# UAD System Manual

**Software Version 10**

Manual Version 220223

UNIVERSAL AUDIO

www.uaudio.com

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# Introduction

## The Authentic Sound of Analog

From project studios to multi-platinum mix engineers, UAD Powered Plug-Ins have been winning over audio professionals for more than 15 years with their stunning analog sound. The UAD library now features more than 100 plug-ins, co-created with the biggest brands in audio. Developed by UA's world-renowned team of DSP engineers, UAD plug-ins set the standard by which all other audio plug-ins are judged.

### The World's Finest Analog Emulation Plug-Ins

From rare tube compressors and equalizers, to vintage reverb processors and tape machines, UAD Powered Plug-Ins inject three-dimensional "out-of-the-box" analog sound to your in-the-box mixes. Access over 90 plug-ins from Ampex, Lexicon, Fender, Studer, Neve, Manley, SSL, EMT, API, MXR and more.*

### Offload your Computer's CPU with DSP Acceleration

With UAD Powered Plug-Ins, the actual processing is offloaded to UAD-2 hardware. This frees up your computer to do other things, like mixing audio and running samplers or soft synths.

### Cross-Platform Compatibility with All Major DAWs

UAD Powered Plug-Ins are compatible with both Mac and Windows, and run smoothly in all major DAWs including Pro Tools, Logic Pro, Cubase, Ableton Live, and more.

### UAD Plug-In Craftsmanship: The Science Behind the Scenes

In developing UAD plug-ins, UA's engineering group undertakes a thorough physical modeling of classic audio hardware — "rebuilding" vintage analog gear in the digital world, component by component. That's how UAD plug-ins replicate the exact, sometimes quirky, behavior of analog hardware — bringing its rich, three-dimensional sound and harmonics "in the box."

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# Features

## All UAD-2 Devices

- 1, 2, 4, or 8 Analog Devices SHARC floating-point processors
- Multi-device support for up to six UAD-2's in one system
- Compatible with VST, AAX 64, and Audio Units plug-in formats
- Drivers optimized for modern multi-thread and multi-processor architectures
- Real-time and faster than real-time processing for mix bounces
- LiveTrack low-latency mode for monitoring, tracking, and performance *(not available with UAD-2 FireWire devices)*
- L.O.D.E. (Live Optimizing DSP Engine) automatically balances DSP loads
- LoadLock ensures resource availability on loaded plug-ins
- UAD Toolbar for preset management and accessing information
- Award-winning UAD Powered Plug-Ins from Ampex, Lexicon, Neve, Manley, SSL, Studer, and more*
- 14-day full function demo for all UAD plug-ins; try before you buy
- UAD plug-ins available at the Universal Audio online store

## UAD Meter & Control Panel application

- Configures global UAD-2 and UAD plug-in settings
- Facilitates automatic authorization of UAD plug-in licenses and UAD-2 devices
- UAD-2 resource meters for DSP and Memory loads

## UAD-2 Satellite

- External form factor
- Thunderbolt: QUAD or OCTO in Thunderbolt enclosure
- FireWire: DUO or QUAD in FireWire enclosure
- USB: QUAD or OCTO in USB 3 enclosure

## UAD-2 PCI Express Cards

- High-bandwidth x1 PCIe
- Full-height, short card form factor
- UAD-2 QUAD and OCTO card models available

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# UAD Documentation Overview

This section describes the various instructional and technical resources that are available for installing, using, and troubleshooting UAD Powered Plug-Ins. Documentation for the product line is available in written, video, and online formats.

## Operation Manuals

Documentation for UAD-2 devices and UAD Powered Plug-Ins are separated by areas of functionality, as described below. The user manuals are placed on the system drive during software installation, and they can be downloaded at www.uaudio.com.

> ***Note:*** *All manual files are in PDF format. PDF files require a free PDF reader application such as Adobe Acrobat Reader (Windows/Mac) or Preview (Mac only).*

### UAD System Manual

The UAD System Manual is the operation manual for overall UAD functionality and applies to the entire UAD-2 product line. It contains detailed information about installing, configuring, and operating UAD devices and plug-ins.

The UAD System Manual includes everything about UAD except Apollo-specific information, and individual UAD plug-in descriptions.

### UAD Plug-Ins Manual

The features and functionality of all the individual UAD Powered Plug-Ins are detailed in the UAD Plug-Ins Manual. Refer to this document to learn about the operation, controls, and interface of each plug-in.

### Direct Developer Plug-Ins

UAD Powered Plug-Ins includes plug-ins from our Direct Developer partners. Documentation for these 3rd-party plug-ins are separate files that are written and provided by the plug-in developers themselves. The filenames for these plug-ins are the same as the plug-in names.

### Apollo Manuals

Apollo models have separate software and hardware manuals that document all the features and functionality of Universal Audio's line of audio interface products. These manuals are installed along with the Apollo software. Arrow has its own manual.

### Host DAW Documentation

Each host DAW software application has its own particular methods for configuring and using plug-ins. Refer to the host DAW's documentation for specific instructions about using plug-in features within the DAW.

### Hyperlinks

Links to other manual sections and web pages are highlighted in blue text. Click a hyperlink to jump directly to the linked item.

> ***Tip:*** *Use the "back" button in the PDF reader application to return to the previous page after clicking a hyperlink.*

## Accessing Installed Manuals

To open the documentation folder, click the “Product Manuals” button in the Help Panel within the UAD Meter & Control Panel application.

### File locations

The UAD and Direct Developer manual files are copied to the hard drive by the software installer to the following locations:

***Windows***

- Start Menu>All Programs>UAD Powered Plug-Ins>Documentation

***Mac***

- /Applications/Universal Audio/Documentation

# Additional Resources & Technical Support

For additional instructional information or if you need to contact Universal Audio for assistance, see the Technical Support page.

# UAD Installation

The UAD Powered Plug-Ins software must be installed to use UAD-2 devices. The UAD installer places all the software necessary to configure and use UAD-2 hardware and UAD plug-ins onto the computer's startup drive. Complete details are in this chapter.

## Additional Instructions

This UAD products below have unique connection and operation instructions. Refer to the chapters below for detailed procedures with these products:

- UAD-2 Satellite Thunderbolt
- UAD-2 Satellite USB
- UAD-2 Satellite FireWire
- UAD-2 SOLO/Laptop
- Apollo interfaces have their own installation procedures and system requirements. See the Apollo Manuals for specific details.

## Windows & Mac

Software installation and removal for Windows and Mac platforms have their own particular procedures. Instructions for each platform are detailed separately.

## Software Updates

The most recent UAD software is always recommended so you'll have access to the latest UAD plug-ins and stability updates. The most recent software is available at the UA website. If the UAD software is already installed, the UAD Meter & Control Panel application has a convenient Check for Updates button that checks for the most recent version.

## Firmware Updates

For optimum results, always update the firmware if prompted by the software. Follow the onscreen instructions to complete the process before attempting to use the software.

## Preparation

Close all open files and applications before starting the software installation procedure. The installer requires a restart after installation.

If you are updating to a newer version of UAD software or installing additional UAD devices, it is not necessary to remove the previous UAD software or hardware from the system.

## Technical Assistance

If you need help, see the Technical Support page.

# System Requirements

- For complete compatibility information, including operating system and storage requirements, please visit help.uaudio.com.
- System requirements are subject to change without notice.

## All Platforms (Mac & Windows)

- Internet connection to download software and authorize UAD plug-ins
- Compatible VST, Audio Units, or AAX 64 plug-in host DAW software

## FireWire Systems (Mac & Windows)

- Available FireWire 800 port*

***Note:** On Windows systems, a qualified PCIe-to-FireWire adapter card is required*

## Thunderbolt Systems (Mac & Windows)

- (Mac) Apple computer with available Thunderbolt port
- (Win) PC computer with available built-in Thunderbolt 3 port

***Note:** Thunderbolt cable and adapter not included*

## USB Systems (Windows only)

- Available built-in* USB 3 SuperSpeed port
- Intel Core i3, Core i5, Core i7, or Xeon processor*
- USB 3.0 SuperSpeed cable (included)

***Notes:**

- 2-in-1 systems (notebook/tablet) are not recommended
- USB 3 adapters (such as PCIe-to-USB 3 expansion cards) are not tested for Apollo Twin USB connection
- Quad Core i7 or better processor recommended

## UAD-2 PCIe Card Systems (Mac & Windows)

- Available PCI Express (PCIe) slot for each UAD-2 card

## Compatible DAW Host Applications

UAD Powered Plug-Ins are compatible with VST, AAX 64, and Audio Units host DAW applications, and are widely used with a variety of major DAW software — including Pro Tools, Logic Pro, Cubase, Nuendo, Live, and more.

However, due to plug-in host differences between DAWs — and our own rigorous testing standards — Universal Audio only officially tests the latest UAD software with:

- Pro Tools 2021
- Apple Logic Pro X
- Steinberg Cubase 11
- Steinberg Nuendo 11
- Ableton Live 11

### DAW Application Notes

- The most recent maintenance release of the DAW application is recommended.

# Installation on Windows Systems (FireWire and/or PCIe)

***Note:*** *To install UAD-2 Satellite USB on Windows systems, see the next page.*

## Install UAD Software First

***Note:*** *For optimum results, install the UAD software before installing/connecting the UAD-2 hardware.*

**To install, register, and authorize UAD plug-ins:**

***Important:*** *Verify the computer system date and time are set correctly before installing the software and/or launching the UAD Meter & Control Panel application for the first time.*

1. Download the latest UAD software installer: www.uaudio.com/download
2. Open the downloaded installer application. The installer will guide you. Be sure to restart the computer when prompted.
3. Shut down (power off) the computer. If the UAD device(s) is already installed or you are updating to a newer version, bypass this step.
4. Install/connect and power on the UAD device(s) then start the computer.

***Note:*** *If prompted to update the firmware, see the procedure below.*

5. After restarting, the default web browser launches and connects to the UA online store. Follow the instructions on the web pages to create an account, register the hardware, and authorize bundled UAD plug-ins.
6. After registration is complete, authorize the UAD device by following the instructions on the registration web pages. The system is ready for use.

If the device was already registered, when the computer restarts the UAD Meter & Control panel automatically opens and UAD plug-ins are automatically authorized in the background.

***Tip:*** *You can use the UAD Meter & Control Panel to verify installation. See* *Verifying Installation* *for details.*

## Firmware Update Procedure

If prompted by the “Firmware Update” dialog window to update the UAD-2 firmware:

1. Click “Load” to begin the process. The “firmware is updating” window appears.
2. Wait for the “Power Off UAD Device” dialog window, which appears after the firmware is updated.
3. Power OFF the UAD-2 hardware, then power it back ON. The firmware update is complete.

# Installation on Windows Systems (Thunderbolt and/or USB)

***Note:*** *To install UAD-2 FireWire devices or PCIe cards on Windows systems, see the previous page.*

## Connect And Power Hardware First

***Note:*** *For optimum results, connect and power the UAD-2 Satellite USB hardware before installing the UAD software.*

**To install, register, and authorize Apollo and UAD plug-ins software:**

1. Connect UAD-2 Satellite USB to a built-in USB 3 port on the computer with the included USB 3 cable, then power on UAD-2 Satellite USB.
2. Download the latest UAD software installer: www.uaudio.com/download
3. Open the downloaded installer program. The installer will guide you. Be sure to restart the computer when prompted.

***Important:*** *If prompted to update the firmware, see the procedure below.*

4. After restarting, the default web browser launches and connects to the UA online store. Follow the instructions on the web pages to create an account, register the hardware, and authorize bundled UAD plug-ins.
5. After registration is complete, authorize the UAD device by following the instructions on the registration web pages. The system is ready for use.
6. Proceed to UAD-2 Satellite USB Windows Setup to complete the setup process.

If the device was already registered, when the computer restarts the UAD Meter & Control Panel automatically opens and UAD plug-ins are automatically authorized in the background.

***Note:*** *To authorize a UAD system that is not connected to the Internet, see "Offline Authorization Procedure" in the UAD System Manual.*

## Firmware Update Procedure

If prompted by the "Firmware Update" dialog window to update the firmware:

1. Click "Load" to begin the process. The "firmware is updating" window appears.
2. Wait for the "Power Off UAD Device" dialog window, which appears after the firmware is updated.

Power OFF UAD-2 Satellite USB, then power ON UAD-2 Satellite USB. The firmware update is complete.

# Installation on Mac Systems

## Install/Connect UAD Hardware First

***Note:*** *For optimum results, install/connect the UAD-2 hardware before installing the UAD software.*

**To install, register, and authorize UAD plug-ins:**

***Important:*** *Verify the computer system date and time are set correctly before installing the software and/or launching the UAD Meter & Control Panel application for the first time.*

1. Shut down (power off) the computer.
2. Install/connect and power the UAD-2 device(s) then start the computer.
3. Download the latest UAD software installer: www.uaudio.com/download
4. Open the downloaded installer application. The installer will guide you. Be sure to restart the computer when prompted.
5. After restarting, the default web browser launches and connects to the UA online store. Follow the instructions on the web pages to create an account, register the hardware, and authorize bundled UAD plug-ins.

***Note:*** *If prompted to update the firmware, see the procedure below.*

6. After registration is complete, authorize the UAD device by following the instructions on the registration web pages. The system is ready for use.

If the device was already registered, when the computer restarts the UAD Meter & Control panel automatically opens and UAD plug-ins are automatically authorized in the background.

***Tip:*** *You can use the UAD Meter & Control Panel to verify installation. See* *Verifying Installation* *for details.*

## Firmware Update Procedure

If prompted by the “Firmware Update” dialog window to update the UAD-2 firmware:

1. Click “Load” to begin the process. The “firmware is updating” window appears.
2. Wait for the “Power Off UAD Device” dialog window, which appears after the firmware is updated.
3. Power OFF the UAD-2 hardware, then power it back ON. The firmware update is complete.

# Installed Software Locations

The UAD Meter & Control Panel application, UAD plug-ins, and UAD documentation are copied to the locations below on the system drive during installation:

**Windows**

- C:\Program Files\Universal Audio\Powered Plug-Ins

These can be accessed from the Windows Start Menu at:

- Start>All Programs>UAD Powered Plug-Ins

The DAW plug-in files are installed to these locations during installation:

***64-bit VST plug-ins directory:***

- C:\Program Files\Steinberg\VSTPlugins\Universal Audio

***Note:*** *To ensure access to the mono (m) plug-ins, set the host application to use the directories above.*

***AAX 64 UAD plug-ins directory:***

- C:\Program Files\Common Files\Avid\Plug-Ins\

**Mac**

- Macintosh HD/Applications/Universal Audio

The DAW plug-in files are installed to the standardized OS X locations:

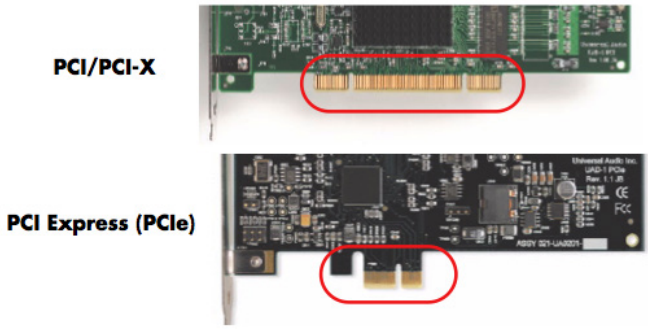
- VST: /Library/Audio/Plugins/VST/Universal Audio
- Audio Units: /Library/Audio/Plug-Ins/Components
- AAX 64: /Library/Application Support/Avid/Audio/Plug-Ins

# UAD-2 PCIe Card Installation

## About PCI and PCI Express

PCI and PCI-X are different than PCI Express (also known as PCIe). UAD-2 PCIe cards are not compatible with PCI or PCI-X because PCIe uses a completely different connector (as shown at right).

UAD-2 SOLO, DUO, QUAD, and OCTO cards are all PCIe cards and will only work in PCI Express (PCIe) slots. Be careful to only install the UAD-2 card into a PCIe slot.




*PCI/PCI-X and PCIe connectors are incompatible*

### UAD-2 PCIe Speed

UAD-2 cards are "x1" PCIe cards. Although these cards can be installed into any speed PCIe slot (x1/x4/x8/x16), putting a them in any PCIe slot faster than x1 will not improve UAD performance.

### PCIe Card Handling

Before handling the UAD card, discharge any static electricity by touching the metal casing of the power supply. Do not touch the gold edge connector contacts.

## Installing UAD PCIe Cards

If necessary, refer to the computer manufacturer's documentation for instructions about installing PCIe cards.

> ***Important:*** *Ensure the computer (and PCIe expansion chassis, if applicable) is powered off before installing the UAD-2 PCIe cards.*

1. Power off the computer system (and PCIe expansion chassis, if applicable), then open the computer case and remove the rear screw and cover of an available PCIe expansion slot.
2. Hold the PCIe card gently by the top edges, and line up its connector with the slot inside the computer.
3. When the connector and slot are aligned, press the card into the slot with firm, even pressure. The card should "pop" into place. The top of the slot on the motherboard should be flush and parallel with the edge of the UAD card.
4. Secure the card with the previously removed screw and replace the computer case.

**PCIe Installation is complete.**

## Online Authorization

> ***Note:*** *UAD devices must be registered, and UAD plug-ins must be authorized, before they can be used.*

After initial registration, UAD authorization is automatic. Simply restart the computer and authorization is accomplished automatically in the background by the UAD Meter & Control Panel application.

Whenever a new UAD-2 or Apollo device is connected (and the UAD software is already installed), registration will begin automatically via the web browser. Follow the instructions on the web pages to create an account, register the UAD device(s), and claim bundled UAD plug-ins.

Automatic authorization requires the UAD host computer to be connected to the Internet. To authorize a system that is not online, see the instructions below.

## Offline Authorization

> ***Note:*** *UAD devices must be registered, and UAD plug-ins must be authorized, before they can be used.*

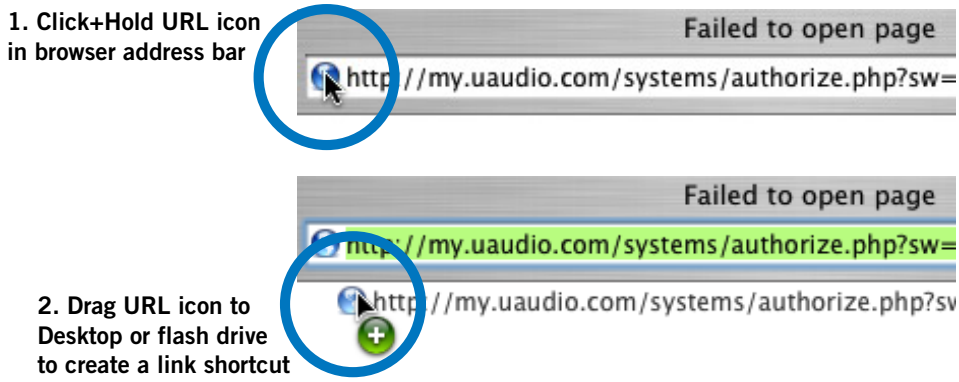
If the UAD computer is not connected to the Internet, you will need to manually transfer the registration URL into the browser of a web-enabled computer, download an authorization file on the web computer, then transfer the authorization file back to the UAD computer.

**To obtain and apply the UAD authorization file if not connected to the internet:**

1. Install UAD Powered Plug-Ins software and the UAD hardware using the procedures detailed in this chapter (the system must be operating properly).
2. Launch the UAD Meter & Control Panel application and open the Plug-Ins Panel.
3. Click the Authorize Plug-ins button. The default web browser opens with the registration URL in the address bar (and you may get an error that the computer is not connected to the Internet).

*(continued)*

4. You must enter this exact URL into a web-connected computer, so either:
   a. Drag the URL icon in the browser's address bar to the Desktop to create a weblink shortcut (preferred; avoids transcription errors) then transfer the weblink shortcut to the internet computer via a storage device or network, OR
   b. Copy/paste the exact URL into a file that can be transferred (or carefully write down the URL, EXACTLY as it appears in the address field).




*Creating a web location shortcut on the offline UAD system for easier transfer of the URL file to an online system*

5. Go to the URL using a web browser on an Internet-connected computer. Double-click the transferred weblink shortcut, or enter the URL as previously noted.
   - If you don't already have a UA account, you are directed to create one. Follow the instructions online.
   - If you already have a UA account, login with your email address and password. If your password is lost, the store can email password reset link to you.
6. Your device will be automatically registered and added to your My UA Hardware page, and your authorization file is generated.
7. The authorization file named "auth.uad2" should begin downloading automatically (if not, click the download authorization link).
8. Transfer the authorization file to the UAD computer via a storage device or network.
9. For optimum results, quit all open audio host applications (DAWs).
10. Double-click the authorization file. The authorization is loaded onto the UAD device(s) and after a few seconds the "Authorizations Status" window appears.

**Offline UAD authorization is complete and UAD plug-ins are ready for use.**

## Verifying Installation

The UAD Meter & Control Panel contains the System Information panel, where UAD software and hardware installation can be verified to ensure the system is working properly.

**To confirm proper UAD installation and operation:**

1. Launch the UAD Meter & Control Panel application (see Launching the Application).
2. Open the System Information Panel.
3. When the UAD device is displayed in the Hardware area and its status is "OK" then the UAD driver is communicating with the UAD device and the system is operating properly.

## UAD-2 LED

The UAD-2 has an LED indicator. This LED provides certain indications about the operational state of the UAD-2. The location of the LED depends on the UAD-2 product. On UAD-2 PCIe cards, the LED is on the mounting bracket of the card. On SOLO/Laptop, the LED is next to the UA logo on the black housing. On UAD-2 Satellite, the LED is on the rear panel.

### Alternating red and green

When the LED alternates between solid red and solid green, the device is powered up properly but the UAD driver is not yet loaded or communicating with the device. This is the expected state if the device is installed but the software is not yet installed, or after booting the system and the UAD driver is not yet loaded. The driver loads when the UAD Meter & Control panel or host DAW application is launched.

### Solid green

When the LED is solid green, the UAD driver is loaded and properly communicating with the device. This is the normal state when using UAD Powered Plug-Ins.

### Solid red or other blinking patterns

When the LED is producing any pattern other than the two conditions above, there is a problem with communication between the driver and the device. Try a cold reboot (complete power down) and/or reinstalling the UAD software before contacting customer support.

# Software Removal

***Important:*** *Power down the computer before removing any UAD cards.*

**To remove all UAD software from the computer:**

***Windows***

1. Go to: Control Panel>Programs>Programs and Features
2. Select “UAD Powered Plug-Ins”
3. Click “Uninstall”

The UAD software is removed.

***Mac***

1. Go to: Mac HD/Applications/Universal Audio
2. Launch the “Uninstall Universal Audio Software” application
3. Click “Uninstall UA Software” in the application’s window

The UAD software is removed.

## Learn More

After installation, registration, and authorization, you’re ready to use UAD Powered Plug-Ins. The Universal Audio Knowledge Base contains helpful videos that explain how to install the hardware and software, register, authorize, and use the product, obtain optional plug-ins, and more.

For additional instructional information or if you need to contact Universal Audio for assistance, see the Technical Support page.

# UAD System Overview

## The UAD Environment

UAD Powered Plug-Ins is a hardware-plus-software system that consists of one or more UAD-2 DSP accelerator devices and/or Apollo audio interfaces combined with the UAD Powered Plug-Ins software.

Various UAD-2 products are available to accommodate your particular computer system, processing needs, and budget. For the complete product lineup, visit the Universal Audio website at www.uaudio.com.

### System Components

The complete UAD Powered Plug-Ins environment consists of various components. These components are:

- One or more UAD-2 DSP hardware accelerator devices
- The UAD plug-ins
- The UAD device drivers
- The host computer system
- The plug-in host application software (DAW)
- A computer audio hardware input/output interface and its drivers
- Your UA account and the UA store

All these components operate together simultaneously within one computer to form the complete UAD audio processing system. An overview of these components is provided in this chapter.

# The UAD Hardware

The UAD-2 DSP (Digital Signal Processing) hardware accelerator devices provide the power behind UAD Powered Plug-Ins. Most UAD plug-ins use extremely complex algorithms to provide the quality sound and accurate modeling Universal Audio is famous for. The UAD processor engines are significantly more optimized to perform the complex DSP routines required for these algorithms than a standard desktop computer CPU can deliver.

All UAD-2 devices are Mac and Windows compatible unless otherwise specified. The cross-platform hardware is identical for both OS platforms.

> ***Note:*** *Multiple UAD hardware types can be used concurrently in the same computer system. For details, see Multiple UAD Devices.*

## UAD-2 Products

UAD-2 is UA's second-generation UAD product line that offers many improvements over the original UAD-1; most notable is significantly increased DSP horsepower. Each UAD-2 DSP provides approximately 2.5 times the processing power of the UAD-1, therefore one UAD-2 OCTO offers approximately 20 times the processing power of UAD-1.

A variety of UAD-2 models are available to suit various processing and protocol needs. Each model is defined by its number of SHARC DSP cores (1, 2, 4, 6, or 8) and its connection protocol (PCIe, FireWire, Thunderbolt, or USB 3). Up to six UAD-2 devices can be run concurrently in one system; see the UA Knowledge Base for specific details about compatibility with each model.

> ***Note:*** *UAD-1 is a discontinued product.*

## DSP Core Complement

The DSP core complement of UAD-2 devices is designated as SOLO, DUO, QUAD, HEXA, or OCTO. These designations indicate the number of SHARC® DSP (Digital Signal Processing) chips in each device.

SOLO devices have one DSP core, DUO devices have two DSP cores, QUAD devices have four DSP cores, HEXA devices (Apollo X Series audio interfaces only) have six DSP cores, and OCTO devices have eight DSP cores.

You can increase the amount of UAD DSP power by adding UAD devices to your system as your UAD processing needs grow.

## UAD-2 PCIe Cards

UAD-2 PCI Express (PCIe) cards are available in QUAD and OCTO core configurations. All UAD-2 PCIe cards use the PCIe x1 architecture, providing plenty of data bandwidth for even the most demanding audio processing requirements, such as four UAD-2 OCTOs (32 DSP cores) in the same system.

***Note:*** *UAD-2 PCIe SOLO and UAD-2 PCIe DUO are discontinued products.*

## UAD-2 SOLO/Laptop

UAD-2 SOLO/Laptop is a self-contained UAD-2 SOLO device housed entirely within an ExpressCard/34 expansion card for use with notebook computers. No external cables or power is required, for the ultimate in mobile DSP capability. UAD-2 SOLO/Laptop has special instructions for installation, connectivity, and use. For details, see UAD-2 SOLO/Laptop.

***Note:*** *UAD-2 SOLO/Laptop is a discontinued product.*

## UAD-2 Satellite

UAD-2 Satellite enables UAD plug-in QUAD or OCTO processing with a variety of modern computer systems. Three UAD-2 Satellite models are available, and each model uses a different connection protocol. All models are housed in rugged and attractive external enclosures.

- For Thunderbolt model details, see UAD-2 Satellite Thunderbolt.
- For USB 3 model details, see UAD-2 Satellite USB.
- For FireWire model details, see UAD-2 Satellite FireWire.

## UA Audio Interfaces

Apollo are Arrow are UA's line of high-resolution audio interfaces with class-leading sound quality, Realtime UAD Processing, FireWire, Thunderbolt, or USB 3 connectivity, and elegant hardware design and workflow.

The Apollo X Series is UA's flagship audio interface lineup. Apollo X rackmount models are the Apollo x6, Apollo x8, Apollo x8p, and Apollo x16, all of which feature HEXA core DSP processing onboard. Apollo X Series desktop models include the Apollo x4 with QUAD core processing, and Apollo Twin X with DUO or QUAD cores.

Other Apollo models include Apollo DUO/QUAD, Apollo FireWire, Apollo 8, Apollo 8p, Apollo Twin, Apollo Twin USB, Apollo Twin MkII, Apollo 16, and Apollo 16 MkII.

Arrow is UA's entry-level audio interface model with professional features at an affordable price.

### UA Audio Interface Documentation

UA audio interface products feature onboard UAD-2 processing. The UAD-2 functionality of UA audio interface UAD-2 processing is documented in this manual. However, functionality that is unique to UA audio interfaces is documented separately in the Apollo Manuals.

> ***Note:*** *Throughout this manual, all mentions of "Apollo" refers to all Apollo models unless noted otherwise.*

*Universal Audio's family of audio interface models*

## UAD-2 Packages

UAD-2 devices are available in a variety of retail configurations to best accommodate your budget and processing requirements. The products have various DSP core complements (SOLO/DUO/QUAD/HEXA/OCTO), form factors (internal, rack mount, desktop), connectivity (PCIe, Thunderbolt, FireWire, USB 3), and included plug-in bundles. For complete details about all available products, visit the Universal Audio website.

# The UAD Software

The UAD Powered Plug-Ins software consists of the UAD installer, the UAD plug-ins, the UAD Meter & Control Panel application, the UAD device drivers, and the product documentation.

## UAD Installer

The UAD Powered Plug-Ins software installers contain all the UAD software components (plug-ins, drivers, and documentation) and copies them to the system drive during installation. The UAD software installers support all variations of UAD-2 and Apollo devices.

## UAD Powered Plug-Ins

UAD plug-ins are the VST, AAX 64, and Audio Units plug-in files that are loaded within the digital audio workstation application (DAW). The plug-ins are where the graphical user interface (GUI) is seen and where the various control parameters can be manipulated to achieve the desired sonic results.

The UAD software installer always installs the complete suite of all available UAD Powered Plug-Ins. However, all of the installed UAD plug-ins may not be licensed. The included licenses depends on the retail package's Bundled Plug-Ins.

## Optional Plug-Ins

Most UAD plug-ins require optional licenses to run without restrictions. Optional plug-in licenses are obtained at the UA online store. Plug-in licenses can be purchased separately or in bundles.

## Demo Mode

UAD plug-ins that are unlicensed can be run in Demo Mode as a 14-day trial period without any functional restrictions.

## Bundled Licenses and Coupons

The UA Account & Store is where bundled software and coupons are redeemed and where additional licenses can be purchased.

> ***Note:*** *When you purchase an optional license, you don't download that individual plug-in. Instead, you download a newer authorization, which enables the plug-in file that is already installed.*

## UAD Meter & Control Panel

The UAD Meter & Control Panel application is used to authorize UAD plug-ins after purchasing and to monitor/configure UAD device resources. It has two main windows: the UAD Meter, and the UAD Control Panel.

The UAD Meter Window displays the current DSP, program, and memory status of the UAD hardware. The UAD Control Panels has multiple panels that display and modify various system, plug-in, and global configuration parameters.

## UAD Drivers

The UAD device drivers are the low-level system software files that instruct the host computer system on how to communicate with the UAD hardware device(s). The UAD drivers are loaded during system startup so the UAD devices are ready to be used when the plug-in host DAW application is launched.

In addition to instructing the OS on how to control the UAD hardware, the driver acts as a software "middleman" between the host application and the UAD hardware. The host application uses the driver to route UAD signals in the DAW.

Each UAD device family (UAD-2 or Apollo) has its own set of drivers that are placed on the system drive during UAD software installation.

### UAD Buffers and Latency

The UAD drivers use *buffers* to shuttle audio signals to and from the device. This means the digital data is transferred in small batches instead of continuously. Buffering induces a very small audio latency (delay) that is inherent in most digital audio systems and can be detected in certain situations.

UAD latency is managed automatically by most host DAW applications and can be reduced to undetectable levels in the UAD-2 PCIe and UAD-2 Satellite Thunderbolt using LiveTrack Mode. Latency and buffers are discussed in greater detail in Latency & Delay Compensation.

> ***Tip:*** *Universal Audio's line of Apollo high-resolution audio interfaces feature Realtime UAD Processing for monitoring and tracking with UAD plug-ins at near-zero latency, regardless of the DAW's I/O buffer size.*

## Product Documentation

Various instructional and technical resources are available for installing, operating, and troubleshooting UAD Powered Plug-Ins. UAD documentation is available in written, video, and online formats. For details about user documentation, see UAD Documentation Overview.

# The DAW Environment

The DAW (digital audio workstation) environment is a system where audio production takes place (either with or without UAD Powered Plug-Ins). The UAD system is an add-on to a computer-based DAW that can dramatically improve the sonic quality and performance of the DAW, while still working entirely from within the DAW.

A computer-based DAW consists of the host computer hardware and its operating system (OS) software, the plug-in host application (DAW software), and an audio input/output (I/O) interface and its drivers.

## Host Computer

The host computer is the system that the host DAW application software runs on and the UAD devices are installed in or connected to. The host computer must meet certain hardware and software System Requirements to use UAD Powered Plug-Ins.

### Operating System

The host computer runs an operating system (macOS or Windows) that defines the OS platform of the system. UAD Powered Plug-Ins is a cross-platform product that is essentially functionally identical on Windows and Mac systems (except as otherwise noted).

## Host Application

The plug-in host application is the software DAW environment where audio recording, playback, mixing, and other production functions are controlled. UAD plug-ins are accessed and operated from within the host software application.

Each host application has a unique feature set and different methods of operation, including how to use plug-ins. However, once UAD plug-ins are loaded, UAD plug-in operation is identical in all host applications.

Because the host application environment is integral to the UAD system but is completely out of our control, we cannot claim compatibility with all hosts that may support use of the UAD plug-in formats. See  for additional details.

### Apollo Console

Universal Audio's Apollo audio interfaces include a host application called *Console*. Console controls Apollo's functionality and enables Realtime UAD Processing, where I/O buffering latency doesn't exist.

## Plug-In Formats

UAD Powered Plug-Ins includes support for VST, AAX 64, and Audio Units plug-in formats. These formats define the software protocols that the host application uses for plug-in processing.

UAD Powered Plug-Ins operations are (for practical purposes) functionally identical in all three plug-in formats. The format of the installed UAD plug-in files are specified during UAD software installation.

### VST

The VST (Virtual Studio Technology) plug-in format is developed by Steinberg and is supported by various Windows and Mac host applications such as Cubase and Nuendo.

### AAX 64

The 64-bit AAX plug-in format is developed by Avid and is supported by Pro Tools 11 (and higher) on Windows and Mac platforms.

### Audio Units

The Audio Units (AU) plug-in format protocol was developed by Apple and is supported by various host applications on the Mac platform only.

## Audio Interface

The audio hardware I/O (input/output) interface is how audio signals get into and out of the host computer. An audio interface is a hardware+driver device that can have analog or digital I/O (or both).

The interface is usually where the analog-to-digital (A/D) and digital-to-analog (D/A) audio conversions take place. Universal Audio's line of Apollo and Arrow products are audio interfaces.

### I/O Drivers

The audio interface is a hardware device that requires a software device driver for the host computer OS. In addition to instructing the OS on how to control the interface hardware, the driver acts as a software "middleman" between the host application and the I/O ports. The host application uses the driver to access the I/O for signal routings.

### I/O Buffers and Latency

As with UAD devices, audio interfaces also use buffers to shuttle audio signals to and from the I/O. For details, see UAD Buffers and Latency.

Smaller I/O buffer settings produce lower latencies which is useful when monitoring tracks while recording performances, but usually results in a higher host computer CPU load since the system has to work harder transferring data. Latency and buffers are discussed in greater detail in Latency & Delay Compensation.

> ***Tip:*** *Universal Audio's line of Apollo high-resolution audio interfaces feature Realtime UAD Processing for monitoring and tracking with UAD plug-ins at near-zero latency, regardless of the DAW's I/O buffer size.*

## UA Store

The UA online store is where optional UAD plug-in licenses are purchased and where UA coupons are redeemed.The UA store is where your UA account and its associated UAD devices and plug-ins are managed. For details, see UA Account & Store.

## Authorization

All UAD plug-ins must be authorized before they can be used. Authorization is automatic when the UAD computer is connected to the Internet. For complete details about the authorization system, see the UAD Authorization Overview.

# UA Account & Store

## Account Overview

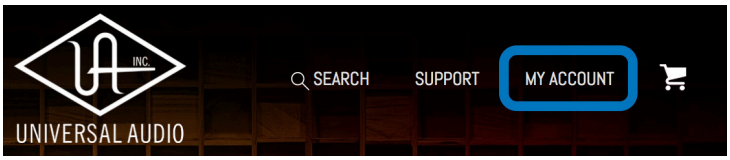
Your Universal Audio account is where all UAD devices, and their associated UAD plug-ins, are registered and managed. An account is required to register and authorize all UAD devices, download UAD software, and receive customer support.

### Device Registration

The account creation and device registration process is triggered automatically whenever a new UAD device is recognized by the UAD software. Our web pages guide you through the process.

### Accessing Your Account

To view your account pages, click the MY ACCOUNT link at the top of web of pages at www.uaudio.com. If you're not already logged in, click the LOG IN link.

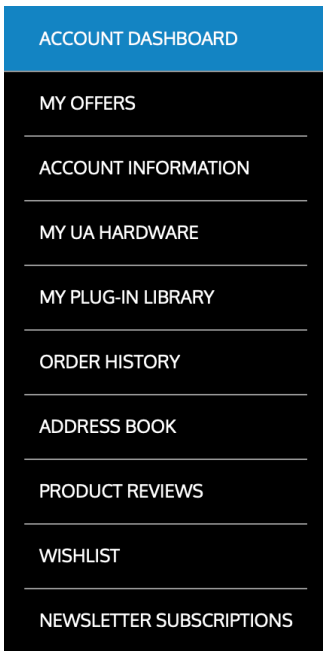



When you revisit your account, you'll be prompted to login. You have the option to stay logged in so you don't have to enter credentials with each visit. If you forgot your password, the store can email a password reset link to you.

### Account Details

The My Account pages are available when logged in. These pages contain all details about the account such as registered UAD devices, licensed UAD plug-ins, and account preferences.

The account menu, shown at right, is used to navigate the account pages. Click an item in the menu to view that account page.



# Store Overview

The Universal Audio online store is where optional UAD plug-in licenses are purchased and UA coupons are redeemed.

## Bundled Plug-Ins

UAD plug-ins that are bundled (included) with the UAD device are automatically issued to your UA account when the device is registered. After registration is complete, authorize the UAD system to run the bundled plug-ins.

> ***Note:*** *UAD devices must be registered and authorized to run bundled plug-ins.*

## Optional Plug-Ins

UAD Powered Plug-Ins that are not bundled with the UAD device require an optional license to run without restrictions. After purchasing a UAD plug-in, the UAD device(s) in the system need to be manually authorized to run the additional plug-in.

Our web pages guide you through the purchasing and authorization process.

## Plug-Ins are already installed

The UAD software installer always installs the complete suite of available UAD plug-ins during installation. When you purchase an optional license, you don't download that individual plug-in. Instead, you simply re-authorize your system, which activates the plug-in file that is already installed.

> ***Important:*** *Older versions of UAD software may not include all the latest UAD plug-ins. To ensure all UAD plug-ins are installed, and for optimum performance, update to the latest UAD version (see Check for Updates).*

## Coupons

Promotional coupons have dollar values that are as "good as cash" for buying UAD plug-ins. Coupons are applied to your UA account automatically. The coupon dollar amount is displayed in your account as a credit, ready to be applied to your store purchase.

Coupons expire after a limited time period, and they can be used only once.

> ***Tip:*** *Coupons are a great reason to sign up for UA's promotional emails. These options are set in the Newsletter Subscriptions page in My Account.*

# UAD Authorization Overview

***Note:*** *This section is an overview of the UAD authorization system. For step-by-step authorization instructions, see UAD Installation.*

## My UA Hardware

The UAD devices and plug-ins that you own are found on your MY HARDWARE page at www.uaudio.com/my/account/hardware. The My Hardware page keeps track of your registered UAD devices and UAD plug-in licenses and is managed automatically by the UA store and the UAD software. UA analog hardware is also managed here.

***Tip:*** *The current UAD plug-in license state is also shown in the Plug-Ins Panel within the UAD Meter & Control Panel application.*

## UAD System

All UAD devices registered to an UA account, and all UAD plug-in licenses for those devices, are referred to as a *System* on the My Hardware page. Licensed UAD plug-ins are only authorized to run on the UAD devices associated with the same account and system.

## Account Creation and Device Registration

Creating a UA account and registering the UAD hardware is only needed once during initial device installation. After registration, authorization is performed automatically in the background by the UAD Meter & Control Panel application each time the computer is started.

## Adding Additional UAD Devices

If a second (or more) UAD device is added to the computer that already has the UAD software installed, the new device(s) is automatically detected by the UAD software. Upon detection, the web browser opens, you are guided to register the new device, and the new device is added to your account.

## Authorizing Newly-Purchased UAD Plug-Ins

When a UAD plug-in is purchased at the UA store, it needs to be manually authorized. The store guides you through the process; see Authorization Procedure for instructions.

## Authorizations Are Stored On UAD Device

During authorization, the UAD plug-in license state is stored on the UAD-2 device. If the UAD-2 is moved to another computer, it is not necessary to reauthorize the device.

# Demo Mode

All unlicensed UAD plug-ins include a free 14-day trial evaluation period. When the demonstration mode is activated, the plug-in will run without functional limitations for 14 days. Demo mode can be activated once only. After the demo trial period has expired, demo mode cannot be activated again on the same UAD device.

If an unlicensed plug-in is loaded and its demo is not started, the plug-in interface appears and its controls can be manipulated, but audio is not processed by the plug-in.

> ***Important:*** *The 14 day demo period can only be activated once, and cannot be stopped or restarted during this period. Activate demo mode only when you have adequate time to thoroughly evaluate its sound and functionality.*

## Demo Reset

As a courtesy, each time a new UAD plug-in is purchased, all expired demo periods are automatically reset so all UAD plug-ins with expired demos can be evaluated again.

## Demo Activation

**To activate demo mode:**

1. Ensure UAD Powered Plug-Ins is already installed and configured properly (see UAD Installation).
2. Open the Plug-Ins Panel within the UAD Meter & Control Panel application.
3. Locate the row for the UAD plug-in you want to evaluate (scroll if necessary).
4. In the Status Column, click the START DEMO button for the UAD plug-in. The demo period begins and audio can be processed by the plug-in.

> ***Note:*** *If loading a DAW session that contains multiple instances of a UAD plug-in that is not yet authorized and you want to start its 14-day demo period, close then reopen the DAW session after starting the demo to enable processing on all instances of the plug-in.*

> ***Important:*** *Manipulating the computer's system date and time will result in a decreased demo period.*

# Buying UAD Plug-Ins

To obtain optional UAD plug-in licenses, simply visit www.uaudio.com, browse the available plug-ins at our secure store, complete your purchase with several payment options, and authorize the plug-in(s). You can also apply any coupon credit that is available from promotional offers.

Lots of product information such as features, specifications, audio/video examples, and reviews are available on the plug-in product pages to help you make informed buying decisions.

## Purchase Procedure

**To purchase optional UAD plug-in licenses:**

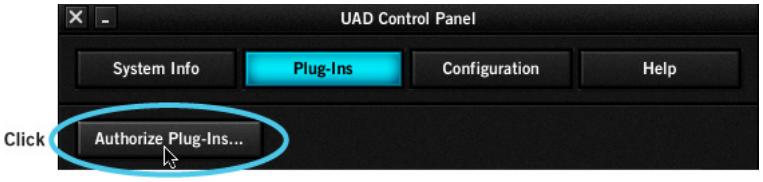
1. Visit the UA store at www.uaudio.com.
2. Add the items you want to purchase to your shopping cart. You'll need to login to your UA account if not already logged in.
3. When ready to complete your purchase, click the Shopping Cart icon at the top of the page, then click the CHECKOUT button. The payment page appears.
4. Select payment method and provide payment details. If applicable, apply any discount coupon codes.
5. Click the PLACE YOUR ORDER button **once only**. The transaction is processed, the order confirmation page appears, a confirmation email is sent, and the UAD plug-in license(s) is issued to your UA account.
6. Authorize the UAD device(s) by following the instructions on the next page.

## Authorization Procedure

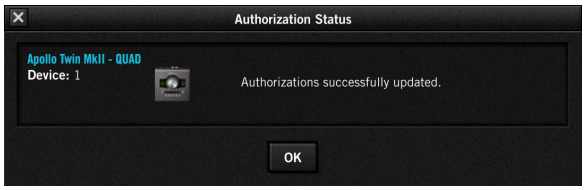
**To authorize optional UAD plug-ins to run on the UAD device:**

1. Open the UAD Meter & Control Panel application (see Launching the Application for methods).
2. Access the Plug-Ins Panel within the application by clicking the blue UAD-2 button in the UAD Meter window.

3. Click the Authorize Plug-ins button in the Plug-Ins panel.




4. After a few moments the Authorization Status window appears.




**The purchased UAD plug-in is now authorized and ready for use.**

# Transferring UAD devices and licenses

Ownership of UAD devices and UAD plug-in licenses can be transferred from one UA account to another to accommodate the used equipment marketplace. Certain restrictions apply. For instructions, policies, and FAQ, visit the UAD transfer page:

- help.uaudio.com

## Transfer Video

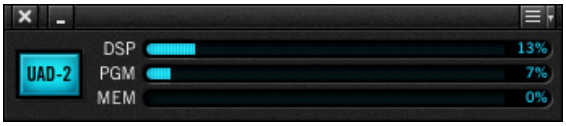
Our Videos page has a video about UAD device transfers:

- www.uaudio.com/videos

# UAD Meter & Control Panel

The UAD Meter & Control Panel application is used to monitor and configure UAD device resources. It has two main windows: the UAD Meter, and the UAD Control Panel.

The UAD Meter displays the current DSP, program, and memory status of the UAD hardware in realtime. The UAD Control Panel has multiple panels that display and modify various system, plug-in, and global configuration parameters. It also shows the FireWire bandwidth (FBW) meter when a UAD FireWire device is connected to the system.




*UAD Meter Window*

The UAD Meter & Control Panel application can be launched or quit at any time. It does not need to be open or active to use UAD plug-ins. It is completely independent and does not require a host DAW application. You can move the UAD Meter to a convenient location on your screen by dragging its window title bar.

> ***Note:*** *If "No Devices Found" appears in the UAD Meter instead of the expected buttons and meters, the UAD software is not communicating with the UAD hardware. If this occurs, double-check hardware and software installations and/or contact Technical Support.*

## Launching the Application

The UAD Meter & Control Panel application can be opened using the techniques listed for each operating system below.

*UAD Meter & Control Panel application icon*

***Windows***

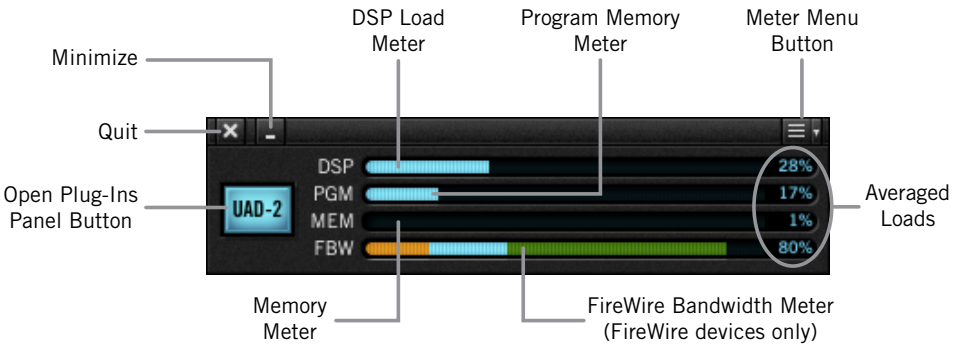
- Access the application from:
  Start Menu>All Programs>UAD Powered Plug-Ins

***Mac***

- Single-click the UAD Meter & Control Panel icon that was placed in the Mac OS X Dock during installation
- Double-click the UAD Meter & Control Panel application that was installed at: /Applications/Universal Audio/

# UAD Meter Window

Refer to the illustration below for descriptions in this section




*The UAD Meter window elements*

## Title Bar

The Title Bar (the strip across the top of the UAD Meter window) contains buttons to quit the UAD Meter & Control panel application, minimize the UAD Meter window, and access the Meter Menu.

> ***Note:*** *The Quit, Minimize, and Menu button positions shown above are as they appear on Mac systems. These button positions are reversed on Windows systems, reflecting the OS conventions.*

## Plug-Ins Panel Button

Clicking this button opens the Plug-Ins Panel. It has the same function as selecting "Plug-Ins..." from the Control Panel drop menu.

## Resource Meters

UAD resource loads are displayed in the UAD Meter window. Loads are constantly updated, even when the UAD Meter is not the foreground application. This allows you to monitor UAD loads as needed, for example when deciding which UAD plug-ins to load, based upon how much DSP is available.

The UAD resources are displayed as bar graphs and as percentages.

### Averaged Loads

The load for each meter represents the average for all UAD devices in use. For example, if one UAD-2 QUAD is installed, the UAD-2 DSP load is an average of the four SHARC DSP processors on the QUAD. If two UAD-2 QUADs are installed, then the eight processors are averaged.

### Individual Loads

The loads of individual devices in a multi-device setup (or the individual DSP loads in a multi-DSP UAD-2 device) can be viewed in the System Information Panel.

### DSP

The DSP meters display the amount of digital signal processing resources that are being used by the UAD plug-in algorithms. DSP is the primary hardware "juice" that powers the algorithms. When UAD plug-ins are disabled in the host, DSP requirements are decreased.

### PGM (Program Memory)

This resource shows how much UAD-2 program memory is in use. Program memory is an on-chip memory that is specific to the UAD-2 DSP processor(s) and is used for certain UAD plug-in resources.

Each unique UAD-2 plug-in uses a bit of program memory. If many different UAD-2 plug-ins are loaded simultaneously, it is possible for this resource to run out before DSP overload occurs. Conversely, program memory is shared by the same plug-in, so multiple instances of the same plug-in may not increase the program memory load. These factors are considered by the automatic UAD-2 load balancing routines.

### MEM (RAM Memory)

The Memory meters indicate the percentage of UAD random access memory that is currently in use. It indicates the total available UAD RAM available, regardless of the number of DSP processors that are installed.

Memory is used for echo, delay lines, reverb, and similar spatial processing. When UAD plug-ins are disabled but not unloaded, memory requirements are not decreased. In this case, the memory remains loaded so that reverb tails and delay lines are not cut off when the plug-in is disabled (if supported by the host).

### FBW (FireWire Bandwidth)

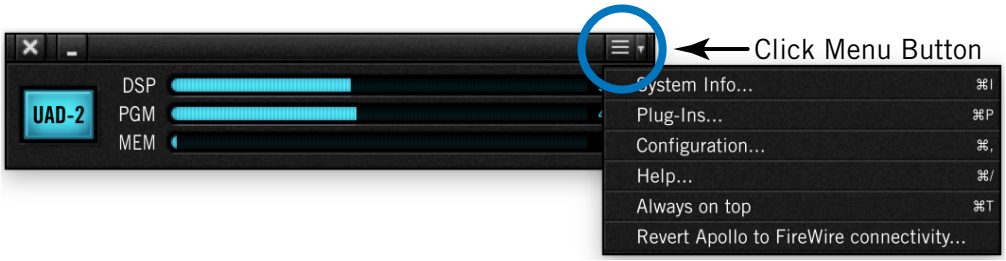
This meter reflects the FireWire bus bandwidth currently used by UAD-2 Satellite FireWire, Apollo FireWire, and all other FireWire peripheral devices (e.g., all FireWire audio interfaces and FireWire hard drives).

> ***Note:*** *The FBW meter is visible only when a UAD FireWire device is connected to the system.*

# Meter Menu

The Meter Menu can be used to access the UAD Control Panels and other functions. To view the Meter Menu, click the menu button in the UAD Meter window title bar as shown below. After clicking the menu button, the available functions are listed in the drop menu. To execute a function, select it from the menu.

> ***Note:*** *The items that appear in the Meter Menu can vary depending on the active system configuration. For example, the FireWire menu item only appears if a UAD FireWire device is connected.*




*Accessing the Meter Menu*

*Meter Menu functions*

## Control Panels

The UAD Control Panels (System Info, Plug-Ins, Configuration, FireWire, Help) can be accessed by selecting them from the Meter Menu.

> ***Tip:*** *The UAD Control Panels can also be accessed by using the keyboard shortcuts listed in the Meter Menu.*

## Always On Top

The UAD Meter & Control Panel windows can be set to either normal or Always on top view modes.

### Always on top mode

In this mode, the UAD Meter and UAD Control Panel windows always float on top of other windows, even when other applications are in the foreground.

To enable Always on top mode, click the Meter Menu button in the UAD Meter window title bar and select Always on top from the drop menu. Always on top is active when a check mark appears next to the item in the menu.

> ***Tip:*** *The Always on top setting can be toggled by using the keyboard shortcut listed in the Meter Menu.*

### Normal mode

In this mode, the UAD Meter and UAD Control Panel windows are covered by the windows of the foreground application. Normal mode is active when the Always on top menu item is unchecked.

## Revert to FireWire connectivity...

This menu function restores FireWire connectivity to Apollo FireWire models that have been updated with Thunderbolt firmware.

To change the Apollo firmware from Thunderbolt to FireWire, select this item from the Meter Menu, then follow the on-screen instructions.

> ***Note:*** *This function only appears when an Apollo or Apollo 16 FireWire unit (silver rack models only) is equipped with the Thunderbolt Option Card, the unit is connected to the computer via Thunderbolt, and Thunderbolt firmware is installed in the unit.*

# UAD Control Panels

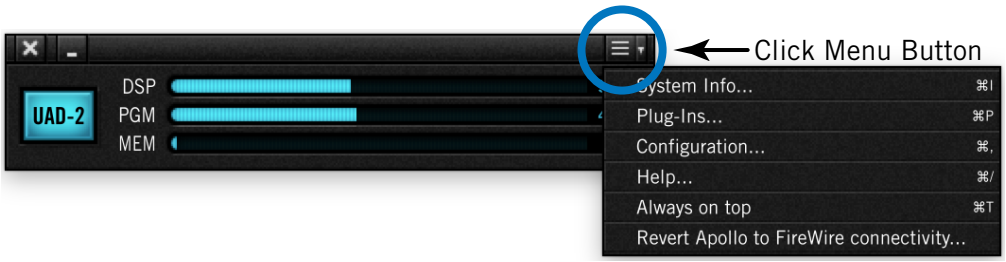
The UAD Control Panels are where detailed system information is displayed and global UAD plug-in settings are modified. The main UAD Control panel window has up to five panels, organized into similar areas of functionality: System Information, Plug-Ins, Configuration, FireWire, and Help.

## Accessing the Control Panels

The UAD Control Panel window is accessed from the UAD Meter window. To open the Control Panel, click the menu button in the UAD Meter window title bar as shown below. After clicking the menu button, the available functions are listed in the drop menu.

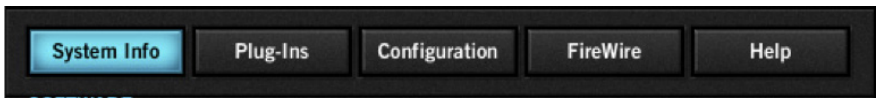
> ***Tip:*** *The Plug-Ins panel can also be accessed by clicking the blue Plug-Ins Panel Button labeled "UAD-2."*

> ***Tip:*** *The UAD Control Panels can also be accessed by using the keyboard shortcuts listed in the Meter Menu.*




*Control Panel drop menu*

When the main UAD Control Panel window is open, the individual window panels are accessed by clicking the title buttons at the top of the Control Panels window, as shown below, or typing the keyboard shortcuts shown in the Control Panel drip menu.

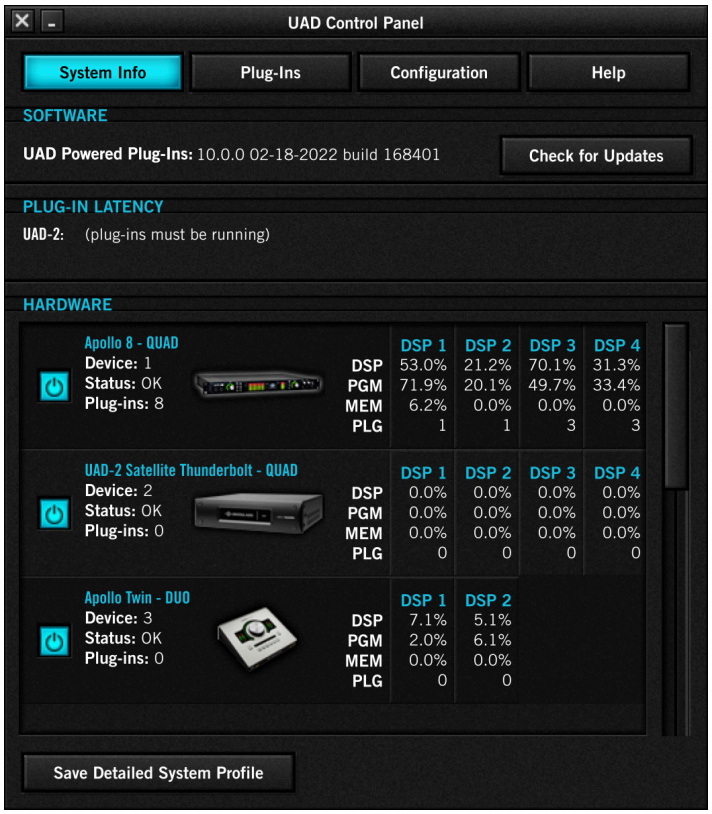



*Control Panel selector buttons*

> ***Note:*** *The FireWire button is only displayed if a UAD FireWire device is connected.*

# System Information Panel

The System Information panel displays detailed UAD software and hardware information and contains several useful buttons. Refer to the screenshot below for parameter descriptions in this section.




## Software Section

### Version String

The currently installed UAD Powered Plug-Ins software version is displayed here.

### Check for Updates

This button checks the Universal Audio web servers for a newer version of the UAD software. Running the latest version of UAD Powered Plug-Ins is recommended for maximum stability and the latest features, such as new plug-ins.

## Plug-In Latency Section

UAD plug-in latency is displayed here. The calculation is based on the audio I/O interface buffer size and the sample rate. The window uses this information to calculate and display the resulting latency in samples and milliseconds.

> ***Note:*** *Displayed latency does not reflect the actual lowered latency value when LiveTrack Mode is active, nor Apollo's Realtime UAD Processing via Console.*

The displayed latency is the audio I/O interface buffer size when Extra Buffering is off. When Extra Buffering is on, the displayed latency is the audio I/O interface buffer size plus 64 samples.

> ***Note:*** *The displayed sample latency number does not include the extra samples produced by UAD plug-ins with additional latency. For more detailed information about the extra samples and latency, see Latency & Delay Compensation.*

## Hardware Section

Detailed information about each UAD device and its DSP is displayed in the Hardware area. If you have several devices installed, use the scrollbar to see the other devices.

### Device Status

For each installed device, a small picture of the hardware and its status is displayed. When the device displays Status: OK the hardware is operating properly. The total number of UAD plug-ins loaded on each device is also displayed here.

### Device Enabled

Individual UAD devices can be disabled using the Device Enabled button. This can be useful, for example, if creating a session on a system with multiple devices that will be transferred to a system with fewer devices or to streamline the performance of the host system when multiple devices are not needed.

Click the button to disable an individual device. The device is enabled when the button is blue. For additional information regarding multi-device use, see Multiple UAD Devices.

Devices remain disabled only while the UAD Meter & Control Panel application is open. When the UAD Meter & Control Panel is quit, disabled devices are re-enabled.

> ***Note:*** *Disabling devices does not disable plug-ins already running on the device; it only prevents additional plug-ins from being loaded onto it.*

> ***Important:*** *For optimum results, quit any host applications using UAD plug-ins before disabling/enabling devices.*

### DSP Load

If more than one UAD DSP is installed, information for each of the processors is displayed. DSP, Program (PGM), and Memory (MEM) loads are displayed as a percentage of total available load for that processor. The number of UAD plug-ins (PLG) running on each individual processor is also displayed.

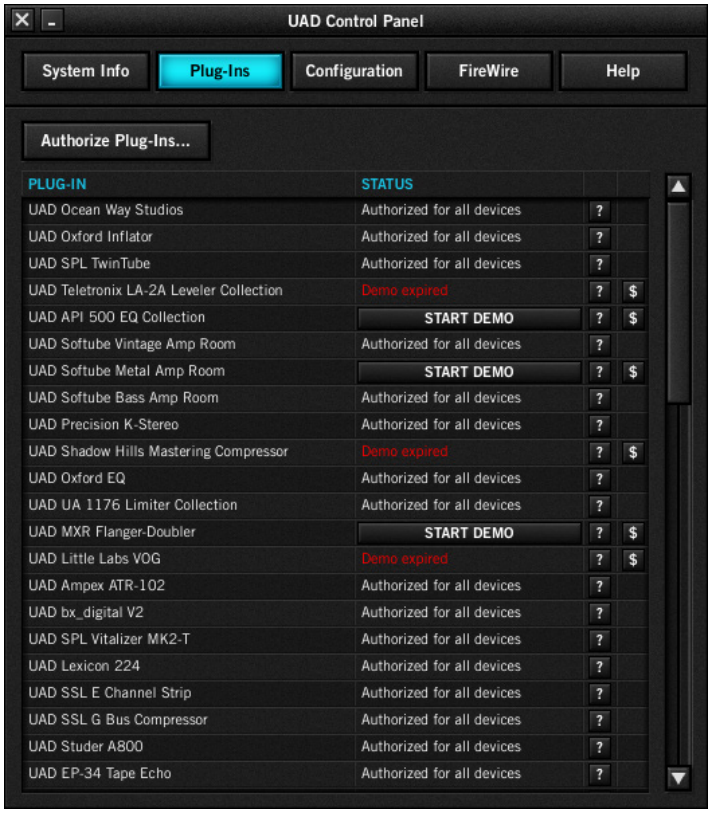
### Save Detailed System Profile

Clicking this button will generate a detailed UAD system profile and prompt you for a location to save the text file to disk. This file contains an even greater level of detail than the System Information panel, which can be useful for troubleshooting or if UA Customer Support requests this document when providing assistance.

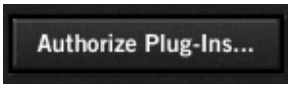
The profile lists the version strings of the individual UAD software components, installed device type(s) with serial and hardware ID numbers, host computer information, and detailed authorization status for all UAD plug-ins.

# Plug-Ins Panel

The Plug-Ins panel displays the current authorization status of all UAD plug-ins. This is also where you can activate plug-in Demo Mode and configure UAD plug-ins to run on a specific device. Use the scrollbar to view plug-ins that are not visible in the list. Refer to the screenshot below for parameter descriptions in this section.




## Authorize Plug-ins button




This button links directly to your account at the UA online store to automatically authorize licensed UAD plug-ins.

> ***Note:*** *Click this button whenever you buy a plug-in in the UA online store to claim your plug-in authorizations.*

The complete procedure for UAD device authorization is detailed in UAD Installation. If the UAD computer is not connected to the internet, see the Offline Authorization.

> ***Important:*** *UAD plug-ins require authorization before they can be used. For detailed information, see the Authorization Procedure.*

## Plug-In Column

All currently installed UAD plug-ins are displayed in the Plug-In column. Use the scroll bars to view the entire list if necessary. Plug-Ins are listed in order of release date, with newest plug-ins at the top of the list.

## Status Column

The Status column reflects the current state of each UAD plug-in. After authorization, the status will show one of the following:

### Authorized for devices

When the plug-in is licensed and authorized to run on all devices in the system "Authorized for all devices" is displayed in white text.

When a plug-in is licensed but not all devices in a multi-device system are authorized with the license, the Status column indicates which of the devices is authorized (for example, "Authorized for device 1 only").

### Start Demo

The demo period has not been started for the plug-in. Click the START DEMO button to begin the 14-day trial period.

UAD plug-in demo periods can also be initiated by the START DEMO button in the UAD Toolbar in the plug-in window. See Demo Mode for detailed information.

> ***Important:*** *The 14-day demo period can only be activated once, and cannot be stopped or restarted during this period. Don't activate demo mode unless you have adequate time to thoroughly evaluate its sound and functionality.*

### Demo Active (days remaining)

If the 14-day trial period has been activated but is not yet expired, the number of days remaining is displayed here in green text.

### Demo Expired

If the 14-day trial period has ended, DEMO EXPIRED is displayed here in red text.

## Help Column

Clicking the Help button ("?") opens a link to the plug-in product page at the UA online store.

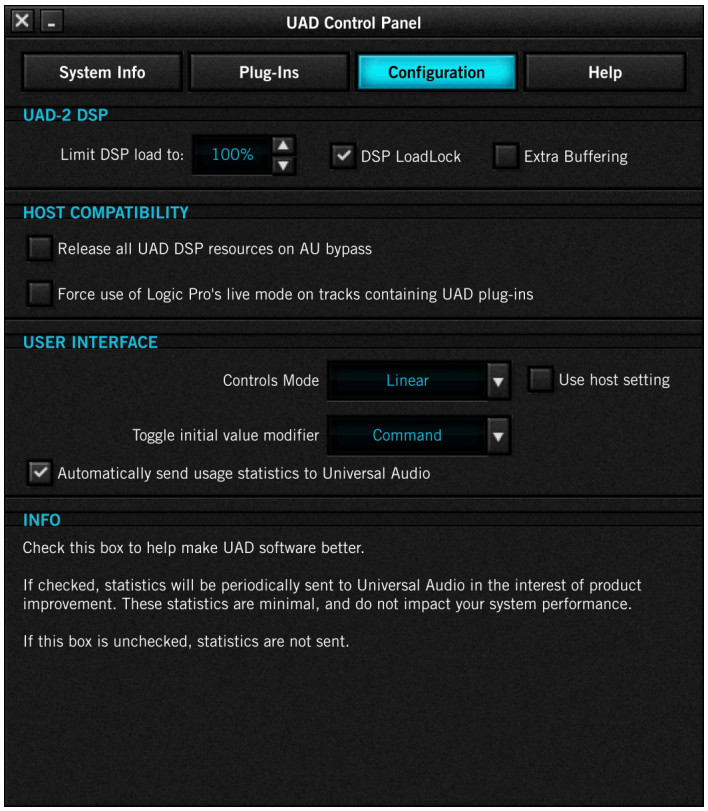
## Buy Column

Clicking the Buy button ("$") adds the plug-in to your shopping cart at the UA online store. See the Purchase Procedure for details. This button does not appear if the plug-in is already licensed.

> ***Tip:*** *The BUY button provides a quick visual reference to determine which plug-ins are licensed.*

# Configuration Panel

The UAD Configuration Panel is where most of the global UAD settings and preferences are specified for all UAD devices. Refer to the screenshot below for parameter descriptions in this section.




The parameters that are displayed in the Configuration Panel depend on the UAD hardware that is currently installed and the OS platform (Windows or Mac). For example, if you have only UAD devices installed in a Windows system, you will not see Mac-specific parameters.

> ***Note:*** *All UAD parameters apply to UAD-2 PCIe cards, UAD-2 SOLO/Laptop, UAD-2 Satellite, and Apollo unless otherwise noted.*

## UAD-2 DSP Settings

### Overview

Without UAD Powered Plug-Ins installed, overloading the host system with native (host based) plug-ins can cause dropouts and possibly system lockup. Steinberg hosts, for example, provide a switch that allows you to trade latency for stability when the system is overloaded. Similarly, the UAD DSP load cannot exceed 100% without unpredictable behavior.

With the Limit DSP Load feature, the UAD DSP can also be limited so the load cannot exceed 100%, thereby increasing overall system stability in high load situations. With very heavy UAD loads, DSP load limiting may also improve host CPU performance.

There are many variables that affect DSP load (sample rate, I/O buffer size, parameter values, mono/stereo, automation, host system, etc). Although these variables are taken into account, the resulting measurement cannot be absolutely accurate. This is due to variations in system configurations, including PCIe bus loading which is impossible to predict. Systems that are heavily loaded due to the presence of other devices or suboptimal configuration may cause additional DSP loading that cannot be predicted by the UAD plug-in load calculator. The DSP load limit should be reduced in this case.

It is possible for certain (non-typical) conditions to be met where another UAD plug-in can't be added, even when the UAD Meter says you should have DSP available when compared to the DSP Load Limit value.

> ***Note:*** *When Limit DSP Load is enabled and the DSP load limit is exceeded when instantiating a new UAD plug-in, an overload message will appear and the plug-in's Toolbar will display DISABLED. In this case, even though the plug-in loads, it will not process audio.*

### Limit DSP Load

This setting determines the maximum UAD DSP load. If performance issues such as overloads, dropouts, stuttering, and/or other artifacts persist, change the UAD DSP load value by clicking the triangles to the right of the percentage display.

UAD-2 DSP load limiting is always on. 100% (the default value) is the maximum available setting.

### DSP LoadLock

DSP LoadLock reserves the maximum UAD-2 DSP load required by each plug-in, even if certain plug-in features are disabled. This ensures there will always be enough DSP if those features are later enabled, or when automating parameters that affect the DSP load.

Disabling LoadLock increases available UAD-2 DSP by turning off unused features in certain plug-ins, but may cause problems with previously saved sessions that had all plug-in features enabled, or when automating parameters that affect the DSP load.

Enabling DSP LoadLock is recommended for optimum performance. Disable LoadLock when you need to squeeze in that extra bit of DSP resources.

> ***Note:*** *Changes to this setting do not take effect until all open sessions containing UAD plug-ins are reloaded.*

### Extra Buffering

Extra Buffering adds an additional 64 samples of buffering for increased host application compatibility. DAWs that are known to require Extra Buffering include Cakewalk SONAR, Cockos REAPER, and Sony Vegas/Acid/Soundforge.

In other hosts, you can disable this mode to reduce latency. If your application is incompatible with reduced latency when Extra Buffering is off, a dialog will be displayed indicating that Extra Buffering is required.

> ***Note:*** *Changes to this setting do not take effect until all open sessions containing UAD plug-ins are closed.*

## Host Compatibility Settings

### Release all DSP resources on Audio Unit bypass (Mac only)

Some Audio Unit hosts dynamically bypass plug-ins when they are not being used during playback, for example when no audio is present at the current playback position. During this dynamic bypassing, UAD plug-ins stay loaded on the device, which reduces glitches in playback.

This setting affects the Audio Units platform only. Checking the option will unload UAD plug-ins from the device during dynamic bypassing. When the option is checked, UAD DSP use may be reduced during dynamic bypassing, but the possibility of artifacts during playback is increased.

> ***Note:*** *Changes to this setting do not take effect until all open sessions containing UAD plug-ins are closed.*

### Force Logic to use "live mode" for tracks with UAD plug-ins (Mac only)

When UAD plug-ins and Logic 7.2.1 (and higher) are used together and this setting is checked, all Logic tracks with UAD plug-ins are forced into Logic's "live mode" and latency is reduced. Reduced latency is useful for tracking when Logic's Software Monitoring feature is active.

> ***Important:*** *This setting should be enabled only when using UAD-2 PCIe cards, UAD-2 Satellite Thunderbolt, UAD-2 Satellite USB, and/or when Apollo is connected via Thunderbolt. Do not enable this setting when using UAD-2 Satellite FireWire or when Apollo is connected via FireWire.*

When this setting is active, UAD latency is the same as the hardware interface I/O buffer. In Logic versions prior to 7.2.1 (and later versions when live mode is disabled), UAD latency is determined by the larger of the audio interface hardware I/O buffer size and the Process Buffer Range setting within Logic.

When Logic's "live mode" is inactive and this setting is not enabled, the minimum Process Buffer Range setting ("Small") in Logic corresponds to 512 samples, meaning the minimum possible UAD latency is 512 samples for UAD-2 (the current latency is displayed in the UAD Meter System Information panel). Latency can be further reduced by using LiveTrack Mode (UAD-2 PCIe, UAD-2 Satellite Thunderbolt, and Apollo Thunderbolt only).

> ***Note:*** *Logic's "live mode" is unrelated to UAD-2's LiveTrack Mode.*

On multi-processor machines, Logic's "live mode" forces all plug-ins on tracks with UAD plug-ins (and any aux/buses fed by those tracks) to run on one processor only. To allow host-based (native) plug-ins to run on all processors under these conditions, deactivate this setting.

> ***Note:*** *Changes to this setting do not take effect until all open sessions containing UAD plug-ins are closed.*

## User Interface Settings

### Controls Mode

This setting determines how UAD plug-in parameter knobs respond to adjustment. Three control modes are offered: Circular, Relative Circular, and Linear. Select the desired mode from the drop menu.

> ***Tip:*** *To increase resolution when in adjusting rotary controls in circular and relative circular modes, increase the radius of the mouse relative to the knob while dragging (move the mouse farther away from the knob while dragging in a circular motion).*

### Linear (slider)

In Linear mode, the knob is adjusted by dragging horizontally or vertically instead of by rotating. This behavior is similar to moving a fader or other slider control.

### Circular (jump)

In Circular mode, the software knobs behave like physical rotary knobs. Values are changed by clicking on the knob then rotating in a circular direction. When the edge of the knob is clicked, the parameter value instantly jumps to the mouse position.

### Relative Circular (grab)

Relative Circular mode operates similar to Circular mode, but the knob value does not jump to the mouse position when clicked. Instead, the knob value is modified relative to its original value.

In this mode you can click anywhere on the knob to make an adjustment originating at the original value (it's not necessary to click on the current knob position).

### Use Host Setting

When Use Host Setting is checked, the control mode that is set within the host application preferences is used (if this feature is supported by the host). This setting forces the host to override the control mode set in the UAD user interface settings.

> ***Note:*** *When Use Host Setting is checked, the UAD Meter user interface settings have no effect unless control mode is NOT supported by the host.*

### Toggle initial value modifier (Mac only)

Holding the specified modifier key while clicking a parameter control will toggle between the value of the control when the editor was opened and its last edited value. This feature is not supported under Windows.

This parameter also affects the "select + click" modifier. See Shortcuts for a complete list of keyboard shortcuts.

### Automatically send usage statistics to Universal Audio

Enabling this option helps make UAD software better. If checked, statistics will be periodically sent to Universal Audio in the interest of product improvement. These statistics are minimal, and do not impact your system performance. If this box is unchecked, statistics are not sent.

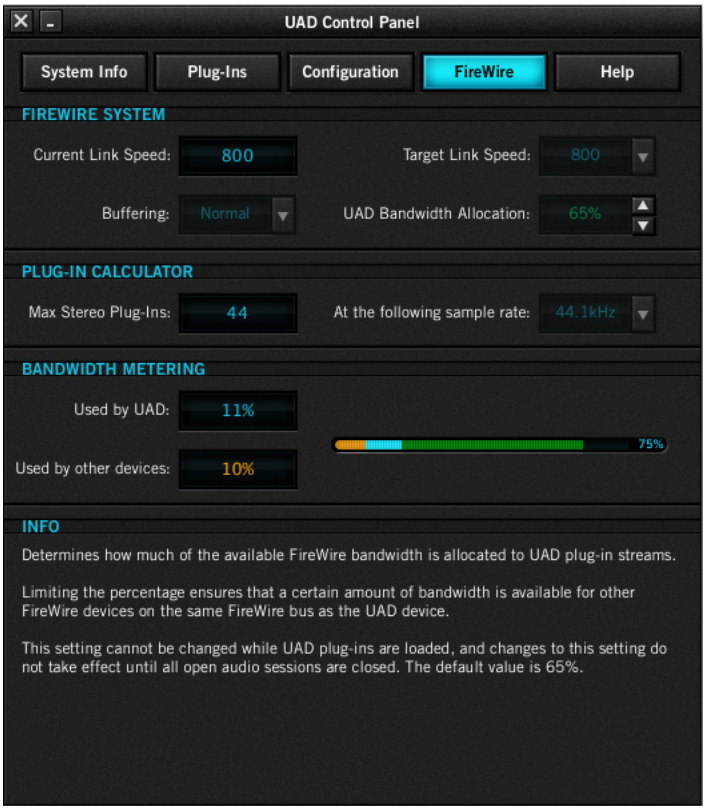
## Info Display

This area displays helpful text about parameters in the Configuration panel. Hover the mouse over a Configuration setting to view the informational text.

# FireWire Panel

Settings specific to UAD FireWire devices (UAD-2 Satellite FireWire and Apollo interfaces connected via FireWire) are configured in the FireWire Panel. Refer to the screenshot below for parameter descriptions in this panel.

> ***Note:*** *The FireWire Panel is only displayed when a UAD FireWire device is connected.*




## FireWire System Settings

The FireWire System parameters affect the configuration of the FireWire bus. These settings affect UAD-2 Satellite FireWire performance and can also affect FireWire audio interfaces (such as Apollo, when connected via FireWire) and hard drive performance if they are connected to the same FireWire bus.

> ***Note:*** *The FireWire System settings cannot be changed when UAD plug-ins are loaded. Quit all UAD plug-in host software to make changes to these settings.*

The primary function of the FireWire System settings is to reduce the UAD FireWire bandwidth allocation and/or link speed when other FireWire devices are on the same bus, or if other performance issues arise.

> ***Important:*** *FireWire device connection methods can affect the FireWire bus speed. For details, see FireWire Bandwidth.*

For more information about FireWire and using it with UAD-2 Satellite and Apollo, see FireWire Basics, FireWire Bandwidth vs. UAD DSP, and FireWire Bus Power.

### Current Link Speed

The current speed of the FireWire link between the host computer and UAD FireWire devices is displayed here. The active link speed can be changed with the Target Link Speed control if FW400 and FW800 are both supported by the host system.

If the host computer has multiple FireWire buses (this is rare), up to two speeds will be displayed, with the values separated by a comma.

> ***Note:*** *If the host computer supports FireWire 800 and the Target Link Speed is set to 800, but the Current Link Speed still displays 400, check the bus ordering of the FireWire devices. See  for information on how to properly combine FireWire 400 and FireWire 800 devices on the same bus.*

### Target Link Speed

The desired speed of the FireWire link between the host computer and the UAD FireWire device is set here (the actual link speed is shown in the Current Link Speed display). To change the value, click the down arrow to display the drop menu, then select the desired value. The setting cannot be changed when UAD plug-ins are loaded.

> ***Note:*** *The Target Link Speed is fixed at FW800 on Windows systems.*

Target Link Speed should be set to 800 when supported by the host computer. However, some FireWire devices may not always perform flawlessly. Changing the Target Link Speed to 400 may actually improve performance and/or stability on systems not optimized for FireWire 800 operation.

> ***Tip:*** *Twice as many UAD plug-ins can be run at FireWire 800 versus 400, so configure the FireWire system to run at 800 if supported by the computer.*

### Buffering (Mac)

The buffering mode adjusts overall FireWire performance. Normal is the default value and has less latency than Safeguard mode. Set to Safeguard if host CPU spikes occur when using UAD plug-ins that have high DSP requirements.

### UAD Bandwidth Allocation

This parameter determines how much of the total available FireWire bus bandwidth will be reserved for UAD plug-ins on UAD FireWire devices. Limiting the bandwidth used by UAD FireWire devices ensures that other FireWire devices on the same bus will have enough bandwidth to function properly.

To change the value, either a) click the increment/decrement arrows, b) click/hold the current target value to display a drop menu, or c) double-click the value for direct text entry. The maximum available value is 85%.

***Note:*** *The value cannot be changed when UAD plug-ins are loaded.*

Although the amount of FireWire bandwidth reserved by UAD FireWire devices depends on the UAD Bandwidth Allocation setting, the amount of DSP used by any UAD plug-in does not affect FireWire bandwidth (UAD plug-ins that use very little DSP require the same FireWire bandwidth as DSP-intensive UAD plug-ins). See FireWire Bandwidth vs. UAD DSP for details.

***Important:*** *To avoid UAD authorization errors, set the UAD Bandwidth Allocation so the FireWire Bandwidth (FBW) gauge in the UAD Meter displays less than 100%.*

It is important to note that all devices on the FireWire bus share the available data bandwidth of the bus, including hard drives and audio interfaces as well as UAD FireWire devices. Therefore all of the bandwidth cannot be allocated for UAD use if FireWire hard drives and/or FireWire audio interfaces are on the same bus. See FireWire Bandwidth for additional information.

***Important:*** *FireWire bandwidth increases proportionally as the system sample rate is increased (higher sample rates require more FireWire bandwidth). Before increasing the sample rate, the UAD Bandwidth Allocation may need to be reduced accordingly to prevent audio dropouts.*

**To determine the proper value for the UAD Bandwidth Allocation:**

1. Connect and power on all FireWire devices (host computer, audio interfaces, hard drives, UAD-2 Satellite FireWire) on the FireWire bus.
2. If running an audio interface on the FireWire bus, ensure the audio interface drivers are installed and configured correctly (specifically, all the audio inputs and outputs that will be used should be enabled).
3. Run the host DAW software (but DO NOT run any UAD plug-ins) at the HIGHEST SAMPLE RATE that will be used in the session (the sample rate may be reduced after UAD Bandwidth Allocation is set).
4. View Used by other devices in the Bandwidth Metering section of the FireWire Meter when UAD plug-ins are NOT running. The value indicated in orange is the percentage of FireWire bandwidth that is used by audio interface I/O streams.
5. Subtract the Used by other devices percentage from 100% and enter the difference as the UAD Bandwidth Allocation.
6. If you are using FireWire hard drives for audio session data on the same bus, the UAD Bandwidth Allocation will need to be reduced to accommodate the FireWire hard drive use.

### UAD Bandwidth Allocation Example

If all the FireWire devices on the bus except UAD-2 Satellite FireWire use 20% of the available FireWire bandwidth (from steps 1 through 4 above), enter 80% as the UAD Bandwidth Allocation (100% – 20% = 80%).

> ***Tip:*** *If FireWire performance issues occur, leave a bit of unused FireWire bandwidth as headroom, so the total use for all devices is less than 100%. To leave 5% of the bandwidth available for headroom in the example above, you'd enter 75% for UAD Bandwidth Allocation (20% bandwidth without UAD-2 Satellite + 75% for UAD-2 Satellite = 95% total FireWire bandwidth). This is especially applicable if using FireWire hard drives on the same bus for audio session data.*

## Plug-In Calculator

The Plug-In Calculator displays the maximum number of stereo UAD plug-ins that can be run on UAD FireWire devices with the current FireWire System Settings at a given sample rate.

> ***Note:*** *The Plug-In Calculator is for informational purposes only; it does not affect UAD FireWire or DSP performance in any way.*

### Max Stereo Plug-Ins

The maximum number of stereo UAD plug-ins that can run on UAD FireWire Devices, based on the FireWire System Settings and an entered session sample rate, is displayed here. The number changes if/when session sample rate changes.

The UAD instantiation count at the current settings could exceed this number If used in true mono configurations. Note that some DAWs use stereo plug-in processing even when used on a mono audio file.

### At the following sample rate

This parameter selects the sample rate used by the Plug-In Calculator. To change the value, click the down arrow to display the drop menu, then select the desired value from the menu.

When a UAD plug-in is loaded by the host software, the session sample rate is entered automatically. In this scenario, the parameter cannot be modified until the host is quit.

> ***Note:*** *The "At the following sample rate" parameter is only used by the Plug-In Calculator; it does not affect the sample rate of the UAD system or the host software.*

## Bandwidth Metering

Bandwidth Metering pertains to the FireWire bus that UAD FireWire devices are attached to. The items displayed in this area are for informational purposes only; there are no settings here that can be changed.

If the host computer has multiple FireWire buses (this is rare), up to two bandwidth meters will be displayed, one for each bus.

### Used by UAD

This number displays the percentage of FireWire bus bandwidth that is used by UAD plug-ins running on UAD FireWire devices. The number cannot exceed the value set by the UAD Bandwidth Allocation parameter.

### Used by other devices

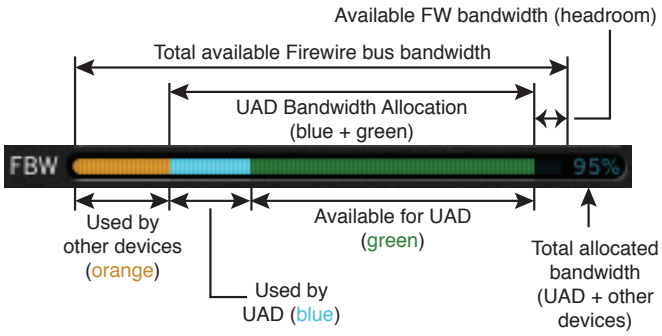
This number displays the percentage of FireWire bus bandwidth that is used by all FireWire audio interface I/O devices connected to the bus (including Apollo). The number is used to help determine an optimum value for the UAD Bandwidth Allocation.

## FireWire Meter

The FireWire Bandwidth (FBW) meter, illustrated below, reflects the FireWire bus bandwidth currently used by UAD FireWire devices and all other FireWire peripheral devices (e.g., audio interfaces and hard drives).

The meter graphically displays the UAD Bandwidth Allocation (green), the bandwidth used by active UAD plug-ins (blue), bandwidth used by FireWire audio interface I/O streams (orange), and bandwidth available for FireWire hard drives (black).

> ***Tip:*** *The FireWire meter in the FireWire control panel is also displayed in the main UAD Meter window when UAD FireWire devices are connected.*




*FireWire meter elements*

> ***Important:*** *FireWire bandwidth is unrelated to UAD DSP loads. See FireWire Bandwidth vs. UAD DSP for details.*

## Info Display

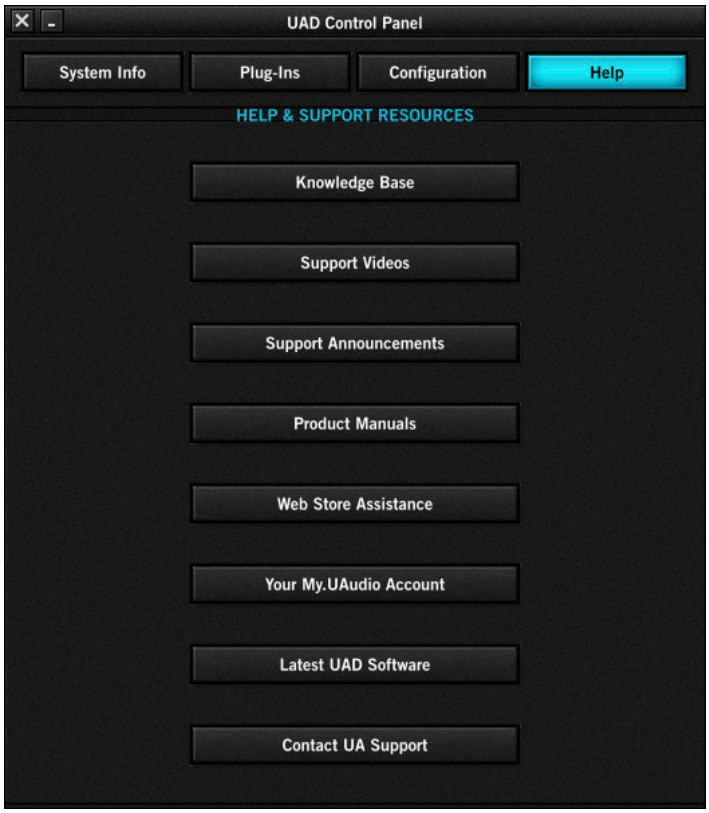
This area displays helpful text about parameters in the FireWire panel. Hover the mouse over a FireWire setting to view the informational text.

# Help Panel

The Help & Support Resources panel (shown below) contains helpful buttons to help you get the most out your UAD Powered Plug-Ins experience.

The button names are self-explanatory. Click a button to open its URL in the default web browser. If the UAD computer isn't online, much of the information is in the manual you're reading now; find it in the Table of Contents or the PDF reader's search feature.

Product Manuals is the only button that doesn't link to the internet. Instead, this button opens the UAD Documentation folder containing all the product operation manuals. See the UAD Documentation Overview for related information.



# Using UAD Plug-Ins

After the UAD hardware and software have been properly installed and configured, UAD plug-ins are accessed and used just like any native (host-based) plug-in. All UAD plug-ins can run concurrently with each other and with native plug-ins simultaneously, in any combination. Note that UAD plug-ins running at 96 kHz use twice as much UAD DSP resources than those used at 48 kHz, and so forth.

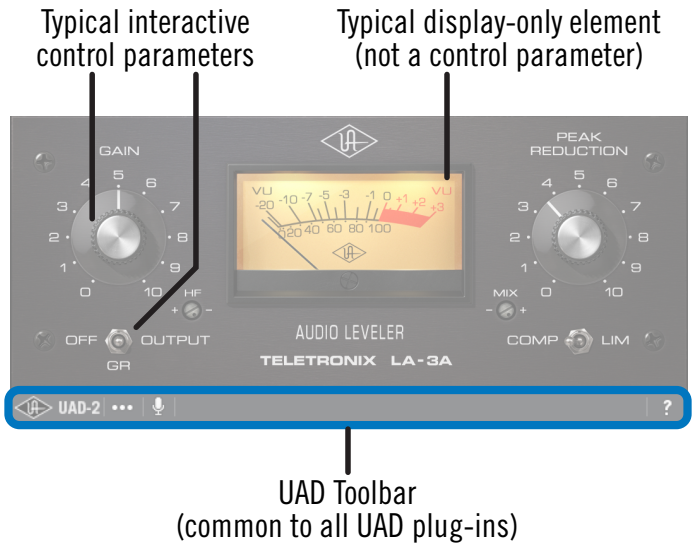
## Launching a UAD Plug-In

Each DAW application has its own particular method for instantiating (aka inserting, launching, loading) a plug-in. Consult the DAW application documentation for specific instructions on loading and using plug-ins with the DAW.

*Instantiating a UAD plug-in in Apple Logic Pro*

# The UAD Plug-In Interface

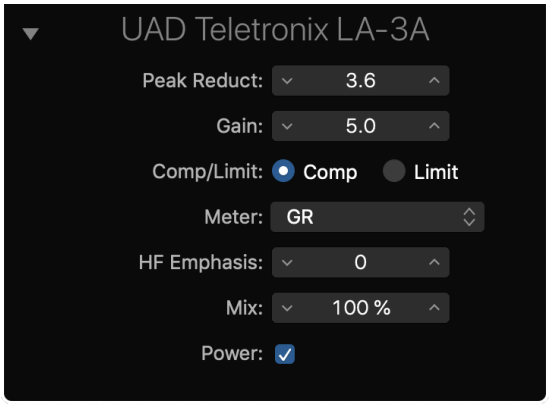
One typical UAD plug-in is shown below. The graphical user interface (GUI) typically contains several control parameters for modifying the sound of the plug-in, and display elements such as meters, for visual feedback. The UAD Toolbar (common to all UAD plug-ins) is also displayed.




*Typical UAD plug-in interface*

## Controls View

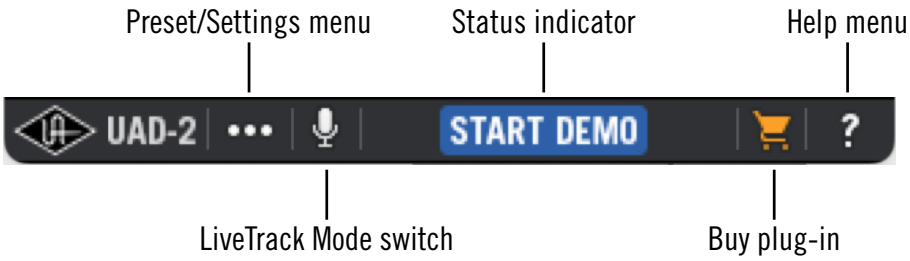
Some DAW applications have an alternate plug-in display mode feature called Controls View, Parameter Mode, or similar terminology. This mode typically displays the control parameters as a list with simple sliders, switches, and menus (the appearance is controlled by the DAW), which some users may prefer. Consult the DAW documentation for how to display this view.




*Typical UAD plug-in showing controls view*

# UAD Toolbar

The UAD Toolbar is located at the bottom of every UAD plug-in (when the plug-in is not in Controls View). The UAD Toolbar has several useful features that make using UAD plug-ins more convenient. Refer to the illustration below for control descriptions in this section.




*UAD Toolbar elements*

## UAD Presets and Settings

The current settings within a UAD plug-in can be saved to disk as a preset file. The preset can then be subsequently loaded into another instance of the same UAD plug-in title and/or shared with other users. Current UAD plug-in settings can also be copied and pasted between instances of the same UAD plug-in title.

These functions are available via the UAD Preset/Settings Menu.

> ***Note:*** *UAD plug-in settings are saved within a project session file by the DAW software, and settings are recalled when the project file is loaded. This occurs automatically without using the UAD Preset/Settings Menu.*

### Additional Factory Presets

Many UAD plug-ins include additional factory and UA artist presets that are not within the factory bank (factory bank presets are accessed directly within the DAW). The additional factory presets are automatically installed to the Default Preset Location.

To access the additional presets, use the Load Preset function in the UAD Preset/Settings menu within the UAD Toolbar, or the Presets browser in Apollo's Console.

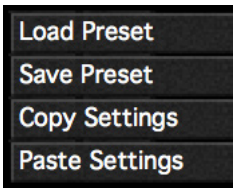
### Preset/Settings Compatibility

Load/save and copy/paste of parameter values between the same UAD plug-in title is allowed, as well as load/save/copy/paste between SE and standard plug-ins of the same title (for example, between Neve 33609 and Neve 33609SE).

> ***Note:*** *Presets and settings between Legacy titles and their newer equivalents with the same title are not compatible (e.g., Fairchild 670 Legacy and Fairchild 670).*

## Load/Save Preset

### UAD Preset/Settings Menu




The UAD Preset/Settings menu is used to load/save plug-in presets and copy/paste plug-in settings. To access these functions, click the presets menu in the UAD Toolbar, then choose an action from the menu.

The Preset load/save features support presets but not banks. To load and save banks, use the DAW's bank management feature (if available).

When Load Preset or Save Preset is selected from the Preset/Settings menu, the standard operating system load/save file dialogs are presented. Preset files can then be loaded (if the plug-in is the same type), or saved to any disk location.

> ***Note:*** *When using UAD plug-ins within Apollo's Console application, the Presets Manager within Console is recommended for managing presets (instead of the UAD Toolbar) because of its additional functionality.*

### Copy/Paste Settings

Settings can copied and pasted directly between UAD plug-ins (within the Preset/Settings Compatibility guidelines) without using the interim step of creating a preset file.

To copy/paste settings between UAD plug-ins, select Copy Settings from the presets menu of the source plug-in, then select Paste Settings from the presests menu of the destination plug-in.

> ***Note:*** *If the menu displays "Cannot Paste Settings" then settings were not copied first, or the paste destination has incompatible settings.*

### Default Preset Location

When the load/save functions are used, the OS load/save file dialogs are automatically directed to the default preset location. Although UAD presets can be loaded from (and saved to) any disk location, using the default preset location automatically organizes all your presets of the same UAD plug-in title within the same folder.

The Presets folder path below is the parent folder for all UAD plug-in presets. Within the parent folder is a subfolder for each individual UAD plug-in title, and the subfolder contains all the presets for that UAD plug-in.

***Windows:***

- C:\Program Files (x86)\Universal Audio\Powered Plugins\Presets

***Mac:***

- /Library/Application Support/Universal Audio/Presets

## Status Indicator

The Status indicator in the UAD Toolbar displays information about the current state of the plug-in. Each state is described below.

### Start Demo

When START DEMO is displayed, the 14-day trial period for the particular plug-in has not been activated. Clicking this button will start the demonstration period (you can also start the demo in the UAD Control Panel's Status Column.

> ***Important:*** *The 14-day demo period can only be activated once, and cannot be stopped or restarted during this period. Don't activate demo mode unless you have adequate time to thoroughly evaluate its sound and functionality.*

### Demo Active

After starting the demo, and when the plug-in is still within the active 14-day trial period, the number of days remaining in demo mode is displayed here.

### Disabled

When DISABLED is displayed in red, the plug-in will not process audio. This can occur in two situations: Either the demo period has expired (click the cart button!), or there are not enough UAD resources to run the plug-in.

### Status Blank

When no text is displayed in the Status area, the plug-in is licensed and operating normally. In this state, the cart button is not displayed.

## Cart Button

When the plug-in is not licensed, the cart button is displayed. If the computer is connected to the internet, clicking cart links to the UA online store so you can purchase the license. See Buying UAD Plug-Ins for purchasing details.

## Help Menu

The Help menu contains two convenient shortcuts. To select the shortcuts, click the "?" icon in the UAD Toolbar, then a choose shortcut from the menu.

### Manual

This option opens the UAD Plug-Ins Manual PDF, where all features and functions of all individual UA-developed UAD plug-ins are documented. With 3rd-party Direct Developer plug-ins, the manual provided by the developer is opened.

### Web Info

This option opens the product page for the UAD plug-in on the Universal Audio website (Internet connection required).

# LiveTrack Mode

## LiveTrack Overview

LiveTrack Mode reduces latency on an active UAD plug-in to the lowest possible amount. This feature is useful for monitoring UAD-processed audio when recording live performances.

Reduced latency in LiveTrack Mode is accomplished by circumventing the standard buffering processes. Normally, UAD signal data is buffered at the audio interface I/O sample buffer size which results in a processing delay. In LiveTrack Mode, UAD signal data is transferred and processed immediately instead of being buffered, resulting in reduced latency.

LiveTrack Mode is available exclusively with UAD-2 devices that use PCIe, Thunderbolt, and/or USB 3 as the connection protocol. LiveTrack is unavailable with UAD-2 FireWire devices (UAD-2 Satellite FireWire and/or Apollo connected via FireWire). Additionally, whenever any UAD-2 FireWire device is connected, LiveTrack Mode becomes unavailable on all of the non-FireWire UAD-2 devices.

> ***Note:*** *LiveTrack Mode is unavailable on all UAD-2 devices whenever any UAD-2 FireWire device is connected to the system.*

## Increased Host Loading using LiveTrack

When LiveTrack is active, host CPU loading increases. The host load is directly proportional to the DSP load of the UAD plug-in(s) in LiveTrack mode, however host CPU is never used for UAD plug-in processing.

## Extra Latency with LiveTrack

When Extra Buffering is enabled or when UAD Plug-Ins with Additional Latency are used with LiveTrack, latency is increased. Extra Buffering adds 64 samples, and each plug-in with additional latency using LiveTrack adds the value from the chart in the UAD Plug-Ins Manual.

> ***Note:*** *For more detailed information about latency and buffers, see Latency & Delay Compensation*

## LiveTrack Activation

To activate LiveTrack Mode, click the microphone icon switch in the UAD Toolbar. LiveTrack Mode is active when the mic icon is red.

LiveTrack Mode can be activated simultaneously on multiple UAD plug-ins. However, host system CPU loads will increase with each LiveTrack Mode instance.

> ***Note:*** *The LiveTrack switch not available when UAD-2 Satellite FireWire and/or Apollo FireWire are connected*

# Adjusting Parameters

The parameter settings within each UAD plug-in can be adjusted to achieve a desired sonic effect. Parameter values are easily modified by dragging sliders, rotating knobs, clicking switches and buttons, or by selecting values in a drop menu. The functions of all plug-in parameters are detailed in the UAD Plug-Ins Manual.

The parameter adjustment style can be Circular, Relative Circular, or Linear. For related information, see User Interface Settings.

> ***Tip:*** *To increase resolution when adjusting rotary controls in circular and relative circular modes, increase the radius of the mouse relative to the knob while dragging (i.e. move the mouse farther away from the knob while dragging).*

## Text Entry

Parameters that have a value display field can be modified directly with text entry. To enter a parameter value using text entry, single-click the parameter value text field. The text value will highlight, indicating it is ready to receive a new value. Type in a new value, then press Return, Enter, or Tab, or click outside of the text box. Press Esc if you want to revert to the prior setting without entering the new value.

Values entered via text entry are rounded to the closest significant digit. If an entered value is out of range, it will be ignored.

### Time Values

To enter time values, the units must be specified; m = milliseconds, and s = seconds. For example: To enter 400 milliseconds, type 0.400s or 400m. To enter 1.5 seconds, type 1.5s or 1500m.

## Mouse Scroll

If your input device has a scroll function, it can be used to adjust knob and slider controls if the DAW supports this functionality. Place the mouse cursor over any knob or slider control, then use the scroll function to increment or decrement the parameter value.

## Keyboard Control (Mac)

If you control-click a parameter, that control is selected for keyboard control. This feature is particularly useful when control adjustment is set to circular mode, and you want to fine-adjust a value.

Normally, clicking on a control in circular mode makes the value jump to where you clicked. Control-clicking will select the control so that you can use the keyboard to adjust the value without causing its value to jump to the cursor location first.

## Shortcuts

The table below lists the keyboard shortcuts that are available for modifying parameter values. When using keyboard shortcuts, the last edited control will be modified.

On Mac systems, you can use control-click to select a different control as the target for keyboard shortcuts without changing the control's value.

***Note:*** *Not all DAW applications support sending keystrokes to plug-ins.*

### UAD Plug-In Keyboard shortcuts

| Keyboard Action | Result |
|---|---|
| Control + Click Parameter (Mac only) | Select parameter for keyboard control (without changing its value) |
| Shift + Drag | Fine Control |
| UpArrow<br>RightArrow<br>Shift + PageUp | Increment Fine |
| DownArrow<br>LeftArrow<br>Shift + PageDown | Decrement Fine |
| Shift + UpArrow<br>Shift + RightArrow<br>PageUp | Increment Coarse |
| Shift + DownArrow<br>Shift + LeftArrow<br>PageDown | Decrement Coarse |
| Control + Click parameter (Windows)<br>Modifier* + Click parameter (Mac) | Toggle initial editor setting (the value when the editor window was last opened) |
| Control + Shift + Click parameter (Windows)<br>Modifier* + Shift + Click parameter (Mac) | Revert to initial editor setting (the value when the editor window was last opened) |
| *Modifier key set in UAD Meter & Control Panel application's Configuration panel | |

# DSP Loading Information

UAD devices feature either one (UAD-2 SOLO), two (UAD-2 DUO), four (UAD-2 QUAD), or eight (UAD-2 OCTO) on-board SHARC DSP chips for UAD plug-in processing.

Multi-DSP systems use sophisticated load balancing routines. UAD-2 plug-ins are always allocated as efficiently as possible, which is not necessarily on the DSP with the lowest resource use.

## UAD FireWire Devices

Because FireWire has significantly less bandwidth than the PCIe protocol, if UAD-2 Satellite FireWire and/or Apollo (when connected via FireWire) is running with UAD-2 PCIe card(s) in a multi-device system, UAD plug-ins will load on the UAD-2 card(s) before the FireWire device in order to maximize FireWire bandwidth. See FireWire Bandwidth vs. UAD DSP for more information.

## More Loading Notes

- Depending on the UAD plug-in, lower session sample rates may use less UAD plug-in DSP resources than higher sample rates.
- Bypassing individual components will conserve DSP on some UAD plug-ins. For example, bypassing the compressor in the Precision Channel Strip when only the EQ is in use, and/or bypassing any of the unused bands of the Precision Channel Strip EQ will use less UAD DSP (unless DSP LoadLock is enabled).
- A chart showing expected plug-in counts is available on the UA website:

  www.uaudio.com/support/uad/compatibility/instance-chart.html

## Host CPU Loads

- The host computer system memory and CPU are never used for UAD plug-in processing. However, there will always be a small amount of load on the host CPU induced by data transfers and user interface operations.
- When LiveTrack Mode is active, host CPU load is increased.

## Automation

Most UAD plug-in parameters can be automated if this feature is supported by the DAW application. Each DAW has its own particular methods for automation; consult the DAW documentation for specific instructions on using automation with the DAW.

UAD plug-ins reduce their DSP load when bypassed or disabled, but not their memory load. This feature allows for automatable load balancing of DSP power, and keeps the track delay constant to avoid on/off clicks.

> ***Note:*** *If there is not enough DSP available when automating, the plug-in may not activate. When this occurs, DISABLED is displayed in the UAD Toolbar.*

## External MIDI Control

UAD plug-in parameters can be controlled by an external MIDI controller, if this feature is supported by the host DAW application. Each DAW has its own particular methods for external MIDI control. Consult the DAW documentation for specific instructions on using external MIDI control with the DAW.

## Mono (m) UAD plug-ins

UAD VST plug-ins with "(m)" in the name are monophonic versions of the plug-in.

The standard VST plug-ins (which support both stereo and mono configurations) do not consume additional UAD DSP on mono sources when loaded in DAWs that use true-mono processing (for example, Apple Logic Pro, Avid Pro Tools, and Steinberg Cubase/Nuendo).

Some DAWs (for example, Ableton Live and Cakewalk Sonar) do not use true-mono processing on mono signals. In these DAWs, using the mono (m) versions may conserve UAD DSP when used on mono sources.

UAD mono (m) plug-ins are not available in Audio Units or AAX format. All qualified AU and AAX 64 DAWs (e.g., Apple Logic Pro, Avid Pro Tools) support true-mono processing.

> ***Note:*** *Some UAD plug-ins do not consume less DSP even when used in a true-mono configuration. For details about mono vs. stereo DSP use, see the UAD Instance Count Chart.*

# Tempo Sync

The time-based parameters of some UAD plug-ins can be synchronized to the tempo of the host application using the Tempo Sync feature.

> ***Note:*** *Not all DAW applications support Tempo Sync. In such hosts, the tempo sync features will not function.*

When Tempo Sync is activated, the time-based parameters that are available for synchronization are changed to note duration values, and will sync to the tempo of the host application using the displayed note value.

*Tempo Sync switch within Precision Delay Mod*

## Tempo Sync Plug-Ins

The Tempo Sync feature is available with the UAD plug-ins listed below.

| | |
|---|---|
| CS-1 Channel Strip | Moog Multimode Filter XL |
| Cooper Time Cube | MXR Flanger/Doubler |
| Galaxy Tape Echo | Precision Delay Mod |
| EP-34 Classic Tape Echo | Precision Delay Mod L |
| Korg SDD-3000 Digital Delay | Precision Reflection Engine |
| Moog Multimode Filter | Roland RE-201 Space Echo |
| Moog Filter Multimode SE | |

> ***Note:*** *This table does not include UAD Direct Developer (3rd-party) plug-ins.*

## Sync Activation

To activate Tempo Sync, click the "Sync" button within the plug-in interface. The Sync button LED will illuminate and the time parameters will change from a time-based display to a note value display.

> ***Note:*** *When Tempo Sync is activated, the plug-in will automatically switch the time or rate parameter(s) to the nearest available note value(s) given the range of the parameter in question and the current tempo.*

## Available Note Values

The note values that are available for selection are listed below. The values are listed in musical notation as a division of measures. For example, 1/4 = one quarter note, 1/1 = one whole note, 4/1 = four whole notes, and so forth.

The available note values were chosen to allow syncing to tempo in odd time signatures as well the common 4/4 time signature.

LFO rate parameters have their note values listed from longest to shortest, since long note values correspond to slow LFO rates.

**Available Tempo Sync Note Values**

| | | | |
|---|---|---|---|
| 1/64D* | 1/8 | 5/8 | 4/1 |
| 1/64 | 5/32* | 1/1T | 5/1 |
| 1/32T | 1/4T | 1/2D | 6/1 |
| 1/32 | 1/8D | 1/1 | 8/1 |
| 1/16T | 1/4 | 5/4 | 9/1 |
| 1/32D | 5/16 | 1/1D | 12/1 |
| 1/16 | 1/2T | 7/4 | 16/1 |
| 1/8T | 1/4D | 2/1 | |
| 1/16D | 1/2 | 3/1 | |
| D = Dotted<br>T = Triplet<br>* = Galaxy Tape Echo & RE-201 only | | | |

A quarter note is always a quarter note, independent of the time signature. In different time signatures a quarter note can represent different numbers of musical beats (e.g. 6/8 ) or different fractions of a bar (e.g. 5/4). For example, say the time signature is 6/8 and the delay time tempo sync note value is 1/4. If a sound occurs on beat one of the measure then its delay will occur on beat 3, which is 1/4 note (i.e. two 8th notes) later.

> ***Note:*** *The "beat" value in a sequencer's BPM tempo setting always refers to a quarter note, independent of time signature.*

### Range Limits

Some Tempo Sync parameters cannot access the entire note range in Available Tempo Sync Note Values. Because the original (non-tempo sync) range of the time-based parameters within each plug-in is limited, if the host tempo is too fast or too slow, the tempo sync note value may not be able to be achieved within the constraints of the original parameter.

#### Out of range

When a parameter note value is out of range of the current tempo note value, the note value is displayed in parentheses. In this case, the parameter's minimum (slow tempo) or maximum (fast tempo) value is used instead of the displayed value.

*Tempo Sync value out of range (parentheses)*

## Entering Values

In addition to adjusting the parameter control, the following methods can be used for entering Tempo Sync values.

### Arrow Keys

After clicking the parameter to select it, the computer's arrow keys can be used to scroll through available note values.

### Text Entry

Any notation values can be entered (fraction or decimal), and the values are automatically converted to the nearest appropriate setting.

Example: If 3/4 or 6/8 is entered using text entry, 1/2D is displayed because a dotted half note equals three quarter notes, which is the duration of one measure in a time signature of 3/4 or 6/8. If 12/8 is entered with text entry, 1/1D is displayed because a dotted whole note equals six quarter notes, which is the duration of one measure in a time signature of 12/8 (or two measures in a time signature of 3/4 or 6/8).

This means you can create a tempo sync duration of one measure for any time signature by simply typing in the time signature (assuming there is a match in the beat table).

Similarly, if 1/12 is entered with text entry, 1/8T is displayed because an eighth note triplet is equivalent to one-twelfth of a measure (if in 4/4 time).

## Precision Delay Modes with Tempo Sync

The UAD Precision Delay Mod and UAD Precision Delay Mod L plug-ins have a Mode menu that switches the plug-in operation between delay, chorus, and flanger mode. In these plug-ins, when the Mode is set to DUAL DELAY and PING PONG, the delay Time and modulation Rate parameters are simultaneously available for Tempo Sync.

However, when the plug-in is set to a CHORUS or FLANGER mode, only the Rate is available for Tempo Sync. This enables the more typical and musical chorus/flange effect by only syncing the modulation Rate to the tevmpo while the delay time remains constant.

## Galaxy Tape Echo & Roland RE-201 Sync

When the Galaxy Tape Echo and Roland RE-201 plug-ins are in Tempo Sync mode, note values can be imprecise due to the fixed tape head relationships.

Values that are imprecise approximations (but are within the available delay time range) are displayed with a “+” or “-” symbol. The leading head in the current mode is accurately synced; the other values are based on the fixed tape head relationship.

> ***Note:*** *When a parameter note value is out of range of the current tempo note value in these plug-ins, the note value flashes instead of in being parentheses.*

# Latency & Delay Compensation

When UAD plug-ins are used, audio data to be processed by a UAD plug-in is sent by the host DAW application to the UAD device. The audio is then processed by the UAD device and sent back to the DAW. This back-and-forth shuffling of digital audio data is called *buffering* and it produces a latency (delay) in the audio signal being processed.

Latency is inherent in digital audio systems and it can be detected in certain situations. Latency time in a DAW is usually determined by the session sample rate and audio I/O interface hardware buffer size settings.

If this latency is not compensated, the processed audio will not be perfectly aligned (synchronized) with unprocessed audio. Fortunately, modern DAW applications automatically compensate for this latency by simply enabling the delay compensation function in the DAW's preference settings. Most DAWs provide full plug-in delay compensation throughout the entire signal path, including inserts, sends, groups/buses, and outputs.

UAD latency and UAD plug-in delay compensation is managed automatically by all modern DAWs using automatic plug-in delay compensation as long as the feature is enabled. Additionally, latency can be reduced to near-undetectable levels in UAD-2 PCIe cards and UAD-2 Satellite Thunderbolt by enabling LiveTrack Mode in the UAD Toolbar.

> ***Note:*** *Delay compensation is fully automatic and requires no user intervention when UAD plug-ins are used in DAWs that support latency delay compensation.*

## Host DAW Application Settings

For optimum results, the delay compensation feature should be enabled in the DAW application, so delay compensation is automatic when UAD plug-ins are used. This option is usually found in the audio or plug-in preference settings window. The specific location of the setting for this option can be found in the DAW documentation.

Latency compensation has various names depending on the DAW. It's usually referred to as "Automatic Delay Compensation" (ADC), "Plug-In Delay Compensation" (PDC) or similar name.

## Realtime UAD Processing with Apollo

With all of Universal Audio's Apollo High-Resolution Audio Interface models, there is no buffering latency on input because the UAD plug-in processing occurs on input within the interface itself; the data does not need to be shuttled to the DAW and back.

This feature, called *Realtime UAD Processing*, is only available when UAD plug-ins are used within Apollo's Console application. I/O buffering latency still applies with Apollo when UAD plug-ins are used within a DAW.

# UAD Plug-Ins with Additional Latency

Some UAD plug-ins introduce additional latency to achieve sonic design goals (for example, upsampling). When these UAD plug-ins are used in a DAW, additional latency is induced in the signal path. Therefore, they require more compensation to remain perfectly synchronized with other tracks.

Although the latency added by these UAD plug-ins is negligible (typically between 0 – 300 samples, depending on the plug-in and session sample rate), this extra latency can affect phase coherency in a session if not properly compensated.

> ***Note:*** *Compensating additional latency from UAD plug-ins is performed automatically by the host DAW application when the latency compensation function is enabled in the DAW.*

## Additional Latency Values

The latency values (in samples) of UAD plug-ins with additional latency are listed in the last chapter within the UAD Plug-Ins Manual.

## Latency Compensation Notes

- To automatically compensate for UAD plug-ins with additional latency, simply enable the delay compensation function in the Host DAW Application Settings.
- Compensating for UAD plug-ins with additional latency is not required when these plug-ins are used for program material on the output bus, where latency is not a consideration because the entire mix is delayed by the same amount.
- The latency in UAD plug-ins with additional latency is also produced when LiveTrack Mode is used with these UAD plug-ins.
- Additional latencies cannot be displayed in the Plug-In Latency Section within the System Information panel due to technical limitations.
- The Ampex ATR-102, AKG BX 20, and Precision Multiband plug-ins have a significantly larger latency than other UAD plug-ins with additional latency because of their complex algorithms. Because manually compensating for these plug-ins in DAWs that don't support full plug-in delay compensation can be complicated, to avoid timing errors in these DAWs, using these plug-ins only on outputs is recommended so no manual compensation is required.

> ***Note:*** *Use the Ampex ATR-102, AKG BX 20, and Precision Multiband only on outputs (as their design was intended), or only in DAWs that have full plug-in delay compensation.*

## Live Processing (without Apollo)

The previous information about delay compensation applies primarily to playback and mixing of existing tracks on (non-Apollo) UAD-2 devices. During recording (tracking), the primary concern usually centers around getting the absolute lowest possible latency out of your hardware and software combination. The lower the latency is, the closer you can get to a real-time "ears match the fingers" performance situation in the digital environment where some latency is unavoidable.

Realtime latency is displayed in the System Information Panel within the UAD Meter & Control Panel application.

Live processing latency is determined by the session sample rate and the audio interface I/O buffer size setting. Higher sample rates and lower buffer sizes produce lower latencies.

### UAD-2 LiveTrack Mode

UAD-2 PCIe cards and UAD-2 Satellite Thunderbolt offer an advanced buffering architecture that can deliver reduced latency when tracking through UAD plug-ins that are loaded in a DAW. To enable the feature, activate LiveTrack Mode in the UAD Toolbar on the UAD plug-in(s) within the DAW.

# UAD-2 Satellite Thunderbolt

## The rich analog sound of UAD plug-ins over Thunderbolt

The UAD-2 Satellite Thunderbolt DSP Accelerator is a sleek, powerful way for Thunderbolt-equipped users to “supercharge” their systems and run larger mixes filled with acclaimed UAD plug-ins. This convenient desktop unit gives you full access to UA’s award-winning plug-in library.

With improved performance and reduced plug-in latency versus FireWire, UAD-2 Satellite Thunderbolt makes the perfect introduction to UAD plug-ins, or ideal DSP expander for Apollo audio interfaces.

Once installed and configured, UAD-2 Satellite Thunderbolt is functionally similar to its UAD-2 PCIe card counterparts.

## Features

- 44.1 – 192 kHz DSP Audio Accelerator for Thunderbolt Computers
- Thunderbolt 3 or Thunderbolt 2 connectivity (depending on model)
- UAD-2 QUAD or OCTO in an attractive external housing
- Same potent DSP power as UAD-2 PCIe QUAD or OCTO
- Kensington Security Slot for anti-theft cables
- Fan-free construction for silent operation

### Retail Package Contents

- UAD-2 Satellite Thunderbolt unit (QUAD or OCTO version)
- External 12VDC power supply with region-specific AC cable
- Getting started URL card

## QUAD and OCTO Models

UAD-2 Satellite Thunderbolt is available in two DSP configurations: QUAD and OCTO. The only difference between these two configurations is the number of SHARC DSP processors inside the device (and therefore the available DSP horsepower for UAD plug-in processing). The QUAD or OCTO designator is on a sticker on the bottom of the unit.

## Thunderbolt 3 and Thunderbolt 2 Models

Depending on the model, UAD-2 Satellite Thunderbolt has either two Thunderbolt 3 ports, or two Thunderbolt 2 ports. Other than the location of the power switch, the only functional difference between these two models is the type of Thunderbolt ports on the device.

> ***Note:*** *To use UAD-2 Satellite Thunderbolt 2 models with Windows 10 computers, or Mac computers with Thunderbolt 3 ports, a compatible Thunderbolt 3 to Thunderbolt 2 adapter (not included) is required. For details, visit help.uaudio.com.*

## Documentation

This UAD System Manual is the primary resource for UAD-2 Satellite Thunderbolt operations. Individual UAD Powered Plug-Ins are detailed separately in the UAD Plug-Ins Manual. For complete documentation information, see the UAD Documentation Overview.

Instructions in this chapter are specific to UAD-2 Satellite Thunderbolt operations only, and apply in addition to the other chapters in this manual. To get the most from your UAD-2 Satellite Thunderbolt, please review the information in this chapter and the rest of this manual.

## Setup Overview

UAD-2 Satellite Thunderbolt setup includes hardware setup, installing the software, and registration/authorization to claim bundled UAD plug-ins.

Hardware setup is detailed below. After the hardware is connected, install the UAD software and authorize the device using the procedures detailed in UAD Installation.

> ***Note:*** *For optimum results, connect and power UAD-2 Satellite Thunderbolt before software installation.*

## System Requirements

To use UAD-2 Satellite Thunderbolt, the computer must meet the System Requirements.

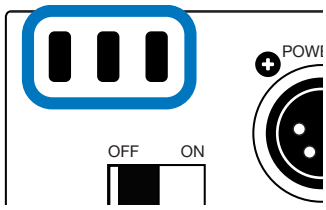
# Hardware Setup

## Install Location

When selecting a location to position UAD-2 Satellite Thunderbolt for installation and operation, consider these points:

- The unit should be positioned on a secure, stable surface and not moved during operation. This will help prevent the disruption of signals from cables and/or connectors if they are accidentally bumped or disconnected.
- For proper ventilation to prevent overheating, place UAD-2 Satellite Thunderbolt on a hard, flat surface and do not cover the unit. This will allow air to circulate underneath the chassis and through the housing vents.
- Multiple UAD-2 Satellite Thunderbolt units may be stacked. Apollo Twin may be stacked on top of UAD-2 Satellite Thunderbolt.
- High levels of radio-frequency radiation could interfere with proper operation. If possible, avoid placement near unshielded monitors, radio transmitters, and similar equipment.

## Security Slot




The air vents on the rear panel are sized to fit Kensington® Security Slot products. This feature helps prevent theft when used with an optional locking cable such as a Kensington ClickSafe® or MicroSaver® security cable. Refer to the instructions included with the optional cable.

## External Power Supply

UAD-2 Satellite Thunderbolt includes an external 12VDC power supply with a region-specific changeable AC cable. The external power supply is required for operation.

> ***Important:*** *UAD-2 Satellite Thunderbolt cannot be bus powered via Thunderbolt. The included external power supply must be used.*

# Hardware Connections

## About Thunderbolt 3 Ports and Cables

***Important:*** *Although Thunderbolt 3 always uses USB-C connectors, not all USB-C ports are Thunderbolt 3 ports. Similarly, not all USB-C cables are Thunderbolt 3 cables. Always connect UAD-2 Satellite Thunderbolt 3 models to a Thunderbolt 3 port with a Thunderbolt 3 cable.*

### USB-C is not Thunderbolt 3

Thunderbolt 3 uses USB-C connections to transfer data and power. However, USB-C is simply a connector type; it doesn't determine the type of data used by the connector. For example, USB-C connections can be used for Thunderbolt 3, USB 3.1, and other data protocols, so USB-C connections are not always interchangeable.

### Does your USB-C connector support Thunderbolt 3?

To determine if a USB-C port or cable connector supports Thunderbolt 3, look for the Thunderbolt icon. The Thunderbolt icon on a USB-C port or cable means the connector supports Thunderbolt 3. Alternately, confirm Thunderbolt 3 compatibility with the device and/or cable manufacturer.

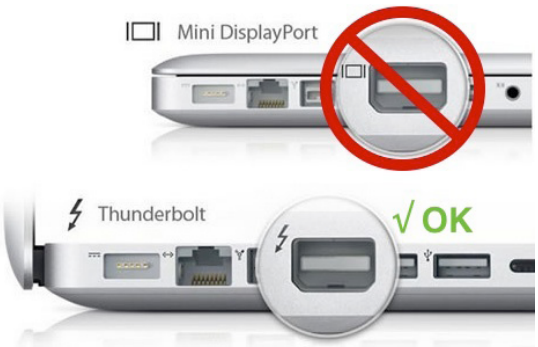
*Thunderbolt icon on Thunderbolt 3 cable (left) and Thunderbolt 3 port (right)*

## About Thunderbolt 2 ports and Cables

***Important:*** *Thunderbolt 2 and Mini DisplayPort both use the same connector. However, not all Mini DisplayPort ports are Thunderbolt 2 ports. Similarly, not all Mini DisplayPort cables are Thunderbolt 2 cables. Always connect UAD-2 Satellite Thunderbolt 2 models to a Thunderbolt 2 port with a Thunderbolt 2 cable (or to a Thunderbolt 3 port via a compatible Thunderbolt 3 to Thunderbolt 2 adapter).*

### Mini DisplayPort is not Thunderbolt 2

UAD-2 Satellite Thunderbolt cannot be used by connecting it to a Mini DisplayPort connector. Although Thunderbolt 2 and Mini DisplayPort devices have the same physical connector, the underlying communication protocol used by these devices is different.




The type of device port can be determined by the icon next to the port. Thunderbolt 2 ports have a lightning bolt icon, while Mini DisplayPort ports have a display icon, as shown at right.

## Connecting and Powering UAD-2 Satellite Thunderbolt

For optimum results, connect and power UAD-2 Satellite Thunderbolt before installing the software. However, UAD-2 Satellite Thunderbolt may be connected and powered after the software is installed.

> ***Note:*** *Per the Thunderbolt specification, the UAD-2 Satellite Thunderbolt hardware may be connected and/or powered while the computer is running. However, quit any audio applications using UAD plug-ins before powering off or disconnecting.*

***To connect and power UAD-2 Satellite Thunderbolt:***

1. Select a suitable Install Location for the UAD-2 Satellite Thunderbolt unit.
2. Connect the female end of the included AC cable to the AC input on the included external power supply. Connect the male end of the AC cable to an AC power outlet.
3. Connect the output (4-pin XLR connector) of the included external power supply to the 12VDC input on the rear panel of UAD-2 Satellite Thunderbolt.
4. Connect one end of a Thunderbolt cable (not included) to a Thunderbolt port on the computer.
5. Connect the other end of the Thunderbolt cable to one of the Thunderbolt ports on UAD-2 Satellite Thunderbolt (either port may be used).

   ***Important:*** *Do not connect both Thunderbolt ports to the computer. The Thunderbolt protocol is bidirectional, so only one Thunderbolt cable is needed.*

6. Apply power to UAD-2 Satellite Thunderbolt by using the POWER switch on the front panel (Thunderbolt 3 models) or rear panel (Thunderbolt 2 models). The Universal Audio logo and text on the front panel illuminate when the unit is properly powered.

Hardware connections are complete and UAD-2 Satellite Thunderbolt is ready for UAD Installation.

# UAD-2 Satellite Thunderbolt Operation

After hardware and software setups are complete, UAD-2 Satellite Thunderbolt is ready for use. UAD-2 Satellite Thunderbolt operation is essentially the same as UAD-2 PCIe cards. Refer to the other chapters in this manual for general operating instructions.

> ***Important:*** *Operations specific to UAD-2 Satellite Thunderbolt are detailed in this chapter.*

## HOST Indicator

The HOST indicator on the front panel indicates the operating state of the unit. The indicator color can be white or red. Three HOST states are possible:

***Blinking white (starting)*** **–** The unit is starting up after power is applied. Full boot time is approximately 8 to 10 seconds.

***Blinking white and red (host undetected)*** **–** The host computer is not connected and/or the UAD device drivers are not installed. Check connections and/or reinstall the UAD software.

***Solid white (normal)*** **–** The unit connected to the host computer and communicating with the UAD device drivers. This is the state during normal operation.

## Powering On

Follow these guidelines when bringing up the computer and DAW systems:

- Power on UAD-2 Satellite Thunderbolt and wait for the solid white HOST Indicator before opening a DAW or other audio applications.
- UAD-2 Satellite Thunderbolt may be powered on before or after the computer is started.

## Powering Off

Follow these guidelines when shutting down the DAW and computer systems:

- Close all audio applications before powering down or disconnecting UAD-2 Satellite Thunderbolt.
- UAD-2 Satellite Thunderbolt may be powered down and/or disconnected while the computer is running, as long as no UAD plug-ins are loaded.

## System Sleep

Per the Thunderbolt protocol specification, system sleep is supported with UAD-2 Satellite Thunderbolt. However, disabling sleep when using DAW software is generally recommended. For optimum results when using UAD-2 Satellite Thunderbolt with DAW software, follow these guidelines to disable sleep.

***Note:*** *Before sleeping the system, quit any DAW software using UAD plug-ins.*

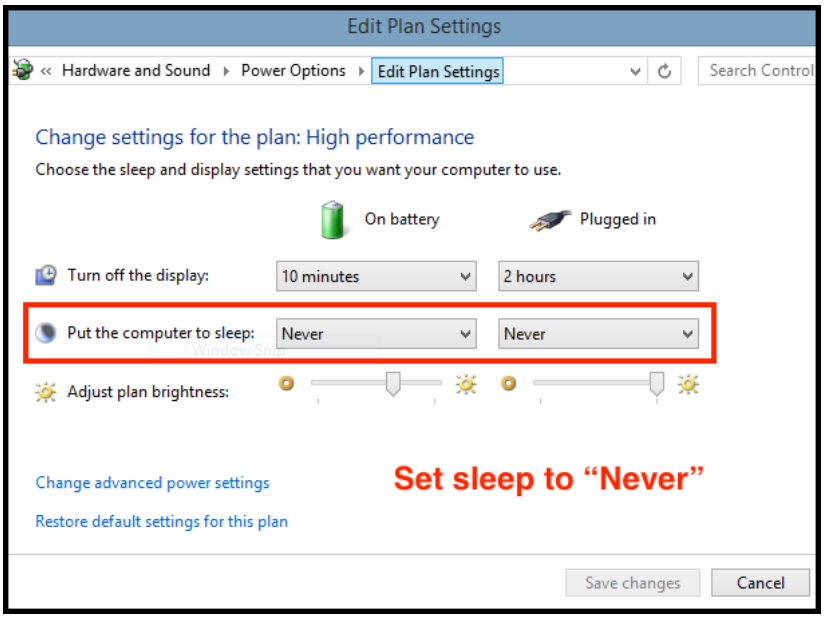
### Mac

- Open the System Preferences>Energy Saver panel and drag the "Computer Sleep" slider (if available) to "Never" (far right position).

***Tip:*** *To access System Preferences, click the Apple icon in the macOS Menu Bar (at upper left corner of screen) then select it from the drop menu.*

### Windows

1. Go to: Control Panel > Hardware and Sound > Power Options. The Power Options window opens.
2. In the Power Options window:
   a. Select the High performance option.
   b. Click the Change plan settings link for the High performance option. The Edit Plan Settings window opens.
3. In the Edit Plan Settings window:
   a. Select Never from the Turn off the display drop menu(s).
   b. Select Never from the Put the computer to sleep drop menu(s).
4. Click the Save changes button to activate the settings.




*Correct setting shown – Sleep disabled in Edit Plan Settings*

## Connecting Thunderbolt peripherals

### Daisy Chains

Thunderbolt peripheral devices (such as an Apollo audio interface or external hard drive) may be serially connected to the available port on the rear panel of UAD-2 Satellite Thunderbolt. The Thunderbolt protocol supports a maximum of six Thunderbolt peripherals per Thunderbolt bus.

> ***Note:*** *UAD-2 Satellite Thunderbolt must be powered on for the computer to recognize the daisy-chained device.*

### Device Compatibility

UAD-2 Satellite Thunderbolt is officially certified as Thunderbolt compliant and is therefore compatible with other certified Thunderbolt devices when used in the same chain.

### Thunderbolt Bus Power

Per the Thunderbolt protocol specification, bus power is supplied by UAD-2 Satellite Thunderbolt to downstream (daisy chained) peripheral Thunderbolt devices connected to the available Thunderbolt port on the rear panel.

> ***Note:*** *UAD-2 Satellite Thunderbolt cannot be bus powered. The included external power supply must be used.*

# UAD-2 Satellite USB

## The rich analog sound of UAD plug-ins over USB 3

The UAD-2 Satellite USB DSP Accelerator is a sleek, powerful way for Window-based PC users to "supercharge" their systems and run larger mixes filled with acclaimed UAD plug-ins. This convenient desktop unit gives you full access to UA's award-winning plug-in library, including exclusive titles from Studer, Lexicon, Neve, and more. With improved performance and reduced plug-in latency versus FireWire, UAD-2 Satellite USB makes the perfect introduction to UAD plug-ins, or an ideal DSP expander for Apollo Twin USB audio interfaces.

Once installed and configured, UAD-2 Satellite USB is functionally similar to its UAD-2 PCIe card counterparts.

## QUAD and OCTO Versions

UAD-2 Satellite USB is available in two versions: QUAD and OCTO. The only difference between these two models is the number of SHARC DSP processors inside the device (and therefore the available DSP horsepower for UAD plug-in processing). The QUAD or OCTO designator is on a sticker on the bottom of the unit.

## Features

- UAD-2 QUAD or OCTO in an attractive external housing
- Same potent DSP power as UAD-2 PCIe QUAD or OCTO
- 44.1 – 192 kHz DSP Audio Accelerator for Windows PC's
- USB 3 connectivity
- Kensington Security Slot for anti-theft cables
- Fan-free construction for silent operation

### Retail Package Contents

- UAD-2 Satellite USB unit (QUAD or OCTO version)
- External 12VDC power supply with region-specific AC cable
- Getting started URL card

## Documentation

This UAD System Manual is the primary resource for UAD-2 Satellite USB operations. Individual UAD Powered Plug-Ins are detailed separately in the UAD Plug-Ins Manual. For complete documentation information, see the UAD Documentation Overview.

Instructions in this chapter are specific to UAD-2 Satellite USB operations only, and apply in addition to the other chapters in this manual. To get the most from your UAD-2 Satellite USB, please review the information in this chapter and the rest of this manual.

## Setup Overview

UAD-2 Satellite USB setup includes hardware setup, installing the software, and registration/authorization to claim bundled UAD plug-ins.

Hardware setup is detailed below. After the hardware is connected, install the UAD software and authorize the device using the procedures detailed in UAD Installation.

> ***Note:*** *For optimum results, connect and power UAD-2 Satellite USB before software installation.*

## System Requirements

To use UAD-2 Satellite USB, the computer must meet the System Requirements.

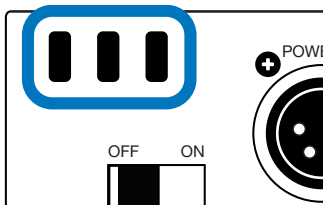
# Hardware Setup

## Install Location

When selecting a location to position UAD-2 Satellite USB for installation and operation, consider these points:

- The unit should be positioned on a secure, stable surface and not moved during operation. This will help prevent the disruption of signals from cables and/or connectors if they are accidentally bumped or disconnected.
- For proper ventilation to prevent overheating, place UAD-2 Satellite USB on a hard, flat surface and do not cover the unit. This will allow air to circulate underneath the chassis and through the housing vents.
- Multiple UAD-2 Satellite USB units may be stacked. Apollo Twin may be stacked on top of UAD-2 Satellite USB.
- High levels of radio-frequency radiation could interfere with proper operation. If possible, avoid placement near unshielded monitors, radio transmitters, and similar equipment.

## Security Slot




The air vents on the rear panel are sized to fit Kensington® Security Slot products. This feature helps prevent theft when used with an optional locking cable such as a Kensington ClickSafe® or MicroSaver® security cable. Refer to the instructions included with the optional cable.

## External Power Supply

UAD-2 Satellite USB includes an external 12VDC power supply with a region-specific changeable AC cable. The external power supply is required for operation.

> ***Important:*** *UAD-2 Satellite USB cannot be bus powered via USB 3. The included external power supply must be used.*

## Hardware Connections

For optimum results, connect and power UAD-2 Satellite USB before installing the software. However, UAD-2 Satellite USB may be connected and powered after the software is installed.

> ***Note:*** *Per the USB 3 specification, the UAD-2 Satellite USB hardware may be connected and/or powered while the computer is running. However, quit any audio applications using UAD plug-ins before powering off or disconnecting.*

***To connect and power UAD-2 Satellite USB:***

1. Select a suitable Install Location for the UAD-2 Satellite USB unit.
2. Connect the female end of the included AC cable to the AC input on the included external power supply. Connect the male end of the AC cable to an AC power outlet.
3. Connect the output (4-pin XLR connector) of the included external power supply to the 12VDC input on the rear panel of UAD-2 Satellite Thunderbolt.
4. Connect one end of the USB 3 cable (included) to a USB 3 port on the PC.
5. Connect the other end of the USB 3 cable to the USB 3 port on UAD-2 Satellite USB.
6. Apply power to UAD-2 Satellite USB by using the POWER switch on the rear panel. The Universal Audio logo and text on the front panel illuminate when the unit is properly powered.

Hardware connections are complete and UAD-2 Satellite USB is ready for UAD Installation.

### USB 3 versus USB 2

UAD-2 Satellite USB cannot be used by connecting it to a USB 2 connector. Although USB 3 and USB 2 devices have a similar physical connector, the underlying communication protocol used by these ports is different.

USB 3 ports contain blue plastic inside the port. They can sometimes be identified by a “SuperSpeed” “SS” label next to the port (as shown at right).

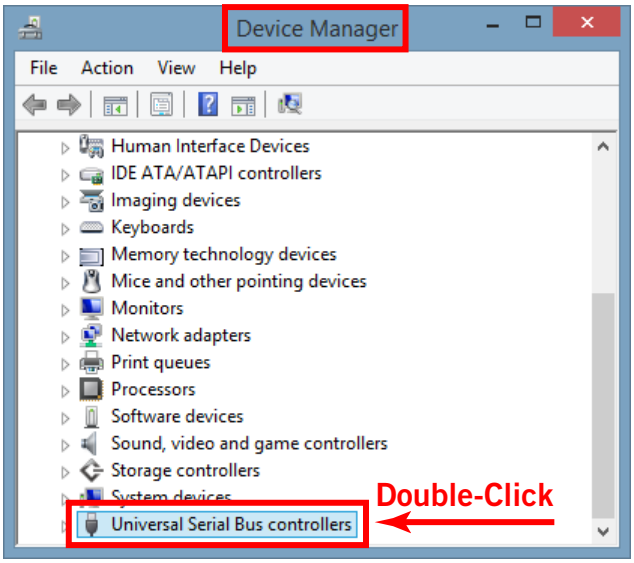
# Windows Setup

The Windows operating system settings below are important to ensure optimum performance with UAD-2 Satellite USB.

## Prevent Windows from powering off USB 3 devices

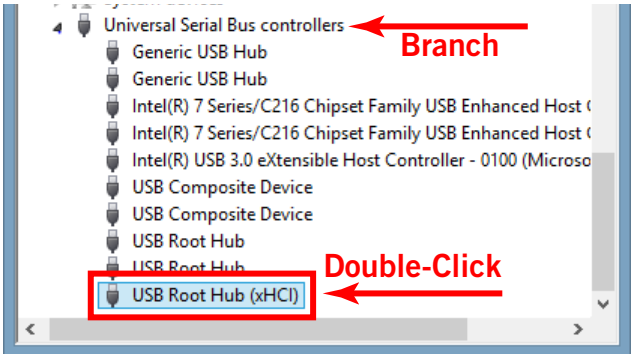
Default Windows settings can interrupt USB data streams. Follow the procedure below to prevent Windows from powering off USB devices.

1. Open the Windows Device Manager. The Device Manager can be accessed by right-clicking the Windows Start Menu and selecting the item from the contextual menu.
2. Double-click the Universal Serial Bus controllers branch in the Device Manager window. The individual USB controllers in the branch are displayed in a list.



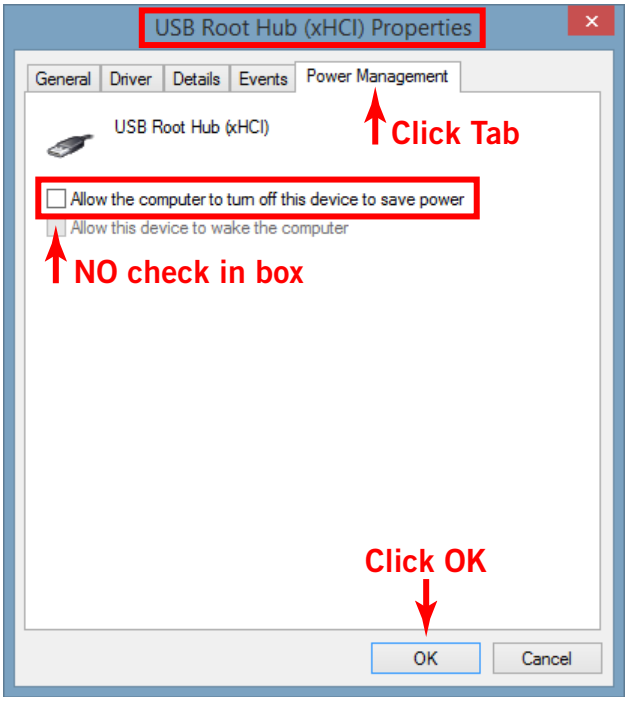

*The USB controllers branch in Device Manager*

3. Double-click the USB Root Hub device in the USB controllers branch list. The Properties window for the individual device opens. *(continued on next page)*



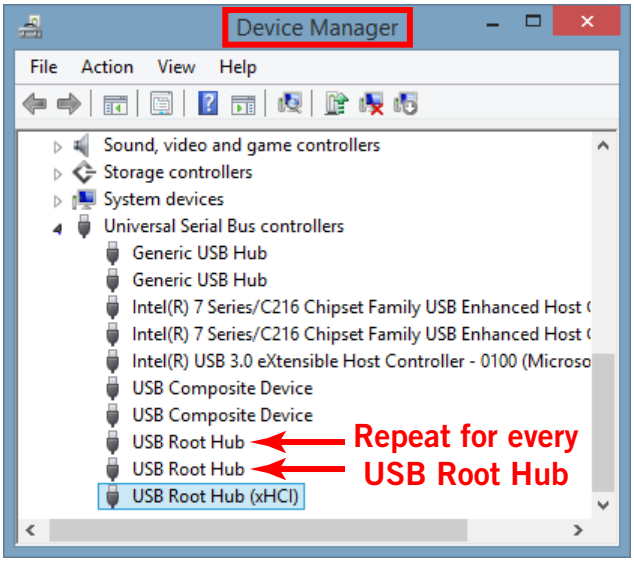

*USB Root Hub controller device in branch list*

4. Click the Power Management tab within the device's Properties window. The power management options are displayed.
5. **Uncheck** the "Allow the computer to turn off this device to save power" option.
6. Click the OK button to activate the new setting.




*Correct setting shown — "Allow" option is disabled in device properties window*

7. Repeat steps 3 – 6 for all individual devices that include "USB Root Hub" in its name.



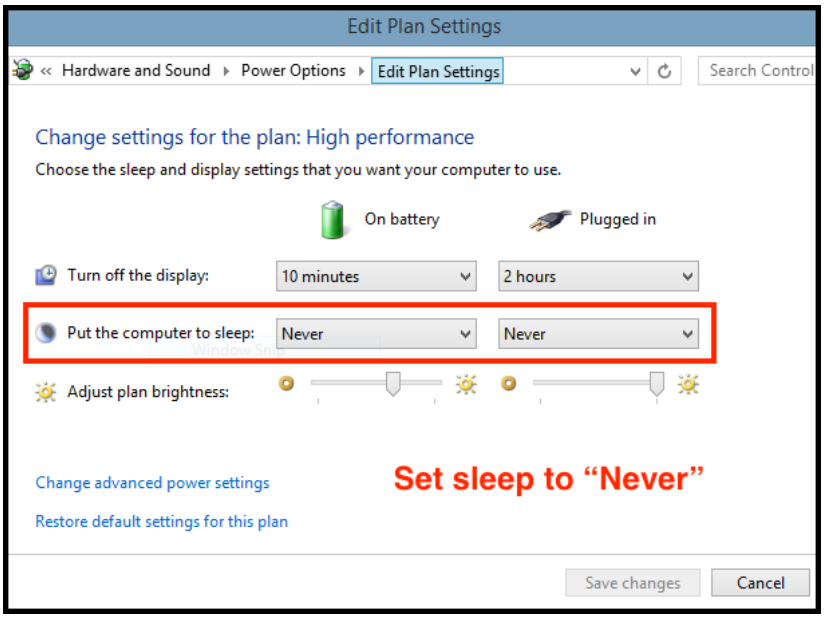

*Repeat procedure for all USB Root Hubs*

UAD-2 Satellite USB is now ready for use.

## System Sleep

System sleep is supported with UAD-2 Satellite USB. However, disabling sleep when using DAW software is generally recommended. For optimum results when using UAD-2 Satellite USB with DAW software, follow these guidelines:

- Disable sleep. Open Control Panel>Hardware and Sound>Power Options>Edit Plan Settings, then select “Never” from the “Put the computer to sleep” menus.
- Before sleeping the system, quit any DAW software using UAD plug-ins.




*Computer sleep disabled in the Edit Plan Settings window within Control Panels*

## Additional Windows Optimizations

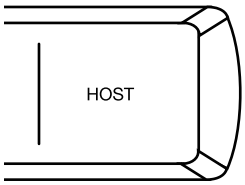
- Visit the UAD-2 Satellite USB Knowledge Base at help.uaudio.com for updated technical news, known issues, and system optimization information.

# UAD-2 Satellite USB Operation

After hardware and software setups are complete, UAD-2 Satellite USB is ready for use. UAD-2 Satellite USB operation is essentially the same as UAD-2 PCIe cards. Refer to the other chapters in this manual for general operating instructions.

> ***Important:*** *Operations specific to UAD-2 Satellite USB are detailed in this chapter.*

## HOST Indicator




The HOST indicator on the front panel indicates the operating state of unit. The indicator color can be white or red. Three HOST states are possible:

***Blinking white (starting)*** **–** The unit is starting up after power is applied. Full boot time is approximately 8 to 10 seconds.

***Blinking white and red (host undetected)*** **–** The host computer is not connected and/or the UAD device drivers are not installed. Check connections and/or reinstall the UAD software.

***Solid white (normal)*** **–** The unit connected to the host computer and communicating with the UAD device drivers. This is the state during normal operation.

## Powering On

Follow these guidelines when bringing up the computer and DAW systems:

- Power on UAD-2 Satellite USB and wait for the solid white HOST Indicator before opening a DAW or other audio applications.
- UAD-2 Satellite USB may be powered on before or after the computer is started.

## Powering Off

Follow these guidelines when shutting down the DAW and computer systems:

- Close all audio applications before powering down or disconnecting UAD-2 Satellite USB.
- UAD-2 Satellite USB may be powered down and/or disconnected while the computer is running, as long as no UAD plug-ins are loaded.

# UAD-2 Satellite FireWire

## Serious analog sound for FireWire-equipped Macs and PCs

A simple FireWire connection is all it takes to plug your Mac or PC into the world's finest analog hardware emulations. UAD-2 Satellite DSP Accelerators offer full access to UAD Powered Plug-Ins, including exclusive titles from Studer, Ampex, Lexicon, Neve, Manley, SSL and more.

UAD-2 Satellite FireWire features a sleek, ultra-portable FireWire 800-based processing unit, plus the Analog Classics plug-in bundle, giving you massive analog character, right out of the box.

Once installed and configured, UAD-2 Satellite FireWire is functionally similar to its UAD-2 PCIe card counterparts. The main difference between UAD-2 Satellite FireWire and UAD-2 PCIe cards is differing architectures (FireWire versus PCIe).

## DUO and QUAD Versions

UAD-2 Satellite FireWire is available in two versions: DUO and QUAD. The primary difference between these two models is the number of processors inside the device (and therefore the available DSP horsepower for running UAD plug-ins). The DUO or QUAD designator is silk-screened on the bottom of the UAD-2 Satellite FireWire housing.

***Note:*** *UAD-2 Satellite FireWire DUO is a discontinued product.*

## Documentation

UAD-2 Satellite FireWire is designed for use with UAD Powered Plug-Ins, the companion software package that includes the drivers, plug-ins, and documentation.

Instructions in this chapter are specific to UAD-2 Satellite FireWire operations only, and apply in addition to the other chapters. To get the most from your UAD-2 Satellite FireWire, please review the information in this chapter and the rest of this manual.

## About FireWire

This chapter contains information about the FireWire protocol and how to use it with UAD-2 Satellite FireWire. For details, see all sections in FireWire Basics.

## Features

- UAD-2 DUO or QUAD in an external housing chassis
- 44.1 - 192 kHz DSP Audio Accelerator for FireWire computers
- FireWire 800 & 400 interface
- Same potent DSP power as UAD-2 PCIe DUO or QUAD
- Kensington Security Slot for anti-theft cables

## Retail Package Contents

- UAD-2 Satellite FireWire unit (DUO or QUAD version)
- External power supply with international AC plug adapters
- FireWire 800 (9-pin) cable
- Important Information Sheet

## System Requirements

To use UAD-2 Satellite FireWire, the computer must meet the System Requirements.

# UAD-2 Satellite FireWire Installation

## Install Software First

The software installation procedure for UAD-2 Satellite FireWire is the exact same procedure as those for UAD cards. Install the software before the hardware unless you are updating a previous installation. Refer to UAD Installation for detailed procedures.

## UAD-2 Satellite FireWire Install Location

When selecting a location to position UAD-2 Satellite FireWire during installation and use, consider these points:

- The unit should be positioned on a secure, stable surface and not moved during operation. This will help prevent the disruption of signals from cables and/or connectors if they are accidentally bumped or disconnected.
- For proper ventilation to prevent overheating, place UAD-2 Satellite FireWire on a hard, flat surface and do not cover the unit. Allow air to circulate underneath the chassis. Two UAD-2 Satellite FireWire units may be safely stacked.
- High levels of radio-frequency radiation could interfere with proper operation. If possible, avoid placement near unshielded monitors, radio transmitters, and similar equipment.

## Security Slot

The Kensington Security Slot is on the rear panel. This feature helps prevent theft when used with an optional locking cable such as the Kensington MicroSaver Security Cable. Refer to the instructions that come with the optional cable.

## External Power Supply

UAD-2 Satellite FireWire includes an external international DC power supply with changeable AC connectors to match the AC socket in various countries.

> ***Important:*** *UAD-2 Satellite FireWire cannot be bus powered via FireWire. The included power supply must be used.*

*External DC power supply and changeable AC connectors*

**To change the AC connector:**

1. Press and hold the button on the AC connector marked PUSH.
2. Rotate the AC prongs counter-clockwise to remove the connector.
3. Insert the desired connector and rotate clockwise until it snaps into place.

**To remove AC connector:**

**1. Press and hold button** **2. Rotate counter-clockwise**

> ***Note:*** *The removable connectors are keyed so they cannot be inserted incorrectly.*

## Connecting UAD-2 Satellite FireWire

***Important:*** *Install the UAD software before connecting UAD-2 Satellite FireWire. UAD-2 Satellite FireWire may be connected before or after the system is booted.*

**To connect UAD-2 Satellite FireWire:**

1. Ensure that the UAD Powered Plug-Ins software is already installed and that the system was powered down after software installation (Mac systems can be hot-plugged after restarting). See UAD Installation for specific instructions.
2. Ensure that all UAD plug-in host software is quit.
3. Select a suitable see UAD-2 Satellite FireWire Install Location for the unit.
4. Connect the AC end of the external power supply to an AC outlet.
5. Connect external power supply output cable to the DC input on the rear panel of the UAD-2 Satellite FireWire unit.
6. Connect one end of the FireWire cable to the FireWire port on the host computer.
7. Connect the other end of the FireWire cable to the UAD-2 Satellite FireWire chassis.

***Important:*** *Do not connect more than one FireWire port to the computer. The FireWire protocol is bidirectional, so only one FireWire cable is needed.*

8. Turn on UAD-2 Satellite FireWire using the power switch on the rear panel. The unit may be powered on before connecting without consequence.
9. Start the computer system.

UAD-2 Satellite FireWire connections are complete and the device is ready for UAD-2 Satellite FireWire Operation. Additional connection methods are detailed later in this chapter.

## Disconnecting UAD-2 Satellite FireWire

***Important:*** *The proper sequence must be followed before disconnecting UAD-2 Satellite FireWire from the computer to avoid unpredictable behavior and/or data loss.*

**To disconnect UAD-2 Satellite FireWire:**

1. Save your sessions and quit all audio software (DAW applications and the UAD Meter & Control Panel).
2. Disconnect UAD-2 Satellite FireWire from the FireWire port.

***Note:*** *UAD-2 Satellite FireWire may be disconnected when it and/or the computer is powered, as long as the steps above are followed.*

# UAD-2 Satellite FireWire Operation

After the UAD Powered Plug-Ins software is installed and UAD-2 Satellite FireWire is properly connected to the computer via FireWire, the system is ready for use. Refer to other chapters in this manual for UAD software operating instructions.

All UAD-2 Satellite FireWire operations (except for hardware setup) are similar to the operation of other UAD-2 devices. See Important UAD-2 Satellite FireWire Notes for exceptions specific to UAD-2 Satellite FireWire.

## About FireWire

For general information about FireWire and how it is used with UAD-2 Satellite FireWire and other FireWire devices, see FireWire Basics and FireWire Bandwidth.

> ***Note:*** *Available FireWire bandwidth is unrelated to UAD DSP loads. See FireWire Bandwidth vs. UAD DSP for details.*

## Power Indicator

When power is applied to UAD-2 Satellite FireWire via the rear switch, the UA logo on the front panel glows. This power indicator does not represent the state of the UAD drivers or their link to UAD-2 Satellite FireWire (the Rear Panel LED indicates the operational state).

*UAD-2 Satellite FireWire Power Indicator*

## Rear Panel LED

UAD-2 Satellite FireWire has a UAD link indicator on the rear panel. This LED provides information about the operational state of the device and its drivers. For more details, see UAD-2 LED.

*UAD-2 LED on Satellite FireWire rear panel*

## Connect/Reconnect

Quit all audio software before connecting or reconnecting UAD-2 Satellite FireWire. The device can be connected or reconnected when the device and/or the host computer is already powered on. The device will be detected and the UAD drivers will automatically load upon connection.

### Adding a device to the active bus

Connecting or disconnecting any FireWire device to an active FireWire bus causes a "bus reset" (as specified by the FireWire protocol). When a FireWire bus reset occurs, all active UAD plug-ins are disabled. The session must be reloaded to reactivate UAD plug-ins.

> ***Note:*** *Connect all FireWire devices to the bus before activating UAD plug-ins.*

## Disconnect

UAD-2 Satellite FireWire can be disconnected when it and/or the host computer is active or sleeping as long as no UAD host applications (including UAD Meter & Control Panel) are running.

> ***Important:*** *Do not disconnect UAD-2 Satellite FireWire while UAD plug-ins are loaded.*

## System Sleep

System sleep while UAD-2 Satellite FireWire is active is not supported. Before sleeping the system, quit all audio plug-in host applications (including the UAD Meter & Control Panel) and disconnect UAD-2 Satellite FireWire. After wake, UAD-2 Satellite FireWire may be reconnected.

> ***Important:*** *Quit all hosts and disconnect UAD-2 Satellite FireWire before system sleep.*

## Hot Plugging (Mac only)

> ***Note:*** *FireWire hot-plugging may work on Windows systems but these operations are not tested.*

Hot plugging refers to the ability to disconnect UAD-2 Satellite FireWire while the host computer is active or sleeping, and reconnect it at a later time without rebooting. UAD-2 Satellite FireWire supports hot plugging (hot plugging is part of the FireWire specification) on Mac systems.

As long as the UAD drivers are properly installed, if UAD-2 Satellite FireWire is hot-plugged into an active FireWire bus, the UAD drivers will load automatically and be ready for use.

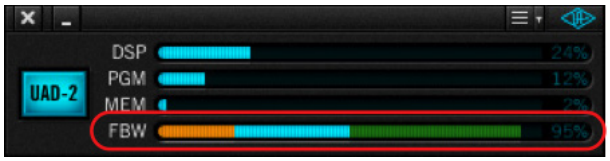
However, disconnecting UAD-2 Satellite FireWire when UAD plug-ins are loaded could cause session data loss and/or unpredictable behavior. Quit all UAD hosts and the UAD Meter & Control Panel before disconnecting the device.

# FireWire Bandwidth

All devices on a FireWire bus must share the available data bandwidth of the bus, including hard drives and audio interfaces as well as UAD-2 Satellite FireWire. If there is not enough FireWire bandwidth to handle all the data traffic on the bus, performance issues (such as audio clicks/pops/dropouts or UAD overloads) could occur.

## FireWire Bandwidth Meter

When UAD-2 Satellite FireWire is connected, the UAD Meter window displays the FireWire Bandwidth (FBW) meter, showing the amount of FireWire bandwidth being used by UAD-2 Satellite FireWire and other FireWire devices on the bus. Elements of the UAD FireWire Meter illustrates all of the elements in the meter.




*The FireWire Bandwidth meter is visible when a UAD FireWire device is connected*

> ***Important:*** *FireWire bandwidth is unrelated to UAD DSP loads. See FireWire Bandwidth vs. UAD DSP for details.*

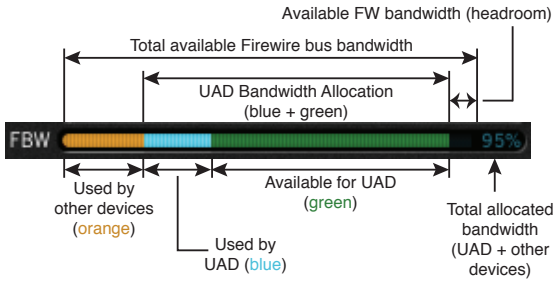
## Sharing Bandwidth

If UAD-2 Satellite FireWire is the only device on the FireWire bus, UAD processing traffic can use the entire bandwidth of the bus. However, if other FireWire devices are on the bus, the amount of bandwidth used for UAD traffic must be reduced so those devices will have enough bandwidth for their processes as well.

## Bandwidth Control

The FireWire bandwidth used for UAD traffic is controlled using the UAD Bandwidth Allocation control. By using the FireWire Bandwidth Meter, it's easy to determine how much bandwidth is being used by the non-UAD devices, so appropriate choices can be made when setting the UAD Bandwidth Allocation.

These settings, and all other UAD-2 Satellite FireWire parameters, are made in the FireWire Panel. See that section for detailed descriptions of the FireWire controls.




*Elements of the UAD FireWire Meter*

## Important UAD-2 Satellite FireWire Notes

For maximum system stability and reduced possibility of data loss, please observe the requirements below when operating UAD-2 Satellite FireWire:

***Note:*** *Only FireWire 800 connections are tested.*

- Due to differing architectures, LiveTrack Mode is unavailable when UAD-2 Satellite FireWire is connected. LiveTrack Mode is also unavailable with UAD-2 PCIe cards or Apollo via Thunderbolt when UAD-2 Satellite FireWire is connected to the same system as these devices.
- UAD-2 Satellite FireWire has a minimum hardware buffer requirement of 512 samples. The hardware I/O buffer setting for the host and audio interface can be adjusted to a value lower than 512 samples when UAD-2 Satellite FireWire is connected, and the UAD-2 Satellite FireWire drivers dynamically adjust to allow for the lower buffer setting while still maintaining UAD-2 Satellite FireWire's minimum buffer requirement of 512 samples.

***Note:*** *For the lowest latency while tracking, disable any plug-ins currently running on UAD-2 Satellite FireWire from the input tracks and the monitoring and/or master output paths.*

- All devices on the FireWire bus share the available data bandwidth of the bus, including external hard drives and audio interfaces as well as UAD plug-ins. The amount of UAD DSP that is available for UAD plug-in processing can exceed the available FireWire bandwidth. For these reasons, the value of the UAD Bandwidth Allocation setting is critical. See FireWire Bandwidth and FireWire Bandwidth vs. UAD DSP for more details.
- All three FireWire ports on UAD-2 Satellite FireWire may be used concurrently as a FireWire hub, however FireWire bus power is not supplied to downstream devices. See Bus Power for details.
- See Mixing FireWire Speeds for important information about using FireWire 800 and FireWire 400 devices on the same bus.
- Although hot-plugging is supported on Mac systems, disconnecting UAD-2 Satellite FireWire when UAD plug-ins are running could cause unpredictable behavior. Quit all UAD hosts and the UAD Meter & Control Panel before disconnecting or powering down UAD-2 Satellite FireWire.

***Important:*** *Do not disconnect UAD-2 Satellite FireWire while UAD plug-ins are loaded.*

*(Continued)*

- After the host software is quit, you may connect or disconnect the unit even if the host computer and/or UAD-2 Satellite FireWire is powered on (see See Hot Plugging (Mac only).
- Connect all FireWire devices to the bus before activating UAD plug-ins. See Adding a device to the active bus for details.
- Two UAD FireWire devices can be used together in a single system. See Multiple UAD Devices for additional information.
- Select a suitable UAD-2 Satellite FireWire Install Location. UAD-2 Satellite FireWire units may be safely stacked.
- Do not bend sharp angles into or otherwise kink the FireWire cable. The cable can be damaged by improper handling.
- UAD-2 Satellite FireWire contains no user serviceable parts. Opening the unit will void the warranty. Note the card inside is different than UAD-2 PCIe cards.

## Power Supply Notes

- UAD-2 Satellite FireWire requires external DC power. It ships with an external power supply adapter that converts AC power to 12VDC @ 1.25A. AC input into the adapter can be 100V-240V at 50-60 Hz; several AC plug adapters are provided for international use.
- The power supply DC output connector is ring=ground/negative and tip=hot/positive. UAD-2 Satellite FireWire is diode-protected; the unit will not be damaged if the wrong DC polarity (or AC input) is connected.
- The QUAD Satellite FireWire draws a maximum of 7 watts; the DUO draws 4 watts.
- The acceptable range of power input for UAD-2 Satellite FireWire is 9VDC - 15VDC @ 1A (9 Watts minimum).

***Note:*** *UAD-2 Satellite FireWire requires the external power supply. It cannot be powered by the FireWire bus, nor can it supply bus power to other FireWire devices.*

# FireWire Bandwidth vs. UAD DSP

The amount of FireWire bandwidth used by UAD-2 Satellite FireWire depends on the number (the quantity) of UAD plug-ins that are loaded on the device; the amount of DSP used by a UAD plug-in (the quality) does not affect FireWire bandwidth at all.

In other words, each UAD-2 Satellite FireWire plug-in instance uses a fixed amount of FireWire bandwidth, regardless of how much DSP a given UAD plug-in uses. It is the audio data stream to and from a UAD plug-in that uses the FireWire bandwidth. The amount of digital signal processing occurring on the UAD device itself is unrelated to the FireWire traffic in and out of the device.

Therefore, with UAD-2 Satellite FireWire it is possible to run out of available FireWire bandwidth before running out of available UAD DSP. For example, running ten lightweight plug-ins such as UAD EX-1 on UAD-2 Satellite FireWire will use the same FireWire bandwidth as running ten DSP-intensive plug-ins such as UAD Moog Multi-Mode Filter. However, the EX-1s will use a fraction of the UAD DSP that UAD Moog Filter would require for the same instance count.

See DSP Loading Information for additional notes.

> ***Important:*** *FireWire bandwidth is unrelated to UAD DSP loads.*

## FireWire versus PCIe

The maximum possible data throughput even at FireWire 800 speeds is only a fraction of what is possible with PCIe. Therefore, if very high UAD plug-in counts are required, UAD-2 PCIe cards provide an alternate solution.

# FireWire Bus Power

Some FireWire devices can be “bus powered” which means the device derives its operating electricity from the FireWire bus itself without a power supply of its own. This operating current, when available, is supplied via two conductors in FireWire cables and ports (4-pin FireWire 400 cables and ports cannot supply bus power).

Although bus powering is part of the FireWire specification, it is an optional feature. Not all FireWire devices are designed to use it nor are all devices designed to supply it, for a variety of reasons. For example, a device may require more current than can be supplied by bus power, or a device may be unable to provide enough current to its FireWire ports.

UAD-2 Satellite FireWire cannot be bus powered nor does it supply bus power from its FireWire ports to other devices. Therefore, when using a FireWire device that requires bus power, it is important to connect that device directly to a FireWire port that supplies bus power (such as the computer itself or an externally powered FireWire repeater that is specifically designed to supply bus power).

> ***Important:*** *UAD-2 Satellite FireWire cannot be bus powered and it does not supply bus power from its FireWire ports to other devices.*

# FireWire Basics

FireWire (also known as “IEEE 1394” and “i.Link”) is a high-speed serial data interconnection protocol that is used to transfer digital information between devices. FireWire is commonly used to interconnect computer systems to hard drives, audio interfaces, and digital camcorders.

A complete discussion of FireWire is beyond the scope of this manual, but some of the main points and how they apply to UAD-2 Satellite FireWire are covered below.

## FireWire vs. USB 2

FireWire is considered superior to USB 2 for audio purposes because it does not rely on the host processor to manage low-level data housekeeping (among other reasons). FireWire typically outperforms USB 2 at the same rated speeds.

## FireWire Bus

FireWire devices are connected to a FireWire “bus” which is comprised of all devices in the serial data stream. The FireWire specification supports up to 63 peripherals per FireWire bus.

Many FireWire devices and host computers have more than one FireWire connector, but these connectors almost always attach to the same FireWire bus (most computers do not have more than one FireWire bus). It is possible to add another FireWire bus to a computer, typically by adding a PCIe-to-FireWire or ExpressCard-to-FireWire adapter card.

## Bus Power

Some FireWire devices can be “bus powered” which means the device derives its operating electricity from the FireWire bus itself without a power supply of its own. See FireWire Bus Power for details.

> ***Important:*** *UAD-2 Satellite FireWire cannot be bus powered and it does not supply bus power from its FireWire ports to other devices.*

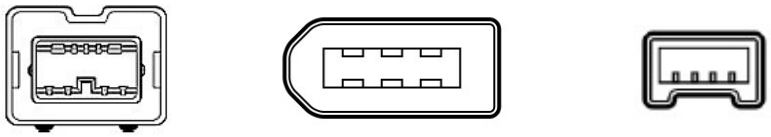
## FireWire 400 versus 800

The most common FireWire devices are available in two speeds: FireWire 400 (IEEE 1394a), which supports transfer speeds up to 400 megabits per second, and FireWire 800 (IEEE 1394b), which supports up to 800 megabits per second. It’s usually possible to determine the speed of the FireWire device by the type of FireWire connector it uses (see FireWire Connectors below).

> ***Note:*** *UAD-2 Satellite FireWire is a FireWire 800 device. See Mixing FireWire Speeds for more information about using FW800 and FW400 devices on the same FireWire bus.*

## FireWire Connectors

FireWire 400 and FireWire 800 devices use different connectors (See FireWire 800 and FireWire 400 (6-pin and 4-pin) connector types below). The connectors are not interchangeable; this helps to differentiate between the two device speeds.



FW 800 (9-pin) FW 400 (6-pin) FW 400 (4-pin)

*FireWire 800 and FireWire 400 (6-pin and 4-pin) connector types*

### FireWire 400 connectors

FireWire 400 devices typically have two types of connector: 4-pin and 6-pin. The small 4-pin FireWire 400 connector is common on digital camcorders and Windows notebook computers. The 6-pin connector is more common with hard drives and audio devices; the two extra pins allow the device to be bus powered (UAD-2 Satellite FireWire cannot be powered by the FireWire bus).

UAD-2 Satellite FireWire has one 6-pin FireWire 400 port.

### FireWire 800 connector

FireWire 800 devices use a 9-pin connector. 9-pin to 6-pin FireWire adapter cables are available to connect FireWire 800 devices to a FireWire 400 bus (with reduced bandwidth). See Mixing FireWire Speeds for more information.

UAD-2 Satellite FireWire has two FireWire 800 ports to facilitate easy daisy-chaining with other FireWire devices.

### FireWire Connections

The ability to connect and disconnect FireWire devices while power is applied (or not) is part of the FireWire specification. UAD-2 Satellite FireWire supports “hot plugging” on Mac systems only.

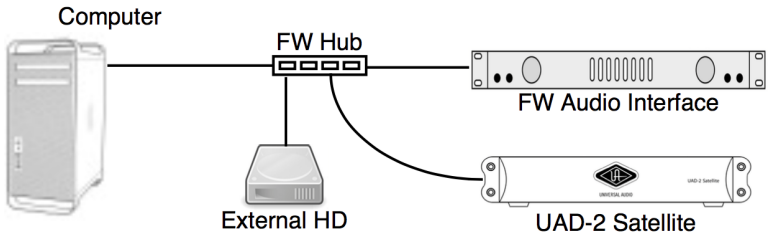
***Note:*** *See Hot Plugging (Mac only) for details.*

### Hubs and Chains

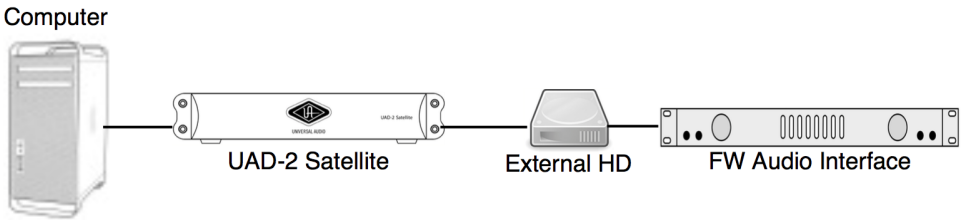
FireWire devices can be connected to a central hub, such as a computer with multiple FireWire ports or a peripheral FireWire hub, connected to each other serially in a "daisy-chain," or any combination of the two in a "tree-chain" topology.

See the following illustrations for topology examples. Note the diagrams are only examples; devices may be connected in any order (see Mixing FireWire Speeds for exceptions).

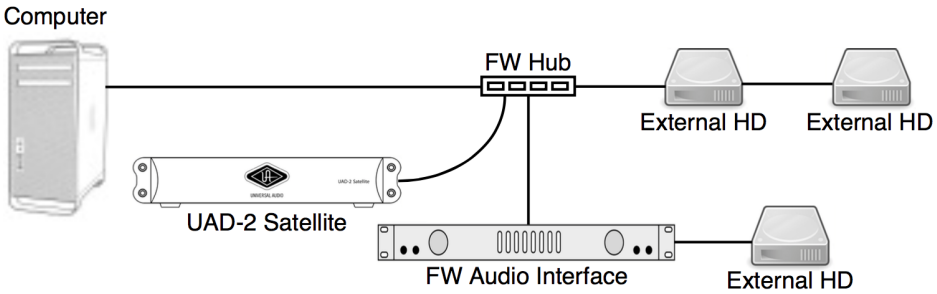
Additionally, UAD-2 Satellite FireWire can function as a FireWire hub, by using the unused ports on the unit to connect other FireWire devices. Note that UAD-2 Satellite FireWire does not supply FireWire bus power to downstream devices; see FireWire Bus Power for details.



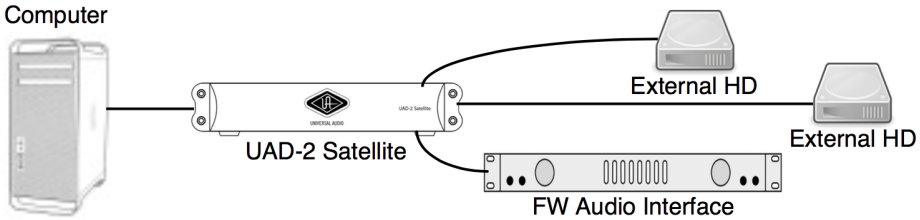

*FireWire bus connections via a hub*




*FireWire bus connection via daisy chain*




*FireWire bus connections via hub and daisy chain*




*FireWire bus connections using UAD-2 Satellite FireWire as a hub*

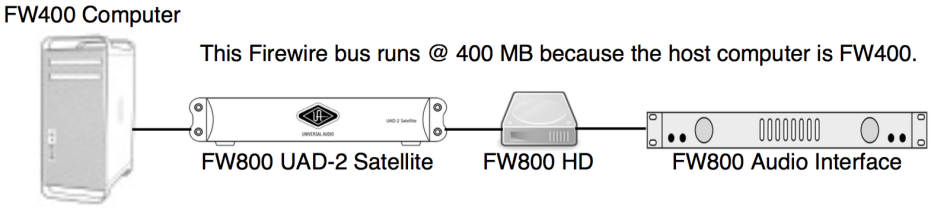
## Mixing FireWire Speeds

Although FireWire 400 and FireWire 800 devices can be connected to the same FireWire bus via a hub or daisy-chain, special precautions must be observed to maximize bandwidth in these situations.

> ***Note:*** *See FireWire 800 bus - devices running at 800 and 400 megabits (recommended setup) when mixing FireWire bus speeds.*

### FireWire 800 devices on a FireWire 400 bus

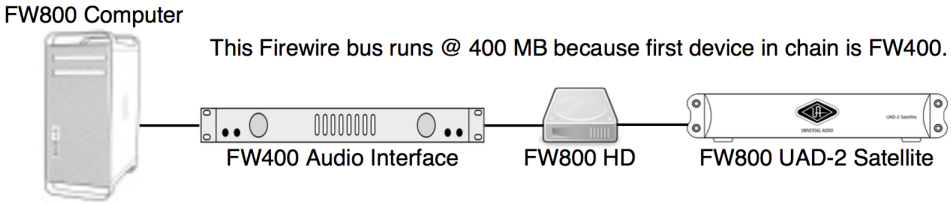
FireWire 800 devices are backwards-compatible and can be connected to a FireWire 400 bus (using a 6-pin to 9-pin FireWire cable or adapter). However in this scenario any 800 megabit-capable device on the bus (including UAD-2 Satellite FireWire) will operate at a maximum of 400 megabits because FireWire bandwidth cannot exceed the maximum bus speed of the host computer.




*FireWire 400 bus - all devices run at 400 megabits*

### FireWire 400 devices on a FireWire 800 bus

FireWire 400 devices can be connected to a FireWire 800 bus (using a 6-pin to 9-pin FireWire cable or adapter). In See FireWire 800 bus - all devices run at 400 megabits (not a recommended setup), all FireWire devices will operate at a maximum of 400 megabits because the FW800 device is located after the FW400 device in the daisy chain (the FW400 device forces all subsequent devices to run at FW400 speeds).



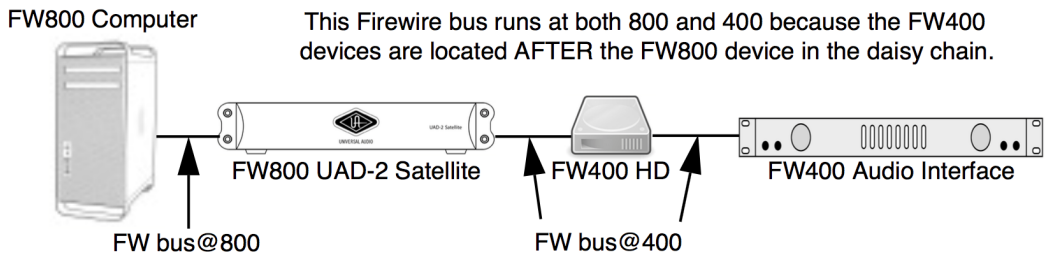

*FireWire 800 bus - all devices run at 400 megabits (NOT a recommended setup)*

It is possible to configure a FireWire bus to run at both FW400 and FW800 speeds simultaneously if the host computer bus is FW800, supporting maximum throughput for a mix of FW400+FW800 devices. This is accomplished by putting any/all FW400 devices AFTER any/all FW800 devices in a daisy chain. See FireWire 800 bus - devices running at 800 and 400 megabits (recommended setup).

### Daisy-chain FireWire 400 devices AFTER the FireWire 800 devices in a FW800 bus

If (and only if) FireWire 400 devices are attached to a FireWire 800 bus after the end of all FireWire 800 devices in a daisy-chain (See FireWire 800 bus - devices running at 800 and 400 megabits (recommended setup)), the FireWire 800 devices will operate at 800 megabits while the FireWire 400 device operates at 400 megabits.

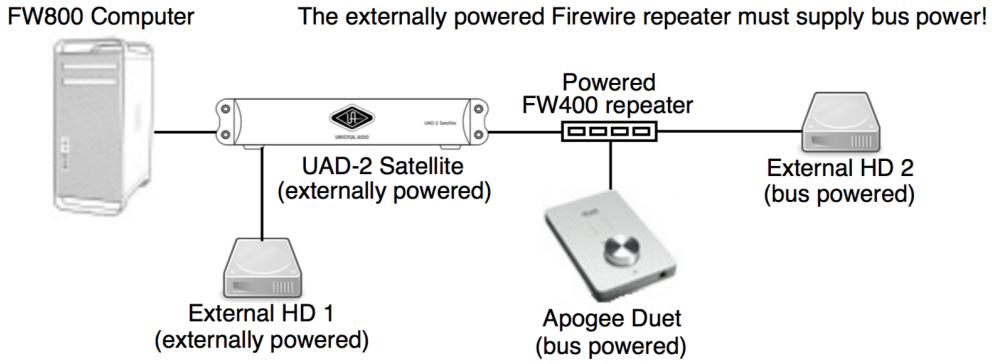
> ***Important:*** *This is the recommended configuration when UAD-2 Satellite FireWire is sharing a FireWire 800 bus with FireWire 400 devices.*




*FireWire 800 bus - devices running at 800 and 400 megabits (recommended setup)*

## Bus Powering Example

The diagram below illustrates the proper method of connecting bus powered FireWire devices with UAD-2 Satellite FireWire. An externally powered FireWire repeater or hub that is specifically designed to provide bus power to connected devices must be used in this case.




*Proper connection of bus powered FireWire devices*

This example uses the Apogee Duet, a popular audio interface with one FireWire port that can only be bus powered. If the Duet was connected directly to UAD-2 Satellite FireWire, it would not have power to operate because UAD-2 Satellite FireWire does not supply bus power. Therefore, the Duet must be connected to the externally powered FireWire repeater or hub that provides bus powering.

In this example, UAD-2 Satellite FireWire operates at FireWire 800 speeds because it is connected directly to a FireWire 800 computer. If external HD #1 is a FireWire 800 device and it is connected a FireWire 800 port on UAD-2 Satellite FireWire, it will also operate at FireWire 800 speeds. Because the FireWire repeater is a FireWire 400 device, all devices connected to it operate at FireWire 400 speeds. See Mixing FireWire Speeds for more about connecting devices of various speeds on the same FireWire bus.

## Caveats

The quality and compatibility of powered FireWire repeaters and hubs can vary widely. Just because a FireWire repeater or hub is externally powered doesn't necessarily mean it provides bus power or that it is compatible with UAD-2 Satellite FireWire and other FireWire devices. For the latest compatibility information and specific repeater and hub recommendations, visit:

- help.uaudio.com

# UAD-2 SOLO/Laptop

ExpressCard™ is a computer expansion slot typically used in notebook computers. Utilizing a 2.5 Gbps differential serial link, ExpressCard conveniently leaves slower USB and FireWire connections free for dongles, Audio I/O, and hard drives, while operating at full PCI Express bandwidth.

UAD-2 SOLO/Laptop is a compact ExpressCard version of the UAD-2 SOLO card. The UAD-2 SOLO/Laptop brings all the power of the UAD-2 to portable digital audio workstation users. The UAD-2 SOLO/Laptop enables large, professional mixes on notebook DAWs without the need for external cabling or a power supply.

Once installed and configured, UAD-2 SOLO/Laptop is functionally identical to its UAD-2 PCIe card counterparts.

***Note:*** *UAD-2 SOLO/Laptop is a discontinued product.*

## Documentation

UAD-2 SOLO/Laptop is a hardware system designed for use with UAD Powered Plug-Ins, which is the companion software package that includes the drivers, plug-ins, and software documentation.

Instructions in this chapter are specific to UAD-2 SOLO/Laptop only, and apply in addition to the other chapters.

## Technical Updates

Please visit the UAD support pages for the latest bulletins:

- help.uaudio.com

# UAD-2 SOLO/Laptop Features

- UAD-2 Solo in a self-contained, compact ExpressCard/34 package (can be used in ExpressCard/54 slots with included adapter)
- 44.1 - 192 kHz DSP Accelerator for notebook computers
- Ultra-fast (2.5 Gbps) ExpressCard/34 interface
- No external cables or power supply necessary
- Same potent DSP power as UAD-2 SOLO PCIe

## Package Contents

- The UAD-2 SOLO/Laptop package contains the following items:
- UAD-2 SOLO/Laptop ExpressCard
- ExpressCard/34 to ExpressCard/54 Adapter
- UAD DSP Family Quickstart Guide DVD
- UAD Powered Plug-Ins software CD-ROM
- Important Information Sheet
- Universal Audio Full Line Catalog

## UAD-2 SOLO/Laptop System Requirements

To use the UAD-2 SOLO/Laptop, your system must meet the System Requirements for UAD Powered Plug-Ins, in addition to the product-specific requirements listed below.

- UAD Powered Plug-Ins software v5.3.1 or higher
- Available ExpressCard/34 or ExpressCard/54 expansion slot
- UAD version 5.5.0 or higher is recommended for best performance

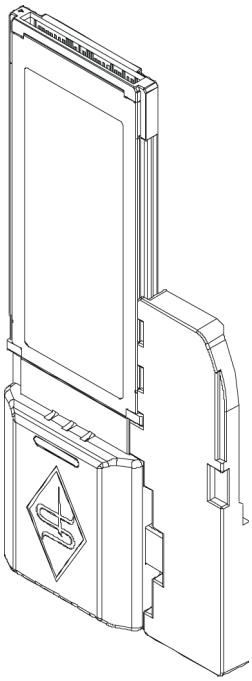
# Software Installation

### Install Software First

For optimum results, install the software before the hardware. Software installation for UAD-2 SOLO/Laptop is the exact same procedure as those for UAD-2 PCIe cards. Refer to UAD Installation for detailed procedures.

If the UAD software is already installed, the UAD Meter & Control Panel has a convenient Check for Updates button that links to the software download page.

## ExpressCard/34 to ExpressCard/54 Adapter



The UAD-2 SOLO/Laptop device uses the ExpressCard/34 form factor. When the device is installed in systems with the wider ExpressCard/54 slot, the enclosed ExpressCard/34 to ExpressCard/54 adapter should be used for the most reliable connection.

The adapter has two tabs on the bottom and one in the middle that snap into place on the SOLO/Laptop device.

**To install the ExpressCard/34 to ExpressCard/54 Adapter:**

1. Line up the bottom two tabs on the adapter with the corresponding holes on the SOLO/Laptop device. The wide end of the adapter aligns with the non-connector end of the ExpressCard.
2. Snap in the middle tab and the adapter will click into place. Done!

To remove the adapter, snap it off by holding the SOLO/Laptop device and gently bending the adapter down.

## Inserting the UAD-2 SOLO/Laptop Hardware

***Note:*** *The UAD-2 SOLO/Laptop device may be inserted before or after the system is booted.*

***Important:*** *Install the UAD software before inserting the device.*

**To install the UAD-2 SOLO/Laptop device:**

1. Ensure that UAD v5.3.1 (or higher) software is already installed and that the system was restarted after software installation.
2. Ensure that all audio plug-in host software is quit.
3. Slide the UAD-2 SOLO/Laptop ExpressCard fully into the host computer's ExpressCard/34 expansion slot (or ExpressCard/54 expansion slot with the adapter) until it is firmly seated.
4. The LED on the UAD-2 SOLO/Laptop will initially flash red/green, indicating the hardware is powered by the computer but the UAD drivers are not yet loaded. Within a few seconds of inserting the device (or after startup is complete, if inserted when powered down), the LED should glow steady green, indicating the UAD drivers are loaded.

**UAD-2 SOLO/Laptop is ready for use.**

# Removing the UAD-2 SOLO/Laptop Hardware

***Important:*** *The proper sequence must be followed before removing the UAD-2 SOLO/Laptop device from the computer to avoid system instability and/or data loss.*

***Note:*** *The UAD-2 SOLO/Laptop device may be removed when the system is active, as long as the steps below are followed.*

**To safely remove the UAD-2 SOLO/Laptop device:**

1. Close all DAW sessions and quit all UAD host software (audio applications and the UAD Meter & Control Panel).
2. Remove the UAD ExpressCard from the expansion slot.

***Note:*** *It is not necessary to power down the device in software using the "Power Off Card" function (Mac Menu Bar) or "Safely Remove Hardware" (Windows Task Bar) before removing the device.*

## SOLO/Laptop Authorization

After initial installation, the UAD-2 SOLO/Laptop must be registered and authorized (it can run in demo mode for 14 days without authorization). See Online Authorization for full explanation and procedures.

### Existing UAD Licenses

If you already have UAD device(s) in a desktop system, you can share those UAD licenses with UAD-2 SOLO/Laptop. This option is presented during initial device registration; please consider your options carefully when registering.

# Important SOLO/Laptop Notes

For maximum system stability and reduced possibility of data loss, please observe these operational requirements when operating UAD-2 SOLO/Laptop.

## All Systems

### Incompatible with Apollo Twin and Apollo Twin USB

The UAD-2 SOLO/Laptop cannot be used together with Apollo Twin in any configuration. This includes using any Mac computer that has an ExpressCard/34 slot and a Thunderbolt port and/or when using an external Thunderbolt-to-ExpressCard/34 adapter.

### System Sleep

***Important:*** *Close sessions and remove UAD-2 SOLO/Laptop before sleep.*

Before putting the computer into system sleep/hibernate/standby mode, quit all UAD host DAW software and remove the UAD-2 SOLO/Laptop device. Otherwise, loss of session data and/or unpredictable behavior could occur.

### "Hot" Device Removal

***Important:*** *Do not remove UAD-2 SOLO/Laptop while UAD plug-ins are loaded.*

Removing the device when it is active could cause the computer system to crash. Quit all UAD host software before removing the device.

### PCIe to ExpressCard Slot Adapters

Using UAD-2 SOLO/Latop with desktop computers via a PCIe-to-ExpressCard adapter is not tested and this configuration is not supported.

## WIndows Systems

### ExpressCard/54 Adapter

The UAD-2 SOLO/Laptop device uses the ExpressCard/34 form factor. When the device is installed in systems with the wider ExpressCard/54 slot, the enclosed ExpressCard/34 to ExpressCard/54 adapter should be used for the most reliable connection. See ExpressCard/34 to ExpressCard/54 Adapter for details.

### Red/Green LED

Occasionally the LED on the UAD-2 SOLO/Laptop device may flash red and green after booting is complete and/or when inserting the device after boot. If this occurs, simply remove then reinsert the device, which should cause the LED to remain steady green.

# Multiple UAD Devices

## Multi-Device Overview

Multiple UAD devices can be combined in a single host computer system for increased DSP capacity so more UAD plug-ins can be used at the same time. The UAD Hardware devices in a multi-device system can be mixed and/or matched in most combinations. However, specific device combinations are limited.

> ***Important:*** *Combining various UAD devices are subject to the compatibility detailed in this chapter.*

### Six UAD Devices Total

A maximum of six UAD hardware devices can be used concurrently with a single host computer system. The hardware devices (Apollo, PCIe, Satellite, SOLO/Laptop) are managed automatically by the UAD software and the UA Account & Store.

### Multi-Device Licensing

When a UAD device is added to a UAD System, the added device inherits the UAD plug-in licenses associated with the UA account the new device is being added to. Conversely, if the added device is licensed for plug-ins the original device does not contain, the original device inherits the added device's licenses.

If both devices share a plug-in license (if the same plug-in was licensed when the devices were in different systems), the duplicate license is added to a new UAD system in the UA account.

### Multiple UAD Systems

A single UA account can contain more than one UAD System, and each separate UAD system associated with the same account can contain up to six UAD devices. However, UAD plug-in licenses cannot be combined or shared between UAD systems even if they are associated with the same UA account.

> ***Important:*** *UAD plug-ins within Apollo's Console use DSP differently than when used within a DAW. To maintain the lowest possible input latency, UAD plug-ins used in a single Console channel strip must run on a single SHARC processor. Therefore, it is possible to get a "DSP load limit exceeded" message on a channel even though the UAD gauges may indicate there is enough DSP available.*

### Multi-Device Operation

When a multi-device system is properly configured, there are no significant operational differences from a single-device system. The DSP and memory loads of the individual UAD devices are automatically balanced across devices dynamically as UAD plug-ins are loaded and unloaded.

> ***Tip:*** *Individual UAD devices in a multi-device system can be disabled to support session compatibility with users that have fewer UAD devices. For details, see* *Disabling Devices**.*

# Multi-Device Constraints

There are specific constraints when UAD devices of different types (PCIe, Satellite, Apollo), or even the same type, are combined within a single system. These constraints are based on the specific connection protocol being used (FireWire, Thunderbolt, or USB 3).

> ***Important:*** *In addition to the multi-device constraints, each UAD device is also subject to the compatibility and system requirements of the individual device.*

In some cases, externally connected UAD devices that use a specific connection protocol may be combined with devices that use a different connection protocol. For example, UAD-2 PCIe cards and UAD-2 Satellite FireWire can be combined with all Apollo models regardless of the connection protocol.

Multi-device constraints are detailed in this section by device type and connection protocol, where applicable. For the latest updated compatibility information and additional details, visit help.uaudio.com.

> ***Important:*** *See the UA Knowledge Base for all of your particular UAD devices to get the latest details about inter-device compatibility with the devices you intend to combine.*

## UAD-2 PCIe Cards

- UAD-2 PCIe cards are compatible with Thunderbolt, USB 3, and FireWire systems.
- (Mac only) When a UAD-2 PCIe card(s) is used with UAD Thunderbolt devices, the card must be installed in a compatible Thunderbolt-to-PCIe expansion chassis (there are no Mac Thunderbolt computers with PCIe slots). For tested chassis models, visit help.uaudio.com.

## Apollo Twin USB

***USB 3 systems***

- Two or more Apollo Twin USB units cannot be combined.
- Apollo Twin USB cannot be combined with any other Apollo or Arrow interface.
- Apollo Twin USB can be combined with one UAD-2 Satellite USB.

***Thunderbolt systems***

- Apollo Twin USB can be combined with UAD-2 Satellite Thunderbolt.

***FireWire systems***

- Apollo Twin USB can be combined with a maximum of two UAD-2 Satellite FireWire units via a compatible PCIe to FireWire 800 adapter card. Notebook computers cannot be used with UAD-2 Satellite FireWire.

## UAD-2 Satellite FireWire

UAD-2 Satellite FireWire is compatible with Thunderbolt and USB 3 systems within the constraints listed below.

***FireWire systems***

- A maximum of two UAD FireWire devices of any type (UAD-2 Satellite FireWire and/or Apollo connected via FireWire) can be combined in any UAD system.
- With Windows computers, a compatible PCIe to FireWire 800 adapter card is required. Notebook computers cannot be used with UAD-2 Satellite FireWire (exception: Thunderbolt 3 notebooks with a qualified Thunderbolt to FireWire adapter).

***Thunderbolt systems***

- (Mac only) UAD-2 Satellite FireWire can be combined with Apollo Thunderbolt and/or UAD-2 Satellite Thunderbolt devices via the Apple Thunderbolt to FireWire Adapter.

***USB 3 systems***

- A maximum of two UAD-2 Satellite FireWire units can be combined with Apollo Twin USB and/or UAD-2 Satellite USB.

## UAD-2 Satellite Thunderbolt

***FireWire systems***

- UAD-2 Satellite Thunderbolt can be combined with Apollo rack models connected via FireWire.

***USB 3 systems***

- UAD-2 Satellite Thunderbolt can be combined with UAD-2 Satellite USB only on Windows 10 computers with Thunderbolt 3.
- UAD-2 Satellite Thunderbolt can be combined with Apollo Twin USB.

## UAD-2 Satellite USB

***USB 3 systems***

- A maximum of two UAD USB devices of any type (two UAD-2 Satellite USB ***or*** one UAD-2 Satellite USB plus Apollo Twin USB) can be combined.

***FireWire systems***

- UAD-2 Satellite USB can be combined with a maximum of two UAD FireWire devices of any type (UAD-2 Satellite FireWire and/or Apollo connected via FireWire).

***Thunderbolt systems***

- UAD-2 Satellite USB can be combined with Apollo Thunderbolt and/or UAD-2 Satellite Thunderbolt devices only on Windows 10 computers with Thunderbolt 3.

## **Apollo FireWire** *(all silver Apollo rack models connected via FireWire)*

***FireWire systems***

- A maximum of two UAD FireWire devices of any type (UAD-2 Satellite FireWire and/or Apollo connected via FireWire) can be combined.
- Combining two Apollo units via FireWire has specific connectivity and operating requirements. For details, see the Apollo FireWire Software Manual.
- With Windows computers, a compatible PCIe to FireWire 800 adapter card is required (notebook computers cannot be used with Apollo FireWire models).

***Thunderbolt systems***

- If the Thunderbolt Option Card is installed in the Apollo FireWire unit(s) and the unit(s) is connected via Thunderbolt, the unit operates the same as an Apollo Thunderbolt model and all Apollo Thunderbolt constraints apply.
- Apollo FireWire connections cannot be combined with Apollo Thunderbolt or Apollo Twin USB connections. All connected Apollo models must use the same connection protocol.

***USB 3 systems***

- Apollo FireWire cannot be combined with Apollo Twin USB.
- Apollo FireWire can be combined with UAD-2 Satellite USB on Windows PC systems only.

## **Apollo Thunderbolt** *(all Apollo models connected via Thunderbolt)*

***Thunderbolt systems***

- Up to four Apollo Thunderbolt interfaces can be combined, with a maximum of one desktop (Arrow, Apollo Twin, Apollo Twin MkII) unit per system.
- Combining two or more Apollo units via Thunderbolt has specific connectivity and operating requirements. For details, see the Apollo Thunderbolt Software Manual.

***FireWire systems***

- Apollo FireWire connections cannot be combined with Apollo Thunderbolt connections. All connected Apollo models must use the same connection protocol.
- (Mac) UAD-2 Satellite FireWire can be combined with Apollo Thunderbolt models via the Apple Thunderbolt to FireWire Adapter.
- (Windows) UAD-2 Satellite FireWire can be combined with Apollo Thunderbolt models via a compatible PCIe to FireWire 800 adapter card only. Thunderbolt to FireWire 800 adapters are not supported on Windows systems.

***USB 3 systems***

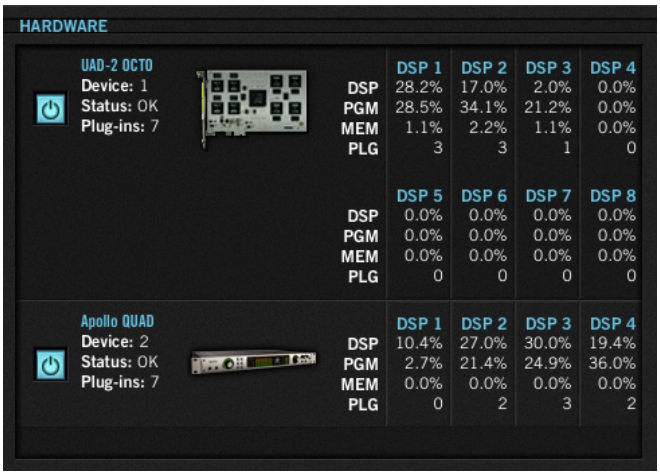
- Apollo/Arrow Thunderbolt devices cannot be combined with Apollo Twin USB.
- Apollo Thunderbolt devices can be combined with UAD-2 Satellite USB only on Windows 10 computers with Thunderbolt 3.

# Multi-Device DSP Loading

DSP loading in a multi-device system behaves the same as in a single UAD-2 DUO, QUAD, or OCTO system (these devices have multiple DSPs), and is managed automatically by the UAD software.

## Device Info Display

UAD DSP and memory resources used for each installed device, and the ability to enable/disable individual devices, is displayed in the System Information Panel.




*System Information Panel showing multiple devices*

## Disabling Devices

Individual UAD devices can be disabled using the Device Enabled button. This can be useful, for example, if creating a session on a system with multiple devices that will be transferred to a system with fewer devices.

Devices are disabled only while the UAD Meter & Control Panel application is open. When the UAD Meter & Control Panel is quit, disabled devices are re-enabled.

If a UAD plug-in is loaded on a device and that device is subsequently disabled, an error message is displayed. This occurs because a plug-in is assigned to a device when it is first instantiated, and it remains assigned to the same device until it is de-instantiated. To avoid errors, unload all plug-ins on the device before disabling the device.

> ***Note:*** *For optimum results, quit any applications using UAD plug-ins before disabling/enabling devices.*

### Host CPU Loads

Using more than one UAD device may cause a slight increase in host CPU loads, so disabling unused UAD devices may allow a bit more host CPU performance if needed. For example, running 15 UAD plug-ins on three devices at five plug-ins per device may require more host CPU than running the same 15 UAD plug-ins on one device.

If you want to minimize latency during tracking by using a smaller I/O buffer size (which will increase host CPU loading, even on non-UAD systems) and need a bit more host CPU, disabling one or more UAD devices during tracking may give the extra pinch of host CPU you need. The buffer size can then be increased and the UAD device(s) re-enabled for mixing.

# Power Requirements

UAD-2 device power requirements are listed in the table below. These figures are measurements of the actual power draw for these devices when running at full DSP load.

> ***Important:*** *If insufficient power is available to UAD devices, unpredictable behavior may result.*

**UAD Power Requirements by Device Type**

| UAD Device Type | Maximum Power Draw |
|---|---|
| UAD-2 SOLO (PCIe) | 5 Watts |
| UAD-2 DUO (PCIe) | 7 Watts |
| UAD-2 QUAD (PCIe) | 10 Watts |
| UAD-2 OCTO (PCIe) | 8 Watts |
| UAD-2 SOLO/Laptop | 3.5 Watts |
| UAD-2 Satellite FireWire (DUO)* | 4 Watts |
| UAD-2 Satellite FireWire (QUAD)* | 7 Watts |
| UAD-2 Satellite Thunderbolt & USB (QUAD)* | 7 Watts |
| UAD-2 Satellite Thunderbolt & USB (OCTO)* | 13 Watts |
| **Via included external power supply* | |

### UAD-2 PCIe

Each UAD-2 PCIe card draws power from its PCIe expansion slot. The total power draw of all installed UAD-2 cards must not exceed the power that can be adequately delivered by the host computer.

#### *Windows*

The PCIe specification provides for up to 25 Watts per device. However, some host systems don't provide this much power. When designing a custom computer DAW system, a common rule of thumb is to provide an extra 50% – 100% of headroom over the estimated maximum total power draw of all components in the system.

> ***Note:*** *Don't skimp on the power supply unit. When building a custom system, a high quality sufficiently-rated PSU is critical for system stability.*

### UAD-2 Satellite

UAD-2 Satellite FireWire and UAD-2 Satellite Thunderbolt cannot be bus powered. The included external power supply adapter is required for proper operation.

### Apollo

Power requirements for Apollo audio interfaces are listed in the Apollo Hardware Manual for each specific Apollo model.

# History

## Bill Putnam Sr.

The name M.T. "Bill" Putnam retains a unique status in the audio industry hall of fame-it's legendary even among those who are considered to be legends themselves. Called the "father of modern recording" by no less a luminary than Bruce Swedien, and a "visionary, responsible for motivating new thinking," by respected studio engineer Tom Hidley, Putnam was a true renaissance man in the world of sound and music.

As a record producer, engineer, inventor, writer, singer, technician, studio owner and businessman, he excelled at combining his talents in a creative way. A pioneer in recording studio acoustics, Putnam is acknowledged to be the first person to use artificial reverberation for commercial recordings. He also developed the first multi-band equalizers, and with his company Universal Audio, was responsible for the development of classic equipment like the 1176LN and UREI® Time Align monitors. He was involved in the early development of stereophonic recording, and founded studios in Chicago, Hollywood and San Francisco whose legacy still lives on today.

Early Interests Born in 1920 in Danville, Illinois, he was influenced by his father, a businessman who also put on radio programs, including a number one country music show. Young Putnam's interests surfaced early; in Boy Scouts he earned a merit badge in wireless, building a crystal set and a one-tube radio. By 15 he was taking the ham radio operator's exam and constructing his own equipment. In high school both his artistic and technical sides emerged full on. He worked repairing radios and renting out P.A. systems, while also singing on weekends with dance bands (for five dollars a night, which included the P.A. rental!), developing his interest in the music business, and realizing, as he has said, that "musicians were my favorite people."

Universal Recording Corp. Opens in Chicago Technical college followed, then work at radio stations, and radio engineering work for the Army during World War II. In 1946 Putnam started his own recording studio, Universal Recording Corp., in Evanston Illinois. His goals at the time, besides having a successful business, were the development of new recording techniques and specialized equipment for recording studios.

To that end the manufacturing company Universal Audio, which later became UREI®, was formed. Most of the equipment, including the console, for Universal Recording was built by Universal Audio. It wasn't long before the company relocated to Chicago, and it was there, in 1947, that Putnam recorded what is generally accepted to be the first "pop" record to use artificial reverberation. The founder of the group The Harmonicats, Jerry Murad, wanted to record using an echo chamber like he'd heard on effects in spooky radio mysteries. Putnam not only financed the record for a piece of the profits, he came up with the idea of using the tiled men's room at Universal Recording to create that echo. The Harmonicats song "Peg-O-My-Heart," became the first million seller smash with more than 1,400,000 copies sold, and the rest was, well, history.

Landmark Recordings Bruce Swedien, a teenager at the time, recalls that the sound on "Peg-O-My-Heart" was a seminal influence on him. "It was the first pop music recording where artificially controlled reverb was used for artistic effect," he explains. "Many of the recordings that were done prior to that had reverb, but it was part of the acoustics of the recording environment. Bill's contribution to the art was that he literally came up with the design of the way the echo or reverb sound is sent from the recording desk and the way it's returned to the mix so that it can be used in a variable amount.

"I was a youngster in Minneapolis in the early 50s when I first heard "Peg-O-My-Heart," Swedien continues, "And I can remember it like it was yesterday. It had an extraordinary effect on me. I didn't understand how the techniques were done, but I knew it had tremendous artistic impact."

Putnam's engineering credits grew quickly; at that time he worked with artists such as Patti Page, Vic Damone and Dinah Washington, and had a million selling record on his own Universal Records label with "Jealous Heart" by Al Morgan. A number of firsts occurred at Universal: the first use of tape repeat, the first vocal booth, the first multiple voice recording, the first 8-track recording trials and experiments with half speed disc mastering.

Universal was becoming famous, doing recordings for the Chicago based labels VeeJay, Mercury and Chess. It was a hub for rhythm and blues recordings including cuts for Muddy Waters, Willie Dixon, Bo Diddley, Little Walter, and Chuck Berry. Jazz artists recorded by Putnam included Stan Kenton, Tommy Dorsey, Count Basie, Dizzy Gillespie, Ella Fitzgerald, Sarah Vaughn, Nat King Cole, and the master, Duke Ellington. Putnam was also producing records for Decca, as well as writing songs and lyrics.

With all this success, Universal Recording went through several incarnations, with the dream version completed in 1955. At that time it was the most advanced and largest independent recording facility in the country attracting top producers like Nelson Riddle, Mitch Miller and Quincy Jones. It was also at that time that Bruce Swedien went to work for the studio.

"It's absolutely true," he states. "Bill Putnam was the father of recording as we know it today. The processes and designs which we take for granted -- the design of modern recording desks, the way components are laid out and the way they function, console design, cue sends, echo returns, multitrack switching -- they all originated in Bill's imagination."

Murray Allen, who purchased Chicago's Universal Recording from Putnam in 1972 elaborates. "Bill was a brilliant person, highly talented, with a great set of ears," he says. "He was Duke Ellington's favorite engineer, among many, and at one time he had more singles in the top 40 than anybody else. At the time, if you needed something in sound, he was the guy. He designed systems for the Sands and other big showrooms in Las Vegas; John Kennedy flew him out to arrange the sound for the broadcast of his inauguration. He did it all."

Moving West- United Recording Corp. With his Chicago studio so successful, Putnam's clients began urging him to open a facility on the West Coast, and finally he was convinced. In 1957 he sold his interest in Universal Recording, started a new company called United Recording Corp. and moved to Hollywood, taking over a building at 6050 Sunset and starting construction on new studios. Stereo was taking off, and Putnam was determined to incorporate as many technological innovations into the complex as possible.

In 1958, Studio B was completed along with two reverb chambers. The facility soon grew to three studios, a mixdown room, three mastering rooms including one with stereo, and a small manufacturing plant, all in 15,000 square feet. The studios were busy around the clock, with projects from Ricky Nelson to voice-overs for Hanna Barbera cartoons like the Flintstones.

In the early 60s Western Recorders, one block away at 6000 Sunset, was acquired and remodeled. The studio was renamed United Western, and business continued to grow. The talent behind and in front of the glass in those days reads like a who's who of classic recording: Bones Howe, Wally Heider and Lee Hirschberg were on staff.

During the 60s and 70s the studios were jumping 24 hours a day, seven days a week with artists like Frank Sinatra, Bing Crosby, Dean Martin, Sammy Davis, Nat King Cole, Johnny Mercer and Ray Charles. Charles classic "I Can't Stop Loving You" was recorded there, as well as Sinatra's "It Was A Very Good Year," and The Mamas and The Papas' "California Dreamin.'" The United Western studios, still in existence today as both Cello Studios and Allen Sides' Ocean Way Recording, are still considered to be some of the best sounding rooms ever built.

Universal Audio and UREI Meanwhile, upstairs in the 6050 Sunset building Universal Audio was thriving, and changing names. Now called UREI®, the company had acquired the patent rights to the LA-2A leveling amplifier, and also to National Intertel, which became the Teletronix division of UREI®. It was a unique situation; Putnam was always searching for better ways to do things and the combination of studios and manufacturing led readily to new product ideas. Out of this synergy came the 1176LN leveling amplifier, the 1108 FET preamp and, in conjunction with Ed Long, the 813 family of speakers.

Mentor and Innovator Allen Sides, currently owner of Ocean Way Recording, whose studios today encompass almost unchanged what was part of United Western, calls Putnam "my best friend." "When Bill started designing control rooms they were about eight feet by six feet and they were calling them booths," he says. "He built the first of what we now call conventional control rooms, with speakers above the windows. The whole control room concept we think of today was Bill's. The first console that had equalizers in every channel was Bill's, the feedback equalizer was Bill's creation, he built all his own limiters, his own consoles, he could tune his own pianos; he basically did the whole deal.

"Around 1962 he was doing half speed cutting, to get the high frequencies on the discs," recalls Sides. "He'd designed his own mastering systems, because you couldn't do it any other way. He was recording on custom made 30 IPS machines and he was doing all the super hi fi stuff, like the Mercury Living Presence series."

Sides, who is renowned for both his golden ears and his abilities in the 'art of the deal,' appreciated Putnam on many levels. "He was an exceptional businessman, with a tremendous understanding of things," he says. "If I had a complex deal and I couldn't quite figure out how to approach it, I'd sit down with Bill and he'd reason it out in the most amazing way.

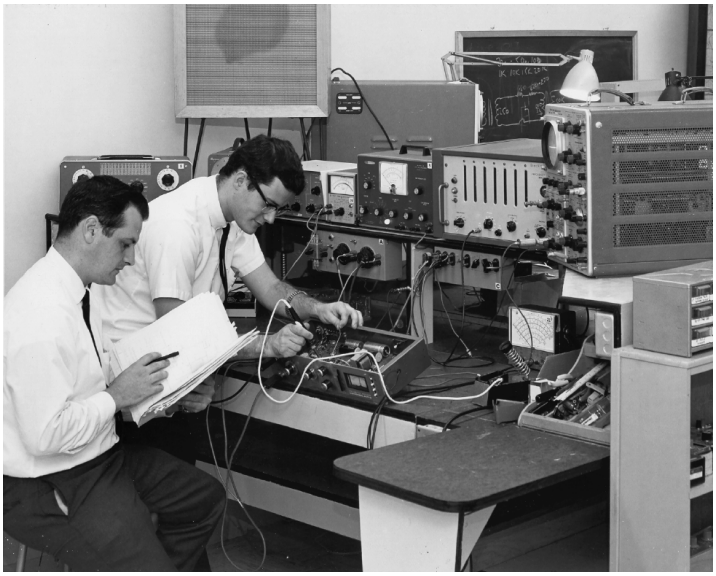
“There’s a great story about when stereo was coming on. The record companies really weren’t that interested -- everyone was cost conscious. They didn’t want to spend any more money and they were saying that stereo was a waste of time. But Bill could see the potential, and around 1959 he started recording everything with feeds to two control rooms, one for a stereo mix, one for a mono mix. In late ‘58, ‘59 and ‘60 everything Bill did was recorded in both stereo and mono.

“When stereo hit big around ‘61, none of the record companies had any catalog. But Bill did -- he had two and one half years worth. It was a lot of material -- understand at that period of time he was doing about $200,000 a month in the United Western Complex -- which is like a million dollars a month now.

“So the record companies came to Bill and said, ‘We’ll pay you for the tape.’ And he said, ‘No, you can’t pay for the tape, but if you repay me all the studio time that was used in the last two and a half years you have a deal.’ And they did. They wrote him a check for the whole thing.”

It’s recollections like these that bring home Putnam’s visionary and entrepreneurial style. An undisputed leader in music recording and in recording technology, with innumerable accolades to his credit, it’s his son, Bill Putnam, who perhaps sums it up best, in a way Bill Sr. himself might like. Bill Jr. says, simply, “He was a guy who built equipment to solve problems in the studio.”

“There’s a whole school of what I’d call Bill Putnam engineers out there,” concludes Murray Allen. “People like Allen Sides and Bruce Swedien who worked with him and who really understood what recording sound should be about. They’ve carried on his tradition, and I think we all agree that it’s very important for people to know what he contributed.”



## Classic Compressors

The LA-2A and 1176 compressor/limiters long ago achieved classic status. They're a given in almost any studio in the world -- relied upon daily by engineers whose styles range from rock to rap, classical to country and everything in between. With so many newer products on the market to choose from, it's worth looking at the reasons why these classics remain a necessary part of any professional studio's outboard equipment collection.

The basic concept of a compressor/limiter, is of course, relatively simple. It's a device in which the gain of a circuit is automatically adjusted using a predetermined ratio that acts in response to the input signal level. A compressor/limiter "rides gain" like a recording engineer does by hand with the fader of a console: it keeps the volume up during softer sections and brings it down when the signal gets louder. The dynamic processing that occurs at ratios below 10 or 12 to one is generally referred to as compression; above that it's known as limiting.

Modern day compressors offer a great degree of programmability and flexibility - older devices such as the 1176 and the LA-2A are more straightforward in their design. Perhaps it is this fact that has contributed to their appealing sound and the longevity of their popularity.

### LA-2A

The LA-2A leveling amplifier, a tube unit with hand wired components and three simple controls, was introduced in the mid-1960s. It utilized a system of electro-luminescent optical gain control that was quite revolutionary. Gain reduction was controlled by applying the audio voltage to a luminescent driver amplifier, with a second matched photoconductive cell used to control the metering section.

With its 0 to 40 dB of gain limiting, a balanced stereo interconnection, flat frequency response of 0.1 dB from 30-15,000 Hz and a low noise level (better than 70 dB below plus 10 dBm output), the LA-2A quickly became a studio standard. Originally patented by Jim Lawrence, it was produced by Teletronix in Pasadena, California, which became a division of Babcock Electronics Corporation in 1965. In 1967 Babcock's broadcast division was acquired by the legendary Bill Putnam's company, Studio Electronics Corporation shortly before he changed the company's name to UREI®. Three different versions of the LA-2A were produced under the auspices of these different companies before production was discontinued around 1969.

## 1176LN

It was Bill Putnam himself who, in 1966, was responsible for the initial design of the 1176. Its circuit was rooted in the 1108 preamplifier which was also designed by Putnam. As is evident from entries and schematics in his design notebook, he experimented with the recently developed Field Effect Transistor (F.E.T.) in various configurations to control the gain reduction in the circuit. He began using F.E.T.s as voltage variable resistors, in which the resistance between the drain and the source terminals is controlled by a voltage applied to the gate. His greatest challenge was to ensure that distortion was minimized by operating the F.E.T.s within a linear region of operation.

After several unsuccessful attempts at using F.E.T.s in gain reduction circuits, Putnam settled upon the straightforward approach of using the F.E.T. as the bottom leg in a voltage divider circuit, which is placed ahead of a preamp stage.

The output stage of the 1176 is a carefully crafted class A line level amplifier, designed to work with the (then) standard load of 600 ohms. The heart of this stage is the output transformer, whose design and performance is critical. Its primary function is to convert the unbalanced nature of the 1176 circuit to a balanced line output, and to provide the proper impedance matching to drive the line impedance of 600 ohms. These two jobs are accomplished by the primary and secondary windings whose turns' ratio defines the impedance ratio.

This transformer is critical due to the fact that it uses several additional sets of windings to provide feedback, which makes it an integral component in the operation of the output amplifier. Putnam spent a great deal of time perfecting the design of this tricky transformer and carefully qualified the few vendors capable of producing it.

The first major modification to the 1176 circuit was designed by Brad Plunkett in an effort to reduce noise--hence the birth of the 1176LN, whose LN stands for low noise. Numerous design improvements followed, resulting in at least 13 revisions of the 1176. Legend has it that the D and E blackface revisions sound the most "authentic".

The original Universal Audio 1176LN designed by Bill Putnam was a major breakthrough in limiter technology - the first true peak limiter with all transistor circuitry offering superior performance and a signature sound. Evolved from the popular Universal Audio 175 and 176 vacuum tube limiters, the 1176LN retained the proven qualities of these industry leaders, and set the standard for all limiters to follow.

# Pros Talk UA

Both the 1176 and the LA-2A remain in daily use. Busy engineers and producers' comments about both the 1176 and the LA-2A demonstrate their impact on the industry:

## Mike Shipley

Mike Shipley (Def Leppard, Shania Twain, Blondie): "I grew up using 1176s - in England they were the compressor of choice. They're especially good for vocals, which is also what I primarily use the LA-2 for. Most anything else I can do without, but I can't be without at least a pair of 1176s and an LA-2A. For example, on the Enrique Iglesias project I'm currently mixing, I'm using both an 1176 and an LA2 on his voice, which is not unusual for me.

"The 1176 absolutely adds a bright character to a sound, and you can set the attack so it's got a nice bite to it. I usually use them on four to one, with quite a lot of gain reduction. I like how variable the attack and release is; there's a sound on the attack and release which I don't think you can get with any other compressor. I listen for how it affects the vocal, and depending on the song I set the attack or release - faster attack if I want a bit more bite. My preference is for the black face model, the 4000 series - I think the top end is especially clean.

"The LA-2A is not as versatile, but it also has a sound that I really like. On certain voices you can crank it heavily, to where you almost want to put a piece of tape over the meter because there's so much gain reduction that you don't want anyone else to see it! I'm not particularly into overcompression, but when you use it that way there's something about it that just sounds really great. It does depend how it's set on the back, where there's a flat control that can be set to roll off certain frequencies when you reduce more gain. If you have a singer with an intensely piercing voice I find that compressor a good one, incredibly useful. It makes things warmer, especially when you crank it, and for thinner voices that can be just the ticket."

## Allen Sides

Allen Sides has always been known for having golden ears when it comes to the sound of equipment. The owner of Ocean Way Studios in Los Angeles and Nashville, he's also a speaker designer and engineer who is especially respected for his work with live musicians, including orchestra and string dates. Among his recent credits are work with the Goo Goo Dolls, Alanis Morissette and Green Day. Sides brings his different perspectives into play when he talks about using the 1176.

"The 1176 is standard equipment for my sessions. I just used them last night, as a matter of fact, on a project for singer Lisa Bonet that Rob Cavallo was producing at Ocean Way. We were recording drums and I used them on the left/right overheads as effects limiters. It's something I learned from (engineer) Don Landy, who worked with Randy Newman a lot. I mult the left and right overheads and bring them back on the console, then insert a pair of 1176s into a pair of the mults. Push in 20 to one and four to one simultaneously and it puts the unit into overdrive creating a very impressive sound."

## Murray Allen

Murray Allen is a veteran engineer and Director of Post Production for the San Francisco Bay Area company Electronic Arts. He has a fascination for gear both old and new and he explains why he thinks the 1176 has been so popular for so long. "It has a unique sound to it that people like, it's very easy to operate, and it does a great job. You have just two controls relative to the ratio of compression. You have input and output and you have attack and release. That's all there is. It's still my favorite limiter for Fender basses and string basses, because you don't know it's working. It doesn't change the way the bass sounds, it just keeps the level at a more controllable place.

## Ken Kessie

Mixer Ken Kessie (En Vogue, Tony! Toni! Tone!, Celine Dion) is known for being experimental. "Seems like everybody knows the basic tricks for the 1176," he says, "But here are two that might be lesser known. If you turn the attack knob fully counterclockwise until it clicks, the 1176 ceases to be a compressor and acts only as an amplifier. Sometimes this is the perfect sound for a vocal. And of course the unit can be overdriven, adding another flavor of distortion in case your plug-ins are maxed out!

"Then, for that hard-to-tame lead vocalist (the one that backs up from the mic to whisper and leans in for the big ending chorus), try an 1176 followed by a DBX 165. Use the 1176 as a compressor, and the DBX as a peak limiter...it's guaranteed to be smooth as silk."

## Jim Scott

Jim Scott shared a Grammy for Best Engineered Album for Tom Petty's Wildflowers. He's also known for his work with Red Hot Chili Peppers, Natalie Merchant and Wilco. "I use 1176s real conservatively and they still do amazing things," he comments. "I'm always on the four to one button, and the Dr. Pepper - you know, 10 o'clock, 2 o'clock, and it does everything I need.

"I always use them on vocals. I use them on room mics, on acoustic guitars- - sometimes in mixing I'll sneak a little on a snare drum or a separated channel of a snare drum. I'm not one of those guys who leaves it on everything, but I'd have to say I've used an1176 on everything at one time or another.

"They have an equalizer kind of effect, adding a coloration that's bright and clear. Not only do they give you a little more impact from the compression, they also sort of clear things up; maybe a little bottom end gets squeezed out or maybe they are just sort of excitingly solid state or whatever they are. The big thing for me is the clarity, and the improvement in the top end.

"The 1176 has that same kind of phenomenon, where, when you patch something through a Neve equalizer and you don't even engage the EQ, it sounds better. It's just a combination of the amps.

"I also use LA-2As all the time. I use them on bass, and it's one of the compressors I use for reverb. Often I'll send a bunch of things to one LA2A and bring it back into the console like a return - it's great for drums, great for kick drum especially.

"LA-2As warm things up. They're the opposite of the 1176--they EQ all the warmth and low mids and bass. When you put bass and drums in them they get fatter and bigger. And unless you hit them way hard and make the tubes sizzle they don't really distort. Of course, you can get them to sound like an AC30 if you want to, just turn them all the way up. They are very loud, powerful amplifiers.

"I've also used both the 1176 and the LA-2A for stereo buss compressors - you just have to be a little bit careful that your mixes don't go one sided. Tom's [Petty's] records have often been mixed through 1176s. I've also done that with LA-2As - they are of course, more inconsistent piece to piece than the 1176s, because of the tubes and the difference in fatigue of the tubes.

"My big mentors were Andy Johns and Lee DeCarlo and Ron Nevision because they were all Record Plant guys. I learned how to make a rock and roll record from them. Although over the years it's become my own thing, my style still tends to be that Record Plant style, U87s, 1176s, LA-2As, 47 F.E.T.s...it's what I like."

## Mike Clink

Producer/Engineer Mike Clink (Guns N' Roses, Sammy Hagar, Pushmonkey) also comes from the Record Plant school of recording. "I find that I actually use 1176s more now than I ever did," he comments. "I like them because they bring out the brightness and presence of a sound - they give it an energy. It seems like when I'm mixing I end up using an 1176 on the vocals every time. And if I want to compress a room sound I'll take a mono room mic, put an 1176 across it and push in all the buttons."

## Bruce Swedien

Bruce Swedien is a master engineer who needs no introduction. He also is a die-hard 1176 fan. "I have two silverface 1176LNs in my rack that Bill Putnam personally picked out for me," he says. "I remember sitting at Bill's place in the Channel Islands, and talking about the 1176 and how I wanted a pair. The next time we went over he'd picked this pair out and they were sitting in his garage waiting for me. I love them on vocals. All of the Michael Jackson and James Ingram vocals that everyone has heard so much were done with at least one of those 1176s. I couldn't part with them for anything. They sound fabulous."

# Thank You

We would like to thank you again for becoming a Universal Audio customer. We encourage you subscribe to our email lists in your account profile at www.uaudio.com so we can keep you informed about UA product developments and promotions.

The Universal Audio Team

# Notices

## Warranty

Universal Audio provides a limited warranty on all UA hardware products. To learn more, visit help.uaudio.com. The limited warranty gives you specific legal rights. You may also have other rights which vary by state or country.

## Repair Service

If you are having trouble with your UAD product, first check all system setups, connections, and operating instructions. If that doesn't help, contact our technical support team. To contact technical support or learn about repair service, visit help.uaudio.com.

## ⚠ Maintenance

- **CAUTION:** To reduce the risk of electric shock, do not open the unit.
- UAD products do not contain a fuse or any other user-replaceable parts. The unit is internally calibrated at the factory. No internal user adjustments are available.

# Important Safety Information

Before using this unit, be sure to carefully read the applicable items of these operating instructions and the safety suggestions. Afterwards, keep them handy for future reference. Take special care to follow the warnings indicated on the unit, as well as in the operating instructions.

1) Read these instructions.

2) Keep these instructions.

3) Heed all warnings.

4) Follow all instructions.

5) Do not use this apparatus near water.

6) Clean only with dry cloth.

7) Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.

8) Do not install near any heat source such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.

9) Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

10) Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.

11) Only use with attachments/accessories specified by the manufacturer.

12) Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use the caution when moving the cart/apparatus combination to avoid injury from tip-over.

13) Unplug this apparatus during lightning storms or when unused for long periods of time.

14) Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

## Description of symbols used

The lightning flash represented by the arrow symbol in an equilateral triangle is intended to alert users to the presence of high voltage within the unit that could cause an electrical shock hazard.

The exclamation mark in an equilateral triangle is intended to alert users to the existence of important instructions in the manual relating to the use and maintenance of the unit.

## Compliance

UAD-2 DSP Accelerator products (UAD-2 PCIe, UAD-2 Satellite FireWire, UAD-2 Satellite Thunderbolt 2, UAD-2 Satellite Thunderbolt 3) complied with the requirements of:

- Subpart B of Part 15 of FCC Rules for Class B digital device

**United States Class B Manual Statement**

NOTE: This equipment has been tested and found to comply with the limits for 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. However, there is no guarantee that interference will not occur in a particular installation. 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 and correct the interference by one or more of the following measures:

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

***Note:*** *Any modifications to the unit, unless expressly approved by Universal Audio, could void the User's authority to operate the equipment.*

**The product UAD-2 Satellite Thunderbolt 3 complied with the requirements of:**

- Subpart B of Part 15 of FCC Rules for Class B digital device
- Canada: Innovation, Science and Economic Development Canada Interference Causing Equipment Standard ICES-003, "Information Technology Equipment (ITE) – Limits and methods of measurement", Issue 6, dated January 2016 (class B)
- Japan: VCCI-CISOR 32:2016 "Technical Requirements" for multimedia equipment (class B)
- EN 55022:2010, "Information technology equipment – Radio disturbance characteristics – Limits and method of measurements (Class B)
- CISPR 22:2008, "Information technology equipment – Radio disturbance characteristics – Limits and method of measurement" (Class B)
- EN 55032:2012, "Electromagnetic compatibility of multimedia equipment – Emission Requirements"
- CISPR 32:2012, " Electromagnetic compatibility of multimedia equipment- Emissions requirements"
- EN 55024:2010 "Information technology equipment – Immunity characteristics. Limits and method of measurement"
- CISPR 24:2010 +A1:2015 "Information technology equipment – Immunity characteristics. Limits and method of measurement."
- TCVN 7189:2009 "Information technology equipment – Radio disturbance characteristics – Limits and method of measurements".
- Korea: KN32/KN35 2015 Multimedia Class B

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# Technical Support

## Universal Audio Knowledge Base

The UA Knowledge Base is your complete online technical resource for configuring, operating, troubleshooting, and repairing all UA products.

You can watch helpful support videos, search the Knowledge Base for answers, get updated technical information that may not be available elsewhere, and more.

**UA Knowledge Base**

## YouTube Support Channel

The Universal Audio Support Channel at youtube.com includes helpful support videos for setting up and using UA products.

**UA YouTube Support Channel**

## Universal Audio Community Forums

The unofficial UA discussion forums are a valuable resource for all Universal Audio product users. This website is independently owned and operated.

**www.uadforum.com**

## Contact Universal Audio Support

To contact the UA support team for technical or repair assistance, please visit:

**help.uaudio.com**

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