UltraLite-mk3™

User Guide for Mac

MOTU

Contents

Quick Reference: UltraLite-mk3 Front Panel

1. This XLR/TRS combo jack accepts either a mic cable or a cable with a quarter-inch plug. Both the low-impedance XLR jack and the high-impedance TRS jack are equipped with 24 dB of front-panel trim adjustment, along with zero, -18 dB or -36 dB of cut (pad). The XLR (mic) input can be supplied with 48V phantom power via the Mic 1 front-panel switch.

2. These two Precision Digital Trim™ knobs provide 24 dB of trim adjustment in 1 dB increments for the front and rear panel Mic/Instrument inputs. Both have preamps, so you can plug in just about anything: a microphone, a guitar or even a synth. For +4 dB signals, use the rear panel TRS inputs. Use the trim knob, three-way pad switch and input level meter in the LCD to calibrate the input signal level.

3. Turn the VOL knob to control the headphone volume. The LCD provides visual feedback for the headphone volume setting as you turn the knob. Push the knob once to view the current volume setting in the LCD display; push it again to control the UltraLite-mk3's MASTER VOLUME setting. From the factory, MASTER VOLUME controls the (TRS) MAIN OUTS 1-2 on the rear panel, but MASTER VOLUME can be programmed to control any combination of outputs. See "The Monitor Group" on page 85 for details.

4. When power is off, push the VOL knob to power on the UltraLite-mk3; press and hold to turn it off. The UltraLite-mk3 is powered by its FireWire connection to the computer. It is recommended that you always power off the UltraLite-mk3 before unplugging the FireWire cable.

5. The multi-purpose backlit LCD provides metering for all of the UltraLite-mk3's inputs and outputs. It also gives you access to the UltraLite-mk3's built-in mixer and other settings. There are eight independent stereo mix busses. Each mixes all inputs (or any subset you wish) to a stereo output of your choice. The four knobs to the right of the LCD correspond directly to the four labeled sections of the LCD. Push the PARAMETER knob repeatedly to cycle through the three main LCD display modes: METER, CUEMIX and SETUP.

   METER mode provides level meters for each input and output. The labels above and below the LCD refer to all of the UltraLite-mk3's inputs and outputs (both analog and digital).

   CUEMIX mode lets you program the UltraLite-mk3's on-board CueMix FX mixer. Use the CHANNEL knob to choose the input, output or mix you wish to edit. Push it to switch among inputs, outputs and busses, then turn it to choose the desired channel or bus. Use the PAGE, PARAM and VALUE knobs to access the settings for the chosen channel.

   SETUP mode lets you access general settings. Use the PARAMETER knob to browse settings, and use the VALUE knob to adjust them.

6. This is a standard quarter-inch stereo headphone jack. From the factory, its output matches the main outs on the rear panel. But it can be programmed to mirror any other output pair (digital or analog). It can even be programmed to serve as its own independent output. Use the volume knob above to control its level.

7. The 48V phantom power switches provide phantom power for condenser microphones. Up is on; down is off. The pad switches are three-way switches: down turns off the pad; the middle position provides an -18 dB pad; the up position provides a -36 dB pad.

Quick Reference: UltraLite-mk3 Rear Panel
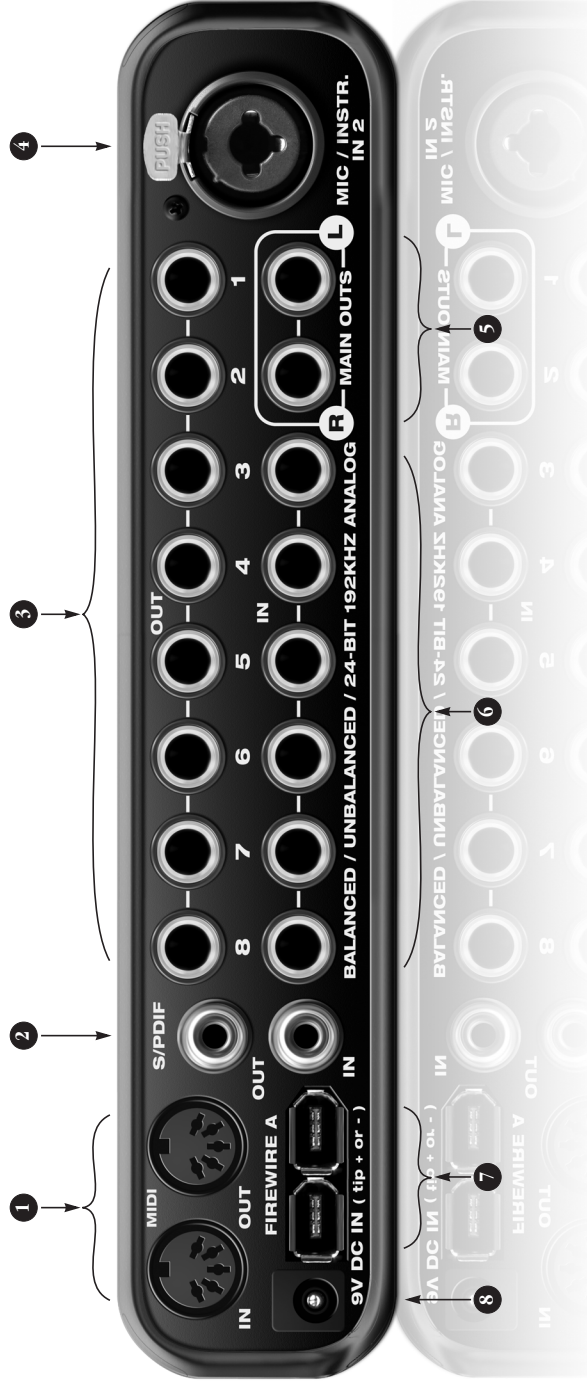
1. Connect a MIDI device here using standard MIDI cables. Connect the UltraLite-mk3's MIDI OUT port to the MIDI IN port on the other device. Conversely, connect the UltraLite-mk3's MIDI IN port to the MIDI OUT port on the other device. You can connect different devices to each port, such as a controller device to the IN port and a sound module to the OUT port. You can also daisy-chain MIDI devices, but be sure to manage their MIDI channels (so that they don't receive or transmit on the same channel).

2. These jacks provide stereo, 24-bit S/PDIF digital input and output at any sample rate up to 96kHz.

3. The UltraLite-mk3's eight analog outputs are gold-plated, balanced +4dB TRS (tip/ring/sleeve) quarter-inch connectors that can also accept an unbalanced plug. They are equipped with 24-bit, 128x oversampling converters.

4. This XLR/TRS combo jack accepts either a mic cable or a cable with a quarter-inch plug. Both the low-impedance XLR jack and the high-impedance TRS jack are equipped with 24dB of front-panel trim adjustment. The XLR (mic) input can be supplied with 48V phantom power via the Mic 2 front-panel switch. The Mic 2 three-way switch provides zero (down), -18dB (middle) and -36dB (up) pad settings for the XLR (mic) input as well.

5. These two balanced, quarter-inch jacks serve as the UltraLite-mk3's main outputs. You can connect them to a set of powered studio monitors and then control the volume from the front panel volume knob. To hear disk tracks in your audio software on these main outs, assign the disk tracks (and master fader) to these main outs (Main Out 1-2). You can also use CueMix FX to monitor live UltraLite-mk3 inputs here as well.

6. Equipped with 24-bit 192 kHz converters, these six analog inputs (3 through 8) are gold-plated, balanced TRS (tip/ring/sleeve) quarter-inch connectors that can also accept an unbalanced plug. They do not have microphone preamps, so they are best used for synthesizers, drum machines, effects processors, and other instruments with line level signals (either -10 dB or +4 dB). These inputs are also equipped with the UltraLite-mk3's Precision Digital Trim™ feature: digitally controlled analog trims that let you adjust input level in 1 dB increments from either front panel LCD or the included CueMix FX software. The trim can be adjusted over a range of -96 to +22 dB.

7. Connect the UltraLite-mk3 to the computer here using the standard 1394 FireWire A cable provided with your UltraLite-mk3. **Important note: it is best to turn off the UltraLite-mk3 when plugging in the FireWire cable, as this avoids the possibility of static discharge, which can harm the electrical components in the UltraLite-mk3 or your computer.** Use the second FireWire port to daisy-chain up to four MOTU FireWire audio interfaces to a single FireWire bus. You can also connect other FireWire devices. Keep in mind that the UltraLite-mk3 uses more FireWire bus bandwidth when it operates at higher sample rates, which will limit the number of devices you can daisy chain on a single FireWire bus. For details, see see "Connecting multiple MOTU FireWire interfaces" on page 22.

8. This jack accepts any standard 10-24V DC power supply with either tip-positive or tip-negative polarity.

Quick Reference: MOTU Audio Setup

✓ Internal
  S/PDIF
  SMPTE
  Built–in Audio
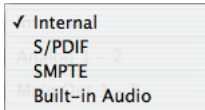
Determines the clock source for your UltraLite-mk3. If you're just using the analog ins and outs, set this to *Internal*. The other settings are for digital transfers via S/PDIF or synchronization to time code or other audio devices.

This menu lets you choose what you will hear from the headphone jack. To mirror the main outs, choose *Main Out 1-2*. Or you can mirror any other output pair. To hear the phones as their own independent output, choose *Phones 1-2*.

✓ Main Out 1 – 2
  Analog 1 – 2
  Analog 3 – 4
  Analog 5 – 6
  Analog 7 – 8
  S/PDIF 1 – 2
  Phones 1 – 2

MOTU Audio Setup

General | UltraLite mk3

Sample Rate	96000
Clock Source	Internal
Default Stereo Input	Analog 1 – 2
Default Stereo Output	Main Out 1 – 2
Phones	Main Out 1 – 2
Main Out Assign	Main Out 1–2
Return Assign	Analog 1–2

firmware: 1.0, bootloader: 1.0
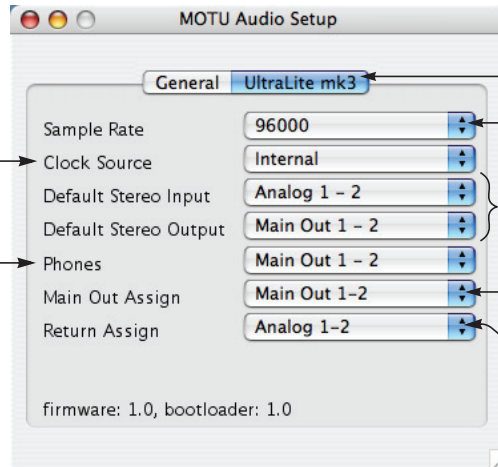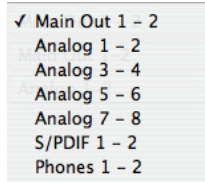
Click the tabs to access general MOTU FireWire interface settings or settings specific to the UltraLite-mk3 (or other connected interface).

Choose the sample rate for the UltraLite-mk3 here.

Specifies the stereo input and output pair when the UltraLite-mk3 is chosen for Mac

Choose the output pair you would like the main outs to mirror, or choose *Main Outs* to operate them as their own independent pair.

The UltraLite-mk3 driver provides a stereo return back to the computer. This return feeds the signal on any output pair directly back to the computer, where you can record, process, monitor or otherwise use it. This is a great way to "bounce" full mixes, complete with live audio routed through the UltraLite-mk3 only, back into the computer.

MOTU Audio Setup

General | UltraLite mk3

☑ Launch MOTU Audio Setup when hardware becomes available

Channel Names
Edit...

Click the General tab to access these settings.

Check this option if you would like the MOTU Audio Setup icon to appear in the application dock as soon as a MOTU FireWire interface is detected (switched on, plugged in, etc.)

This button opens another dialog that lets you assign your own customized names to each UltraLite-mk3 input and output. For example, if you have a lead vocal mic plugged into input 1, you could name it "Lead Vox." Your customized names then appear in your host audio application (if it supports CoreAudio input naming).

✓ ☐ MOTU Audio Setup

UltraLite mk3
Sample Rate ▶
Clock Source ▶
Default Input ▶
Default Output ▶
Phones ▶

Remove from Dock
Open at Login
Show In Finder
Show
Quit
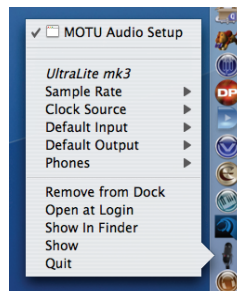
In the standard Mac OS X fashion, the setup software appears in the dock when you launch it. If the *Launch console automatically* option is checked (as shown above), the icon appears as soon as you switch on your UltraLite-mk3 interface. If you click and hold on the dock icon (instead of clicking it) or control-click, a menu of hardware settings appears as shown to the right. You can view and configure any hardware settings from this menu, without opening the setup software window.

CHAPTER 1   About the UltraLite-mk3

OVERVIEW

The UltraLite-mk3 is a FireWire audio interface for Mac and Windows with on-board effects and mixing that offers 10 inputs and 14 outputs at any standard sample rates up to 96 kHz. Both analog and digital I/O are offered at sample rates up to 96 kHz, and analog recording and playback is offered at rates up to 192 kHz. All inputs and outputs can be accessed simultaneously. The UltraLite-mk3 is housed in a sturdy, compact half-rack enclosure that connects directly to a computer via a standard IEEE 1394 FireWire™ cable.

The UltraLite-mk3 offers the following main features:

■ Bus-powered operation

■ Six 24-bit analog quarter-inch (TRS) inputs

■ Ten 24-bit analog quarter-inch (TRS) outputs

■ Two combo XLR/TRS mic/guitar inputs with preamps, 48V phantom power, three-way pad switch , and Precision Digital Trim™ preamp gain adjustment

■ Operation on all analog I/O at standard sample rates up to 192 kHz

■ Digitally controlled analog trim for all analog inputs

■ RCA S/PDIF digital I/O at sample rates up to 96 kHz

■ MIDI I/O

■ On-board SMPTE synchronization

■ Headphone jack with volume control

■ Front panel volume control of the Main Outs (or any programmable combination of outputs)

■ CueMix™ FX no-latency mixing, monitoring and effects processing

■ Front-panel LCD programming for the mixer and all other settings

■ Extensive front panel metering and status LEDs

■ Stand-alone operation

■ Mac and Windows drivers for multi-channel operation and across-the-board compatibility with any audio software on current Mac and Windows systems

■ AudioDesk™, full-featured audio workstation software for Mac OS that supports both 16-bit and 24-bit recording

With a variety of I/O formats, mic preamps and no-latency mixing and processing of live input, the UltraLite-mk3 is a complete, portable "studio in a box" when used with a Mac or Windows computer.

THE ULTRALITE-MK3 REAR PANEL

The rear panel has the following connectors:

■ Ten gold-plated, balanced +4dB quarter-inch (TRS) analog outputs (with 24-bit 192 kHz converters)

■ Six gold-plated, balanced quarter-inch (TRS) analog inputs (with 24-bit 192 kHz converters)

- One combo XLR/TRS mic/instrument input

- RCA S/PDIF in/out

- MIDI IN and MIDI OUT jacks

- Two 1394 FireWire jacks

- DC power jack

10 inputs and 14 outputs

All UltraLite-mk3 inputs and outputs can be used simultaneously, for a total of 10 inputs and 14 outputs when operating at sample rates up to 96 kHz:

Connection	Input	Output
Analog 24-bit 192 kHz on bal/unbal TRS	6	10
Mic preamps 24-bit 192 kHz on XLR/TRS combo	2	-
SPDIF 24-bit 96kHz digital	2	2
Headphone output	-	2
Total	**10**	**14**

All inputs and outputs are discrete and can be active simultaneously.

The headphone outputs can operate as an independent output pair, or they can mirror any other UltraLite-mk3 output pair, such as the main outs.

Mic/guitar inputs with preamps

The two mic/instrument inputs (front panel and rear panel) are equipped with preamps and "combo" XLR/TRS jacks, which accept low-impedance XLR microphone inputs or high-impedance quarter-inch guitar/instruments inputs. Individual switches supply 48 volt phantom power to each mic input. A three-way pad switch provides zero, -18 dB or -36 dB of attenuation. The Precision Digital Trim™ knobs on the front panel for each mic/instrument input provide 24 dB of adjustment in precise 1 dB increments.

Analog

All six quarter-inch analog inputs are equipped with 24-bit 192 kHz A/D converters. All eight analog outputs have 24-bit 192 kHz D/A converters. All audio is carried to the computer in a 24-bit data stream.

All ten analog outputs and six quarter-inch analog inputs are on balanced TRS +4dB quarter-inch jacks. All of these jacks can also accept unbalanced plugs.

Precision Digital Trim™

All of the UltraLite-mk3's analog inputs are equipped with digitally controlled analog trims that allow adjustments in 1 dB increments. The mic/guitar input trims can be adjusted using front-panel digital rotary encoders that provide feedback in the front panel LCD with 24 dB of adjustment. All analog inputs, including six rear-panel TRS analog inputs, can be trimmed using the front panel LCD or using the UltraLite-mk3's included CueMix FX control software for Mac and Windows. This allows you to fine-tune trim settings for synths, effects modules and a wide variety of analog inputs for optimum levels. Different trim configurations can then be saved as files on disk for instant recall.

S/PDIF

The UltraLite-mk3 rear panel provides RCA "coax" S/PDIF input and output.

MIDI I/O

The UltraLite-mk3's standard MIDI IN and MIDI OUT jacks supply 16 channels of MIDI I/O to and from the computer via the UltraLite-mk3's FireWire connection. Timing accuracy can be sample-accurate with host software that supports it.

On-board SMPTE synchronization

The UltraLite-mk3 can resolve directly to SMPTE time code via any analog input, without a separate synchronizer. It can also generate time code via any analog output. The UltraLite-mk3 provides a DSP-driven phase-lock engine with sophisticated filtering that provides fast lockup times and sub-frame accuracy.

The included MOTU SMPTE Console™ software provides a complete set of tools for generating and regenerating SMPTE time code, which allows you to slave other devices to the computer. Like CueMix FX, the synchronization features are cross-platform and compatible with any audio sequencer software that supports the ASIO2 sample-accurate sync protocol.

1394 FireWire

The two 1394 FireWire jacks accept a standard IEEE 1394 FireWire cable to connect the UltraLite-mk3 to a FireWire-equipped Mac or Windows computer. The UltraLite-mk3 has the ability to power itself from its FireWire connection to the computer.

The second jack can be used to daisy chain multiple interfaces — up to four MOTU FireWire interfaces — on a single FireWire bus. It can also be used to connect other FireWire devices without the need for a FireWire hub. Keep in mind, however, that the UltraLite-mk3 uses more FireWire bus bandwidth when it operates at higher sample rates. These operating configurations will limit the number of devices you can daisy chain on a single FireWire bus.

Power supply

If you do not want the UltraLite-mk3 to draw power from the computer, and AC power is available, you can power the UltraLite-mk3 from any standard 10-18V, 12 watt DC power supply with any polarity (tip positive or negative).

THE ULTRALITE-MK3 FRONT PANEL

Mic/instrument input

See "Mic/guitar inputs with preamps" on page 10.

48V phantom power and pad switch

See "Mic/guitar inputs with preamps" on page 10.

Headphone output and main volume control

The UltraLite-mk3 front panel provides a quarter-inch stereo headphone output jack and volume knob. The LCD display provides feedback as you turn the knob. The VOL knob can be used to control the volume of the main out jacks on the rear panel. It can alternately be configured to control any combination of outputs.

Programmable backlit LCD display

Any UltraLite-mk3 setting, including the powerful CueMix FX on-board 16-bus mixer with effects, can be accessed directly from the front panel using the four rotary encoders and the 2x16 backlit LCD display.

The LCD also provides activity metering for all UltraLite-mk3 inputs and outputs.

16-BIT AND 24-BIT RECORDING

The UltraLite-mk3 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 UltraLite-mk3's analog or digital inputs and outputs. 24-bit audio files can be recorded with any compatible host application that supports 24-bit recording.

CUEMIX FX 32-BIT FLOATING POINT MIXING AND EFFECTS

All UltraLite-mk3 inputs and outputs can be routed to the on-board CueMix FX 16-bus (8 stereo) digital mixer driven by hardware-based DSP with 32-bit floating point precision. The mixer allows you to apply no-latency effects processing to inputs, outputs or busses directly in

the UltraLite-mk3 hardware, independent of the computer. Effects can even be applied when the UltraLite-mk3 is operating stand-alone (without a computer) as a complete portable mixer. 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 reverb, parametric EQ and compression/limiting. The UltraLite-mk3's Classic Reverb™ provides five different room types, three frequency bands with adjustable crossover points, shelf filtering and reverb lengths up to 60-seconds.

Two forms of compression are supplied: a standard compressor with conventional threshold/ratio/attack/release/gain controls and the Leveler™, an accurate model of the legendary LA-2A optical compressor, which provides vintage, musical automatic gain control.

CueMix FX also provides 7-band parametric EQ modeled after British analog console EQs, featuring 4 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 EQ employs extremely high precision 64-bit floating point processing.

The UltraLite-mk3's flexible effects architecture allows you to apply EQ and compression on every input and output (a total of 24 channels), with enough DSP resources for at least one band of parametric EQ and compression on every channel

at 48 kHz. However, DSP resources are allocated dynamically and a DSP meter in the CueMix FX software (included) allows you to keep tabs on the UltraLite-mk3's processing resources. Each input, output and mix bus provides a send to the Classic Reverb processor, which then feeds reverb returns to mix busses and outputs, with a selectable split point between them to prevent send/return feedback loops.

AUDIODESK

AudioDesk is a full-featured, 24-bit audio workstation software package included with the UltraLite-mk3 system (for Mac only). AudioDesk provides multi-channel waveform editing, automated virtual mixing, graphic editing of ramp automation, real-time effects plug-ins with 32-bit floating point processing, crossfades, support for many third-party audio plug-ins, background processing of file-based operations, sample-accurate editing and placement of audio, and more.

DIGITAL PERFORMER

The UltraLite-mk3 system is fully integrated with MOTU's award-winning Digital Performer audio sequencer software package.

OTHER HOST AUDIO SOFTWARE

The UltraLite-mk3 system includes a standard Mac OS X Core Audio driver for multichannel I/O with any audio application that supports Core Audio.

CHAPTER 2   Packing List and Mac System Requirements

PACKING LIST

The UltraLite-mk3 ships with the items listed below. If any of these items are not present in your UltraLite-mk3 box when you first open it, please immediately contact your dealer or MOTU.

- One UltraLite-mk3 I/O rack unit
- One 6-pin to 6-pin IEEE 1394 "FireWire" cable
- One set of removable rack ears
- One UltraLite-mk3 Mac/Windows manual
- One AudioDesk Manual
- One cross-platform CD-ROM
- Product registration card

MAC SYSTEM REQUIREMENTS

The UltraLite-mk3 system requires the following Mac system:

- A G4/500MHz Power Mac or faster equipped with at least one FireWire port
- At least 256 MB (megabytes) of RAM (512 MB or more is recommended)
- Mac OS X (version 10.4.9 or later)
- A large hard drive (preferably at least 250 GB)

PLEASE REGISTER TODAY!

Please register your UltraLite-mk3 today. There are two ways to register.

- Visit www.motu.com/register

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!

Be sure to do the same for the included AudioDesk software, which must be registered separately. You can do so online or by filling out and mailing the included software registration card found at the beginning of your AudioDesk manual. Please be sure to register AudioDesk as well, so that you will be eligible to receive online technical support email and announcements about AudioDesk software enhancements as soon as they become available.

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

CHAPTER 3 Installing the UltraLite-mk3 Hardware

OVERVIEW

Here's an overview for installing the UltraLite-mk3:

IMPORTANT NOTE BEFORE YOU BEGIN!

Before you begin installing the UltraLite-mk3 (or any bus-powered device), take these important precautionary measures to avoid damaging the sensitive electrical components in your computer, the UltraLite-mk3 or other devices being connected:

■ Turn off the computer.

■ Turn off the UltraLite-mk3 (push and hold the VOL knob.

■ Turn off the power of any other devices.

■ Touch the metal casing of the UltraLite-mk3 to discharge any static electricity that you may be carrying just before the installation.

After you have made all of the necessary connections, as described in this chapter, turn on the devices in this sequence:

1. Turn on the computer.

2. Turn on the UltraLite-mk3.

3. Turn on other devices connected to the UltraLite-mk3.

CONNECT THE ULTRALITE-MK3 INTERFACE

1 Make sure your computer and the UltraLite-mk3 are switched off.

2 Plug one end of the UltraLite-mk3 FireWire cable (included) into the FireWire socket on the computer as shown below in Figure 3-1.

☞ You can connect the UltraLite-mk3 to an 800Mbit "FireWire B" port using a 9-pin to 6-pin FireWire B cable (not shown). However, the UltraLite-mk3 will still operate at its specified 400Mbit (FireWire A) data rate.

3 Plug the other end of the FireWire cable into the UltraLite-mk3 I/O as shown below in Figure 3-1.
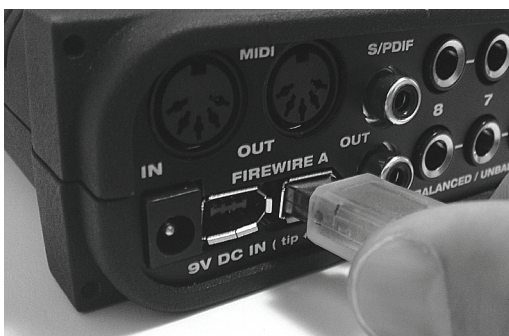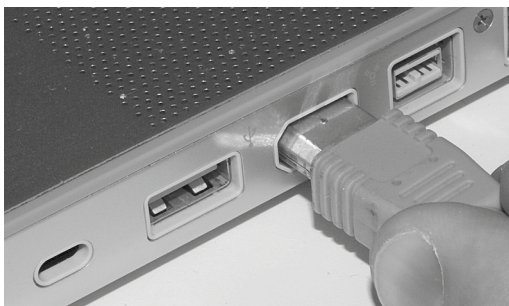
Figure 3-1: Connecting the UltraLite-mk3 to the computer.

☞ Make absolute sure to align the flat side of the FireWire plug properly with the flat side of the FireWire socket on the UltraLite-mk3. If you attempt to force the plug into the socket the wrong way, you can damage the UltraLite-mk3.

CONNECT AUDIO INPUTS AND OUTPUTS

The UltraLite-mk3 audio interface has the following audio input and output connectors:

■ 10 balanced quarter-inch analog outputs

■ 6 balanced quarter-inch analog inputs

■ 2 XLR/quarter-inch "combo" analog inputs with preamps

■ 1 pair of RCA S/PDIF in and out

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

Mic/instrument inputs

Connect a microphone, guitar, instrument or other analog input to the XLR/TRS combo jack with either a standard mic cable or a balanced cable with a quarter-inch plug.

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

Phantom power

If you are connecting a condenser microphone or other device that requires phantom power, move the 48V phantom power switch on the front panel to the up position (enabled).

Trim

Both the low-impedance XLR jack and the high-impedance TRS jack are equipped with 24dB of trim control. Use the digital trim knobs on the front panel to adjust the input level as needed for each input. The LCD provides visual feedback as you turn the trim knob. The UltraLite-mk3's input trims are digital controlled, so they allow you to make fine-tuned adjustments in precise 1dB increments. You can also adjust trim in the MOTU CueMix FX software. See "Input trim" on page 69.

Three-way pad

The XLR jack is equipped with a three-way pad, so "hot" signals are best connected via an XLR cable so that you can use the pad switch. Since the pad is not available on the TRS jack, hot signals connected via the TRS jack will probably overdrive the input. The independent three-way pad switch for each input provides zero (down), -18 dB (middle) and -36 dB (up) pad settings for the XLR jack. When combined with the 24 dB digital trim, the full gain range is 60 dB. This is the difference between the minimum (trim at zero + pad at -36 dB) and maximum (trim at +24 dB + pad at zero) gain settings.

Combo jack summary

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

Input	48V	Pad	Trim
Condenser mic	On	As needed	As needed
Dynamic mic	Off	As needed	As needed
Guitar	Off	n/a	As needed
-10 dB Line level via TRS	Off	n/a	As needed
-10 dB Line level via XLR	Off	-36dB	+12dB
+4 dB line level (XLR only)	Off	-36dB	Zero

Quarter-inch analog

The quarter-inch analog inputs (3-8) and outputs (1-8 plus main out) are balanced (TRS) connectors that can also accept an unbalanced plug.

The quarter-inch outputs are calibrated to produce a +4 dBu line level output signal.

Quarter-inch analog input trims

The quarter-inch inputs are calibrated to accommodate either +4 or -10 dBu signals and are equipped with digitally controlled analog trims that provide +22 dB of gain and -96 dB of cut. You can use either the front panel LCD or the included CueMix FX software to adjust the input trim. To adjust these trims using CueMix FX, see "Input trim" on page 69. To adjust the trims using the front panel LCD:

1 Push the PARAM knob repeatedly until you see CUEMIX in the LCD display.

2 Push the CHANNEL knob repeatedly until you see "I:" (which stands for *Input*) in the CHANNEL section of the LCD (Figure 3-2).

3 Turn the CHANNEL KNOB until you see the desired analog input or input pair. For example, analog inputs 1-2 appear as "I:An 1-2" (Figure 3-2), which means *Input analog 1-2*.

4 From the factory, analog inputs are grouped in stereo pairs (1-2, 3-4, etc.) If you need to split a pair to program it as two individual mono inputs, turn the PARAM knob until you see PAIR in the parameter section of the LCD (Figure 3-2). Turn the VALUE knob to choose MONO. Then turn the CHANNEL knob again to select the desired input.

Figure 3-2: The settings for analog inputs 1 and 2 (as a pair).

5 After splitting the stereo pair, if necessary, turn the PARAM knob until you see the TRIM parameter in the LCD (Figure 3-3):
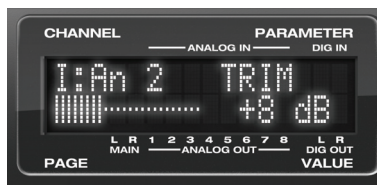
Figure 3-3: Setting the input trim for a TRS analog input pair.

6 Turn the VALUE knob to adjust the trim.

Separate main outs

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 studio monitors, but they can also be used as regular outputs for any purpose. Their reference level is +4dB. Main out volume is controlled by the VOL knob on the front panel: push it repeatedly until you see MASTER and then turn it to adjust the master volume output. This knob can be programmed to control any combination of outputs you wish.

S/PDIF

If you make a S/PDIF digital audio connection to another device, be sure to review the digital audio clocking issues, as explained in "Connecting and syncing S/PDIF devices" on page 19.

The UltraLite-mk3 on-board mixer also supplies 12dB of digital trim adjustment for the S/PDIF input pair, which can be adjusted from CueMix FX ("Input trim" on page 69) or the front panel (using the same procedure as explained earlier for "Quarter-inch analog input trims" on page 17.

CONNECT MIDI GEAR

Connect your MIDI device's MIDI IN jack to the UltraLite-mk3's MIDI OUT jack (Connection A below). Conversely, connect the MIDI device's MIDI OUT jack to the UltraLite-mk3's MIDI IN jack (Connection B).
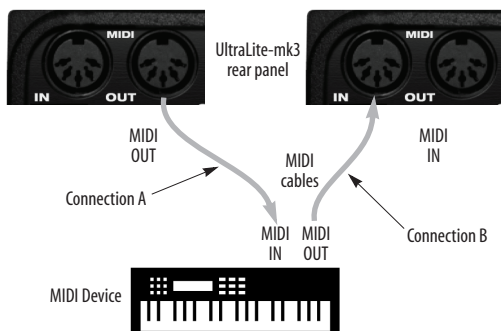
Figure 3-4: Connecting a MIDI device to the UltraLite-mk3.

One-way MIDI connections

MIDI devices that do not receive MIDI data, such as a dedicated keyboard controller, guitar controller, or drum pad, only need Connection B shown in Figure 3-4. 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 THRUs

If you need to connect several pieces of MIDI gear, run a MIDI cable from the MIDI THRU of a device already connected to the UltraLite-mk3 to the MIDI IN on the additional device as shown below in Figure 3-5. The two devices then share the UltraLite-mk3's MIDI OUT port. This means that they share the same set of 16 MIDI channels, too, so try to do this with devices that receive on only one MIDI channel (such as effects modules) so their receive channels don't conflict with one another.
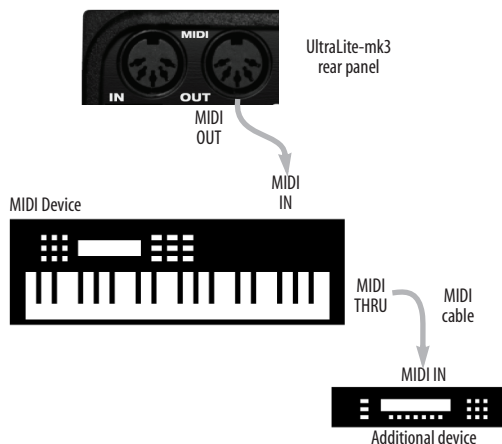
Figure 3-5: Connecting additional devices with MIDI THRU ports.

MIDI Thru when operating stand-alone

The UltraLite-mk3 has a MIDI Thru feature for stand-alone operation. See "MIDI Thru in standalone" on page 38.

CONNECTING AND SYNCING S/PDIF DEVICES

DAT decks and other devices with S/PDIF digital I/O will sync to the UltraLite-mk3 in via the S/PDIF connection itself. Just connect it to the UltraLite-mk3 via the S/PDIF connectors. When the device records a digital audio signal (from the UltraLite-mk3), it will simply synchronize to the clock provided by the digital audio input.

On the other hand, when you transfer audio from the S/PDIF device into the UltraLite-mk3, you'll have to slave the UltraLite-mk3 to its S/PDIF input.
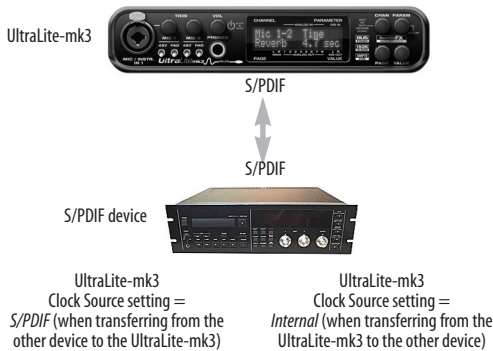
Figure 3-6: The setup for synchronizing a S/PDIF device with the UltraLite-mk3. Sync is achieved via the digital I/O connection itself. In this case, you have to choose S/PDIF as the UltraLite-mk3's clock source when recording from the other device.

POWER OPTIONS

The UltraLite-mk3 can draw power from two possible sources: the computer (via FireWire) or a DC power supply.

Bus power requirements

The UltraLite-mk3 draws all the power it needs from the FireWire bus connection to the computer. However, the FireWire connection to the computer must meet all of the requirements discussed below.

6-pin FireWire connectors

The UltraLite-mk3 can only draw power over the FireWire bus from a 6-pin to 6-pin cable, or a 6-pin to 9-pin (FireWire B) cable. It cannot draw power from a FireWire cable with a 4-pin connector, as shown below:
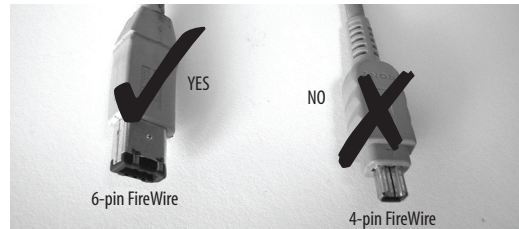
Figure 3-7: 4-pin FireWire connectors cannot be used for bus power.

When operating under bus power, daisy-chaining is not recommended

The UltraLite-mk3 can be daisy-chained with other FireWire devices from a single FireWire connection to the computer. However, if the UltraLite-mk3 is operating under bus power, this is not recommended. If you need to daisy chain the UltraLite-mk3 with other devices on the same FireWire bus, power the UltraLite-mk3 with the included power adaptor. The other devices on the chain should also have their own power supply. In general, bus-powered FireWire devices should not be daisy-chained.

FireWire adapter products must be powered

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

■ **PCI FireWire cards** — If you plan to connect the UltraLite-mk3 to a PCI card and run the UltraLite-mk3 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 or ExpressCard slot adapters** — If you plan to connect the UltraLite-mk3 to a PC card FireWire adapter (inserted in the PC card slot in your laptop), it must provide a 6-pin connection and it must also have its own power supply. Most commonly, these types of products have a DC power adapter. As you can see, however, this situation does not allow for remote battery operation, as the PC card adapter requires AC.

Examples of bus- powered operation
Here are a few typical examples of bus-powered UltraLite-mk3 operation:

Bus power from a desktop computer
Your desktop computer is running off of its usual AC power connection, and the UltraLite-mk3 draws power from the FireWire 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 UltraLite-mk3 is powered via the FireWire 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 UltraLite-mk3 is being powered by its FireWire connection to the computer. So the laptop battery is supplying power to both the laptop and the UltraLite-mk3. 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.

DC power supply
If you do not want the UltraLite-mk3 to draw power from the computer, and AC power is available, you can power the UltraLite-mk3 from any standard 8-18 volt, 12 watt DC power supply with any polarity (tip positive or negative), and amperage as shown below.

Voltage	Amperage
9 volts	1.33 amps
12 volts	1 amp
18 volts	0.66 amps

Bus power versus DC power
When you connect a DC power supply, the UltraLite-mk3 could draw power from either FireWire or the DC power supply. So which source does it use? The answer is: the source that is currently supplying the greatest voltage. But in practice, it doesn't really matter because the only situation in which you need to be concerned about the UltraLite-mk3's power draw is when you are operating it with a battery-powered laptop. And in this situation, the only available power is from FireWire. In all other situations, the computer has its own power, so it doesn't matter if the UltraLite-mk3 is drawing power from FireWire.

Turning off the UltraLite-mk3
To turn on the UltraLite-mk3, push the VOL knob. To turn it off, push *and hold* the VOL knob. When the UltraLite-mk3 is turned off, it is really in a sort of "sleep" mode, where it still draws just enough power to detect the power switch (a digital encoder) when the UltraLite-mk3 is turned back on. But the amount of power that the UltraLite-mk3 draws when it is turned off is so small that it has very little practical impact. If you are running a laptop under battery power, and you are in a situation where you are not using the UltraLite-mk3 and you need every last bit of laptop battery power, unplug the UltraLite-mk3 entirely from the computer.

A TYPICAL ULTRALITE-MK3 SETUP

Here is a typical UltraLite-mk3 studio setup. This rig can be operated without an external mixer. All mixing and processing can be done in the computer with audio software. During recording, you can use the UltraLite-mk3's CueMix™ FX no-latency monitoring to listen to what you are recording via the main outs, headphone outs, or any other output pair. You can control monitoring either from the front panel or from the included CueMix FX software.
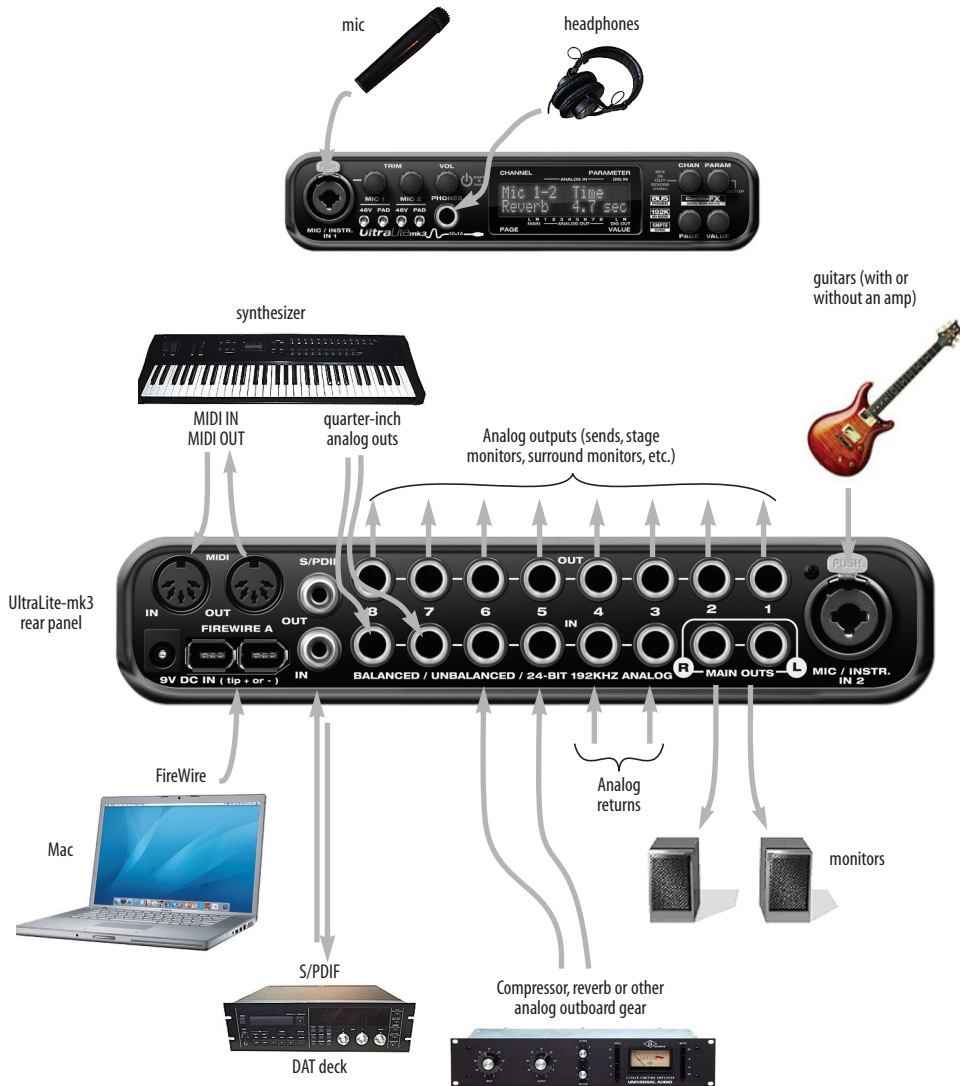
Figure 3-8: A typical UltraLite-mk3 studio setup.

CONNECTING MULTIPLE MOTU FIREWIRE INTERFACES

You can daisy-chain up to four MOTU FireWire interfaces on a single FireWire bus, with the restrictions described in the following sections. Most computers have only one built-in FireWire bus (even if it supplies multiple FireWire sockets). Connect them as follows:

Mac

FireWire

FireWire

FireWire

FireWire

FireWire

etc.
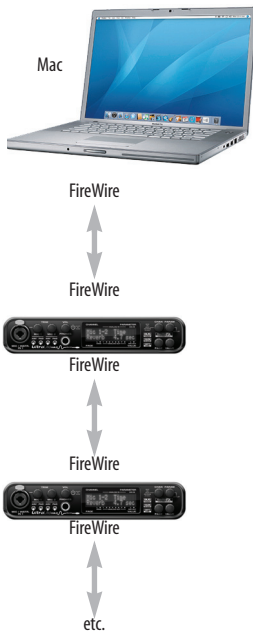
Figure 3-9: Connecting multiple UltraLite-mk3's (or other MOTU Audio interfaces) to a computer.

Multiple interfaces cannot be bus-powered

Do not run the UltraLite-mk3 under bus power when connecting it with other devices to the same FireWire bus. See "Power options" and "Bus power requirements" on page 19.

Multiple interfaces in MOTU Audio Setup

MOTU Audio Setup displays the settings for one interface at a time. To view the settings for an interface, click its tab as shown below in Figure 3-10.
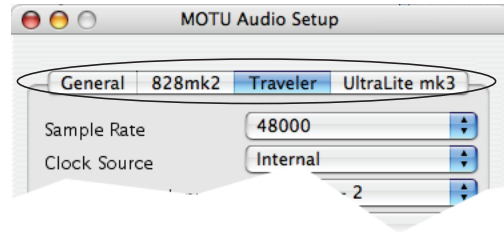
Figure 3-10: To view the settings for an interface, click its tab.

Synchronizing multiple interfaces

Mac OS X provides an advanced, flexible driver model that allows multiple Core Audio drivers to be active at one time, accessed by multiple applications simultaneously. For example, you can run both FireWire and PCI audio interfaces at the same time, accessing all of their inputs and outputs from your host audio application — or even multiple applications — simultaneously. You can even take advantage of Mac OS X's aggregate device driver feature, which allows you to create a unified "meta device" out of several different audio interfaces. The aggregate device presents to your host software all of the inputs and outputs of the included devices.

An important feature of this flexible driver model is that multiple drivers can be synchronized to one another in order to remain resolved to each another. Without synchronization, the audio streams being handled by each interface might drift with respect to one another. For example, the audio tracks playing back through the UltraLite-mk3 might drift out of sync with the audio tracks playing back through your 2408mk3 PCI interface. Synchronizing them to each other ensures that they remain as tightly and continuously phase-locked as if they were operating as one unified interface.

Resolving to other Core audio drivers

So if you combine the UltraLite-mk3 with other interfaces for the playback and/or recording of multiple audio streams (that must remain

synchronized with each other), it is important to synchronize the UltraLite-mk3 with the other device(s).

The MOTU FireWire driver has the ability to resolve to other Core Audio drivers. This allows the UltraLite-mk3, and other MOTU FireWire interfaces, to resolve to other audio interfaces running simultaneously on the same computer, such as the Mac's built-in audio, a PCI-424 core system, or even 3rd-party interfaces, without the need for external word clock connections between the devices. Doing so ensures that audio tracks being played or recorded by your MOTU FireWire interface will not drift apart from tracks on the other device during long playback or recording passes.

To synchronize multiple devices via the MOTU FireWire driver, choose one device (PCI, FireWire or otherwise) as the master clock and then slave the UltraLite-mk3 and other FireWire devices to it. All interfaces will remain resolved to each other via the master interface.

Make the Clock Source settings for each interface as follows:

■ For the master interface, click its tab in MOTU Audio Setup and choose any clock source you wish (except any of the slave interfaces, of course).

■ For each slave interface, click its tab and choose the master interface from the *Clock Source* menu, as demonstrated below in Figure 3-11. This causes the slave interfaces to resolve to the master interface.
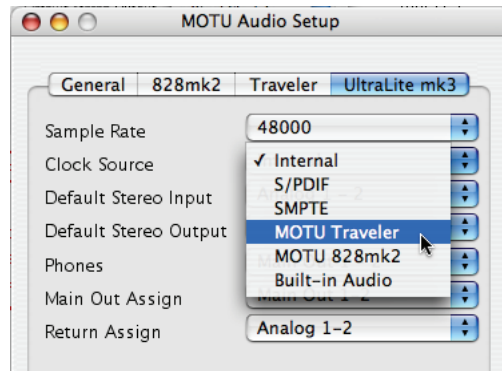
Figure 3-11: To resolve a MOTU FireWire interface to another Core Audio device, choose the other device from the Clock Source menu in MOTU Audio Setup. In this example, the UltraLite-mk3 will slave to the Traveler.

If you have multiple UltraLites, choose one as the master, and set its Clock Source to *Internal*. Then, click the tab of the other UltraLites and set their Clock Source to the first UltraLite-mk3.

Connecting other MOTU FireWire interfaces
You can add an original MOTU 828 to the end of a FireWire daisy chain (because the 828 has only one FireWire port), or you can mix and match multiple UltraLites with other MOTU FireWire interfaces using a standard FireWire hub. You can also add 828mkIIs, 828mk3s, 896HDs, 896mk3s, Travelers and UltraLites, which have two FireWire ports convenient for daisy-chaining. Up to four interfaces can be combined on one FireWire bus.

Operating multiple FireWire interfaces at high sample rates
Four MOTU FireWire interfaces can operate at 44.1 or 48kHz on a single FireWire bus, although you may have to disable optical banks (on interfaces that have them) to conserve FireWire bus bandwidth. At the 2x samples rates (88.2 or 96kHz) and 4x sample rates (176.4 and 192kHz), you can operate no more than two FireWire interfaces on a single FireWire bus.

Adding additional interfaces with a second FireWire bus

Third-party FireWire bus expansion products in the form of a cardbus ("PC card") adaptor, ExpressCard adaptor or PCI card allow you to add a second FireWire bus to your computer. In may be possible to add additional MOTU FireWire interfaces connected to such a third-party product, depending on the performance of the product and the performance of your host computer.

Installing the UltraLite-mk3 Mac Software

OVERVIEW

SOFTWARE INSTALLATION

Install the UltraLite-mk3 software as follows:

1 Insert the MOTU Audio Installer disc and launch the installer.

2 Follow the directions that the installer gives you.

What does the OS X 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 OS X installation. Drivers are installed, along with MOTU Audio Setup, CueMix FX, and several other applications, summarized below:

The UltraLite-mk3 Core Audio driver

Core Audio is a term that refers to the software technology built into Mac OS X that provides all of its standardized audio features. More specifically, we use *Core Audio* to refer to Mac OS X's standard audio driver model. A *Core Audio driver* allows the UltraLite-mk3 to establish audio input and output with any Mac OS X Core Audio-compatible software.

Once the UltraLite-mk3's Core Audio driver has been successfully installed (by the installer), and you have chosen it for use in your host audio software, the UltraLite-mk3 will appear as a choice for audio inputs and outputs in your software.

All MOTU audio hardware, including our PCI systems and other FireWire interfaces, ship with Core Audio drivers that allow them to operate successfully with virtually all Mac OS X audio software.

Software component	Location	Purpose	For more information
MOTU FireWire Audio driver.kext	/System/Library/ Extensions	Provides UltraLite-mk3 multi-channel audio input and output with all Mac OS X audio software	"The UltraLite-mk3 Core Audio driver" on page 25
MOTU MIDI driver.kext	/System/Library/ Extensions	Provides UltraLite-mk3 MIDI input and output for all Mac OS X MIDI software	"CoreMIDI and Audio MIDI Setup" on page 26
MOTU MIDI driver.plugin	/System/Library/ Audio/MIDI Drivers	Provides UltraLite-mk3 MIDI input and output for all Mac OS X MIDI software	"CoreMIDI and Audio MIDI Setup" on page 26
MOTU Audio Setup	Applications folder	Provides access to all of the settings in the UltraLite-mk3 and other MOTU FireWire inter-faces. Required for UltraLite-mk3 operation.	chapter 5, "MOTU Audio Setup" (page 29)
CueMix FX	Applications folder	Gives you complete control over the UltraLite-mk3's CueMix DSP feature, which pro-vides no-latency monitoring and mixing of live inputs through your UltraLite-mk3 system.	chapter 11, "CueMix FX" (page 63)
MOTU SMPTE Setup	Applications folder	Provides access to the UltraLite-mk3 system's SMPTE time code sync features.	chapter 12, "MOTU SMPTE Console" (page 91)
AudioDesk Workstation Software	Applications folder	Provides complete multi-track recording, mixing and processing. Optional.	AudioDesk User Guide
AudioDesk Demo Project	Anywhere you want	Provides a multi-track mix that you can open, play, and mix in AudioDesk. Optional.	AudioDesk User Guide

CoreMIDI and Audio MIDI Setup

CoreMIDI is the "under-the-hood" portion of Mac OS X that handles MIDI services for MIDI hardware and software. CoreMIDI provides many universal MIDI system management features, including MIDI communication between your UltraLite-mk3 FireWire interface and all CoreMIDI compatible software.

Audio MIDI Setup is a utility included with Mac OS X that allows you to configure your UltraLite-mk3 interface for use with all CoreMIDI 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 CoreMIDI-compatible programs

■ A simple, intuitive list of your MIDI devices whenever you need it in any CoreMIDI-compatible program

Launching Audio MIDI Setup

1 Make sure your UltraLite-mk3 interface is connected 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 of Audio MIDI Setup.

If the interfaces does not appear, or if it is grayed out, check your cable connections and click *Rescan MIDI*.
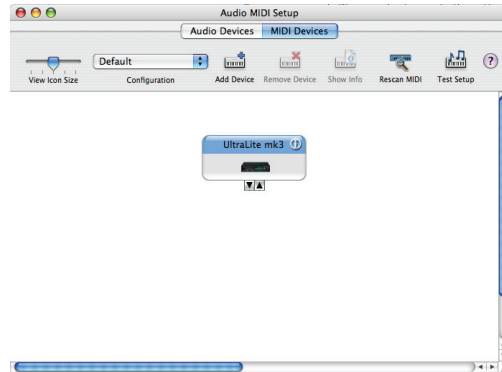
Figure 4-1: The UltraLite-mk3 interface as it appears in the MIDI tab of Audio MIDI Setup.

Connecting MIDI devices to the UltraLite-mk3

Once your UltraLite-mk3 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 CoreMIDI compatible applications.

To add a device in Audio MIDI Setup:

1 Click *Add Device*.
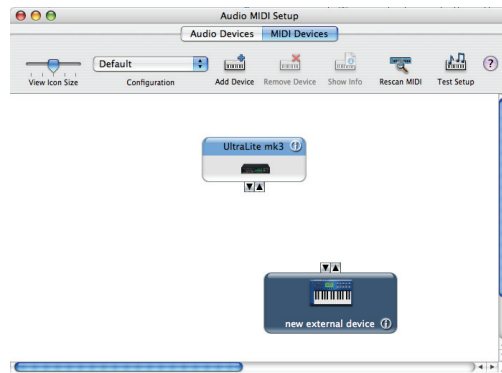
Figure 4-2: Adding a MIDI device.

2 Drag on its input and output arrows to draw connections to the UltraLite-mk3 that match its physical connection.
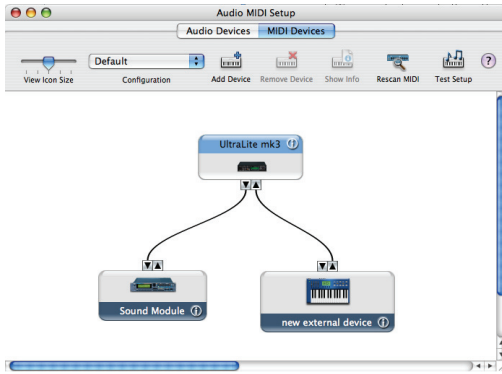
Figure 4-3: Connecting devices to the UltraLite-mk3. In this example, a controller keyboard is connected to the UltraLite-mk3's MIDI IN, and a sound module is connected to the UltraLite-mk3 MIDI OUT.

3 Double-click the device to make settings, such as input and output channels, that further describe the device.
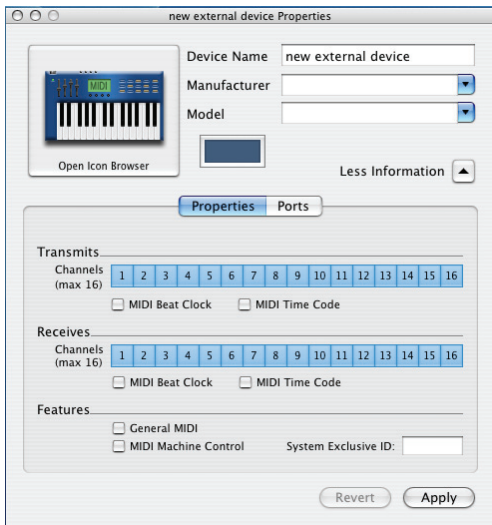
Figure 4-4: Device settings.

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

5 When you are finished, quit Audio MIDI Setup.

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

CUEMIX FX

This program provides a mixing console that gives you control over the UltraLite-mk3's no-latency CueMix FX features. For details, see chapter 11, "CueMix FX" (page 63).

MOTU SMPTE CONSOLE

The MOTU SMPTE Console software provides a complete set of tools to resolve the UltraLite-mk3 to SMPTE time code, and to generate SMPTE for striping, regenerating or slaving other devices to the computer. For details, see chapter 12, "MOTU SMPTE Console" (page 91).

AUDIODESK WORKSTATION SOFTWARE

The MOTU Audio installer places AudioDesk in your system's Applications folder.

AudioDesk is an advanced workstation software package for the UltraLite-mk3 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 manual included with your UltraLite-mk3 system for details.

Figure 4-5: AudioDesk for Mac OS X.

MOTU Audio Setup

OVERVIEW

MOTU Audio Setup gives you access to basic UltraLite-mk3 hardware settings, such as sample rate, clock source and more.

ACCESSING THE ULTRALITE-MK3 SETTINGS

There are several ways to access MOTU Audio Setup settings:

■ Click the MOTU Audio Setup icon in the dock

■ Press on the MOTU Audio Setup dock icon to open the menu shown below, or control-click it to open the menu immediately

■ From within AudioDesk™ or Digital Performer™, choose *Setup menu>Configure Audio System>Configure Hardware Driver*. (Note: this dialog only provides access to basic settings such as sample rate and clock source. For access to all settings, use one of the techniques above.)

■ In Cubase or Nuendo, open the Device Setup window, click *VST Audio System* and choose *MOTU Audio ASIO* from the *Master ASIO Driver* menu. Then click the *MOTU Audio ASIO* item in the list and click the *Control Panel* button.

■ From the front panel LCD (see chapter 6, "UltraLite-mk3 Front Panel Operation" (page 35)).

UltraLite-mk3 tab settings

The UltraLite-mk3 tab provides settings that apply to a specific UltraLite-mk3 interface. If you have several UltraLites (or other MOTU FireWire audio interfaces) connected, you'll see a separate tab for each one.

General tab settings

The General tab provides settings that apply globally to all connected MOTU FireWire interfaces.

'ULTRALITE-MK3' TAB SETTINGS

Sample Rate

Choose the desired *Sample Rate* for recording and playback. The UltraLite-mk3 can operate at 44.1 (the standard rate for compact disc audio), 48, 88.2, 96, 176.4 or 192KHz. If you have a S/PDIF device connected to the UltraLite-mk3, make sure that it matches the UltraLite-mk3's sample rate.

☞ Mismatched sample rates cause distortion and crackling. If you hear this sort of thing, check the sample rate settings in your hardware and here in MOTU Audio Setup.

S/PDIF at 4x sample rates (176.4 or 192kHz)

At the 4x sample rates (176.4 or 192kHz), all analog I/O remains active, but S/PDIF digital I/O is disabled.

Clock Source

The *Clock Source* determines the digital audio clock that the UltraLite-mk3 will use as its time base. The following sections briefly discuss each clock source setting.

Internal

Use the *Internal* setting when you want the UltraLite-mk3 to operate under its own digital audio clock. For example, you may be in a situation where all you are doing is playing tracks off hard disk in your digital audio software on the computer. In a situation like this, you most often don't need to reference an external clock of any kind.

Another example is transferring a mix to DAT. You can operate the UltraLite-mk3 system on its internal clock, and then slave the DAT deck to the UltraLite-mk3 via the S/PDIF connection (usually DAT decks slave to their S/PDIF input when you choose the S/PDIF input as their record source).

If you would like help determining if this is the proper clock setting for your situation, see "Connecting and syncing S/PDIF devices" on page 19.
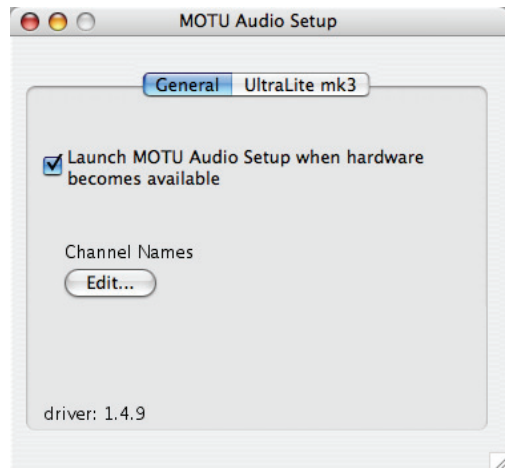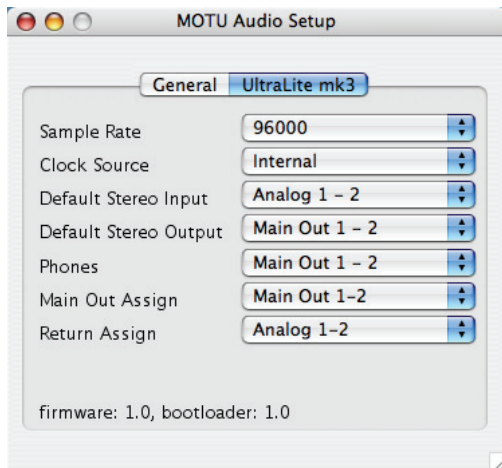
Figure 5-1: MOTU Audio Setup gives you access to all of the settings in the UltraLite-mk3 hardware.

S/PDIF

The *S/PDIF* clock source setting refers to the S/PDIF RCA input jack on the UltraLite-mk3. This setting allows the UltraLite-mk3 to slave to another S/PDIF device.

Use this setting whenever you are recording input from a DAT deck or other S/PDIF device into the UltraLite-mk3. It is not necessary in the opposite direction (when you are transferring from the UltraLite-mk3 to the DAT machine).

For further details about this setting, see "Connecting and syncing S/PDIF devices" on page 19.

SMPTE

Choose this setting to resolve the UltraLite-mk3 directly to SMPTE time code (LTC) being received via the UltraLite-mk3's quarter-inch SMPTE input jack. For details, see "Syncing to SMPTE time code" on page 94and chapter 12, "MOTU SMPTE Console" (page 91).

Built-in Audio

Choose this setting to resolve the UltraLite-mk3 to your Mac's built-in audio. Doing so will ensure that audio streams playing back from or recorded by the UltraLite-mk3 will not drift apart from audio streams simultaneously played or recorded by the Mac's built-in mic, speakers or audio output. For complete details, see "Resolving to other Core audio drivers" on page 22.

Other audio devices (drivers)

The MOTU FireWire Audio Driver has the ability to resolve to other Core Audio drivers. Doing so will ensure that audio streams playing back from or recorded by the UltraLite-mk3 will not drift apart from audio streams simultaneously played or recorded by the other devices. For complete details, see "Resolving to other Core audio drivers" on page 22.

Default Stereo Input/Output

In the System Preferences window, Mac OS X lets you choose third-party hardware such as the UltraLite-mk3 for your Mac sound input and output. The system input and output can be used for alert sounds and general audio I/O for applications like iTunes, iMovie, etc.
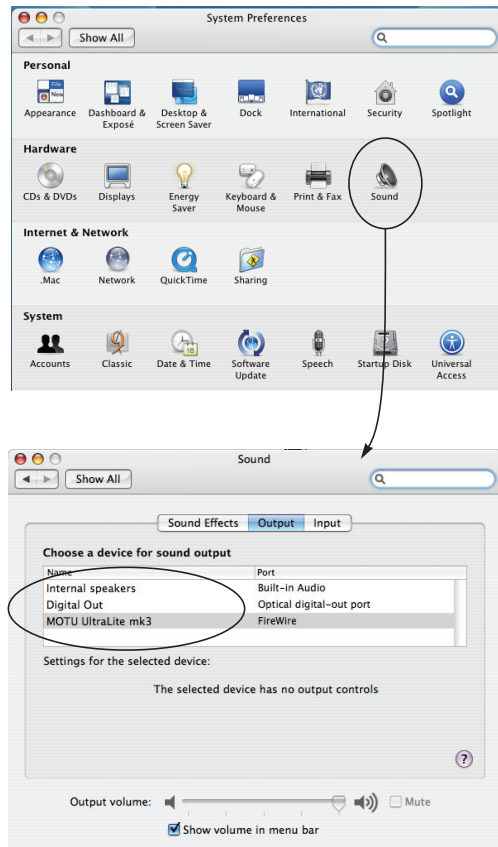
Figure 5-2: The Mac OS X sound preferences let you use the UltraLite-mk3 for general stereo audio input and output for your Mac.

The *Default Stereo Input* and *Default Stereo Output* settings in MOTU Audio Setup (Figure 5-1 on page 30) let you specify the stereo input and output on the UltraLite-mk3 to be used when it is chosen as the audio I/O device in the system preferences.

Phones

The *Phones* setting lets you choose what you will hear from the headphone jack. Choose *Main Out 1-2* if you'd like the headphone output to match the main outs. Choose *Phones* if you would like the headphones to serve as their own independent output, which you can access as an independent output destination in your host audio software and as an output destination for the eight on-board CueMix FX mix busses.

Main Out Assign

Choose *Main Outs* from the *Main Out Assign* menu to treat the Main Outs as their own independent output pair. Choose any other output pair to cause the MAIN OUT jacks to mirror (duplicate) the output pair you choose.

Return Assign

The *Return Assign* menu lets you choose any pair of UltraLite-mk3 audio outputs. The audio signal from this output pair is then sent back to the computer via the *Stereo Return 1-2* bus. This stereo return bus from the UltraLite-mk3 appears in your host software alongside all other UltraLite-mk3 inputs, wherever your host software lists them.

The UltraLite-mk3 stereo return bus can be used for a variety of purposes. For example, you could use it to send a final mix being played through the UltraLite-mk3 back to the computer, where you could record it for mastering or archiving purposes.

As another example, you could use the stereo return bus to capture tracks played from your host software, along with live inputs being routed directly through the UltraLite-mk3 hardware via CueMix FX (with or without CueMix effects processing on the live inputs).

'GENERAL' TAB SETTINGS

Launch MOTU Audio Setup when hardware becomes available

Check this option if you would like the MOTU Audio Setup icon to appear in the application dock as soon as a MOTU FireWire interface is detected (switched on, plugged in, etc.)

Edit Channel Names

Click the *Edit Channel Names* button to open the Channel Names window (Figure 5-3). This window lets you edit the names of the UltraLite-mk3 inputs and outputs, as they appear in your host audio software. For example, when you click on a menu that displays the UltraLite-mk3 inputs (or outputs), you will see the names you specify in this window (e.g. "vocal mic", "lead guitar", etc.), instead of the default generic names ("Analog 1", "Analog 2", etc.)

☞ Not all Mac OS X audio software supports channel names. If not, you'll see generic port names in your host audio software.
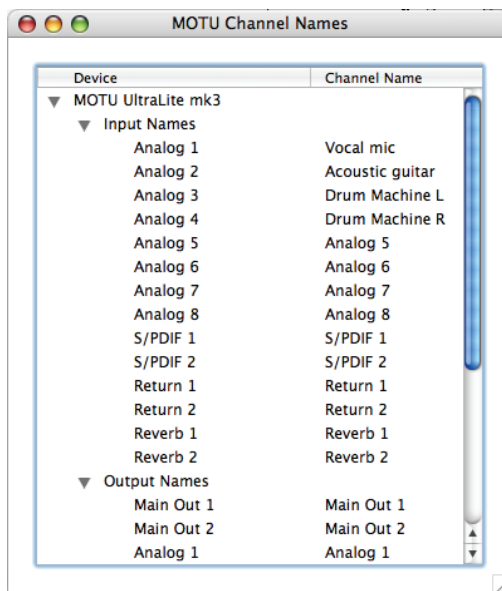
Figure 5-3: The Edit Channel Names window.
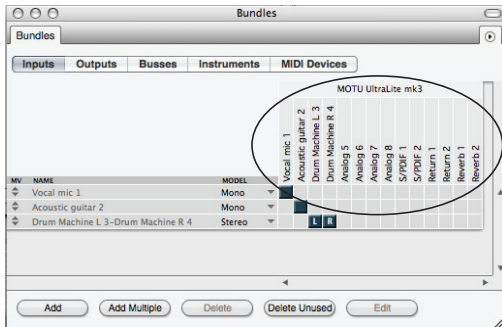
Figure 5-4: UltraLite-mk3 channel names as they appear in Digital Performer.

Enable Pedal

This setting applies to other MOTU FireWire audio interfaces, but it does not apply to the UltraLite-mk3.

CHAPTER 6 UltraLite-mk3 Front Panel Operation

OVERVIEW

The UltraLite-mk3 offers complete front-panel programming via four rotary encoders and a 2x16 backlit LCD display. All UltraLite-mk3 settings can be accessed via these front-panel controls.

PUSH-BUTTON ROTARY ENCODERS

All of the knobs on the UltraLite-mk3 front panel are push-button digital rotary encoders. In many cases, you can either push the knob or turn it to make a setting or toggle the LCD display (depending on the encoder and setting).

POWER SWITCH

Push the VOL knob to power on the UltraLite-mk3. Push in and hold the VOL knob to turn it off.

MIC/GUITAR INPUTS

The UltraLite-mk3 mic/guitar inputs are equipped with many features to handle a wide variety of recording situations.

For information about connections and settings, see "Mic/instrument inputs" on page 16 in the installation chapter.

For information about the many settings available for the mic/guitar inputs, see:

- "The Inputs tab" on page 68

- "The channel settings section" on page 72

- "The Channel tab" on page 72

- "The EQ tab" on page 74

- "The Dynamics tab" on page 80

Figure 6-1: The UltraLite-mk3 front panel mic/guitar inputs and phone jack.

PHONES

From the factory, the PHONES jack (Figure 6-1) is a discrete output at 44.1/48 kHz, but it can mirror any other output pair (digital or analog) or serve as its own independent output.

When you turn the phone VOL knob, the LCD display provides visual feedback:
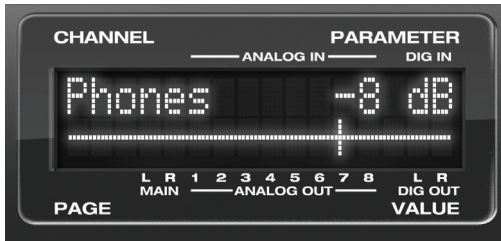
Figure 6-2: The LCD provides feedback as you adjust Phone volume.

To view the current setting without changing it, just push the knob (without turning it).

MAIN OUT VOLUME

Push the VOL knob twice to view and control the volume of the main outs on the rear panel.

Figure 6-3: The LCD provides feedback as you adjust Phone volume.

The MASTER volume adjustment can be programmed to control any combination of outputs. See "The Monitor Group" on page 85 for details.

The LCD is divided into four sections that correspond to the four knobs to the left.

When viewing CueMix settings in the LCD, push the CHANNEL knob to cycle among four main mixer menus: MIX, IN (inputs), OUT (outputs) and REVERB. Turn it to choose a channel.

Push the PARAM knob to cycle among three global menus: METER, CUEMIX (mixer) and SETUP.

Turn the PAGE knob to view settings for each channel. Push it to jump to the next section or back to the beginning.

Turn and/or push the VALUE knob to adjust the current setting.

Figure 6-4: The UltraLite-mk3 front panel controls.

MULTI-FUNCTION LCD DISPLAY

The LCD provides access to the many UltraLite-mk3 settings, as well as visual feedback of the current parameter being modified.

Parameter "zooming"

For many settings, the LCD temporarily "zooms in" to display a long-throw meter and alpha-numeric display to give you precise, real-time feedback as you adjust the setting. For example, if you change the headphone volume, the LCD displays a level meter and gain reduction reading that updates as you turn the volume knob, as shown in Figure 6-2 on page 36. After a brief time-out, the display returns to its previous state before you turned the volume knob.

Four global display modes

Push the PARAM knob to cycle the LCD among four global display modes:

METER DISPLAY

To access the METER display, push the PARAM knob until you see *METER* displayed in the LCD. The METER display (Figure 6-5) provides comprehensive metering for each input and output. The labels above and below the LCD indicate the meters for each input and output pair, including the S/PDIF input and output (labeled DIG IN and DIG OUT, respectively).
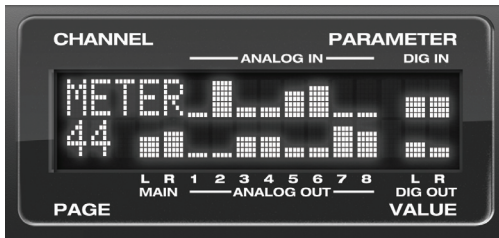
Figure 6-5: METER mode.

AUDIO MENU

To access the UltraLite-mk3 AUDIO menu, push the PARAM knob until you see *AUDIO* displayed in the LCD. This menu provides basic audio-related. Turn the PARAM knob to access each setting. Each setting in the AUDIO menu has a corresponding setting in the MOTU Audio Setup software, as shown below:

Audio menu item	Where to find more information
Clock Source*	"Clock Source" on page 30
Sample rate*	"Sample Rate" on page 30
Phones Assign	"Phones" on page 32
Main Out Assign	"Main Out Assign" on page 32
Return Assign	"Return Assign" on page 32

* If the UltraLite-mk3 is currently connected to a computer, this setting cannot be changed from the front-panel LCD. It must be changed in MOTU Audio Setup instead. Or, you can disconnect the UltraLite-mk3 from the computer to change the Clock Source from the front panel.

SETUP MENU

To access the UltraLite-mk3 SETUP menu, push the PARAM knob until you see *SETUP* displayed in the LCD. This menu provides basic features for managing the UltraLite-mk3 hardware. Turn the PARAM knob to access each setting. The first five settings in the SETUP menu have corresponding settings in the MOTU Audio Setup software, as shown below:

LCD Contrast

Turn the VALUE knob to adjust the LCD contrast.

Save/Name Preset

An UltraLite-mk3 preset holds all current CueMix FX mix settings (everything in the CUEMIX menu). SETUP menu parameters are not included. Turn the VALUE knob to move from character to character in the preset name. Turn PAGE to change the currently flashing letter. Once you've named the preset, push VALUE to save it, turn it again to choose the desired preset slot you

wish to save it to (1-16), and the push again to confirm the save. To cancel the save operation at any time, turn the PARAM knob.

Load Preset
Turn VALUE to choose the preset you wish to load (1-16) and push VALUE to load it.

MIDI Thru in standalone
Turn VALUE to enable (Y) or disable (N) the UltraLite-mk3's *MIDI Thru* feature when the it is being operated stand-alone (not connected to a computer via FireWire). When MIDI Thru is enabled, the MIDI IN jack passes MIDI data directly to the MIDI OUT jack. This allows you, for example, to play a sound module connected to the MIDI OUT from a keyboard controller connected to the MIDI IN, without a computer connected.

All Notes Off
The *All Notes Off* setting sends a MIDI *All Notes Off* message, as well as a MIDI note-off message for every note on every MIDI channel. This stops any stuck notes that are currently playing. Push VALUE to send the All Notes Off MIDI data.

AutoSave Status
All of the parameters in the UltraLite-mk3 are periodically saved automatically in its memory, so that if you power down the unit, it will power back up in the same state. AutoSave Status tells you the current state of this process: *Change Detected*, *Saving…* or *Saved*. If it says *Saved*, it is ready to be powered down. If it says *Change Detected* or *Saving…*, wait until it changes to *Saved*.

Factory Defaults
Push VALUE to restore the UltraLite-mk3 hardware to its factory default settings. Push VALUE again to confirm, or turn PARAM to cancel.

CUEMIX MENU
To access the CUEMIX menu, push the PARAM knob until you see *CUEMIX* displayed in the LCD. This menu displays the settings for the UltraLite-mk3 CueMix FX mixer.

CueMix mixer basics
It is much easier to navigate the CUEMIX menu in the LCD if you have a general understanding of the CueMix FX mixer. We strongly recommend that you review chapter 11, "CueMix FX" (page 63) before learning the LCD, especially "CueMix FX basic operation" on page 65.

CUEMIX menu organization
Mixer settings are divided into four sub-menus, which correspond to the Inputs, Mixes, Outputs and Reverb tabs in the CueMix FX software:

- IN (inputs)
- OUT (outputs)
- MIX (Mixes)
- REVERB (reverb processor)

Navigating the four main menus
To access the four main menus above, push the CHANNEL knob repeatedly. Then turn the CHANNEL knob to select the desired channel or mix.

The IN (inputs) menu

Push the CHANNEL button repeatedly until you see "I:" in the channel section of the LCD (Figure 6-6). This is similar to accessing the Inputs tab in CueMix FX console ("The Inputs tab" on page 68).

Figure 6-6: The IN (inputs) menu.

Choosing a channel

Once you see the Inputs menu (Figure 6-6) in the LCD, turn the CHANNEL knob to select the desired input that you wish to edit. This is roughly equivalent to specifying an input channel strip to work with in the Inputs tab in CueMix FX software (Figure 11-3 on page 68).

Choosing a setting to modify

Once you've selected an input channel, you can access the various settings for that channel using the PAGE knob and PARAMETER knobs.

Turn the PAGE knob to scroll through channel settings such as individual bands of EQ, the compressor, reverb sends, etc. Push the PAGE knob

to jump to the next "section" of parameters or to jump back to the beginning of the list. This is roughly the equivalent of moving through the various channel controls in an individual input channel strip in CueMix FX (Figure 11-3 on page 68), as well as the settings in the Channel tab (Figure 11-8 on page 72).

Turn the PARAMETER knob to scroll through individual parameters, such as the frequency for the current band of EQ. This is roughly equivalent to the parameters in the EQ tab (Figure 11-10 on page 74), Dynamics tab (Figure 11-21 on page 80) and Reverb tab (Figure 11-23 on page 83) in the CueMix FX software.

Adjusting the value of a parameter

Turn the VALUE knob to adjust the value of the current PARAMETER. Some parameters have default values. If so, push the VALUE knob to cycle through them.

Inactive items

If a menu item is inactive for some reason (perhaps it doesn't currently apply or it is disabled), it is displayed in parentheses.

Copying and pasting

EQ, dynamics and Mix Assign settings allow you to copy and paste settings between EQ bands and/or channels. Push the VALUE knob to copy, scroll to the other item and then push again to paste.

Summary of Inputs menu settings

For a summary of Inputs menu settings, see "Inputs menu" on page 41.

The OUT (Outputs) menu

Push the CHANNEL button repeatedly until you see "O:" in the channel section of the LCD (Figure 6-7). This is similar to accessing the Outputs tab in CueMix FX console ("The Outputs tab" on page 70).

"O:" Indicates the OUT (outputs) menu.

The current channel.

Access individual parameters here, such as the frequency setting for a band of EQ.

"Pages" are groups of channel settings, such as one band of EQ.

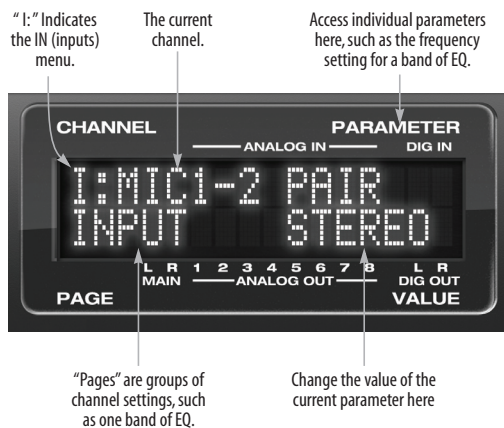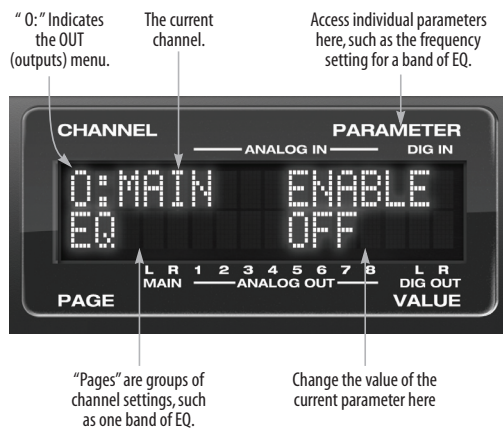Change the value of the current parameter here

Figure 6-7: The OUT (outputs) menu.

Choosing a channel

Once you see the Outputs menu (Figure 6-7) in the LCD, turn the CHANNEL knob to select the desired output that you wish to edit. This is roughly equivalent to specifying an output channel strip to work with in the Outputs tab in CueMix FX software (Figure 11-6 on page 71).

Working with outputs in the LCD

Once you've selected an output channel, you can access the various settings for that channel using the PAGE knob and PARAMETER knobs. The knobs function the same as described for inputs in "Choosing a setting to modify" on page 39 and "Adjusting the value of a parameter" on page 39.

Summary of Output menu settings

For a summary of Inputs menu settings, see "Outputs menu" on page 42.

The MIX (Mixes) menu

Push the CHANNEL button repeatedly until you see "MIX 1" (or "MIX 2", etc.) in the channel section of the LCD (Figure 6-8). This is similar to accessing the Mixes tab in CueMix FX console ("The Mixes tab" on page 66).

The current mix bus.

Access individual parameters here, such as input channel settings.

Here, choose master fader settings, reverb settings, and individual input channels.

Change the value of the current parameter here
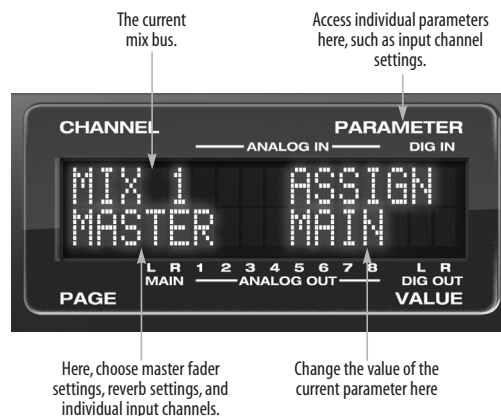
Figure 6-8: The MIX (Mixes) menu.

Choosing a mix bus

Once you see the MIX menu (Figure 6-8) in the LCD, turn the CHANNEL knob to select the desired mix that you wish to edit. This is roughly equivalent to choosing a mix in the Mixes tab in CueMix FX software (Figure 11-2 on page 66).

Working with mix busses in the LCD

Once you've selected a mix, you can access the various settings for that mix using the PAGE knob and PARAMETER knobs. The knobs function the same as described for inputs in "Choosing a setting to modify" on page 39 and "Adjusting the value of a parameter" on page 39. The PAGE knob scrolls through the following mix bus settings:

■ MASTER — these are master fader settings, such as the master fader output assignment, master mute on/off, and the master fader volume. Access them with the PARAMETER knob.

■ REVERB — these are the reverb send and return controls for the bus master fader. Access them with the PARAMETER knob.

■ Individual channels — once you scroll past MASTER and REVERB, the PAGE knob then scrolls through all available inputs for the mix bus. Once you choose an input, access its channel settings using the PARAM knob and VALUE knob.

Summary of Mix menu settings
For a summary of Mix menu settings, see "Mixes menu" on page 42.

The REVERB settings
Push the CHANNEL button repeatedly until you see "REVERB" in the channel section of the LCD (Figure 6-9). This is similar to accessing the Reverb tab in CueMix FX ("The Reverb tab" on page 83).

☞ The REVERB processor is not available at sample rates above 48 kHz. Therefore, when the UltraLite-mk3 is operating at 88.2 kHz or higher, the REVERB menu does not appear in the LCD.
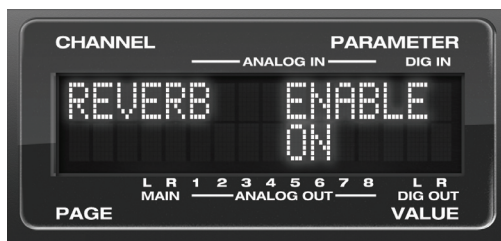
Figure 6-9: The REVERB settings.

Once you've selected the REVERB menu, you can access all settings using the PARAMETER and VALUE knobs. The PAGE knob is not needed and is therefore disabled when editing reverb settings.

Summary of Reverb menu settings
See "Reverb menu" on page 42 for a summary.

INPUTS MENU

CHANNEL	PAGE	PARAM
INPUTS mic 1-2 Analog 1-2 Analog 3-4 etc.	INPUT	PAIR PHASE L-R/M-S (stereo or M/S) SWAP WIDTH TRIM
	EQ (global)	ENABLE COPY PASTE RESET
	HPF (High-pass)	ENABLE SLOPE FREQ
	LF (Low w/shelf)	ENABLE TYPE FREQ GAIN WIDTH
	LMF (Low-mid)	ENABLE TYPE FREQ GAIN WIDTH
	MF (Mid)	ENABLE TYPE FREQ GAIN WIDTH
	HMF (High-mid)	ENABLE TYPE FREQ GAIN WIDTH
	HF (High w/shelf)	ENABLE TYPE FREQ GAIN WIDTH
	LPF (Low-pass)	ENABLE SLOPE FREQ
	DYN (Dynamics)	ENABLE COPY PASTE RESET
	COMP (Compressor)	ENABLE MODE THRESH RATIO ATTACK RELEASE TRIM
	LEVELER	ENABLE MODE REDUCE MAKEUP
	REVERB	SEND SEND PAN (mono only)

OUTPUTS MENU

CHANNEL	PAGE	PARAM
OUTPUTS Main Analog 1-2 Analog 3-4, etc.	EQ (global)	ENABLE COPY PASTE RESET
	HPF (High-pass)	ENABLE SLOPE FREQ
	LF (Low w/shelf)	ENABLE TYPE FREQ GAIN WIDTH
	LMF (Low-mid)	ENABLE TYPE FREQ GAIN WIDTH
	MF (Mid)	ENABLE TYPE FREQ GAIN WIDTH
	HMF (High-mid)	ENABLE TYPE FREQ GAIN WIDTH
	HF (High w/shelf)	ENABLE TYPE FREQ GAIN WIDTH
	LPF (Low-pass)	ENABLE SLOPE FREQ
	DYN (Dynamics)	ENABLE COPY PASTE RESET
	COMP (Compressor)	ENABLE MODE THRESH RATIO ATTACK RELEASE TRIM
	LEVELER	ENABLE MODE REDUCE MAKEUP
	REVERB	SEND SEND PAN
	MASTER	MONITOR TALKBACK LSNBACK

MIXES MENU

CHANNEL	PAGE	PARAM
MIXES Mix 1 Mix 2 etc.	MASTER	ASSIGN MUTE FADER COPY PASTE RESET
	REVERB	SEND RETURN
	ANALOG 1 ANALOG 2 etc. (if mono)	MUTE SOLO (BAL/WID) - n/a PAN FADER
	ANALOG 3-4 ANALOG 5-6 etc. (if stereo)	MUTE SOLO BAL/WID BAL FADER
	SP (S/PDIF)	MUTE SOLO BAL/WID BAL FADER

REVERB MENU

CHANNEL	PAGE	PARAM
REVERB	---	ENABLE TIME PREDELAY WIDTH CUT Hz CUT dB ROOM REFSIZE REF LEV LO % MID % HI % LO XOVR HI XOVR SPLIT

STAND-ALONE OPERATION

All settings, including all mix settings and global settings, are saved in the UltraLite-mk3's memory, and they remain in effect even when the UltraLite-mk3 is not connected to a computer. This allows you to use the UltraLite-mk3 as a stand-alone 8-bus mixer. You can make adjustments to any setting at any time from the front panel.

Digital Performer

OVERVIEW

This chapter provides a brief overview of Digital Performer's basic I/O and synchronization operation with the UltraLite-mk3 hardware.

SETTING UP YOUR SYSTEM

As described in chapter 4, "Installing the UltraLite-mk3 Mac Software" (page 25), the Digital Performer and MOTU UltraLite-mk3 software installers will properly install and update everything for you.

THE ULTRALITE-MK3 SETTINGS

Choose the UltraLite-mk3 as your audio input output device by choosing *Configure Audio System>Configure Hardware Driver* from the Setup menu. This window shows some of the UltraLite-mk3 settings, such as sample rate and clock source, but to access all of the UltraLite-mk3 settings, open MOTU Audio Setup, as shown in Figure 5-1 on page 30.
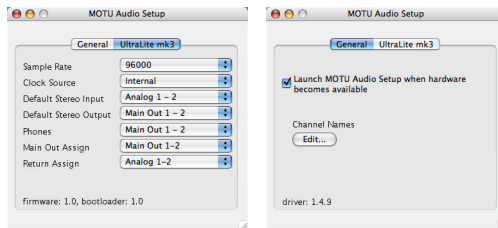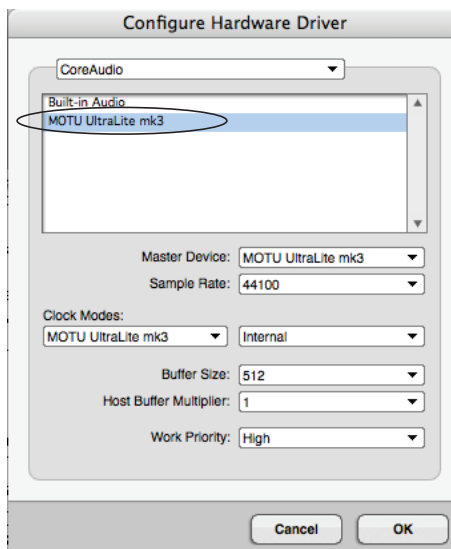
Figure 7-1: Choose Setup menu> Configure Audio System> Configure Hardware Driver to open the dialog shown above and access the UltraLite-mk3 Core Audio driver. To access the rest of the UltraLite-mk3 settings, open MOTU Audio Setup.

For complete details about the UltraLite-mk3 settings, see chapter 5, "MOTU Audio Setup" (page 29). The following sections provide a brief explanation of each UltraLite-mk3 setting for use with Digital Performer.

Sample rate

Choose the desired overall sample rate for the UltraLite-mk3 system and Digital Performer. Newly recorded audio in Digital Performer will have this sample rate. Imported audio or

soundbites in existing files that do not match this sample rate will be displayed in the Soundbites window with a red 'X' on its move handle to indicate that it cannot be played.

Clock Source

This setting is very important because it determines which audio clock the UltraLite-mk3 will follow.

If you do not have any digital audio connections to your UltraLite-mk3 (you are using the analog inputs and outputs only), and you will not be slaving your host software to external SMPTE time code, choose *Internal*.

If you have a S/PDIF digital audio device connected to the UltraLite-mk3, see "Connecting and syncing S/PDIF devices" on page 19.

If you are slaving the UltraLite-mk3 and Digital Performer to SMPTE time code via the UltraLite-mk3 itself, choose *SMPTE* and follow the directions in "Resolving DP or AudioDesk to SMPTE time code" on page 93.

Buffer Size

The *Buffer Size* setting can be used to reduce the delay — or *monitoring latency* — that you hear when live audio is patched through your UltraLite-mk3 hardware and Digital Performer. For example, you might have MIDI instruments, samplers, microphones, and so on connected to the analog inputs of the UltraLite-mk3. If so, you will often be mixing their live input with audio material recorded in Digital Performer. See chapter 10, "Reducing Monitoring Latency" (page 57) for complete details.

Phones

This UltraLite-mk3 setting lets you choose what you'll hear from the headphone jack. For example, if you choose *Main Out 1-2*, the headphones will duplicate the main outs. Or you can choose any

other output pair. If you choose *Phones 1-2*, this setting makes the headphone jack serve as its own independent output pair. As a result, you'll see *Phones 1-2* as an additional audio destination in Digital Performer's audio output menus.

Main Outs Assign

Use the Main Outs Assign setting to determine what audio you will hear on the TRS main outs of the UltraLite-mk3. If you would like to treat them as their own separate output pair, choose *Main Outs*.

Return Assign

In Digital Performer's audio input menus and the Bundles window, you'll see an UltraLite-mk3 input called *Return 1-2 (*Figure 7-2*)*. This is a stereo feed from the UltraLite-mk3 that matches the output of one of its output pairs. Use the Return Assign menu in MOTU Audio Setup to choose which output pair you would like to hear on this return. This can be used, for example, to record back a final stereo mix that includes effects processing from the UltraLite-mk3 DSP (such as the Leveler) for reference and archiving purposes.
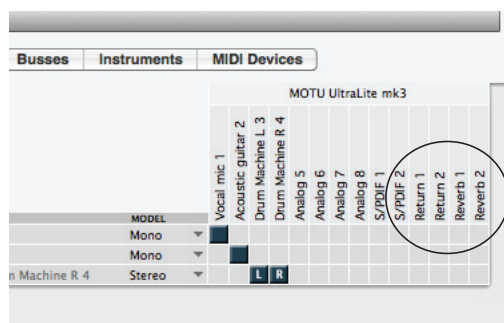

Figure 7-2: The stereo return and reverb return busses from the UltraLite-mk3 in Digital Performer's Bundles window.

☞ Warning: the Return inputs can cause feedback loops! DO NOT assign this input to a track that shares the same UltraLite-mk3 output pair as the returns.

Reverb return

The UltraLite-mk3 also supplies a return to Digital Performer that carries the output of its reverb processor (Figure 7-2). This return can be used for any purpose you wish.

WORKING WITH ULTRALITE-MK3 INPUTS AND OUTPUTS

Once you've enabled the MOTU FireWire Audio driver as explained earlier in "The UltraLite-mk3 settings" on page 43, UltraLite-mk3 audio inputs and outputs will appear in Digital Performer's audio input and output menus, as well as the Bundles window (Figure 7-2).

Phones 1-2

If you've chosen to treat the UltraLite-mk3 headphones as an independent output, you'll see *Phones 1-2* in Digital Performer's output menus. Audio tracks assigned to this output pair will be heard on the headphone jack only. For further explanation, see "Phones" on page 32.

24-BIT OPERATION

Your UltraLite-mk3 hardware fully supports Digital Performer's 24-bit recording capabilities, including both analog and digital 24-bit recording. If you would like to record and play back 24-bit audio files, go to the Setup menu, choose *Configure Audio System>Configure Sample Format*, and choose 24-bit recording as the sample format. This setting is saved with the Digital Performer project.

MIDI I/O VIA THE ULTRALITE-MK3 MIDI PORTS

Once you've followed the procedure for enabling the UltraLite-mk3's MIDI features as explained in "Software installation" on page 25, the UltraLite-mk3 MIDI ports will appear as a input source and output destination in Digital Performer's MIDI I/O menus.

PROCESSING LIVE INPUTS WITH PLUG-INS

If you patch a live input (such as MIDI synthesizer) through a plug-in effect in Digital Performer, you might hear a slight delay. There are several ways to reduce this delay. For details, see chapter 10, "Reducing Monitoring Latency" (page 57).

WORKING WITH CUEMIX FX MIXING AND EFFECTS

The UltraLite-mk3 provides powerful external mixing, EQ, compression and reverb, which you can operate hand-in-hand with Digital Performer's complete mixing environment. For example, the UltraLite-mk3 can serve as a monitor mixer routing channels to musicians, or it can serve as an integrated extension of your Digital Performer mixing environment. If you program an UltraLite-mk3 mixing and processing configuration that goes hand in hand with your DP project, be sure to use the file save features in CueMix FX to save the UltraLite-mk3 settings as a file in your DP project folder for instant recall of all settings. See chapter 11, "CueMix FX" (page 63) for complete details. You can even set up your UltraLite-mk3 configuration file as a DP startup clipping so that it automatically loads when you open the project. See your DP manual for details.

SYNCHRONIZATION

Together, Digital Performer and the UltraLite-mk3 have the ability to resolve directly to SMPTE time code, without an additional time code synchronizer. See "Syncing to SMPTE time code" on page 94.

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 Save As command and choose the AudioDesk 2.0 file format.

CHAPTER 8   AudioDesk

OVERVIEW

This chapter provides a brief overview of AudioDesk's basic I/O and synchronization operation with the UltraLite-mk3. For complete information about all of AudioDesk's powerful workstation features, see the AudioDesk manual included with your UltraLite-mk3.

SETTING UP YOUR SYSTEM

As described in chapter 4, "Installing the UltraLite-mk3 Mac Software" (page 25), the MOTU Audio software installer will properly install everything for you, including AudioDesk.

THE ULTRALITE-MK3 SETTINGS

Choose the UltraLite-mk3 as your audio input output device by choosing *Configure Audio System>Configure Hardware Driver* from the Setup menu. This window shows some of the UltraLite-mk3 settings, such as sample rate and clock source, but to access all of the UltraLite-mk3 settings, open MOTU Audio Setup, as shown in Figure 5-1 on page 30.
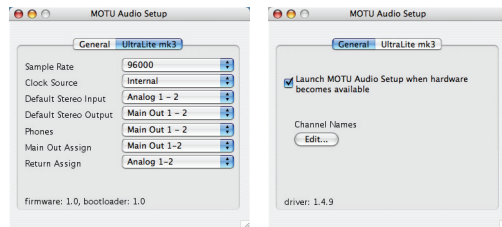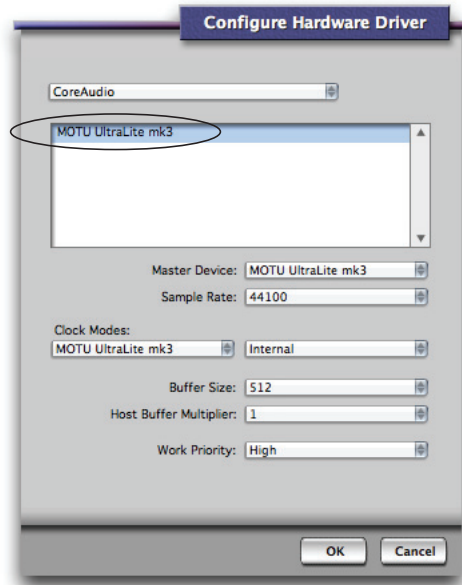
Figure 8-1: Choose Setup menu> Configure Audio System> Configure Hardware Driver to open the dialog shown above and access the UltraLite-mk3 Core Audio driver. To access the rest of the UltraLite-mk3 settings, open MOTU Audio Setup.

For complete details about the UltraLite-mk3 settings, see chapter 5, "MOTU Audio Setup" (page 29). The following sections provide a brief explanation of each UltraLite-mk3 setting for use with AudioDesk.

Sample rate

Choose the desired overall sample rate for the UltraLite-mk3 system and AudioDesk. Newly recorded audio in AudioDesk will have this sample rate. Imported audio or soundbites in existing files that do not match this sample rate will be displayed in the Soundbites window with a red 'X' on its move handle to indicate that it cannot be played.

Clock Source

This setting is very important because it determines which audio clock the UltraLite-mk3 will follow.

If you do not have any digital audio connections to your UltraLite-mk3 (you are using the analog inputs and outputs only), and you will not be slaving your host software to external SMPTE time code, choose *Internal*.

If you have a S/PDIF digital audio device connected to the UltraLite-mk3, see "Connecting and syncing S/PDIF devices" on page 19.

If you are slaving the UltraLite-mk3 and AudioDesk to SMPTE time code via the UltraLite-mk3 itself, choose *SMPTE* and follow the directions in "Resolving DP or AudioDesk to SMPTE time code" on page 93.

Buffer Size

The *Buffer Size* setting can be used to reduce the delay — or *monitoring latency* — that you hear when live audio is patched through your UltraLite-mk3 hardware and AudioDesk. For example, you might have MIDI instruments, samplers, microphones, and so on connected to the analog inputs of the UltraLite-mk3. If so, you will often be mixing their live input with audio material recorded in AudioDesk. See chapter 10, "Reducing Monitoring Latency" (page 57) for complete details.

Phones

This UltraLite-mk3 setting lets you choose what you'll hear from the headphone jack. For example, if you choose *Main Out 1-2*, the headphones will duplicate the main outs. Or you can choose any other output pair. If you choose *Phones*, this setting makes the headphone jack serve as its own independent output pair. As a result, you'll see *Phones 1-2* as an additional audio destination in AudioDesk's audio output menus.

Main Outs Assign

Use the Main Outs Assign setting to determine what audio you will hear on the TRS main outs of the UltraLite-mk3. If you would like to treat them as their own separate output pair, choose *Main Outs*.

Return Assign

In AudioDesk's audio input menus and the Bundles window, you'll see an UltraLite-mk3 input called *Return 1-2 (*Figure 8-2*)*. This is a stereo feed from the UltraLite-mk3 that matches the output of one of its output pairs. Use the Return Assign menu in MOTU Audio Setup to choose which output pair you would like to hear on this return. This can be used, for example, to record back a final stereo mix that includes effects processing from the UltraLite-mk3 DSP (such as the Leveler) for reference and archiving purposes.
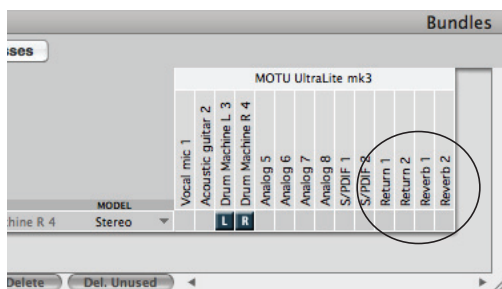

Figure 8-2: The stereo return and reverb return busses from the UltraLite-mk3 in AudioDesk's Bundles window.

☛ Warning: the Return inputs can cause feedback loops! DO NOT assign this input to a track that shares the same UltraLite-mk3 output pair as the returns.

Reverb return

The UltraLite-mk3 also supplies a return to AudioDesk that carries the output of its reverb processor (Figure 8-2). This return can be used for any purpose you wish.

WORKING WITH ULTRALITE-MK3 INPUTS AND OUTPUTS

Once you've enabled the MOTU FireWire Audio driver as explained earlier in "The UltraLite-mk3 settings" on page 47, UltraLite-mk3 audio inputs and outputs will appear in AudioDesk's audio input and output menus.

Phones 1-2

If you've chosen to treat the UltraLite-mk3 headphones as an independent output, you'll see *Phones 1-2* in AudioDesk's output menus. Audio tracks assigned to this output pair will be heard on the headphone jack only. For further explanation, see "Phones" on page 48.

24-BIT OPERATION

Your UltraLite-mk3 hardware fully supports AudioDesk's 24-bit recording capabilities, including both analog and digital 24-bit recording. If you would like to record and play back 24-bit audio files, go to the Setup menu, choose *Configure Audio System>Configure Sample Format*, and choose 24-bit recording as the sample format. This setting is saved with the AudioDesk project.

MIDI I/O VIA THE ULTRALITE-MK3 MIDI PORTS

Once you've followed the procedure for enabling the UltraLite-mk3's MIDI features as explained in "Software installation" on page 25, the UltraLite-mk3 MIDI ports will appear as a input source and output destination in AudioDesk's MIDI I/O menus.

PROCESSING LIVE INPUTS THROUGH PLUG-INS

If you patch a live input (such as MIDI synthesizer) through a plug-in effect in AudioDesk, you might hear a slight delay. There are several ways to reduce this delay. For details, see chapter 10, "Reducing Monitoring Latency" (page 57).

WORKING WITH CUEMIX FX MIXING AND EFFECTS

The UltraLite-mk3 provides powerful external mixing, EQ, compression and reverb, which you can operate hand-in-hand with AudioDesk's complete mixing environment. For example, the UltraLite-mk3 can serve as a monitor mixer routing channels to musicians, or it can serve as an integrated extension of your AudioDesk mixing environment. If you program an UltraLite-mk3 mixing and processing configuration that goes hand in hand with your AudioDesk project, be sure to use the file save features in CueMix FX to save the UltraLite-mk3 settings as a file in your AudioDesk project folder for instant recall of all settings. See chapter 11, "CueMix FX" (page 63) for complete details.

SYNCHRONIZATION

Together, AudioDesk and the UltraLite-mk3 have the ability to resolve directly to SMPTE time code, without an additional time code synchronizer. See "Syncing to SMPTE time code" on page 94.

EXCHANGING PROJECTS WITH DIGITAL PERFORMER

To open AudioDesk Version 2 (or Version 1) files in Digital Performer, just use DP's Open command. (No conversion is required beforehand in AudioDesk.) To export a Digital Performer project to AudioDesk, use Save As in Digital Performer's File menu and choose the *AudioDesk 2.0* file format. Then open the resulting AudioDesk 2.0 document in AudioDesk.

AUDIODESK AND MIDI SEQUENCING

AudioDesk can play audio as a background application, allowing you to run a sequencer at the same time in the foreground. However, there is no way to continuously synchronize — or *resolve* — a sequencer with AudioDesk, so the two programs will eventually drift out of sync, even if you manage to start them at the same time. If you'd like to do integrated MIDI sequencing, your best bet is Digital Performer, which offers pretty much all of the same features as AudioDesk, along with powerful, state-of-the-art MIDI sequencing. Talk to your authorized MOTU dealer for details about upgrading from AudioDesk to Digital Performer.

CHAPTER 9   Other Mac OS X Software

OVERVIEW

The UltraLite-mk3 provides multichannel audio and MIDI input and output for all Mac OS X audio applications, including 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.

INSTALLING THE ULTRALITE-MK3 MAC OS X DRIVERS

To install the UltraLite-mk3's Mac OS X audio and MIDI drivers, just run the installer on the MOTU Audio installer CD as detailed in chapter 4, "Installing the UltraLite-mk3 Mac Software" (page 25).

PREPARING MIDI INPUT AND OUTPUT

If you will be using the UltraLite-mk3's MIDI input and output ports, be sure to follow the procedure in "Preparing MIDI input and output" on page 51.

RUN MOTU AUDIO SETUP

Before you run your host audio software, launch MOTU Audio Setup to configure your UltraLite-mk3 hardware. MOTU Audio Setup lets you configure your audio interface, and it lets you enable the desired inputs and outputs. Only enabled inputs and outputs will be available to your software, so this is an important step. For complete details see chapter 5, "MOTU Audio Setup" (page 29).
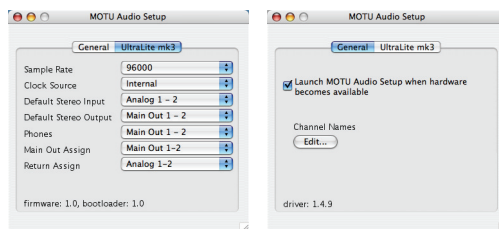

Figure 9-1: MOTU Audio Setup.

For complete details about the UltraLite-mk3 settings, see chapter 5, "MOTU Audio Setup" (page 29). The following sections provide a brief explanation of each UltraLite-mk3 setting for use with Logic and other Mac OS X audio software.

Sample rate

Choose the desired overall sample rate for the UltraLite-mk3 system and your host audio software. Newly recorded audio will have this sample rate.

Clock Source

This setting is very important because it determines which audio clock the UltraLite-mk3 will follow.

If you do not have any digital audio connections to your UltraLite-mk3 (you are using the analog inputs and outputs only), and you will not be slaving your host software to external SMPTE time code, choose *Internal*.

If you have a S/PDIF digital audio device connected to the UltraLite-mk3, see "Connecting and syncing S/PDIF devices" on page 19.

If you are slaving the UltraLite-mk3 and your host software to SMPTE time code, follow the directions in "Syncing to SMPTE time code" on page 94.

Phones

This UltraLite-mk3 setting lets you choose what you'll hear from the headphone jack. For example, if you choose *Main Out 1-2*, the headphones will duplicate the main outs. Or you can choose any other output pair. If you choose *Phones 1-2*, this setting makes the headphone jack serve as its own independent output pair. As a result, you'll see *Phones 1-2* as an additional audio destination in your host's audio output menus.

Main Outs Assign

Use the Main Outs Assign setting to determine what audio you will hear on the XLR main outs of the UltraLite-mk3. If you would like to treat them as their own separate output pair, choose *Main Outs*. Note that when operating at 176.4 or 192 kHz, the main outs must mirror one of the TRS analog output pairs.

Return Assign

In your OS X host audio software audio input menus, you'll see an UltraLite-mk3 input called *Return 1-2*. This is a stereo feed from the UltraLite-mk3 that matches the signal of one of its output pairs. Use the Return Assign menu in MOTU Audio Setup to choose which output pair you would like to hear on this return. This can be used, for example, to record back a final stereo mix that includes effects processing from the UltraLite-mk3 DSP (such as the Leveler) for reference and archiving purposes.

☞ Warning: the Return inputs can cause feedback loops! DO NOT assign this input to a track that shares the same UltraLite-mk3 output pair as the returns.

Reverb return

The UltraLite-mk3 also supplies a return to your host software that carries the output of its reverb processor. This return can be used for any purpose you wish.

CHOOSING THE MOTU FIREWIRE CORE AUDIO 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 UltraLite-mk3 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 UltraLite-mk3 from this menu.

Logic Pro and Logic Express

In Logic Pro and Logic Express, go to the Preferences window, click the *Audio* tab, click the *Driver*s tab and click the *Core Audio* tab as shown in Figure 9-2. Choose the *MOTU UltraLite-mk3* from the Driver menu. For information about the *I/O Buffer Size* setting, see "Adjusting the audio I/O buffer" on page 59.
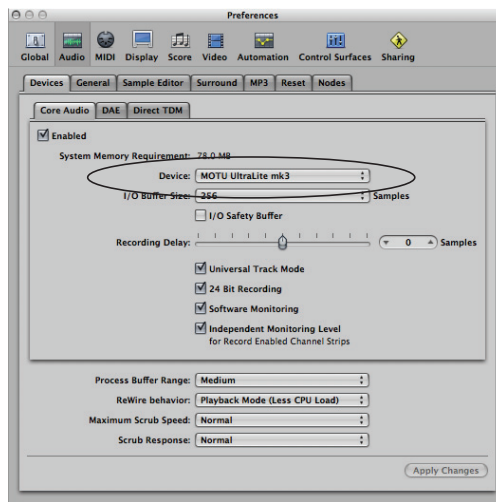

Figure 9-2: Enabling the UltraLite-mk3 in Logic Pro or Logic Express.

Soundtrack Pro

In Soundtrack Pro, access the preferences window, click the Recording tab and choose *MOTU UltraLite-mk3* from the *Input* and *Monitor* menu as shown below in Figure 9-3.
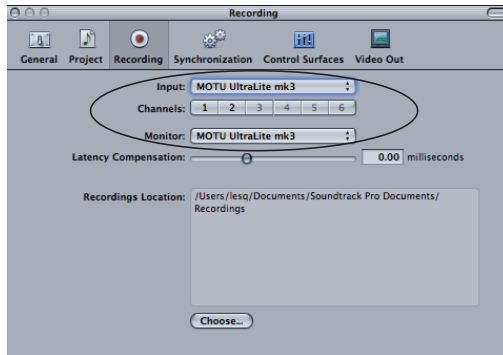

Figure 9-3: Enabling the UltraLite-mk3 in Soundtrack Pro.

Garage Band

In Garage Band, go to the *Audio/MIDI* preferences and choose *MOTU UltraLite-mk3* from the *Audio Output* and *Audio Input* menus as shown below in Figure 9-4. For information about the *Optimize for* setting, see "Adjusting the audio I/O buffer" on page 59.
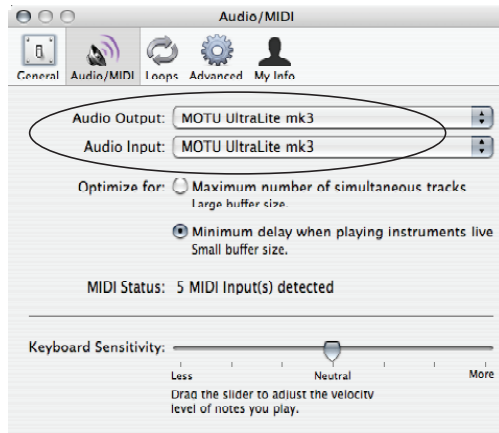

Figure 9-4: Enabling the UltraLite-mk3 in Garage Band.

Live

In Ableton Live, access the preferences window and click the *Audio* tab. Choose *CoreAudio* from the *Driver Type* menu. Choose the *MOTU UltraLite-mk3* from the *Input Audio Device* and *Output Audio Device* menus as shown below in Figure 9-5. For information about the *Buffer Size* setting, see "Adjusting the audio I/O buffer" on page 59.

Figure 9-5: Enabling the UltraLite-mk3 in Live.

Reason

In Propellerhead Reason, go to the Preferences window, choose *Audio* preferences from the menu and choose *MOTU UltraLite-mk3* from the *Audio Output* menu as shown below in Figure 9-6. For information about the *Buffer Size* setting, see "Adjusting the audio I/O buffer" on page 59.
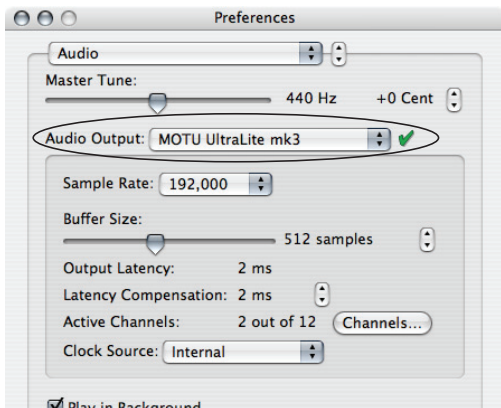

Figure 9-6: Enabling the UltraLite-mk3 in Reason.

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 UltraLite-mk3* from the *Master ASIO Driver* menu as shown below in Figure 9-7. 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 59.
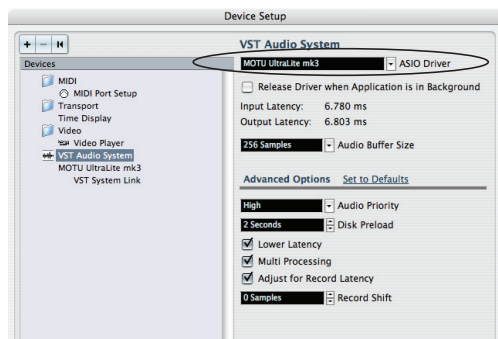

Figure 9-7: Enabling the UltraLite-mk3 audio driver in Cubase.

Other audio software

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

WORKING WITH ULTRALITE-MK3 INPUTS AND OUTPUTS

Once you've enabled the UltraLite-mk3's Core Audio driver, UltraLite-mk3 audio inputs and outputs will appear in your host software wherever audio inputs and outputs are listed.

AUDIO INPUT AND OUTPUT NAMES

The UltraLite-mk3 Core Audio driver supplies text string labels for its inputs and outputs to clearly identify each one, but some applications do not display these labels. For example, in Cubase, the UltraLite-mk3 outputs are numbered like this:
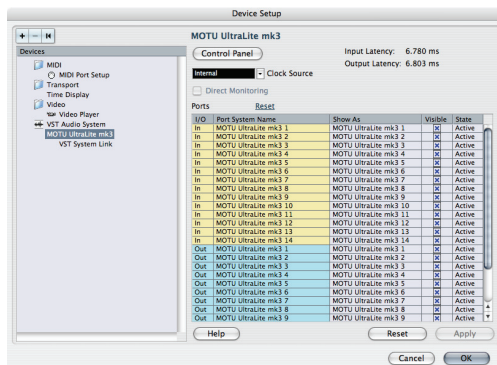

Figure 9-8: Some applications number the UltraLite-mk3 inputs and outputs, but don't display which outputs they refer to.

The following tables show how you can identify each input and output in a numbered list like this.

Input	Number of Channels	List position	Comment
Analog	8	1-8	-
SPDIF	2	9-10	-
Stereo return	2	11-12	See "Return Assign" on page 52.
Reverb return	2	13-14	See "Reverb return" on page 52.

Outputs are listed in this order:

Output	Channels	List position
Main	2	1-2
Analog	8	3-10
SPDIF	2	11-12
Phones	2	13-14

NUMBER OF CHANNELS

If your host audio software requires that you specify the number of audio voices or channels you will be using, be sure to choose enough channels to cover the 10 inputs and 14 outputs provided by your UltraLite-mk3.

MIDI I/O VIA THE ULTRALITE-MK3 MIDI PORTS

Once you've followed the procedure for enabling the UltraLite-mk3's MIDI features as explained in "Software installation" on page 25, the UltraLite-mk3 MIDI ports will appear as an input source and output destination in your host software's MIDI I/O menus.

PROCESSING LIVE INPUTS WITH HOST PLUG-INS

If you patch a live input (such as a MIDI synthesizer) 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 10, "Reducing Monitoring Latency" (page 57).

WORKING WITH CUEMIX FX MIXING AND EFFECTS

The UltraLite-mk3 provides powerful external mixing, EQ, compression and reverb, which you can operate hand-in-hand with your host's mixing environment. For example, the UltraLite-mk3 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 an UltraLite-mk3 mixing and processing configuration that goes hand in hand with your host project, be sure to use the file save features in CueMix FX to save the UltraLite-mk3 settings as a file in your host project folder for instant recall of all settings. See chapter 11, "CueMix FX" (page 63) for complete details.

SYNCHRONIZATION

If your host audio software supports Core Audio's sample-accurate positioning protocol, then it can resolve to the UltraLite-mk3's built-in time code synchronization feature. To resolve your UltraLite-mk3 directly to SMPTE time code with no additional synchronization devices, use the setup shown in "Syncing to SMPTE time code" on page 94.

CHAPTER 10 Reducing Monitoring Latency

OVERVIEW

Monitoring latency is that slight delay you hear when you run an input signal through your host audio software. For example, you might hear it when you drive a live mic 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 UltraLite-mk3 input, passes through the UltraLite-mk3 hardware into the computer, through your host audio software, and then back out to an UltraLite-mk3 output.

If you don't need to process a live input with plug-ins, the easiest way to avoid monitoring latency is to use the UltraLite-mk3's CueMix FX digital mixer to patch the input directly to your monitor outs via the UltraLite-mk3 audio hardware. The UltraLite-mk3 even provides effects processing (EQ, compression and reverb), which can be applied on input, output, or even at the bussing stage, just like a conventional mixer. For details, see "CueMix FX hardware monitoring" on page 61.

If you *do* need to process a live input with plug-ins, or if you are playing virtual instruments live through your UltraLite-mk3 audio hardware, you can significantly reduce latency — and even make it completely inaudible, regardless of what host audio application software you use. This chapter explains how.

It is important to note that monitoring delay has no effect on when audio data is recorded to disk or played back from disk. Actual recording and playback is extremely precise.

MONITORING LIVE INPUT

There are two ways to monitor live audio input with an UltraLite-mk3: 1) through the computer or 2) via the Ultralite-mk3's CueMix FX hardware mixer. Figure 10-1 below shows method 1, which allows you to add effects processing such as reverb and guitar amp effects via plug-ins in your audio software. See the next section, "Adjusting the audio I/O buffer" for details about how to reduce — and possibly eliminate — the audible monitoring delay that the computer introduces.

Figure 10-2 shows how to use CueMix FX hardware-based monitoring, which lets you hear what you are recording with no monitoring delay and no computer-based effects processing. Instead, input is routed directly to an output, either with or without UltraLite-mk3-based effects processing (EQ, compression or reverb). See

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

If the material you are recording is suitable, there is a third way to monitor live input: use both methods (Figure 10-1 and Figure 10-2) 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 — or perhaps with a touch of UltraLite-mk3 Classic Reverb.

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

2. Mic signal goes immediately to the computer (dry, with no effects processing).

3. Mic signal is 'patched thru' back to the audio interface with reverb or other 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).
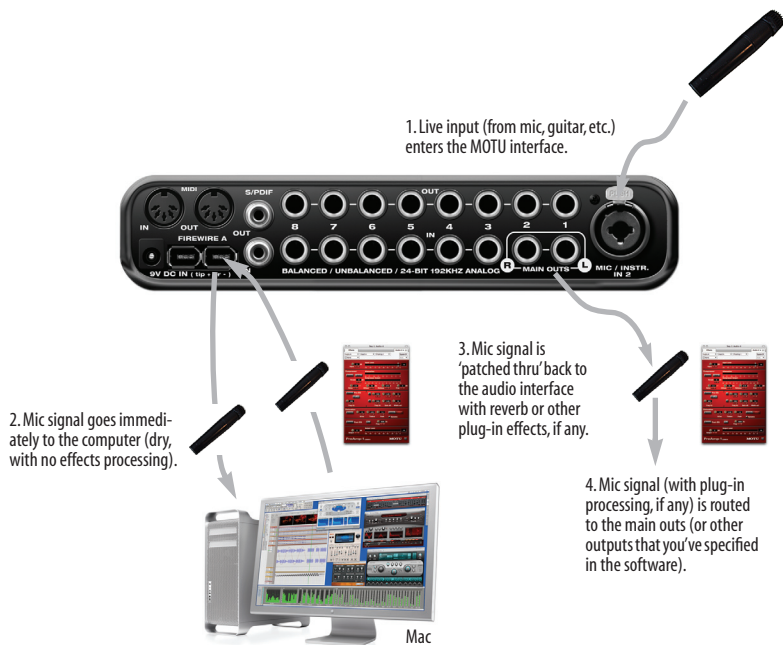
Mac

Figure 10-1: There are two ways to monitor live audio inputs with an UltraLite-mk3: 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.

ADJUSTING THE AUDIO I/O BUFFER

A *buffer* is a small amount of computer memory used to hold data. For audio interfaces like the UltraLite-mk3, 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.

Under Mac OS X, audio I/O buffer size is handled by the host audio application (not the UltraLite-mk3 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.
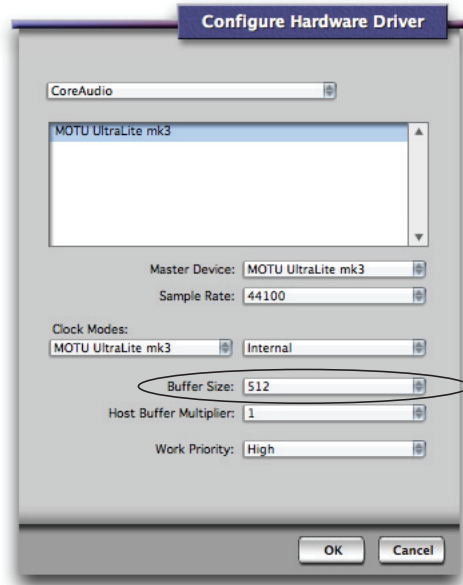
Figure 10-3: In Digital Performer and AudioDesk, choose Setup menu> Configure Audio System> Configure Hardware Driver to open the dialog shown above and access the Buffer Size setting. Refer to your Digital Performer or AudioDesk manual for information about the Host Buffer Multiplier setting.

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

3. Mic signal is mixed with the main outs, and you can control the volume (relative to the rest of the mix) with the mic's fader in CueMix FX.

2. CueMix FX immediately patches the live mic signal directly to the main outs (or other output), completely bypassing the computer. This signal could be dry, or with UltraLite-mk3 effects processing, such as EQ, compression or Classic Reverb.
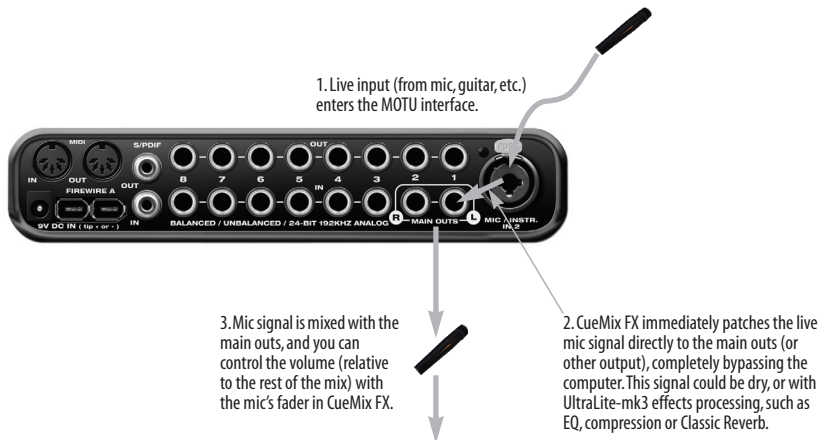
Figure 10-2: This diagram shows the signal flow when using CueMix FX no-latency monitoring. Notice that this method does not process the live input with plug-ins in your audio software. Instead, you can apply UltraLite-mk3 effects, such as the reverb, EQ and/or compression.
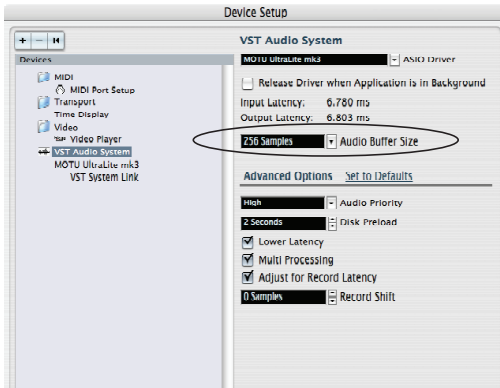
Figure 10-4: In Cubase SX or Nuendo, choose Devices menu> Device Setup and click VST Audiobay to access the window above and the Audio Buffer Size setting.
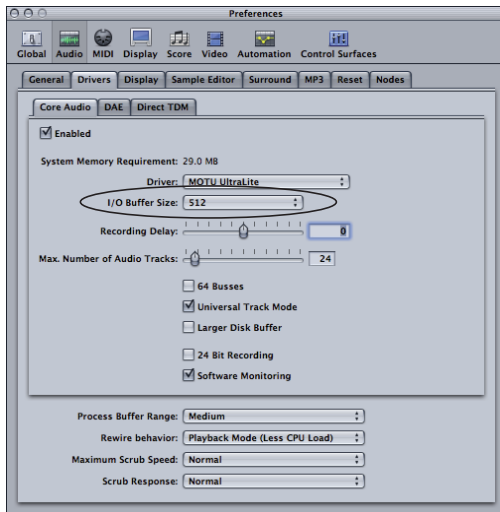

Figure 10-5: In Logic Pro or Logic Express, go to the Audio Driver preferences to access the Buffer Size option shown above.

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 AudioDesk, Digital Performer or other 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 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.
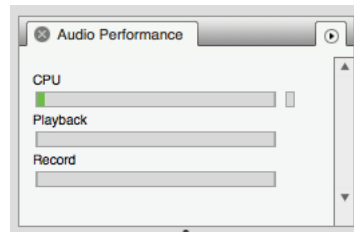

Figure 10-6: When adjusting the buffer size to reduce monitoring latency, watch the 'processor' meter in Digital Performer or AudioDesk's Performance Monitor. If you hear distortion, or if the Performance meter is peaking, try raising the buffer size.

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 UltraLite-mk3 has a more direct method of patching audio through the system. This method is called *CueMix FX*. When enabled, CueMix activates hardware patch-thru in the UltraLite-mk3 itself. CueMix FX has two important benefits:

■ First, it completely eliminates the patch thru delay (reducing it to a small number of samples — about the same amount as one of today's digital mixers).

■ Secondly, 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 UltraLite-mk3 itself and are mixed with disk tracks playing back from your audio software. This means that you cannot apply 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 DSP 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).

TWO METHODS FOR CONTROLLING CUEMIX FX

There are two ways to control CueMix FX:

■ With CueMix FX

■ From within your host audio software (if it supports direct hardware monitoring)

You can even use both methods simultaneously.

Using CueMix FX

If your host audio software does not support direct hardware monitoring, you run CueMix FX side-by-side with your audio software and manage your monitor mix in CueMix FX.

CueMix FX allows you to create up to eight separate UltraLite-mk3 monitor mixes, or any other desired routing configurations. These routings are independent of your host audio software. For complete details, see chapter 11, "CueMix FX" (page 63).

Controlling CueMix FX from your audio software

Some audio applications allow you to control CueMix FX monitoring from within the application (without the need to use CueMix FX). In most cases, this support consists of patching an UltraLite-mk3 input directly to an output when you record-arm a track. Exactly how this is handled depends on the application.

The following applications are among those that support direct control over CueMix FX:

■ Digital Performer

■ AudioDesk

CueMix FX routings that are made via host applications are made "under the hood", which means that you won't see them in CueMix FX. However, CueMix FX connections made inside your host audio software dovetail with any other mixes you've set up in CueMix FX. For example, if your host application routes audio to an output pair that is already being used in CueMix FX for an entirely separate mix bus, both audio streams will simply be merged to the output.

Controlling CueMix FX from within AudioDesk or Digital Performer

To turn on CueMix FX in AudioDesk and Digital Performer:

1 From the Setup menu, choose *Configure Audio System>Input Monitoring Mode*.

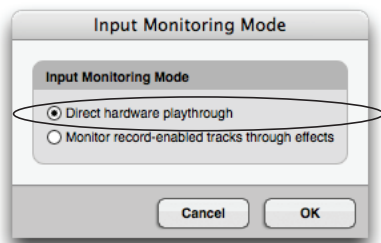**2** Choose the *Direct hardware playthrough* option, as shown below in Figure 10-7.

Figure 10-7: Enabling CueMix FX in AudioDesk or Digital Performer. Note: the 'Only during recording...' and 'Always' options are for AudioDesk and DP only. Later versions of DP have expanded input monitoring features. Consult your documentation.

3 From the Studio menu, choose *Audio Patch Thru*, and choose any monitoring mode except *Off*.

Once enabled, CueMix FX monitoring is tied with Digital Performer or AudioDesk's *Audio Patch Thru* feature: when you record-enable a track, the track's input is routed directly to its output (via CueMix FX in the UltraLite-mk3 hardware). For example, if you record-enable a track called *guitar* in your DP or AudioDesk project, and its audio input assignment is *Analog in 2*, and its audio output assignment is channels 7-8, CueMix FX no-latency hardware monitoring will automatically be set up from analog in 2 to outputs 7-8.

Controlling CueMix FX from within other software

Consult the manual for your software.

CueMix FX

OVERVIEW

CueMix FX is a cross-platform software application that provides graphic, on-screen control for the UltraLite-mk3's flexible CueMix FX on-board mixer and effects processing.

CueMix FX can be used independently of host audio software, or together with it. CueMix dovetails with the direct monitoring features of your host audio software, allowing you to seemlessly mix in both environments.

For information about programming the UltraLite-mk3's on-board mixing and effects using the front panel LCD, see chapter 11, "CueMix FX" (page 63).

A 16-BUS MIXER WITH EQ, COMPRESSION AND REVERB

All UltraLite-mk3 inputs and outputs can be routed to the on-board CueMix FX 16-bus (8 stereo bus) digital mixer driven by hardware-based DSP with 32-bit floating point precision.

The CueMix FX mixer allows you to apply no-latency effects processing to inputs, outputs or busses directly in the UltraLite-mk3 hardware, independent of the computer. Effects can even be applied when the UltraLite-mk3 is operating stand-alone (without a computer) as a complete portable mixer. 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:

■ Classic Reverb with tail lengths up to 60 seconds

■ 7-band parametric EQ modeled after British analog console EQs

■ A standard compressor with conventional threshold/ratio/attack/release/gain controls

■ The Leveler™, an accurate model of the legendary LA-2A optical compressor, which provides vintage, musical automatic gain control

The UltraLite-mk3's flexible effects architecture allows you to apply EQ and compression on every input and output (a total of 58 channels), with enough DSP resources for at least one band of parametric EQ and compression on every channel at 48 kHz. DSP resources are allocated dynamically and a DSP meter in the CueMix FX software allows you to keep tabs on the UltraLite-mk3's processing resources.

Each input, output and mix bus provides a send to the Classic Reverb processor, which then feeds reverb returns to mix busses and outputs, with a selectable split point between them to prevent send/return feedback loops.

ADVANTAGES OVER HOST-BASED MIXING AND PROCESSING

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

■ CueMix has no buffer latency. Thanks to the UltraLite-mk3's DSP chip, CueMix provides the same throughput performance as a digital mixer.

■ CueMix mixing and effects processing imposes no processor drain on the computer's CPU.

■ CueMix routing can be maintained independently of individual software applications or projects.

■ CueMix routing can operate without the computer, allowing the UltraLite-mk3 to operate as a portable, stand-alone mixer with effects.

CUEMIX FX INSTALLATION

CueMix FX is installed with the rest of your UltraLite-mk3 software.
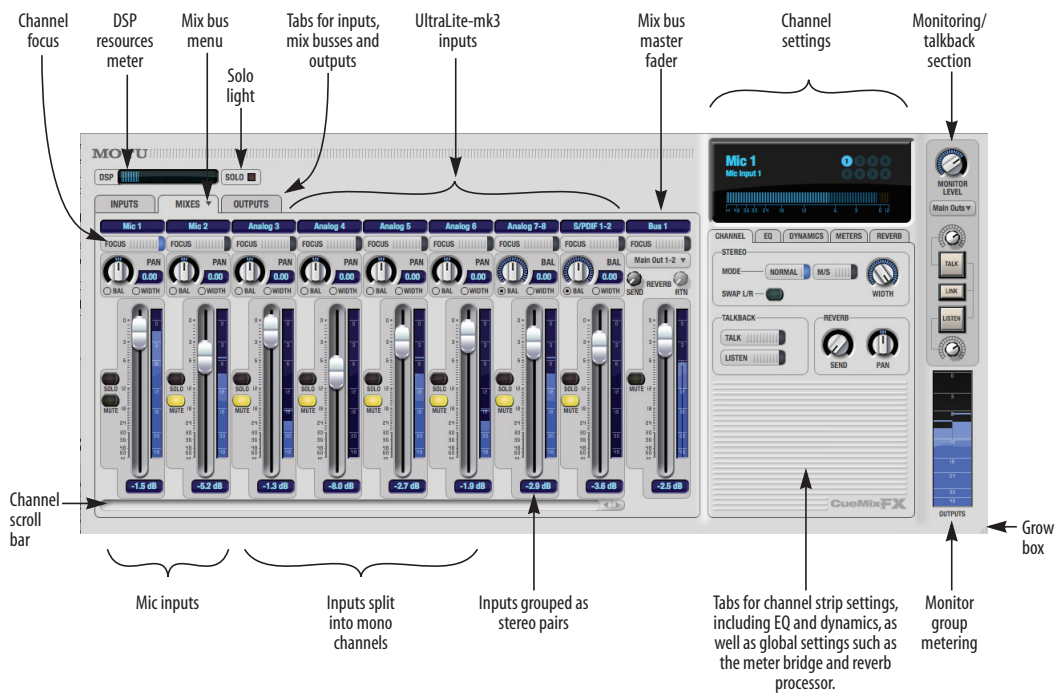
Figure 11-1: CueMix FX is a virtual mixer that gives you control over the UltraLite-mk3's on-board mixing features.

CUEMIX FX BASIC OPERATION

Here is a brief overview of the CueMix FX mixer.

Eight stereo mix busses

CueMix provides eight stereo mix busses: Bus 1, Bus 2, Bus 3, and so on. Each mix bus can take any number of inputs and mix them down to any UltraLite-mk3 output pair that you choose. For example, Bus 1 could go to the headphones, Bus 2 could go to the main outs, Bus 3 could go to a piece of outboard gear connected to analog outputs 7-8, etc.

Many inputs to one output pair

It might be useful to think of each mix bus as some number of inputs all mixed down to a stereo output pair. CueMix FX lets you choose which inputs to include in the mix, and it lets you specify the level, pan and other input-specific mix controls for each input being fed into the mix.

Viewing one mix bus at a time

CueMix FX displays one mix bus at a time in the *Mixes* tab (Figure 11-2 on page 66). To select which mix you are viewing, choose it from the mix bus menu (Figure 11-2). The mix name appears above the mix bus master fader (Figure 11-2), 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 11-3 on page 68) gives you access to settings for individual UltraLite-mk3 inputs (or input pairs), such as phase, trim, EQ and dynamics processing. Each input also includes a send to the UltraLite-mk3's global reverb processor. 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 11-6 on page 71) gives you access to settings for each UltraLite-mk3 output pair, including EQ, dynamics processing and send/return controls for feeding and returning the output signal to/from the UltraLite-mk3's global reverb processor. 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 11-1) to view channel-specific parameters in the Channel Settings section of the CueMix FX window (Figure 11-1). Separate tabs are provided for channel-specific settings (channel strip, EQ and dynamics), plus the global meter bridge and reverb processor.

Global reverb processor

The UltraLite-mk3 has a global reverb module (Figure 11-23 on page 83). Once it has been activated, you can feed signals to the reverb processor from various points in the UltraLite-mk3 mix matrix via input sends, bus sends and output sends. Stereo output from the reverb processor can then be fed back to mix busses or output pairs using reverb returns.

Other features

CueMix offers many additional features, discussed in this chapter, such as talkback/listenback, extensive metering, graphic editing of certain effects parameters, monitor grouping and more.

Widening the CueMix FX window

To view more input faders at once, drag the grow box (Figure 11-1) to the right.

THE MIXES TAB

Click the *Mixes* tab (Figure 11-2) to gain access to the UltraLite-mk3's eight stereo mix busses. The Mixes tab displays one mix bus at a time.

Viewing a mix

Choose the mix you wish to view from the mix bus menu (in the Mixes tab itself, as shown in Figure 11-2). The menu shows all mixes by name, followed by the UltraLite-mk3 output pair to which each bus master fader is currently assigned, if any.

Naming a mix

Click the mix name at the top of the mix bus master fader (Figure 11-2) to edit the name.

Assigning a mix bus output

Choose the desired output pair for the mix bus from the bus output menu (Figure 11-2). The bus output menu displays all current available (enabled) UltraLite-mk3 output pairs. If a bus is already assigned to an output pair, the bus name appears next to the output pair name to indicate that the output pair is already taken by a bus. Only one bus can be assigned to any given output pair. If you choose an output already assigned to another bus, that bus output will become disabled.

Bus fader

The bus fader (Figure 11-2) controls the overall level of the mix (its volume on its stereo output). Use the individual input faders to the left to control individual input levels.
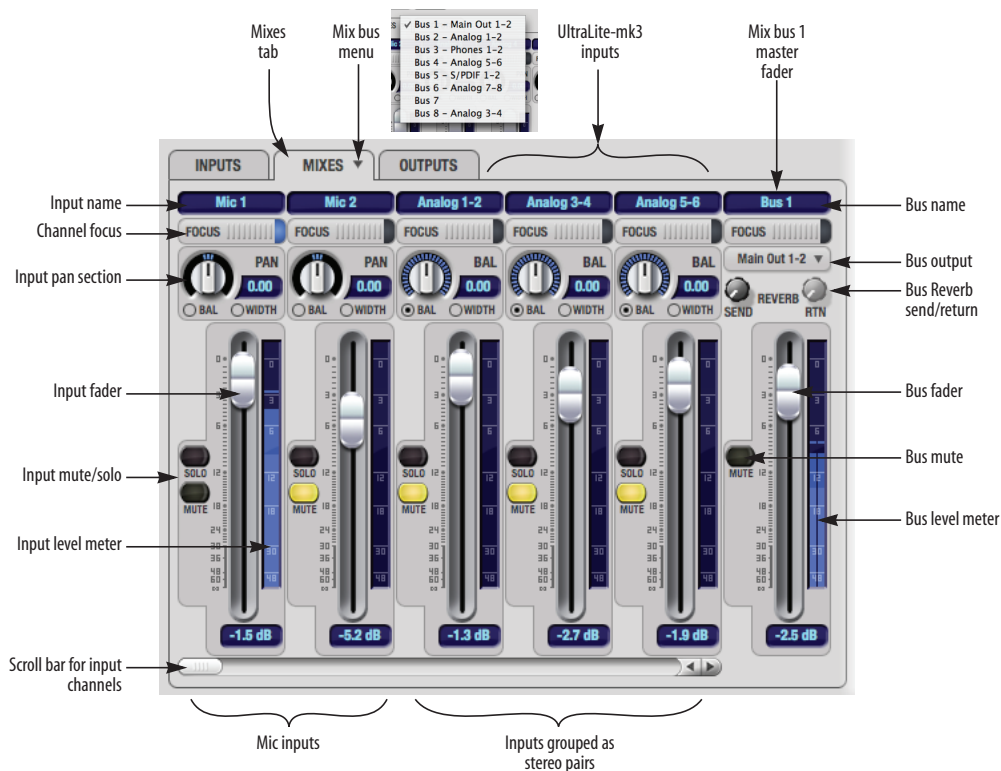
Figure 11-2: The Mixes tab.

Bus mute
The bus mute button (Figure 11-2) disables (silences) the mix.

Bus level meter
The bus level meter, which is post-fader, shows you the output for the mix's output.

Bus reverb send/return
The bus reverb send (Figure 11-2) feeds the output of the mix bus, pre-fader, to the UltraLite-mk3's global reverb processor, where it is merged with any other signals being fed to the reverb. The reverb's output can then be fed back into the mixer at various return points, including the bus return (discussed below).

The bus reverb *return* (Figure 11-2) feeds the output of the UltraLite-mk3's global reverb processor into the mix bus, pre-fader. This includes any other signals currently being fed to the reverb. The bus reverb return is disabled (grayed out) when the reverb *Split Point* is set to *Output* to eliminate the possibility for feedback loops created by reverb send/return loops. See "Split point" on page 84.

Input section
The horizontally scrolling area in the Mix tab to the left of the master fader (Figure 11-2) displays channel strips for all currently enabled UltraLite-mk3 inputs.

Naming an input
Click the input name at the top of the input channel strip (Figure 11-2) to edit the name. Input names are global across all mixes. This name also appears in host audio software on the computer (if the software supports channel names).

Input channel focus
Click the channel focus button (Figure 11-3) to view and edit parameters in the channel settings section of the CueMix FX window (Figure 11-7 on page 72). Clicking the mix bus master fader focus button brings the assigned output into focus, if there is one.

Input pan section
The input pan knob (Figure 11-2) pans the input across the bus stereo outputs. If the input itself is grouped as a stereo pair (in the Inputs tab), two forms of panning control are provided:

Balance
Balance works like the balance knob on some radios: turn it left and the right channel dims, turn it right and left channel dims. But the left channel always stays left and the right channel stays right.

Width
Width spreads the left and right channels across the stereo image, depending on the knob position. Maximum value (turning the pan knob all the way up) maintains the original stereo image: the left channel goes entirely left and right goes entirely right, without attenuation. The minimum value (turning the knob all the way down) creates a mono effect: equal amounts of left and right are combined and sent to both outputs. In between, the left out is a mixture of the left input and some of the right input (and vice-versa) with the effect of narrowing the field.

Input fader and mute/solo
To add an input to a mix, or remove it, click its Mute button. To solo it, use its Solo button. Use the input fader (Figure 11-2) to adjust the level for the input in the mix. Note that an input can have different level, pan, mute and solo settings for different mixes. Input channel level meters are post-fader.

If any solo button on the current (active) bus is enabled, the Solo Light (Figure 11-1) will illuminate.

THE INPUTS TAB

The UltraLite-mk3 provides many features for managing analog and digital input signals. Some of these features, such as the UltraLite-mk3's digitally controlled analog trims, are implemented in the analog domain; others are implemented in the digital domain as DSP applied to the digital signal (after the A/D converter on analog inputs). Click the *Inputs* tab (Figure 11-3) to access and control all of these input channel settings for each UltraLite-mk3 input or input pair.

Input tab settings are global

Except for the reverb send, all settings you make in the Input tab are applied to the input signal before it goes anywhere else (to a mix bus or the computer). For example, if you apply EQ and compression to the input signal, you will record the processed version of the signal in your host audio software running on the computer. If you need to record a completely unprocessed input signal, do not apply any changes to it in the Input tab. The only exception to this is the reverb send, which simply splits the input signal and feeds a copy of it to the UltraLite-mk3's reverb processor.

Signal flows from top to bottom

Settings in each Input tab channel strip are generally applied to the signal in order from top to bottom. Input channel signal flow is as follows: trim, phase, stereo versus M/S decoding, width, L/R swap, EQ, dynamics and reverb send.

Naming an input

Click the input name at the top of the input channel strip (Figure 11-3) to edit the name. Input names are global across all mixes. This name also appears in host audio software on the computer (if the software supports channel names).

Input channel focus

Click the channel focus button (Figure 11-3) to view and edit parameters in the channel settings section of the window (Figure 11-7 on page 72).

Mono/stereo pairing

Click the *Mono* button (Figure 11-3) if you would like an input to be treated as a mono channel. If you would like to work with it as one channel of a linked stereo pair, click the *Stereo* button. Inputs

Figure 11-3: The Inputs tab.

are grouped in odd/even pairs (mic 1-2, Analog 1-2, 3-4, etc.) Stereo pairs appear as a single channel strip in the CueMix FX mixer (in all tabs).

Invert phase

The *Phase* button (Figure 11-3) inverts the phase of the input signal. For stereo pairs, you can invert the phase for the left and right channels independently.

Input trim

All UltraLite-mk3 inputs, both analog and digital, offer continuously variable input trim. In all cases, trim level can be controlled digitally in 1 dB increments. This includes the digitally controlled analog trims on the two mic/guitar inputs and the six quarter-inch analog inputs on the back panel. Here is a summary of input trim ranges for each type of UltraLite-mk3 input:

Input	Trim cut	Trim boost	Trim Range
Mic/Guitar	0 dB	24 dB	24 dB
TRS analog inputs	-96 dB	+22 dB	118 dB
S/PDIF (RCA)	0 dB	+12 dB	12 dB

Once you adjust the trim levels, you can save them as a file on disk for future instant recall. See "Saving and loading hardware presets" on page 87 and "Configurations menu" on page 88.

Input EQ and dynamics

The UltraLite-mk3 lets you apply 7-band parametric EQ and dynamics processing (DSP) to any input, analog or digital.

The controls in the EQ/Compression section of the Inputs tab (Figure 11-3) let you edit EQ and compression settings within the context of the channel strip. This is ideal when you are comparing settings among neighboring channels, or perhaps even applying the same setting across all inputs. However, for more detailed editing of EQ and compression settings for an input channel, you can click its Focus button and view the settings in the

Channel Section of the CueMix FX window (Figure 11-1). This section even provides graphical editing of EQ curves and the compressor graph, allowing you to click and drag directly on the graphic. For details see "The channel settings section" on page 72.

The EQ/Dynamics graph

The EQ/Dynamics graph for each input channel strip (Figure 11-3) provides a thumbnail view of the EQ curves or Compressor graph for the channel. This graphic is for display purposes only; it cannot be edited directly. To change the EQ settings in this graph, use the two or three knobs below, as explained in the following sections. If, however, you would like to edit the EQ curves graphically, you can do so in the EQ tab (Figure 11-10 on page 74).

EQ/Dynamics selectors

The EQ/Dynamics selector buttons along the right-hand edge of the EQ/Dynamics section (Figure 11-3) allow you to choose what you are viewing and editing in the EQ/Dynamics section.
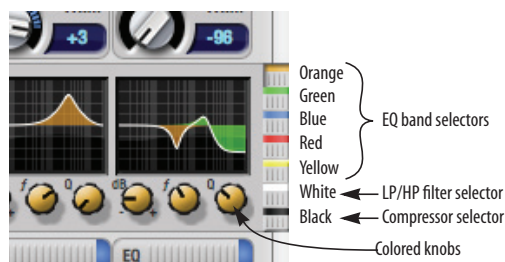
Figure 11-4: The EQ/Dynamics selectors.

Click the selector (Figure 11-4) for the desired EQ band, low-pass (LP) filter, high pass (HP) filter or compressor to view it across all channels.
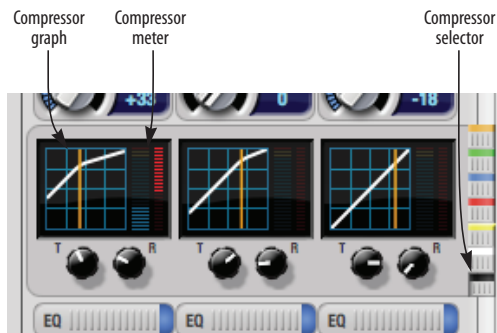
Figure 11-5: The Compressor controls.

☛ Shortcut: hold down the option key while clicking an EQ selector button to show just that band of EQ in the graphs. Click any selector again to return to viewing all bands.

Using the EQ/Dynamics knobs
Once you have chosen the desired EQ band, or the compressor, you can modify its settings using the two or three knobs below the graph. The knobs match the color of the currently selected effect, to help remind you of which effect you are currently editing.

☛ Important: before you can modify the settings of an EQ band using the three knobs below the graph, the EQ band must be enabled. This is done in the EQ tab (Figure 11-10), as explained in "Enabling EQ" on page 74.

EQ/Dynamics enable/disable buttons
Click the EQ or Dynamics button at the bottom of the input channel (Figure 11-3) to toggle the effect on or off. Note that you can program EQ and compressor settings, even when the effect is currently disabled. (You just won't hear the result until you enable it.)

Reverb send
The input reverb *send* (Figure 11-3) feeds the input signal to the UltraLite-mk3's global reverb processor, where it is merged with any other signals being fed to the reverb. The reverb's output can

then be fed back into a mix or output pair. The send occurs after all other settings in the input channel strip (phase invert, EQ, compression, etc.)

THE OUTPUTS TAB
The Outputs tab (Figure 11-6) lets you apply EQ, dynamics and reverb to any output pair, just before the signal leaves the UltraLite-mk3. This is processing that occurs at the very end of the signal flow, after everything else (host based effects, UltraLite-mk3 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, which is applied before the reverb send and return.

Naming an output
Click the output name at the top of the output channel strip (Figure 11-6) to edit the name. Output names are global and will also appear in host audio software on the computer (if the software supports channel names).

Output channel focus
Click the channel focus button (Figure 11-6) to view and edit parameters in the channel settings section of the CueMix FX window (Figure 11-7 on page 72).

Output EQ and Dynamics
The EQ/Dynamics section in the Outputs tab (Figure 11-6) works identically to the EQ/Dynamics section for the Inputs tab (Figure 11-3). See "Input EQ and dynamics" on page 69.

Output reverb send/return

The output reverb *send* (Figure 11-6) feeds the signal for the output to the UltraLite-mk3's global reverb processor, where it is merged with any other signals being fed to the reverb. The reverb's output can then be fed back into the mixer at various return points, including the same output from which it was sent (discussed below). The output reverb send is disabled (grayed out) when the reverb *Split Point* is set to *Mix* to eliminate the possibility for feedback loops created by reverb send/return loops. See "Split point" on page 84.

The output reverb *return* (Figure 11-6) feeds the output of the UltraLite-mk3's global reverb processor directly to the output. This includes any other signals currently being fed to the reverb.

Both the send and return occur after EQ and dynamics processing, but before listenback and talkback.

Talkback/Listenback

Click the *Talkback* or *Listenback* buttons (Figure 11-6) to toggle whether the output pair is included in the Talkback or Listenback group. See "Talkback and listenback" on page 86.

Monitor group assign

Click the Monitor buttons (Figure 11-6) to toggle whether the output pair is included in the Monitor group. See "The Monitor Group" on page 85.
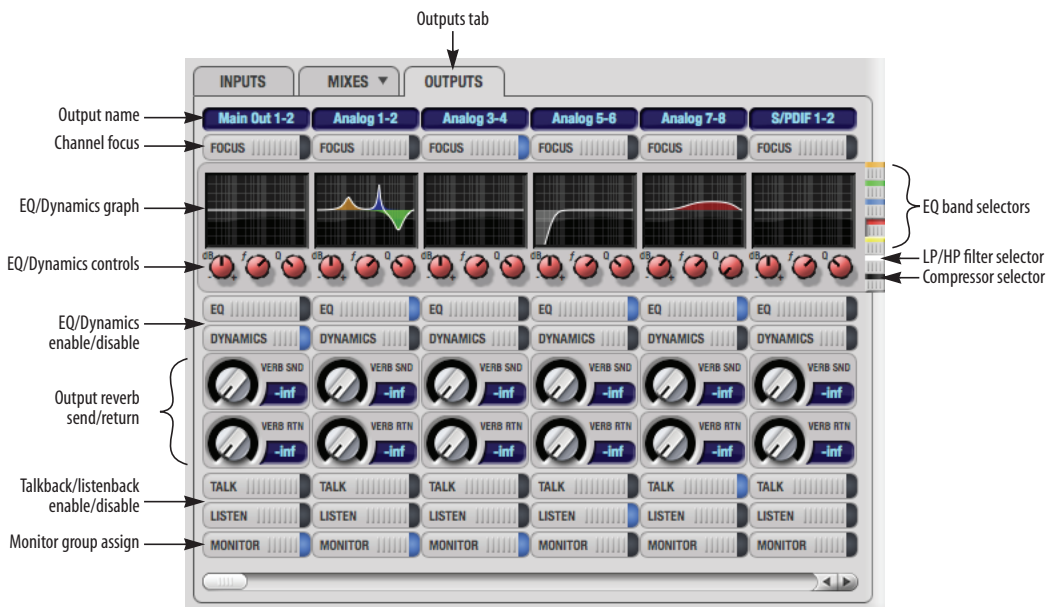
Figure 11-6: The Outputs tab.

THE CHANNEL SETTINGS SECTION

The channel settings section in the CueMix FX window (Figure 11-1) displays three tabs for Channel, EQ and Dynamics settings for the channel with the current focus. There are also two global tabs: the Meter Bridge and the Reverb Processor, as shown below.

Tabs for the channel that currently has the focus

Tabs for the global meter bridge and reverb processor
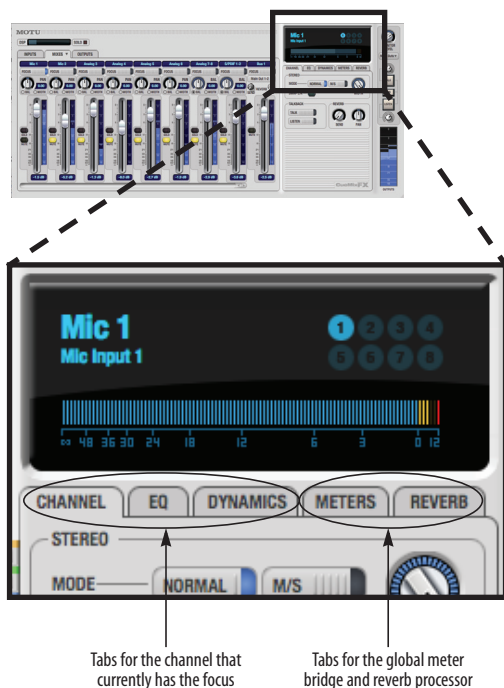
Figure 11-7: The Channel Settings section.

The Channel tab

The Channel tab (Figure 11-8) displays settings for input channels. Click any focus button in the Inputs tab to view the Channel tab settings for the channel.
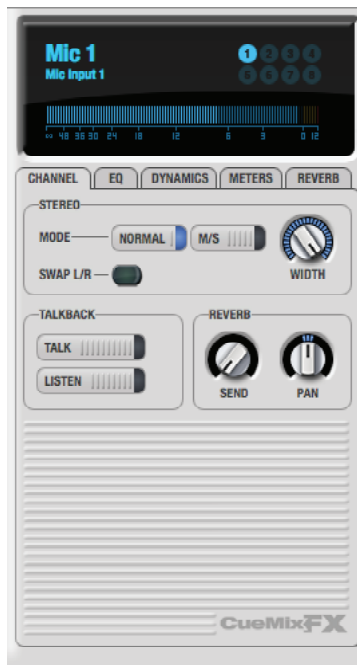
Figure 11-8: The Channel tab.

Signal flow

Settings in the Channel tab occur just before the EQ, dynamics and reverb sends in the Input tab channel strip (Figure 11-3 on page 68). Input channel signal flow is as follows: trim, phase, stereo versus M/S decoding, width, L/R swap, EQ, dynamics and reverb send.

Stereo settings

Inputs that have been grouped as stereo pairs in the Inputs tab (Figure 11-3) provide two stereo modes (Figure 11-8): *Normal* and *M/S*. M/S mode provides decoding for a mid-side microphone configuration.

The *Width* knob (Figure 11-8) provides control over the stereo imaging, going from a full stereo image to mono (both channels panned equally). See "Width" on page 67.

The *Swap L/R* button (Figure 11-8) lets you switch the left and right channels.

Talkback section
Click the *Talkback* or *Listenback* button (Figure 11-8) to toggle whether the input is the Talkback or Listenback input. Only one input can be the talkback input, and only one input can be the listenback input. See "Talkback and listenback" on page 86.

Reverb section
The *Send* in the reverb section (Figure 11-8) is the same control as the reverb send in the Input tab channel strip (Figure 11-3). See "Reverb send" on page 70. If the input is currently not grouped as a stereo pair in the Input tab (it is operating as a mono input), use the reverb *Pan* knob (Figure 11-8) to pan the mono signal for the stereo reverb processor.

Input meter and bus activity LEDs
When the Channel tab is active (Figure 11-8), the display above the tab provides a horizontal level meter and eight *bus activity LEDs* (Figure 11-9).
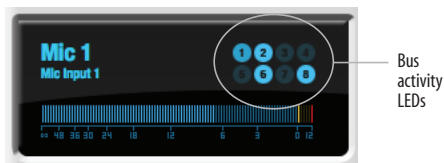
Figure 11-9: Input meter and bus activity LEDs.

The *input level meter* (Figure 11-9) is the same as the input meters in the Meters tab (Figure 11-22 on page 83) with the *Pre FX* button engaged, which shows the input level on the physical input itself, before any processing of any kind occurs within the UltraLite-mk3. This meter gives you the most accurate reading of the actual signal level hitting the input, regardless of any other settings.

The *Bus Activity LEDs* (Figure 11-9) show you which mix busses the input signal is being fed to. For example, LED #6 will glow under the following conditions: the input is unmuted in mix bus 6, its fader is up, and there is signal activity from the input going into the mix bus.

The EQ tab

The EQ tab (Figure 11-10) displays the EQ settings for the input or output channel that currently has the focus. Click any focus button in the Inputs or Outputs tab to view the EQ tab settings for the channel.

Vintage EQ

Inspired by legendary British large console EQs, the UltraLite-mk3 *Vintage EQ section* (Figure 11-10) gives you the look, feel and sound of the most sought-after classic equalizers. Five bands of center frequency parametric EQ filtering are provided, each with four EQ types that provide current popular EQ styles and vintage analog EQ styles alike. Two bands include shelf filtering. Two additional bands of variable slope low pass and high pass filtering are provided. The filter response display provides comprehensive control and visual feedback of the EQ curve being applied. With 64-bit floating point processing, the UltraLite-mk3 Vintage EQ has been carefully crafted and meticulously engineered to produce musical results in a wide variety of applications.

Enabling EQ

Each input and output channel has a global *EQ enable/disable* button (Figure 11-3 and Figure 11-6). This button enables or disables all bands of EQ for the channel. In addition, each individual band of EQ has a *Filter enable/disable* switch (Figure 11-10), allowing you to enable as few or as many bands as needed for each individual channel.
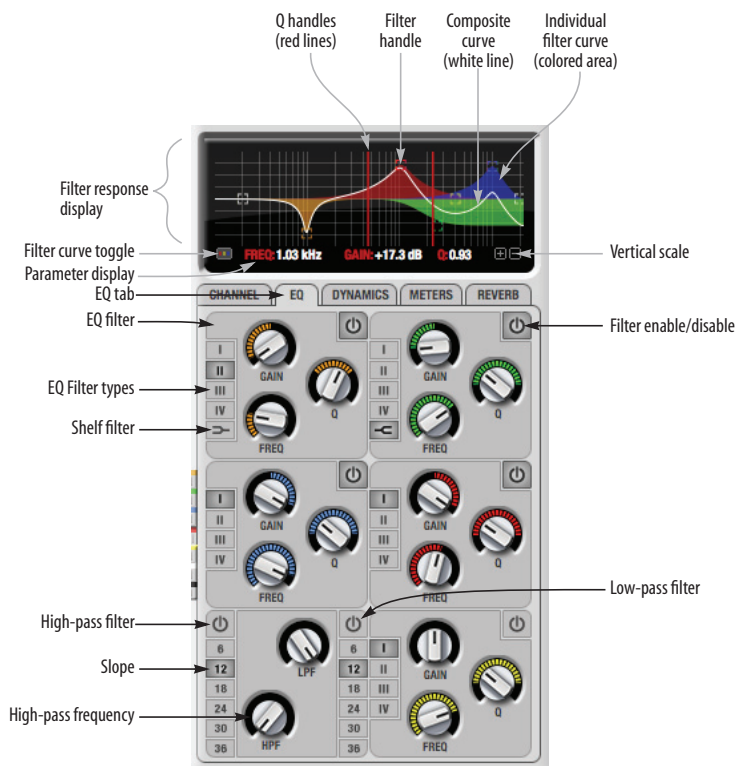
Figure 11-10: The EQ tab.

Vintage EQ Quick reference

Filter response display: Shows the response curve for the current settings.

Vertical scale: Lets you zoom the vertical scale of the filter response display.

Parameter display: Shows the precise numbers of the parameter you are adjusting (or hovering over with the arrow cursor). The labels (*frequency, gain*, etc.) match the color of the filter being displayed. When a filter handle is not selected and when the cursor is not hovering over the display, the parameter display shows the name of the current channel being edited (the channel that currently has the focus), as shown below:

The name of the channel being EQ'd.
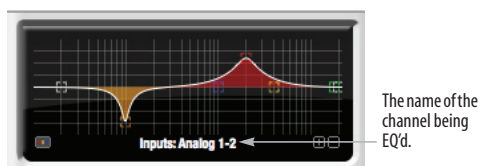
Figure 11-11: When a filter handle is not selected and when the cursor is not hovering over the display, the parameter display shows the name of the current channel being edited (the channel that currently has the focus).

EQ filter: one of five center bands of EQ that can be independently enabled and programmed.

Filter type: Lets you choose from one of four or five EQ styles for each independent band of EQ.

Low/High Pass filter: Both a low pass and high pass filter are supplied with six different slope settings.

Slope: Lets you choose the slope (fall off) characteristics of the low pass and high pass filter.

Q handle: Drag the Q handle lines to graphically adjust the Q setting for the currently selected filter. To select the filter, click its filter handle.

Filter handle: Drag this handle to graphically adjust the filter's boost/cut and/or frequency.

Composite curve (white line): shows the overall response curve of the current settings in the window.

Individual filter curve: Each filter has a color (indicated by its knobs). When filter curves are being displayed (the filter curve option is turned on), each individual filter's response curve is displayed in the filter's color.

Filter curve toggle: Shows/hides the colored filter curves in the display.

Filter enable/disable: Turns the filter on or off.

How the vintage EQ works

The Vintage EQ operates like a standard EQ filter, but with much more sophisticated processing algorithms "under the hood". There are five bands of EQ, each with their own unique knob color, plus additional low pass and high pass filters. Each filter can be set to any center frequency you wish.

Each filter can be independently turned on or off with the enable/disable button (Figure 11-10). Each filter can be set to one of four different filter types (I, II, III or IV). The two top-most filters (orange and green) provide an extra low and high shelf setting, in addition to the four standard band settings. The additional low pass and high pass filters (lower left) have gray cutoff frequency knobs and six settings for slope (in octaves/dB).

Frequency response display

The frequency response display at the top of the window displays the response curve of the current settings in the window. The (horizontal) frequency range is from 10 hertz to 20 KHz. The (vertical) amplitude scale is in dB and is adjustable between 3 and 24 dB using the *vertical scale* buttons (Figure 11-10).

Showing and hiding filter curves

To view a filter in the display, turn on the filter. The shape of the filter, according to its current settings, is shaded in the same color as the filter's knob(s). Use the *filter curve toggle* (Figure 11-10) to show or hide them in the display.

Adjusting filters in the display

Each filter has a handle, displayed as shown below in Figure 11-12 (in the filter's color), for adjusting its boost/cut and/or frequency:
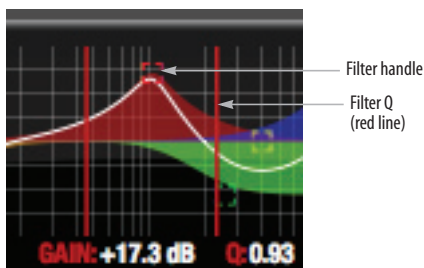
Figure 11-12: Drag the filter handle to adjust its frequency and/or boost/cut. Drag the Filter Q handles to adjust the Q.

For the EQ filters, when you click the handle, you'll also see lines on either side for adjusting the Q parameter, as shown above.

EQ filters

The EQ filters have three parameters:

Control	unit	range
Gain	dB	-20.00 to +20.00
Frequency	Hertz	20 Hz to 20 kHz
Q	n/a - see note below	0.01 to 3.00

Q

The Q setting does not have a unit of measurement. Rather, it is the ratio of the filter's center frequency to the bandwidth of the filter. In addition, the actual Q value for the EQ curve being applied is dependent on three factors: the gain setting, the filter style, and the Q setting.

Filter types

Each filter can be independently set to one of four different filter types: I, II, III and IV. These, and the additional shelf filters for the LMF and HMF band, are discussed in the section "EQ filter styles".

Returning to zero (or nominal frequency)

To return a knob to zero, or it's nominal frequency, double-click it.

EQ filter styles

EQ is one of the most widely used processing tools and can be applied to many different situations, from minor corrective tasks to highly creative applications. Over the years, many EQs have been engineered for specific applications or to achieve a certain sound. The Vintage EQ has been designed to be flexible enough to cover a broad range of applications. To that end, several different filter types are supplied, varying mostly in the way they handle the dynamic interaction between Gain and Q. This crucial relationship has been modeled to emulate the smooth and musical character of classic analog EQ circuits, in which the Gain/Q dependency was dictated by the actual circuit design and electrical components used.

The following sections describe the character of each type of EQ filter and their suggested applications. In the illustrations for each filter style (Figure 11-13 through Figure 11-16), the settings for the three example curves are the same for the purpose of comparison:

- Frequency = 1.00 kHz
- Q = 1
- Gain = +3, +10 and +20 dB

Type I
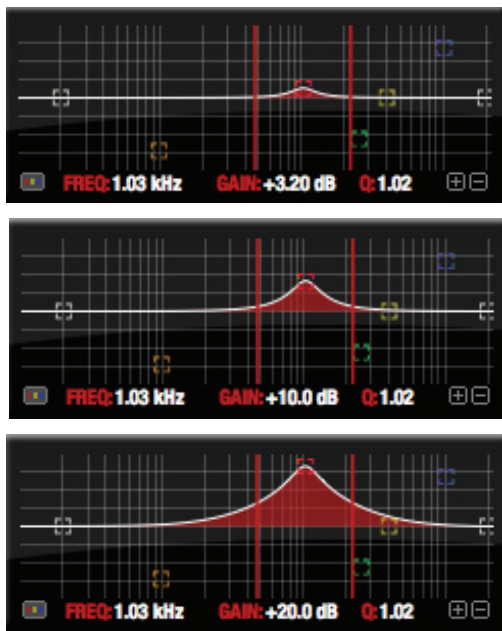
Figure 11-13: Type I EQ filter style.

Type II

Figure 11-14: Type II EQ filter style.

The *Type I* EQ filter has the least amount of Gain/Q interaction, providing the most precision and control of all the EQ filter types. Even small adjustments in gain or reduction produce relatively high Q. This EQ style is best for situations that call for precise EQ adjustments requiring the maximum amount of individual parameter control. For more general shaping (e.g. full mixes) or subtle control (e.g. vocals), the other styles discussed in the following sections might be more appropriate. This filter type is the most similar to a standard parametric EQ.

The *Type II* EQ filter produces constant Q response during boost or cut. The Type II style emulates several classic legacy EQs and produces good results for resonance control on drums and percussion because it provides relatively high Q values with more extreme gain or cut settings.

Type III
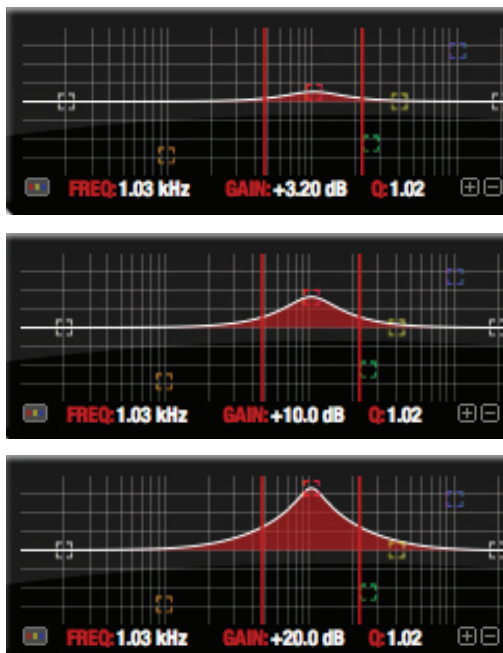
Figure 11-15: Type III EQ filter style.

Type IV

Figure 11-16: Type IV EQ filter style.

The *Type III* EQ filter increases Q as boost is applied. Therefore, lower amounts of boost provide a softer, "wider" EQ effect (since the affected frequency range widens), while higher boost tends to sound louder and more "up front", due to the increase in Q as the gain is increased. The more gentle Q curve at lower settings is well suited for overall EQ fills and more subtle corrections in instrument and vocal sources. Boosting or cutting by small amounts will seem to produce the effect that your ear expects, without the need to adjust Q. As a result, this filter style, and similar EQs with this characteristic behavior, are often referred to as being more "musical". More specifically, this style emulates the classic Neve EQs, their modern derivatives and later SSL G series EQs. Many current popular outboard "boutique" EQs exhibit this same gain/Q relationship.

The *Type IV* EQ filter is a more extreme form of the Type III filter. It exhibits a high degree of interaction between Q and gain in order to maintain as closely as possible an equal amount of area under the response curve as gain is adjusted. Type IV is the most gentle of the four EQ styles and is ideal for large scale EQ adjustments, especially on sub-mixes and complete mixes. This EQ style is also ideal for any applications where subtle changes in the overall character of the sound are desired. For example, it can be used for mastering applications, such as the overall adjustments that must often be applied to entire tracks to match other tracks on the album.

Shelf filters
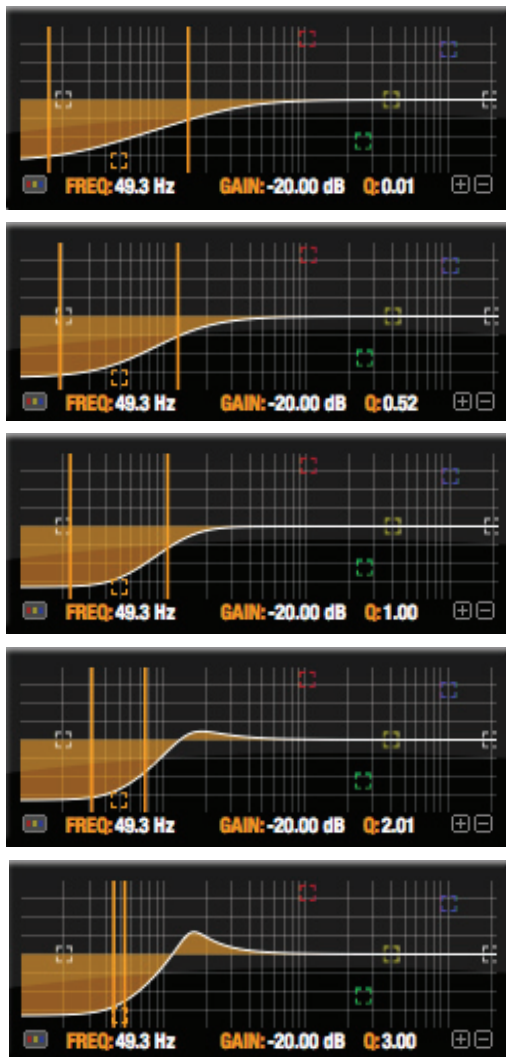
Figure 11-17: Shelf filter Q parameter overshoot.

When two top-most bands in the EQ tab are set to their *shelf filter* setting (Figure 11-10), the Q parameter controls the amount of overshoot applied to the response curve, as illustrated in Figure 11-17. When Q = 0.01 (the lowest setting), normal shelving is applied with no overshoot. This produces the response provided by a first order shelf. When Q = 1.0 (the default setting), the

response corresponds to a second order shelf, still with no overshoot. This is the same response as conventional parametric EQs. In some situations, this form of accurate, clean shelving can sound harsh, especially when compared to legacy analog EQs. To soften the results, the overshoot is increased as Q is increased, as shown Figure 11-17 for Q values of 1.00, 2.00 and 3.00. This overshoot region produces a boost in frequencies just above the cutoff, which compensates in a smooth, more pleasing fashion for the perceived drop in low frequencies being cut.

Conversely, when shelving boost is being applied, overshoot cuts frequencies just above the cutoff to again compensate in a smooth and pleasing fashion for the perceived boost in low frequencies:
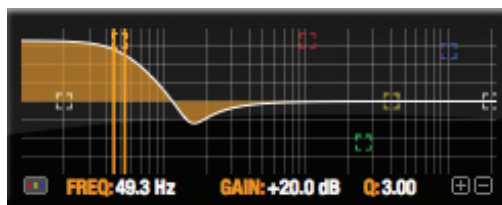
Figure 11-18: Overshoot when low shelf boost is applied.

Overshoot is also applied to high shelf boost and cut:
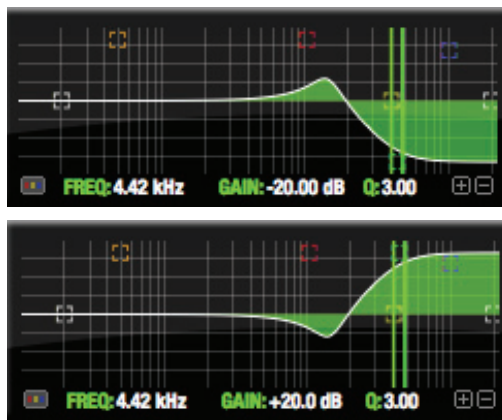
Figure 11-19: Overshoot when high shelf cut and boost is applied.

Overshoot tends to produce more of what one would expect to hear when applying shelving and is therefore considered to be more musical than shelving without overshoot. This effect, which has gained tremendous popularity among audio engineers, was first made popular in original Neve series EQs and later in the SSL G series.

At maximum the maximum Q setting of 3.00, the overshoot peaks at half the total boosted (or cut) gain. For example, with a maximum gain setting of +20dB, the loss in the overshoot region is -10 dB.

Overshoot curves are symmetrical for both cut and boost.

Low pass and high pass filters

The Vintage EQ low and high pass filters are similar to those found in most conventional parametric EQs (which usually have a fixed slope of 12 dB per octave), except that Vintage EQ provides six different slope (roll off) settings: 6, 12, 18, 24, 30 and 36 dB per octave. This control over the shape of the "knee" gives you a great deal flexibility and control for a wide variety of applications.
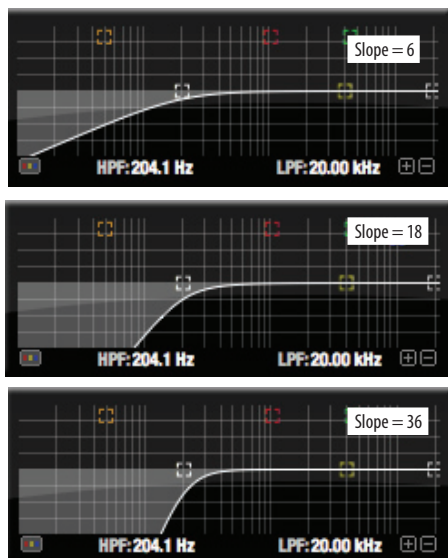
Figure 11-20: The low pass filter with three example slope settings.

The Dynamics tab

The Dynamics tab (Figure 11-21) displays the Dynamics processing settings for the input or output channel that currently has the focus. Click any focus button in the Inputs or Outputs tab to view the Dynamics tab settings for the channel.
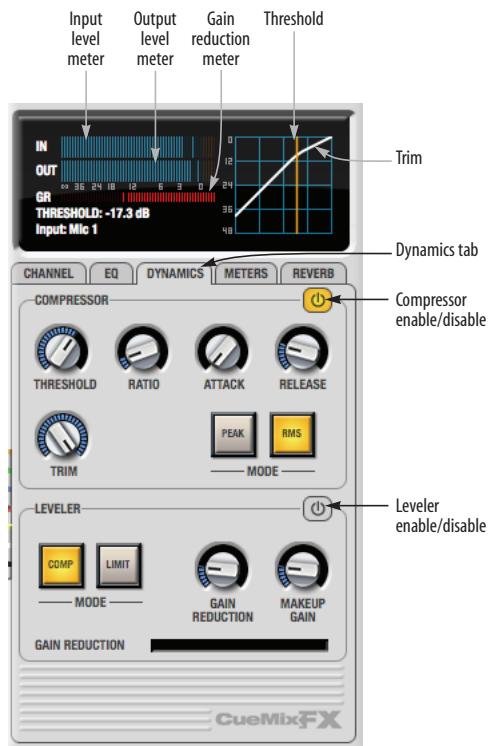
Figure 11-21: The Dynamics tab.

Enabling Dynamics

Each input and output channel has a global *Dynamics enable/disable* button (Figure 11-3 and Figure 11-6). This button enables or disables all dynamics processing for the channel. In addition, the Dynamics tab has two different dynamics processors, the Compressor and Leveler, which can be individually enabled or disabled (Figure 11-21) for the channel.

Compressor

The *Compressor* (Figure 11-21) lowers the level of the input when it is above the threshold. The amount of attenuation is determined by the *Ratio* and the input level. If the input is 6 dB above the *Threshold* and the Ratio is 3:1, then the output will be 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 when the average input level quickly fluctuates above and below the Threshold.

These sorts of issues can be addressed by applying the Leveler instead.

Graphic adjustment of the Threshold

The Threshold can be adjusted by turning the Threshold knob or by dragging the Threshold line directly in the compressor graph (Figure 11-21).

Input level meter

The *Input Level* meter (Figure 11-21) shows the level of the input signal before it enters the compressor. It shows either the peak level or the RMS level, depending on which mode is currently chosen.

Gain reduction (GR) meter

The Gain reduction *(GR)* level meter (Figure 11-21) displays the current amount of attenuation applied by the compressor.

Output level

The *Output Level* meter (Figure 11-21) displays the peaks of the output signal. Trim is applied before the Output Level meter.

Peak/RMS modes

In RMS *mode* the compressor uses RMS values (a computational method for determining overall loudness) to measure the input level. In *Peak* mode, the compressor uses signal peaks to determine the input level. RMS mode will let peaks through because the detector sidechain is only looking at the average signal level. Peak mode will react to brief peaks. Peak mode is generally used for drums, percussion and other source material with strong transients, while RMS mode is mostly used for everything else.

The input meters show either the peak level or the RMS level, depending on the mode.

Leveler

The Leveler™ (Figure 11-21) provides an accurate model of the legendary Teletronix™ LA-2A® optical compressor, known for its unique and highly sought-after Automatic Gain Control (AGC) characteristics. The UltraLite-mk3 Leveler faithfully models the LA-2A using the on-board DSP with 32-bit floating point precision.

A model of an optical compressor

The simplest description of an optical leveling amplifier device is a light shining on a photore-sistor. The intensity of the light source is proportional to the audio signal, and the resistance of the photoresistor is in turn inversely proportional to the intensity of the light. Photore-sistors respond quite quickly to increases in light intensity, yet return to their dark resistance very slowly. Thus, incorporation of the photoresistor into an attenuator followed by an amplifier which provides make-up gain produces a signal which maintains a constant overall loudness.

Automatic gain control using light

The the Automatic Gain Control (AGC) circuit of the LA-2A uses a vintage opto-coupler known by its model number (T4). The T4 contains an electroluminescent panel (ELP) and photoresistor mounted so that the emission of the panel modulates the resistance. An ELP consists of a thin layer of phosphorescent material sandwiched between two insulated electrodes to form a capacitor. Making one of the electrodes transparent allows the light to escape. These devices are essentially glow-in-the-dark paint on a piece of foil covered by metalized glass or plastic, and are the same devices used in low-power night lights. Unfortunately, these devices need high voltages to operate, and are best driven by tube circuits which can supply voltage swings of several hundred volts.

Response characteristics

Once the light has faded away, the photoresistor then decays back to its dark state. The shape of the decay curve varies depending on how bright the light was, and how long the light lasted. A general rule of thumb is that the louder the program, the slower the release. Typically, the release can take up to and over one minute. One thing to keep in mind when using these types of devices is that the typical concepts of compression ratio, attack, release, and threshold do not apply. The light intensity is determined by the highly non-linear interactions of the input signal, AGC circuit, and ELP, and thus exhibit a strong program dependence that is impossible to describe without the mind-numbing mathematics of statistical mechanics. The actual results, however, can be almost mystical: even when you feed the same material (a loop perhaps) through the Leveler twice, you'll often see a new response the second time through a loop, complete with unique attack times, release times and compression ratios. Furthermore, two different input signals with the same RMS levels may be leveled in a drastically different manner.

It is precisely this self-adjusting behavior that makes optical compressors the tool of choice for smoothing out vocals, bass guitar and full-program mixes without destroying perceived dynamics.

Compressor/Limit buttons

The *Comp* and *Limit* buttons (Figure 11-21) model the original LA-2A Limit/Compress mode switch. The effect is very subtle, with the Limit option behaving only slightly more like a limiter than a compressor. The switch increases the level of the input to the AGC model and runs the attenuator at a slightly lower level. The Leveler then responds more strongly to transients, but otherwise still behaves like a leveling amplifier.

Gain Reduction

Gain Reduction (Figure 11-21) sets the strength of the signal sent to the AGC model.

Makeup Gain

Makeup gain (Figure 11-21) amplifies the output signal to make up for gain reduction.

Enabling or disabling the Leveler

The Leveler models the LA-2A so closely, it also models the time it takes for an actual LA-2A to "warm up" after it is turned on. Therefore, when you enable the Leveler, give it a moment to "settle" before you begin processing signals with it.

The Meters tab

The *Meters* tab (Figure 11-22) serves as a comprehensive meter bridge for all inputs, outputs and mix busses in the UltraLite-mk3. This tab gives you a "bird's-eye" view of all signal activity in the UltraLite-mk3; it is ideal for confirming your signal routing programming and for troubleshooting.
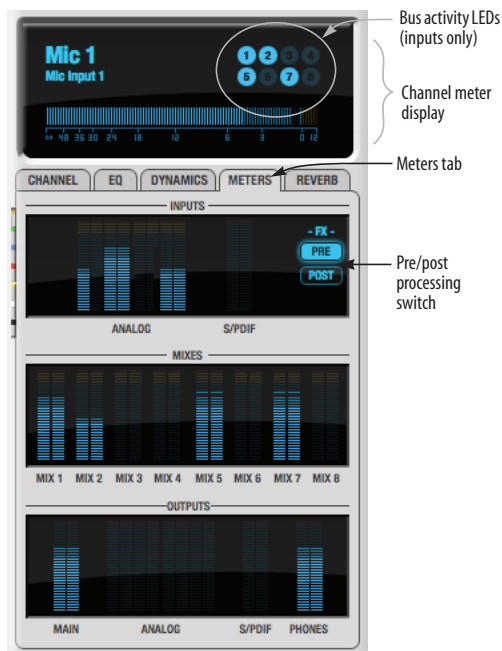
Figure 11-22: The Meters tab.

Channel meter display
The *channel meter display* (Figure 11-22) provides a long-throw meter for the input or output that currently has the focus in the Input/Output tabs.

Bus activity LEDs (inputs only)
The *Bus activity LEDs* (Figure 11-22) are present only for inputs. See "Input meter and bus activity LEDs" on page 73.

Pre/post processing switch
The *pre/post processing* switch (Figure 11-22) 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.)

The Reverb tab

The *Reverb* tab (Figure 11-23) provides access to the UltraLite-mk3's single, global reverb processor, which provides high-fidelity reverberation and graphic control over its parameters.

Figure 11-23: The Reverb tab.

Enabling reverb
Use the enable/disable button (Figure 11-23) to turn the reverb processor on or off. Since reverb uses considerable DSP resources, it is best to leave it off when you are not using it.

Routing inputs, busses and outputs to the reverb processor

The reverb processor is a single, independent unit that provides stereo reverb. You can route multiple signals to it from various points (sends) in the CueMix FX mixer, but all incoming signals to the reverb processor are merged and processed together. The resulting stereo output from the reverb can then be inserted into a mix bus or output using stereo returns.

Reverb sends

The following signals can be sent to the reverb processor via their corresponding sends (discussed earlier in this chapter):

- Mono or stereo inputs (Figure 11-3 on page 68)

- Mix bus output (Figure 11-2 on page 66)

- Outputs (Figure 11-6 on page 71)

Reverb returns

The stereo output from the reverb processor can be sent to the following destinations via their corresponding returns (discussed earlier in this chapter):

- Mix bus outputs

- Outputs

- The computer (via the Reverb Return bus)

Split point

The *Split Point* (Figure 11-23) prevents feedback loops that would be caused by a signal being sent to the reverb processor and then returned to the same signal path.

Mix

When the Split Point is set to *Mix*, the returns in the Mix bus tab become active and the sends in the Output tab gray out. This allows you to send from inputs and mixes and return to mixes and outputs.

Output

When the Split Point is set to *Output*, the sends in Output tab become active and the returns in the Mix bus tab gray out. This allows you to send from inputs, mixes and outputs and return to outputs.

Primary controls

The Primary Controls section (Figure 11-23) in the Reverb tab provides the following basic parameters for programming the reverb.

Reverb Time

Reverb time determines the length of decay, or *tail*, of the reverb. This is a global setting for the reverb processor. You can further refine the tails by independently setting the reverb time of three separate frequency bands, as discussed below in the Reverb Design section.

PreDelay

PreDelay is the amount of time before you hear the very first reflections. If you are in a large room, it takes a while before the first reflections return. PreDelay is useful for clarifying the original sound. For example, with vocals, the reflections won't start until after the initial sound of a word has been sung.

Shelf Filter

The *Shelf Filter* is a low-pass filter that controls the high frequency characteristics of the overall effect. *Frequency* sets the cutoff frequency for the filter and *Cut* sets the amount of signal attenuation applied by the filter.

Early reflections

Initial reflections give a space its unique sound. The shape of the room, the angles of the walls, even furniture in the room will produce a series of Initial Reflections. Think of the early reflections and room type as the "flavor" of the reverb. You can choose between several types of rooms. These are acoustic models for simulating these different

types of spaces. The *Size* and *Level* parameters let you control the size of the room and the strength of the initial reflections.

☛ Here's a tip: try using initial reflections without any subsequent reverb (turn the reverb time down as far as it will go). You'll hear interesting and unusual effects.

Reverb design

The Reverb Design section allows you to independently control the reverb time for three separate frequency bands (*Low*, *Mid* and *High)* with adjustable cross-over points between them (*Low* and *High*). The *reverb time* for each band is specified in percent of the overall reverb time in the Primary Controls section at the top of the tab.

You can edit these parameters graphically by dragging the handles in the graphic display (Figure 11-23).

Width does what its name implies: if you turn this control all the way up, the result is maximum stereo imaging. A position of 12 o'clock produces essentially a mono image. Turning the control all the way down completely swaps the stereo image.

THE MONITOR GROUP

The *monitor group* is a set of UltraLite-mk3 outputs that can be controlled with the master Monitor Level knob in upper right corner of the CueMix FX mixer window (Figure 11-24), as well as the MASTER VOL knob on the UltraLite-mk3 front panel.
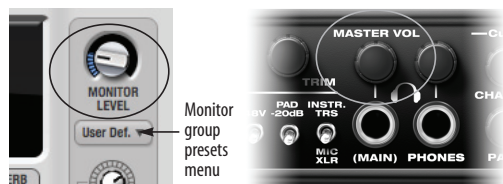
Figure 11-24: Monitor group volume control from CueMix FX and the front panel MASTER VOL knob.

Assigning outputs to the monitor group

Any combination of outputs can be assigned to the monitor group. To include an output pair in the monitor group, click its Monitor button in the Outputs tab (Figure 11-6 on page 71).

Monitor group presets menu

The *monitor group presets menu* (Figure 11-24) provides several presets for commonly used monitor groups:

Monitor group preset	Output assignment
Main Outs	Main Out 1-2
Stereo	Analog Out 1-2
Quad	Analog Out 1-4
5.1	Analog Out 1-6
7.1	Analog Out 1-8

If you program your own monitor output group, the presets menu displays the word *Custom*.

Monitor group meters

The monitor group meters (Figure 11-1 on page 64) show levels for any/all output pairs that are currently included in the monitor group. The width of the meters scales proportionally so that all current monitor group outputs will fit within the prescribed space for the meters. If many outputs are included, then the meters will look fairly thin, but they will all be included in the meter.

DSP METER

The DSP meter (Figure 11-1) shows how much of the available DSP processing power is currently being used by the UltraLite-mk3 for effects processing. DSP resources are allocated in channel order from the first input to the last output. If there aren't enough DSP resources for all effects to be enabled on a channel, none of them are allocated on that channel or any following channel.

EQ on a stereo channel requires approximately twice the DSP resources as the same EQ on a mono channel. The Compressor (2.5 x 1 EQ band) and Leveler (4 x 1 EQ band) require about the same DSP resources for a mono or stereo channel.

SOLO LIGHT

The Solo light (Figure 11-1) illuminates when any input in the current (active) mix bus is soloed (even if it is currently scrolled off-screen).

TALKBACK AND LISTENBACK

CueMix FX provides *Talkback* and *Listenback* buttons. Talkback allows an engineer in the control room to temporarily dim all audio and talk to musicians in the live room. Conversely, Listenback allows musicians to talk to the control room.

Hardware setup

Figure 11-25 below shows a typical hardware setup for Talkback and Listenback. For Talkback, set up a dedicated mic in your control room and connect it to a mic input on your UltraLite-mk3. For Listenback, set up a dedicated listenback mic in the live room for the musicians and connect it to another mic input. For talkback output, set up a headphone distribution amp or set of speakers in the live room, and connect it to a pair of outputs. For example, you might connect a headphone distribution amp to analog outputs 7-8 on your UltraLite-mk3, as demonstrated below in Figure 11-25.
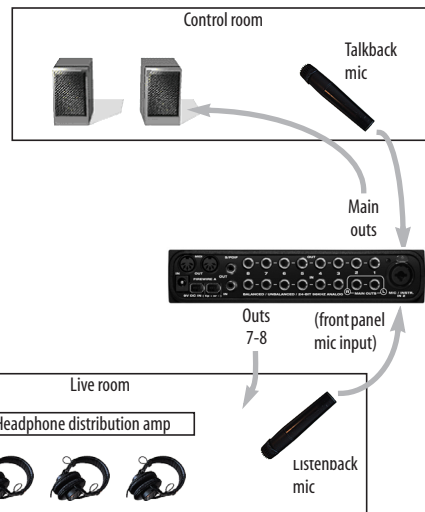
Figure 11-25: Typical hardware setup for Talkback and Listenback.

Talkback / Listenback Mic Input

To configure the talkback mic in CueMix FX, go to the Inputs tab (Figure 11-3 on page 68) and click the Focus button for the input that the talkback mic is connected to. Click the Channel tab (Figure 11-8 on page 72) and enable the *Talk* button.

Repeat this procedure for the Listenback mic, except click the *Listen* button in the Channel tab.

Talk / Listen output

To configure the talkback and listen back outputs, go to the Outputs tab (Figure 11-6 on page 71) and enable the *Talk* button for any output pair on which you'd like to hear the talkback mic. Similarly, enable the *Listen* button for any output pair on which you'd like to hear the listenback mic.

Talkback / Listenback Monitor Dim

Use the knobs next to the Talk and Listen buttons (Figure 11-26) to determine the amount of attenuation you would like to apply to all other audio signals (besides the talkback/listenback signal) when Talkback and/or Listenback is engaged. To completely silence all other CueMix audio, turn them all the way down. attenuation

only occurs when talkback or listenback is engaged. Audio playing back from disk (your host software) is not affected.

Figure 11-26: The Talkback/Listenback controls.

Engaging/disengaging Talkback and Listenback
To engage Talk back or Listenback, press on the Talk or Listen buttons (Figure 11-26) and then release to disengage. Talkback and/or Listenback is engaged for as long as you hold down the mouse button. Option-click to make the buttons "sticky" (stay engaged until you click them again — so you don't have to hold down the mouse). Or use the Talkback menu items.

If you would like to engage both Talkback and Listenback at the same time, enable the *Link* button (Figure 11-26).

Controlling Talkback and Listenback volume
To control the volume of the Talkback and/or Listenback mics, adjust their input trim in CueMix FX.

SHORTCUTS
Hold down the following general modifier keys as shortcuts:

Shortcut	Result
Shift key	Applies your action to all inputs or all outputs in the mix.
Command key	Applies your action to the stereo input pair, even when it is currently configured as mono.
Option key	Applies your action to all busses.
Shift-Option	Applies your action to all inputs and mixes.
Double-click	Returns the control to its default value (pan center, unity gain, etc.)

Hold down the following modifier keys as shortcuts for the EQ tab and controls:

Shortcut	Result
Shift click	Applies EQ button change to all input or outputs.
Option-click	Applies EQ enable button changes to all bands in that input or output.
Shift-Option-click	Applies EQ enable button changes to all bands and all inputs or outputs.

FILE MENU

Saving and loading hardware presets
The UltraLite-mk3 can store up to 16 presets in its on-board memory. A preset includes of all CueMix FX settings for all for mix busses, but it excludes global settings like clock source and sample rate.

The Load Hardware Preset and Save Hardware Preset commands in the CueMix FX file menu let you name, save and load presets in the UltraLite-mk3.

Peak/hold time
In CueMix FX, a peak indicator is a line (representing a virtual LED) displayed in a level meter that indicates the maximum signal level registered by the meter. The *Peak/hold time* setting (File menu) determines how long this indicator

remains visible before it disappears (or begins to drop). To disable peak/hold indicators altogether, choose Off from this sub-menu.

Mix1 Return Includes Computer
The *Mix1 return includes computer* File menu item applies to other MOTU interfaces products and has no effect on the UltraLite-mk3.

Hardware follows console stereo settings
This File menu item applies to other MOTU interfaces products and has no effect on the UltraLite-mk3.

Show meter in dock icon
This File menu item applies to other MOTU interfaces and has no effect on the UltraLite-mk3.

EDIT MENU

Undo/Redo
CueMix FX supports multiple undo/redo. This allows you to step backwards and forwards through your actions in the software.

Copying & pasting (duplicating) entire mixes
To copy and paste the settings from one mix to another:

1 Select the source mix (Figure 11-1) and choose Copy from the Edit menu (or press command-C).

2 Choose the destination mix and choose Paste from the Edit menu (or press command-V).

Clear Peaks
Choose *Clear Peaks* from the Edit menu to clear all peak indicators in all CueMix FX meters.

DEVICES MENU
If you are working with more than one MOTU audio interface product, this menu displays all interfaces that are currently on line. Choose any device from the menu to edit its settings using the CueMix FX software.

CONFIGURATIONS MENU
A configuration is just like a hardware preset (a "snapshot" of all settings in CueMix FX and therefore the UltraLite-mk3 hardware itself), except that it can be created and managed using the CueMix FX software on your computer, completely independently of the UltraLite-mk3 hardware. The commands in the Configurations menu let you create, save, load, import, export and otherwise manage as many configurations as you wish.

Here is a summary of Configurations menu operations:

Configurations Menu item	What it does
Create New	Lets you name and save a new configuration, which appears at the bottom of the Configurations menu.
Save	Overwrites the current configuration (checked in the list at the bottom of the menu) with the current settings in CueMix FX.
Save To	Same as Save above, except that it lets you first choose the configuration you wish to save to (instead of the current one).
Delete	Lets you choose a configuration to permanently remove from the menu.
Import	Loads all configurations from a configuration file on disk.
Export	Saves all current configurations as a file on disk.
Configuration list	Choose any configuration to load it. The current (last loaded or saved) configuration has a check mark next to it.

Modifying a configuration
The name of the current configuration is displayed in the CueMix FX window title bar. If you make any changes to the settings in CueMix FX, an asterisk appears in front of the name to remind you that the current state of CueMix FX doesn't match the saved configuration. If you wish to update the saved configuration with the new changes, use the Save command. To save the current state of CueMix FX to another configuration, use Save To. To save as a new, separate configuration, use Create New.

Saving a CueMix FX configuration as a hardware preset

To save a CueMix FX configuration as a hardware preset:

1 Choose the configuration from the Configurations menu to make it the current active configuration.

2 Choose *File menu> Save Hardware Preset*.

3 Type in a name, choose a preset slot and click OK.

Saving a hardware preset as a CueMix FX configuration

To save a hardware preset as a CueMix FX configuration:

1 Choose *File menu> Load Hardware Preset* to make it the current active preset.

2 Choose *Configuration menu> Create New* (or *Save To*) to save it as a configuration.

TALKBACK MENU

Choose the commands in the Talkback menu to engage or disengage Talkback or Listenback.

PHONES MENU

The Phones menu allows you to choose what you will hear on the headphone output, just like the Phones setting in MOTU Audio Setup. However, this menu provides one extra option that is exclusive to CueMix FX: *Follow Active Mix*. This menu item, when checked, causes the headphone output to mirror the output of the current mix being viewed in CueMix FX. For example, if you are currently viewing mix bus 3, the headphones will mirror the mix bus 3 output (whatever it is assigned to).

CONTROL SURFACES MENU

CueMix FX can be controlled from an automated control surface such as the Mackie Control™. Use the commands in the *Control Surfaces* menu to enable and configure this feature.

Application follows control surface

When checked, the *Application follows control surface* menu command makes the CueMix FX window scroll to the channel you are currently adjusting with the control surface, if the channel is not visible when you begin adjusting it. The same is true for the bus tabs: if you adjust a control in a bus that is not currently being displayed, CueMix FX will jump to the appropriate tab to display the control you are adjusting.

Share surfaces with other applications

When the *Share surfaces with other applications* menu command is checked, CueMix FX releases the control surface when you switch to another application. This allows you to control your other software with the control surface. Here's a simple way to understand this mode: the control surface will always control the front-most application. Just bring the desired application to the front (make it the active application), and your control surface will control it. When you'd like to make changes to CueMix FX from the control surface, just bring CueMix FX to the front (make it the active application).

When this menu item is unchecked, your control surface will affect CueMix FX all the time, even when CueMix FX is not the front-most application. In addition, you will not be able to control other host audio software with the control surface at any time (because CueMix FX retains control over it at all times). This mode is useful when you do not need to use the control surface with any other software.

CueMix Control Surfaces

CueMix FX includes support for the following control surface products:

■ Mackie Control™

■ Mackie HUI™

■ Mackie Baby HUI™

Use the sub-menu commands in the *CueMix Control Surfaces* menu item to turn on and configure control surface support, as described briefly below.

Enabled

Check this menu item to turn on control surface operation of CueMix FX. Uncheck it to turn off control surface support.

Configure…

Choose this menu item to configure your control surface product. Launch the on-line help for specific, detailed instructions on configuring CueMix FX for operation with your control surface product.
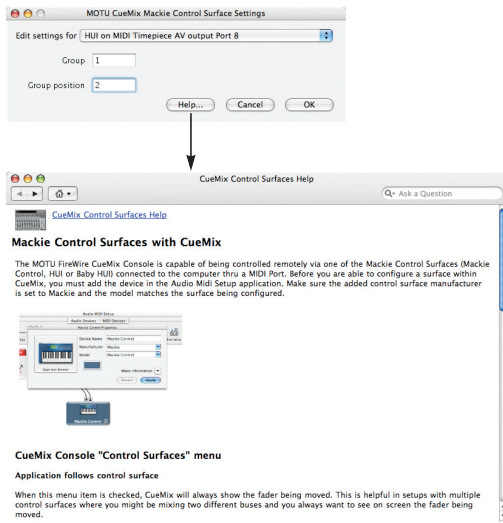
Figure 11-27: Refer to the extensive on-line help for details about configuring CueMix FX for operation with your control surface product.

Other HUI-compatible control surfaces

Any control surface that has the ability to emulate a HUI should be compatible with CueMix FX. Just add a Mackie HUI to Audio MIDI Setup and put the control surface hardware into HUI emulation mode. Consult the control surface manual for details about how put it into HUI emulation mode.

Other control surface hardware products

If you install other control surface drivers written for CueMix FX, they will appear as separate menu items at the bottom of the Control Surfaces menu, with the same sub-menu items described above.

CHAPTER 12 MOTU SMPTE Console

OVERVIEW

The UltraLite-mk3 can resolve directly to SMPTE time code via any analog input, without a separate synchronizer. The UltraLite-mk3 can also generate time code via any analog output. The UltraLite-mk3 provides a DSP-driven phase-lock engine with sophisticated filtering that provides fast lockup times and sub-frame accuracy. Direct time code synchronization is supported by AudioDesk and Digital Performer on Mac OS X.

MOTU SMPTE SETUP

The included MOTU SMPTE Setup™ software provides a complete set of tools to generate SMPTE for striping, regenerating or slaving other devices to the computer.

CLOCK/ADDRESS

The *Clock/Address* menu (Figure 12-1) provides the same global *Clock Source* setting as in MOTU Audio Setup ("Clock Source" on page 30), but it includes additional information: each setting shows both the clock and the address (time code or sample location), separated by a forward slash (/). To resolve the UltraLite-mk3 to SMPTE time code, choose the *SMPTE / SMPTE* setting in the Clock/ Address menu. This means that the system will use SMPTE as the clock (time base) and SMPTE as the address.

FRAME RATE

This setting should be made to match the SMPTE time code frame rate of the time code that the system will be receiving. The UltraLite-mk3 can
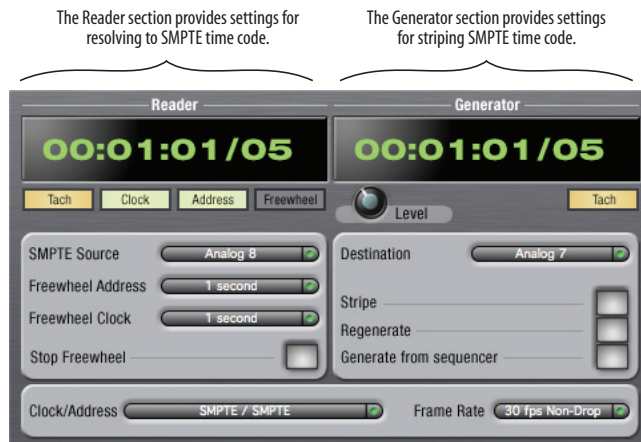
Figure 12-1: SMPTE Setup gives you access to your UltraLite-mk3's on-board SMPTE time code synchronization

auto-detect and switch to the incoming frame rate, except that it cannot distinguish between 30 fps and 29.97 fps time code, or 23.976 and 24 fps time code. So if you are working with either of these rates, make sure you choose the correct rate from this menu. The UltraLite-mk3 driver updates the frame rate setting in Digital Performer and AudioDesk for you.

READER SECTION

The Reader section (on the left-hand side of the window in Figure 12-1) provides settings for synchronizing the UltraLite-mk3 to SMPTE time code.

Status lights

The four status lights (Tach, Clock, Address and Freewheel) give you feedback as follows.

Tach

The Tach light blinks once per second when the UltraLite-mk3 has successfully achieved lockup to SMPTE time code and SMPTE frame locations are being read.

Clock

The Clock light glows continuously when the UltraLite-mk3 has successfully achieved lockup to an external time base, such as SMPTE time code or the S/PDIF input.

Address

The Address light glows continuously when the UltraLite-mk3 has successfully achieved lockup to SMPTE time code.

Freewheel

The Freewheel light illuminates when the UltraLite-mk3 is freewheeling address (time code), clock or both. For details about Freewheeling, see "Freewheel Address" and "Freewheel clock" below.

SMPTE source

Choose the analog input that is connected to the time code source. This is the input that the UltraLite-mk3 "listens" to for time code.

Freewheel Address

Freewheeling occurs when there is a glitch or drop-out in the incoming time code for some reason. The UltraLite-mk3 can freewheel past the drop-out and then resume lockup again as soon as it receives readable time code. Choose the amount of time you would like the UltraLite-mk3 to freewheel before it gives up and stops altogether.

The UltraLite-mk3 cannot freewheel address without clock. Therefore, the *Freewheel Address* setting will always be lower than or equal to the *Freewheel Clock* setting, and both menus will update as needed, depending on what you choose.

Keep in mind that freewheeling causes the system to keep going for as long as the duration you choose from this menu, even when you stop time code intentionally. Therefore, if you are starting and stopping time code frequently (such as from the transports of a video deck), shorter freewheel times are better. On the other hand, if you are doing a one-pass transfer from tape that has bad time code, longer freewheel times will help you get past the problems in the time code.

The 'Infinite' freewheel setting

The *Infinite* freewheel setting in the *Freewheel Address* menu causes the UltraLite-mk3 to freewheel indefinitely, until it receives readable time code again. To make it stop, click the *Stop Freewheeling* button.

Freewheel clock

Freewheeling occurs when there is glitch or drop-out in the incoming SMPTE time code for some reason. The UltraLite-mk3 can freewheel past the drop-out and then resume lockup again as soon as it receives a stable, readable clock signal.

The UltraLite-mk3 cannot freewheel address without clock. Therefore, the *Freewheel Address* setting will always be lower than or equal to the *Freewheel Clock* setting, and both menus will update as needed, depending on what you choose.

The 'Infinite' freewheel setting

The *Infinite* freewheel setting in the *Freewheel Clock* menu causes the UltraLite-mk3 to freewheel indefinitely, until it receives readable time code again. To make it stop, click the *Stop Freewheeling* button.

Stop Freewheeling

The Stop Freewheeling button stops the system if it is currently freewheeling.

GENERATOR SECTION

The Generator section (on the right-hand side of the window in Figure 12-1) provides settings for generating SMPTE time code.

Level

Turn the level knob to adjust the volume of the SMPTE time code being generated by the UltraLite-mk3. The level knob disappears when the Destination is set to *None*.

Tach light

The Tach light blinks once per second when the UltraLite-mk3 is generating SMPTE time code.

Destination

In the *Destination* menu, choose either *SMPTE* (to generate time code) or *None* (to turn it off).

Stripe

Click this button to start or stop time code. To set the start time, click directly on the SMPTE time code display in the Generator section and type in the desired start time. Or drag vertically on the numbers.

Click here to edit the start time, or drag vertically on the numbers.
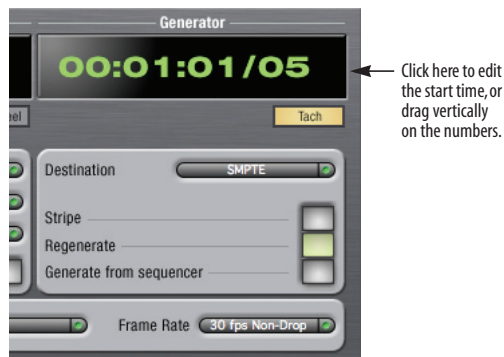
Figure 12-2: Setting the time code start time.

Regenerate

This option, when enabled, causes the generator to generate time code whenever the UltraLite-mk3 is receiving SMPTE time code.

Generate from sequencer

This option, when enabled, causes the generator to generate time code whenever you are running AudioDesk or Digital Performer. Time code begins at the time specified by the AudioDesk or Digital Performer main transport.

RESOLVING DP OR AUDIODESK TO SMPTE TIME CODE

To resolve your Digital Performer/UltraLite-mk3 system directly to SMPTE time code with no additional synchronization devices, use the setup shown in Figure 12-3 on page 94. Choose *Receive Sync* from the Setup menu and choose the *Sample accurate* option. Then make sure that the *Slave to External Sync* command in the Studio menu is checked. Make sure the *Clock Source* setting in the MOTU Audio Setup window is set to *SMPTE*. Also, make sure that you've connected an LTC input signal to the UltraLite-mk3 Time Code input, and that you've specified that input in the SMPTE Setup.

SYNCING TO SMPTE TIME CODE

The UltraLite-mk3 system can resolve directly to SMPTE time code. It can also generate time code, under its own clock or while slaving to time code. Therefore, the UltraLite-mk3 can act both as an audio interface and as a SMPTE time code synchronizer to which you can slave other devices. You can use the UltraLite-mk3 to slave your audio software to time code as well, as long as your software supports sample-accurate sync, which is the means by which the software follows the UltraLite-mk3. The accuracy may not be sample-accurate, but in most cases it will be very close.

Use this setup if you have:

✓ A SMPTE time code source, such as a multitrack tape deck.

✓ An UltraLite-mk3 by itself, OR with another slaved device (such as a digital mixer).

✓ Host software that supports sample-accurate sync.

This setup provides:

✓ Continuous sync to SMPTE time code.

✓ Sub-frame timing accuracy.

✓ Transport control from the SMPTE time code source.
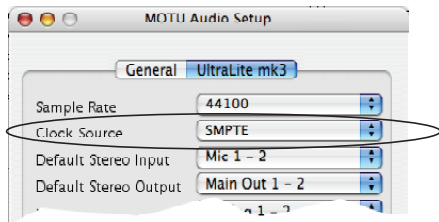
First, choose *SMPTE* as the clock source in AudioDesk, Digital Performer, or MOTU Audio Setup. This setting can also be made in the MOTU SMPTE Console (shown below).

SMPTE time code source

audio cable bearing LTC (Longitudinal Time Code)

Any analog input

UltraLite-mk3 interface

FireWire cable

Mac running AudioDesk, Digital Performer or other sample-accurate software.
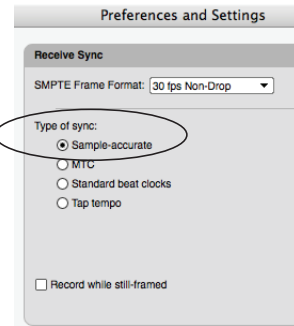
In AudioDesk or Digital Performer:

1. Choose *Receive Sync* from the Setup menu.

2. Choose the *Sample-accurate* option. (If this option is grayed out, choose *SMPTE* as the clock source setting first, as shown above.)

3. Make sure that *Slave to External Sync* mode is enabled.

Launch the MOTU SMPTE Console to specify the time code frame rate and amount of freewheel. Also, confirm that the *Clock Source/Address* is *SMPTE/SMPTE*.

Figure 12-3: Connections for synchronizing the UltraLite-mk3 directly to SMPTE time code.

CHAPTER 13 Troubleshooting

Things seems like they are working fine, but the UltraLite-mk3 then just drops off line, and the computer can't see it anymore on the FireWire bus.
This is a common symptom when the problem is that the UltraLite-mk3 is not getting enough power. Check the power source for the UltraLite-mk3. Make sure that the power connection meets the requirements outlined in "Power options" on page 19.

Slaving directly to time code in AudioDesk or Digital Performer
To slave Digital Performer or AudioDesk directly to time code, be sure to go to the Receive Sync dialog in Digital Performer or AudioDesk and switch from "MTC" to "Sample-accurate."

UltraLite-mk3 inputs and outputs are not visible in Cubase
You probably need to enable them in Cubase.

Can't authenticate AudioDesk
When installing software off the CD-ROM, 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 exactly as it appears in your AudioDesk manual (on the inside of the back cover). If you continue to have difficulties, try repairing Mac OS X disk permissions using *Disk Utility*.

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 UltraLite-mk3. 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 the disk drivers are outdated.

Connecting or powering gear during operation
It is not recommended that you connect/disconnect, or power on/off devices connected to the UltraLite-mk3 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 UltraLite-mk3's hardware-based CueMix FX monitoring feature. Please see chapter 10, "Reducing Monitoring Latency" (page 57).

Controlling monitoring latency
See chapter 10, "Reducing Monitoring Latency" (page 57).

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 UltraLite-mk3. Doing so entitles you to technical support and notices about new products and software updates.

REPLACING DISKS

If your UltraLite-mk3 software installer CD 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 UltraLite-mk3 system, you may contact our technical support department in one of the following ways:

■ Tech support hotline: (617) 576-3066 (Monday through Friday, 9 am to 6 pm EST)

■ 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 UltraLite-mk3 system. This is printed on a sticker placed on the bottom of the UltraLite-mk3 unit. 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 which refer to the parts of the UltraLite-mk3 or AudioDesk with which you are having trouble.

■ The version of your computer's operating system.

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

If you have features or ideas you would like to see implemented, we'd like to hear from you. Please write to the UltraLite-mk3 Development Team, MOTU Inc., 1280 Massachusetts Avenue, Cambridge, MA 02138.