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MakerHawk ZK-502H

MakerHawk TPA3116D2 Bluetooth 5.0 Stereo Audio Amplifier Module ZK-502H User Manual

Model: ZK-502H

1. PRODUCT OVERVIEW

The MakerHawk TPA3116D2 Bluetooth 5.0 Stereo Audio Amplifier Module (Model ZK-502H) is a high-performance Class D amplifier designed for HiFi stereo audio applications. It features multiple audio input methods and robust protection mechanisms, making it suitable for various DIY audio projects and home entertainment systems.

Key Features:

- **High Performance:** Utilizes the TPA3116D2 Class D amplifier IC, offering high power output with low distortion (<0.1%).
- **HiFi Stereo:** Dual-channel 100W (50W*2) output for clear and rich audio.
- **Multiple Audio Inputs:** Supports AUX (3.5mm), Bluetooth 5.0, USB flash drive, and PC sound card input.
- **Versatile Outputs:** Compatible with both active and passive speakers.
- **Bluetooth 5.0:** Ensures higher transmission efficiency, stability, and an extended wireless range of up to 15m (49 feet) in open spaces.
- **Robust Protection:** Includes short-circuit, thermal, overvoltage, undervoltage, and DC protection to prevent damage.
- **User-Friendly:** Features a potentiometer for volume adjustment with an integrated power switch.

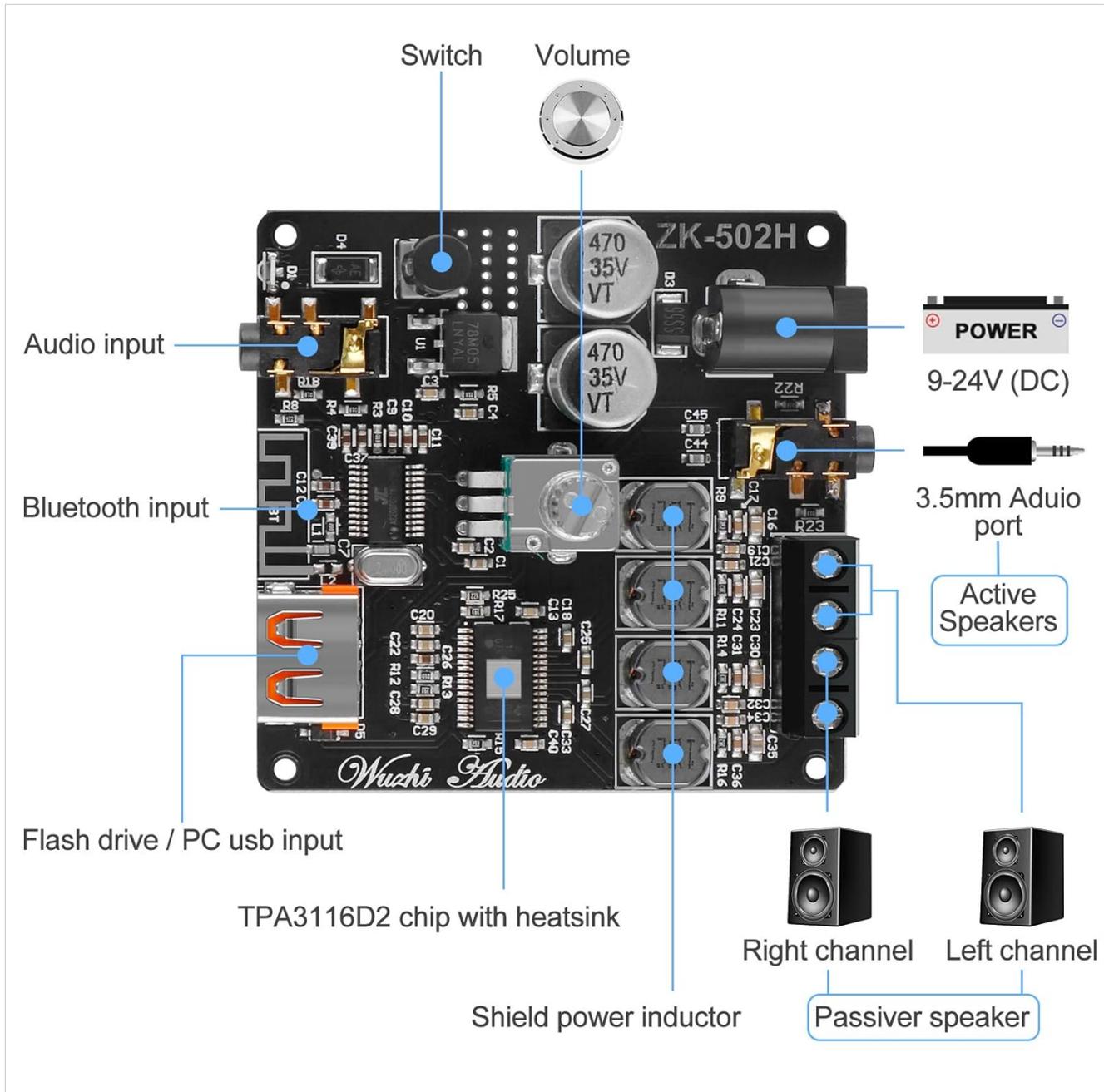


Figure 1: Detailed view of the ZK-502H amplifier board, highlighting various inputs, outputs, and the TPA3116D2 chip with heatsink.

MULTIPLE INPUTS & FUNCTIONS

With AUX, Bluetooth, USB flash drive, USB sound card multiple audio input methods. Bluetooth 5.0 higher efficiency, farther distance.



Figure 2: The assembled amplifier module, showing the volume knob and various input ports for AUX, Bluetooth, and USB.

2. PACKAGE CONTENTS

Verify that all components are present in your package:

- TPA3116D2 Bluetooth 5.0 Stereo Audio Amplifier Module (ZK-502H)
- Acrylic protective casing components
- Mounting hardware (screws, standoffs)
- Volume knob
- Small screwdriver
- DC power adapter cable (optional, may vary)

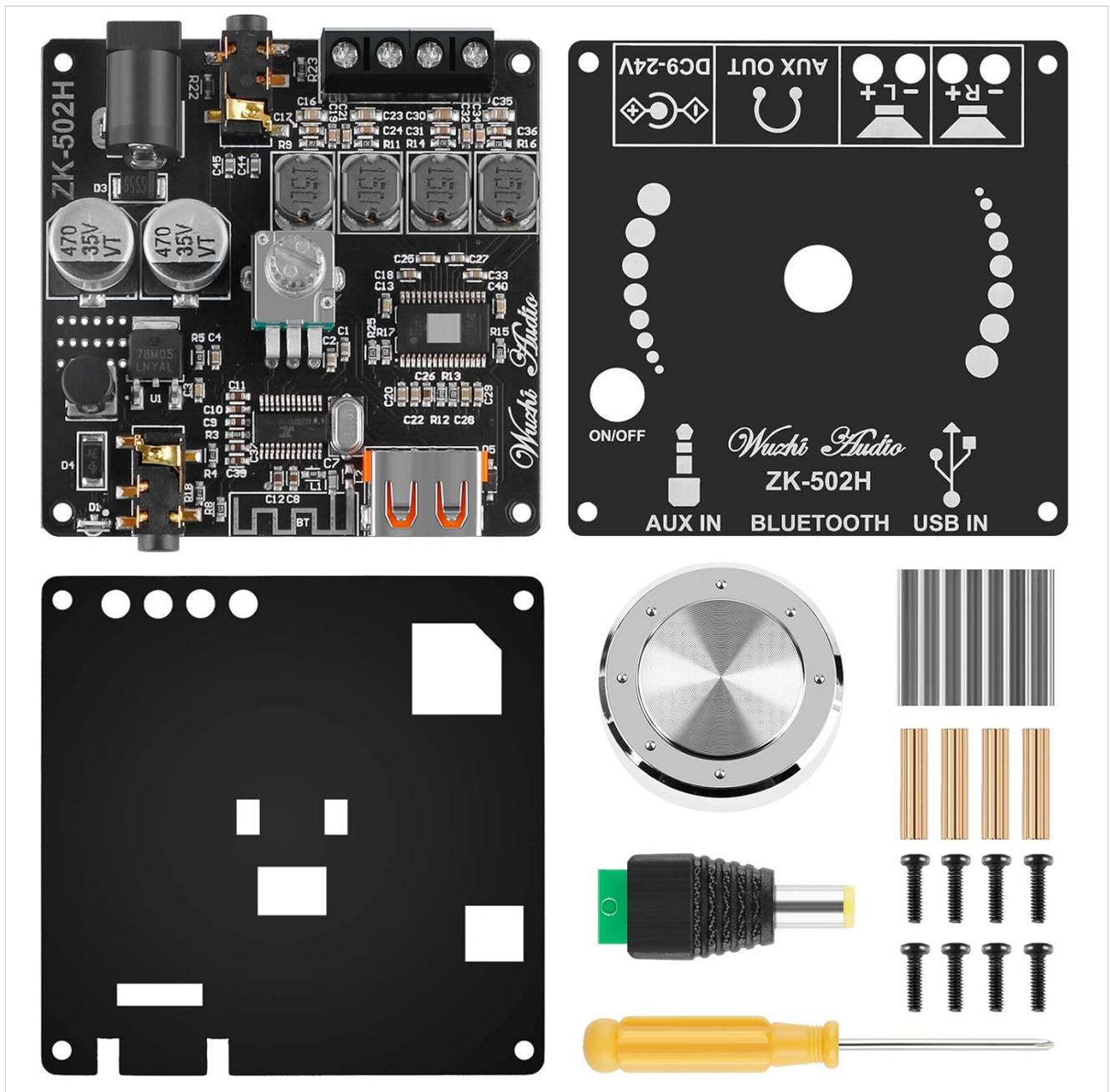


Figure 3: Contents of the ZK-502H amplifier kit, including the main board, acrylic case parts, knob, and tools.

3. SETUP INSTRUCTIONS

3.1 Assembly (Optional)

If your module came unassembled with an acrylic case, follow these steps:

1. Carefully remove all protective films from the acrylic panels.
2. Attach the standoffs to the main amplifier board using the provided screws.
3. Secure the bottom acrylic panel to the standoffs.
4. Mount the top acrylic panel, ensuring all cutouts align with the board's components (e.g., volume knob, ports).
5. Attach the volume knob to the potentiometer shaft.

3.2 Power Connection

The module requires a DC power supply between 9V and 24V. Connect the power supply to the DC input port on the board. Ensure correct polarity.

3.3 Speaker Connection

Connect your speakers to the speaker output terminals. The module supports both active and passive speakers. For passive speakers, ensure they are rated appropriately for the amplifier's output (50W per channel). Observe correct polarity for optimal sound quality.

MAX OUTPUT POWER 50W+50W

Highly effectiveness, which can drive most home speakers. HiFi clear and delicate sound, no audible noise even at high power output.



PC sound card/Flash drive



3.5 AUX Input



Smartphone



DVD



Tablet



PC



Laptop



MP3/MP4



CD

Figure 4: Connection diagram showing how to connect audio sources (PC, USB, AUX) and speakers to the amplifier module.

4. OPERATING INSTRUCTIONS

4.1 Power On/Off and Volume Control

The volume potentiometer also functions as the power switch. Rotate the knob clockwise to turn on the module and increase volume. Rotate counter-clockwise to decrease volume and turn off the module.

4.2 Audio Input Selection

The module automatically detects and switches between input sources. Prioritize the desired input by connecting it first or disconnecting other sources.

- **Bluetooth Input:** Once powered on, the module will enter Bluetooth pairing mode. Search for "ZK-502H" on your device (smartphone, tablet, laptop) and pair. A confirmation sound will indicate successful pairing.
- **AUX Input:** Connect an audio source (e.g., MP3 player, CD player) to the 3.5mm AUX IN jack.
- **USB Input:** Insert a USB flash drive containing audio files into the USB port. The module will automatically play the audio.
- **PC Sound Card Input:** Connect the module to a PC via a USB cable. The PC should recognize it as an external sound card.

5. MAINTENANCE

To ensure the longevity and optimal performance of your amplifier module, follow these maintenance guidelines:

- **Cleaning:** Use a soft, dry cloth to clean the module. Avoid using liquid cleaners or solvents.
- **Environment:** Operate and store the module in a dry, well-ventilated area, away from direct sunlight, high temperatures, and excessive humidity.
- **Connections:** Periodically check all connections (power, speakers, audio inputs) to ensure they are secure and free from corrosion.
- **Avoid Overload:** Do not exceed the recommended power supply voltage or speaker impedance to prevent damage to the amplifier.

6. TROUBLESHOOTING

If you encounter issues with your amplifier module, refer to the following common problems and solutions:

Problem	Possible Cause	Solution
No sound output	<ul style="list-style-type: none"> • Incorrect power supply • Loose speaker connections • Incorrect audio input selected • Volume too low 	<ul style="list-style-type: none"> • Verify power supply is 9-24V DC and correctly connected. • Check speaker wire connections and polarity. • Ensure the correct audio source is active. • Increase volume using the knob.
Bluetooth connection issues	<ul style="list-style-type: none"> • Module not in pairing mode • Device too far from module • Interference 	<ul style="list-style-type: none"> • Restart the module to enter pairing mode. • Ensure your device is within 15m (49 feet) of the module. • Reduce interference from other wireless devices.
Distorted sound	<ul style="list-style-type: none"> • Volume too high (amplifier or source) • Poor quality audio source • Speaker impedance mismatch 	<ul style="list-style-type: none"> • Reduce volume on both the amplifier and the audio source. • Try a different audio source. • Ensure speakers are compatible with the amplifier's output.

Problem	Possible Cause	Solution
Module not powering on	<ul style="list-style-type: none"> No power supply Faulty power supply Volume knob not turned on 	<ul style="list-style-type: none"> Connect a compatible DC power supply. Test the power supply with another device if possible. Rotate the volume knob clockwise to turn on.

7. SPECIFICATIONS

Specification	Value
Model Number	ZK-502H
Amplifier Chip	TPA3116D2
Channels	2.0 Stereo
Output Power	2 x 50W (Max 100W total)
Supply Voltage Range	9V - 24V DC
Bluetooth Version	5.0
Wireless Range	Up to 15m (49 feet) in open space
Audio Inputs	AUX (3.5mm), Bluetooth, USB Flash Drive, PC Sound Card
Protection Features	Short-circuit, Thermal, Overvoltage, Undervoltage, DC Protection
Dimensions (L x W x H)	6cm x 6cm x 1.4cm (approx. 2.36 x 2.36 x 0.71 inches)
Item Weight	Approx. 2.4 ounces

HIFI & STEREO

Adopting classical TPA3116 chip, dual channel with filter inductor, the sound is round and clear. AM interference suppression prevent noise.



Figure 5: The assembled amplifier module with its approximate dimensions.

8. WARRANTY AND SUPPORT

Specific warranty information and direct support contact details are not provided within this manual. Please refer to the product packaging or the retailer's website for warranty terms and customer support options.