

2.1 Channel BT Amplifier Board

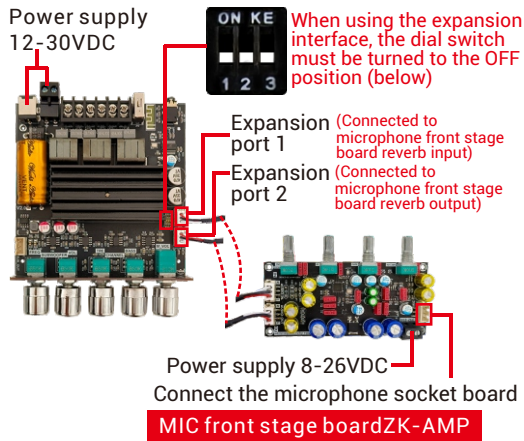
Model: ZK-ST21

Product parameters

Product name: 2.1 channel BT amplifier board 100W+100W+200W
 Product model: ZK-ST21
 Adapted power supply: The working voltage range is 12-30VDC, and it is recommended to use a DC power supply with a voltage of 24V-28V and a current of 10A or above.
 Maximum power: Left or right channel— 105W@30V, 4Ω; 55W@30V, 8Ω. Subwoofer— 208W@30V 2Ω; 105W@30V, 4Ω.
 In short, the higher the voltage, the smaller the resistance, and the greater the output power.
 Adapted speakers: Left and right channels, supporting 3-8 ohms and speakers up to 100W; The subwoofer supports 2-8 ohms and speakers up to 200W.
 BT chip: JieLi 5.1, transmission distance of 15 meters.
 Input method: BT+AUX+USB drive+sound card.
 Number of channels: 2.1, Left channel+right channel+subwoofer
 Power amplifier chip: Two TI original TPA3221
 Protection mechanism: Input undervoltage, input anti reverse connection, overheating, overcurrent, short circuit protection.
 Product size: 121x100x25mm
 Product weight: Integrated without shell net weight: 192g; With packaging: 228g;
 Integrated with shell net weight: 261g; With packaging: 297g
 External lead type net weight: 254g; With packaging: 310g

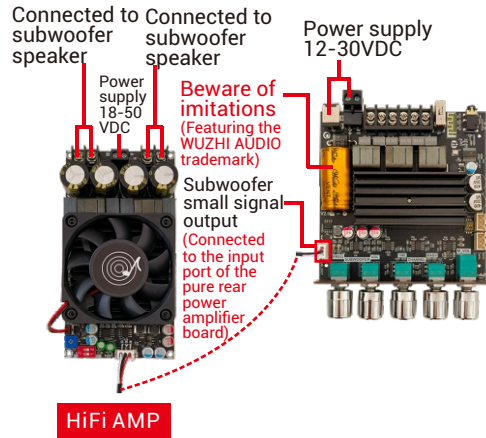
MIC extension interface

Adding the front stage plate ZK-AMP of the microphone

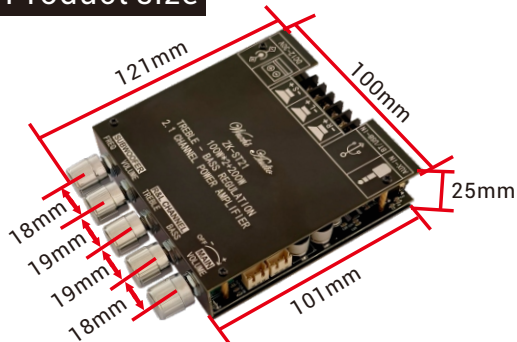


Subwoofer expansion interface

Add installation of pure rear stage power amplifier boards ZK-1602 and 3002

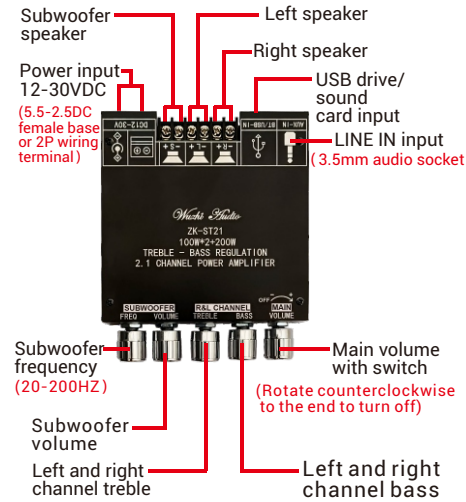


Product size

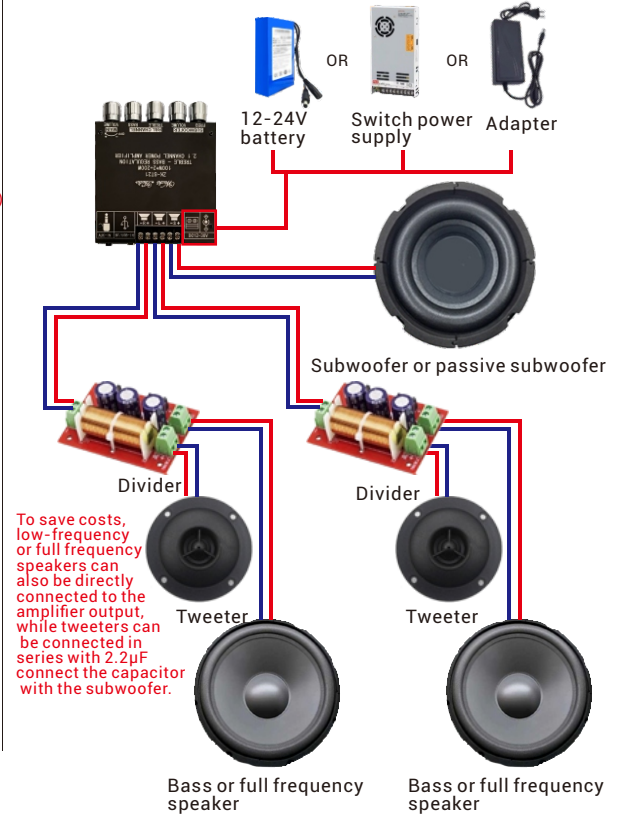


Same spacing as TB21 potentiometer

Product function



Connection method of speaker



Question and answer

What kind of speaker does it come with? How much power is used? Recommend an amplifier?

In fact, this is the same question because the three of them are related. I believe that after learning the following knowledge, no matter what kind of amplifier you make, you will calculate the compatibility relationship between the power supply, speaker, and amplifier yourself.

- According to Ohm's law, power $P=U \cdot I/R$, the higher the voltage, the smaller the horn resistance and the greater the power; So the final output power is not only related to the power amplifier, but also to the power supply voltage and the resistance of the speaker. According to the formula, if the power supply is 24V and the horn resistance is 4 ohms, then the peak power $=24V \cdot 24V/4 \Omega=144W$, and the effective value (rated power) of a 1kHz sine wave $=24V \cdot 0.707 \cdot 24V \cdot 0.707/4 \Omega=72W$. The peak power of an 8-ohm horn is $24V \cdot 24V/8 \Omega=72W$, and the rated power is $24V \cdot 0.707 \cdot 24V \cdot 0.707/8 \Omega=36W$; if the power supply is 12V and the 8 ohm horn is used, the peak power is $12V \cdot 12V/8 \Omega=18W$, and the rated power is $12 \cdot 0.707 \cdot 12 \cdot 0.707/8 \Omega=9W$. Our amplifier's nominal power is the rated power, and later on, it defaults to the rated power.
- In order to leave sufficient power margin and avoid clipping distortion, it is better to have an amplifier power of 1.5-2.5 times the speaker power. For example, if your single channel speaker is 100W, the corresponding amplifier board's single channel output power should be between 150W and 250W. Speakers can be connected in parallel or series. Two 8-ohm and 50W speakers connected in parallel are equivalent to a 100W 4 ohm speaker. It is recommended to choose an amplifier with a typical load impedance value that is the same as the final impedance value of your speaker system. Our amplifiers generally support 4-8 ohm speakers, while a few high-power amplifiers support 2-8 ohm speakers. If the speaker resistance is too small, the amplifier chip is prone to overcurrent power protection or burning.
- The choice of power supply is also very important. Some customers use a 5V2A mobile phone charger or a 12V1A2A adapter to drive a 50W100W amplifier, but the voltage and power are obviously not enough. Ultimately, the voltage is pulled down, and the sound becomes distorted and distorted when slightly louder, resulting in a cloudy sound or intermittent protection from the power supply causing sound lag. It doesn't matter if the power supply is too high, but if the power supply is not sufficient, the problem mentioned above will occur. So what size of power should be chosen? This issue involves two parameters: voltage and current. In theory, the power supply should be greater than the total power of the power amplifier. For example, if TB21 is a 50W+50W+100W power amplifier, you should choose a 24V8A or higher power supply. But there is also a situation where the speaker you choose is not that large. In order to facilitate power adaptation or reduce power costs, you can calculate the actual power required. For example, the subwoofer speaker you choose is 4 ohms 50W, and two stereo speakers are 8 ohms 30W. If you choose a 12V power supply, the maximum output rated power of the subwoofer is $P=12 \cdot 0.707 \cdot 12 \cdot 0.707/4 \Omega=18W$. Obviously, a 12V voltage cannot meet this requirement. Try a 24V power supply again. The subwoofer output $P=72W$, the stereo output $P=36W+36W$, and the total power is 144W. Therefore, a 24V6A power supply is sufficient. Some customers say that I have a 24V20A power supply with a power of 480W, but it's better to have an 8-ohm 100W speaker. According to Ohm's law, a maximum power output of 36W can be achieved with a 24V and 8-ohm power supply. Obviously, the speaker cannot be pushed. Although the speaker has sound, it is not full enough. According to the formula, the voltage needs to reach 40V or above. Another thing to note is that the power supply of adapters on the market is falsely labeled, and 24V8A10A adapters may be protected for less than 6A.
- Many customers have a misconception: the higher the power of the amplifier board, the louder the speaker will definitely be. The answer is not certain! I once encountered a customer who purchased a 3002T (30W+30W) amplifier and requested a return. They said that the amplifier had a severe false label and the sound was not as loud as their 30W amplifier, and there was no 300W at all. His original amplifier gain was 36dB, the speaker was 8 ohms and 30W powered by 24V, and according to the formula, the maximum output power for a single channel was 36W. He uses 3002T, which is also powered by 24V, and the speaker uses 8 ohms and 150W. However, according to the formula, the maximum output is also 36W, and the gain of 3002T itself is 32dB. Its original small amplifier volume was adjusted to 70%, achieving 100% volume of the large amplifier. This issue is obviously not a false calibration of the power amplifier, but rather an incorrect one. Customers should choose a power supply with 48V6A or higher to fully utilize its power. Can a 30W small power amplifier support 48V power supply and 300W output?

FCC Warning:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution: Any changes or modifications to this device not explicitly approved by manufacturer could void your authority to operate this equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.