Monolith[™] by Monoprice

Desktop Headphone Amplifier and DAC

with THX[®] AAA Technology (Dual AKM 4493 DACs & Dual AAA-788 Modules)



P/N 24459

User's Manual

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SAFETY WARNINGS AND GUIDELINES

Please read this entire manual before using this device, paying extra attention to these safety warnings and guidelines. Please keep this manual in a safe place for future reference.

- This device is intended for indoor use only.
- Do not expose this device to water or moisture of any kind. Do not place drinks or other containers with moisture on or near the device. If moisture does get in or on the device, immediately unplug it from the power outlet and allow it to fully dry before reapplying power.
- Do not touch the device, the power cord, or any other connected cables with wet hands.
- Do not subject the product to extreme force, shock, or fluctuations in temperature or humidity.
- Do not expose this device to excessively high temperatures. Do not place it in, on, or near heat sources, such as a fireplace, stove, radiator, etc. Do not leave it in direct sunlight.
- Do not place or install this device in an area where it can be exposed to excessive amounts of dust, humidity, oil, smoke, or combustible vapors.
- Prior to operation, check the unit and power cord for physical damage. Do not use if physical damage has occurred.
- Before plugging the unit into a power outlet, ensure that the outlet provides the same type and level of power required by the device.

- Unplug this device from the power source when not in use.
- Take care to prevent damage to the power cord. Do not allow it to become crimped, pinched, walked on, or become tangled with other cords. Ensure that the power cord does not present a tripping hazard.
- Never unplug the unit by pulling on the power cord. Always grasp the connector head or adapter body.
- Ensure that power is turned off and disconnected before making any electrical connections.
- Clean using a soft, dry cloth only. Do not use chemical cleaners, solvents, or detergents. For stubborn deposits, moisten the cloth with warm water.
- This device has no user serviceable parts. Do not attempt to open, service, or modify this device.

FEATURES

- Dual AK4493 32-bit Digital-to-Analog Converter with support for up to 768kHz PCM and 22.4MHz DSD (Direct Stream Digital[™])
- Dual THX[®] AAA-788 amplifier modules with bipolar class-AB output stages, each providing 1590mW of power into 16Ω at less than -140dB THD
- Dirac Sensaround[®] provides a natural soundscape where listeners can enjoy their favorite media in a way that seems to spread instruments, voices, and objects out into space, enveloping the listener exactly as the artist intended
- Six layer printed circuit board for the highest level of analog and digital signal integrity
- Highest quality NDK low noise, low jitter oscillators
- Input options include USB, optical, coaxial, and AES/EBU digital audio inputs, as well as two channels of balanced and unbalanced analog audio inputs
- Outputs include unbalanced line level as well as balanced and unbalanced headphone outputs

CUSTOMER SERVICE

The Monoprice Customer Service department is dedicated to ensuring that your ordering, purchasing, and delivery experience is second to none. If you have any problem with your order, please give us an opportunity to make it right. You can contact a Monoprice Customer Service representative through the Live Chat link on our website **www.monoprice.com** during normal business hours (Mon-Fri: 5am-7pm PT, Sat-Sun: 9am-6pm PT) or via email at **support@monoprice.com**

PACKAGE CONTENTS

Please take an inventory of the package contents to ensure you have all the items listed below. If anything is missing or damaged, please contact Monoprice Customer Service for a replacement.

1x Desktop headphone amplifier

1x AC power adapter

1x User's manual

PRODUCT OVERVIEW

Front Panel



5. Value Knob

6. Enter Button

- 2. 1/4" (6.35mm) Unbalanced Headphone Output
- 3. Display
- Rear Panel
- DIGITAL INPUTS ANALOG ANALOC ANALOG ANALOG
 - 1. DC Power Jack
 - 2. USB Digital Audio Input
 - 3. Optical Digital Audio Input
 - 4. Coaxial Digital Audio Input
 - 5. AES/EBU Digital Audio Input

- 6. XLR Balanced Right Channel Analog Audio Input
- 7. RCA Unbalanced Analog Audio Input
- 8. RCA Pre-Amplifier Output
- 9. XLR Balanced Left Channel Analog Audio Input

Display



• The **Home Screen** of the display shows the volume level in decibels (dB), the selected input, and any selected options.

CONNECTIONS

Headphones Output

You can connect your headphones to the Desktop Headphone Amplifier using either an unbalanced 1/4" (6.35mm) TRS plug or a balanced 4-pin XLR connector.



- If your headphones use a 3.5mm TRS plug, you will need a 3.5mm-to-1/4" adapter, such as the Monoprice 7139 adapter (available separately).
- You cannot use both the balanced XLR and unbalanced 1/4" TRS headphone outputs at the same time. When a 1/4" plug is inserted, the XLR output is muted.
- When plugging or unplugging a 1/4" connector, completely insert or remove the connector in one quick, smooth motion. Because of the design of the plug, keeping the connector plugged in half way can cause a short circuit between the left and right output channels and may trigger the short circuit protection feature.

• The following diagram shows the pin-out assignment for the Balanced Headphone Output. Note that pins 2 (L-) and 4 (R-) are individual signal pins and cannot be tied together as the ground pin for a single-ended headphone. Never use any adapter to connect the Balanced Headphone Output to a single-ended headphone.



Pre-Amplifier Output

You can use the Desktop Headphone Amplifier as a pre-amplifier or a digital-to-analog converter (DAC) by connecting the **RCA Pre-Amplifier Output** to a power amplifier or a pair of powered speakers.



Analog RCA Input

You can connect an analog audio source device to the **RCA Unbalanced Analog Audio Input** using a pair of RCA cables (available separately).



Digital Coaxial Input

You can connect a digital audio source device to the **Coaxial Digital Audio Input** using a digital coaxial cable (available separately). The digital signal will be converted by the internal DAC and sent to the analog headphone and pre-amplifier outputs.



• The **Coaxial Digital Audio Input** accepts only stereo PCM signals. Compressed and multichannel audio signals, such as Dolby Digital[™] and DTS[®], are not supported.

Digital Optical Input

You can connect a digital audio source device to the **Optical Digital Audio Input** using an optical cable, also known as a TOSLINK[®] cable (available separately). The digital signal will be converted by the internal DAC and sent to the analog headphone and pre-amplifier outputs.



• The **Optical Digital Audio Input** accepts only stereo PCM signals. Compressed and multichannel audio signals, such as Dolby Digital[™] and DTS[®], are not supported.

Digital AES/EBU Input

You can connect a device with an AES/EBU digital output to the **AES/EBU Digital Audio Input** using a 3-pin XLR cable (available separately). The digital signal will be converted by the internal DAC and sent to the analog headphone and pre-amplifier outputs.



• The AES/EBU Digital Audio Input accepts only stereo PCM signals. Compressed and multichannel audio signals, such as Dolby Digital[™] and DTS[®], are not supported.

Digital USB Input

You can connect your computer to the Desktop Headphone Amplifier using a USB cable with a Type-A connector on one end and a Type-B on the other end (available separately). This allows you to use your computer and any playback software you prefer to output audio through the amp. The digital signal will be converted by the internal DAC and sent to the analog headphone and pre-amplifier outputs.



OPERATION

Power

- Momentarily press the Menu Button on the front panel to turn the amplifier on.
 While the unit is powering on, the Monolith[™] logo will display. When it is fully ready for use, the Home Screen will display.
- Press and hold the Menu Button until the display scrolls off to turn the amplifier off.

Source Selection

Perform the following steps to select the input source.

- 1. Press and hold the Enter Button for several seconds.
- 2. Use the Value Knob to scroll backwards or forwards through the input options. The **Display** will show the currently selected input.

- Once the desired input is displayed, momentarily press the Enter Button to select it. The Display will revert back to the Home Screen with the selected input visible in the top right corner.
 - The input options include RCA LINE, XLR LINE, OPTICAL, COAXIAL, AES3, and USB.

Volume Control

- Rotate the Value Knob clockwise or counterclockwise to increase or decrease the volume level. The Display will change to show volume level in decibels (dB).
- The numeric dB value indicates the amount of attenuation (negative) or gain (positive) applied to the original input signal.
- The volume level range is -80.0dB to +16.0dB, in 0.5dB increments.
- It is normal for the displayed dB value to change by several dB when adjusting the volume at the low end of the range due to the logarithmic nature of the volume control curve.

MAIN MENU

- Momentarily press the Menu Button to display the Main Menu.
- Rotate the Value Knob clockwise or counterclockwise to cycle forward or backward through the list of available menus.
- Momentarily press the Enter Button to select the displayed menu.
- Momentarily press the Menu Button to return to the Main Menu.
- The submenus are EQ [1/4], DRC [2/4], DIRAC [3/4], and SETTINGS [4/4].
- After about 30 seconds of no input while any menu or submenu is displayed, the **Display** will revert back to the **Home Screen**.

EQ MENU

The **EQ Menu** allows you to set the parameters for the Shelf EQ and up to five Parametric EQs (PEQs).

Shelf EQ

The **Shelf EQ** is the equivalent of the Bass and Treble controls on a conventional amplifier, but with more control over the amount of gain and the specific frequencies. The **LF GAIN** value applies to all frequencies below the selected frequency, while the **HF GAIN** value applies to all frequencies above the selected frequency.

Perform the following steps to set the Shelf EQ.

- 1. Momentarily press the **Menu Button**. The **Display** will show **EQ [1/4]**.
- 2. Momentarily press the Enter Button. The Display will show SHELF EQ [1/6].
- 3. Momentarily press the Enter Button. The Display will show SHELF EQ [1/4] with a pointer to the left of the LF GAIN label.
- 4. Rotate the Value Knob clockwise or counterclockwise to increase or decrease the LF GAIN value from -6dB to +6dB in 0.5dB increments.
- Momentarily press the Enter Button. The Display will change to show SHELF EQ
 [2/4] and the pointer will move to the left of the FREQ label.
- 6. Rotate the Value Knob clockwise or counterclockwise to increase or decrease the **FREQ** value from 60Hz to 200Hz in 10Hz increments.
- Momentarily press the Enter Button. The Display will change to show SHELF EQ
 [3/4] and the pointer will move to the left of the HF GAIN label.
- 8. Rotate the Value Knob clockwise or counterclockwise to increase or decrease the HF GAIN value from -6dB to +6dB in 0.5dB increments.
- Momentarily press the Enter Button. The Display will change to show SHELF EQ
 [4/4] and the pointer will move to the left of the FREQ label.
- 10. Rotate the Value Knob clockwise or counterclockwise to increase or decrease the **FREQ** value from 5kHz to 12kHz in 1kHz increments.

- 11. Momentarily press the Enter Button. The Display will cycle back to show SHELF EQ [1/4] with the pointer to the left of the LF GAIN label.
- 12. Momentarily press the Menu Button three times to return to the Home Screen. Alternatively, wait about 30 seconds and the Display will automatically return to the Home Screen. The Home Screen will display an EQ label, indicating that EQ is enabled.

Note: Once a value is changed in any of the above steps, it will take effect whether or not the Enter Button is pressed. There is no Cancel function to abort changes that have been made.

PEQ

The Desktop Headphone Amplifier features five Parametric EQs (PEQs), which you can use to boost or cut frequencies with more precision than the Shelf EQ offers. Rather than boosting or cutting all frequencies above or below a particular point, you can boost or cut a specific range of frequencies within a bell curve.

This gives a greater amount of boost or cut to the frequency at the center of the curve and a smaller amount to frequencies the further they get from the central frequency. This allows you to accentuate particular sounds, voices, or instruments in an audio mix. It is also useful if the speakers or headphones or even any item within the room have a resonant frequency that rattles.

With PEQ you can set which frequency is at the apex of the curve, the amount of gain or attenuation, and the width of the curve.

Perform the following steps to set one of the five available PEQs.

- 1. Momentarily press the **Menu Button**. The **Display** will show **EQ [1/4]**.
- 2. Momentarily press the Enter Button. The Display will show SHELF EQ [1/6].
- 3. Rotate the Value Knob clockwise until the Display shows PEQ 1 [2/6].
- 4. Momentarily press the Enter Button. The Display will show PEQ 1 [1/4] with a pointer to the left ENABLE label.
- 5. Rotate the Value Knob clockwise until the value for ENABLE is ON.

- 6. Momentarily press the Enter Button. The Display will show PEQ 1 [2/4] with the pointer to the left of the FREQ label.
- Rotate the Value Knob clockwise or counterclockwise to increase or decrease the FREQ value in the range 50Hz to 15kHz. The FREQ value can be adjusted in 1Hz increments above 50Hz, 10Hz increments above 100Hz, and 0.1kHz increments above 1kHz.
- 8. Momentarily press the Enter Button. The Display will show PEQ 1 [3/4] with the pointer to the left of the GAIN label.
- 9. Rotate the Value Knob clockwise or counterclockwise to increase or decrease the GAIN value from -6.0dB to +6.0dB in 0.5dB increments.
- 10. Momentarily press the Enter Button. The Display will show PEQ 1 [4/4] with the pointer to the left of the Q label.
- 11. Rotate the Value Knob clockwise or counterclockwise to increase or decrease the Q value from 0.5 octaves to 5.0 octaves in 0.1 octave increments.
- 12. Momentarily press the Enter Button. The Display will show PEQ 1 [1/4] with the pointer to the left ENABLE label.
- 13. Momentarily press the Menu Button three times to return to the Home Screen. Alternatively, wait about 30 seconds and the Display will automatically return to the Home Screen. The Home Screen will display an EQ label, indicating that EQ is enabled.

Note: Once a value is changed in any of the above steps, it will take effect whether or not the Enter Button is pressed. There is no Cancel function to abort changes that have been made.

DRC

DRC is an acronym for Dynamic Range Compensation.

For audio material, Dynamic Range generally refers to the difference between the quietest and loudest portions of the audio signal. In theory, humans have an audio Dynamic Range of about 140dB, however in practice, our ears adjust to the prevailing volume level in the same way our eyes adjust to light levels, making it difficult to see in the dark if exposed to bright light.

Dynamic Range Compensation is used to reduce the amount of difference between the quietest and loudest portions of the audio signal. This is generally perceived negatively by audiophiles and, because Monolith[™] by Monoprice products are true audiophile products, the feature is disabled by default.

The DRC feature built into this Desktop Headphone Amplifier starts with an LPF/HPF to split low and high frequencies (24dB/octave filters at 140Hz). This is followed by two independent stereo compressors and a mixer to combine the compressed low and high frequency bands. The DRC operates on the pre-volume control signal, so the DRC threshold level refers to the level of the incoming signal source.

- The **Threshold** value determines at which point the DRC takes effect.
- The **Ratio** value determines how much compression is added to the signal. The lowest setting (1.2:1) will have minimal effect, while the highest level (8.0:1) will have an audible "squashing" effect on your mix.
- **LF Offset** is essentially a separate gain stage for just the LF signal below 140Hz. You can reduce or enhance the bass using the DRC similar to how studio and concert sound engineers use multiband compression.

Perform the following steps to configure and use the DRC feature:

- 1. Momentarily press the **Menu Button**. The **Display** will show **EQ [1/4]**.
- 2. Rotate the Value Knob clockwise until the Display shows DRC [2/4].
- 3. Momentarily press the Enter Button. The Display will show DRC [1/4] with a pointer to the left of the ENABLE label.
- 4. Rotate the Value Knob until the value for ENABLE is ON.

- 5. Momentarily press the Enter Button. The Display will show DRC [2/4] with the pointer to the left of the THRESHOLD label.
- 6. Rotate the Value Knob clockwise or counterclockwise to increase or decrease the THRESHOLD value from -32dB to -2dB in 1.0dB increments.
- 7. Momentarily press the Enter Button. The Display will show DRC [3/4] with the pointer to the left of the RATIO label.
- 8. Rotate the Value Knob clockwise or counterclockwise to increase or decrease the RATIO value from 1.2:1 to 8.0:1 in 0.1 ratio increments.
- 9. Momentarily press the Enter Button. The Display will show DRC [4/4] with the pointer to the left of the LF OFFSET label.
- 10. Rotate the Value Knob clockwise or counterclockwise to adjust the LF OFFSET value from -12dB to +12dB in 1.0dB increments.
- 11. Momentarily press the Enter Button. The Display will show DRC [1/4] with a pointer to the left of the ENABLE label.
- Momentarily press the Menu Button two times to return to the Home Screen. Alternatively, wait about 30 seconds and the Display will automatically return to the Home Screen. The Home Screen will display a DRC label, indicating that DRC is enabled.

Note: Once a value is changed in any of the above steps, it will take effect whether or not the Enter Button is pressed. There is no Cancel function to abort changes that have been made.

DIRAC SENSAROUND®

Music is usually mixed with loudspeakers in mind, not headphones. As a result, headphone listening is often plagued by a distorted soundstage—instruments and voices may seem incorrectly placed and trapped inside your head, causing an unnatural listening experience that can result in listener fatigue.

Dirac Sensaround[®] takes a different approach by using advanced algorithms to reproduce a sound field similar to that of a professional listening room. Using a pair of ordinary headphones, you can enjoy your favorite media in a way that seems to spread instruments, voices, and objects out into space, enveloping you exactly as the artist intended.

Dirac[®] studies the way sound moves and is reflected by the environment, as well as how human ears perceive sound in space, in order to innovate beyond the limitations of conventional surround sound effects. By carefully measuring and modeling a preferred listening space, Dirac Sensaround[®] reproduces key acoustic properties associated with high fidelity stereo/home cinema listening within the headphones themselves.

You will notice that the result sounds vastly different from so-called virtual surround techniques that color the sound and take the edge away from the recording. Dirac Sensaround[®] is not a sound effect to grow tired of, it is a headphone sound field optimization that you will not want to be without once you have tried it.

Perform the following steps to use Direc Sensaround[®].

- 1. Momentarily press the **Menu Button**. The **Display** will show **EQ [1/4]**.
- 2. Rotate the Value Knob clockwise until the Display shows DIRAC [3/4].
- 3. Momentarily press the Enter Button. The Display will show Dirac Sensaround with either ON or OFF to the right of the label.
- 4. Rotate the Value Knob clockwise until the Display value for Dirac Sensaround is ON.
- Momentarily press the Menu Button two times to return to the Home Screen. Alternatively, wait about 30 seconds and the Display will automatically return to the Home Screen. The Home Screen will display a DIRAC label, indicating that Dirac Sensaround[®] is enabled.

SETTINGS

The **Settings Menu** allows you to control various aspects of the Desktop Headphone Amplifier's performance. You can control the following factors.

- **EQ Disable:** Rather than adjust your individual EQ settings, you can globally enable or disable all EQ values with this setting. The possible options are **ON** (EQ disabled) or **OFF** (EQ enabled).
- **Output Mode:** The Desktop Headphone Amplifier can only send output signals to one of the front panel **Headphones** outputs or to the rear panel **Line Out** jacks. The possible options are **HP** (headphones) and **Line** (Line Out).
- DAC Filter: DACs require a reconstruction filter to "convert" the discrete samples into a continuous analog waveform. Usually this is a low-pass filter (LPF) with the cutoff frequency being 1/2 the sample frequency with a very sharp roll-off characteristic. Unfortunately, there is no such thing as a perfect reconstruction filter, so that is why the AKM DAC and other DACs have selectable filter characteristics. Your headphones and listening requirements vary, so experiment with the different slopes to find your sound. The possible options are Normal, Slow 1, and Slow 2.
- ADC Filter: This is an anti-aliasing filter, similar to a DAC. The possible options are Normal and Slow.
- **Reset All?:** This function allows you to reset all of the settings to the factory default values. To reset all settings, rotate the **Value Knob** clockwise until the displayed value is **ON**, then momentarily press the **Enter Button** to perform the reset.
- **About...**: Rotate the **Value Knob** clockwise to display the product name and software version.

Perform the following steps to adjust the various settings:

- 1. Momentarily press the **Menu Button**. The **Display** will show **EQ [1/4]**.
- 2. Rotate the Value Knob clockwise until the Display shows SETTINGS [4/4].
- 3. Momentarily press the Enter Button. The Display will show EQ DISABLE [1/6].
- 4. Rotate the Value Knob clockwise or counterclockwise to set the EQ DISABLE value to ON or OFF.

- 5. Momentarily press the Enter Button. The Display will show OUTPUT MODE [2/6].
- 6. Rotate the Value Knob clockwise or counterclockwise to set the OUTPUT MODE value to LINE or HP (headphones).
- 7. Momentarily press the Enter Button. The Display will show DAC FILTER [3/6].
- 8. Rotate the Value Knob clockwise or counterclockwise to set the DAC FILTER value to NORMAL, SLOW 1, or SLOW 2.
- 9. Momentarily press the Enter Button. The Display will show ADC FILTER [4/6].
- 10. Rotate the Value Knob clockwise or counterclockwise to set the ADC FILTER value to SLOW or NORMAL.
- 11. Momentarily press the Enter Button. The Display will show RESET ALL? [5/6].
- 12. If you want to reset the Desktop Headphone Amplifier's settings to their factory default values, rotate the Value Knob clockwise until the RESET ALL? value is YES, otherwise leave it set to NO.
- Momentarily press the Enter Button. If you had RESET ALL? set to YES, the system will reset all settings to their factory default values. The Display will show ABOUT... [6/6].
- 14. If you want to view the product name and software version information, rotate the **Value Knob** clockwise.
- 15. Momentarily press the Menu Button two times to return to the Home Screen. Alternatively, wait about 30 seconds and the Display will automatically return to the Home Screen.

USAGE NOTES

- To prolong the life of the Desktop Headphone Amplifier, wait at least 30 seconds before you power it on after powering it off.
- In case of malfunction, power the unit off, wait for 30 seconds, then power it back on.

SPECIFICATIONS

Model	24459
Analog Inputs	1x unbalanced RCA, 1x unbalanced XLR
Digital Inputs	1x Optical, 1x Coaxial, 1x AES/EBU, 1x USB
Playable Frequency Response	1Hz ~ 40kHz ±0.5dB (96kHz input)
Signal-to-Noise Ratio (A-Weighted)	> 120dB
Dynamic Range	> 120dB
Total Harmonic Distortion	< 0.0005%
Crosstalk	< 100dB
Maximum XLR Input Voltage	5.2 V _{rms}
XLR Input Impedance	20 kilohms
Maximum RCA Input Voltage	2.6 V _{rms}
RCA Input Impedance	10 kilohms
Optical Sampling Frequency	96kHz
Maximum Optical Resolution	24 bits
Coaxial Sampling Frequency	192kHz
Maximum Coaxial Resolution	24 bits
AES/EBU Sampling Frequency	192kHz
Maximum AES/EBU Resolution	24 bits
Supported Sampling Rates	32 ~ 192 kHz
Direct Stream Digital™ Support	DSD64, DSD128
Input Power	16 VDC, 1.25A
AC Adapter Input Power	100 ~ 240 VAC, 0.5A, 50/60 Hz
Dimensions	8.7" x 7.8" x 2.0"

TECHNICAL SUPPORT

Monoprice is pleased to provide free, live, online technical support to assist you with any questions you may have about installation, setup, troubleshooting, or product recommendations. If you ever need assistance with your new product, please come online to talk to one of our friendly and knowledgeable Tech Support Associates. Technical support is available through the online chat button on our website www.monoprice.com during regular business hours, 7 days a week. You can also get assistance through email by sending a message to **tech@monoprice.com**

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Dolby[®], Dolby[®] Digital[™], Dolby Audio[™], and the double-D symbol are trademarks of Dolby Laboratories.

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