



# X-HD

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Apogee X-Series Expansion Card

## User's Guide

V2.0 - January 2005





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## Warnings

### FCC warning

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to take whatever measures necessary to correct the interference at his own expense.

### Copyright Notice

The Apogee X-HD card is a computer-based device, and as such contains and uses software in ROMs. This software, and all related documentation, including this User’s Guide contain proprietary information which is protected by copyright laws. All rights are reserved. No part of the software and its related documentation may be copied, transferred, or modified. You may not modify, adapt, translate, lease, distribute, resell for profit or create derivative works based on the software and its related documentation or any part thereof without prior written consent from Apogee Electronics Corporation, U.S.A.

### Trademark Acknowledgements

Digidesign, Pro Tools|HD, 192 I/O, SYNC I/O and digiLink are trademarks of Digidesign, a division of Avid Technology, Inc. Prism is copyrighted by Prism Media Products Ltd.

## Declarations of Conformity

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference

(2) This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits of a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

1. Re-orient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. Connect the equipment into an outlet on a different circuit from that to which the receiver is connected.
4. Consult the dealer or an experienced radio/TV technician for help.

NOTE: The use of non-shielded cable with this equipment is prohibited.

CAUTION: Changes or modifications not expressly approved by the manufacturer responsible for compliance could void the user's authority to operate the equipment.

Apogee Electronics Corporation, 3145 Donald Douglas Loop South, Santa Monica, CA 90405.  
Betty Bennett, CEO.

### Industry Canada Notice

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations. Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

### Declaration of Conformity – CE

Apogee Electronics Corporation hereby declares that the product, the X-HD card, to which this declaration relates, is in material conformity with the following standards or other normative documents:

- EN50081-1/EN55022; 1995
- EN50082-1/IEC 801-2, 3, 4; 1992  
following the provisions of:
- 73/23/EEC – Low Voltage Directive
- 89/336/EEC – EMC Directive

### Declaration of Conformity – Japan

Apogee Electronics Corporation hereby declares that the X-HD card, to which this declaration relates, is in material conformity with the VCCI Class A standard.

### Declaration of Conformity – Australia

Apogee Electronics Corporation hereby declares that the X-HD card is in material conformity with AN/NZS standard requirements.

## Registration and Warranty Information

Be sure to register your X-HD card, either by filling in the enclosed Registration Card or by completing the on-line registration form at our Web site: <http://www.apogeedigital.com/support/>. If you do so, Apogee can contact you with any update information. As enhancements and upgrades are developed, you will be contacted at the registration address. Firmware updates are free for the first year of ownership unless otherwise stated. Please address any inquiries to your dealer or directly to Apogee at:

**APOGEE ELECTRONICS CORPORATION,  
3145 Donald Douglas Loop South, Santa Monica, CA 90405, USA.  
TEL: (310) 915-1000, FAX: (310) 391-6262  
email: [support@apogeedigital.com](mailto:support@apogeedigital.com). Web: <http://www.apogeedigital.com/>**

APOGEE ELECTRONICS CORPORATION warrants this product to be free of defects in material and manufacture under normal use for a period of 12 months. The term of this warranty begins on the date of sale to the purchaser. Units returned for warranty repair to Apogee or an authorized Apogee warranty repair facility will be repaired or replaced at the manufacturer’s option, free of charge.

**ALL UNITS RETURNED TO APOGEE OR AN AUTHORIZED APOGEE REPAIR FACILITY MUST BE PREPAID, INSURED AND PROPERLY PACKAGED, PREFERABLY IN THEIR ORIGINAL BOX.** Apogee reserves the right to change or improve design at any time without prior notification. Design changes are not implemented retroactively, and the incorporation of design changes into future units does not imply the availability of an upgrade to existing units.

This warranty is void if Apogee determines, in its sole business judgment, the defect to be the result of abuse, neglect, alteration or attempted repair by unauthorized personnel.

The warranties set forth above are in lieu of all other warranties, expressed or implied, and Apogee specifically disclaims any and all implied warranty of merchantability or of fitness for a particular purpose. The buyer acknowledges and agrees that in no event shall the company be held liable for any special, indirect, incidental or consequential damages, or for injury, loss or damage sustained by any person or property, that may result from this product failing to operate correctly at any time.

USA: Some states do not allow for the exclusion or limitation of implied warranties or liability for incidental or consequential damage, so the above exclusion may not apply to you. This warranty gives you specific legal rights, and you may have other rights which vary from state to state.

## Service Information

The X-HD card contains no user-serviceable components: refer to qualified service personnel for repair or upgrade. Your warranty will be voided if you tamper with the internal components. If you have any questions with regard to the above, please contact Apogee.

In the event your X-HD card needs to be upgraded or repaired, it is necessary to contact Apogee prior to shipping, and a Return Materials Authorization (RMA) number will be assigned. This number will serve as a reference for you and helps facilitate and expedite the return process. Apogee requires that shipments be pre-paid and insured — unless otherwise authorized in advance.

**IMPORTANT: ANY SHIPMENT THAT IS NOT PRE-PAID OR IS SENT WITHOUT AN RMA NUMBER WILL NOT BE ACCEPTED.**

## OWNER’S RECORD

The serial number is located on the rear panel of the unit. We suggest you record the serial number in the space provided below. Refer to it whenever you call an authorized Apogee Electronics repair facility or the manufacturer. Please be sure to return your completed warranty card immediately!

X-HD card Serial No. \_\_\_\_\_

Purchase Date \_\_\_\_\_

Dealer \_\_\_\_\_

Phone \_\_\_\_\_

Address \_\_\_\_\_

**CAUTION:**

**Any changes or modifications not expressly approved by APOGEE ELECTRONICS CORPORATION could void your authority to operate this equipment under the FCC rules.**

Please register this unit by filling in the included registration card, or registering online at <http://www.apogeedigital.com/support/register.php> Please read this manual – if you call for technical support, we’ll assume that you have. There will be a quiz.









# X-HD

## User's Guide

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## Introduction

The Apogee X-HD Option card allows Apogee hardware interfaces to connect directly to Digidesign HD Core, Process and Accel PCI cards directly, with no other hardware needed. Now you can bring the quality of Apogee’s X-Series conversion to your Digidesign Pro Tools HD system.

## Before Getting Started

When installing X-HD cards in Apogee interfaces, ensure that firmware on the interface has been updated to the required version:

For **AD16X** – version 1.30 or higher (press the PREV button while powering up to determine the version).

For **DA16X** – version 1.42 or higher (press the PREV button while powering up to determine the version).

For **Rosetta 800** – any firmware version; do not attempt 192k sessions with a Rosetta 800 96k

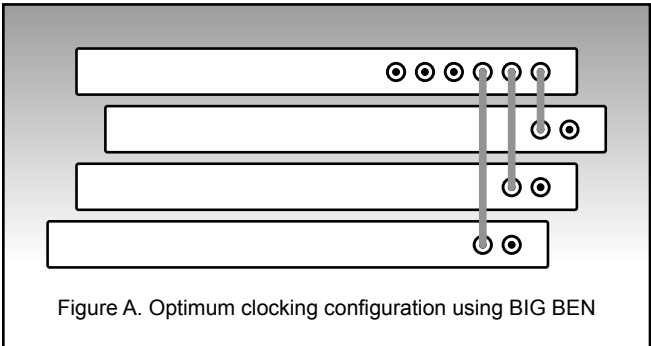
## Getting Started Quickly

- 1 Install the X-HD card :**  
If the X-HD card is not installed in your Apogee interface, please see page 13 for installation instructions
- 2 Determine proper order of interfaces :**  
From the Interface Connections Chart on pages 9-12, locate the entry that corresponds to the set of interfaces you wish to connect. This entry will indicate the proper order to connect Apogee, Digidesign and Prism hardware interfaces to one PCI card. *When using Digidesign or Prism interfaces, please note that they must be connected first in the Digilink chain.*
- 3 Connect Clock and DigiLink cables :**  
Refer to page 3 to determine the correct clock configuration for the set of interfaces you wish to connect. Also indicated on this page is general information on connecting Digilink connections, once the proper order has been determined. *Please note that the Primary Port on the X-HD card is the LEFT connector when looking from the back of the unit.*
- 4 Power On the Hardware Interfaces :**  
Power on all connected interfaces, and ensure that all Apogee devices have a valid clock source and are locked.
- 5 Configure HARDWARE SETUP :**  
Boot up the computer and Pro Tools, select Setups>Hardware Setup in Pro Tools, and verify that interfaces are detected correctly as indicated in the Interface Connections Chart. Select each “192 I/O” displayed under Peripherals and click the Set to Default button. See page 6 for more details.
- 6 Configure I/O SETUP :**  
In Pro Tools, select Setups>I/O Setup, In the I/O Setup page, select the Input, Output, and Insert selection one at a time and press the Default button after each selection. Next, refer to the Interface Connections Chart to determine the actual paths being used by the connected Apogee hardware. In order that I/O settings in the Pro Tools mixer are as clear as possible, delete unused paths and rename remaining paths to precisely indicate the hardware connection – for example, Rosetta A In 8, to indicate input channel 8 on the first Rosetta. See page 7 for more details.

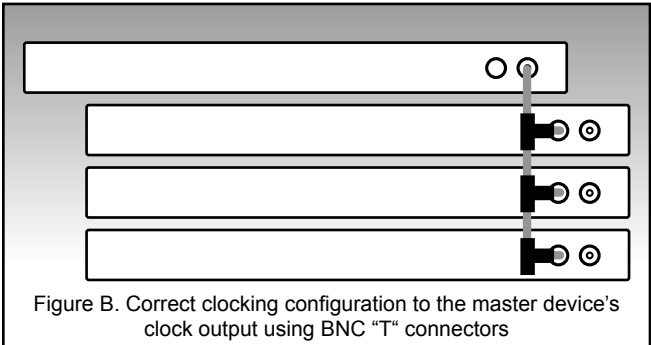
## Connecting X-HD Equipped Apogee Interfaces

### Clock Connections

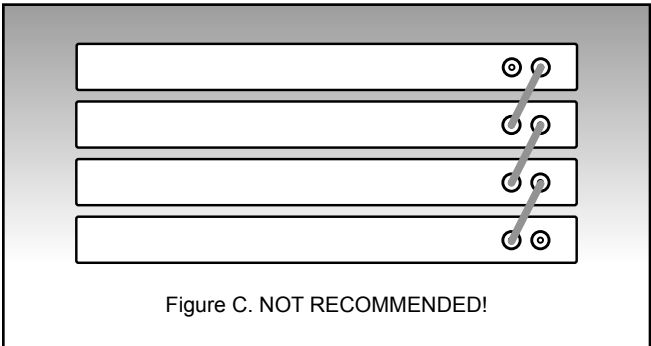
Apogee has conducted considerable research on the clocking of digital systems, resulting in the development and production of our Big Ben Master Clock. With vanishingly low jitter and enough clock outputs to connect several slave interfaces directly to one master, Big Ben is always the best solution for clocking any digital system, including X-HD equipped Apogee interfaces.



In lieu of Big Ben, we recommend connecting the master device’s clock output to the slave devices using BNC “T” connectors as illustrated in the connection diagrams shown to the right. Terminate the last Word Clock input with a 75 ohm load



We recommend against any clocking scheme where the clock output of one device is connected to the clock input of the next, that unit’s clock output is connected to a third’s clock input, and so on. By thus “reclocking” at each interface, additional phase lock loops (PLLs) are introduced into the clock chain, resulting in the accumulation of jitter.



## Incorporating a SYNC I/O

There are 3 configuration possibilities for incorporating a SYNC I/O into the HD system : using a Master Clock, SYNC I/O as master, and HD-equipped Apogee interface as master.

**Using a Master Clock** – Once again, the use of a Master Clock such as Big Ben greatly simplifies clock configuration. Simply connect one of Big Ben's outputs to a SYNC I/O clock input, and set the SYNC I/O's clock source to the appropriate setting. Be sure to set the Big Ben's sample rate to correspond to the sample rate of the Pro Tools session.

**SYNC I/O as master** – In certain situations (for example, when locking Pro Tools to time code from an analog tape machine), the SYNC I/O must be the clock master. In this case, we highly recommend inserting a Big Ben Master Clock between the SYNC I/O's word clock output and the word clock inputs of the audio interfaces for jitter attenuation.

**HD-equipped Apogee interface as master, SYNC I/O slave** – Due to automatic switching of clock sources in Pro Tools, it is not practical to lock one of the connected audio interfaces internally while the SYNC I/O is locked to word clock. It IS possible, by using the SYNC I/O's Loop Sync In and setting the Apogee interface's Word Clock Ratio setting so the sample rate of the interface is at the desired setting while the clock system runs at a 44.1/48k multiple.

## Clock Configuration (when incorporating Digidesign or Prism HD Interfaces)

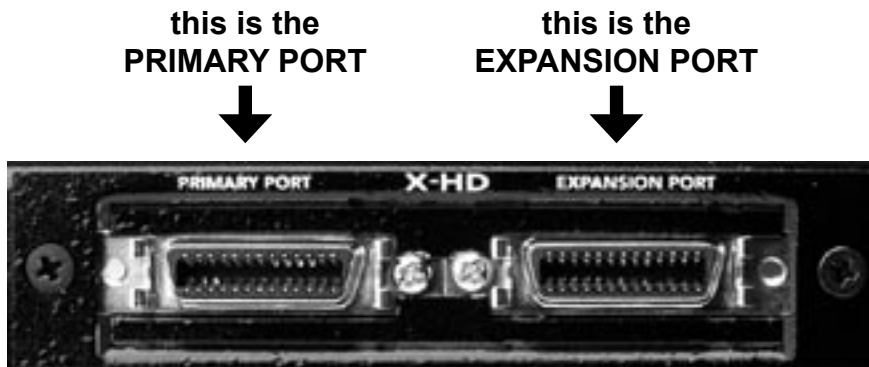
Again, making clock connections when incorporating a Digidesign or Prism interface is simplified by using a Master Clock, so direct connections may be made between the Master Clock and each interface.

We know, we're starting to repeat ourselves, but that's how useful a Master Clock is.

If a Master Clock is not employed, keep in mind that the word clock input of Digidesign interfaces is internally terminated; thus it's not possible to employ BNC "T"s to distribute clock.

## Digilink Connections

Like Digidesign interfaces, the X-HD card is equipped with two ports, Primary and Expansion. *Please note that the Primary Port on the X-HD card is the LEFT connector when looking from the back of the unit.*



The proper order to connect Apogee, Digidesign and Prism hardware interfaces may be determined by locating the entry on pages 9-12 that corresponds to the set of interfaces you wish to connect. *When using Digidesign or Prism interfaces, please note that they must be connected first in the Digilink chain.*

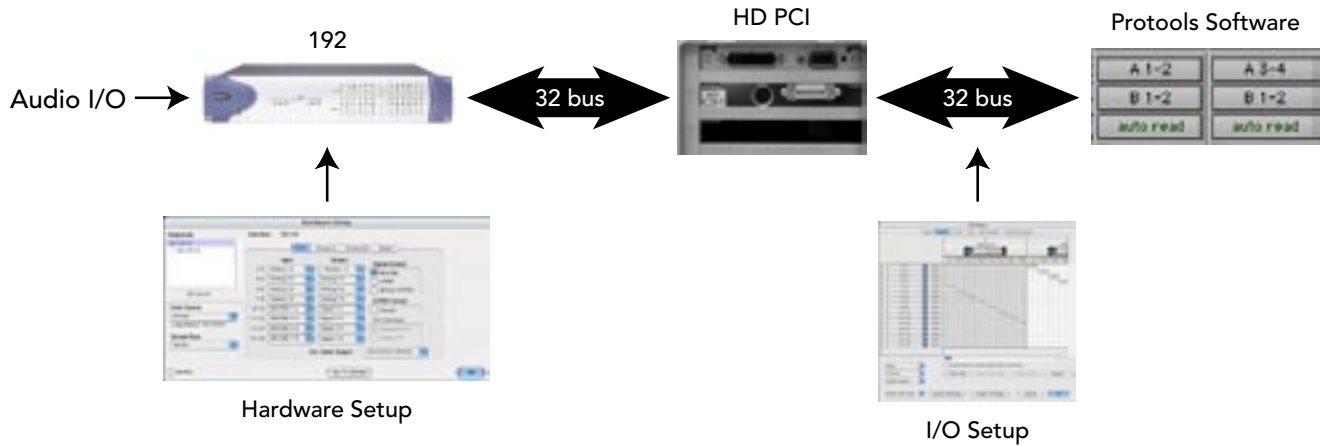
Connect a Digilink cable from the HD Core, Process or Accel card to the Primary port on interface #1, from interface #1’s Expansion port to interface #2’s Primary port, from interface #2’s Expansion port to interface #3’s primary port, and so on until all interfaces are connected. *Use only 18” Digilink cables to make connections between hardware interfaces.*

*After all clock and Digilink connections have been made, ensure that all devices are locked to a valid clock before booting the computer.*

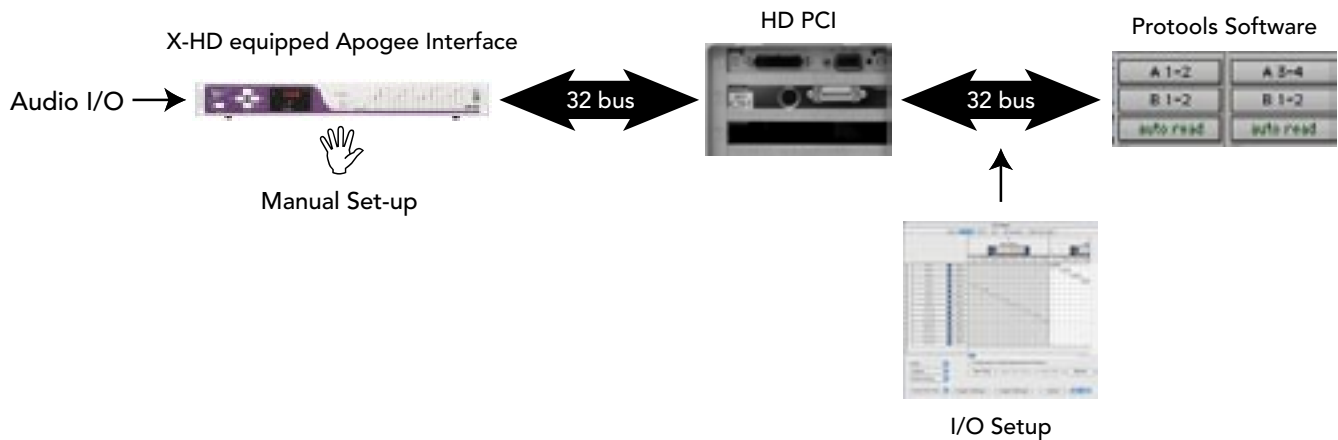
# Configuring Digidesign Pro Tools®

## Hardware Setup

The Hardware Setup and I/O Setup dialogs are the two primary tools within Pro Tools software used to configure hardware. The Hardware Setup dialog serves to define which physical I/O connections on detected hardware are routed to the 32 I/O busses available through each HD PCI card (on the DigiLink cable), while the I/O Setup dialog serves to label and map the manner in which these 32 busses appear in Pro Tools software.



As the audio I/O of Apogee interfaces differs from that of a 192 I/O, a connected Apogee interface will ignore all settings in the Hardware Setup which pertain to audio I/O on the hardware. To define how audio I/O on an Apogee interface is routed to the 32 I/O busses (through the X-HD card), settings should be configured from the unit’s front panel.





## Hardware Setup

- 1 In Pro Tools, select Setups>Hardware
- 2 From the Peripherals list on the left side of the Hardware Setup dialog, verify that Apogee interfaces have been detected correctly (as indicated in the Interface Connections Chart found on pages 9-12).
- 3 If all interfaces have been correctly detected, select each instance of “192 I/O” displayed, and click on the “Set to Default” button.

**Peripherals** – All Apogee interfaces are detected in the Peripheral list as “192 I/O”, as indicated by the Interface Connections Chart on pages 9-12.

**Clock Source** – The Apogee interface connected directly to the HD Core card will respond to the Clock Source setting, when the Clock Source selection made in Pro Tools corresponds to a clock source setting on the Apogee interface.

**Sample Rate** – Before a Pro Tools session has been opened, it is possible to change the Sample Rate of the Apogee interface connected directly to the HD Core card if the interface is clocked internally or to a SYNC I/O. Once a session is opened, the sample rate of interfaces is determined by the session. Again, Apogee interfaces will follow session sample rates if the Core card interface is locked internally or to a SYNC I/O. When Apogee hardware is locked to an external clock source such as Big Ben, be sure to set the hardware clock rate to correspond to the session sample rate.

**Port Settings** – If this parameter is not greyed out, it must be set to Expansion I/O to detect multiple Apogee interfaces.

**Main tab** – These settings are ignored by Apogee interfaces, but it is essential that each buss (1-16) is set to a unique setting. This is most easily accomplished by following the steps above.

**Analog In, Analog Out, Digital tabs** – These settings are ignored by Apogee interfaces.

## I/O Setup

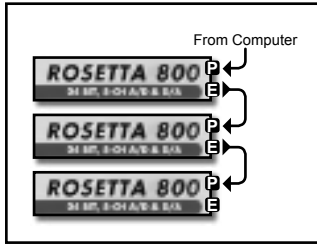
- 1 Once Hardware Setup has been configured, select Setups>I/O Setup.
- 2 Select the Input tab and press Default
- 3 Select the Output tab and press Default
- 4 Select the Insert tab and press Default

The steps above will create a set of signal “paths” based on the number of “192 I/O”s detected in the Hardware Setup>Peripherals list. Refer to the Interface Connections Chart to determine the actual paths being used by the connected Apogee hardware, and rename them to more clearly reflect the connected Apogee interface(s). Delete unused signal “paths”.

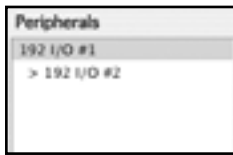
For example, 1 Rosetta 800 will be detected as 1 192 I/O in the Hardware Setup>Peripherals list, resulting in paths A1-16 to be created in the Input, Output and Insert tab pages. On the Input page, re-label paths A1-8 as Rosetta In 1-8; On the Output page, re-label paths A1-8 as Rosetta Out 1-8; delete paths A9-16 on each page, as they are not active paths.

## Interface Connections Chart: Standard Routing (per Digidesign Core, Process or Accel card)

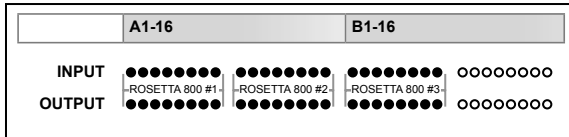
The following chart displays connection specifics for all possible combinations of HD-compatible interfaces that may be connected to one HD Core, Process or Accel PCI card. There is no limit to the number of PCI cards used beyond those limits imposed by the Digidesign system itself.



In the leftmost column, a set of interfaces is depicted in the required order.



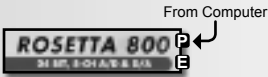
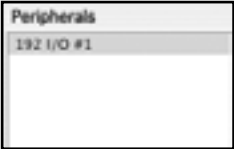
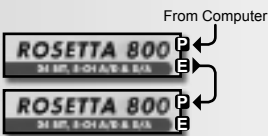
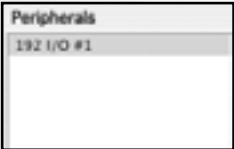
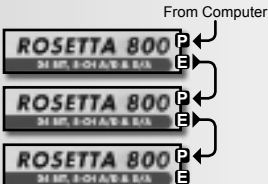
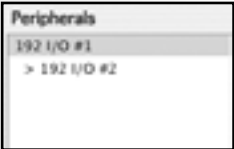
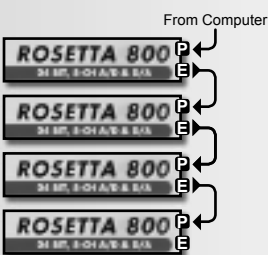
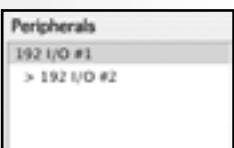

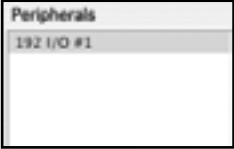
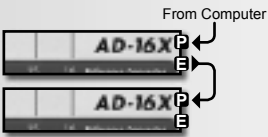
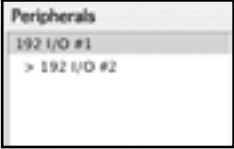
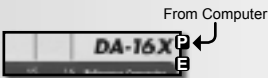
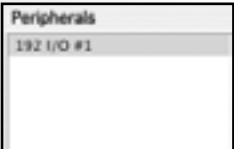


The middle column indicates the manner that such a set should appear in the Pro Tools Hardware Setup dialog; note that in many cases two Apogee interfaces will appear as only one 192 I/O.

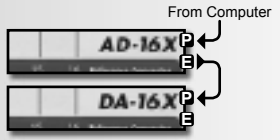

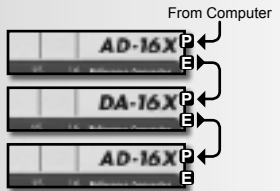
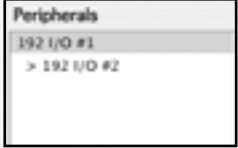
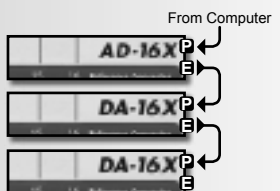
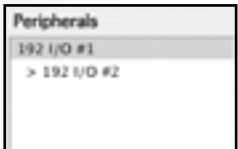
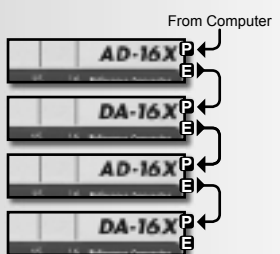
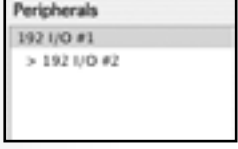
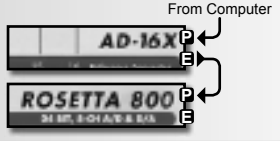

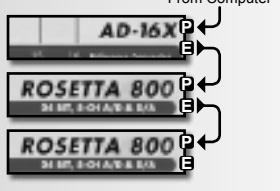
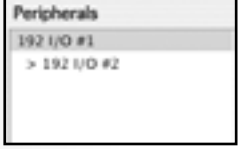




The third column indicates which of the 32 possible I/O busses (per HD PCI card) is in use. For example, three Rosetta 800s appear in the Hardware Setup as two “192 I/Os” but only I/O channels 1-24 are used.

### Important Configuration Notes:

- Be sure to connect interfaces in the order indicated.
- The Apogee AD-8000 and Trak2, not shown on the chart, are equivalent to a Rosetta 800.
- The Rosetta 200 is equivalent to the Rosetta 800.
- The Prism ADA-8 is equivalent to a Digidesign interface, and must be placed first in the chain of interfaces.
- If a Digidesign 96 is placed before a Rosetta 800 192k, no inputs from the Rosetta will be available in sessions at 192k. In this case, better to connect each interface to its own PCI card.
- Later versions of “DigiSetup” include a hardware interface loop-through test. The following error message is encountered with Apogee interfaces : “Peripheral Digital Loop Back Test; 1-16 failed”. This does not affect correct operation of the interface.
- When running sessions at 192k, only 24 busses are available for each PCI card, 12 per 192 interface.

INTERFACE SET	APPEARS AS... in Hardware Setup	CHANNELS IN USE									
<b>ROSETTA 800</b>											
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**APPEARS AS...  
in Hardware Setup**

**INTERFACE SET**

**CHANNELS IN USE**

**AD-16X, DA-16X & ROSETTA 800 *continued***

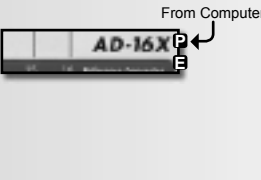
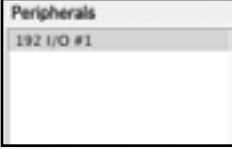

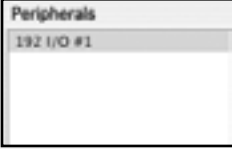
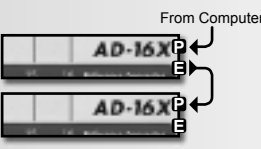
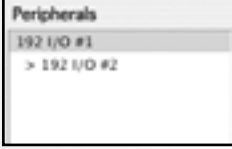
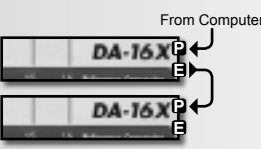
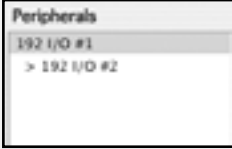
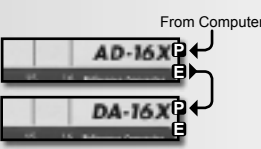
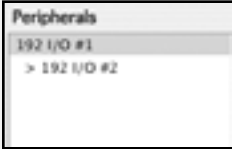
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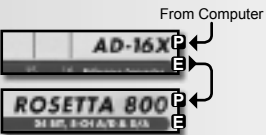

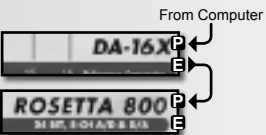


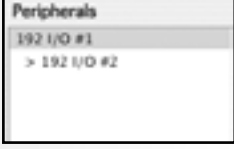
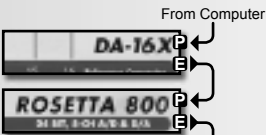
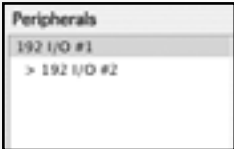
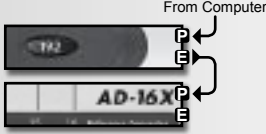
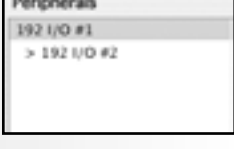
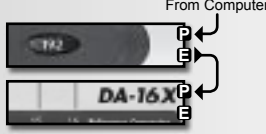

INTERFACE SET	APPEARS AS... in Hardware Setup	CHANNELS IN USE												
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OUTPUT	DIGI 192 #1 ●●●●●●●● ●●●●●●●●	ROSETTA 800 #2- ●●●●●●●●												

## Interface Connections Chart: Advanced Option Routing (per Digidesign Core, Process or Accel card)

When Advanced Option routing is enabled on AD16X or DA16Xs, the additional digital I/O accessible to the X-HD card causes the interfaces to be detected differently in the Pro Tools’ Hardware Setup page. For example, an AD and DA16X set to Standard routing is detected as 1 Digidesign 192, while the same interfaces in Advanced Option routing are detected as 2 192s; the AD16X operates as a 16 analog in, 16 digital out 192 while the DA16X operates as a 16 digital in, 16 analog out 192.

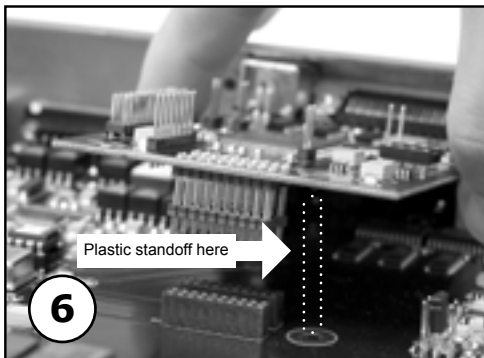
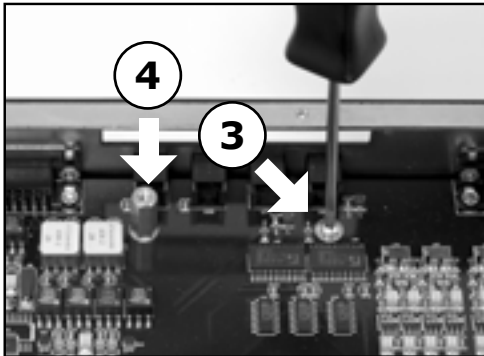
The following chart entries display all combinations of AD16Xs, DA16Xs (when set to Advanced Option routing) and other HD-compatible interfaces that may be connected to one HD Core Process or Accel PCI card.

INTERFACE SET	APPEARS AS... in Hardware Setup	CHANNELS IN USE									
<b>AD-16X &amp; DA-16X</b> 		<table border="1"> <thead> <tr> <th></th> <th>A1-16</th> <th>B1-16</th> </tr> </thead> <tbody> <tr> <td><b>INPUT</b></td> <td> </td> <td> </td> </tr> <tr> <td><b>OUTPUT</b></td> <td> </td> <td> </td> </tr> </tbody> </table>		A1-16	B1-16	<b>INPUT</b>			<b>OUTPUT</b>		
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## Installing the X-HD Card



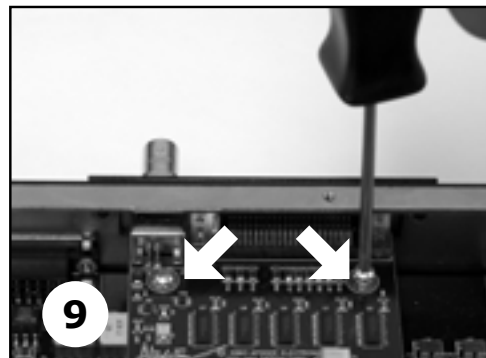
8



Your X-HD card should include the following:

- 1 X-HD circuit board
- 1 X-HD Coverplate
- 2 aluminium standoffs
- 1 plastic standoff
- 2 screws
- 1 manual

- 1 Remove the top cover of the interface
- 2 Remove the Option Card coverplate and install the X-HD coverplate using the screws from the original coverplate.
- 3 Remove the two interface circuit board screws indicated at left, and set them aside for later use
- 4 Install the two aluminium standoffs in the threaded holes vacated by the screws.
- 5 Install the plastic standoff in the hole adjacent to the connector pins of the X-HD card.
- 6 Insert the Primary/Expansion ports connector end of the X-HD card through the appropriate cutouts in the coverplate, and carefully place the X-HD connector pins in the mating interface connector.
- 7 After verifying the alignment of the X-HD connector pins and the interface mating connector, firmly press down on the X-HD card, over the connector, until the pins are completely seated in the mating connector.
- 8 Secure the Primary/Expansion Port connectors to the Coverplate by installing the 2 provided screws into the 2 inner threaded holes
- 9 Re-install the circuit board screws in the locations indicated below.

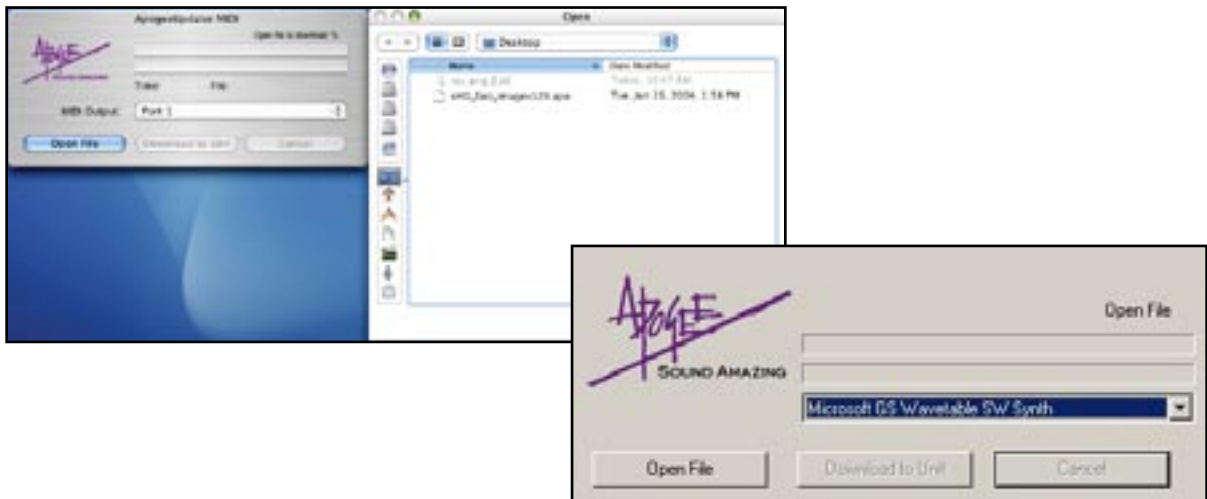


## Upgrading Firmware on the X-HD card

To allow the greatest flexibility in the field, Apogee now employs a firmware update method using standard Midi protocol. You’ll need the following items to update the firmware of your Apogee device:

- ApogeeUpdater program, available from Apogee’s website
- New firmware file, also available from our website
- Macintosh OSX 10.2 or higher or Windows XP computer
- USB Midi interface, compatible with OS used.

- 1 Install both the ApogeeUpdater and the new firmware file onto a computer equipped with a USB Midi Interface. It’s assumed that all drivers necessary for the proper test and operation of the Midi Interface have been installed.
- 2 Connect the X-HD Midi port to an output of the Midi Interface.
- 3 Set the Apogee Host interface to 44.1kHz Internal Clock.
- 4 Open the ApogeeUpdater application, and click on OPEN FILE. In the Navigation window which appears, navigate to the new firmware file, select it, and click on OPEN.
- 5 Click on DOWNLOAD TO UNIT.



- 6 Both the red and green LEDs on the X-HD card should flash, indicating that the card is updating.
- 7 Once the ApogeeUpdater indicates “Finished” in the upper right hand corner, power cycle the Apogee Host interface; the X-HD card is now ready for use.
- 8 On the Rosetta 800, set Source to Analog Out to Option and verify that the LED does NOT flash. On the AD/DA-16X, verify that a valid sample rate is indicated.
- 9 If the Option LED does flash on the Rosetta 800, or “000” is indicated on the AD/DA-16X, programming has failed; check your MIDI setup and try again.





## X-HD card USER'S GUIDE - v2.0 - January 2005

Text conceived *and* delivered by: Roger Robindore

Graphics and illustrations by: Sean McArthur

