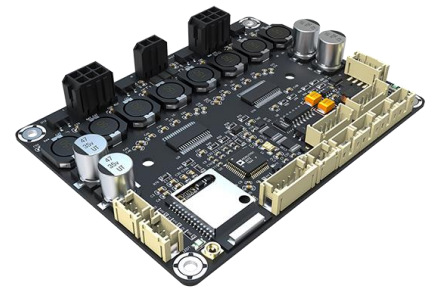


# JAB Series

## 4 x 30 Watt (4.0 / 2.1 / 2.0 / 0.2) Class D Audio Amplifier Board w ADAU1701 DSP & BT 5.0 – JAB4



### Key Features

- 3.6 x 2.7 Inches PCB Size
- Integrated with Bluetooth 5.0
- Integrated with ADAU1701 DSP
- 4x30W / 2x30W+1x60W / 2 x 60W
- Suitable for Audio 4.0 / 2.1 / 2.0 / 0.2 System
- Bluetooth & Line Input Supported
- I2S Signal Output
- Bluetooth Pairing Cancellation
- Four External Potentiometers
- Supporting Programming & PC UI Control
- Signal Level Sensor System
- Power Management System

### Distributors:



All Audio Amplifier boards are complied with ROHS and they are pre-tested with our power supply solution to comply with FCC and CE. We could provide FCC, CE and RoHS certifications for customers' convenience. The test reports will be provided upon requests by e-mails only for customers who apply for bulky purchase of MOV USD\$10,000 or MOQ 500pcs.

### Ready for:



### Contact Info

- Email: info@wondom.com



### Overview

JAB4 is an audio amplifier integrated with both **ADAU1701 DSP and Bluetooth 5.0**, supporting various audio format decode, such as aptX, aptX HD, aptX LL, SBC and AAC. JAB4 is a 4CH audio amplifier based on TI's TPA3118, delivering 30W per channel into an 8Ohm load. Furthermore, JAB4 supports PBTTL configuration, meaning that each two channels can be configured as one channel with double output power. Therefore, JAB4 can work as 2.1 mode (2 x 30W + 1 x 60W), and 2.0 mode (2 x 60W). Thanks to the equipped cable identification circuit, the switching between the output modes is automatically achieved by inserting cables. JAB4 features high quality audio performance, high efficiency, high flexibility and expandability, perfectly suitable for DIY applications, Home audio, Hotel audio, Desktop audio, Garden audio and demanding industrial audio applications.

There is a built-in antenna on the board for stable connection. In addition, a port for external Bluetooth antenna is provided to ensure the stable audio transmission and high quality audio. Besides Bluetooth input, JAB4 supports 3.5mm line input. The signal from both input methods would be mixed before being transmitted to audio processing. JAB4 provides an I2S signal output. You can connect which to an I2S audio amplifier board, in which condition, JAB4 is set as master mode. Thanks to the employed ADAU1701 DSP chip, JAB4 supports hardware control and software control. Four ports for external potentiometers are offered on board as default. After connection with the potentiometers, you can adjust the gain, volume and frequency. What's more, JAB4 supports programming with SigmaStudio and remote control through PC UI with connection with ICP5.

Power management system and signal level sensor system are quipped on JAB4 for lower power consumption and high working efficiency.

### Electrical Specifications

Specifications typical @ +25°C, powered by 24V DC, unless otherwise noted. Specifications subject to change without notice.

Parameter		Conditions	Min.	Typ.	Max.	Units
Number of Channels		-	-	4	-	-
Minimum Load Impedance		-	-	4	-	Ω
Efficiency		4 x 30W@80hm, 1kHz	-	87	-	%
Nominal Power Requirement		@24V, 1kHz	-	140	-	W
Operating Voltage		@1kHz, 80hm	10	24	26	V
Idle Power		Signal detected	-	3.2	-	W
		No Signal detected	-	1.2	-	W
Switching Frequency		SD Floating@24V	-	400	-	kHz
Power Consumption		1/4 of max output power@80hm, 24V, 1kHz	-	31	-	W
		1/8 of max output power@80hm, 24V, 1kHz	-	17	-	W
Control	Standby (Low = inputs enabled)	High-level Input Voltage	3.3	-	-	V
		Low-level Input Voltage	-	-	0.8	V
	Mute (High = outputs enabled)	High-level Output Voltage	3.3			V
		Low-level Output Voltage	-	-	0.8	V
Standby Power		SD short to GND, only when low power module available	-	86	-	mW

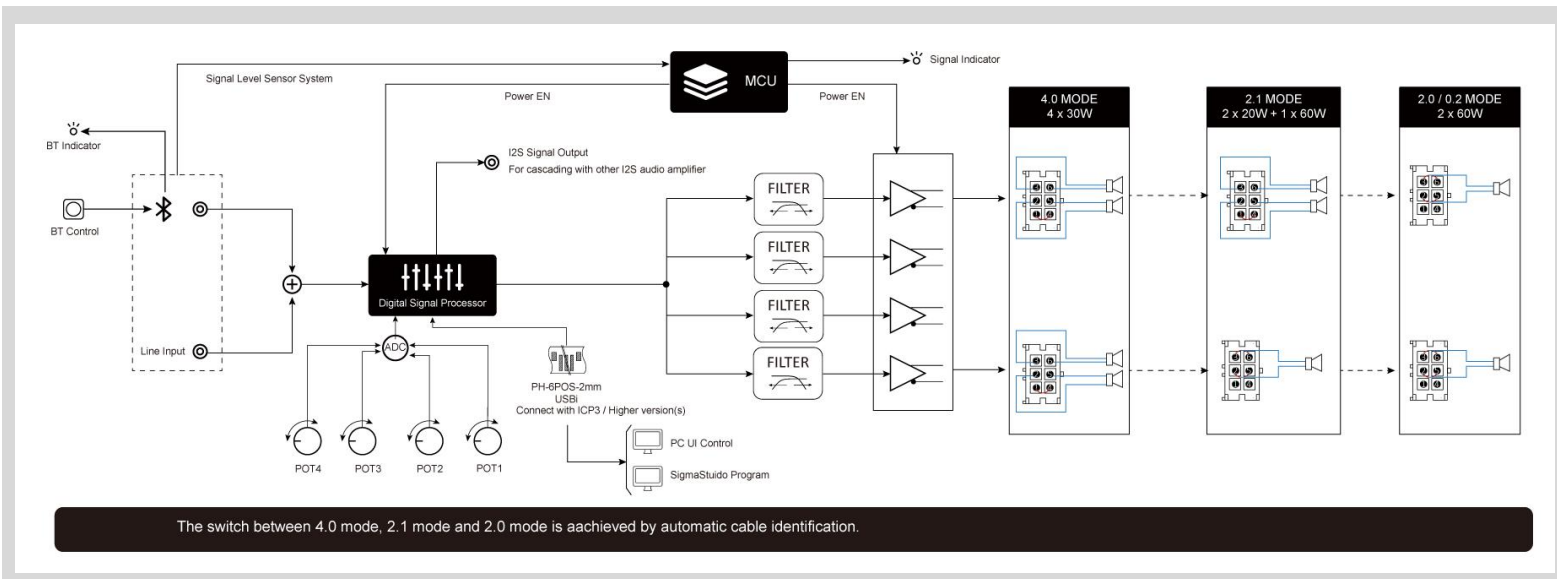
### Audio Performance

Specifications typical @ +25°C, powered by 24V DC, unless otherwise noted. Specifications subject to change without notice.

Parameter		Conditions	Min.	Typ.	Max.	Units
Amp Gain		@80hm, 20Hz - 20kHz	-	26	-	dB
DSP Gain	SE1 (Single Amp)	@80hm, 1kHz	-60	-	0	dB
	SE2 (Line Output)	@80hm, 1kHz	-60	-	6.5	dB
Input Sensitivity		2 x 30W@80hm, 1kHz, 26dB		770		mV
Filter Gain		Butterworth, Q= 0.707	-	4	-	dB
Cutoff Frequency		HFP	0.25	-	2	kHz
		LFP	-	20	-	kHz
SNR		2 x 30W@80hm, THD+N=1%, 26dB, A-weighting		97		dB
THD+N		5W@80hm, 1kHz,26dB		0.03		%
		10W@80hm, 1kHz, 26dB		0.06		%
Input Impedance		-		10		kΩ
Supported Sampling Rates		-	-	48	-	kHz
Output Noise Level		A-weighting, Input Connected to GND, 26dB		153		uV
DC Offset		-		10		mV
Crosstalk Separation		20Hz-20kHz, Gain=26dB	-	-60	-	dB

All parameters were tested with Rohde & Schwarz UPV audio analyzer (AES17 filter enabled) and Audio Precision AUX0025 filter. For authorized distributors and OEM customers who need more detailed performance graphs and parameter settings, please send an inquiry e-mail to us. (Not available for retail customers)

## Block Diagram



### Notes:

- JAB4 supports 4.0 mode (4 x 30W), 2.1 mode (2 x 30W + 1 x 60W) and 2.0 mode (2 x 60W). The switch between the three modes is achieved by automatic cables identification, without any need of other operations. If you want to use JAB4 as 0.2, please set the mode and frequency through PC UI after connection with WONDOM ICP5. 0.2 Mode is not available when using hardware control (potentiometers).
- Besides speaker output, JAB4 provides an I2S signal output, which can be transmitted to an I2S audio amplifier.
- Signal Level Sensor System has been employed in JAB4 for low power consumption. JAB4 will enter into standby mode when audio signal is not detected for long time (5min). Once audio signal is detected under this circumstance, JAB4 will restart to work. It is not malfunction if JAB4 enters into standby mode.
- The basic cable package of JAB4 contains: one power cable and two speaker cables. If you have special requirements of cables, please contact us at [store@sure-electronics.com](mailto:store@sure-electronics.com).

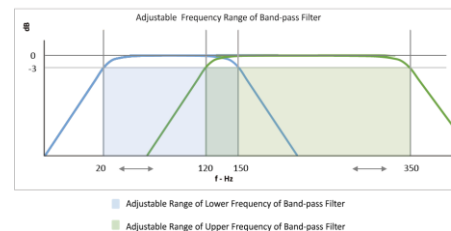
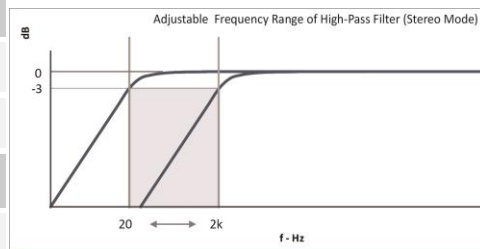
## Function of Potentiometers

Port	Function	4.0 / 2.0 Mode	2.1 Mode (CH1 - Mono)	2.1 Mode (CH2 - Mono)
POT4	Overall Gain	Overall Gain	Overall Gain	Overall Gain
POT3	CH2 HPF or BPF	High-pass Filter of CH2	High-pass Filter of CH2	Band-pass Filter of CH2
POT2	CH1 HPF or BPF	High-pass Filter of CH1	Band-pass Filter of CH1	High-pass Filter of CH1t
POT1	CH1 Relative Gain	CH1 Relative Gain	CH1 Relative Gain	CH1 Relative Gain

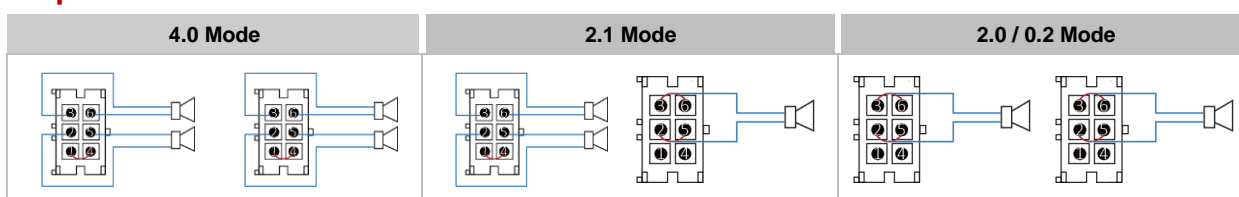
### Note:

- The channel 1 speaker output (J11) of JAB4 is defined as CH1; channel 2 speaker output (J12) is defined as CH2.
- POT1 and POT2 are used to adjust CH1 output, POT1 is used to adjust the gain of CH1 on the basis of overall gain. POT3 is used to adjust CH2 output and POT4 is used for overall gain. When JAB4 works as 2.1 mode, you can configure any channel as 0.1. The function of potentiometers will be changed accordingly.
- HPF refers to High-pass Filter; BPF refers to Band-pass Filter. When CH1 (CH2) is stereo output, the function of POT2 (POT3) is HPF; when CH1 (CH2) is mono output, the function of POT2 (POT3) is BPF.
- For the functions of potentiometers when used in other applications, please contact us at [store@sure-electronics.com](mailto:store@sure-electronics.com).

Function	Range of Frequency
High-pass Filter (4.0 / 2.0 Mode)	20Hz- 2kHz
High-pass Filter (2.1 Mode)	250Hz- 2kHz
Band-pass Filter	20Hz-150Hz (High-pass)
	120Hz-350Hz (Low-pass)



## Output Connection



Customer could customize frequency range through Sigma Studio. We provide SigmaStudio source code for downloading. (PC UI Control only works with default firmware.)



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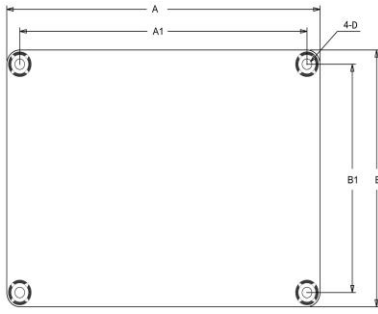
[store.sure-electronics.com](http://store.sure-electronics.com)

[www.wondom.com](http://www.wondom.com)

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Skype: surewebstore

## Mechanical Dimensions

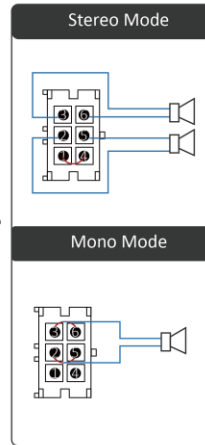
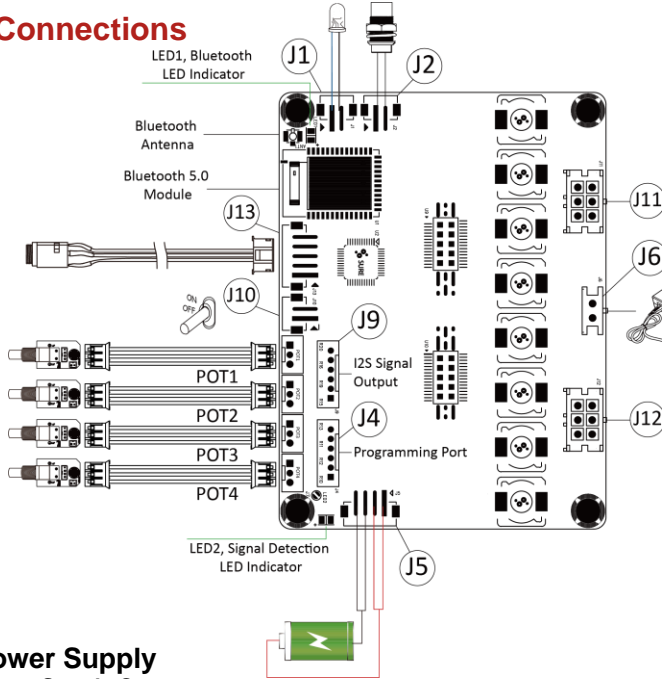


Dimensions	A (inch/mm)	A1 (inch/mm)	B (inch/mm)	B1 (inch/mm)	D (inch/mm)
	3.60/91.44	3.30/83.8	2.70/68.6	2.40/61.0	0.14/3.6

### Notes:

- All dimensions are typical in inches/mm, Height = 0.79inch / 20mm
  - Tolerance x.xx =  $\pm 0.02(\pm 0.50)$
- The height is measured from the bottom of the PCB to the highest part of the components.

## Connections



## LED Indicator

### LED1, Bluetooth Indicator

When Bluetooth is paired, the LED will be ON;  
When Bluetooth is searching, the LED will BLINK.

### LED2, Signal Detection Indicator

When there is signal detected, the LED will be ON;  
When there is no signal detected for 5min, the LED will be OFF.

External Bluetooth LED Indicator:

· J1, PH- 2Pos- 2mm

Pin	Definition
1	LED-
2	LED+

## Power Supply

### Power Supply Connector:

· J6, Molex MicroFit- 2Pos- 3mm

Pin	Definition
1	VCC
2	GND

The recommended power supply range is DC12-26V.

### Battery Power Connector:

· J5, PH- 4Pos- 2mm

Pin	Definition
1	VCC
2	VCC
3	GND
4	GND

It is suggested to use WONDOM BCPB series battery board to power JAB4 since there is no charging circuit equipped with JAB4.

## Programming

### Programming Connector:

· J4, PH- 6Pos- 2mm

Pin	Definition
1	RST
2	+5V
3	GND
4	WP
5	SCL
6	SDA

This port is for connection with WONDOM ICP5 to achieve programming and remote control functions.

## Audio Input

### Bluetooth Input:

· Bluetooth 5.0 Module, supporting

PAIRED DEVICES



There is a built-in antenna on JAB4 so you can connect with your device for audio playback without connection with an external antenna.

### External Bluetooth Antenna:

· Bluetooth Antenna  
If you want to integrate JAB4 in a speaker or a cabinet, it is suggested to install the external Bluetooth antenna for stable connection.

### Line Input Connector:

· J13, PH- 5Pos- 2mm

Pin	Definition
1	LIN
2	GND
3	RIN
4	NC
5	NC

JAB4 supports 3.5mm line input as well. The signal from both input methods will be mixed.

## Audio Output

### Speaker Output Connector:

· J11, Molex MicroFit- 2x3Pos- 3mm

Pin	Stereo	Mono
1	GND	GND
2	OUTR1-	MONO1+
3	OUTL1+	MONO1-
4	MODE1	MODE1
5	OUTR1+	MONO1+
6	OUTL1-	MONO1-

· J12, Molex MicroFit- 2x3Pos- 3mm

Pin	Stereo	Mono
1	GND	GND
2	OUTR2-	MONO2+
3	OUTL2+	MONO2-
4	MODE2	MODE2
5	OUTR2+	MONO2+
6	OUTL2-	MONO2-

Short circuit 'GND' and 'MODE' in stereo mode, which is not required in mono mode.

JAB4 supports PBTL configuration. Based on cable identification, JAB4 can automatically switch among 4.0 / 2.1 / 2.0 mode.

The connection is as shown in the connection diagram.

If you want to use JAB4 as 0.2, please set the mode and frequency through PC UI after connection with WONDOM ICP5.

0.2mode is not available when using hardware control (potentiometers).

### I2S Signal Output Connector:

· J9, PH- 6Pos- 2mm

Pin	Definition
1	LRCLK
2	BCLK
3	DATA
4	GND
5	+5V
6	NC

JAB4 provides an I2S signal output. You can transmit the I2S signal to an I2S audio amplifier, in which condition, JAB4 would be master mode as default.

## Control

### BT Pairing Cancellation Connector:

· J2, PH- 2Pos- 3mm

Pin	Definition
1	EN
2	+3.3V

When Bluetooth is paired, short circuit 'EN' and '+3.3V' to cancel pairing. After cancellation, please release short circuit.

### Standby Control Connector:

· J10, PH- 2Pos- 3mm

Pin	Definition
1	EN
2	GND

Short circuit 'EN' and 'GND' to enter into standby mode; Release short circuit for normal playback.



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