

TSA8802B

2 x 100W Bluetooth + DSP Audio Amplifier Board

Datasheet





1 Features

- Wide-range 12V to 30V Supply Voltage Operation
- 2x100W output power with $R_L = 3\Omega$ and $V_{CC} = 24V$
- Size: 135mm*92mm*35mm
- DSP programmable
- Bluetooth programmable
- Bluetooth 5.1
- Qualcomm TrueWireless Technology
- aptX, aptX Low Latency, SBC and AAC
- Four selectable, fixed gain settings of nominally 18dB, 24dB, 30dB and 34dB.
- Compatible with all Bluetooth devices that support media audio, including iPhone

2 Applications

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

3 Description

TSA8802B 2x100W 2 channels Bluetooth+DSP amplifier board with an AudioB I2S Bluetooth module that supports Apt-X. TSA8802B is a very flexible DSP/DAC/Amplifier combination board. It has perfect class-D architecture(Based on TPA3221) and 2 channels have 100W 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.

It's a 2 channels amplifier board. 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 "TSA8802B". You don't need a PIN, pair it and then you can play music.

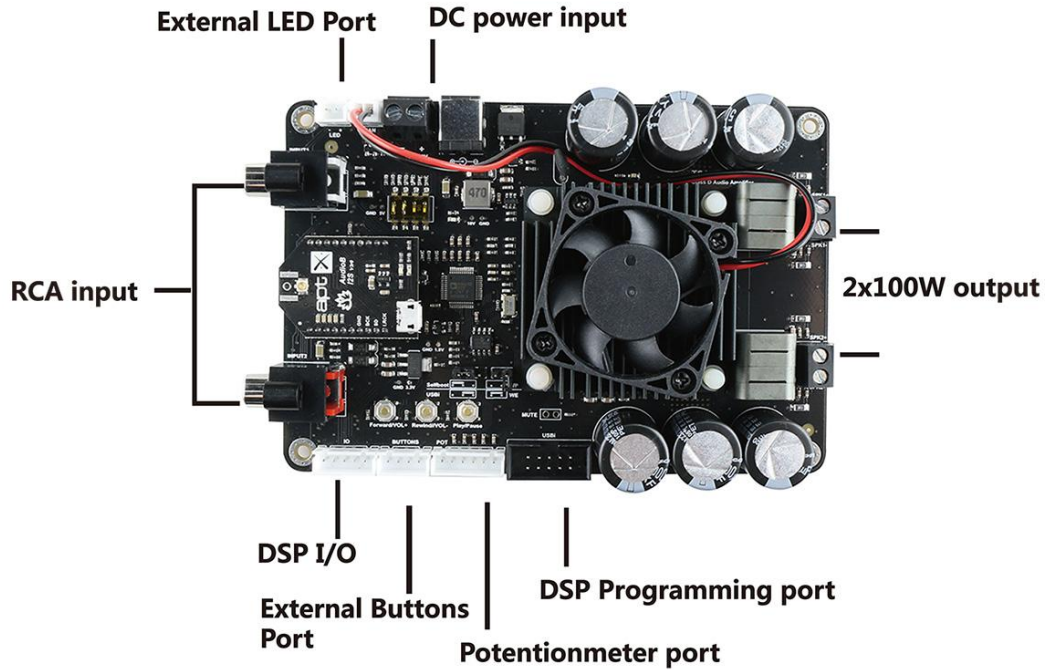
The highlight point is ADAU1701 DSP chip on board. It has a default DSP program loaded. Customers can adjust the gain, bass, midrange and treble in the DSP program. It also have a debug port for Sigima Studio, User can program this module with our USBi programmer to get more functions which includes equalization, crossover, bass enhancement, multiband dynamics processing, delay compensation, etc. TSA8802B has Apt-X and TWS supported. Therefore, Users can stream audio to 2 paired amplifier boards at the same time wirelessly.



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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)	-	10	24	30
Power output per channel	RL= 3Ω, 10% THD+N		112W	
	RL= 4Ω, 10% THD+N		105W	
	RL= 3Ω, 1% THD+N		100W	
	RL= 4Ω, 10% THD+N		88W	
	200W channel: RL= 2Ω, 1% THD+N		208W	
THD+N	1W		0.02%	
SNR	A-weighted, Gain= 18 dB		108dB	
DNR	A-weighted, Gain= 18 dB		109dB	
Minimum Load Impedance		3Ω	4Ω	
Gain		18dB	24dB	34dB
Efficiency	100W@40hm		90%	

Input Impedance	18dB		48K Ω	
	24dB		24K Ω	
	30dB		12K Ω	
	34dB		7.7K Ω	

6 Connection Ports and Functions

6.1 Power input

TSA8802B 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.

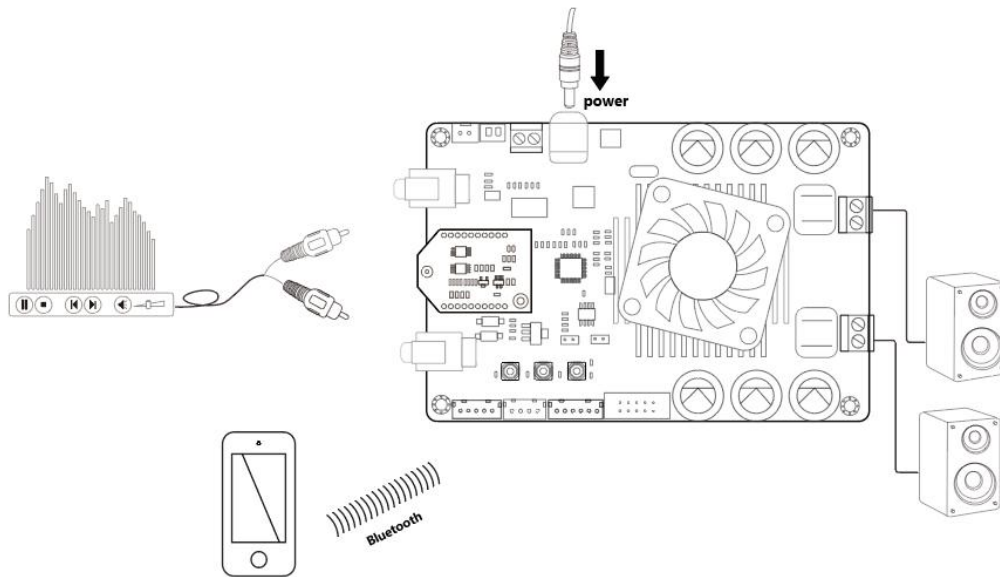
- DC input voltage: DC12V-30V.
- Power reverse connect protection

The Recommend input voltage is DC12V-30V. 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

- **Play/Pause Button**
 - Short click: play or pause the music.
- **Rewind/VOL- Button**
 - Short click: play the previous song.
 - Long press: decrease the volume.
- **Forward/VOL+ Button**
 - Short click: play the next song.
 - Long press: increase the volume.

6.2.1 Standard working mode



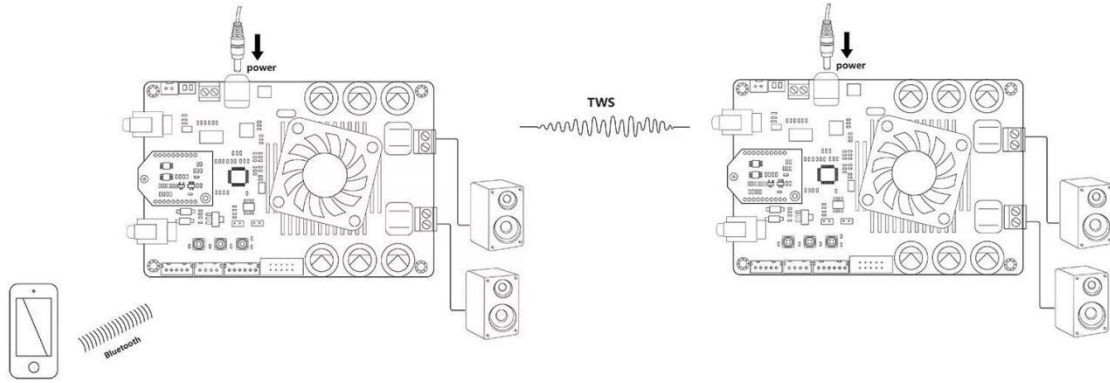
One TSA8802B works alone

How to use:

1. Connect speakers with TSA8802B and power up the TSA8802B, Blue LED and Red LED
2. Now, your smartphone will be able to find a new Bluetooth device which name is “**TSA8802B**”. Connect it. (Blue LED fast blink)
3. You can play the music now.

6.2.2 TWS mode

- S1 - Play/Pause button
- S2 - Rewind/VOL- button
- S3 - Forward/VOL+ button



Two TSA8802B works in TWS mode

How to use:

1. Connect speakers with one TSA8802B and power it up, Blue LED and Red LED flash alternately.
2. Now, your smartphone will be able to find a new Bluetooth device which name is “**TSA8802B**”. Connect it. (Blue LED fast blink)
3. You can play music now.
4. Connect speakers with another TSA8802B and power it up, Blue LED and Red LED flash alternately.
5. Long press **S1+S3** for 1 second on the first TSA8802B, board goes into TWS master mode.
6. Long press **S1+S2** for 1 second on the second TSA8802B, board goes into TWS slave mode.
7. Wait a moment, master board and slave board connected together.
8. Now, both TSA8802B have music out.
9. If you want to clear the pairing info, long press **S1** for 6 seconds.
10. If you want to disconnect TWS connection, long press **S2+S3** for 1 second.

6.3 RCA Input

TSA8802B’s DSP program detects signal from Bluetooth module, if Bluetooth audio signal detected, amplifier will output Bluetooth audio source, otherwise it will output RCA audio source. You can also develop DSP program to fulfill your requirement.

6.4 External LED port

User can connect an external LED to this port, the state is same as the Blue LED on AudioB I2S Bluetooth module.

LED State	Description
Fast blink	Bluetooth connectable
Fast blink 3 times then repeat	Bluetooth connected

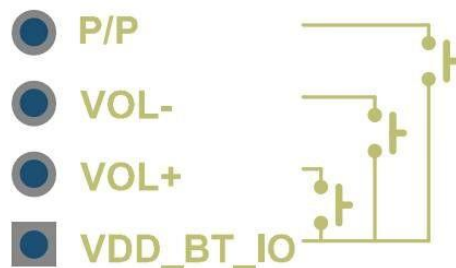
6.5 External DSP I/O port

We provide 3 I/O pins of ADAU1701 DSP chip to use: MP6, MP7 and MP0, you can develop DSP program to fulfill your requirement. For the default DSP firmware, if you connect any of these pins to GND, TSA8802 will output a 1kHz sine wave.



6.6 External Buttons port

Wiring:



Pin functions

Pin#	Name	Description
1	P/P	Play/Pause button
2	VOL-	VOL- button Short click: Previous track Long press: Audio volume -
3	VOL+	VOL+ button Short click: Next track Long press: Audio volume +
4	VDD_BT_IO	1.8V output

6.7 External POT port

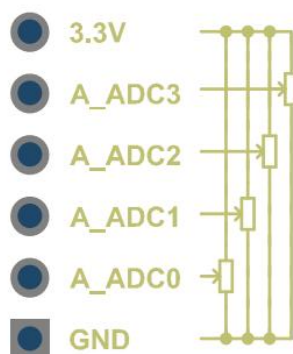
User can connect external potentiometer(5K~20K) to control the Main volume, treble, middle,



Bass. TSA8802B's default firmware does not support potentiometers, if you want to use potentiometers, you need to update the DSP program first. You can download the DSP program in the product page.

We also provided a potentiometer kit (Part number: G6438C446C9585) which can be connected to this port directly.

Wiring:



Pin#	Name	Description
1	3.3V	3.3V output
2	ADC3	DSP ADC3 pin - Treble volume
3	ADC2	DSP ADC2 pin - Middle volume
4	ADC1	DSP ADC1 pin - Bass volume
5	ADC0	DSP ADC0 pin - Main volume
6	GND	Ground

6.8 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.

6.9 Amplifier chip Gain settings

The gain of TSA8802B is fixed to 24dB by default, it is set by a 4-position slide switch near power input port. You can change switch settings as listed below to get a different gain, please disconnect amplifier's power supply when setting the switch.

GAIN	Switch settings			
	1	2	3	4
18dB	OFF	OFF	OFF	ON



24dB	OFF	OFF	ON	OFF
30dB	OFF	ON	OFF	OFF
34dB	ON	OFF	OFF	OFF

7 DSP programming

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

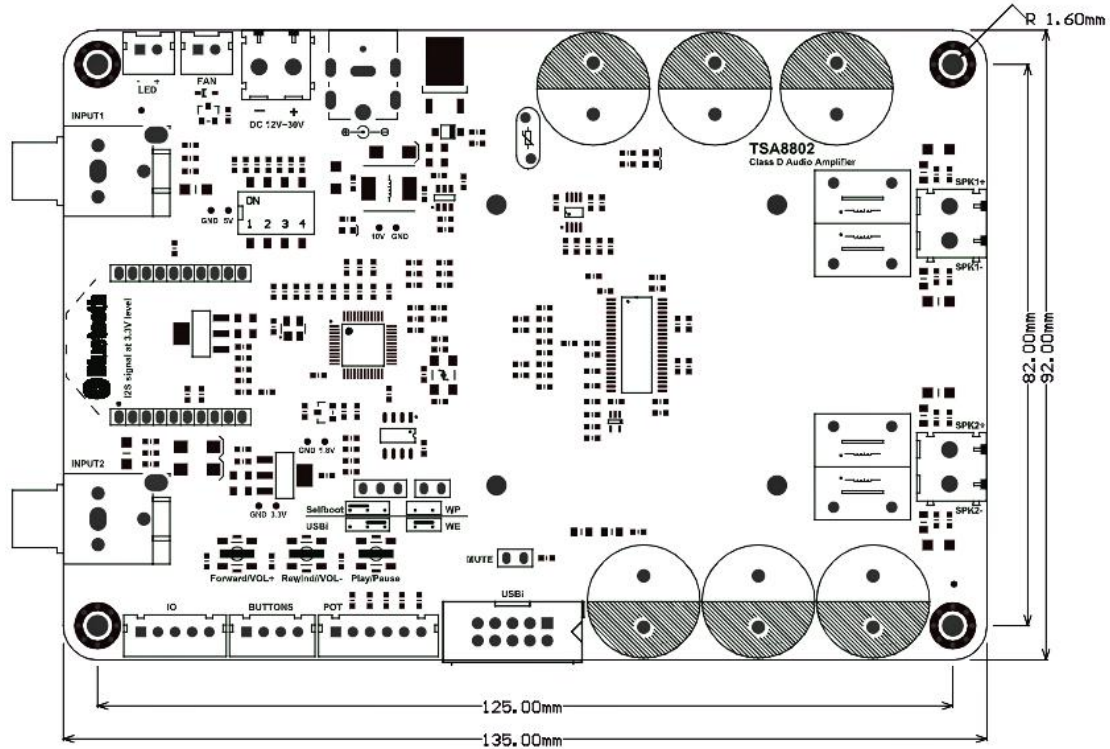
- [How to write DSP program to DSP board](#)
- [Default DSP program](#)
- [DSP program \(with external POTs\)](#)

8 Bluetooth programming

TSA8802B use Qualcomm QCC3031 as the main Bluetooth chip. User can do the programming via the USB port on the board. You can change the BT name, Audio tones, Firmware ect... by using the official Qualcomm software.

- [Bluesuite3.3](#)
- [ADK_QCC512X_QCC302X_WIN_6.4.2.26](#)
- [QCC3031 Bluetooth firmware](#)
- [How to change the BT name](#)

9 Dimensions



10 Revision history

Document revision history

Date	Revision	Changes
14-Nov-2023	1	Initial release