



# Astell Kern PEM21 Portable Wired/Wireless Bluetooth DAC/AMP Instruction Manual

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**Astell&Kern**

**Astell Kern PEM21 Portable Wired/Wireless Bluetooth DAC/AMP**



## Product Information

### Specifications

- **Model:** AK HB1
- **Charging cable:** USB-C to USB-C, USB-C to Lightning
- **Ports:** 3.5mm unbalanced, 4.4mm balanced
- **Power button:** On/Off, battery status
- **Bluetooth Pairing button:** Bluetooth pairing, volume wheel function
- **Media button:** Music playback control, call handling
- **Volume:** Sound volume adjustment
- **Power/Battery LED:** Battery and charging status
- **Status LED:** Connection status and music information
- **Mic:** Used for calls when connected via Bluetooth
- USB Type-C charging/input port

### User Guide – Getting Started

#### Before Using the Product

Ensure that you have read the safety precautions, copyright, certifications, registered trademarks, and disclaimers.

#### Components

Components may change without previous notice to improve the performance or quality of the device.

- AK HB1 Charging cable
- USB-C to USB-C cable
- USB-C to Lightning cable
- Quick Start Guide
- Warranty Card
- User Guide (can be downloaded from the Astell&Kern website)

#### Parts Names

The appearance of the device as well as the information printed and engraved on the device may vary depending

on the manufacturer's specifications.

- 3.5mm Unbalanced Port
- 4.4mm Balanced Port
- Media button
- Bluetooth Pairing button
- Status LED
- Volume
- Power/Battery LED
- Power button
- USB Type-C charging/input port
- Mic.

## **Power**

### **Turn on/off power**

1. To turn on the power, press and hold the power button on the side of your product for 3 seconds.
2. To turn off the power, press and hold the power button on the side of your product for 3 seconds while the power is on.

### **Using the Reset Function**

In cases where the device malfunctions or freezes during use, press and hold the power button and the media button simultaneously for over 10 seconds, then release to turn off the power. Press and hold the power button for 3 seconds to turn it back on.

### **Factory Reset**

Press and hold the power button and pairing button simultaneously for over 10 seconds. The Power LED will blink green three times and the power will turn off.

## **User Guide – Using the Device**

### **Button Operations**

The device has various buttons for different functions

- **Power button:** Turn power on/off, check battery status
- **Bluetooth Pairing button:** Enter Bluetooth pairing mode, lock/unlock volume wheel function
- **Media button:** Control music playback, answer or reject incoming calls
- **Volume:** Adjust sound volume

### **Listening to Music**

To listen to music

1. Connect your earphones or headphones to the appropriate ports (3.5mm unbalanced or 4.4mm balanced).
2. Turn on the power.
3. Press the Media button to start music playback.

## **Making a Phone Call**

To make a phone call

1. Connect the device to your mobile device via Bluetooth.
2. Use the Mic. to talk during the call.

## **Using the App**

To use the app

1. Download the app from the Astell&Kern website.
2. Install and open the app on your device.

## **App Screen**

The app screen provides additional controls and settings for your device.

## **User Guide – Miscellaneous**

### **Safety Precautions**

Read and follow the safety precautions provided in the user manual.

### **Copyright**

Respect the copyright of the product and any included content.

### **Certifications**

The product has obtained certifications for compliance with certain standards.

### **Registered Trademarks**

Respect the registered trademarks of the product.

### **Disclaimers**

Read and understand the disclaimers provided with the product.

## **FAQ**

### **• Q: Where can I download the User Guide?**

A: The User Guide can be downloaded from the Astell&Kern website: <http://www.astellnkern.com Support > Download>.

## **INSTRUCTION BOOK**

User Guide

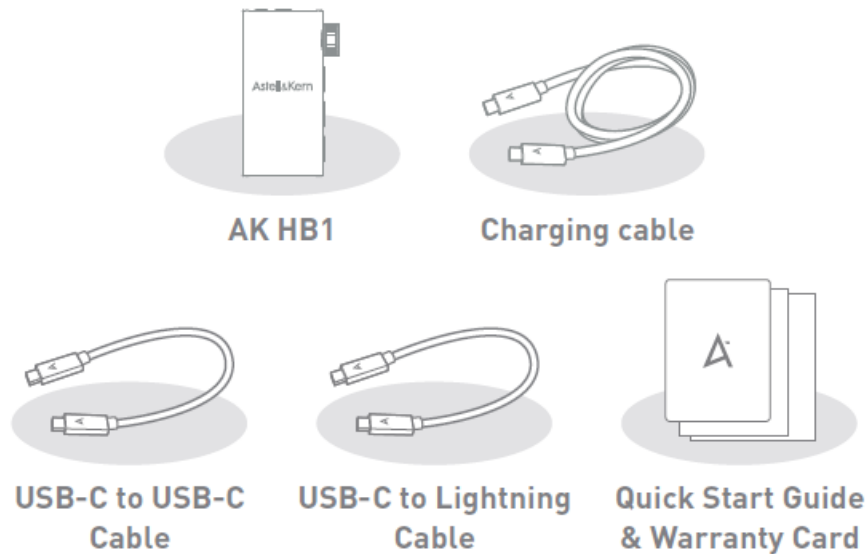
## **Before Using the Product**

- The descriptions contained in this instruction book are based on the device's default settings.
- The content of this user guide may differ from that of the actual device depending on the manufacturer's specification changes, and pictures in the user guide may also differ from the actual device.
- Modifying the software provided by the manufacturer or installing software obtained unofficially may cause device malfunction or errors, and warranty service may not be provided.

- When connected to a playback device, please check the volume before wearing earphones or headphones.

## Components

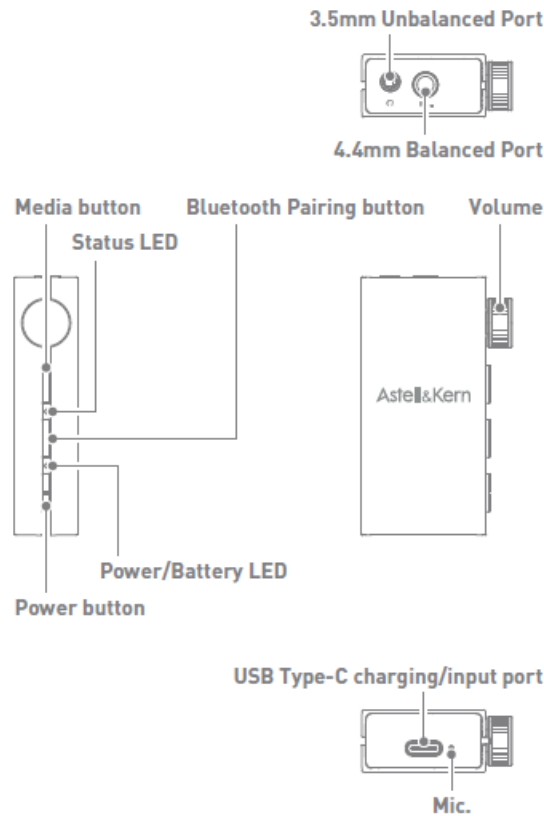
Components may change without previous notice to improve the performance or quality of the device.



- **Charging cable** : Use when charging the device.
- **USB-C to USB-C cable** : Use when connecting the product to a PC or Android device.
- **USB-C to Lightning cable** : Use when connecting the product to an iOS device.
- **Quick Start Guide** : Basic overview of device functionality.
- **Warranty Card** : Please keep the warranty card, since it is required when requesting warranty (after-sale) service.
- **Device User Guide** : The User Guide can be downloaded from the Astell&Kern website:  
[\[http://www.astellinkern.comSupport>Download\]](http://www.astellinkern.comSupport>Download).

## Parts Names

The appearance of the device as well as the information printed and engraved on the device may vary depending on the manufacturer's specifications.



- **Power button** : You can turn the power On / Off or check the battery status.
- **Bluetooth Pairing button** : Enter Bluetooth pairing mode or lock/unlock the volume wheel function.
- **Media button** : Control music playback and answer or reject incoming calls.
- **Volume** : Turn the wheel to adjust the sound volume.
- **Power/Battery LED** : Displays battery status and charging status.
- **Status LED** : Displays the connection status and current music information.
- **3.5 mm / 4.4 mm Ports** : Supports 3.5mm unbalanced and 4.4mm balanced earphones and headphones to output sound.
- **Mic.** : Used for calls when connected to mobile device via Bluetooth.
- **USB Type-C charging/input port** : Use the enclosed cable to connect with other devices or charge the product.

## Power

### Turn on/off power

1. To turn on the power, press and hold the power button on the side of your product for 3 seconds.
2. To turn off the power, press and hold the power button on the side of your product for 3 seconds while the power is on.

- If the device does not turn On, use the enclosed charging cable and charge for at least an hour before turning the power On again.
- If the power remains Off even after charging, initiate a reset.

### Using the Reset Function

In cases where the device malfunctions or freezes during use, press and hold the power button and the media button simultaneously for over 10 seconds, then release to turn Off the power.  
Press and hold the power button for 3 seconds to turn back on.

## Factory Reset

1. Pressing and holding the power button and pairing button simultaneously for over 10 seconds will make the [Power LED] blink green three times and the power turn Off.
2. All saved data will be deleted, and all user settings will be reset.

## Charging

### Charging when the Power is Off

1. Connect your product to the supplied charging cable to charge it through the USB Type-C charging port on the bottom of the product.
  2. When charging starts, the [Power/Battery LED] blinks in white, and when charging is complete, the LED turns blue.
- Charging Time: Approximately 1.5 hours (fully discharged, with power OFF)
  - If the red LED continues to blink when the charging cable is connected, please disconnect and reconnect the charging cable.
  - If the red LED continues to blink even after reconnection, stop charging and request warranty (after-sale) service.

### Charging while the power is On

1. Quickly press the [Power Button] twice to turn charging mode on or off.
2. When charging mode is on, the HB1 internal battery will charge when connected via USB-C cable. Charging will stop if charging mode is turned off.
3. You can verify charging mode by checking the status of the [Power/Battery LED].

LED Color	Status
Purple light blinks once	Charging Mode On
Purple light blinks twice	Charging Mode Off

When charging mode is turned on while connected to a mobile device, the HB1 uses the battery power of the mobile device, and when the charging mode is turned off, the HB1's internal battery is used.  
If you use the device in USB DAC mode with charging mode on, the connected mobile device's battery may drain. Conversely, if you connect with a mobile device with the charging mode off, the HB1's battery can drain quickly. Adjust the charging mode according to the situation. When using with an iPhone in USB DAC mode, it is recommended to turn off charging mode.  
If you turn off the HB1 and power it back on while charging mode is off, charging mode is automatically enabled.

## Checking the Battery Status

1. You can check the current battery status through the [Power/Battery LED].
2. When the power is On, press the [Power] button briefly once to display the current battery status with the [Power/Battery LED].
3. When the battery level is 10% or below, even without pressing the [Power Button], an alert sound occurs and the [Power/Battery LED] blinks red.

LED Color	Status
Red blinking	10% or below
Red	10~20%
Yellow	20~60%
Green	60~99%
Blue	100%

## Connections

### Connecting in Bluetooth mode

1. When you turn on the HB1, it automatically enters pairing standby mode, and the [Status LED] blinks red and blue.
  2. Turn on the Bluetooth feature in your mobile device settings.
  3. Selecting [AK HB1] from the list of detected devices will complete pairing with your mobile device, and the [Status LED] turns blue.
- If the HB1 does not enter the pairing standby mode, press the [Bluetooth Pairing Button] on the side of the product for 3 seconds to enter the pairing standby mode. A device only needs to be paired once and will subsequently connect automatically.
  - Pressing the pairing button for more than 10 seconds will cause the [Status LED] to blink yellow three times, and deleting all previously paired device information.

### Multi-point Connection

1. While connected to the first Bluetooth device, press HB1's pairing button for 3 seconds to enter pairing standby mode.
2. Enter Bluetooth settings on the second device to connect.
3. Press search for device, and the [HB1] will be detected, selecting the [HB1] completes pairing with the second device.
4. Go back to the Bluetooth settings of the first device and select [HB1] from the [Registered Devices] list, both devices will be connected simultaneously.

Multi-point supports connection of up to 2 devices.

### Connecting in USB DAC mode



1. After turning the power On, connecting a mobile device or PC using the enclosed cable will connect the HB1 in USB DAC mode.
2. When connected in USB DAC mode, the [Status LED] turns white.

### Connection Status LED Indicator

LED Color	Status
Red/Blue LED alternating blink	Bluetooth Pairing Standby mode
White LED On	Bluetooth/USB DAC mode connected properly

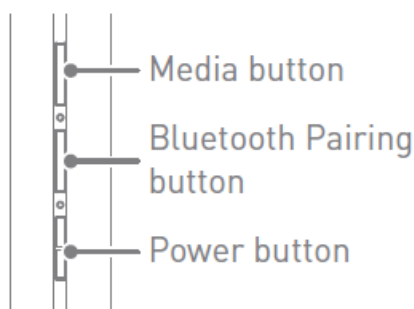
HB1 is set to UAC2.0 by default. When connecting to certain gaming consoles, it is recommended to change to UAC1.0 via the AK Control app before use.

When using as a USB DAC, the Bluetooth connection is active, allowing you to use the AK Control app to change settings at the same time.

When connected to a Windows PC, you need to install a separate USB DAC Driver for high quality audio playback. You can download the USB DAC Driver from [www.astellinkern.com- Support-Download](http://www.astellinkern.com-Support-Download).

### Button Operations

You can use the buttons on the side of the product to perform various functions.



#### Power button

Action	Power button	
	When the product is on	When the product is off
Short press once	Check battery status	-
Short press twice	Turn the charging mode on/off	-
Long press for 3 seconds	Power off	Power on

#### Bluetooth Pairing button

Action	Bluetooth Pairing button
Long press for 3 seconds	Bluetooth Pairing Standby mode
Long press for 10 seconds	Reset pairing information
Short press twice	Lock/Unlock Volume Wheel function

#### Media button

Action	Media button	
	Playing media	Receiving a call
Short press once	Play/Pause	Accept/end a call
Short press twice	Play the next track	-
Short press 3 times	Play the previous track	-
Press and hold for more than 1 second	-	Decline a call

## Listening to Music

### Playing music

Play music stored on your mobile device or stream music while connected to your mobile device. When music is playing, the [Status LED] indicates information about the song currently playing.

LED Color	Details
Red	PCM
Cyan	DSD
Magenta	MQA Renderer

**Continuous Playback Time:** Approximately 6 hours (based on Bluetooth mode, AAC, unbalanced)

### Controlling the volume

You can increase or decrease the volume in 50 steps by turning the wheel on the side of the device.

Short press the [Bluetooth Pairing Button] twice to lock the volume wheel. The [Status LED] will blink green once to confirm volume lock is enabled. When locked, turning the volume wheel will not adjust the volume. Short press the [Bluetooth Pairing Button] twice again to unlock the volume wheel. The [Status LED] will blink green twice to confirm volume lock is disabled. Turning the power off and then on while the volume wheel function is locked will unlock the volume wheel function.

### Pause/Play

During music playback, press the [Media] button on the side once to pause the music, and press again to resume playback.

### Playing the previous/next music file

During music playback, quickly press the [Media] button twice to play the next music track.

During music playback, quickly press the [Media] button three times to play the previous music track.

When connected to a music playback device, please check the volume before wearing earphones or headphones. Listening at maximum volume can cause serious hearing damage. Adjust the volume to an appropriate level before listening to music.

## Making a Phone Call

### Accept/decline a call

When receiving a call while connected to a mobile device, you can accept or decline the call.

- To answer a call, press the [Media Button] on the side of the product once.
- To decline a call, press and hold the [Media Button] on the side of the product for more than 1 second.

In Bluetooth mode, when connected to a mobile device, you can only make calls through HB1's built-in microphone. When connected to an Android mobile device in USB DAC mode, you can make calls using the built-in microphone of your earphones/headphones.

For iPhones, call functionality is not supported in USB DAC mode, and some Android mobile devices with a 3.5 mm port may not support calls with the HB1.

## Using the App

### End a call

To end a call, press the [Media Button] once.

Utilize the AK Control app to monitor the HB1's status and adjust your usage settings.

### Download the app

On the iOS App Store or Google Play Store, you can download the app by searching for [AK Control].

### Supported operating systems

- **Android:** 7.0 or newer
- **iOS:** 9.0 or newer (iPads are not supported).

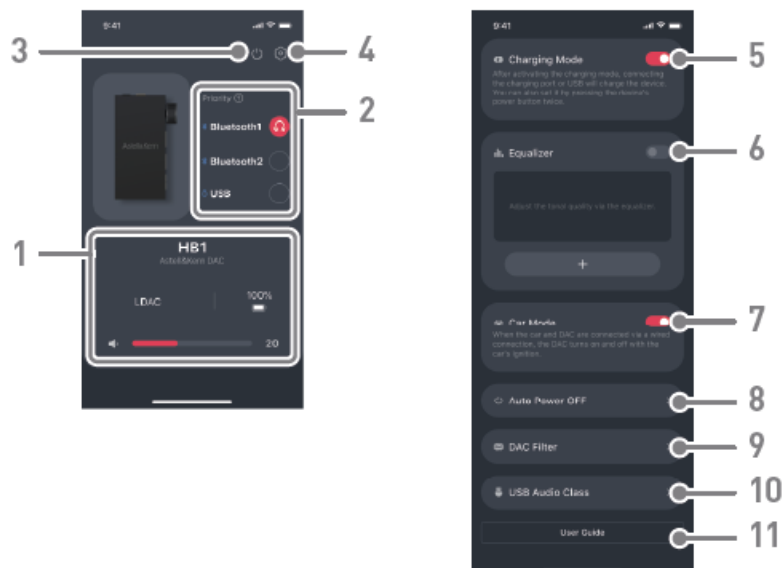
### Launch the app

1. Open the installed AK Control app.
2. Follow the prompts to allow Bluetooth connectivity and grant the necessary permissions, before the HB1's details will be displayed.

You can only launch the AK Control app when the HB1 is connected via Bluetooth.

If the app doesn't start, please check your Bluetooth connection and try launching it again.

### App screen



<b>1</b>	<b>Device Status</b>	Displays battery life, codec information, device name, and volume.
<b>2</b>	<b>Priority Settings</b>	Set playback priorities when connected to multiple devices.
<b>3</b>	<b>Power</b>	Power Off the HB1.
<b>4</b>	<b>Settings</b>	View app information and firmware details.
<b>5</b>	<b>Charging Mode</b>	Turn charging mode On / Off.
<b>6</b>	<b>Equalizer</b>	Go to the EQ screen.
<b>7</b>	<b>Car Mode</b>	Turn car mode On / Off.
<b>8</b>	<b>Auto Power Off</b>	Set time for automatic power off when in standby mode.
<b>9</b>	<b>DAC Filter</b>	Set the DAC filter.
<b>10</b>	<b>USB Audio Class</b>	Set UAC output to either 2.0 or 1.0.
<b>11</b>	<b>User Guide</b>	View HB1 user guide.

## Safety Precautions

- When a plug is inserted into the unbalanced, balanced, or USB port, do not apply any force or impact to the plug. Do not insert any metal objects (coins, hairpins, etc.) or flammable debris into the device.
- Do not put heavy objects on the device.
- If the device gets wet (rain, water, chemicals, medicine, cosmetics, sweat, moisture, etc.), allow the device to dry thoroughly before powering on. (Damage may not be repairable, however if deemed repairable, any damage due to liquid exposure will be repaired for an additional fee even if the device is under warranty.)
- Avoid exposing the device to direct sunlight or extreme temperatures (0°C – +40°C) such as the inside of a car during the summer.
- Do not store or use in hot and humid places such as saunas. Avoid places with excessive dust or smoke.
- Do not use for extended periods on blankets, electric blankets, or carpet.
- Do not place near a fire or in a microwave.
- Never disassemble, repair, or alter the product.
- Do not store for extended periods in a confined space with the power on.
- Do not place the device near magnetic objects (magnets, televisions, monitors, speakers, etc.).
- Do not let chemicals or detergents come in contact with the product since they may damage the surface and paint. Do not drop or expose the product to strong impacts (places where there is strong vibration, etc.).

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### **Certification**

KC / FCC / CE / TELEC

Class B Device (Communication equipment for residential use): This is a Class B Device and is registered for EMC requirements for residential use. This device can be used in residential areas and all other areas.

### **FCC ID : QDMPPEM21**

This device complies with Part 15 of the FCC Rules, Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

### **FCC Interference Statement (Part 15.105)**

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to correct the interference by one of the following measures

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

### **FCC Caution**

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. FCC Radiation Exposure Statement (Part 2.1093)

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This equipment complies with RF exposure requirements set forth for an uncontrolled environment.

### **Registered Trademarks**



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- Qualcomm aptX is a product of Qualcomm Technologies, Inc. and/or its subsidiaries.
- Qualcomm is a trademark of Qualcomm Incorporated, registered in the United States and other countries. aptX is a trademark of Qualcomm Technologies International, Ltd., registered in the United States and other countries.

#### **MQA (Master Quality Authenticated)**

- The AK HB1 LED glows magenta to indicate that the unit is rendering an MQA stream or file. This delivers the final unfold of the MQA file.
- MQA is an award-winning British technology that delivers the sound of the original master recording. The master MQA file is fully authenticated and is small enough to stream or download.
- Visit [mqa.co.uk](http://mqa.co.uk) for more information
- MQA and the Sound Wave Device are registered trademarks of MQA Limited.© 2016

#### **Disclaimers**

The manufacturer, importer, and distributor shall not be liable for damages including accidental and personal injury due to the improper use or operation of this product. The information in this user manual was written based on current product specifications. The manufacturer, Dreamus Company, regularly adds new features via OTA updates and will continue to apply new technologies in the future. Product specifications may be changed without prior notice. There is no warranty against data loss due to the use of this product.

#### **Specifications**

<b>Product Name</b>		AK HB1
<b>Model</b>		PEM21
<b>Bluetooth</b>	<b>Chipset</b>	Qualcomm CSR8675
	<b>Version</b>	5.0
	<b>Profile</b>	A2DP, AVRCP, HFP
	<b>Codec</b>	LDAC, aptX™HD, aptX™, AAC, SBC
<b>DAC</b>		ESS ES9281AC PRO x1
<b>Decoding</b>		Supports up to 32bit / 384kHz and DSD256
<b>Output Level</b>		Unbalanced 2Vrms / Balanced 4Vrms (Condition No Load)
<b>Input</b>		USB Type-C (Supports UAC2.0 and UAC1.0)
<b>Output</b>		Unbalanced Out (3.5mm, Supports CTIA standard 4-pole earphones/headphones), Balanced Out (4.4mm, only 5-pole supported)
<b>Dimension</b>		33 x 68.4 x 16.5mm (Excluding the volume wheel)
		39.8 x 68.4 x 16.5mm (Including volume wheel)
<b>Weight</b>		Approx. 40g (1.41oz)

## Audio Specifications


<b>Frequency Response</b>	<ul style="list-style-type: none"> <li>• <math>\pm 0.0135\text{dB}</math> (<b>Condition</b> : 20Hz~20kHz) Unbalanced,</li> <li>• <math>\pm 0.0136\text{dB}</math> (<b>Condition</b> : 20Hz~20kHz) Balanced,</li> </ul>
<b>S/N</b>	117dB @ 1kHz, Unbalanced / 118dB @ 1kHz, Balanced
<b>Crosstalk</b>	-112dB @ 1kHz, Unbalanced / -112dB @ 1kHz, Balanced
<b>THD+N</b>	0.0005% @ 1kHz, Unbalanced / 0.0005% @ 1kHz, Balanced
<b>IMD SMPTE</b>	0.0003% 800Hz 10Hz (4:1) Unbalanced, Balanced
<b>Output Impedance</b>	3.5mm (2.5ohm) / 4.4mm (2.0ohm)

## Battery

<b>Capacity:</b> 600mAh 3.8V Li-Polymer Battery
<b>Continuous Playback Time:</b> about 6hours (Standard : Bluetooth, AAC, Unbalanced)
<b>Charge Time</b> :about 1.5hours (5V 2A General Charging)

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## Documents / Resources

	<p><a href="#">Astell Kern PEM21 Portable Wired/Wireless Bluetooth DAC/AMP</a> [pdf] Instruction Manual PEM21 Portable Wired Wireless Bluetooth DAC AMP, PEM21, Portable Wired Wireless Bluetooth DAC AMP, Wired Wireless Bluetooth DAC AMP, Wireless Bluetooth DAC AMP, Bluetooth DAC AMP, DAC AMP, AMP</p>
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## References

- [🌐 Astell&Kern](#)
- [AA Homepage | Experience the best sound with MQA | MQA](#)
- [User Manual](#)

[Manuals+](#), [Privacy Policy](#)

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