Traveler™
User's Guide for Macintosh

MOTU

Contents

SAFETY PRECAUTIONS AND ELECTRICAL REQUIREMENTS

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

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

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

IMPORTANT SAFEGUARDS

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

ENVIRONMENT

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

AVOID THE HAZARDS OF ELECTRICAL SHOCK AND FIRE

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

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

Quick Reference: Traveler Front Panel
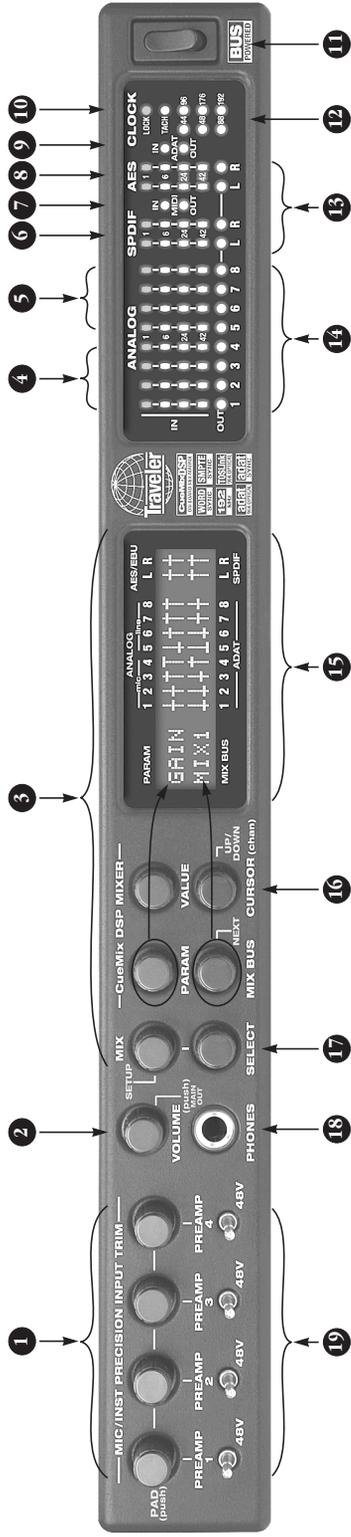
1. These four detented digital trim knobs provide 53dB of gain, but they also function as pad switches (when pushed) for an additional 20dB of gain or reduction. When you turn or push the knobs, you'll see dynamic feedback of your adjustment in the LCD display. The total gain range — from when pad is enabled and the trim is turned all the way down to when the pad disabled and trim is turned all the way up — is 73dB. All four inputs have preamps, so you can plug in just about anything: a microphone, a guitar, a synth, or even a +4 signal. Use the trim knob and input level meters 1-4 in the metering section to calibrate the input signal level. The meters cover both the TRS and XLR input.

2. Controls the headphone volume or main out volume. Push to toggle between them. The LCD provides feedback.

3. This section controls the Traveler's built-in CueMix DSP monitor mixer. There are four independent mix busses: MIX1 through MIX4. Each mixes all inputs (or any subset you wish) to a stereo output of your choice. To edit a mix, choose it by pressing the MIX BUS knob. Each mix has parameters (volume, pan, etc.) for each input: choose the parameter you wish to edit with the PARAM knob.

The LCD shows each Traveler input (XLR/combo, TRS, ADAT, SPDIF and AES/EBU), along with the current mix parameter setting for each input. To change a setting, scroll to it with the CURSOR knob and change it with the VALUE knob.

4. These four 4-segment meters show input signal level for the mic/instrument XLR/combo inputs on the rear panel.

5. These four 4-segment meters show input signal level for the analog TRS input jacks on the rear panel.

6. 4-segment metering for S/PDIF input.

7. MIDI activity LEDs for MIDI input and output.

8. 4-segment metering for AES/EBU input.

9. ADAT optical and TOSLink signal present LEDs.

10. When the Traveler is resolving to SMPTE time code, the LOCK light glows green when lockup has been achieved. The TACH light blinks once per second when the Traveler is successfully reading address (time code) information.

11. The Traveler is powered by its FireWire connection to the computer. Use this power switch to turn in on and off. It is recommended that you always power off the Traveler before unplugging the FireWire cable.

12. These lights indicate the global sample rate at which the Traveler is operating. Use the MOTU FireWire Audio Console to set the sample rate or to choose an external clock source, from which the sample rate will be derived. When no clock signal is currently present, one of these LEDs flashes rapidly. For example, if you've set the Traveler to slave to an external clock, such as ADAT, but there is no clock signal currently being detected, it flashes.

13. These four round "L/R" LEDs indicate signal presence on the stereo S/PDIF and AES/EBU digital outputs.

14. These round LEDs indicate signal presence on the eight rear-panel TRS analog outputs. Their threshold is around -42 dB. They do not indicate clipping in any way; use your host audio software level meters to calibrate output levels. Outputs 1-2 serve as the main outs. Push and then turn the front-panel volume knob for volume control.

15. The multi-purpose backlit LCD shows system settings or CueMix DSP settings, depending on which knobs you turn. The labels above and below the LCD refer to all of the Traveler's inputs (both analog and digital).

16. Use the VALUE and CURSOR knobs to adjust the CueMix settings (gain, pan, etc.) for individual inputs.

17. Use the SETUP and SELECT knobs to change system settings, like the Traveler sample rate and clock source. The SETUP knob chooses the setting; the SELECT knob modifies the current system setting displayed in the LCD. Some settings require that you push SELECT instead of turning it, or you may need to push it to confirm the setting you've chosen by turning it.

18. 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.

19. These switches provide phantom power for their respective microphone input. Left is off; right is on. (Right on!)

Quick Reference: Traveler Rear & Side Panels
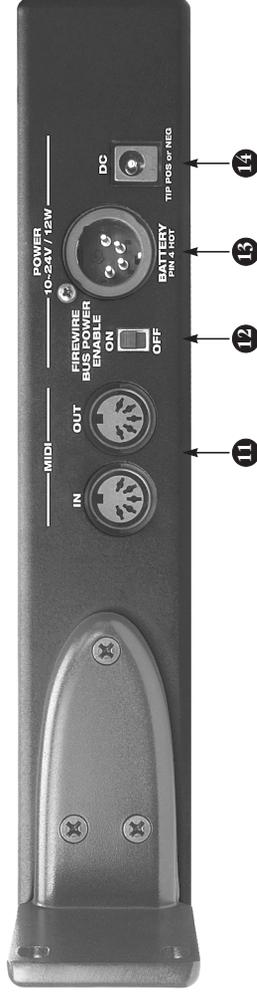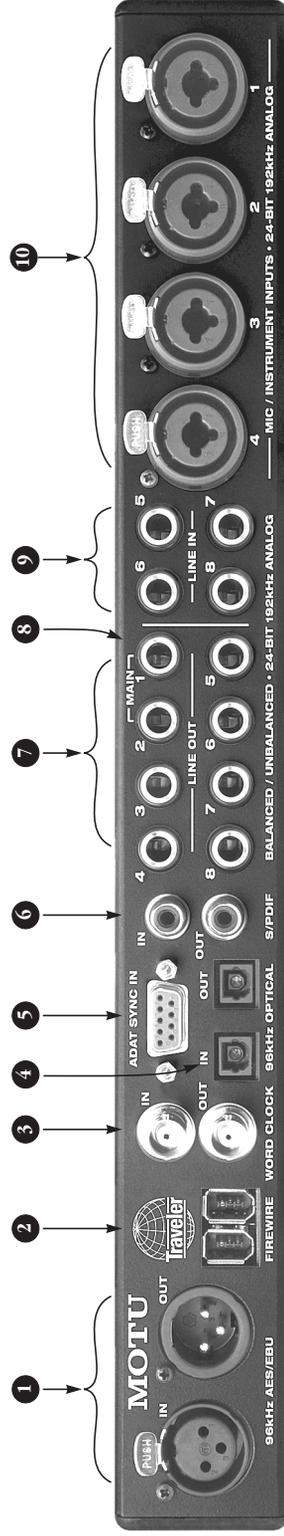
1. These jacks provide stereo, 24-bit AES/EBU digital input and output at any sample rate up to 96kHz. They are disabled at the 4x rates (176.4 and 192kHz).

2. Connect the Traveler to the computer here using the standard 1394 FireWire A cable provided with your Traveler. **Important note: it is best to turn off the Traveler when plugging in the FireWire cable, as this avoids the possibility of static discharge, which can harm the electrical components in the Traveler 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. For details, see "Connecting multiple MOTU FireWire Interfaces" on page 35.

3. These are standard word clock jacks. Use them for a variety of applications, such as for digital transfers with devices that cannot slave to the clock supplied by their digital I/O connection with the Traveler. When the Traveler is operating at a 2x sample rate (88.2 or 96kHz) or 4x sample rate (176.4 or 192kHz), the word clock output can either match the Traveler's sample rate or be reduced to the equivalent 1x rate (either 44.1 or 48 kHz). This setting is made via the FireWire Audio Console. See "Word Out" on page 48.

4. These optical digital I/O connectors can be connected either to an ADAT-compatible "lightpipe" device (such as a digital mixer) or to a S/PDIF optical ("TOSLink")

compatible device, such as an effects processor or DAT machine. Be sure to set the format in the MOTU FireWire Audio Console software. (see "Optical input/output" on page 48) for details.) ADAT optical supplies eight channels of 24-bit digital I/O (4 channels at 96kHz). TOSLink is stereo. Note: you can choose independent formats for the optical IN and OUT. For example, you could choose ADAT for the optical IN (for, say, eight channels of input from your digital mixer) and S/PDIF for the optical OUT (for, say, your DAT machine).

5. If you are using the Traveler with an ADAT, use this standard ADAT SYNC INPUT to connect the Traveler to the end of your ADAT sync chain. For example, if you have three ADATs, chain the ADATs in the usual fashion (SYNC OUT to SYNC IN, etc.), and then connect the last ADAT's SYNC OUT to this SYNC IN. This connection allows you to make sample-accurate audio transfers between AudioDesk (or other sample-accurate software) and the ADATs. If you have a MOTU MIDI Timepiece AV or Digital Timepiece, make it the master of the ADAT SYNC chain so that you can control everything from AudioDesk (or your other MIDI Machine Control compatible software).

6. These jacks provide stereo, 24-bit S/PDIF digital input and output at any sample rate up to 96kHz. They are disabled at the 4x rates (176.4 and 192kHz).

7. The Traveler'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.

8. These two balanced, quarter-inch jacks serve as the Traveler'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. (Push the knob first to switch from main out volume control.) To hear disk tracks in your audio software on these main outs, assign the disk tracks (and master fader) to these main outs (Analog 1-2). You can also use CueMix DSP to monitor live Traveler inputs here as well.

9. These 4 analog inputs are gold-plated, balanced TRS (tip/ring/sleeve) quarter-inch connectors that can also accept an unbalanced plug. The front panel LCD and CueMix Console software let you adjust them for either +4dB or -10dB input signals. They have 24-bit, 64x oversampling converters. These inputs (5 through 8) do not have microphone preamps, so they are best used for synthesizers, drum machines, effects processors, and other instruments with line level signals.

10. These four Neutrik™ combo (XLR/TRS) jacks accept either a mic cable or a cable with a quarter-inch plug. Both the low-impedance XLR jack and the high-imped-

ance TRS jack are equipped with a 20dB pad (so you can even connect a +4 line level input). 48V phantom power can be supplied via the front-panel switch.

11. Connect a MIDI device here using standard MIDI cables. Connect the Traveler's MIDI OUT port to the MIDI IN port on the other device. Conversely, connect the Traveler'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).

12. For bus-powered operation, turn on the Bus Power Enable switch. For battery operation (i.e. powering the Traveler from a battery pack via the 4-in XLR jack), turn this switch to the OFF position.

13. Connect a 10-24V battery pack or other power supply here via a 4-in XLR cable. Remember to also turn off the bus power switch to the left.

14. This jack accepts any standard 10-24V DC power supply with either tip-positive or tip-negative polarity. Remember to also turn the BUS POWER switch to the OFF position.

Quick Reference:
MOTU FireWire Audio Console

✓ Internal
AES/EBU
S/PDIF
Word Clock In
ADAT 9-pin
ADAT Optical
SMPTE
Macintosh built-in
PCI-424

Determines the clock source for your Traveler. If you're just using the analog ins and outs, set this to 'Internal'. The other settings are for digital transfers via S/PDIF, AES/EBU or external synchronization via the ADAT SYNC in port.

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

Phones 1 – 2
✓ Analog 1 – 2
Analog 3 – 4
Analog 5 – 6
Analog 7 – 8
AES/EBU 1 – 2
S/PDIF 1 – 2
ADAT 1 – 2
ADAT 3 – 4

MOTU FireWire Audio

General Traveler

Sample Rate 96000
Clock Source .... Internal
Default Stereo Input ... Analog 1 – 2
Default Stereo Output .. Analog 1 – 2
Optical Input .... ADAT
Optical Output .... ADAT
Phones .... Analog 1 – 2
Word Out .... Force 44.1/48 kHz

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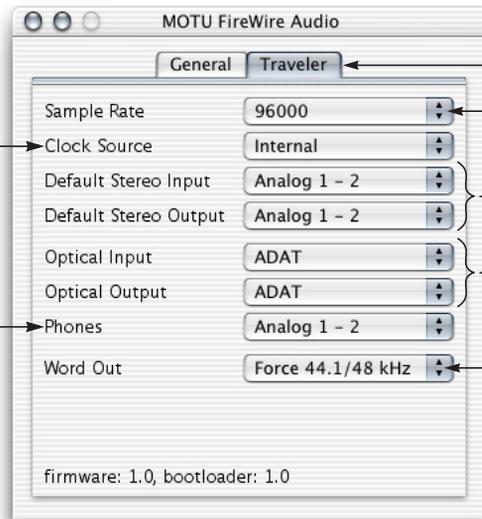
Click the tabs to access general MOTU FireWire interface settings or settings specific to the Traveler (or other connected interface.)

Choose the sample rate for the Traveler here.

Specifies the stereo input and output pair when the Traveler is chosen for Mac OS X audio I/O.

Choose the desired optical format you'd like to use for the optical input and output. (ADAT or TOS Link). Note that they don't have to be the same.

If you are running a Traveler interface at a high sample rate (88.2, 96, 176.4 or 192kHz), this option appears in the interface tab. It lets you choose a word clock output rate that either matches the global sample rate (e.g. 192kHz) or reduces the word clock output to the corresponding 1x rate (either 44.1 or 48kHz).

Click the General tab to access these settings.

MOTU FireWire Audio

General Traveler

☑ Enable Pedal
Pedal Down
Set [3]
Pedal Up
Set none

☑ Launch console when hardware becomes available

Edit Channel Names...

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

In the standard Mac OS X fashion, the console 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 Traveler 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 console window.

✓ ☐ MOTU FireWire Audio
Traveler
Sample Rate ▶
Clock Source ▶
Optical Input ▶
Optical Output ▶
Default Input ▶
Default Output ▶
Phones ▶
Keep In Dock
Show In Finder
Quit

If you have a foot switch connected to another MOTU FireWire interface, these settings let you map the foot switch to any computer keyboard key for both the up and down position. This setting does not apply to the Traveler, which does not have a foot switch input.

This button opens another dialog that lets you assign your own customized names to each Traveler 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/output naming).

About the Traveler

OVERVIEW

The Traveler is a computer-based hard disk recording system for Mac OS and Windows that offers 20 inputs and 22 outputs. Analog recording and playback is offered at any standard sample rate up to 192kHz. At 96kHz or lower, all inputs and outputs, both analog and digital, can be accessed simultaneously. The Traveler consists of a light (3.8 pounds) and small (14.75x9 inches) aluminum alloy-encased interface that connects directly to a computer via a standard IEEE 1394 FireWire™ cable. The Traveler offers the following:

- Bus-powered and battery-powered operation

- Four combo XLR/TRS mic/guitar inputs with preamps and 48V phantom power

- Digital Precision Trim™ preamp gain adjustment

- Four 24-bit analog TRS inputs

- Eight 24-bit analog TRS outputs

- Eight-channel ADAT optical digital I/O

- S/PDIF digital I/O (optical and RCA)

- AES/EBU digital I/O

- ADAT SYNC IN and word clock I/O

- MIDI I/O

- On-board SMPTE synchronization

- Headphone jack

- Main volume knob (for headphone + main outs)

- CueMix™ DSP no-latency mixing & monitoring

- Front-panel programming

- Stand-alone mixing

With a variety of I/O formats, mic preamps, no-latency monitoring of live input and synchronization capabilities, the Traveler is a complete, portable "studio in a box" when used with a Macintosh or Windows computer. The Traveler system includes AudioDesk™, full-featured audio workstation software for Mac OS that supports both 16-bit and 24-bit recording.

THE TRAVELER I/O REAR PANEL

The Traveler rear panel has the following connectors:

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

- Four combo XLR/TRS mic/instrument inputs

- Four gold-plated, balanced -10/+4 dB quarter-inch (TRS) analog inputs (with 24-bit 192kHz converters)

- One set of ADAT optical 'light pipe' connectors (8 channels of ADAT optical I/O at 44.1/48kHz or 4 channels at 88.2/96kHz), individually switchable to optical S/PDIF ('TOSLink')

- RCA S/PDIF in/out

- AES/EBU in/out

- One 9-pin ADAT SYNC IN connector

- Word clock in/out

- Two 1394 FireWire jacks

20 inputs and 22 outputs

All Traveler inputs and outputs can be used simultaneously, for a total of 20 inputs and 22 outputs:

Connection	Input	Output
Analog 24-bit 192kHz on bal/unbal TRS	4	8
Mic preamps 24-bit 192kHz on XLR/TRS combo	4	-
ADAT optical digital (at 44.1 or 48kHz)	8	8
AES/EBU 24-bit 96kHz digital	stereo	stereo
SPDIF 24-bit 96kHz digital	stereo	stereo
Headphone output	-	stereo
Total	**20**	**22**

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

The ADAT optical ports provide 4 channels of I/O at 88.2 or 96kHz. They can also be independently configured as stereo TOSLink SPDIF at any supported sample rate (up to 96kHz).

All digital I/O is disabled for 192kHz operation.

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

Mic/instrument inputs

The four mic/instrument inputs are equipped with preamps and Neutrik™ "combo" XLR/TRS jacks, which accept low-Z XLR microphone inputs or high-Z quarter-inch guitar/instruments inputs. The total gain range for these preamps, including the 20dB pad, is 73dB, allowing you to connect anything from guitars and microphones to +4dB or –10dB line level signals. Preamp gain and pad can be controlled from the front panel digital rotary encoders/switches or the included CueMix Console™ software.

Analog

All four quarter-inch analog inputs are equipped with 24-bit 192kHz, 64x oversampling A/D converters. All eight analog outputs have 24-bit 128x oversampling D/A converters. All audio is carried to the computer in a 24-bit data stream. All eight analog outputs and four quarter-inch inputs are on balanced TRS +4dB quarter-inch jacks. All of these jacks can also accept unbalanced plugs.

The quarter-inch analog inputs can be switched in pairs between a +4 and -10dB reference level. An additional 6dB of software boost can be applied to each channel individually via the CueMix Console software application or via the front panel LCD display.

Optical

The Traveler optical jacks support two digital audio formats: ADAT and S/PDIF. The ADAT optical format provides eight channels of 24-bit digital audio at either 44.1 or 48 kHz, and four channels at 88.2 or 96kHz. The optical S/PDIF format (often referred to as *TOSLink*), supplies stereo S/PDIF input or output. The optical jacks are disabled at the 4x sample rates (176.4 and 192kHz).

AES/EBU

The Traveler rear panel provides a standard AES/EBU digital input and output that supports digital I/O at 44.1, 48, 88.2 and 96 kHz. The AES/EBU jacks are disabled at the 4x sample rates (176.4 and 192kHz).

S/PDIF

The Traveler rear panel provides S/PDIF input and output in two different formats: RCA "coax" and optical "TOSLink". The RCA jacks are dedicated to the S/PDIF format. The TOSLink jacks can be used either for either TOSLink or ADAT optical. The optical input/output jacks can operate independently. For example, the optical input can be set to

TOSLink while the optical output is set to ADAT. The RCA and optical S/PDIF jacks are disabled at the 4x sample rates (176.4 and 192kHz).

On-board SMPTE synchronization
The Traveler can resolve directly to SMPTE time code via any analog input, without a separate synchronizer. The Traveler can also generate time code via any analog output. The Traveler 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.

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

ADAT sync: sample-accurate synchronization
The Traveler's standard 9-pin ADAT SYNC IN connector provides sample-accurate synchronization with all Alesis ADAT tape decks connected to the system—or any device that supports the ADAT sync format. For example, if you digitally transfer a single track of material from an ADAT via light pipe into audio workstation software on the computer, and then transfer the track back to the ADAT, it will be recorded exactly at its original location, down to the sample.

Word clock
The Traveler provides standard word clock that can slave to any supported sample rate. In addition, word clock can resolve to and generate "high" and "low" sample rates. For example, if the Traveler global sample rate is set to 96 kHz, the word clock input can resolve to a "low" rate of 48 kHz. Similarly, when the Traveler is operating at 96 kHz, the MOTU FireWire Audio Console lets you choose a word clock output rate of 48 kHz.

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

THE TRAVELER FRONT PANEL

Phantom power
Individual 48V phantom power can be enabled for each preamp with the four front panel switches.

Digital Precision Trim™ rotary encoders
The four Digital Precision Trim™ detented rotary encoders provide preamp gain adjustment and also serve as 20dB pad switches when pushed. When you turn these trim knobs, input gain can be adjusted in 1dB increments, and the LCD display provides active numeric feedback as the adjustment is made.

Headphone output and main volume control
The Traveler front panel includes a quarter-inch stereo headphone output jack and volume knob. The volume knob also controls the rear-panel main outs. Push the knob to toggle between them. The LCD display provides feedback.

CueMix™ DSP no-latency on-board mixing
The CueMix DSP section of the front-panel provides access to the Traveler's on-board mixing features, as well as global system settings. Together, these features provide complete stand-alone operation, without a computer. The Traveler can mix all inputs to any output pair, and up to four such mixes can be independently programmed and simultaneously operated.

Backlit LCD display

Any Traveler setting can be accessed directly from the front panel using the six rotary encoders and the 2x16 backlit LCD display. CueMix DSP settings such as input gain, panning, +4/-10 input level, 6dB boost, stereo pair grouping, mix output assignment and others are quickly accessed, clearly marked and easy to adjust. Sixteen presets can be created, saved, recalled and duplicated.

Metering section

The front panel of the Traveler displays several banks of input metering and output activity LEDs. The round analog, SPDIF and AES/EBU output activity LEDs, as well as the ADAT optical in/out activity LEDs, display signal presence. The threshold for these lights is approximately -42 dB. The four-segment input meters provide dedicated multi-segment metering for their respective inputs.

The *Clock* lights indicate the global sample rate (as chosen in the MOTU FireWire Audio Console software). The LOCK and TACH LEDs provide feedback for the Traveler's on-board SMPTE synchronization features.

TRAVELER SIDE PANEL

MIDI I/O

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

Bus power

The Traveler can draw power from three possible sources:

1. the computer (via the FireWire cable connection between the Traveler and the computer)

2. an external battery pack (purchased separately)

3. a DC power supply

If you are using FireWire bus power only, then the Bus Power switch needs to be turned on. However, if you are using battery or DC power, and you do not wish to draw power from the computer (to conserve your laptop battery, for example), you can disable bus power by moving the Bus Power switch to the *Off* position.

Battery power

The 4-pin XLR battery power jack allows you to connect a standard DC battery pack for extended remote recording. The battery pack must supply a minimum of 10-18 volts and 12 watts. For further details, contact your preferred supplier of professional audio/video equipment.

Power supply

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

16-BIT AND 24-BIT RECORDING

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

AUDIODESK

AudioDesk is a full-featured, 24-bit audio workstation software package included with the Traveler system (for Macintosh 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 Traveler system is fully integrated with MOTU's award-winning Digital Performer audio sequencer software package.

OTHER HOST AUDIO SOFTWARE

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

A COMPUTER-BASED SYSTEM

Regardless of what software you use with the Traveler, the host computer determines the number of tracks the software can record and play simultaneously, as well as the amount of real-time effects processing you can apply to your mix. A faster computer with more RAM and faster hard drives will allow more simultaneous tracks and real-time effects than a slower computer with less RAM and slower hard drives. Today's fastest computers can typically play as many as 72 tracks or more.

CHAPTER 2 Packing List & Mac System Requirements

PACKING LIST

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

- One Traveler I/O rack unit
- One set of removable rack ears
- One 1394 "FireWire" cable
- One Traveler Mac/Windows manual
- One AudioDesk Manual
- One cross-platform CD-ROM
- Product registration card

MACINTOSH SYSTEM REQUIREMENTS

The Traveler system requires the following Macintosh system:

- A G3/300MHz Power Macintosh 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 10.2 or later)
- A large hard drive (preferably at least 20 GB)

PLEASE REGISTER TODAY!

Please send in the registration card included with your Traveler system. As a registered user, you will be eligible to receive on-line technical support email and announcements about product enhancements as soon as they become available. Only registered users receive these special update notices, so please, complete and mail this registration card!

There is also an AudioDesk software registration card found at the beginning of your AudioDesk manual. Please be sure to fill out and return this card as well, so that you will be eligible to receive on-line 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 Traveler Hardware

OVERVIEW
Here's an overview for installing the Traveler:

IMPORTANT NOTE BEFORE YOU BEGIN!
Before you begin installing the Traveler (or any
bus-powered device), take these important
precautionary measures to avoid damaging the
sensitive electrical components in your computer,
the Traveler or other devices being connected:

■ Turn off the computer.

■ Turn off the Traveler's front panel power switch.

■ Turn off the power of any other devices.

■ Touch the metal casing of the Traveler 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 Traveler.

3. Turn on other devices connected to the Traveler.

CONNECT THE TRAVELER INTERFACE

1 Make sure your computer and the Traveler are switched off.

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

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

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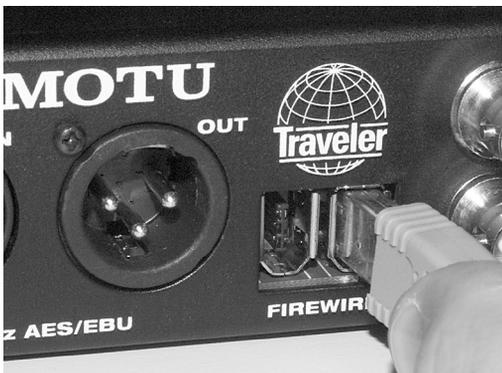
Figure 3-1: Connecting the Traveler to the computer.

CONNECT AUDIO INPUTS AND OUTPUTS

The Traveler audio interface has the following audio input and output connectors:

■ 8 balanced, +4 dB quarter-inch analog outputs

■ 4 balanced +4/-10 dB quarter-inch analog inputs

■ 4 Neutrik™ XLR/quarter-inch analog inputs with preamps

■ 1 pair of RCA S/PDIF in and out

■ 1 pair of AES/EBU in and out

■ 1 pair of optical in/out switchable between ADAT ("Lightpipe") or optical S/PDIF (TOSLink)

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

Mic/guitar/instrument inputs

Connect a microphone, guitar or other similar instrument to the front-panel inputs, as recommended in the table below. If your microphone requires phantom power, move the 48V phantom power switch on the front panel to the right (enabled). Use the trim knobs on the front panel to adjust the input level as needed for each input. The LCD provides feedback for the current trim setting. The Traveler's input trims are digital controlled, so they allow you to make fine-tuned adjustments in approximately 1dB increments. Use the four input level meters on the front panel (labeled *ANALOG 1-4*) to calibrate the level. These meters register for both the XLR and TRS input.

Input	48V phantom power	Pad
Condenser mic	On	Off
Dynamic mic	Off	Off
Guitar	Off	Off
Synth, sampler, etc.	Off	Off
+4dB line level input	Off	On

To toggle the pad, push the input's trim knob. The LCD provides feedback for the current pad setting. The pad settings above are recommended initial settings. Use the front-panel trim knobs to adjust input levels, and use the Traveler's front-panel 4-segment meters to adjust the gain accordingly. If necessary, after adjusting the trim, you can enable or disable the pad as needed, depending on actual signal levels.

Quarter-inch analog

The quarter-inch analog inputs (5-8) and outputs (1-8) are balanced TRS connectors that can also accept an unbalanced plug. The outputs are all referenced to +4dBu. The inputs can be manually set to either +4 or -10dBu. Use the front panel controls to adjust the reference level (+4/-10) as needed for each input (or input pair) as follows:

1 Turn the PARAM knob until you see the "4/10" setting displayed in the LCD, as shown below.

If turning the PARAM knob doesn't do anything, press the SETUP knob once, and then turn it.
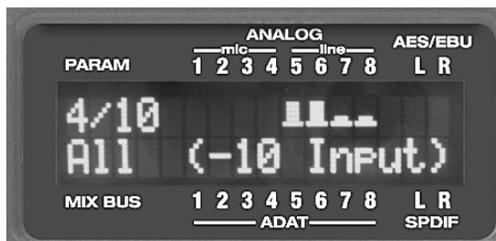
Figure 3-2: Setting the reference level for the four TRS analog inputs.

2 Turn the CURSOR knob until the desired input flashes.

3 Turn (or press) the VALUE knob to toggle the input between a +4 or -10dB reference level setting.

Optical

Reminder: optical goes OUT to IN and IN to OUT, like MIDI. The optical jacks can be connected to either an ADAT "lightpipe" device or an optical

S/PDIF "TOSLink" device. Just make the connections as needed and then you'll set the format later in the MOTU FireWire Audio Console. Input and output are independent. For example, you could connect ADAT optical input from your digital mixer and connect TOSLink optical output to your DAT deck.

The optical S/PDIF jacks are disabled at the 4x sample rates (176.4 and 192kHz).

Analog outputs 1-2 can serve as main outs

Analog outputs 1-2 can serve as main outputs. The main out volume is controlled by the volume knob on the front panel. Push the knob to toggle between phone and main out volume control. 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.

CONNECT MIDI GEAR

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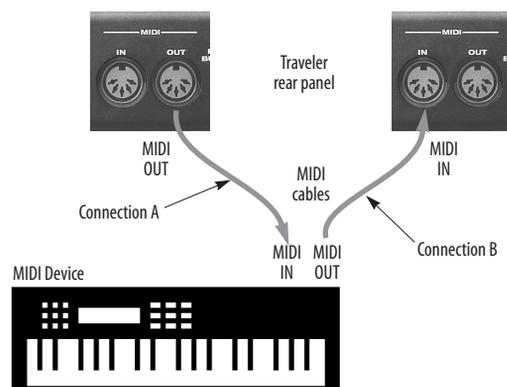
Figure 3-3: Connecting a MIDI device to the Traveler.

One-way MIDI connections

MIDI devices that do not receive MIDI data, such as a dedicated keyboard controller, guitar controller, or drum pad, only need Connection B

shown in Figure 3-3. Similarly, devices that never send data, such as a sound module, only need Connection A. Make both connections for any device that needs to both send and receive MIDI data.

Connecting additional gear with MIDI THRUs

If you need to connect several pieces of MIDI gear, run a MIDI cable from the MIDI THRU of a device already connected to the Traveler to the MIDI IN on the additional device as shown below in Figure 3-4. The two devices then share the Traveler'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.
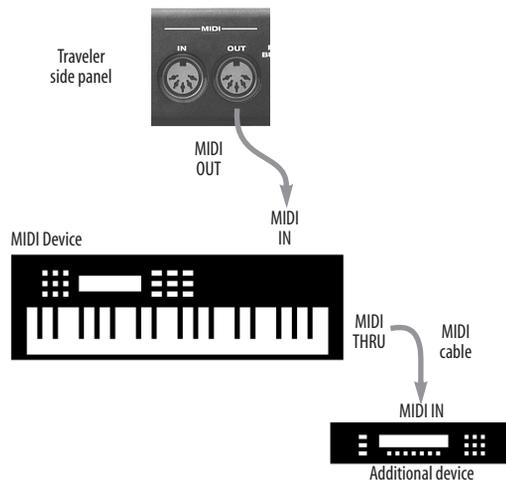
Figure 3-4: Connecting additional devices with MIDI THRU ports.

POWER OPTIONS

The Traveler can draw power from three possible sources:

1. the computer (via FireWire)

2. an external battery pack

3. a DC power supply

Figure 3-5: The Traveler's battery and power supply options.

Bus power requirements

The Traveler 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 Traveler 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:
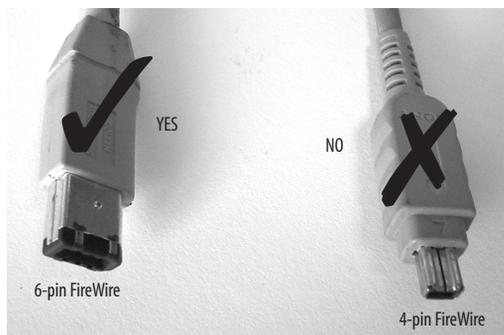
Figure 3-6: 4-pin FireWire connectors cannot be used for bus power.

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

The Traveler can be daisy-chained with other FireWire devices from a single FireWire connection to the computer. However, if the Traveler is operating under bus power, this is not recommended. If you need to daisy chain the Traveler with other devices on the same FireWire bus, power the Traveler with a DC power supply (or battery), and turn off the Bus Power switch on the side panel. 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 Traveler to a PCI card and run the Traveler 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 slot adapters** — If you plan to connect the Traveler 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 that plugs into an AC wall outlet. 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 Traveler operation:

Bus power from a desktop computer

Your desktop computer is running off of its usual AC power connection, and the Traveler 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 Traveler 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 Traveler is being powered by its FireWire connection to the computer. So the laptop battery is supplying power to both the laptop and the Traveler. 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.

Powering the Traveler from a battery pack

The 4-pin XLR battery jack on the Traveler side panel allows you to connect a standard DC battery pack, which is ideal for extended remote recording. These products can provide multiple hours of operation, depending on their capacity. The battery pack should supply 10-18 volts and 12 watts. A typical application would employ a 12 volt battery, therefore requiring 1 amp. In this scenario, a 1 amp-hour battery will power the unit for 1 hour. A 10 amp-hour battery will power the unit for 10 hours. Follow the manufacturer's recommendations for battery discharge for proper battery maintenance. For further details, contact your preferred supplier of professional audio/video equipment.

DC power supply

If you do not want the Traveler to draw power from the computer, and AC power is available, you can power the Traveler from any standard 8-18 volt, 12 watt DC power supply with any polarity (tip positive or negative), and amperage as shown below. To prevent the Traveler from drawing power from the computer, turn off the Bus Power switch.

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

The Bus Power Enable/Disable switch

The Bus Power Enable/Disable switch on the side panel of the Traveler lets you control whether or not the Traveler draws power from the computer via FireWire.

For example, when battery or DC power supply options are not being used, and FireWire is the only available power source, turn on the Bus Power switch.

If you are powering the Traveler via battery or DC power supply, and you do not want it to draw power from the computer (perhaps because it is a laptop running under its own battery, and you don't want the Traveler to run down the laptop's battery unnecessarily), turn off the Bus Power switch.

A TYPICAL TRAVELER SETUP (NO MIXER)

Here is a typical Traveler 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 Traveler's CueMix™ DSP 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 Console software.
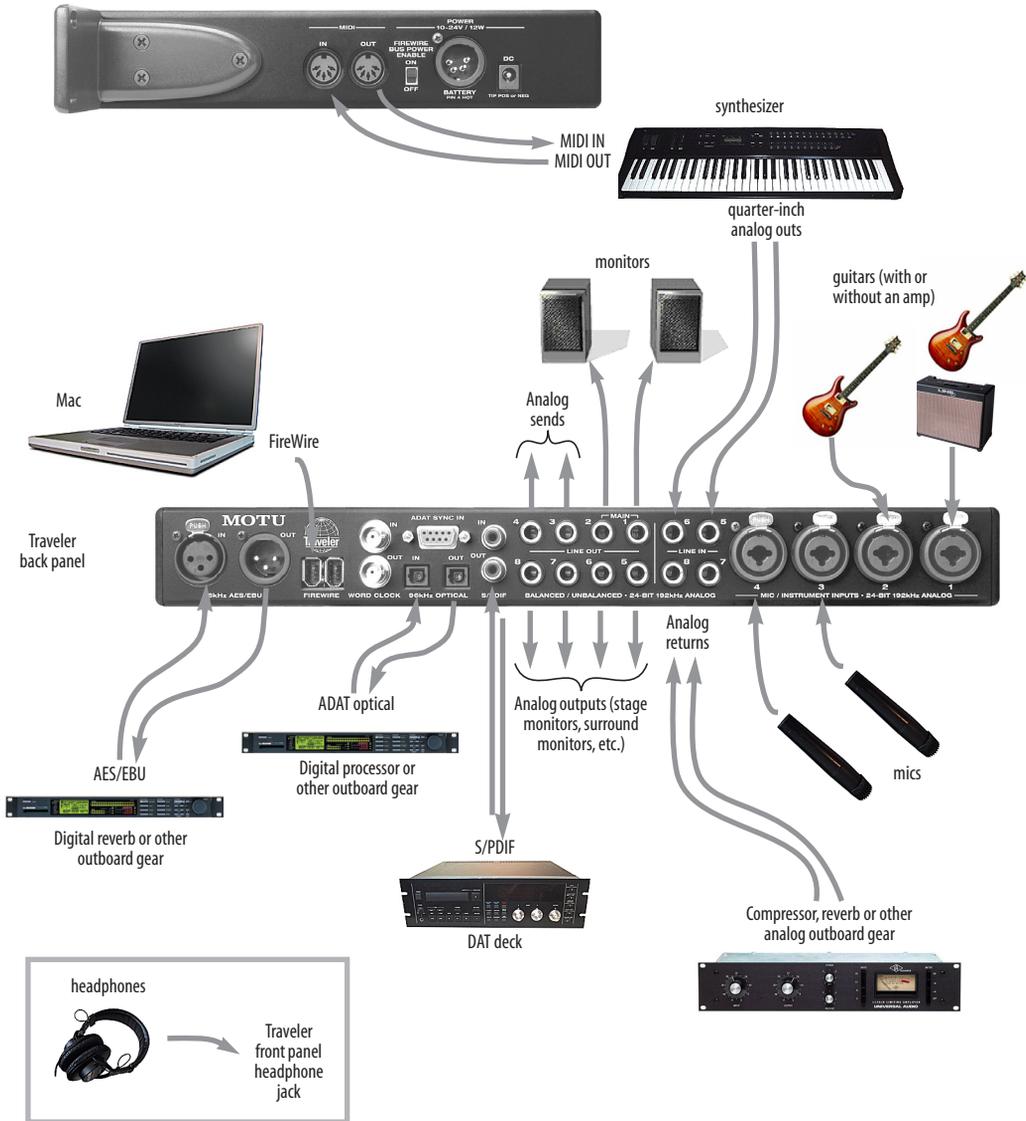
Figure 3-7: A typical Traveler studio setup.

USING THE TRAVELER WITH A MIXER

While there are many ways to use the Traveler with an external mixer, typically the Traveler serves as a multi-channel "pipeline" between the mixer and the computer. If your mixer is analog, connect the analog section of the Traveler to your mixer. If your mixer is digital, and it has ADAT optical I/O, you can connect them optically as shown below in Figure 3-8. The Traveler's available analog, SPDIF and AES/EBU inputs and outputs can serve as an extension to the mixer I/O, but then you will probably find yourself mixing in two places: the mixer and the computer. A word of advice: if you would like to use the Traveler with an external mixer, use the mixer for mixing. Trying to mix large multitrack projects in two places can become very cumbersome very quickly.

Mac

FireWire

8-channel digital I/O

ADAT optical

synths, samplers, etc.

synthesizers
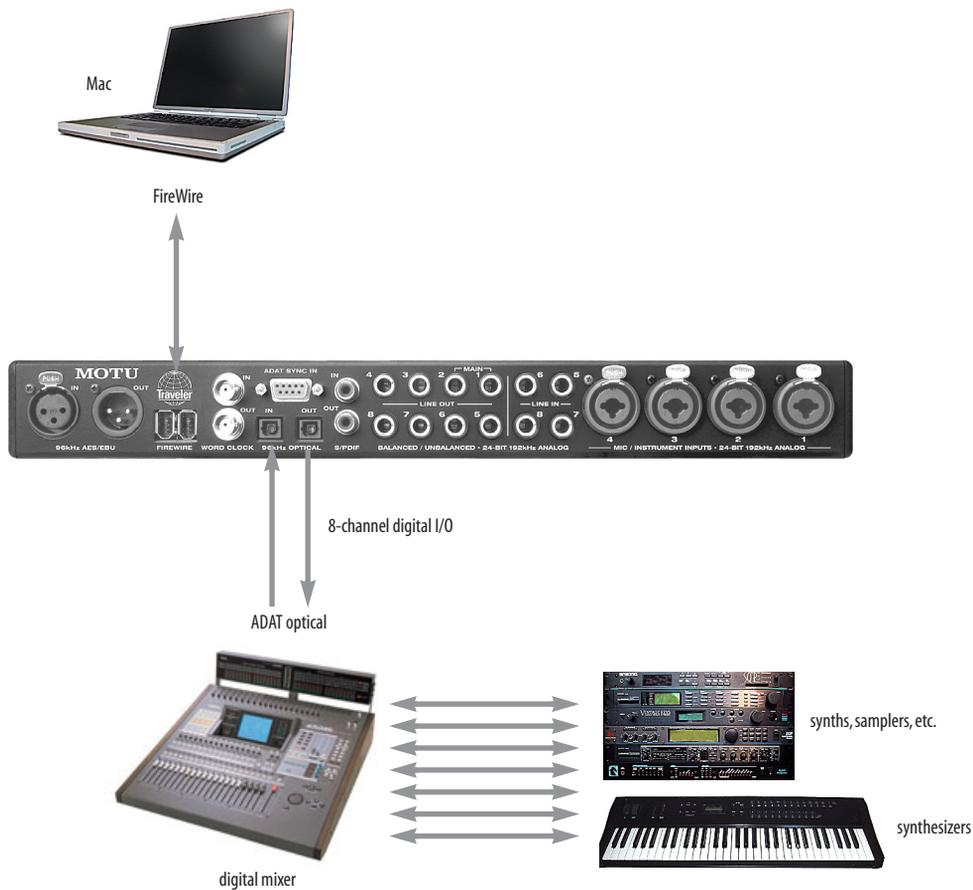
digital mixer

Figure 3-8: Using the Traveler with a digital mixer.

MAKING SYNC CONNECTIONS

If you connect devices digitally to the Traveler, or if you need to synchronize the Traveler with an outside time reference such as SMPTE time code, you must pay careful attention to the synchronization connections and clock source issues discussed in the next few sections.

Do you need to synchronize the Traveler?

If you will be using only the Traveler's analog inputs and outputs (and none of its digital I/O), and you have no plans to synchronize your Traveler system to SMPTE time code, you don't need to make any sync connections. You can skip this section and proceed to chapter 4, "Installing the Traveler Mac OS X Software" (page 39). After you install the Traveler software, you'll open the MOTU FireWire Audio Console and set the *Clock Source* setting to *Internal* as shown below. For details, see chapter 5, "MOTU FireWire Audio Console" (page 43).
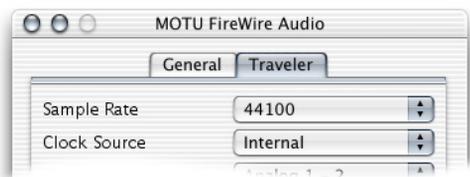
Figure 3-9: You can run the Traveler under its own internal clock when it has no digital audio connections and you are not synchronizing the Traveler system to an external time reference such as SMPTE.

Situations that require synchronization

There are three general cases in which you will need to resolve the Traveler with other devices:

■ Synchronizing the Traveler with other digital audio devices so that their digital audio clocks are *phase-locked* (as shown in Figure 3-10)

■ Slaving the Traveler system to SMPTE time code from a video deck, analog multi-track, etc.

■ Both of the above

Synchronization is critical for clean digital I/O

Synchronization is critical in any audio system, but it is especially important when you are transferring audio between digital audio devices. Your success in using the Traveler's digital I/O features depends almost entirely on proper synchronization. The following sections guide you through several recommended scenarios.

Be sure to choose a digital audio clock master

When you transfer digital audio between two devices, their audio clocks must be in phase with one another — or *phase-locked*. Otherwise, you'll hear clicks, pops, and distortion in the audio — or perhaps no audio at all.
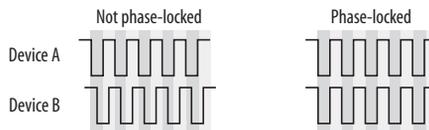
Figure 3-10: When transferring audio, two devices must have phase-locked audio clocks to prevent clicks, pops or other artifacts.

There are two ways to achieve phase lock: slave one device to the other, or slave both devices to a third master clock. If you have three or more digital audio devices, you need to slave them all to a single master audio clock.
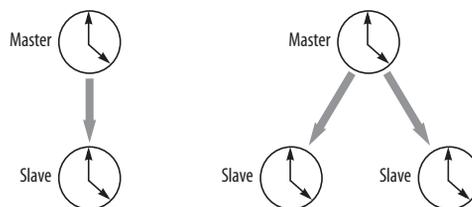
Figure 3-11: To keep the Traveler phased-locked with other digital audio devices connected to it, choose a clock master.

Also remember that audio phase lock can be achieved independently of time code (location). For example, one device can be the time code master while another is the audio clock master. But only one device can be the audio clock master. If you set things up with this rule in mind, you'll have trouble-free audio transfers with the Traveler.

DO YOU NEED A SYNCHRONIZER?

Whether or not you'll need a synchronizer depends on your gear and what you will be doing with your Traveler system. The following pages give you specific information about common sync scenarios. At least one of them will likely apply to you. Here are some general considerations to help you figure out if you need (or want) a synchronizer for your Traveler system.

You don't need a synchronizer if...

As explained earlier, the Traveler's digital audio clock must be phase-locked (synchronized) with other connected digital audio devices to achieve clean digital transfers between them. Can this be accomplished without an additional digital audio synchronizer? It depends on the nature of the other devices, and what you want to do with them. You don't need a synchronizer if the device has a way of locking itself directly to the Traveler's clock (via ADAT lightpipe, S/PDIF, AES/EBU or word clock), AND if the device carries no sense of location in time. A digital mixer is a good example: it can slave to its ADAT lightpipe connection from the Traveler, and it has no sense of time; it just passes audio through for mixing.

A stand-alone digital recorder, on the other hand, does have a sense of location in time, either via SMPTE time code or via its own sample address. For example, if you want to fly tracks back and forth between your computer and an Alesis hard disk recorder while maintaining the audio's position in time, the ADAT Sync port on the Traveler lets you do so without a separate synchronizer — and with sample-accurate precision, as long as you're using AudioDesk, Digital Performer, or other sample-accurate software. Just connect the Traveler directly to the Alesis recorder (or other ADAT Sync-compatible device) as discussed in "Sample-accurate ADAT sync with no synchronizer" on page 29. But if you also want transport control over the entire rig

(including the hard disk recorder) from your audio software, you'll need a MIDI Machine Control-compatible synchronizer such as MOTU's MIDI Timepiece AV, as discussed in "Sample-accurate sync" on page 27. If you are simply using a stand-alone recorder as a way to capture live tracks that you then transfer in one pass into the computer, no synchronizer is required because the tracks will remain in perfect phase lock with each other as you transfer them together. You can simply slave the stand-alone recorder to the optical output from the Traveler as explained in "Syncing optical devices" on page 32.

Transport control from your computer

If you have stand-alone digital recorders connected to the Traveler, and they support ADAT Sync, your audio software — if it supports MIDI Machine Control (MMC) — allows you to control the transports of everything from your computer. Most advanced audio programs support MMC. To do this, you'll also need an MMC-compatible ADAT synchronizer such as a MOTU MIDI Timepiece AV. Synchronizers like these allow you to play, stop, rewind and locate all of your tape decks using the transport controls in the audio software. If your audio software supports sample-accurate sync (like Digital Performer and AudioDesk), you can do so with sample-accurate precision. The following pages show you how to achieve MMC control, where possible.

Continuous sync to SMPTE / MTC

The Traveler can synchronize directly to SMPTE time code. If your audio software supports sample-accurate sync (like Digital Performer and AudioDesk), it can also resolve to time code via the Traveler. If your software does not support sample-accurate sync, you need a dedicated synchronizer, as illustrated on the following pages.

SAMPLE-ACCURATE SYNC

Your Traveler system provides you with the most advanced, accurate synchronization possible with Alesis modular digital tape decks and hard disk recorders — or any device that supports sample-accurate ADAT sync. Figure 3-12 below shows a few best-case scenarios. Below is a brief explanation of the benefits you achieve with these setups.

Sample accurate locating

With *sample accurate locating*, when you transfer audio between AudioDesk (or any other sample-accurate host software) and a sample-accurate recorder, the audio will not drift in time — even by as little as one sample. This is the tightest possible synchronization between digital audio devices. The timing in your audio will not be affected in any way by the process of transferring it between the Traveler and the recorder.

Is your audio software sample-accurate?

Sample-accurate locating is only possible with software that supports this feature, such as AudioDesk or Digital Performer.

Transport control from your computer

If you have a MIDI Timepiece AV, Digital Timepiece or any ADAT synchronizer that also supports MIDI Machine Control (MMC), you can play, stop, rewind and locate all of your ADATs using the transport controls in the audio software running on your computer. This includes cueing features like markers, position bars, playback wipers, time rulers, etc.
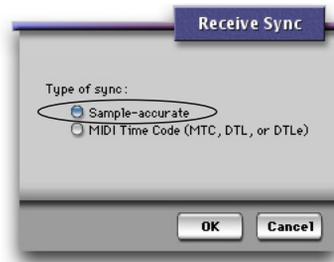
Figure 3-13: AudioDesk and Digital Performer support sample-accurate transfers with ADAT Sync compatible digital tape decks and modular hard disk recorders.

Sync format	Software	Synchronizer	Sample accurate locating	Transport control from computer	Continuous sync to SMPTE / MTC
ADAT	AudioDesk or Digital Performer	MIDI Timepiece AV or Digital Timepiece	Yes	Yes	Yes
ADAT	AudioDesk or Digital Performer	BRC (or any MMC capable ADAT synchronizer)	Yes	Yes	Yes
ADAT	AudioDesk or Digital Performer	None	Yes	No	No

Figure 3-12: These recommended combinations of hardware and software offer the tightest sync possible between the Traveler and digital audio recorders in the form of sample-accurate locating between the software and the tape decks. Sample accurate locating is possible even without a MIDI Timepiece AV or Digital Timepiece, although you give up transport control from the computer.

SAMPLE-ACCURATE ADAT SYNC

The Traveler can achieve sample-accurate sync with ADATs, Alesis hard disk recorders or any ADAT Sync-compatible devices. Sample-accurate software is required, such as AudioDesk, Digital Performer or compatible software that also supports sample-accurate sync. Connect the Traveler to the end of the ADAT Sync chain and make the software settings shown below in Figure 3-14. If you will be using the stand-alone recorder for its analog inputs and outputs only (you won't be doing any recording with it), treat it as an 'optical' device. See "Syncing optical devices" on page 32.

Use this setup if you have:

✓ ADATs, Alesis hard disk recorders or any ADAT SYNC compatible device(s).

✓ A MOTU Digital Timepiece, MIDI Timepiece AV or other ADAT synchronizer.

✓ Host software that supports sample-accurate sync.

This setup provides:

✓ Sample-accurate locating between all ADAT SYNC-compatible devices, the Traveler and your software (AudioDesk, Digital Performer or other sample-accurate software).

✓ With a Digital Timepiece, this setup provides sample-accurate locating across all devices: ADAT, Tascam and the Traveler.

✓ Transport control of everything from the computer, OR continuous sync to SMPTE time code and other sync sources (the other source is the transport master in this case).

In AudioDesk or Digital Performer:

1. Choose *Receive Sync* the Setup menu.

2. Choose the *Sample-accurate* option shown to the left.

3. Make sure that *Slave to External Sync* is checked in the Studio menu.

To set the Traveler hardware clock source for sample-accurate sync:

1. In AudioDesk or Digital Performer, choose Configure Audio System>Configure Hardware Driver from the Setup menu, or run the MOTU FireWire Audio Console.

2. Choose ADAT 9-pin from the Clock Source menu as shown to above.

3. Make sure the Sample Rate setting matches the recorder and synchronizer.

Macintosh computer running AudioDesk, Digital Performer or other sample-accurate software.

USB cable (bi-directional MIDI connection) bearing MMC transport commands from AudioDesk or Digital Performer to the MIDI Timepiece AV (or other synchronizer)

FireWire

Digital Timepiece, MIDI Timepiece AV, Alesis BRC or any other MMC-compatible ADAT synchronizer

If you have a MOTU synchronizer, set its sync mode to *Internal*.

ADAT Sync Out

ADATs

Sync In

Sync Out   ADAT sync cables

Sync In

Sync Out   etc.

Sync In

Sync Out

FireWire

Sync In

In AudioDesk or Digital Performer, turn on MIDI Machine Control by pressing this button. This brings on line all the recorders connected to the DTP or MTP AV.

AudioDesk automatically scans the DTP or MTP AV for connected recorders, and they appear here.
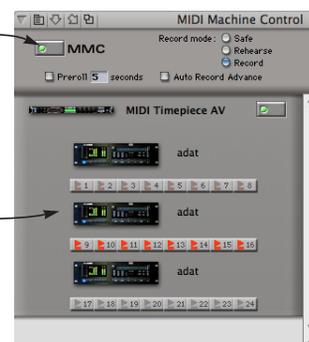
Figure 3-14: Connections for sample-accurate ADAT sync.

SAMPLE-ACCURATE ADAT SYNC WITH NO SYNCHRONIZER

Even if you don't have an ADAT synchronizer, you can achieve sample-accurate sync between ADAT-sync compatible devices, a Traveler, and any sample-accurate software (such as AudioDesk or Digital Performer). Just connect the Traveler to the end of the ADAT sync chain as shown below. You don't get transport control from your computer, nor can you slave the system to SMPTE time code. Instead, you have to play, stop, rewind and cue the system from the transports on your recorder. If you're using the recorder as an additional source of analog inputs and outputs only (not for recording), see "Syncing optical devices" on page 32.
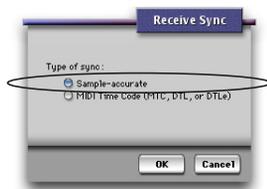
Use this setup if you have:

✔ ADATs, Alesis hard disk recorders or any ADAT SYNC compatible device(s).

✗ No ADAT synchronizer.

✔ Host software that supports sample-accurate sync.

This setup provides:

✔ Sample-accurate locating between all ADAT SYNC-compatible devices, the Traveler and your software (AudioDesk, Digital Performer or other sample-accurate software).

✗ No transport control of everything from the computer.

✗ No sync to SMPTE time code or other sync sources.

In AudioDesk or Digital Performer:

1. Choose *Receive Sync* the Setup menu.

2. Choose the *Sample-accurate* option shown to the left.

3. Make sure that *Slave to External Sync is* checked in the Studio menu.

To set the Traveler hardware clock source for sample-accurate sync:

1. In AudioDesk or Digital Performer, choose Configure Audio System>Configure Hardware Driver from the Setup menu, or run the MOTU FireWire Audio Console.

2. Choose ADAT 9-pin from the Clock Source menu as shown to above.

3. Make sure the Sample Rate setting matches the recorder and synchronizer.

Macintosh computer running AudioDesk or Digital Performer

With no synchronizer, the ADAT that is the master of the ADAT sync chain becomes transport master over everything, including your audio software.

FireWire

ADATs

Sync Out

Sync In
Sync Out

ADAT sync cables

Sync In
Sync Out

etc.

FireWire
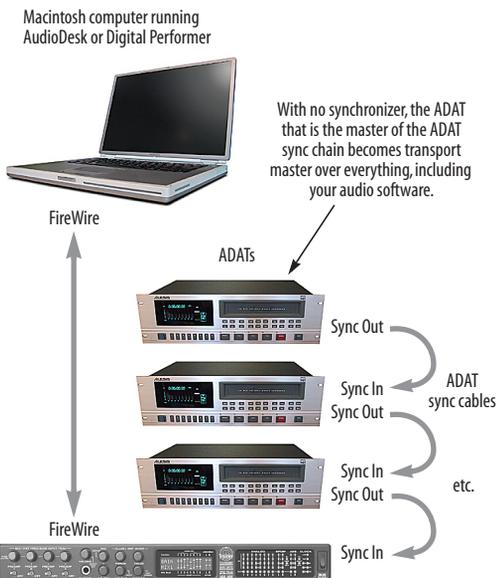
Sync In

In AudioDesk or Digital Performer:

1. Make sure that *Slave to External Sync is* checked in the Studio menu.

2. Click the play or record button. The software will then wait for you to start your recorder.

3. Press the Play button on the front panel of your recorder to initiate playback or recording.

Figure 3-15: Sample-accurate sync between AudioDesk or Digital Performer and one or more ADAT-sync compatible devices — without an ADAT synchronizer.

SYNCING TO SMPTE TIME CODE

The Traveler system can resolve directly to SMPTE time code. It can also generate time code and word clock, under its own clock or while slaving to time code. Therefore, the Traveler can act both as an audio interface and digital audio synchronizer, to which you can slave other digital audio devices. You can use the Traveler to slave your audio software to SMPTE as well, as long as your software supports sample-accurate sync, which is the means by which the software follows the Traveler. 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.

✓ A Traveler by itself, OR with another slaved device (such as a digital mixer).

✓ Host software that supports sample-accurate sync.

This setup provides:

✗ No sample-accurate locating.

✓ Continuous sync to SMPTE time code.

✓ Sub-frame timing accuracy.

✓ Transport control from the SMPTE time code source.
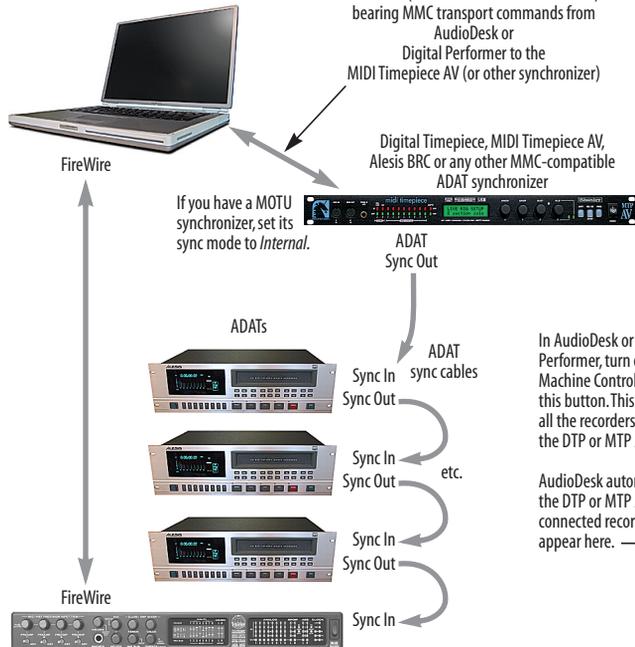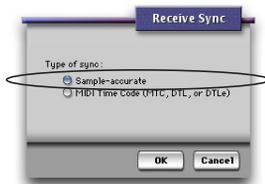
In AudioDesk or Digital Performer:

1. Choose *Receive Sync* the Setup menu.

2. Choose the *Sample-accurate* option shown to the left.

3. Make sure that *Slave to External Sync is* checked in the Studio menu.
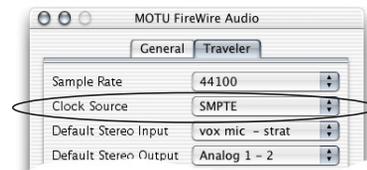
Choose *SMPTE* as the clock source in AudioDesk, Digital Performer, or the MOTU FireWire Audio Console. This setting can also be made in the MOTU SMPTE Console (shown below).

SMPTE time code source

audio cable bearing LTC (Longitudinal Time Code)
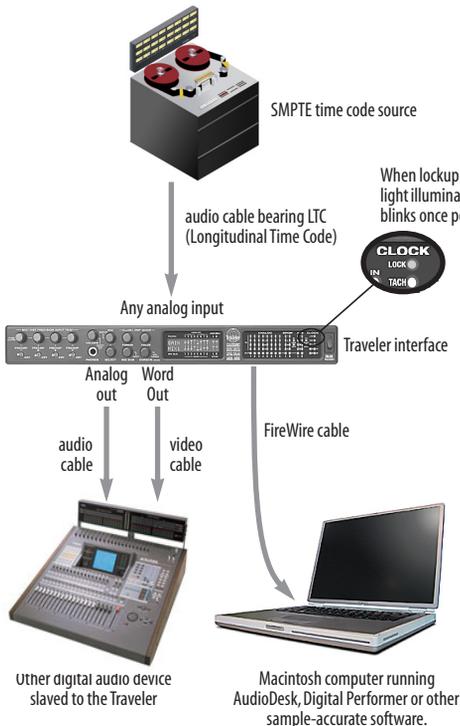
When lockup is achieved, the LOCK light illuminates and the TACH light blinks once per second.

Any analog input

Traveler interface

Analog out   Word Out

audio cable   video cable

FireWire cable

Launch the MOTU SMPTE Console to specify the time code input, frame rate and amount of freewheel. Also, confirm that the *Clock Source/Address* is *SMPTE/SMPTE*. For details about the other settings, see chapter 12, "FireWire SMPTE Console" (page 87).

Other digital audio device slaved to the Traveler

Macintosh computer running AudioDesk, Digital Performer or other sample-accurate software.

Figure 3-16: Connections for synchronizing the Traveler directly to SMPTE time code.

SYNCING TO VIDEO AND/OR SMPTE TIME CODE USING A SYNCHRONIZER

If your host audio software does not support the Traveler's on-board SMPTE sync features (because your software does not support sample-accurate sync), you need a universal synchronizer, such as a MOTU MIDI Timepiece AV. These dedicated sync boxes can read video and SMPTE time code and then convert it into word clock and MIDI Time Code (MTC). The word clock goes to the Traveler to resolve the audio hardware, and MIDI Time Code is fed to your host audio software, which locks to it, as shown below in Figure 3-17.

Use this setup if you have:

✔ Video and/or a SMPTE time code source.

✔ A Digital Timepiece, MIDI Timepiece AV or other universal synchronizer.

✔ Host software that does not support sample-accurate sync (although you can use this setup even if it does).

This setup provides:

✗ No sample-accurate locating.

✔ Continuous sync to SMPTE time code.

✔ Sub-frame timing accuracy.

✔ Transport control from the SMPTE time code source.

Video deck
or other source for video and/or SMPTE time code

Audio cable bearing LTC
(Longitudinal Time Code)

MOTU MIDI Timepiece AV or
Digital Timepiece slaving to
video and/or SMPTE time code

word clock

MIDI Time Code
(Via MIDI interface)

Traveler

Set up your audio software to
slave to MIDI Time Code.

Macintosh computer running any audio software

MOTU FireWire Audio

General | Traveler

Sample Rate — 44100
Clock Source — Word Clock In
Default Stereo Input — vox mic – strat
Default Stereo Output — Analog 1 – 2

Choose *Word Clock In* as the clock source in the MOTU FireWire Audio Console application. If you have multiple interfaces connected, be sure to choose the Word Clock In option that corresponds to the interface receiving the clock signal.

Figure 3-17: If your host audio software does not support sample-accurate sync and the Traveler's built-in SMPTE sync features, use a universal synchronizer such as the MOTU MIDI Timepiece AV or Digital Timepiece.

SYNCING OPTICAL DEVICES

The word *optical* is our short-hand way of referring to any device that connects to the Traveler via an optical cable. But we make a further distinction: an optical device is also one that doesn't care about sample location. An example is a digital mixer. Since a digital mixer is not a recording device, it has no sense of sample location like an ADAT does. An ADAT can cue to a specific sample number (e.g. sample number 43,478, 103) — as can any device that supports ADAT sync, but most digital mixers simply mix and process audio digitally, with no sense of a specific sample location. There are many other devices that fall into this category, including digital effects processors, synthesizers, A/D converters, and many more.

For ADATs or other devices that support ADAT sync, synchronize them with the Traveler as described in the previous sections of this chapter.

For *optical* devices, such as digital mixers, all you have to do is make sure that their digital audio clock is phase-locked (in sync with) the Traveler. There are three ways to do this:

■ Slave the optical device to the Traveler

■ Slave the Traveler to the optical device

■ Slave both the optical device and the Traveler to a third master clock (such as a Digital Timepiece or MIDI Timepiece AV synchronizer)
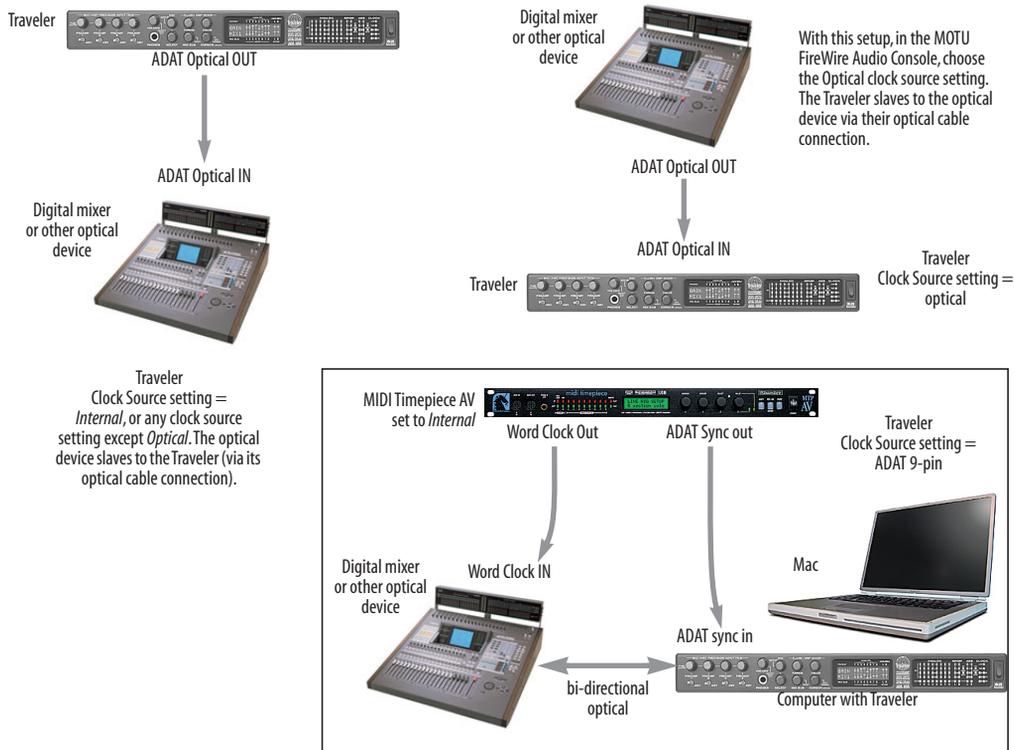
Figure 3-18: Three setups for synchronizing an optical device with the Traveler. You can slave the optical device to the Traveler or vice versa with their optical connections. For more elaborate setups, you can slave both to a digital audio synchronizer like the Digital Timepiece. Don't use any of these setups for an ADAT or other optical device that records. Instead, see "Sample-accurate ADAT sync" on page 28.

SYNCING S/PDIF AND AES/EBU DEVICES

DAT decks and other devices with S/PDIF and/or AES/EBU digital I/O will sync to the Traveler in one of two ways:

- Via the S/PDIF or AES/EBU connection itself

- Via word clock

Devices with no word clock

If your S/PDIF or AES/EBU device has no word clock sync connectors, just connect it to the Traveler via the S/PDIF or AES/EBU connectors. When the device records a digital audio signal (from the Traveler), 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 or AES/EBU device into the Traveler, you'll have to slave the Traveler to its S/PDIF or AES/EBU input. If you have other digital audio devices connected to the Traveler, and they are not slaved directly to the Traveler itself, you may hear clicks and pops resulting from their unsynchronized audio clock. If so, just turn them off during the transfer.

Devices with word clock

If your S/PDIF or AES/EBU device has a Word Clock input, slave the device to the Traveler via their word clock connection. You can then freely transfer audio between the Traveler and the S/PDIF device.

Traveler

S/PDIF or AES/EBU

S/PDIF or AES/EBU

S/PDIF or AES/EBU device

Traveler
Clock Source setting = *Internal* (when transferring from the Traveler to the other device)

Traveler
Clock Source setting = *S/PDIF* or *AES/EBU* (when transferring from the other device to the Traveler)

Traveler
Clock Source setting = *Internal*

Traveler

Word Clock Out   SPDIF or AES/EBU

Word Clock In   SPDIF or AES/EBU

S/PDIF or AES/EBU device

With this setup, in the MOTU FireWire Audio Console window, choose *Internal*, or any other clock source setting except SPDIF or AES/EBU. The other device slaves to the Traveler via word clock for digital transfers in both directions.

Figure 3-19: Two setups for synchronizing an S/PDIF device with the Traveler. In the top diagram, sync is achieved via the digital I/O connection itself. In this case, you have to choose S/PDIF or AES/EBU as the Traveler's clock source when recording from the other device. If you don't want to have to worry about switching the Clock Source setting depending on the direction of the digital transfer, you can slave the other device to word clock from the Traveler or vice versa (not shown). The Word Clock connection maintains sync, regardless of the direction of the transfer.

SYNCING WORD CLOCK DEVICES

The Traveler word clock connectors allow you to synchronize it with a wide variety of other word clock-equipped devices.

For standard word clock sync, you need to choose an audio clock master (as explained in "Be sure to choose a digital audio clock master" on page 25). In the simplest case, you have two devices and one is the word clock master and the other is the slave as shown below in Figure 3-20 and Figure 3-21.

Figure 3-20: Slaving another digital audio device to the Traveler via word clock. For the Traveler clock source, choose any source besides word clock, as it is not advisable to chain word clock.
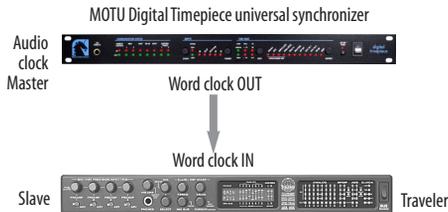
Figure 3-21: Slaving the Traveler to word clock. For the Traveler clock source, choose 'Word Clock In'.

Don't chain word clock

If you have three or more digital audio devices that you need to synchronize, avoid chaining their word clock connections (OUT to IN, OUT to IN, etc.), as this causes problems. Instead, use a dedicated synchronizer like the Digital Timepiece or a word clock distribution device of some kind.

Slaving to 2x and 1/2x word clock

All MOTU FireWire audio interfaces that support 96 and 192 kHz operation (including the 896HD) have the ability to slave to a word clock signal running at the 1x sample rate that corresponds to their current clock rate. For example, the Traveler could be running at 192 kHz while slaving to a 48 kHz word clock signal from a MOTU MIDI Timepiece AV. Similarly, the Traveler could run at 88.2 kHz and slave to 44.1 kHz word clock. In all of these cases, the front panel clock LEDs flash both sample rates to indicate that the Traveler is slaving to word clock at the corresponding 1x clock rate. But if the Traveler is running at 96 kHz, it cannot slave to word clock running at 44.1 kHz.

SYNCING LARGE SYSTEMS

If you are connecting the Traveler to a lot of other digital audio gear, get a word clock distribution device, which offers multiple word clock outputs.

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:
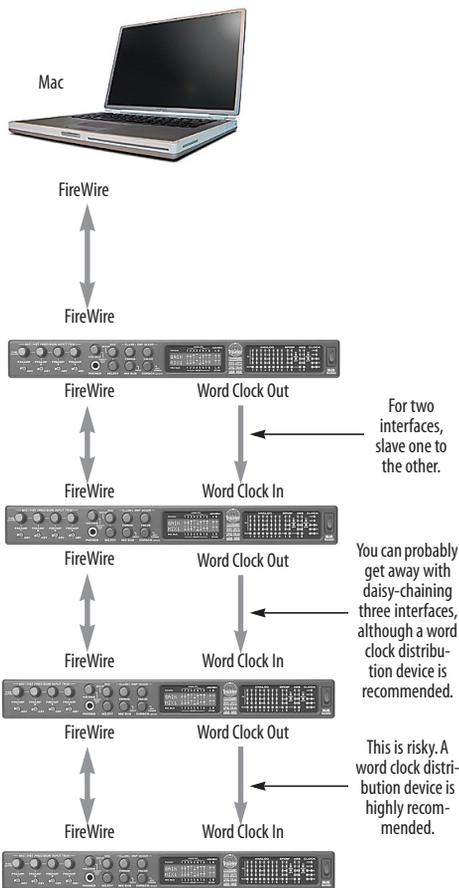
Figure 3-22: Connecting multiple Traveler's (or other MOTU FireWire audio interfaces) to a computer.

Multiple interfaces cannot be bus-powered

Do not run the Traveler under bus power when connecting it with other devices to the same FireWire bus. See "Power options" and "Bus power requirements" on page 20.

Multiple interfaces in the MOTU FireWire Audio Console

The MOTU FireWire Audio Console displays the settings for one interface at a time. To view the settings for an interface, click its tab as shown below in Figure 3-23.
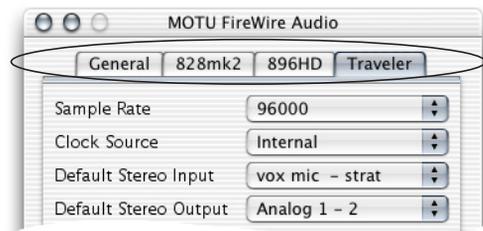
Figure 3-23: To view the settings for an interface, click its tab.

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.

A by-product of this more flexible model is that multiple devices must be synchronized to one another in order to remain resolved to each another. Without synchronization, the audio streams going to each interface might drift with respect to one another. For example, the audio tracks playing back through the Traveler 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.

There are two ways to synchronize the Traveler with other devices, as discussed in the following sections: via the driver or via word clock.

Resolving to other Core audio drivers
The MOTU FireWire driver has the ability to resolve to other Core Audio drivers. This allows the Traveler, and other MOTU FireWire interfaces, to resolve to other audio interfaces running simulta-neously 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 Traveler 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 the FireWire Console 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 3-24. This causes the slave interfaces to resolve to the master interface.
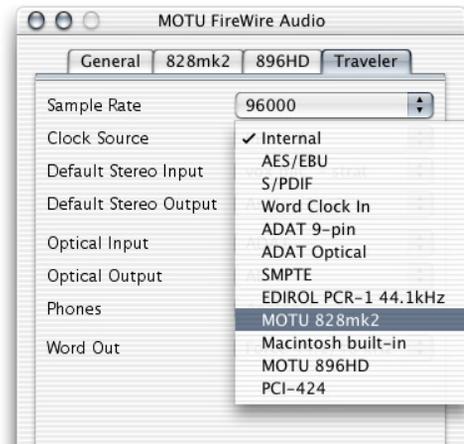
Figure 3-24: To resolve a MOTU FireWire interface to another Core Audio device, choose the other device from the Clock Source menu in the MOTU FireWire Audio Console. In this example, the Traveler will slave to the 828mkII.

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

Resolving to word clock
To resolve two Traveler FireWire interfaces with each other via word clock, choose one as the word clock master and then slave the second interface to the first, as shown in Figure 3-22 on page 35. For three interfaces, you can probably get away with daisy-chaining them via their word clock connectors, but this may not always produce the most reliable results. For three or more devices, a word clock distribution device is highly recommended. In this case, the distribution box is the master, and all FireWire interfaces slave directly to it (instead of to each other).

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 828's with other MOTU FireWire interfaces using a standard FireWire hub. You can also add 828mkII's

or 896HD's, 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. At the 2x samples rates (88.2 or 96kHz) and 4x sample rates (176.4 and 192kHz), you can operate no more than three 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 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.

CHAPTER 4   Installing the Traveler Mac OS X Software

OVERVIEW

SOFTWARE INSTALLATION FOR MAC OS X

Install the Traveler software as follows:

1   Insert the MOTU FireWire 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 the MOTU FireWire Audio Console, FireWire CueMix Console, and several other applications, summarized in the following table:

The Traveler 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 Traveler to establish audio input and output with any Mac OS X Core Audio-compatible software.

Once the Traveler's Core Audio driver has been successfully installed (by the installer), and you have chosen it for use in your host audio software, the Traveler 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 Core Audio driver	/System/Library/ Extensions	Provides Traveler multi-channel audio input and output with all Mac OS X audio software	"The Traveler Core Audio driver" on page 39
MOTU MIDI driver (.kext)	/Library/Audio/ MIDI Drivers	Provides Traveler MIDI input and output for all Mac OS X MIDI software	"CoreMIDI and Audio MIDI Setup" on page 40
MOTU FireWire Audio Console	Applications folder	Provides access to all of the settings in the Traveler and other MOTU FireWire inter-faces. Required for Traveler operation.	chapter 5, "MOTU FireWire Audio Console" (page 43)
FireWire SMPTE Console	Applications folder	Provides access to the Traveler system's SMPTE time code sync features.	chapter 12, "FireWire SMPTE Console" (page 87)
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
FireWire CueMix Console	Applications folder	Gives you complete control over the Traveler's CueMix DSP feature, which provides no-latency monitoring and mixing of live inputs through your Traveler system.	chapter 11, "CueMix Con-sole" (page 79)

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 Traveler FireWire interface and all CoreMIDI compatible software.

Audio MIDI Setup is a utility included with Mac OS X that allows you to configure your Traveler 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 Traveler 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.*
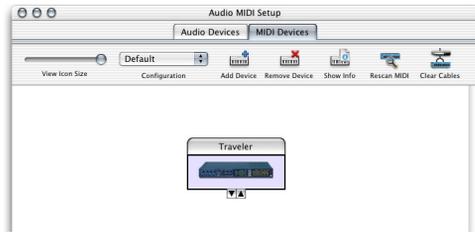
Figure 4-1: The Traveler interface as it appears in the MIDI tab of Audio MIDI Setup.

Connecting MIDI devices to the Traveler

Once your Traveler 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*.
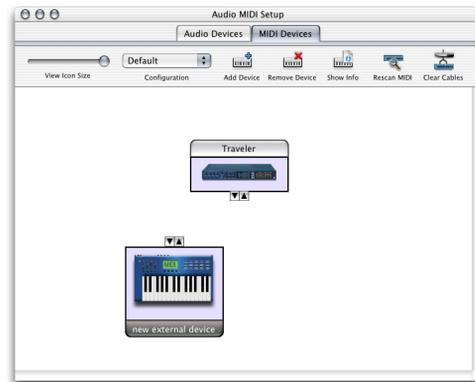
Figure 4-2: Adding a MIDI device.

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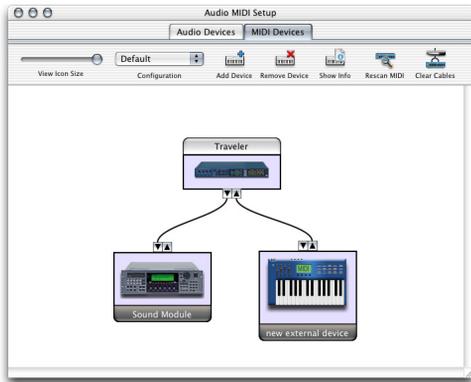
Figure 4-3: Connecting devices to the Traveler. In this example, a controller keyboard is connected to the Traveler's MIDI IN, and a sound module is connected to the Traveler MIDI OUT.

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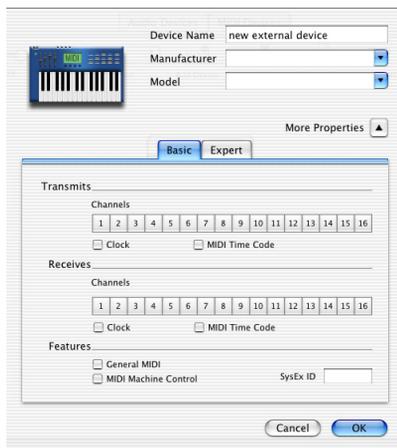
Figure 4-4: Device settings.

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 CONSOLE

This program provides a mixing console that gives you control over the Traveler's no-latency CueMix DSP features. For details, see chapter 11, "CueMix Console" (page 79).

FIREWIRE SMPTE CONSOLE

The FireWire SMPTE Console software provides a complete set of tools to resolve the Traveler to SMPTE time code, and to generate SMPTE for striping, regenerating or slaving other devices to the computer. For details, see chapter 12, "FireWire SMPTE Console" (page 87).

AUDIODESK WORKSTATION SOFTWARE

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

AudioDesk is an advanced workstation software package for the Traveler 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, sample-accurate synchronization with ADATs, 24-bit recording, and much more.

See the AudioDesk manual included with your Traveler system for details.

Figure 4-5: AudioDesk for Mac OS X.

MOTU FireWire Audio Console

OVERVIEW

ACCESSING THE TRAVELER SETTINGS

There are several ways to access the MOTU
FireWire Audio Console settings:

■ Click the MOTU FireWire Audio Console icon
in the dock

■ Press on the MOTU FireWire Audio Console
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 SX, open the Device Setup window,
click *VST Audiobay* and choose *MOTU FireWire
Audio* from the *Master ASIO Driver* menu. Then
click the MOTU FireWire Audio item in the list and
click the Control Panel button as shown below.

■ From the front panel LCD (see chapter 6,
"Traveler Front Panel Operation" (page 51)).

Traveler tab settings

The Traveler tab provides settings that apply to a
specific Traveler interface. If you have several
Travelers (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.

TRAVELER SETTINGS

Sample Rate

Choose the desired *Sample Rate* for recording and playback. The Traveler can operate at 44.1 (the standard rate for compact disc audio), 48, 88.2, 96, 176.4 or 192kHz. Make absolutely sure that all of the devices connected digitally to the Traveler match the Traveler's sample rate. Also make sure that your Digital Timepiece, MIDI Timepiece AV or other digital audio synchronizer matches it as well. At the 4x sample rates (176.4 or 192kHz), all digital I/O on the Traveler is disabled.

☞ 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 the MOTU FireWire Audio Console.

Operation at 4x sample rates (176.4 or 192kHz)
At the 4x sample rates (176.4 or 192kHz), operation of the Traveler is restricted, due to the higher audio bandwidth demands, as follows:

■ All digital I/O is disabled (there is no optical, TOSLink, S/PDIF or AES/EBU input/output).

■ The Traveler provides 8 channels of analog input and 8 channels of analog output, simultaneously.

■ The *Mix1* input, as described in "Mix1 1-2" on page 65, is not available.

■ The headphone output can be assigned to any analog output pair or the *Phones* setting (as described in "Phones" on page 48). But at the 4x sample rates, the Phones output is not available from the computer. Instead, it is only available as a destination for the four CueMix DSP mixes. In other words, it can only take CueMix inputs.

■ The main outs mirror the phones.

Clock Source

The *Clock Source* determines the digital audio clock that the Traveler will use as its time base. For a complete explanation of synchronization issues,
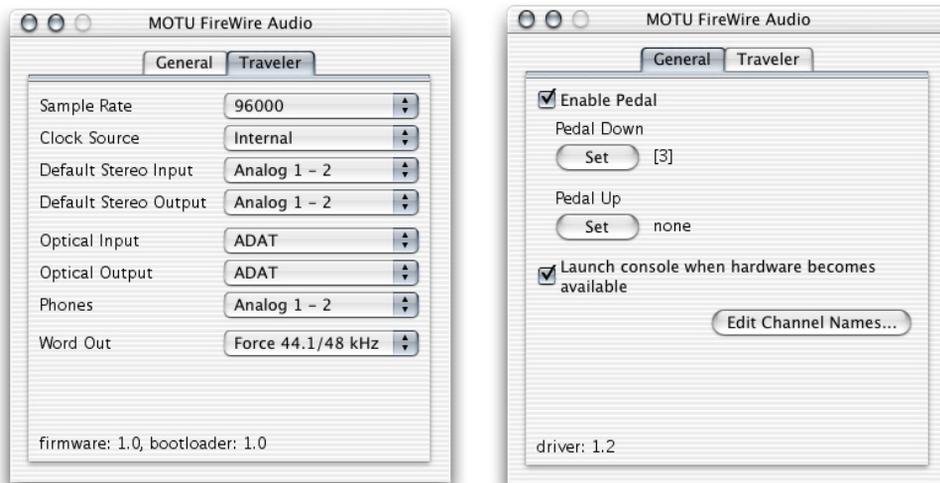

Figure 5-1: The MOTU FireWire Audio Console gives you access to all of the settings in the Traveler hardware.

see "Making sync connections" on page 25. The following sections briefly discuss each clock source setting.

Internal

Use the *Internal* setting when you want the Traveler 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 Traveler system on its internal clock, and then slave the DAT deck to the Traveler via the S/PDIF connection (usually DAT decks slave to their S/DIF input when you choose the S/PDIF input as their record source) or via the Traveler's word clock output (if your DAT deck has a word clock input).

If you would like help determining if this is the proper clock setting for your situation, see "Do you need a synchronizer?" on page 26.

With ADAT devices, however, you usually want an external digital audio synchronizer, such as the MIDI Timepiece AV or Digital Timepiece, to be the digital clock master. In this case, you would set the Traveler clock source setting to *ADAT 9-pin*, as described below.

AES/EBU

The *AES/EBU* clock source setting refers to the AES/EBU XLR input jack on the Traveler. This setting allows the Traveler to slave to another AES/EBU device.

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

For further details about this setting, see "Syncing S/PDIF and AES/EBU devices" on page 33.

S/PDIF

The *S/PDIF* clock source setting refers to the S/PDIF RCA input jack on the Traveler. This setting allows the Traveler 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 Traveler. It is not necessary in the opposite direction (when you are transferring from the Traveler to the DAT machine).

For further details about this setting, see "Syncing S/PDIF and AES/EBU devices" on page 33.

Word Clock In

The *Word Clock In* setting refers to the Word Clock In BNC connector on the Traveler rear panel. Choosing this setting allows the Traveler to slave to an external word clock source, such as the word clock output from a digital mixer or another Traveler.

ADAT 9-pin

The *ADAT 9-pin* clock source setting refers to the ADAT digital audio synchronization format. It allows the Traveler to slave to an ADAT — or ADAT sync chain — via its ADAT sync 9-pin connector. ADAT sync also carries precise, sample location information, which allows AudioDesk and Digital Performer to transfer audio to and from ADAT-sync compatible recorders without drifting by as much as one sample.

Use this setting when you are using the Traveler with one or more ADAT-sync compatible recorders. Make sure the Traveler is connected to the end of the ADAT sync chain.

You should also use this setting if you have a MIDI Timepiece AV, which allows you to drive your entire system from the transport controls of AudioDesk, Digital Performer or other computer software.

You could also use ADAT sync to continuously resolve the Traveler to SMPTE time code, video, and word clock via a synchronizer like the MOTU MIDI Timepiece AV. Word clock can accomplish the same thing.

For further details, see "Sample-accurate ADAT sync" on page 28, "Sample-accurate ADAT sync with no synchronizer" on page 29 and "Syncing to video and/or SMPTE time code using a synchronizer" on page 31.

ADAT optical

The *ADAT optical* clock source setting refers to the clock provided by the Traveler's optical input, when it is connected to an ADAT optical device. This setting can be used to slave the Traveler directly to the optical input connection. Most of the time, you can set up a better operating scenario that uses one of the other synchronization options. However, there may be occasions when you have an ADAT optical compatible device that has no way of synchronizing digitally to the Traveler or an external synchronizer such as the Digital Timepiece. In this case, the *ADAT Optical* clock source setting lets you slave the Traveler to the device itself via its digital input to the Traveler.

If the *ADAT Optical* setting does not appear in the menu, it means that the Traveler's optical input is currently either turned off or set to the TOSLink format. In either case, choose the *ADAT optical* format from the Optical input menu (Figure 5-1 on page 44).

This setting is also useful if you just need to make a simple, click-free digital transfer between the Traveler and another device — where a time code reference and shared transport control are not needed — without having to set up an elaborate synchronization scenario.

For further details about this setting, see "Syncing optical devices" on page 32.

TOSLink

The *TOSLink* clock source setting refers to the clock provided an optical S/PDIF device connected to the Traveler's optical input. This setting can be used to slave the Traveler directly to the optical input connection. Most of the time, you can set up a better operating scenario that uses one of the other synchronization options. However, there may be occasions when you have an TOSLink-compatible device that has no way of synchronizing digitally to the Traveler or an external synchronizer such as the Digital Timepiece. In this case, the *TOSLink* clock source setting lets you slave the Traveler to the other device via the Traveler's optical input.

If the *TOSLink* setting does not appear in the menu, it means that the Traveler's optical input is currently either turned off or set to the *ADAT optical* format. In either case, choose the *TOSLink* format from the Optical input menu (Figure 5-1 on page 44).

This setting is also useful if you just need to make a simple, click-free digital transfer between the Traveler and another device — where a time code reference and shared transport control are not needed — without having to set up an elaborate synchronization scenario.

For further details about this setting, see "Syncing optical devices" on page 32.

SMPTE

Choose this setting to resolve the Traveler directly to SMPTE time code (LTC) being received via any analog input on the Traveler. For details, see "Syncing to SMPTE time code" on page 30 and chapter 12, "FireWire SMPTE Console" (page 87).

Macintosh built-in

Choose this setting to resolve the Traveler to your Mac's built-in audio. Doing so will ensure that audio streams playing back from or recorded by the Traveler 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 36.

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 Traveler 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 36.

Default Stereo Input/Output

In the System Preferences window, Mac OS X lets you choose third-party hardware such as the Traveler for your Macintosh 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 Traveler for general stereo audio input and output for your Mac.

The *Default Stereo Input* and *Default Stereo Output* settings in the MOTU FireWire Console (Figure 5-1 on page 44) let you specify the stereo input and output on the Traveler to be used when it is chosen as the audio I/O device in the system preferences.

☛ Note: The Default Stereo Input/Output settings have the following system software requirements:

■ Mac OS X 10.2.x together with QuickTime 6.4

OR

■ Mac OS X 10.3 (aka *Panther*) or later

If your Macintosh system software does not meet these minimum requirements, the Default Stereo Input/Output options do not appear in the MOTU FireWire Console window.

Optical input/output

The *Optical input* and *Optical output* settings let you choose between ADAT optical ('lightpipe') and S/PDIF optical ('TOSLink') as the format for the Traveler's optical input and output. Choose the format that matches the device connected. If you are not using the optical connections, it is recommended that you turn them off (as provided in the menus) to reduce bandwidth and processing overhead. Note that you can operate the input and output independently. For example, you could use the ADAT optical format on the input (with a digital mixer, for example) and optical S/PDIF on the output (with a DAT deck, for example).

When the optical output is set to TOSLink, the signal is split to both the RCA and optical output jacks. However, when the optical input is set to TOSLink, the RCA S/PDIF jack is disabled.

Phones

The *Phones* setting lets you choose what you will hear from the headphone jack. Choose *Analog 1-2* if you'd like the headphone output to match the main outs. Choose *Phones 1-2* 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 four on-board CueMix DSP mix busses.

At the 4x sample rates (176.4 and 192kHz), the headphone output can be assigned to any analog output pair or the *Phones 1-2* setting, as described above. But at the 4x sample rates, the Phones output is not available as an output destination for software on the computer. Instead, it is only

available as a destination for the two CueMix DSP mixes. In other words, it can only take CueMix inputs.

Word Out

If you are running a Traveler interface at a high sample rate (88.2, 96, 176.4 or 192kHz), the *Word Out* menu appears in the interface tab (as shown in Figure 5-1 on page 44). This menu lets you choose a word clock output rate that either matches the global sample rate (e.g. 176.4 or 192kHz) or reduces the word clock output to the corresponding 1x rate (either 44.1 or 48kHz). For example, if the Traveler is operating at 176.4kHz, choose *Force 44.1/48kHz* to produce word clock output at 44.1kHz.

To match the Traveler's sample rate, choose *System Clock*. To reduce the word clock rate to the corresponding 1x rate, choose *Force 44.1/48kHz*.

'GENERAL' TAB SETTINGS

Enable Pedal

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

Launch console when hardware becomes available

Check this option if you would like the MOTU FireWire Audio Console 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 Traveler inputs and outputs, as they appear in your host audio software. For example, when you click on a menu that displays the Traveler 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.)

There are several conditions for your custom channel names to appear in your Mac OS X audio software. First, your software must support Mac OS X's port naming features. Secondly, this feature has the following system software requirements:

■ Mac OS X 10.2.x together with QuickTime 6.4

OR

■ Mac OS X 10.3 (aka *Panther*) or later

If your Macintosh system software does not meet these minimum requirements, the Default Stereo Input/Output options do not appear in the MOTU FireWire Console window, and you'll see generic port names in your host audio software.
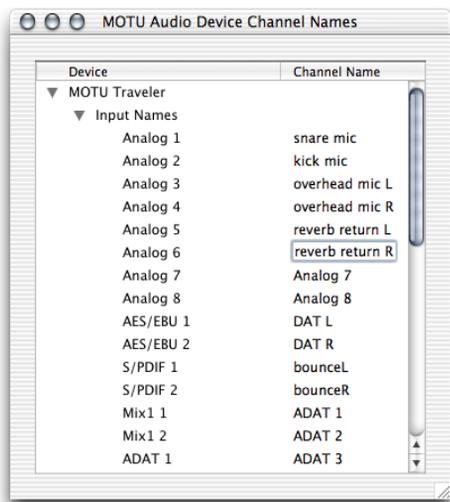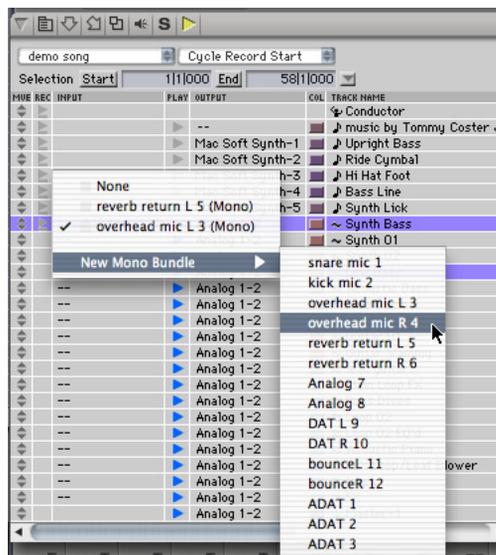

Figure 5-4: Traveler channel names as they appear in Digital Performer.

Figure 5-3: The Edit Channel Names window.

Traveler Front Panel Operation

OVERVIEW

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

PUSH-BUTTON ROTARY ENCODERS

All of the knobs shown in Figure 6-1 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).

MULTI-FUNCTION LCD DISPLAY

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

The LCD operates in two different modes: setup mode and mixer mode. Push the MIX/SETUP knob to toggle between the two modes.

Choose the mix parameter to edit here with the PARAM knob.

The top row shows settings for the 8 analog inputs and AES/EBU digital input.

Use the CURSOR knob to scroll to a channel and use VALUE to change its setting.

Choose the mix you are editing by pushing the MIX BUS knob. Turn the knob to change the mix volume.

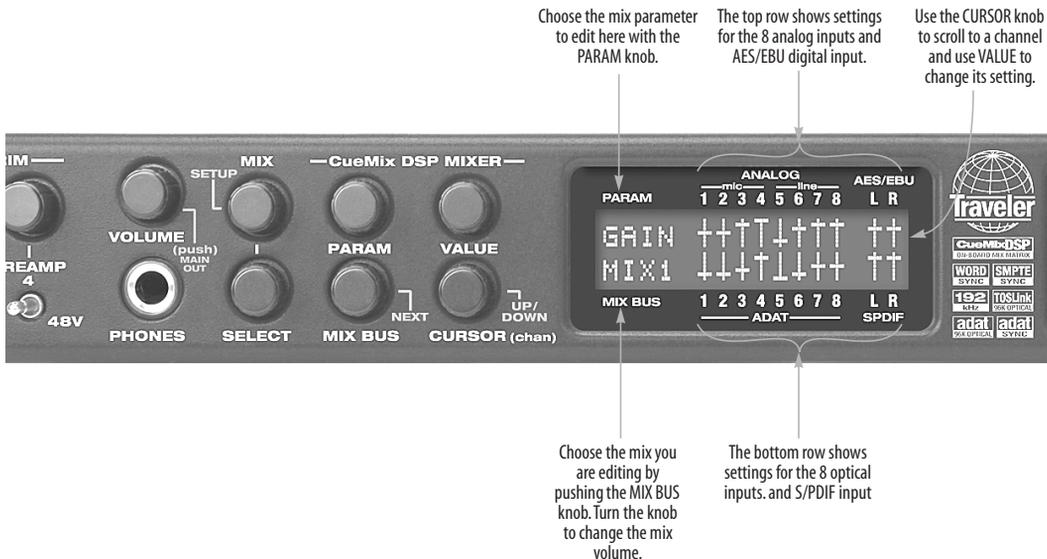The bottom row shows settings for the 8 optical inputs. and S/PDIF input

Figure 6-1: The Traveler front panel controls.

Setup mode

In setup mode, the LCD displays basic settings, such as clock source, optical I/O format (ADAT versus TOSLink), and so on. These settings are covered in detail later in "SETUP / SELECT" on page 52.

Figure 6-2: In setup mode, the LCD displays a setup parameter in the top row of the LCD and the current setting in the bottom row.

Mixer mode

In mixer mode, the LCD displays the settings for the current Traveler mix being shown in the display, as demonstrated in Figure 6-1 on page 51.

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 will display a level meter and gain reduction reading that updates as you turn the volume knob. After a brief time-out, the display returns to its previous state before you turned the volume knob. The time-out period can be adjusted, as explained later in the section called "Fader View Time".
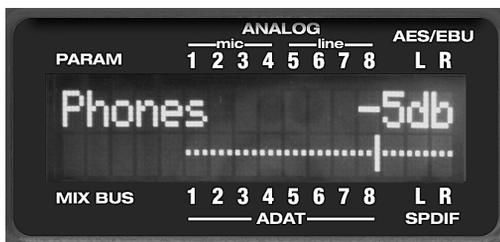

Figure 6-3: For many settings, the LCD "zooms in" on the setting as you adjust it.

VOLUME

The VOLUME knob lets you control the volume of both the headphone jack and the rear-panel main outs. Press the knob to toggle between the headphones and the main outs. As explained in the previous section, the LCD provides detailed feedback as you turn the knob. To view the current setting without changing it, just push the knob (without turning it).

SETUP / SELECT

Press the MIX/SETUP knob to toggle between mixer mode and setup mode. In mixer mode, the SETUP and SELECT knob do nothing. In setup mode, turn SETUP to choose a setting and SELECT to change it. In some cases, SELECT chooses one of the Traveler's four mixes, and the VALUE knob changes the setting. The setup settings are briefly explained below.

Clock source

This sets the global clock source for the Traveler and is the same as the *Clock Source* setting in the MOTU FireWire Audio Console as explained in "Clock Source" on page 44. If the Traveler is currently connected to a computer, this setting cannot be changed from the front-panel LCD. It must be changed in the MOTU FireWire Audio Console instead. Or, you can disconnect the Traveler from the computer to change the Clock Source from the front panel.

Word Clock Out

If you are running a Traveler interface at a high sample rate (88.2, 96, 176.4 or 192kHz), the *Word Clock Out* setting lets you choose a word clock output rate that either matches the global sample rate (e.g. 176.4 or 192kHz) or reduces the word clock output to the corresponding 1x rate (either 44.1 or 48kHz). To match the Traveler's sample rate, choose *Follows System*. To reduce the word clock rate to the corresponding 1x rate, choose *Force 44/48*.

Fader View Time

The *Fader View Time* option lets you control the length of time that an adjusted parameter remains displayed in the LCD before the LCD returns to its previous state. For example, when you turn the MIX BUS knob to adjust the volume of the current mix, you'll see a long-throw horizontal fader in the LCD, along with a numeric display of the current gain reduction. After you stop turning the knob, this fader remains displayed in the LCD for a moment before the LCD returns to its previous state. The Fader View Time option lets you control how long the adjusted parameter remains on the LCD after the knob stops turning.

Optical In / Optical Out

These two settings determine the format for the Traveler's optical input and output. They are the same as the optical setting in the MOTU FireWire Audio Console as explained in "Optical input/ output" on page 48. To change the setting, turn the SELECT knob, and then push it to confirm your choice.

Bus output

The *Bus Output* setting lets you choose the Traveler output pair for each of the four CueMix DSP mix busses. Turn the SELECT knob to choose a bus. Turn the VALUE knob to choose an output. Push the VALUE knob to select the output. The output stops flashing to confirm that it has been selected.

Bus mute

The *Bus Mute* setting mutes and unmutes the bus output. Turn the SELECT knob to choose a bus. Push the SELECT knob to mute or unmute the bus.

Phones Assign

The *Phones Assign* setting lets you choose what you hear on the headphone output. This is the same as the *Phones* setting in the MOTU FireWire Audio Console as explained in "Phones" on page 48.

Init Current Mix

The *Init Current Mix* setting lets you reset the current mix (or all four mixes). All inputs get reset to unity gain (0 dB), pan center, etc.

Copy Bus Mix

Copy Bus Mix lets you copy all of the settings for the currently displayed mix. Turn the SELECT knob to choose a mix. Push the SELECT knob to copy it. You can then paste the settings to another mix as explained below. The word *Done* appears briefly to confirm that the mix settings have been successfully copied.

Paste Bus Mix

After you copy mix settings (explained above), *Paste Bus Mix* lets you paste the copied mix settings to another mix. Turn the SELECT knob to choose a mix. Push SELECT to paste. The word *Done* appears briefly to confirm the paste. The following mix parameter are included in the paste operation: Gain, Pan, Solo, Mute, +4/-10, +6dB boost, and stereo pairing. The following mix parameters are not pasted: Bus output, Bus mute and Bus gain.

Save/Name Preset

The *Save/Name Preset* setting lets you name and save up to sixteen separate Traveler presets. A preset holds all of the current CueMix DSP mix settings for all four mix busses. Setup parameters are not included. The name can have up to 12 characters. Here is a summary of how to name and save a preset:

To do this:	Do this:
To change the currently flashing character	Turn the VALUE knob
To jump to capital letters, lower case letters, numbers or symbols	Push the VALUE knob repeatedly
To scroll to a different character	Turn the CURSOR knob.
To save the preset	Push SELECT. If you are asked to replace existing preset, push SELECT again to replace it, or turn it to select a different preset.

Load preset

After you've saved one or more presets, *Load Preset* lets you recall them. Turn the SELECT knob to choose a preset. Push SELECT to load it. The word *Loaded* appears briefly to confirm the operation.

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 SELECT to initiate the All Notes Off operation. The MIDI OUT LED will glow to confirm that the note-off data is being sent.

Factory Defaults

The *Factory Defaults* setting restores the Traveler factory settings. Push SELECT to initiate the operation, and then when the LCD asks "Are you sure?", push VALUE to execute it.

MIX BUS

The Traveler on-board CueMix DSP mixer provides four stereo mix busses, named MIX1, MIX2, MIX3 and MIX4, respectively. Each mix bus (also referred to as a "mix") independently mixes all inputs (or any subset of your choosing) down to one Traveler output pair of your choosing. For example, you could assign MIX1 to the main outs, MIX2 to analog outputs 1-2 and MIX3 to the headphone outs. You can then independently assign any input to any mix. An input can even be included in two or more mixes simultaneously at different input levels.
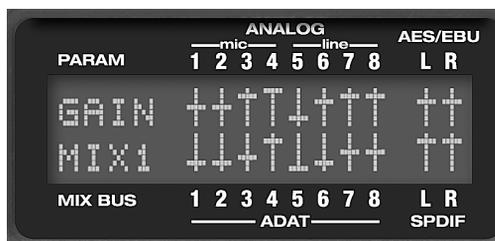

Figure 6-4: In mixer mode, the LCD displays the mix settings for the mix bus currently being displayed in the LCD.

When the LCD display is in mixer mode, push the MIX BUS knob repeatedly to cycle through the four mixes. The current mix is indicated in the LCD above the MIX BUS label (as shown in Figure 6-1 on page 51). Turn the MIX BUS knob to change the output level for the mix.

PARAM

When the LCD display is in mixer mode, the PARAM knob cycles through the mix parameters listed below. Use the CURSOR knob to scroll to a particular channel (until it flashes) and use the VALUE knob to change its setting:

Mix parameter	Range	Comments
Gain	OFF, -84 to 0 dB	Each channel displays a small fader. Push the VALUE knob to toggle between OFF and unity gain (0dB).
Pan	-64 to +64 Zero = pan center	Push the VALUE knob to jump to pan center. Stereo pairs (explained below) are panned hard left/right by default.
Solo	"s" or blank	Push the VALUE knob to toggle between soloed (S) and not soloed (blank), or turn the knob to toggle.
Mute	"m" or blank	Push the VALUE knob to toggle between muted (m) and unmuted (blank), or turn the knob to toggle.
4/10	down (+4) or up (-10)	This setting applies universally across ALL mix busses for analog inputs 5-8. Push the VALUE knob to toggle between a +4dB reference level (down) and a -10dB reference level (up). Or turn the knob to toggle.
+6db	"+" or 0	This setting applies universally across ALL mix busses for analog inputs 5-8. Push the VALUE knob to toggle between a +6dB software boost (+) and no boost (0). Or turn the knob to toggle.
Pair	"[ ]" or blank	This setting applies universally across ALL mixes. Push the VALUE knob to toggle a stereo input pair between separate mono inputs (blank) or a stereo pair ("[ ]"). Or turn the knob to toggle. When a pair of inputs are linked, all of their mix settings become linked (gain, solo, etc.) except for pan. When the pair is first created, pan is set to hard left and hard right, but the channels can then be further modified independently. When a pair is unlinked, the channels are set to pan-center.

Mix parameters that apply across all mixes

The last three mix settings (input reference level, +6dB software boost, and stereo pairing) apply across all mixes because they have to do with the nature of the input itself. For example, if you have an input that requires a -10dB reference level, then you'll want the reference level to apply to all mixes.

Working with stereo pairs

When you group a pair of inputs as a stereo pair, all of their mix settings become linked, and whenever you scroll to either channel, both channels will flash to indicate that they will operate as a linked stereo pair. Note that when a pair is first created, pan is set to hard left and hard right, but the channels can then be further modified independently. When a pair is unlinked, the channels are set to pan-center.

CURSOR / VALUE

When the LCD display is in mixer mode, the CURSOR knob scrolls left and right over the 20 inputs displayed in the LCD. The current input flashes. As a shortcut, you can push the CURSOR knob to toggle between the top row (analog inputs) and bottom row (digital inputs). The VALUE knob changes the current mix parameter for the currently flashing input. In some cases, such as Gain and Pan, the LCD will "zoom" to the enlarged horizontal fader while you adjust it with the VALUE knob. After you stop adjusting, the LCD will return to the mixer display.

STAND-ALONE OPERATION

All settings, including all mix settings and global settings, are saved in the Traveler's memory, and they remain in effect even when the Traveler is not connected to a computer. This allows you to use the Traveler 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 Traveler hardware.

SETTING UP YOUR SYSTEM

As described in chapter 4, "Installing the Traveler Mac OS X Software" (page 39), the Digital Performer and MOTU Traveler software installers will properly install and update everything for you.

If you are using a MIDI Timepiece AV or Digital Timepiece for synchronization, be sure they are present in Audio MIDI setup.

THE TRAVELER SETTINGS

Choose the Traveler as your audio input output device by choosing *Configure Audio System>Configure Hardware Driver* from the Setup menu. This window shows some of the Traveler settings, such as sample rate and clock source, but to access all of the Traveler settings, open the MOTU FireWire Audio Console, as shown in Figure 5-1 on page 44.
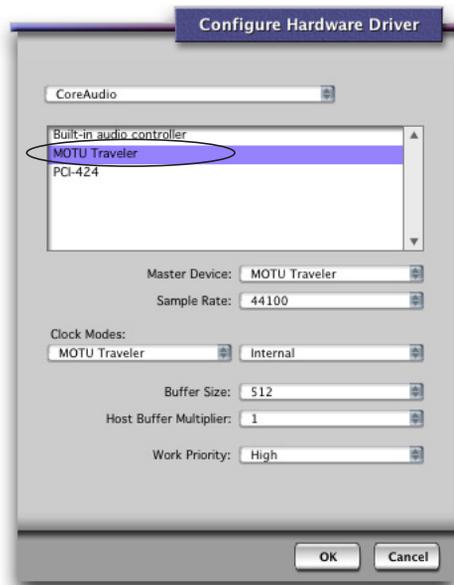

Figure 7-1: Choose Setup menu> Configure Audio System> Configure Hardware Driver to open the dialog shown above and access the Traveler Core Audio driver. To access the rest of the Traveler settings, open the MOTU FireWire Audio Console.

For complete details about the Traveler settings, see chapter 5, "MOTU FireWire Audio Console" (page 43). The following sections provide a brief explanation of each Traveler setting for use with Digital Performer.

Sample rate

Choose the desired overall sample rate for the Traveler 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.

Before running the Traveler at the 4x sample rates, see "Operation at 4x sample rates (176.4 or 192kHz)" on page 44.

Clock Source

This setting is very important because it determines which audio clock the Traveler will follow.

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

If you are slaving the Traveler to the ADAT sync Input connector, choose *ADAT 9-pin*.

If you are slaving the Traveler and Digital Performer to SMPTE time code via the Traveler itself, choose *SMPTE* and follow the directions in "Syncing to SMPTE time code" on page 30.

If you have digital audio devices connected to the Traveler, or if you are not sure about the clock source of your setup, be sure to read "Making sync connections" on page 25 and "Clock Source" on page 44.

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 Traveler hardware and Digital Performer. For example, you might have MIDI instruments, samplers, microphones, and so on connected to the analog inputs of the Traveler. If so, you will often be mixing their live input with audio material recorded in Digital Performer. See chapter 10, "Reducing Monitoring Latency" (page 73) for complete details.

Optical input and output

To make a Traveler optical input or output available in Digital Performer, choose the appropriate format (*ADAT optical* or *TOSLink)* from the optical input and/or output menu. If you won't be using the optical connectors, turn them off.

Phones

This Traveler setting lets you choose what you'll hear from the headphone jack. For example, if you choose *Analog 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 (except when running at 176.4 or 192kHz). As a result, you'll see *Phones 1-2* as an additional audio destination in Digital Performer's audio output menus.

BE SURE YOU HAVE ENOUGH VOICES

Go to the Setup menu and choose *Configure Audio System>Configure Studio Size*. Then check to make sure you have enough mono and stereo audio voices to cover the 20 channels of input and 22 channels of output provided by your Traveler — although the number of channels may depend on how your Traveler is configured:

■ 10 channels for analog I/O (including the headphone out)

■ 2 channels for RCA S/PDIF

■ 2 channels for AES/EBU

■ Zero, 2 or 8 channels for optical, depending on whether you have optical turned off, or set to TOSLink or ADAT optical

For example, if you are using analog only, you only need 10 channels. If you are using analog and RCA S/PDIF, you need 12 channels.

As another example, if you are using analog, RCA S/PDIF, AES/EBU and ADAT optical, you need 22 channels (the maximum number of simultaneous output channels provided by the Traveler).

TRIMMING THE MIC/INSTRUMENT INPUTS

The Traveler mic/instrument inputs provide trim knobs on the front panel. To calibrate an audio input:

1 Record-enable a track in Digital Performer.

2 Choose the desired Traveler mic input for the track.

3 Open the Audio Monitor window.

4 As you feed signal to the input, adjust the input's corresponding trim knob on the front panel of the Traveler until peaks in the level meter are as high as possible without clipping (hitting zero dB).

WORKING WITH TRAVELER INPUTS AND OUTPUTS

Once you've enabled the MOTU FireWire Audio driver as explained earlier in "The Traveler settings" on page 57, Traveler audio inputs and outputs will appear in Digital Performer's audio input and output menus. If you don't see the optical inputs and/or outputs, check the MOTU FireWire Audio Console to make sure they are turned on and set to the format you require. If you don't plan to use the optical input or output, turn it off to conserve computer bandwidth.

Phones 1-2

If you've chosen to treat the Traveler 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 48.

Mix1 1-2

In Digital Performer's audio input menus, you'll see a Traveler input called *Mix1 1-2*. This input source delivers the output of CueMix DSP "MIX1" (the first mix bus of the four on-board no-latency monitor mixes in the Traveler) back to your computer. This input serves, for example, as a convenient way for you to record the Traveler's MIX1 monitor mix back into Digital Performer (for reference and archiving purposes). Further, if you are sending audio from Digital Performer to the same output pair as MIX1, you can choose to either include or exclude the audio from the computer in the stream being sent back to Digital Performer. For details on how to do this, see "Mix1 Return Includes Computer" on page 84.

The Mix1 1-2 input is not available at the 4x sample rates (176.4 or 192kHz).

☞ Warning: the Mix1 1-2 input can cause feedback loops! DO NOT assign this input to a track that shares the same Traveler output pair as MIX1.

24-BIT OPERATION

Your Traveler 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.

FINE-TUNING I/O TIMING

The Traveler has the ability to be sample accurate. This means that when you transfer audio between Digital Performer and an ADAT (or other ADAT-sync compatible recorder), for example, you can

record the audio back and forth as many times as you want between them and it will remain exactly at its original sample location (unless you move it in Digital Performer, of course).

Occasionally, you may encounter a situation in which you observe a slight offset of one sample — or maybe a few — caused by inherent latencies in the devices you are using with the Traveler. Usually, these offsets will be consistent, and you can compensate for them in Digital Performer. To do so, choose *Configure Audio System>Fine-tune Audio I/O Timing* from the Setup menu as shown in Figure 7-2.

Figure 7-2: Fine-tuning the timing of audio playback and recording.

SYNCHRONIZATION

Digital Performer can run under its own transport control or slave to an external sync source, such as SMPTE time code or ADAT sync (sample address).

Running DP under its own transport control

If you do not need to synchronize Digital Performer with time code or another recording device, such as a tape deck, just leave the *Slave to External Sync* command in the Studio menu unchecked.

However, even though Digital Performer is not slaving to external sync, you still need to be concerned with the synchronization of the Traveler's digital audio clock with other devices connected to it digitally (if any). For example, if you have a digital mixer connected to the Traveler via an ADAT optical lightpipe cable, you need to

make sure that their audio clocks are phase-locked. For details, see "Syncing optical devices" on page 32 and "Making sync connections" on page 25. If you don't have any digital audio devices connected to the Traveler, digital audio phase-lock does not apply to you.

Resolving DP and the Traveler to SMPTE time code

If you need to slave Digital Performer and the Traveler to SMPTE time code, you can do so with or without a dedicated synchronizer.

Resolving directly to time code (with no synchronizer)

To resolve your Digital Performer/Traveler system directly to SMPTE time code with no additional synchronization devices, use the setup shown in "Syncing to SMPTE time code" on page 30.

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 FireWire Audio Console window is set to *SMPTE*. Also, make sure that you've connected an LTC input signal to a Traveler analog input, and that you've specified that input in the SMPTE Console.

Resolving to video and/or time code with a dedicated synchronizer

To resolve your Digital Performer/Traveler system to video and/or SMPTE time code using an additional synchronization device, use the setup shown in "Syncing to video and/or SMPTE time code using a synchronizer" on page 31.

Choose *Receive Sync* from the Setup menu and choose the MTC (MIDI Time Code) option. Then make sure that the *Slave to External Sync* command in the Studio menu is checked. To ensure that your audio tracks don't drift out of sync with your MIDI tracks — or time code, use a hardware synchronizer like the MIDI Timepiece AV or

Digital Timepiece to resolve the Traveler hardware as well, as shown in Figure 3-17 on page 31. A digital audio synchronizer is required for drift-free SMPTE/MIDI time code sync. Make sure the *Clock Source* setting in the MOTU FireWire Audio Console window has the appropriate setting for locking the Traveler to the synchronizer. For example, in Figure 3-17 on page 31, word clock is being used to resolve the Traveler, so the Clock Source setting is *Word Clock In*.

☛ If you have an ADAT sync compatible device, don't use SMPTE time code. Instead, use sample-accurate sync as described in the next section.

Sample-accurate sync to ADAT and Tascam
Together, Digital Performer and the Traveler provide you with sample-accurate transfers with ADATs, Alesis recorders and any other devices that support standard ADAT sample address (*ADAT Sync*).

Similarly, with the help of a MOTU Digital Timepiece, Digital Performer and a Traveler can perform sample-accurate transfers with Tascam digital recorders.

A sample-accurate transfer is one in which the original location of the audio is preserved in the transfer, down to the sample.

For details on how to set up sample-accurate sync, see "Sample-accurate sync" on page 27. Be sure to choose the *Sample Accurate Sync* option in Digital Performer's *Receive Sync* dialog, and make sure that the *Slave to External Sync* command is checked, too.

To control the transports of everything together from Digital Performer, see the next section.

MIDI MACHINE CONTROL (MMC)
If you have ADATs and a MMC-compatible ADAT synchronizer like the MIDI Timepiece AV or Digital Timepiece, you can control everything from your computer screen with Digital Performer's transport controls and cueing features (like Markers, the playback wiper, etc.)

Similarly, if you have Tascam recorders and a MOTU Digital Timepiece (or other MMC-compatible Tascam synchronizer), can control all of your Tascam decks (in ABS time) in a similar fashion from Digital Performer.

See the MIDI Machine Control chapter in your MIDI Timepiece AV or Digital Timepiece manual for details on how to set this up.

MIDI I/O VIA THE TRAVELER MIDI PORTS
Once you've followed the procedure for enabling the Traveler's MIDI features as explained in "Software installation for Mac OS X" on page 39, the Traveler 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 73).

EXCHANGING PROJECTS WITH AUDIODESK
DP4 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 DP4's Save As command and choose the AudioDesk 2.0 file format.

AudioDesk

OVERVIEW

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

SETTING UP YOUR SYSTEM

As described in chapter 4, "Installing the Traveler Mac OS X Software" (page 39), the MOTU FireWire Audio software installer will properly install everything for you, including AudioDesk.

If you are using a MIDI Timepiece AV or Digital Timepiece for synchronization, be sure they are present in Audio MIDI setup.

THE TRAVELER SETTINGS

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

to access all of the Traveler settings, open the MOTU FireWire Audio Console, as shown in Figure 5-1 on page 44.
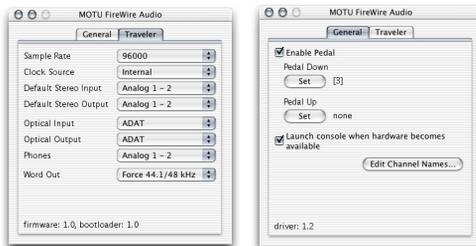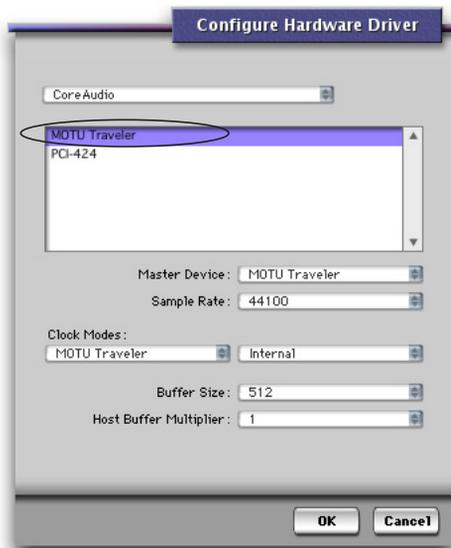
Figure 8-1: Choose Setup menu> Configure Audio System> Configure Hardware Driver to open the dialog shown above and access the Traveler Core Audio driver. To access the rest of the Traveler settings, open the MOTU FireWire Audio Console.

For complete details about the Traveler settings, see chapter 5, "MOTU FireWire Audio Console" (page 43). The following sections provide a brief explanation of each Traveler setting for use with AudioDesk.

Sample rate

Choose the desired overall sample rate for the Traveler 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.

Before running the Traveler at the 4x sample rates, see "Operation at 4x sample rates (176.4 or 192kHz)" on page 44.

Clock Source

This setting is very important because it determines which audio clock the Traveler will follow.

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

If you are slaving the Traveler to the ADAT sync Input connector, choose *ADAT 9-pin*.

If you are slaving the Traveler and AudioDesk to SMPTE time code via the Traveler itself, choose *SMPTE* and follow the directions in "Syncing to SMPTE time code" on page 30.

If you have digital audio devices connected to the Traveler, or if you are not sure about the clock source of your setup, be sure to read "Making sync connections" on page 25 and "Clock Source" on page 44.

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 Traveler hardware and AudioDesk. For example, you might have MIDI instruments, samplers, microphones, and so on connected to the analog inputs of the Traveler. If so, you will often be mixing their live input with audio material recorded in AudioDesk. See chapter 10, "Reducing Monitoring Latency" (page 73) for complete details.

Optical input and output

To make a Traveler optical input or output available in AudioDesk, choose the appropriate format (*ADAT optical* or *TOSLink)* from the optical input and/or output menu. If you won't be using the optical connectors, turn them off.

Phones

This Traveler setting lets you choose what you'll hear from the headphone jack. For example, if you choose *Analog 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.

BE SURE YOU HAVE ENOUGH VOICES

Go to the Setup menu and choose *Configure Audio System>Configure Studio Size*. Then check to make sure you have enough mono and stereo audio voices to cover the 20 channels of input and 22 channels of output provided by your Traveler — although the number of channels may depend on how your Traveler is configured:

■ 10 channels for analog I/O (including the headphone out)

■ 2 channels for RCA S/PDIF

■ 2 channels for AES/EBU

■ Zero, 2 or 8 channels for optical, depending on whether you have optical turned off, or set to TOSLink or ADAT optical

For example, if you are using analog only, you only need 10 channels. If you are using analog and RCA S/PDIF, you need 12 channels.

As another example, if you are using analog, RCA S/PDIF, AES/EBU and ADAT optical, you need 22 channels (the maximum number of simultaneous output channels provided by the Traveler).

TRIMMING THE MIC/INSTRUMENT INPUTS

The Traveler mic/instrument inputs provide trim knobs on the front panel. To calibrate an audio input:

1 Record-enable a track in AudioDesk.

2 Choose the desired Traveler mic input for the track.

3 Open the Audio Monitor window.

4 As you feed signal to the input, adjust the input's corresponding trim knob on the front panel of the Traveler until peaks in the level meter are as high as possible without clipping (hitting zero dB).

WORKING WITH TRAVELER INPUTS AND OUTPUTS

Once you've enabled the MOTU FireWire Audio driver as explained earlier in "The Traveler settings" on page 63, Traveler audio inputs and outputs will appear in AudioDesk's audio input and output menus. If you don't see the optical inputs and/or outputs, check the MOTU FireWire Audio Console to make sure they are turned on and set to the format you require. If you don't plan to use the optical input or output, turn it off to conserve computer bandwidth.

Phones 1-2

If you've chosen to treat the Traveler 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 64.

Mix1 1-2

In AudioDesk's audio input menus, you'll see a Traveler input called *Mix1 1-2*. This input source delivers the output of CueMix DSP "MIX1" (the first mix bus of the four on-board no-latency monitor mixes in the Traveler) back to your computer. This input serves, for example, as a convenient way for you to record the Traveler's MIX1 monitor mix back into AudioDesk (for reference and archiving purposes). Further, if you are sending audio from AudioDesk to the same output pair as MIX1, you can choose to either include or exclude the audio from the computer in the stream being sent back to AudioDesk. For details on how to do this, see "Mix1 Return Includes Computer" on page 84.

The Mix1 1-2 input is not available at the 4x sample rates (176.4 or 192kHz).

☞ Warning: the Mix1 1-2 input can cause feedback loops! DO NOT assign this input to a track that shares the same Traveler output pair as MIX1.

24-BIT OPERATION

Your Traveler 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.

FINE-TUNING I/O TIMING

The Traveler has the ability to be sample accurate. This means that when you transfer audio between AudioDesk and an ADAT (or other ADAT-sync compatible recorder), for example, you can record the audio back and forth as many times as you want between them and it will remain exactly at its original sample location (unless you move it in AudioDesk, of course).

Occasionally, you may encounter a situation in which you observe a slight offset of one sample — or maybe a few — caused by inherent latencies in the devices you are using with the Traveler. Usually, these offsets will be consistent, and you can compensate for them in AudioDesk. To do so, choose *Configure Audio System>Fine-tune Audio I/O Timing* from the Setup menu as shown in Figure 8-2.

Figure 8-2: Fine-tuning the timing of audio playback and recording.

SYNCHRONIZATION

AudioDesk can run under its own transport control or slave to an external sync source, such as SMPTE time code or ADAT sync (sample address).

Running AudioDesk under its own transport control

If you do not need to synchronize AudioDesk with time code or another recording device, such as a tape deck, just leave the *Slave to External Sync* command in the Studio menu unchecked.

However, even though AudioDesk is not slaving to external sync, you still need to be concerned with the synchronization of the Traveler's digital audio clock with other devices connected to it digitally (if any). For example, if you have a digital mixer connected to the Traveler via an ADAT optical lightpipe cable, you need to make sure that their audio clocks are phase-locked. For details, see "Syncing optical devices" on page 32 and "Making sync connections" on page 25. If you don't have any digital audio devices connected to the Traveler, digital audio phase-lock does not apply to you.

Resolving AudioDesk and the Traveler to SMPTE time code

If you need to slave AudioDesk and the Traveler to SMPTE time code, you can do so with or without a dedicated synchronizer.

Resolving directly to time code (with no synchronizer)

To resolve your AudioDesk/Traveler system directly to SMPTE time code with no additional synchronization devices, use the setup shown in "Syncing to SMPTE time code" on page 30.

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 FireWire Audio Console window is set to *SMPTE*. Also, make sure that you've connected an LTC input signal to a Traveler analog input, and that you've specified that input in the SMPTE Console.

Resolving to video and/or time code with a dedicated synchronizer

To resolve your AudioDesk/Traveler system to video and/or SMPTE time code using an additional synchronization device, use the setup shown in "Syncing to video and/or SMPTE time code using a synchronizer" on page 31.

Choose *Receive Sync* from the Setup menu and choose the MTC (MIDI Time Code) option. Then make sure that the *Slave to External Sync* command in the Studio menu is checked. To ensure that your audio tracks don't drift out of sync with your MIDI tracks — or time code, use a hardware synchronizer like the MIDI Timepiece AV or Digital Timepiece to resolve the Traveler hardware as well, as shown in Figure 3-17 on page 31. A digital audio synchronizer is required for drift-free SMPTE/MIDI time code sync. Make sure the *Clock Source* setting in the MOTU FireWire Audio Console window has the appropriate setting for locking the Traveler to the synchronizer. For

example, in Figure 3-17 on page 31, word clock is being used to resolve the Traveler, so the Clock Source setting is *Word Clock In*.

☞ If you have an ADAT sync compatible device, don't use SMPTE time code. Instead, use sample-accurate sync as described in the next section.

Sample-accurate sync to ADAT and Tascam
Together, AudioDesk and the Traveler provide you with sample-accurate transfers with ADATs, Alesis recorders and any other devices that support standard ADAT sample address (*ADAT Sync*).

Similarly, with the help of a MOTU Digital Timepiece, AudioDesk and a Traveler can perform sample-accurate transfers with Tascam digital recorders.

A sample-accurate transfer is one in which the original location of the audio is preserved in the transfer, down to the sample.

For details on how to set up sample-accurate sync, see "Sample-accurate sync" on page 27. Be sure to choose the *Sample Accurate Sync* option in AudioDesk's *Receive Sync* dialog, and make sure that the *Slave to External Sync* command is checked, too.

To control the transports of everything together from AudioDesk, see the next section.

MIDI MACHINE CONTROL (MMC)
If you have ADATs and a MMC-compatible ADAT synchronizer like the MIDI Timepiece AV or Digital Timepiece, you can control everything from your computer screen with AudioDesk's transport controls and cueing features (like Markers, the playback wiper, etc.)

Similarly, if you have Tascam recorders and a MOTU Digital Timepiece (or other MMC-compatible Tascam synchronizer), can control all of your Tascam decks (in ABS time) in a similar fashion from AudioDesk.

See the MIDI Machine Control chapter in your MIDI Timepiece AV or Digital Timepiece manual for details on how to set this up.

MIDI I/O VIA THE TRAVELER MIDI PORTS
Once you've followed the procedure for enabling the Traveler's MIDI features as explained in "Software installation for Mac OS X" on page 39, the Traveler 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 73).

EXCHANGING PROJECTS WITH DIGITAL PERFORMER
To open AudioDesk Version 2 (or Version 1) files in DP4, just use DP4'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.

Logic and Other Mac OS X Software

OVERVIEW

The Traveler provides multichannel audio and MIDI input and output for Apple's Logic, Logic Express and all Mac OS X audio applications. This chapter covers third-party audio applications. For information about running Digital Performer or AudioDesk under Mac OS X, refer to chapter 7, "Digital Performer" (page 57) or chapter 8, "AudioDesk" (page 63).

INSTALLING THE TRAVELER MAC OS X DRIVERS

To install the Traveler's Mac OS X audio and MIDI drivers, just run the installer on the MOTU FireWire Audio installer CD as detailed in chapter 4, "Installing the Traveler Mac OS X Software" (page 39).

PREPARING MIDI INPUT AND OUTPUT

If you will be using the Traveler's MIDI input and output ports, be sure to follow the procedures in "CoreMIDI and Audio MIDI Setup" on page 40.

RUN THE MOTU FIREWIRE AUDIO CONSOLE

Before you run your host audio software, launch the MOTU FireWire Audio Console to configure your Traveler hardware. The MOTU FireWire Audio Console lets you configure your audio interface.
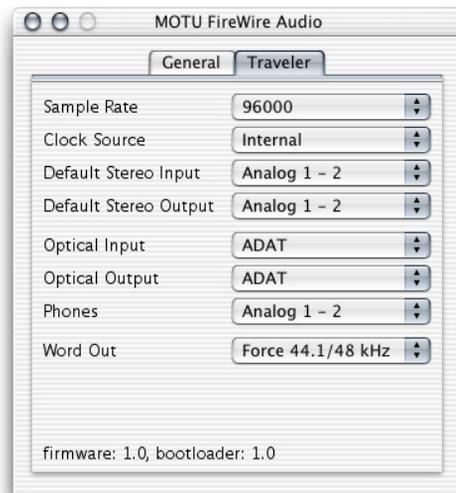
Figure 9-1: The MOTU FireWire Audio Console.

For complete details about the Traveler settings, see chapter 5, "MOTU FireWire Audio Console" (page 43). The following sections provide a brief explanation of each Traveler setting for use with Logic and other Mac OS X audio software.

Sample rate

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

Before running the Traveler at the 4x sample rates, see "Operation at 4x sample rates (176.4 or 192kHz)" on page 44.

Clock Source

This setting is very important because it determines which audio clock the Traveler will follow.

If you do not have any digital audio connections to your Traveler (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 wish to slave the Traveler to the ADAT sync Input connector, choose *ADAT 9-pin*. Note that this port will only work properly as a clock source for Mac OS X audio applications that support sample-accurate sync (such as AudioDesk and Digital Performer).

If you have digital audio devices connected to the Traveler, or if you are not sure about the clock source of your setup, be sure to read "Making sync connections" on page 25 and "Clock Source" on page 44.

Optical input and output

To make a Traveler optical input or output available in your host software, choose the appropriate format (*ADAT optical* or *TOSLink)* from the optical input and/or output menu. If you won't be using the optical connectors, turn them off.

Phones

This Traveler setting lets you choose what you'll hear from the headphone jack. For example, if you choose *Main Outs*, 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 your host audio software's audio output menus.

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 Traveler 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 Traveler from this menu.

Logic Audio

In Logic audio, go to the Preferences window, click the Audio icon click the *Drivers* tab and click the *Core Audio* tab as shown below. Choose the *MOTU Traveler* from the Driver menu. For information about the *I/O Buffer Size* setting, see "Adjusting the audio I/O buffer" on page 75.
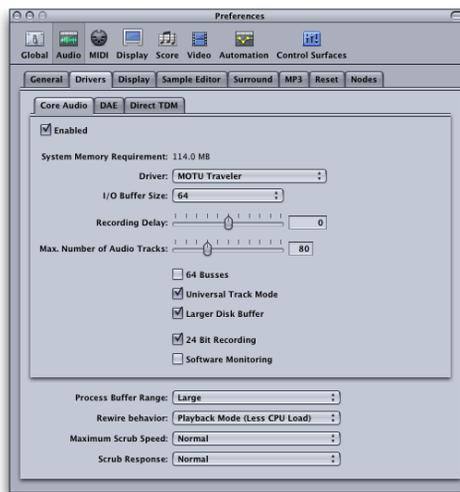
Figure 9-2: Enabling the Traveler in Logic Audio.

Cubase SX and Nuendo

Go to the Devices menu and choose Device Setup. Choose the Traveler Core Audio driver from the "ASIO Driver" menu as shown below. 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 75.

Figure 9-3: Enabling the Traveler audio driver in Cubase SX.

Other audio software

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

AUDIO INPUT AND OUTPUT NAMES

The Traveler 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 SX, the Traveler outputs are numbered like this:
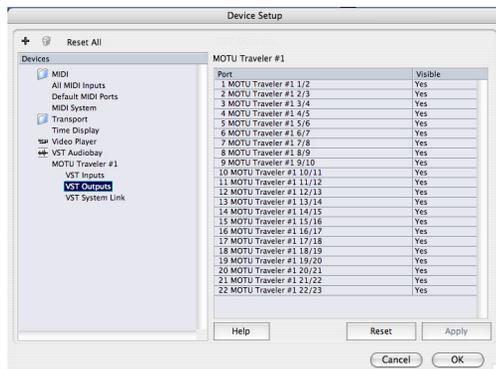

Figure 9-4: Some applications number the Traveler inputs and outputs, but don't display which outputs they refer to.

Most programs will likely address this issue in future updates. In the meantime, here is how you can identify each input and output. Inputs are always listed in the same order as follows:

Input	Channels	List position	Comment
Analog	8	1-8	-
AES/EBU	2	9-10	
SPDIF	2	11-12	-
Mix1	2	13-14	See "The 'Mix1' input pair" below.
ADAT	8 @ 44.1/48kHz 4 @ 88.2/96kHz	15-22 15-18	If the optical bank is set to *TOSLink* or *None*, then no ADAT inputs are displayed.

Outputs are similarly listed in the same order as follows:

Output	Channels	List position	Comment
Analog	8	1-8	-
AES/EBU	2	9-10	-
SPDIF	2	11-12	-
Phones	2	13-14	If the phones are assigned to mirror another output pair (such as the main outs), they won't be listed separately.
ADAT	8 @ 44.1/48kHz 4 @ 88.2/96kHz	15-22 15-18	If the phones are mirroring, then subtract 2. If the optical bank is set to *TOSLink* or *None*, then no ADAT outputs are displayed.

As an example, the AES/EBU inputs will always be listed as inputs 9-10. As another example, ADAT output channels 1-2 will be listed as channels 15-16, unless the phones are mirroring the main outs (or another output), in which case ADAT outputs 1-2 would be listed as channels 13-14.

The 'Mix1' input pair

The *Mix1* input pair delivers the output of CueMix DSP "MIX1" (the first mix bus of the four on-board no-latency monitor mixes in the Traveler) back to your computer. This input serves, for example, as a convenient way for you to record the Traveler's MIX1 monitor mix back into your host audio software (for reference and archiving purposes). Further, if you are sending audio from your host audio software to the same output pair as MIX1, you can choose to either include or exclude the audio from the computer in the stream being sent back to the computer. For details on how to do this, see "Mix1 Return Includes Computer" on page 84.

The Mix1 1-2 input is not available at the 4x sample rates (176.4 or 192kHz).

☞ Warning: the Mix1 input can cause feedback loops! DO NOT assign this input to a track that shares the same Traveler output pair as MIX1.

Phones 1-2

If you've chosen to treat the Traveler headphones as an independent output, they appear in your host software as an independent output pair. Audio tracks assigned to this output pair will be heard on the headphone jack only. For further explanation, see "Phones" on page 48.

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 20 inputs and 22 outputs provided by your Traveler — although the number of channels may depend on how your Traveler is configured:

■ 10 channels for analog I/O (including the headphone out)

■ 2 channels for RCA S/PDIF

■ 2 channels for AES/EBU

■ Zero, 2 or 8 channels for optical, depending on whether you have optical turned off, or set to TOSLink or ADAT optical

For example, if you are using analog only, you only need 10 channels. If you are using analog and RCA S/PDIF, you need 12 channels.

As another example, if you are using analog, RCA S/PDIF, AES/EBU and ADAT optical, you need 22 channels (the maximum number of simultaneous output channels provided by the Traveler).

PROCESSING LIVE INPUTS WITH PLUG-INS

If you patch a live input (such as 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 73).

SYNCHRONIZATION

As of Version 10.3.6, Mac OS X does not allow third-party applications to take advantage of the Traveler's sample-accurate sync features or on-board SMPTE sync features. Refer to www.motu.com for further developments. However, if most applications that support external sync will be able to supports the Traveler's word clock sync capabilities. Consult chapter 3, "Installing the Traveler Hardware" (page 17) and use the synchronization diagrams in that chapter to synchronize your software and the Traveler to the other components of your system.

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 a reverb 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 a Traveler input, passes through the Traveler hardware into the computer, through your host audio software, and then back out to a Traveler 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 Traveler's CueMix DSP feature to patch the input directly to your monitor outs via the Traveler audio hardware. This is just like bussing inputs to outputs in a digital mixer. For details, see "CueMix DSP hardware monitoring" on page 77.

If you *do* need to process a live input with plug-ins, or if you are playing virtual instruments live through your Traveler 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 a Traveler: 1) through the computer or 2) via CueMix™ DSP hardware monitoring. Figure 10-1 on page 74 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™ DSP hardware-based monitoring, which lets you hear what you are recording with no monitoring delay and no computer-based effects processing. (You can add effects later, after you've recorded the live input as a disk track.) See "CueMix DSP hardware

monitoring" later in this chapter for details on how to use CueMix DSP with your audio software, or with the included CueMix Console 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 vocals to both the computer (for a bit of reverb) and mix that processed signal on the main outs with dry vocals from CueMix DSP.

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
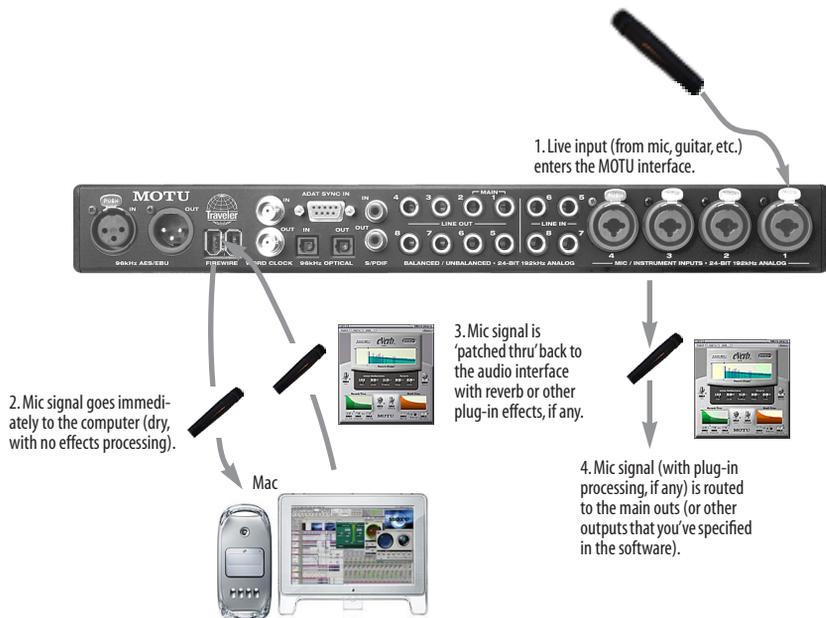
Figure 10-1: There are two ways to monitor live audio inputs with a Traveler: 1) through the computer or 2) via CueMix™ DSP hardware monitoring. This diagram shows method 1 (through the computer). When using this method, use your host software's buffer setting to reduce the slight delay you hear when 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 Traveler, 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 Traveler 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.
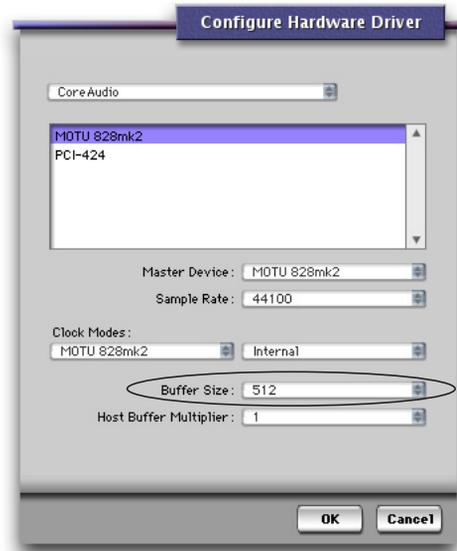
Figure 10-3: In Digital Performer and AudioDesk, choose Setup menu> Configure Audio System> Configure Hardware Driver to open the dialog shown above and access the Buffer Size setting. Refer to your Digital Performer or AudioDesk manual for information about the Host Buffer Multiplier setting.

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 Console.

2. CueMix™ DSP immediately patches the live mic signal directly to the main outs (or other output), completely bypassing the computer (dry, with no effects processing).
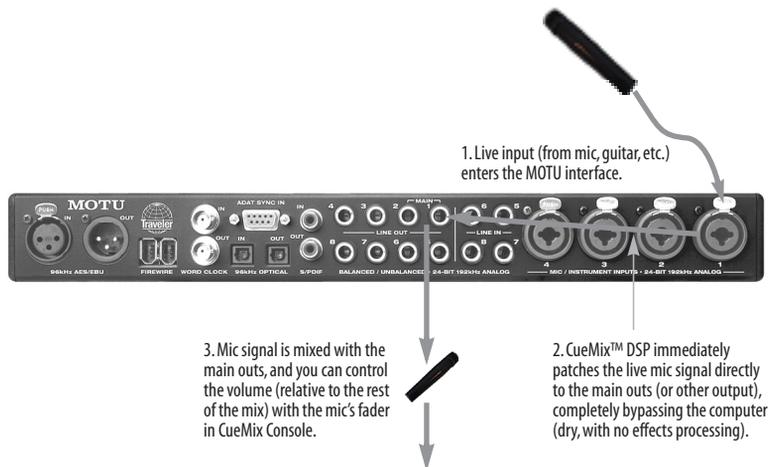
Figure 10-2: This diagram shows the signal flow when using CueMix™ DSP no-latency monitoring. Notice that this method does not allow you to process the live input with plug-ins in your audio software while it is being monitored. You can, however, add effects later — after recording the live input as a disk track. CueMix™ DSP lets you hear what you are recording with no delay and no computer-based effects.

Figure 10-4: In Cubase SX or Nuendo, choose Devices menu> Device Setup and click VST Multitrack to access the window above and the Audio Buffer Size setting.
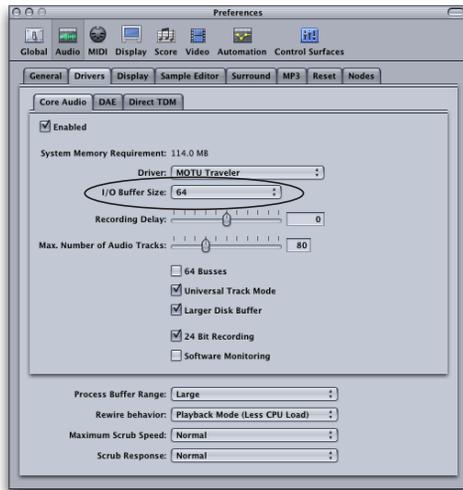
Figure 10-5: In Logic Audio, go to the Audio Driver preferences to access the I/O buffer Size option shown above.

Lower latency versus higher CPU overhead
The buffer setting has a large impact on the following things:

■ Patch thru latency

■ The load on your computer's CPU

■ Possible distortion at the smallest settings

■ How responsive the transport controls are in 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 DSP HARDWARE MONITORING

The Traveler has a more direct method of patching audio through the system. This method is called *CueMix DSP*. When enabled, CueMix activates hardware patch-thru in the Traveler itself. CueMix DSP 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 DSP imposes no strain on the computer.

The trade-off, however, is that CueMix DSP bypasses your host audio software. Instead, live audio inputs are patched directly through to outputs in the Traveler 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 DSP. Instead, reduce latency with the buffer setting (as explained earlier in this chapter).

TWO METHODS FOR CONTROLLING CUEMIX DSP

There are two ways to control CueMix DSP:

■ With CueMix Console

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

You can even use both methods simultaneously.

Using CueMix Console

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

CueMix Console allows you to create up to four separate Traveler monitor mixes, or any other desired routing configurations. These routings are independent of your host audio software. For complete details, see chapter 11, "CueMix Console" (page 79).

Controlling CueMix DSP from your audio software

Some audio applications allow you to control CueMix DSP monitoring from within the application (without the need to use CueMix Console). In most cases, this support consists of patching a Traveler 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 DSP:

■ Digital Performer

■ AudioDesk

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

Follow the directions below in the section that applies to you.

Controlling CueMix DSP from within AudioDesk or Digital Performer
To turn on CueMix DSP 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.

3 From the Studio menu, choose *Audio Monitor*, and enable Audio Patch Thru (the button with the headphone icon on it).

Once enabled, CueMix DSP 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 DSP in the Traveler 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 optical channels 7-8, CueMix DSP no-latency hardware monitoring will automatically be set up from analog in 2 to optical outputs 7-8.

Controlling CueMix DSP from within other software
Consult the manual for your software.

Figure 10-7: Enabling CueMix DSP in AudioDesk or Digital Performer.

CueMix Console

OVERVIEW

CueMix Console provides access to the flexible on-board mixing features of the Traveler. CueMix lets you route any combination of inputs to any stereo output pair. These mixes can be set up entirely independently of your host audio software. CueMix allows you to set up four completely independent mix configurations with the Traveler. You can also save and load mix configurations.

CueMix Console can be used independently of host audio software, or together with it. CueMix mixing dovetails with the direct monitoring (hardware patch thru) features of your host audio software, allowing you to seemlessly mix in both environments.

Figure 11-1: CueMix Console is a virtual mixer that gives you control over the Traveler's on-board mixing features.

ADVANTAGES OF CUEMIX MONITORING

CueMix Console provides several major advantages over monitoring live inputs through your host audio software:

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

■ CueMix imposes absolutely 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 Traveler to operate as a portable, stand-alone mixer.

CueMix Console does not provide effects processing. For information about using your audio software's native plug-ins together with CueMix, see chapter 10, "Reducing Monitoring Latency" (page 73).

CUEMIX CONSOLE INSTALLATION

CueMix Console is installed with the rest of your Traveler software.

CUEMIX CONSOLE BASIC OPERATION

The CueMix console is simple to operate, once you understand these basic concepts.

Four mixes

CueMix provides four separate mixes: Mix1, Mix2, Mix3 and Mix4. Each mix can have any number of inputs mixed down to any Traveler output pair that you choose. For example, Mix1 could go to the headphones, Mix2 could go to the main outs, Mix3 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 as some number of inputs all mixed down to a stereo output pair. CueMix Console lets you choose which inputs to include in the mix, and it lets you specify the level and pan for each input being fed into the mix.

Viewing one mix at a time

CueMix Console displays one mix at a time. To select which mix you are viewing, click its tab at the bottom of the window, as shown in Figure 11-1. The mix name appears in the tab. Double-click the name to change it.

Each mix is completely independent

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

Some channel settings apply across all mixes

The settings at the top of the CueMix Console window (above the channel section) apply to all mixes. These settings include the preamp gain and pad for the four mic inputs, and the +4/-10dB reference level and +6dB software boost for analog inputs 5-8.

Widening the CueMix Console window

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

WORKING WITH A MIX

Each mix has the following components:

■ A stereo output with master fader

■ Name

■ Master mute (to enable/disable the entire mix)

■ Any number of mono or stereo inputs

■ Pan, volume, mute and solo for each input

These elements are visually grouped together in the lightly shaded area in the lower half of the CueMix Console window.

Viewing a mix
To view a mix, click its tab at the bottom of the window, as shown in Figure 11-1. The mix name appears in the tab.

Naming a mix
Double-click the mix name in the tab.

Master mute
The master mute button (Figure 11-1) temporarily disables (silences) the mix.

Master fader
The master fader (Figure 11-1) 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.

Output level meters
The OUT level meters show you the output for the mix's physical output, which may include audio from your host audio software. The clip indicators clear themselves after a few seconds.

Input section
The channel strips to the left of the master fader represent each input in your Traveler. Use the input scroll bar to view additional inputs.

Input mute/solo
To add an input to a mix, or remove it, click its MUTE button. To solo it, use its SOLO button. To toggle these buttons for a stereo pair, hold down the command key while clicking either channel. The Solo indicator LED (Figure 11-1) lights up when any input is soloed (including inputs that may currently be scrolled off-screen).

Input volume and pan
Use the input fader and pan knob (Figure 11-1) to adjust these settings for the input in the mix. Again, all settings within the gray-shaded channel strip area belong to the mix currently being viewed. Note that an input can have different settings in different mixes.

To adjust the volume or panning for a stereo input pair, hold down the command key while dragging the fader or knob for either the left or right input.

SHORTCUTS
Hold down the following modifier keys as shortcuts:

Shortcut	Result
Shift key	Applies your action to all inputs in the mix.
Command key	Applies your action to the stereo input pair
Option key	Applies your action to all busses
Double-click	Returns the control to its default value (pan center, unity gain, etc.)

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 file menu (or press command-C).

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

MESSAGE CENTER
The Message Center displays fly-over help for items in the CueMix Console window. It also displays messages regarding the overall operation of the Traveler.

PREAMP GAIN, PAD, REFERENCE LEVEL AND +6DB BOOST

The preamp gain, pad, reference level and +6dB boost settings at the very top of the CueMix Console window (Figure 11-1) affect each input globally, across all mixes and for audio being routed to the computer. For example, if you add 6dB of boost, your host software will receive the boost for that input as well.

Preamp gain

This setting (Figure 11-1) adjusts preamp gain, just like the four trim knobs on the front panel of the Traveler.

Pad

These buttons (Figure 11-1) toggle the pad for each mic input. Clicking these buttons is the same as pushing the trim knobs on the front panel.

Boost

This setting (Figure 11-1) adds 6 dB of gain to the input signal. This setting is applied globally for the input.

+4/-10 reference level

Click the reference button to toggle between these two standard reference levels. This setting is applied globally for the input pair.

SAVING AND LOADING PRESETS

As explained earlier in "Save/Name Preset" on page 53, the Traveler can store up to 16 presets in its on-board memory. A preset includes of all CueMix DSP settings for all four mix busses, but it excludes global settings like clock source and sample rate.

The Load Preset and Save Preset commands in the CueMix Console File menu let you name, save and load presets in the Traveler.

SAVING AND LOADING PRESETS TO/FROM DISK

The *Save* and *Load* commands in the CueMix Console File menu allow you to save Traveler presets to and from your hard drive. This allows you to save an unlimited number of Traveler presets on disk. (Use the *Load Preset* and *Save Preset* commands to get presets from — and save them to — the Traveler itself.) Click the Save button to save the current configuration; click the Load button to open an existing configuration that you have previously saved on disk.

EDIT CHANNEL NAMES

Choose Edit Channel Names from the CueMix Console File menu to open a window that lets you customize the names of the Traveler's inputs and outputs. Your custom names appear in CueMix Console (in the input name strip as shown in Figure 11-1 on page 79) and in the input and output menus of your host audio software. For details, see "Edit Channel Names" on page 48.

TALKBACK AND LISTENBACK

CueMix Console 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 11-2 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 MOTU FireWire audio interface. 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 MOTU Firewire audio interface, as demonstrated below in Figure 11-2 on page 83.
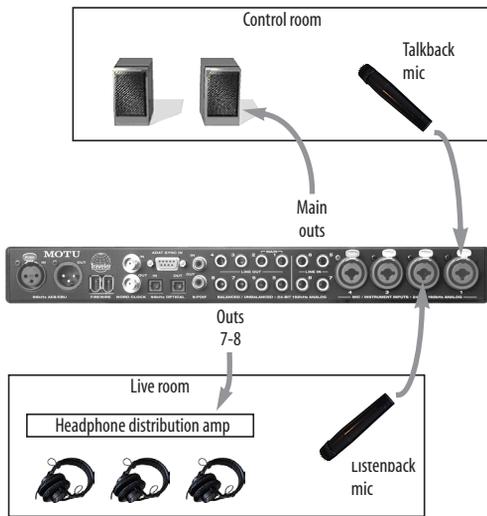
Figure 11-2: Typical hardware setup for Talkback and Listenback.

CueMix Console setup

To set up Talkback and/or Listenback in CueMix Console, choose *File menu> Talkback settings> Configure Talkback/Listenback* to open the window shown in Figure 11-3:
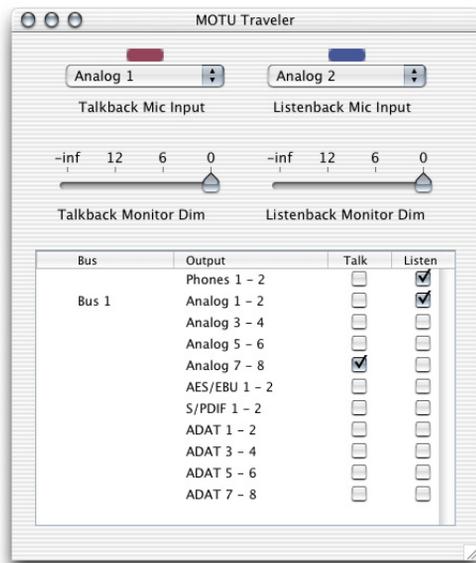
Figure 11-3: Configuring Talkback and Listenback.

Talkback / Listenback Mic Input

Choose the audio input to which your Talkback and/or Listenback mic is connected. These inputs are labeled with a purple and blue swatch, respectively, just above the channel fader.

Figure 11-4: The purple label identifies the Talkback mic input; the blue label indicates the Listenback mic. Use the input fader to control the mic volume.

Talkback / Listenback Monitor Dim

Choose the amount of attenuation you would like to apply to all other audio signals (besides the talkback volume) when Talkback and/or Listenback is engaged. To completely silence all other audio, move the slider all the way to the left (-Inf).

Talk / Listen signal routing

As shown in Figure 11-3, check the boxes next to the outputs on which you'd like to hear the Talkback mic and/or Listenback mic. For example, as demonstrated in the diagram in Figure 11-2, to hear the Talkback mic on the headphones in the live room, check the *Analog 7-8* check box in the *Talk* column as demonstrated in Figure 11-3. To hear the Listenback mic on the main monitors in the control room, check the *Analog 1-2* check box in the *Listen* column, also demonstrated in Figure 11-3.

Engaging/disengaging Talkback and Listenback

To engage Talk back or Listenback, press on the Talk or Listen buttons 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). If you would like to engage both Talkback and Listenback at the same time, enable the *Link* button.

Figure 11-5: The Talkback and Listenback buttons.

Controlling Talkback and Listenback volume

To control the volume of the Talkback and/or Listenback mics, adjust their input fader in CueMix Console. This fader controls the volume of the input, regardless of which bus mix is being displayed in the CueMix Console window. In other words, once an input has been designated as a Talkback or Listenback input, its fader becomes global for all CueMix buses.

MIX1 RETURN INCLUDES COMPUTER

The *Mix1 return includes computer* item in the CueMix Console File menu refers to the *Mix1* bus that the Traveler driver provides as an input to host audio software. This input source delivers the output of CueMix DSP "MIX1" (the first mix bus of the four on-board no-latency monitor mixes in the

Traveler) back to your computer. This input serves, for example, as a convenient way for you to record the Traveler's MIX1 monitor mix back into your host audio software (for reference and archiving purposes).

When the *Mix1 return includes computer* menu item is checked, any audio being sent from your audio software on the computer to the same output as Mix1 will be included in the Mix1 return bus. When it is uchecked, computer output is excluded.

This menu item is essentially a pre/post switch for the computer audio insert to the stream of audio going to Mix1's Traveler output pair (and also back to the computer).

SHOW METER IN DOCK ICON

This CueMix Console File menu item, when checked, causes the CueMix Console dock icon to display a small level meter that mirrors the main output meter for the current mix being displayed in CueMix Console.

PHONES MENU

The Phones menu allows you to choose what you will hear on the headphone output, just like the Phones setting the MOTU FireWire Audio Console. However, this menu provides one extra option that is exclusive to CueMix Console: *Follow Active Mix*. This menu item, when checked, causes the headphone output to mirror the output of the current mix being viewed in CueMix Console. For example, if you are currently viewing Mix3 (the Mix3 tab is active), the headphones will mirror the Mix3 output (whatever it is assigned to).

CONTROL SURFACES MENU

CueMix Console 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 Console 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 Console 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 Console 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 Console from the control surface, just bring CueMix Console to the front (make it the active application).

When this menu item is unchecked, your control surface will affect CueMix Console all the time, even when CueMix Console 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 Console 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.

Mackie Control Surfaces

CueMix Console includes support for the following control surface products:

- Mackie Control™

- Mackie HUI™

- Mackie Baby HUI™

Use the sub-menu commands in the *Mackie 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 Console. 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 for configuring CueMix Console for operation with your control surface product.
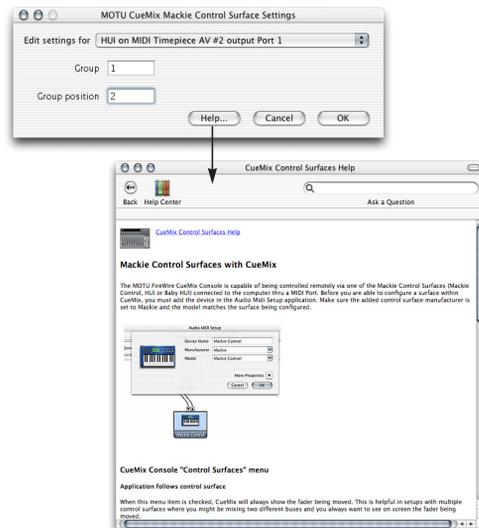
Figure 11-6: Refer to the extensive on-line help for details about configuring CueMix Console for operation with your control surface product.

Other HUI-compatible control surfaces

Any control surface that has the ability to emulate a HUI should be compatible with CueMix Console. Just add a Mackie HUI to Audio MIDI Setup and put the control surface hardware into HUI emulation mode. Consult the manual for the control surface 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 Console, they will appear as separate menu items at the bottom of the Control Surfaces menu, with the same sub-menu items described above.

CUEMIX CONSOLE EXAMPLES

Figure 11-7 below shows some examples of how you can use CueMix DSP:

■ Powered speakers are connected to the Traveler main outs. Any input can be routed directly to the speakers.

■ Microphone input can be routed via CueMix DSP to the effects processor for live outboard processing during recording. The resulting signal can be recorded into the computer either wet, dry or both (via the effects processor return or the direct mic input).

■ The ADAT optical connection provides 8 channels of 24-bit digital I/O to the digital mixer (or 4 channels at 96kHz). Any device connected to the Traveler can be routed to/from the mixer with no latency. Conversely, any mixer channel can be routed to any device connected to the Traveler with no latency.
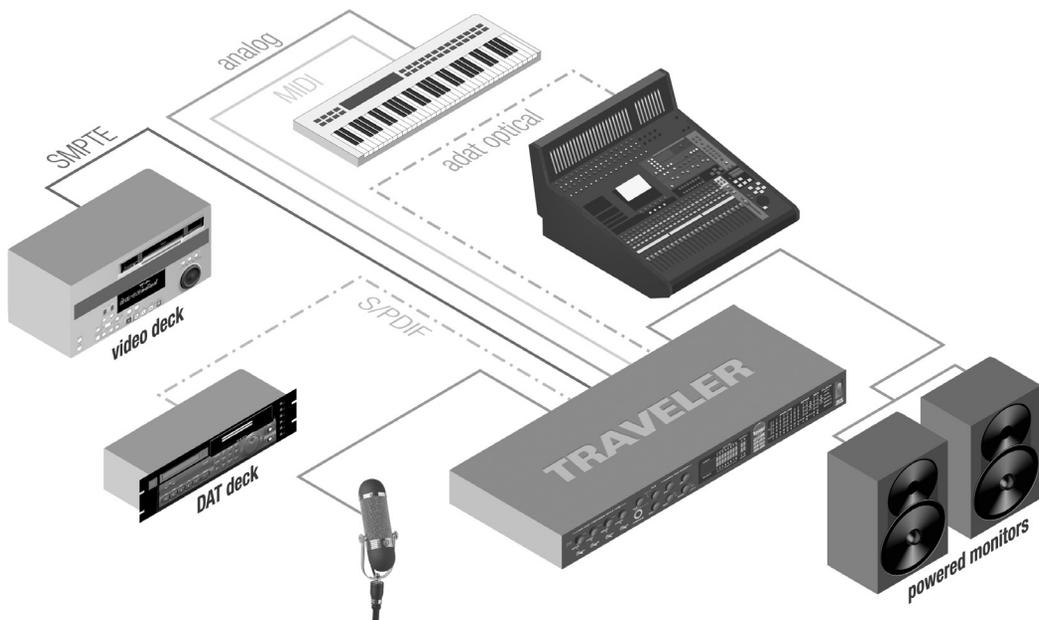
Figure 11-7: An example setup of a system that takes full advantage of CueMix DSP.

CHAPTER 12 FireWire SMPTE Console

OVERVIEW

The Traveler can resolve to SMPTE time code, without a dedicated synchronizer. It can also serve as a SMPTE time code generator.

The FireWire SMPTE Console software provides a complete set of tools to resolve to SMPTE, and to generate SMPTE for striping, regenerating or slaving other devices to the computer.

The Traveler provides a DSP-driven phase-lock engine with sophisticated filtering that provides fast lockup times and sub-frame accuracy.

Any analog input and output on the Traveler can be used for time code (LTC) input and output, respectively.

CLOCK/ADDRESS

The Clock/Address menu provides the same global Clock Source setting as in the MOTU FireWire Audio Console ("Clock Source" on page 44), but it includes additional information: each setting shows both the clock and the address (time code or sample location), separated by a forward slash (/). For example, the word clock setting (*Word Clock In / Internal*) shows the clock source (*Word Clock In*) followed by the address (*Internal*). Notice that only the SMPTE setting supports SMPTE time code as the reference for address. The digital clock sources do not support the Traveler's on-board SMPTE time code sync.

Resolving to SMPTE time code

To resolve the Traveler 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
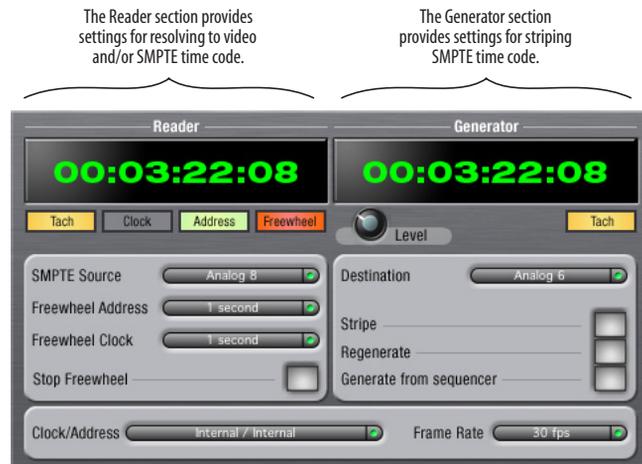
Figure 12-1: SMPTE Console gives you access to your Traveler's on-board SMPTE time code synchronization features.

address. For further details on the hardware connections involved, see "Syncing to SMPTE time code" on page 30.

Resolving to video

To resolve the Traveler to video, you need a synchronizer such as a MIDI Timepiece AV or a Digital Timepiece to feed word clock to the Traveler. In this scenario, choose the *Word Clock In* clock source setting in The MOTU FireWire Audio Console. The Traveler uses word clock for the time base and your host application resolves to MIDI Time Code generated from the synchronizer. For details, see "Syncing to video and/or SMPTE time code using a synchronizer" on page 31.

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 Traveler can auto-detect and switch to the incoming frame rate, except that it cannot distinguish between 30 fps and 29.97 fps time code. So if you are working with either of these rates, make sure you choose the correct rate from this menu. The Traveler 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 Traveler 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 Traveler has successfully achieved lockup to SMPTE time code and SMPTE frame locations are being read.

Clock

The Clock light glows continuously when the Traveler has successfully achieved lockup to an external time base, such as SMPTE time code or word clock.

Address

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

Freewheel

The Freewheel light illuminates when the Traveler 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 to which the SMPTE time code source is connected. This is the input that the Traveler "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 Traveler 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 Traveler to freewheel before it gives up and stops altogether.

The Traveler 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 Traveler 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 Traveler can freewheel past the drop-out and then resume lockup again as soon as it receives a stable, readable clock signal.

The Traveler 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 Traveler 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 setting for generating SMPTE time code.

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

Tach light
The Tach light blinks once per second when the Traveler is generating SMPTE time code.

Destination
In the *Destination* menu, choose the analog output from which SMPTE time code will be generated. This is the output that sends time code.

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.
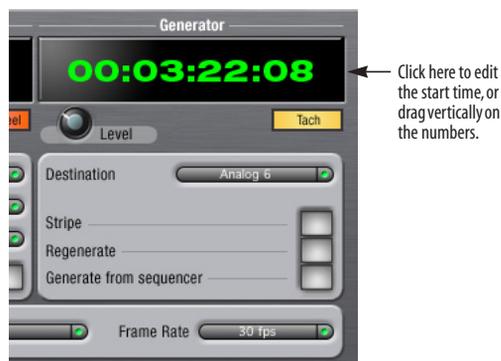
Figure 12-2: Setting the time code start time.

Regenerate
This option, when enabled, causes the generator to generate time code whenever the Traveler is receiving either SMPTE time code or ADAT Sync (via its ADAT Sync In port).

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.

CHAPTER 13   Troubleshooting

Things seems like they are working fine, but the Traveler 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 Traveler is not getting enough power. Check the power source for the Traveler. Make sure that the power connection meets the requirements outlined in "Power options" on page 20.

Sample accurate sync in AudioDesk and Digital Performer
When you first use sample accurate sync, be sure to go to the Receive Sync dialog in Digital Performer or AudioDesk and switch from "MTC" to "Sample-accurate."

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.*

No input on an ADAT tape deck
If you are having trouble recording on your ADAT tape deck from the Traveler, check the Digital input setting. After power cycling, tape decks often come up configured to record from their analog inputs. You won't be able to record from the Traveler to a tape deck until it is switched to digital input. Tip: configure this in ClockWorks or AudioDesk if you want your decks to come up in the right mode when power cycled.

Clicks and pops under word clock sync
Many problems result from incorrect word clocking. It is essential that all digital devices in the system be word locked. Consult "Making sync connections" on page 25 for detailed information on how to word clock your gear. Whenever there is any weird noise or distortion, suspect incorrect word lock.

Clicks and pops under ADAT Sync
Sometimes, the ADAT sync cable seems to be plugged into the Traveler, and it partially works. But it isn't really all the way in. This can cause clicks when slaved to ADAT 9-pin. Make sure the ADAT Sync cable plug is really seated firmly.

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 Traveler. If you encounter the same artifacts you may want try using another drive in your computer. Clicks and pops can also occur when the drive is severely fragmented, the disk drivers are outdated, or if you are using a SCSI accelerator that is not optimally configured for working with audio.

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

No optical inputs or outputs are available in host audio application
Check to make sure you have the desired optical inputs and/or outputs enabled in the MOTU FireWire Audio Console.

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 Traveler's hardware-based CueMix DSP monitoring feature. Please see chapter 10, "Reducing Monitoring Latency" (page 73).

Controlling monitoring latency
See chapter 10, "Reducing Monitoring Latency" (page 73).

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 complete the registration card included with your Traveler. When we receive your card, you'll be placed on our mailing list for free software updates and information about new products.

REPLACING DISKS

If your Traveler 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.

TECHNICAL SUPPORT

If you are unable, with your dealer's help, to solve problems you encounter with the Traveler 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

■ Tech support email: techsupport@motu.com

■ Web site: www.motu.com

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

■ The serial number of the Traveler system. This is printed on a sticker placed on the bottom of the Traveler rack 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 Traveler or AudioDesk with which you are having trouble.

■ The version or creation date of the system software you are using to run the Macintosh.

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