

# Getting Started With HD

**Version 5.3 for TDM on Macintosh and Windows**

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# chapter 1

## Introduction

Welcome to Pro Tools|HD. Pro Tools|HD-series audio cards and interfaces, together with Pro Tools software version 5.3 or higher, provide high-definition audio, high sample rates, and many powerful mixing and I/O capabilities to Pro Tools. This guide tells you how to install Pro Tools|HD hardware and Pro Tools version 5.3 software on Macintosh and Windows platforms. System and installation tests are provided, as well as a chapter covering the basics of working with Pro Tool (designed for anyone who is new to Pro Tools).

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### Pro Tools TDM Systems

Pro Tools 5.3 supports the following TDM (Time Division Multiplex) systems:

#### Pro Tools|HD 1, HD 2, and HD 3

A system includes:

- HD Core card.
- HD Process card; HD 2 and HD 3 come with one and two Process cards, respectively (HD 1 does not include a Process card).
- Pro Tools software.
- Digidesign audio interface (sold separately).
- DigiLink cable (to connect I/O to HD card).
- TDM FlexCable (to connect two HD cards); one TDM Flex Cable per each Process card (HD 1 does not include a TDM FlexCable).

Each system provides:

- For HD 1: up to 96 tracks at 44.1 or 48 kHz, 48 tracks at 88.2 or 96 kHz, or 12 tracks at 176.4 or 192 kHz, of recording and playback of 24-bit and 16-bit audio files.
- For HD 2 and HD 3: up to 128 tracks at 44.1 or 48 kHz, 64 tracks at 88.2 or 96 kHz, or 24 tracks at 176.4 or 192 kHz, of recording and playback of 24-bit and 16-bit audio files.

All systems provide:

- TDM digital mixing and DSP plug-in environment.
- Non-linear, random-access editing and mix automation.
- MIDI recording, playback and editing.

 *Pro Tools system performance depends on factors such as computer processor speed, amount of system memory, and hard drive performance. Refer to “System Requirements” on page 3.*

## Audio Interfaces

To record and play audio you must have one of the following Digidesign audio interfaces:

### 192 I/O Audio Interface

- ◆ Supports sample rates up to 192 kHz. At least one 192 I/O must be connected to your Pro Tools|HD system for 192 kHz recording, mixing, playback, and so on.
- ◆ Supports a multitude of analog and digital connections, including AES/EBU, S/PDIF, TDIF, and ADAT optical:
  - Digital I/O Card: eight channels, DB-25 (AES/EBU and TDIF), or one pair of Lightpipe (ADAT) connectors. Expandable up to 16 channels digital I/O with the addition of the 192 Digital expansion card.
  - Analog: eight channels, DB-25 (balanced) connectors, inputs selectable between +4 dBu or -10 dBV, outputs +4 dBu only. Expandable up to 16 analog inputs or 16 outputs using an optional 192 AD or 192 DA expansion card, respectively.
  - Digital: two channels, XLR (AES/EBU) connectors; two channels RCA (S/PDIF) connectors.
  - Optical: eight channels, a pair of Lightpipe (ADAT) connectors (selectable to two channels, S/PDIF).
  - Word Clock in and out receive or send 1x Word clock (configurable to 256x for Legacy support, see “Optional Legacy I/O Audio Interfaces” on page 2).

### 96 I/O Audio Interface

- ◆ Supports sample rates up to 96 kHz.
- ◆ Supports analog and digital connections, including AES/EBU, S/PDIF, and ADAT optical:
  - Analog: eight channels, 1/4” TRS (balanced or unbalanced) connectors, +4 dBu or -10 dBV.
  - Digital: two channels, XLR (AES/EBU) connectors; two channels, RCA (S/PDIF) connectors.
  - Optical: eight channels, one pair of Lightpipe (ADAT) connectors (selectable to two channels, S/PDIF).
  - Word Clock in and out receive or send 1x Word clock (configurable to 256x for Legacy support, see “Optional Legacy I/O Audio Interfaces” on page 2).

### Optional Legacy I/O Audio Interfaces

For additional input and output channels, older Digidesign audio interfaces (called Legacy I/Os) can be connected to the 192 I/O or 96 I/O. Legacy interfaces can only be used with 44.1 or 48 kHz sessions. These include:

#### 888|24 I/O

- ◆ Analog: eight channels, XLR (balanced or unbalanced) connectors, selectable between +4 dBu or -10 dBV.
- ◆ Digital: eight channels, XLR (AES/EBU) connectors; two channels, RCA (S/PDIF) connectors.

#### 882|20 I/O

- ◆ Analog: eight channels, 1/4” TRS (balanced or unbalanced) connectors, selectable between +4 dBu and -10 dBV.
- ◆ Digital: two channels, RCA (S/PDIF) connectors.

## 1622 I/O

- ◆ Analog: sixteen input channels and two output channels, 1/4" TRS (balanced or unbalanced) connectors. Inputs are selectable from +4 dBu to -10 dBV line levels and higher in 2 dB gain steps; outputs are selectable between +4 dBu or -10 dBV.
- ◆ Digital: two channels, RCA (S/PDIF) connectors.

## Digidesign 24-bit ADAT Bridge I/O and Original ADAT Bridge I/O

- ◆ Optical: sixteen channels, a pair of Lightpipe (ADAT) connectors.
- ◆ Analog output: two channels, 1/4" TRS (balanced) connectors, selectable between +4 dBu and -10 dBV.
- ◆ Digital: two channels, XLR (AES/EBU); two channels RCA (S/PDIF) connectors.

**⚠** *The original 888 I/O and 882 I/O interfaces are not supported with Pro Tools|HD.*

---

## System Requirements

The CPU, hard disk, monitoring, and MIDI requirements for Pro Tools differ depending on your system configuration and computer platform (Macintosh or Windows). The requirements for each configuration are listed below.

### Compatibility Information

Digidesign can only assure compatibility and provide support for hardware and software it has tested and approved. For a list of Digidesign-qualified computers, operating systems, and third-party devices, refer to the latest compatibility information on the Digidesign Web site:

[www.digidesign.com/compato/](http://www.digidesign.com/compato/)

## Computer Requirements

### Macintosh

- ◆ A Digidesign-qualified Power Macintosh computer with:
  - 1 unused PCI slot for Pro Tools|HD 1 systems (64-bit slot recommended).
  - 2 unused adjacent PCI slots for Pro Tools|HD 2 systems (64-bit slots recommended).
  - 3 unused adjacent PCI slots for Pro Tools|HD 3 systems (64-bit slots recommended).
  - For systems with an expansion chassis, the expansion chassis host card takes the place of the HD Core card, and all of the Pro Tools|HD cards are placed in the chassis.
  - A CD-ROM or equivalent optical drive.

**⚠** *The maximum number of HD-series cards supported in an expansion chassis is seven. However, there may be further restrictions depending on your operating system and the specific model of your expansion chassis. For more information, visit the Digidesign Web site at:*

[www.digidesign.com/compato/](http://www.digidesign.com/compato/)

- ◆ Apple System software version 9.1, 9.2, 9.2.1, or 9.2.2.
- At least 256 MB RAM (Pro Tools application "Preferred" memory allocation set to 134 MB).
- Additional RAM is required for:
  - High edit density sessions, extensive use of plug-ins and addition of options such as MachineControl, DigiTranslator, and AVoption|XL (384 MB recommended).

- Sessions larger than the default track size—384 MB minimum, 512 MB recommended (Pro Tools application “Preferred” memory allocation set to 225 MB). Default session sizes are 64 tracks at 44.1/48 kHz, 32 tracks at 88.2/96 kHz, and 12 tracks at 176/192 kHz.
  - Virtual memory is not supported.
- ◆ System Utility software (included with Pro Tools):
- OMS (Open Music System) software version 2.3.8, installed on the hard drive in the Opcode folder.
  - Apple QuickTime System Extension version 5.0.2, replaces any older version in the Extensions folder.
  - ATTO ExpressPro-Tools version 2.3.2 or later, installed on the hard drive in its own folder.
- ◆ A 17-inch or larger color monitor; black and white monitors are not supported.

## Windows

- ◆ A Digidesign-qualified, uniprocessor Pentium III or Pentium 4-based computer:
- 1 unused PCI slot for Pro Tools|HD systems (64-bit slot recommended).
  - 2 unused adjacent PCI slots for Pro Tools|HD 2 systems (64-bit slots recommended).
  - 3 unused adjacent PCI slots for Pro Tools|HD 3 systems (64-bit slots recommended).
  - For systems with an expansion chassis, the expansion chassis host card takes the place of the HD Core card, and all of the Pro Tools|HD cards are placed in the expansion chassis.
  - VIA Apollo Pro133 or Intel 440BX chipsets for Pentium III.

- Intel 860 or Intel 850 chipsets for Pentium 4.
  - Phoenix or Award BIOS.
  - A CD ROM or equivalent drive.
  - An AGP display card.
  - Windows XP Home Edition, or Windows 2000 Professional Edition with Service Pack 2 or higher.
- At least 256 MB RAM.
- Additional RAM is required for:
- High edit density sessions, extensive use of plug-ins and addition of options such as MachineControl, DigiTranslator, and AVoption|XL (384 MB recommended).
  - Sessions larger than the default track size—384 MB minimum, 512 MB recommended. Default session sizes are 64 tracks at 44.1/48 kHz, 32 tracks at 88.2/96 kHz, and 12 tracks at 176/192 kHz.
  - Virtual memory is not supported.
- ◆ A 17-inch or larger color monitor. Black and white monitors are not supported.

## Hard Drive Requirements

### Macintosh

For audio recording and storage, all Pro Tools TDM systems require one or more Digidesign-qualified drives.

For example, for 96-track, 24-bit, at 44.1 or 48 kHz performance, a TDM system must include at least three Digidesign-qualified SCSI hard drives attached to a qualified SCSI HBA (host bus adapter) card.

For 96-track sessions that have substantial edit densities (such as one edit every third of a second across 96 voices) or large amounts of cross-fades, up to four SCSI drives may be required, allocated with 24 tracks per drive and two drives per SCSI channel.

The following track count and sample rate examples require four hard drives:

- 128 tracks at 44.1 or 48 kHz
- 64 tracks at 88.2 or 96 kHz
- 24 tracks at 176.4 or 192 kHz

Dedicated internal IDE/ATA drives can provide 32-track, 24-bit, at 44.1 or 48 kHz performance to all TDM systems.

Refer to the Digidesign Web site for compatible hard drives and SCSI HBA cards:

[www.digidesign.com/compato/](http://www.digidesign.com/compato/)

## Windows

For audio recording and storage, all Pro Tools TDM systems require one or more Digidesign-qualified SCSI drives attached to a qualified PCI SCSI HBA card or qualified built-in SCSI HBA connector on the motherboard.



*Drives formatted as FAT32 are recommended for quicker disk priming time when starting a Pro Tools record operation.*

For best 96-track, 24-bit performance, use four hard drives, with audio files distributed among them.

IDE drives are also supported for use as audio and session drives on Windows-based Pro Tools systems (with limited track counts). 24-bit sessions are compatible with IDE drives.



*For maximum performance, Digidesign recommends the use of SCSI hard drives. IDE hard drives provide limited track count performance and are not supported when an Expansion Chassis is used for expanded Pro Tools systems. For more information regarding Expansion Chassis operating procedures, see the Pro Tools Expanded Systems Guide.*

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The following track count and sample rate examples require four hard drives:

- 128 tracks at 44.1 or 48 kHz
- 64 tracks at 88.2 or 96 kHz
- 24 tracks at 176.4 or 192 kHz

Refer to the Digidesign Web site for compatible hard drives and SCSI HBA cards:

[www.digidesign.com/](http://www.digidesign.com/)

## MIDI Requirements

Both USB and serial MIDI interfaces work effectively with Pro Tools.

PCI-based serial expanders do not work with serial MIDI interfaces on Macintosh systems. Serial MIDI interfaces require a qualified modem-to-serial port adapter. Refer to the Digidesign compatibility page for supported adapters:

[www.digidesign.com/compato/](http://www.digidesign.com/compato/)

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## Digidesign Registration

Make sure to complete and return the registration card included with your Pro Tools TDM system. Registered users are entitled to one year of free technical support, and will receive periodic software updates and upgrade notices.

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## About the Pro Tools Guides

PDF versions of the Pro Tools guides are installed automatically with Pro Tools, and can be easily accessed from the Help menu in Pro Tools. To read the guide online, or print it, you must install *Acrobat Reader* (included on the Pro Tools Installer CD).

## Conventions Used in This Guide

Digidesign guides use the following conventions to indicate menu choices and key commands:

Convention	Action
File > Save Session	Choose Save Session from the File menu
Control+N	While pressing the Control key, press the N key
Option-click	While pressing the Option key, click the mouse button
Right-click (Windows)	Click with the right mouse button

The following symbols are used to highlight important information:

 *User Tips are helpful hints for getting the most from your system.*

 *Important Notices include information that could affect your data or the performance of your system.*

 *Cross References point to related sections in other Digidesign guides.*

## **Choose and Select**

The words “choose” and “select” are often interchangeable in conversational english. In this guide, however, there is a distinction between the two terms.

**Select** When the guide instructs you to *select* something, it stays selected. This is the case with dialog box options and menu items that enable or disable an option.

**Choose** When the guide instructs you to *choose* something, a one-time action is performed. This is the case with most menu commands; they perform their chosen action only once.



## chapter 2

# Macintosh Configuration

To configure your Pro Tools|HD system for Macintosh, you will need to install Pro Tools hardware and software, verify your TDM system, then launch Pro Tools.

## Installing Pro Tools Hardware

### Pro Tools TDM Cards

The number of Pro Tools TDM cards will differ depending on your system configuration. Card components for each configuration are listed below.

 *If you are using an Expansion Chassis to add additional cards to your system, refer to the Expanded Systems Guide included with your Pro Tools system.*

### Pro Tools|HD Hardware

Pro Tools|HD hardware comes in three configurations:

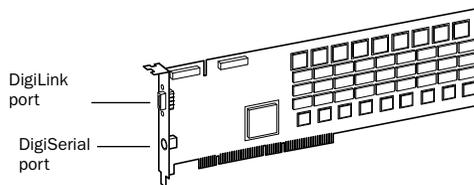
**Pro Tools|HD 1** Includes a single HD Core card.

**Pro Tools|HD 2** Includes an HD Core card, an HD Process card, and a TDM FlexCable for connecting the HD Core to the HD Process card.

**Pro Tools|HD 3** Includes an HD Core card, two HD Process cards, and two TDM FlexCables (one for connecting the HD Core to the first HD Process card, and the other for connecting the first HD Process card to the other HD Process card).

### The HD Core Card

The HD Core card provides up to 96 tracks of direct-to-disk recording and playback, and 32 channels of I/O to your Pro Tools HD-series system, as well as DSP power for processing and mixing. The HD Core card supports up to 24-bit and up to 192 kHz sessions.



**HD Core card**

This card includes a single DigiLink port for connecting up to 32 channels of I/O.

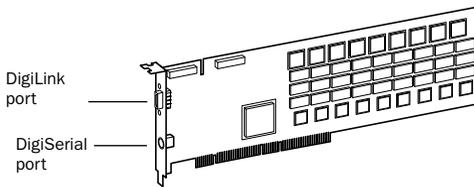
The DigiSerial port is for connecting a Digidesign SYNC I/O. This connector is an 8-pin mini-DIN.

**⚠** *The DigiSerial port on HD Core cards does not support MachineControl connections. Use the Digidesign SYNC I/O for Pro Tools MachineControl 9-pin. A serial port (not a DigiSerial port) is required for MC Remote mode (only). For a list of qualified serial port adapters (such as USB), see:*

*[www.digidesign.com/compato](http://www.digidesign.com/compato)*

### The HD Process Card

The HD Process card provides DSP power for mixing, processing, and DSP software such as the DigiRack plug-ins included with Pro Tools. It also provides a DigiLink port for connecting up to 32 channels of I/O.



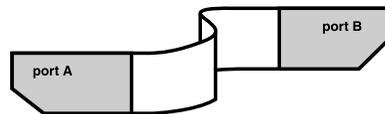
**HD Process card**

The DigiSerial port on an HD Process card does not offer any functionality.

### The TDM FlexCable

The TDM FlexCable is used to connect a pair of cards in your Pro Tools system so they can share data along the TDM bus. Additional FlexCables are required to connect additional cards. One FlexCable comes with each HD Process card.

**⚠** *The TDM FlexCable is actually a flexible printed circuit board with delicate traces. Do not overbend the cable, twist it, or otherwise pinch it. Doing so may cause unpredictable behavior in Pro Tools as well as harm to your system.*



**TDM FlexCable, shown properly bent**

### Installing the Pro Tools|HD Cards

This section shows how to install Pro Tools HD cards into a Macintosh CPU. If you're installing cards into an expansion chassis, see the *Expanded Systems Guide*.

#### To install the Pro Tools cards:

- 1 Turn off your computer and any peripherals. Make sure the equipment is properly grounded.
- 2 Disconnect all cables attached to the CPU (such as hard drives, monitor(s), USB and firewire connections) except for power.
- 3 Open the computer case.

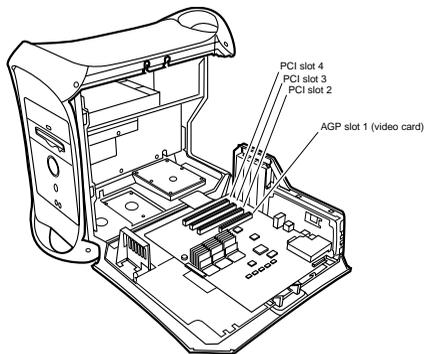
**⚠** *Before handling any card, discharge any static electricity that may be on your clothes or body by touching a grounded metal surface, such as the power supply case inside your computer.*

4 Remove the metal access port cover behind the PCI slot you want to use by removing the screw and sliding the cover out from the access port. Keep the screws in a safe place.

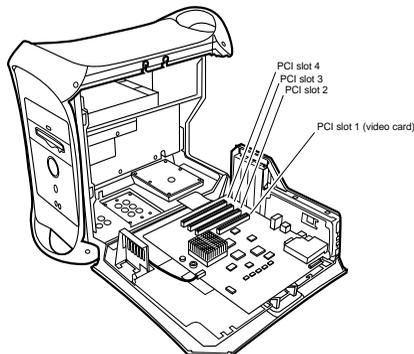
5 Install the HD Core card into the lowest numbered slot inside the CPU as shown in the following figures. The HD Core card will always be installed in the lowest numbered PCI slot.

Make sure the first card is an HD Core card. HD Process cards cannot occupy the lowest slot.

The following figures show the lowest slot for Power Macintosh computers supported by Pro Tools.



**G4 Dual Processor**



**G4 Processor**

6 Install HD Process cards in the following slots.

7 If installing a SCSI HBA card, install it in the highest numbered remaining slot.

8 If installing other cards, verify that your cards are installed in the following order, starting with the lowest numeric slot.

💡 *The guidelines below may include optional cards not present in your system.*

For each Pro Tools TDM system, your cards should be installed in the following order, starting with the lowest numeric slot.

- HD Core cards
- HD Process cards
- SCSI host bus adapter (HBA)
- Video capture cards
- Display card for your computer monitor

⚠ *Do not use SampleCell hardware cards in a Pro Tools|HD system. Doing so can result in system crashes. Instead, please use Soft SampleCell which has been specifically engineered to support 24-bit depths and higher sampling rates.*

9 If installing an HD Core system (and not a Pro Tools|HD 2 or HD 3 system), complete the following:

- Secure the card in place with the slot access port screw you removed earlier.
- Close the computer case.
- Skip the following steps and continue with “Connecting Audio Interfaces” on page 13.

10 If installing a Pro Tools|HD 2, HD 3, or an Expanded HD 1 system, connect the HD cards with TDM FlexCables (see “Connecting Multiple Cards with the TDM FlexCable” on page 12).

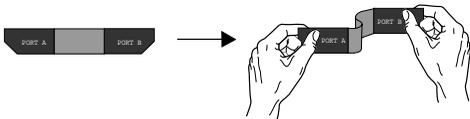
## Connecting Multiple Cards with the TDM FlexCable

Each HD card has two ports along the top of the card, labelled Port A and Port B.

When installing multiple HD cards, data communication across HD cards is achieved by using a TDM FlexCable to connect Port B of the lead card to Port A of the next card. The FlexCable has two connectors, also labeled Port A and Port B, to ensure proper connection.

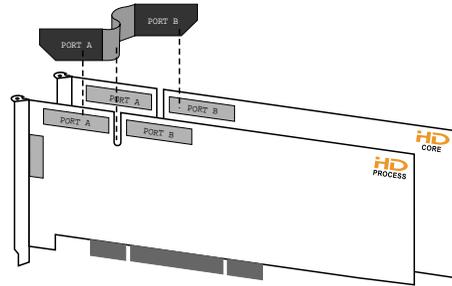
### To connect HD cards with the TDM FlexCable:

- 1 Make sure you have secured cards with the slot access port screws you removed earlier.
- 2 The FlexCable needs to be shaped before installing it on your HD cards. To do this, grasp it with both hands, then move the Port A portion of the cable straight towards you and inwards, as shown below. Do not bend the cable more than you need to, as you may damage the traces in the cable.



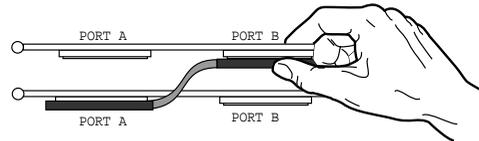
### Preparing TDM FlexCable for installation

- 3 Slide the FlexCable into the notch of the *second* card, so that the Port B connector of the FlexCable can be aligned with Port B of the lead card; and the Port A connector of the FlexCable can be aligned with Port A of the second card (as shown in the following diagram).



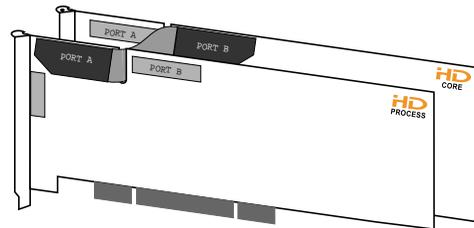
Inserting TDM FlexCable

- 4 Connect the Port A connector of the FlexCable to Port A on the second card. Push down gently but firmly until the cable is fully connected to the card. Next, attach the other end of the FlexCable (labeled Port B) to Port B on the lead card.



Top view of two HD cards connected with TDM FlexCable

- 5 Verify the connection, as shown below.



Side view of two HD cards connected with TDM FlexCable

- 6 For systems with more than two cards, each additional card must be connected to its preceding card. Use FlexCables to connect cards together, as described above, until all cards are connected. Each subsequent HD Process card will include a FlexCable.

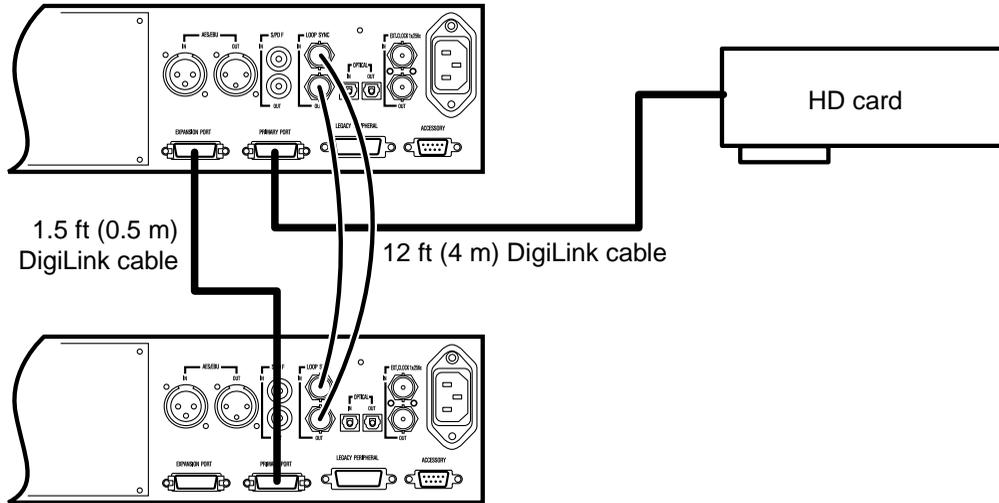


Figure 1. Two 96 I/Os, 32-channel

## Connecting Audio Interfaces

Each interface supplies up to 16 channels of input and output to your system.

Pro Tools|HD supports up to a maximum of eight 192 I/Os or 96 I/Os.

Each HD card supports up to 32 channels; to get a full 32 channels of I/O from one card, you can connect, or daisy chain, a second 16-channel HD I/O to the first HD I/O that is connected directly to the HD card (Figure 1).

**⚠** *HD audio interfaces need room at their sides to maintain proper air flow for cooling. It is important to leave room for air intake and ventilation on the sides of the unit. Do not block the sides of the unit or disconnect the internal fan. If the units are racked up in a case, remove all lids and/or doors before operating the system. Failure to do so can result in the units overheating very quickly, which can permanently damage sensitive components.*

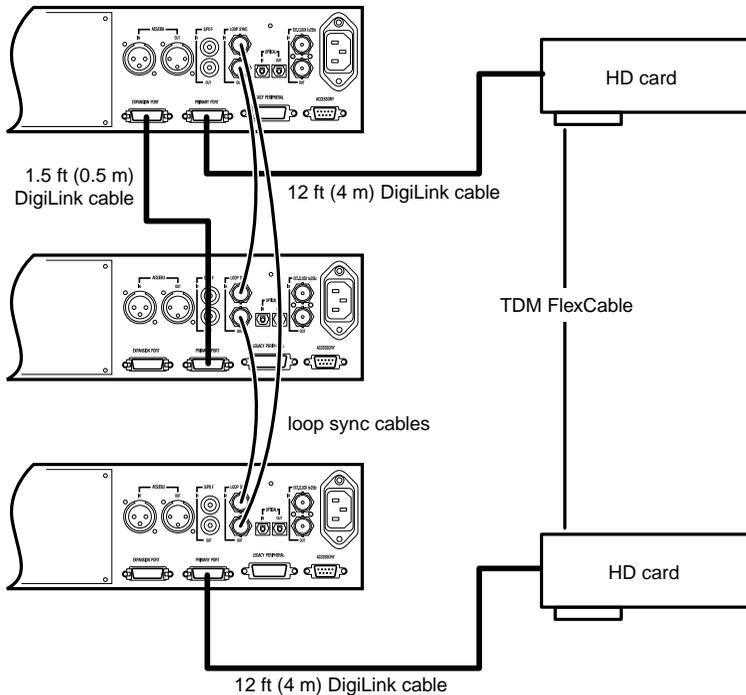
In addition, previous generations of audio interfaces can be connected to the 192 I/O or 96 I/O. These include: 888|24 I/O, 882|20 I/O, 1622 I/O, 24-bit ADAT Bridge I/O, and the original ADAT Bridge I/O. The original 888 I/O and 882 I/O interfaces are not supported with Pro Tools|HD.

### To connect the HD audio interfaces:

**1** If using a single 192 I/O or 96 I/O, connect it to the HD Core card with the provided DigiLink cable that came in the HD Core packaging. You must attach at least one 192 I/O or 96 I/O to your system in order for Pro Tools to boot.

**⚠** *If you have at least one 192 I/O in your system configuration, it must be connected to the HD Core card as the “primary” interface.*

**2** Connect additional HD audio interfaces to subsequent Digidesign audio cards or daisy chain your I/Os (by connecting a secondary I/O to the primary I/O).



**Figure 2. Three 96 I/Os, 48-channel**

If you are connecting both 192 and 96 I/O audio interfaces to your system, connect the 192 I/O to your HD Core card, followed by any additional 192 I/O interfaces connected to the next highest-priority cards. Then connect the 96 I/O interfaces to subsequent cards.

You can also connect a single HD I/O to each HD card in your system using the provided DigiLink cables. There is no advantage to this configuration over daisy chaining I/Os.

**3** If using two or more HD audio interfaces, connect the Loop Sync Out of each interface to the Loop Sync In of the next interface with the BNC cables included in your HD I/O packaging. Then, connect the Loop Sync Out of the last interface to the Loop Sync In of the primary interface.

**4** If connecting a Digidesign Legacy audio interface (such as an 888|24 I/O, 882|20 I/O, or 1622 I/O, or a Digidesign ADAT Bridge I/O), continue with “Connecting an Additional 16 Channels of Audio to Legacy I/Os” on page 15.

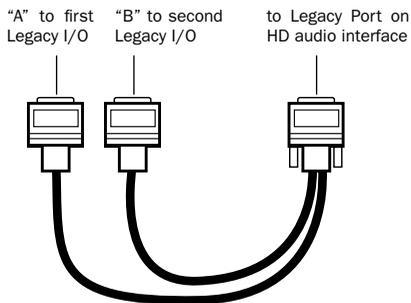
## Connecting an Additional 16 Channels of Audio to Legacy I/Os

Each 192 I/O and 96 I/O can support 16 channels of audio to and from Digidesign Legacy peripherals. These include: 888|24 I/O, 882|20 I/O, 1622 I/O, 24-bit ADAT Bridge I/O, and the original ADAT Bridge I/O. The original 888 I/O and 882 I/O interfaces are not supported with Pro Tools|HD.

### To connect Digidesign Legacy I/Os:

**1** Connect the “MIX card” end of the peripheral cable that came with your Legacy I/O (60-pin side) to the Legacy Port on the primary HD audio interface. Connect the other end to the Computer Port on the Legacy I/O. Connect additional Legacy I/Os, if any, in the same manner, to HD audio interfaces connected directly to HD Process cards.

If using a Y cable or 16-channel peripheral cable adapter, connect this to the Legacy port first, then connect the audio interface peripheral cables to Port A and Port B of the Y cable.



Optional 16-channel peripheral cable adapter

**2** In order to properly clock the Legacy device, you will need to connect the Ext. Clock output port on the HD I/O to the Slave Clock IN on the Legacy peripheral. The Legacy peripheral will switch to Slave mode once the proper clock is outputting from the HD I/O. Always use the Ext. Clock Out port of the same I/O to which the Legacy peripheral is attached.

If using multiple MIX-series audio interfaces, connect the Slave Clock Out of the first interface to the Slave Clock In of the second interface with the provided BNC cable. If using three 888|24 or other MIX-series I/Os, the third 888|24 would get its 256x clock from the second HD I/O to which the Legacy peripheral is attached.

**⚠** Before you turn on and configure your Legacy I/O, turn down the volume of output devices. Very loud digital noise may be emitted before the Legacy I/O is initialized.

---

## Installing Pro Tools Software

The complete Pro Tools software installation process includes:

- Preparing your Apple System software for Pro Tools
- Installing Pro Tools software
- Installing OMS

After software installation is completed, the first time you launch Pro Tools you will be prompted to enter your Pro Tools authorization code and configure hardware. Instructions for this begin in “Checking Your TDM System and Launching Pro Tools” on page 18.

 *If you haven't already installed Pro Tools hardware, do so now. See “Installing Pro Tools Hardware” on page 9 for instructions.*

## Apple System Software Settings

To ensure optimum performance with Pro Tools, configure the Apple System software with the following settings for OS9.1, 9.2, 9.2.1, or 9.2.2.

### To configure the Apple System software for optimum Pro Tools use:

- 1** In the Memory Control Panel do the following:
  - Set the Disk Cache to a Custom Setting of 512 K.
  - Set Virtual Memory to Off.
  - Set the Ram Disk to Off.
- 2** In the Energy Saver Control Panel, set the “inactive” time to Never.
- 3** In the Appearance Control Panel do the following:

- Click the Fonts tab and set the Large System Font to Chicago. In addition, deselect “Smooth all fonts on screen.”
  - Click the Sound tab and select None from the Sound Track pop-up menu.
- 4** In the Extensions Manager Control Panel do the following:
    - Choose Mac OS 9.1 Base (or Mac OS 9.2 Base, Mac OS 9.2.1, or Mac OS 9.2.2) from the Selected Set pop-up menu. This is done to avoid any potential extensions conflicts.
    - Click Restart to restart your computer.

## Installing Pro Tools Software

### To install Pro Tools software:

- 1** Locate the Pro Tools 5.3 Installer CD for Macintosh and place it in your CD-ROM, or equivalent.
- 2** Locate and double-click the file named “Install Pro Tools.”
- 3** Select the hard drive on which to install Pro Tools from the Install Location pop-up menu. For maximum reliability, install Pro Tools on your startup drive.
- 4** Select the Pro Tools 5.3 Installer.
- 5** Several optional items are listed directly below the main installation choices. To install any of these items, select them from the list.

**Digidesign Control Panel** Add this item if you want to use your Digidesign hardware with Sound Manager-compatible applications.

**Machine Control Guide** Install this document if you also use Digidesign’s MachineControl option for Pro Tools.

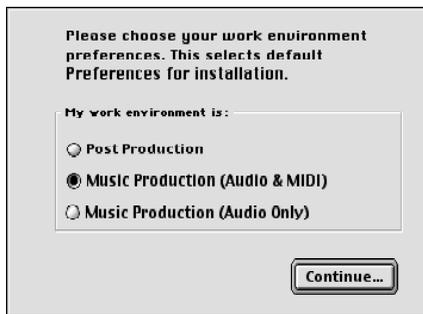
**SYNC I/O Setup** Add this to your installation if you own a Digidesign SYNC I/O. SYNC I/O Setup lets you update SYNC I/O firmware and configure the SYNC I/O remotely. TDM systems need only install SYNC I/O Setup if access to the complete set of SYNC I/O features is required. SYNC I/O Setup requires a serial port (either Stealth or Keyspan USB adapter). Refer to the *SYNC I/O Guide* for details.

**OMF Utilities** Add this to your installation if you are an OMF (Open Media Framework) user.

6 After selecting from the above options, click Install.

Preference settings can be customized at any time in Pro Tools. See the *Pro Tools Reference Guide* for more information about Preferences.

7 Select a “work environment.” This is an initial set of Product Name Preferences. These Preference “sets” have been pre-configured to include some of the more popular settings for post production, audio, and audio with MIDI. After selecting a setting, Click Continue.



Selecting a Pro Tools Preference

 Preference settings can be customized at any time in Pro Tools. See the *Pro Tools Reference Guide* for more information about Preferences.

8 Select whether to install the Surround Mixer plug-in. This plug-in is required for mixing, mastering, and monitoring in surround. For Surround systems, select Yes – Monitoring Pro Tools Film Format if your monitoring is configured for Film Format, or select Yes – Monitoring in ProControl (DTS Format) if using a ProControl dedicated controller. Select No – Stereo mixing only, if your monitoring is configured for Stereo. After making a selection, click Continue.



Selecting a Pro Tools Preference

9 When installation is complete, click Restart (to restart your computer).

10 After restarting, install OMS.

## Installing OMS

To use MIDI with Pro Tools, you must first install and configure the Open Music System (OMS).

 Even if you do not plan on using MIDI, OMS must be installed. Pro Tools will not launch without OMS.

OMS, which is included on the Pro Tools Installer CD, has the following capabilities:

- Keeps track of which MIDI devices you are using, how they are connected, and which patches they are using.
- Enables MIDI hardware to communicate with your music applications.
- Provides timing services and inter-application communication.

OMS stores a description of your MIDI studio in *Studio Setup* documents, which are edited in the *OMS Setup* application. Once OMS is configured, your music applications know which MIDI devices you are using by referencing the current Studio Setup document.

The following section provides basic instructions for installing OMS. For OMS configuration steps, see “Configuring a New Studio Setup in OMS” on page 87. For additional information, refer to the online *OMS Guide* installed with Pro Tools.

## Installing OMS

The OMS Installer is located on your Pro Tools Installer CD.

### To install OMS:

- 1 Insert the Pro Tools Installer CD in your CD-ROM drive.
- 2 Open the OMS Installer folder and double-click the Installer.
- 3 At the Install window, select the Easy Install option, and set the Install Location to your Start-up hard drive. Click Install.
- 4 Follow the on-screen installation instructions.
- 5 When the installation is complete, restart your Macintosh.

---

## Checking Your TDM System and Launching Pro Tools

We strongly urge you to launch the DigiTest diagnostics application before your initial launch to Pro Tools. Doing so ensures that you have all cards recognized in the system, in the proper order, and with valid TDM FlexCable connections.

DigiTest is located in the Digidesign Utilities folder (see “Running DigiTest” on page 19).

When DigiTest has completed, restart your computer, then launch Pro Tools for the first time.



*You should also run DigiTest after making any changes to your hardware setup (such as adding or removing cards, adding or removing audio interfaces, adding or removing synchronization cables, and so on) to verify that your system is correctly configured and functioning properly.*

## Starting Up Your System

Whenever you start your system, you must turn on all of your system components in a specific order.

### Start your Pro Tools System in this order:

- 1 Make sure all your equipment (including your CPU) is off.
- 2 For TDM systems with an expansion chassis, turn on the expansion chassis.
- 3 Turn on external hard drives, if any. Wait approximately ten seconds for them to spin up to speed.
- 4 Lower the volume of all output devices, then turn on your Pro Tools audio interfaces.
- 5 Turn on any MIDI interfaces and devices, or synchronization peripherals.

**6** Turn on your Pro Tools audio interfaces (such as 96 I/O). On power up, the status LEDs will flash. Wait at least fifteen seconds for the audio interface to initialize, and the status LEDs to stop blinking and stay lit.

If you launch Pro Tools without turning on your audio interfaces, you will be prompted to turn them on. Allow fifteen seconds for audio interfaces to power-up and the status LEDs to stop blinking and stay lit, before clicking OK.

**7** Turn on your computer.

## Running DigiTest

Run the DigiTest diagnostics application to identify TDM cards and verify that they are correctly installed and working.

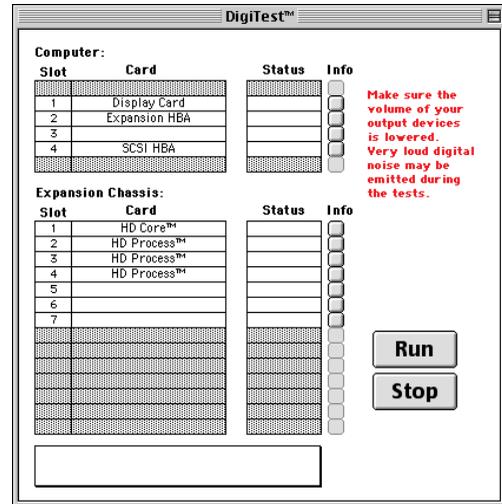
 *DigiTest is included on the Pro Tools Installer CD and installed with Pro Tools. DigiTest resides in the Digidesign Utilities folder located on your hard drive, under Digidesign/Pro Tools/Pro Tools Utilities.*

 *Before you run DigiTest, lower the volume of your monitoring system and all output devices. Additionally, be sure to remove your headphones. Very loud digital noise may be emitted during the test.*

### To run DigiTest:

**1** From the Digidesign Utilities folder, double-click the DigiTest application program. DigiTest opens and lists the supported cards it finds in your system in their corresponding slot location.

If you have a large amount of cards and/or connected HD I/Os, it may take awhile for the main DigiTest screen to appear. This is due to the test scanning for all cards and I/Os connected to the system.



**DigiTest window**

If a supported card is installed and not listed, check card seating and TDM FlexCable connection. Close DigiTest, power down your system, and reinstall the cards (see “Installing the Pro Tool|HD Cards” on page 10). After power up, begin DigiTest again.

**2** From the SlotArrangement menu, select your computer. The number of computer card slots updates in the main window to reflect your computer model.

When you select a computer type, a second window also opens and displays the lowest slot in your computer.

**3** If using an expansion chassis, select it from the SlotArrangement menu. The number of Expansion Chassis card slots updates in the main window to reflect your chassis type.

4 From the DigiTest window, click Run.

 *If you haven't done so already, turn down your speakers before running DigiTest. Additionally, be sure to remove your headphones.*

DigiTest begins by checking the arrangement of your cards. If cards are installed in the correct order, DigiTest will automatically continue with the next step and check card functionality.

If cards are not installed in the proper order, DigiTest will stop, inform you that the system is misconfigured, and display error codes in the status box of each card identified as being misconfigured.

The more cards in your system, the longer the test will take. Furthermore, the more I/Os connected to the system, the longer it takes.

For descriptions of error codes, refer to Appendix B, “DigiTest Error Codes.” For test details, click the Info button to the right of the reported error, then click Failures in the pop-up window and change Failures to Detailed.

Refer to the Digidesign Web site for compatibility information:

[www.digidesign.com/compto/](http://www.digidesign.com/compto/)

Make sure you quit and power down your system, before reconfiguring your cards.

5 After checking card arrangement, DigiTest checks card functionality. The Status box for each tested card will indicate Passed or Failed.

 *DigiTest only reports valid test results for slots which contain Digidesign cards.*

6 If all the Digidesign cards pass, quit DigiTest and restart your computer.

– or –

If any cards fail, you can review test details by clicking the Info button for the corresponding card and slot. Following review, you will need to quit DigiTest, power down your system, and re-install your cards. Verify proper card seating and TDM FlexCable cable connection. (See “Installing Pro Tools Hardware” on page 9.)

If a card continues to fail DigiTest, contact Digidesign Technical Support.

tel: 650-731-6100

tel: 650-856-4275

## Launching Pro Tools the First Time

### Validate Pro Tools Software

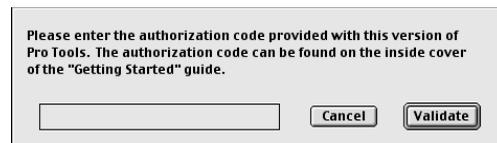
When launching Pro Tools the first time, you are prompted to enter an authorization code to validate your software.

#### To validate Pro Tools software:

1 Double-click the Pro Tools application in the Pro Tools folder inside the Digidesign folder.

2 If OMS was not previously configured, you will be prompted to configure a New Studio Setup. For specific steps, see Appendix C, “Configuring OMS.”

3 Enter the authorization code in the dialog when prompted, making sure to observe any spaces, then click Validate.



Please enter the authorization code provided with this version of Pro Tools. The authorization code can be found on the inside cover of the “Getting Started” guide.

Authorization code validation for Pro Tools

The authorization code is located on the inside cover of this guide. Again, be sure to include any spaces in the authorization code.

Congratulations! Pro Tools is launched. When Pro Tools is launched for the first time only the menus will appear. To see Edit and Mix windows, a new session must be created. But before you begin working with Pro Tools, you should get acquainted with Pro Tools system settings, described in the following section.

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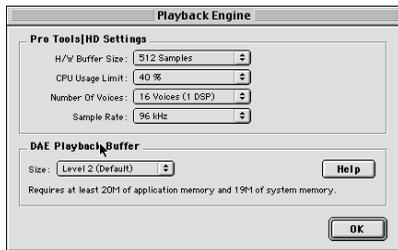
## Configuring Pro Tools

### Configuring the Playback Engine

The Playback Engine sets the voice count (and voiceable tracks) for your system, and its sessions. Additionally, it lets you customize various System Usage parameters (such as buffers and CPU Usage).

#### To configure the Playback Engine:

- 1 Choose Setups > Playback Engine.



*Playback Engine dialog for Pro Tools TDM system*

- 2 From the H/W Buffer Size pop-up, select the audio buffer size, in samples, for host processing tasks such as Real-Time AudioSuite (RTAS) plug-in processing. The default setting is 512 samples. Select a higher setting if you need more buffer time for RTAS, HTDM, and Direct Connect applications.

- 3 From the CPU Usage Limit pop-up, select the maximum percentage of CPU resources to allocate to host processing tasks. The default setting is 40%. Select a higher setting if you need more buffer time for RTAS, HTDM, and Direct Connect applications.

**▲** *Increasing the CPU Usage Limit may slow down screen responses.*

- 4 From the Number of Voices pop-up, select the amount of voices (and voiceable tracks), for your sessions. The default number of voices on a Pro Tools|HD 1 system is 48 voices (at the default 48 kHz sample rate).

**▲** *Changing the number of voices, along with sample rate, affects DSP usage and your system performance. Please read the following carefully.*

Depending on the current sample rate, and the number of HD Core and Process cards in your system, you will have different choices available. For example, each HD card allows you to use one or two of its DSPs per card for voicing.

Most DSP amounts support three levels of voice numbers:

- Select higher voice numbers when your cards are in your machine, and you aren't running extra PCI cards which may conflict with Digidesign cards. You should also select higher voice numbers when using a chassis to run higher track counts at higher sample rates (such as 64 tracks at 96 kHz) and you want more voices (such as 16 voices per DSP at 96 kHz).
- Select medium voice numbers when running cards in an expansion chassis, or when using other PCI cards along with Digidesign cards.

- Select minimum voice numbers if you are running high bandwidth PCI cards (such as video capture).

For voice limits on different HD systems, refer to the *Pro Tools Reference Guide*.

**5** From the Sample Rate pop-up, select the session sample rate. This choice will not be available if a session is open.

 *Session sample rate can always be set in the Create a New Session dialog. (See the Pro Tools Reference Guide.)*

**6** Set DAE Playback Buffer Size.

The DAE Playback Buffer Size determines the amount of memory allocated within DAE to manage disk buffers, which affects system performance.

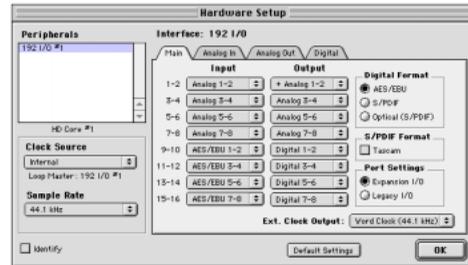
Though DAE automatically selects the optimal playback buffer size for your system, you may want to adjust this parameter to modify your system's performance:

- ◆ Allocating a larger buffer size can sometimes allow for a higher density of edits. This can be useful if you experience system performance problems in sessions with a large number of edits in rapid succession. However, choosing a larger buffer size can cause a time lag to occur before playback or recording begins. It can also cause a time lag to occur when you are editing during playback.
- ◆ Allocating a smaller buffer size can sometimes improve playback/recording initiation speed. This can be useful if you are experiencing a time lag when you initiate playback/recording. However, choosing a smaller buffer size can make it difficult for slower hard drives to play or record tracks reliably.

**7** Click OK, when finished.

## Configuring Hardware Setup (Audio Interfaces)

Pro Tools HD peripherals support 16 channels of simultaneous I/O. The peripherals support multiple formats (such as analog, AES/EBU, TDIF, and so on).



*Hardware Setup dialog for 192 I/O, Main page*

The Main page of the Hardware Setup dialog is where you define what physical ports are routed to Pro Tools input and output ports. Think of this window as a patchbay that allows you to route any of the physical inputs or outputs on your HD I/Os to channel assignments in the Pro Tools mixer.

The Main page also provides controls for session Sample Rate, clock settings, and defining whether Expansion Port or Legacy Port peripherals are active.

Additional pages are available to configure other parameters on each I/O (such as setting operating levels).

You must select the peripheral, then set the parameters for that interface—repeating this for each interface in your system.

 *Use the Up and Down Arrow keys to scroll through each peripheral.*

**To validate audio interfaces with the Identify button:**

- 1 Choose Setups > Hardware in Pro Tools.
- 2 From the Peripherals list, select the Digidesign audio interface connected to the first card in your HD system. This will be the interface at the top of the list.
- 3 Make sure Main page tab is chosen.
- 4 Use the Identify button to verify that your audio interface has been properly identified. Click on the Identify button, located in the lower left corner of the Hardware Setup dialog, to illuminate all the LEDs on the front panel of the audio interface. If the LEDs do not light, make sure the interface is selected in the Peripherals list, and that it is powered on. If the LEDs continue to not light, review hardware installation and run DigiTest again.
- 5 Repeat the above steps for additional audio interfaces.

 *Legacy I/Os must be initialized in the Peripherals list before they can be validated with the Identify button. For initialization steps, see “Configuring Legacy I/Os” on page 26.*

**To configure audio interfaces:**

- 1 Choose Setups > Hardware in Pro Tools.
- 2 From the Peripherals list, select the Digidesign audio interface connected to the first card in your HD system. This will be the interface at the top of the list.
- 3 Make sure Main page tab is chosen.

4 To select a different digital I/O on your audio interface (enclosure), click on one of the format buttons, under Digital Format. Choices include: AES/EBU, S/PDIF, and Optical (S/PDIF). Selecting Optical (S/PDIF) resets the physical Optical I/O port (which is, by default, eight channels of ADAT I/O) to two channels of S/PDIF I/O. For more information about HD enclosure and card ports, refer to the guide for your I/O.

5 From the Clock Source pop-up, select the appropriate clock source for the system. In most cases, you will use Internal. The other choices are for resolving Pro Tools to external clock sources. Depending on your audio interface, Clock Source options can include: AES/EBU [Encl], S/PDIF, Optical [Encl], AES/EBU 1–8, TDIF, ADAT, and Word clock (optional word clock rates are available at higher frequencies). For more information, see the *Pro Tools Reference Guide* or the guide for your audio interface.

6 From the Ext. Clock Output, select the appropriate clock source to feed to devices attached to your I/O.



*If the Legacy Port is enabled (as opposed to the Expansion Port) then the Ext. Clock Output automatically switches to Slave256x. To reset the Ext. Clock Output, the Port Settings button must be set back to Expansion and the Legacy I/O must be set to No Interface. (To set a Legacy I/O to No Interface, select its name in the Peripherals list, then click on No Interface in the Interface pop-up menu.)*

7 For S/PDIF compatibility with Tascam DA30 DAT recorders, click on the Tascam button, under S/PDIF Format.

**8** From the input and output channel pop-ups, select the physical ports (such as Analog 1–2, Optical 1–2, and so on), that will be routed to the Pro Tools input and output ports (such as Ch 1–2, 3–4, and so on).

Refer to your peripheral’s guide for sample rate, and other restrictions. For example, the Optical 1–8 channels (on the enclosure) will not be available for session sample rates of 88.2 kHz or higher (whereas the ports on the 192 I/O Digital I/O card will be available).

To differentiate inputs and outputs of the same format, they are labeled differently in the input and output channel pop-ups. For example, the AES/EBU inputs and outputs that come standard in the 192 I/O enclosure are identified as AES/EBU [Enc]; the AES/EBU inputs and outputs that come on the factory-installed Digital port are listed (in pairs) as AES/EBU 1–2, AES/EBU 3–4, and so on. For 192 I/Os equipped with the optional Digital I/O Card, the additional AES/EBU I/O ports on the optional card are labelled AES/EBU 9–10, AES/EBU 11–12, and so on.

**9** Configure controls specific to your HD I/O. See “Configuring 192 I/O Controls” on page 24 and “Configuring 96 I/O Controls” on page 25.

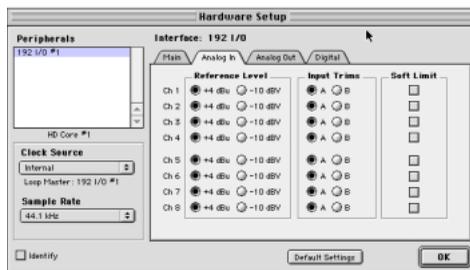
**10** For additional HD-series I/Os, choose the I/O in the Peripherals list, and repeat the above steps.

## Configuring 192 I/O Controls

### To configure controls specific to a 192 I/O:

**1** With the 192 I/O selected in the Peripherals list, click on the Analog In tab for the following options:

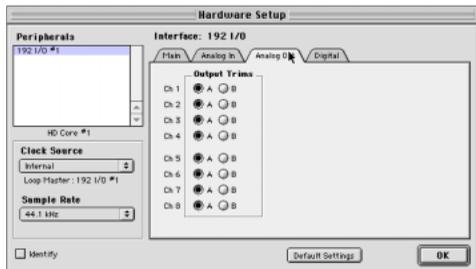
- You can set your operating level by selecting Reference Level +4 dBu or –10 dBV, on a channel-by-channel basis, based on which physical inputs are routed to Pro Tools inputs. Refer to the *192 I/O Guide* for more information.
- Each of the analog channels in the 192 I/O has two Input Trims, labelled A and B, for precisely calibrating and switching levels. Select Input Trim A or B on a channel-by-channel basis. See the *192 I/O Guide* for information on setting the rear panel trims.
- You can select Soft Clip on a channel-by-channel basis. The Soft Clip limiter attenuates the incoming analog signal, providing extra protection from temporary clipping transients that can cause digital distortion when they exceed the maximum input of the unit. With Soft Clip enabled, 192 I/O supports an additional 4 dB of headroom by rounding off the top 4 dB to the clip point. This is useful for eliminating stray transients or emulating analog tape saturation.



Hardware Setup dialog for 192 Analog In page

2 Click on the Analog Out tab for the following option:

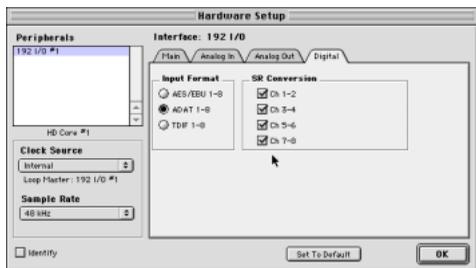
- Each of the analog channels in the 192 I/O has two Output Trims, labelled A and B, respectively. You can select Input Trim A or B on a channel-by-channel basis.



Hardware Setup dialog for 192 I/O, Analog Out page

3 On the 192 I/O with an optional Digital I/O card, click on the Digital tab, to set the Input Format and SR Conversion (real-time sample rate conversion).

 *At session sample rates above 48 kHz, sample rate conversion for the TDIF and Optical (ADAT) inputs on the Digital I/O card is automatically enabled on all eight inputs of the selected format.*



Hardware Setup dialog for 192 I/O, Digital page

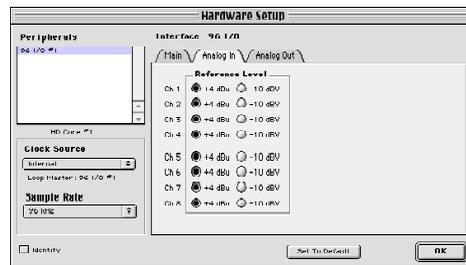
## Configuring 96 I/O Controls

**To configure controls specific to a 96 I/O:**

1 With the 96 I/O selected in the Peripherals list, configure your I/O front panel meters for input or output metering from the Meters pop-up.

2 Click on the Analog In tab, for the following option:

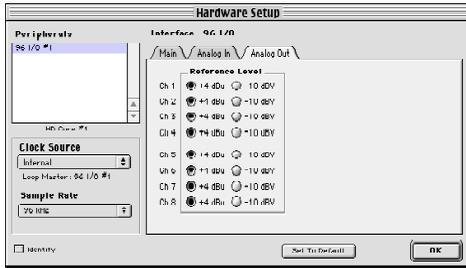
- You can set your operating level by selecting Reference Level +4 dBu or -10 dBV, on a channel-by-channel basis, based on which physical inputs are routed to Pro Tools inputs. Refer to the 96 I/O Guide for more information.



Hardware Setup dialog for 96 I/O, Analog Out page

**3** Click on the Analog Out tab, for the following option:

- You can set your output level by selecting Reference Level +4 dBu or -10 dBV, on a channel-by-channel basis, based on which physical outputs are routed to Pro Tools inputs. Refer to the 96 I/O Guide for more information.



*Hardware Setup dialog for 96 I/O, Analog Out page*

## Configuring Legacy I/Os

Repeat the above steps for any Legacy I/Os (such as 888|24 I/O) connected to the first I/O, then second, and so on. Before you can configure a Legacy I/O, it must first be initialized in Hardware Setup.

### To initialize a Legacy I/O:

- 1** Before you turn on and configure your Legacy I/O, turn down the volume of output devices. Very loud digital noise may be emitted before the Legacy I/O is initialized.
- 2** Power on your Legacy I/O.
- 3** From the Peripherals list, choose the primary I/O (the audio interface to which you are connecting your Legacy peripheral).
- 4** From the Main page, select the Legacy I/O button in the Port Settings.
- 5** From the Peripherals list, select "> <No Interface>."
- 6** From the Interface pop-up, select your I/O.

**7** After the Hardware Setup dialog updates, choose your I/O in the Peripherals list. The Legacy I/O is now ready to be configured.

 For more information on Hardware Setup parameters for each I/O, refer to the peripheral's guide.

## Configuring I/O Setup

The I/O Setup dialog provides a graphical representation of the Hardware Setup. Each I/O attached to your system is displayed, with controls to route physical ports to Pro Tools inputs and outputs. These controls mirror the routing controls found in Hardware Setup. Changes made to physical routing in one dialog, are always reflected in the other. I/O Setup also lets you label and map Pro Tools input, output, insert, and bus *signal paths*.

Pro Tools ships with default I/O Setup settings that will get you started. You only need to go to I/O Setup if you want to remap or rename the default I/O paths.

 Refer to the Pro Tools Reference Guide for more information on setting up I/O paths.

### To configure I/O routing in I/O Setup:

- 1** Choose Setups > I/O Setups in Pro Tools.
- 2** Map and name paths as desired.
- 3** If necessary, redefine formats for I/O channels of any peripherals.

## Routing a Pro Tools Output Pair to Multiple Audio Interface Output Ports

Pro Tools channel pairs can be routed to multiple outputs on your Digidesign audio interface through Hardware Setup.

This lets you have the same signal (such as a stereo pair, a stem mix, or a multichannel mix) sent to multiple destinations (such as multiple mastering devices). Instead of doing multiple bounces or mix passes, each to a discrete device or output, or daisy-chaining devices, Hardware Setup allows you to “mirror” the Pro Tools output and provide multiple channels of the same signal to different I/O ports. For example, if you assign Analog 1–2 and Digital [Encl] (AES/EBU, S/PDIF) in Hardware Setup to Pro Tools Output pair 1–2, when you select Pro Tools Output pair 1–2 (as defined in I/O Setup), the audio will be routed to all three outputs with a single dual channel assignment.

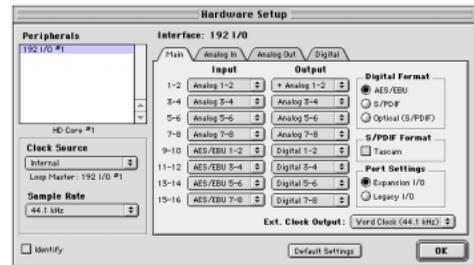
Pro Tools output pairs can also be routed to multiple audio interface outputs in I/O Setup.

### To select multiple output ports for a Pro Tools output channel pair:

- 1 Choose Setups > Hardware Setup in Pro Tools.
- 2 From the Peripherals list, select the desired interface.
- 3 Make sure Main page tab is chosen.
- 4 Select an output pair.
- 5 Ctrl+Shift an additional output destination.

The output name updates with a plus sign (“+”) before it.

To verify which output ports have been routed, select the original output: In the pop-up menu, each output assigned to the Pro Tools output channel pair will have a check mark next to it.



Hardware Setup dialog for 192 I/O, Main page

- 6 Select additional output destinations, as desired. The only limit to output choices is the number of outputs available in your system.



## chapter 3

# Windows Configuration

To configure your Pro Tools|HD system for Windows, you will need to install Pro Tools hardware and software, verify your TDM system, then launch Pro Tools.

## Installing Pro Tools Hardware

### Pro Tools TDM Cards

The number of Pro Tools TDM cards will differ depending on your system configuration. Card components for each configuration are listed below.

 *If you are using an Expansion Chassis to add additional cards to your system, refer to the Expanded Systems Guide included with your Pro Tools system.*

### Pro Tools|HD Hardware

Pro Tools|HD hardware comes in three configurations:

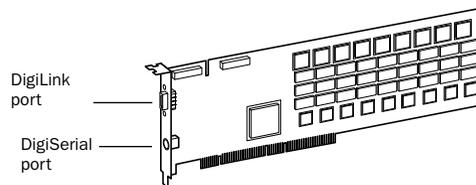
**Pro Tools|HD 1** Includes a single HD Core card.

**Pro Tools|HD 2** Includes an HD Core card, an HD Process card, and a TDM FlexCable for connecting the HD Core to the HD Process card.

**Pro Tools|HD 3** Includes an HD Core card, two HD Process cards, and two TDM FlexCables (one for connecting the HD Core to the first HD Process card, and the other for connecting the first HD Process card to the other HD Process card).

### The HD Core Card

The HD Core card provides up to 96 tracks of direct-to-disk recording and playback, and 32 channels of I/O to your Pro Tools HD-series system, as well as DSP power for processing and mixing. The HD Core card supports up to 24-bit and up to 192 kHz sessions.



**HD Core card**

This card includes a single DigiLink port for connecting up to 32 channels of I/O.

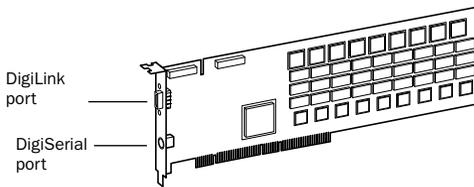
The DigiSerial port is for connecting a Digidesign SYNC I/O. This connector is an 8-pin mini-DIN.

**⚠** *The DigiSerial port on HD Core cards does not support MachineControl connections. Use the Digidesign SYNC I/O for Pro Tools MachineControl 9-pin. A serial port (not a DigiSerial port) is required for MC Remote mode (only). For a list of qualified serial port adapters (such as USB), see:*

*[www.digidesign.com/compato](http://www.digidesign.com/compato)*

### The HD Process Card

The HD Process card provides DSP power for mixing, processing, and DSP software such as the DigiRack plug-ins included with Pro Tools. It also provides a DigiLink port for connecting up to 32 channels of I/O.



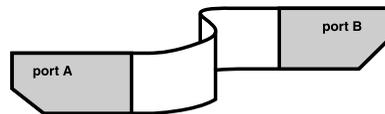
#### HD Process card

The DigiSerial port on an HD Process card does not offer any functionality.

### The TDM FlexCable

The TDM FlexCable is used to connect a pair of cards in your Pro Tools system so they can share data along the TDM bus. Additional FlexCables are required to connect additional cards. One FlexCable comes with each HD Process card.

**⚠** *The TDM FlexCable is actually a flexible printed circuit board with delicate traces. Do not overbend the cable, twist it, or otherwise pinch it. Doing so may cause unpredictable behavior in Pro Tools as well as harm to your system.*



*TDM FlexCable, shown properly bent*

### Installing the Pro Tools|HD Cards

This section shows how to install Pro Tools HD cards into a Windows CPU. If you're installing cards into an expansion chassis, see the *Expanded Systems Guide*.

Before you begin to physically install your Pro Tools cards, we recommended you temporarily disable the warning option, "Display a message before installing an unsigned file." This expedites and automates much of the installation process. If you do not temporarily disable the warning, warning messages (that you are installing an unsigned driver) appear after each DSP chip during the detecting Pro Tools phase of installation.

**To temporarily disable the warning option:**

- 1 Turn on your computer.
- 2 Right-click the My Computer icon located on your Windows desktop.
- 3 Choose Properties.
- 4 Select the Hardware Tab.
- 5 In the Device Manager section of the dialog box that appears, select the Driver Signing button.
- 6 In Driver Signing Options, select “Ignore – Install All Files Regardless Of File Signature.”
- 7 Click OK twice.
- 8 Turn your computer off.
- 9 Proceed with physically installing your Pro Tools cards.

**To install the Pro Tools cards:**

- 1 Turn off your computer and any peripherals. Turn off your computer and any peripherals. Make sure the equipment is properly grounded.
- 2 Disconnect all cables attached to the CPU (such as hard drives, monitor(s), USB and firewire connections) except for power.
- 3 Open the computer case.

 *Before handling any card, discharge any static electricity that may be on your clothes or body by touching a grounded metal surface, such as the power supply case inside your computer.*

- 4 Remove the metal access port cover behind the PCI slot you want to use by removing the screw and sliding the cover out from the access port. Keep the screws in a safe place.

- 5 Install the HD Core card into the lowest numbered slot inside the CPU as shown in the following figures. The HD Core card will always be installed in the lowest numbered PCI slot.

Make sure the first card is an HD Core card. HD Process cards cannot occupy the lowest slot.

- 6 Install HD Process cards in the following slots.
- 7 If installing a SCSI HBA card, install it in the highest numbered remaining slot.
- 8 If installing other cards, verify that your cards are installed in the following order, starting with the lowest numeric slot.

 *The guidelines below may include optional cards not present in your system.*

For each Pro Tools TDM system, your cards should be installed in the following order, starting with the lowest numeric slot.

- HD Core cards
  - HD Process cards
  - SCSI host bus adapter (HBA)
  - Video capture cards
  - Display card for your computer monitor
- 9 If installing an HD Core system (and not a Pro Tools|HD 2 or HD 3 system), complete the following:
    - Secure the card in place with the slot access port screw you removed earlier.
    - Close the computer case.
    - Skip the following steps and continue with “Connecting Audio Interfaces” on page 34.
  - 10 If installing a Pro Tools|HD 2, HD 3, or an Expanded HD 1 system, connect the HD cards with TDM FlexCables (see “Connecting Multiple Cards with the TDM FlexCable” on page 32).

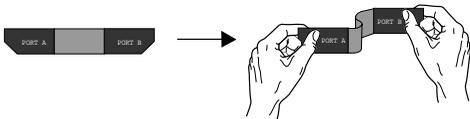
## Connecting Multiple Cards with the TDM FlexCable

Each HD card has two ports along the top of the card, labelled Port A and Port B.

When installing multiple HD cards, data communication across HD cards is achieved by using a TDM FlexCable to connect Port B of the lead card to Port A of the next card. The FlexCable has two connectors, also labeled Port A and Port B, to ensure proper connection.

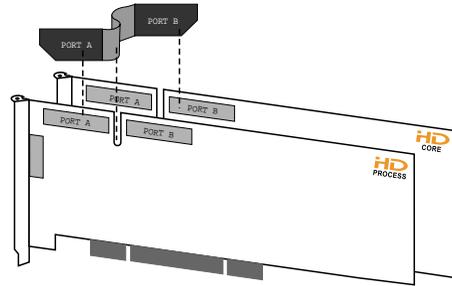
### To connect HD cards with the TDM FlexCable:

- 1 Make sure you have secured cards with the slot access port screws you removed earlier.
- 2 The FlexCable needs to be shaped before installing it on your HD cards. To do this, grasp it with both hands, then move the Port A portion of the cable straight towards you and inwards, as shown below. Do not bend the cable more than you need to, as you may damage the traces in the cable.



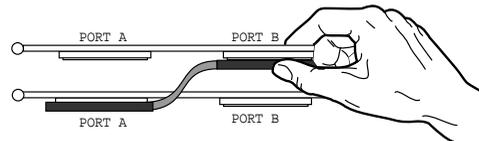
### Preparing TDM FlexCable for installation

- 3 Slide the FlexCable into the notch of the *second* card, so that the Port B connector of the FlexCable can be aligned with Port B of the lead card; and the Port A connector of the FlexCable can be aligned with Port A of the second card (as shown in the following diagram).



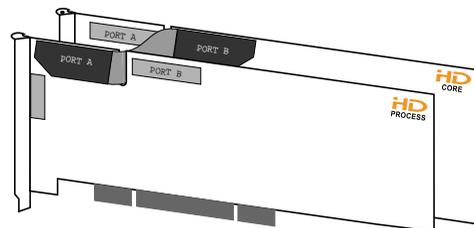
### Inserting TDM FlexCable

- 4 Connect the Port A connector of the FlexCable to Port A on second card. Push down gently but firmly until the cable is fully connected to the card. Next, attach the other end of the FlexCable (labeled Port B) to Port B on the lead card.



### Top view of two HD cards connected with TDM FlexCable

- 5 Verify the connection, as shown below.



### Side view of two HD cards connected with TDM FlexCable

- 6 For systems with more than two cards, each additional card must be connected to its preceding card. Use FlexCables to connect cards together, as described above, until all cards are connected. Each subsequent HD Process card will include a FlexCable.

## Connecting Multiple Cards with the Female-to-Female TDM FlexCable

Some computers have a gap between PCI slots that exceeds the length of the TDM FlexCable. For such computers (for example, the IBM IntelliStation E Pro 6846), you will need a special adapted cable (the female-to-female TDM FlexCable, in conjunction with a regular TDM FlexCable) to connect multiple HD Process cards. To obtain the Female-to-Female TDM FlexCable, please contact Digidesign's Technical Support:

tel: 650-731-6100

tel: 650-856-4275

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## Detecting Pro Tools Cards

### To detect Pro Tools Cards:

- 1 Start or restart your computer.
- 2 Start up Windows, logging in with Administrator privileges.
- 3 The Found New Hardware Wizard dialog pops up automatically. Click Next. If Digidesign DSP devices are found and installed automatically, skip to step 13.
- 4 Select the "Search For A Suitable Driver For My Device (Recommended)" option in the Install Hardware Device Drivers dialog. Click Next.
- 5 In the Locate Driver Files dialog, check (only) the CD-ROM option under Optimal Search Locations. Click Next.
- 6 In the Locate File window, select the Drivers folder (on your Pro Tools CD-ROM). Click Open.
- 7 Open "dalwdm.inf" or "dalwdm."
- 8 Click OK in the Found New Hardware Wizard dialog.

9 Click Next to install the multimedia controller in the Driver Files Search Results dialog.

10 Click Yes in the Digital Signature Not Found dialog, if present.

11 Click Finish in the Completing Found New Hardware dialog (indicating that a DSP is found).

12 Repeat step 10 for each DSP chip found. There are 9 chips on each HD Core card.

13 Re-enable the warning option, "Display a message before installing an unsigned file." See "Installing the Pro Tools HD Cards" on page 30.

14 You are now ready to install Pro Tools Software.

If you do not follow the steps above or if you cancel any of the steps, your computer may not recognize your Pro Tools cards and you may receive the error message, "Cannot Create DAE Deck." To resolve this error message, see "Cannot Create DAE Deck Or Error Number 4" on page 41.

The complete Pro Tools software installation process includes:

- Un-installing any previously installed versions of Pro Tools.
- Upgrading to Windows 2000, or Windows XP.
- Preparing your computer for Pro Tools.
- Installing Pro Tools software.

The first time you launch Pro Tools after software installation, will be prompted to enter your Pro Tools authorization code and configure hardware. Instructions for this begin in "Launching Pro Tools the First Time" on page 43.

Before you begin installing Pro Tools software, Pro Tools hardware should already be installed. For more information, see "Installing Pro Tools Hardware" on page 29.

## Connecting Audio Interfaces

Each interface supplies up to 16 channels of input and output to your system.

Pro Tools|HD supports up to a maximum of eight 192 I/Os or 96 I/Os.

Each HD card supports up to 32 channels; to get a full 32 channels of I/O from one card, you can connect, or daisy chain, a second 16-channel HD I/O to the first HD I/O that is connected directly to the HD card.

For example of connecting multiple HD I/Os, see Figure 1 on page 13 and Figure 2 on page 14.

**▲** *HD audio interfaces need room at their sides to maintain proper air flow for cooling. It is important to leave room for air intake and ventilation on the sides of the unit. Do not block the sides of the unit or disconnect the internal fan. If the units are racked up in a case, remove all lids and/or doors before operating the system. Failure to do so can result in the units overheating very quickly, which can permanently damage sensitive components.*

In addition, previous generations of audio interfaces can be connected to the 192 I/O or 96 I/O. These include: 888|24 I/O, 882|20 I/O, 1622 I/O, 24-bit ADAT Bridge I/O, and the original ADAT Bridge I/O. The original 888 I/O and 882 I/O interfaces are not supported with Pro Tools|HD.

### To connect the HD audio interfaces:

**1** If using a single 192 I/O or 96 I/O, connect it to the HD Core card with the provided DigiLink cable that came in the HD Core packaging. You must attach at least one 192 I/O or 96 I/O to your system in order for Pro Tools to boot.

**▲** *If you have at least one 192 I/O in your system configuration, it must be connected to the HD Core card as the “primary” interface.*

**2** Connect additional HD audio interfaces to subsequent Digidesign audio cards or daisy chain your I/Os (by connecting a secondary I/O to the primary I/O).

If you are connecting both 192 and 96 I/O audio interfaces to your system, connect the 192 I/O to your HD Core card, followed by any additional 192 I/O interfaces connected to the next highest-priority cards. Then connect the 96 I/O interfaces to subsequent cards.

You can also connect a single HD I/O to each HD card in your system using the provided DigiLink cables. There is no advantage to this configuration over daisy chaining I/Os.

**3** If using two or more HD audio interfaces, connect the Loop Sync Out of each interface to the Loop Sync In of the next interface with the BNC cables included in your HD I/O packaging. Then, connect the Loop Sync Out of the last interface to the Loop Sync In of the primary interface.

**4** If connecting a Digidesign Legacy audio interface (such as an 888|24 I/O, 882|20 I/O, 1622 I/O, or Digidesign ADAT Bridge I/O), continue with “Connecting an Additional 16 Channels of Audio to Legacy I/Os” on page 35.

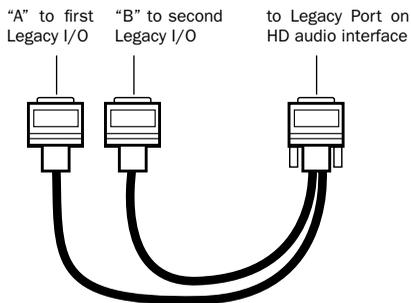
## Connecting an Additional 16 Channels of Audio to Legacy I/Os

Each 192 I/O and 96 I/O can support 16 channels of audio to and from Digidesign Legacy peripheral. These include: 888|24 I/O, 882|20 I/O, 1622 I/O, 24-bit ADAT Bridge I/O, and the original ADAT Bridge I/O. The original 888 I/O and 882 I/O interfaces are not supported with Pro Tools|HD.

### To connect Digidesign Legacy I/Os:

**1** Connect the “MIX card” end of the peripheral cable that came with your Legacy I/O (60-pin side) to the Legacy Port on the primary HD audio interface. Connect the other end to the Computer Port on the Legacy I/O. Connect additional Legacy I/Os, if any, in the same manner, to HD audio interfaces connected directly to HD Process cards.

If using a Y cable or 16-channel peripheral cable adapter, connect this to the Legacy port first, then connect the audio interface peripheral cables to Port A and Port B of the Y cable.



Optional 16-channel peripheral cable adapter

**2** In order to properly clock the Legacy device, you will need to connect the Ext. Clock output port on the HD I/O to the Slave Clock IN on the Legacy peripheral. The Legacy peripheral will switch to Slave mode once the proper clock is outputting from the HD I/O. Always use the Ext. Clock Out port of the same I/O to which the Legacy peripheral is attached.

If using multiple MIX-series audio interfaces, connect the Slave Clock Out of the first interface to the Slave Clock In of the second interface with the provided BNC cable. If using three 888|24 or other MIX-series I/Os, the third 888|24 would get its 256x clock from the second HD I/O to which it is attached.

**⚠** Before you turn on and configure your Legacy I/O, turn down the volume of output devices. Very loud digital noise may be emitted before the Legacy I/O is initialized.

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## Installing Pro Tools Software

The complete Pro Tools software installation process includes:

- Upgrading to Windows 2000 or XP
- Configuring your computer
- Installing Pro Tools software

After software installation is completed, the first time you launch Pro Tools you will be prompted to enter your Pro Tools authorization code and configure hardware. Instructions for this begin in “Checking Your TDM System and Launching Pro Tools” on page 41.

**📖** If you haven't already installed Pro Tools hardware, do so now. See “Installing Pro Tools Hardware” on page 29 for instructions.

## Upgrading to Windows 2000 with IBM IntelliStation M Pro Model 6889

If you are using IBM's IntelliStation M Pro Model 6889 and downgraded from Windows 2000 to Windows NT (to be compatible with Pro Tools 5.0.1), you will need to recover Windows 2000.

**▲** *Make sure you back up important files before recovering Windows 2000.*

### To recover Windows 2000:

**1** If you have an IDE boot drive, you must disable "Onboard SCSI" in your BIOS before starting the recovery process, as follows:

- Access "Devices and I/O Ports."
- Set "Onboard SCSI" to disabled.

When you have completed the following recovery steps fully, you can re-enable "Onboard SCSI."

**2** Start or restart your computer.

**3** Press F11 during the message, "To start the IBM product recovery program, press F11." This message appears briefly, so you will need to be quick. If you miss it, allow the E Pro to boot into Windows and restart again.

**4** Select Full Recovery of Windows 2000 in the "IBM Product Recovery Program."

**5** Follow the on-screen instructions. You will be warned that the recovery process will erase everything on that drive. The recovery process takes about 40 minutes.

**6** You now have Windows 2000. Proceed to configuring your computer.

## Configuring Your Computer

To ensure optimum performance with Pro Tools, configure your computer before installing the Pro Tools software.

**▲** *Before you make any changes to your computer's system settings, make a backup copy of your Registry (where many of these essential settings are stored). By doing so, you will be able to restore your system's original settings in case of trouble. See your Windows User's Guide for details.*

*If your computer does not provide the BIOS configuration options included in this section, or if you do not feel comfortable changing system parameters or deleting drivers, consult with a Windows system administrator, or your computer dealer or manufacturer for assistance.*

### There are five parts to configuring your computer:

- 1** Configuring your BIOS.
- 2** Configuring your SCSI BIOS.
- 3** Installing the SCSI drivers.
- 4** Setting Display Performance.
- 5** Setting Application Response.

## Configuring Your BIOS

BIOS (Basic Input/Output System) parameters vary depending on the make and model of the computer. Refer to the documentation that came with your computer for more details.

Different BIOS manufacturers often use different names to describe the same system function. Some manufacturers do not provide a particular configuration option at all. Consequently, the names and options that appear in your computer's BIOS may differ from those described in this guide.

### To modify your computer's BIOS:

- 1 Start or restart your computer.
- 2 During power up, enter BIOS Setup by pressing the appropriate key on your computer keyboard. On most computers, this is F1, F2, or the Delete key. Refer to the documentation that came with your computer.
- 3 When you are in BIOS Setup, disable Plug & Play OS, if present.
- 4 Disable PCI Parity, if present.
- 5 Enable SCSI support, if your computer is equipped with built-in SCSI hardware. SCSI support parameters are typically found on the Devices & I/O Options page of the BIOS setup utility. If you do not have built-in SCSI hardware and using a SCSI host adapter card instead, you do not need to set this setting.
- 6 Disable Power Management, if present.
- 7 Enable PCI Dynamic Bursting, if present.
- 8 Enable PCI Master 0 WS Write, if present.
- 9 Disable PCI Delay Transaction, if present.
- 10 Disable PCI#2 Access #1 Retry, if present.
- 11 Save settings.
- 12 Exit BIOS setup and restart your computer.

### Configuring Your SCSI BIOS

In addition to configuring your BIOS, you must also modify the settings of your built-in SCSI hardware or SCSI adapter card. This allows SCSI hard drives to work properly with Pro Tools. This procedure varies on different computers. Consult your computer's User Guide.

#### To modify your computer's SCSI BIOS:

- 1 Start your computer. If your computer is already on, restart it.
- 2 During power up, when the text message regarding the SCSI BIOS appears, press the key combination listed on the screen to enter the SCSI BIOS. The SCSI BIOS setup utility appears.
- 3 Consult your SCSI host bus adapter's User Guide to set the following parameters:
  - Maximum Sync Transfer Rate parameter to 20 MB/sec for each SCSI ID and SCSI channel connected to your audio drives.
  - If you are using an ATTO HBA, change the PCI Burst Size to 32 Bytes.
  - If you are using an Adaptec HBA, enable the Host Adapter BIOS option.
- 4 Save these settings.
- 5 Exit SCSI BIOS setup and restart your computer.



*If you are using the ATTO EPCI-DC card that came in Digidesign's SCSI64 Kit, these parameters are already set correctly for use with Pro Tools.*

## Installing the ATTO or Adaptec SCSI Drivers

Pro Tools requires the use of SCSI host adapters and SCSI drives. For Pro Tools to run at maximum efficiency with these devices, install the Digidesign approved SCSI driver (ATTO or Adaptec, depending on the card you are using).

 Check Digidesign's Compatibility Documents for a list of Digidesign approved computers and supported SCSI driver versions:  
[www.digidesign.com/compato](http://www.digidesign.com/compato)

**The full name of the ATTO driver is:**

- ATTO ExpressPCI

**The full name of the Adaptec drivers for the IBM M Pro is:**

- Adaptec  
AHA290/291/294x/394x/4944/AIC78xx

If you need to install the ATTO or Adaptec driver, consult the driver manufacturer's documentation.

## Setting Display Performance

Configure your computer's video display for optimal performance with Pro Tools. You can avoid disk performance issues by changing two video display parameters on your system.

**To change video display parameters:**

- 1 Right-click on the desktop.
- 2 Go to Properties.
- 3 Select the Settings tab.
- 4 Go to Advanced.
- 5 Select the Troubleshooting tab.

- 6 Disable all accelerations by manually moving the slider to None (from its default setting of Full).

- 7 Click OK.

- 8 For Windows 2000, select the Effects tab.

- 9 For Windows XP, select the Appearance tab, click the Effects button, and uncheck the "Use the following transition effect for menus and tooltips."

- 10 Deselect the Show Windows Contents While Dragging box.

- 11 Click OK.

Specific settings vary, depending on the type of video card in your computer. For a complete list of compatible video cards and their settings, refer to the latest compatibility information on the Digidesign web site:

[www.digidesign.com/](http://www.digidesign.com/)

## Setting Application Response

The final step in configuring your computer is setting your system's Application Response parameter.

**To configure Application Response (Windows):**

- 1 From the Start Menu, choose Settings > Control Panel.
- 2 Double-click on System.
- 3 Click the Advanced tab.
- 4 Click Performance Options.
- 5 Under Application Response select Background Services.
- 6 Click OK, twice.

### To configure Application Response (Windows XP):

- 1 From the Start Menu, choose Control Panel.
- 2 Double-click on System.
- 3 Click the Advanced tab.
- 4 Under Performance, click Settings.
- 5 Click the Advanced tab.
- 6 Under Processing Scheduling, set to Background Services.
- 7 Click OK, twice.

## Installing Pro Tools Software

 *To install Pro Tools, you must log on to Windows as Administrator. If you do not have Administrator privileges or do not know how to set them up, see your Windows User's Guide.*

### To install Pro Tools software:

- 1 If you are using virus-protection software, turn it off or remove it and restart your computer. Avoid running virus-protection software while using Pro Tools since it adversely affects system performance.
- 2 Place the Pro Tools Installer CD for Windows in your CD-ROM drive. Locate and double-click the blue icon named "Setup."
- 3 Click Next.
- 4 Click OK to accept the License Agreement.
- 5 Select the hard drive on which to install Pro Tools from the Install pop-up menu. For maximum reliability, install Pro Tools on your startup drive.
- 6 Click Next.

7 We recommend you choose the Typical Install option. However, if you Custom Install, the next window will ask you to choose the options you want to install. To install any of these items, select them from the following list:

**Program Files** This component contains the Pro Tools executable and all support DLLs.

**Plug-Ins** This component contains the core plug-ins. These files are required by Pro Tools.

**Controllers** This component contains the Pro Tools Control Surface Personalities.

**Documentation** This component contains Pro Tools documentation and release notes.

**System Files** This component contains Digidesign System Files. These files are required by Pro Tools.

**Pro Tools Utilities** This component contains the DigiTest utility and calibration test tones.

**Acrobat Reader** This component contains the Acrobat 4.0 Reader installer.

**Codecs** This component contains the Pro Tools Audio Codecs: MP3, RealAudio, and Windows Media.

**Answerbase** This component contains stand-alone Pro Tools multi-lingual information databases. Note that these files require approximately 37 MB of disk space.

 *MacOpener is included on the Pro Tools installer CD-ROM disk and requires a separate installation process.*

- 8 Click Next.

**9** Select a “work environment.” This is an initial set of Pro Tools Preferences. These Preference “sets” have been pre-configured to include some of the more popular settings for post production, audio, and audio with MIDI. Click Next.



Selecting a Pro Tools Preference

 Preference settings can be customized at any time in Pro Tools. See the Pro Tools Reference Guide for more information about Preferences.

**10** Select whether to install the Surround Mixer plug-in. This plug-in is required for mixing, mastering, and monitoring in surround. For Surround systems, select Yes – Monitoring Pro Tools Film Format if your monitoring is configured for Film Format, or select Yes – Monitoring in Pro-Control (DTS Format) if using a ProControl dedicated controller. Select No – Stereo mixing only, if your monitoring is configured for Stereo. After making a selection, click Next.



Selecting a Pro Tools Preference

**11** When installation is complete, click Finish to restart your computer.

## Using MIDI

Pro Tools in Windows uses your Multimedia Setup to configure MIDI devices and their properties. Refer to your device’s installation and usage documentation to properly configure the device.

## Cannot Create DAE Deck Or Error Number 4

Your computer may not recognize your Pro Tools cards if you did not follow all of the steps above, or if you upgrade from Windows NT to Windows 2000 or Windows XP.

If you receive error message number 4 or “Cannot Create DAE Deck,” when you launch Pro Tools, complete the instructions below.

### To correct a “Cannot Create DAE Deck” error:

- 1 Turn your computer off.
- 2 Confirm that all your Pro Tools cards are seated correctly and cables are tightly fastened.
- 3 Start your computer and launch Pro Tools. If the error does not re-appear, you do not need to continue with these steps.
- 4 With your computer on, right-click the My Computer icon (located on your Windows desktop).
- 5 Choose Properties > Hardware > Device Manager.
- 6 Expand the Sound, Video and Game Controllers list.
- 7 In Multimedia Devices, you should see an “!” icon next to each Pro Tools DSP chips that is not properly installed.
- 8 Select one of these “!” icons and press Delete. Click OK in the Confirm Device Remove dialog.
- 9 Repeat the previous step for each of these “!” icons, until they are all removed. Then, click OK.
- 10 You are ready to install your Pro Tools cards. See “Detecting Pro Tools Cards” on page 33.

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## Checking Your TDM System and Launching Pro Tools

Before you launch Pro Tools, run the DigiTest diagnostics application located in the Digidesign Utilities folder (see “Running DigiTest” on page 42). DigiTest finds your cards and confirms that they are correctly installed and working.

When DigiTest has completed and you have rebooted your computer, launch Pro Tools for the first time.

### Starting Up Your System

Whenever you start your system, you must turn on all of your system components in a specific order.

#### Start your Pro Tools System in this order:

- 1 Make sure all your equipment (including your CPU) is off.
- 2 For TDM systems with an expansion chassis, turn on the expansion chassis.
- 3 Turn on external hard drives, if any. Wait approximately ten seconds for them to spin up to speed.
- 4 Lower the volume of all output devices, then turn on your Pro Tools audio interfaces.
- 5 Turn on any MIDI interfaces and devices, or synchronization peripherals.
- 6 Turn on your Pro Tools audio interfaces (such as 96 I/O). On power up, the status LEDs will flash. Wait at least fifteen seconds for the audio interface to initialize, and the status LEDs to stop blinking and stay lit.

If you launch Pro Tools without turning on your audio interfaces, you will be prompted to turn them on. Allow fifteen seconds for audio interfaces to power-up and the status LEDs to stop blinking and stay lit, before clicking OK.

7 Turn on your computer.

## Running DigiTest

Run the DigiTest diagnostics application to identify TDM cards and verify that they are correctly installed and working.

 *DigiTest is included on the Pro Tools Installer CD and installed with Pro Tools. DigiTest resides in the Digidesign Utilities folder located in your hard drive, in the subdirectory Digidesign/Pro Tools/Pro Tools Utilities.*

 *Before you run DigiTest, lower the volume of all output devices. Very loud digital noise may be emitted during the test.*

### To run DigiTest:

- 1 Turn off Pro Tools.
- 2 Go to Start > Programs > Digidesign > Pro Tools > DigiTest.
- 3 Test cards.
  - To test only one Digidesign card in your system, click the button that corresponds to this card.
  - To test all Digidesign cards at once, press the “Test All Cards” button.

4 When prompted, recycle power on all Pro Tools peripherals. Press Continue.

5 Check the “Test I/O Box.”

 *LEDs on your digital interfaces may light up during this test. This is normal. Continue to test.*

6 Exit DigiTest by clicking on the “close” box on the top right hand corner of the application window.

7 Reboot your computer.

## Errors and Undetected Cards

Complete the steps below if:

- There is a problem with a component in your system and an error message has been displayed to the right of the corresponding card’s button in DigiTest.
  - or –
- A supported card is installed but not automatically detected during DigiTest.

### If a supported card is installed and is not automatically detected:

- 1 Close DigiTest.
- 2 Power down your system.
- 3 Reinstall the cards (see “Installing the Pro Tool|HD Cards” on page 30).
- 4 Check the card seating.
- 5 Check the ribbon cable connection.
- 6 Power up.
- 7 Begin DigiTest again.

For descriptions of all error codes, refer to Appendix B, “DigiTest Error Codes.” For test details, click the Info button to the right of the reported error, then click Failures in the pop-up window and change Failures to Detailed.

If a card continues to fail DigiTest, contact Digidesign Technical Support.

tel: 650-731-6100  
tel: 650-856-4275

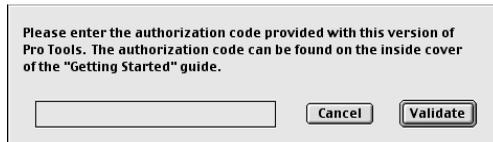
## Launching Pro Tools the First Time

### Validate Pro Tools Software

When launching Pro Tools the first time, you are prompted to enter an authorization code to validate your software.

#### To validate Pro Tools software:

- 1 Double-click the Pro Tools application in the Pro Tools folder inside the Digidesign folder.
- 2 Enter the authorization code in the dialog when prompted, making sure to observe any spaces, then click Validate.



#### Authorization code validation for Pro Tools

The authorization code is located on the inside cover of this guide.

Congratulations! Pro Tools is launched. When Pro Tools is launched for the first time only the menus will appear. To see Edit and Mix windows, a new session must be created. But before you begin working with Pro Tools, you should get acquainted with Pro Tools system settings, described in the following section.

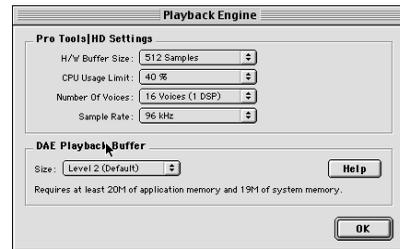
## Configuring Pro Tools

### Configuring the Playback Engine

The Playback Engine sets the voice count (and voiceable tracks) for your system, and it's sessions. Additionally, it lets you customize various System Usage parameters (such as buffers, CPU Usage).

#### To configure the Playback Engine:

- 1 Choose Setups > Playback Engine.



#### Playback Engine dialog for Pro Tools TDM system

- 2 From the H/W Buffer Size pop-up, select the audio buffer size, in samples, for host processing tasks such as Real-Time AudioSuite (RTAS) plug-in processing. The default setting is 512 samples. Select a higher setting if you need more buffer time for RTAS, HTDM, and Direct Connect applications.
- 3 From the CPU Usage Limit pop-up, select the maximum percentage of CPU resources to allocate to host processing tasks. The default setting is 40%. Select a higher setting if you need more buffer time for RTAS, HTDM, and Direct Connect applications.

**▲** Increasing the CPU Usage Limit may slow down screen responses.

**4** From the Number of Voices pop-up, select the amount of voices (and voiceable tracks), for your sessions. The default number of voices on a Pro Tools|HD 1 system is 48 voices (at the default 48 kHz sample rate).

**⚠** *Changing the number of voices, along with sample rate, affects DSP usage and your system performance. Please read the following carefully.*

Depending on the current sample rate, and the number of HD Core and Process cards in your system, you will have different choices available. For example, each HD card allows you to use one or two of its DSPs per card for voicing.

Most DSP amounts support three levels of voice numbers:

- Select higher voice numbers when your cards are in your machine. You should also select higher voice numbers when using a chassis to run higher track counts at higher sample rates (such as 64 tracks at 96 kHz) and you want more voices (such as 16 voices per DSP at 96 kHz).
- Select medium voice numbers when running cards in an expansion chassis, or when using other PCI cards along with Digidesign cards.
- Select minimum voice numbers if you are running high bandwidth PCI cards (such as video capture).

For voice limits on different HD systems, refer to the *Pro Tools Reference Guide*.

**5** From the Sample Rate pop-up, select the session sample rate. This choice will not be available if a session is open.

 *Session sample rate can always be set in the Create a New Session dialog. (See the Pro Tools Reference Guide.)*

**6** Set DAE Playback Buffer Size.

The DAE Playback Buffer Size determines the amount of memory allocated within DAE to manage disk buffers, which affects system performance.

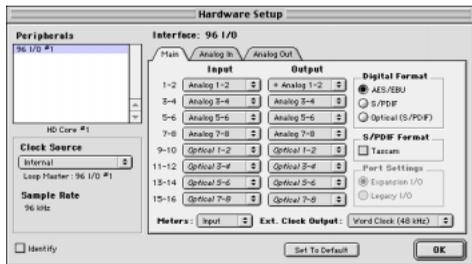
Though DAE automatically selects the optimal playback buffer size for your system, you may want to adjust this parameter to modify your system's performance:

- ◆ Allocating a larger buffer size can sometimes allow for a higher density of edits. This can be useful if you experience system performance problems in sessions with a large number of edits in rapid succession. However, choosing a larger buffer size can cause a time lag to occur before playback or recording begins. It can also cause a time lag to occur when you are editing during playback.
- ◆ Allocating a smaller buffer size can sometimes improve playback/recording initiation speed. This can be useful if you are experiencing a time lag when you initiate playback/recording. However, choosing a smaller buffer size can make it difficult for slower hard drives to play or record tracks reliably.

**7** Click OK, when finished.

## Configuring Hardware Setup (Audio Interfaces)

Pro Tools HD peripherals support 16 channels of simultaneous I/O. The peripherals support multiple formats (such as analog, AES/EBU, TDIF, and so on).



Hardware Setup dialog for 192 I/O, Main page

The Main page of the Hardware Setup dialog is where you define what physical ports are routed to Pro Tools input and output ports. Think of this window as a patchbay that allows you to route any of the physical inputs or outputs on your HD I/Os to channel assignments in the Pro Tools mixer.

The Main page also provides controls for session Sample Rate, clock settings, and defining whether Expansion Port or Legacy Port peripherals are active.

Additional pages are available to configure other parameters on each I/O (such as setting operating levels).

You must select the peripheral, then set the parameters for that interface—repeating this for each interface in your system.

 Use the Up and Down Arrow keys to scroll through each peripheral.

To validate audio interfaces with the Identify button:

- 1 Choose Setups > Hardware in Pro Tools.
- 2 From the Peripherals list, select the Digidesign audio interface connected to the first card in your HD system. This will be the interface at the top of the list.
- 3 Make sure Main page tab is chosen.
- 4 Use the Identify button to verify that your audio interface has been properly identified. Click on the Identify button, located in the lower left corner of the Hardware Setup dialog, to illuminate all the LEDs on the front panel of the audio interface. If the LEDs do not light, make sure the interface is selected in the Peripherals list, and that it is powered on. If the LEDs continue to not light, review hardware installation and run DigiTest again.
- 5 Repeat the above steps for additional audio interfaces.

 Legacy I/Os must be initialized in the Peripherals list before they can be validated with the Identify button. For initialization steps, see “Configuring Legacy I/Os” on page 49.

### To configure audio interfaces:

- 1 Choose Setups > Hardware in Pro Tools.
- 2 From the Peripherals list, select the Digidesign audio interface connected to the first card in your HD system. This will be the interface at the top of the list.
- 3 Make sure Main page tab is chosen.
- 4 To select a different digital I/O on your audio interface (enclosure), click on one of the format buttons, under Digital Format. Choices include: AES/EBU, S/PDIF, and Optical (S/PDIF). Selecting Optical (S/PDIF) resets the physical Optical I/O port (which is, by default, eight channels of ADAT I/O) to two channels of S/PDIF I/O. For more information about HD enclosure and card ports, refer to the guide for your I/O.
- 5 From the Clock Source pop-up, select the appropriate clock source for the system. In most cases, you will use Internal. The other choices are for resolving Pro Tools to external clock sources. Depending on your audio interface, Clock Source options can include: AES/EBU [Encl], S/PDIF, Optical [Encl], AES/EBU 1–8, TDIF, ADAT, and Word clock (optional word clock rates are available at higher frequencies).
- 6 From the Ext. Clock Output, select the appropriate clock source to feed to devices attached to your I/O.

 *If the Legacy Port is enabled (as opposed to the Expansion Port) then the Ext. Clock Output automatically switches to Slave256x. To reset the Ext. Clock Output, the Port Settings button must be set back to Expansion and the Legacy I/O must be set to No Interface. (To set a Legacy I/O to No Interface, select its name in the Peripherals list, then click on No Interface in the Interface pop-up menu.)*

**7** For S/PDIF compatibility with Tascam DA30 DAT recorders, click on the Tascam button, under S/PDIF Format.

**8** From the input and output channel pop-ups, select the physical ports (such as Analog 1–2, Optical 1–2, and so on), that will be routed to the Pro Tools input and output ports (such as Ch 1–2, 3–4, and so on).

Refer to your peripheral's guide for sample rate, and other restrictions. For example, the Optical 1–8 channels (on the enclosure) will not be available for session sample rates of 88.2 kHz or higher (whereas the ports on the 192 I/O Digital I/O card will be available).

To differentiate inputs and outputs of the same format, they are labeled differently in the input and output channel pop-ups. For example, the AES/EBU inputs and outputs that come standard in the 192 I/O enclosure are identified as AES/EBU [Encl]; the AES/EBU inputs and outputs that come on the factory-installed Digital port are listed (in pairs) as AES/EBU 1–2, AES/EBU 3–4, and so on. For 192 I/Os equipped with the optional Digital I/O Card, the additional AES/EBU I/O ports on the optional card are labelled AES/EBU 9–10, AES/EBU 11–12, and so on.

**9** Configure controls specific to your HD I/O. See “Configuring 192 I/O Controls” on page 47 and “Configuring 96 I/O Controls” on page 48.

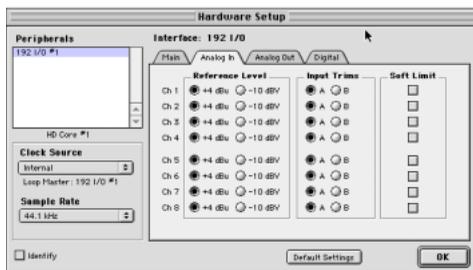
**10** For additional HD-series I/Os, choose the I/O in the Peripherals list, and repeat the above steps.

## Configuring 192 I/O Controls

### To configure controls specific to a 192 I/O:

1 With the 192 I/O selected in the Peripherals list, click on the Analog In tab for the following options:

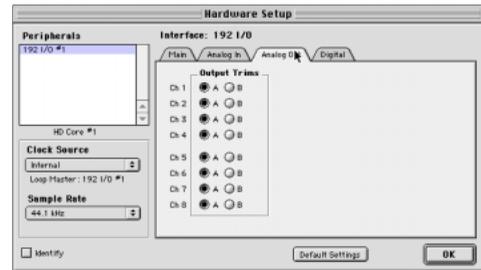
- You can set your operating level by selecting Reference Level +4 dBu or -10 dBV, on a channel-by-channel basis, based on which physical inputs are routed to Pro Tools inputs. Refer to the 192 I/O Guide for more information.
- Each of the analog channels in the 192 I/O has two Input Trims, labelled A and B, for precisely calibrating and switching levels. Select Input Trim A or B on a channel-by-channel basis. See the *192 I/O Guide* for information on setting the rear panel trims.
- You can select Soft Clip on a channel-by-channel basis. The Soft Clip limiter attenuates the incoming analog signal, providing extra protection from temporary clipping transients that can cause digital distortion when they exceed the maximum input of the unit. With Soft Clip enabled, 192 I/O supports an additional 4 dB of headroom by rounding off the top 4 dB to the clip point. This is useful for eliminating stray transients or emulating analog tape saturation.



Hardware Setup dialog for 192 Analog In page

2 Click on the Analog Out tab for the following option:

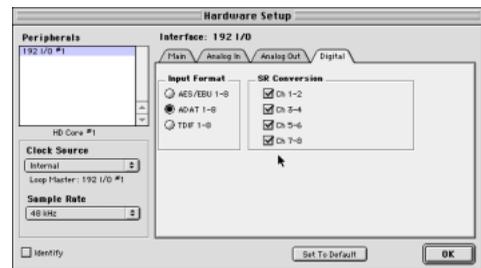
- Each of the analog channels in the 192 I/O has two Output Trims, labelled A and B, respectively. You can select Input Trim A or B on a channel-by-channel basis.



Hardware Setup dialog for 192 I/O, Analog Out page

3 On the 192 I/O with an optional Digital I/O card, click on the Digital tab, to set the Input Format and SR Conversion (real-time sample rate conversion).

 At session sample rates above 48 kHz, sample rate conversion for the TDIF and Optical (ADAT) inputs on the Digital I/O card is automatically enabled on all eight inputs of the selected format.



Hardware Setup dialog for 192 I/O, Digital page

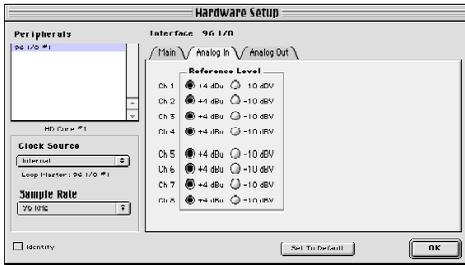
## Configuring 96 I/O Controls

To configure controls specific to a 96 I/O:

1 With the 96 I/O selected in the Peripherals list, configure your I/O front panel meters for input or output metering from the Meters pop-up.

2 Click on the Analog In tab, for the following option:

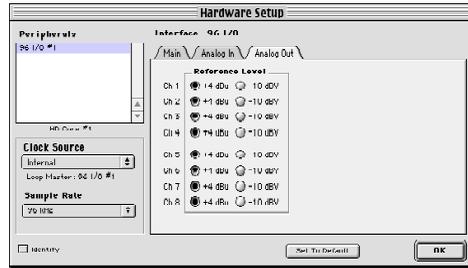
- You can set your operating level by selecting Reference Level +4 dBu or -10 dBV, on a channel-by-channel basis, based on which physical inputs are routed to Pro Tools inputs. Refer to the *96 I/O Guide* for more information.



Hardware Setup dialog for 96 I/O, Analog Out page

3 Click on the Analog Out tab, for the following option:

- You can set your output level by selecting Reference Level +4 dBu or -10 dBV, on a channel-by-channel basis, based on which physical outputs are routed to Pro Tools inputs. Refer to the *96 I/O Guide* for more information.



Hardware Setup dialog for 96 I/O, Analog Out page

## Configuring Legacy I/Os

Repeat the above steps for any Legacy I/Os (such as 888|24 I/O) connected to the first I/O, then second, and so on. Before you can configure a Legacy I/O, it must first be initialized in Hardware Setup.

### To initialize a Legacy I/O:

- 1 Before you turn on and configure your Legacy I/O, turn down the volume of output devices. Very loud digital noise may be emitted before the Legacy I/O is initialized.
- 2 Power on your Legacy I/O.
- 3 From the Peripherals list, choose the primary I/O (the audio interface to which you are connecting your Legacy peripheral).
- 4 From the Main page, select the Legacy I/O button in the Port Settings.
- 5 From the Peripherals list, select "> <No Interface>."
- 6 From the Interface pop-up, select your I/O.
- 7 After the Hardware Setup dialog updates, choose your I/O in the Peripherals list. The Legacy I/O is now ready to be configured.

 For more information on Hardware Setup parameters for each I/O, refer to the peripheral's guide.

## Configuring I/O Setup

The I/O Setup dialog provides a graphical representation of the Hardware Setup. Each I/O attached to your system is displayed, with controls to route physical ports to Pro Tools inputs and outputs. These controls mirror the routing controls found in Hardware Setup. Changes made to physical routing in one dialog, are always reflected in the other. I/O Setup also lets you label and map Pro Tools input, output, insert, and bus *signal paths*.

Pro Tools ships with default I/O Setup settings that will get you started. You only need to go to I/O Setup if you want to remap or rename the default I/O paths.

 Refer to the Pro Tools Reference Guide for more information on setting up I/O paths.

### To configure I/O routing in I/O Setup:

- 1 Choose Setups > I/O Setups in Pro Tools.
- 2 Map and name paths as desired.
- 3 If necessary, redefine formats for I/O channels of any peripherals.

## Routing a Pro Tools Output Pair to Multiple Audio Interface Output Ports

Pro Tools channel pairs can be routed to multiple outputs on your Digidesign audio interface through Hardware Setup.

This lets you have the same signal (such as a stereo pair, a stem mix, or a multichannel mix) sent to multiple destinations (such as multiple mastering devices). Instead of doing multiple bounces or mix passes, each to a discrete device or output, or daisy-chaining devices, Hardware Setup allows you to "mirror" the Pro Tools output and provide multiple channels of the same signal to different I/O ports. For example, if you assign Analog 1–2 and Digital [Encl] (AES/EBU,

S/PDIF) in Hardware Setup to Pro Tools Output pair 1–2, when you select Pro Tools Output 1–2 (as defined in I/O Setup), the audio will be routed to all three outputs with a single dual channel assignment.

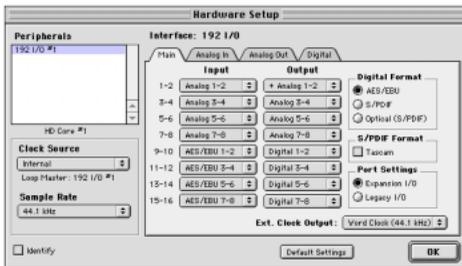
Pro Tools outputs pairs can also be routed to multiple audio interface outputs in I/O Setup.

**To select multiple output ports for a Pro Tools output channel pair:**

- 1 Choose Setups > Hardware Setup in Pro Tools.
- 2 From the Peripherals list, select the desired interface.
- 3 Make sure Main page tab is chosen.
- 4 Select an output pair.
- 5 Ctrl+Shift an additional output destination.

The output name updates with a plus sign (“+”) before it.

To verify which output ports have been routed, select the original output: In the pop-up menu, each output assigned to the Pro Tools output channel pair will have a check mark next to it.



*Hardware Setup dialog for 192 I/O, Main page*

- 6 Select additional output destinations, as desired. The only limit to output choices is the number of outputs available in your system.

## chapter 4

# Connecting Your Studio

This chapter provides general information on connecting Pro Tools to your system, including digital equipment, effects units, MIDI gear, and SMPTE synchronization devices.

Refer to the *96 I/O Guide* or the *192 I/O Guide* for specific details regarding:

- Front and back panel connectors and indicators
- Technical specifications
- On 192 I/O, installing optional cards

**▲** *HD audio interfaces need room at their sides to maintain proper air flow for cooling. It is important to leave room for air intake and ventilation on the sides of the unit. Do not block the sides of the unit or disconnect the internal fan. If the units are racked up in a case, remove all lids and/or doors before operating the system. Failure to do so can result in the units overheating very quickly, which can permanently damage sensitive components.*

---

## Setting Up Your Studio

Figure 3 illustrates a typical studio setup, with a 192 I/O connected to a mixing console, effects and other equipment.

Figure 4 illustrates a setup without a mixer, where effects and monitoring gear are connected directly to a 96 I/O.

## Example Studio Setup with a Mixing Console

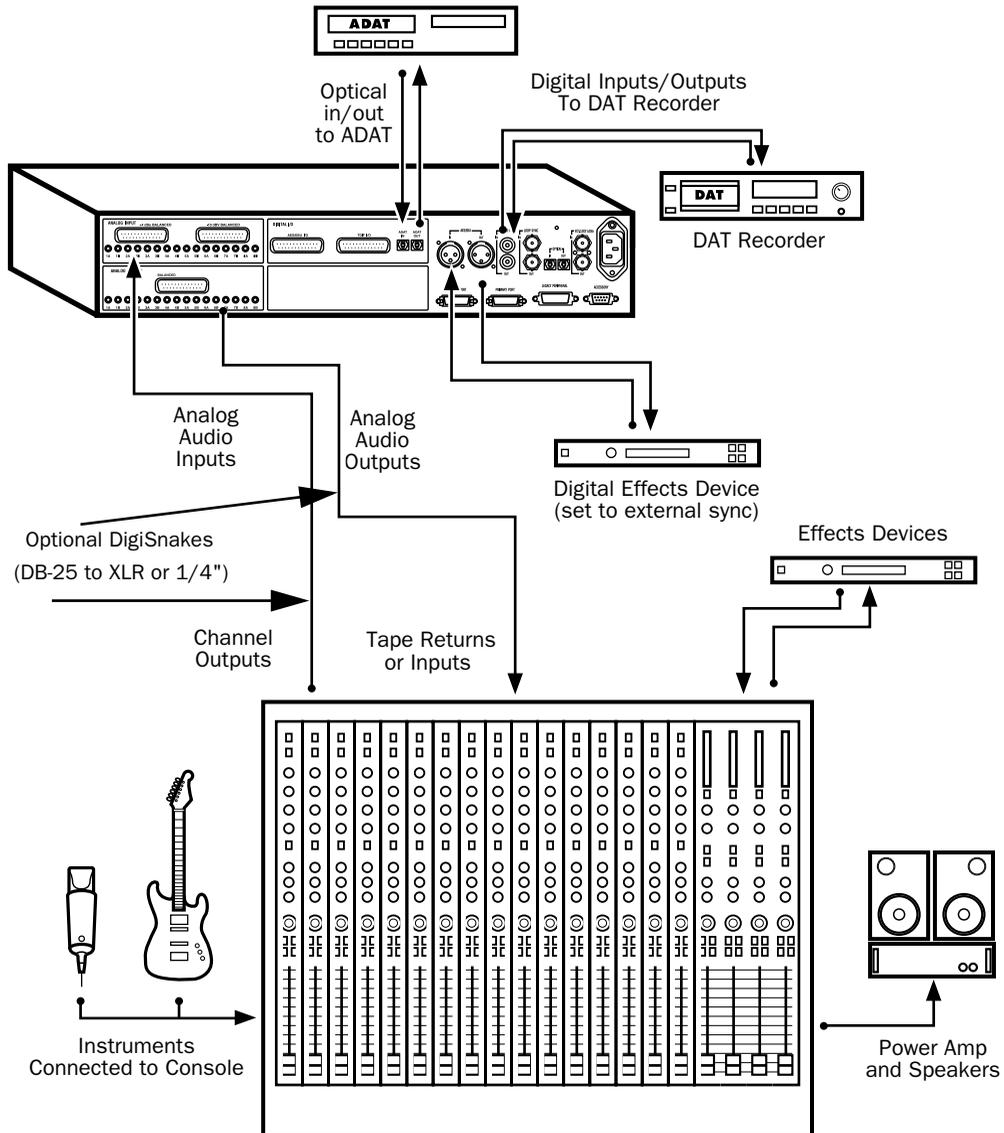


Figure 3. Typical studio configuration using 192 I/O with mixer connections

# Example Studio Setup without a Mixing Console

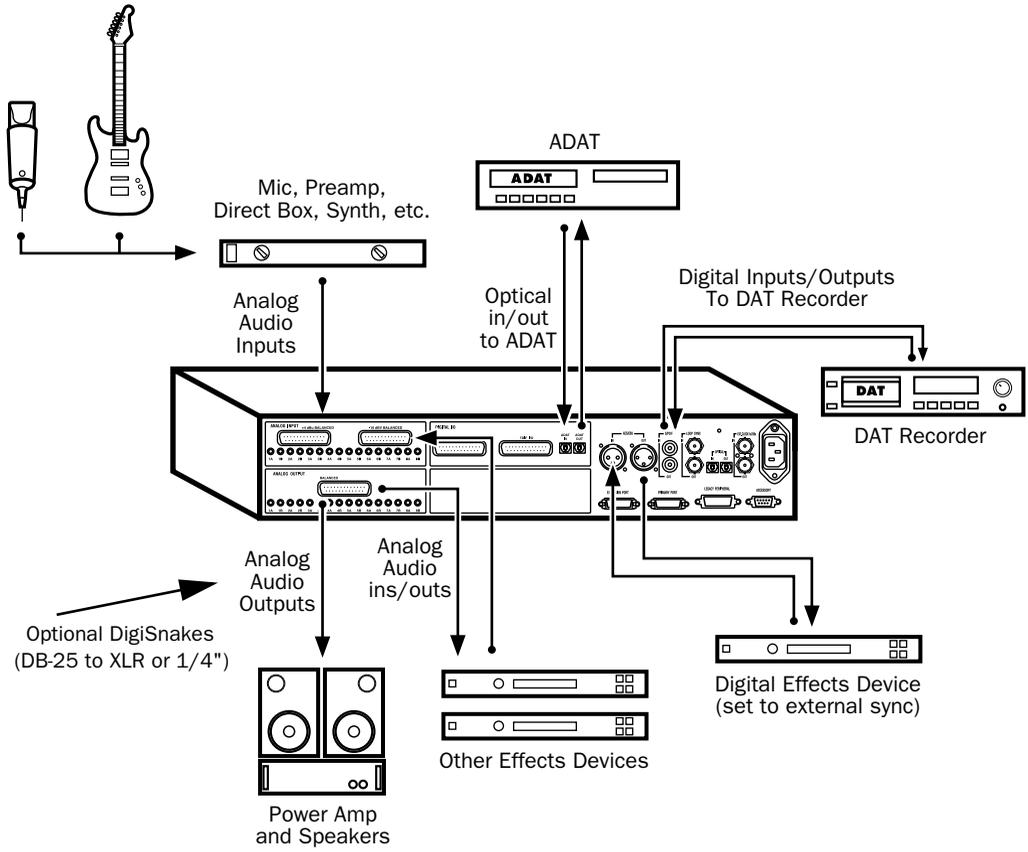


Figure 4. Typical studio configuration using 96 I/O without a mixer

## 192 I/O

The 192 I/O features two DB-25 breakout connectors for two sets of eight inputs each, at +4 dBu and –10 dBV respectively.

There are no –10 dBV outputs, however; analog outputs break out from a single DB-25 output at +4 dBu operating levels.

**⚠** *When driving unbalanced lines on the 192 I/O output card, leave negative “–” terminals disconnected. Failure to do so will result in noisy outputs.*

The 192 I/O requires a custom DB-25 snake. Digidesign sells nine different DigiSnake (DB-25) cables for this purpose. Contact your dealer or Digidesign for more information.

## 96 I/O

The 96 I/O analog connectors are TRS 1/4” with TIP wired hot (or “+”), RING cold (or “–”), and SLEEVE ground.

If connecting to unbalanced loads, use unbalanced TS cables.

There is one bank of eight inputs (software-switchable between +4 dBu and –10 dBV line levels on a line-by-line basis).

There is one bank of eight outputs (that use +4 dBu line levels).

---

## Connecting Equipment with Digital Audio Ins and Outs

Each Pro Tools HD I/O includes AES/EBU, S/PDIF, and ADAT digital options. The 192 I/O includes additional AES/EBU and optical ports, as well as TDIF, dual-wire AES/EBU at 192 kHz, and sample rate converters.

The following example provides basic setup guidelines for connecting to a DAT recorder. For detailed information for recording to and from an ADAT, see “Recording To and From Digital Devices” on page 72.

### To connect your Pro Tools system to a DAT recorder:

- 1 Connect the AES/EBU or S/PDIF output on the enclosure to the AES/EBU or S/PDIF input of your DAT deck. By default, this port is assigned to Pro Tools Output 1–2.
- 2 Connect the AES/EBU or S/PDIF input on the enclosure to the AES/EBU or S/PDIF output of your DAT deck. Route the digital input to Pro Tools inputs in the Hardware Setup dialog.

 *You can route any of the physical input or output pairs to any of the input and output channel assignments in the Pro Tools mixer. Refer to the Pro Tools Reference Guide.*

**⚠** *Pro Tools does not analyze the incoming sample rate across the digital ports. Therefore, make sure the DAT tape or digital device is set for the same sample rate as Pro Tools. Otherwise, once you set the Clock Source back to Internal, the pitch will be off.*

---

## Connecting Effects Units

The 192 I/O and 96 I/O allow you to connect analog or digital effects units to your Pro Tools system, and use them as inserts or make them the destination for effects sends and returns.

Five inserts are available on each audio channel. Each insert can be a hardware insert (or software plug-in), and can be mono or stereo.

When using a hardware insert, you can connect the device to matching inputs and outputs on your system. For example, a stereo insert could use outputs 7–8 and inputs 7–8 for the sends and returns, respectively. Routing the physical inputs and outputs of the interface to Pro Tools inputs and outputs can be done in either the Hardware Setup dialog or I/O Setup dialog. From I/O Setup, inserts can also be defined, and their channels mapped to audio interface channels. For more information, see the *Pro Tools Reference Guide*.

You can also connect effects units to your system by using any analog or digital inputs and outputs as Auxiliary Inputs and Outputs for effects sends and returns. Once an effects unit is attached this way, you can send a variable amount of a track's output to the effects unit using a *send fader* in Pro Tools.

Five separate send controls on each Pro Tools track allow you to route audio to any of the available outputs connected to your system or through any of the 64 internal busses in the Pro Tools TDM Mixer. Outputs can be returned to mono or stereo Auxiliary Inputs for automated mixing or processing.

When you are using an effect in this send-type of configuration, make sure the unit's internal mix or balance between direct (unprocessed) and wet (effected) signal is set so that only the processed signal is returned to Pro Tools. On most effect units, a balance setting of 100% (completely wet) is the appropriate setting.

If you've been using an effects unit in an instrument setup, such as a guitar effects rack, you'll probably find the balance to be below 50%. If the unit has separate dry and effect level knobs, turn dry level control off. If you don't do this, the dry, unprocessed signal will be present in an effect's output along with the desired processed sound, and you'll have trouble accurately controlling the effect balance in your final mix.

### Connecting Effects Units Digitally

To use your audio interface's inputs and outputs as effects sends and returns to a digital effects device, set your interface's Clock Source to Internal in the Hardware Setup dialog (unless it is referenced to another clock source or peripheral). You should then set your digital effects devices to accept an external digital clock so that they will synchronize themselves to Pro Tools. Make sure you set the channel pair to the digital input in the Hardware Setup dialog (or I/O Setup dialog).

---

## Connecting MIDI Devices

By adding a Macintosh-compatible MIDI interface to your system, you can take advantage of all the MIDI features of Pro Tools, including recording and editing MIDI tracks, and synchronizing to MIDI Time Code or MIDI beat clock.

 For information on configuring a MIDI control surface for use with Pro Tools, see the electronic PDF version of the Pro Tools MIDI Control Surfaces Guide (included with Pro Tools).

### To connect MIDI devices to your system:

- 1 Connect the MIDI interface to your computer according to the MIDI interface's documentation.
- 2 Install any MIDI driver software required by the MIDI interface. (Once you have installed your MIDI interface hardware and software, confirm that it is working properly using the procedure given in the interface's documentation.)
- 3 Connect the MIDI OUT of your MIDI device or controller to the MIDI IN of your MIDI interface.
- 4 Connect the MIDI IN of your MIDI device or controller to the MIDI OUT of your MIDI interface.

 For Macintosh systems, see Appendix C, "Configuring OMS" for information on configuring OMS (Open Music System) software, which is required for Pro Tools and MIDI.

---

## Connecting SMPTE Synchronization Devices

If you intend to synchronize Pro Tools to external devices with SMPTE using MIDI Time Code, your system must be connected properly. For details on SMPTE and synchronization, see the *Pro Tools Reference Guide* or the *SYNC I/O Guide*.

## Digidesign SYNC I/O

Digidesign's SYNC I/O is a multi-purpose synchronization peripheral that provides most all of the functions and connections needed to achieve synchronization to a variety of devices.

SYNC I/O lets you synchronize Pro Tools to LTC, VITC, and Bi-Phase/Tach, or internal for positional reference (time code), and supports all major clock references.

SYNC I/O offers extremely fast lockup, near-sample accurate synchronization, and an exceptionally low-jitter clock. These features provide professional performance and maximum audio fidelity under a wide range of synchronization conditions.

For more information, refer to the *SYNC I/O Guide*.

## chapter 5

# Working with Pro Tools

This chapter takes you on a guided tour of Pro Tools, introducing its main windows and features. Also included is a step-by-step overview of basic audio recording (see “Basic Recording” on page 70).

### How to Use This Chapter

If you are new to Pro Tools, read this chapter for an overview of how to get started learning to record, edit, automate, and mix using Pro Tools|HD.

All of the features described in this chapter are explained fully in the *Pro Tools Reference Guide*. Refer to that guide and its index to find additional information on all Pro Tools features.

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## Session Basics

Pro Tools projects are created and saved as *sessions*. Sessions store all tracks, audio, MIDI, and other session information. Audio and fade files are stored in folders within the session folder.



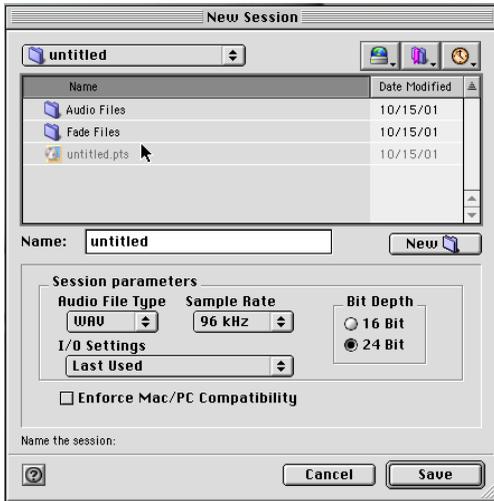
**Session folder, containing the session file and its Audio Files and Fade Files folders**

Pro Tools remembers audio interface configuration and other system settings and applies them to all new sessions.

## Starting a Session

The basic steps to set up a new session are:

- 1 Launch Pro Tools.
- 2 Choose File > New Session.
- 3 In the New Session dialog, set sample rate, bit depth, and other options for the new session.



*New Session dialog*

- 4 Select where you want to save your session. If using external hard drives with your Pro Tools system, make sure you select the appropriate drive in the New Session dialog.
- 5 Choose Save. The new session opens its Mix, Edit, and Transport windows (see Figure 5 on page 59).



## Session Settings

Pro Tools provides several different Timebase Rulers to select the timebase for your session. Timebase Rulers, displayed along the top of the Edit window, include Bars:Beats, Minutes:Seconds, Time Code, and Feet.Frames. The current Timebase determines the format of your main counters, and provides the basis for the Edit window Grid.

For post production, select either Time Code or Feet.Frames as your session Timebase in the Rulers view.

### To select a Timebase Ruler:

- Click the circle next to the displays at the top left side of the Edit window (labeled Bars:Beats, Time Code, Sample, and so on).

## Tempo

You can set a session tempo using the MIDI tempo controls in the expanded Transport window, or using the Tempo ruler.

### To define your session tempo:

- Click in the Tempo field in the Transport window, and type in the desired tempo.

### To tap in a session tempo:

- 1 Choose Display > Transport Window Shows > MIDI Controls.
- 2 In the Transport MIDI controls, turn off the Conductor to enable Manual Tempo mode.
- 3 Use the Space bar to click on the Tap button.

## Click and Metronome

Pro Tools provides its own MIDI Click options. This feature can be turned on and off using the Metronome icon in the Transport window, and is configured from the MIDI Click Options dialog.

### To configure and enable the Pro Tools click:

- 1 Choose MIDI > Click Options.
- 2 Configure the click parameters as needed for your MIDI sound source.
- 3 During recording or playback, you can turn the Click on or off using the Click switch in the Transport window, MIDI Controls display.



Transport window, displaying Click and Tempo Controls

## Frame Rate and Other Synchronization Settings

### To set session frame rate or other synchronization settings:

- 1 Choose Windows > Show Session Setup.
- 2 Set parameters as desired.

 *If you are using an Ethernet or MIDI control surface, or an external synchronization peripheral, choose Setups > Peripherals, then select MIDI Controllers or Ethernet Controllers, as appropriate, and enable each device.*

## Saving Sessions

As you build a session by adding tracks, changing session parameters, and so forth, you will want to save your work. Pro Tools provides three ways to save sessions, with each providing a different set of options.

 *Saving sessions is most often performed for data security, archiving, and in preparation for transferring projects. In addition, session files can be saved in order to perform sample rate conversion, or even to create session templates. Session templates are Pro Tools sessions that have tracks, routing, plug-ins, or any other parameters predefined. See the Pro Tools Reference Guide for more information about how to create and use session templates.*

### To save a session:

- Choose File > Save Session, Save Session As, or Save a Session Copy In.

**Save Session** Saves the currently open session as is, leaving it open to continue working.

**Save Session As** Creates a duplicate session file with the name you choose. It does not create a new Audio Files or Fade Files folder. This can be useful if you want to experiment with different arrangements in the session without affecting the original session.

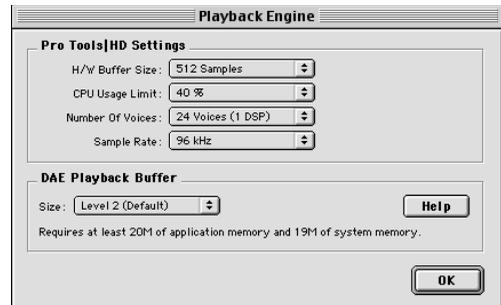
**Save a Session Copy In** Only saves the files that you are using in the current session. This can be useful for creating a final copy of the session that does not include audio files or fades you are no longer using.

## System Resources and Settings

You can customize many Pro Tools system settings in the Playback Engine dialog to optimize system performance.

### Playback Engine Dialog

Lets you adjust DSP allocation, number of voices (total voiceable tracks), buffers, and other system settings.



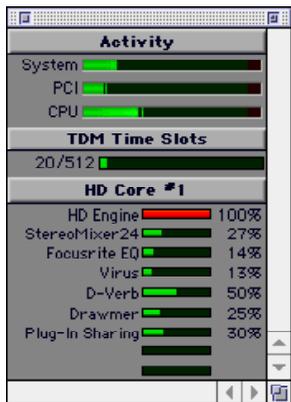
*Playback Engine dialog for Pro Tools TDM system*

### To configure system resources:

- Choose Setup > Playback Engine. For more information, see “Configuring the Playback Engine” on page 21 (Macintosh) or “Configuring the Playback Engine” on page 43 (Windows).

## System Usage Window

Displays information on CPU and DSP performance.



Meters in the System Usage window (TDM shown)

To view system resources and usage:

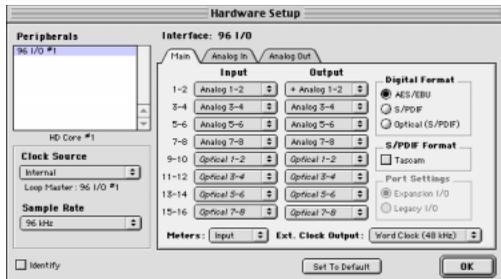
- Choose Windows > Show System Usage.

## Audio Hardware Configuration

The Hardware Setup and I/O Setup dialogs let you configure your audio hardware and basic internal signal routing.

### Hardware Setup Dialog

Configures audio interfaces. Includes settings for input and output levels, hardware routing, and clock source (sync mode).



Hardware Setup dialog

To configure audio interfaces and other hardware peripherals:

- Choose Setup > Hardware Setup.

For more information, see “Configuring Hardware Setup (Audio Interfaces)” on page 22 for Macintosh systems, or “Configuring Hardware Setup (Audio Interfaces)” on page 45 for Windows systems.

### I/O Setup

Maps Pro Tools channels to hardware inputs and outputs. The I/O Setup dialog lets you customize the Pro Tools mixer to match your work style and the needs of your projects.



I/O Setup dialog

To change your I/O Setup:

- Choose Setup > I/O Setup.

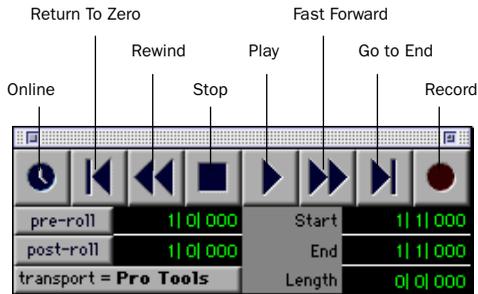
For more information, see the *Pro Tools Reference Guide*.

## Transport Controls

The Transport window provides all Pro Tools transport commands. There are different available transport controls that can be displayed or hidden by selecting or deselecting them in the Transport Window Shows sub-menu.

### To show the Transport window:

- Choose Window > Show Transport Window.



Transport window

### To configure the Transport window:

- Choose Display > Transport Window Shows and select the desired view options.

In standard view, the Transport window provides Play, Stop, and other standard transport controls. The Expanded Transport window provides pre- and post-roll, start, end, and length indicators for Timeline selection, as well as the Transport Master selector. The Transport window can also display the following MIDI Controls: Wait for Note, Click, Countoff, MIDI Merge, Conductor, Meter, and Tempo.

 *Pro Tools starts playing from the location of the cursor, or from the beginning of the current selection. The current setting of the Link Edit/Timeline command in the Operations menu also affects playback. See the Pro Tools Reference Guide for more information.*

## Timeline and Navigation

Pro Tools provides many ways to navigate in a session, including using the mouse, and entering a location into one of the counters.

### To navigate to a location in the Edit window:

- Click at the desired location with the insert bar.

Click in a track, or on a Time Scale



Navigating in the Edit window

### To navigate using the counters:

- Click in the Main counter and enter the desired location using your computer keyboard.

Click and enter a location into either counter



Navigating in the Counter

 *Press the \* key on the numeric keypad as an alternative to clicking in the counter.*

## Memory Locations

Memory locations provide another way to navigate within sessions.

### To define a memory location:

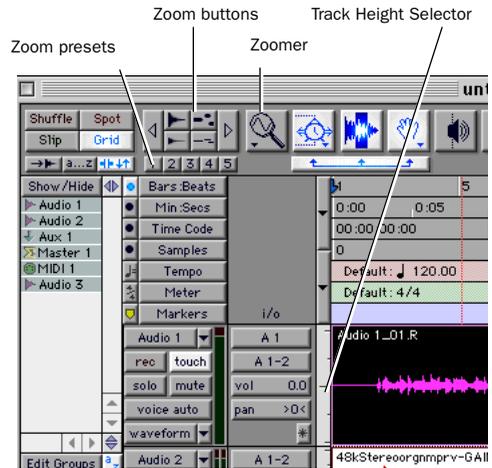
- Press the Enter key on the numeric keypad while stopped or during playback. The New Memory Location window appears, in which you can define a marker, store a selection, or store any combination of the other available settings. These settings include track height, group enables, pre- and post-roll values, and track Show/Hide. Choose settings for the marker and click OK.

### To go to a stored memory location:

- Press the Decimal key on the numeric keypad, followed by the marker number, followed by the Decimal key.

## Viewing and Zooming

When viewing tracks in the Edit window, you can adjust the height of tracks as well as zoom in vertically and horizontally using the Track Height selector and Zoom tools.



Zoom and Track Height tools in the Edit window

### To change track height:

- Click the Track Height Selector, and select a view size for the track.

💡 You can apply many commands, including changing the track height selection, to more than just a single track. Hold down the Option key (Macintosh) or Alt key (Windows) while performing the operation to apply it to all tracks; or hold down both the Shift and Option keys (Macintosh) or Shift and Alt keys (Windows) while performing the operation to apply it to all selected tracks.

### To Zoom in on any area of a track in the Edit window:

- 1 Click to select the Zoomer.
- 2 Click or drag with the Zoomer to zoom in horizontally for a track or Ruler.

### To zoom in or out, incrementally:

- Click the appropriate Zoom button.
  - Left Arrow (Horizontal Zoom Out)
  - Right Arrow (Horizontal Zoom In)
  - Waveform and MIDI buttons, to increase or decrease vertical zoom of the appropriate track type (audio, or MIDI)

Pro Tools also provides five Zoom preset buttons. You can use these to immediately return to established zoom levels (you can define the magnification level for each preset, on a session-by-session basis).

### To use a stored Zoom preset:

- Click the appropriate Zoom preset switch 1–5.

### To store a new Zoom preset definition:

- Command-click a Zoom preset number to store the current horizontal and vertical Zoom to that preset.

## Using Memory Locations for Zoom Control

Pro Tools Memory Locations let you store many attributes with each marker or memory location, including Track Height and Zoom Settings. By creating Memory Locations that are neither Markers or Selections, but have Track Height, Zoom Settings, or other options enabled, you can use Memory Locations to zoom in and out using just the numeric keypad.

---

## Tracks

Pro Tools lets you create audio and MIDI tracks as needed, for audio and MIDI recording, sub-mixing, routing, automating, and editing.

### To create a new track:

- Choose File > New Tracks.



*New Track dialog*

Pro Tools provides four types of tracks: Audio Tracks, Auxiliary Inputs, Master Faders, and MIDI Tracks. Audio Tracks, Auxiliary Inputs, and Master Faders can be mono, stereo, or any of the supported multichannel formats for surround mixing.

**Audio Tracks** Record and play back audio to and from hard disk, monitor audio input when record-enabled, and edit audio regions.

**Auxiliary Inputs** Audio mixer channels, used for input, routing, and submixing.

**Master Faders** Provide master channel controls and options for any Output or Bus path.

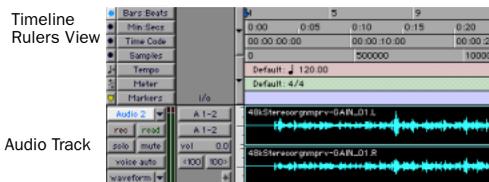
**MIDI Tracks** Record, play back, and edit MIDI data.

Audio, Auxiliary Input, Master Fader, and MIDI tracks appear as vertical channel strips in the Mix window. Track type is indicated by the Track Type icons, just below the faders.



### Tracks in the Mix window

In the Edit window, tracks are displayed horizontally along the Timeline. The area in which audio appears for each track is the Playlist.



### Timeline Rulers and a stereo Audio track in the Edit window

Audio, Auxiliary Input, Master Fader, and MIDI tracks can be automated. (See “Mix Automation” on page 70 for more information.)

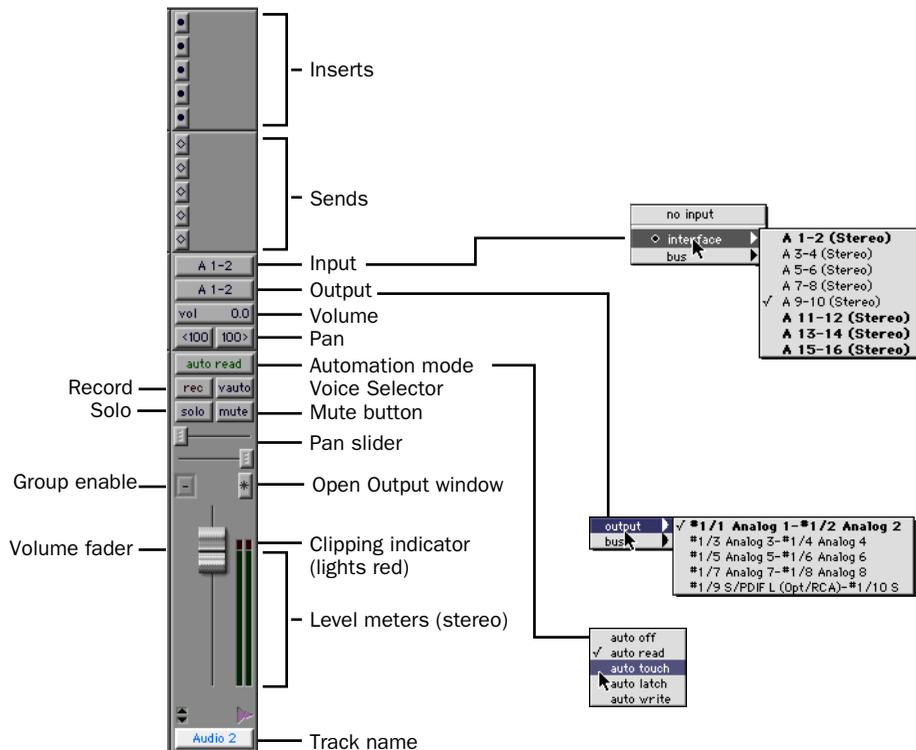


Figure 6. Stereo audio track in the Mix window

## Audio Tracks

All audio tracks—whether audio (disk) tracks, Auxiliary Inputs, or Master Faders—share many identical controls. Figure 6 above shows the controls found in an audio or Auxiliary Input track.

Master Fader tracks provide all the same features as audio and Auxiliary Input tracks, with the following exceptions:

**Input Selector** A Master Fader’s output assignment determines its input, or source.

**Sends** Master Faders do not provide sends. Use Auxiliary Inputs instead, or multi-assign its output.

## MIDI Tracks

MIDI tracks provide track level, solo, and mute, in addition to MIDI input, output, channel, and program (patch) controls. MIDI volume, mute, and pan can also be automated using Pro Tools automation features (see “Mix Automation” on page 70 for more information).

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## Editing

Pro Tools provides many tools for editing audio and MIDI tracks. Editing is done primarily in the Edit window. The Edit window toolbar provides Edit mode and Edit Tool selectors.



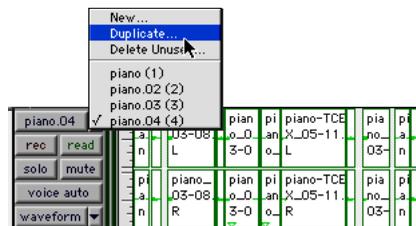
**Edit modes and tools (Grid mode, SmartTool enabled)**

Audio and MIDI editing are typically used to:

- Fix or replace mistakes.
- Re-arrange songs and projects.
- Clean up track timing and rhythm by aligning hits to Grid values like bars and beats, time code, or other timebases.
- Create final tracks using selections from multiple takes (also known as a *comp* track, or compilation).

## Playlists and Non-Destructive Editing

Playlists let you create and retrieve multiple versions of track edits. A playlist can be a complete take, an overdub, or an arrangement of selections from multiple takes. You can duplicate playlists from multiple takes. You can duplicate playlists to save edits in their current state, then continue making additional edits to the new playlist knowing you can always go back to the previous version.



**Duplicating a playlist**

---

## The Mixer

The Pro Tools mix environment provides many familiar channel strip controls for setting track level, pan, solo, and mute. Mixer and I/O controls can be shown in both the Mix and Edit windows.

## Basic Signal Routing

Signal routing is accomplished by assigning track inputs and outputs. Audio track inputs can be from any hardware input. Once recorded, an audio track's input is its audio file on disk. Auxiliary Track inputs can be any hardware input or internal mix bus. For all types of audio tracks, outputs can be routed to any hardware output or internal bus send.

Together, these signal routing features let you set up virtually any mixer architecture needed for your projects, including submixing, sends and returns for effects processing, and multi-channel mixing for surround.



Pro Tools comes with a complete set of DigiRack plug-ins, and many more are available from Digidesign and our Development Partners.

 For more information about plug-ins, see the *DigiRack Plug-Ins Guide*, the *Digidesign Plug-Ins Guide*, and the *Plug-Ins* chapter of the *Pro Tools Reference Guide*.

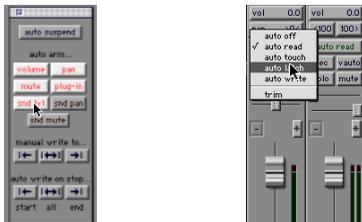
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## Mix Automation

Mix automation lets you record, or *automate*, changes to track and send levels, mutes, pan, and plug-in parameters. MIDI tracks provide track level, pan, and mute automation only.

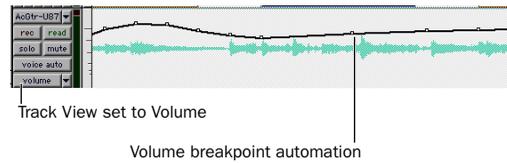
**The basic steps for automation recording are:**

- 1 In the Automation Enable window, enable an automation *type* (volume, pan, mute, send level, send pan, send mute, or any plug-in automation).
- 2 Select an automation *mode* for the tracks to be automated (Write, Touch, Latch, or Trim mode).
- 3 Begin playback and begin automation recording, adjusting faders and other controls as desired. Pro Tools remembers all moves performed on enabled parameters.



Enabling automation (left) and setting a track Automation mode (right)

Once recorded, automation can be re-recorded, or displayed and edited graphically in the Edit window.



Volume automation in a track in the Edit window

 Pro Tools also provides Automation Safe mode for protecting plug-in automation from being overwritten, as well as many Automation Preferences to fine-tune performance. See the *Pro Tools Reference Guide*.

---

## Basic Recording

This section describes how to record audio and MIDI tracks in Pro Tools.

### Routing Audio to a Track

**To route audio to a track:**

- 1 Verify the connections to your instruments. Refer to the guide for your audio interface for more information about setting up your studio.
- 2 Create a new track to record on by choosing File > New Track. Select 1 Mono Audio Track and click Create.
- 3 In the Mix window, find the track I/O controls. If it is not already visible, select Display > Mix Window Shows > I/O View. The I/O View is located below the sends and above the solo and mute buttons.
- 4 Click the Input button of the new track.

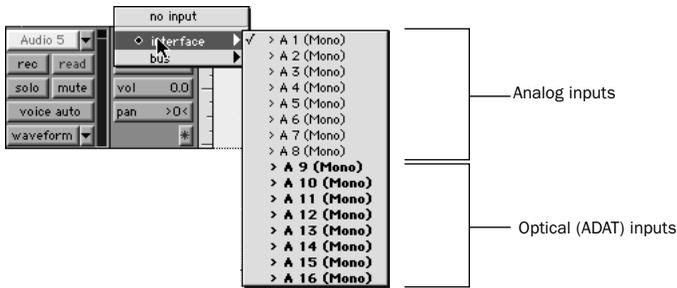


Figure 7. Routing an input to a mono track

From the pop-up menu, select the input you want recorded. For example, specify A 1 if your audio source is plugged into analog input 1. See Figure 7 on page 71. The menu displays the names of the inputs defined in Hardware Setup (or I/O Setup dialog).

## Setting Levels

Adjust the level of the input at the source (instrument, mic pre-amp, or mixer) to set Pro Tools recording levels. The key to setting proper input levels is to get a signal as loud as possible without creating digital clipping. Signals that get close to the top of the meter in Pro Tools use more of the full bit range (the 24 bits that make up each audio sample). The more you are able to maximize this bit range, the better the sound quality will be—by setting optimum levels, you will get the least possible noise and distortion.

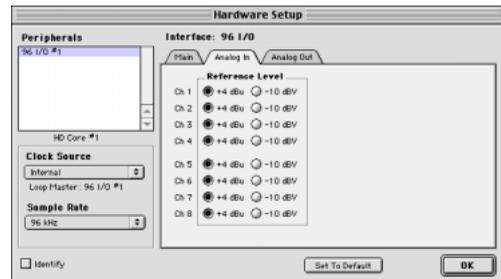
**⚠** Watch out for digital clipping. Clipping occurs when you feed a signal to an audio device that is louder than the circuitry can accept. The result is distortion. Digital clipping is harsh, and usually not something you want to hear at all, so watch those meters!

**💡** Increasing gain raises the noise floor. Make sure that the device you have connected is outputting as strong a signal as possible without distorting.

## Setting your Reference Levels

To configure input levels for the 96 I/O:

- 1 In Pro Tools, choose Setups > Hardware.
- 2 If using multiple audio interfaces, select the desired interface in the Peripherals list.
- 3 In the Interface area, click the Analog In tab.

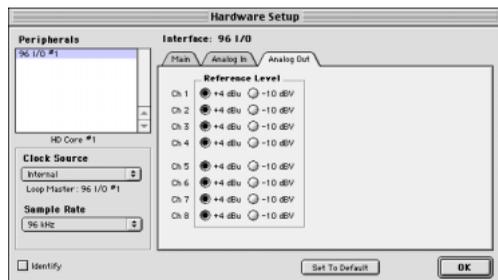


Hardware Setup, 96 I/O Analog In settings

- 4 Set the desired Reference Level for each Input Channel.
- 5 Click OK.

## To configure output levels for the 96 I/O or the 192 I/O:

- 1 In Pro Tools, choose Setups > Hardware.
- 2 If using multiple audio interfaces, select the desired interface in the Peripherals list.
- 3 In the Interface area, click the Analog Out tab.



Hardware Setup, 96 I/O Analog Out settings

- 4 Set the desired Reference Level for each Output Channel.
- 5 Click OK.

## Recording an Audio Track

### To record an audio track:

- 1 Record-enable the desired track, assign its input, and set the input levels appropriately.
- 2 In the Transport window (Windows > Show Transport), click Return To Zero to ensure that you are starting from the beginning of the session. You can also record according to a selection or from the cursor location in the Edit window.
- 3 Click Record in the Transport window to enable recording.
- 4 Click Play or press the Spacebar to record on all record-enabled tracks.
- 5 Start playing your instrument.

- 6 Click Stop in the Transport window or press the Spacebar when you are done recording.

### To play back a recorded track:

- 1 Disable the track's Record-enable button.
- 2 Click Play in the Transport window or press the Spacebar to start playback.
- 3 Click Stop in the Transport window or press the Spacebar to stop playback.

## Recording To and From Digital Devices

Using a single 96 I/O audio interface, you can digitally transfer as many as eight tracks at a time to or from a digital device (such as an ADAT). You can transfer up to 16 tracks on a single 192 I/O and up to 96 channels with multiple 192 I/Os.

### Setting Digital Format and Clock Source

Before recording from a digital source, make sure you have enabled the appropriate Digital Format in Hardware Setup. Digital Format defaults to AES/EBU, meaning your HD I/O will listen to the AES/EBU (Encl) In port for digital clock. If you want to record from a DAT machine connected to your S/PDIF RCA inputs, select S/PDIF Digi Format. If using multiple HD I/Os, be sure to configure the appropriate one in Hardware Setup.

After enabling a different digital format, appropriate clock signals will become available in the Clock Source selector. If you have multiple interfaces, choose the appropriate clock source, on the desired HD I/O.

## Using Output Pairs

Because of the way that outputs function in Pro Tools, each track looks for a stereo output pair. This means that in order to record to eight ADAT tracks, you have to send four pairs of ADAT tracks (each pair panned hard left and right) to four pairs of ADAT Optical Digital outputs.

## Working with 88.2 kHz or Higher Sessions

If the session sample rate is 88.2 kHz or higher, ADAT and TDIF sources can still be used with Digidesign's 192 I/O, but the SRC (sample-rate converter) chips must be enabled. 96 I/O audio interfaces do not have SR Conversion capability, and the ADAT port will go offline with sample rates above 48 kHz.

When the SR Conversion option is disabled, signal does not pass through the sample rate converter.

### To enable SR Conversion on the 192 I/O:

- 1 Choose Setups > Hardware in Pro Tools.
- 2 From the Peripherals list, select the primary 192 I/O audio interface.
- 3 Select the Digital tab.
- 4 Select the desired Input Format (AES/EBU 1–8, ADAT 1–8, or TDIF 1–8).

- 5 Enable SR Conversion for each channel pair as desired.

## ADAT to Pro Tools

The 192 I/O provides 16 channels of ADAT input and output (eight on the chassis, eight on the digital card). These inputs and outputs are numbered 9–16 and 17–24 by default in the Pro Tools Hardware Setup and I/O Setup dialogs.

The 96 I/O provides eight channels of ADAT input and output. These inputs and outputs are labeled Optical 1–8 and ADAT 1–8 by default in the Pro Tools Hardware Setup and I/O Setup dialogs.

### To record ADAT tracks in Pro Tools:

- 1 Connect the Optical Out connector from your ADAT deck to the Optical In connector on the back of the 96 I/O or 192 I/O audio interface.
- 2 Open or create a session in Pro Tools.
- 3 Create the appropriate number (eight) of new tracks (choose File > New Tracks).
- 4 Assign Pro Tools track inputs. For each track, click its Input selector and assign Inputs 9–16 to your eight tracks, or however many inputs you plan to record. See Figure 8 below.

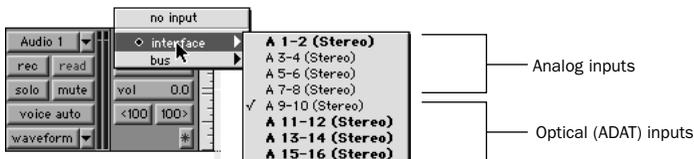


Figure 8. Routing an Optical input pair to a stereo track

5 Record-enable up to eight audio tracks (depending on how many tracks are used on the ADAT tape).

6 Click Record in the Transport window.

7 Click Play in the Transport window to begin recording, then press Play on the ADAT.

8 When playback from the ADAT tape is finished, click Stop in the Transport window, or press the Spacebar.

## Pro Tools to ADAT

### To record Pro Tools tracks to ADAT:

1 Connect the Optical Out connector on your Pro Tools|HD audio interface to the Optical In connector on the back of the ADAT deck.

2 Open the session you want to record to ADAT.

3 Record-enable up to eight tracks on the ADAT.

4 On the ADAT, enable Digital In.

5 In Pro Tools, pan the four pairs of tracks you want to record to ADAT so that each pair is panned hard stereo (one track of each pair is panned all the way left, and the other is panned all the way right).

6 Route each track pair to a separate Optical output pair by selecting from the Output pop-up menu for each track.

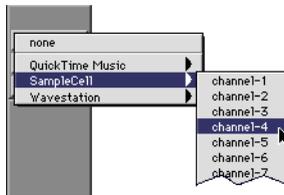
7 Start recording on the ADAT, then click Play in the Pro Tools Transport window. When playback is complete, stop both systems.

## Recording MIDI

### To configure a new MIDI track for recording:

1 Choose File > New Track and specify 1 MIDI Track, then click Create.

2 In the Mix window, click on the track's MIDI Device/Channel Selector and assign a device and channel from the pop-up menu.



### MIDI Device Channel Selector

3 If you want, you can assign a default program change to the track by clicking on the Program button in the Mix window and making the necessary selections for program and bank select, and then click Done. Default program changes are sent when playing a track.

4 In the Mix Window, record-enable the MIDI track.

5 Make sure MIDI > MIDI Thru is selected, then play some notes on your MIDI controller. The MIDI instrument assigned to the track should sound, and the track's meters should register MIDI activity.

### To record the new MIDI track:

1 Verify that the MIDI track you want to record to is record-enabled and receiving MIDI.

2 In the Transport window, click Return To Zero to ensure that recording starts from the beginning of the track. You can also record according to a selection or from the cursor location in the Edit window.

**3** Click Record in the Transport window.

**4** Click Play in the Transport window or press the Spacebar to begin recording.

– or –

If using Wait for Note, the Play, Record, and Wait for Note buttons flash. Recording begins when the first MIDI event is received.

– or –

If using Countoff, click Play. The Record and Play buttons flash during the Countoff—after which, recording begins.

**5** Play your MIDI instrument.

**6** When you have finished recording, click Stop in the Transport window, or press the Spacebar. The newly recorded MIDI data appears as a MIDI region on the track in the Edit window, as well as in the MIDI Regions List.

#### **To play back the recorded MIDI track:**

**1** Disable record-enable on the MIDI track to take it out of Record-Ready mode.

**2** In the Transport window, click Return To Zero.

**3** Click Play in the Transport window to begin playback. The recorded MIDI data plays back through the track's assigned instrument and channel.

#### **Monitoring MIDI Instruments Without a Mixer**

Create an Auxiliary Input to monitor your MIDI instrument. Auxiliary Inputs function as inputs for both internally bussed signals and external audio sources.

#### **To configure an Auxiliary Input for MIDI monitoring:**

**1** Connect the MIDI instrument's audio output to the appropriate inputs on your audio interface.

**2** Choose File > New Track and specify 1 mono or stereo Auxiliary Input track, then click Create.

**3** Click the Input selector of the Auxiliary Input channel and choose the input to which your MIDI instrument is connected.

**4** Click the Output selector of the Auxiliary Input channel and choose an output.

**5** Adjust the level of the Auxiliary Input with its volume fader.



## appendix a

# Connecting SCSI Drives

SCSI hard drives function as the recommended recording media for Pro Tools TDM systems; it is there that Pro Tools sessions and audio files are kept.

Although Pro Tools will let you record to your system drive, this is generally not recommended. Performance for recording and playback on system drives is worse than on non-system drives, resulting in lower track counts and fewer plug-ins.

SCSI hard drives offer several advantages over ATA/IDE drives. First, SCSI drives can be external and therefore provide portable audio storage that is easily moved between systems. Second, SCSI drives offer better performance when recording to large numbers of tracks; attempting to record to a large number of audio tracks with an ATA/IDE drive results in a short delay before recording begins.

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## SCSI Requirements

### High-Performance SCSI Drives and SCSI Host Bus Adapters

For 96-track, 24-bit, at 44.1 or 48 kHz performance, a TDM system must include at least three Digidesign-qualified SCSI hard drives attached to a qualified SCSI HBA (host bus adapter) card.

For 96-track sessions that have substantial edit densities (such as one edit every third of a second across 96 voices) or large amounts of cross-fades, up to four SCSI drives may be required, allocated with 24 tracks per drive and two drives per SCSI channel.

The following track count and sample rate examples require four hard drives:

- 128 tracks at 44.1 or 48 kHz
- 64 tracks at 88.2 or 96 kHz
- 24 tracks at 176.4 or 192 kHz

SCSI drives must provide a data transfer rate of at least 9 MB per second of sustained throughput.

Refer to the Digidesign Web site for compatible hard drives and HBA cards:

[www.digidesign.com/compato/](http://www.digidesign.com/compato/)

 *Software RAID is not supported for audio drives.*

## SCSI Cables

Use shorter SCSI cables to improve reliability. Table 1 provides guidelines for maximum cable lengths according to SCSI type.

In the following table, the maximum cable length includes all cables used in the chain, not just point-to-point connections.

*Table 1: Maximum cable length and number of drives supported according to SCSI type*

SCSI type and transfer rate	maximum cable length	maximum # of drives
Fast SCSI 10 MB/sec	3 meters	8
Wide SCSI 20 MB/sec	3 meters	16
Ultra SCSI 20 MB/sec (8-bit narrow)	3 meters	5
Ultra SCSI 40 MB/sec (16-bit wide)	3 meters	5
Ultra SCSI 20 MB/sec (8-bit narrow)	1.5 meters	6–8
Ultra SCSI 40 MB/sec (16-bit wide)	1.5 meters	6–8
Ultra2 SCSI Low Voltage Differential (LVD) 80 MB/sec	1.2 meters	16

## Disk Space for Audio Tracks

A single mono audio track recorded at 24-bit resolution at a CD-fidelity sampling rate of 44.1 kHz requires about 7.5 MB of hard drive space per minute. The same track recorded at 16-bit resolution requires about 5 MB per minute. Stereo tracks require about twice as much hard drive space.

### Using these guidelines:

- 128 mono tracks of 44.1/48 kHz, 24-bit audio takes up about 969 MB (44.1kHz) or 1055 MB (48kHz) of hard drive space per minute.
- 128 mono tracks of 44.1/48 kHz, 16-bit audio takes up about 646 MB (44.1 kHz) or 703 MB (48kHz) of hard drive space per minute.
- 64 mono tracks of 88.2 or 96 kHz, 24-bit audio takes up about 969 MB (88.2kHz) or 1055 MB (96kHz) of hard drive space per minute.
- 64 mono tracks of 88.2 or 96 kHz, 16-bit audio takes up about 646 MB (88.2 kHz) or 703 MB (96kHz) of hard drive space per minute.
- 24 mono tracks of 176.4 or 192 kHz, 24-bit audio takes up about 727 MB (176.4kHz) or 791 MB (192kHz) of hard drive space per minute.

### A 36-gigabyte drive holds:

- about 35 minutes of 128 tracks, 44.1 or 48 kHz, 24-bit audio
- about 52 minutes of 128 tracks, 44.1 or 48 kHz, 16-bit audio
- about 35 minutes of 64 tracks, 88.2 or 96 kHz, 24-bit audio
- about 46 minutes of 24 tracks, 176.4 or 192 kHz, 24-bit audio

## Distribute Audio Across Multiple Drives

For best recording and playback performance, don't record and play back all audio files in a session from the same drive. Instead, use Pro Tools Disk Allocation features to distribute audio files between multiple drives. See the *Pro Tools Reference Guide* for details.

## Separate Video and Audio Files

If you are working with QuickTime, movie files must reside on a different SCSI bus than audio files. If audio files reside on disks connected to a SCSI HBA card, video data should reside on drives connected to a different SCSI bus.

## Dual-Channel SCSI HBA Cards

If you use a dual-channel SCSI HBA card, equally allocate audio files to drives connected to each of the two busses on the card for optimal performance.

If using video files, make sure to put your video files on one bus and audio files on the other bus.

---

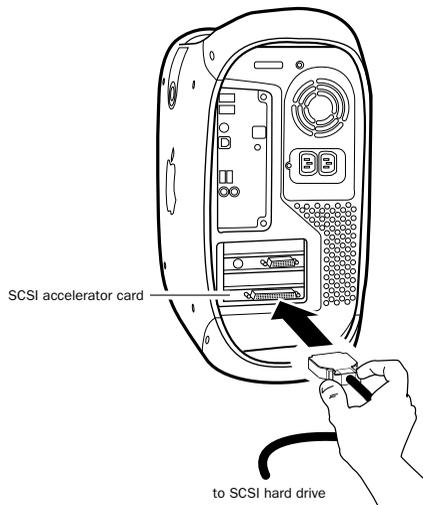
## Connecting SCSI Drives

### To connect an external SCSI drive:

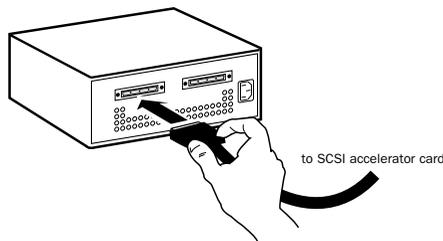
- 1 Turn off power to both the computer and the hard drive.
- 2 Attach a SCSI cable from the SCSI port of the hard drive to the SCSI port of the SCSI HBA card or computer depending on your system's SCSI requirements.
- 3 Secure the cable's connectors to the hard drive and computer. Loose cables can cause data loss.
- 4 Connect additional drives by daisy-chaining from one drive to another. Keep cable lengths to a minimum (see Table 1).

5 Verify that the last SCSI device connected is properly terminated. (See "SCSI Termination" on page 80.)

6 Attach power cables to the hard drives.



Connecting a SCSI cable to a SCSI HBA card



Connecting an external SCSI hard drive

## SCSI Termination

Your computer's SCSI chain must be properly terminated or your system will not function correctly. Only the last device on the chain should be terminated using the termination type recommended by the hard drive manufacturer.

The drive should use either an external terminator plug or have its internal terminators enabled. If you are using a terminator plug, Digidesign recommends that you purchase and use an *active* terminator.

**▲** *Do not enable internal termination and install an external terminator plug on the same drive. This will cause SCSI errors. See your hard drive's documentation for information regarding which type of termination it uses.*

---

## Quick Formatting a SCSI Drives

### Macintosh Requirements

On Macintosh systems, SCSI hard drives used for audio recording on TDM systems must be formatted (or initialized) for either the HFS or HFS+ file system. Drive partitions of up to 2 terabytes (2000 gigabytes) can be used.

TDM systems require that you use the ExpressPro-Tools software from ATTO (included with Pro Tools) for all drive formatting and partitioning; only one disk utility should be used for all drives in a system.

### Windows Requirements

SCSI hard drives used for audio recording on TDM systems must be formatted for the FAT32, or NTFS file system. Under Windows 2000 and Windows XP, NTFS drive partition sizes are almost limitless, whereas FAT32 drive partitions have a limit of 32 GB.

TDM Windows systems require that you use Microsoft Windows Disk Administration software for drive formatting and partitioning. Use only one disk utility for all drives in a system.

 *Pro Tools for Windows 2000 allows you to connect Macintosh-formatted hard drives and play sessions created on Pro Tools for Macintosh when using MacOpener from DataViz. An installer for the demo version of MacOpener is included as an installation option for Pro Tools.*

## Initializing a Macintosh Drive

### To initialize a new drive:

- 1 Turn on your hard drives, computer, and any other peripherals.
- 2 Use ATTO's ExpressPro-Tools software version 2.3.2 to initialize and partition any new hard drives.

 *Refer to the ExpressPro-Tools User's Manual.*

**▲** *If you have existing FWB-formatted drives, don't install the ExpressPro-Tools extension; this can cause a conflict. This extension is not required to use the ExpressPro-Tools software (to format new drives).*

## Initializing a Windows Drive

### To format a new drive:

- 1 Turn on your hard drives, computer, and any other peripherals.
- 2 Use Microsoft's Disk Management software, located in the Administrative Tools control panel under Computer Management > Storage.

Refer to your Windows manual or help for information on how to use the Disk Management software.

---

## General Hard Drive Maintenance Information

 *If using Macintosh drives on Windows systems, refer to "Using Macintosh Drives on Windows Systems" on page 83.*

## Formatting Drives

There are two different types of formatting: high-level formatting and low-level formatting.

 *Digidesign does not recommend low-level formatting.*

### High-Level Formatting (Initialization)

High-level formatting, or *initializing* a drive replaces the drive's directory, volume partition map and drivers. Information about the drive is created and drivers that communicate this information to the host CPU are installed. The drive itself is not erased, nor is verification performed.

### When is High-Level Formatting Necessary?

It is generally necessary to high-level format a hard drive in one of the following cases:

- ◆ If a new drive is being prepared for use on a computer for the first time and the drive is not already high-level formatted.
- ◆ If you suspect that the directories containing the drive's information have become corrupted.
- ◆ If a drive is being changed from one platform to another. For example if you are switching from a Macintosh to a Windows-based system, or from a Windows to a Macintosh-based system, the drive must be high-level re-formatted for the new operating system.

### Low-Level (Physical) Formatting

Low-level formatting means completely erasing the hard drive and rewriting each sector address on the drive. In low-level formatting, the sector and track addresses, error-correction codes, and other details are written on the platters of the hard drive in the form of a magnetic pattern. A low-level format permanently erases all data on the drive.

### When is Low-Level Formatting Necessary?

Virtually all hard drives come pre-formatted from the manufacturer. Low-level formatting is generally unnecessary except in rare circumstances. They are:

- ◆ If you want to change the Block Size of the drive. This is not recommended by Digidesign. Digidesign systems only recognize 512-byte blocks.
- ◆ If you want to perform permanent deletion of data.
- ◆ If you want to clean a drive that is being migrated from one operating system to another (for instance, from UNIX to Macintosh).

Should you decide low-level formatting is necessary, keep in mind that it can take up to three hours or more (depending on the size of the drive). Avoid power interruptions and computer bus resets during the format operation or permanent damage to the drive could occur. In addition, leave the drive powered on for at least 30 minutes prior to formatting so that the drive has time to make any necessary thermal adjustments or recalibrations.

## Partitioning Drives

Partitioning divides a physical drive into multiple, unique volumes, almost as if you were creating virtual hard drives. Partitioning is usually performed when the drive is high-level formatted (Macintosh) or initialized (Windows).

 *Mac OS 7.6.1 and above allows drives larger than 4096 MB to be seen as whole volumes. Drives must be initialized with ExpressPro-Tools (or another utility) that recognizes the 2 terabyte limit. Single files cannot exceed 2048 MB in size.*

 *Windows 2000 allows drives formatted with the NTFS or FAT32 file systems to be seen as whole volumes. Single Pro Tools audio files cannot exceed 2048 MB in size.*

## Seek Times on Partitioned Drives

Seek times are actually faster on partitioned drives (assuming that reads and writes are performed on a single partition), since the heads only have to seek within the partition boundaries, rather than the whole capacity of the drive.

In addition, smaller partitions perform faster than larger partitions. However, this comes at the expense of contiguous storage space. When you partition a drive, you will need to find the compromise that best suits your performance and storage requirements.

 *Avoid distributing audio files within a session over different partitions on the same drive since this will adversely affect drive performance.*

## Avoiding File Fragmentation

For maximum recording and playback efficiency, data should be written to your hard drive in a contiguous fashion—minimizing the seek requirements to play back the data. Unfortunately, your computer can't always store the sound files in this way and must write to disk wherever it can find space.

In multitrack recording, audio tracks are written in discrete files, spaced evenly across the disk. While fragmentation of individual files may be zero, the tracks may be far enough apart that playback will still be very seek-intensive. Also, the remaining free space on the disk will be discontinuous, increasing the likelihood of file fragmentation on subsequent record passes.

Increased fragmentation increases the chance of disk errors, which can interfere with playback of audio, and result in performance errors.

 *On Windows, to avoid fragmentation, format drives with higher cluster sizes (such as 32K).*

 *On Macintosh, if Norton Utilities is used, it must be Norton Utilities v4.0 or later to ensure compatibility with HFS+ drives.*

## Optimizing (Defragmenting) Drives

To prevent fragmentation, you can optimize your drive, which rearranges your files into a contiguous format. Most optimizing software lets you run a check on a drive to find out the percentage of fragmentation. If your drive shows moderate to heavy fragmentation, you should consider optimizing it.

If you use your system for intensive editing, or if you frequently delete audio or fade files from your hard drive, you may need to optimize your drives on a weekly basis, or even every few days, since it doesn't take long for even a large hard drive to become fragmented.

## Backing Up Data Before Optimizing

Since your files will be rewritten by the optimization process, always make a backup copy of the data on your hard drive before you optimize it. You should also use a hard drive utility to find and repair any problems before optimizing data. If there is any damage to your hard drive's directories prior to optimizing, serious data loss may result.

---

## Using Macintosh Drives on Windows Systems

Pro Tools for Windows lets you record and play back sessions directly from a Macintosh-formatted (HFS or HFS+) drive connected to a Windows system. This functionality requires that all Macintosh session and audio files be stored on Macintosh-formatted drives.

To mount HFS or HFS+ drives on a Windows system, you must use the MacOpener™ software utility by DataViz. An installer for the demo version of MacOpener is included as an installation option for Pro Tools.

 For details on sharing sessions between Macintosh and Windows systems, see the *Pro Tools Reference Guide*.

## Installing the MacOpener Utility

If selected during Pro Tools installation, the MacOpener installer was placed on your hard drive in the following location:

*<user selected folder>\Digidesign\Utilities\MacOpener 2000 Demo*

### To Install MacOpener:

- 1 Quit Pro Tools if it is open.
- 2 Locate the macopener executable (.exe) file in the above location and double-click it to launch the installer.
- 3 Follow the on-screen instructions to install MacOpener.
- 4 When installation is complete, restart your computer.

## **Enabling the MacOpener Driver**

When you are finished installing MacOpener, the MacOpener driver must be enabled to mount HFS and HFS+ drives.

### **To enable the settings on the MacOpener Driver:**

- 1** Choose Start > Programs > MacOpener 5.0 > MacOpener Driver Preferences.
- 2** Under Driver Settings, select Enable MacOpener Driver.
- 3** Under Extension Mapping, select Do not add the PC extension to the Mac file name.

## **Mounting HFS Drives**

If the MacOpener utility is installed and enabled, no additional steps are required to mount HFS drives. They appear as normal system drives after you connect them and restart your computer.

## **Formatting and Maintaining HFS and HFS+ Drives**

Although you can use MacOpener to format HFS and HFS+ drives from a Windows machine, it is not recommended for use with Pro Tools. We recommend that you connect the drives to a Macintosh computer (if possible) and use the ExpressPro-Tools software from ATTO (included on the Mac Pro Tools CD-ROM).

## appendix b

# DigiTest Error Codes

For the latest version of DigiTest, refer to the Digidesign Web site:

[www.digidesign.com](http://www.digidesign.com)

### *DigiTest Error Codes*

Code	Description
Err3	Cards from different Pro Tools systems are incorrectly mixed. See the configuration chapters.
Err4	Cards marked with this error are installed in the wrong order. See the configuration chapters.\.
Err5	Too many cards of this type are installed in the system. Refer to the Digidesign Web site for compatibility information: <a href="http://www.digidesign.com/compato/">www.digidesign.com/compato/</a>
Err6	A card is installed in a reserve slot. For example, a Digidesign card is installed in the slot reserved for the Expansion Chassis Host Interface card. Refer to the configuration chapters, as well as related installation guides.
Err1220	SCSI Accelerator card is installed in the wrong slot. See the configuration chapters for correct location of the card.
Err1221	Expansion Chassis Host Interface card is installed in the wrong slot. See configuration for correct location of the card.



## appendix c

# Configuring OMS

OMS stores a description of your MIDI studio in *Studio Setup* documents, which are edited in the *OMS Setup* application. Once OMS is configured, your music applications know which MIDI devices you are using by referencing the current Studio Setup document.

## Configuring a New Studio Setup in OMS

(First-Time OMS Users Only)

When launching Pro Tools the first time, the OMS software will prompt you to create a new studio setup if OMS was not previously configured. OMS can also be reconfigured by launching the OMS Setup application (from your OMS folder).

Before configuring OMS, make sure your MIDI interfaces and devices are connected according to the manufacturer's instructions and powered on.

**To configure a New Studio Setup in OMS:**

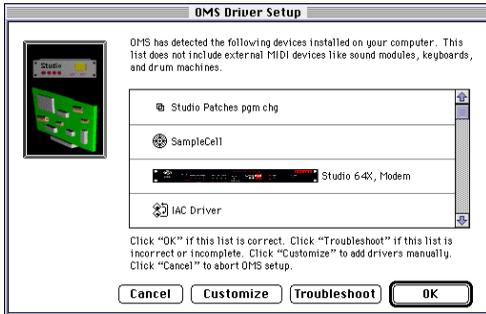
- 1 When prompted to configure a New Studio Setup, click OK.
- 2 If using a USB or PCI-based MIDI interface, leave both ports unchecked. Click Search.



**Ports for OMS Driver Search**

OMS searches for and displays any detected MIDI interfaces, MIDI cards, and OMS drivers. If your interface is not detected, click *Troubleshoot*. Once your interface *is* detected, you are prompted to search for MIDI instruments connected to your interface.

3 Click OK to search for MIDI devices connected to your MIDI interface. To be detected, the device must be turned on and have both of its MIDI ports connected to your MIDI interface.



### OMS Driver Setup

OMS searches for and displays any detected MIDI devices. Some older instruments, as well as some newer ones, may not be recognized by the OMS auto-detection routines.



### Undefined OMS device

Devices not recognized by OMS appear with a red question mark and are named based on the interface or port to which they are connected. These devices can be defined as necessary within the OMS Setup application (see “Defining MIDI Devices in OMS” on page 88).

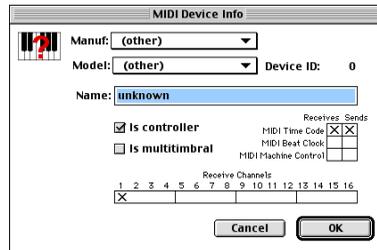
4 Click OK to save your Studio Setup document.

## Defining MIDI Devices in OMS

### To define a MIDI device in OMS Setup:

1 Double-click the device’s icon in the Studio Setup window.

2 In the MIDI Device Info dialog, select the Manufacture and Model for the device from the pop-up menus. If the device is not listed, leave the Model set to “other” and enter a name for the device.



### Defining a MIDI device

3 Select the receiving channel for the device. If receiving multiple channels, select the option for “Is Multitimbral.”

4 If you will record from the device in Pro Tools, select the option for “Is Controller.” If the device will be a source or destination for MIDI Time Code, Beat Clock, or MMC, select the appropriate option.

5 Click Ok.

## Disabling Serial DMA in OMS

Pro Tools requires that you deselect the “Use Apple Serial DMA Driver When Available” option in OMS Setup. If you do not disable this option, problems will occur with MIDI and synchronization functions in Pro Tools.

### To disable Serial DMA in OMS:

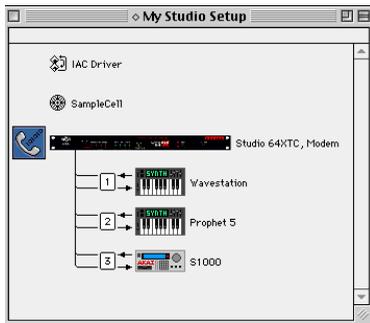
- 1 Double-click the OMS Setup application.
- 2 Choose Edit > Preferences.
- 3 Deselect “Use Apple Serial DMA Driver When Available” and click OK.
- 4 Quit OMS Setup.
- 5 Reboot your computer.

## MIDI Machine Control and the IAC Driver

If you are planning to use MIDI Machine Control (MMC) for Pro Tools synchronization with other MMC-capable devices or applications, you must rename the OMS IAC Driver and remove the infinity symbol (“∞”) from its name. If you do not do this, MMC will not function properly.

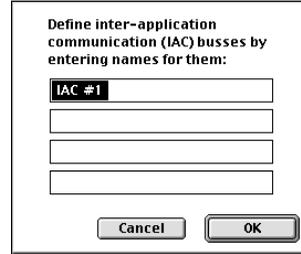
### To edit the IAC driver’s name:

- 1 Double-click the OMS Setup application.
- 2 In the Studio Setup window, double-click the IAC driver.



Studio Setup window with IAC Driver

- 3 Rename “∞ IAC bus #1” to “MMC” and click OK.



### Renaming the IAC Driver

- 4 Save your changes.
- 5 Quit OMS Setup.



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