or vice versa, do so using the Mono/Stereo buttons in the Inputs tab (Figure 7-2).

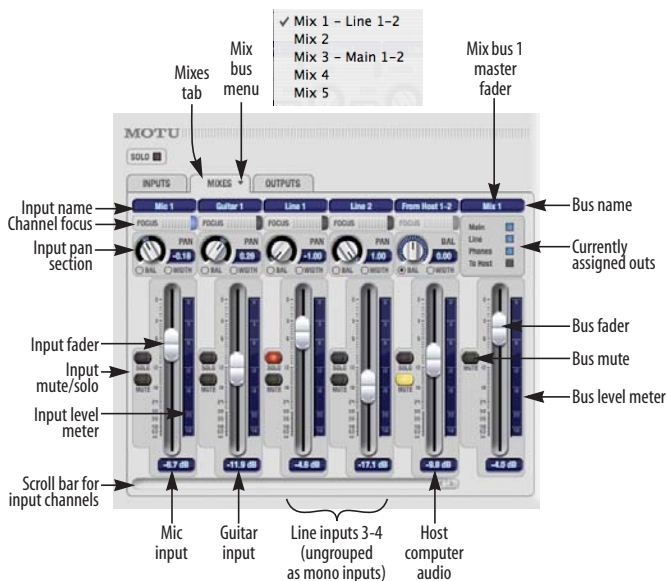


Figure 7-3: The Mixes tab.

THE OUTPUTS TAB

The *Outputs* tab (Figure 7-4) lets you apply EQ and dynamics to any output pair, just before the signal leaves the MicroBook. This is processing that occurs at the very end of the signal flow, after everything else (host based effects, MicroBook input or bus processing, mixing, and so on). Processing is done in the digital domain, just before the signal goes analog through the D/A converter. Output tab processing is applied to the entire output mix (all signals being mixed to the output from various sources).

Signal flows from top to bottom

Settings in each Output tab channel strip are applied to the signal in order from top to bottom. For example, EQ occurs before Dynamics.

Output channel focus

Click the channel focus button (Figure 7-4) to view and edit parameters, such as EQ and dynamics, in the Output Settings section of the CueMix FX window.

Output source

Choose the *Source* for the audio output. The source can be one of the MicroBook's inputs, a mix bus (which can have multiple sources itself), or the MicroBook's signal generator.

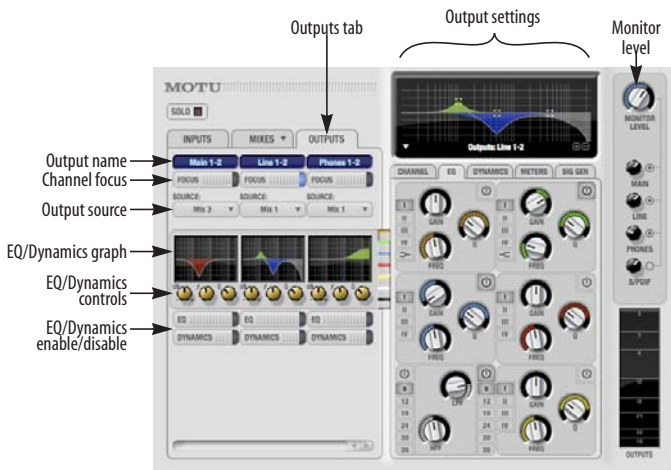


Figure 7-4: The Outputs tab.

THE METERS TAB

The *Meters* tab (Figure 7-5) serves as a comprehensive meter bridge for all inputs, outputs and mix busses in the MicroBook, giving you a “bird’s-eye” view of all signal activity.

Channel meter display

The *channel meter display* (Figure 7-5) provides a long-throw meter for the input or output that currently has the focus in the Input/Output tabs.

Pre/post processing switch

The *pre/post processing* switch (Figure 7-5) affects all input meters (and the meter in the channel meter display above the tab, if this area is displaying an input meter). Click *Pre* to view levels *before* any input channel processing besides trim; click *Post* to view levels *after* all channel processing (EQ, compression, M/S decoding, L/R swap, etc.)

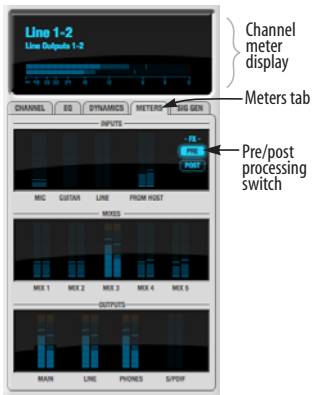


Figure 7-5: The Meters tab.

THE SIGNAL GENERATOR TAB

The *Signal Generator* tab (Figure 7-6) provides settings for the Sine Wave generator (frequency and amplitude) and the White/Pink noise generators (amplitude). Use the Output Source menus in the Outputs tab (Figure 7-4) to choose the desired output(s) for these test signals.



Figure 7-6: The Signal Generator tab.

USB ROUTING TO HOST

Choose *Devices menu > MicroBook > Setup* to access the *USB Routing To Host* settings below (Figure 7-7). The MicroBook sends four channels of audio to the host audio software running on your computer. This window lets you control the audio *Source* for each channel and whether or not the signal will be processed with the MicroBook EQ and/or Dynamics processing settings via the *Pre/post effects* menu.

The factory default settings route the MicroBook's four physical inputs to the computer, but you could also route mix busses, and even MicroBook output signals, back to the computer.

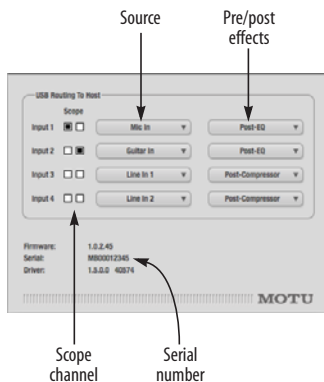


Figure 7-7: MicroBook Device Setup.

SCOPE CHANNELS

The *Scope* buttons (Figure 7-7) let you choose what input channels (as assigned by the Source menus) will be fed to the CueMix FX audio analysis (scoping) features described on the next few pages (FFT “waterfall” display, Oscilloscope, X-Y Plot, and Phase Analysis).

AUDIO ANALYSIS TOOLS

CueMix FX provides advanced audio analysis tools. This section gives a brief summary. For complete information, refer to the CueMix FX PDF manual, which is placed on your hard drive by the MicroBook installer.

FFT display

The Filter response display section in CueMix FX can display real-time FFT and spectrogram information.

Choose *Show FFT* from the *Filter display options* menu (Figure 7-8) to superimpose a real-time Fast Fourier Transform (FFT) frequency measurement curve over the EQ filter display, as show below:

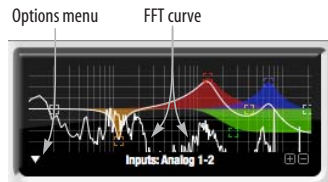


Figure 7-8: FFT display. Make sure that the *Scope Channels* (Figure 7-7) match the channels that are currently in focus via the *Focus* buttons (Figure 7-1).

The FFT curve is post-filter. Therefore, the FFT shows the results of the EQ filter(s) being applied.

Spectrogram

Choose *Options menu > Show Spectrogram* (Figure 7-8) to superimpose a real-time spectrogram “waterfall” display in the EQ display background:

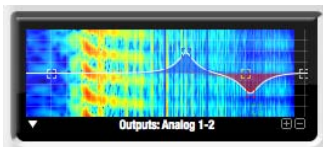


Figure 7-9: Spectrogram display.

X-Y Plot

The *X-Y Plot* window (Figure 7-10) graphs the amplitude of a stereo audio signal on a two-dimensional grid. To open the X-Y Plot, choose it from the *Devices* menu.

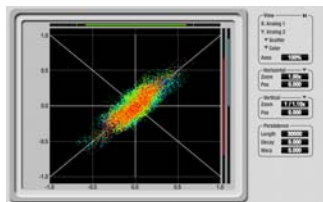


Figure 7-10: X-Y Plot.

For each unit of time (i.e. each sample), the amplitude of the left channel is displayed on the x-axis and the amplitude of the right channel is displayed on the y-axis. A thick white vertical line marks

where left channel amplitude equals zero; a thick white horizontal line marks where right channel amplitude equals zero (Figure 7-10, below). There are also thick white diagonal lines for $y = x$ and $y = -x$.

Phase Analysis

To open the Phase Analysis window (Figure 7-11), choose it from the Devices menu. Phase Analysis graphs frequency versus phase difference versus amplitude of a stereo signal on either rectangular or polar coordinates.

In rectangular coordinates, the vertical axis represents frequency, and the horizontal axis represents the phase of the left channel minus the phase of the right channel (measured in radians).

In polar coordinates, the radius represents frequency and the angle (theta) from the +y vertical axis represents the phase difference of left channel minus the right channel.

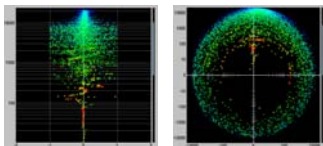


Figure 7-11: Rectangular versus Polar display with a logarithmic plot.

Oscilloscope

CueMix FX provides a full-featured oscilloscope (Figure 7-12). To open an oscilloscope, choose the *Oscilloscope* item from the Devices menu.

The oscilloscope follows the currently chose scope channels (Figure 7-7 on page 46).

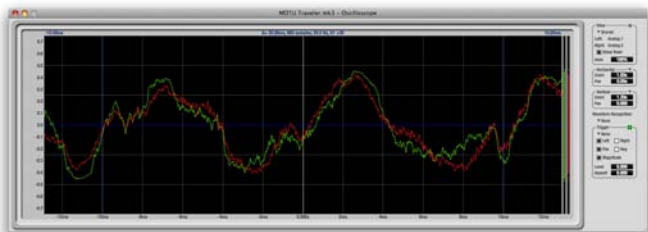


Figure 7-12: Oscilloscope

APPENDIX A Troubleshooting

AudioDesk authorization doesn't succeed

When authorizing AudioDesk, the *OK* button does not become active until you have entered in your name and a valid keycode. Your name must contain at least 3 characters, and you must enter the keycode provided with your AudioDesk installer disc. Additionally, the AudioDesk installer disc must be inserted.

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 of the MicroBook. 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, the disk drivers are outdated, or other drive-related issues. If you are using a USB hard drive on the same bus as the MicroBook, it could be that the USB bus is overloaded (too many devices on the same bus). Try removing all devices except the MicroBook.

Connecting or powering gear during operation

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

Monitoring - How to monitor 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 MicroBook's hardware-based CueMix FX monitoring feature. Please see chapter 7, "CueMix FX" (page 39).

Controlling monitoring latency

See chapter 7, "CueMix FX" (page 39).

CUSTOMER SUPPORT

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

REPLACING DISKS

If your MicroBook software installer disc becomes damaged and fails to provide you with fresh, working copies of the software, our Customer Support Department will be glad to replace it. You can request a replacement disc by calling

our business office at (617) 576-2760 and asking for the customer service department. In the meantime, you can download the latest drivers from www.motu.com.

TECHNICAL SUPPORT

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

- Tech support hotline, Monday through Friday, 9 AM to 6 PM EST:
(617) 576-3066
- Tech support 24-hour fax line:
(617) 354-3068
- 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 the MicroBook system. Please see "Obtaining your MicroBook serial number" on page 14. 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 user guide which refer to the parts of the MicroBook 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.

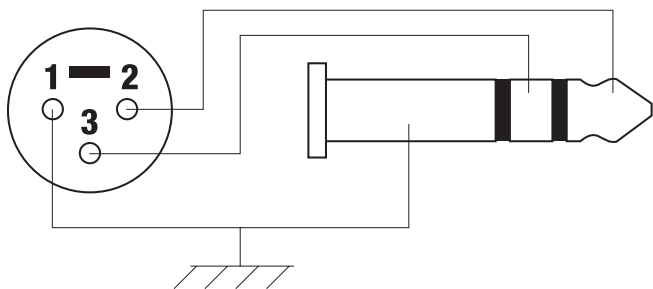
If you have features or ideas you would like to see implemented, we'd like to hear from you. Please contact us online at www.motu.com/suggestions or write to:

MicroBook Development Team
MOTU Inc.
1280 Massachusetts Avenue,
Cambridge, MA 02138.

APPENDIX B Mic Adapter Pin-outs

Below is a diagram showing the pin-out assignments for the female XLR-to-male quarter inch microphone adapter included with the MicroBook package:

- XLR pin 1 = ground
- XLR pin 2 = tip
- XLR pin 3 = ring



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