Monolith™ by Monoprice

Portable Headphone Amplifier and DAC

with THX® AAA Technology (AKM 4493 DAC and AAA-78 Modules)

P/N 24460

User's Manual

CONTENTS

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 turn it off and allow it to fully dry before reapplying power.

- Do not touch the device or any 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.

- This device contains a Lithium battery. Dispose of this device only in accordance with local, state, or federal regulations for electronic waste.

- Charge the battery before first use and at least once every three months.

- 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

- AK4493 32-bit Digital-to-Analog Converter with support for up to 768kHz PCM and 22.4MHz DSD (Direct Stream Digital™)

- THX® AAA-78 amplifier module with bipolar class-AB output stages, providing 220mW of power into 32Ω 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 and optical digital audio inputs, as well as an unbalanced analog stereo audio input

- Unbalanced stereo headphone output

- Built-in 4000mAh rechargeable battery provides up to 10 hours of audio playtime

- Includes USB wall charger for recharging the internal battery.

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 Portable headphone amplifier
>
> 1x Protective sock
>
> 1x USB wall charger (5 VDC, 2A)
>
> 1x Micro USB cable (Type-A to micro Type-B)
>
> 1x User's manual
>
> 1x Thank you card

PRODUCT OVERVIEW

Top View

1. **HEADPHONES:** 3.5mm unbalanced headphone output jack.

2. **LINE/OPT IN:** Combination 3.5mm unbalanced analog stereo input and 3.5mm digital optical (mini TOSLINK®) input.

3. **POWER/VOLUME:** With the unit powered off, turn the knob clockwise until it clicks to turn the unit on. With the unit powered on, turn the knob fully counterclockwise until it clicks to turn the unit off. With the unit powered on, turn the knob clockwise or counterclockwise to increase or decrease the volume level.

Bottom View
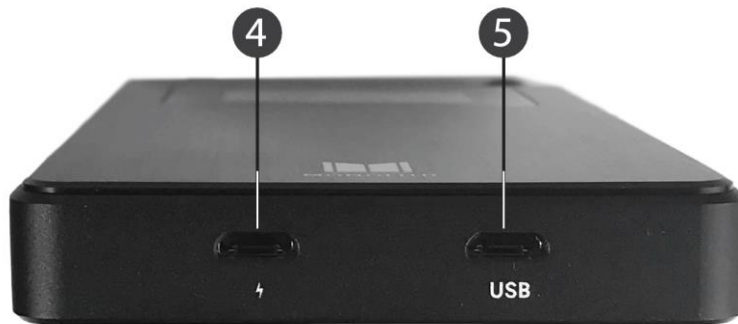
4. **CHARGE:** Micro USB charging port to connect to the included micro USB cable and USB wall charger.

5. **USB:** Micro USB digital audio input.

Side View
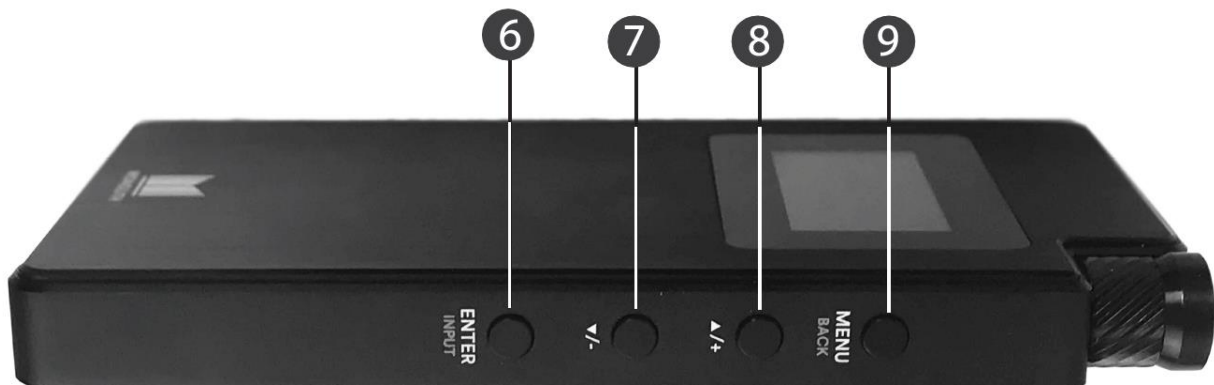
6. **ENTER/INPUT:** Momentarily press the button to select options. Press and hold the button to enter the **Input Selection Menu**.

7. **DECREASE:** Momentarily press the button to select the previous menu or to decrease the value of an edited option.

8. **INCREASE:** Momentarily press the button to select the next menu or to increase the value of an edited option.

9. **MENU/BACK:** Momentarily press the button to enable the **Main Menu**. Momentarily press the button to exit.

CHARGING

1. Plug the included micro USB cable into the **CHARGE** port on the amplifier, then plug the other end into the USB port on the included USB wall charger.

2. Plug the USB wall charger into a nearby AC power outlet. A charge indicator will animate on the display while charging is in progress. When charging is complete, the screen will go blank.

Notes:

- The USB wall charger accepts input voltages from 100 ~ 240 VAC, 50/60 Hz.

- Charge the battery before first use and at least once every three months to keep the battery fresh and capable of holding a full charge.

- Charging should be performed at temperatures between +50 ~ +95°F (+10 ~ +35°C). Attempting to charge at temperatures outside this range could result in failure to charge properly.

AUDIO INPUT CONNECTIONS

Analog
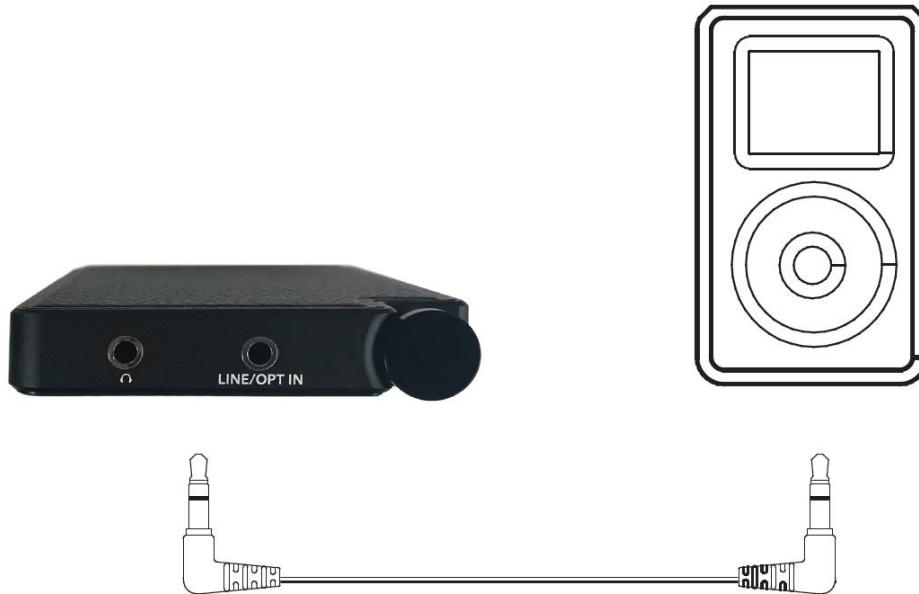
- Audio input cables are sold separately.

- Turn the amplifier and the source device off before making audio connections.

- Use a 3.5mm-to-3.5mm stereo audio cable (e.g., PID 9765) to connect the headphone output of an mp3 player or smartphone to the **LINE/OPT IN** jack on the amplifier.

- Use a 3.5mm-to-RCA stereo audio cable (e.g., PID 9768) to connect the RCA stereo audio output of an audio source device (e.g., CD player) to the **LINE/OPT IN** jack on the amplifier.

Digital Optical

- Audio input cables are sold separately.

- Turn the amplifier and the source device off before making audio connections.

- Use a TOSLINK®-to-mini-TOSLINK digital optical cable (e.g., PID 1557) to connect the optical output of an audio source device (e.g., DVD player) to the **LINE/OPT IN** jack on the amplifier.

- Use a TOSLINK-to-TOSLINK digital optical cable (e.g., PID 1419) and a TOSLINK-to-mini-TOSLINK adapter (e.g., PID 2671) to connect the optical output of an audio source device (e.g., DVD player) to the **LINE/OPT IN** jack on the amplifier.

- Multi-channel audio is not supported. The amplifier support LPCM 2-channel input only.

USB
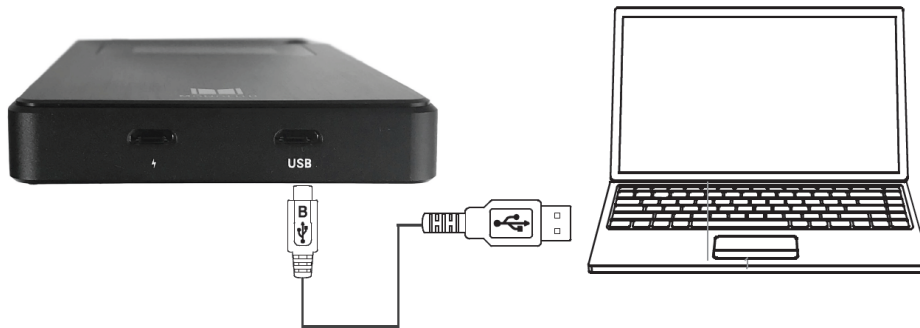
- Turn the amplifier and the source device off before making audio connections.

- Use the included micro USB cable to connect a computer to the **USB** audio input on the amplifier.

- No drivers are required when connecting to a Mac® OS X® or Windows® computer. You may need to select USB audio output in your computer's System Preferences or Control Panel.

- Using USB input allows you to use audio playback software of your choice.

- Multi-channel audio is not supported. The amplifier support LPCM 2-channel input only.

INPUT SELECTION

Automatic

By default, the amplifier will automatically select the most recently connected input. This feature can be disabled in the **SETTINGS** section of the **Main Menu.**

Manual

1. Press and hold the **MENU/INPUT** button on the amplifier to display the Input Selection Menu on the display.

2. Use the **INCREASE** and **DECREASE** buttons to highlight the desired input, then momentarily press the **MENU/INPUT** button to select the highlighted entry.

OPERATION
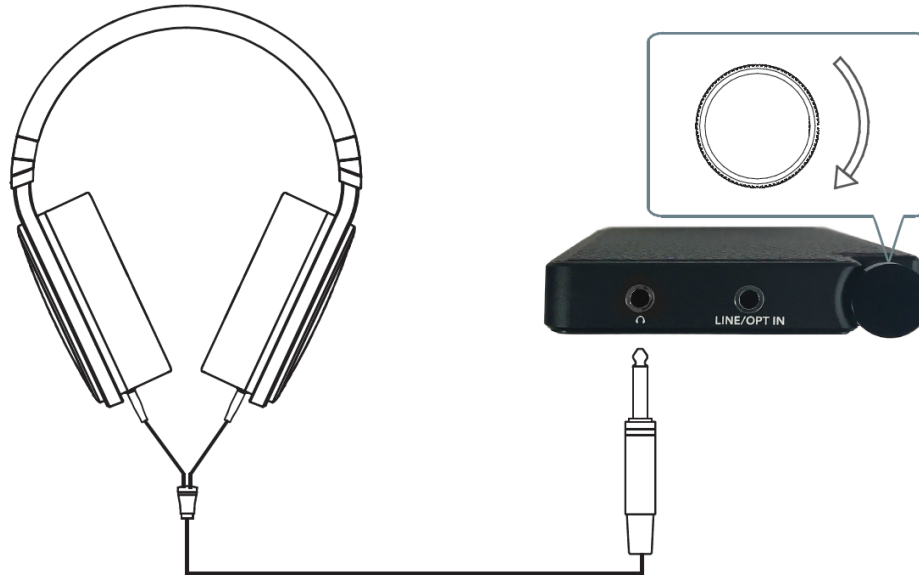
1. Turn the amplifier off by turning the **POWER/VOLUME** knob fully counterclockwise past the click.

2. Connect an audio source device to one of the inputs by following the instructions in the *AUDIO INPUT CONNECTIONS* section above.

3. If automatic input selection is disabled, select the desired input by following the *Manual* instructions in the *INPUT SELECTION* section above.

4. Plug a pair of headphones with 3.5mm plug into the **HEADPHONES** jack on the amplifier.

5. If your audio source device has a volume control, put the volume at the midpoint.

6. Start audio playback on your audio source device.

7. Turn the **POWER/VOLUME** knob clockwise to a point just past the click to turn the amplifier on.

8. Slowly turn the **POWER/VOLUME** knob clockwise to increase the volume to a comfortable listening level. If the **POWER/VOLUME** knob is fully clockwise and the volume level is still too low, increase the output volume level on your audio source device. Use the two volumes to find the desired listening level.

Notes:

- You can connect powered speakers or an external amplifier instead of headphones.

- If your headphones are equipped with a 1/4" plug, use a 1/4"-to-3.5mm TRS adapter (e.g., PID 7165).

- Use a 3.5mm-to-RCA stereo audio cable (e.g., PID 9768) to connect the **HEADPHONES** output of the amplifier to a stereo line input on an external amplifier.

MAIN MENU

- Momentarily press the **MENU/BACK** button to display the **Main Menu**.

- Use the **INCREASE** and **DECREASE** buttons to cycle forward or backward through the list of available menus.

- Momentarily press the **ENTER/INPUT** button to select the displayed menu.

- Momentarily press the **MENU/BACK** 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 button 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 three 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/BACK** button. The **Display** will show **MAIN MENU [1/4] EQ**.

2. Momentarily press the **ENTER/INPUT** button. The **Display** will show **EQ MENU [1/4] SHELF EQ**.

3. Momentarily press the **ENTER/INPUT** button. The **Display** will show **SHELF EQ** with a pointer to the left of the **LF GAIN** label.

4. Use the **INCREASE** or **DECREASE** buttons to increase or decrease the **LF GAIN** value from -6.0dB to +6.0dB in 0.5dB increments.

5. Momentarily press the **ENTER/INPUT** button. The **Display** will change to show the pointer to the left of the **FREQ** label.

6. Use the **INCREASE** or **DECREASE** buttons to increase or decrease the **FREQ** value from 60Hz to 200Hz in 10Hz increments.

7. Momentarily press the **ENTER/INPUT** button. The **Display** will change to show the pointer to the left of the **HF GAIN** label.

8. Use the **INCREASE** or **DECREASE** buttons to increase or decrease the **HF GAIN** value from -6.0dB to +6.0dB in 0.5dB increments.

9. Momentarily press the **ENTER/INPUT** button. The **Display** will change to show the pointer to the left of the **FREQ** label.

10. Use the **INCREASE** or **DECREASE** buttons to increase or decrease the **FREQ** value from 5kHz to 12kHz in 1kHz increments.

11. Momentarily press the **ENTER/INPUT** button. The **Display** will cycle back to show the pointer to the left of the **LF GdddddAIN** label.

12. Momentarily press the **MENU/BACK** 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 ON** 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/INPUT** button is pressed. There is no Cancel function to abort changes that have been made.*

PEQ

The Portable Headphone Amplifier features three 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, headphones, or even any item within the room has 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 first of the three available PEQs. The concept is the same for the other two PEQs.

1. Momentarily press the **MENU/BACK** button. The **Display** will show **MAIN MENU [1/4] EQ**.

2. Momentarily press the **ENTER/INPUT** button. The **Display** will show **EQ MENU [1/4] SHELF EQ**.

3. Momentarily press the **INCREASE** button. The **Display** will show **EQ MENU [2/4] PEQ 1**.

4. Momentarily press the **ENTER/INPUT** button. The **Display** will show **PEQ 1** with a pointer to the left of the **ENABLE** label.

5. If the value for **ENABLE** is **OFF**, momentarily press the **INCREASE** button to change the value for **ENABLE** to **ON**.

6. Momentarily press the **ENTER/INPUT** button. The **Display** will show **PEQ 1** with the pointer to the left of the **FREQ** label.

7. Use the **INCREASE** or **DECREASE** buttons to increase or decrease the **FREQ** value in the range 50Hz to 15.0kHz. 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/INPUT** button. The **Display** will show **PEQ 1** with the pointer to the left of the **GAIN** label.

9. Use the **INCREASE** or **DECREASE** buttons to increase or decrease the **GAIN** value from -6.0dB to +6.0dB in 0.5dB increments.

10. Momentarily press the **ENTER/INPUT** button. The **Display** will show **PEQ 1** with the pointer to the left of the **Q** label.

11. Use the **INCREASE** or **DECREASE** buttons 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/INPUT** button. The **Display** will show **PEQ 1** with the pointer to the left of the **ENABLE** label.

13. Momentarily press the **MENU/BACK** 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 ON** 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/INPUT** 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 Portable 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/BACK** button. The **Display** will show **MAIN MENU [1/4] EQ**.

2. Momentarily press the **INCREASE** button once. The **Display** will show **MAIN MENU [2/4] DRC**.

3. Momentarily press the **ENTER/INPUT** button. The **Display** will show **DRC** with a pointer to the left of the **ENABLE** label.

4. If the value for **ENABLE** is **OFF**, momentarily press the **INCREASE** button to change the value for **ENABLE** to **ON**.

5. Momentarily press the **ENTER/INPUT** button. The **Display** will show **DRC** with the pointer to the left of the **THRESHOLD** label.

6. Use the **INCREASE** or **DECREASE** buttons to increase or decrease the **THRESHOLD** value from -32dB to -2dB in 1.0dB increments.

7. Momentarily press the **ENTER/INPUT** button. The **Display** will show **DRC** with the pointer to the left of the **RATIO** label.

8. Use the **INCREASE** or **DECREASE** buttons 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/INPUT** button. The **Display** will show **DRC** with the pointer to the left of the **LF OFFSET** label.

10. Use the **INCREASE** or **DECREASE** buttons to adjust the **LF OFFSET** value from -12dB to +12dB in 1.0dB increments.

11. Momentarily press the **ENTER/INPUT** button. The **Display** will show **DRC** with a pointer to the left of the **ENABLE** label.

12. Momentarily press the **MENU/BACK** 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 ON** 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/INPUT 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/BACK** button. The **Display** will show **MAIN MENU [1/4] EQ**.

2. Momentarily press the **INCREASE** button two times. The **Display** will show **MAIN MENU [3/4] DIRAC**.

3. Momentarily press the **ENTER/INPUT** button. The **Display** will show **Dirac Sensaround** with either **ON** or **OFF** to the right of the label.

4. If the value for **Dirac Sensaround** is **OFF** and you want to turn it on, momentarily press the **INCREASE** button. If the value for **Dirac Sensaround** is **ON** and you want to turn it off, momentarily press the **DECREASE** button.

5. Momentarily press the **MENU/BACK** 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 Portable Headphone Amplifier's performance. You can control the following factors.

- **Auto Input:** When **Auto Input** is enabled, the amplifier will automatically select the most recently connected input. The possible options are **ON** (Auto Input enabled) or **OFF** (Auto Input disabled).

- **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**.

- **Reset All?:** This function allows you to reset all of the settings to the factory default values. To reset all settings, momentarily press the **INCREASE** button to change the displayed value to **ON**, then momentarily press the **ENTER/INPUT** button to perform the reset.

- **About…:** Momentarily press the **INCREASE** or **DECREASE** button to display the product name and software version.

Perform the following steps to adjust the various settings:

1. Momentarily press the **MENU/BACK** button. The **Display** will show **MAIN MENU [1/4] EQ**.

2. Momentarily press the **INCREASE** button three times. The **Display** will show **MAIN MENU [4/4] SETTINGS**.

3. Momentarily press the **ENTER/INPUT** button. The **Display** will show **SETTINGS [1/4] AUTO INPUT.**

4. If the value for **AUTO INPUT** is **ON** and you want to turn it off, momentarily press the **DECREASE** button. If it is **OFF** and you want to turn it on, momentarily press the **INCREASE** button.

5. Momentarily press the **ENTER/INPUT** button. The **Display** will show **MAIN MENU [2/4] DAC FILTER.**

6. Use the **INCREASE** and **DECREASE** buttons to set the **DAC FILTER** value to **NORMAL, SLOW 1,** or **SLOW 2.**

7. Momentarily press the **ENTER/INPUT** button. The **Display** will show **MAIN MENU [3/4] RESET ALL?.**

8. If you want to reset the Portable Headphone Amplifier's settings to their factory default values, press the **INCREASE** button to change the **RESET ALL?** value to **YES,** otherwise leave it set to **NO.**

9. Momentarily press the **ENTER/INPUT** button. If you had **RESET ALL?** set to **YES,** the system will reset all settings to their factory default values. The **Display** will show **MAIN MENU [4/4] ABOUT....**

10. If you want to view the product name and software version information, momentarily press either the **INCREASE** or **DECREASE** button.

11. Momentarily press the **MENU/BACK** button two times to return to the **Home Screen.** Alternatively, wait about 30 seconds and the **Display** will automatically return to the **Home Screen.**

SPECIFICATIONS

Model	24460
Inputs	1x unbalanced 3.5mm TRS, 1x Optical, 1x USB
Playable Frequency Response	1Hz ~ 20kHz ±0.5dB
Signal-to-Noise Ratio (A-Weighted)	> 117dB
Dynamic Range	> 117dB
Total Harmonic Distortion	< 0.001%
Crosstalk	< 100dB
Maximum Output Voltage	3.7 V$_{rms}$
Maximum 3.5mm Analog Input Voltage	2.0 V$_{rms}$
3.5mm Analog Input Impedance	10 kilohms
Optical Sampling Frequency	32 ~ 96 kHz
Maximum Optical Resolution	24 bits
USB Sampling Frequency	32 ~ 192 kHz
Direct Stream Digital™ Support	DSD64, DSD128
Battery Capacity	4000mAh
Charging Power	5 VDC, 2A
USB Wall Charger Input Power	100 ~ 240 VAC, 50/60 Hz
Dimensions	5.4" x 2.8" x 0.6"
Weight	0.5 lbs.

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**