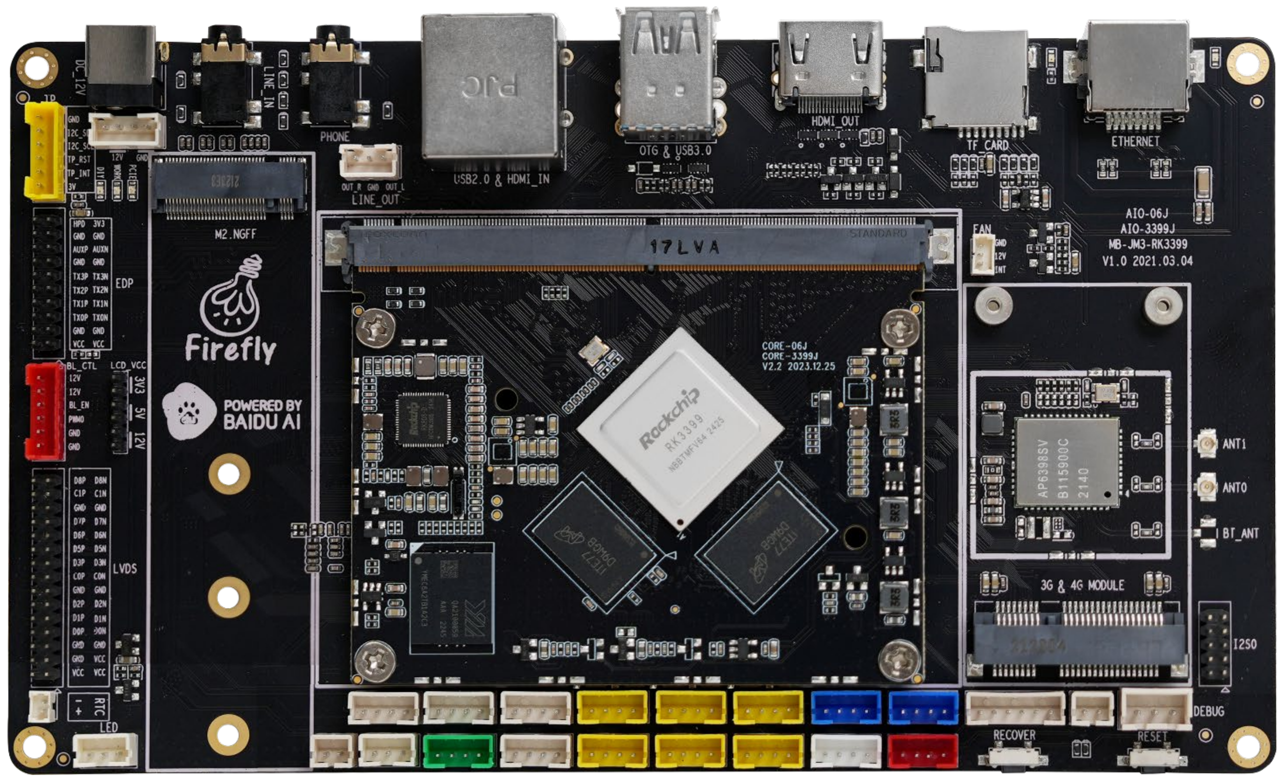
Hexa-core 64-bit Industrial Mainboard

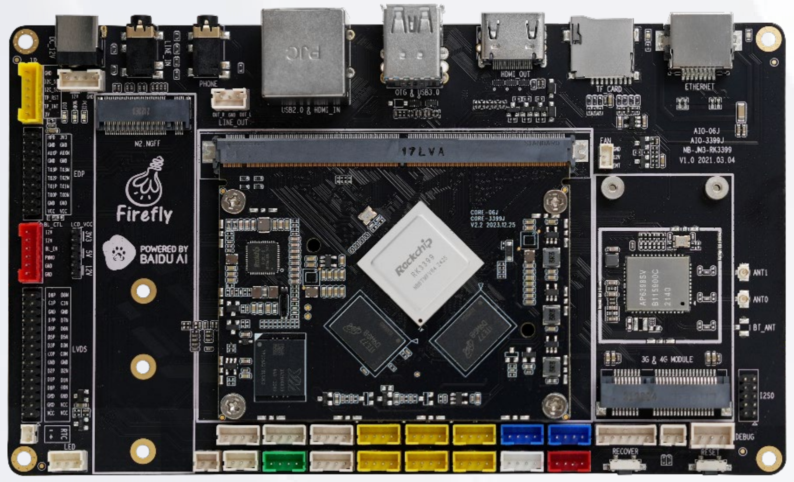
- AIO-3399J (Commercial)
- AIO-3399KJ (Industrial)



V2.2 2025-12-8

FIREFLY TECHNOLOGY

Product features



Hexa-core 64-bit high-performance processor

Adopts RK3399 hexa-core 64-bit (A72*2 + A53*4) high-performance processor with a maximum frequency of 1.8GHz, integrated with a quad-core Mali-T860 GPU. Offers multiple storage configuration options; users can quickly realize project R&D and production by expanding the function baseboard.

4K high-definition video decoding support

Supports 4K@60fps H.265/H.264/VP9 and 1080P multi-format video decoding, as well as 1080P H.264/AVC/VP8 video encoding.

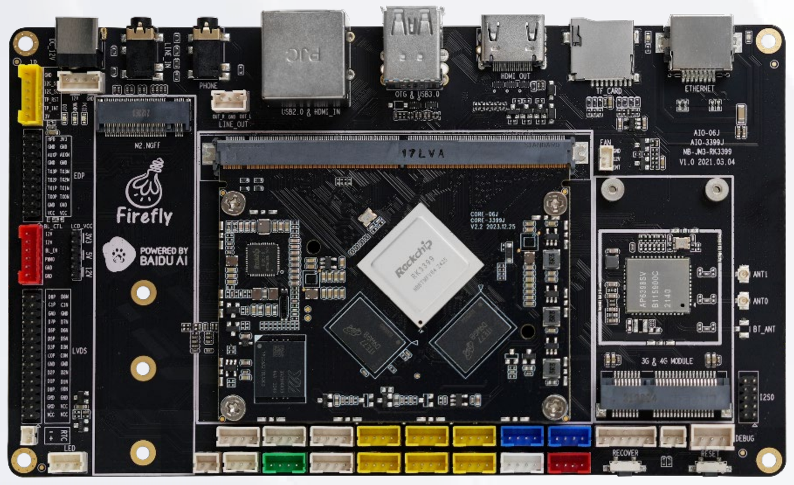
Supporting dual-screen mirroring and independent display

Supports MIPI, dual LVDS, eDP1.3, and HDMI2.0 display interfaces, as well as dual-screen mirroring and dual-screen independent display.

Multiple product forms for different needs

Offers commercial grade and industrial wide temperature grade options to meet different application requirements. The industrial wide temperature grade supports operation within -20°C to 70°C and 24/7 uninterrupted stable operation, meeting industrial-grade application needs.

Product features



Support for multiple operating systems

Supports Android, Linux OS, and domestic operating systems; provides a safe and stable system environment for product R&D and production, meeting the needs of different users.

Rich expansion interfaces

On-board expansion interfaces including M.2 PCIe, RS485, RS232, MIPI-CSI, MIPI-DSI, USB3.0, USB2.0, Line-in, I2S, I2C, SPI, and UART, facilitating connection to various peripherals and meeting the needs of different application scenarios.

Comprehensive development resources

Provides supporting source code, tutorials, technical documents, and development tools, simplifying the development process.

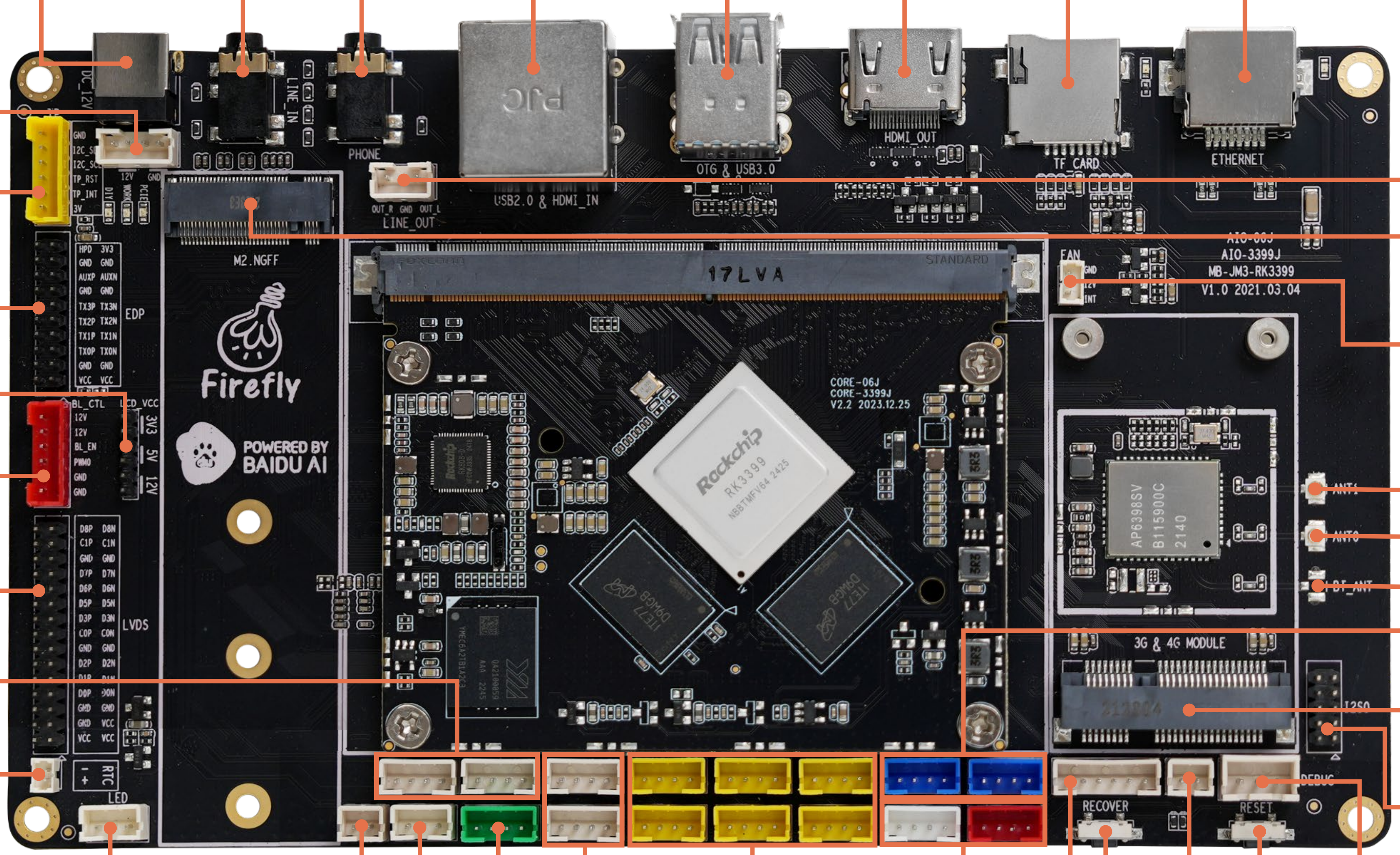
Wide application scenarios

Widely applicable to industries such as industrial computers, edge computing, computer vision, self-service terminals, commercial display integrated devices, and cloud servers.

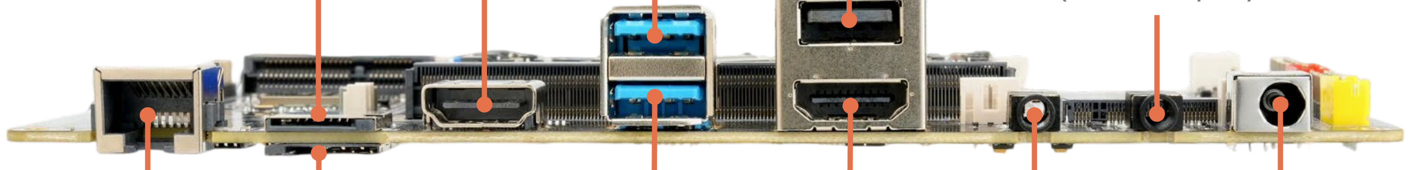
Specifications

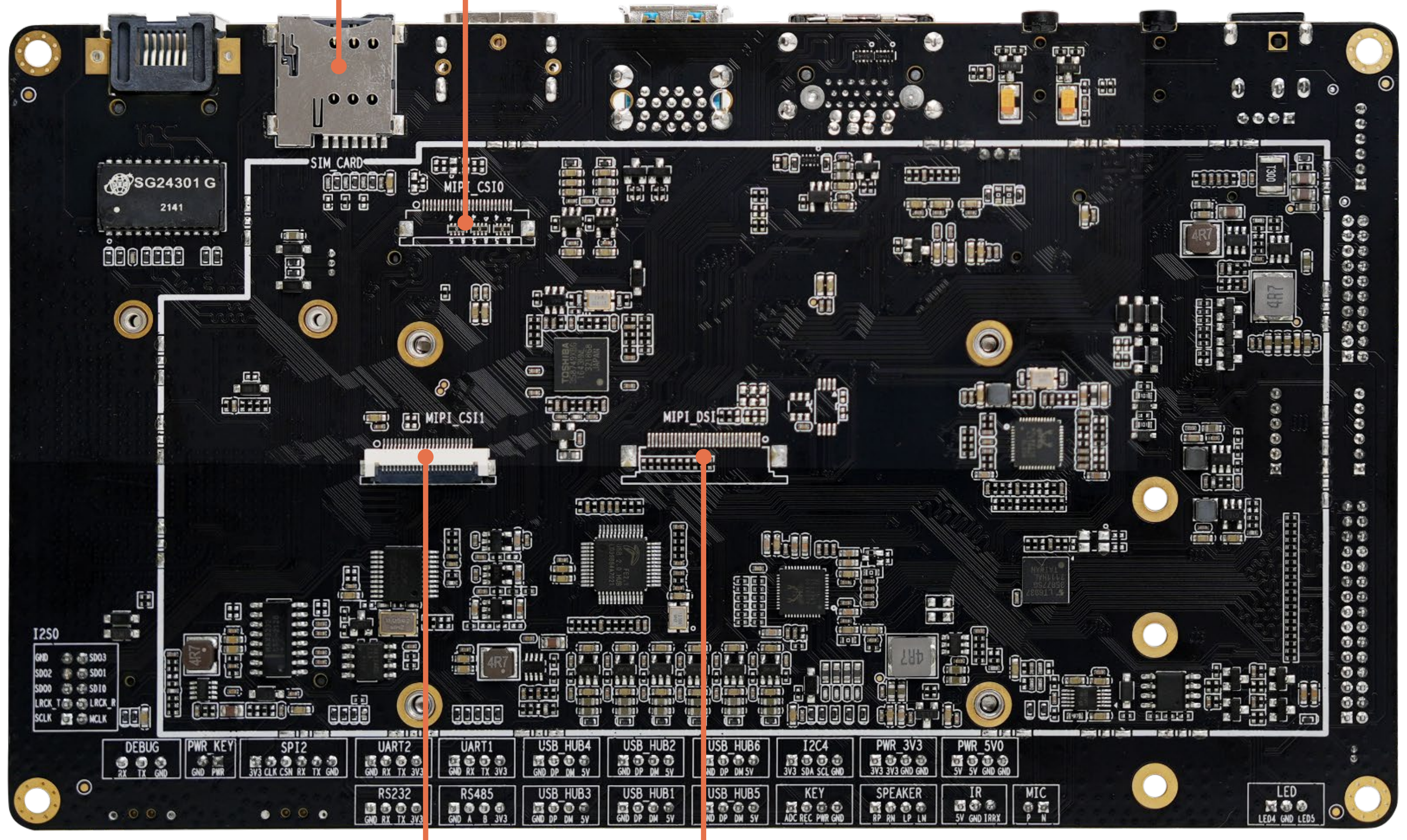
		AIO-3399J (Commercial)	AIO-3399KJ (Industrial)
Basic Specifications	CPU	RK3399 Hexa-core 64-bit processor (Cortex-A72×2 + Cortex-A53×4), up to 1.8GHz	RK3399K Hexa-core 64-bit processor (Cortex-A72×2 + Cortex-A53×4), up to 2.0GHz
	GPU	Mali-T860 MP4 quad-core GPU Support OpenGL ES1.1/2.0/3.0/3.1, OpenVG1.1, OpenCL, DX11 Support AFBC (Frame Buffer Compression)	
	ISP	Built-in dual hardware ISP, support up to single 13M pixel or dual 8M pixel	
	VPU	Hardware decoding: 4K@60fps H.265/H.264/VP9 video decoding, multi-format decoding of 1080P videos (VC-1, MPEG-1/2/4, VP8) Hardware encoding: 1080P H.264/AVC/VP8 video encoding Video post processing: deinterlacing, noise reduction, edge/detail/color optimization	
	RAM	LPDDR4 (2GB/4GB optional)	
	Storage	eMMC (16GB/32GB/64GB/128GB optional)	
	Storage expansion	1 × TF Card	
	Power	DC 12V-2A (DC 5.5×2.1mm jack or 4P-2mm wafer)	
	OS	Android and Linux OS	
	Size	182.79mm (L) × 107.06mm (W) × 22.4mm (H)	
	Environment	Operating temperature: -20℃ ~ 60℃ Operating humidity: 10% ~ 90%RH (non-condensing)	Operating temperature: -20℃ ~ 70℃ Operating humidity: 10% ~ 90%RH (non-condensing)
Interface Specifications	Network	Supports 1 channel of 1000Mbps Ethernet (RJ45) Supports 2.4GHz/5GHz dual-band WiFi (802.11a/b/g/n/ac protocol, 2×2 MIMO technology) and Bluetooth 4.1 (Support BLE) 3G/4G LTE modules (WCDMA, EVDO, 4G full Netcom) expandable via Mini-PCIe	
	Video input	1 × MIPI-CSI0 (24P-0.5mm, shared with HDMI-IN, not populated by default) 1 × MIPI-CSI1 (1080P@60fps, 4 lanes with 6Gbps, 24P-0.5mm) 1 × HDMI-IN (1080P@60fps)	
	Video output	1 × HDMI2.0 (4K@60fps, supports HDCP 1.4/2.2) 1 × Dual-channel LVDS (Max. 1920×1200 (24-bit) @60fps, 30P-2mm pin header) 1 × Dual-channel MIPI-DSI (Max. 2560×1600@60fps, shared with dual LVDS display interface, not populated by default) 1 × eDP1.3 (4 lanes with 10.8Gbps, 20P-2mm pin header) * Supports dual-screen mirroring and dual-screen independent display	
	Audio input	1 × MIC audio input (Shared with HDMI-IN, 2P-2mm wafer), 1 × Line-in (3.5mm audio jack)	
	Audio output	1 × HDMI audio output, 1 × Phone (3.5mm audio jack), 1 × Line-out (3P-2mm wafer), 1 × I2S (8 channels, 10P-2mm pin header), 1 × Speaker (Left & Right channels, built-in dual 4Ω/2.1W, 8Ω/1.2W power amplifier; 4P-2mm wafer)	
	USB	1 × USB3.0 OTG, 1 × USB3.0 HOST, 1 × USB2.0 HOST, 6 × USB2.0 (4P-2mm wafer)	
	Antenna	1 × WiFi antenna, 1 × WiFi & Bluetooth antenna, 1 × Bluetooth antenna (Not populated by default)	
	Button	1 × Reset, 1 × Recovery	
	Other interfaces	1 × RS232 (4P-2mm wafer), 1 × RS485 (4P-2mm wafer), 2 × UART (4P-2mm wafer), 1 × Debug (3P-2.54mm wafer), 1 × SPI (6P-2mm wafer), 1 × I2C (4P-2mm wafer), 1 × FAN (3P-1.25mm wafer), 1 × Power (2P-2mm wafer), 1 × IR Receiver (3P-2mm wafer), 1 × LED expansion interface (3P-2mm wafer), 1 × RTC battery holder (2P-1.25mm wafer), 1 × 5V Power output (4P-2mm wafer), 1 × 3.3V Power output (4P-2mm wafer), 1 × Display backlight interface (6P-2mm Wafer), 1 × Display voltage jumper (6P-2mm pin header), 1 × TP touch interface (6P-2mm Wafer), 1 × SIM Card	

Interface description

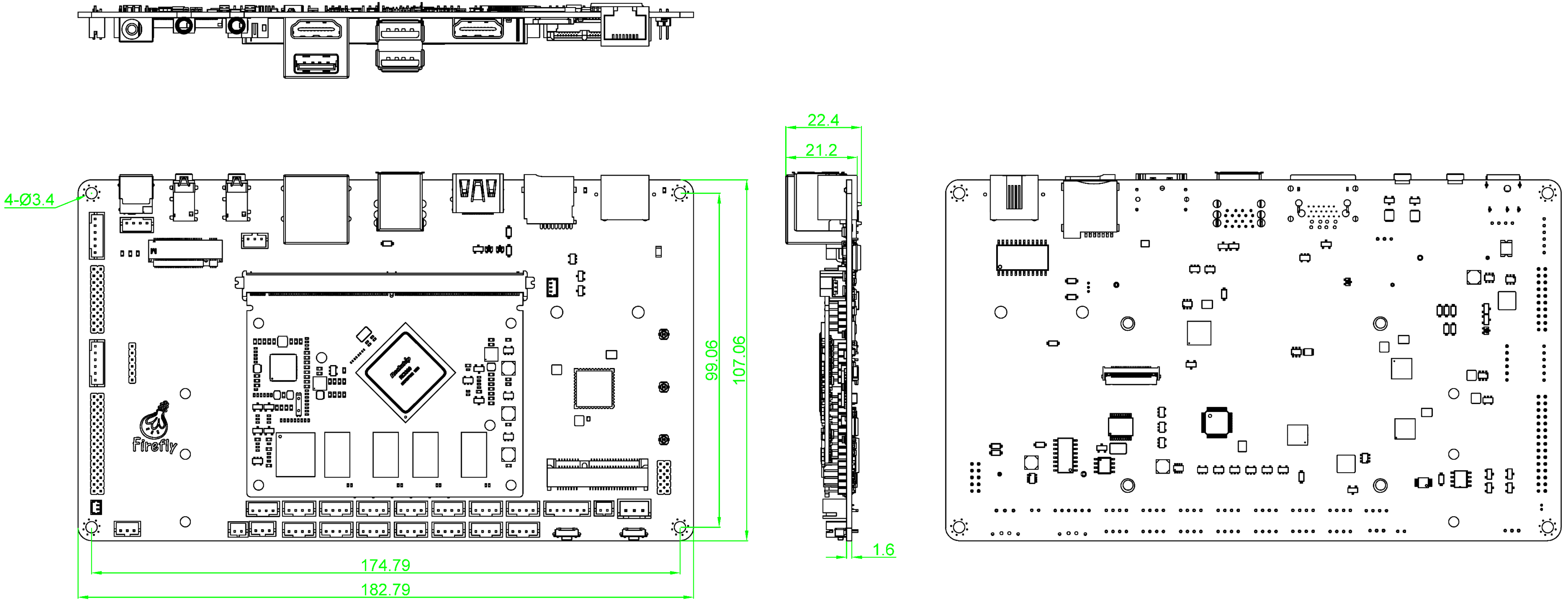


Interface description



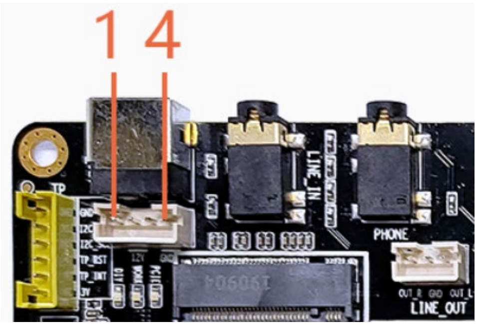


Dimension



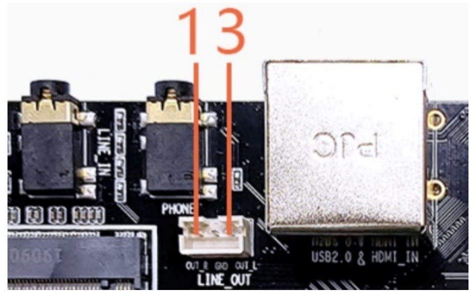
Interface definition

1. (J2) DC_IN 4PIN 2.0mm pitch Extension interface



NO.	Definition	Level/V	NO.	Definition	Level/V
1	DC_12V	12	3	GND	
2	DC_12V	12	4	GND	

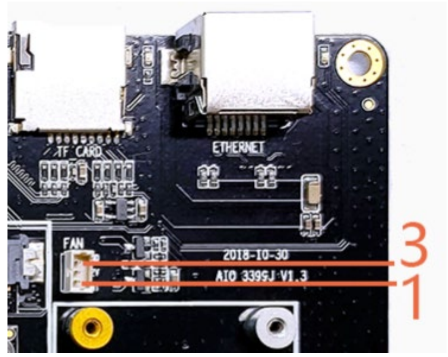
2. (J44) LINE-OUT 3PIN 2.0mm pitch Extension interface



NO.	Definition	Level/V	NO.	Definition	Level/V
1	LINE_OUT_R	3.0	3	LINE_OUT_L	3.0
2	GND				

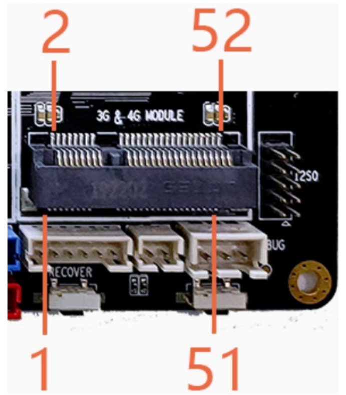
Interface definition

3. (J25) FAN 3PIN 1.25mm pitch Extension interface



NO.	Definition	Level/V	NO.	Definition	Level/V
1	FAN_INT	12	3	GND	
2	FAN_12V	12			

4. (J27) MINI PCIE 3G/4G



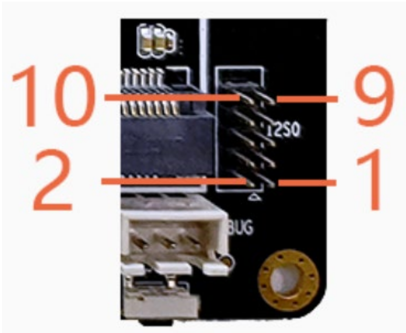
NO.	Definition	Level/V	NO.	Definition	Level/V
1	NC		2	VCC3V8_3G	3.8
3	NC		4	GND	
5	NC		6	NC	

Interface definition

9	GND		10	UIM_DAT	1.8
11	NC		12	UIM_CLK	1.8
13	NC		14	UIM_RST	1.8
15	GND		16	NC	
17	NC		18	GND	
19	NC		20	NC	
21	GND		22	PE_RST	3.3
23	NC		24	NC	
25	NC		26	GND	
27	GND		28	NC	
29	GND		30	NC	
31	NC		32	NC	
33	NC		34	GND	
35	GND		36	HOST0_DM	-
37	GND		38	HOST0_DP	-
39	VCC3V8_3G	3.8	40	GND	
41	VCC3V8_3G	3.8	42	NC	
43	GND		44	NC	
45	NC		46	NC	
47	NC		48	NC	
49	NC		50	GND	
51	NC		52	VCC3V8_3G	3.8

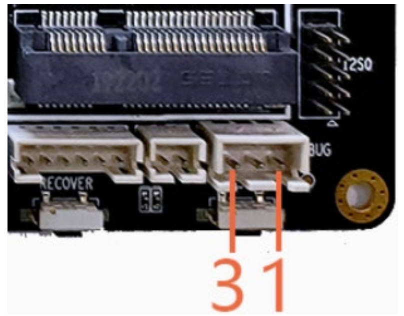
Interface definition

5. (J34) I2S0 10PIN double row 2.0mm pitch Extension interface



NO.	Definition	Level/V	NO.	Definition	Level/V
1	I2S0_SCLK	1.8	2	I2S0_CLK	1.8
3	I2S0_LRCK_TX	1.8	4	I2S0_LRCK_RX	1.8
5	I2S0_SDO0	1.8	6	I2S0_SDI0	1.8
7	I2S0_SDO2	1.8	8	I2S0_SDO1	1.8
9	GND		10	I2S0_SDO3	1.8

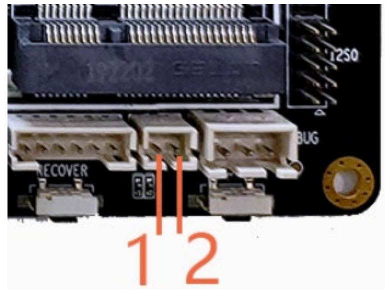
6. (J26) DEBUG 3PIN 2.54mm pitch Extension interface



NO.	Definition	Level/V	NO.	Definition	Level/V
1	UART2_RXD	3.0	3	GND	
2	UART2_TXD	3.0			

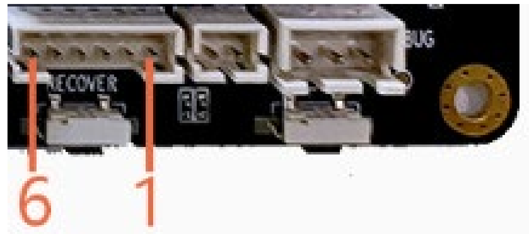
Interface definition

7. (J7) POWER KEY 2PIN 2.0mm pitch Extension interface



NO.	Definition	Level/V	NO.	Definition	Level/V
1	POWER	5.0	2	GND	

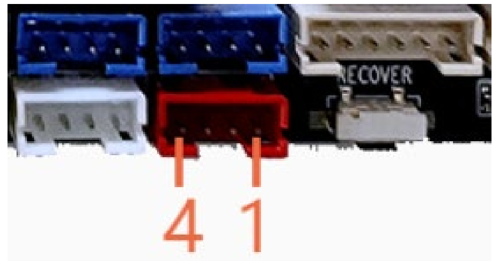
8. (J18) SPI2 6PIN 2.0mm pitch Extension interface



NO.	Definition	Level/V	NO.	Definition	Level/V
1	VCC3V3_SYS	3.3	4	GPIO2_B1/SPI2_RXD	1.8
2	GPIO2_B3/SPI2_CLK	1.8	5	GPIO2_B2/SPI2_TXD	1.8
3	GPIO2_B4/SPI2_CSN0	1.8	6	GND	

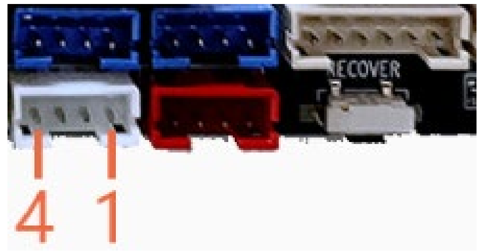
Interface definition

9. (J5) RS232 4PIN 2.0mm pitch Extension interface



NO.	Definition	Level/V	NO.	Definition	Level/V
1	GND		3	RS232_TX	3.3
2	RS232_RX	3.3	4	VCC3V3_UART	3.3

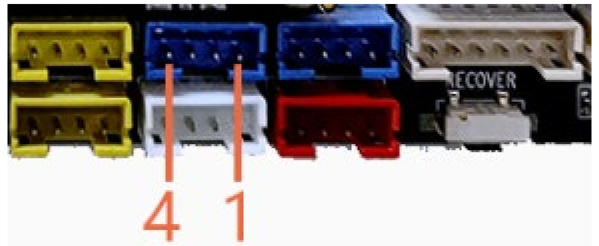
10. (J6) RS485 4PIN 2.0mm pitch Extension interface



NO.	Definition	Level/V	NO.	Definition	Level/V
1	GND		3	RS485_B	3.3
2	RS485_A	3.3	4	VCC3V3_UART	3.3

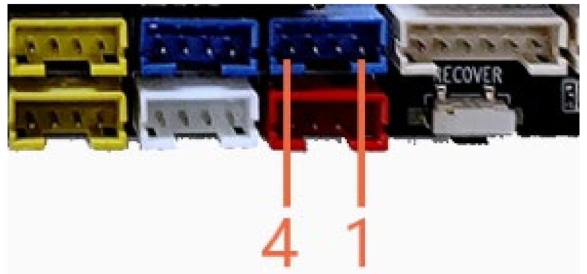
Interface definition

11. (J108) UART1 4PIN 2.0mm pitch Extension interface



NO.	Definition	Level/V	NO.	Definition	Level/V
1	GND		3	RXD	3.3
2	RXD	3.3	4	VCC3V3_UART	3.3

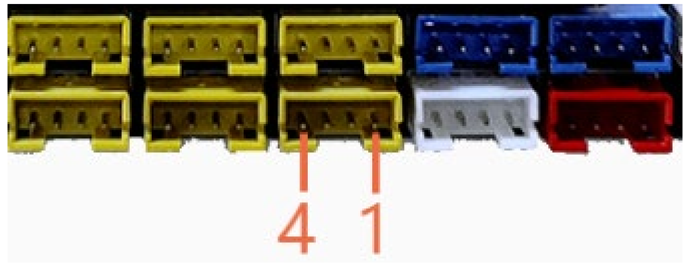
12. (J107) UART2 4PIN 2.0mm pitch Extension interface



NO.	Definition	Level/V	NO.	Definition	Level/V
1	GND		3	TX_C	3.3
2	RX_C	3.3	4	VCC3V3_UART	3.3

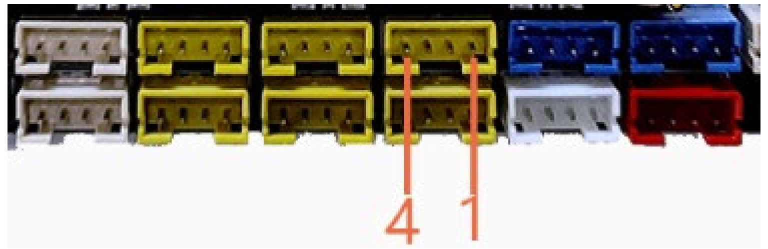
Interface definition

13. (J12) USB-HUB3 4PIN 2.0mm pitch Extension interface



NO.	Definition	Level/V	NO.	Definition	Level/V
1	GND		3	HUB_DM3	3.3
2	HUB_DP3	3.3	4	VCC5V0_HOST3	5.0

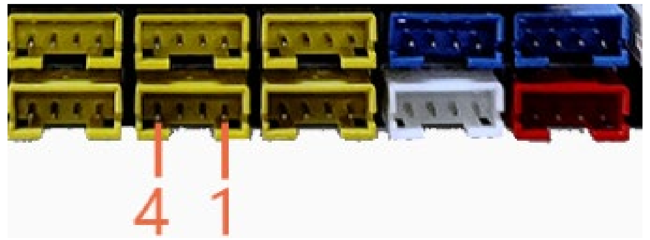
14. (J13) USB-HUB4 4PIN 2.0mm pitch Extension interface



NO.	Definition	Level/V	NO.	Definition	Level/V
1	GND		3	HUB_DM4	3.3
2	HUB_DP4	3.3	4	VCC5V0_HOST4	5.0

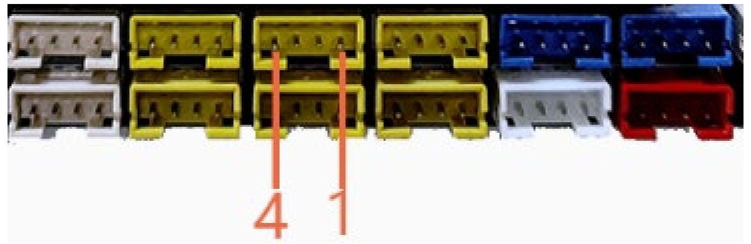
Interface definition

15. (J10) USB-HUB1 4PIN 2.0mm pitch Extension interface



NO.	Definition	Level/V	NO.	Definition	Level/V
1	GND		3	HUB_DM1	3.3
2	HUB_DP1	3.3	4	VCC5V0_HOST1	5.0

16. (J11) USB-HUB2 4PIN 2.0mm pitch Extension interface



NO.	Definition	Level/V	NO.	Definition	Level/V
1	GND		3	HUB_DM5	3.3
2	HUB_DP2	3.3	4	VCC5V0_HOST5	5.0

Interface definition

17. (J105) USB-HUB5 4PIN 2.0mm pitch Extension interface

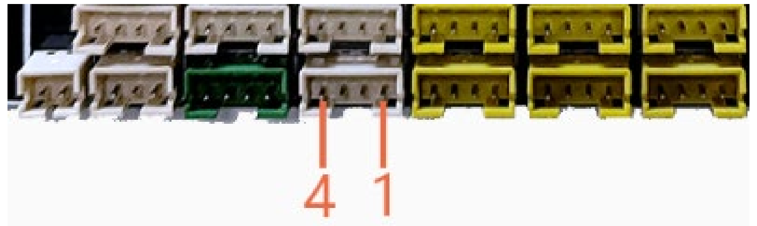
NO.	Definition	Level/V	NO.	Definition	Level/V
1	GND		3	HUB_DM5	3.3
2	HUB_DP5	3.3	4	VCC5V0_HOST5	5.0

18. (J104) USB-HUB6 4PIN 2.0mm pitch Extension interface

NO.	Definition	Level/V	NO.	Definition	Level/V
1	GND		3	HUB_DM6	3.3
2	HUB_DP6	3.3	4	VCC5V0_HOST6	5.0

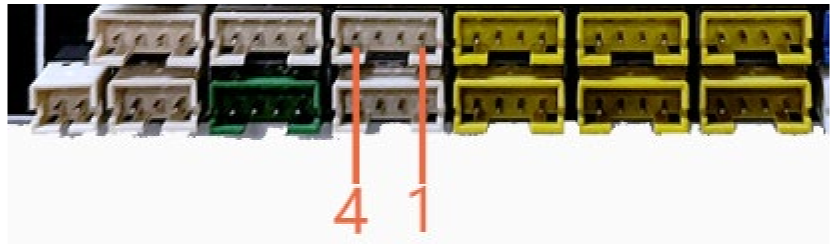
Interface definition

19. (J109) KEY 4PIN 2.0mm pitch Extension interface



NO.	Definition	Level/V	NO.	Definition	Level/V
1	ADC_IN0	1.8	3	PWR_ON	5.0
2	RECOVER_KEY	1.8	4	GND	

20. (J47) I2C4 4PIN 2.0mm pitch Extension interface



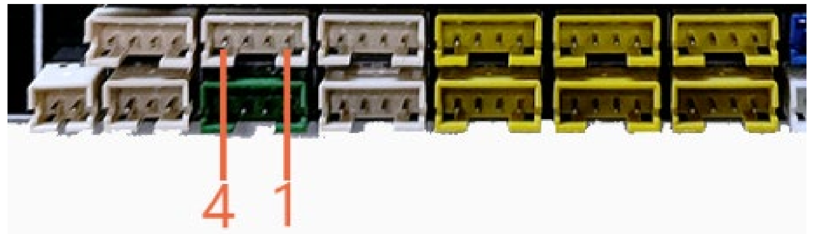
NO.	Definition	Level/V	NO.	Definition	Level/V
1	VCC3V3_SYS	3.3	3	I2C4_SCL	3.0
2	I2C4_SDA	3.0	4	GND	

Interface definition

21. (J17) SPEAKER 4PIN 2.0mm pitch Extension interface

NO.	Definition	Level/V	NO.	Definition	Level/V
1	SPK_RN	10W@8Ω	3	SPK_LN	10W@8Ω
2	SPK_RP		4	SPK_LP	

22. (J41) PWR_3V3 4PIN 2.0mm pitch Extension interface



NO.	Definition	Level/V	NO.	Definition	Level/V
1	VCC3V3_SYS	3.3	3	GND	
2	VCC3V3_SYS	3.3	4	GND	

Interface definition

23. (J42) PWR_5V0 4PIN 2.0mm pitch Extension interface

NO.	Definition	Level/V	NO.	Definition	Level/V
1	VCC_SYS	5.0	3	GND	
2	VCC_SYS	5.0	4	GND	

24. (J43) IR Receiver 4PIN 2.0mm pitch Extension interface

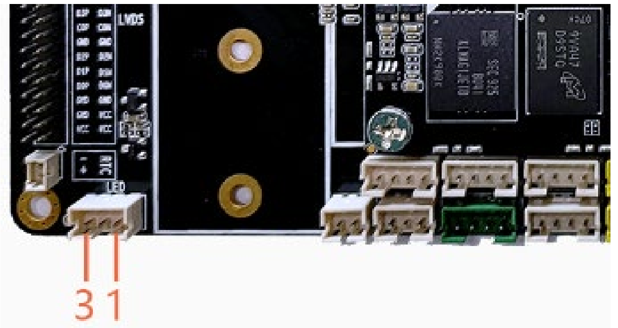
NO.	Definition	Level/V	NO.	Definition	Level/V
1	IR_VCC	5.0	3	IR_INT	1.8
2	GND				

Interface definition

25. (J14) MIC 2PIN 2.0mm pitch Extension interface

NO.	Definition	Level/V	NO.	Definition	Level/V
1	MIC_IN1N	3.0	2	MIC_IN1P	3.0

26. (J102) LED 3PIN 2.0mm pitch Extension interface



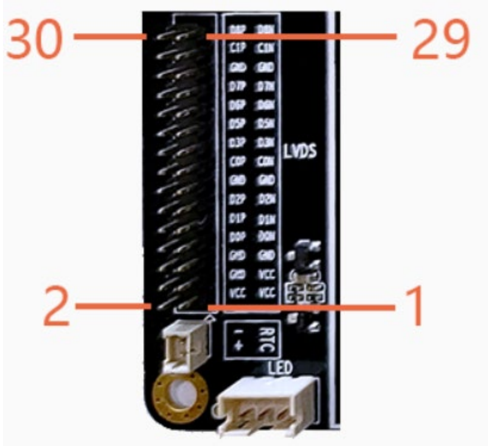
NO.	Definition	Level/V	NO.	Definition	Level/V
1	LED4	3.3	3	LED5	3.3
2	GND				

Interface definition

27. (J3) RTC 2PIN 1.25mm pitch Extension interface

NO.	Definition	Level/V	NO.	Definition	Level/V
1	GND		2	VCC_RTC	3.3~5.0

28. (CON40) LVDS double row 30PIN 2.0mm pitch Extension interface



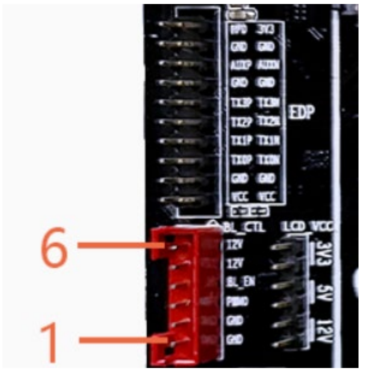
*VCC_LCD Selection via Jumper J101

NO.	Definition	Level/V	NO.	Definition	Level/V
1	VCC_LCD	3.3V/5V/12V Optional*	2	VCC_LCD	3.3V/5V/12V Optional*
3	VCC_LCD	3.3V/5V/12V Optional*	4	GND	
5	GND		6	GND	
7	LVDS_D0N	-	8	LVDS_D0P	-

Interface definition

9	LVDS_D1N	-	10	LVDS_D1P	-
11	LVDS_D2N	-	12	LVDS_D2P	-
13	GND		14	GND	
15	LVDS_CLK0N	-	16	LVDS_CLK0P	-
17	LVDS_D3N	-	18	LVDS_D3P	-
19	LVDS_D5N	-	20	LVDS_D5P	-
21	LVDS_D6N	-	22	LVDS_D6P	-
23	LVDS_D7N	-	24	LVDS_D7P	-
25	GND		26	GND	
27	LVDS_CLK1N	-	28	LVDS_CLK1P	-
29	LVDS_D8N	-	30	LVDS_D8P	-

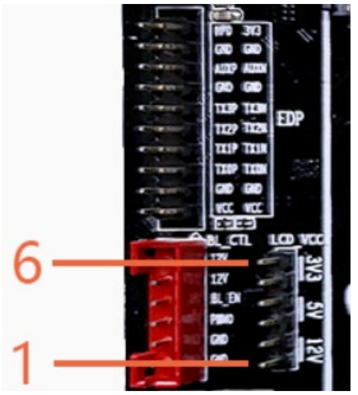
29. (J45) BL_CTL 6PIN 2.0mm pitch Extension interface(GPIO)



NO.	Definition	Level/V	NO.	Definition	Level/V
1	GND		4	BL_EN	3.0
2	GND		5	DC_12V	12
3	LCD_BL_PWM0	3.0	6	DC_12V	12

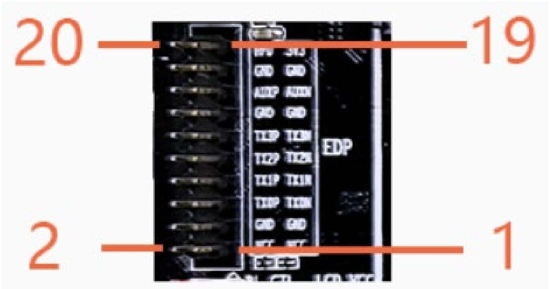
Interface definition

30. (J101) LCD_VCC 6PIN 2.0mm pitch Extension interface



NO.	Definition	Level/V	NO.	Definition	Level/V
1	DC_12V	12V	4	VCC_LCD_S	3.3V/5.0V/12V Optional
2	VCC_LCD_S	3.3V/5.0V/12V Optional	5	VCC3V3_SYS_S3	3.3V
3	VCC_SYS	5V	6	VCC_LCD_S	3.3V/5.0V/12V Optional

31. (JP1)EDP double row 20PIN 2.0mm pitch Extension interface(GPIO)



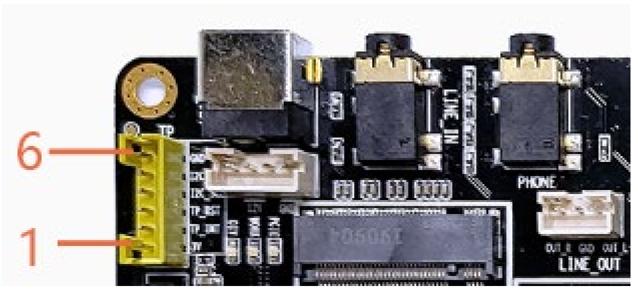
*VCC_LCD Selection via Jumper J101

NO.	Definition	Level/V	NO.	Definition	Level/V
1	VCC_LCD	3.3V/5.0V/12V Optional	2	VCC_LCD	3.3V/5.0V/12V Optional
3	GND		4	GND	
5	EDP_TX0N	-	6	EDP_TX0P	-

Interface definition

7	EDP_TX1N	-	8	EDP_TX1P	-
9	EDP_TX2N	-	10	EDP_TX2P	-
11	EDP_TX3N	-	12	EDP_TX3P	-
13	GND		14	GND	
15	EDP_AUXN	-	16	EDP_AUXP	-
17	GND		18	GND	
19	VCC_3V0	3.0	20	LCD_HPD	3.0

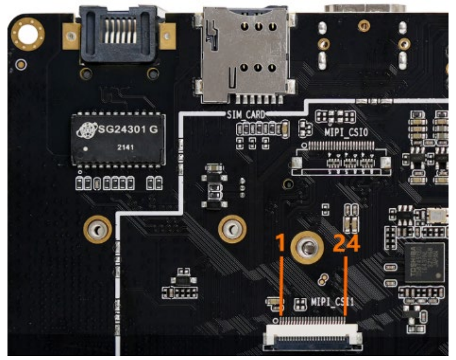
32. (J24) TP 6PIN 2.0mm pitch Extension interface



NO.	Definition	Level/V	NO.	Definition	Level/V
1	VCC_3V0	3.0	2	TP_INT	3.0
3	TP_RST	3.0	4	I2C4_SCL_TP	3.0
5	I2C4_SDA_TP	3.0	6	GND	

Interface definition

33. (J32) MIPI CSI1 24PIN 0.5mm pitch



NO.	Definition	Level/V	NO.	Definition	Level/V
1	VCC_SYS	5.0	13	GND	
2	CIF_PWR [GPIO1_C6]	3.0	14	MIPI_TX1/RX1_D2P	-
3	DVP_PWR [GPIO1_C7]	3.0	15	MIPI_TX1/RX1_D2N	-
4	I2C1_SDA （Pull-up resistor 2.2K)	1.8	16	GND	
5	I2C1_SCL （Pull-up resistor 2.2K)	1.8	17	MIPI_TX1/RX1_CLKP	-
6	MIPI_RST【GPIO0_B0】	1.8	18	MIPI_TX1/RX1_CLKN	-
7	DVP_PDN0_H 【GPIO2_B0】	1.8	19	GND	
8	GND		20	MIPI_TX1/RX1_D1P	-
9	MIPI_MCLK0	1.8	21	MIPI_TX1/RX1_D1N	-
10	GND		22	GND	
11	MIPI_TX1/RX1_D3P	-	23	MIPI_TX1/RX1_D0P	-
12	MIPI_TX1/RX1_D3N	-	24	MIPI_TX1/RX1_D0N	-

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