



TSA7800B

2 x 50W + 100W 2.1 Channels Bluetooth + DSP Audio Amplifier

Board Datasheet





## 1 Features:

- Wide-range 12V to 24V Supply Voltage Operation
- Size: 135\*92\*34mm
- DSP programmable
- Bluetooth programmable
- TWS connection
- Bluetooth 5.0
- aptX, aptX Low Latency, SBC and AAC
- Qualcomm TrueWireless Technology
- I2S Sampling Rate: 48KHz
- 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:

TSA7800B 2x50W + 100W 2.1 channels Bluetooth + DSP amplifier board with an **AudioB I2S** Bluetooth module that supports Apt-X. TSA7800B is a very flexible DSP/DAC/Amplifier combination board. It has perfect class-D architecture(Based on TPA3116D2) and 2 channels have 50W power output and another one channel has 100W power output. All the channels are capable of outputting nominal power simultaneously and continuously. This board can be powered by any DC12V-24V power supply. It can be used to drive any 4Ω or 8Ω passive speakers (Subwoofer channel can drive 2Ω speaker).

It's a 2.1 channels amplifier board. That channel for subwoofer are 100W mono output (User can change the DSP program to let it becomes right or left channel). 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 "TSA7800B". You don't need a PIN, pair it and then you can play music.

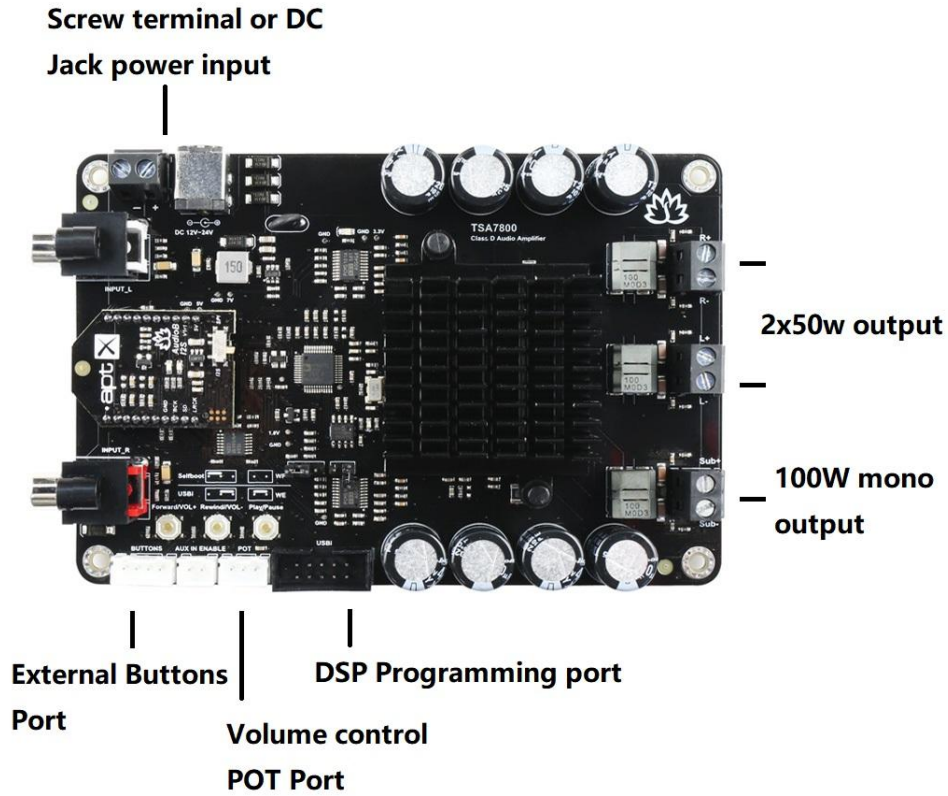


The highlight point is ADAU1701 DSP chip on board. User can set each channel audio tones separately. Apt-X and TWS supported. Therefore, Users can stream audio to 2 paired amplifier boards at the same time wirelessly.

## Table of Contents

1 Features: .....	2
2 Applications: .....	2
3 Description: .....	2
4 Device function diagram: .....	4
5 Specifications .....	4
6 Connection Ports and Functions .....	5
6.1 Power input .....	5
6.2 Control buttons .....	5
6.3 LEDs .....	7
6.4 External Buttons port .....	8
6.5 Ext POT port .....	9
6.6 Auxin En .....	9
6.7 USBi - DSP programming port .....	10
7 DSP programming .....	10
8 Bluetooth programming .....	10
9 Dimensions .....	11
10 Revision history .....	11

## 4 Device function diagram:



## 5 Specifications

Specifications typical @ +25°C, Powered by 24VDC, unless otherwise noted. Specifications subject to change without notice.

Parameter	Condition	Min	Typ	Max
Supply Voltage (VDC)	-	12	21	24
Output Power per channel(W)	RL=4Ω, 10%, THD+N	-	50	-
	RL=8Ω, 10%, THD+N	-	-	30
	RL=4Ω, 10%, THD+N	18	-	-
	100W channel:RL=2Ω, 1%, THD+N	-	-	100
THD+N	@4Ω, 1W, 1KHz	-	0.03%	-
Bandwidth @ ±3dB	@4Ω	20Hz	-	20KHz
Input Impedance	-	-	22KΩ	-
Minimum Load Impedance(Ω)	-	3.2	4	-



Gain (dB)	-	18	24	34
Efficiency	50W @4 Ohm	87%	-	92%

## 6 Connection Ports and Functions

### 6.1 Power input

TSA7800B 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.

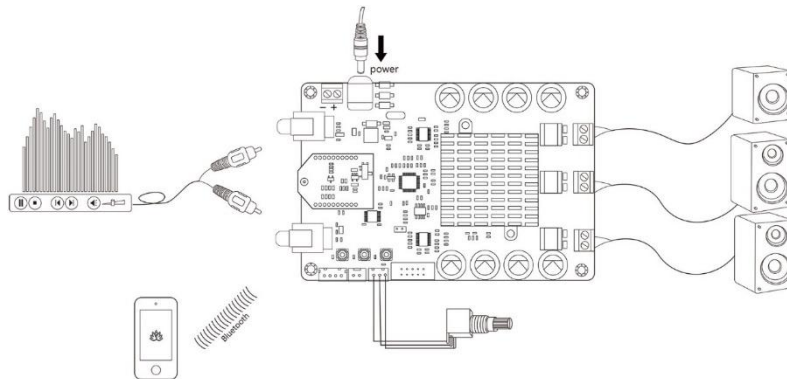
- DC input voltage: DC12V-24V.
- Power reverse connect protection

The Recommend input voltage is DC12V-36V. Higher input voltage can get full power output. But the board will have more heat output. Lower input voltage will have less heat output.

### 6.2 Control buttons

Buttons	Functionality
S1 (Play/Pause Button)	1.Click to play or pause 2.Long press 5 seconds 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

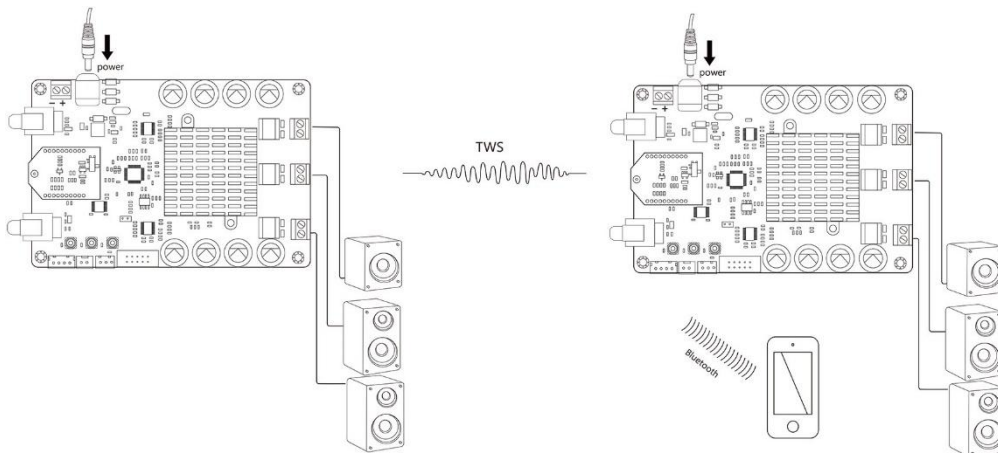
### How to use:

1. Connect speakers with TSA7800B and Power up, red LED slow blink then red and blue LED flash alternately.
2. Now, your smartphone will be able to find a new Bluetooth device which name is "TSA7800B". Connect it.
3. You can play the music now.

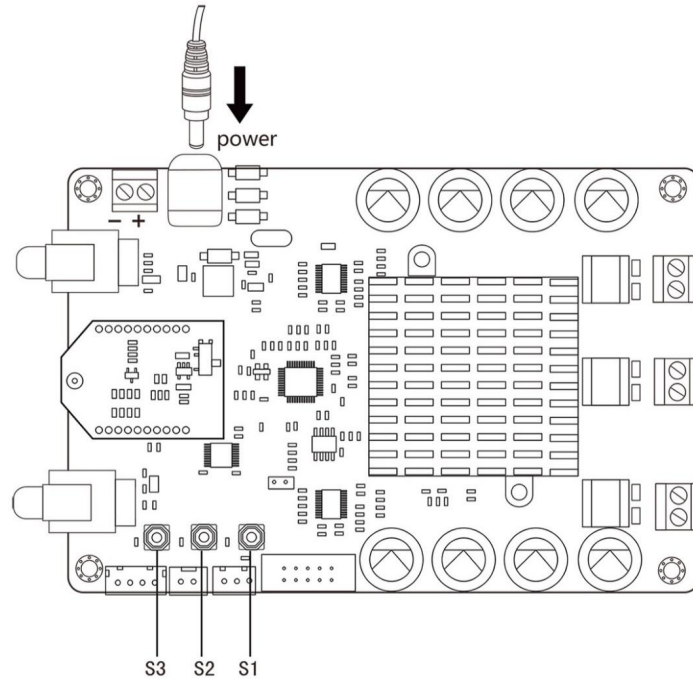
## 6.2.2 TWS mode

In this mode, User can have two TSA7800B paired and work together. One TSA7800B works as master (transmitter) and the other work as slave (receiver). Smartphone only connect with the master board. Both two TSA7800Bs have audio output when your smartphone playing the music.

In TWS mode, one of the TSA7800B outputs the left channel audio and the another one outputs the right channel audio. The master board will resume to stereo output when the slave board is disconnected from the master board.



2 boards work in TWS mode.



### How to Use:

Master board:

1. Power up the TSA7800B, red LED slow blink then red and blue LED flash alternately.
2. Now, your smartphone will be able to find a new Bluetooth device which name is "TSA7800B". Connect it.
3. Long press S1+S3 1s into TWS master mode.

Slave board:

1. Power up another TSA7800B, red LED slow blink then red and blue LED flash alternately.
2. Long press S1+S2 1s into TWS slave mode.
3. The master board will auto searching (30s) slave board. Both master and slave board will be connected.
4. You can play the music and the slave board will have music out now.
5. If you want to disconnect TWS connection, long press S2+S3 1s disconnect TWS connection.

## 6.3 LEDs

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

### Bluetooth LED states

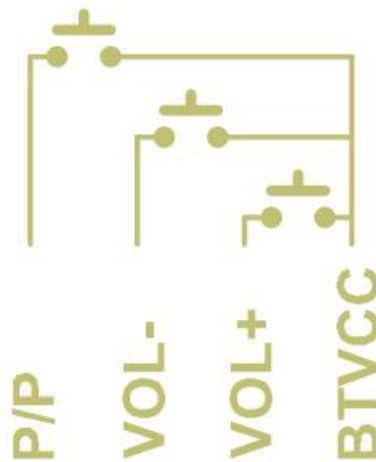
LED	State	Description
RED	Slow Blink	Automatically reconnecting
	Always off	Automatically reconnect successful
BLUE	Three flashes per cycle	Bluetooth cannot be found by new device
	Two flashes per cycle	Bluetooth can be found by new device
	Three blinks a second	Bluetooth connected
	Blinks twice a second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

### DSP LED state

A green LED was connected to the DSP chip MP8 pin. User can change the DSP program to control this LED.

## 6.4 External Buttons port

### Wiring:



### Pin functions

Pin#	Name	Description
1	BTVCC	Provides voltage to the IO port of the Bluetooth module
2	VOL+	1. Click to play the next song 2. Long press to increase volume 3. Long press S3+S2 to disconnect TWS connection
3	VOL-	1. Click to play the previous song 2. Long press to decrease volume 3. Long press S2+S1 to search for master



4	P/P	1.Click to play or pause 2.Long press 5 seconds clear pairing info 3.Long press S1+S3 to search for slave
---	-----	---

## 6.5 Ext POT port

User can connect external potentiometer(5K~20K) to control the Main volume. You can download the DSP program in the product page. We also provided a [Potentiometer Module - TSA1300](#)(Part number: G6438C40EC3CC5) which can be connected to this port directly.

**Wiring:**



Pin functions

Pin#	Name	Description
1	GND	Ground
2	A_ADC1	DSP ADC1 pin - Main volume
3	3.3V	3.3V output

## 6.6 Auxin En

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

**Wiring:**





#### Pin functions

Pin#	Name	Description
1	GND	-
2	Enable control	Connect with QCC3031 Bluetooth module pin6 (PIO15) 0: Auxin enable. Open: Aux in disable

## 6.7 USBi - DSP programming port

This port is for ADAU1701 DSP programming. User need to connect the [USBi JTAG Sigma DSP programmer](#) (Part number: G5EF991701A0EB) to program the DSP chip.

## 7 DSP programming

Please download and read the related documents on the Analog Devices website to learn how to use the [ADI SigmaStudio software](#)

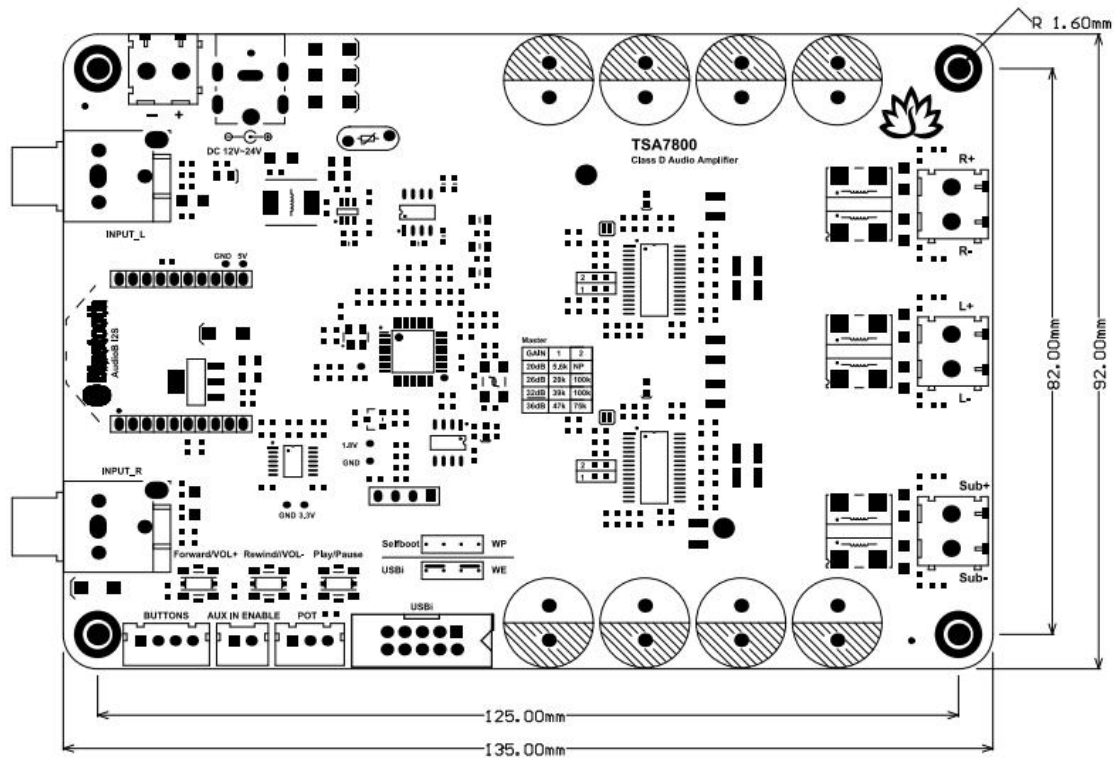
- [How to write DSP program to DSP board](#)
- [Default DSP program \(for v2 board\)](#)
- [Default DSP program \(for v3 board\)](#)

## 8 Bluetooth programming

TSA7800B use 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](#)
- [QCC3008 Bluetooth firmware](#)
- [How to change the BT name](#)

## 9 Dimensions



## 10 Revision history

### Document revision history

Date	Revision	Changes
19-Mar-2024	1	Initial release