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CUQI ZK-HT21

CUQI ZK-HT21 2.1 Channel Bluetooth Amplifier Board User Manual

Model: ZK-HT21

1. Introduction

This manual provides comprehensive instructions for the CUQI ZK-HT21 2.1 Channel Bluetooth Amplifier Board. It covers product features, specifications, setup, operation, maintenance, and troubleshooting to ensure optimal performance and safe use. This amplifier board is designed for DIY audio projects, offering high-fidelity sound with versatile input options.

2. Product Overview

The ZK-HT21 is a 2.1 channel Bluetooth 5.0 amplifier board featuring a DA7498E chip. It delivers 160W for left and right channels and 220W for the subwoofer, providing a clear and powerful audio experience. It supports AUX, USB, and Bluetooth audio inputs and includes comprehensive protection features and efficient heat dissipation.

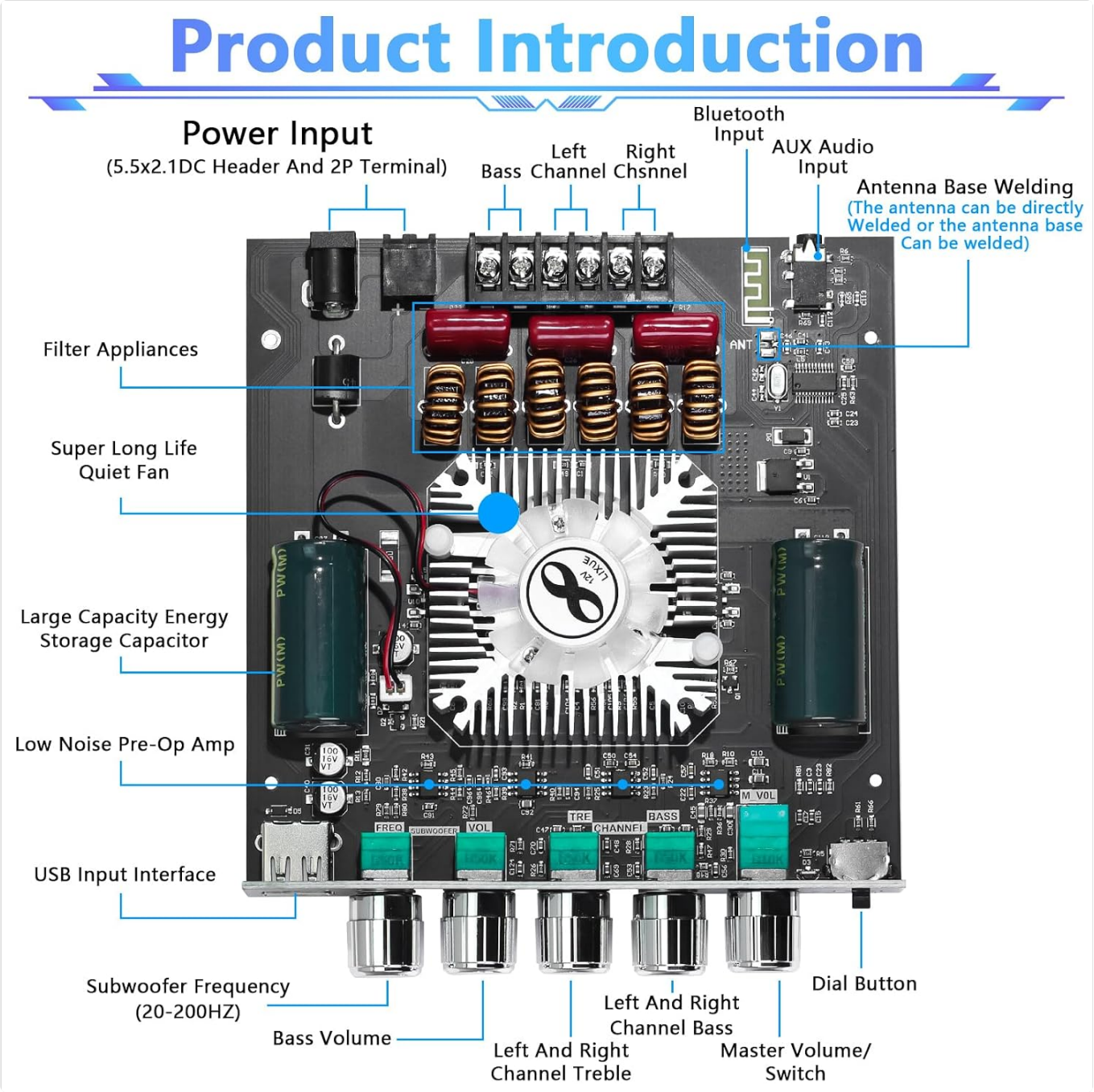
2.1 Key Features

- **Triple Audio Input Methods:** Supports AUX, USB, and Bluetooth 5.0 for versatile device connectivity.
- **High Power Output:** 160W + 160W for stereo channels and 220W for the subwoofer.
- **Integrated DA7498E Chip:** Ensures transparent and clear sound quality.
- **Effective Heat Dissipation:** Features a silent fan within a semi-open structure to maintain optimal operating temperature and extend lifespan.
- **Multi-Protection System:** Built-in safeguards against reverse polarity, short circuits, overheating, and overcurrent.
- **Wide Compatibility:** Operates with DC 15-36V power supplies and is compatible with 30-200W, 4-8Ω speakers.
- **Adjustable Controls:** Independent controls for subwoofer frequency, bass, treble, and master volume.

2.2 Components and Controls

Familiarize yourself with the layout of the amplifier board and its various connection points and controls.

Product Introduction

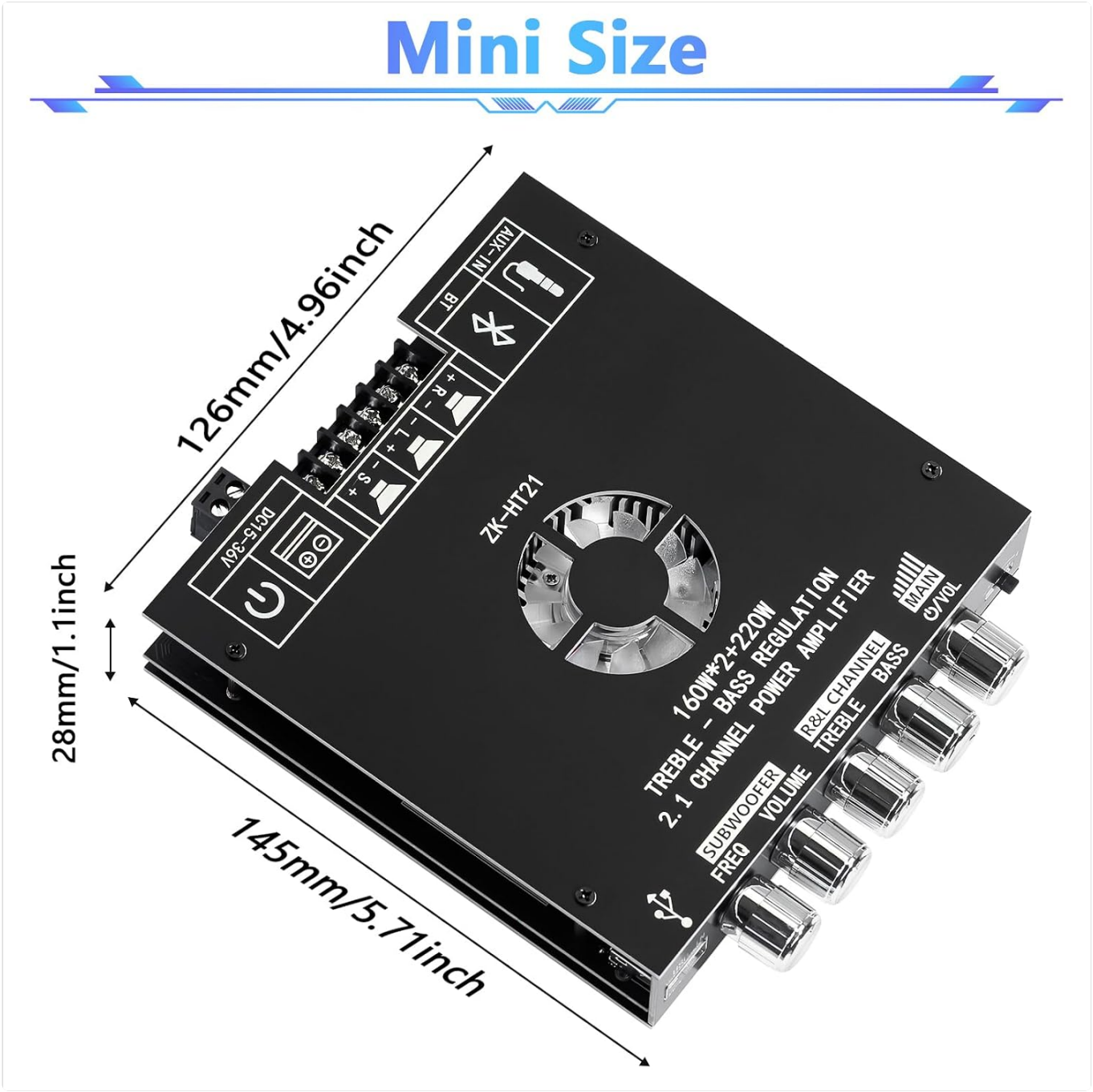


This detailed diagram identifies the key components and connection points on the ZK-HT21 amplifier board, including power input, speaker outputs, audio inputs (AUX, USB, Bluetooth), and various control knobs.

- **Power Input:** 5.5x2.1DC Header and 2P Terminal (DC 15-36V).
- **Speaker Outputs:** Left, Right, and Subwoofer channels.
- **Audio Inputs:** Bluetooth, AUX (3.5mm jack), USB (U-Disk).
- **Control Knobs:**
  - **Subwoofer Freq (FRQ):** Adjusts subwoofer cutoff frequency.
  - **Subwoofer Volume (VOL):** Controls subwoofer output level.
  - **Left & Right Channel Bass (BASS):** Adjusts bass for stereo channels.
  - **Left & Right Channel Treble (TRE):** Adjusts treble for stereo channels.
  - **Master Volume/Switch (MAIN CV/VOL):** Controls overall volume and acts as a power switch (push to toggle).
- **Bluetooth Antenna:** For wireless audio reception.
- **USB Input Interface:** For U-Disk audio playback.

3. Specifications

Parameter	Value
Model	ZK-HT21 (Part Number: BAB-2.1T)
Brand	CUQI
Channels	2.1 (Left, Right, Subwoofer)
Output Power	160W (L) + 160W (R) + 220W (Subwoofer)
Bluetooth Version	5.0
Bluetooth Range	Up to 15 meters (49 feet)
Input Voltage (DC)	15V - 36V
Speaker Impedance	4-8 Ω
Speaker Power	30W - 200W
Dimensions (L x W x H)	12.6 cm x 14.5 cm x 2.8 cm
Included Components	Bluetooth Amplifier Board, Cover Plates, Knobs, Screws, Screwdriver

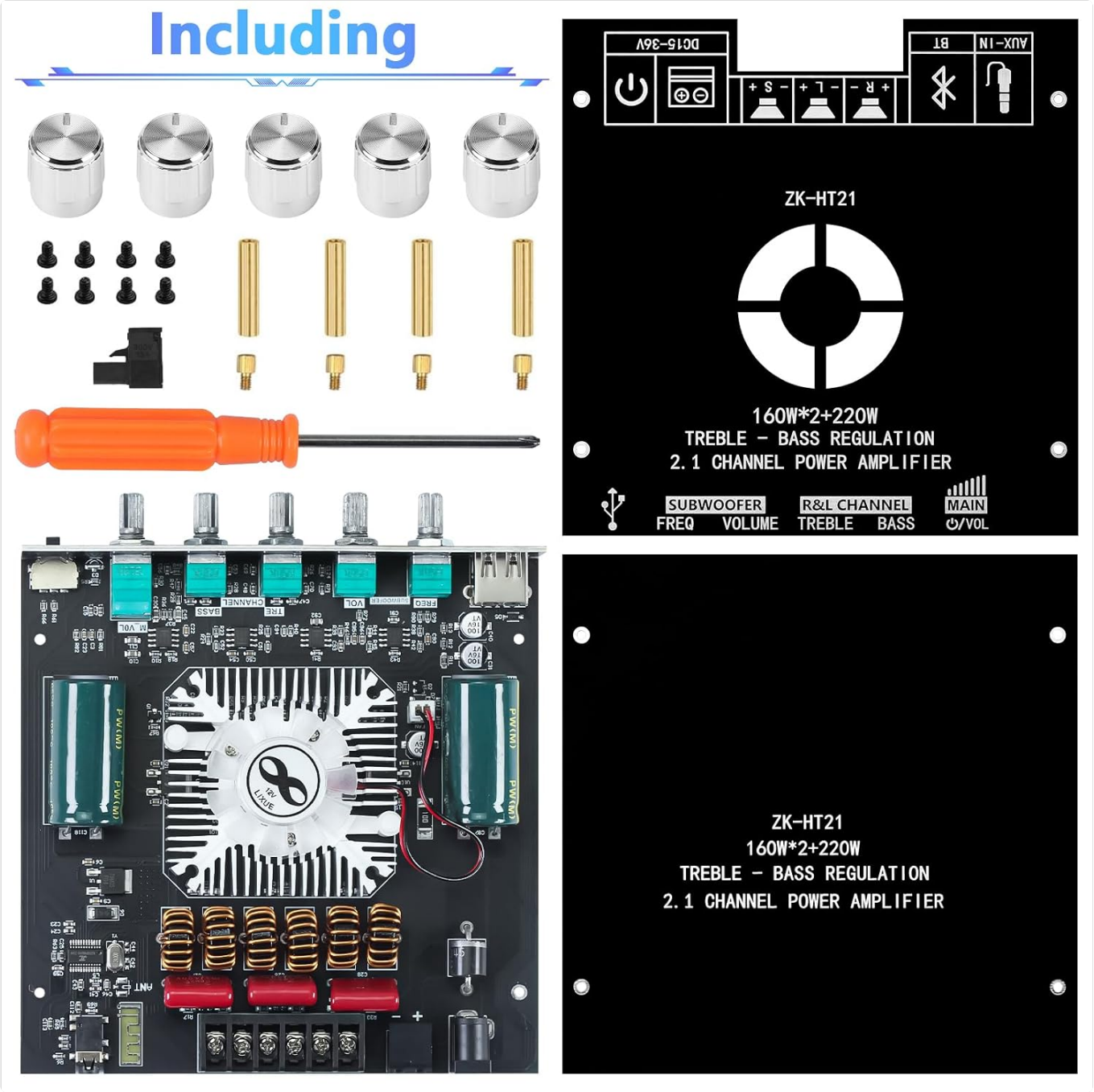


This image illustrates the compact dimensions of the ZK-HT21 amplifier board, measuring 126mm in length, 145mm in width, and 28mm in height.

4. Setup and Installation

4.1 Unpacking and Included Components

Carefully unpack all components and verify that all items are present.

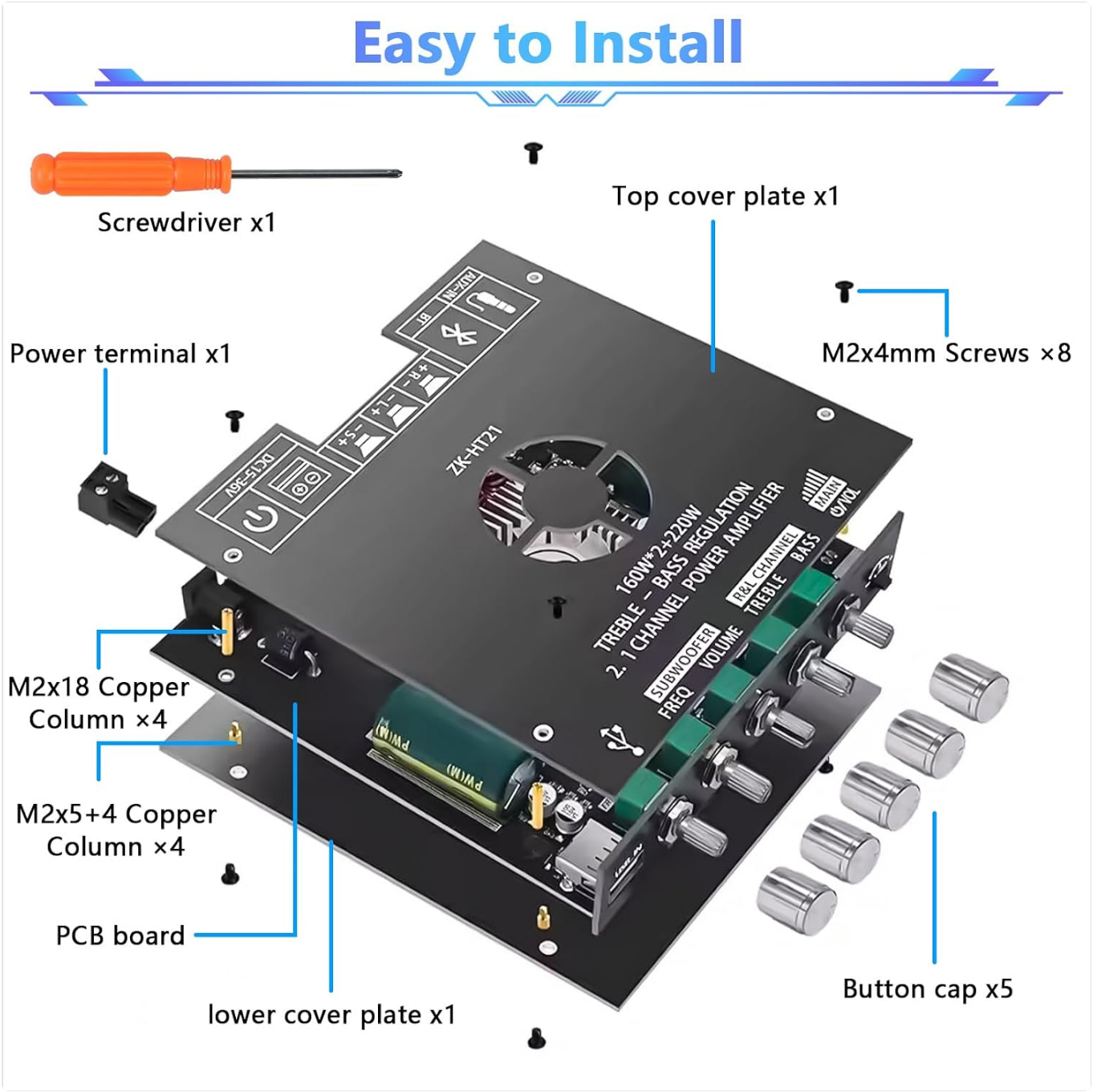


This image displays all items included in the package: the ZK-HT21 amplifier board, protective cover plates, control knobs, mounting hardware, power terminal, and a screwdriver for assembly.

- ZK-HT21 Amplifier Board (PCB)
- Top Cover Plate
- Bottom Cover Plate
- Control Knobs (x5)
- M2x4mm Screws (x8)
- M2x18 Copper Columns (x4)
- M2x5+4 Copper Columns (x4)
- Power Terminal (2P)
- Screwdriver (x1)

4.2 Assembly Instructions

Follow these steps to assemble the amplifier board with its protective casing.



This diagram provides a visual guide for assembling the amplifier board, detailing the placement of the PCB, cover plates, and fastening components.

1. Place the four M2x5+4 copper columns onto the bottom cover plate.
2. Carefully align the PCB board over the copper columns and secure it with four M2x18 copper columns.
3. Place the top cover plate over the M2x18 copper columns and secure it with four M2x4mm screws.
4. Attach the five control knobs to their respective shafts on the PCB.
5. Connect the 2P power terminal to the designated power input on the board.

4.3 Power Supply Connection

The ZK-HT21 requires a DC power supply between 15V and 36V. Ensure the power supply is stable and provides sufficient current for your speaker setup.

- Connect the positive (+) terminal of your DC power supply to the '+' terminal on the amplifier board's power input.
- Connect the negative (-) terminal of your DC power supply to the '-' terminal on the amplifier board's power input.
- **Caution:** Incorrect polarity can damage the device. Always double-check connections before powering on.

4.4 Speaker Connections

Connect your speakers to the appropriate terminals on the amplifier board. The board supports 4-8Ω speakers with power ratings between 30W and 200W.

- **Left Channel Speaker:** Connect to the 'L' and 'GND' terminals for the left channel.
- **Right Channel Speaker:** Connect to the 'R' and 'GND' terminals for the right channel.
- **Subwoofer:** Connect to the 'SW' and 'GND' terminals for the subwoofer.
- Ensure all speaker wires are securely connected and do not short-circuit.

5. Operating Instructions

5.1 Power On/Off

Press the Master Volume/Switch knob (MAIN CV/VOL) to power the amplifier board on or off.

5.2 Audio Input Selection

The ZK-HT21 supports three audio input methods:



The amplifier supports three audio input methods: Bluetooth for wireless connection, 3.5mm AUX for wired devices like phones or PCs, and USB for playing audio from a U-disk.

1. **Bluetooth Mode:**
    - Ensure no AUX cable is connected.
    - Turn on the amplifier. The Bluetooth indicator light will flash, indicating it's in pairing mode.
    - On your device (phone, tablet, laptop), search for Bluetooth devices and select "ZK-HT21" to connect.
    - Once connected, the indicator light will remain solid.
    - The Bluetooth connection range is approximately 15 meters (49 feet).
    - In Bluetooth mode, pressing the Master Volume knob can control playback functions (play/pause, next/previous track depending on device).
2. **AUX Mode (3.5mm Jack):**
    - Connect a 3.5mm audio cable from your audio source (phone, PC, MP3 player, TV) to the AUX input jack on the amplifier board.
    - The amplifier will automatically detect the AUX input and disconnect Bluetooth if it was previously connected.

- In AUX mode, pressing the Master Volume knob will mute/unmute the audio.

3. **USB Mode (U-Disk):**
    - Insert a USB flash drive (U-Disk) containing audio files into the USB input interface.
    - The amplifier should automatically switch to USB playback.
    - Use the Master Volume knob to control playback (e.g., play/pause, skip tracks). Refer to the specific functionality of the knob for USB mode.

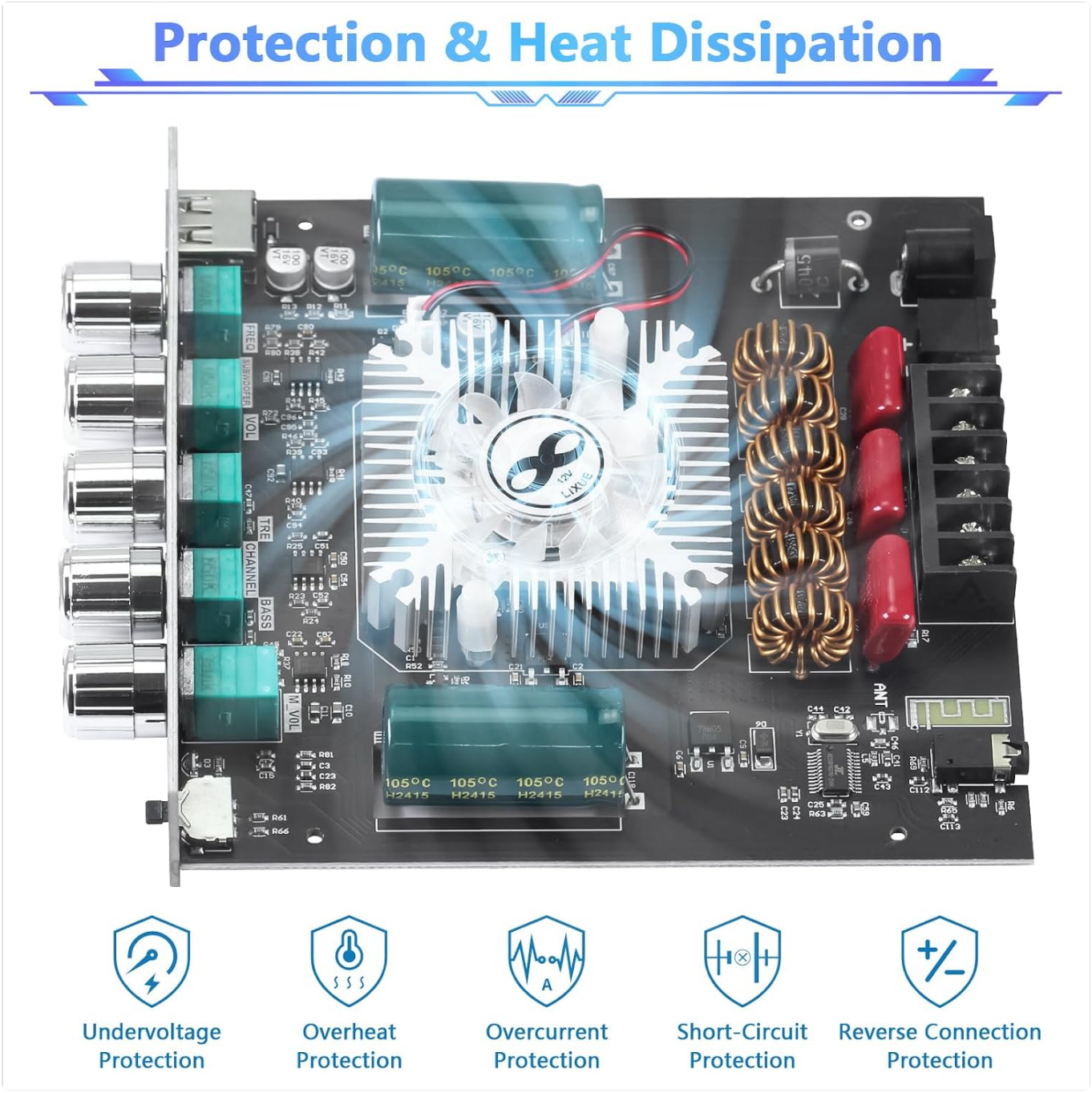
5.3 Audio Adjustment Controls

Adjust the sound to your preference using the dedicated knobs:

- **Subwoofer Freq (FRQ):** Rotate to adjust the low-pass filter frequency for the subwoofer, allowing you to fine-tune the crossover point.
- **Subwoofer Volume (VOL):** Rotate to increase or decrease the volume level of the subwoofer output independently.
- **Left & Right Channel Bass (BASS):** Rotate to boost or cut the bass frequencies for the main stereo channels.
- **Left & Right Channel Treble (TRE):** Rotate to boost or cut the treble frequencies for the main stereo channels.
- **Master Volume (MAIN CV/VOL):** Rotate to adjust the overall output volume of all channels simultaneously.

6. Safety and Protection

The ZK-HT21 amplifier board incorporates multiple protection mechanisms to ensure safe and reliable operation:



This image demonstrates the integrated cooling fan for effective heat dissipation and the multiple protection features of the amplifier board, ensuring safe and reliable operation.

- **Undervoltage Protection:** Automatically triggers if the input voltage drops below 9V DC.
- **Overheat Protection:** The integrated silent fan and semi-open design prevent the board from reaching excessive temperatures.
- **Overcurrent Protection:** Safeguards against excessive current draw.
- **Short-Circuit Protection:** Protects the amplifier and connected speakers from damage due to short circuits.
- **Reverse Connection Protection:** Prevents damage if the power supply polarity is accidentally reversed.

Always ensure proper ventilation around the amplifier board to assist with heat dissipation.

7. Maintenance

To ensure the longevity and optimal performance of your ZK-HT21 amplifier board, follow these maintenance guidelines:

- **Cleaning:** Use a soft, dry cloth to gently wipe the surface of the board and casing. Avoid using liquid cleaners or solvents.
- **Ventilation:** Ensure the fan and ventilation openings are free from dust and obstructions. Periodically clean dust buildup

with compressed air.

- **Storage:** When not in use for extended periods, store the amplifier board in a cool, dry place away from direct sunlight and extreme temperatures.
- **Connections:** Periodically check all power and speaker connections to ensure they are secure and free from corrosion.

8. Troubleshooting

If you encounter issues with your ZK-HT21 amplifier board, refer to the following common problems and solutions:

Problem	Possible Cause	Solution
No power/No indicator light	◦ Power supply not connected or faulty. ◦ Input voltage too low or too high. ◦ Power switch off.	◦ Check power supply connection and ensure it's within 15-36V DC. ◦ Press the Master Volume knob to turn on the device.
No sound output	◦ Incorrect audio input selected. ◦ Speaker wires loose or incorrectly connected. ◦ Volume too low or muted. ◦ Audio source issue.	◦ Verify the correct input mode (Bluetooth, AUX, USB). ◦ Check all speaker connections for proper polarity and secure fit. ◦ Increase Master Volume and ensure it's not muted. ◦ Test with a different audio source.
Bluetooth connection issues	◦ AUX cable connected. ◦ Device too far from amplifier. ◦ Bluetooth not enabled on source device.	◦ Disconnect any AUX cable. ◦ Move the source device closer to the amplifier (within 15m). ◦ Ensure Bluetooth is active and discoverable on your source device.
Distorted or poor sound quality	◦ Input signal too high. ◦ Speaker impedance/power mismatch. ◦ Loose connections.	◦ Reduce the volume on your audio source. ◦ Ensure speakers are within 4-8Ω and 30-200W. ◦ Check all wiring.
Amplifier overheating	◦ Insufficient ventilation. ◦ Operating at maximum power for extended periods.	◦ Ensure adequate airflow around the board. ◦ Reduce volume or allow the unit to cool down.

9. Warranty and Support

CUQI products are manufactured to high-quality standards. For specific warranty information and technical support, please refer to the documentation provided at the time of purchase or contact your retailer. Keep your purchase receipt as proof of purchase.

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