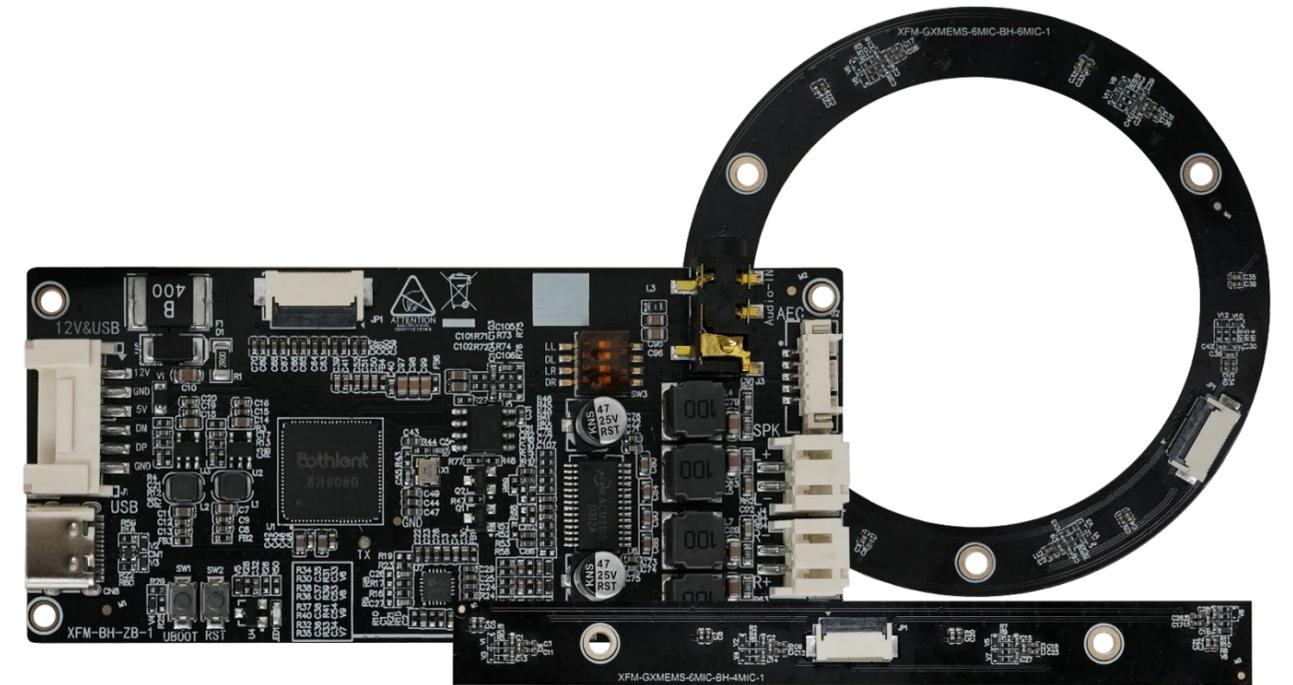




Intelligent Voice Control Kit



V1.0 2025-11-24

T-CHIP INTELLIGENCE TECHNOLOGY

Product features



Fully Integrated Voice Hardware

The kit integrates a USB sound card and a microphone array board, providing a comprehensive hardware foundation for intelligent voice. Simply connect the main control board and speakers to easily complete the development of intelligent voice products.



Dual-microphone array design

Optional linear 4-microphone array and circular 6-microphone array, 180°/360° sound source localization, equipped with CAE noise reduction technology, effective sound pickup within 3-5 meters, positioning accuracy of $\pm 15^\circ$, comprehensive and accurate sound source capture.



Built-in power amplifier, direct drive dual speaker output

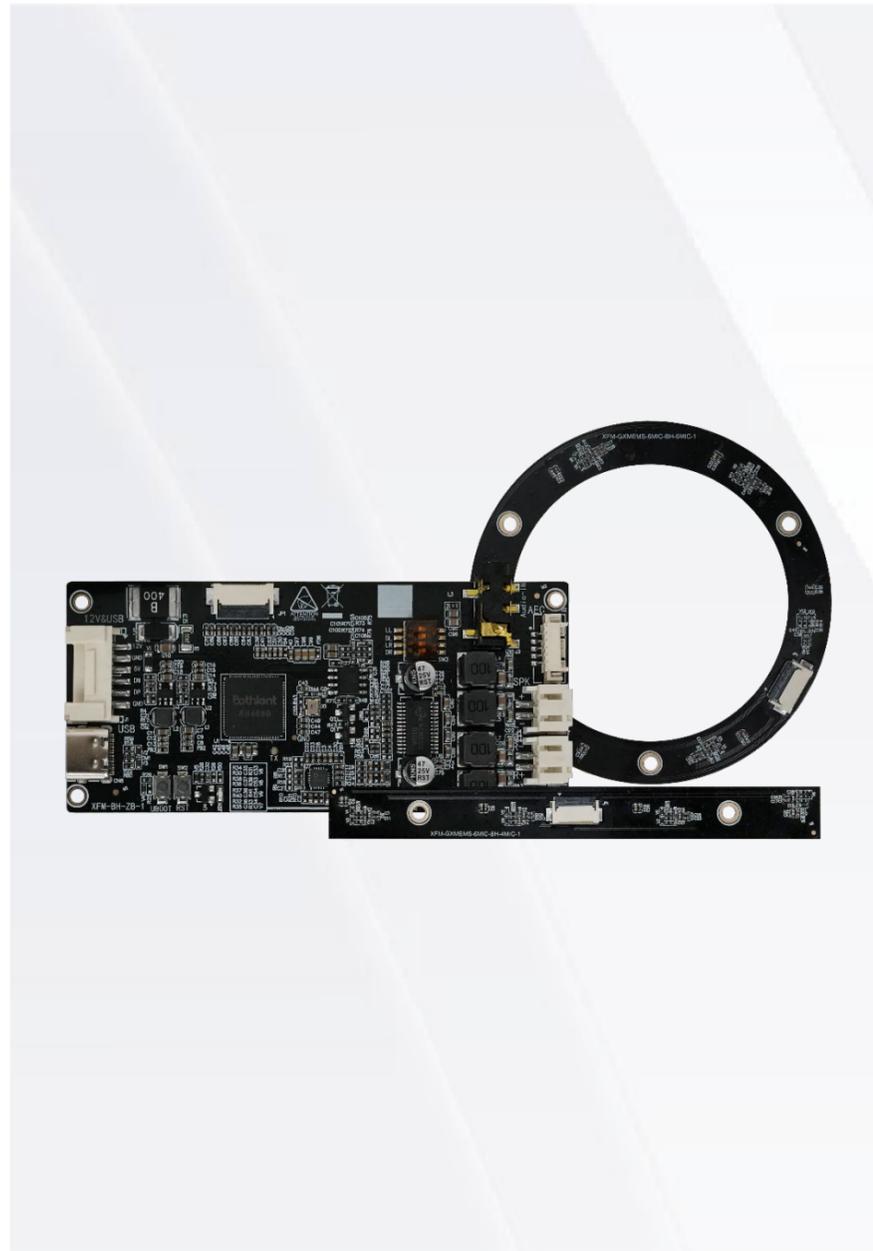
The built-in power amplifier can directly drive 8Ω5W dual speakers, supports AEC echo cancellation function and interrupt interaction, ensures clear and loud audio output, and enables smooth and delay-free voice interaction.



Empowered by AI SDK, enabling rapid low-code integration

Equipped with AI SDK and AIUI cloud services, it provides demo source code and professional technical support. Low-code development enables quick implementation, effectively shortening the project cycle.

Product features



Strong anti-interference

The wake-up rate is 93% and the word accuracy rate is 94% in a quiet environment. In a noisy environment, the wake-up rate remains 87% and the word accuracy rate is 86%. The speech recognition performance is stable and reliable in complex scenarios.



Compatible with multiple hardware platforms

Compatible with embedded motherboards based on the Android system and equipped with USB and Line out interfaces, such as Firefly's AIO-3588SJD4, ITX-3588J, ITX-3568JQ, etc.



Compact structure, high space utilization rate

Both the USB sound card and the microphone array board have a height limit of 8mm. The boards are compact in size, flexible to install, and suitable for various device scenarios with limited space.



Wide Range of Application Scenarios

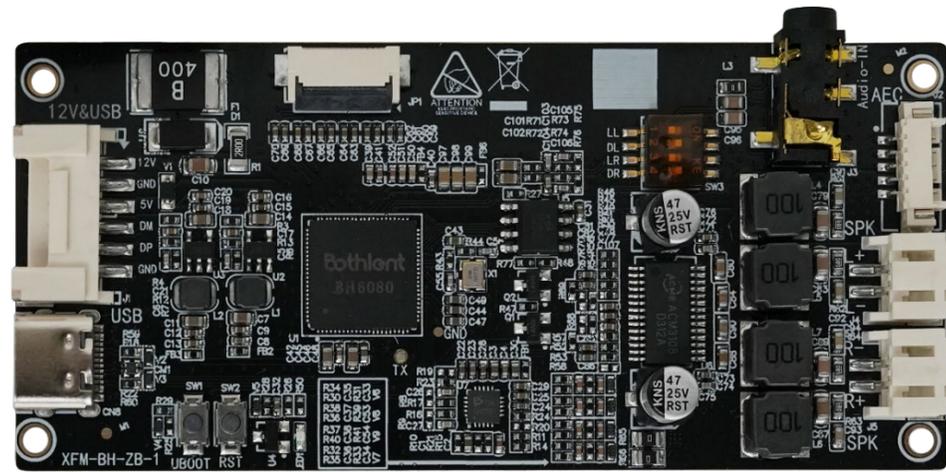
Widely applicable to robots, industrial development boards, intelligent service terminals, smart mirrors, smart home panels, commercial display devices and other products and fields.

Specifications



Specifications			
Kit	Kit features	It is equipped with AI SDK and CAE array algorithm, compatible with AIUI and IFLYOS platforms, provides voice software demo source code, and has built-in AEC echo cancellation function. It can be connected to iFLYTEK's AIUI cloud service and the paid version of Kuwo music source to realize core capabilities such as keyword wake-up, noise reduction, sound source positioning, and human-computer interaction	
	Hardware integration	The kit integrates a USB sound card and microphone array board, providing a comprehensive intelligent voice hardware foundation, and only needs to be connected to the main control board and speakers to easily complete the project development of intelligent voice products	
	Compatible platforms	Compatible with embedded motherboards based on Android system with USB and Line out interfaces, such as Firefly's AIO-3588SJD4, ITX-3588J, ITX-3568JQ, AIO-3588Q, ROC-RK3588S-PC	
	Application fields	Robots, industry development boards, intelligent service terminals, magic mirrors, smart home panels, commercial display equipment and other industry fields	
Microphone Array Board	Type	Linear 4-microphone array	Circular 6-microphone array
	Module formation	Long strip	Circular
	Number of elements	Supports 4 ECM electret MICs (recommended 6027 specification)	Supports 6 MEMS analog silicon MICs on board
	MIC SNR	SNR > 70dB	SNR > 65dB
	MIC sensitivity	-32dBA, consistency ≤2dB	-32dBA, consistency ≤1dB
	Wake-up distance	3 ~ 5m	3 ~ 5m
	Recognition distance	3 ~ 5m	3 ~ 5m
	Sound source localization	Horizontal 180°	360°
	Localization accuracy	±15°	±15°
	Other features	Supports AEC function, 60° sound pickup beam (3 beams supported)	Supports AEC function, 60° sound pickup beam (6 beams supported)
	Interface	14Pin-0.5mm FPC socket	14Pin-0.5mm FPC socket
	Size	111.5mm × 12mm, maximum height 8mm	Diameter 79.5mm, maximum height 8mm, mounting hole diameter 3mm
	Operating temperature	-10°C ~ 70°C	-10°C ~ 70°C
	Storage temperature	-40°C ~ 85°C	-40°C ~ 85°C
USB Sound Card	Interface	1 × 12V power amplifier supply & UAC (6Pin-2mm), 1 × Type-C (5V power supply & audio transmission), 1 × 4&6-microphone board interface (14Pin-0.5mm FPC socket), 1 × 3.5mm audio input, 1 × AEC (5Pin-1.25mm), 1 × Left channel speaker (2Pin-2mm), 1 × Right channel speaker (2Pin-2mm)	
	Button	1 × Reset button, 1 × Forced burning button	
	Size	88mm × 40mm, maximum height 8mm	

Picture



USB Sound Card

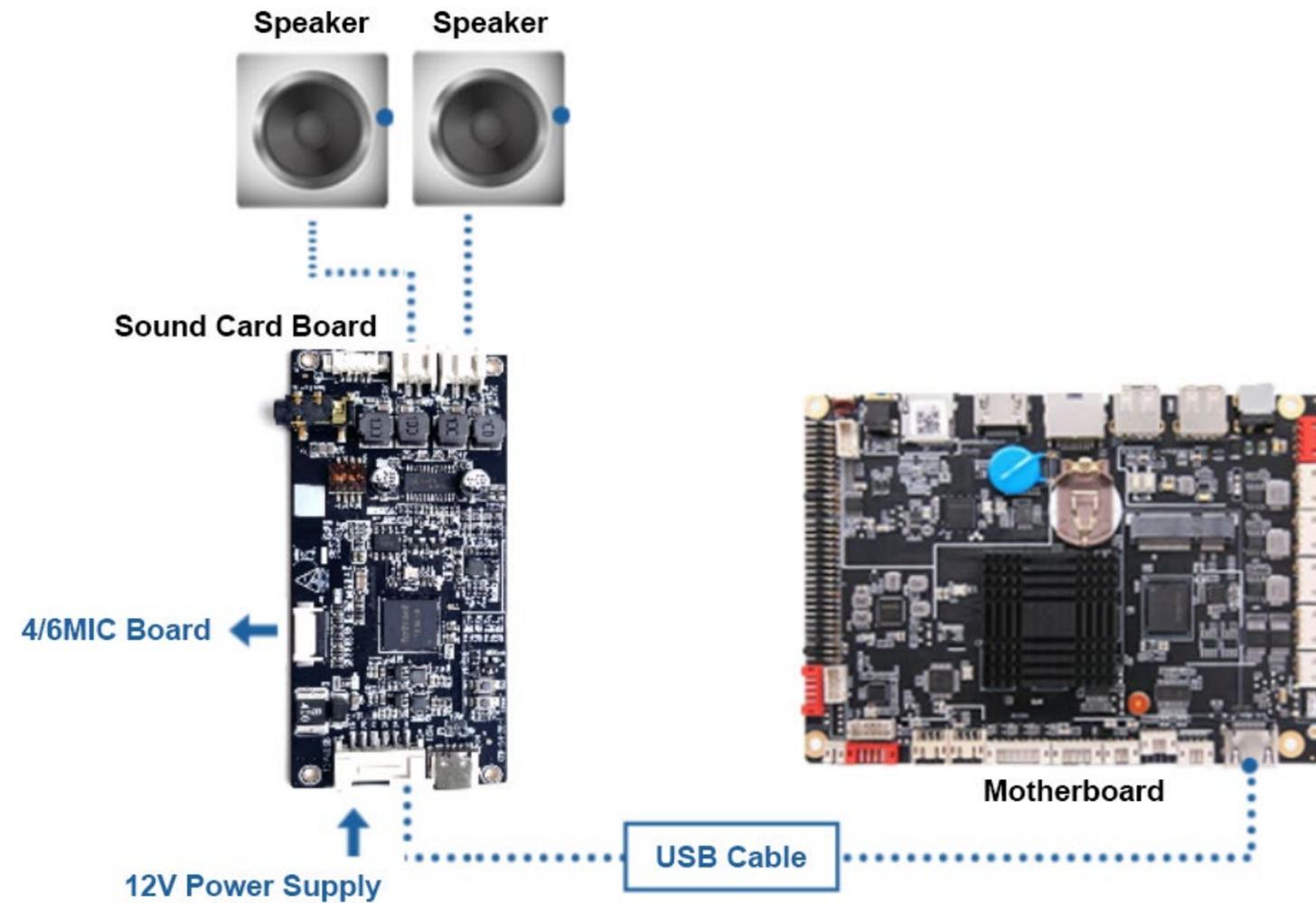


Circular 6-microphone Array



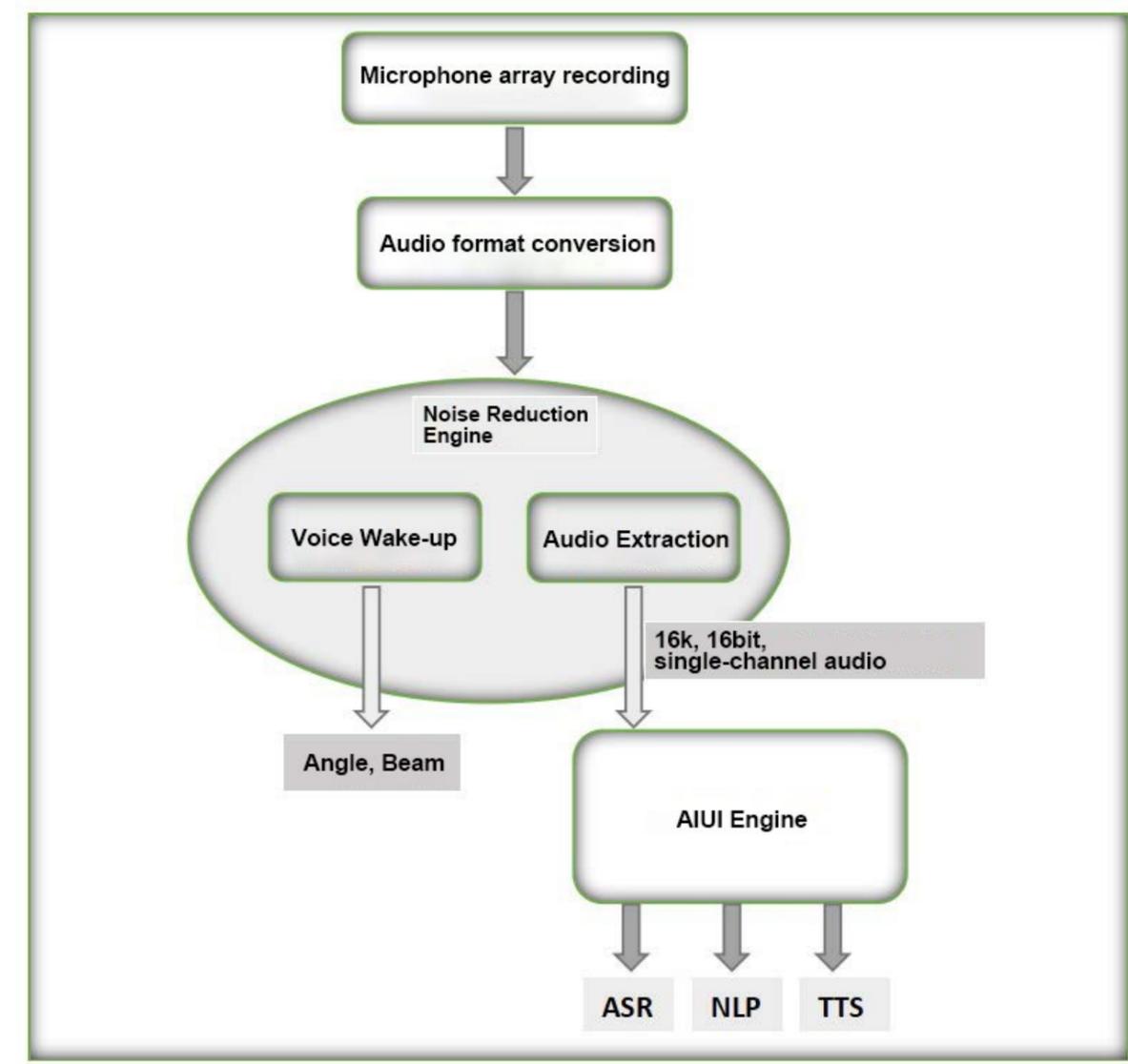
Linear 4-microphone Array

Connection Diagram



- 1.Mics 1-6: Analog MEMS microphones.
 - 2.Mic signals output to hosts (e.g., Android boards) via standard UAC.
 - 3.Loopback signal to sound card for interrupt interaction.
 - 4.AI SDK deployed on Android motherboard.
- Note: Built-in amp drives dual 8Ω 5W speakers directly.

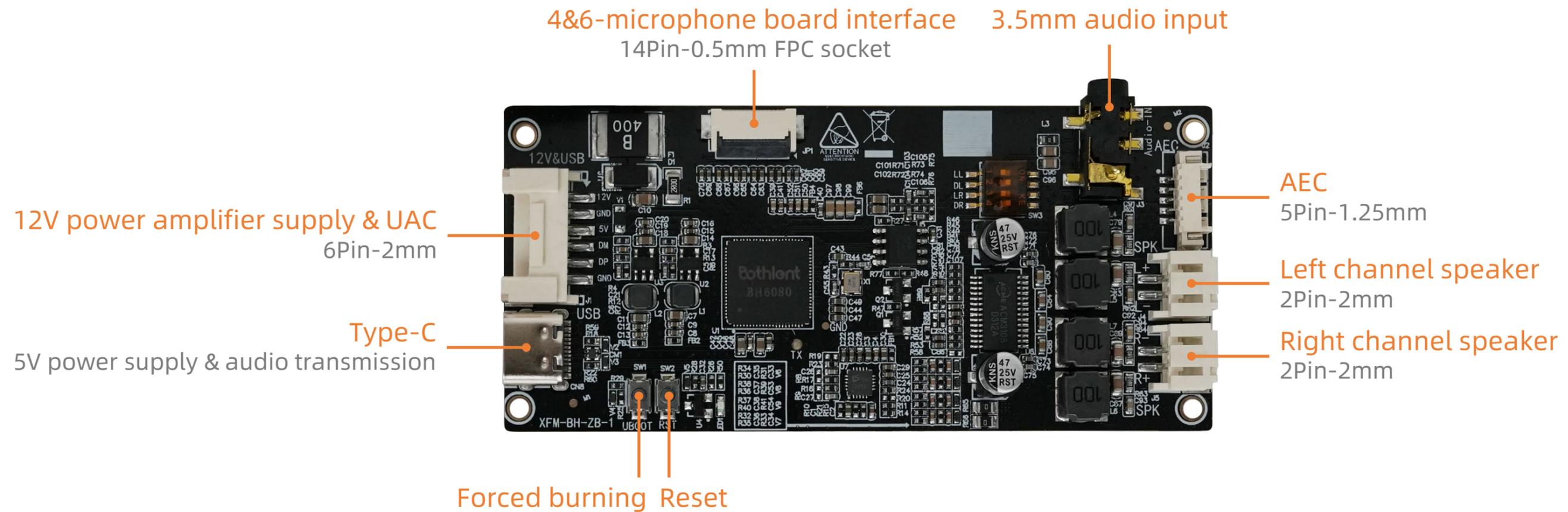
Workflow Diagram



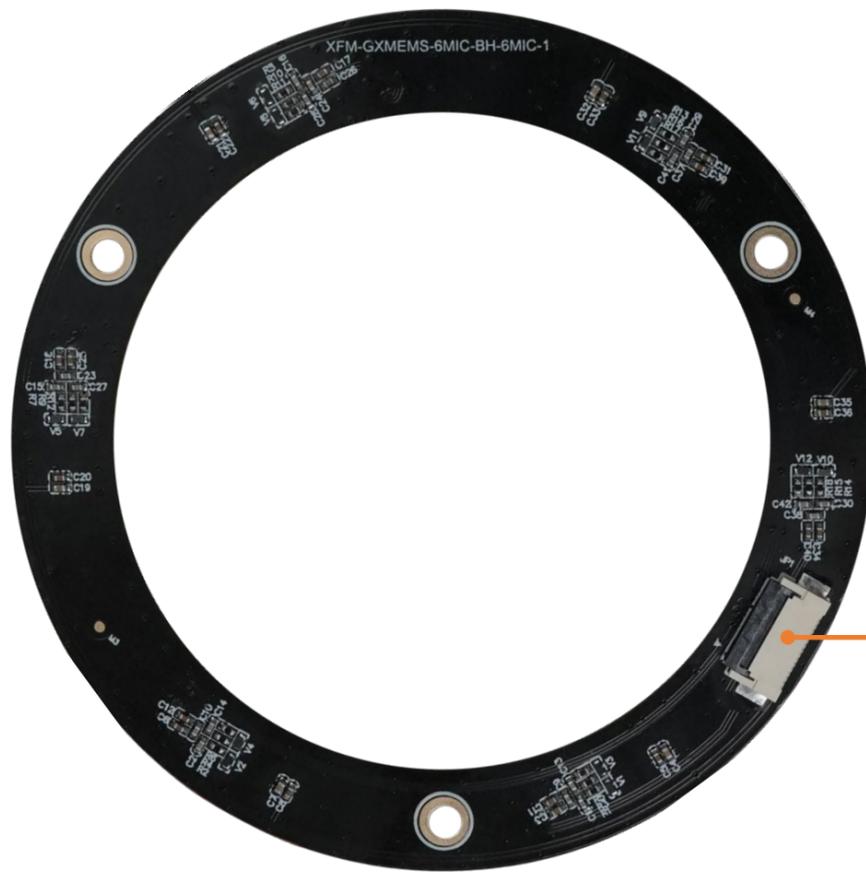
Audio Processing Chain

In bypass mode, audio is output to the host computer via UAC, and then the host computer processes the audio.

Interface description



Interface description

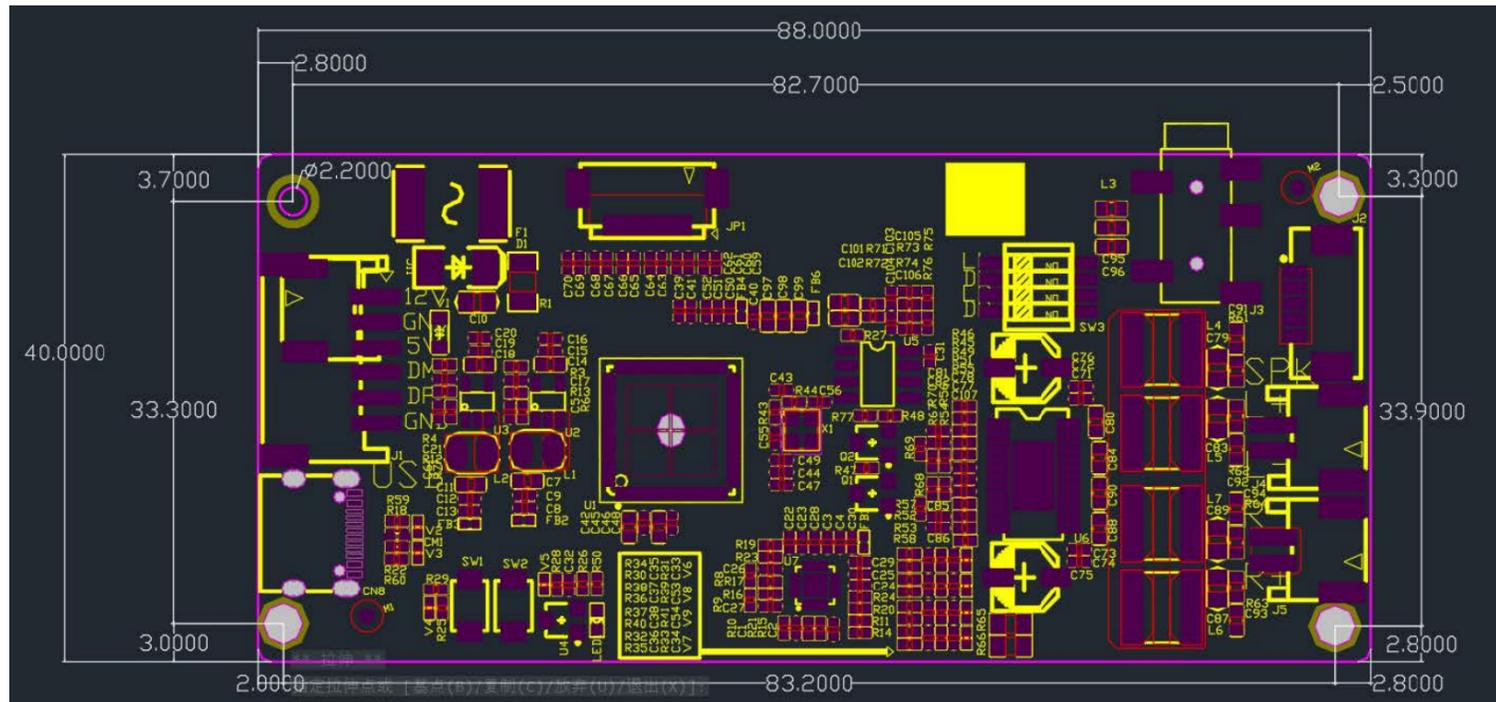


6-microphone board interface
(Connect USB sound card)
14Pin-0.5mm FPC socket

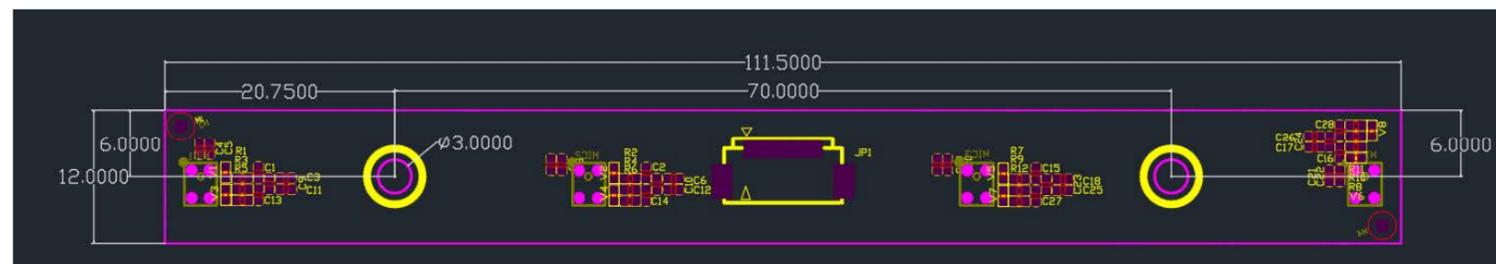


4-microphone board interface
(Connect USB sound card)
14Pin-0.5mm FPC socket

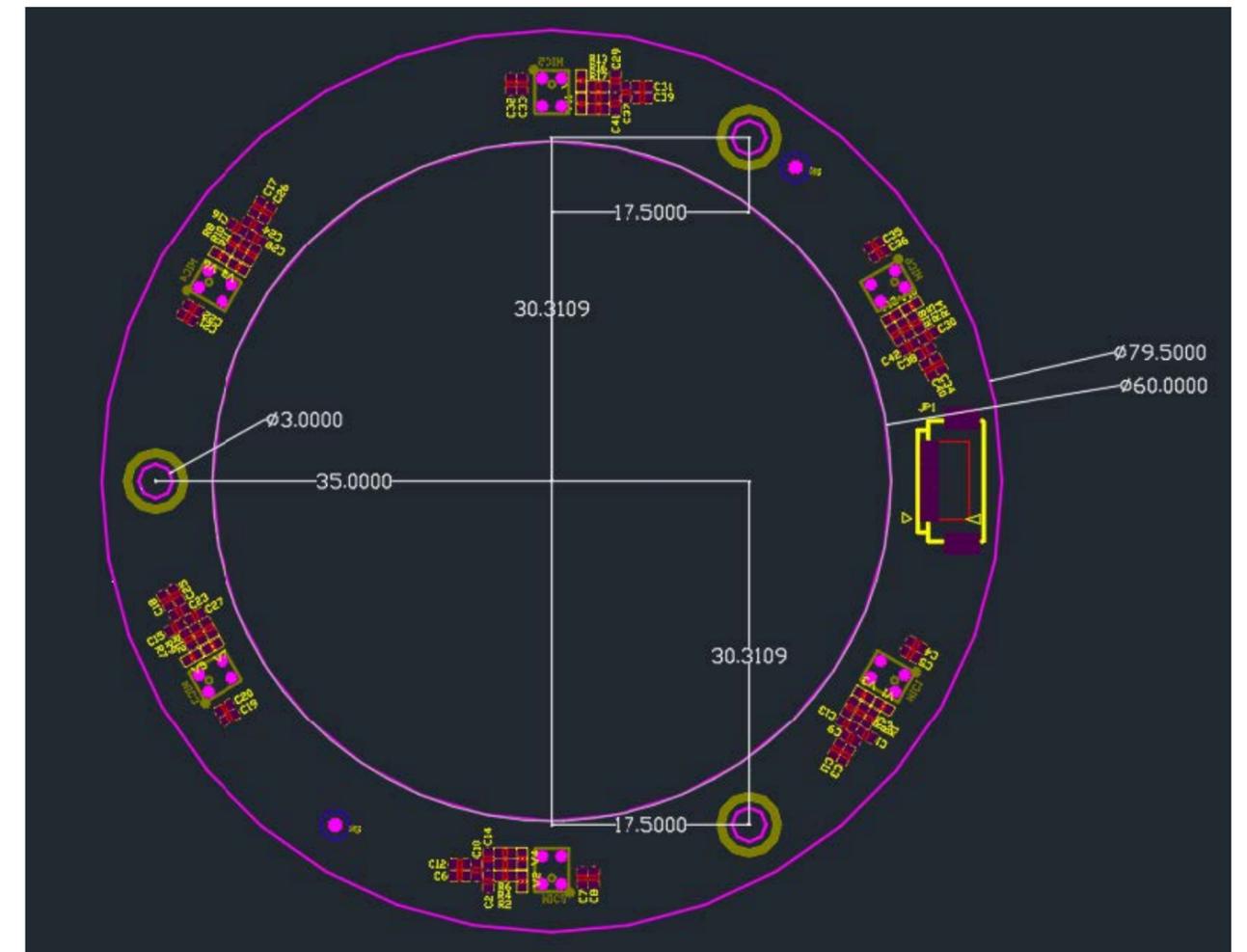
Dimension



USB Sound Card



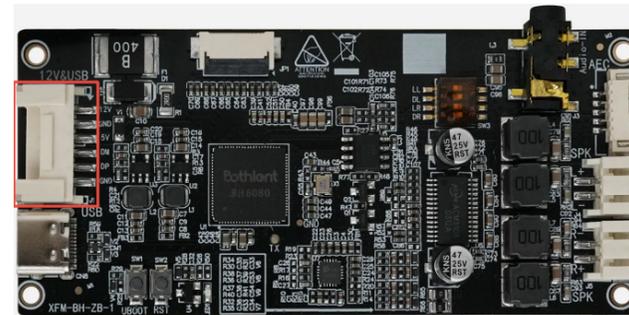
Linear 4-microphone Array



Circular 6-microphone Array

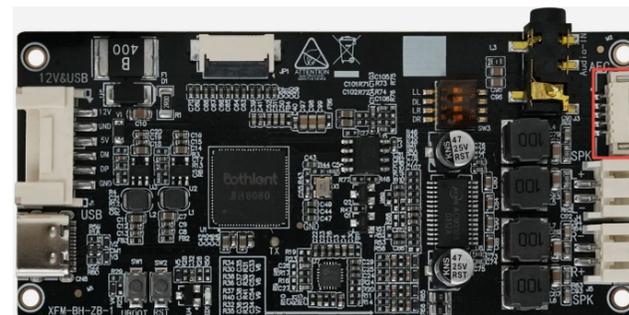
Interface definition

1-1. (J1) 12V amplifier power supply & 5V power supply & audio transmission: 6PIN 2.0mm pitch wafer socket



Pin No.	Definition	Pin No.	Definition
1	12V	2	GND
3	5V	4	DM
5	DP	6	GND

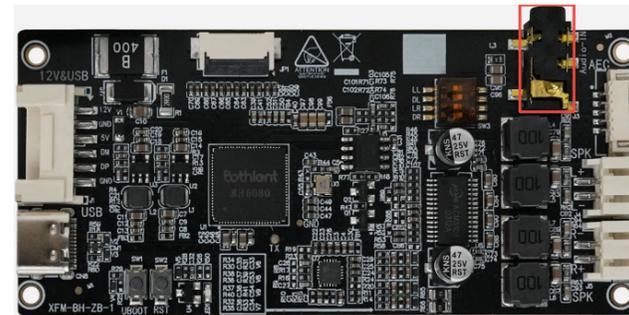
1-2. (J2) AEC: 5PIN 1.25mm pitch wafer socket



Pin No.	Definition	Pin No.	Definition
1	L+	2	L-
3	GND	4	R+
5	R-		

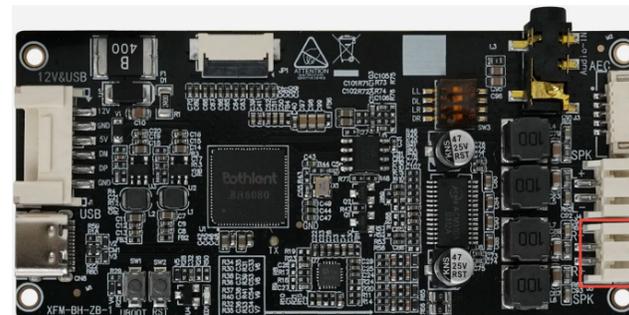
Interface definition

1-3. (J3) 3.5mm audio input: 3.5mm connector



Pin No.	Definition	Pin No.	Definition
1	NC	2	GND
3	LineIN-L	4	NC
5	LineIN-R		

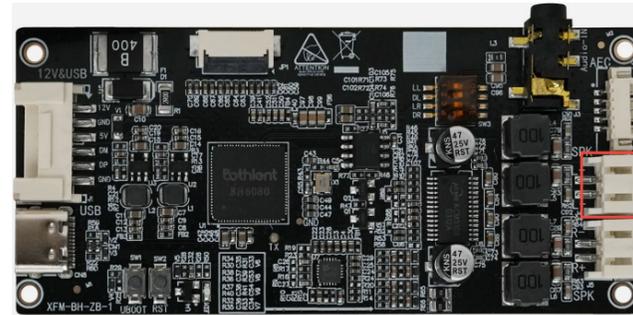
1-4. (J4) Right channel speaker: 2PIN 2mm pitch wafer socket



Pin No.	Definition	Pin No.	Definition
1	L+	2	L-

Interface definition

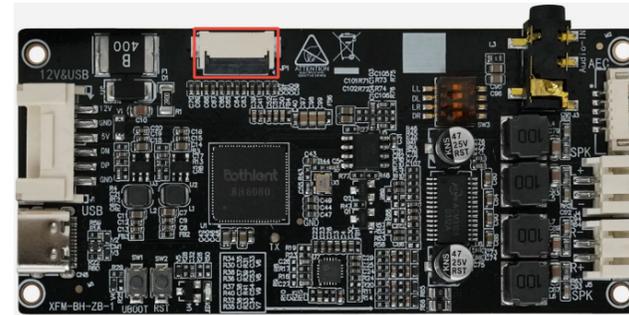
1-5. (J5) Left channel speaker: 2PIN 2mm pitch wafer socket



Pin No.	Definition	Pin No.	Definition
1	R+	2	R-

Interface definition

1-6. (JP1) 4MIC & 6MIC board interface: 14PIN 0.5mm pitch FPC socket



Pin No.	Definition	Pin No.	Definition
1	ADC 2.5V	2	GND
3	MIC1+	4	MIC1-
5	MIC2+	6	MIC2-
7	MIC3+	8	MIC3-
9	MIC4+	10	MIC4-
11	MIC5+	12	MIC5-
13	MIC6+	14	MIC6-

Interface definition



2-1. (MIC1,MIC2,MIC3,MIC4,MIC5,MIC6) Analog silicon microphone: Analog silicon MIC 3.76X2.95 Weil semiconductor



Pin No.	Definition	Pin No.	Definition
1	VDD	2	OUTPUT
3	GND	4	GND

Interface definition



2-2. (JP1) 6MIC board interface: 14PIN 0.5mm pitch FPC socket



Pin No.	Definition	Pin No.	Definition
1	ADC 2.5V	2	GND
3	MIC1+	4	MIC1-
5	MIC2+	6	MIC2-
7	MIC3+	8	MIC3-
9	MIC4+	10	MIC4-
11	MIC5+	12	MIC5-
13	MIC6+	14	MIC6-

Interface definition

3-1. (MIC1,MIC2,MIC3,MIC4) Analog silicon microphone: Analog silicon MIC 3.76X2.95 Weil semiconductor



Pin No.	Definition	Pin No.	Definition
1	VDD	2	OUTPUT
3	GND	4	GND

Interface definition

3-2. (JP1) 4MIC board interface: 14PIN 0.5mm pitch FPC socket



Pin No.	Definition	Pin No.	Definition
1	ADC 2.5V	2	GND
3	MIC1+	4	MIC1-
5	MIC2+	6	MIC2-
7	MIC3+	8	MIC3-
9	MIC4+	10	MIC4-
11	NC	12	NC
13	NC	14	NC



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