

CUQI ZK-HT21

CUQI ZK-HT21 Bluetooth Amplifier Board Instruction Manual

Model: ZK-HT21 (BAB-2.1T)

1. INTRODUCTION

This manual provides detailed instructions for the installation, operation, and maintenance of the CUQI ZK-HT21 Bluetooth Amplifier Board. This 2.1 channel amplifier module is designed for DIY speaker projects, offering high-fidelity audio output with versatile input options and robust protection features.

2. PRODUCT FEATURES

- **Three Audio Input Methods:** Supports AUX (3.5mm), USB (U-Disk), and Bluetooth 5.0 connections for broad compatibility with various audio devices. The Bluetooth connection range is approximately 15 meters (49 feet).
Note: When using AUX mode, ensure the module's Bluetooth connection is disconnected.
- **Triple-Channel Audio Experience:** Features a built-in DA7498E chip, delivering 160W for left and right channels and 220W for the subwoofer, providing clear and powerful sound.
- **Effective Heat Dissipation:** Incorporates a semi-open structure with a silent fan to efficiently reduce operating temperature and extend the amplifier board's lifespan.
- **Multi-protection:** Built-in safeguards against reverse polarity, short circuits, overheating, and overcurrent ensure safe operation.
- **Wide Compatibility:** Supports DC 15–36V power supplies (under-voltage protection triggers below 9V, also supports 12V). Compatible with 30–200W, 4–8Ω speakers.

3. PACKAGE CONTENTS

Verify that all items listed below are included in your package:

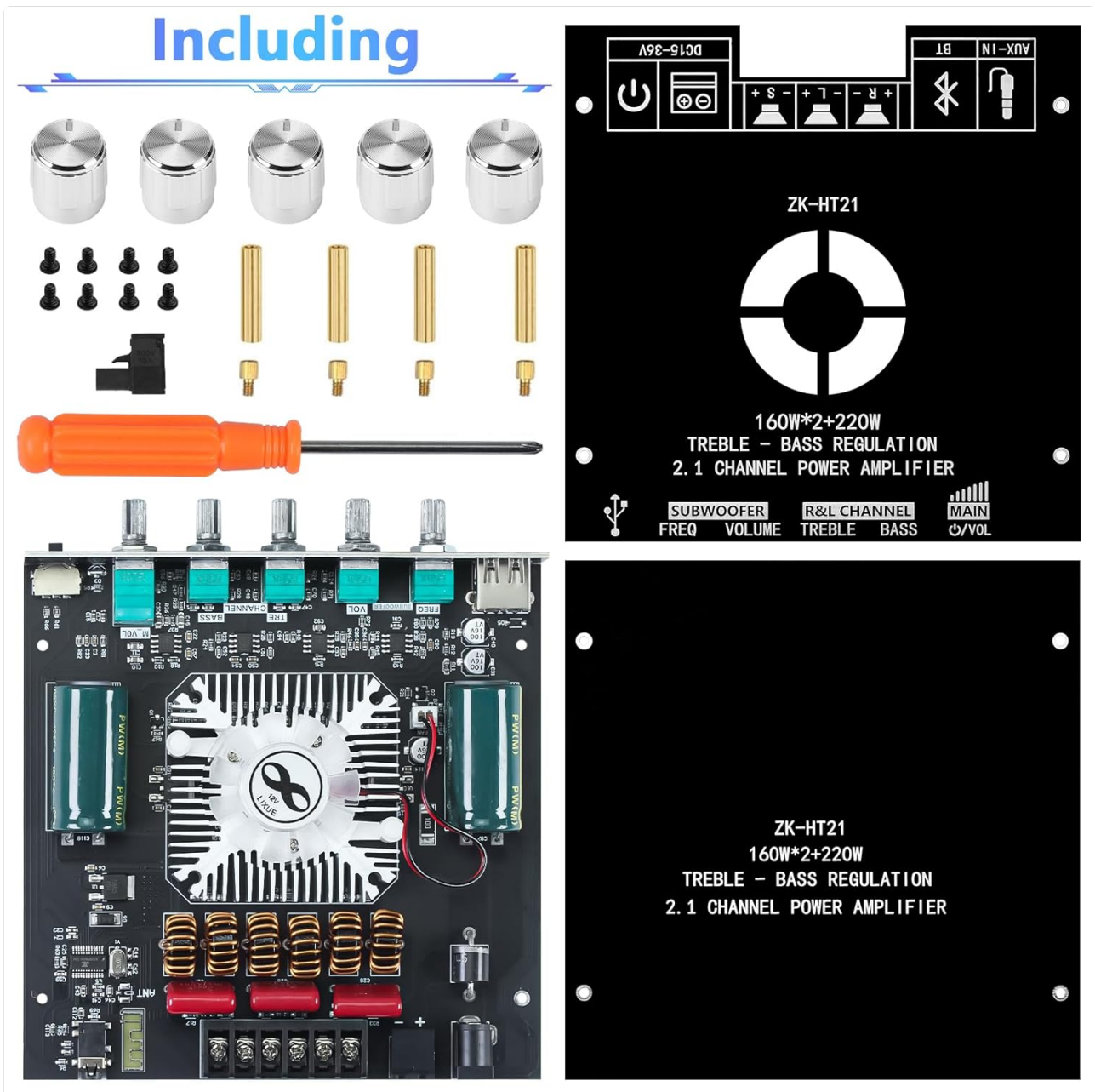


Figure 3.1: Package Contents. This image displays the ZK-HT21 amplifier board, top and bottom cover plates, various screws and copper columns for assembly, five button caps, a power terminal, and a screwdriver.

- ZK-HT21 Bluetooth Amplifier Board x1
- Top Cover Plate x1
- Lower Cover Plate x1
- M2x18 Copper Column x4
- M2x5+4 Copper Column x4
- M2x4mm Screws x8
- Button Cap x5
- Power Terminal x1
- Screwdriver x1

4. PRODUCT OVERVIEW

Familiarize yourself with the components and controls of the ZK-HT21 amplifier board.

Product Introduction

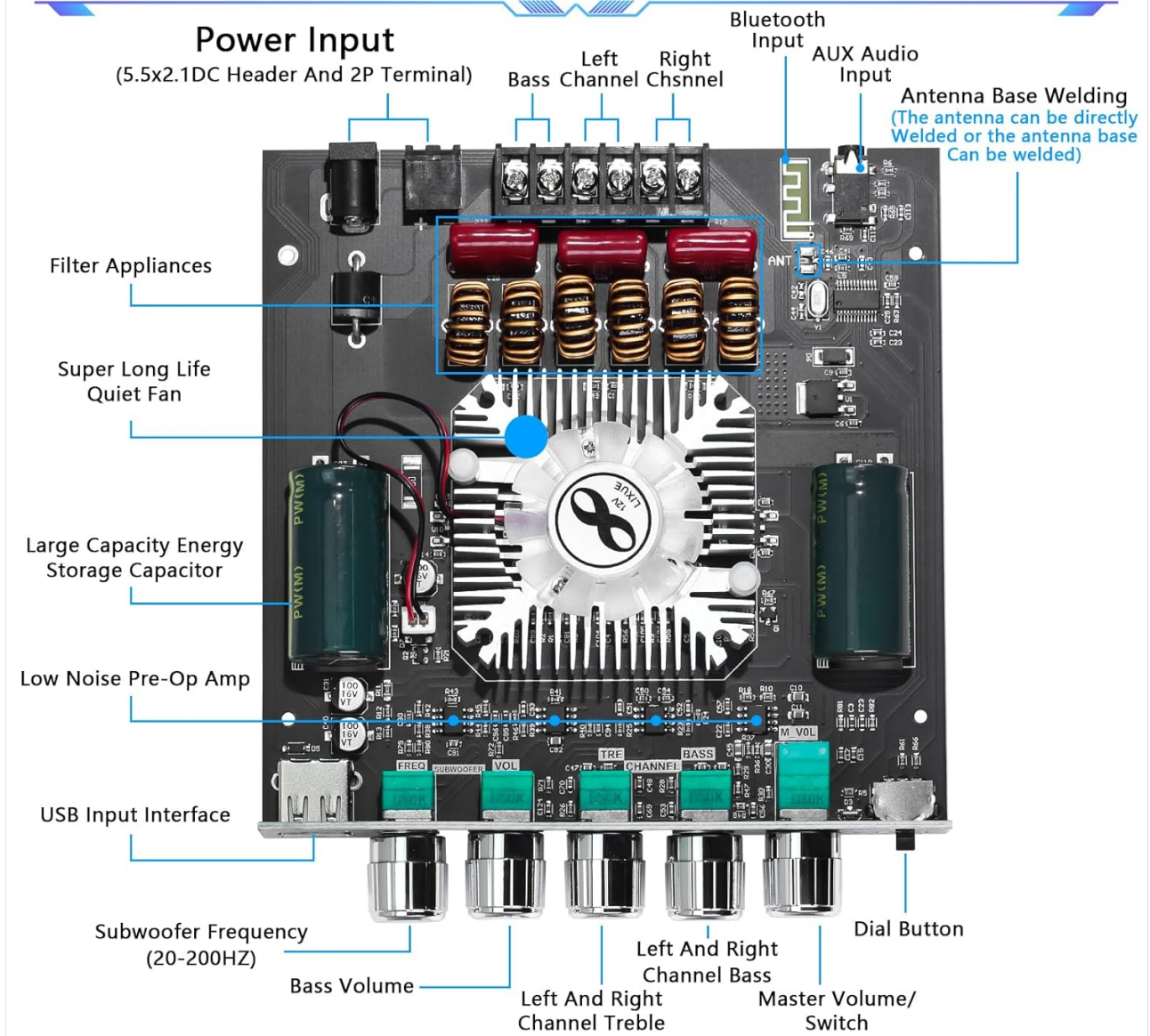


Figure 4.1: Component Layout. This diagram identifies the power input, speaker terminals, audio inputs (Bluetooth, AUX, USB), control knobs (Subwoofer Frequency, Bass Volume, Left/Right Channel Treble, Left/Right Channel Bass, Master Volume/Switch), and internal components like the fan and capacitors.

- **Power Input:** 5.5x2.1DC Header and 2P Terminal for DC 15-36V power supply.
- **Speaker Outputs:** Terminals for Left, Right, and Subwoofer channels.
- **Audio Inputs:** Bluetooth, AUX (3.5mm), USB (U-Disk).
- **Subwoofer Freq (Frequency):** Adjusts the cutoff frequency for the subwoofer.
- **Subwoofer Volume:** Controls the output level of the subwoofer.
- **Left and Right Channel Treble:** Adjusts high frequencies for stereo channels.
- **Left and Right Channel Bass:** Adjusts low frequencies for stereo channels.
- **Master Volume/Switch:** Controls overall volume. Press the dial button for short press (pause/play) or long press (switch mode: USB/Bluetooth/AUX).
- **USB Input Interface:** For connecting a U-Disk to play audio files.
- **Antenna Base:** For Bluetooth antenna (can be directly welded or use the antenna base).

5. SETUP AND INSTALLATION

Follow these steps to assemble and connect your amplifier board.

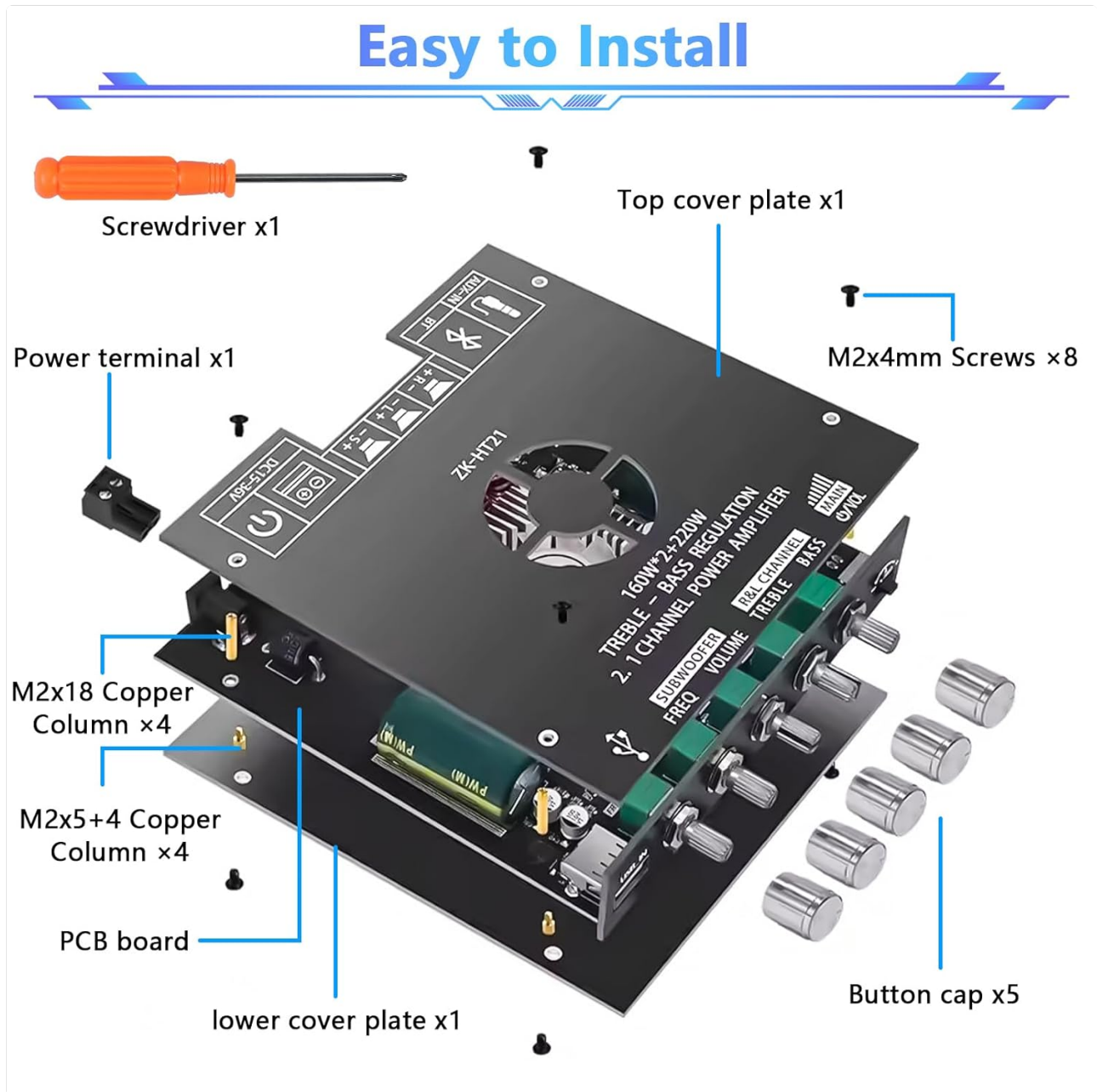


Figure 5.1: Assembly Diagram. This image illustrates the assembly process, showing the PCB board, copper columns, top and bottom cover plates, screws, and button caps.

1. Assemble the Casing:

- Attach the M2x5+4 copper columns to the PCB board using the M2x4mm screws.
- Place the lower cover plate onto these copper columns.
- Attach the M2x18 copper columns to the PCB board.
- Place the top cover plate onto the M2x18 copper columns and secure with the remaining M2x4mm screws.
- Install the five button caps onto the control shafts.

2. **Connect Speakers:** Connect your 30-200W, 4-8Ω speakers to the designated Left, Right, and Subwoofer output terminals on the amplifier board. Ensure correct polarity (+/-).

3. **Connect Power:** Connect a DC 15-36V power supply to the 5.5x2.1DC header or the 2P terminal. Ensure correct polarity.

4. **Connect Audio Source:** Choose one of the following input methods:

- **Bluetooth:** Power on the board. The Bluetooth indicator will flash. Search for "ZK-HT21" on your device and pair.
- **AUX:** Connect your audio device (phone, PC, MP3, TV) to the 3.5mm AUX input. Ensure Bluetooth is disconnected.
- **USB:** Insert a U-Disk with audio files into the USB input interface.

6. OPERATING INSTRUCTIONS

Once connected, operate the amplifier using the following controls:



Figure 6.1: Audio Input Methods. This image visually represents connecting audio sources via Bluetooth, AUX, or USB to the amplifier board for playback through speakers.

- **Power On/Off:** The amplifier powers on automatically when connected to a suitable power supply.
- **Master Volume/Switch Knob:**

- Rotate to adjust the overall output volume.
- **Short Press:** In Bluetooth mode, this acts as Play/Pause. In AUX mode, it mutes/unmutes the audio.
- **Long Press:** Switches between input modes (USB, Bluetooth, AUX).
- **Subwoofer Freq Knob:** Adjusts the low-pass filter frequency for the subwoofer output. Turn clockwise for higher cutoff, counter-clockwise for lower.
- **Subwoofer Volume Knob:** Adjusts the volume level of the subwoofer independently.
- **Left and Right Channel Treble Knob:** Adjusts the high-frequency response for the main stereo channels.
- **Left and Right Channel Bass Knob:** Adjusts the low-frequency response for the main stereo channels.

7. MAINTENANCE

To ensure optimal performance and longevity of your ZK-HT21 amplifier board:

- Keep the board clean and free from dust. Use a soft, dry cloth for cleaning.
- Ensure adequate ventilation around the amplifier, especially around the fan, to facilitate proper heat dissipation.
- Avoid exposing the board to moisture, extreme temperatures, or direct sunlight.
- Do not attempt to modify the circuit board, as this may void any potential warranty and could cause damage.

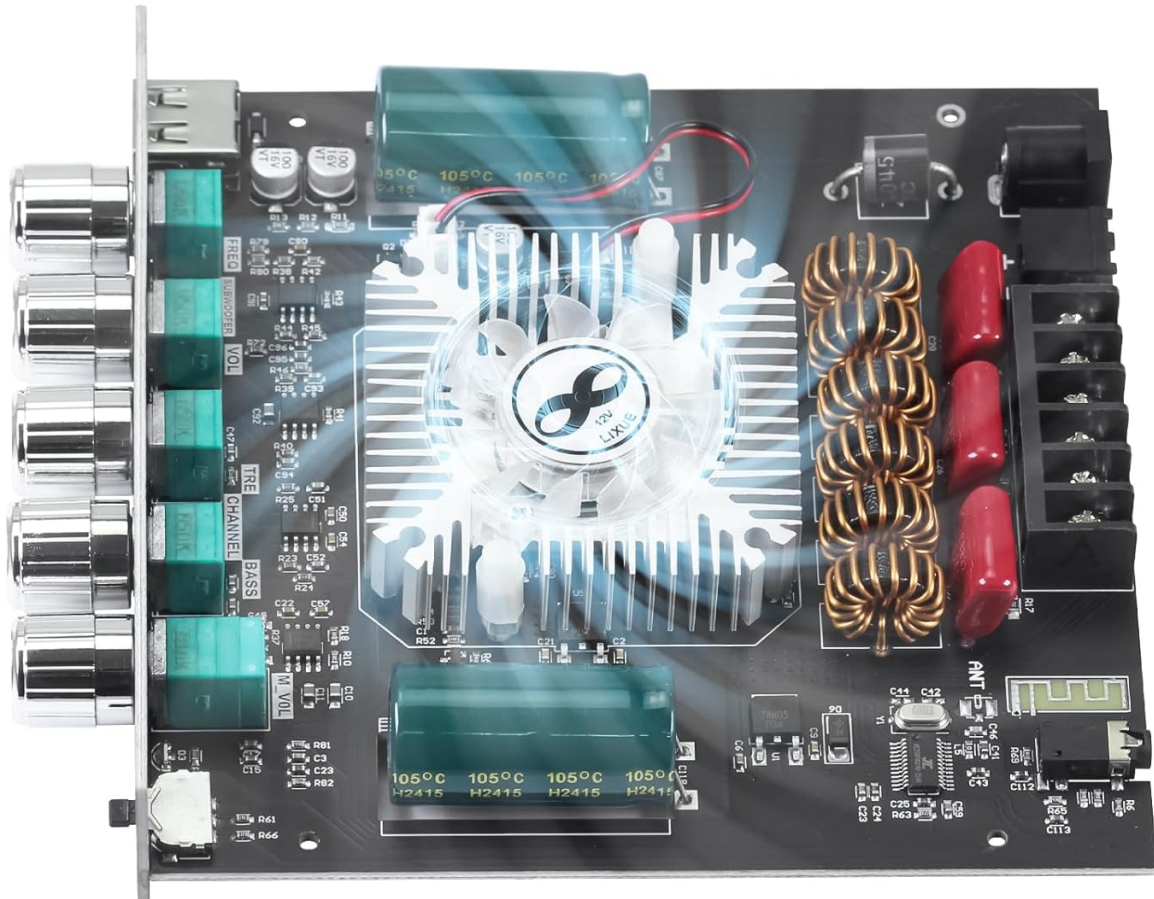
8. TROUBLESHOOTING

If you encounter issues, refer to the following common problems and solutions:

Problem	Possible Cause	Solution
No sound output.	<ul style="list-style-type: none"> Incorrect power supply voltage or polarity. Loose speaker connections. Incorrect input mode selected. Source device volume too low or muted. Bluetooth not paired or disconnected. 	<ul style="list-style-type: none"> Verify power supply is DC 15-36V and connected correctly. Check all speaker wire connections for secure contact and correct polarity. Long press the Master Volume knob to cycle through input modes (USB/Bluetooth/AUX). Increase volume on both the amplifier and the source device. Re-pair Bluetooth or ensure AUX cable is fully inserted and Bluetooth is disconnected.
Distorted sound.	<ul style="list-style-type: none"> Volume too high (clipping). Improper speaker impedance. Poor audio source quality. 	<ul style="list-style-type: none"> Reduce volume on both amplifier and source. Ensure speakers are 4-8Ω. Test with a different audio source or higher quality audio files.
Bluetooth connection issues.	<ul style="list-style-type: none"> Device out of range. Interference. AUX cable connected. 	<ul style="list-style-type: none"> Move device closer to the amplifier (within 15m/49ft). Avoid placing near other wireless devices. Disconnect any AUX cable to enable Bluetooth.

Problem	Possible Cause	Solution
Amplifier feels hot.	Inadequate ventilation. Prolonged high-volume operation.	Ensure the fan is unobstructed and there is airflow around the board. Reduce volume or allow the unit to cool down. The board has built-in overheat protection.

Protection & Heat Dissipation



Undervoltage
Protection



Overheat
Protection



Overcurrent
Protection



Short-Circuit
Protection



Reverse Connection
Protection

Figure 8.1: Protection Features. This image highlights the various built-in protections of the amplifier board, including undervoltage, overheat, overcurrent, short-circuit, and reverse connection protection.

9. SPECIFICATIONS

Parameter	Value
Model Number	ZK-HT21 (BAB-2.1T)

Parameter	Value
Brand	CUQI
Channels	2.1 (Left, Right, Subwoofer)
Output Power	160W (Left) + 160W (Right) + 220W (Subwoofer)
Power Supply	DC 15-36V
Speaker Impedance	4-8Ω
Speaker Power	30-200W
Bluetooth Version	5.0
Bluetooth Range	Up to 15 meters (49 feet)
Audio Input Methods	Bluetooth, AUX (3.5mm), USB (U-Disk)
Product Dimensions (L x W x H)	126mm x 145mm x 28mm (4.96 x 5.71 x 1.1 inches)
Item Weight	Approximately 13 ounces

Mini Size

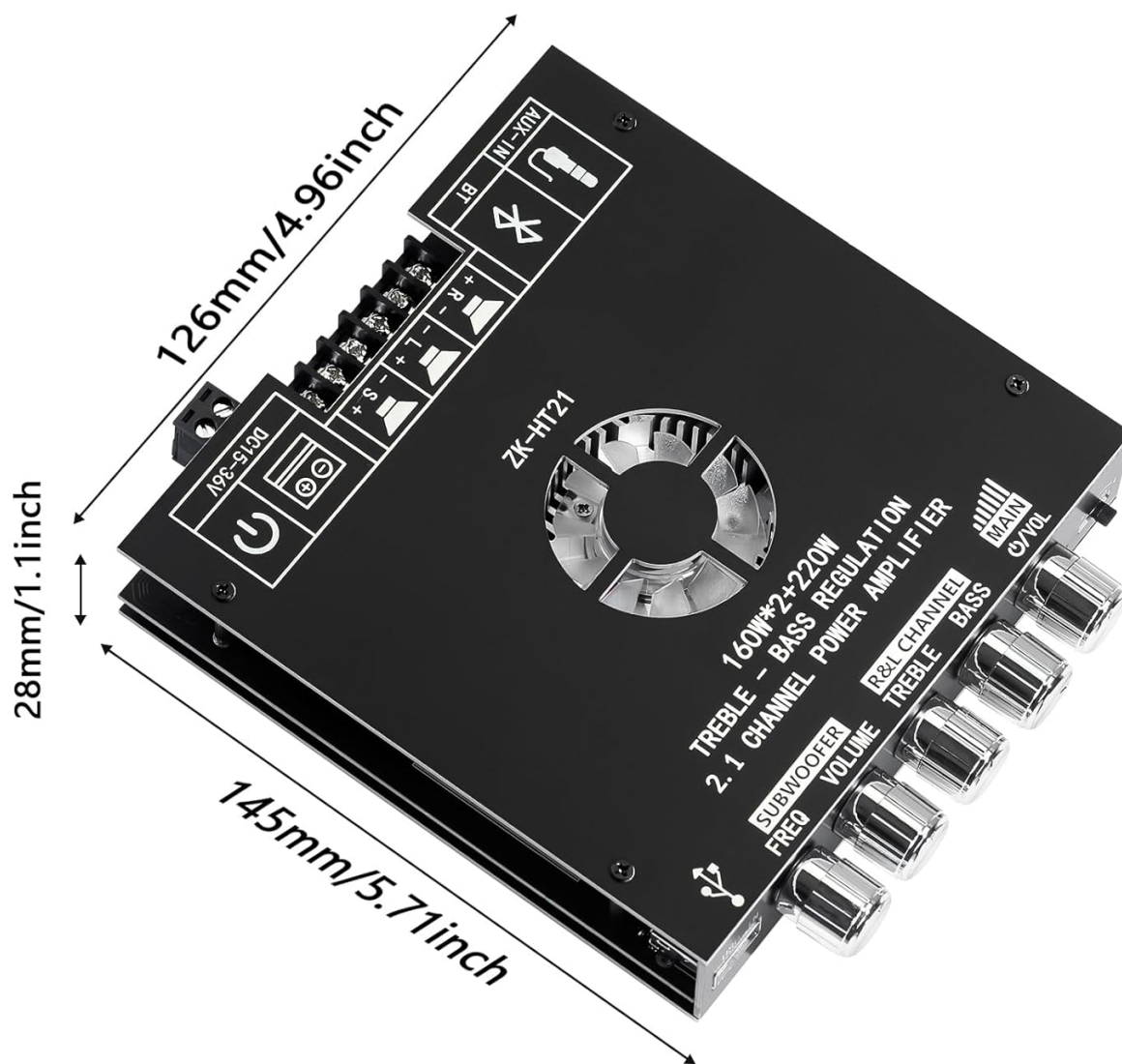


Figure 9.1: Product Dimensions. This image provides a visual representation of the amplifier board's physical dimensions.

10. SAFETY INFORMATION

Please read and follow these safety guidelines to prevent injury or damage to the product:

- Use only the specified DC 15-36V power supply. Using an incorrect voltage or AC power can damage the board.
- Ensure correct polarity when connecting the power supply and speakers.
- Do not operate the amplifier in wet or damp conditions.
- Avoid touching the circuit board components while the unit is powered on.
- Keep out of reach of children.
- The amplifier board includes built-in protections against reverse polarity, short circuits, overheating, and overcurrent. However, always exercise caution during installation and operation.

11. WARRANTY AND SUPPORT

For warranty information or technical support, please contact the seller or manufacturer directly. Retain your purchase receipt for any warranty claims.