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Wuzhi Audio ZK-AS21P

Wuzhi Audio ZK-AS21P Bluetooth Amplifier Board User Manual

Model: ZK-AS21P

1. Introduction

Thank you for choosing the Wuzhi Audio ZK-AS21P Bluetooth Amplifier Board. This high-performance 2.1 channel audio amplifier is designed to deliver powerful and clear sound for your audio projects. Featuring dual TPA3255 chips, multiple audio input options (Bluetooth 5.1, AUX, USB), and comprehensive protection features, the ZK-AS21P provides a versatile and reliable audio solution. This manual will guide you through the setup, operation, and maintenance of your amplifier board to ensure optimal performance.

2. Important Safety Instructions

- **Power Supply:** Use only a DC power supply within the specified range of 18-50V and with a current rating of 10A or higher. Using an incorrect power supply can damage the device and void the warranty.
- **Polarity:** Observe correct polarity when connecting the power supply. **Reverse polarity is strictly prohibited** and will cause irreversible damage to the amplifier board.
- **Ventilation:** Ensure adequate ventilation around the amplifier board. Do not cover the cooling fan or heat sink.
- **Environment:** Avoid exposing the device to water, moisture, extreme temperatures, or direct sunlight.
- **Handling:** Handle the board with care to avoid damaging components. Avoid touching the circuit board while it is powered on.
- **Servicing:** Do not attempt to repair or modify the amplifier board yourself. Refer all servicing to qualified personnel.

3. Package Contents

Please check the package for the following items:

- ZK-AS21P Bluetooth Amplifier Board (x1)

4. Product Overview

The ZK-AS21P amplifier board features a well-organized layout with clearly marked ports and controls. Familiarize yourself with the components before installation.



Figure 4.1: ZK-AS21P Component Layout

This diagram illustrates the various inputs, outputs, and control knobs on the ZK-AS21P amplifier board. Key components include the Power Input (18-50VDC via 5.5x2.5mm DC jack or 2P terminal block), USB Input, 3.5mm AUX Input, Subwoofer Small Signal Output, and two Expansion Ports. Control knobs are provided for Subwoofer Frequency (20-200Hz), Subwoofer R&L Volume, R&L Treble, R&L Bass, and Main Volume. The Main Volume knob also functions as a multi-function button for play/pause, track navigation, and power on/off.

Figure 4.2: Multiple Audio Input Modes
The ZK-AS21P supports versatile audio input options including Bluetooth 5.1 for wireless streaming, a 3.5mm AUX input for wired connections, and a USB input that functions as both a USB sound card and a port for USB flash drives (FAT32 format, up to 32GB). An upgraded DC socket is also visible, designed for reliable power connection.

Figure 4.3: Key Internal Features
This image highlights critical design elements of the ZK-AS21P: an upgraded 5.5*2.5mm DC socket for improved power connection without sparking, dual TPA3255 amplifier chips for high-fidelity audio and wide voltage input (18-50V DC) with low distortion, and a large heat sink coupled with a quiet cooling fan to ensure efficient heat dissipation and stable long-term operation.

5. Setup Guide

Follow these steps to correctly set up your ZK-AS21P amplifier board:

1. **Power Supply Connection:**
   Connect an 18-50V DC power supply (minimum 10A recommended) to the DC input jack (5.5x2.5mm) or the 2-pin terminal block. **Ensure correct polarity (+ to + and - to -) to prevent damage.**
2. **Speaker Connection:**
   Connect your passive speakers to the SPEAKER output terminals. Connect the left speaker to L+ and L-, the right speaker to R+ and R-, and your subwoofer to S+ and S-. Ensure secure connections.
3. **Audio Input Connection:**
   Choose your desired audio input method:
   - **Bluetooth:** Ensure no other audio source is connected. The board will automatically enter Bluetooth pairing mode when powered on.
   - **3.5mm AUX:** Connect your audio source (e.g., phone, PC) to the 3.5mm AUX input jack.*Note: Disconnect Bluetooth for uninterrupted AUX playback.*
   - **USB:** Insert a USB flash drive (FAT32 format, ≤32GB) into the USB port, or connect the board to a computer via USB to use it as a USB sound card.
4. **Expansion Ports (Optional):**
   The ZK-AS21P features two expansion ports for advanced configurations:
   - **Expansion Port 1:** Connects to the audio input of a MIC preamp board or a 2.0 pure rear stage amplifier input port.
   - **Expansion Port 2:** Connects to the reverb output of a MIC preamp board or the audio output of a Qualcomm decoding board.

   Note: When using Expansion Port 1 and an expansion port, remove the three 0 ohm resistors (R76, R75, and R74).

Figure 5.1: Advanced Connection Diagram
This diagram illustrates how the ZK-AS21P can be integrated with other audio components. It shows connections to a Pure Rear Power Amplifier Board (via the Subwoofer small signal output) and a MIC Front Stage Board (via Expansion Port 1 and Expansion Port 2), demonstrating the versatility for custom audio setups.

6. Operating Instructions

6.1 Power On/Off

To power on or off the amplifier board,**long press** the Main Volume knob.

6.2 Audio Input Selection

The amplifier automatically prioritizes inputs. When multiple inputs are connected, the last active input may take precedence. For optimal performance, disconnect unused audio sources. For AUX input, ensure Bluetooth is disconnected.

6.3 Bluetooth Pairing

1. Power on the ZK-AS21P. It will automatically enter Bluetooth pairing mode.
2. On your device (smartphone, tablet, etc.), enable Bluetooth and search for available devices.
3. Select "ZK-AS21P" from the list to pair.
4. Once paired, you will hear a confirmation tone, and you can start playing audio wirelessly.

6.4 USB Input

- **USB Flash Drive:** Insert a USB flash drive (formatted to FAT32, maximum 32GB) into the USB port. The amplifier will automatically detect and play audio files.
- **USB Sound Card:** Connect the amplifier board to your computer using a USB cable. The computer should recognize it as an audio output device. Select it as your playback device in your computer's sound settings.

6.5 Volume and Tone Control

- **Main Volume:** Adjusts the overall output volume. This knob also functions as a multi-function button:
  - **Single Press:** Play/Pause
  - **Double Press:** Next Track
  - **Triple Press:** Previous Track
  - **Long Press:** Power On/Off
- **Subwoofer R&L Volume:** Adjusts the volume level of the subwoofer output.
- **R&L Treble:** Adjusts the high-frequency response of the left and right channels.
- **R&L Bass:** Adjusts the low-frequency response of the left and right channels.
- **Subwoofer Frequency (20-200Hz):** Adjusts the crossover frequency for the subwoofer, allowing you to fine-tune the bass response.

7. Technical Specifications

Feature	Specification
Model	ZK-AS21P
Channels	2.1 (Left, Right, Subwoofer)
Amplifier Chip	Dual TPA3255
Power Output (Peak)	300W (L) + 300W (R) + 600W (Subwoofer)
Power Supply Range	DC 18V-50V / ≥10A (Recommended ≥12A)
Audio Inputs	Bluetooth 5.1, 3.5mm AUX, USB (Flash Drive/Sound Card)
Bluetooth Version	5.1
USB Flash Drive Format	FAT32, ≤32GB
Protection Features	Input undervoltage, overheating, overcurrent, short circuit protection. No input anti-reverse protection (positive and negative poles cannot be reversed).
Product Dimensions (L x W x H)	150mm x 120mm x 40mm (approx. 5.91 x 4.72 x 1.57 inches)
Material Type	PCB

Figure 7.1: ZK-AS21P Specification Summary
This image provides a concise table of the ZK-AS21P's key technical specifications, including Bluetooth version, power output, audio input types, channel configuration, amplifier chip, power supply requirements, protection features, and product dimensions.

Figure 7.2: Output Power Table (@1KHz)
This table details the ZK-AS21P's power output under various conditions, specifically at a 1KHz test frequency. It shows the power delivered to the R&L channels and the SUB channel based on the input DC voltage (24V, 36V, 50V) and speaker impedance (8Ω, 4Ω, 2Ω). For optimal performance at 50V input, the speaker impedance for left and right channels must be ≥4 ohms, and the subwoofer channel impedance must be ≥2 ohms.

8. Troubleshooting

No Sound Output:

- Check if the amplifier is powered on and the power indicator is lit.
- Verify all speaker connections are secure and correctly wired.
- Ensure the audio source is playing and its volume is turned up.
- Check the input selection; try switching between different input modes.
- Confirm the main volume and individual channel volumes (subwoofer, treble, bass) are not set to minimum.

Distorted Sound:

- Reduce the volume of both the amplifier and the audio source.
- Check speaker impedance compatibility with the amplifier's output.
- Ensure the power supply is stable and provides sufficient current (at least 10A, preferably 12A or more).
- Inspect audio cables for damage or loose connections.

Bluetooth Connection Issues:

- Ensure the amplifier is in pairing mode (no other audio input connected).
- Disable and re-enable Bluetooth on your source device.
- Forget/remove "ZK-AS21P" from your device's Bluetooth list and try pairing again.
- Move the source device closer to the amplifier to reduce interference.

Power Indicator Not On:

- Verify the power supply is connected correctly and providing the specified voltage (18-50V DC).
- Check the power adapter and outlet for functionality.
- Ensure power supply polarity is correct.

9. Maintenance

- **Cleaning:** Use a soft, dry cloth to clean the amplifier board. Do not use liquid cleaners or solvents.
- **Storage:** When not in use for extended periods, store the amplifier in a cool, dry place away from direct sunlight and moisture.
- **Ventilation:** Regularly check that the cooling fan and heat sink are free from dust and obstructions to ensure proper heat dissipation.
- **Handling:** Avoid dropping or subjecting the board to physical shocks.

10. Warranty and Support

Wuzhi Audio products are designed for reliability and performance. For any technical support, warranty claims, or inquiries, please contact your retailer or the manufacturer directly. Please have your product model number (ZK-AS21P) and purchase information ready when contacting support.

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