Pro Tools

TDM Installation Guide

Version 5.1 for Macintosh

digidesign®

A division of **Avid**.

contents

Pro Tools TDM System Requirements

Pro Tools TDM Systems

Pro Tools 5.1 supports the following TDM systems.

Pro Tools 24 MIX and MIXplus

A core system includes:

- MIX Core card
- MIX Farm card (MIXplus only)
- Pro Tools software
- Digidesign audio interface
  (sold separately)

A core system provides:

- Up to 64 tracks of recording and playback of 24-bit and 16-bit audio files
- TDM digital mixing and DSP plug-in environment
- Non-linear, random-access editing and mix automation
- MIDI recording, playback and editing

Pro Tools 24

A core system includes:

- d24 Audio card
- DSP Farm card
- Pro Tools software
- Digidesign audio interface
  (sold separately)

A core system provides:

- Up to 32 tracks of recording and playback of 24-bit and 16-bit audio files
- TDM digital mixing and DSP plug-in environment
- Non-linear, random-access editing and mix automation
- MIDI recording, playback and editing

⚠ Pro Tools 24 requires a MIX Farm card to support up to 64 tracks.

Audio Interfaces

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

888/24 I/O

◆ Analog: XLR (balanced or unbalanced) connectors, +4 dBu or –10 dBV

◆ Digital: XLR (AES/EBU) or RCA (S/PDIF) connectors

882/20 I/O

◆ Analog: 1/4" TRS (balanced or unbalanced) connectors, +4 dBu or –10 dBV

◆ Digital: RCA (S/PDIF) connectors

1622 I/O

◆ Analog: 1/4" TRS (balanced or unbalanced) connectors. Inputs are variable from +4 dBu to –10 dBV; outputs are selectable between +4 dBu or –10 dBV

◆ Digital: RCA (S/PDIF) connectors

Digidesign ADAT Bridge I/O

◆ Analog: 1/4" TRS (balanced) connectors, +4 dBu or –10 dBV

◆ Digital: XLR (AES/EBU) or RCA (S/PDIF) connectors

◆ Optical: Two pairs of EIAJ fiber optic connectors

System Requirements

The CPU, hard disk, monitoring and MIDI requirements for Pro Tools differ depending on your system configuration. 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/

Computer Requirements

◆ A Digidesign-qualified Power Macintosh computer with:

- At least 128 MB RAM; 192 MB RAM recommended
- Additional RAM is highly recommended if you plan to use other audio or MIDI applications concurrently with Pro Tools; virtual memory is not supported

◆ Apple System software version 9.0 or later

◆ System Utility software (included with Pro Tools):

- OMS (Open Music System) software version 2.3.8 or later
- Apple QuickTime System Extension version 4.0 or later
- ATTO ExpressPro-Tools version 2.3.2 or later

◆ A 17-inch or larger color monitor; black and white monitors are not supported

◆ A Digidesign-qualified floppy drive, along with the appropriate driver software (included on the Pro Tools Installer CD-ROM); required to authorize most plug-ins

Hard Drive Requirements

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

To provide full 64-track, 24-bit, 48 kHz performance, a TDM system must include at least two Digidesign-qualified SCSI hard drives attached to a qualified SCSI HBA (host bus adapter) card.

For 64-track sessions that have substantial edit densities (such as one edit every third of a second across 64 voices) or large amounts of cross-fades, up to four SCSI drives may be required, allocated with 16 tracks per drive and two drives per SCSI channel.

Dedicated internal IDE/ATA drives can provide 32-track performance to all TDM systems.

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

www.digidesign.com/compato/

Older Power Macintosh Computers

Power Macintosh 9500 and 9600 computers have two SCSI busses: an internal fast SCSI bus and an external narrow SCSI bus. On these machines, sessions with higher track counts and high edit density require a SCSI HBA card. For optimum performance without a SCSI HBA card, use the internal fast SCSI bus.

⚠ For higher track counts on Power Macintosh 9500, 9600, and Beige G3 computers, avoid using the external narrow SCSI drive.

MIDI Requirements

Both USB and serial MIDI interfaces work effectively with Pro Tools. Serial MIDI interfaces offer the tightest possible MIDI timing.

Serial MIDI interfaces require either a Mac serial port or a qualified modem-to-serial port adapter (thereby not using a PCI slot). Refer to the Digidesign compatibility page for supported adapters:

www.digidesign.com/compato/

Digidesign Registration

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

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

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 slightly better performance when recording to large numbers of tracks; attempting to record to a large number of audio tracks with an ATA/IDE drive will result in a short delay before recording begins.

SCSI Requirements

High-Performance SCSI Drives and SCSI Host Bus Adapters

To provide full 64-track, 24-bit, 48 kHz performance, a Pro Tools TDM system must include at least two Digidesign-qualified SCSI hard drives attached to a qualified SCSI HBA host bus adapter (HBA) card.

For 64-track sessions that have substantial edit densities (such as one edit every third of a second across 64 voices) or large amounts of crossfades, up to four SCSI drives may be required, allocated with 16 tracks per drive and two drives per SCSI channel.

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

⚠ *Pro Tools 24 requires a MIX Farm card (or the discontinued Pro Tools 24 Expansion Kit) to support up to 64 tracks.*

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

www.digidesign.com/compato/

⚠ *Software RAID is not supported for audio drives.*

Older Macintosh Computers

Power Macintosh 9500 and 9600 computers have two SCSI busses: an internal fast SCSI bus and an external "narrow" SCSI bus. On these machines, sessions with higher track counts and high edit density require a SCSI HBA card. For optimum performance without a SCSI HBA card, use the internal fast SCSI bus.

For higher track counts on Power Macintosh 9500, 9600, and Beige G3 computers, avoid using the external narrow SCSI drive.

SCSI Cables

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

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	12 meters	16

Disk Space for Audio Tracks

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

Using these guidelines:

- 64 mono tracks of 24-bit audio takes up about 480 MB of hard drive space per minute.
- 64 mono tracks of 16-bit audio takes up about 320 MB of hard drive space per minute.
- 32 mono tracks of 24-bit audio takes up about 240 MB of hard drive space per minute.
- 32 mono tracks of 16-bit audio takes up about 160 MB per minute.

A 9-gigabyte drive holds:

- 18 minutes of 64 tracks, 24-bit audio
- 28 minutes of 64 tracks, 16-bit audio
- 37 minutes of 32 tracks, 24-bit audio
- 56 minutes of 32 tracks, 16-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 SCSI drives. See the *Pro Tools Reference Guide* for details.

Separate Video and Audio Files

If you are working with imported movies, 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.

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 7.)

6 Attach power cables to the hard drives.
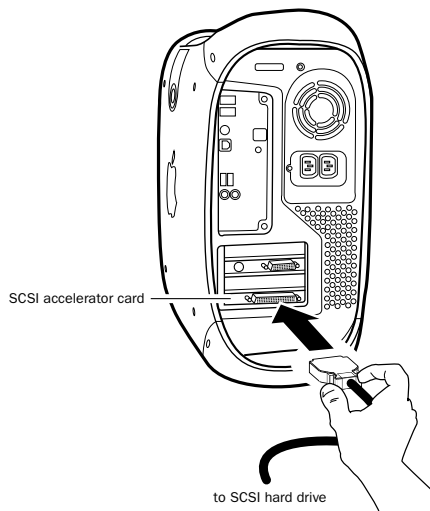
Connecting a SCSI cable to a SCSI HBA card
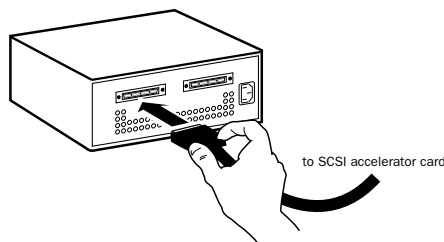
Connecting an external SCSI hard drive

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.*

Initializing and Maintaining SCSI Drives

SCSI hard drives used for audio recording on TDM systems must be formatted (or initialized) for either the HFS or HFS plus 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.

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).*

Formatting Drives

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

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.

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 initialize 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 initialized.

◆ If a drive is being changed from one platform to another. For example if you are switching from a Windows to a Macintosh-based system, the drive must be reinitialized for the new operating system.

◆ If you suspect that the directories containing the drive's information have become corrupted.

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 initialized.

⚠ *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.*

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 discontiguous, 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.

⚠ 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

For compatibility with Macintosh-based 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. A demo version of MacOpener is included with Pro Tools Windows.

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

Installing the MacOpener Utility

To use Macintosh-formatted HFS or HFS+ drives, you will need to install the MacOpener software utility. The MacOpener installer was placed on your hard drive when you installed Pro Tools, in the following location:

Program Files\Digidesign\Pro Tools Utilities\ MacOpener Demo

To Install MacOpener:

1 Locate the Setup.exe file in the above location and double-click it to launch the installer.

2 Follow the on-screen instructions to install MacOpener.

3 After installation is complete, restart your computer.

Enabling the MacOpener Driver

After installing MacOpener, the MacOpener driver must be enabled to mount HFS and HFS+ drives.

To enable the MacOpener Driver:

1 From the Start menu, choose Programs > MacOpener > 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 an HFS Drive

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

Formatting and Maintaining HFS (and HFS+) Drives

While it is possible to use MacOpener to format HFS (and HFS+) drives from a Windows machine, this can yield unpredictable results. If you need to format an HFS drive, connect it to a Macintosh computer and use the ExpressPro-Tools software from ATTO (included with Pro Tools).

Don't Use Windows Disk Utility Software on HFS Drives

Disk utility software for the Windows platform (such as Norton Utilities for Windows) should *not* be used on HFS drives. These utilities do not recognize HFS-formatted drives and may try to reformat them. This could cause format errors on the HFS drive and result in data loss.

If you need to perform disk maintenance on an HFS-formatted drive, connect the drive to a Macintosh computer and use a Macintosh utility.

chapter 3

Installing Pro Tools Hardware

Pro Tools TDM Cards

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

📓 *If you are installing an expanded system in your computer, or 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 24 MIX Hardware

Pro Tools 24 MIX hardware comes in two configurations:

Pro Tools 24 MIX Includes a single MIX Core card and a 5-node TDM ribbon cable for connecting to other optional TDM-equipped cards.

Pro Tools 24 MIXplus Includes a MIX Core card, a MIX Farm card, and a 5-node TDM ribbon cable for connecting the MIX Core to the MIX Farm and other optional TDM-equipped cards.

The MIX Core Card

The MIX Core card provides 24-bit, 64-track, 16-channel I/O, direct-to-disk recording and playback to your Pro Tools 24 MIX system, as well as DSP power for its mixing and processing capabilities.

audio interface port
DigiSerial port
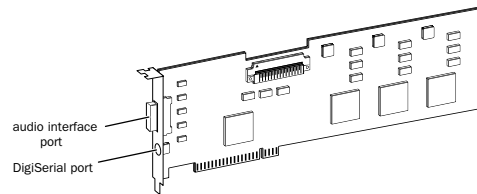
MIX Core card

This card includes a connector for attaching a single 888/24 I/O, 882/20 I/O, or 1622 I/O Audio Interface. If you purchase the optional 16-channel peripheral cable adapter, you can attach two 8-channel audio interfaces. The Digi-Serial port is for connecting a Digidesign Universal Slave Driver, or a 9-pin device for use with the Pro Tools MachineControl option.

The MIX Farm Card

The MIX Farm card provides more DSP power for mixing, processing, and DSP software such as the DigiRack plug-ins included with Pro Tools. It also provides a connector for attaching a single 888/24 I/O, 882/20 I/O, or 1622 I/O Audio Interface. If you purchase the optional 16-channel peripheral cable adapter,

you can attach two 8-channel audio interfaces. The DigiSerial port is for connecting a Digidesign Universal Slave Driver, or a 9-pin device for use with the Pro Tools MachineControl option.

MIX Farm card

Pro Tools 24 Hardware

Pro Tools 24 system hardware consists of a d24 audio card, a DSP Farm card, and a 5-node TDM ribbon cable for connecting them.

The d24 Audio Card

The d24 audio card provides 24-bit, 32-track, 16-channel I/O, direct-to-disk recording and playback capabilities to your Pro Tools 24 system. 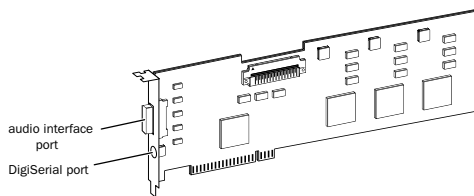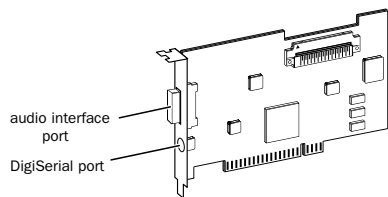It also provides a connector for attaching a single 888/24 I/O, 882/20 I/O, or 1622 I/O Audio Interface. If you purchase the optional 16-channel peripheral cable adapter, you can attach two 8-channel audio interfaces.

d24 card

The DigiSerial port is for connecting an optional Digidesign Universal Slave Driver, or a 9-pin device for use with the Pro Tools MachineControl option.

The DSP Farm

The DSP Farm provides the power for the Pro Tools 24 system's mixing and processing capabilities. It powers DSP software such as the DigiRack plug-ins included with Pro Tools. It also provides a connector for attaching an 8-channel audio interface.
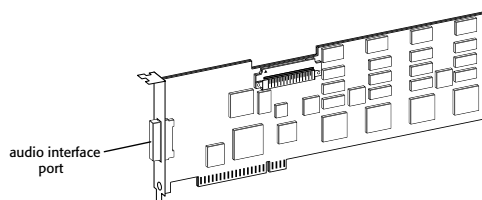
DSP Farm card

⚠ *The 1622 I/O Audio Interface is not supported by the DSP Farm. It must be connected to a MIX Core, MIX Farm, or d24 card. Only one 1622 I/O can be connected to any of these cards. The optional 16-channel peripheral cable adapter is not supported by the 1622 I/O.*

The TDM Ribbon Cable

The TDM ribbon cable is used to connect multiple cards in your Pro Tools system so they can share data along the TDM bus.
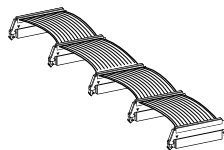
TDM Ribbon Cable

A 5-node cable comes with your system. If you plan to use your system with an expansion chassis, you can order a TDM cable with more nodes from your Digidesign dealer.

Installing the Pro Tools Cards

Install the Pro Tools cards:

1 Turn off your computer and any peripherals. Leave your computer's power cable plugged in so the computer is grounded.

2 Open the computer case. The illustrations in this section show a Blue & White Macintosh G3 and a Macintosh 9600 computer. If you are using a different model, your installation should be similar. For additional details on installing a card in your computer, refer to its User's Guide.

⚠ *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.*

3 Remove the metal access port cover behind the expansion slot you want to use by removing the screw (if present) and sliding the cover out from the access port.

4 Install the primary MIX Core or d24 card (clock master with primary audio interface) in the lowest numbered slot in your computer; to determine which slot is the lowest, refer to "Determining Slot Order" on page 57.
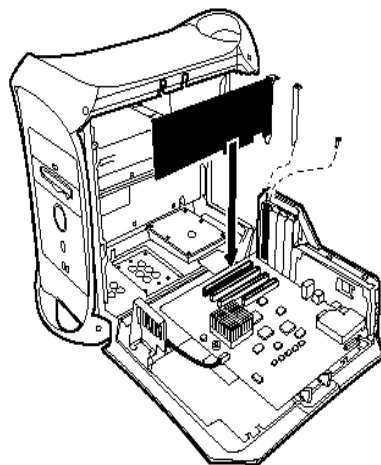
Installing a Pro Tools card in a Macintosh G3
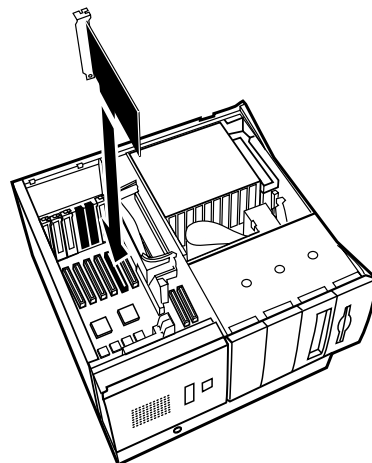
Installing a Pro Tools card in a Macintosh 9600

5 Install the remaining Digidesign cards in successive slots.

Pro Tools cards must be installed in a specific order that is dependent on the slot numbering of the model of Macintosh you are using.

📄 *See Appendix A, "Determining Slot Order" for details on determining slot order in your Power Macintosh.*

Group similar cards together (put all MIX Farm cards next to each other, for example).

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

For 9500 and 9600 computers, the SCSI HBA should reside before the video card.

Connect all TDM cards with the TDM ribbon cable:

1 Connect the first node of the cable to the first TDM card. Make sure the TDM cable is facing the right direction—align the white triangles on the cable plug with the triangle on the card.

Attaching the TDM ribbon cable to MIX Core and MIX Farm cards

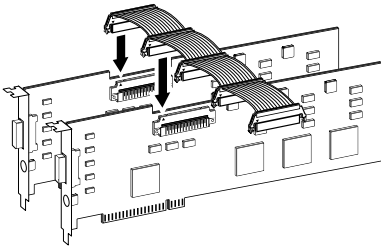**2** Push down gently but firmly until the node is fully connected to the card. When the plug is properly seated, the two tabs on the side of the cable's TDM connector will click shut. To detach the ribbon cable, squeeze the tabs on the TDM connector inward.

3 Attach the remaining nodes on the TDM cable to subsequent cards.

☆ *It is OK to have ribbon connectors that go unused. They should reside after the last TDM card.*

4 Secure the cards in place with the slot access port screws you removed earlier and close your computer.

Connecting Audio Interfaces

Pro Tools provides you with a choice of the 888/24 I/O, 882/20 I/O, *1622 I/O*, or ADAT Bridge I/O interfaces. These devices supply the inputs and outputs for your system.

▤ *For instructions on connecting an ADAT Bridge I/O, see the ADAT Bridge I/O Installation Guide.*

Connect the Pro Tools audio interfaces:

1 Connect the primary audio interface to the primary Mix Core or d24 card with the provided interface cable. The primary audio interface functions as the clock master.

2 Connect additional audio interfaces to subsequent Digidesign audio cards.

If you are connecting both 888/24 and 882/20 or 1622 I/O Audio Interfaces to your system, for best system performance, connect the 888/24 to your core Pro Tools card, followed by any additional 888/24 interfaces to the next highest-priority cards. Then connect the 882/20 or 1622 I/O interfaces to subsequent cards.

You can use Digidesign's 16-channel peripheral cable adapter (optional) to connect two 8-channel audio interfaces to a single MIX Core, MIX I/O, d24, or MIX Farm card.
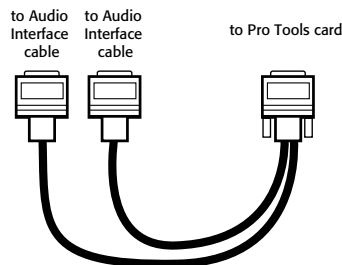
Optional 16-channel peripheral cable adapter

⚠ *The 1622 I/O Audio Interface is not supported by the DSP Farm. It must be connected to a MIX Core, MIX Farm, or d24 card. Only one 1622 I/O can be connected to any of these cards. The optional 16-channel peripheral cable adapter is not supported by the 1622 I/O.*

3 If using multiple audio interfaces, connect the Slave Clock Out of the primary interface to the Slave Clock In of the second interface with the provided BNC cable. Connect the Slave Clock Out of the second interface to the Slave Clock In of the next audio interface (and so forth).
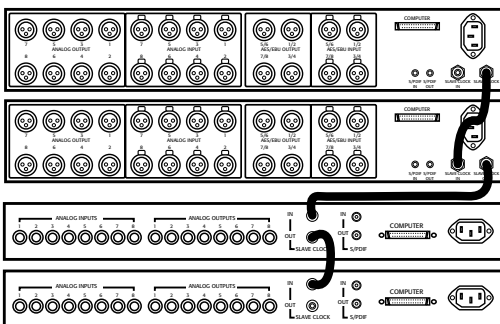
Connecting multiple audio interfaces together

chapter 4

Connecting Your Studio

This chapter explains how to connect Pro Tools to a mixer, amplification system, digital recorders, and SMPTE synchronization devices.

The information is organized according to the type of interface or Pro Tools configuration you have. Instructions are provided for:

- 888/24 I/O
- 882/20 I/O
- 1622 I/O

📄 *If you have an ADAT Bridge I/O interface, refer to the ADAT Bridge I/O User's Guide for details on connecting it to your studio.*

At the end of the chapter is general information on connecting Pro Tools to digital equipment, effects units, MIDI gear, and SMPTE synchronization devices.

The 888/24 I/O Interface

This section explains each of the connectors and indicators on the front and back panels of the 888/24 I/O interface, how they are used, and offers suggestions for connecting the 888/24 I/O to your studio.

888/24 I/O Front Panel

The 888/24 I/O has the following front panel indicators, moving from left to right:
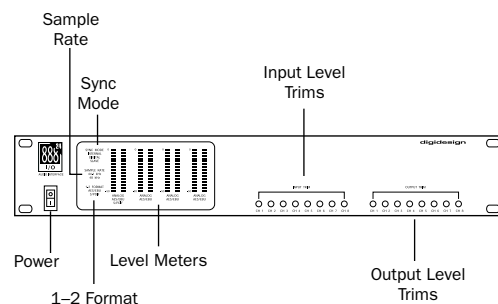
Front panel of the 888/24 I/O

Power

This switch applies power to the 888/24. The "I" position is on. The "O" position is off.

Sync Mode

The Sync Mode LEDs indicate which sample rate clock reference is currently used by the analog-to-digital converters (ADCs) and the digital-to-analog converters (DACs).

Internal This is the 888/24 I/O standard setting. In this mode, the 888/24 I/O sample rate is generated by its internal crystal oscillator (whose frequency is determined by the Sample Rate setting in the Session Setup window). Internal mode should be active whenever the 888/24 I/O is not synchronized to an external clock source.

Digital This setting indicates that an AES/EBU or S/PDIF word clock signal is currently the source for the 888/24 I/O sample rate. This is the setting to use for inputting material from DAT recorders or other digital devices.

To use the 888/24 I/O digital inputs and outputs as effects sends and returns to digital effects devices, you should set the 888/24 I/O to Internal mode. You should then set the digital effects device to accept an external digital clock (from the 888/24 I/O) so it synchronizes itself to Pro Tools.

The 888/24 I/O can only synchronize to and receive word clock lock on channels 1–2 of its digital inputs. To synchronize your system to an external digital clock source, it must be connected to digital inputs 1–2 of the 888/24 I/O. In an expanded Pro Tools system, the system clock is carried by the audio interface connected to the first Pro Tools card in your system. This audio interface will act as the master interface in your system. All other audio interfaces will be slaved to it.

⚠ *Because some digital audio devices do not output proper clock when they are not playing back, leaving the 888/24 I/O in Digital mode may cause Pro Tools audio playback quality to suffer, or play back at the wrong pitch. If you are using digital I/O, reset the Sync Mode from Digital to Internal after inputting material.*

Slave This LED is lit when the 888/24 I/O sample rate is synchronized to another Digidesign audio interface or synchronization peripheral. In this mode, the sample rate of the slave interface is derived from the frequency of the incoming master clock signal present at the Slave Clock In (256x) port.

The 888/24 I/O automatically switches to this mode when a Slave Clock Out signal from another Digidesign interface, Universal Slave Driver, Video Slave Driver, or SMPTE Slave Driver is connected to the 888/24 I/O Slave Clock In port.

In expanded Pro Tools systems, the Super Clock output of the master audio interface locks all other interfaces together with sample accuracy, keeping all signals phase-synchronous.

💡 *When slaving to a Digidesign Universal Slave Driver, Video Slave Driver, or SMPTE Slave Driver, set the clock source to Internal. The audio interface will automatically switch to Slave mode when it detects the 256x input clock*

Sample Rate and 1–2 Format Indicators

These LEDs indicate the sample rate of the 888/24 I/O internal crystal oscillator and the digital format (AES/EBU or S/PDIF) of the audio input signal to channels 1 and 2.

The choice of digital format for these two channels is made in the Session Setup window or Hardware Setup dialog. Digital input pairs 3–4, 5–6, and 7–8 of the 888/24 I/O are always AES/EBU. Sample Rate is set in the Session Setup window or Hardware Setup dialog in Pro Tools.

The 888/24 I/O provides the following sample rates:

48 kHz This is a standard sampling rate of many professional audio devices. It is recommended for use with devices that cannot receive digital transfers at 44.1 kHz.

44.1 kHz This is the compact disc standard sampling rate and the Pro Tools default sample rate. To avoid the need for sample rate conversion, you should use this rate when you are recording material that will ultimately be published on a compact disc.

⚠️ *When you are using an external digital source such as a DAT recorder, the front panel of the 888/24 I/O indicates only the internal oscillator sample rate, not that of the external digital source.*

Level Meters

The 888/24 I/O level meters monitor the channel outputs of Pro Tools. Input levels are monitored on-screen in the Pro Tools software.

The 888/24 I/O is factory calibrated so that a meter reading of –18 dB corresponds to the 888/24 I/O nominal operating level (which can be set to either +4 dBu or –10 dBV). If you sent the output to an analog device with a VU meter, this would correspond to "0 VU" on the VU meter.

The red LED indicators on the audio interface indicate both full-code (highest level before clipping) and clipping of Pro Tools output signals. The on-screen meters in Pro Tools software indicate clipping when at least three consecutive full-code samples follow each other.

Input Level Trims

The 888/24 I/O analog inputs are factory calibrated at a –18 dB nominal level, referenced to a full code signal. This means that at the nominal reference input level (either +4 dBu or –10 dBV), you have 18 dB of headroom before clipping. The input level trim pots allow adjustment of the 888/24 I/O input levels to match the operating level of your external equipment. Adjustments can be made with a Phillips screwdriver.

Output Level Trims

The 888/24 I/O analog outputs are factory calibrated at a –18 dB nominal level, referenced to a full code signal. This means that at the nominal reference output level (either +4 dBu or –10 dBV), you have 18 dB of headroom before clipping. The output level trim pots allow adjustment of the 888/24 I/O output levels to match the operating level of your external equipment. Adjustments can be made with a Phillips screwdriver.

To calibrate the input and output levels of the 888/24 I/O to match your mixing console or other devices in your studio, use Calibration Mode and the Signal Generator TDM Plug-In in Pro Tools.

📖 *Instructions for calibrating the 888/24 I/O appear in Chapter 7, "Calibrating the 888/24 I/O."*

888/24 I/O Back Panel

The 888/24 I/O has the following back panel connectors, moving from left to right:
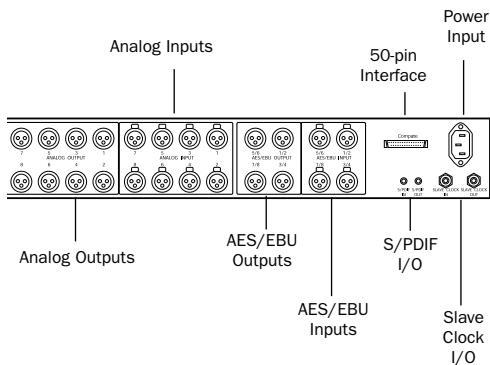
Back panel of the 888/24 I/O

Analog Audio Outputs

These are balanced male XLR connectors for analog audio output connections. All eight output channels are continuously active. The 888/24 I/O analog outputs feature 24-bit digital-to-analog converters.

Analog Audio Inputs

These are balanced female XLR connectors for analog audio input connections. The 888/24 I/O analog inputs feature 24-bit analog-to-digital converters. Because input channels 1–8 of the 888/24 I/O are software selectable in pairs between analog or digital format, analog input to a channel pair is disabled when digital input format is chosen for that channel.

The 888/24 I/O analog audio connectors are balanced XLRs with pin 2 wired hot, (or "+"); pin 3 cold, (or "–"); and pin 1 ground.

AES/EBU Digital Outputs 1–8

The 888/24 I/O AES/EBU output jacks are balanced, 3-conductor, XLR connectors which output a 24-bit digital data stream. Output is continuously active on both the AES/EBU and S/PDIF jacks even when the 888/24 I/O input selector is set to analog.

AES/EBU Digital Inputs 1–8

The AES/EBU digital format is used in many professional digital audio devices, including some DAT recorders. The interface's AES/EBU input jacks are balanced, 3-conductor XLR connectors which accept a full 24-bit digital data stream.

For AES/EBU connections, 110-ohm cables are highly recommended for use in professional installations. For best results, cable lengths should not exceed 30 meters.

Input channels 1–8 of the 888/24 I/O are software selectable in pairs between analog or digital format. Digital input to a channel pair is disabled when analog input format is chosen for that channel in the Hardware Setup dialog. Input to AES/EBU input channels 1–2 is disabled when S/PDIF digital format is chosen for these inputs in the Pro Tools Session Setup window.

50-pin Interface Connector

This 50-pin Computer connector is used to connect the 888/24 I/O to a MIX card, d24 audio card, Disk I/O card, or a DSP Farm card. The necessary cable is supplied with your audio interface. If you plan to connect two 888/24 I/O interfaces to a MIX card or d24 card, a 16-channel peripheral cable adapter is necessary. (This cable is available from your Digidesign dealer.)

S/PDIF Digital Input/Output

The Sony Philips Digital Interface Format (S/PDIF) is used in many professional and consumer CD players and DAT recorders. The 888/24 I/O S/PDIF in/out jacks are unbalanced 2-conductor phono (RCA) jacks which utilize a full 24-bit digital data stream. To avoid RF interference, use 75-ohm coaxial cable for S/PDIF transfers and keep the cable length to a maximum of 10 meters.

Because input channels 1–2 of the 888/24 I/O are software selectable between analog or digital format, input to these two digital channels is disabled when analog input is chosen or when AES/EBU digital format is chosen in the Pro Tools Session Setup window. Output is continuously active on both the AES/EBU and S/PDIF output jacks, regardless of which digital input format is selected for channels 1–2. To avoid RF interference, use 75-ohm coaxial cable for S/PDIF transfers and do not exceed a cable length of 10 meters.

Slave Clock In/Out

The Slave Clock Out jack is a standard BNC type connector that outputs a 256 times sample rate Super Clock signal for slaving and synchronizing multiple Digidesign interfaces and synchronization peripherals together.

When the 888/24 I/O Sync Mode is set to Internal, connecting a valid Slave Clock Out signal to this port will cause the 888/24 I/O to automatically switch to Slave mode. When the 888/24 I/O is the master interface or the first interface in a chain, Digital mode overrides the Slave Clock input, and an incoming Slave Clock Out signal will not switch the 888/24 I/O to Slave mode.

Because crucial timing data is passed over these ports, you should use high-quality, 75-ohm RG-59 cables for making connections, and keep total cable length to less than 3 meters between interfaces.

Power Input

This connector accepts a standard AC power cable. The interface automatically selects power (100 V to 240 V) and will automatically work with a standard modular cable to connect to AC power receptacles in any country.

Changing Operating Levels of Individual 888/24 I/O Channels

The 888/24 I/O is factory set to +4 dBu operating levels for input and output. However, the 888/24 I/O allows you to individually switch any of its analog inputs or outputs to either a +4 dBu or –10 dBV operating level by moving internal jumpers on its circuit board.
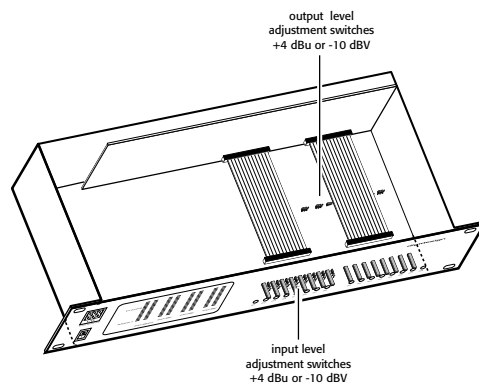
Input and output level switches inside the 888/24 I/O

To change the operating level of an input channel:

1 Turn off your computer and the 888/24 I/O.

2 With a Phillips screwdriver, remove the screws from the top of the 888/24 I/O.

3 Using the 1/16-inch hex wrench included with the 888/24 I/O, carefully remove the front four panel screws as noted on the bag containing the hex wrench.

4 Lift the top off of the 888/24 I/O.

5 Inside the 888/24 I/O chassis, next to each of the channel input trims, there is a jumper switch with a removable cap. Locate the jumper switch for the channe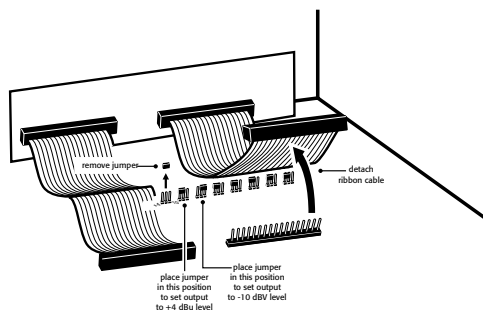l you want to modify. Gently lift the cap off the 3-pronged connector. Place it in the position corresponding to the operating level that you desire. For +4 dBu levels, it should be placed over the rear two prongs. For –10 dBV levels, it should be placed over the front two prongs.

6 After you have made the desired changes, replace the top of the 888/24 I/O.

7 Replace the four front panel screws using the hex wrench.

8 Replace the top screws with a Phillips screwdriver.
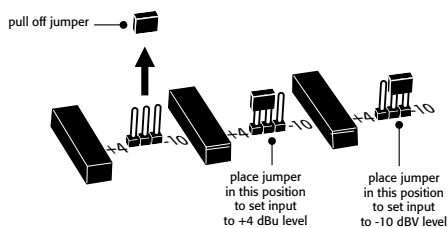
Setting the input level jumper switches

To change the operating level of an output channel:

1 Turn off your computer and the 888/24 I/O.

2 Using the 1/16-inch hex wrench included with the 888/24 I/O, carefully remove the front four panel screws as noted on the bag containing the hex wrench.

3 With a Phillips screwdriver, remove the screws from the top of the 888/24 I/O and lift the top off of the 888/24 I/O.

4 To find the channel output switches, detach the front part of the ribbon cable at the right side of the chassis. To do this, grip both sides of the black connector and gently pull up.

5 With the ribbon cable out of the way you'll see eight 3-pronged jumper switches, each with a removable cap. Locate the switch for the channel you want to modify.

Setting the output level jumper switches

6 Gently lift the cap off of the jumper switch. Place it in the position corresponding to the operating level that you desire. For +4 dBu levels, it should be placed over the left two prongs. For –10 dBV levels, it should be placed over the right two prongs.

7 After you have made the desired changes, reconnect the ribbon cable and put the top back on the 888/24 I/O.

8 Replace the four front panel screws using the hex wrench.

9 Replace the top screws with a Phillips screwdriver.

Making Signal Connections to the 888/24 I/O

Depending on how you plan to use the 888/24 I/O, the way you connect it to your studio will vary.

Choosing between +4 dBu and –10 dBV operation modes

The 888/24 I/O can be set to operate at +4 dBu or –10 dBV input and output levels (see "Changing Operating Levels of Individual 888/24 I/O Channels" on page 23). It is important that you determine which line level mode is appropriate for your studio. In +4 dBu operating mode, the 888/24 I/O is a 24-bit digital audio device capable of producing audio signals at or near +26 dBu. Check the owner's manual for your mixer, power amplifier or effects processor to see if it can handle this load. If it cannot, consider setting the 888/24 I/O to operate at –10 dBV line levels.

Consider the following when connecting a mixer:

◆ If your mixer cannot handle more than 1.5 V (RMS) inputs at +4 dBu, then you should set the 888/24 I/O to run at –10 dBV line level.

◆ If your mixer can handle up to 8.5 V (RMS) inputs, or has pads or attenuators on its inputs, then you can use the +4 dBu setting on the 888/24 I/O.

Most manuals contain device input specifications, including whether or not there are pads or attenuators. Consult the manufacturer of your mixer or power amplifier for further information.

Setting Up Your Studio

The following diagram illustrates a typical studio setup, with the 888/24 I/O connected to a mixing console, effects and other equipment.
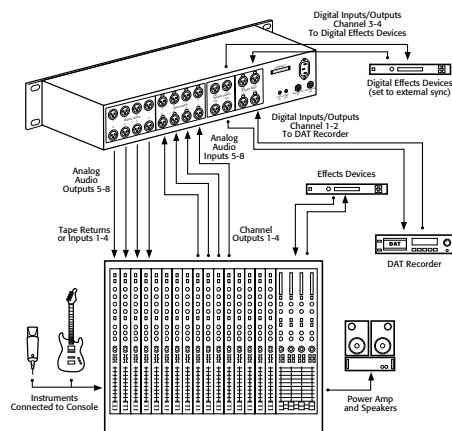
Typical studio configuration

The 888/24 I/O analog audio connectors are balanced XLRs with pin 2 wired hot (or "+"), pin 3 cold (or "–"), and pin 1 ground.

If you are connecting a balanced system, pin 1 and shield should be connected at the input only (not at the output). This will prevent ground loops between the shield and pin 1 conductor.

If you are connecting an unbalanced signal to the 888/24 I/O inputs or outputs, connect only pin 2 to the "+" signal, and pins 1 and 3 to ground at all inputs only.

Using the 888/24 I/O Interface as Standalone Audio Converter

The 888/24 I/O can be used apart from Pro Tools as a standalone 8-channel, 24-bit, analog-to-digital or digital-to-analog converter.

Before you use the 888/24 I/O in standalone mode:

1 Turn off the 888/24 I/O.

2 Do not turn on your computer while the 888/24 I/O is in standalone mode. If you do, the 888/24 I/O will stop functioning in standalone mode.

To use the 888/24 I/O as a standalone A/D converter:

1 Turn off any digital devices that may send a word clock signal to the 888/24 I/O channel 1–2 digital input ports.

2 Turn on the 888/24 I/O. The 888/24 I/O searches briefly for a word clock signal on channels 1–2 of its digital input ports.

3 If the 888/24 I/O does not detect word clock, it functions as a standalone A/D converter using its internal clock. In this mode you will use analog inputs 1–8 and AES/EBU outputs 1–8.

☼ *The default sample rate of the 888/24 I/O in standalone A/D mode is 44.1 kHz. To change this default setting to 48 kHz, you must open the 888/24 I/O and manually reset it by moving an internal jumper switch. Instructions for doing this are provided in the 888/24 I/O Installation Guide.*

To use the 888/24 I/O as a standalone D/A converter:

1 Make sure that a digital device providing a word clock signal is connected to AES/EBU inputs 1–2 of the 888/24 I/O and turned on.

2 Turn on the 888/24 I/O. The 888/24 I/O will search for a valid word clock or a word clock signal on channels 1–2 of its digital input ports.

3 When a valid word clock lock is recognized, the 888/24 I/O will enter Digital mode and function as a standalone D/A converter using AES/EBU inputs 1–8 and analog outputs 1–8.

The 888/24 I/O D/A sample rate is determined by the sample rate it detects on channels 1–2 of its AES/EBU inputs.

☼ *The 888/24 I/O defaults to listening to a digital word clock signal on channels 1–2 of its AES/EBU digital input ports. To use a S/PDIF device as your source of word clock, you must reset this default by opening the 888/24 I/O and moving an internal jumper switch. Instructions for doing this are provided in the 888/24 I/O Installation Guide. That guide also provides instructions for changing other standalone mode default parameters such as sample rate and DAC muting.*

**To return the 888/24 I/O to Pro Tools-based operation:**

■ Turn on your computer.

– or –

■ If your computer is on, launch Pro Tools.

The 882/20 I/O Interface

This section explains all of the connectors and indicators on the front and back panels of the 882/20 I/O interface, how they are used, and offers suggestions for connecting the 882/20 I/O to your studio.

882/20 I/O Interface Front Panel

The 882/20 I/O has the following front panel indicators, moving from left to right:
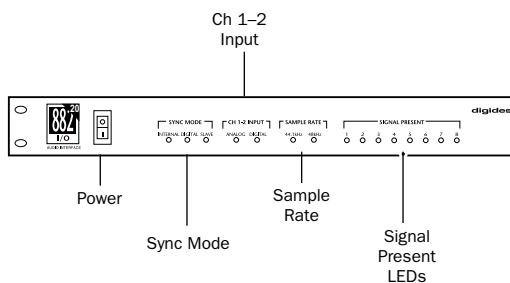
Front panel of the Digidesign 882/20 I/O

Power

This switch applies power to the 882/20. The "I" position is on. The "O" position is off.

Sync Mode

The Sync Mode LEDs indicate which sample rate clock reference is currently used by the analog-to-digital converters (ADCs) and the digital-to-analog converters (DACs).

Internal This is the 882/20 I/O standard setting. In this mode, the 882/20 I/O sample rate is generated by its internal crystal oscillator (whose frequency is determined by the Sample Rate setting in the Session Setup window). Internal mode should be active whenever the 882/20 I/O is not synchronized to an external clock source.

Digital This setting indicates that a S/PDIF word clock signal is the source for the 882/20 I/O sample rate. This is the setting you would use for inputting material from DAT machines or other S/PDIF digital devices.

To use the 882/20 I/O digital input and output as an effects send and return to a digital effects device, you should set the 882/20 I/O to Internal mode. You should then set the digital effects device to accept an external digital clock (from the 882/20 I/O) so it synchronizes with Pro Tools.

In an expanded system, the system clock is carried by the audio interface connected to the first Pro Tools card in your system. This audio interface will act as the master interface in your system, and all other audio interfaces will be slaved to it. Only the master interface allows you to set the Sync Mode. Slaved interfaces do not allow this parameter selection.

⚠ *Because some digital audio devices do not output proper clock when they are not playing back, leaving the 882/20 I/O in Digital mode may cause Pro Tools audio playback quality to suffer, or to play back at the wrong pitch. If you are using digital I/O, reset the Sync Mode from Digital to Internal after inputting material.*

Slave This LED is lit when the 882/20 I/O sample rate is synchronized to another Digidesign audio interface or synchronization peripheral. In this mode, the sample rate of the slave interface is derived from the frequency of the incoming master clock signal present at the Slave Clock In (256x) port. The 882/20 I/O automatically switches to this mode when a Slave Clock Out signal from another Digidesign interface, Universal Slave Driver, Video Slave Driver, or SMPTE Slave Driver is connected to its Slave Clock In port.

In expanded Pro Tools systems, the Super Clock output of the master audio interface locks all other interfaces together with sample accuracy, keeping all signals phase-synchronous.

♡ When slaving to a Digidesign Universal Slave Driver, Video Slave Driver, or SMPTE Slave Driver, set the clock source to Internal. The audio interface will automatically switch to Slave mode when it detects the 256x input clock.

Ch 1–2 Input

This LED indicates the format (analog or digital) of the audio input signal to channels 1 and 2. In Pro Tools, you choose analog or digital input for these two channels in the Session Setup window. Input channels 3 through 8 of the 882/20 I/O are always analog.

Sample Rate

These LEDs display the current sample rate of the 882/20 I/O internal crystal oscillator, which can be either 44.1 kHz or 48 kHz. In Pro Tools, this is set in the Session Setup window.

The 882/20 I/O provides the following sample rates:

48 kHz This is a standard sampling rate of many professional audio devices. It is recommended for use with devices that cannot receive digital transfers at 44.1 kHz.

44.1 kHz This is the compact disc standard sampling rate and the Pro Tools default sample rate. To avoid the need for sample rate conversion, you should use this rate when you are recording material that will ultimately be published on a compact disc.

⚠ When you are using an external digital source such as a DAT recorder, the front panel of the 882/20 I/O indicates only the internal oscillator sample rate, not that of the external digital source.

Signal Present LEDs

These LEDs indicate whether signal is present (above the level of –30 dB) at a given channel's output. These LEDs indicate the presence of channel output signals, not input signals. Input signals are monitored on-screen in the Pro Tools software. The LEDs do not indicate clipping. Clipping is indicated by the on-screen meters in Pro Tools software.

882/20 I/O Back Panel

The 882/20 I/O has the following back panel connectors, moving from left to right:
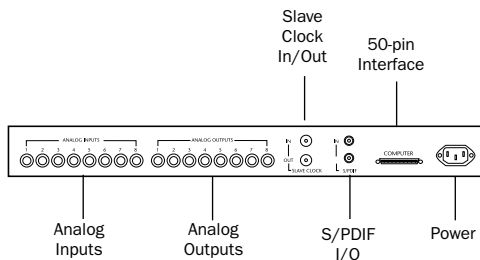
Back panel of the Digidesign 882/20 I/O

Analog Audio Inputs

These are balanced, 1/4-inch TRS jacks for analog audio input connections. The 882/20 I/O analog inputs feature 20-bit analog-to-digital converters.

Input operating levels are switchable between +4 dBu and –10 dBV operation. Unbalanced connections are supported through the use of standard 1/4-inch TRS mono phone plugs.

Because input channels 1–2 of the 882/20 I/O are software selectable between analog or S/PDIF digital format, input to these two analog channels is disabled when S/PDIF digital input format is chosen in the Pro Tools Hardware Setup dialog.

The 882/20 I/O analog inputs are factory calibrated at a –14 dB nominal level, referenced to a full code signal. This means that at the nominal reference input level (either +4 dBu or –10 dBV), you have 14 dB of headroom before clipping.

Analog Audio Outputs

These are balanced, 1/4-inch TRS jacks for analog audio output connections. The 882/20 I/O analog outputs feature 20-bit digital-to-analog converters.

All eight output channels are continuously active. Output operating levels are switchable between +4 dBu and –10 dBV operation. Unbalanced connections are supported through the use of standard 1/4-inch TRS mono phone plugs.

The 882/20 I/O analog outputs are factory calibrated at a –14 dB nominal level, referenced to a full code signal. This means that at the nominal reference output level (either +4 dBu or –10 dBV), you have 14 dB of headroom before clipping.

Slave Clock In/Out

The Slave Clock Out jack is a standard BNC type connector that outputs a 256x audio sample rate master Super Clock signal for slaving and synchronizing multiple Digidesign interfaces and synchronization peripherals together.

The Slave Clock In jack is a standard BNC type connector designed to receive a Slave Clock Out signal from another Digidesign interface, a Universal Slave Driver™, Video Slave Driver™, or SMPTE Slave Driver™ for synchronizing multiple Digidesign interfaces and synchronization peripherals together.

When the 882/20 I/O Sync Mode is set to Internal, connecting a valid Slave Clock Out signal to this port will cause the 882/20 I/O to automatically switch to Slave mode. When the 882/20 I/O is the master interface or the first interface in a chain, Digital mode overrides the Slave Clock input, and an incoming Slave Clock Out signal will not switch the 882/20 to Slave mode.

Because crucial timing data is passed over these ports, you should use high-quality, 75-ohm RG-59 cables for making connections, and keep total cable length to less than 3 meters between interfaces.

S/PDIF Digital Input/Output

The Sony Philips Digital Interface Format (S/PDIF) is used in many professional and consumer CD players and DAT recorders. The 882/20 I/O S/PDIF jacks are unbalanced, 2-conductor, phono (RCA) jacks. Because input channels 1–2 of the 882/20 I/O are software selectable between analog or digital format, input to these two digital channels is disabled when analog input is chosen in the Hardware Setup dialog in Pro Tools. Output is continuously active on the S/PDIF output jack, even if the 882/20 I/O input selector is set to Analog in the Hardware Setup dialog. To avoid RF interference, use 75-ohm coaxial cable for S/PDIF transfers and do not exceed a cable length of 10 meters.

50-pin Interface Connector

This 50-pin connector is used to connect the 882/20 I/O to a MIX card, d24, Disk I/O, or DSP Farm card. The necessary cable is supplied with your audio interface. If you plan to connect two 882/20 I/O interfaces to a MIX card or d24 card, a 16-channel peripheral cable adapter is necessary. (This cable is available from your Digidesign dealer.)

Power Input

This connector accepts a standard AC power cable. The interface automatically selects power (100 V to 240 V), and will automatically work with a standard modular cable to connect to AC power receptacles in any country.

Making Signal Connections to the 882/20 I/O

Depending on how you plan to use the 882/20 I/O, the way you connect it to your studio will vary.

Choosing between +4 dBu and –10 dBV operation modes

The 882/20 I/O can be set to operate at +4 dBu or –10 dBV input and output levels. It is important that you determine which line level mode is appropriate for your studio. In +4 dBu operating mode, the 882/20 I/O is a 20-bit digital audio device capable of producing audio signals at or near +18 dBu. Check the owner's manual for your mixer, power amplifier or effects processor to see if it can handle this load. If it cannot, consider setting the 882/20 I/O to operate at –10 dBV line levels.

Consider the following when connecting a mixer:

◆ If your mixer cannot handle more than 1.5 V (RMS) inputs at +4 dBu, then you should set the 882/20 I/O to operate at –10 dBV line level.

◆ If your mixer can handle up to 8.5 V (RMS) inputs, or has pads or attenuators on its inputs, then you can use the +4 dBu setting on the 882/20 I/O.

Most manuals contain device input specifications, including whether or not there are pads or attenuators. Consult the manufacturer of your mixer or power amplifier for further information.

Setting Up Your Studio

The following diagrams provide general suggestions for connecting studio gear to your system. Figure 1 illustrates a studio setup with the 882/20 I/O connected to a mixing console, with effects and other gear routed into the console as well.
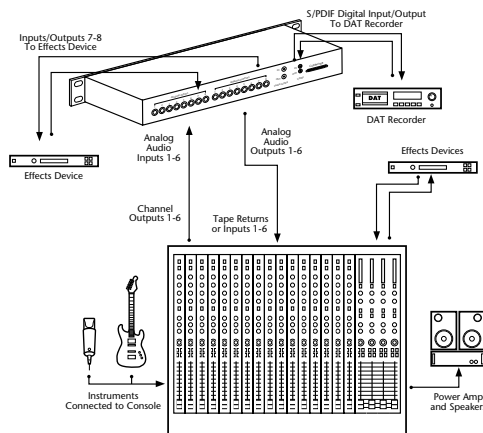
Figure 1. Typical studio configuration with mixer connections

Figure 2 diagram shows a setup without a mixer, where effects and monitoring gear are connected directly to the 882/20 I/O.
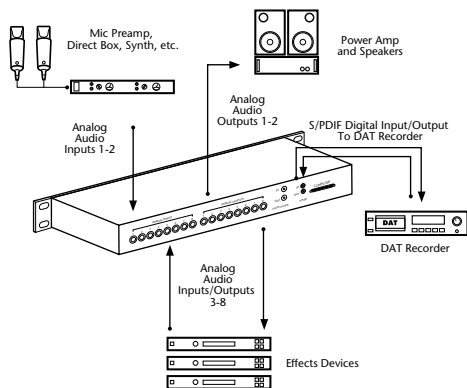

Figure 2. Typical studio configuration without a mixer

Using the 882/20 I/O Interface as Standalone Audio Converter

The 882/20 I/O can be used apart from Pro Tools as a standalone 2-channel, 20-bit, analog-to-digital or digital-to-analog converter.

⚠ *The 882/20 I/O always operates at –10 dBV when in standalone mode.*

Before you use the 882/20 I/O in standalone mode:

1 Turn off the 882/20 I/O.

2 Do not turn on your computer while the 882/20 I/O is in standalone mode. If you do, the 882/20 I/O will stop functioning in standalone mode.

To use the 882/20 I/O as a standalone A/D converter:

1 Turn off any digital devices that may send a word clock signal to the 882/20 I/O S/PDIF digital input.

2 Turn on the 882/20 I/O. The 882/20 I/O searches briefly for a word clock signal on channels 1–2 of its digital input ports.

3 If the 882/20 I/O does not detect word clock, it functions as a standalone A/D converter using its internal clock. In this mode you will use analog inputs 1–2 and the S/PDIF output.

⚠ *In standalone mode, the 882/20 only operates at a 44.1 kHz sample rate. If you want to convert analog signals into 48 kHz digital audio, you must launch Pro Tools (or any other software which supports the 882/20 I/O) to change the default sample rate.*

To use the 882/20 I/O as a standalone D/A converter:

1 Make sure that a digital device providing a word clock signal is connected to the S/PDIF input of the 882/20 I/O and that the device is powered on.

2 Turn on the 882/20 I/O. The 882/20 I/O will search for a valid word clock on its S/PDIF input.

3 When a valid word clock lock is recognized, the 882/20 I/O will enter Digital mode and function as a standalone D/A converter using the S/PDIF input and analog outputs 1–2.

The 882/20 I/O sample rate is determined by the sample rate that it detects on its S/PDIF input.

**To return the 882/20 I/O to Pro Tools-based operation:**

■ Turn on your computer.

– or –

■ If your computer is on, launch Pro Tools.

The 1622 I/O Interface

This section explains the connectors and indicators on the front and back panels of the 1622 I/O interface, how they are used, and offers suggestions for connecting the 1622 I/O to your studio.

1622 I/O Front Panel

The 1622 I/O has the following front panel indicators, moving from left to right:
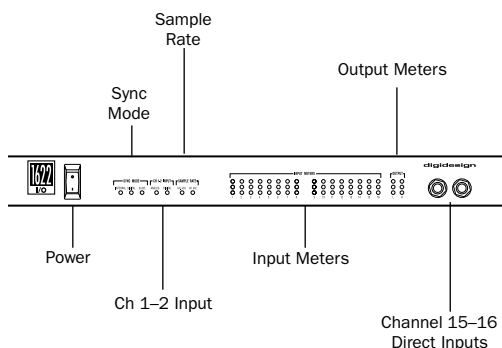
Front panel of the Digidesign 1622 I/O

Power

This switch applies power to the 1622 I/O. The "I" position is on. The "O" position is off.

Sync Mode

The Sync Mode LEDs indicate which sample rate clock reference is currently used by the analog-to-digital converters (ADCs) and the digital-to-analog converters (DACs).

Internal This is the 1622 I/O standard setting. In this mode, the 1622 I/O sample rate is generated by its internal crystal oscillator (whose frequency is determined by the Sample Rate setting in the Session Setup window). Internal mode should be active whenever the 1622 I/O is not synchronized to an external clock source.

Digital This setting indicates that a S/PDIF word clock signal is the source for the 1622 I/O sample rate. This is the setting to use for inputting material from DAT machines or other S/PDIF digital devices.

To use the 1622 I/O digital input and output as an effects send and return to a digital effects device, set the 1622 I/O to Internal mode. Set the digital effects device to accept an external digital clock (from the 1622 I/O) so it synchronizes with Pro Tools.

In expanded Pro Tools systems, the Super Clock output of the master audio interface locks all other interfaces together with sample accuracy, keeping all signals phase-synchronous.

⚠ *Because some digital audio devices do not output proper clock when they are not playing back, leaving the 1622 I/O in Digital mode may cause Pro Tools audio playback quality to suffer, or to play back at the wrong pitch. If you are using digital I/O, reset the Sync Mode from Digital to Internal after inputting material.*

Slave This LED is lit when the 1622 I/O is synchronized to another Digidesign audio interface or synchronization peripheral. In this mode, the sample rate of the slave interface is derived from the frequency of the incoming master clock signal present at the Slave Clock In (256x) port. If the Sync Mode is set to Internal, connecting a Slave Clock Out signal from another Digidesign interface or synchronization peripheral to the 1622 I/O Slave Clock In port will automatically switch it to Slave mode.

In expanded Pro Tools systems, the Super Clock output of the master audio interface locks all other interfaces together with sample accuracy, keeping all signals phase-synchronous.

When slaving to a Digidesign Universal Slave Driver, Video Slave Driver, or SMPTE Slave Driver, set the clock source to Internal. The audio interface will automatically switch to Slave mode when it detects the 256x input clock.

Ch 1–2 Input

This LED indicates the format (analog or digital) of the audio input signal to channels 1–2. In Pro Tools, you choose analog or digital input for these two channels in the Session Setup window or the Hardware Setup dialog. Input channels 3 through 16 of the 1622 I/O are always analog.

Sample Rate

These LEDs display the current sample rate of the 1622 I/O internal crystal oscillator, which can be either 44.1 kHz or 48 kHz. In Pro Tools, this is set in the Session Setup window or in the Hardware Setup dialog.

The 1622 I/O provides the following sample rates:

48 kHz This is a standard sampling rate of many professional audio devices. It is recommended for use with devices that cannot receive digital transfers at 44.1 kHz.

44.1 kHz This is the compact disc standard sampling rate and the Pro Tools default sample rate. To avoid the need for sample rate conversion, you should use this rate when you are recording material that will ultimately be published on a compact disc.

⚠ *When you are using an external digital source such as a DAT recorder, the front panel of the 1622 I/O indicates only the internal oscillator sample rate, not that of the external digital source.*

Input Meters

These LEDs indicate whether signal is present at a given channel's input. Segment 1 (green) indicates –20.0 dB. Segment 2 (yellow) indicates –3.0 dB. Segment 3 (red) indicates –0.1 dB.

Output Meters

These LEDs indicate whether signal is present at one of the two outputs. Segment 1 (green) indicates –20.0 dB. Segment 2 (yellow) indicates –3.0 dB. Segment 3 (red) indicates –0.1 dB.
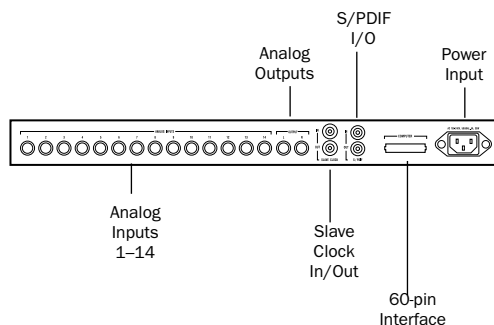
Channel 15–16 Direct Inputs

These are balanced, 1/4-inch TRS jacks for convenient front panel audio input connections.

Inputs can be individually calibrated from +4 dBu to –10 dBV line levels and higher in 2 dB gain steps, using the Other Options dialog (choose Setups > Hardware and click Other Options). This allows the 1622 I/O to accommodate any standard line-level input, including

synthesizers, samplers and effects devices. Un-balanced connections are supported through the use of standard 1/4-inch TRS mono phone plugs.

1622 I/O Back Panel

The 1622 I/O has the following back panel connectors, moving from left to right:

Back panel of the Digidesign 1622 I/O

Analog Audio Inputs 1–14

These are balanced, 1/4-inch TRS jacks for analog audio input connections.

Inputs can be individually calibrated from +4 dBu to –10 dBV line levels and higher in 2 dB gain steps, using the Other Options dialog (choose Setups > Hardware and click Other Options). This allows the 1622 I/O to accommodate any standard, line-level input, including synthesizers, samplers and effects devices. Un-balanced connections are supported through the use of standard 1/4-inch TRS mono phone plugs.

The 1622 I/O analog inputs are factory calibrated at a –14 dB nominal level, referenced to a full code signal. This means you can have up to 14 dB of headroom before clipping, depending on the input levels you set in the Other Options dialog.

Because input channels 1–2 of the 1622 I/O are software selectable between analog or S/PDIF digital format, input to these two analog channels is disabled when S/PDIF digital input format is chosen in the Pro Tools Hardware Setup dialog.

Analog Audio Outputs L-R

These are balanced, 1/4-inch TRS jacks for analog audio output connections. They carry Pro Tools main output channels 1–2. The analog outputs feature 24-bit digital-to-analog converters. Both output channels are continuously active. Output operating levels are switchable between +4 dBu and –10 dBV operation.

Unbalanced connections are supported through the use of standard 1/4-inch TRS mono phone plugs.

The 1622 I/O analog outputs are factory calibrated at a –14 dB nominal level, referenced to a full code signal. This means that at the nominal reference output level (either +4 dBu or –10 dBV), you have 14 dB of headroom before clipping.

Slave Clock In/Out

The Slave Clock Out jack is a standard BNC type connector that outputs a 256x audio sample rate master Super Clock signal for slaving and synchronizing multiple audio interfaces and synchronization peripherals together.

When the 1622 I/O Sync Mode is set to Internal, connecting a valid Slave Clock signal to the Slave Clock In port will cause the 1622 I/O to automatically switch to Slave mode. When the 1622 I/O is the master interface or the first interface in a chain, Digital mode overrides the Slave Clock input, and an incoming Slave Clock Out signal will not switch the 1622 I/O to Slave mode.

Because crucial timing data is passed over these ports, you should use high-quality, 75-ohm RG-59 cables for making connections, and keep total cable length to less than 3 meters between interfaces.

S/PDIF Digital Input/Output

The Sony Philips Digital Interface Format (S/PDIF) is used in many professional and consumer CD players and DAT recorders. The 1622 I/O S/PDIF jacks are 24-bit capable, unbalanced, 2-conductor, phono (RCA) jacks.

Because input channels 1–2 of the 1622 I/O are software selectable between analog or digital format, input to these two digital channels is disabled when analog input is chosen in the Hardware Setup dialog in Pro Tools.

Output is continuously active on the S/PDIF output jack, even if the 1622 I/O input selector is set to analog in the Hardware Setup dialog. To avoid RF interference, use 75-ohm coaxial cable for S/PDIF transfers and do not exceed a cable length of 10 meters.

60-pin Interface Connector

This 60-pin connector is used to connect the 1622 I/O to a MIX or d24 card. The appropriate interface cable is supplied with the 1622 I/O.

Power Input

This connector accepts a standard AC power cable. The 1622 I/O automatically selects power (100 V to 240 V), and will automatically work with a standard modular cable to connect to AC power receptacles in any country.

Making Signal Connections to the 1622 I/O Interface

Depending on how you plan to use the 1622 I/O, the way you connect it to your studio will vary.

Adjusting 1622 I/O Gain Levels

The 1622 I/O input levels are adjustable through the Pro Tools software to accommodate a variety of equipment output levels. For optimum fidelity and signal-to-noise performance, you should adjust these inputs according to the devices that you connect to them.

After you have set up, configured, and launched Pro Tools, refer to the instructions below for adjusting input gain levels for the 1622 I/O.

☼ *For best signal-to-noise performance, set the 1622 I/O input gain to +4 dBu when recording devices that provide this output level.*

To adjust input level gain on the 1622 I/O:

1 Connect the instrument or device to the 1622 I/O.

2 In Pro Tools, choose Setups > Hardware.

3 Click Other Options.

4 Set the input trim slider to match the output level of the connected instrument. (Refer to the manufacturer's documentation for details.) If you do not know the output level of the device, use the default input trim level, then fine tune the input level gain using the procedure below.

5 Select the desired output gain level, +4 dBu or –10 dBV, and click Done.

To fine tune the input level gain:

1 Create an Auxiliary Input track. This can be either mono or stereo depending on the device you are monitoring.

2 Set the track input to the 1622 I/O input channel you just set in the Other Options dialog.

3 Play the instrument at maximum volume, sending a steady signal to the 1622 I/O. (You will not be able to hear the input signal while adjusting your levels in this dialog, but you can see the levels on the input meters of the 1622 I/O.)

4 Note where the instrument output signal registers on the on-screen meters in Pro Tools.

5 In the Other Options dialog, adjust the channel input trim slider to increase or decrease gain until you are able to achieve maximum signal level without clipping.
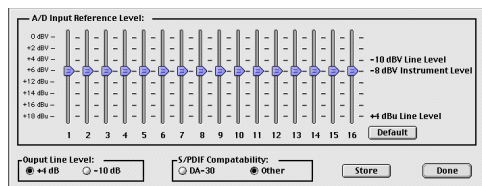
Adjusting Input Sliders in the Other Options dialog

6 Repeat as necessary for other instruments/inputs.

7 Click Store, then Done.

8 Click OK when you have finished.

☀ *Input trim level, output line level, and sample rate settings are stored in non-volatile memory so that the 1622 I/O will retain them when used in standalone mode.*

Setting Up Your Studio

The diagrams below provide suggestions for connecting studio gear to your system. Figure 3 illustrates a studio setup with the 1622 I/O connected to a mixing console, with effects and other gear routed into the console as well.
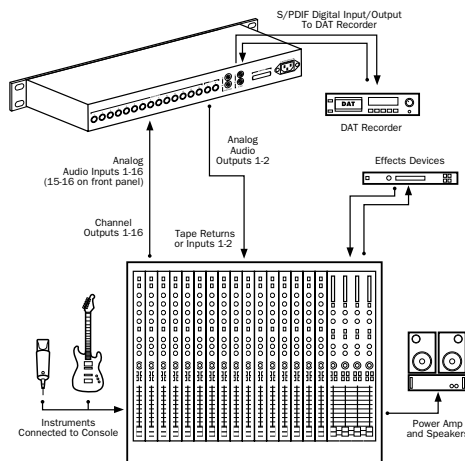

Figure 3. Typical studio configuration with a mixer

Figure 4 illustrates a setup without a mixer, where effects processors and monitoring gear are connected directly to the 1622 I/O.
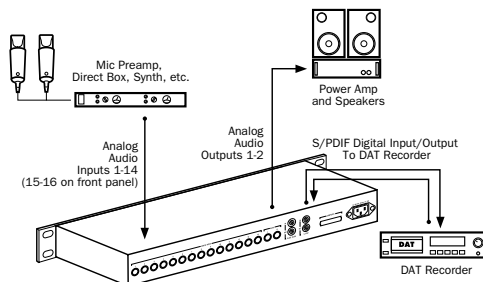

Figure 4. Typical studio configuration without a mixer

Using the 1622 I/O Interface as Standalone Audio Converter

The 1622 I/O can be used apart from Pro Tools as a standalone 2-channel, 20-bit analog-to-digital, or 24-bit digital-to-analog converter.

Input and output levels are determined by the settings last saved by clicking the Store button in the Other Options dialog (choose Setups > Hardware and click Other Options).

⚠ *If no input level settings are stored, input levels default to +4 dBu and output levels default to –10 dBV.*

There are no panning controls in standalone mode. Odd-numbered channels are hard-panned left and even-numbered channels hard-panned right. Mono instruments will play out of output L or R, but not both. Stereo instruments will play out of both outputs L and R. Output gain must be controlled directly from connected instruments.

Before you use the 1622 I/O in standalone mode:

1 Turn off the 1622 I/O.

2 Do not turn on your computer while the 1622 I/O is in standalone mode. If you do, the 1622 I/O will stop operating in standalone mode.

To use the 1622 I/O as a standalone A/D converter:

1 Turn off any digital devices that may send a word clock signal to the 1622 I/O S/PDIF digital input.

2 Turn on the 1622 I/O. The 1622 I/O searches briefly for a word clock signal on channels 1–2 of its digital input ports.

3 If the 1622 I/O does not detect word clock, it functions as a standalone A/D converter using its internal clock. In this mode you will use analog inputs 1–16 and the S/PDIF output.

To use the 1622 I/O as a standalone 24-bit D/A converter:

1 Make sure that a digital device providing a word clock signal is connected to the S/PDIF input of the 1622 I/O and that the device is powered on.

2 Turn on the 1622 I/O. The 1622 I/O will search for a valid word clock on its S/PDIF input port.

3 When a valid word clock lock is recognized, the 1622 I/O will enter Digital mode and function as a standalone D/A converter using the S/PDIF input and analog outputs 1–2.

To return the 1622 I/O to Pro Tools-based operation:

▪ Turn on your computer.

– or –

▪ If your computer is on, launch Pro Tools.

Connecting Equipment with Digital Audio Ins and Outs

Because the 888/24 I/O, 882/20 I/O, 1622 I/O, and ADAT Bridge I/O feature digital inputs and outputs, Pro Tools allows you to digitally record to or from a digital device such as a DAT recorder. The 888/24 I/O and ADAT Bridge I/O provide both AES/EBU and S/PDIF digital audio input and output. The 882/20 I/O and 1622 I/O provide S/PDIF digital audio input and output.

If you plan to use a DAT player, CD recorder, or other digital input and output device with your Pro Tools system, be sure the external device supports either the AES/EBU or S/PDIF format. Your interface's AES/EBU inputs and outputs should only be connected to another AES/EBU device. Likewise, its S/PDIF inputs and outputs should only be connected to another S/PDIF device.

To connect your Pro Tools system to a DAT recorder:

1 Connect the digital output of the audio interface to the digital input of the DAT deck. Audio channels 1 and 2 will be sent out of these outputs.

2 Connect the digital output of the DAT to the digital input of the audio interface. The DAT recorder will be routed to Pro Tools inputs 1 and 2.

Connecting Effects Units

The 888/24 I/O, 882/20 I/O, 1622 I/O, and ADAT Bridge I/O audio interfaces allow you to connect effects units to your system by using any analog (or digital) inputs/outputs as Auxiliary Inputs/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 32-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 & returns to a digital effects device, set your interface to Internal mode (unless it is already synchronized to an external clock

source such as a DAT deck). You should then set your digital effects devices to accept an external digital clock so that they will synchronize themselves to Pro Tools. In the Pro Tools Hardware Setup dialog, set the input of the channel pair to which you have connected the digital effects device to Digital, and set the Sync Mode to Internal.

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 tracks, syncing to MIDI Time Code or MIDI beat clock (this requires an appropriate MIDI interface) and the use of MIDI Controllers.

📖 *For information on configuring a MIDI control surface for use with Pro Tools, see the Pro Tools MIDI Control Surfaces Guide.*

📖 *Blue & White Macintosh G3 computers require additional hardware to allow MIDI connections. Refer to Chapter 1 of this guide for more information.*

To connect MIDI devices to your system:

1 Connect the MIDI interface to your computer according to the MIDI interface's documentation.

⚠ *On 9600, 9500, and Beige G3 Power Macintosh computers, connect the MIDI interface to the modem port. MIDI timing data output through the modem port is more accurate than that output through the printer port.*

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.

📖 *See Chapter 5, "Installing Pro Tools Software" 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. This section provides setup suggestions for synchronizing Pro Tools to audio or video tape. For details on SMPTE and synchronization, see the *Pro Tools Reference Guide*.

Pro Tools and Synchronization

Pro Tools supports a type of SMPTE synchronization known as SMPTE Trigger through the use of SMPTE-to-MIDI Time Code converters. This type of synchronization allows Pro Tools to chase and start (or stop) playback and recording while slaved to other systems. With SMPTE Trigger alone, once playback or recording starts, there is no further synchronization, and Pro Tools will play back at a rate determined by the internal clock of the audio interface or selected external clock source.

For fairly short pieces of audio program material, SMPTE Trigger is acceptable, especially if the sync master has a fairly stable transport or is resolved to house sync or a black burst generator. In this case, the master transport and Pro Tools will probably not drift very far apart in such a short period of time.

Trigger Sync for Audio Post Applications
(recommended for short duration audio regions)
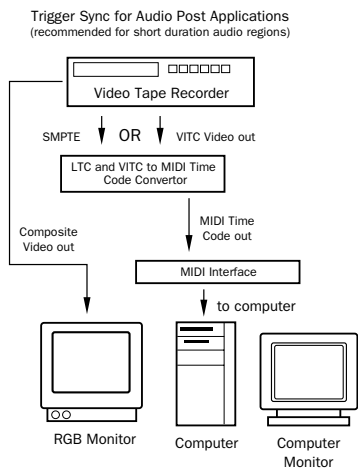
Synchronization setup using SMPTE Trigger alone

On the other hand, if the audio piece is several minutes long, or if the sync master has an unstable transport (as in the case of a low quality recording deck striped with SMPTE, for example), SMPTE Trigger alone is probably not an acceptable solution, since the two systems may drift apart noticeably over the duration of the source material.

A better alternative is to use Digidesign's Universal Slave Driver.

The Digidesign Universal Slave Driver

The Universal Slave Driver (USD) is a multi-purpose synchronization peripheral that provides virtually all of the functions and connections needed to achieve synchronization to a variety of devices.

The USD allows synchronization of Pro Tools to Linear Time Code (LTC), external video black burst, or word clock signal. It supports all major industry-standard clocks and formats and can also act as a standalone MIDI Time Code (MTC) or VITC reader/generator.

In addition, the Universal Slave Driver 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.

LTC or VITC-locked Sync for music/audio applications
with Digidesign's Universal Slave Driver
(for resolving to LTC or VITC)
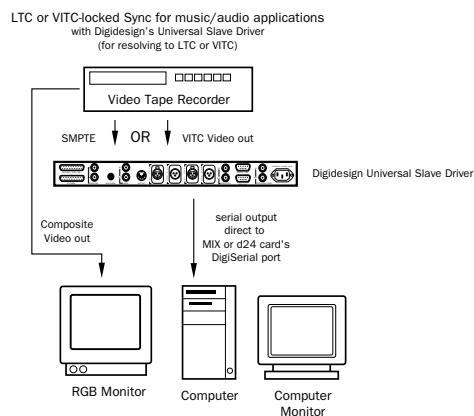
Synchronization setup using a USD

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 serial number and configure hardware. Instructions for this begin in "Launching Pro Tools the First Time" on page 49.

📓 *If you haven't already installed Pro Tools hardware, do so now. See Chapter 3, "Installing Pro Tools Hardware" for instructions.*

Apple System Software Settings

To ensure optimum performance with Pro Tools, configure the Apple System software with the following settings.

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 If using a Power Macintosh 9500 or 9600, set the number of colors to 256 in the Monitors & Sound Control Panel.

5 In the Extensions Manager Control Panel do the following:

- Choose Mac OS 9.0 Base (or Mac OS 9.1 Base) from the Selected Set pop-up menu.

- Click Restart to restart your computer.

Installing Pro Tools Software

To install Pro Tools software:

1 Locate the Pro Tools Installer CD for Macintosh and place it in your CD-ROM drive. Locate and double-click the file named "Install Pro Tools."

2 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.

3 Select the appropriate installer for your Digidesign hardware: Pro Tools 24 MIX & MIXplus, or Pro Tools 24.

4 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. When you launch Pro Tools the first time, you will be prompted to configure your hardware (see "Configuring Pro Tools TDM Cards and Audio Interfaces" on page 50).

Procrastinator Add this item if you have a Pro Tools 24 MIX system *and one or more DSP Farm cards* and you want to use the Procrastinator™ extended delay plug-in. This is useful if you plan to open old sessions that use the Procrastinator Plug-In. (Do not select this item if you have a Pro Tools 24 system—Procrastinator is automatically installed for you.)

Dynamics Add this item to install the original Dynamics Plug-In included with Pro Tools version 4.2 and earlier. This will allow you to open older Pro Tools sessions that use this plug-in.

EQ Add this item to install the original EQ Plug-In included with Pro Tools version 4.2 and earlier. This will allow you to open older Pro Tools sessions that use this plug-in.

SampleCell Patcher Add this to your installation if you own a Digidesign SampleCell card and want to update the SampleCell Editor software for use with the latest version of Pro Tools.

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

USD Setup Add this to your installation if you own a Digidesign Universal Slave Driver™ (USD). USD Setup lets you update USD firmware and configure the USD remotely. Pro Tools MIX/MIXplus and Pro Tools 24 systems need only install USD Setup if remote access to the complete set of USD features is required. Refer to the *Universal Slave Driver Guide* for details.

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

5 After selecting from the above options, click Install.

6 Select 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. After selecting a setting, click Continue.
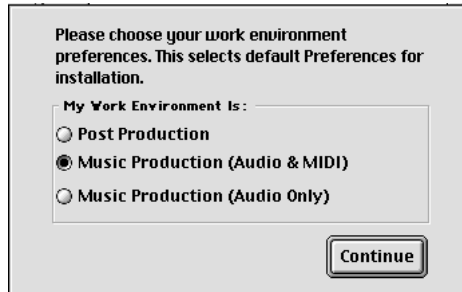
Selecting a Pro Tools Preference

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

7 For Pro Tools 24 MIX and MIXplus systems, you are prompted to install the Surround Mixer plug-in. This plug-in is required for mixing, mastering, and monitoring in surround. Select Yes to install Surround Mixer, or No for stereo, then click Continue.

Installing Surround Mixer

8 If you installed Surround Mixer in the previous step, the Installer prompts you to select a Surround Monitor Format. Select Standard Pro Tools if your monitoring is configured for Film Format, or select ProControl for DTS Format, then click Install.

Selecting a Surround Monitor Format

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

Installing and Configuring OMS

To use Pro Tools you must first install and configure the Open Music System (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 sections provide basic instructions for installing and configuring OMS. For more detailed 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 Startup hard drive. Click Install.

4 Follow the on-screen installation instructions.

5 When the installation is complete, restart your Macintosh.

Configuring a New Studio Setup

(First-Time OMS Users Only)

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

To configure a New Studio Setup in OMS:

1 Launch the OMS Setup application. If OMS has not yet been configured, you'll be prompted to configure a New Studio Setup. Click OK.

2 Select whether your MIDI interface is connected to the Modem or Printer port. If using a USB or PCI-based MIDI interface, leave both ports unchecked. Click Search.
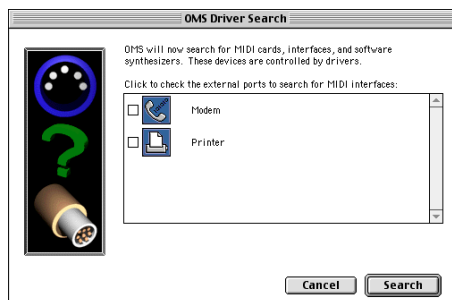
Ports for OMS Driver Search

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.
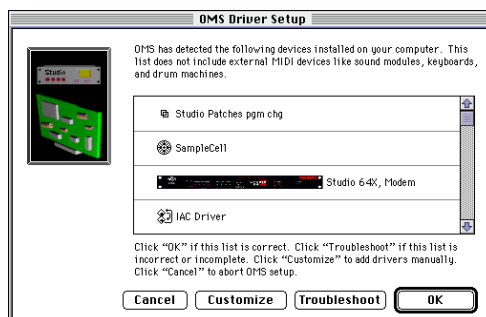
OMS Driver Setup

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 45).

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.
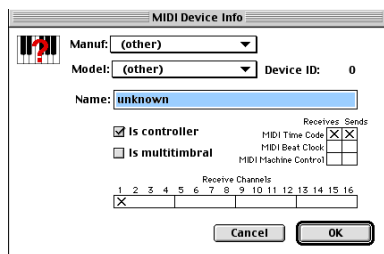
Defining a MIDI device

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 SerialDMA 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 SerialDMA 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

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.
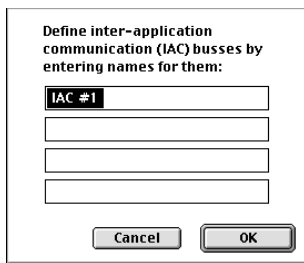
To edit the IAC driver's name:

1 Double-click the OMS Setup application.

2 In the Studio Setup window, double-click the IAC driver.
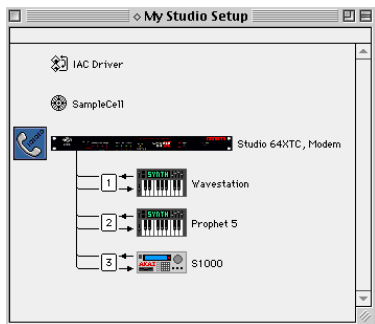
Studio Setup window with IAC Driver

3 Rename "∞ IAC bus #1" to "MMC" and click OK.

Renaming the IAC Driver

4 Quit OMS Setup.

chapter 6

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 48). 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. Pro Tools provides dialogs to validate your software and configure your TDM cards and audio interfaces (see "Launching Pro Tools the First Time" on page 49).

After completing initial configuration, you can install and play the demo session included on the Pro Tools Installer CD (see "Installing the Demo Session" on page 51).

📖 *If you haven't already installed Pro Tools software, do so now. See Chapter 5, "Installing Pro Tools Software" for instructions.*

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 Turn on your external hard drives. Wait approximately ten seconds for them to come up to speed.

2 Lower the volume of all output devices, then turn on your Pro Tools audio interfaces. Wait at least ten seconds for them to initialize.

3 Turn on your computer. Or, if it is already on, restart it.

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.*

⚠️ *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 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.
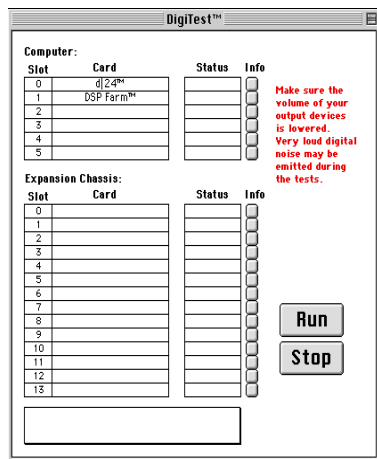
DigiTest for Pro Tools 24 system running on Power Macintosh 9600
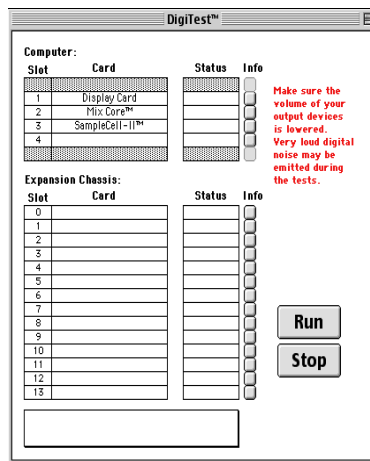
DigiTest for Pro Tools 24 Mix system with SampleCell II running on Power Macintosh G4

If a supported card is installed and not listed, check card seating and ribbon connection. Close DigiTest, power down your system, and reinstall the cards (see "Installing the Pro Tools Cards" on page 15). 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.
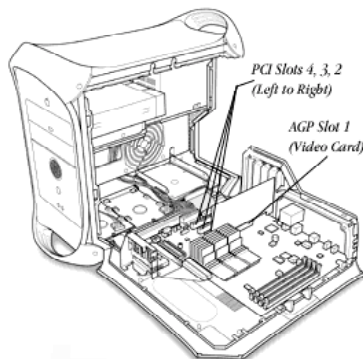
DigiTest Slot Arrangement window (Power Macintosh G4 Dual Processor)

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.

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.

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.

See Appendix A, "Determining Slot Order" for more help in arranging your cards. Additionally, refer to the Digidesign Web site for compatibility information:

www.digidesign.com/compato/

Make sure you close DigiTest 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.*

If all the Digidesign cards pass, continue to the next step.

6 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 close DigiTest, power down your system, and reinstall your cards. Verify proper card seating and ribbon cable connection. (See "Installing Pro Tools Hardware" on page 13.)

If a card continues to fail DigiTest, contact Digidesign.

7 If all the Digidesign cards have Passed, quit DigiTest and restart the computer before running any Digidesign application.
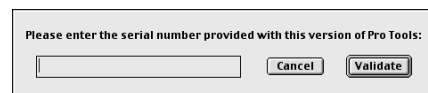
Launching Pro Tools the First Time

Validate Pro Tools Software

When launching Pro Tools the first time, you are prompted to enter a serial number 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 serial number in the dialog when prompted, making sure to observe any spaces, then click Validate.
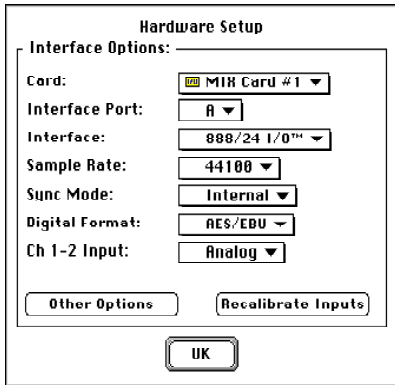

Serial number entry for Pro Tools

The serial number is located on the inside cover of this guide.

Configuring Pro Tools TDM Cards and Audio Interfaces

The first time you run Pro Tools, the Hardware Setup dialog automatically opens after you validate Pro Tools software. The Hardware Setup dialog prompts you to configure the parameters for each Pro Tools card and audio interface in your system.

```
                   Hardware Setup
┌─ Interface Options: ────────────────────┐
│                                          │
│  Card:         [🔲 MIX Card #1 ▼]        │
│  Interface Port:  [A ▼]                  │
│  Interface:    [888/24 I/O™ ▼]           │
│  Sample Rate:  [44100 ▼]                 │
│  Sync Mode:    [Internal ▼]              │
│  Digital Format: [AES/EBU ▼]             │
│  Ch 1–2 Input:  [Analog ▼]               │
│                                          │
│   [ Other Options ]  [ Recalibrate Inputs ]│
│                                          │
│              [ OK ]                       │
└──────────────────────────────────────────┘
```

Hardware Setup dialog

If Pro Tools was previously configured, you can reconfigure hardware by opening Pro Tools and choosing Setups > Hardware.

If you have a system with multiple TDM cards and audio interfaces, you must configure each by selecting the appropriate items from the pop-up menus in this dialog.

You must select the card, identify the interface connected to it, then set the parameters for that interface—repeating this for each card and interface in your system.

⚠️ *Some parameters explained below do not apply to all Pro Tools configurations.*

To configure Pro Tools hardware:

1 If the Hardware Setup dialog isn't on-screen, choose Setups > Hardware in Pro Tools.

2 From the Card pop-up, select the Digidesign card type.

3 From the Interface Port pop-up, select the port to which your audio interface is connected (port A or port B).

Choose port A if only one audio interface is connected to the card. If two audio interfaces are connected to your card, follow the steps below for each port and interface.

4 From the Interface pop-up, choose the audio interface connected to the card you selected in the previous step.

5 From the Sample Rate pop-up, select the desired sample rate for the current card and interface (the sample rate of the demo session is 44100 Hz).

6 From the Sync Mode pop-up, select the appropriate sync mode on the currently selected interface (Internal or Digital). In most cases you will use Internal. Digital is used primarily for inputting data from DAT or other digital sources.

7 From the Digital Format pop-up, select the desired digital format of Channels 1–2 of the currently selected interface (AES/EBU or S/PDIF).

8 From the Ch 1–2 Input pop-up, select the input format of Channels 1–2 of the currently selected interface (Analog or Digital).

9 From the H/W Buffer pop-up, select the audio buffer size, in samples, for host processing tasks such as Real-Time AudioSuite (RTAS) plug-in processing.

Select a minimum of 128 samples. Select larger buffer sizes for slower computers; for a Power Macintosh 9600 or a beige G3, the Hardware Buffer size can be set as high as 1024 samples.

10 From the CPU Usage Limit pop-up, select the maximum percentage of CPU resources to allocate to host processing tasks.

Select a minimum percentage of 65%. Select higher CPU usage percentages for slower computers; for a Power Macintosh 9600 or a beige G3, CPU usage percentage can be set as high as 85%.

11 Click Recalibrate Inputs to recalibrate the analog-to-digital convertors of the audio interface and remove any DC offset that may have built up in them. (For an explanation of DC offset, see the *DigiRack Plug-Ins Guide*.)

12 Click Other Options for additional configuration options specific to the audio interface. These include:

◆ Setting the input format (analog or digital) of each pair of input channels on an 888/24 I/O

◆ Configuring the level sensitivity and peak hold settings for the output level meters on the front panel of the 888/24 I/O

◆ Selecting S/PDIF compatibility with Tascam DA30 DAT recorders

⚠ *To record to or from a Tascam® DA30 DAT recorder, you must set S/PDIF compatibility to "Tascam." To record to or from a non-Tascam DA30 DAT recorder, set S/PDIF compatibility to "Other."*

◆ Enabling or disabling DAC Muting (mutes the 888/24 I/O digital-to-analog convertors when its output level falls below a certain threshold, to reduce noise)

◆ Setting the input and output levels of a 1622 I/O

13 Configure the Other Options parameters as desired and click Done.

14 Click OK to close the Hardware Setup dialog.

15 Choose File > Quit to close Pro Tools.

Installing the Demo Session

Next you will install the demo session included on the Pro Tools Installer CD.

To install the demo session:

1 Insert the Pro Tools Installer CD in your CD-ROM drive.

2 Double-click the file "Install Pro Tools Demo Session."

3 Select "Pro Tools SoundCheck." This is the session used for testing your system. The other demo sessions demonstrate more capabilities of Pro Tools. Since they are not used for testing purposes, installation is optional.

4 Choose a drive on which to install the demo session.

5 Click Install. When installation is complete, click OK to return to the Finder.

Opening the Demo Session

Now you will open the demo session and begin playback to hear Pro Tools in action.

To open the demo session:

1 Locate and open the demo session folder.

2 Double-click the file, "Pro Tools Sound-Check."

3 If this is the first time you are launching Pro Tools, a dialog appears prompting you to use the Hardware dialog to configure your system. Click OK. (See "Configuring Pro Tools TDM Cards and Audio Interfaces" on page 50.)

To play the demo session:

1 Adjust the volume control on your monitoring system so that it is set relatively low. You can adjust levels as the demo begins to play.

2 Press the Spacebar on your keyboard to begin playback. To stop playback, press the Spacebar again.

Welcome to Pro Tools!

If you weren't able to play the demo session, see the Pro Tools Reference Guide for troubleshooting tips.

chapter 7

Calibrating the 888/24 I/O

Before you use the 888/24/I/O Audio Interface, you may want to calibrate its input and output levels to the level of your mixing console.

The 888/24 I/O is factory-calibrated so that its input operating level is set to +4 dB nominal with 18 dB headroom nominal at full code, unity gain, making calibration unnecessary for most professional applications.

If you do need to recalibrate your interface or other components of your studio, you can use the alignment procedure described in this chapter.

About Calibration

Calibrating levels on a digital recording device is different from calibrating levels on an analog recording device. Unlike analog devices, most digital devices do not have a standard "0 VU" level setting that corresponds to nominal input and output levels. Instead, with an interface such as the 888/24 I/O, the meters are calibrated in *decibels below peak* (digital clipping) level.

Headroom

The concept of headroom is slightly different for analog and digital devices.

Analog Most analog devices allow for a certain amount of headroom above 0 VU. If you send a signal above 0 VU to an analog recorder, you still have a margin of headroom, and if tape saturation occurs, it does so fairly gracefully, giving the audio a compressed sound that some find desirable.

Digital Digital devices, on the other hand, do not allow for signals that exceed the dynamic range of the input. When a signal exceeds the maximum input level for a digital device, clipping occurs, causing digital distortion, which is harsh and usually undesirable.

The AES Standard for Headroom

The AES (Audio Engineering Society) standard for headroom is currently –18 dB for nominal level in a digital audio system. The exact value you use will be determined by the amount of headroom available in the rest of your system. For example, if your mixing console has 15 dB of headroom above nominal level, then you may want to calibrate the 888/24 I/O to have 15 dB of headroom.

The Calibration Process

Analog To calibrate the input level of an analog device to a mixing console's output level, you would typically send a 1 kHz tone at 0 VU from the console to the analog deck and align the recording deck's meters to read 0 VU.

Digital With a digital recording device such as the 888/24 I/O, in order to allow for headroom, you must align a 0 VU tone from the console to a value less than zero on the 888/24 I/O, by exactly the amount of headroom that you want.

For example, to have 12 dB of headroom above 0 VU with the 888/24 I/O, you must align the incoming 0 VU 1kHz tone to a level of –12 dB. For 18 dB of headroom, you would align it to –18 dB. (Since it is assumed that you are using the 888/24 I/O with a +4 dBu console, a 0 VU signal level coming out of the console is actually equivalent to a nominal +4 dBu level signal.)

Calibrating The 888/24 I/O

To calibrate the 888/24 I/O you will put Pro Tools in a special operating mode called *Calibration mode,* then use the Signal Generator plug-in to generate a test tone for alignment.

The Pro Tools Installer includes several pre-configured calibration session templates that cover most common calibration setups. You can use these in addition to the calibration procedure given below.

⚠ *Turn down your monitoring system before beginning calibration! The Signal Generator plug-in emits a continuous signal when inserted on a track.*

To calibrate the 888/24 I/0:

1 Launch Pro Tools by opening the Digidesign folder, then the Pro Tools folder, and double-clicking Pro Tools.

2 In Pro Tools, create a new session by choosing File > New Session.

3 Choose Setups > Preferences and click Operations.

4 Enter the desired Calibration Reference Level value in dB. A level of –18 dB is typical. (It isn't necessary to type a minus sign here.)

5 Click Done.

6 Create a new mono audio track by choosing File > New Track.

7 Insert the Signal Generator TDM plug-in on the track.

8 Set Signal Generator's output level. This should be the same value you entered as the Calibration Reference Level.

9 Set Signal Generator's frequency to 1000 Hz.

10 Set Signal Generator's signal waveform to Sine.

11 Route the track's output to Bus 1.

12 Create a mono Auxiliary Input track for each 888/24 I/O output you want to calibrate. Set the output assignment for each of these Auxiliary Inputs to its respective 888/24 I/O output.

13 Set the input of each Auxiliary Input track to Bus 1.

14 Create an additional mono Auxiliary Input track for each 888/24 I/O input you want to calibrate. Set the input assignment for each of these Auxiliary Inputs to its respective 888/24 I/O input. Then set the output of each of these Auxiliary Inputs to an unused bus pair (for example Bus 31–32) so that feedback doesn't occur when monitoring main outputs 1–2.

15 Connect an external VU meter to each of the 888/24 I/O outputs in turn. (One at a time as you calibrate.)

16 Set all Pro Tools track faders to their default of 0 dB by Shift-Option-clicking each fader in the session.

17 Adjust the 888/24 I/O output level trim pots with a Phillips screwdriver to align the outputs to read "0 VU" on the external VU meter.

18 Connect each output of the 888/24 I/O directly to its input. Connect channel 1 output to channel 1 input, and so on for each channel.

19 In Pro Tools, select Operations > Calibration Mode.

The names of all uncalibrated tracks begin to flash. In addition, the track volume indicator of each Auxiliary Input track receiving an external input signal now displays the reference level coming from the calibrated output.

20 Adjust the 888/24 I/O input level trim pots with a Phillips screwdriver to align the inputs to match the reference level. When the level is properly matched, the track name will stop flashing.

The Automatch indicator arrows on each track show the direction of adjustment required for alignment:

◆ When the incoming level is higher than the reference level, the down arrow will appear lit (blue). In this case, trim the 888/24 I/O input level down.

◆ When the incoming level is lower than the reference level the up arrow will appear lit (red). In this case, trim the 888/24 I/O input level up.

When you have properly aligned the incoming peak signal levels to match the calibration reference level, both Automatch indicator arrows will light: the up arrow red and the down arrow blue.

21 When you have finished, deselect Operations > Calibration Mode.

Calibrating a System with Both 888/24 I/O and 882/20 I/O Audio Interfaces

The 888/24 I/O is factory preset with 18 dB of headroom in its +4 dB line level operating mode. The 882/20 I/O, however, is fixed at 14 dB of headroom and its inputs are not adjustable.

When setting up an 882/20 I/O (particularly in systems using a combination of the 882/20 I/O and 888/24 I/O), make sure that you use a headroom setting of –14 dB for your system. This helps ensure that recorded audio files have the same relative levels regardless of which interface they are recorded with.

appendix a

Determining Slot Order

In order to determine slot order for your TDM cards, you need to first note the model of your Power Macintosh, then find its lowest numeric slot.

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

☀ *For systems without an Expansion Chassis, the primary d24 or MIX Core card will always be installed in your computer's lowest slot. Subsequent cards will be installed as described in "Card Order Guidelines for Each Pro Tools System" on page 58.*

For systems using an expansion chassis to add additional cards to your system, refer to the Pro Tools Expanded Systems Guide.

PCI Slots 4, 3, 2 (Left to Right)
PCI Slot 1 (Video Card)

G4

PCI Slots 4, 3, 2 (Left to Right)
PCI Slot 1 (Video Card)

G3 Blue & White

PCI Slots 4, 3, 2 (Left to Right)
AGP Slot 1 (Video Card)
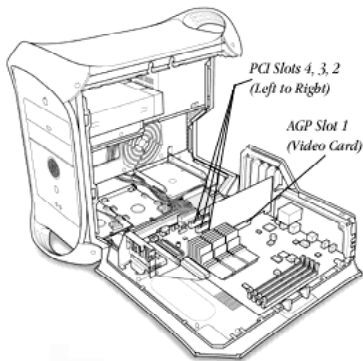
G4 Dual Processor

G3 Beige Minitower

G3 Beige Desktop

9600 or 9500

Card Order Guidelines for Each Pro Tools System

The following are card installation guidelines for each Pro Tools TDM system. Install your cards in the following order, starting with the lowest numeric slot.

💡 *The guidelines below may include optional cards not present in your system.*
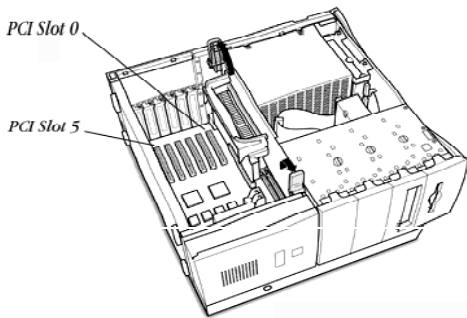
Card order for Pro Tools 24 MIX and MIXplus:

1 MIX Core cards

2 MIX Farm cards

3 MIX I/O cards

4 SampleCell II TDM cards

5 SCSI host bus adapter (HBA)

6 Video capture cards

7 Display card for your computer monitor

Card order for Pro Tools 24:

1 Pro Tools d24 audio cards

2 DSP Farm cards

3 SampleCell II TDM cards

4 SCSI host bus adapter (HBA)

5 Video capture cards

6 Display card for your computer monitor

Card order for mixed systems:

1 MIX Core card

2 MIX Farm card

3 d24 audio cards

4 DSP Farm cards

5 MIX I/O cards

6 SampleCell II TDM cards

7 SCSI host bus adapter (HBA)

8 Video capture cards

9 Display card for your computer monitor

Additional Rules for Card Placement

PCI Slots, Bus Masters, and Bridges (Power Macintosh 9500 and 9600 computers)

The Power Macintosh 9500 and 9600 have six PCI slots. These slots are grouped in banks of three, with each being controlled by a PCI *Bridge Chip*. The first three slots are in one group and the next three slots are in another.

A *bus master* card is a PCI card that controls the data transfer to and from the Bridge Chip that controls its group. The Digidesign MIX Core and d24 cards are bus masters.

Other cards that act as bus master include:

• Expansion chassis host cards

• SCSI host bus adapters (HBA)

• Most video capture cards (including AVoption and AVoption XL)

When configuring a Pro Tools system with a Power Macintosh 9500 0r 9600 (without an expansion chassis), make sure to install Pro tools Core cards on a separate PCI bridge from other bus master cards.

When using an expansion chassis with a 9500 or 9600, install the chassis host card on a separate bridge from other bus master cards (such as SCSI HBAs and video capture cards).

Consult the manufacturer of your third-party PCI cards to determine if they operate as bus masters.

Systems Using an Expansion Chassis

If you are using an expansion chassis, refer to the *Pro Tools Expanded Systems Guide* included with your Pro Tools system for instructions on connecting an expansion chassis to your computer.

appendix b

DigiTest Error Codes

DigiTest Error Codes

Code	Description
Err3	Cards from different Pro Tools systems are incorrectly mixed. See "Card Order Guidelines for Each Pro Tools System" on page 58.
Err4	Cards marked with this error are installed in the wrong order. See "Card Order Guidelines for Each Pro Tools System" on page 58.
Err5	Too many cards of this type are installed in the system. Refer to the Digidesign Web site for compatibility information: www.digidesign.com/compato/
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 "Card Order Guidelines for Each Pro Tools System" on page 58, as well as related installation guides.
Err1010	Too many MIX Core cards installed. The maximum number of MIX Core cards allowed is 7.
Err1011	Too many MIX Farm cards installed. The maximum number of MIX Farm cards allowed is 7.

DigiTest Error Codes

Code	Description
Err1012	Too many total MIX cards installed. The maximum number of total MIX cards allowed is 7.
Err1020	Too many d24 Core cards installed. The maximum number of d24 Core cards allowed is 2.
Err1021	Too many MIX I/O cards installed. The maximum number of MIX I/O cards allowed is 2.
Err1022	Too many total d24 cards installed. The maximum number of total d24 cards allowed is 2.
Err1220	SCSI Accelerator card is installed in the wrong slot. See "Card Order Guidelines for Each Pro Tools System" on page 58 for correct location of the card.
Err1221	Expansion Chassis Host Interface card is installed in the wrong slot. See "Card Order Guidelines for Each Pro Tools System" on page 58 for correct location of the card.
Err1301	A Core card is not installed. At least one Cord card is needed.
Err1310	A DSP Farm card is not installed. At least one DSP Farm card is needed.

index

clock master 15, 16

compatibility information for Pro Tools 2

computer requirements 2

configuring Expanded Pro Tools systems 47

connecting
    digital recorders 38
    effects units 38
    external SCSI drive 7
    SMPTE synchronization devices 39
    studio 19

CPU requirements 2

D

d24 card 14

DAC Muting option
    Hardware Setup dialog 51

DAT recorder 51
    connecting to Pro Tools 38

DC offset 51

Demo Session 47
    installing 51
    playing 52

Digidesign Control Panel install option 42

DigiSerial port 13, 14

digital distortion 53

Digital Sync mode of 888/24 I/O 20

DigiTest 48

DSP Farm 14

Dynamics install option 42

E

effects units, connecting to Pro Tools 38

EQ install option 42

expanded Pro Tools Systems, configuring 13

Expansion Chassis 13, 57
    using with Pro Tools 59

F

formatting hard drives
    high-level 8
    low-level 8

fragmentation 9

G

G3 computer requirements 3

H

hard drives
    optimizing 10
    requirements 3

Hardware Setup dialog
    configuring Pro Tools with 52
    DAC Muting option 51

headroom 53

HFS Drives, formatting 11

high-level formatting 9, 10

I

IAC Driver 45

Infinity symbol
    removing from IAC Bus name 45

input gain levels of 1622 I/O
    setting 35

Input level trims of 888/24 I/O 21

Input meters of 1622 I/O 33

Installer CD 42

installing
    Demo Session 51
    Pro Tools cards 15
    Pro Tools software 42
    Surround Mixer 43

Internal Sync mode of 888/24 I/O 20

L

level meters for 888/24 I/O 21

low-level formatting 8

M

Macintosh hard drives, using 10

Macintosh sessions, playing 10

MacOpener 10

MIDI
    connections 39
    machine control 45
    requirements 3

MIX Core card 13

MIX Farm card 13