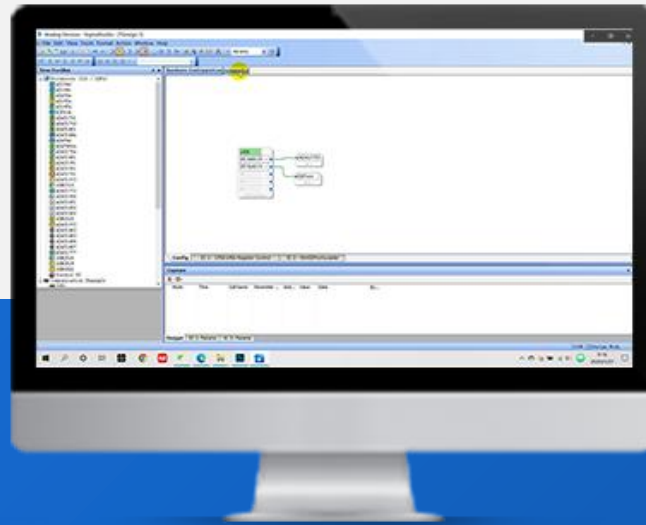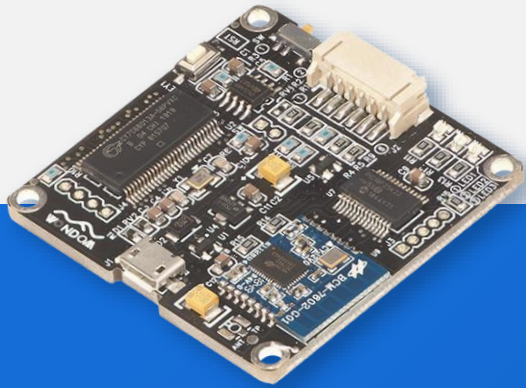# How to Program WONDOM ADAU1701 JAB3+ with SigmaStudio

Before Reading

JAB3+ is an audio amplifier board integrated with both Bluetooth and ADAU1701 DSP. You can program JAB3+ with SigmaStudio. Since JAB3+ employs Bluetooth, extra attention needs to be paid to the programming.

The purpose of this document is to give you instructions on how to program JAB3+ with SigmaStudio.
We will focus on the following points.

CORRESPONDENCE

It is essential to know the correspondence relationship between the resources of JAB3+ hardware and ADAU1701 program before you want to re-write the program.

AUDIO SETTINGS

You need to complete the audio settings before programming so that JAB3+ can work normally after re-writing program.

PROGRAM

We will list out which settings are necessary, which are optional and will give some suggestions.
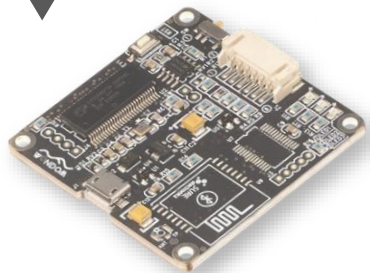
Preparations

We will need the following stuff at hand before we start.
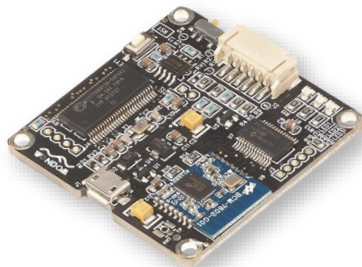
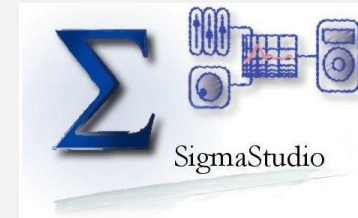**1** WONDOM JAB3+ & ICP3/ICP1

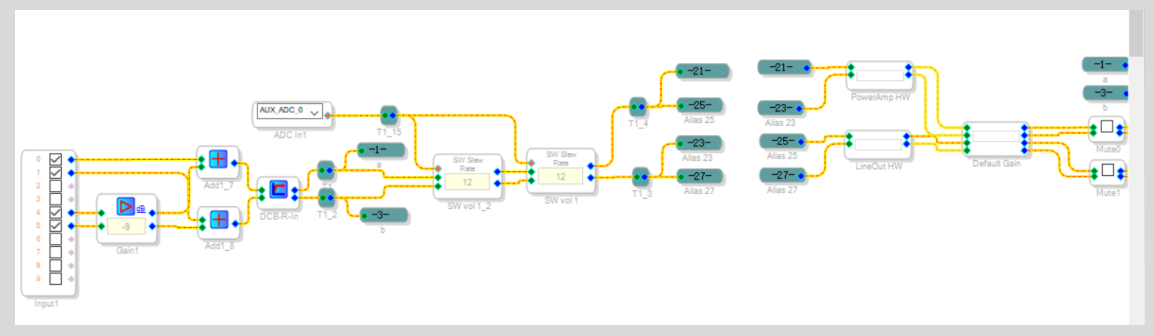JAB3+

ICP1

ICP3

OR

2 SigmaStuido Software

Analog Devices, Inc.
SigmaStudio™

3 Demo Program of JAB3+

You can see the hardware configuration and schematic in the demo program. Click HERE to download.

Correspondence

To make it more instinct and easier for understanding, we will make use of the demo program of JAB3+ to explain the relationship of the hardware and ADAU1701 program.
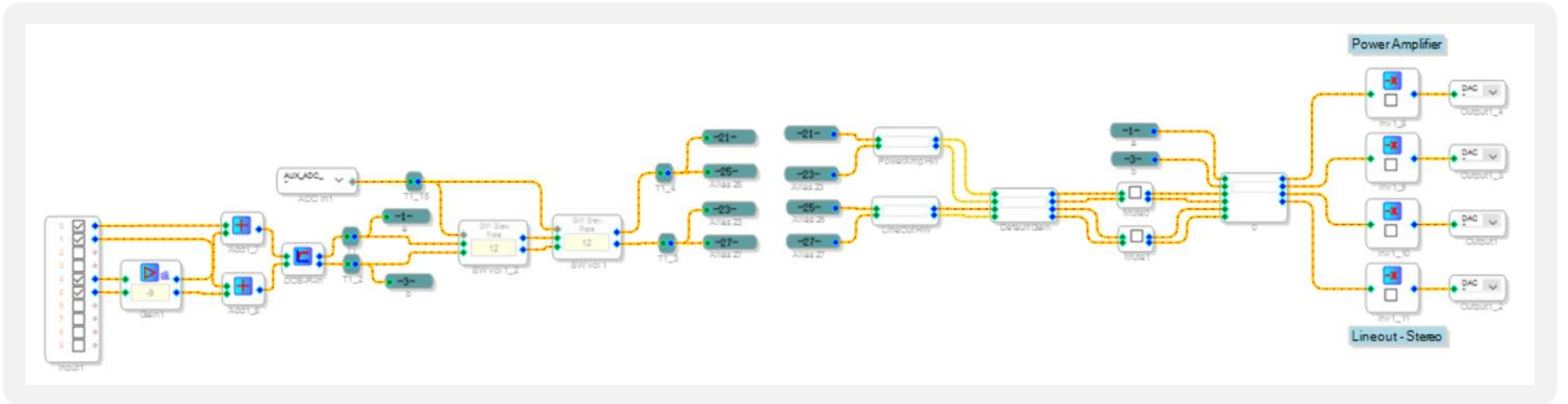
This is the demo program in the SigmaStudio. We will introduce to you in the following order.

Audio Input → Audio Output → Potentiometers → Extension Port
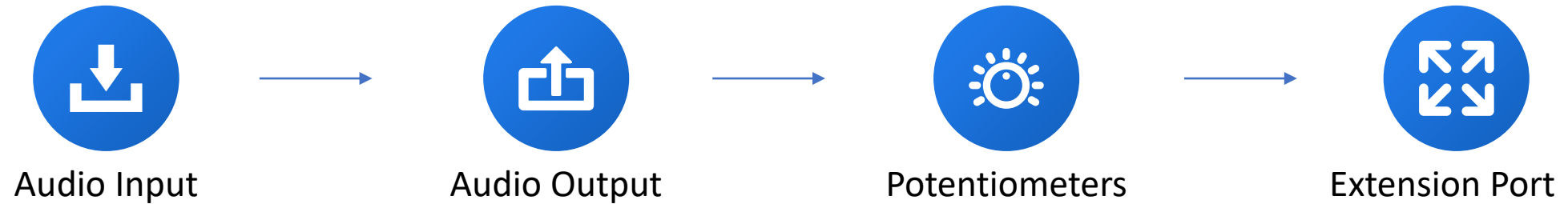
Audio Input

JAB3+ supports both Bluetooth input and 3.5mm line input. The signals would be mixed.

Analog Input

The 0, 1 in the input module is related to analog input, which is 3.5mm AUX in (J9) of JAB3+.

Bluetooth Input

The 4, 5in the input module is related to Bluetooth input of JAB3+.

Signal Mix

The signals input from analog input and Bluetooth input would be mixed by left channel and right channel, just as shown in this picture.
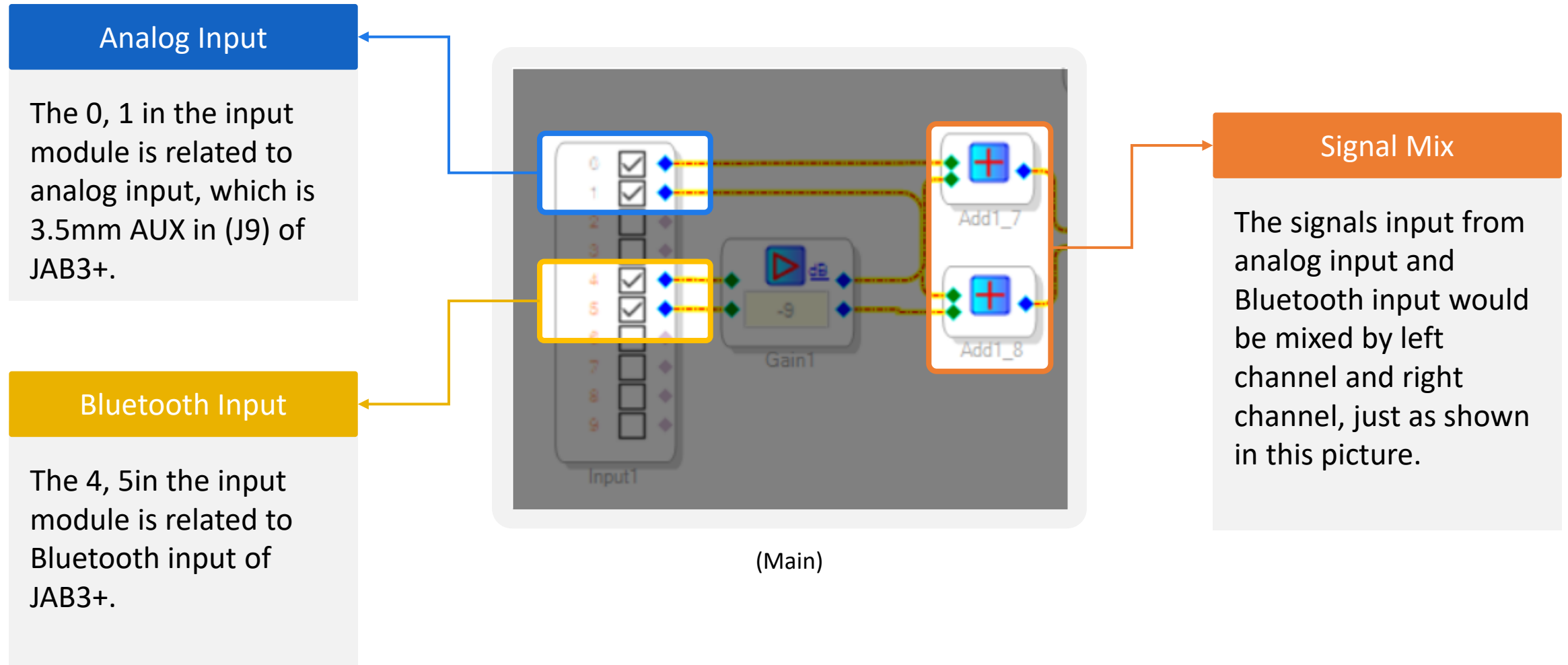
(Main)

Audio Output

In addition to speaker output, JAB3+ offers line output for cascading with WONDOM standard amplifier to build 2.1/4.0 system.
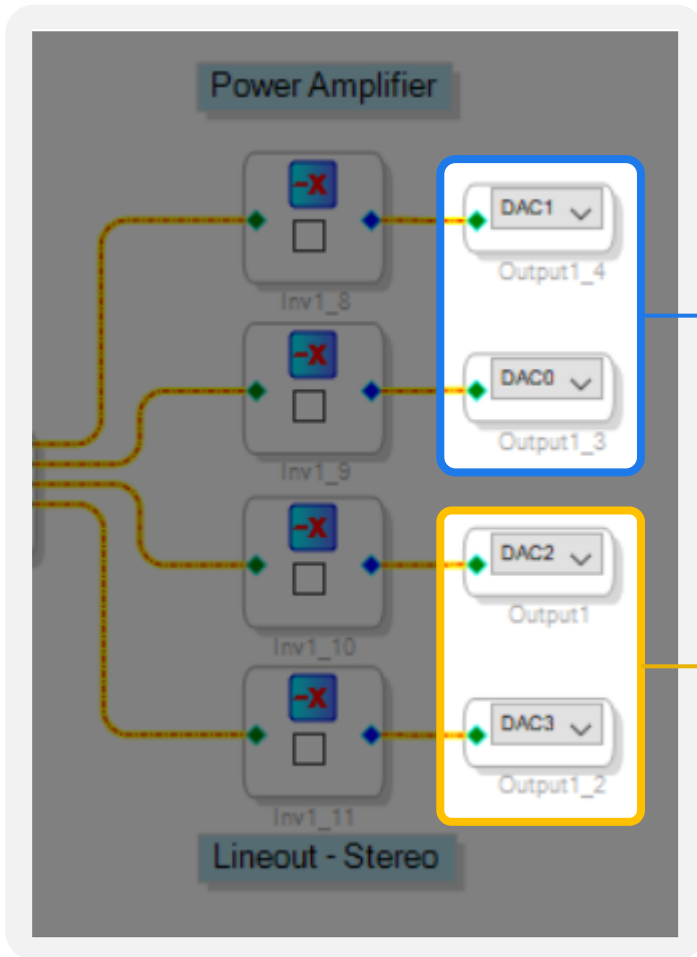
(Main)

Speaker Output

DAC0 and DAC1 are corresponding to power amplifier output (J10) of JAB3+.

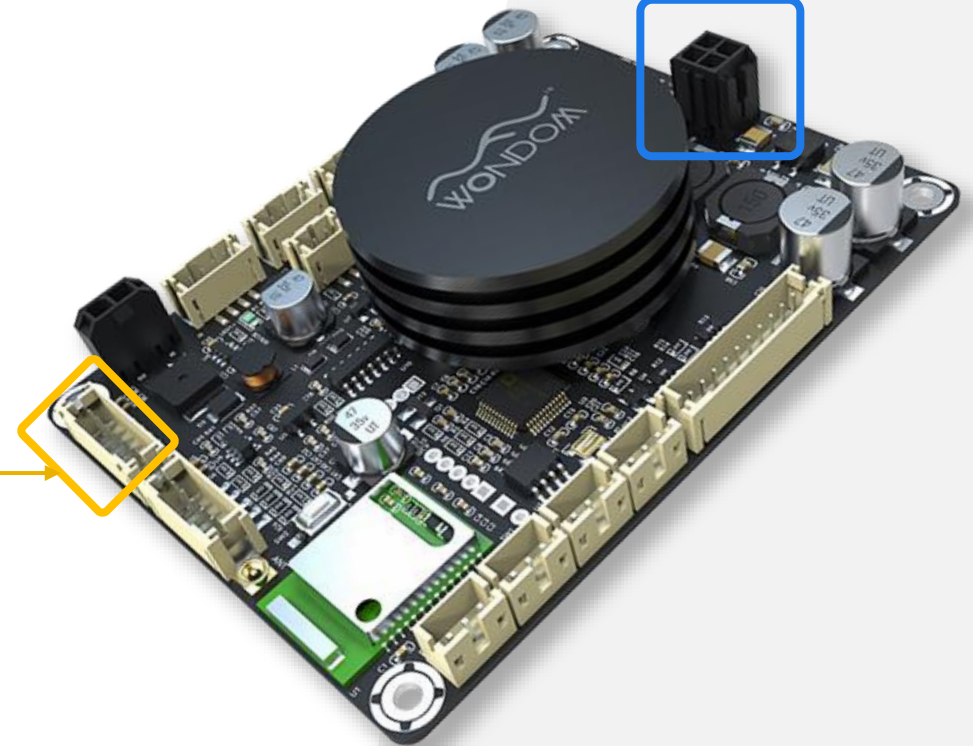## Line Output

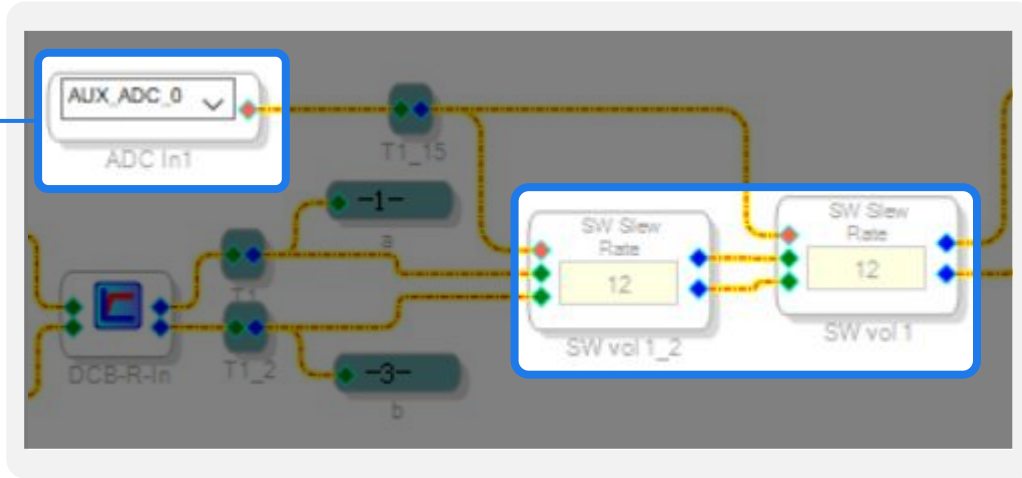DAC2 and DAC3 are corresponding to line output (J7) of JAB3+.

Potentiometers

Four ports for external potentiometers are provided on JAB3+ for easy control of your audio system.

(Main)

"PowerAmp HW" Part in the demo program

(PowerAmp HW)

POT4

AUX_ADC_0 ---> POT4

Overall Volume Control

POT3

AUX_ADC_3 ---> POT3

High-pass Filter / Band-pass Filter of Power Amplifier Output

Potentiometers

POT2 and POT1 are used for control of line output. You can find it in the "Lineout HW" part in the demo program.

(Lineout HW)

POT2

AUX_ADC_2 ---> POT2

High-pass Filter of Line Output
You can change the cut-off frequency.

POT1

AUX_ADC_1 ---> POT1

Relative Volume Control of Line Output

Extension Port

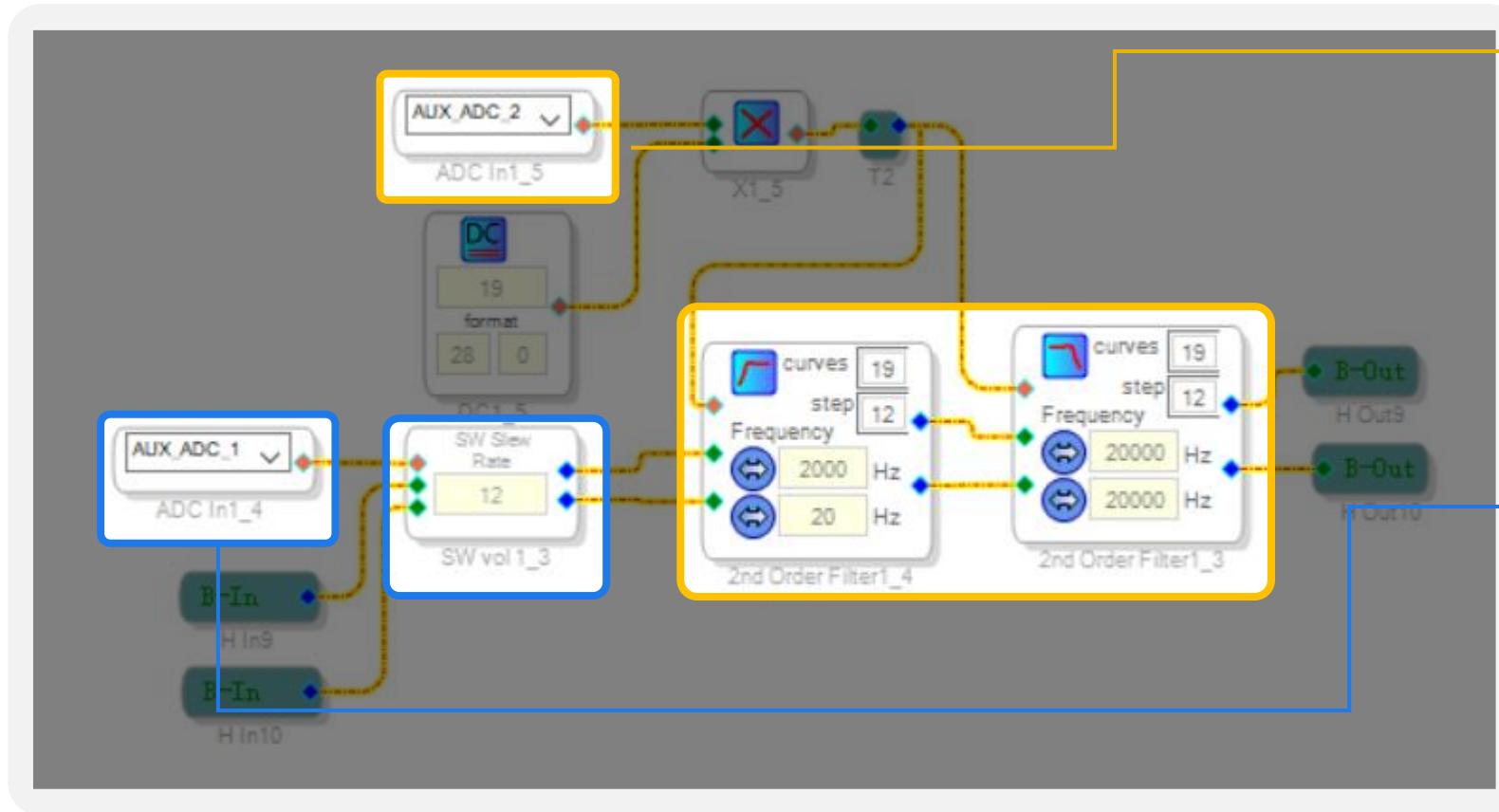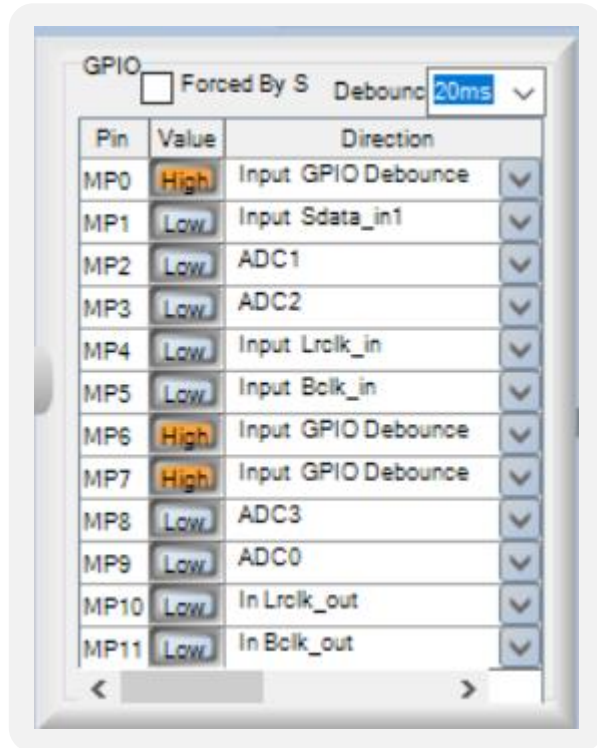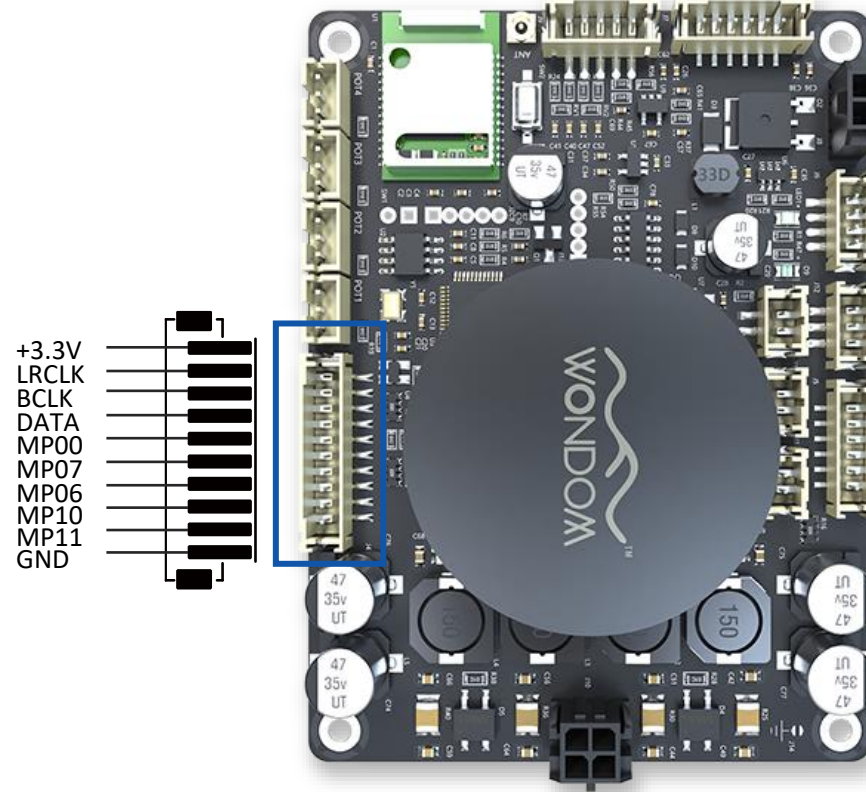As some customers want to develop JAB3+ on their own, we have left an extension port, which leads out some pins of ADAU1701 for further development.

You can find the correspondence in the "Hardware Configuration" – "IC 1 – 170x\140x Register Control" part.

GPIO			
Pin	Value	Direction	
MP0	High	Input GPIO Debounce	
MP1	Low	Input Sdata_in1	
MP2	Low	ADC1	
MP3	Low	ADC2	
MP4	Low	Input Lrclk_in	
MP5	Low	Input Bclk_in	
MP6	High	Input GPIO Debounce	
MP7	High	Input GPIO Debounce	
MP8	Low	ADC3	
MP9	Low	ADC0	
MP10	Low	In Lrclk_out	
MP11	Low	In Bclk_out	

Forced By S Debounce 20ms

(Hardware Configuration
– IC 1 – 170x\140x Register Control)

+3.3V
LRCLK
BCLK
DATA
MP00
MP07
MP06
MP10
MP11
GND

MP0, MP6 and MP7 are still available for your use.
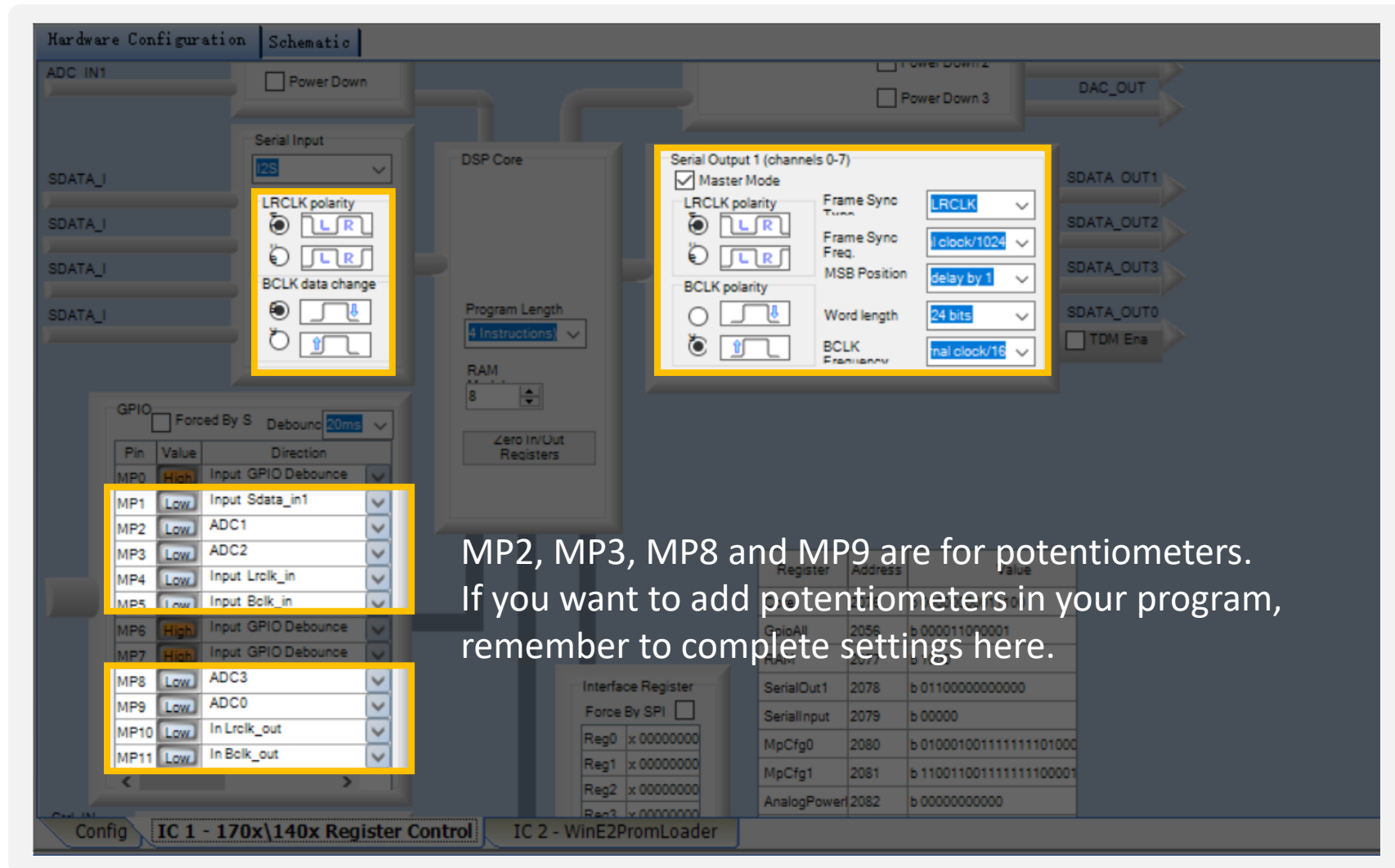MP4, MP5, MP10 and MP11 can be used as clock signal of I2S.

The Bluetooth of JAB3+ is a slave device, therefore, ADAU1701 needs to be set as Master mode in this system. So the GPIOs of I2S master mode and the GPIOs of I2S slave mode need to be connected in parallel.

Audio Setting before Programming

As we know, JAB3+ is integrated with Bluetooth. Therefore, we need to set the audio configuration before programming. Otherwise, the Bluetooth would malfunction after programming.

As for the settings, you can find it in the "Hardware Configuration" – "IC 1 – 170x\140x Register Control" part in the demo program.

All the points in the yellow boxes are important. Please set them the same as what is shown

MP2, MP3, MP8 and MP9 are for potentiometers. If you want to add potentiometers in your program, remember to complete settings here.
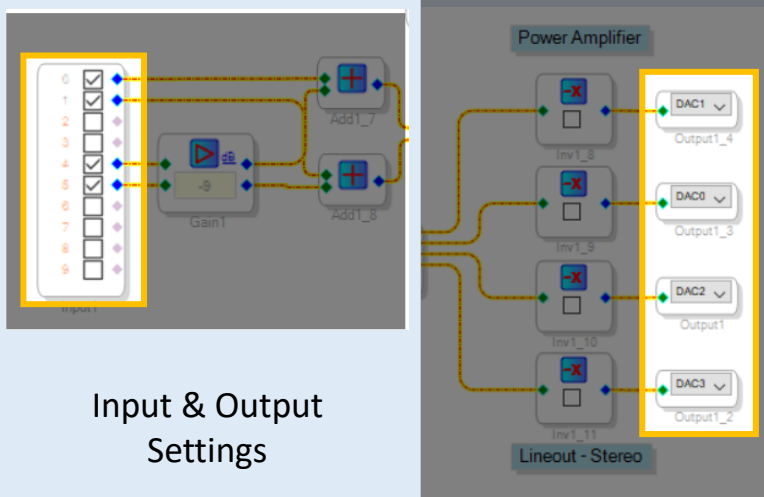
Program

Please do remember to set the input & Output module when programming.
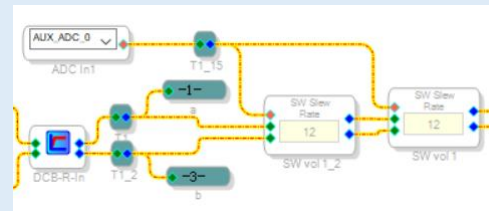
Necessary Settings

You can refer to the demo program for the settings.

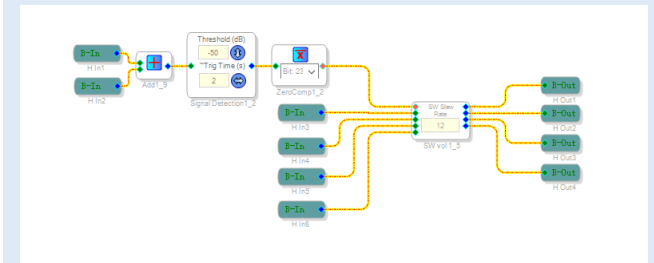Input & Output Settings

Optional Settings

You can add any function you want in the program, such as EQ, phase, frequency or volume.
You can switch or change the functions of potentiometers in the program.

Potentiometers

Recommended Functions

It is recommended to add a noise suppressor function in the program for a better sound quality.

Signal Detection

Summary

It is HIGHLY suggested that you directly make changes on the basis of our demo program.

Audio Configuration

Do remember to set the hardware configuration before you write program.

Add Functions

Add any function you want in your program.

1

2

3

4

Set the input and output when writing your program.

Input & Output settings

After the program is done, download it into the JAB3+.

Download Program