

apollo 16

HIGH-RESOLUTION INTERFACE
with Realtime UAD Processing



Apollo 16 mkII Hardware Manual

Manual Version 151006



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A Letter from Bill Putnam Jr.

Thank you for deciding to make an Apollo High-Resolution Interface part of your music making experience. We know that any new piece of gear requires an investment of time and money — and our goal is to make your investment pay off. The fact that we get to play a part in your creative process is what makes our efforts meaningful, and we thank you for this.

In many ways, the Apollo family of audio interface products represent the best examples of what Universal Audio has stood for over its long history; from UA's original founding in the 1950s by my father, through our current vision of delivering the best of both analog and digital audio technologies.

Starting with its high-quality analog I/O, Apollo's superior sonic performance serves as its foundation. This is just the beginning however, as Apollo products are the only audio interfaces that allow you to run UAD plug-ins in real time. Want to monitor yourself through a Neve® console channel strip while tracking bass through a classic Fairchild or LA-2A compressor? Or how about tracking vocals through a Studer® tape machine with some added Lexicon® reverb?* With our growing library of more than 90 UAD plug-ins, the choices are limitless.

At UA, we are dedicated to the idea that this powerful technology should ultimately serve the creative process — not be a barrier. These are the very ideals my father embodied as he invented audio equipment to solve problems in the studio. So as you begin to incorporate Apollo into your creative process, we hope that the excitement and pride that we've built into it comes through. We believe Apollo will earn its way into your creative workflow by providing stunning fidelity, great ease-of-use, and rock-solid reliability for years to come.

As always, please feel free to reach out to us via our website www.uaudio.com, and via our social media channels. We look forward to hearing from you, and thank you once again for choosing Universal Audio.

Sincerely,

A handwritten signature in black ink, appearing to be 'Bill Putnam Jr.', written in a cursive style.

Bill Putnam Jr.

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Table Of Contents

Tip: Click any section or page number to jump directly to that page.

- A Letter from Bill Putnam Jr. 2
- Introduction 4
 - What is Apollo 16 mkII? 4
 - Apollo 16 mkII Features 5
 - About Apollo 16 Documentation..... 7
 - Web Documentation 8
 - Technical Support..... 9
- Front Panel 10
- Rear Panel 15
- Installation & Configuration 19
- Interconnections..... 20
 - Installation Notes 20
 - Typical Setup 21
 - Apollo Expanded: Multi-Unit Wiring..... 22
- Specifications 23
- Hardware Block Diagram 26
- DB25 Wiring 27
- Troubleshooting 28
- Notices..... 29
 - Important Safety Information 29
 - Warranty 30
 - Maintenance 30
 - Repair Service 30

Introduction

What is Apollo 16 mkII?

Thunderbolt Audio Interface with QUAD Processing

The new Apollo 16 is an elegant update to UA's premium audio interface — delivering enhanced sound with the tone, feel, and flow of analog recording. Perfect for professional studios, this 18 x 20 Thunderbolt interface offers twice the analog connectivity of the Apollo 8/8p, making it ideal for pairing with mixing consoles and outboard processors.

Apollo 16 further distinguishes itself with Realtime UAD Processing, letting you record at near-zero latency through the full range of UAD plug-ins from Neve, Studer, Manley, Lexicon, and more.* Apollo Expanded software now allows cascading up to four Apollos and six total UAD-2 devices in a single system over Thunderbolt (Mac), so you can scale up your studio as your needs grow.

With its powerful onboard UAD-2 QUAD processing, genuine UA analog design, and next-generation A/D and D/A conversion, Apollo 16 puts class-leading audio performance in a sleek new package.

Next-Generation Apollo A/D and D/A Conversion

Apollo 16 improves upon the original Apollo's gold-standard audio quality with completely redesigned, class-leading digital conversion — giving you increased dynamic range and even lower THD. This results in breathtaking clarity, depth, and accuracy in your recordings, from tracking and overdubbing, to mixing and mastering.

Realtime UAD Plug-In Processing for Tracking, Mixing, and Mastering

While Apollo 16's "natural" sound is very open and transparent, it can quickly deliver a stunning range of classic analog tones and color via its Realtime UAD Processing. Available with generous UAD-2 QUAD processing onboard, Apollo's DSP Acceleration allows for recording through UAD Powered Plug-Ins — with as low as sub-2ms latency — letting you monitor and "print" audio using classic analog emulations from Ampex, Lexicon, Manley, Neve, Roland, SSL, Studer, and more.*

The Apollo 16's bundled "Realtime Analog Classics Plus" suite of UAD plug-ins gives you the UA 610-B Tube Preamp & EQ, Raw Distortion, Softube Amp Rooms, legacy LA-2A, 1176, and Fairchild compressors, Pultec EQs, and more, so you have a rack full of bonafide audio classics, right out of the box.

Using Apollo, UAD plug-ins are also available during mixing and mastering, putting UAD plug-ins (VST, RTAS, AU, AAX 64) at your disposal throughout the creative process.

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Apollo Expanded and Console 2.0

Thanks to Apollo Expanded software, users of Thunderbolt-equipped Apollo Twin, Apollo 16, Apollo 16p, and Apollo 16 audio interfaces can combine up to four Apollos and six total UAD-2 devices — adding I/O and DSP as their studio grows. Apollo Expanded also provides seamless integration with previous generation Apollos over Thunderbolt.

With Apollo 16's Console 2.0 application — a complete re-imagining of Apollo's original Console software — you can take advantage of over 25 user-requested features such as Channel Strip presets, Drag & Drop functionality, dynamically resizable windows, and more.

Apollo 16 mkII Features

Key Features

- Next-generation Apollo A/D and D/A conversion for professional music production
- Onboard UAD-2 QUAD Core DSP allows Realtime UAD Processing — record through plug-ins from Neve, Lexicon, Studer, Manley, Ampex, and more*
- 18 x 20 Thunderbolt 2 audio interface for Mac with powerful Console 2.0 software control
- 16 x 16 analog I/O via DB-25 connectors — ideal for pairing with mixing consoles, outboard preamps, etc.
- Cascade up to 4 Apollo interfaces and 6 UAD devices total over Thunderbolt
- Includes “Realtime Analog Classics Plus” UAD plug-in bundle with 610-B Tube Preamp & EQ, Raw Distortion, Softube Amp Rooms, legacy LA-2A, 1176, and Fairchild compressors, Pultec EQs, and more
- World class UA analog design, superior components, and premium build quality

Audio Interface

- Sample rates up to 192 kHz at 24-bit word length
- 16 x 18 simultaneous analog input/output channels:
 - 16 channels of analog-to-digital conversion via line inputs on dual DB25 connectors
 - 18 channels of digital-to-analog conversion:
 - 16 line outputs via dual DB25 connectors
 - Stereo monitor outputs via dual XLR connectors
- Adjustable reference levels for all analog I/O (+4 dBu or -10 dBV)
- Two channels of AES/EBU digital I/O with optional sample rate conversion on input
- Front panel pre-fader metering of analog signal input or output levels
- Two Thunderbolt 2 ports for daisy-chaining other Thunderbolt devices

Monitoring

- Independently-addressable stereo monitor outputs (in addition to 16 line outputs)
- Digitally-controlled analog monitor outputs maintains highest fidelity
- Front panel control of monitor levels and muting
- Front panel pre-fader metering of monitor bus levels
- Digital AES/EBU outputs can mirror the analog monitor outputs

UAD-2 QUAD Inside

- Four SHARC® DSP processors
- Realtime UAD Processing on all of Apollo 16's analog and AES/EBU inputs
- Same features and functionality as other UAD-2 products when used with DAW
- Can be combined with other UAD-2 devices for increased mixing DSP
- Complete UAD Powered Plug-Ins library is available online

Software

Console application:

- Analog-style control interface for realtime monitoring and tracking
- Enables Realtime UAD Processing with UAD plug-ins
- Remote control of Apollo 16 mkII features and functionality
- Virtual I/O for routing DAW tracks through Console

Console Recall plug-in:

- Saves Console configurations inside DAW sessions for easy recall
- Convenient access to Console's monitor controls via DAW plug-in
- VST, RTAS, AAX 64, and Audio Units plug-in formats

UAD Meter & Control Panel application:

- Configures global UAD settings and monitors system usage

Other

- Easy firmware updates
- 1U rack-mountable form factor
- One year warranty includes parts and labor

About Apollo 16 Documentation

Documentation for all Apollo components is extensive, so instructions are separated by areas of functionality. Each functional area has a separate manual file. An overview of each file, and how they are accessed, is provided in this section.

***Note:** Extensive [Web Documentation](#), including technical information not available in other publications, is also available.*

Apollo Manual Files

***Note:** All manual files are in PDF format. PDF files require a free PDF reader application such as Preview (included with Mac OS X) or Adobe Reader.*

Apollo Hardware Manuals

Each Apollo model has a unique hardware manual. The Apollo hardware manuals contain complete hardware-related details about one specific Apollo model. Included are detailed descriptions of all hardware features, controls, connectors, and specifications.

***Note:** Each hardware manual contains the unique Apollo model in the file name.*

Apollo Software Manual

The Apollo Software Manual is the companion guide to the Apollo hardware manuals. It contains detailed information about how to configure and control all Apollo software features for all Apollo models using the Console application, Console Settings window, and Console Recall plug-in. Refer to the Apollo Software Manual to learn how to operate the software tools and integrate Apollo's functionality into the DAW environment.

***Note:** All Apollo models have the same software manual.*

UAD System Manual

The UAD System Manual is the complete operation manual for Apollo's UAD-2 functionality and applies to the entire UAD-2 product family. It contains detailed information about installing and configuring UAD devices, the UAD Meter & Control Panel application, buying optional plug-ins at the UA online store, and more. It includes everything about UAD except Apollo-specific information and individual UAD plug-in descriptions.

UAD Plug-Ins Manual

The features and functionality of all individual UAD Powered Plug-Ins is detailed in the UAD Plug-Ins Manual. Refer to this document to learn about the operation, controls, and user interface of each UAD plug-in that is developed by Universal Audio.

Direct Developer Plug-Ins

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

Installed Documentation Location

All documentation is copied to the startup disk during software installation:

- Macintosh HD/Applications/Universal Audio

Accessing Installed Documentation

Any of these methods can be used to access installed documentation:

- Navigate the file system within the Mac OS X Finder
- Choose “Documentation” from the Help menu within the Console application
- Click the “View Documentation” button in the Help panel within the UAD Meter & Control Panel application
- Manuals are also available online: www.uaudio.com/support/manuals.html

Web Documentation

UA Support Videos

Many informational videos are available online to help you get started with Apollo:

- www.uaudio.com/support/thunderbolt

Apollo Support Page

The latest technical information for Apollo is posted on the Universal Audio website. The Apollo Thunderbolt support page contains updated, late-breaking information that is not available in other publications. Please visit this page for the latest news:

- www.uaudio.com/support/thunderbolt

UAD Users Forum

The unofficial UAD users forum, for the exchange of tips and information, is online at:

- www.uadforum.com

Technical Support

Universal Audio provides free customer support to all registered Apollo 16 users. Support specialists are available to assist you via email and telephone during normal business hours, which are from 9 AM to 5 PM, Monday through Friday, Pacific Standard Time.

Email Support

To request online support via email, click the link below for a direct link to the help ticket form:

- <https://www.uaudio.com/my/support/create/>

Alternately, visit the main support page at www.uaudio.com/support, then click the blue “Submit Support Ticket” button on the right side of the web page to create a help ticket.

A blue rectangular button with white text that reads "SUBMIT SUPPORT TICKET »".

Telephone Support

USA toll-free: +1-877-698-2834 (1-877-MY-UAUDIO)

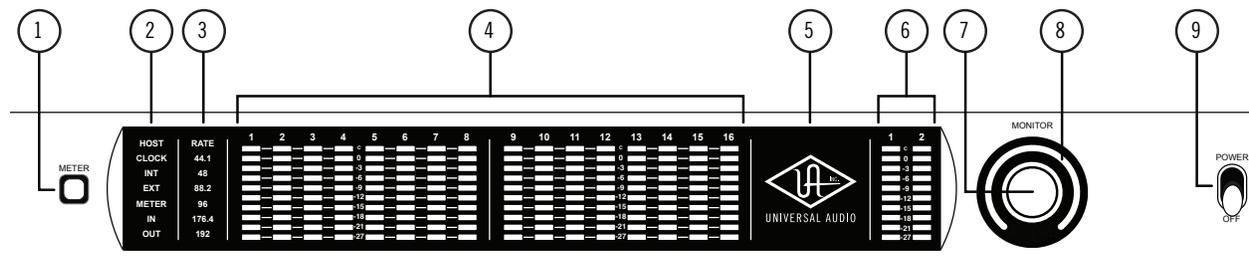
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Front Panel

This section describes the features and functionality of all controls and visual elements on the Apollo 16 front panel. Note that most front panel functions can be controlled remotely with the Console software application.



Apollo 16 mkII front panel elements

(1) Meter

This switch determines whether the Channel Level Meters (#4) are displaying input levels or output levels. Pressing the switch toggles the state of the channel meters and the Meter Indicators (#2).

(2) Status Indicators

These indicators display the status of the host computer connection, clock, and signal meters, as described below.

Host

The HOST indicator displays the status of the Thunderbolt connection to the host computer system. The possible states are:

Lit – The system is connected to the host computer and operating normally.

Unlit – The unit is starting up or it is not recognized by the host computer. Verify software installation and Thunderbolt connections.

Red – System error. Please contact technical support if the issue persists.

Clock

Apollo 16's clock source and status are displayed with these indicators. Either internal (INT) or external (EXT) is displayed. The clock source is set within the Console application; see the [Apollo Software Manual](#) for details.

Internal Clock

When Apollo 16 is set to internal clock, the INT indicator is illuminated white.

External Clock

Apollo 16 can use an external clock from the Word Clock or AES/EBU inputs. The EXT indicator has two possible states:

White – When set to external clock and a valid clock signal is detected at the specified port, the EXT indicator is illuminated white and Apollo 16 is synchronized to the external clock source.

Red – When set to external clock and a valid clock signal is NOT detected at the specified port, the EXT indicator is illuminated red and the internal clock remains active instead. In this situation, if/when the specified external clock becomes available, Apollo 16 switches back to the external clock, and the EXT indicator is illuminated and white.

Important: *When set to use any external clock source, Apollo 16's sample rate must be manually set to match the sample rate of the external clock.*

Meter

The METER indicator reflects the state of the Channel Meters (#4). The I/O state of the Channel Meters is changed with the METER switch (#1).

IN – When IN is illuminated, the channel meters display analog input signal levels.

OUT – When OUT is illuminated, the channel meters display analog output signals levels.

(3) Sample Rate Indicators

These indicators display the current sample rate setting for A/D and D/A conversion. The sample rate is set within the Console application or the host DAW; see the Apollo Software Manual for details.

(4) Channel Level Meters

The 10-segment LED channel meters display the input or output signal peak levels for analog channels 1 – 16. Input or output metering is selected with the METER switch (#1), and the input/output state is shown by the METER indicators (#2).

The dB values of the meter LEDs are indicated between the meters for channels 4 & 5 and 12 & 13. "0" indicates a level of 0 dBFS. When digital clipping occurs (when 0 dBFS is exceeded), the red "C" (clip) LED illuminates.

Input Channel Meters

When set to INPUT, the channel meters display the signal peak input levels for analog channels 1 – 16 at the input to the A/D converters. Avoid digital clipping at the channel's A/D converter by reducing the output level of the device connected to the channel's input.

Output Channel Meters

When set to OUTPUT, the channel meters display the signal peak output levels for analog channels 1 – 16 at the output of the D/A converters.

(5) Power Indicator (UA Logo)

The Universal Audio logo illuminates when the external power supply is properly connected to an AC outlet and the power input on the rear of the unit, and the POWER switch (#9) is in the up position.

(6) Monitor Output Level Meters

The 10-segment LED meters display the signal peak output levels of the rear panel Left & Right Monitor outputs at the output of the D/A converters. These meters are before the Monitor Level control (pre-fader) and reflect the D/A converter levels regardless of the current Monitor Level and Headphone Level knob settings.

The dB values of the monitor meter LEDs are indicated between the left and right channel meters. When digital clipping occurs, the red "C" (clip) LED illuminates.

If the monitor output level clips, reduce the monitor output level within the DAW and/or reduce the output level of individual channels feeding the monitor output bus within the Console application.

(7) Monitor Level and Mute Knob

This rotary encoder serves two functions. Rotating the knob adjusts the monitor output level, and pressing the knob mutes the monitor outputs.

Monitor Level

Rotating the knob clockwise increases the signal level at the Left & Right Monitor Outputs on the rear panel. If ALT monitor outputs are configured and active, this knob controls the signal level at the ALT monitor's line outputs.

Although this is a digital control, the Left & Right Monitor Outputs volume is attenuated in the analog domain, after D/A conversion (digitally-controlled analog volume). This method provides the utmost monitoring fidelity, in contrast to digital volume controls that reduce levels by truncating the digital word length (aka "dropping bits").

Monitor Output Gain Bypass

By default, monitor output levels are continuously variable. However, the monitor outputs can be set to completely bypass the monitor level circuitry and operate at a fixed reference level. This feature is set with the MONITOR OUTPUT GAIN menu in the Hardware panel within the Console Settings window.

***Tip:** This feature enables the highest possible fidelity with the monitor outputs when level control is not needed (for example, when connecting the monitor outputs to an external monitor controller).*

When the MONITOR OUTPUT GAIN menu is set to BYPASS in Console Settings:

- The Monitor Level Indicator ring (#8) is solid green
- When the Monitor knob (#7) is rotated, the ring flashes to indicate that no level adjustment is occurring
- ALT monitoring features are unavailable
- Signals at the Monitor Outputs (#1) are output at line level (without attenuation)

Monitor Mute

Pressing the Monitor knob toggles the mute state of the signals at the Left & Right Monitor Outputs on the rear panel. If ALT monitoring is configured in the Hardware panel within the Console Settings window (when ALT COUNT is a non-zero value), the ALT monitor outputs are also muted by this control.

When the monitor outputs are muted, the Monitor Level Indicator ring (#8) is red.

(8) Monitor Level & Monitor State Indicator

***Tip:** The Monitor Level and Monitor State indications are reflected in the Monitor column within the Console application.*

Monitor Output Level Indicator

The relative signal level at the rear panel monitor outputs (and ALT monitor outputs, if configured) is indicated by the illuminated ring surrounding the Monitor Level knob.

This indicator is after the Monitor Level control (post fader). It indicates relative levels only and is not calibrated to specific dB values.

Monitor State Indicator

The color of the indicator ring indicates the current state of the monitor outputs:

Green (variable) – The main monitor outputs are active with variable level control

Green (fixed at maximum) – MONITOR OUTPUT GAIN is set to BYPASS in the Hardware panel within the Console Settings window

Red – The main monitor outputs (and ALT monitor outputs, if configured) are muted

Orange – The ALT 1 monitor outputs are active*

Amber – The ALT 2 monitor outputs are active*

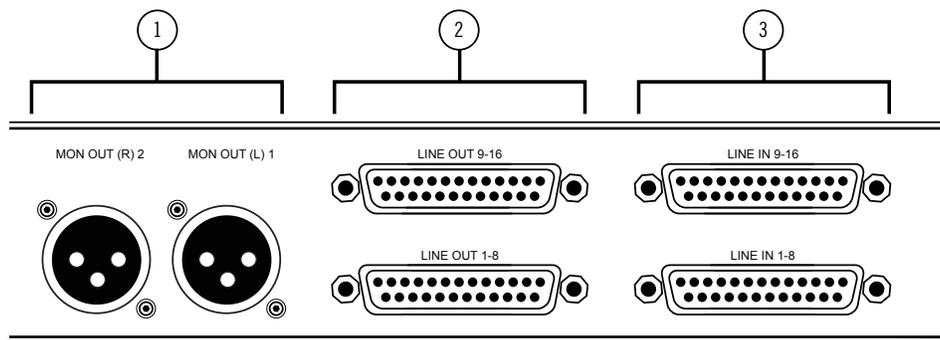
Flashing – The monitor DIM and/or MONO functions are active*

**Note: These functions are controlled within the Console application.*

(9) Power Switch

This switch applies power to Apollo 16. When the unit is powered on, the Universal Audio logo (#5) is illuminated. The external power supply must be properly connected for this switch to function.

Rear Panel



Apollo 16 rear panel – analog I/O

(1) Left & Right Monitor Outputs

These balanced XLR jacks are line-level analog outputs typically used for connection to a stereo loudspeaker monitoring system. The signal levels at these outputs are controlled with the Monitor Level & Mute knob (#7).

Note: If *MONITOR OUTPUT GAIN* is set to *BYPASS* in the Hardware panel within the Console Settings window, monitor signals are output at line level (without attenuation) and the Monitor Level knob does not control the Monitor or ALT output levels. See [Monitor Output Gain Bypass](#) for related information.

The Monitor Outputs can be configured to use an operating level of 14 dBu or 20 dBu. This option is set in the Hardware panel within the Console Settings window.

The Monitor Outputs are completely independent from the 16 line outputs (except when ALT monitoring is configured). By default, the “1–2” or “L–R” or “Main” outputs from a DAW are routed to these outputs (these labels vary within each particular DAW).

NOTE: The AES/ABU outputs (#8) can be configured to mirror the Monitor Outputs, for routing the stereo monitor signal to the stereo AES/EBU input of other devices. This feature is set with the *DIGITAL MIRROR* menu in the Hardware panel within the Console Settings window.

(2) Line Outputs 1 – 16

The 16 analog outputs are accessed via dual female DB25 connectors. Each DB25 jack carries eight balanced line-level channel outputs using standardized Tascam wiring.

Note: See [DB25 Wiring](#) for connector pinouts.

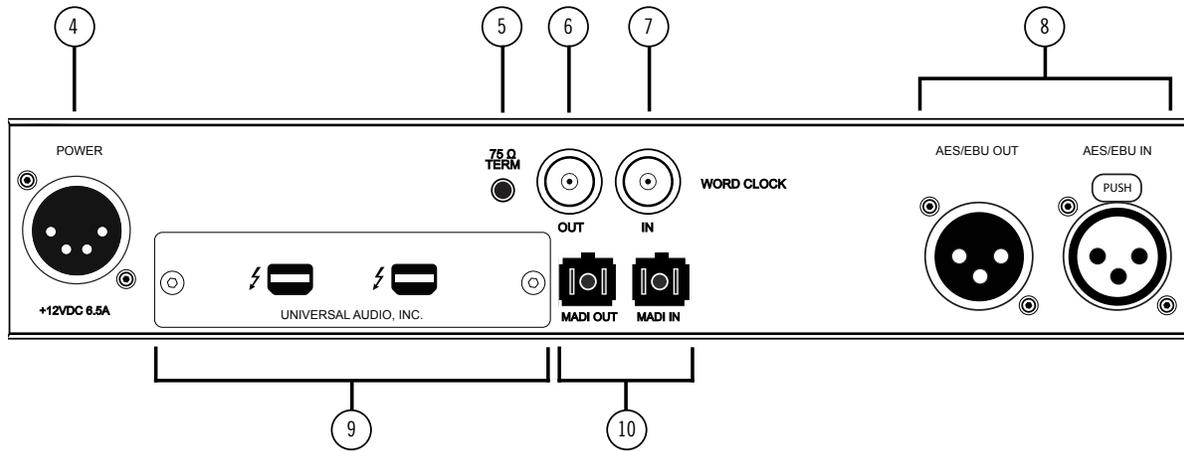
The Line Outputs can be configured in adjacent pairs to use -10 dBV or +4 dBu reference levels. This function is configured in the Hardware panel within the Console Settings window.

(3) Line Inputs 1 – 16

The 16 analog inputs are accessed via dual female DB25 connectors. Each DB25 jack carries eight balanced line-level channel inputs using standardized Tascam pinouts.

Note: See [DB25 Wiring](#) for connector pinouts.

The Line Inputs can be configured to use -10 dBV or +4 dBu reference levels. This function is configured within the input channel strips in the Console application.



Apollo 16 rear panel – digital I/O

(4) Power Input

The included external power supply connects to this 4-pin locking XLR jack. Apollo 16 requires 12 volts DC power and draws approximately 55 Watts.

To eliminate risk of circuit damage, connect only the factory-supplied power supply. Use the Power switch on the front panel to power the unit on and off.

Important: Do not disconnect the power supply while Apollo 16 is in use, and confirm the Power switch is in the “off” position before connecting or disconnecting the power supply.

(5) 75 Ohm Word Clock Termination Switch

This switch provides internal 75-ohm word clock input signal termination when required. Word clock termination is active when the switch is engaged (depressed).

Apollo 16’s termination switch should only be engaged when Apollo 16 is set to sync to external word clock and it is the last device at the receiving end of a word clock cable. For example, if Apollo 16 is the last “slave” unit at the end of a clock chain (when Apollo 16’s word clock out port is not used), termination should be active.

(6) Word Clock Out

This BNC connector transmits a standard (1x) word clock when Apollo 16 is set to use its internal clock. The clock rate sent by this port matches the current system sample rate, as specified within the Console application.

When Apollo 16 is set to use external word clock as its clock, Apollo 16 is a word clock slave. If the incoming external word clock is within $\pm 0.5\%$ of a supported sample rate (44.1 kHz, 48 kHz, 88.2 kHz, 96 kHz, 176.4 kHz, 192 kHz), Word Clock Out will mirror Word Clock In with a slight phase delay (about 40ns).

Because Apollo 16's word clock output is not a true mirror of the word clock input, word clock out should not be used to daisy chain the word clock if Apollo 16 is in the middle of the word clock chain. The correct method to connect Apollo 16 in the middle of a word clock chain is to use a T-connector at Apollo 16's word clock input and leave Apollo 16's word clock output unconnected (the Termination switch should not be engaged in this scenario).

(7) Word Clock In

Apollo 16's internal clock can be synchronized (slaved) to an external master word clock. This is accomplished by setting Apollo 16's clock source to Word Clock within the Console application, connecting the external word clock's BNC connector to Apollo 16's word clock input, and setting the external device to transmit word clock. If Apollo 16 is the last device in the clock chain, the Termination switch (#10) should be engaged.

Important: *Apollo 16's sample rate must be manually set to match the incoming clock's sample rate.*

Note: *Apollo 16 can be synchronized to an external "1x" clock signal only. Super-clock, overclocking, and subclocking are not supported.*

(8) AES/EBU Ports

The AES/EBU ports provide two channels of digital I/O with resolutions up to 192 kHz via XLR connectors. For optimum results, use only high-quality 110-ohm XLR cables specifically designed for AES/EBU digital audio.

SR Convert

Sample rate conversion can be enabled on the AES/EBU input. This function is set in the AES/EBU input channel strip within the Console application. When sample rate conversion is enabled and the sample rate of the incoming AES/EBU signal does not match the sample rate specified in the Console application, the AES/EBU signal is converted to match Apollo 16's sample rate.

Note: *When Apollo 16 is set to use AES/EBU as the master clock source, sample rate conversion is inactive.*

Mirror Monitor Outputs

The AES/EBU output can be configured to mirror the Monitor outputs, for routing the stereo Monitor signal to the stereo AES/EBU input of other devices. This function is configured in the Hardware panel within the Console Settings window.

(9) Thunderbolt Ports

Apollo 16 has two Thunderbolt 2 ports. One port is used to connect Apollo 16 to a Thunderbolt 1 or Thunderbolt 2 port on the host computer. Thunderbolt peripheral devices may be serially connected (daisy-chained) to the second Thunderbolt port.

When Apollo 16 is properly communicating with the host computer via Thunderbolt, the HOST indicator (#2) illuminates.

Thunderbolt Bus Power

Per the Thunderbolt specification, bus power is supplied to downstream (daisy-chained) Thunderbolt peripheral devices. Apollo 16 must be powered on for the daisy-chained peripheral to receive Thunderbolt bus power.

(11) MADI Optical Ports

The MADI I/O ports are unused and do not transmit or receive audio.

Installation & Configuration

Note: Items on this page are detailed in the [Apollo Software Manual](#). See [About Apollo 16 Documentation](#) for related information.

System Requirements

All system requirements must be met for Apollo 16 to operate properly. Before proceeding with installation, see the system requirements in the Apollo Software Manual.

Software Installation

The software must be installed to use the hardware and UAD plug-ins. The UAD Powered Plug-Ins software installer contains the Apollo 8 software and drivers.

To obtain the latest UAD Powered Plug-Ins software installer, visit:

- www.uaudio.com/downloads

Registration and Authorization

Apollo 16 must be registered and authorized at my.uaudio.com to unlock UAD plug-ins that are bundled with the product. Registration and authorization via a web browser is triggered automatically by the UAD software the first time the device is connected.

System Configuration

Complete details about setting up the Apollo 16 system, including how to integrate with a DAW and related information, are included in the Apollo Software Manual.

Console Application

The included Console application is the software interface for the Apollo 16 hardware. Console controls Apollo 16 and its digital mixing, monitoring, and Realtime UAD Processing features. Console is also used to configure Apollo 16's I/O settings such as sample rate, clock source, and reference levels.

For complete details about how to operate Console, refer to the Apollo Software Manual.

Apollo Expanded

When more I/O and/or DSP is needed, up to four Apollo interfaces can be cascaded together via Thunderbolt in a multiple-unit configuration. For complete details about multi-unit cascading, refer to the Apollo Software Manual.

UA Support Videos

Many informational videos are available online to help you get started with Apollo 16:

- www.uaudio.com/support/thunderbolt

Interconnections

Installation Notes

- Apollo 16 may get hot during normal operation if it doesn't receive adequate airflow circulation around its chassis vents. For optimum results when mounting Apollo 16 in a rack, leaving at least one empty rack space above the unit to allow adequate airflow for cooling is recommended.
- As with any sound system, the following steps are recommended to avoid audio spikes in your speakers:
 - Apply power to the speakers last, after all other devices (including Apollo 16) are powered on.
 - Turn off the speakers first, before all other devices (including Apollo 16) are powered off.

About Thunderbolt Connections

- Apollo 16 must be connected directly to a Thunderbolt port on the host computer. The Apple Thunderbolt to FireWire Adapter cannot be used for the host computer connection.
- Connect only one Apollo 16 Thunderbolt port to the host computer. Thunderbolt is a bidirectional protocol.
- Apollo 16 cannot be bus powered via Thunderbolt. The included external power supply must be used.
- Thunderbolt bus power is supplied to downstream (daisy-chained) peripheral devices. Apollo 16 must be powered on for the daisy-chained peripheral to receive Thunderbolt bus power.

About Thunderbolt 2

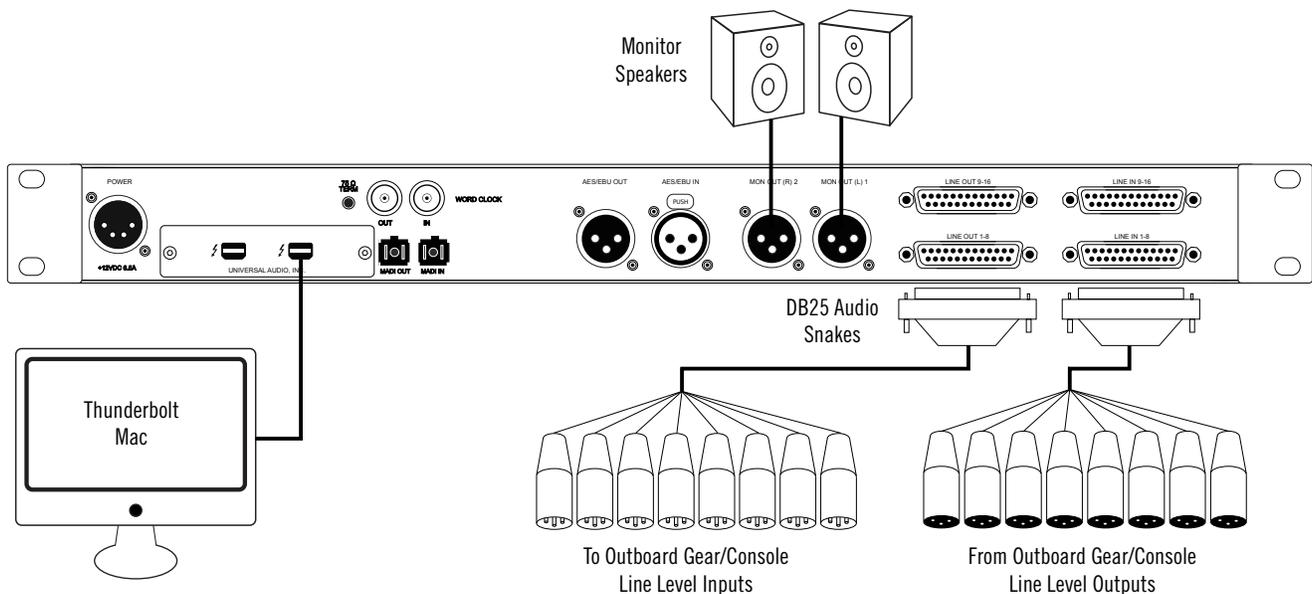
- Apollo 16 is a Thunderbolt 2 device. Thunderbolt 2 technology is designed for backwards compatibility with Thunderbolt 1.
- Apollo 16 can be connected to Mac computers and other devices that have Thunderbolt 1 ports or Thunderbolt 2 ports.

Typical Setup

This diagram illustrates a basic Apollo 16 system. In this example, only analog devices are connected; digital I/O is not used.

Key points for this example:

- Either Thunderbolt port can be used for the host computer connection
- The Monitor outputs are connected to powered monitors (or an amp+speaker system)
- DB25 audio snakes are used for connections to line-level audio gear
- Although this example uses XLR connectors, DB25 snakes that terminate to XLR, TRS, or other DB25 connectors can be used

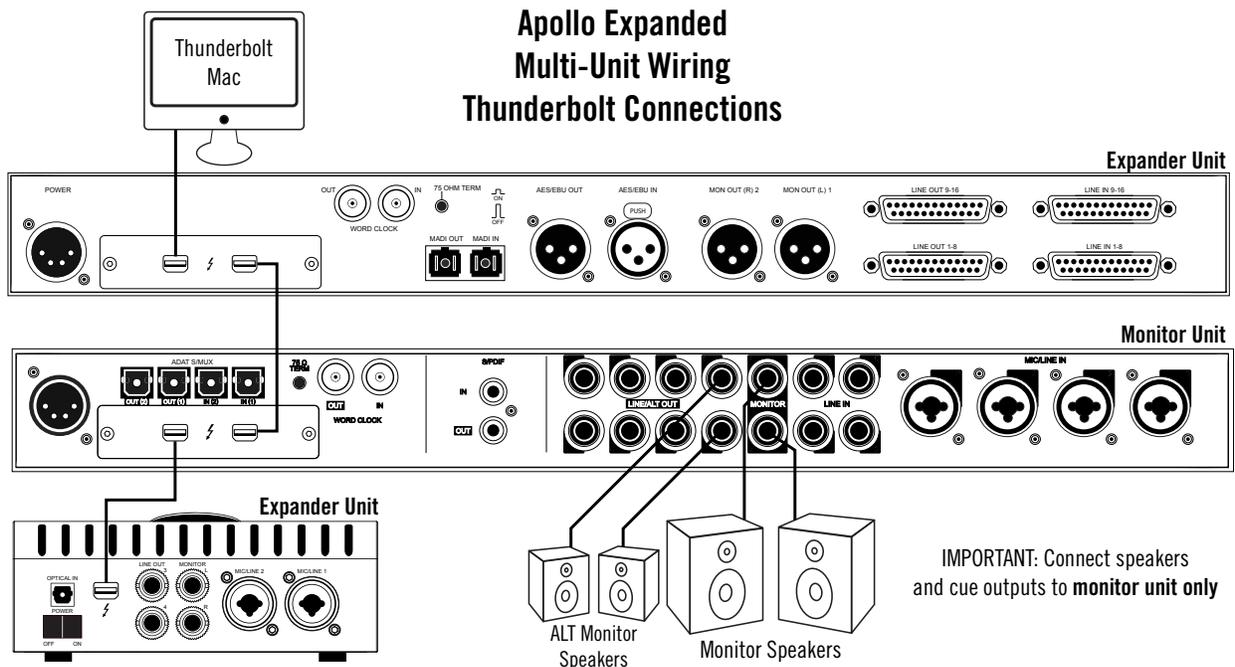


Typical Apollo 16 connections

Apollo Expanded: Multi-Unit Wiring

The diagram below illustrates how to interconnect multiple Apollo units and the host computer via Thunderbolt.

Important: For complete details about system operation when multi-unit cascading, see the [Apollo Software Manual](#).



Cables Required

- One Thunderbolt cable for each Apollo unit

Note: All Apollo rack units require Thunderbolt connections.

Apollo Expanded Wiring Notes

- A single Thunderbolt cable is required for all device interconnections. Connect one cable to the host computer and one cable between Apollo units.
- Thunderbolt 1 or 2 ports may be mixed and used for any/all connections.
- The computer and all Apollo units must be connected to the same Thunderbolt bus.
- The Apollo device ordering and the Thunderbolt ports used (second port on Apollo vs. second port on computer, placement in daisy chain, etc) is not important.
- In the wiring example diagram, the lower Apollo 8 is designated as the monitor (master) unit. Connect speakers (including ALT speakers) to the monitor unit only.
- Do not connect more than one Thunderbolt cable between the same two devices (the Thunderbolt protocol is bidirectional).
- Do not interconnect any Word Clock, FireWire, ADAT, or MADI ports between any Apollo units.

Specifications

All specifications are typical performance unless otherwise noted, tested under the following conditions: 48 kHz internal sample rate, 24-bit sample depth, 20 kHz measurement bandwidth, with balanced output.

SYSTEM	
<i>I/O Complement</i>	
Analog Line Inputs	16
Analog Line Outputs	16 (not including monitor outputs)
Analog Monitor Outputs	Two (one stereo pair)
AES/EBU	One stereo input, one stereo output
Thunderbolt 2 ports	Two (Thunderbolt 1 compatible)
Word Clock	One input, one output
<i>A/D – D/A Conversion</i>	
Supported Sample Rates (kHz)	44.1, 48, 88.2, 96, 176.4, 192
Bit Depth Per Sample	24
Simultaneous A/D conversion	16 channels
Simultaneous D/A conversion	18 channels
Analog Round-Trip Latency	1.1 milliseconds @ 96 kHz sample rate
Analog Round-Trip Latency with up to four serial UAD plug-ins via Console application	1.1 milliseconds @ 96 kHz sample rate

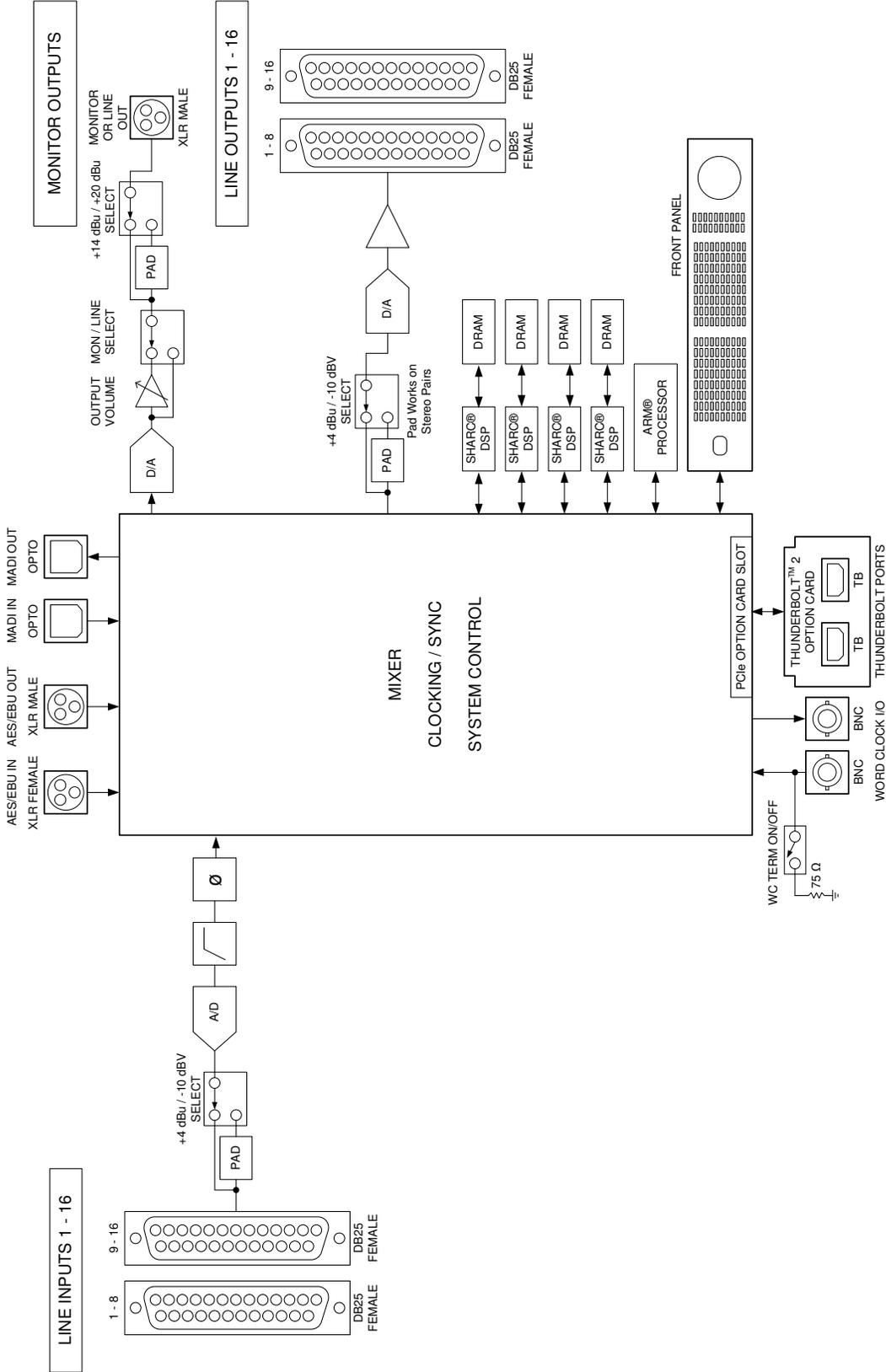
(continued)

ANALOG I/O	
Frequency Response	20 Hz – 20 kHz, ± 0.1 dB
Line Inputs 1 – 16	
Connector Type	Two Female DB25, Tascam wiring
Dynamic Range	119 dB (A-weighting)
Signal-to-Noise Ratio	119 dB (A-weighting)
Total Harmonic Distortion + Noise	-112.5 dB @ -1 dBFS
Common-Mode Rejection Ratio (CMRR)	75 dB (10' cable)
Input Impedance	10K Ohms
Input Reference Level	+4 dBu (fixed)
Maximum Input Level (+4 dBu setting)	+20.2 dBu
Maximum Input Level (-10 dBV setting)	+6.2 dBV (unbalanced)
Line Outputs 1 – 16	
Connector Type	Two Female DB25, Tascam wiring
Dynamic Range	126 dB (A-weighting)
Signal-to-Noise Ratio	126 dB (A-weighting)
Total Harmonic Distortion + Noise	-118 dBFS @ -1 dBFS
Stereo Level Balance	± 0.01 dB
Output Impedance	100 Ohms
Maximum Output Level	+20.2 dBu
Monitor Outputs 1 – 2	
Connector Type	XLR Male
Dynamic Range	124 dB (A-weighting)
Signal-to-Noise Ratio	123 dB (A-weighting)
Total Harmonic Distortion + Noise	-117 dBFS
Stereo Level Balance	± 0.01 dB
Output Impedance	100 Ohms
Maximum Output Level	+20.2 dBu

(continued)

DIGITAL I/O	
AES/EBU	
Connector Type	XLR
Format	IEC 60958 Type I
MADI (Not Implemented)	
Connector Type	Dual Optical SC-Plug (ISO/IEC 9314-3)
Word Clock	
Connector Type	BNC
Lock Range	±0.5% of any supported sample rate
Word Clock Input Termination	75 Ohms, switchable
Synchronization Sources	
Internal, Word Clock, AES/EBU	
Electrical	
Power Supply	External AC to DC Power Supply, Level V compliant
AC Input Connector Type	IEC Male
AC Requirements	100V – 240V AC, 50 – 60 Hz
DC Connector Type	XLR 4-Pin Locking Male (Neutrik P/N NC4MDM3-H)
DC Requirements	12 VDC, ±5%
Maximum Power Consumption	50 Watts
Mechanical	
Dimensions	
Width	19"
Height	1.75" (1U rack space)
Depth, Chassis Only	12.125"
Depth, Including Knob & Jack Protrusions	13.5"
Shipping Box (Width x Depth x Height)	24" x 17" x 8"
Weight	
Shipping Weight (with box & accessories)	18 pounds
Weight (bare unit)	8.7 pounds
Package Contents	
Apollo 16 mkII Audio Interface Unit	
External Power Supply	
AC Power Cable (IEC)	
Getting Started URL Card	
Set of (4) Rack-Mount Screws	

Hardware Block Diagram



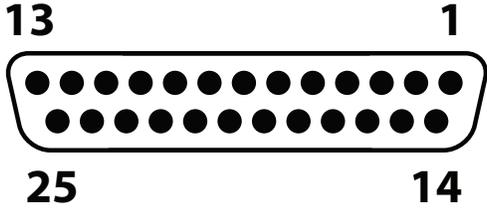
Apollo 16 mkII Hardware Block Diagram v02

DB25 Wiring

Apollo 16’s analog I/O is accessed via 25-pin D-sub female connectors. Each DB25 jack carries eight balanced line-level audio channels on the standardized Tascam pinouts also used with Digidesign and Avid products.

DB25 Connector Pin Numbers

The pin numbers for female DB25 connectors are shown in the diagram below. When facing the Apollo 16 rear panel, pin 1 is the upper rightmost pin.



Apollo 16 female DB25 pin numbers

DB25 Connector Wiring

The signals carried on the female DB25 connector pins are listed in the table below. Two channels are listed for each pin. The first is for the connector carrying channels 1 – 8; the second is for the connector carrying channels 9 – 16. Pinouts are identical for inputs and outputs.

APOLLO 16 DB25 CONNECTOR PINOUTS								
Pin	Channels	Signal	Pin	Channels	Signal	Pin	Channels	Signal
1	8, 16	Hot	9	3, 11	Cold	17	6, 14	Cold
2	8, 16	Ground	10	2, 10	Hot	18	5, 13	Hot
3	7, 15	Cold	11	2, 10	Ground	19	5, 13	Ground
4	6, 14	Hot	12	1, 9	Cold	20	4, 12	Cold
5	6, 14	Ground	13	–	No Connect	21	3, 11	Hot
6	5, 13	Cold	14	8, 16	Cold	22	3, 11	Ground
7	4, 12	Hot	15	7, 15	Hot	23	2, 10	Cold
8	4, 12	Ground	16	7, 15	Ground	24	1, 9	Hot
						25	1, 9	Ground

Troubleshooting

If Apollo 16 isn't behaving as expected, here are some common troubleshooting items to confirm. If you are still experiencing issues after performing these checks, contact [Technical Support](#).

SYMPTOM	ITEMS TO CHECK
Unit won't power on	<ul style="list-style-type: none"> • Confirm power supply connections at power supply input and back of unit • Confirm Power switch is not in "OFF" position • Confirm AC power is available at wall socket by plugging in a different device
No monitor output	<ul style="list-style-type: none"> • Confirm connections, power, and volume of monitoring system • Confirm monitor knob is turned up • Confirm monitor outputs are not muted (press monitor knob) • Confirm monitor LEDs are active (check signal flows)
Monitor output level range is too loud or too quiet	<ul style="list-style-type: none"> • Monitor output reference levels can be switched between 14 dBu and 20 dBu in the Hardware panel within the Console Settings window
Input levels are too high or too low	<ul style="list-style-type: none"> • Input reference levels can be switched between -10 dBV and +4 dBu in the input channel strips of the Console application
Can't fine tune input signal levels	<ul style="list-style-type: none"> • Signal levels for all inputs, including digital inputs, are adjusted at the device connected to those inputs
Output levels are too high or too low	<ul style="list-style-type: none"> • Output reference levels for adjacent pairs can be switched between -10 dBV and +4 dBu in the Hardware panel within the Console Settings window
Audio glitches and/or dropouts during playback	<ul style="list-style-type: none"> • Increase audio I/O buffer size setting in DAW • Confirm clocking setups (check cable connections and confirm all device clocks are synchronized to one master clock device)
Undesirable echo/phasing	<ul style="list-style-type: none"> • Confirm input monitoring is not enabled in both Console and DAW
HOST indicator is unlit or red	<ul style="list-style-type: none"> • Confirm Thunderbolt connections • Confirm UAD Powered Plug-Ins software is installed • Power Apollo off then power on Apollo, and restart computer • Reinstall Apollo 16 software • Try a different Thunderbolt cable
Faint static and/or white noise is heard when nothing is plugged in	<ul style="list-style-type: none"> • Mute unused inputs • Some UAD plug-ins model the noise characteristics of the original equipment; defeat the noise model in the UAD plug-in interface, or mute the channel containing the plug-in to temporarily mute the noise
Various LEDs inside the unit are blinking	<ul style="list-style-type: none"> • This is normal operational behavior that can be safely ignored
Apollo 16 is behaving unexpectedly	<ul style="list-style-type: none"> • As a last resort, perform a hardware reset on the unit by following these steps: <ol style="list-style-type: none"> 1. Power off Apollo 16 2. Press and hold the METER and MONITOR controls 3. Power on Apollo 16 while continuing to hold both controls 4. After all front panel LEDs flash rapidly (after several seconds), release the controls.

Notices

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.

Water and Moisture – Do not use the unit near any source of water or in excessively moist environments.

Object and Liquid Entry – Care should be taken so that objects do not fall, and liquids are not spilled, into the enclosure through openings.

Ventilation – When installing the unit in a rack or any other location, be sure there is adequate ventilation. Improper ventilation will cause overheating, and can damage the unit.

Heat – The unit should be situated away from heat sources, or other equipment that produces excessive heat.

Power Sources – The unit should be connected to a power supply only of the type described in the operating instructions, or as marked on the unit.

Power Cord Protection – AC power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them. Pay particular attention to cords at plugs, convenience receptacles, and the point where they exit from the unit. Never take hold of the plug or cord if your hand is wet. Always grasp the plug body when connecting or disconnecting it.

Cleaning – Follow these general rules when cleaning the outside of the unit:

- a. Turn the power off and unplug the unit
- b. Gently wipe with a clean lint-free cloth
- c. Do not use aerosol sprays, solvents, or abrasives

Nonuse Periods – The AC power supply cord of the unit should be unplugged from the AC outlet when left unused for a long period of time.

Damage Requiring Service – The unit should be serviced by a qualified service personnel when:

- a. The AC power supply unit has been damaged; or
- b. Objects have fallen or liquid has been spilled into the unit; or
- c. The unit has been exposed to rain; or
- d. The unit does not operate normally or exhibits a marked change in performance; or
- e. The unit has been dropped, or the enclosure damaged.

Servicing – The user should not attempt to service the unit beyond that described in the operating instructions. All other servicing should be referred to qualified service personnel.

Warranty

Universal Audio provides a warranty on all hardware products. To learn more, please visit www.uaudio.com/support/warranty.html or contact [Technical Support](#). This limited warranty gives you specific legal rights. You may also have other rights which vary by state or country.

Maintenance

Apollo 16 does not contain a fuse or any other user-replaceable parts. The unit is internally calibrated at the factory. No internal user adjustments are available.

Repair Service

If you are having trouble with Apollo 16, the first check all system setups, connections, software installations, and the [Troubleshooting](#) chart. If that doesn't help, contact [Technical Support](#). To learn more about repair service, please visit:

- www.uaudio.com/support/rma-faq.html

FCC Compliance

Federal Communications Commission United States Class A Manual Statement

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

Any modifications to the unit, unless expressly approved by Universal Audio, could void the User's authority to operate the equipment.

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