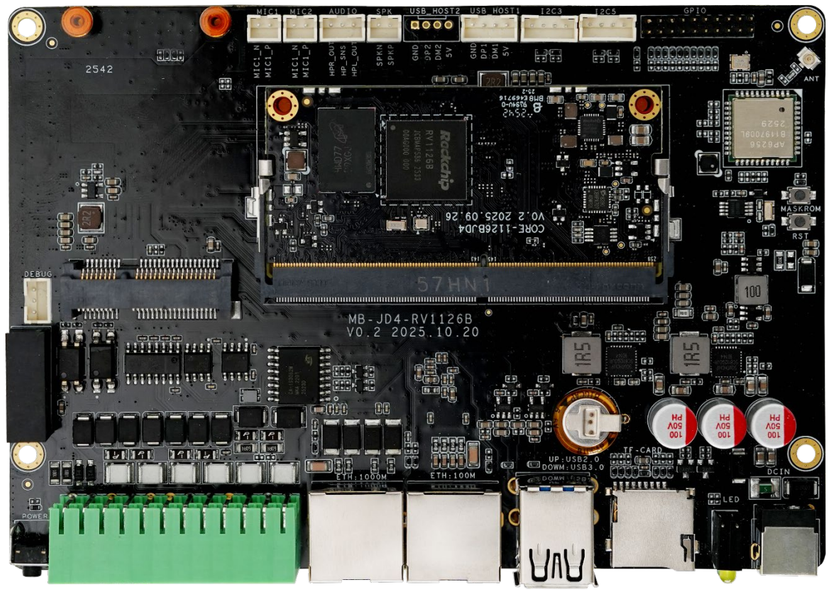
AIO-1126BJD4

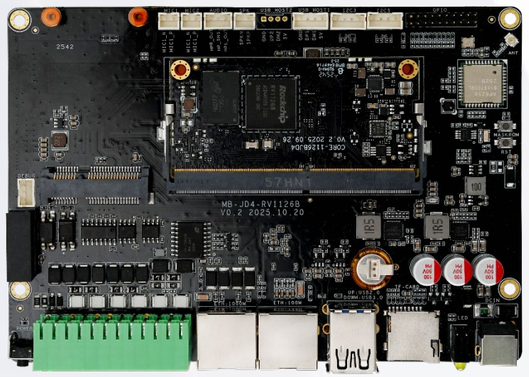
High-performance AI Vision Mainboard



V0.2 2025-12-9

FIREFLY TECHNOLOGY

Product features



High-performance AI vision processor RV1126B

It adopts a quad-core 64-bit high-performance AI vision processor RV1126B, based on ARM Cortex-A53 core, integrates NEON advanced SIMD and FPU (floating-point computing unit), and is clocked at up to 1.6GHz, providing strong support for high-performance computing and multitasking.

3TOPS computing power NPU empowers AI applications

It has a built-in 3TOPS NPU, supports INT4/INT8/INT16/FP16 hybrid computing, and supports deep learning frameworks such as TensorFlow, TensorFlow Lite, PyTorch, Caffe, and ONNX, which can perform intelligent data processing, speech recognition, and image analysis to meet the needs of most edge computing AI applications on terminal devices.

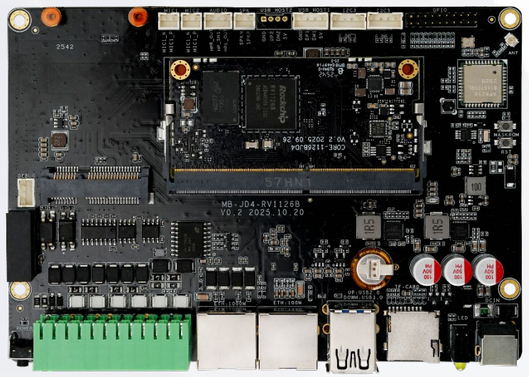
Private deployment of lightweight large AI models

It supports the privatization deployment of lightweight large language models and multimodal large models within the Transformer architecture 2B, such as Qwen series, Gemma2-2B, Phi2, InternLM2, MiniCPM series, TinyLLAMA, RWKV7 and other small-scale AI models, to meet the needs of localized applications in lightweight scenarios.

12MP ISP, powerful image processing capabilities

A new generation of 12MP ISP, 8MP AI-ISP, and post-processor have been introduced. It integrates multiple algorithm accelerators, such as HDR, 3A, LSC, 3DNR, etc., to provide better spatial noise reduction performance and enhanced image enhancement effects.

Product features



Support 12M video encoding, 4K video decoding

It can achieve up to 12M@30fps encoding and supports multi-stream encoding (such as storing high-resolution video locally and transmitting low-resolution video in the cloud). Supports 4K@30fps decoding, integrated JPEG codec, supports Baseline mode and multiple image sizes and YUV formats.

Multiple video input interfaces

Supports 2 MIPI CSI/LVDS/SubLVDS DPHY video input interfaces and 1 MIPI DSI video output interface, featuring strong compatibility, stable and reliable transmission, and meeting various visual acquisition and display requirements.

Abundant expansion interfaces

Features expansion interfaces including MIPI-DSI, MIPI-CSI, RS485, RS232, I2C, SPI, UART, CAN, GPIO, USB3.0, USB2.0, etc., meeting peripheral expansion needs for various scenarios.

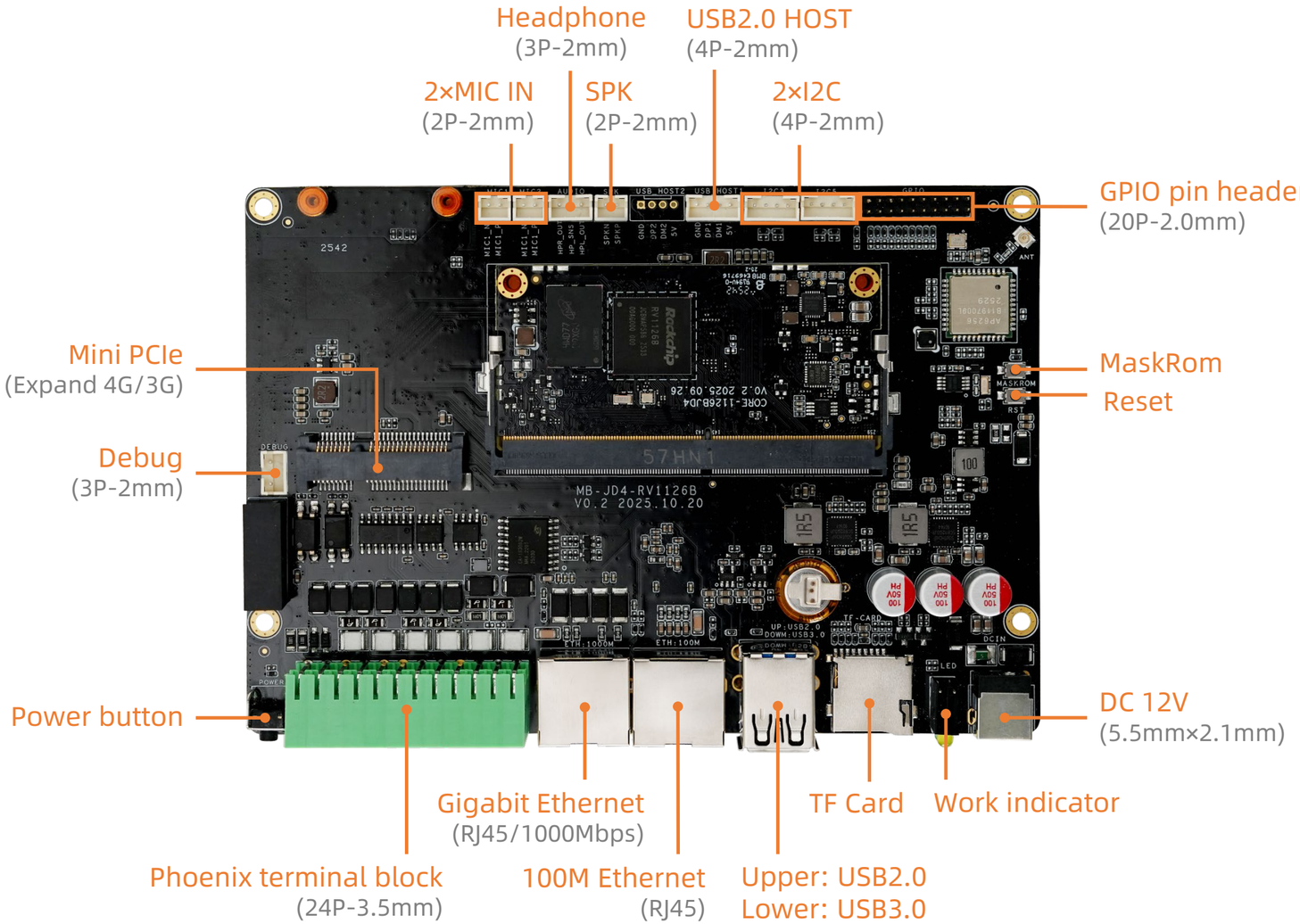
Widely applicable scenarios

Widely applicable to: face recognition, access control systems, intelligent security, smart IP cameras, smart doorbells/peepholes, dashcams, and other industrial fields.

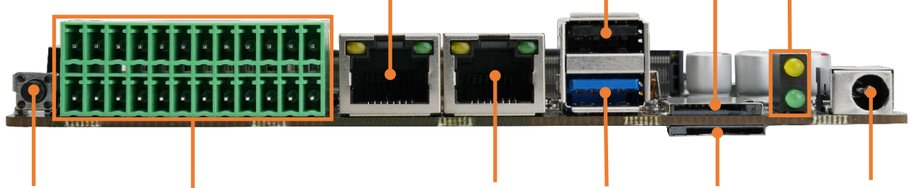
Specifications

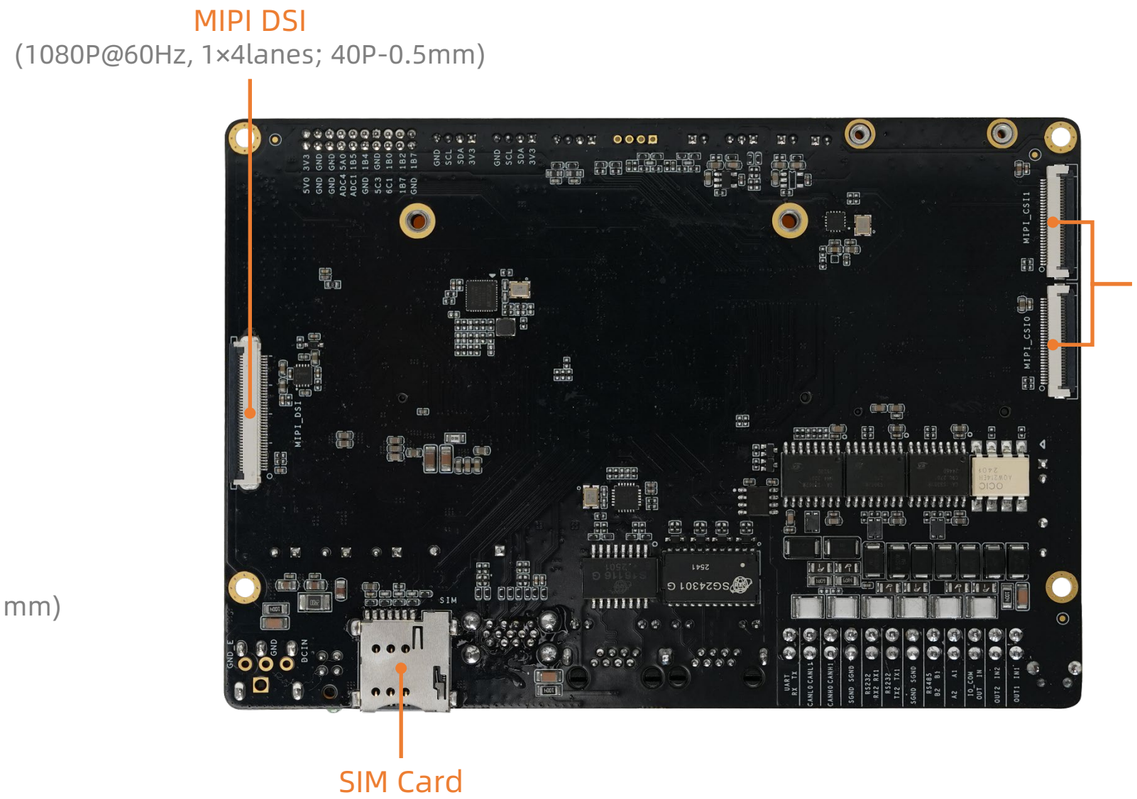
Specifications		
Basic Specifications	SOC	Rockchip RV1126B
	CPU	Quad-core 64-bit ARM Cortex-A53, integrated with NEON and FPU, maximum main frequency of 1.6GHz
	NPU	3TOPS NPU, supporting INT4/INT8/INT16/FP16 mixed-precision computing
	ISP	12MP ISP, 8MP AI-ISP, integrated with multiple algorithm accelerators including HDR, 3A, LSC, 3DNR, 2DNR, sharpening, defogging, fisheye correction, gamma correction, feature point detection, etc.
	Encoding/ Decoding	Encoding: 12M@30fps H.265/H.264 Decoding: 4K@30fps H.265/H.264
	RAM	LPDDR4 (1GB/2GB/4GB Optional)
	Storage	eMMC (8GB/16GB/64GB Optional)
	Storage expansion	1 × TF Card
	Power	DC 12V (5.5×2.1mm)
	Power consumption	Normal: 3.6W (12V/300mA), Max: 7.2W (12V/600mA), Min(Sleep): 0.84W (12V/70mA)
	OS	Debian12, Buildroot+QT, Ubuntu
	Software support	Supports private deployment of lightweight large language models and multimodal large models with up to 2B parameters under the Transformer architecture, such as small-sized large AI models including the Qwen series, Gemma2-2B, Phi2, InternLM2, MiniCPM series, TinyLLAMA, and RWKV7. Supports deep learning frameworks such as TensorFlow, TensorFlow Lite, PyTorch, Caffe, and ONNX.
	Size	146.0mm × 102.21mm × 21.71mm
	Weight	≈127g
	Environment	Operating Temperature: -20℃ ~ 60℃, Storage Temperature: -20℃ ~ 70℃, Storage Humidity: 10% ~ 90%RH (non-condensing)
Interface Specifications	Internet	Ethernet: 1 × Gigabit Ethernet (RJ45), 1 × 100M Ethernet (RJ45), supporting TSO (TCP Segmentation Offload) and USO (UDP Segmentation Offload) network acceleration WiFi: On-board WiFi & Bluetooth module, supporting 2.4GHz/5GHz dual-band WiFi and Bluetooth 5.0/4.2 4G: 4G/3G expandable via Mini PCIe
	Video input	2 × MIPI-CSI/LVDS/sub LVDS DPHY (Support 1/2/4Lane mode, 1Lane defaults to D0, and 2Lane mode defaults to D0/D1; 30P-0.5mm)
	Video output	1 × MIPI-DSI (1080P@60Hz, 1×4lanes; 40P-0.5mm)
	Audio	2 × MIC IN (2Pin-2mm), 1 × SPK (2Pin-2mm), 1 × Headphone (3Pin-2mm)
	USB	1 × USB2.0 HOST (Max: 0.5A), 1 × USB3.0 DRD (Max: 1A), 1 × USB2.0 HOST (Wafer socket, 4Pin-2mm)
	Antenna	1 × WiFi/Bluetooth antenna
	Button	1 × Power, 1 × MaskRom, 1 × Reset
	Other interfaces	1 × SIM Card, 1 × Debug (3Pin-2mm), 2 × I2C (4Pin-2mm), 1 × GPIO pin header (20Pin-2mm), 1 × Phoenix terminal block (24Pin, 3.5mm pitch): 2 × RS485, 2 × RS232, 2 × CAN 2.0, 1 × UART, 3 × IO input, 3 × IO output

Interface description



Interface description

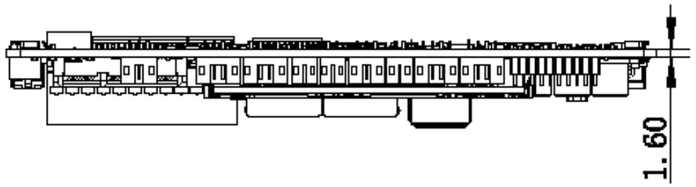


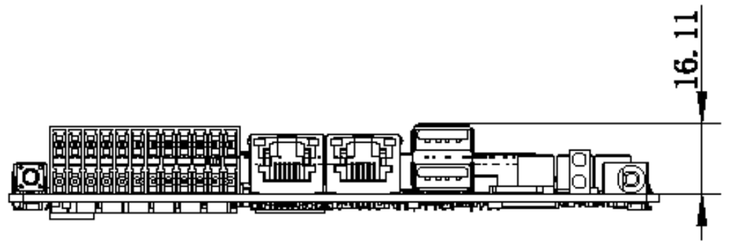


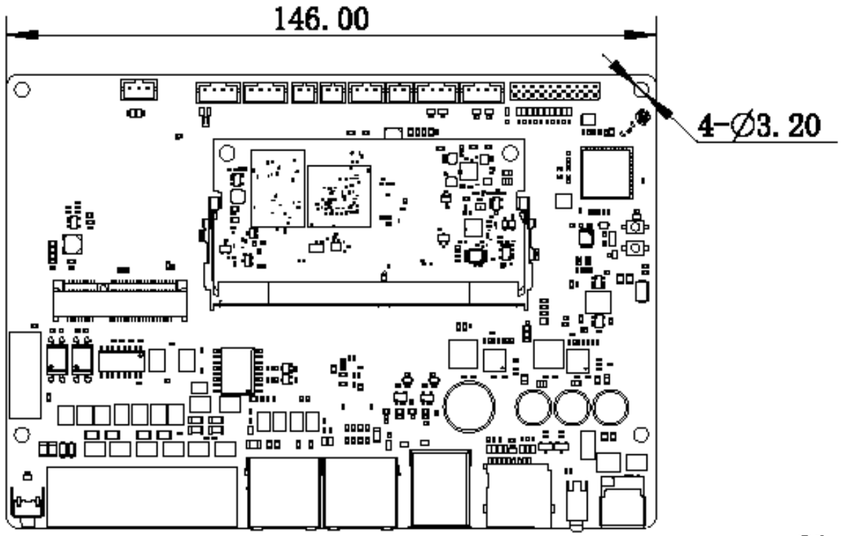
Phoenix terminal block (24Pin, 3.5mm pitch)

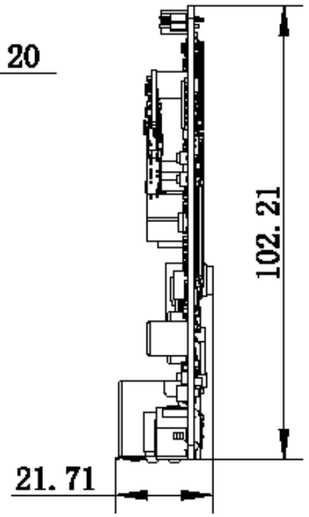
UART_TX	CAN_L	CAN_H	GND	232_RX	232_TX	GND	485_B	485_A	IO_IN	IO_IN	IO_IN
UART_RX	CAN_L	CAN_H	GND	232_RX	232_TX	GND	485_B	485_A	IO_OUT	IO_OUT	IO_OUT

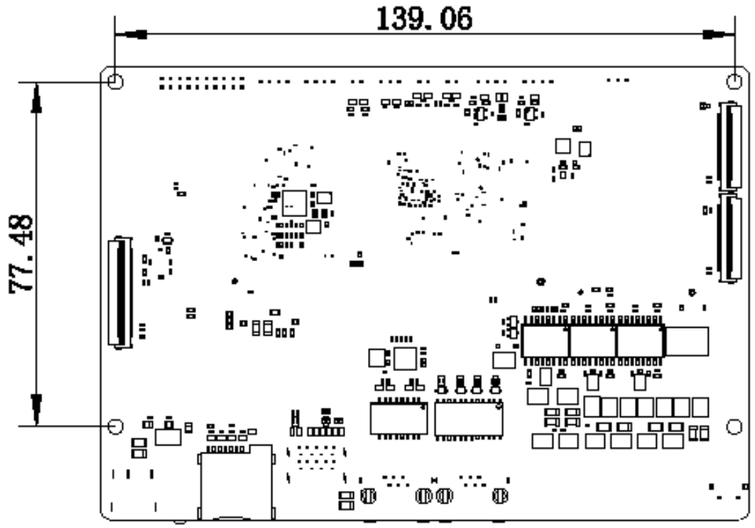
Dimension





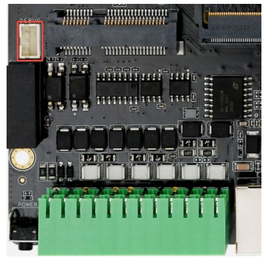






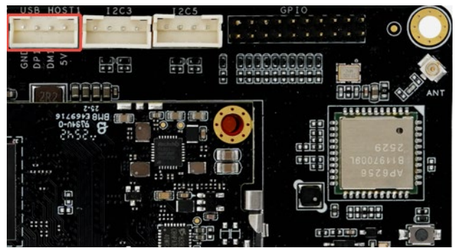
Interface definition

1. (J13) DEBUG: 3PIN 2.0mm pitch Wafer socket



NO.	Definition	Power/V	NO.	Definition	Power/V
1	UART0_RX_DBG	3.3V	3	GND	/
2	UART0_TX_DBG	3.3V			

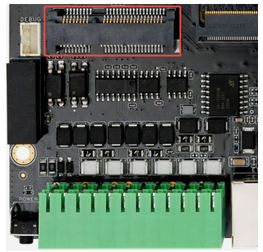
2. (J9) USB_HOST1: 4PIN 2mm pitch Wafer socket



NO.	Definition	Power/V	NO.	Definition	Power/V
1	GND	/	2	HUB_HOST20_DP2	/
3	HUB_HOST20_DM2	/	4	VCC5V0_USB_HOST1 (5V Output)	5V

Interface definition

3. (U16) 4G MINI PCIE



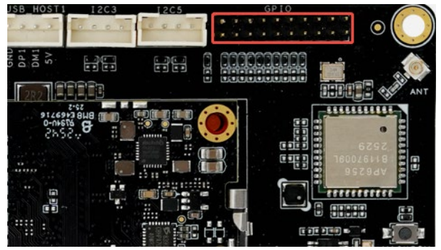
序号	定义	电平/V	序号	定义	电平/V
1	NC		2	VCC3V5_4G (3.5V Output)	3.5V
3	NC		4	GND	
5	NC		6	NC	
7	NC		8	UIM_PWR	-
9	GND		10	UIM_DAT	-
11	NC		12	UIM_CLK	-
13	NC		14	UIM_RST	-
15	GND		16	NC	
17	NC		18	GND	
19	NC		20	NC	
21	GND		22	4G_RESET [pull up resistor10K]	3.3V
23	NC		24	NC	
25	NC		26	GND	
27	GND		28	NC	

Interface definition

29	GND		30	NC	
31	NC		32	NC	
33	NC		34	GND	
35	GND		36	HUB20_DM2	
37	GND		38	HUB20_DP2	
39	VCC3V5_4G (3.5V Output)	3.5V	40	GND	
41	VCC3V5_4G (3.5V Output)	3.5V	42	NC	
43	GND	-	44	SIM_DET	
45	NC		46	NC	
47	NC	-	48	NC	
49	NC	-	50	GND	
51	NC		52	VCC3V5_4G (3.5V Output)	3.5V
53	GND		54	GND	
55	NC		56	NC	
57	GND		58	-	
59	GND		60	-	

Interface definition

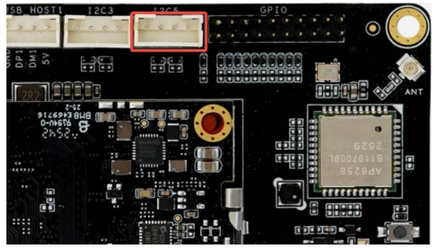
4. (J17) GPIO Double-row pin header 2*10PIN 2.0mm pitch



序号	定义	电平/V	序号	定义	电平/V
1	GND		2	GPIO1_B6_d	-
3	GPIO1_B7_d	-	4	GPIO1_B2_d	-
5	GPIO6_C1_d	-	6	GPIO1_B0_u	-
7	GPIO5_C3_d	-	8	GND	
9	GND		10	GPIO1_B4_u	-
11	SARADC0_IN1	-	12	GPIO1_B5_u	-
13	SARADC0_IN4	-	14	GPIO5_A0_d	-
15	GND		16	GND	
17	GND		18	GND	
19	VCC5V0_SYS (5.0V Output)	5V	20	VCC3V3_SYS (3.3V Output)	3.3V

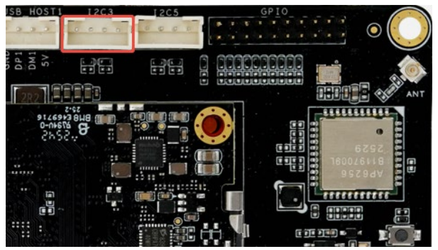
Interface definition

5. (J11) I2C5 4PIN 2.0mm pitch Wafer socket



NO.	Definition	Power/V	NO.	Definition	Power/V
1	VCC3V3_SYS(3.3V Output)	3.3	2	I2C5_SDA_M2_EXT(3.3V Output) Pull-up resistor 2.2K	3.3
3	I2C5_SCL_M2_EXT(3.3V Output) Pull-up resistor 2.2K	3.3	4	GND	

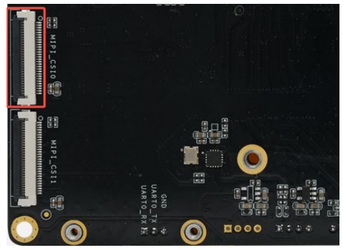
6. (J5) I2C3 4PIN 2.0mm pitch Wafer socket



NO.	Definition	Power/V	NO.	Definition	Power/V
1	VCC3V3_SYS(3.3V Output)	3.3	2	I2C3_SDA_M2_EXT(3.3V Output) Pull-up resistor 2.2K	3.3
3	I2C3_SCL_M2_EXT(3.3V Output) Pull-up resistor 2.2K	3.3	4	GND	

Interface definition

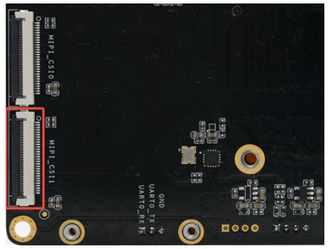
7. (J7) MIPI_CSI0 30PIN 0.5mm pitch



NO.	Definition	Power/V	NO.	Definition	Power/V
1	SDA_CAM0【GPIO3_B5】	-	16	GND	
2	SCL_CAM0【GPIO3_B4】	-	17	MIPI_CSI_RX0_CLK0P	-
3	MIPI_PDN0_CAM【GPIO4_A2】	-	18	MIPI_CSI_RX0_CLK0N	
4	MIPI_RESET0_CAM【GPIO0_A6】	-	19	GND	-
5	GND		20	MIPI_CSI_RX0_D2P	-
6	MIPI_MCLK_OUT0【GPIO4_B1】	-	21	MIPI_CSI_RX0_D2N	
7	MIPI_PDN1_CAM【GPIO4_A3】	-	22	GND	
8	MIPI_RESET1_CAM【GPIO0_c5】	-	23	MIPI_CSI_RX0_D3P	-
9	MIPI_MCLK_OUT1【GPIO4_B0】	-	24	MIPI_CSI_RX0_D3N	-
10	GND		25	GND	
11	MIPI_CSI_RX0_D0P	-	26	MIPI_CSI_RX0_CLK1P	-
12	MIPI_CSI_RX0_D0N	-	27	MIPI_CSI_RX0_CLK1N	-
13	GND		28	GND	
14	MIPI_CSI_RX0_D1P	-	29	VCC5V0_SYS (5V Output)	5.0V
15	MIPI_CSI_RX0_D1N	-	30	VCC5V0_SYS (5V Output)	5.0V

Interface definition

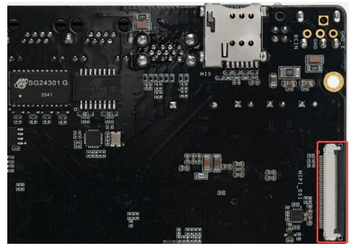
8. (J10) MIPI_CSI1 30PIN 0.5mm pitch



NO.	Definition	Power/V	NO.	Definition	Power/V
1	SDA_CAM0【GPIO7_B1】		16	GND	
2	SCL_CAM0【GPIO7_B0】		17	MIPI_CSI_RX0_CLK0P	-
3	MIPI_PDN0_CAM【GPIO4_A4】		18	MIPI_CSI_RX0_CLK0N	-
4	MIPI_RESET0_CAM【GPIO4_A6】		19	GND	
5	GND		20	MIPI_CSI_RX0_D2P	-
6	MIPI_MCLK_OUT0【GPIO4_A1】		21	MIPI_CSI_RX0_D2N	-
7	MIPI_PDN1_CAM【GPIO4_A6】		22	GND	
8	MIPI_RESET1_CAM【GPIO4_A5】		23	MIPI_CSI_RX0_D3P	-
9	MIPI_MCLK_OUT1【GPIO4_A0】		24	MIPI_CSI_RX0_D3N	-
10	GND		25	GND	
11	MIPI_CSI_RX0_D0P		26	MIPI_CSI_RX0_CLK1P	-
12	MIPI_CSI_RX0_D0N		27	MIPI_CSI_RX0_CLK1N	-
13	GND		28	GND	
14	MIPI_CSI_RX0_D1P		29	VCC5V0_SYS(5V Output)	5.0
15	MIPI_CSI_RX0_D1N		30	VCC5V0_SYS(5V Output)	5.0

Interface definition

9. (J3) MIPI_DSI 40PIN 0.5mm pitch



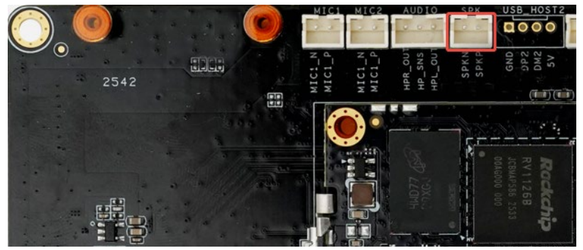
NO.	Definition	Power/V	NO.	Definition	Power/V
1	VCC3V3_TP (3.3V Output)		16	GND	
2	NC		17	MIPI_DSI_D2N	
3	TP_RST_L【GPIO3_B3】 Pull-up resistor 4.7K		18	MIPI_DSI_D2P	
4	TP_INT_L【GPIO3_B2】 Pull-up resistor 4.7K		19	GND	
5	I2C4_SDA_M0【GPIO3_B5】		20	MIPI_DSI_D3N	
6	I2C4_SCL_M0【GPIO3_B4】		21	MIPI_DSI_D3P	
7	GND		22	GND	
8	MIPI_DSI_D0N【GPIO7_B0】		23	NC	
9	MIPI_DSI_D0P【GPIO7_B0】		24	NC	
10	GND		25	LCD0_RST Pull-up resistor 10K	
11	MIPI_DSI_D1N【GPIO7_B0】		26	NC	
12	MIPI_DSI_D1P【GPIO7_B0】		27	NC	
13	GND		28	VCC_LCD1V8	

Interface definition

14	MIPI_DSI_CLKN【GPIO7_B0】		29	NC	
15	MIPI_DSI_CLKP【GPIO7_B0】		30	AVEE_5V5	
31	AVEE_5V5		37	VCC_LEDK	
32	NC		38	VCC_LEDA	
33	AVDD_5V5		39	VCC_LEDA	
34	AVDD_5V5		40	VCC_LEDA	
35	VCC_LEDK		41	GND	
36	VCC_LEDK		42	GND	

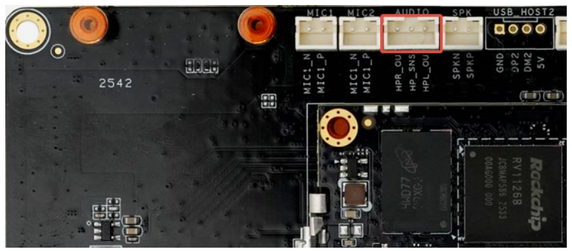
Interface definition

10. (J15) SPK 2PIN 2.0mm pitch Wafer socket



NO.	Definition	Power/V	NO.	Definition	Power/V
1	SPKN_OUT		2	SPKP_OUT	-

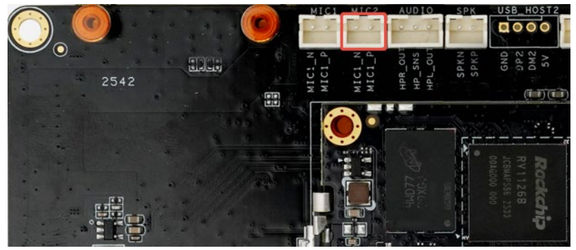
11. (J19) Headphone 3PIN 2.0mm pitch Wafer socket



NO.	Definition	Power/V	NO.	Definition	Power/V
1	HPR_OUT		3	HPL_OUT	
2	HP_SNS				

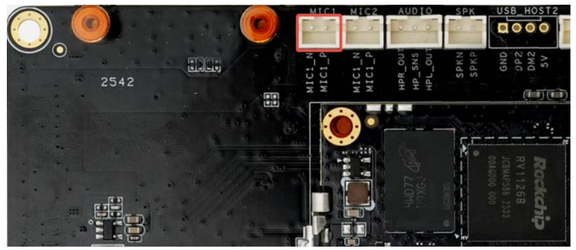
Interface definition

12. (J18) MIC2 2PIN 2.0mm pitch Wafer socket



NO.	Definition	Power/V	NO.	Definition	Power/V
1	MIC0_P	-	2	MIC0_N [pull up resistor1.1K]	1.8V

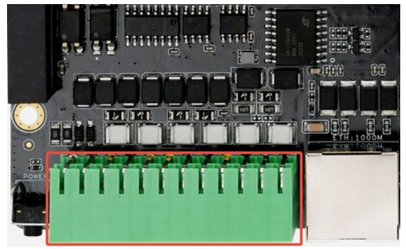
13. (J16) MIC1 2PIN 2.0mm pitch Wafer socket



NO.	Definition	Power/V	NO.	Definition	Power/V
1	MIC1_P	-	2	MIC1_N [pull up resistor1.1K]	1.8V

Interface definition

14. (J9918) Phoenix terminal block 24PIN 3.5mm pitch (GREEN)



NO.	Definition	Power/V	NO.	Definition	Power/V
1	IO_OUT_1	-	2	IO_IN_1	-
3	IO_OUT_2	-	4	IO_IN_2	-
5	IO_OUT_COM	-	6	IO_IN_COM	-
7	RS485_A_2	-	8	RS485_A_1	-
9	RS485_B_2	-	10	RS485_B_1	-
11	GND		12	GND	
13	RS232_TXD_2	-	14	RS232_TXD_1	-
15	RS232_RXD_2	-	16	RS232_RXD_1	-
17	GND		18	GND	
19	CANH_0	-	20	CANH_1	-
21	CANL_0	-	22	CANL_1	-
23	UART5_RX_M1_C	-	24	UART5_TX_M1_C	-

FIREFLY TECHNOLOGY

Contact Us
(+86)18688117175

E-mail
global@t-firefly.com

Website
www.t-firefly.com

Address
Room 2101, Hongyu Building, #57 Zhongshan 4Rd, East District, Zhongshan, Guangdong, China.