

Appendix E

Pro Tools Hardware

The Pro Tools System

Digidesign's Pro Tools system has always included a software application and various hardware components. The hardware consists of one or more cards for the computer along with one or more audio interfaces, optional interfaces for sync or MIDI, and an optional eight-channel remotely controllable microphone preamplifier. The main software application is a complete recording, editing, processing, and mixing environment that includes a multitrack waveform editor, a mixing console emulation, plug-in signal processors and virtual instruments, and controls to let you record and playback audio from hard disk.

The range of plug-ins available for Pro Tools surpasses that available for any other platform because of the large numbers of Development Partners that Digidesign has always encouraged. More or less every kind of processor that you might wish for is available either from a Digidesign or from a third-party developer.

The Pro Tools software also lets you record and edit MIDI and offers separate MIDI Editor and Score Editor windows. It also comes with a comprehensive collection of signal processing plug-ins and virtual instruments, so it competes very effectively with Logic, Digital Performer, Sonar, Cubase, and Nuendo.

As you are about to discover, Pro Tools|HD systems are possibly the most flexible audio workstations that you can buy. You can easily create a customized system, choosing how many DSP cards, how many channels of input and output, and so forth—expanding as your needs grow. If you want hands-on mixing, you can add a control surface such as Digidesign's C|24 or the Mackie Control Universal. And if a medium- or large-format mixing console is more appropriate, you could go for one of the ICON integrated consoles.

Pro Tools|HD features a 48-bit mixing architecture that provides more than sufficient of the headroom and “foot room” that is needed to make sure that the highest quality is maintained throughout the production process. The hardware interfaces provide excellent quality to suit most needs, and even higher quality third-party interfaces are available from Apogee and Prism.

Pro Tools|HD Hardware

Unlike host-only systems that rely on the host computer's CPU for all processing, Pro Tools|HD's DSP cards are designed to handle the majority of the system's audio processing tasks, offloading that work from the computer so that the computer is left with plenty of processing power still available to run additional plug-ins or applications.

Pro Tools DSP cards are available for both PCI-based and PCIe-based computers:

Digidesign introduced the first generation of Pro Tools|HD systems for computers using the PCI bus sometime around the second quarter of 2002. Three basic configurations

were made available that used the HD Core card either on its own or together with one or two HD Process cards. Around the end of 2003, the HD Process card was superseded by the HD Accel card. This featured almost twice the DSP power as the HD Process cards and supported more complex plug-in algorithms and increased plug-in counts. HD Accel systems always included an HD Core Card along with one or more HD Accel cards.

Note

Various TDM plug-ins were developed that only run on the HD Accel cards, that is, not on HD1 systems.

In December 2005, the HD AccelCore card for the new PCIe bus was introduced for use with the Intel Macs that had become available. Although there are some technical differences between the PCI Express (PCIe) and PCI versions of the Pro Tools|HD system, for most users, they both provide very similar DSP power. The PCIe HD Accel card uses a combination of the chip types used on the Core and Accel PCI cards. This gives the PCIe version more processing power than a PCI Core, and a little less than a PCI Accel. In larger systems (HD 3 and greater), this difference is insignificant. In smaller systems (HD 1, HD 2), there are some noticeable differences, but for many typical sessions using a combination of different algorithms, the differences are minor.

Note

The PCIe version of the HD 1 system can run Accel-only plug-ins, which is not the case with the PCI version of the HD 1.

The different ways that different plug-ins use the DSP chips on the different cards, and the way that some plug-ins are optimized for the latest software and hardware while others are not tend to even out the differences between the systems, even though PCIe HD 1 and HD 2 systems do have more MIPS (*millions of instructions per second*) than their PCI counterparts. According to Digidesign, “Users of HD 1 for PCIe may see a significant performance gain versus HD 1 for PCI systems, particularly if they tend to use many instances of just a few different plug-ins and if those plug-ins have been optimized for Pro Tools 7. However, with HD 2 and HD 3, there is a much smaller difference in power between the systems. In fact, with systems larger than HD 3, there is no advantage to running on PCIe versus PCI other than slot-type compatibility.”

Session Compatibility

According to Digidesign, “All sessions created with PCI versions of HD 1, HD 2, and HD 3 systems will open on their PCIe counterpart. Track counts are not affected, as PCIe Accel cards have three Presto DSPs each enough to run a full six DSP engine with a Pro Tools|HD 2 system for PCIe. (The sole exception to this is a session requiring several instances of Antares Mic Modeler, which is currently the only Presto-only plugin.) However, it is possible to create sessions on PCIe-based HD 1 systems that cannot be opened on a PCI-based HD 1 system.”

The Future

Digidesign says, “it will continue to make both the PCI and PCIe versions of HD cards, and we expect to do so as long as demand for both types exists. Our intent is to support the widest possible range of computers. Windows computers with multiple PCIe slots will be qualified for use when they become widely available.”

Pro Tools|HD Core Systems

Pro Tools|HD Core systems include a card (or cards) containing digital signal processor (DSP) “chips” and a bundle of software. These Core systems differ according to the number of cards that you get, the number of input and output channels, and the number of software plug-ins included.

Pro Tools|HD 1 uses the HD Core card and supports up to 32 channels of I/O.

Pro Tools|HD 2 Accel includes the HD Core card and an HD Accel card, offering support for 64 channels of I/O.

Pro Tools|HD 3 Accel features the HD Core card and two HD Accel cards, supporting up to 96 channels of I/O.

At 44.1/48 kHz, Pro Tools|HD 1 systems will playback or record up to 96 simultaneous audio tracks. Expanded Pro Tools|HD systems, Pro Tools HD 2 and HD 3, can playback or record up to 128 mono voices, whereas Pro Tools |HD Accel 2 and Accel 3 systems can playback or record up to 192 simultaneous mono audio tracks.

Another specification is Total Voiceable Tracks. This refers to the maximum number of audio tracks that can share the available voices on your system. Mono tracks take up one voice whereas Stereo and multichannel tracks, as you might expect, take up one voice per channel. Expanded Pro Tools|HD and HD| Accel systems with two or more cards offer the greatest number of “Voiceable” Tracks, with 224 available at 44.1/48 kHz, whereas Pro Tools HD 1 systems can only manage a maximum of 112.

insert FigAE_1-HDAccelCard.tif

Figure E.1 Pro Tools HD Accel Card.

All Core systems support sample rates up to 192 kHz; including TDM II (Digidesign's advanced bus architecture that provides support for extremely large mixing configurations); and support Digidesign's DigiLink interface.

DigiLink allows HD Core and HD Process cards to be connected across lengths of up to 100 ft, although the 100-ft cables only support up to 96 kHz sample rates.

Note

All Core systems require that you have at least one Digidesign HD audio interface connected before you can use them. These are supplied separately so that you can choose whichever interface suits you best.

HD 1 Systems

Pro Tools|HD 1 systems use a single core DSP card—either an original HD Core PCI card or an Accel Core PCIe card. The card has nine DSP chips for powering the mix engine and TDM plug-ins, supports sample rates up to 192 kHz and supports up to 32 channels of I/O.

You can use up to a total of 112 audio tracks of which 96 can be played back simultaneously at 44.1/48 kHz. As you increase the sample rate, the number of simultaneously playable tracks decreases to 48 at 96 kHz and to 24 at 192 kHz.

HD 1 systems also offer up to 160 mono or stereo auxiliary inputs, up to 128 instrument tracks, 256 MIDI tracks, and 128 internal mix buses.

Along with the Pro Tools HD software and its standard DigiRack plug-ins, the system also includes the Pro Tools HDpack plug-in bundle, the Pro Tools Ignition Pack 2 Pro collection, various free Bomb Factory plug-ins, and the Xpand! sample-playback/synthesizer—totaling more than 40 processing plug-ins, virtual instruments, and compatible applications.

HD 2 Accel Systems

The Pro Tools|HD 2 Accel system uses two dedicated PCI or PCIe DSP cards (either one PCI HD Core card and one PCI HD Accel card or one PCIe Accel Core card and one

PCIe HD Accel card). This system has 18 DSP chips for powering the mix engine and TDM plug-ins and supports up to 64 channels of I/O.

You can use up to a total of 256 audio tracks of which 192 can be played back simultaneously at 44.1/48 kHz. As you increase the sample rate, the number of simultaneously playable tracks decreases to 96 at 96 kHz and 36 at 192 kHz.

HD 2 Accel systems also offer up to 160 mono or stereo auxiliary inputs, up to 128 instrument tracks, 256 MIDI tracks, and 128 internal mix buses.

Along with the Pro Tools HD software and its standard DigiRack plug-ins, the system also includes the Pro Tools HDpack plug-in bundle, the Pro Tools Ignition Pack 2 Pro collection, various free Bomb Factory plug-ins and the Xpand! sample-playback/synthesizer—totaling more than 50 processing plug-ins, virtual instruments, and compatible applications.

HD 3 Accel Systems

The Pro Tools|HD 3 Accel system uses three dedicated PCI or PCIe DSP cards (either one PCI HD Core card and two PCI HD Accel cards or one PCIe Accel Core card and two PCIe HD Accel cards). This system has 27 DSP chips for powering the mix engine and TDM plug-ins and supports up to 96 channels of I/O.

You can use up to a total of 256 audio tracks of which 192 can be played back simultaneously at 44.1/48 kHz. As you increase the sample rate, the number of simultaneously playable tracks decreases to 96 at 96 kHz and 36 at 192 kHz.

HD 3 Accel systems also offer up to 160 mono or stereo auxiliary inputs, up to 128 instrument tracks, 256 MIDI tracks, and 128 internal mix buses.

Along with the Pro Tools HD software and its standard DigiRack plug-ins, the system also includes the Pro Tools HDpack plug-in bundle, the Pro Tools Ignition Pack 2 Pro collection, various free Bomb Factory plug-ins, and the Xpand! sample-playback/synthesizer.

Pro Tools|HD 3 Accel systems are supplied with the largest number of Digidesign and Digidesign Development Partner effects and instrument plug-ins as part of the free HDpack collection, with a total of more than 60 processing plug-ins, virtual instruments, and compatible applications.

Expanded Pro Tools|HD Accel Systems

You are limited to a maximum of three Pro Tools cards in current qualified host computers. To cater for larger studio setups, Digidesign offers expanded Pro Tools|HD Accel systems that can use PCI Core and Accel cards in up to an HD 6 configuration.

These use a single PCI or PCIe Host card to connect to the Digidesign Expansion|HD chassis—a 4U rackmount unit capable of housing up to six Digidesign PCI DSP cards.

A fully expanded system has 54 DSP chips for powering the mix engine and TDM plugins and supports up to 160 channels of I/O. Otherwise, the specifications are the same as for HD 3 Accel systems.

Note

Users of expanded PCI systems can upgrade their computers to newer, faster models without the need to change their Pro Tools HD cards—they can just buy a new PCIe Host card and continue to use their Pro Tools HD PCI cards in the Expansion|HD chassis.

Pro Tools|HD Interfaces

Digidesign's range of Pro Tools|HD interfaces has been accepted around the world for use in professional studios. They all do what they claim to do “on the tin,” and they do it well, using low-jitter internal clocks and offering excellent technical specifications that compare very well with those of their competitors. Nevertheless, you may still want to consider adding a Sync I/O to your system to provide a high-quality Master clock source, or you could even add a higher quality third-party clock source. For example, Prism and Apogee both feature extremely high-quality clock sources within their A/D converters, and stand-alone converters are available such as the Aardvark Aardsync II or the Mutec Smart Clock.

Tip

The best clock source to use while recording audio through A/D converters is almost always the internal clock in the converters, whose clock signal has to travel the least distance.

192 I/O

The top-of-the-range interface is the 192 I/O, which features 24-bit and up to 192 kHz A/D and D/A conversion.

The A/D converters offer a 120-dB dynamic range whereas the D/A converters offer 118 dB. Sample rates of 44.1, 48, 88.2, 96, 176.4, 192 kHz \pm 10% are supported.

Note

One of the most important features of the 192 I/O is that it offers switchable, real-time sample rate conversion on digital inputs on the 192 Digital card, so you can input digital signals at any sample rate and it will convert these to the session sample rate.

The basic 192 I/O supports up to 16 simultaneous channels of analog and digital I/O. The standard interface has two 25-way D-sub connectors on the rear panel providing 16 channels of balanced analog inputs either at +4 dBu or at -10 dBV, depending on which of the two connectors you use. A single 25-way D-sub connector provides 16 channels of balanced analog output. The digital I/O bay is occupied by a 25-way D-sub connector that provides eight channels of AES/EBU I/O, a second 25-way D-sub connector for

eight channels of TDIF I/O, and a pair of 8-way ADAT optical input and output connectors.

A pair of XLR connectors provides two channels of AES/EBU I/O, and a pair of RCA/Phono connectors provides two channels of S/PDIF I/O. There is also a pair of optical 2-channel S/PDIF I/O connectors. Two pairs of BNC connectors are available to provide loop sync and external clock (Word 1x and Slave Clock 256x) input/output. Additional ports include an Expansion Port that allows for direct connection of another 192 I/O or 96 I/O and a Legacy Peripheral port.

The 192 I/O has one empty I/O bay that can be used to add more inputs or outputs. To expand the analog I/O capacity, you can add either a 192 AD card, providing eight more analog input channels, or a 192 DA card, which gives you eight additional analog output channels. The 192 I/O can also be fitted with the 192 Digital card, which adds a further eight channels of AES/EBU, TDIF, and ADAT I/O.

Tip

If the session sample rate is 88.2 kHz or higher, ADAT and TDIF input sources can still be used with Digidesign's 192 I/O, but the sample rate conversion option must be enabled using the Hardware dialog from the Setup menu.

If you fully expand the 192 I/O, it supports a total of 50 channels of I/O, including the 16 basic analog channels, the 24 digital I/O channels, the eight additional I/O channels, and the 2-channel digital I/O. A neat feature provided for the analog inputs, the Soft-Clip

Limiter, allows you to record higher levels onto disk so that you get punchier, hotter recordings.

insert FigAE_2-192IOFront.tif

Figure E.2 192 I/O Front.

insert FigAE_3-192IORear.tif

Figure E.3 192 I/O Rear.

192 Digital I/O

If you don't need analog I/O, the 192 Digital I/O features a wide range of digital I/O options, including up to 16 channels of AES/EBU, TDIF, and ADAT I/O, along with S/PDIF I/O.

Note

The 192 Digital I/O also has switchable, real-time sample rate conversion on digital inputs to allow input of digital signals at any sample rate.

This interface supports up to 16 simultaneous channels of AES/EBU I/O at 96 kHz or up to eight simultaneous channels of AES/EBU I/O at 192 kHz. The rear panel has two bays filled with digital I/O connectors. Each bay has a 25-way D-sub connector for AES/EBU I/O, a 25-way D-sub connector for TDIF I/O, and a pair of optical connectors for ADAT I/O. Just like the 192 I/O, a pair of XLR connectors provides two channels of AES/EBU

I/O, and a pair of RCA/Phono connectors provides two channels of S/PDIF I/O. There is also a pair of optical 2-channel S/PDIF I/O connectors. Two pairs of BNC connectors are available to provide loop sync and external clock (Word 1x and Slave Clock 256x) input/output. Additional ports include an Expansion Port that allows for direct connection of another 192 I/O or 96 I/O and a Legacy Peripheral port.

Note

You cannot use all of the possible I/O connections at the same time—they are provided to allow flexibility when connecting to the different types of digital equipment that you may wish to use.

FigAE_4-192DigitalIOFront.tif

Figure E.4 192 Digital I/O Front.

Insert FigAE_4-192DigitalIOFront.tif

Figure E.5 192 Digital I/O Rear.

96 I/O

The 96 I/O is an affordable 16-channel audio interface for Pro Tools|HD systems that feature a versatile selection of I/O options, including eight channels of high-definition analog I/O via 1/4 in. TRS jacks and eight channels of ADAT optical I/O, plus two channels of AES/EBU and S/PDIF I/O, and Word Clock I/O. The A/D converters offer a 115-dB dynamic range whereas the D/A converters offer 114 dB.

Note

The 96 I/O audio interface does not have any sample rate conversion capability, so the ADAT port will always go offline, thereby preventing you from using it, with sample rates above 48 kHz.

insert FigAE_6-96IOFront.tif

Figure E.6 96 I/O Front.

insert FigAE_7-96IORear.tif

Figure E.7 96 I/O Rear.

96i I/O

The 96i I/O provides 16 analog inputs to enable you to easily connect keyboards, samplers, effects, and other line-level equipment to your Pro Tools system. Its 16 analog inputs provide balanced or unbalanced connections using tip-ring-sleeve (TRS) 1/4 in. connectors. A 24-bit capable S/PDIF port allows you to connect DAT recorders, CD players, and other digital recording devices. The A/D converters offer a 111-dB dynamic range whereas the D/A converters offer 113 dB. Six-step software-adjustable level controls are provided for inputs 1–4, with two-step software-adjustable level controls provided for inputs 5–16. Outputs are software-switchable between +4 dBu and -10 dBV.

This unit also has two pairs of BNC connectors for loop sync and Word Clock input/output and an Expansion Port to connect additional units.

Note

The 96i I/O doesn't have sample rate conversion, it doesn't have AES/EBU or ADAT I/O, and it doesn't have a Legacy Port.

insert FigAE_8-96iIOFront.tif

Figure E.8 96i I/O Front.

insert FigAE_9-96iIORear.tif

Figure E.9 96i I/O Rear.

Pro Tools|HD Peripherals

PRE

The PRE is an eight-channel remotely controllable microphone preamplifier unit. It contains eight separate, matched transistor, hybrid microphone preamplifier circuits. You can connect almost any type of input signal including microphones via XLR inputs, and line or direct instrument (DI) level inputs via 1/4-in. jacks to any of the eight channels. Each channel includes a high pass filter, a phase reverse switch, “48 V” phantom power, and a “-18”dB pad. You can control any of its settings remotely using the Pro Tools software or any of the Digidesign control surfaces, so you can position the PRE anywhere within reasonable distance of your main Pro Tools system, such as out in a studio area close to your audio sources. The PRE can also be used as a stand-alone device and can be controlled remotely using any standard MIDI controller for nonPro Tools applications. To connect PRE to your Pro Tools system, you need to hook up the MIDI connections to

allow remote control and feed the audio from Pre into a suitable Pro Tools audio interface via PRE's DB-25 connector.

Note

You can plug PRE directly into a 192 I/O with ease, using a DB-25 to DB-25 cable and connectors. However, if you have another interface such as the 96 I/O, you will need a cable that has a DB-25 connector on one end and TRS jacks on the other end.

insert FigAE_10_PREFront.tif

Figure E.10 Digidesign PRE Eight-channel Microphone Preamplifier Front.

insert FigAE_11_PRE Rear.tif

Figure E.11 Digidesign PRE Eight-channel Microphone Preamplifier Rear.

SYNC I/O

If you need to work to picture, with film or video, you will need a suitable synchronizer to take sync signals from the film or video equipment and use these to generate a Word Clock to synchronize your digital audio equipment. Digidesign offers just such a box, the SYNC I/O, which allows near sample-accurate synchronization to time code or biphas/tach signals. This 192 kHz-capable device generates a low-jitter Word Clock that provides extremely stable clock signals for any digital system such as Pro Tools|HD. The SYNC I/O supports all the industry-standard clock sources and time code formats, including the most widely used pull-up/pull-down rates for film and video. It has two

nine-pin ports for use with the Digidesign MachineControl option. It also has AES/EBU clock I/O; video reference in/thru; and video program in/out connectors.

insert FigAE_12-SYNCIOFront.tif

Figure E.12 SYNC I/O Front.

insert FigAE_13-SYNCIORear.tif

Figure E.13 SYNC I/O Rear.

MIDI I/O

Digidesign also offers a ten-way multiport MIDI interface, the appropriately named MIDI I/O. This has ten MIDI inputs and ten MIDI outputs, each of which can carry 16 MIDI channels independently for a total of 160 MIDI channels. The MIDI I/O connects to your computer via a self-powered USB connection and includes support for Digidesign's MIDI Time Stamping technology, which guarantees excellent timing accuracy and precision. Ports 9 and 10 are mirrored on the front panel for convenience, and Input 1 can be patched to all outputs in Hardware Thru Mode for stand-alone operation. A hardware "thru" mode allows you to patch any number of inputs to any number of outputs without using the computer, enabling the unit to also function as a MIDI patchbay.

insert FigAE_14_MIDIIOFront.tif

Figure E.14 MIDI I/O Front.

insert FigAE_15_MIDIIOrear.tif

Figure E.15 MIDI I/O Rear.

Legacy Interfaces

The Legacy peripheral port on the 192 I/O, 192 Digital I/O, and 96 I/O interfaces allows you to connect any of the following audio interfaces to your HD system: the 888|24, the 882|20, the 24-bit ADAT Bridge I/O, the original 20-bit ADAT Bridge I/O, or the 1622 I/O.

Note

You cannot use the 888 I/O or the 882 I/O with HD systems.

There are some restrictions when using the Legacy Peripheral port. The biggest of these is that you can only work on sessions at up to 48 kHz. At higher sample rates, the Legacy port ceases to function. Also, the maximum number of Legacy peripherals that you can hook up to an HD system is eight, and for this, you would need to have four HD-series audio interfaces with four 16-channel Peripheral Cable Adapters (“Y” cables).

Third-Party Interfaces

Although the Pro Tools HD interfaces offer very high quality, some people prefer to pay the extra for the very highest quality that money can buy. Two companies in particular, PrismSound and Apogee, offer interfaces that directly connect to Pro Tools HD systems.

These interfaces can be used instead of the standard Digidesign interfaces or in combination with these.

PrismSound

www.prismsound.com

Having carried out a series of comparative tests of all the leading converters, my top recommendation is the ADA-8XR, made by PrismSound—one of the UK's leading converter manufacturers.

insert FigAE_16_PrismSoundADA-8XR.jpg

Figure E.16 PrismSound ADA-8XR.

The modular multichannel, 24-bit 192 kHz-capable ADA-8XR provides A/D and D/A conversions and various digital interfaces with a stereo monitor mix output in digital and analog formats. The ADA-8XR can be configured using plug-in modules to suit a wide variety of applications. For example, it can be a 16-channel AD converter, a 16-channel DA converter, or an 8-channel AD/DA converter. Digital modules are also available for interfacing to a variety of formats from AES/EBU and FireWire to Pro Tools HD, so it can be used with most popular digital audio workstation software, including Logic Pro, Cubase, Nuendo, and Pro Tools.

insert FigAE_17_ADA-8XRFrontPanel.jpg

Figure E.17 ADA-8XR Front Panel.

PrismSound offers four popular configurations for Pro Tools HD systems, although other configurations are possible. The 8C-STD-HD has eight analog inputs, eight analog outputs; the 8C-STD-HD-AES has eight analog inputs, eight analog outputs, and eight AES3 inputs and outputs; the 8C-STD-HD-16AD has 16 analog inputs; and the 8C-STD-HD-16DA has 16 analog outputs.

insert FigAE_18_ADA-8XRRearPanel.jpg

Figure E.18 ADA-8XR Rear Panel.

The 8C-STD-HD-AES configuration is similar to a Digidesign 192 I/O interface, offering a mix of analog and digital input and output. It is possible to configure a pair of 8C-STD-HD ADA-8XRs to emulate a single 192 I/O, but with 16 analog inputs and outputs. If a pair of 8C-STD-HD-AES ADA-8XRs is used instead, the digital outputs appear in parallel with the analog outputs, and the digital inputs can be selected instead of the analog inputs on a per-channel basis. Two such pairs can be accommodated on a single Pro Tools|HD Core or Process card.

The 16AD and 16DA ADA-8XR configurations are ideal for users who need more analog inputs than outputs, or vice versa. For use with an analog summing mixer, for example, you could use a pair of the 8C-STD-HD-16DA configurations to provide 32 analog output channels—connecting these to a single Pro Tools|HD Core or Process card.

If you want to capture the highest quality of audio, the ADA-8XR makes an excellent choice whether you are recording vocals, single instruments, drums or orchestra, or providing multiple outputs for external analog summing. The ADA-8 also allows conversion between its various interface formats, for example, between DSD (Direct Stream Digital) and PCM (Pulse Code Modulation) systems such as Pro Tools, or between AES and DSD.

Apogee

www.apogeedigital.com

Apogee, one of the USA's leading converter manufacturers, also offers a range of products that can interface with Pro Tools, including the AD-16X and DA-16X, the Rosetta 800 and Rosetta 200.

insert FigAE_19_ApogeeAD-16XandDA16X.pict

Figure E.19 Apogee AD-16X and DA-16X.

With up to 192k standard sample rates, the 16-channel AD-16X and DA-16X converters use Apogee's C777 digital clocking process, developed with Apogee's advanced Direct Digital Synthesis technology and DSP-based digital filtering. Using a stable, crystal-based digital PLL for clocking, the AD-16X and DA-16X offer very low-jitter performance, helping to keep the sound quality high throughout the production process.

The AD-16X lets you convert analog audio coming in at line level from a mixing console or other analog source into digital audio. It features Apogee's proprietary SoftLimit analog peak limiter, which helps to keep recording levels high while avoiding clipping by allowing the user to capture an additional 4–6 dB of level without “overs.” The DA-16X lets you convert from the digital world back into analog audio to feed into analog mixers or recorders or to use for high-quality monitoring and mastering purposes. The DA-16X features Apogee's proprietary UV22 HR dither technology that is used for reducing the word length of a high-resolution digital signal to 16 bits for CD mastering, while preserving 24-bit detail.

Note

It is claimed that eight out of 10 hit records in the US are mastered using Apogee's UV22HR technology, and that UV22HR can also be used to produce dramatically improved Internet and computer audio content without increased file sizes or data rates.

The ROSETTA 800 gives you eight channels of 24-bit AD/DA conversion at sample rates of up to 192k along with Apogee's SoftLimit, UV22HR, and advanced Intelliclock features, providing a more affordable set of converters to suit project studios.

insert FigAE_20-ApogeeRosetta800.jpg

Figure E.20 Apogee Rosetta 800.

The ROSETTA 200 has similar features but with just two channels.

insert FigAE_21-ApogeeRosetta200.jpg

Figure E.21 Apogee Rosetta 200.

I like to think of Apogee converters as being the converters to choose for rock and pop as opposed to classical and jazz (for which PrismSound converters are highly recommended), although there are plenty of people who might think the opposite—it can be a very subjective matter.

ICON Integrated Consoles

Digidesign's ICON consoles combine a mixing console work surface with a Pro Tools|HD system and an XMON monitoring and communications system so that you can buy a complete studio system from the one source. ICON systems can handle every aspect of a project—from recording, editing, processing, and mixing to combining audio and video—at the highest quality with up to 24-bit/192 kHz audio in up to 7.1 surround format.

ICON consoles allow access to every session element, independently of the on-screen Pro Tools software interface. Advanced automation features such as Match, Join, and Glide further streamline the mixing process, allowing operators to focus on their mix without having to worry about managing automation or missing a move. What's more, all automation data stays tied to its corresponding audio, enabling mixers to move audio without losing any automation data.

ICON offers automation capabilities that surpass even the most advanced automation packages available with other consoles. Everything in the Pro Tools environment can be automated, giving you full dynamic control and absolute recall of every session element, from track volume, mute, and panning to all plug-in parameters. And with ICON, you're not locked into dedicated, built-in EQ, and dynamics processors. You have access to the industry's largest collection of plug-in effects. Emulations of vintage analog hardware units and meticulous re-creations of familiar console EQs and dynamics processors, such as the Sony Oxford plug-ins, let you work from a familiar sonic palette.

You can expand your processing power and scale your system by adding DSP cards and an expansion chassis; building a customized system using the various combinations of additional audio, video, and MIDI interfaces; remote-controllable mic preamps; and synchronization, machine control, session interchange, and delivery options.

ICON with D-Control also features an inline console monitor emulation mode for control of input and monitor levels from a single channel strip. The flagship system features the large-format D-Control work-surface integrated with a Pro Tools|HD Accel system and your choice of the various Pro Tools|HD interfaces and peripherals. Smaller systems can be configured around the medium-format D-Command work-surface.

ICON D-Control

The flagship D-Control work-surface is an impressive-looking mixing console designed for facilities with larger rooms, combining the feel of a large-format console with a level

of control and added Pro Tools functionality that can only be accessed with an ICON system. For example, with ICON and Pro Tools HD software, all your session data resides in a single file, making it simple to recall even the most complex projects in a matter of minutes.

D-Control features built-in 7.1-channel panning, touch-sensitive controls, and lots of visual mixing feedback with LCD displays, LED rings, and bar graphs. There are six touch sensitive, multipurpose, rotary encoders per channel strip, each with a multicolor LED ring, six-character alphanumeric multicolor LCD display, and three-color automation indication LED. Each channel strip has a channel name display, 27 illuminated pushbuttons, and a pair of 32-segment bargraph meters, and most of the mixer controls are located where you would expect them to be.

There is a comprehensive central section with eight multicolor 32-segment bargraph meters that provides control over all processing functions and routing. This section has global automation capabilities, dedicated panels for EQ and dynamics control, and full studio and control room monitoring and communications facilities. The centrally located Focus Channel Strip includes an additional fader, and there is an advanced Surround Panner option with an integrated touch screen and touch-sensitive joysticks.

The base configuration has 16 channel strips, each with its own fader, and D-Control can be expanded to include up to 80 channel strips by adding 16-channel Fader Modules.

ICON D-Control|ES

D-Control|ES is an update to the D-Control worksurface with a new dark color scheme option added to the original design. The updated text and graphics offer improved legibility in low light, brighter LCDs provide a wider viewing angle, and the improved switch color layout makes the console easier to navigate and memorize.

Digidesign is offering D-Control ES conversion kits that include all new top panels (including new electronics, switches, encoders, and displays), silk screened metal plates, bolsters, and other cosmetic components to transform any older D-Control system into a D-Control ES. Kits may include an updated 100BASE-T Ethernet communications boards, power supplies, motor drive assemblies, and other electronic components, depending on your specific configuration. With the latest electronics, Pro Tools HD software's Multi-Mode feature allows a single D-Control to access up to four Pro Tools|HD systems.

insert FigAE_22-D-ControlES_Overhead.tif

Figure E.22 Digidesign ICON D-Control|ES.

ICON D-Command

ICON D-Command, like D-Control, partners with the HD|Accel cards and XMON analog monitoring and communications unit to form an integrated studio system. Like D-Control, D-Command employs an intuitive console layout and has an easily accessible, central control section with straightforward monitoring and communications controls.

With its compact size and powerful feature set, including dedicated EQ and dynamics editing sections, custom fader modes and touch-sensitive rotary controls, D-Command is ideal for smaller music or postproduction studios.

insert FigAE_23-D-Com-MainAngle.jpg

Figure E.23 ICON D-Command.

D-Command has plenty of LCD displays, LED rings, and bargraph meters to provide visual feedback. There are two touch sensitive, multipurpose rotary encoders per channel strip, each with a single color LED ring, a 6-character alphanumeric LCD display, and a three-color automation indication LED. Each channel strip also has a channel name display, 15 illuminated pushbuttons, and two 32-segment bargraph meters.

Supplied as standard with eight-channel faders, D-Command can be expanded to 24 faders by adding a 16-channel Fader Module.

insert FigAE_24-DCom-24-Front.jpg

Figure E.24 Expanded D-Command.

ICON D-Command|ES

In the summer of 2008, Digidesign introduced the updated ICON D-Command|ES worksurface, featuring the same color scheme as its larger sibling, the D-Control ES, but in a compact design. This offers updated text and line art on the surface for better

legibility, especially in low-light environments. Digidesign also introduced two special offer D-Command ES bundles, each offering the latest ICON worksurface bundled with a powerful Pro Tools|HD system.

insert FigAE_25-DCOMM_ES.jpg

Figure E.25 D-Command ES.

XMON

XMON, ICON's remote, rack-mounted, analog monitor and communications system allows monitoring of mono, stereo, surround, and various external sources. External inputs can be routed to main, near-field, or mini speaker configurations. XMON also provides separate stereo Cue outputs, studio monitors outputs, and a dedicated engineer's headphone output.

Supplied as a 2U 19 in. rack-mountable unit, XMON uses a single 15-pin cable connection that enables this unit to be remotely positioned up to 80 ft away from the D-Control or D-Command control surface. The audio inputs and outputs use standard DB25 multipin connectors. There is also an External Talkback input, two Listenback inputs, an AFL stereo solo Input, and a stereo Mini Speaker AutoCue feature that allows automatic talkback or listenback while the transport is parked.

insert FigAE_26_XMONMonitorSystem.jpg

Figure E.26 XMON Monitor System.

Used with D-Control, XMON can be used to monitor separate, simultaneous 8-channel mixes (7.1 surround) along with up to four external stereo sources.

[Sty: App text] Used with D-Command, XMON can be used to monitor separate, simultaneous 6-channel mixes (5.1 surround) along with up to three external stereo sources.

C|24 Control Surface

The 24-channel Digidesign C|24 control surface provides direct hands-on control of Pro Tools mixing, recording, and editing; a complete array of high-quality analog inputs; and a 5.1 analog monitor section to use with your Pro Tools I/O.

Featuring a sleek, low-profile industrial design with stylish dark graphite color scheme, and a separate power supply to provide lower noise performance, the C|24 is a brand new design that replaces the Focusrite-built Control 24.

The C|24 has 24 bankable channel strips, each with a touch-sensitive, motorized fader and dedicated Mute, Solo, Select, Input, Record, EQ, Dynamics, Insert, Send, and Automation buttons. It also has 24 high-quality rotary encoders with LED rings.

The 16 high-quality mic preamps are similar to those in the Digi 003, with low noise and good specifications. These have high-pass filters and variable input gain to allow direct mic, instrument, and line-level connections (via a DB25 multiway connector) for recording through a Digidesign audio interface.

Compared with the Control 24, the C|24 has more dedicated button controls on the channels along with easier-to-read, 6-character, dual-row LED scribble strip displays that provide better visual feedback for channel names, plug-in parameters, sends, panning, and other editing functions. The C|24 has also an 8-channel stereo line submixer that can be routed directly to the monitor section. The monitor section has main speakers, switchable modes, and a studio loudspeaker section that was not available on the Control 24. There are built-in talkback mic and inputs for remote talkback and listenback, and it also has trimmable analog inputs and speaker outputs.

Ideal for professional project studios, the C|24 is a significant improvement on its fore-runner and makes a great choice for music studios, especially for recording bands.

insert FigAE_27_C24ControlSurface.tif

Figure E.27 C|24 Control Surface.

Digidesign Reference Monitor Series

Digidesign's Reference Monitor Series bi-amplified, near-field studio monitor designs, the compact RM1 and the larger RM2, were introduced in May 2007 priced at \$1,249 for each RM1 and \$1,749 for each RM2.

insert FigAE_28-Speaker_Angle_Duo.tif

Figure E.28 Reference Monitor Series RM1 and RM2.

Codeveloped with PMC (the Professional Monitor Company), a leading professional monitor manufacturer based in the UK, these specially engineered monitors use PMC's Advanced Transmission Line (ATL) technology to deliver exceptional clarity and tonal accuracy, low distortion, and accurate bass response, with a wide dynamic range.

PMC's Advanced Transmission Line design combines sophisticated cabinet engineering, proprietary drive unit and crossover components, and patented absorption materials with claimed benefits over sealed and ported designs. Benefits include improved audio resolution with a higher sound pressure level, reduced distortion, flat frequency response, and deeper, more defined bass frequencies than other speaker designs of similar size.

Both monitors have a 48-bit, fixed-point digital signal processing engine to manage the monitors' complex frequency crossover, speaker positioning EQ settings, trim level, and Bass Port Emulation. With the Bass Port Emulation feature switched in, the monitors emulate the tonal characteristics associated with ported bass reflex speakers. With the Bass Port Emulation switched off, the frequency response is flat and free of any additional coloration.

The two-way digital crossover features steep filter designs that ensure an exceptionally clean transition, with virtually zero phase shift, between the two drivers' response curves and roll-off rates. The net result is the ideal transition between the high frequency and low frequency drivers, as well as superb phase response over a wider listening window.

The RM1 uses a 5.5-in. low/mid frequency driver with an 80-watt amplifier whereas the RM2 uses a 6.7-in. driver with a 100-watt amplifier. Both are two-way systems using 1-in. soft dome, ferrofluid-cooled high frequency drivers individually powered by 50-watt amplifiers. These specially designed Class D amplifiers provide an extremely accurate frequency response, and use linear power supplies that provide twice the peak current headroom and much better noise isolation than typical switched mode designs.

The rear panels of both RM1 and RM2 are practically identical. Each has a balanced XLR analog input and an AES 3 digital XLR input that accept 44.1, 48, 88.2, and 96 kHz sample rates. An additional AES digital input and an AES digital THRU connector using RJ-45 connectors are also provided. There is an HF control adjustable from –4 dB to +3 dB in 0.5 dB increments and an LF control adjustable from –4 dB to +3 dB in 0.5 dB increments that allow the performance to be tailored to the room, to the speaker positions, and to the user's preferences. A Channel Assign switch allows the user to select which incoming AES digital input channel (left or right) to use, and a Bass Port emulation switch allows this feature to be turned on or off. A Gain Trim encoder is also provided to allow the user to set the input sensitivity from 0 dB to –15 dB.

insert FigAE_29Speaker_Back_RM1.tif

Figure E.29 RM1 Rear View.

Digidesign's RM1 and RM2 monitors are in the same league as similar models from Genelec and ATC, with advanced technical specifications that will help to deliver the highest quality results from any Pro Tools system.

Summary

Digidesign offers a well-designed range of hardware to work with its software that allows professional users to put together systems to suit most types of professional recording situations. Whether you plan to mix "in the box" or prefer the tactile control of the various work surfaces, there is a solution to match your needs. The integrated ICON systems are finding their way into many of the leading professional recording studios around the world while the C|24 control surface is gaining popularity in music project studios. Adding a pair of Digidesign Reference Monitors completes your studio system all the way from the mic preamplifiers to the mixes that you hear from the loudspeakers, making sure that the audio quality is never compromised along its path.

Mike Collins © 2010