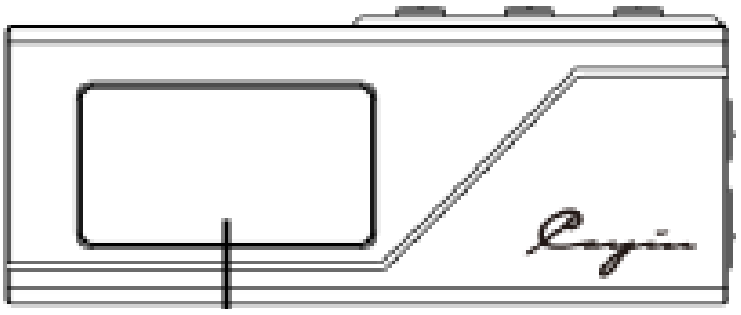
Cayin



RU3 Portable USB DAC Headphone Amplifier

User Manual

RU3 Portable USB DAC Headphone Amplifier

User Manual

Thank you for purchasing the Cayin RU3 Portable USB DAC Headphone Amplifier. Please read this manual carefully before use to help you quickly understand the basic operation of the device.

Package Contents:

RU3 Portable USB DAC Headphone Amplifier — 1 Unit

Type-C USB Cable — 1 Piece

User Manual — 1 Booklet

Features:

1. UAC 2.0 / 1.0 Mode Selection
Switch between UAC 2.0 and UAC 1.0 modes to ensure compatibility with different devices and operating systems.
2. Playback Control
Control playback functions such as play, pause, forward, and rewind directly from the device.

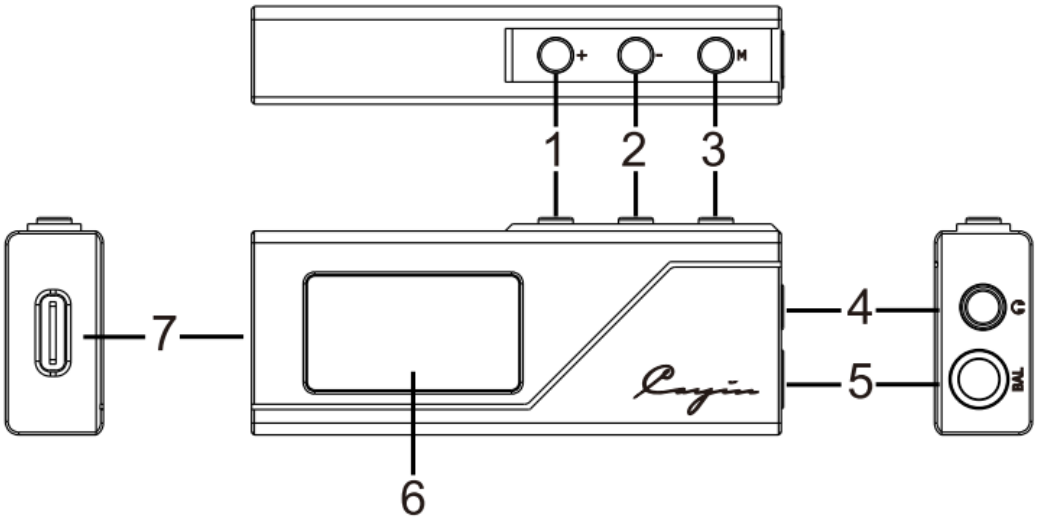
3. Hyper/Standard Mode Selection
Switch between Hyper Mode for maximum performance and Standard Mode for balanced operation.

4. High / Low Gain Selection
Adjust the output gain to match different headphones or earphones for optimal performance.

5. PO / LO Output Mode Selection
Choose between PO (Phone Out) and LO (Line Out) modes based on your usage scenario.

6. EQ Sound Effects
Enable equalizer (EQ) settings to tailor the sound signature to your personal preference.

7. Remote Control via Cayin Control App (Android Version)
Manage device functions and settings remotely through the Cayin Control App on your Android smartphone.



Control and Description

1. Multi-Function Volume Key “+”

Volume Key “+” has multi-functions. It allows you to volume up with short or long press. Under Settings Menu you can modify the settings.

2. Multi-Function Volume Key “-”

Volume Key “-” has multi-functions. It allows you to volume down with short or long press. Under Settings Menu you can modify the settings.

3. Key M:

- **Play / Pause playback.**
- **Switch on or off the screen**
- **Call up the Menu.**
- **Exit the Menu.**

4. 3.5mm Single-Ended Headphone Out/Line Out. Provides single-ended headphone output or line-level output.

5. 4.4mm Balanced Headphone Out/Line Out. Provides balanced headphone output or line-level output.

6. Display: Shows the current operating status, playback information, and menu settings.

7. USB Input Port: Receives digital audio signals and power from an external USB source.

Basic Operation

1. Multi-Function (M) Button Operations

Screen Control

Short Press: Turns the screen on or off.

Playback Control

Short Press (when the screen is on): Toggles between *Play* and *Pause*.

Settings Menu

Long Press: Opens the *Settings Menu*.

Long Press (while in the Settings Menu): Exits the *Settings Menu* and returns to the Status Display Interface.

2. “+” Button

The “+” (Volume Up) Button has multiple functions depending on the current operating mode:

Volume Control

Short Press: Increases the volume by one step.

Long Press: Continuously increases the volume until released.

Track Control

Double Press: Plays the previous track.

Settings Menu

Short Press: Adjusts or modifies the selected menu item.

3. “–” Button

The “–” (Volume Down) Button has multiple functions depending on the current operating mode:

Volume Control

Short Press: Decreases the volume by one step.

Long Press: Continuously decreases the volume until released.

Track Control

Double Press: Plays the next track.

Settings Menu

Short Press: Adjusts or modifies the selected menu item.

User Interface Description

1. Volume Level
Displays the current output volume level.
2. Gain
Displays the active gain setting in PO (Headphone Out) Mode:

H: High Gain

L: Low Gain

3. EQ (Equalizer)
Indicates the status of the EQ sound effect:

Colored “EQ” icon: EQ is disabled.

White “EQ” icon: EQ is enabled.

4. PO/LO Mode
Shows the active output mode:

PO: Headphone Out

LO: Line Out

5. UAC Mode
Displays the active USB Audio Class:

U1: UAC 1.0

U2: UAC 2.0

6. Power Mode
Indicates the selected power configuration:

STD: Standard Power Mode

HYP: Hyper Power Mode

7. Audio Format and Sampling Rate
Displays the audio format (e.g., PCM, DSD) and the sampling rate of the currently playing track.

System Settings

Enter into Settings Menu by pressing M key continuously.

1. Gain:

To adjust the Gain setting:

Enter the *Settings Menu*.

Press the "+" or "–" button to navigate to Gain.

Short press the M (Multi-Function) Button to confirm selection.

Use the "+" or "–" button to choose between H (High Gain) and L (Low Gain)

Select the appropriate Gain level based on the sensitivity and impedance characteristics of your headphones for optimal performance.

2. PCM Filter:

To configure the PCM Filter setting:

Enter the *Settings Menu*.

Navigate to PCM Filter using the "+" or "–" button.

Press the M (Multi-Function) Button to access the PCM Filter options.

Use the "+" or "–" button to select the desired filter mode:

MP (Minimum Phase)

MP Slow LD (Minimum Phase Slow Rolloff LD)

MP Slow (Minimum Phase Slow Rolloff)

MP Fast (Minimum Phase Fast Rolloff)

LP Slow (Linear Phase Slow Rolloff)

LP Fast LR (Linear Phase Fast Rolloff LR)

LP Fast (Linear Phase Fast Rolloff)

LP Fast AP (Linear Phase Fast Rolloff AP)

3. EQ (Equalizer)

The EQ function allows you to enable or disable sound effects, with additional customization available through the Cayin Control App.

To configure the EQ setting:

Enter the *Settings Menu*.

Navigate to EQ using the "+" or "–" button.

Press the M (Multi-Function) Button to access the EQ options.

Use the "+" or "–" button to select the desired EQ mode:

OFF

HIP-HOP

CLASSICAL

R&B

DANCE

ROCK

POP

JAZZ

4. Output:

To configure the output mode:

Enter the *Settings Menu*.

Navigate to Output using the "+" or "–" button.

Press the M (Multi-Function) Button to enter the output mode setting.

Use the "+" or "–" button to select the desired mode:

PO (Headphone Out)

LO (Line Out)

5. UAC Mode (USB Audio Class Selection)

The UAC Mode setting allows you to select the appropriate USB Audio Class for your device connection.

To configure UAC Mode:

Enter the *Settings Menu*.

Navigate to UAC using the "+" or "–" button.

Press the M (Multi-Function) Button to access the UAC mode settings.

Use the "+" or "–" button to select one of the following options:

UAC 1.0

UAC 2.0

Usage Recommendations:

For most devices (such as PCs, smartphones, and tablets), select UAC 2.0 for optimal performance.

For certain gaming consoles or legacy systems, UAC 1.0 may be required to ensure proper compatibility.

6. Power Mode

The Power Mode can be selected based on the connected source device and listening requirements.

HYP (Hyper Power Mode): Provides maximum output power.

STD (Standard Power Mode): Provides standard output power.

To configure Power Mode:

Enter the *Settings Menu*.

Navigate to Mode using the "+" or "–" button.

Press the M (Multi-Function) Button to access the setting.

Use the "+" or "–" button to select between HYP and STD.

7. Brightness

The Brightness setting allows adjustment of the display screen brightness for optimal visibility in different lighting conditions.

To configure the Brightness setting:

Enter the *Settings Menu*.

Navigate to Brightness using the "+" or "–" button.

Press the M (Multi-Function) Button to access the adjustment.

Use the "+" or "–" button to increase or decrease the display brightness to the desired level.

8. Firmware Version

The Firmware Version menu displays the current firmware version installed on the RU3.

To check the firmware version:

Enter the *Settings Menu*.

Navigate to Firmware Version using the "+" or "–" button.

Press the M (Multi-Function) Button to view the installed firmware version.

9. Factory Reset

The Factory Reset function restores the RU3 to its original default settings. All customized configurations, including EQ preferences, Gain, Balance, and other user-defined parameters, will be cleared.

To perform a Factory Reset:

Enter the *Settings Menu*.

Navigate to Factory Reset using the "+" or "–" button.

Press the M (Multi-Function) Button to confirm selection.

Use the "+" or "–" button to choose NO or YES. Selecting YES will trigger a 3-second countdown, after which the reset will be executed.

Once the process is complete, the unit will automatically return to the main User Interface.

Note: Performing a Factory Reset does not change or remove the current firmware version installed on the RU3.

10. Screen Timeout

The Screen Timeout function allows you to set the duration before the display automatically turns off when not in use.

To configure Screen Timeout:

Enter the *Settings Menu*.

Navigate to Screen Timeout using the "+" or "–" button.

Press the M (Multi-Function) Button to enter the Screen Timeout settings.

Use the "+" or "–" button to select one of the following options:

- **Never**
- **10S**
- **20S**
- **30S**
- **40S**
- **50S**
- **60S**

Note: Selecting Never will keep the display permanently on until manually turned off.

11. Theme:

To configure Theme Style:

Enter the *Settings Menu*.

Navigate to Theme using the "+" or "–" button.

Press the M (Multi-Function) Button to access the Theme settings.

Use the "+" or "–" button to select between the two available styles.

12. Balance

The Balance function allows adjustment of the left and right channel output levels to achieve the desired stereo balance.

To configure the Balance setting:

Enter the *Settings Menu*.

Navigate to Balance using the “+” or “–” button.

Press the M (Multi-Function) Button to access the Balance adjustment.

Use the “+” or “–” button to shift the audio output toward the Left or Right channel until the preferred balance is achieved.

USB DAC Instructions

1. Connection to Mobile Devices

Use a Type-C cable or Lightning cable to directly connect the RU3 to a mobile phone, tablet, or other audio source device.

Note:

Due to differences in operating systems and hardware, certain devices may experience compatibility issues.

Some smartphones may require manual activation of OTG (On-The-Go) function before use.

2. Connection to Computers

The RU3 is compatible with Windows 10 and above as well as Mac OS systems.

Mac OS:

Driver-free operation. Simply connect the RU3 via USB for immediate plug-and-play functionality.

Windows PCs:

It is recommended to install the official Cayin USB Audio Driver for optimal performance. Installing the driver enables ASIO mode, providing enhanced audio quality and lower latency.

The driver can be downloaded from the official Cayin website: www.cayin.cn.

After connection, ensure that either “Cayin USB DAC” or “Cayin ASIO Driver” is selected as the default audio output device in your computer’s audio settings.

3. Volume Control in USB Exclusive Mode

In USB Exclusive Mode, volume control may be disabled on some devices.

It is strongly recommended to adjust the RU3’s volume to a comfortable level before wearing headphones to prevent sudden loud output, discomfort, or potential hearing damage.

Product Information

Product Information	
USB Audio Bridge	SPV5068 (RISC-V high-performance dual-core heterogeneous audio architecture)
DAC Chip	ES9069Q *1
Op-Amp IC	OPA1602 *2
Headphone Amplifier IC	SGM8262 *2
Display	0.96-inch IPS LCD
Headphone Output	3.5mm Single-Ended + 4.4mm Balanced (PO/LO shared)
Line Output	3.5mm Single-Ended + 4.4mm Balanced (PO/LO shared)
Dimensions	60 × 25.4 × 11 mm
Net Weight	24 g
Colors	Black, Purple, Light Cyan

Specifications

Specifications		
3.5mm Single-ended PO	Power Output	180mW + 180mW (32Ω, THD+N≤1%)
	THD+N	0.0018% (32Ω, 1kHz, Output: 1.0 V rms)
	SNR	115dB (20-20kHz, A-weighted)
	Dynamic Range	115dB (20-20kHz, A-weighted)
	Frequency Response	20Hz~50kHz (±0.2dB)
	Crosstalk	82dB
	Output Impedance	0.7Ω
4.4mm Balanced PO	Output Power	560mW + 560mW (32Ω, THD+N≤1%)
	THD+N	0.0015% (32Ω, 1kHz, Output: 2.0 V rms)
	SNR	117dB (20-20kHz, A-weighted)
	Dynamic Range	117dB (20-20kHz, A-weighted)
	Frequency Response	20Hz~50kHz (±0.2dB)
	Crosstalk	105dB
	Output Impedance	1.2Ω
USB Input	UAC Mode	Supports UAC 1.0 and UAC 2.0.
	Supported Formats	UAC 1.0: Driver-free operation. UAC 2.0: Supports up to 32-bit / 768 kHz PCM

		and DSD512 native playback.

Precautions

1. The RU3 is powered via USB and will draw power directly from the connected device (e.g., smartphone, computer, or other audio source).

2. Due to the high-performance audio processing and amplification circuits, it is normal for the device to become slightly warm during operation.

3. Always set the volume to a safe level before listening to prevent potential hearing damage from sudden loud sounds.

4. Do not wear headphones while plugging in or unplugging the headphone connector, as transient noise may occur which could harm your hearing.

5. Do not use the device in environments that may pose safety risks or potential hazards.

6. Do not disassemble, modify, or attempt to repair the device. Avoid placing the product near water or in humid conditions to prevent damage.