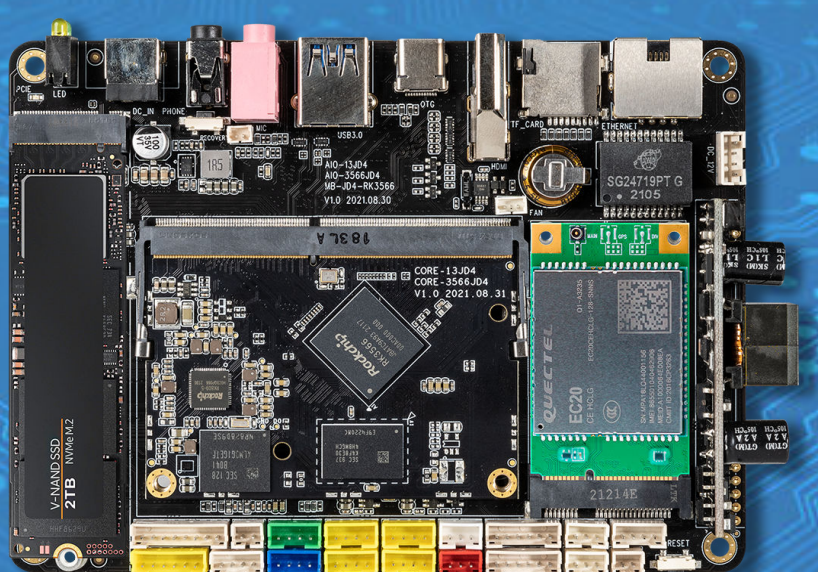
AIO-3566JD4

Quad-Core High-Performance Mainboard

V1.0



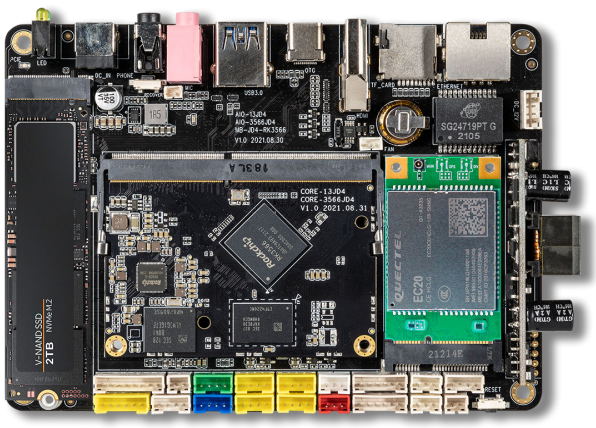
T-CHIP INTELLIGENCE TECHNOLOGY CO.,LTD.
www.t-firefly.com

Update history

Version	Date	Details
V1.0	2021-12-17	Original version
V1.0	2023-05-29	Update interface definition

Directory

Equipped with RK3566 quad-core 64-bit processor, and integrated with dual-core GPU and high-efficiency NPU, the mainboard supports 8G large RAM. The onboard M.2 interface and SATA3.0 interface enable storage expansion with large hard disks. With various interface, it can be used in scenarios such as entertainment PC, smart NVR, cloud terminal, and IoT gateway.



- **RK3566 quad-core 64-bit processor**

  RK3566 quad-core 64-bit Cortex-A55 processor has frequency up to 1.8GHz. With 22nm lithography process, it features low power consumption and high performance.

- **8GB large RAM, all-data-link ECC**

  It supports up to 8GB RAM, and supports all-data-link ECC, making data safer and more reliable, and meeting the requirements of running large-memory products.

- **Powerful network communication**

  This mainboard supports 1000Mbps Ethernet, 2.4G/5G dual-band WiFi, and 4G LTE/3G network communication. With multiple high-speed, low-latency network communication methods, it meets the needs of products with multiple network ports such as NVR and industrial gateway.

- **M.2 and SATA3.0 interface**

  M.2 PCIe2.1 interface can be connected with NVMe SSD, and SATA3.0 interface can be connected with SSD/HDD, owning the superiority of high-speed reading and writing and large storage.

- **Multiple display interfaces**

  MIPI-DSI×2, HDMI2.0, EDP display interfaces are equipped. Supporting MIPI-CSI (4-channel) camera interface, and with built-in 8M ISP image signal processor, it can be connected with single-channel 8M camera or dual-channel 2M camera. This mainboard can be used in NVR, intelligent terminal, multimedia advertising player and other products.

- **More interfaces for more possibilities**

  With UART, I2C, ADC, PWM, GPIO, PCIE2.1, SATA3.0, USB2.0, USB3.0, HDMI, EDP, MIPI CSI, MIPI DSI, I2S, SPEAK, and other interfaces, it can be directly used for external device control and expansion.

- **Supports various operating systems**

  It supports Android, Ubuntu Buildroot+QT, OpenWRT, Debian and other operating systems, stable and reliable.

- **Abundant resources for customization**

  A complete SDK, development documents, examples, technology documents, tutorials and other resources are provided for users to make further customization.

- **A wide range of applications**

  The product is suitable for scenarios such as entertainment PC, smart NVR, cloud terminal, IoT gateway, industrial control, edge computing, face recognition gate, NAS, and vehicle center console.

Specifications

Basic Specifications

SOC	RockChip RK3566
CPU	Quad-core 64-bit Cortex-A55, 22nm lithography process, up to 1.8GHz
GPU	ARM G52 2EE GPU Supports OpenGL ES 1.1/2.0/3.2. OpenCL 2.0. Vulkan 1.1 Embedded high-performance 2D acceleration hardware
NPU	Integrated RKNN NPU AI accelerator, 1Tops@INT8 Supports one-click switching of Caffe/TensorFlow/TFLite/ONNX/PyTorch/ Keras/Darknet
VPU	4K@60fps H.265/H.264/VP9, 1080P@60fps VC-1, VP8, MPEG-1/2/4 video decoding; 1080P 100fps H.265, 1080P@60fps H.264 video encoding
RAM	1GB/2GB/4GB/8GB LPDDR4/LPDDR4X
Storage	16GB/32GB/64GB/128GB eMMC
Storage Expansion	Supports M.2 PCIe 2.1 NVMe SSD (2242/2260/2280) Supports SATA3.0 SSD/HDD Supports TF card

Hardware Specifications

Ethernet	1×1000Mbps Ethernet (RJ45)
WiFi	2.4GHz / 5GHz dual-band WiFi, 802.11a/b/g/n/ac Bluetooth5.0 Supports 4G LTE/3G
Display	1 × HDMI2.0, supports up to 4K@60fps output 2 × MIPI DSI, single/dual channel mode, up to 2560×1440@60fps output 1 × eDP1.3, supports up to 2560×1600@60fps output
Audio	1 × Phone audio output (3.5mm jack) 1 × HDMI audio output 2 × Speaker (1.3W/8Ω, 10W/8Ω) 2 × Mic audio input (3.5mm jack, 2P/1.25mm Wafer socket)
Camera	MIPI-CSI (4-channel), supports 2-channel input, built-in 8M ISP, Supports single-lens 8M camera / dual-lens 2M camera
USB	4 × USB2.0 (Max: 500mA) 1 × USB3.0 (Max: 1000mA) 1 × USB-C (OTG)
Power	1 × DC 12V（5.5×2.1mm, support 9V~24V wide voltage input) 1 × DC-IN (12V/Wafer) 1 × DC-OUT (12V/5V/3.3V) Supports POE+ (802.3 AT, output power 25W)
Power Consumption	Min: 0.075W Normal: 2.8W Max: 4.6W
Interface	1×TP, 1×I2C, 1×UART, 1×RS232, 1×RS485, 1×GPIO, 1×SPI, 1×IR, 1× Debug, 1×PowerKey, 1×Reset, 1×KEY (ADC/REC/RST) , 1×Fan (12V/3P/1.25mm)

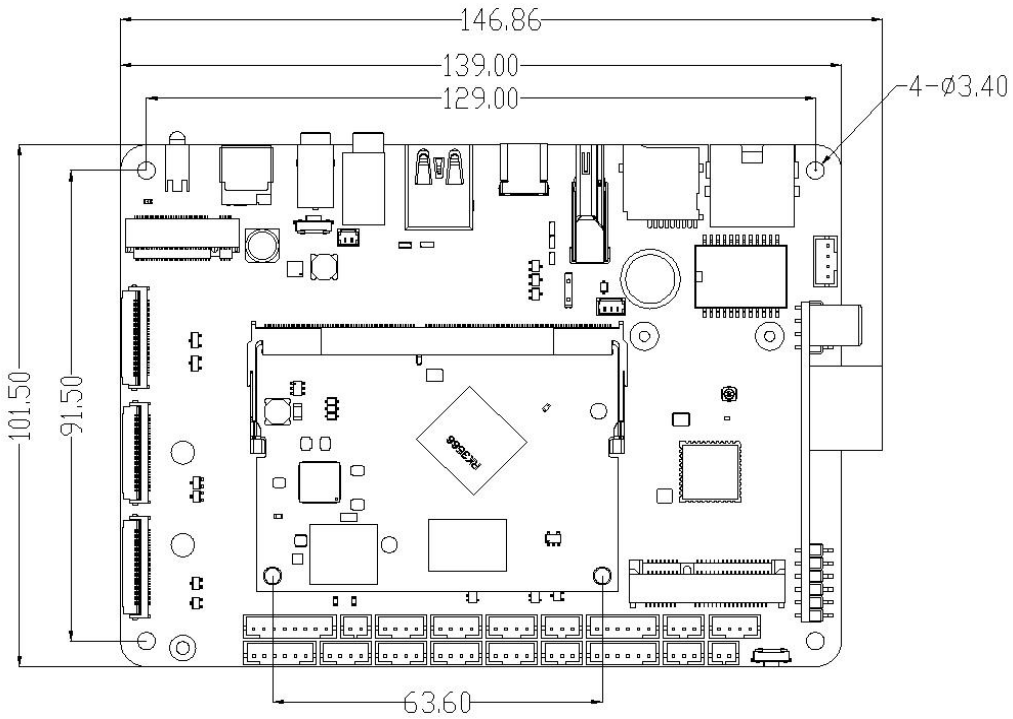
OS / Software

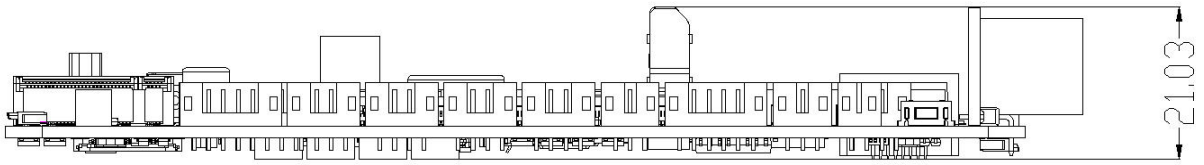
OS	Supports Android, Ubuntu, Buildroot+QT, OpenWRT, Debian, etc.

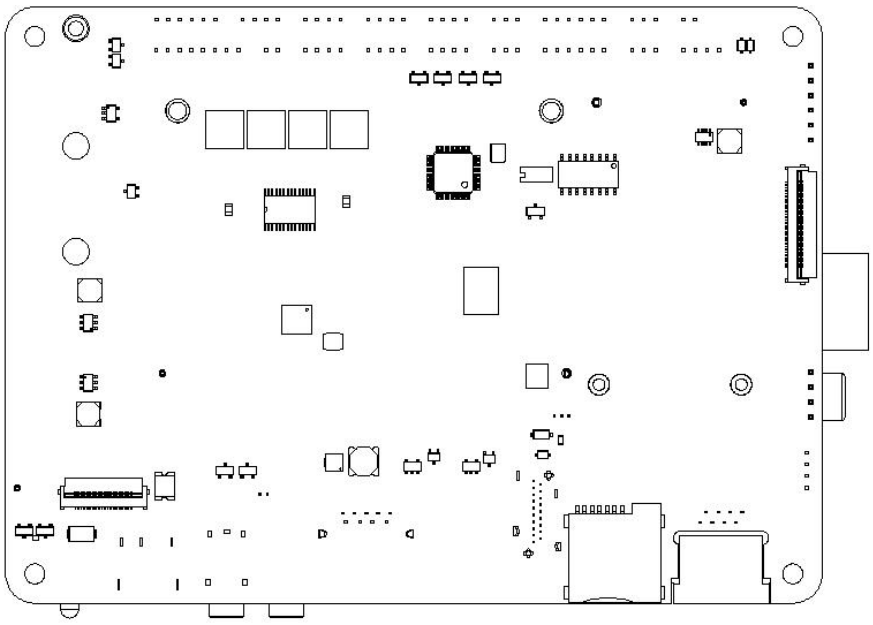
General

Size	139.0mm × 101.5mm
Heat Dissipation	Heat sink installation hole pitch: 45mm, matched heat sink is recommended (Click to See)
Environment	Operating Temperature: -20℃~60℃ Storage Temperature: -20℃~70℃ Storage Humidity: 10%~80%RH(non-condensing)

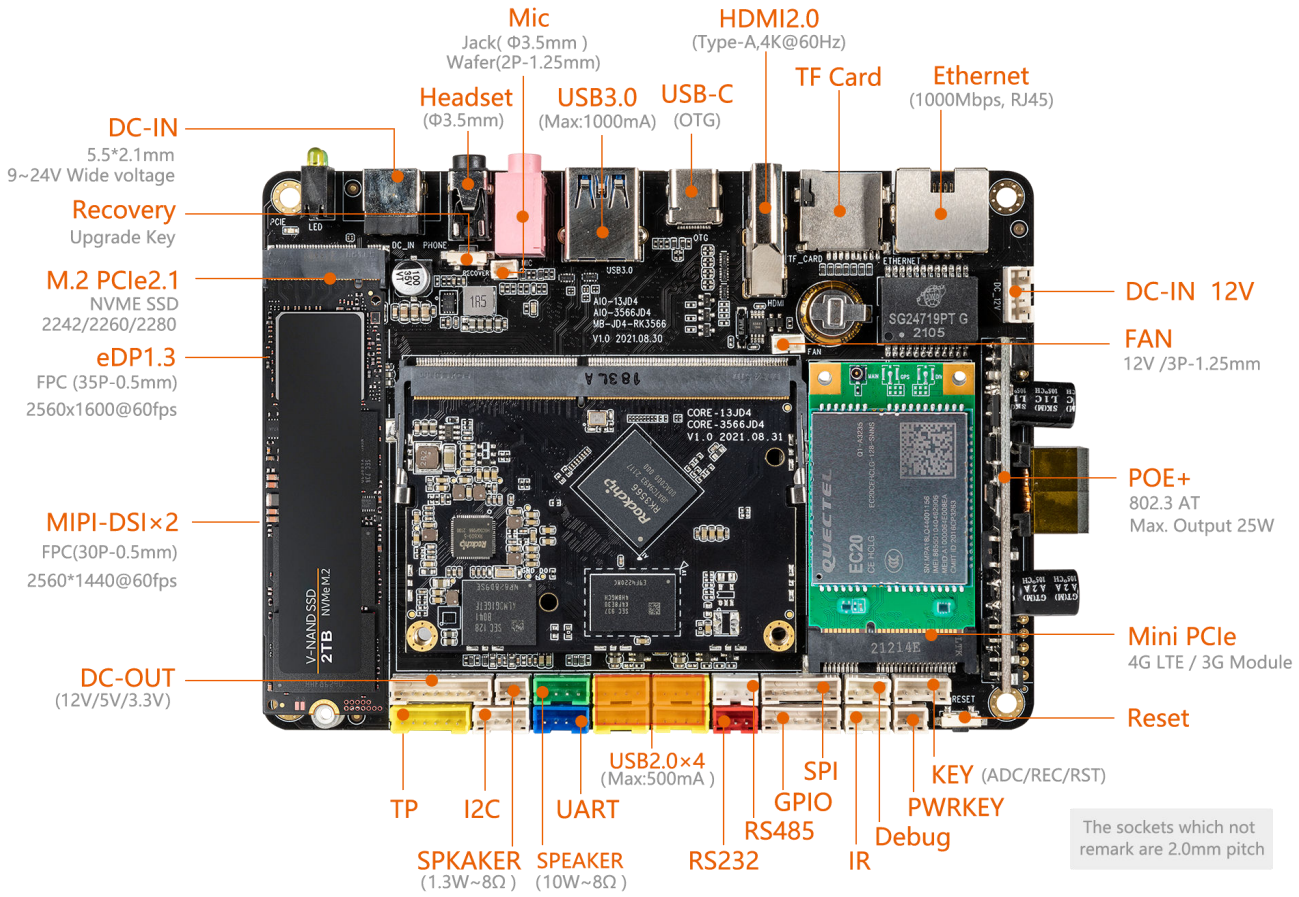
Size

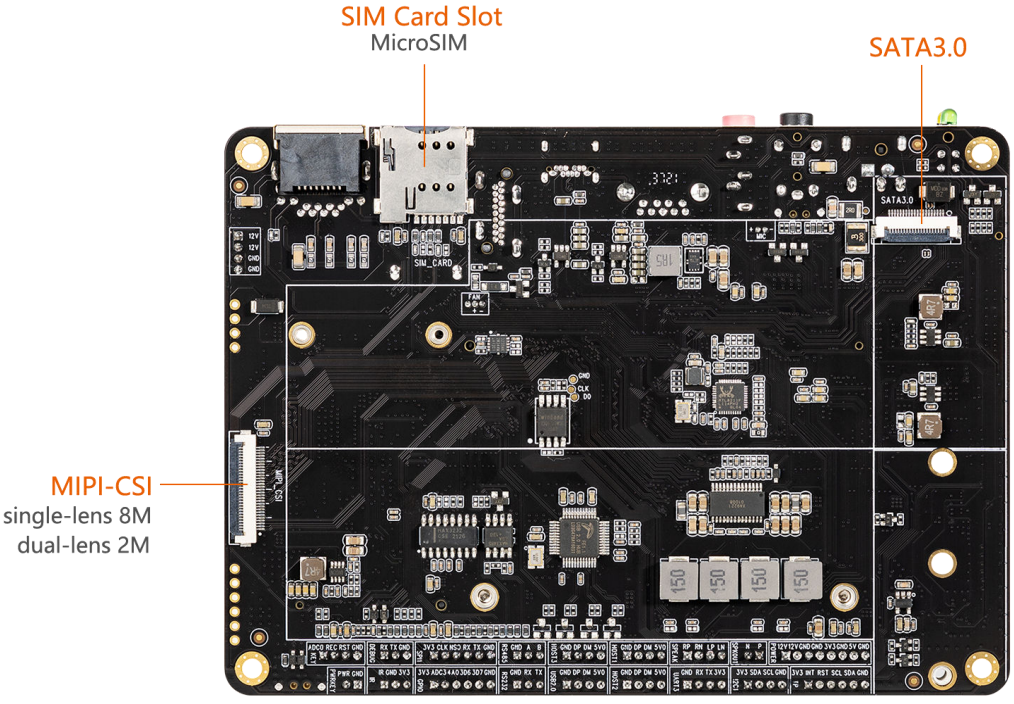




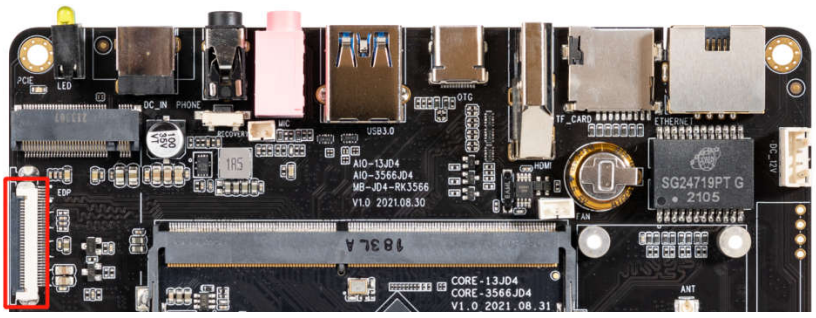


Interface describe



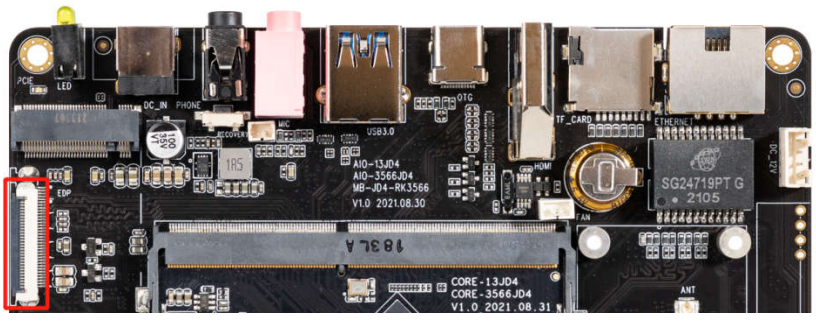


1. (J22) EDP_Display_Interface 30 PIN 0.5mm Pitch



NO.	definition	Level/V	NO.	definition	Level/V
1	NC		19	GND	
2	GND		20	GND	
3	EDP_TX_D1N	-	21	GND	
4	EDP_TX_D1P	-	22	EDP_BL_EN（GPIO0_C5_d）	*3.3V*
5	GND		23	EDP_BL_PWM5 （PWM5 /GPIO0_C4_d）	*3.3V*
6	EDP_TX_D0N	-	24	NC	
7	EDP_TX_D0P	-	25	NC	
8	GND		26	DC_12V (12V Output)	*12V*
9	EDP_AUXP	-	27	DC_12V (12V Output)	*12V*
10	EDP_AUXN	-	28	DC_12V (12V Output)	*12V*
11	GND		29	DC_12V (12V Output)	*12V*
12	VCC_LCD (3.3V Output)	3.3V	30	NC	
13	VCC_LCD (3.3V Output)	3.3V			
14	NC				
15	GND				
16	GND				
17	EDP_HPD（GPIO4_C2_d）	3.3V			
18	GND				

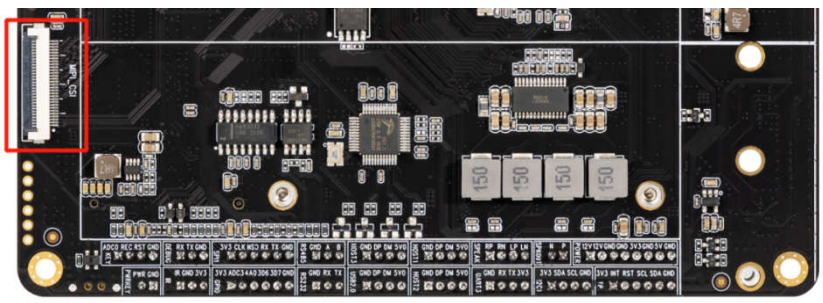
2. (J20) EDP_Display_Interface 35 PIN 0.5mm Pitch （Reserve—Default NC）



NO.	definition	Level/V	NO.	definition	Level/V
1	EDP_TX_D3N	-	19	NC	
2	EDP_TX_D3P	-	20	GND	
3	GND		21	GND	
4	NC		22	EDP_HPD（GPIO4_C2_d）	*3.3*
5	EDP_TX_D2N	-	23	GND	
6	EDP_TX_D2P	-	24	GND	
7	GND		25	GND	

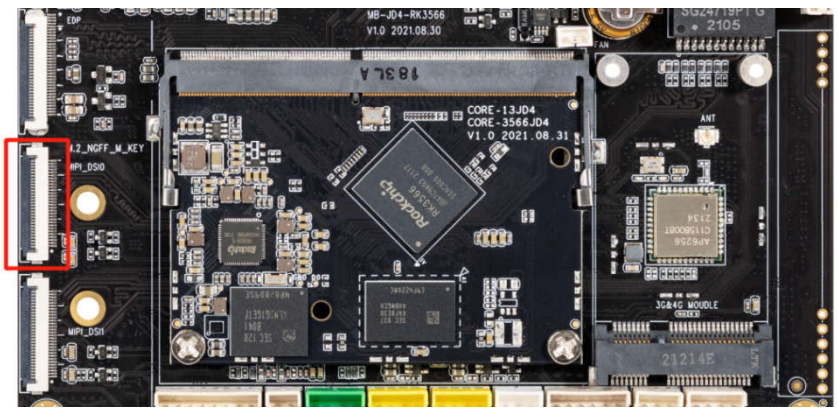
8	EDP_TX_D1N	-	26	GND	
9	EDP_TX_D1P	-	27	EDP_BL_EN（GPIO0_C5_d）	*3.3V*
10	GND		28	EDP_BL_PWM5 （PWM5/ GPIO0_C4_d）	*3.3V*
11	EDP_TX_D0N	-	29	NC	
12	EDP_TX_D0P	-	30	NC	
13	GND		31	DC_12V (12V Output)	*12V*
14	EDP_AUXP	-	32	DC_12V (12V Output)	*12V*
15	EDP_AUXN	-	33	DC_12V (12V Output)	12V
16	GND		34	DC_12V (12V Output)	*12V*
17	VCC_LCD (3.3V Output)	*3.3V*	35	NC	
18	VCC_LCD (3.3V Output)	*3.3V*			

3. (J19) MIPI CAMERA 30 PIN 0.5mm Pitch



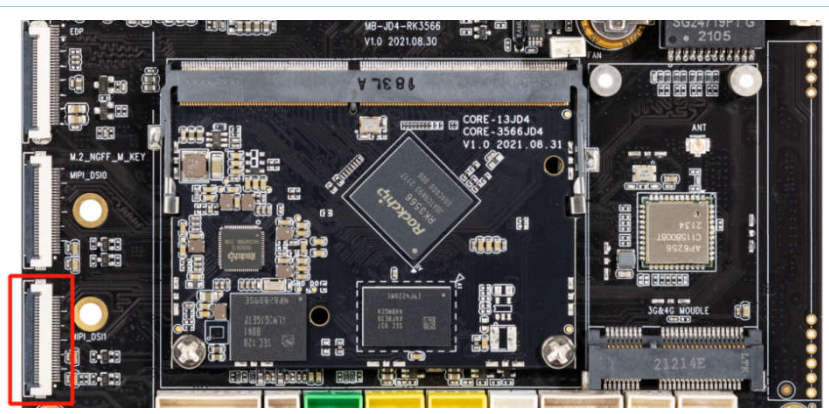
NO.	definition	Level/V	NO.	definition	Level/V
1	I2C4_SDA_M0 【板上已上拉 2.2K】	1.8V	16	GND	
2	I2C4_SCL_M0 【板上已上拉 2.2K】	1.8V	17	MIPI_CSI_RX_CLK0P	-
3	MIPI_PDN0_CAM（GPIO3_D4_d）	1.8V	18	MIPI_CSI_RX_CLK0N	-
4	MIPI_RESET0_CAM（GPIO3_D5_d）	1.8V	19	GND	
5	GND		20	MIPI_CSI_RX_D2P	-
6	MIPI_MCLK0 （CAM_CLKOUT0/GPIO4_A7_d）	1.8V	21	MIPI_CSI_RX_D2N	-
7	MIPI_PDN1_CAM（GPIO4_B1_d）	1.8V	22	GND	
8	MIPI_RESET1_CAM（GPIO4_A4_d）	1.8V	23	MIPI_CSI_RX_D3P	-
9	MIPI_MCLK1 （CIF_CLKOUT /GPIO4_C0_d）	1.8V	24	MIPI_CSI_RX_D3N	-
10	GND		25	GND	
11	MIPI_CSI_RX_D0P	-	26	MIPI_CSI_RX_CLK1P	-
12	MIPI_CSI_RX_D0N	-	27	MIPI_CSI_RX_CLK1N	-
13	GND		28	GND	
14	MIPI_CSI_RX_D1P	-	29	VCC5V0_SYS (5V Output)	5.0V
15	MIPI_CSI_RX_D1N	-	30	VCC5V0_SYS (5V Output)	5.0V

4. (J23) MIPI_Display_Interface 30 PIN 0.5mm Pitch



NO.	definition	Level/V	NO.	definition	Level/V
1	VCC5V0_SYS (5V Output)	5.0V	16	MIPI_DSI_TX0_D0P/LVDS_TX0_D0P	-
2	VCC5V0_SYS (5V Output)	5.0V	17	MIPI_DSI_TX0_D0N/LVDS_TX0_D0N	-
3	VCC5V0_SYS (5V Output)	5.0V	18	GND	
4	GND		19	MIPI_DSI_TX0_D1P/LVDS_TX0_D1P	-
5	I2C_ID 【Input, 10K pull-up on board】	3.3V	20	MIPI_DSI_TX0_D1N/LVDS_TX0_D1N	-
6	VCC3V3_SYS （3.3V Output）	3.3V	21	GND	
7	I2C1_SDA 【The core board has been pull-up resistor 2.2K】	3.3V	22	MIPI_DSI_TX0_CLKP/LVDS_TX0_CLKP	-
8	I2C1_SCL 【The core board has been pull-up resistor 2.2K】	3.3V	23	MIPI_DSI_TX0_CLKN/LVDS_TX0_CLKN	-
9	LCD0_PWR_EN（GPIO4_B5_d） 【Pull up resistance on mainboard 4.7K】	3.3V	24	GND	
10	TP_INT_L（GPIO4_C3_d）	3.3V	25	MIPI_DSI_TX0_D2P/LVDS_TX0_D2P	-
11	BL_EN（GPIO0_C2_d）	3.3V	26	MIPI_DSI_TX0_D2N/LVDS_TX0_D2N	-
12	LCD0_BL_PWM4 （PWM4/ GPIO0_C3_d）	3.3V	27	GND	
13	LCD0_RST_L (GPIO3_C6_d) 【Pull up resistance on mainboard 4.7K】	3.3V	28	MIPI_DSI_TX0_D3P/LVDS_TX0_D3P	-
14	TP0_RST_L (GPIO4_A6_d) 【Pull up resistance on mainboard 4.7K】	3.3V	29	MIPI_DSI_TX0_D3N/LVDS_TX0_D3N	-
15	GND		30	GND	

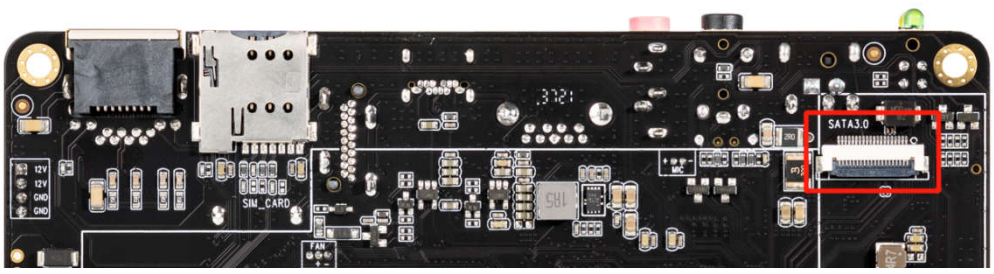
5. (J24) MIPI_Display_Interface 30 PIN 0.5mm Pitch



NO.	definition	Level/V	NO.	definition	Level/V
1	VCC5V0_SYS (5V Output)	5.0V	16	MIPI_DSI_TX1_D0P	-
2	VCC5V0_SYS (5V Output)	5.0V	17	MIPI_DSI_TX1_D0N	-
3	VCC5V0_SYS (5V Output)	5.0V	18	GND	
4	GND		19	MIPI_DSI_TX1_D1P	-

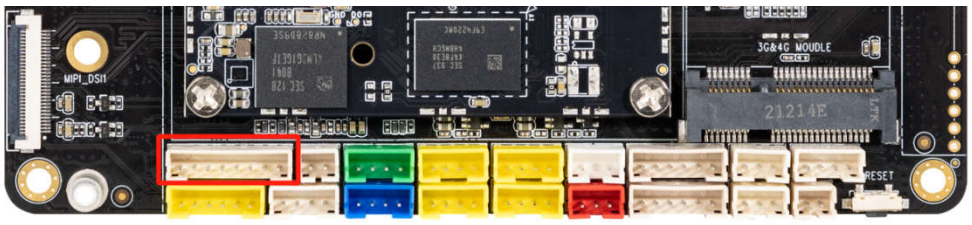
5	I2C_ID【Input, 10K pull-down on board】	3.3V	20	MIPI_DSI_TX1_D1N	-
6	VCC3V3_SYS （3.3V Output）	3.3V	21	GND	
7	I2C2_SDA_M0 【The core board has been pull-up resistor 2.2K】	3.3V	22	MIPI_DSI_TX1_CLKP	-
8	I2C2_SCL_M0 【The core board has been pull-up resistor 2.2K】	3.3V	23	MIPI_DSI_TX1_CLKN	-
9	LCD_PWR_EN （GPIO0_A6_d）	3.3V	24	GND	
10	TP_INT (GPIO0_A5_d)	3.3V	25	MIPI_DSI_TX1_D2P	-
11	BL_EN (GPIO0_A0_d)	3.3V	26	MIPI_DSI_TX1_D2N	-
12	LCD0_BL_PWM0_M1 (PWM0_M1/GPIO0_C7_d)	3.3V	27	GND	
13	LCD1_RST_L (GPIO3_D3_d) 【Pull up resistance on mainboard 4.7K】	3.3V	28	MIPI_DSI_TX1_D3P	-
14	TP1_RST_L (GPIO3_C7_d) 【Pull up resistance on mainboard 4.7K】	3.3V	29	MIPI_DSI_TX1_D3N	-
15	GND		30	GND	

6. (J41)SATA 3.0 20PIN FPC 0.5mm Pitch



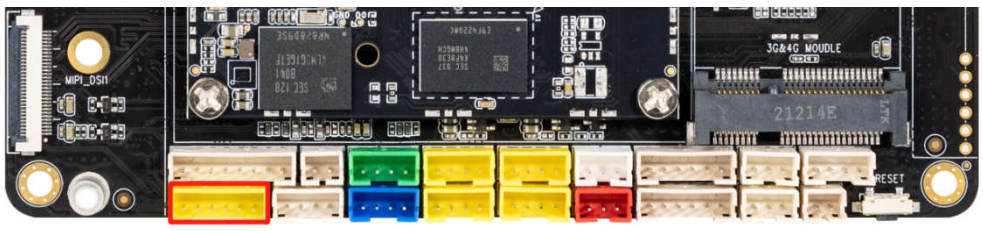
NO.	definition	Level/V	NO.	definition	Level/V
1	GND		11	VCC5V0_SYS (5V Output)	5.0V
2	PCIE20_TXP/SATA2_TXP 【On board series capacitance 0.1uF】	-	12	VCC5V0_SYS (5V Output)	5.0V
3	PCIE20_TXN/SATA2_TXN 【On board series capacitance 0.1uF】	-	13	VCC5V0_SYS (5V Output)	5.0V
4	GND		14	VCC5V0_SYS (5V Output)	5.0V
5	PCIE20_RXN/SATA2_RXN 【On board series capacitance 0.1uF】	-	15	GND	
6	PCIE20_RXP/SATA2_RXP 【On board series capacitance 0.1uF】	-	16	GND	
7	GND		17	GND	
8	SATA2_ACT_LED (GPIO4_C4_d)	3.3V	18	DC_12V (12V Output)	12V
9	GND		19	DC_12V (12V Output)	12V
10	GND		20	DC_12V (12V Output)	12V

7. (J27)POWER 8 PIN 2.0mm Pitch wafer (WHITE)



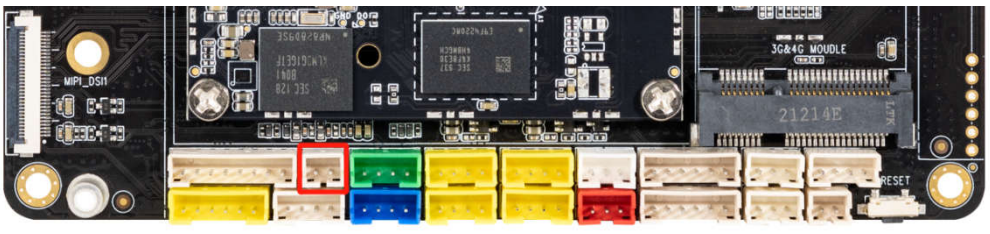
NO.	definition	Level/V	NO.	definition	Level/V
1	DC_12V (12V Output)	12V	5	VCC_3V3 (3.3V Output)	3.3V
2	DC_12V (12V Output)	12V	6	GND	
3	GND		7	VCC5V0_SYS (5V Output)	5.0V
4	GND		8	GND	

8. (J21)TP 6 PIN 2.0mm Pitch wafer (YELLOW)



NO.	definition	Level/V	NO.	definition	Level/V
1	VCC3V3_TP (3.3V Output)	3.3V	4	I2C2_SCL_M0 【Core board pull-up resistor 2.2K】	3.3V
2	EDP_TP_INT （GPIO4_A2_d）【Pull up resistance on mainboard 4.7K】	3.3V	5	I2C2_SDA_M0 【Core board pull-up resistor 2.2K】	3.3V
3	EDP_TP_RESET（GPIO4_A3_d）【Pull up resistance on mainboard 4.7K】	3.3V	6	GND	

9. (J15)Mini Speaker 2 PIN 2.0mm Pitch wafer



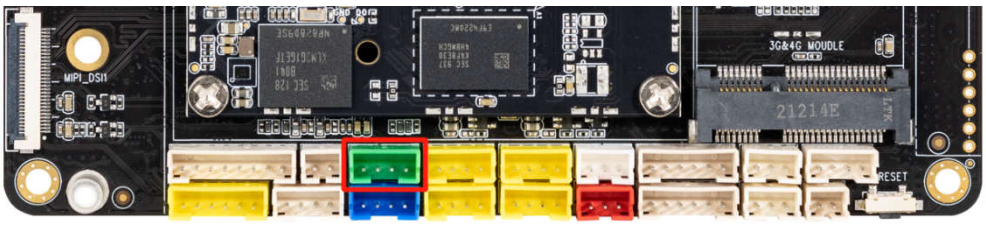
NO.	definition	Level/V	NO.	definition	Level/V
1	SPK_OUT_P 【RK809 Power amplifier output】	5V	4	SPK_OUT_N 【RK809 Power amplifier output】	5V

10. (J26) I2C 4 PIN 2.0mm Pitch wafer

NO.	definition	Level/V	NO.	definition	Level/V

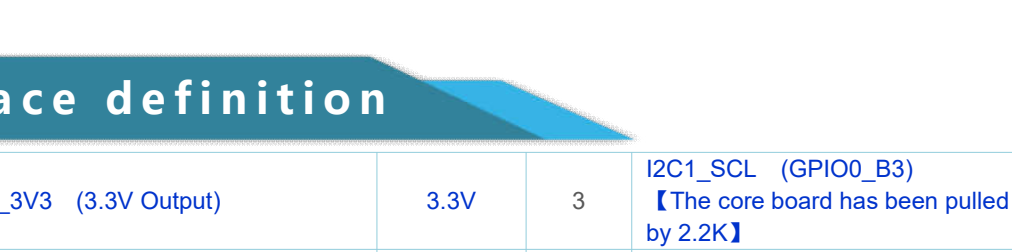
1	VCC_3V3 (3.3V Output)	3.3V	3	I2C1_SCL (GPIO0_B3) 【The core board has been pulled up by 2.2K】	3.3V
2	I2C1_SDA (GPIO0_B4) 【The core board has been pulled up by 2.2K】	3.3V	4	GND	

11. (J35)SPEAKER 4 PIN 2.0mm Pitch wafer (GREEN)



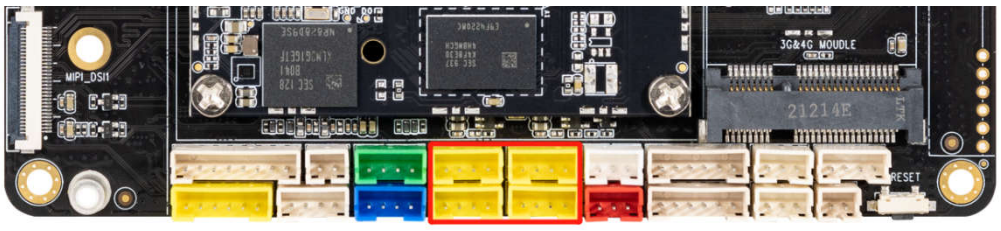
NO.	definition	Level/V	NO.	definition	Level/V
1	SPK_RP【Right channel output of power amplifier】	12V	3	SPK_LP【Left channel output of power amplifier】	12V
2	SPK_RN【Right channel output of power amplifier】	12V	4	SPK_LN【Left channel output of power amplifier】	12V

12. (J29) UART 4 PIN 2.0mm Pitch wafer (BLUE)



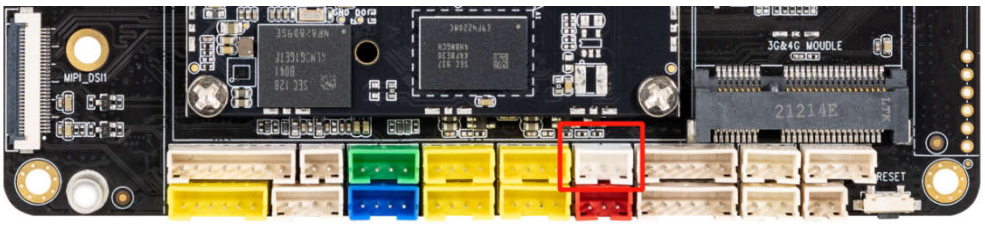
NO.	definition	Level/V	NO.	definition	Level/V
1	GND		3	UART3_TX_M0/ I2C3_SCL_M0/GPIO1_A1_u 【2.2K pulled up on the core board】	3.3V
2	UART3_RX_M0/ I2C3_SDA_M0/GPIO1_A0_u 【2.2K pulled up on the core board】	3.3V	4	VCC_3V3 (3.3V Output)	3.3V

13. (J7,J8,J9,J10)USB_HOST 4 PIN 2.0mm Pitch wafer (YELLOW)



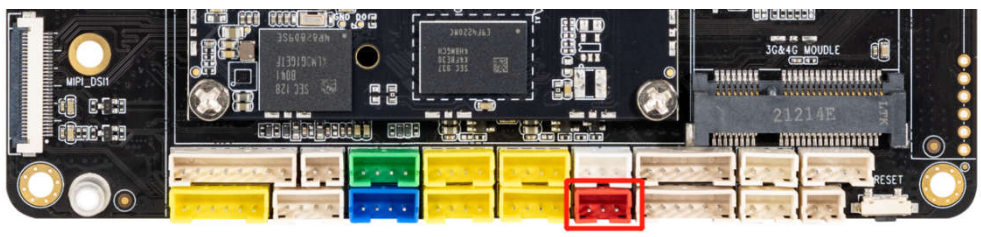
NO.	definition	Level/V	NO.	definition	Level/V
1	GND		3	HUB_USB_DM	-
2	HUB_USB_DP	-	4	VCC5V0_HOST (5V Output)	5.0V

14. (J31)RS485 3PIN 2.0 mm Pitch wafer (WHITE)



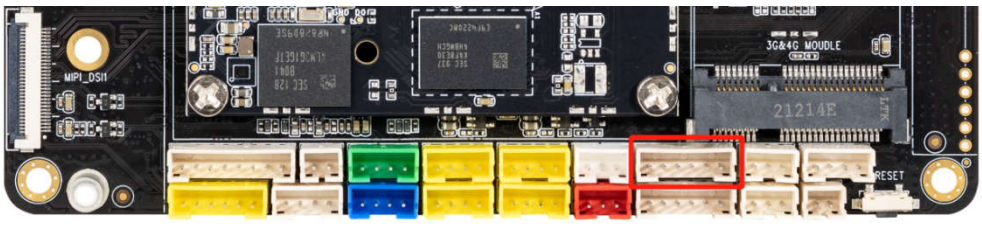
NO.	definition	Level/V	NO.	definition	Level/V
1	GND		3	RS485_B	-
2	RS485_A	-	4		

15. (J30)RS232 3PIN 2.0 mm Pitch wafer (RED)



NO.	definition	Level/V	NO.	definition	Level/V
1	GND		3	RS232_TX	+/-15V
2	RS232_RX	+/-15V			

16. (J42)SPI 6 PIN 2.0mm Pitch wafer

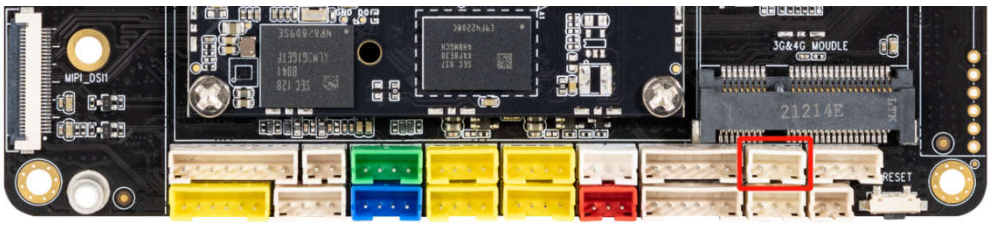


NO.	definition	Level/V	NO.	definition	Level/V
1	VCC_3V3 (3.3V Output)	3.3V	4	SPI1_MISO_M1/UART5_TX (GPIO3_C2_d)	3.3V
2	SPI1_CLK_M1/UART5_RX （GPIO3_C3_d）	3.3V	5	SPI1_MOSI_M1 （GPIO3_C1_d）	3.3V
3	SPI1_CS0_M1 （GPIO3_A1_d）	3.3V	6	GND	

17. (J25)GPIO 6 PIN 2.0mm Pitch wafer

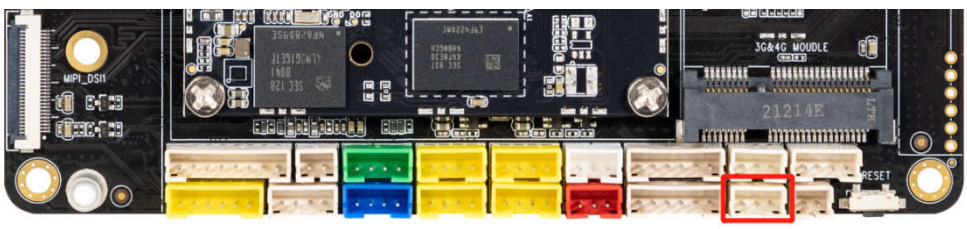
NO.	definition	Level/V	NO.	definition	Level/V
1	VCC_3V3 (3.3V Output)	3.3V	4	GPIO3_D6_d	1.8V
2	ADC3 Input	1.8V	5	GPIO3_D7_d	1.8V
3	GPIO4_A0_d	1.8V	6	GND	

18. (J36)DEBUG 3 PIN 2.0mm Pitch wafer



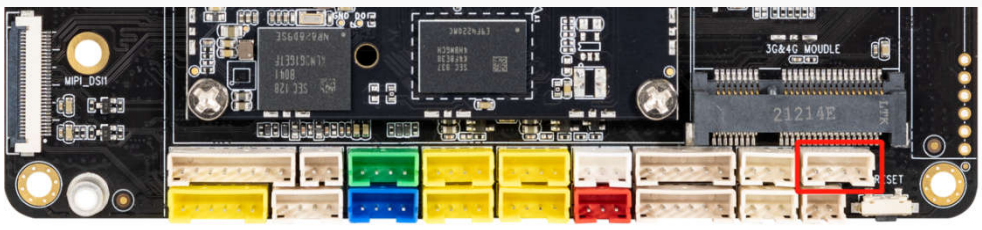
NO.	definition	Level/V	NO.	definition	Level/V
1	UART2_RXD 【Debug】	3.3V	3	GND	
2	UART2_TXD 【Debug】	3.3V			

19. (J39)IR 3 PIN 2.0mm Pitch wafer



NO.	definition	Level/V	NO.	definition	Level/V
1	VCC_IR (3.3V Output)	3.3V	3	PWM7_IR (IR Input，Active L)（GPIO0_C6_d---Pull up 10K on the board)）	3.3V
2	GND				

20. (J37) KEY 4 PIN 2.0mm Pitch wafer

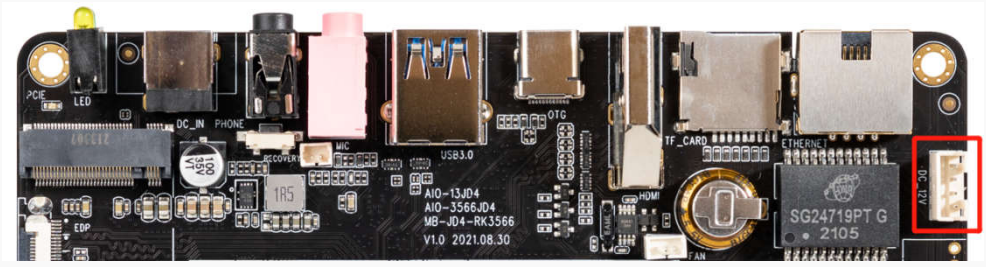


NO.	definition	Level/V	NO.	definition	Level/V
1	ADC1 Input	1.8V	3	RESET_KEY (System Input,Active L)【System Reset】	3.3V
2	ADC0 Input (RECOVER_KEY)	1.8V	4	GND	

21. (J38)POWER KEY 4 PIN 2.0mm Pitch wafer

NO.	definition	Level/V	NO.	definition	Level/V
1	GND		2	PMIC_PWRON (Power Key Input, ,Active L)【Connect to RK809】	3.3V

22. (J4) 12V 4 PIN 2.0mm Pitch wafer



NO.	definition	Level/V	NO.	definition	Level/V
1	DC_12V (12V Input)	12V	3	GND	
2	DC_12V (12V Input)	12V	4	GND	

T-CHIP TECHNOLOGY

Create Value for Customers
Pursue Sustainable Development

About us

T-CHIP focuses on R&D, design, production and sale of open source intelligent hardware, AI, IoT and audio product, and provides the whole solution of intelligent hardware products. T-CHIP is a Independent Design House officially authorized by RockChip and its strategic partner. We have been working closely with RockChip and contributing to embedded electronic industry for over 15 years. “Create Value for Customers, Pursue Sustainable Development” is our philosophy. We hope to achieve win-win development and move together for a shared future

Our Brands

Firefly

Firefly is an open source brand in 2014. “Make technology more simple, Make life more intelligent” is its philosophy. We promote intelligent upgrades in the industries of new technology, intelligent hardware, AI, AIOT, and digital audio product, and build a more open and professional platform for intelligent hardware technology

Stationpc

Station PC is a new brand in 2020, consisting of the core geek members. We create entertainment products for new generation of people with innovative spirit through exploration of pan-entertainment. “More Entertainment, More Free Creation” is its philosophy. We aim at making everyone enjoy themselves and awakening interesting souls with more extreme product experience

Website: www.t-firefly.com
E-mail: sales@t-firefly.com
Service: service@t-firefly.com
PostCode: 528400
Telphone: (86)186 8811 7175 400-151-1533
Address: 2101, Hongyu Building, #57 Zhongshan 4Rd, Zhongshan, Guangdong