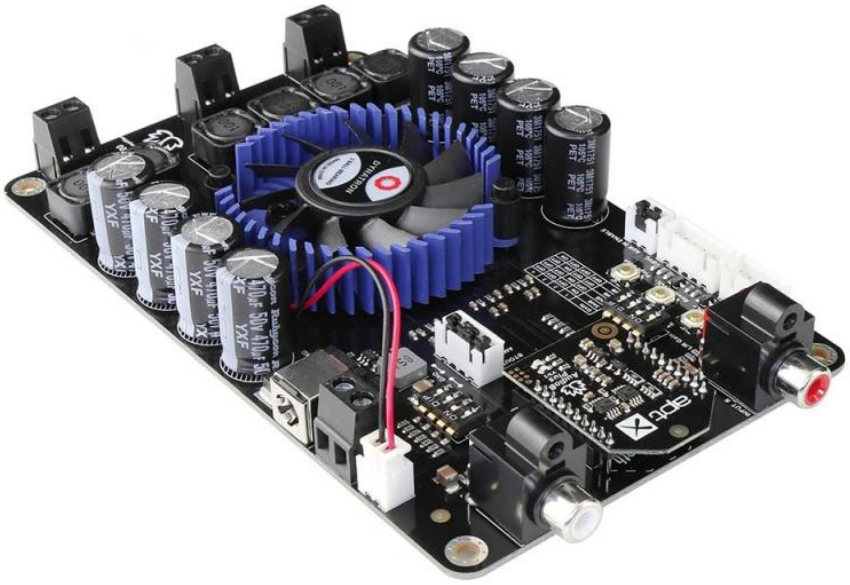
TinySine

TSA7500B

2 x 100W + 200W 2.1 Channels Bluetooth Audio Amplifier Board

Data sheet



1 Features:

- Wide-range 12V to 30V Supply Voltage Operation
- Size: 150*90*25mm
- Bluetooth 5.0
- Bluetooth audio volume control port (BVC)
- aptX, aptX Low Latency, SBC and AAC
- Aux in/Line in auto detect
- TWS connection
- DSP programmable
- 2.1 channels
- Compatible with all Bluetooth devices that support media audio, including iPhone
- Over/ under voltage protection
- Over current protection
- Over temperature protection

2 Applications:

- Personal computer
- Background music system
- Musical instrument amplifiers
- Home DIY
- Car audio

3 Description:

TSA7500B 2x100W + 220W 2.1 channels audio amplifier board with **AudioB pro** Bluetooth module that supports Apt-X. It has perfect class-D architecture (Based on TPA3221) and 2 channels have 100W power output and another one channel has 200W power output. All the channels are capable of outputting nominal power simultaneously and continuously. This board can be powered by any DC12V-30V power supply. It can be used to drive any 4Ω or 8Ω passive speakers (Subwoofer channel need 2Ω or 4Ω). TSA7500B can also be connected with our TSA1000,TSA1010 or TSA1020 external audio volume control board. People can adjust the audio volume by rotating the real knob.

It's a 2.1 channels amplifier board. That channel for subwoofer is 200W mono output. You can pair it with a mobile phone or a computer (etc). Power the amplifier board. Use your phone or PC (etc) to search for a new Bluetooth device. The module will appear as "TSA7500B". You don't need a PIN, pair it and then you can play music.

The highlight point is Apt-X and TWS supported. Therefore, users can stream audio to 2 amplifier boards at the same time wirelessly.

- TSA7500B can automatically detect the Aux in/Line in Audio input. Bluetooth Audio source has a higher priority. When Bluetooth audio is paused or Bluetooth is disconnected. The amplifier will output the Aux in/Line in audio.
- There is an audio connector can connect with an external DSP to set the subwoofer audio tones.
- BVC Port: BVC port can be connected with our Audio volume controller to control the Bluetooth audio volume.

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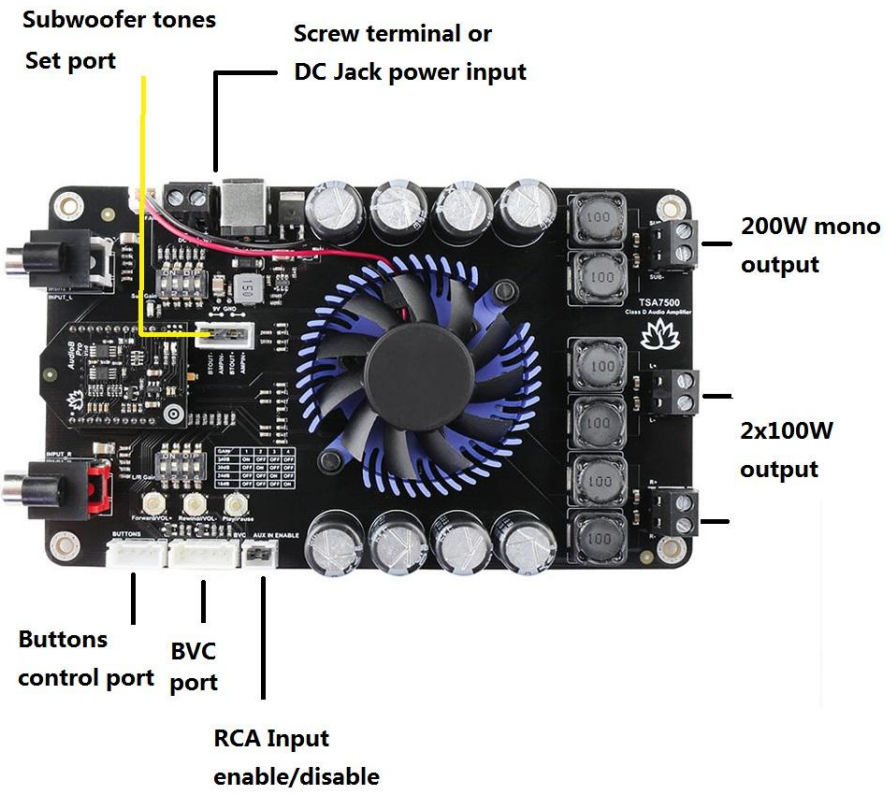
4 Device function diagram:



5 Specifications

Specifications typical @ +25℃, Powered by 30VDC, unless otherwise noted. Specifications subject to change without notice.

Parameter	Condition	Min	Type	Max
Supply Voltage (VDC)	-	10	24	30
Output Power per channel(W)	RL=3Ω, 10%, THD+N	-	-	112
	RL=4Ω, 10%, THD+N	-	-	105
	RL=3Ω, 1%, THD+N	-	-	100
	RL=4Ω, 10%, THD+N	-	-	88
	200W channel: RL=2Ω, 1%, THD+N	-	-	208
THD+N	1W	-	0.02%	-
SNR	A-weighted, Gain= 18 dB	-	108 dB	-
DNR	A-weighted, Gain= 18 dB	-	109 dB	-
Minimum Load Impedance(Ω)	-	3	4	-
Gain (dB)	-	18	24	34
Efficiency	100W @4 Ohm	-	90%	-

Input Impedance	18dB	-	48KΩ	-
	24dB	-	24KΩ	-
	30dB	-	12KΩ	-
	34dB	-	7.7KΩ	-

6 Connection Ports and Functions

6.1 Power input

TSA7500B has 2 power input ports. One is a screw terminal connector and another one is a DC Jack connector. The DC input jack is 2.5mm with positive core polarity. These two ports are connected in parallel. You can only connect power to one of them at the same time.

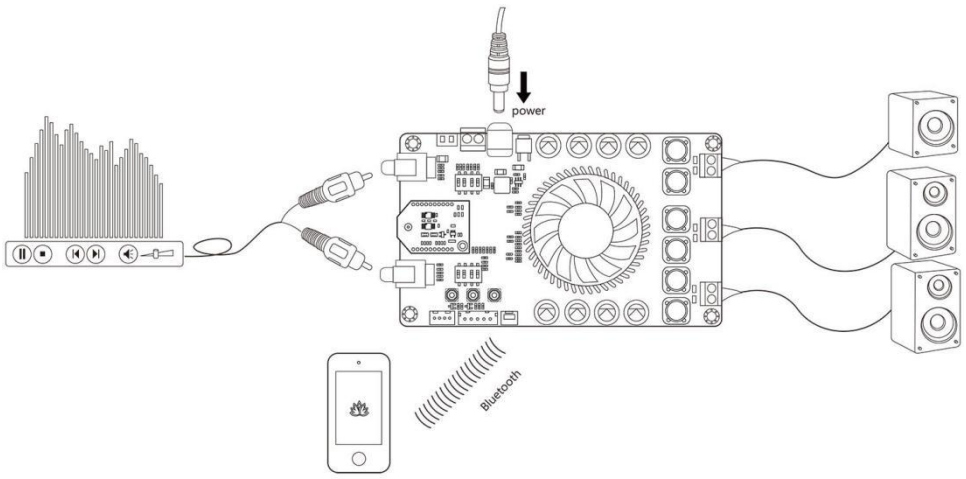
- DC input voltage: DC12V-30V.
- Power reverse connect protection

6.2 Control buttons

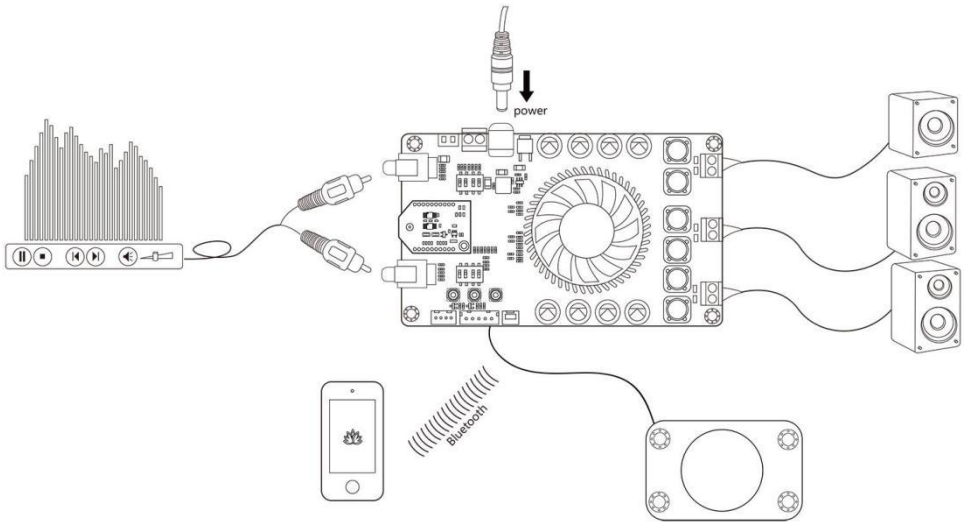
There are 3 buttons on the board which can control the audio volume and play/pause ect... You can connect external buttons easily by using this buttons control port.
Pins define:(Check the board backside silkscreen):

Buttons	Functionality
S1 (Play/Pause Button)	1.Click to play or pause 2.Long press 5 seconds to clear pairing info 3.Long press S1+S3 to search for slave
S2 (Rewind/VOL- Button)	1.Click to play the previous song 2.Long press to decrease volume 3.Long press S2+S1 to search for master
S3 (Forward/VOL+ Button)	1.Click to play the next song 2.Long press to increase volume 3.Long press S3+S2 to disconnect TWS connection

6.2.1 Standard working mode



One board works alone



TSA7500B + TSA1000, Both Aux in and Bluetooth audio volume can be controlled through BVC port

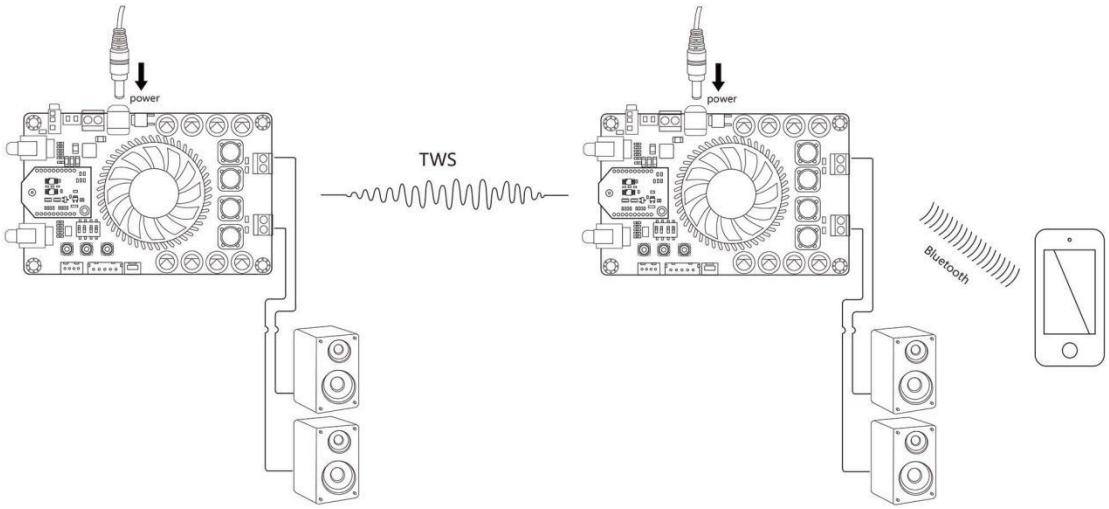
How to use:

1. Connect speakers with TSA7500B and power up, red LED slow blinks then red and blue LED flash alternately.
2. Now, your smartphone will be able to find a new Bluetooth device whose name is "TSA7500B". Connect it.
3. You can play the music now.

6.2.2 TWS mode

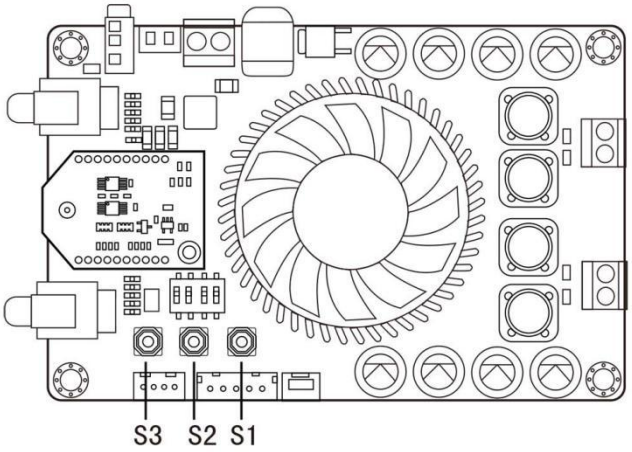
In this mode, users can make two TSA7500B paired and work together. One TSA7500B works as master (transmitter) and the other works as slave (receiver). Smartphone only connects with the master board. Two TSA7500B have audio output when your smartphone plays music.

In TWS mode, one of the TSA7500B outputs the left channel and the other outputs the right channel. The master will resume stereo output when the slave is disconnected from the master.



2 boards work in TWS mode. You can also build a wireless subwoofer system.

*User must remove the slave board Aux in Enable jumper before pairing 2 boards



How to use:

Master board:

1. Power up the TSA7500B, red LED slow blinks then red and blue LED flash alternately.
2. Now, your smartphone will be able to find a new Bluetooth device whose name is "TSA7500B". Connect it.
3. Long press S1+S3 1s into TWS master mode.

Slave board:

1. Power up another TSA7500B, red LED slow blinks then red and blue LED flash alternately.
2. Long press S1+S2 1s into TWS slave mode.
3. The master board will automatically search (30s) slave board. Both master and slave board will be connected.
4. You can play the music and the slave board can play music now.
5. If you want to disconnect TWS connection, long press S2+S3 1s to disconnect TWS connection.

6.3 LEDs

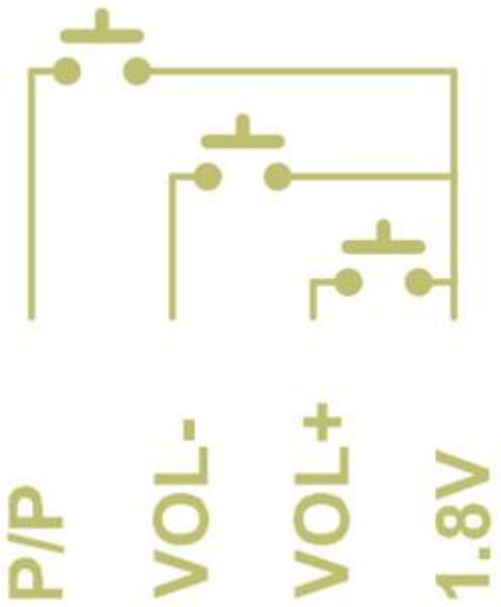
There are 2 LEDs on the Bluetooth module to indicate the current Bluetooth status.

Bluetooth LED states

LED	State	Description
RED	Slow Blink	Automatically reconnecting
	Always off	Automatically reconnect successful
BLUE	Three flashes per cycle	Bluetooth cannot be discovered by new devices
	Two flashes per cycle	Bluetooth can be found by new device
	Three blinks a second	Bluetooth connected
	Blinks twice a second	Streaming A2DP
RED+BLUE	Red LED and Bluetooth LED flash alternately	1.Bluetooth can be found by new devices 2.Searching for each other in TWS mode

6.4 External Buttons port

Wiring:

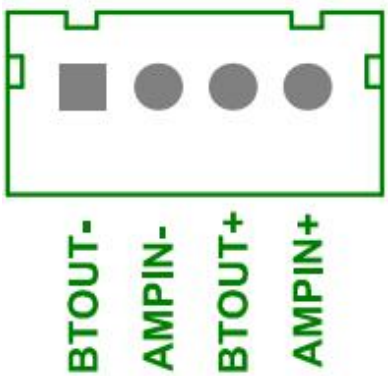


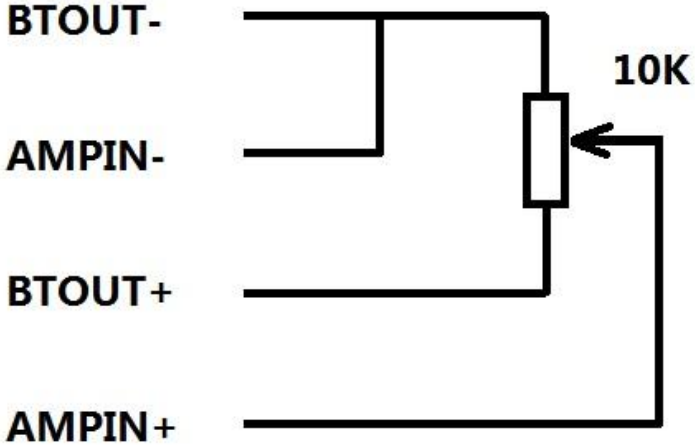
Pin functions

Pin#	Name	Description
1	1.8V	Provides voltage to the IO port of the Bluetooth module
2	VOL+	VOL+ button 1.Short click: Audio volume + 2.Long press: Next track
3	VOL-	VOL- button Short click: Audio volume - Long press: Previous track
4	P/P	Play/Pause button

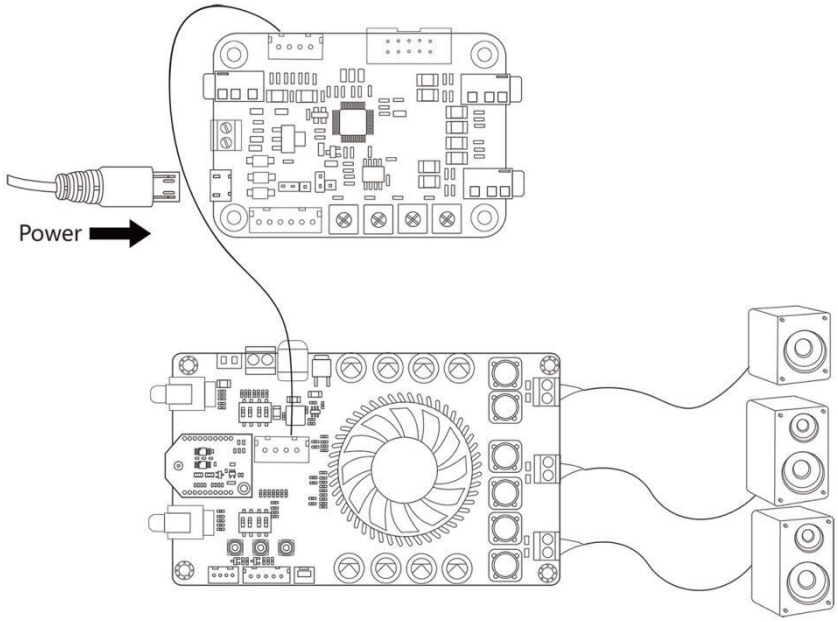
6.5 Subwoofer tones set port

Wiring:





Connect an external potentiometer control the subwoofer volume separately



TSA1701 control our 2.1 channel amplifier board subwoofer channel

6.6 Auxin En

Aux in enable connector, Aux in port is enabled when the jumper is installed. Aux in port is disabled when it is open. Disabling the aux in port can reduce the whole board noise level.

Wiring:

Pin functions

Pin#	Name	Description
1	GND	-
2	Enable control	Connect with QCC3008 Bluetooth module pin6 (PIO17) Connect: Auxin enable. Open: Aux in disable

6.7 Amplifier chip Gain settings

The TSA7500B board features two amplifier chips, and users have the flexibility to independently adjust the gains of each amplifier chip according to their preferences.

SUBWOOFER:

GAIN	DIP SWITCH			
	1	2	3	4
23.6dB	OFF	OFF	OFF	ON
29.6dB	OFF	OFF	ON	OFF
33.1dB	OFF	ON	OFF	OFF
35.6dB	ON	OFF	OFF	OFF

STEREO:

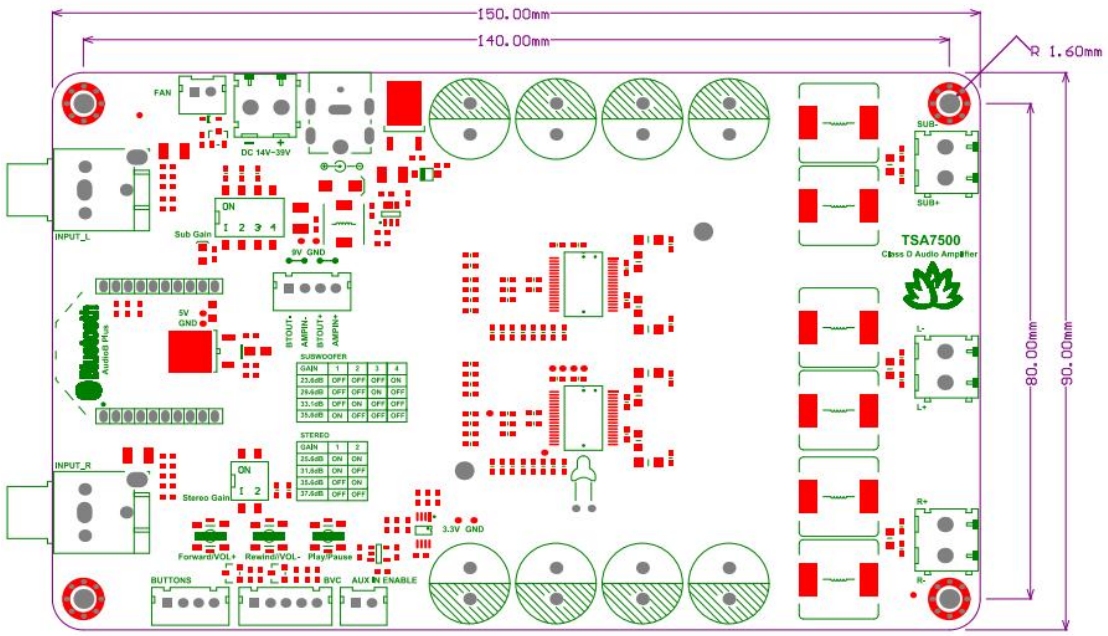
GAIN	DIP SWITCH	
	1	2
25.6dB	ON	ON
31.6dB	ON	OFF
35.6dB	OFF	ON
37.6dB	OFF	OFF

7 Bluetooth programming

TSA7500B uses Qualcomm QCC3008 as the main Bluetooth chip. User can do the programming via the CSR USB-SPI programmer. You can change the BT name, Audio tones, Firmware ect... by using the Official Qualcomm software.

- Bluesuite2.5.0
- How to change the BT name
- How to enable BT password
- TSA7500B Bluetooth module PSR file (PCB Antenna version)
- TSA7500B Bluetooth module xml file for QCC3008

8 Dimensions



9 Revision history

Document revision history

Date	Revision	Changes
19-Jul-2024	1	Initial release