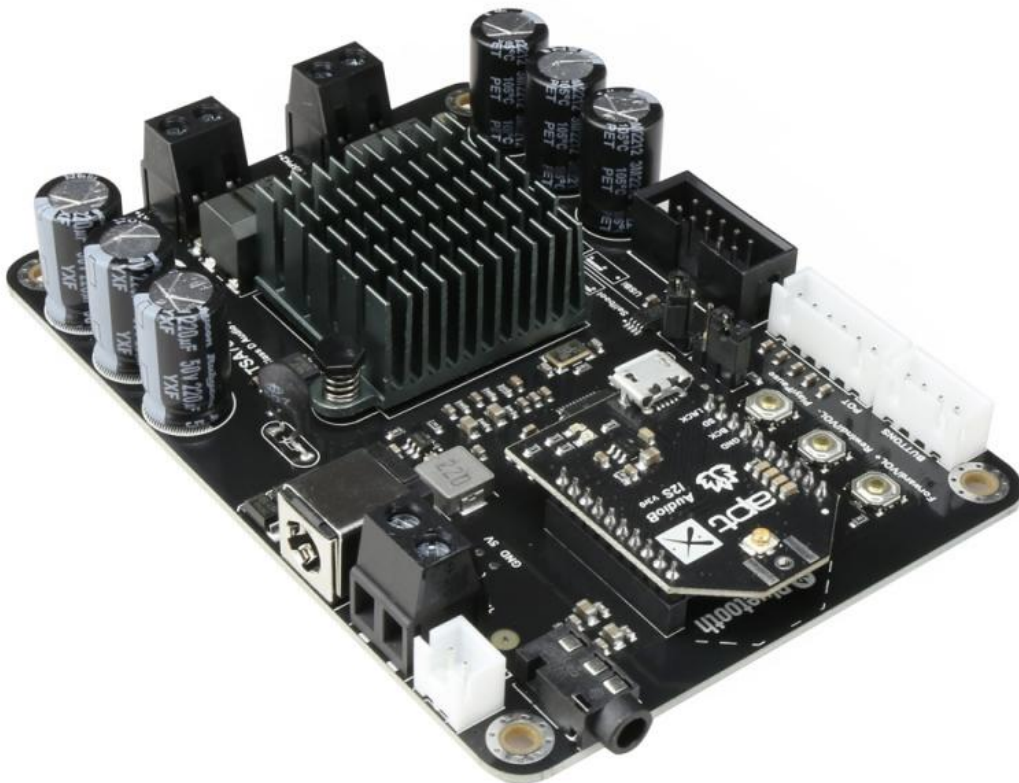




TSA7802B

2 x 50W Bluetooth + DSP Audio Amplifier Board

Datasheet





1 Features

- Wide-range 12V to 24V Supply Voltage Operation
- 2x50W output power with $R_L = 4\Omega$ and $V_{CC}=21V$
- Size: 105mm*75mm*22mm
- DSP programmable
- Bluetooth programmable
- Bluetooth 5.1
- Qualcomm TrueWireless Technology
- aptX, aptX Low Latency, SBC and AAC
- Four selectable, fixed gain settings of nominally 20dB, 26dB, 32dB and 32dB.
- 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

TSA7802B 2x50W 2 channels Bluetooth+DSP amplifier board with an AudioB I2S Bluetooth module that supports Apt-X. TSA7802B 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. 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.

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 "TSA7802B". You don't need a PIN, pair it and then you can play music.

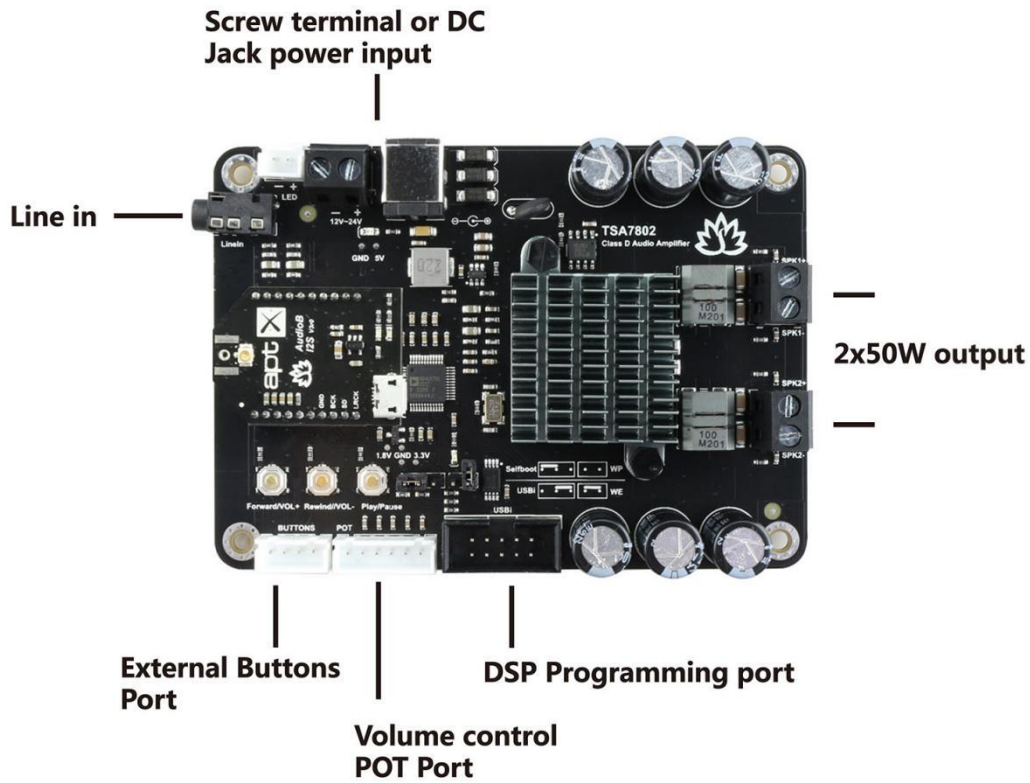
The highlight point is ADAU1701 DSP chip on board. It has a default DSP program loaded. Customers can adjust the gain, bass, midrange and treble in the DSP program. It also have a debug port for Sigma Studio, user can program this board with our USBi programmer to get more functions which includes equalization, crossover, bass enhancement, multiband dynamics processing, delay compensation, etc. TSA7802B 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 30VDC, unless otherwise noted. Specifications subject to change without notice.

Parameter	Condition	Min	Typ	Max
Supply Voltage (VDC)	-	12	21	24
Power output per channel	RL= 4Ω, 10% THD+N		50W	
	RL= 8Ω, 10% THD+N			30W
	RL= 4Ω, 10% THD+N	18W		
THD+N	@4Ω, 1W, 1KHz		0.03%	
Bandwidth @± 3dB	@4Ω	20Hz	-	20KHz
Input Impedance	-	-	22KΩ	-
Minimum Load Impedance			3.2Ω	
Gain		18dB	24dB	34dB
Efficiency	50W@40hm	87%	-	92%

6 Connection Ports and Functions

6.1 Power input

TSA7802B 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.

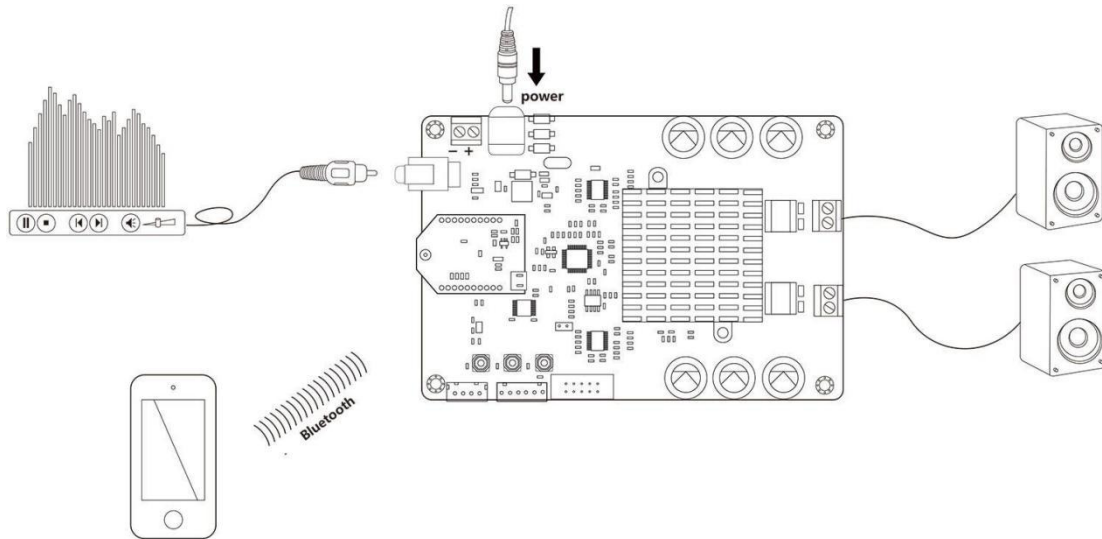
- DC input voltage: DC12V-24V.
- Power reverse connect protection

The Recommend input voltage is DC12V-24V. 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



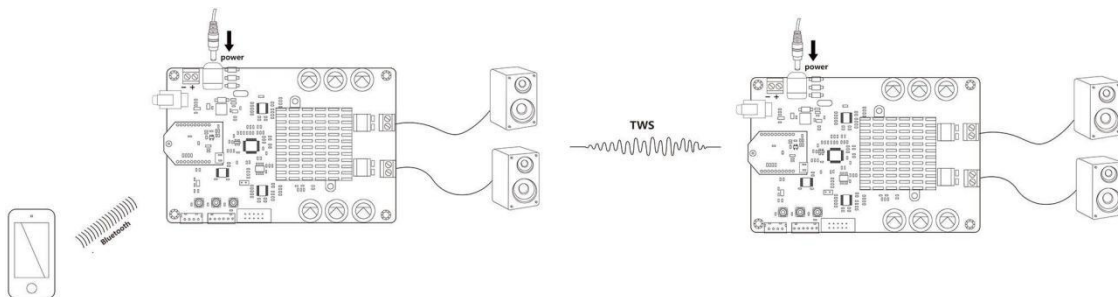
One TSA7802B works alone

How to use:

1. Connect speakers with TSA7802B and power up the TSA7802B, Blue LED and Red LED
2. Now, your smartphone will be able to find a new Bluetooth device which name is “**TSA7802B**”. 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 TSA7802B works in TWS mode

How to use:

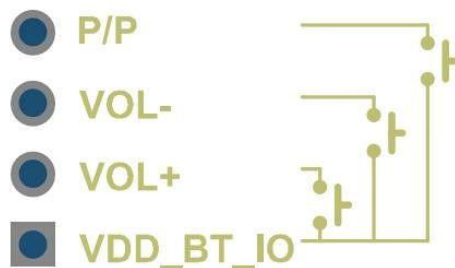
1. Connect speakers with one TSA7802B and power it up, Blue LED and Red LED flash alternately.
2. Now, your smartphone will be able to find a new Bluetooth device which name is “**TSA7802B**”. Connect it. (Blue LED fast blink)
3. You can play music now.
4. Connect speakers with another TSA7802B and power it up, Blue LED and Red LED flash alternately.
5. Long press **S1+S3** for 1 second on the first TSA7802B, board goes into TWS master mode.
6. Long press **S1+S2** for 1 second on the second TSA7802B, board goes into TWS slave mode.
7. Wait a moment, master board and slave board connected together.
8. Now, both TSA7802B 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 Aux in En

TSA7802B’s DSP program detects signal from Bluetooth module, if Bluetooth audio signal detected, amplifier will output Bluetooth audio source, otherwise it will output aux in audio source. You can also develop DSP program to fulfill your requirement.

6.4 External Buttons port

Wiring:



Pin functions

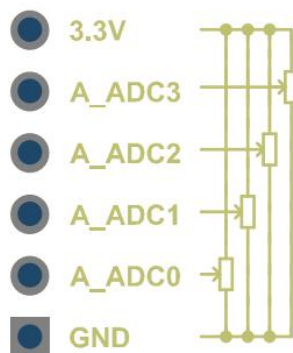
Pin#	Name	Description
1	P/P	Play/Pause button
2	VOL-	VOL- button Short click: Previous track Long press: Audio volume -
3	VOL+	VOL+ button Short click: Next track Long press: Audio volume +
4	VDD_BT_IO	1.8V output

6.5 Ext POT port

User can connect external potentiometer(5K~20K) to control the Main volume, treble, middle, Bass. TSA7802B’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

6.6 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.

6.7 Amplifier chip Gain settings

The gain of TSA7802B is fixed to 32dB by default, it’s set by 2 resistors marked as “1” and “2” near amplifier chip under the heat sink. You can change resistance as listed below to get a different gain.



GAIN	RESISTANCE	
	1	2
20dB	5.6K	-
26dB	20K	100K
32dB	39K	100K
36dB	47K	75K

7 DSP programming

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

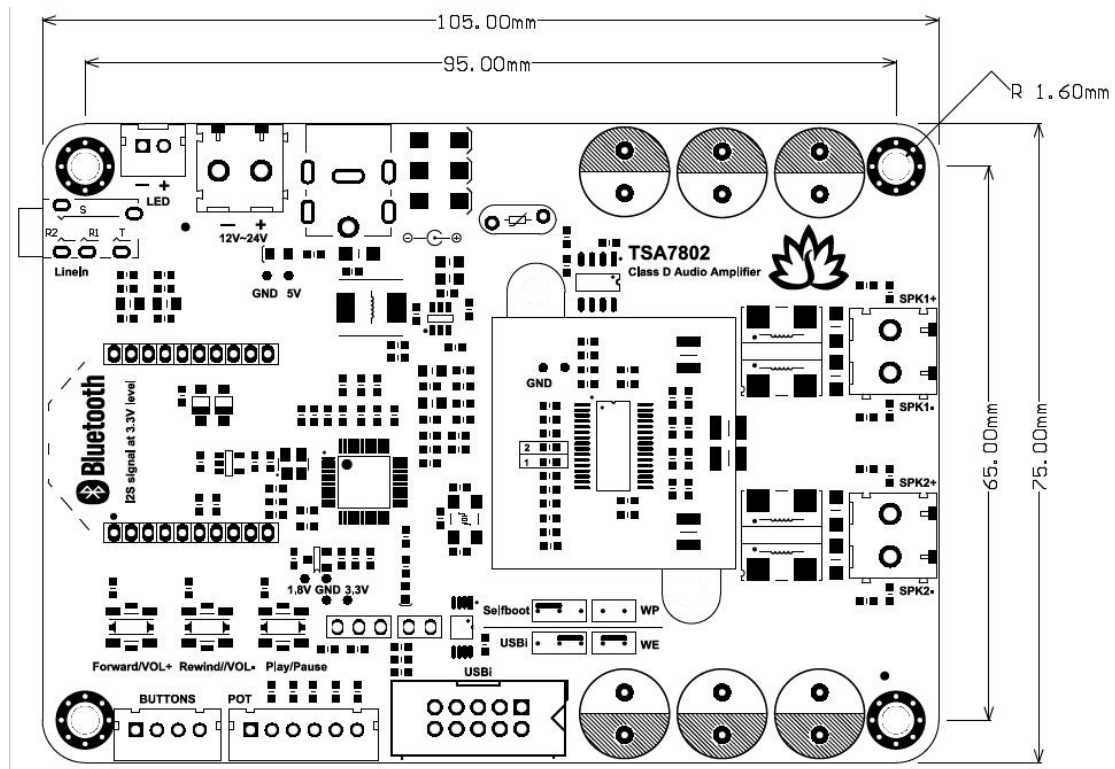
- [How to write DSP program to DSP board](#)
- [Default DSP program](#)
- [DSP program \(with external POTs\)](#)

8 Bluetooth programming

TSA7802B 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
15-Aug-2023	1	Initial release