

[Manuals.plus](#) /

› [Wuzhi Audio](#) /

› ZK-ST21 2.1 Channel Bluetooth Amplifier Board User Manual

Wuzhi Audio Wuzhi Audio ZK-ST21

ZK-ST21 2.1 Channel Bluetooth Amplifier Board User Manual

Brand: Wuzhi Audio | **Model:** ZK-ST21

1. INTRODUCTION

Thank you for choosing the Wuzhi Audio ZK-ST21 2.1 Channel Bluetooth Amplifier Board. This high-fidelity audio amplifier is designed to deliver powerful and clear sound for your home audio or vehicle setups. Featuring dual TPA3221 chips, it provides 100W per stereo channel and 200W for the subwoofer, along with versatile input options including Bluetooth, AUX, and USB. This manual provides detailed instructions for setup, operation, maintenance, and troubleshooting to ensure optimal performance and longevity of your device.

2. WHAT'S IN THE BOX

Please check the contents of your package. If any items are missing or damaged, please contact customer support.

- ZK-ST21 2.1 Channel Bluetooth Amplifier Board
- Small Screwdriver (for terminal connections)
- User Manual (this document)



Figure 2.1: ZK-ST21 Amplifier Board and included screwdriver.

The image displays the ZK-ST21 amplifier board, a compact black circuit board with several silver knobs and various input/output terminals. A small yellow-handled screwdriver is placed next to it, indicating its use for connecting wires to the terminals.

3. PRODUCT OVERVIEW

Familiarize yourself with the various components and controls of the ZK-ST21 amplifier board.

3.1 Component Layout

DUAL TPA3221 CHIP

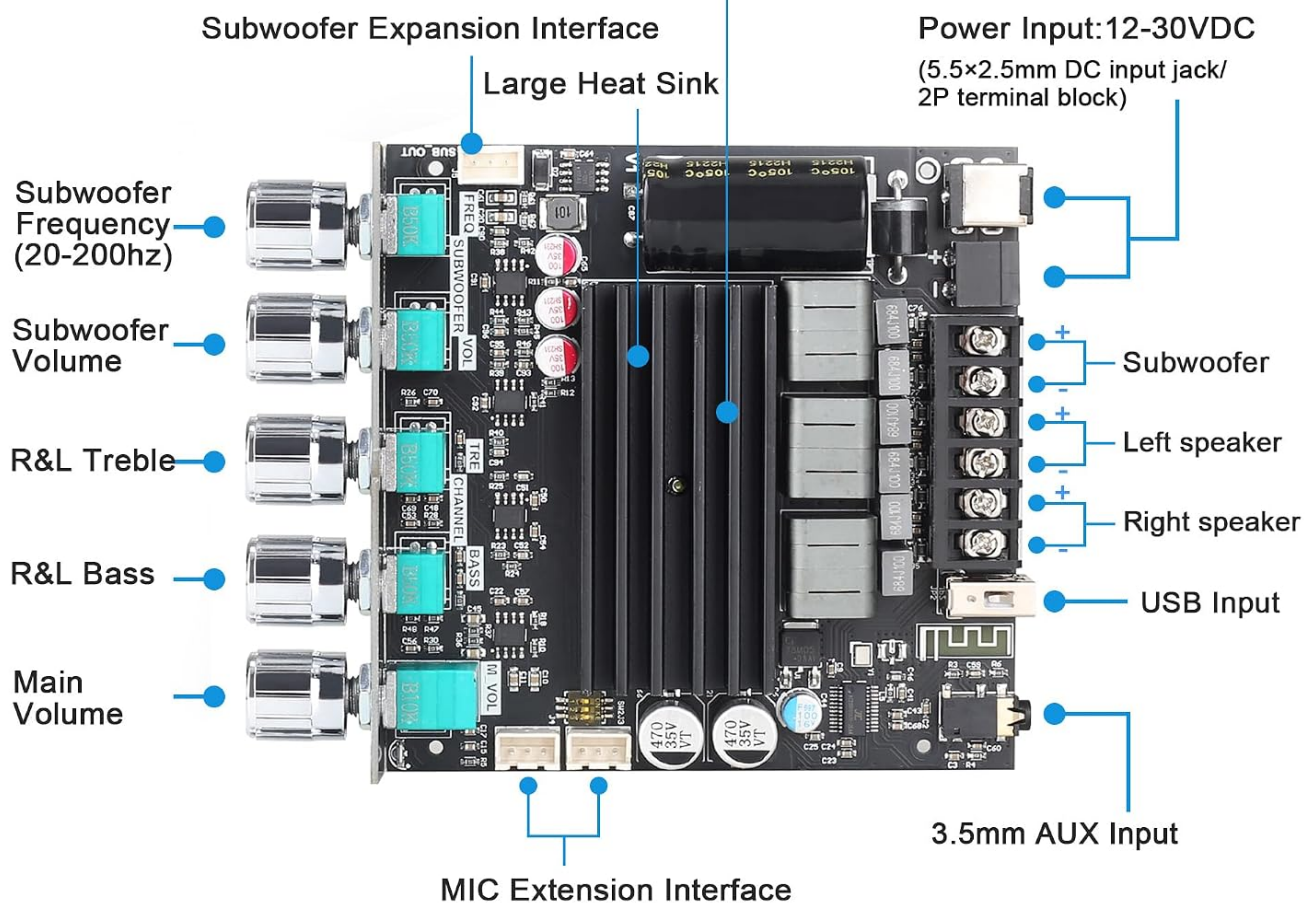


Figure 3.1: ZK-ST21 Component Diagram.

This diagram labels the key components and connection points on the ZK-ST21 amplifier board, including the power input (12-30VDC), subwoofer and speaker outputs, USB input, 3.5mm AUX input, subwoofer expansion interface, MIC extension interface, large heat sink, and control knobs for Subwoofer Frequency, Subwoofer Volume, R&L Treble, R&L Bass, and Main Volume.

- **Power Input (DC 12-30V):** Connect your power supply here.
- **Subwoofer Output:** Connect your passive subwoofer.
- **Left/Right Speaker Outputs:** Connect your passive left and right speakers.
- **USB Input:** For USB drive playback or USB sound card functionality.
- **AUX Input (3.5mm):** For wired audio connection from devices.
- **Bluetooth 5.1 Module:** For wireless audio streaming.
- **Subwoofer Expansion Interface:** For connecting an external subwoofer amplifier.
- **MIC Extension Interface:** For connecting a microphone front stage board (e.g., ZK-AMP).
- **Large Heat Sink:** Dissipates heat from the amplifier chips.
- **Dual TPA3221 Chips:** High-performance audio amplifier chips.

3.2 Control Knobs

- **Main Volume:** Controls the overall output volume.
- **R&L Bass:** Adjusts the bass level for the left and right stereo channels.
- **R&L Treble:** Adjusts the treble level for the left and right stereo channels.
- **Subwoofer Volume:** Controls the volume of the subwoofer output.
- **Subwoofer Freq (Frequency):** Adjusts the crossover frequency for the subwoofer.

4. SPECIFICATIONS

Feature	Specification
Bluetooth Version	5.1
Power Output (Peak)	100W+100W+200W
Audio Input	AUX + Bluetooth + USB
Channels	2.1
Chip	Dual TPA3221
Power Supply Range	DC 12V-30V / ≥10A
Speaker Impedance (L&R)	3-8Ω, ≤100W
Speaker Impedance (Subwoofer)	2-8Ω, ≤200W
Protection Features	Undervoltage input, reverse polarity, overheat, overcurrent, short circuit protection
Product Dimensions	121mm x 100mm x 25mm (4.76 x 3.93 x 0.98 inches)
Weight	7.76 ounces

4.1 Output Power Table

ZK-ST21 Output Power Table(@1KHZ)

Model : ZK-ST21		Power Supply : DC12-30V/10A OR Above	
Power Output	DC Voltage	Channel	Output Power (Max)
	12V	R & L	10W+10W @ 8Ω
			20W+20W @ 4Ω
		Subwoofer	10W @ 8Ω
			20W @ 4Ω
			35W @ 2Ω
	24V	R & L	30W+30W @ 8Ω
			70W+70W @ 4Ω
		Subwoofer	30W @ 8Ω
			70W @ 4Ω
			150W @ 2Ω
	30V	R & L	60W+60W @ 8Ω
			100W+100W @ 4Ω
		Subwoofer	60W @ 8Ω
			100W @ 4Ω
			200W @ 2Ω

If the input voltage is 30V, the speaker impedance for the left and right channels must be greater than or equal to 4 ohms, and the subwoofer channel impedance must be greater than or equal to 2 ohms.

Figure 4.1: ZK-ST21 Output Power Table (@1KHz).

This table details the maximum output power for the ZK-ST21 amplifier at 1KHz, showing power output for R&L channels and the subwoofer at different DC voltages (12V, 24V, 30V) and speaker impedances (8Ω, 4Ω, 2Ω). For example, at 30V, R&L channels can output 100W+100W at 4Ω, and the subwoofer can output 200W at 2Ω.

4.2 Product Dimensions

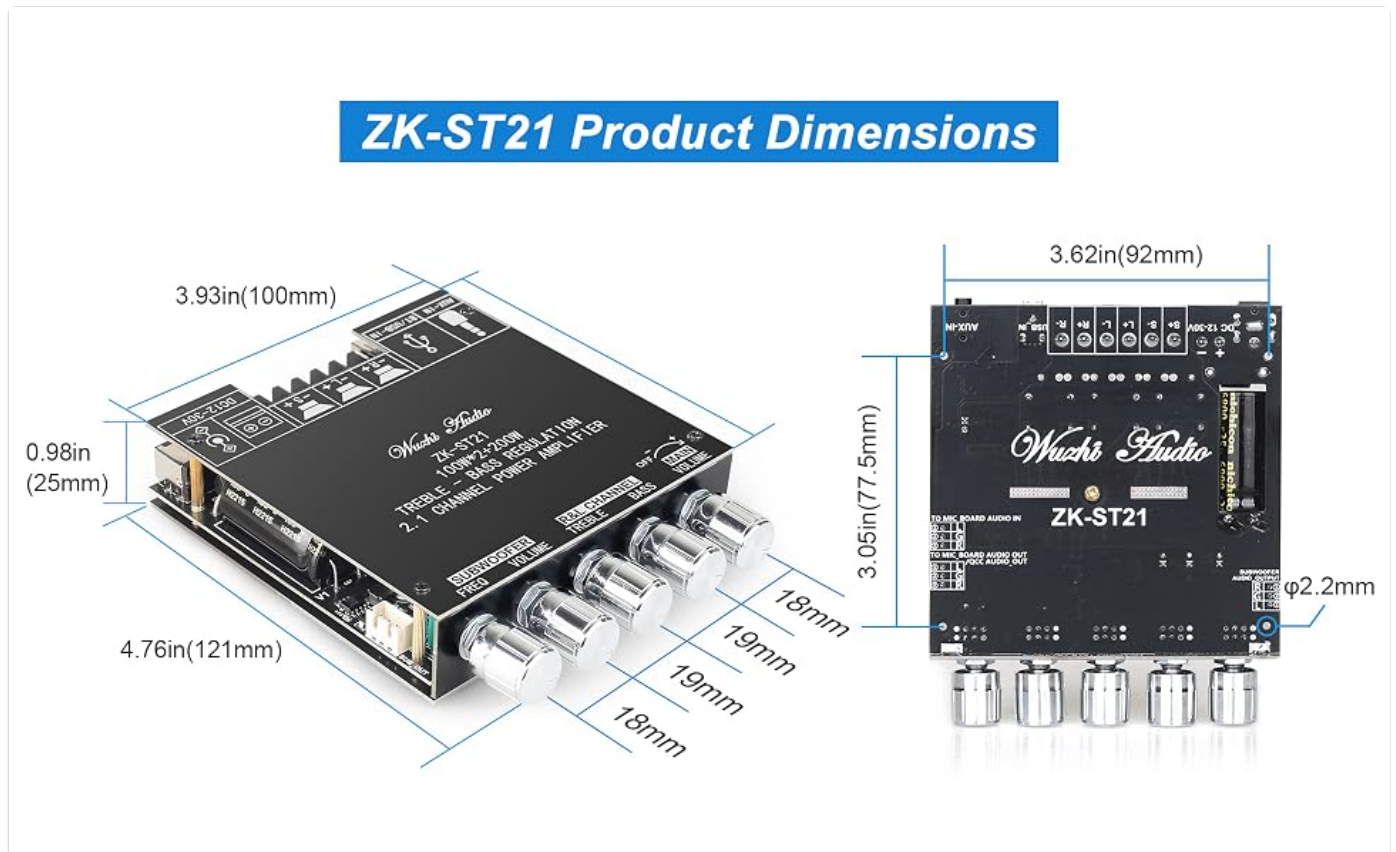


Figure 4.2: ZK-ST21 Product Dimensions.

This diagram provides the physical dimensions of the ZK-ST21 amplifier board, showing its length (121mm / 4.76in), width (100mm /

3.93in), and height (25mm / 0.98in), along with other detailed measurements for mounting and component spacing.

5. SETUP GUIDE

Follow these steps to correctly set up your ZK-ST21 amplifier board.

5.1 Power Connection

1. Ensure your power supply is rated for DC 12V-30V and provides at least 10A.
2. Connect the positive (+) terminal of your power supply to the DC IN + terminal on the amplifier board.
3. Connect the negative (-) terminal of your power supply to the DC IN - terminal on the amplifier board.
4. **Caution:** Ensure correct polarity to prevent damage to the board. The board has reverse-polarity protection, but incorrect connection should still be avoided.

5.2 Speaker Connection

Connect your passive speakers and subwoofer to the appropriate terminals.

1. **Left & Right Speakers:** Connect your left speaker to the L+ and L- terminals, and your right speaker to the R+ and R- terminals. Ensure speaker impedance is between 3-8Ω and power rating is ≤100W per channel.
2. **Subwoofer:** Connect your subwoofer to the SW+ and SW- terminals. Ensure subwoofer impedance is between 2-8Ω and power rating is ≤200W.
3. **Note:** Use appropriate gauge speaker wire for optimal performance and to prevent overheating.



Figure 5.1: Amplifier connected to 2.1 channel speaker system.

The image shows the ZK-ST21 amplifier board positioned between two wooden stereo speakers and a subwoofer (partially visible). Wires are connected from the amplifier to the speakers, illustrating a typical 2.1 channel audio setup.

5.3 Input Source Connection

Choose your preferred audio input method:

- **Bluetooth:** No physical connection needed. Proceed to Section 6.1 for pairing.
- **AUX Input:** Connect a 3.5mm audio cable from your audio source (e.g., phone, TV, laptop) to the AUX-IN port on the amplifier board.
- **USB Input:** Insert a USB flash drive containing audio files into the USB port, or connect a device functioning as a USB sound card.

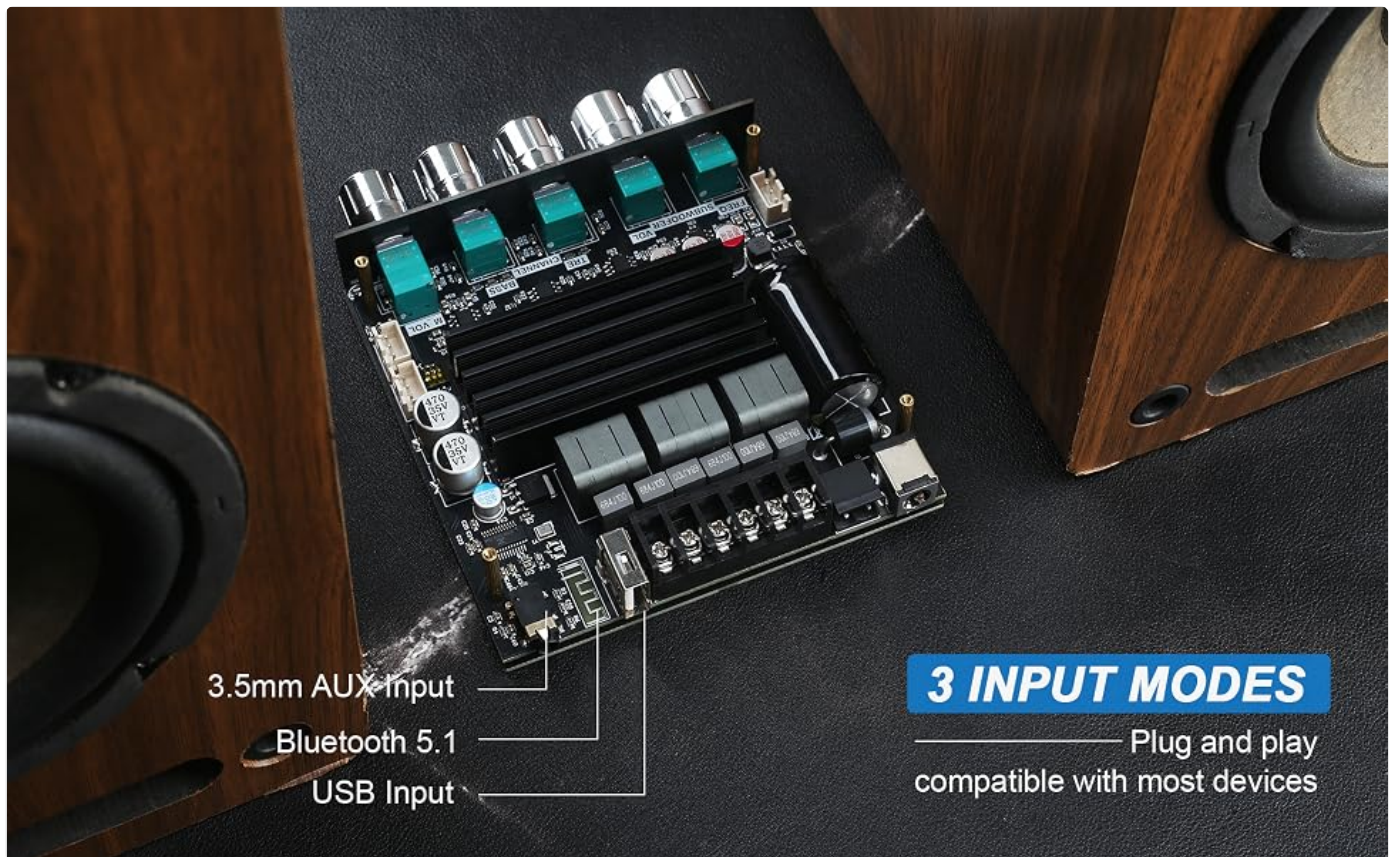


Figure 5.2: Available Input Modes.

This image highlights the three input modes of the ZK-ST21 amplifier: 3.5mm AUX Input, Bluetooth 5.1, and USB Input. The amplifier is shown connected to speakers, with labels pointing to the respective input ports.

6. OPERATING INSTRUCTIONS

6.1 Bluetooth Connection

1. Power on the amplifier board.
2. On your audio device (smartphone, tablet, etc.), enable Bluetooth and search for available devices.
3. Select "ZK-ST21" from the list of devices to pair.
4. Once paired, the amplifier will indicate a successful connection (e.g., a confirmation tone).
5. You can now play audio from your device through the amplifier.

6.2 AUX Input Usage

1. Connect your audio source to the AUX-IN port using a 3.5mm audio cable.
2. The amplifier will automatically switch to AUX input mode.
3. Adjust the volume on both your audio source and the amplifier for desired sound levels.

6.3 USB Input Usage

1. Insert a USB flash drive (formatted to FAT32) containing MP3/WAV/FLAC audio files into the USB port.
2. The amplifier will automatically detect the USB drive and begin playback.

3. Alternatively, connect a device that functions as a USB sound card to the USB port.

6.4 Sound Customization

Use the control knobs to fine-tune your audio experience:

- **Main Volume:** Rotate clockwise to increase volume, counter-clockwise to decrease.
- **R&L Bass/Treble:** Adjust these knobs to enhance or reduce bass and treble frequencies for the main stereo channels.
- **Subwoofer Volume:** Adjust this knob to control the output level of the subwoofer.
- **Subwoofer Freq:** Adjust this knob to set the crossover frequency for the subwoofer, determining which low frequencies are sent to the subwoofer.

7. MAINTENANCE

- **Cleaning:** Use a soft, dry cloth to wipe the surface of the amplifier board. Do not use liquid cleaners or solvents.
- **Ventilation:** Ensure the amplifier board is placed in a well-ventilated area to prevent overheating. Do not block the heat sink.
- **Storage:** When not in use for extended periods, store the amplifier in a cool, dry place away from direct sunlight and excessive dust.
- **Connections:** Periodically check all wire connections to ensure they are secure and free from corrosion.

8. TROUBLESHOOTING

If you encounter issues with your ZK-ST21 amplifier board, refer to the following common problems and solutions:

Problem	Possible Cause	Solution
No sound output	No power Incorrect speaker wiring Incorrect input source selected Volume too low	Check power supply connection and voltage. Verify speaker polarity and secure connections. Ensure the correct input (Bluetooth, AUX, USB) is active. Increase Main Volume and source device volume.
Distorted sound	Volume too high (clipping) Speaker impedance mismatch Poor audio source quality	Reduce volume on amplifier and/or source. Ensure speakers meet impedance requirements (3-8Ω for L&R, 2-8Ω for Sub). Try a different audio source or cable.
Bluetooth connection issues	Device not in pairing mode Too far from amplifier Interference	Ensure amplifier is powered on and discoverable. Move device closer to the amplifier. Turn off other Bluetooth devices nearby. Forget "ZK-ST21" on your device and re-pair.
Amplifier shuts off automatically	Overheat protection Overcurrent protection Undervoltage protection	Ensure adequate ventilation; reduce volume. Check speaker wiring for shorts; ensure speaker impedance is correct. Verify power supply voltage is within 12-30V and stable.

9. WARRANTY AND SUPPORT

Wuzhi Audio is committed to providing reliable products and excellent customer service. Your ZK-ST21 amplifier board comes with built-in safety protections to ensure prolonged and safe use.

For any questions, issues, or technical support, please contact our customer service team. We guarantee a 100% satisfactory resolution to your inquiries.

Please refer to your purchase platform or product packaging for specific warranty terms and contact information.

ASK A QUESTION ABOUT THIS MANUAL

Ask about setup, troubleshooting, compatibility, parts, safety, or missing instructions. Manuals+ will review the question and use this page's manual context to help answer it.

Name

Anonymous

Email

you@example.com

After a successful submission, we securely hash the supplied account or form email before sending it to Microsoft Advertising for conversion attribution. [Privacy details](#).

Question

Example: How do I reset this device or fix this error?

Details

Model number, symptoms, what you tried, or the section of the manual you are using.

Submit question