

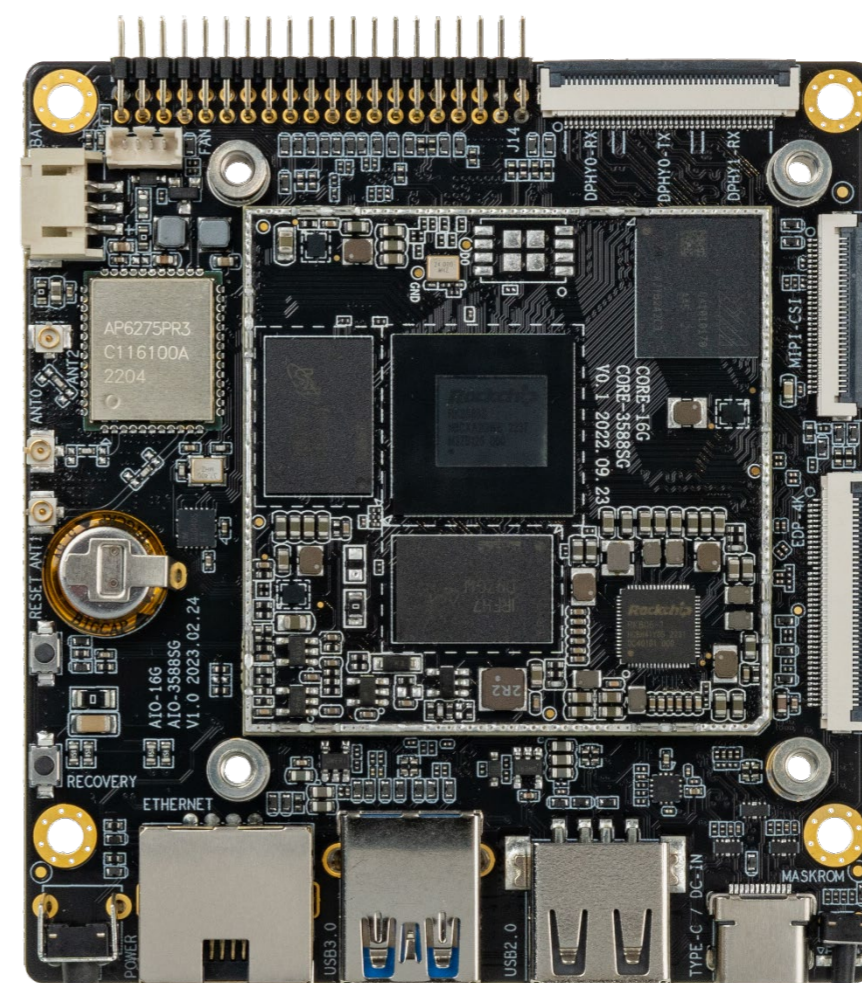


8核 \$*, //J >

八核 8K 人工智能主板

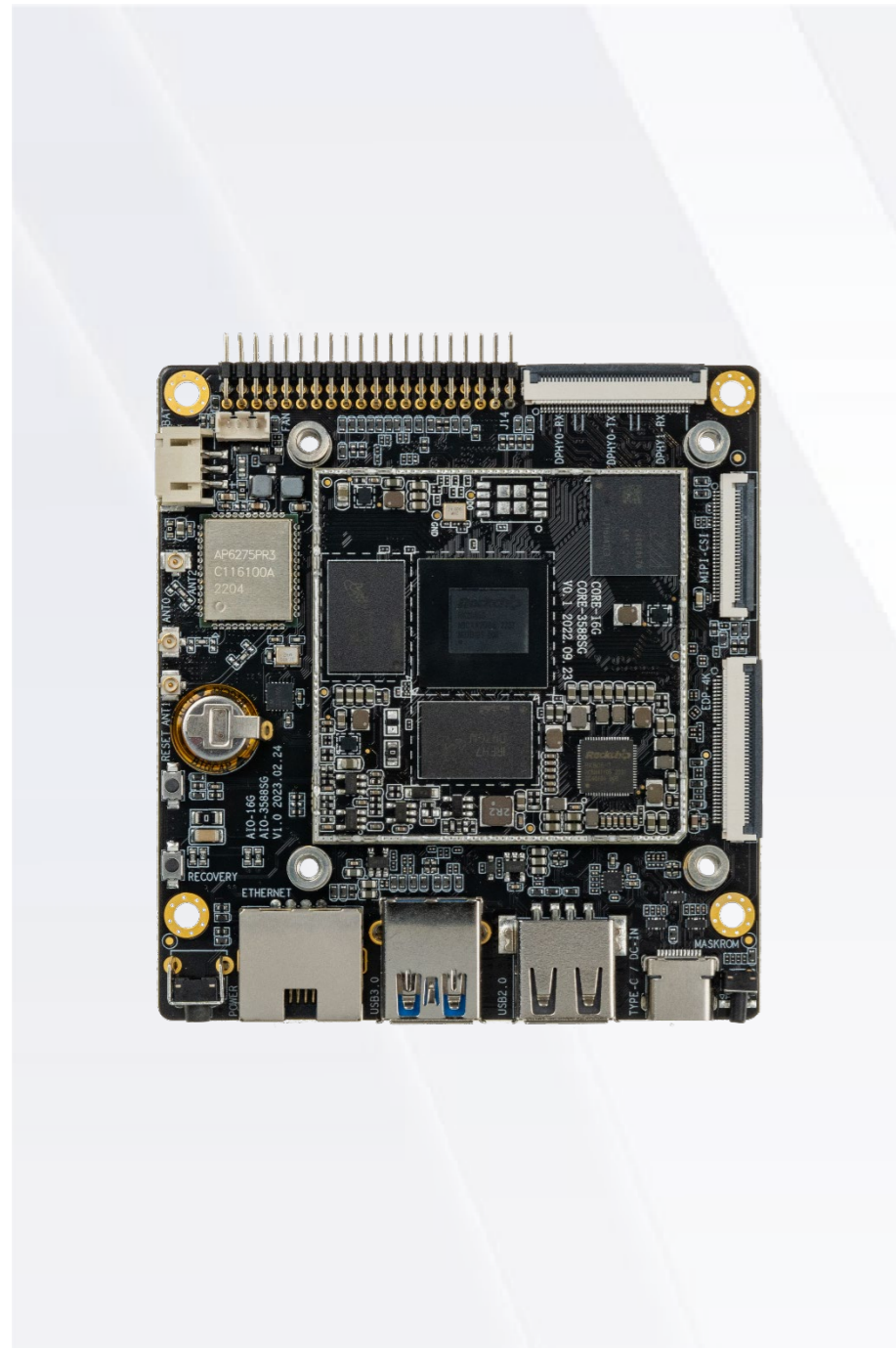
V1.0 2024-2-18

天启智能科技



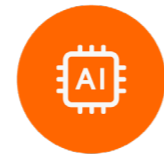


产品特点 Product features



新一代高端处理器

八核64位处理器RK3588S
主频高达2.4GHz, 采用8nm工艺



集成GPU/VPU/NPU

8K@60fps H.265/VP9 视频解码
8K@30fps H.265/H.264视频编码
6TOPS 算力 NPU



支持多种操作系统

Android、Ubuntu
Debian11、Buildroot、RTLinux
麒麟 Linux



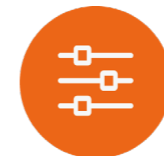
可高配32GB大内存

最高可配32GB内存容量
支持LPDDR4/LPDDR4x/LPDDR5



强大的网络通讯功能

支持千兆（1000Mbps）以太网
2.4G/5G Hz双频WiFi6
蓝牙 5.0



丰富的扩展接口

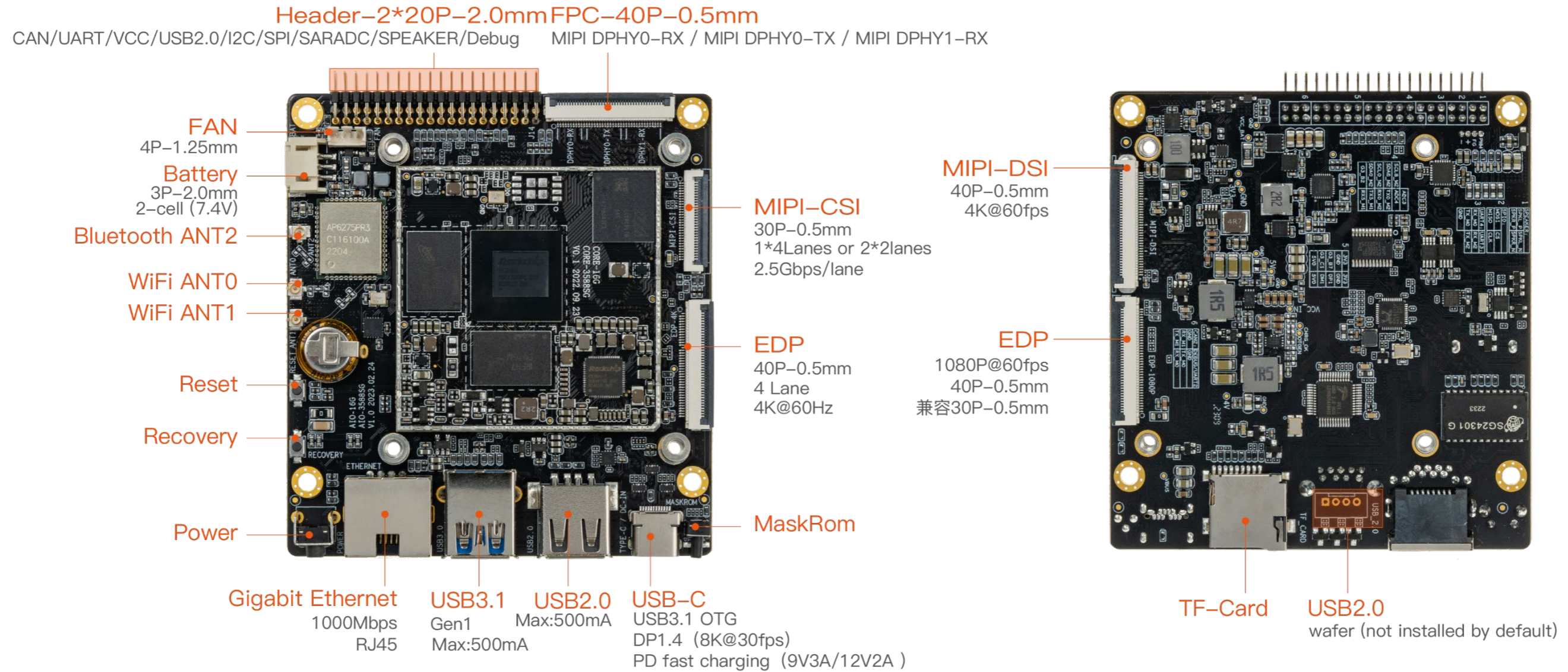
EDP、MIPI-CSI、MIPI-DSI、USB3.1、USB2.0、Gigabit、Ethernet*1、CAN、UART、VCC、I2C、SPI、SARADC



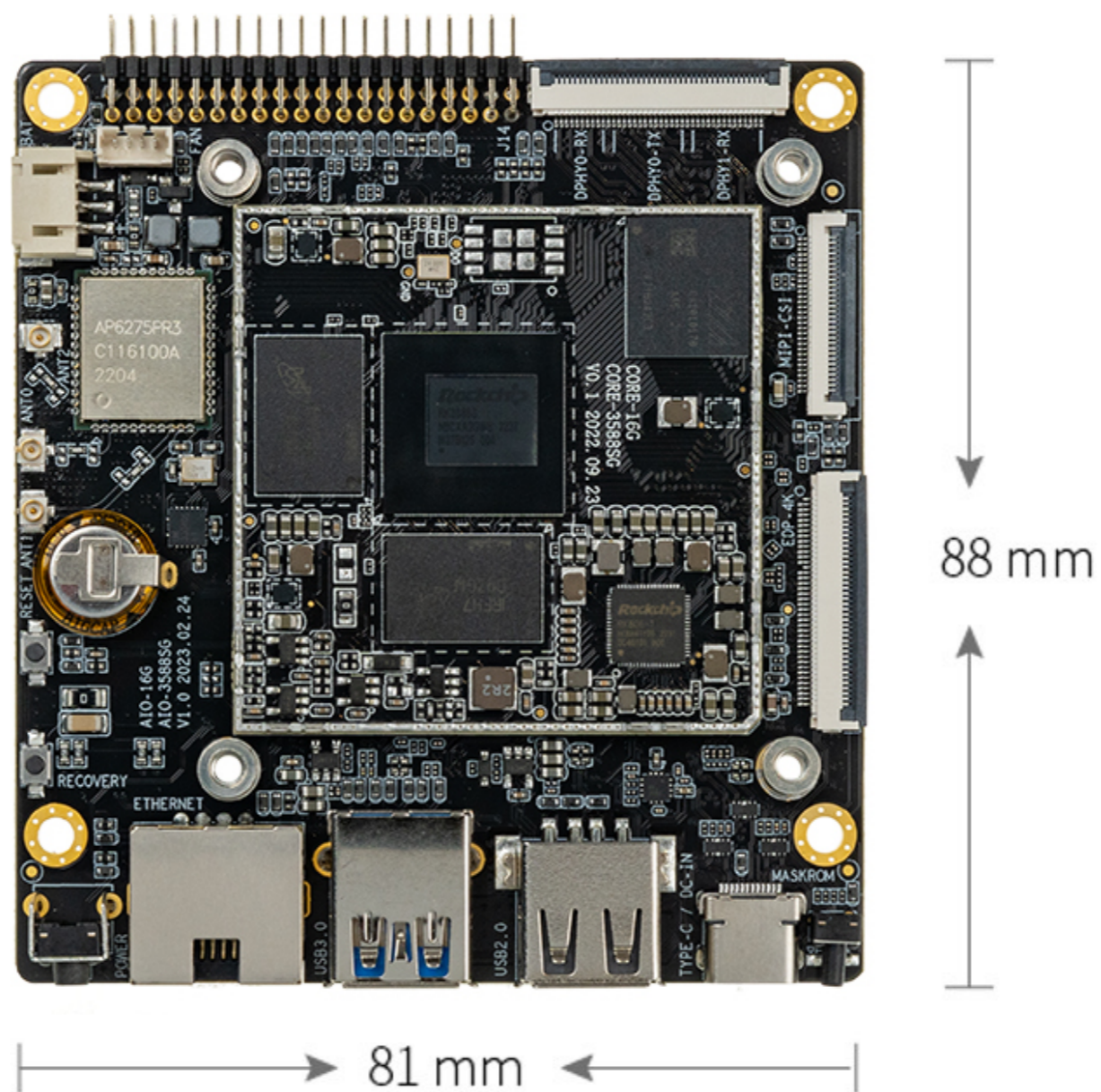
规格参数 Specifications

类 型	主要参数
SOC	RK3588S
CPU	八核64位 (4*Cortex-A76+4*Cortex-A55) , 8nm 先进工艺, 主频高达2.4GHz
GPU	ARM Mali-G610 MP4四核GPU, 支持 OpenGL ES3.2 / OpenCL 2.2 / Vulkan1.1, 450 GFLOPS
NPU	6 TOPS, 支持INT4/INT8/INT16混合运算, 可实现基于TensorFlow / MXNet / PyTorch / Caffe等系列框架的网络模型转换
编解码	视频解码: 8K@60fps H.265/VP9/AVS2、8K@30fps H.264 AVC/MVC、4K@60fps AV1、1080P@60fps MPEG-2/-1/VC-1/VP8 视频编码: 8K@30fps编码, 支持H.265 / H.264
内存	4GB/8GB/16GB (最高可配32GB) 64bit LPDDR4/LPDDR4x/LPDDR5
存储	16GB/32GB/64GB/128GB/256GB eMMC
以太网	千兆以太网(1000Mbps) * 1
无线网	2.4G/5GHz 双频WiFi6, 802.11 a/b/g/n/ac/ax、Bluetooth5.0
视频输出	1 * MIPI-DSI (up to 4K@60fps) 、 1 * DP1.4 (up to 8K@30fps) 、 1 * eDP1.3(2 Lane /up to 4K@60Hz) 、 * 最高可以实现三屏异显
视频输入	1* MIPI-CSI (30P-0.5mm, 1*4Lane 或2*2lanes, 2.5Gbps/lane)
音频	1*DP1.4音频输出、1*Speaker (由Header-40P-2.0mm引出4Pin)
USB	1 * USB3.1 (Gen1) 、 2 * USB2.0 (其中一个由Header-40P-2.0mm引出4Pin) 、 1 * USB-C (DP1.4(8K@30fps)/OTG/PD fast charging)
其它接口	Header-40P-2.0mm (CAN/UART/VCC/USB2.0/I2C/SPI/SARADC/SPEAKER/Debug) FPC-40P-0.5mm (DPHY0-RX/DPHY0-TX/DPHY1-RX)
电源	DC 9-36V/2.5A以上 (推荐使用PD电源适配器)
系统	Android 12.0、Ubuntu、Debian11、Buildroot、RTLinux、麒麟Linux
尺寸	88mm * 81mm
重量	约71克
功耗	Max: 15.6w(12V/1.3A) Normal: 5w (12V/0.42A) Mini:0.18w (12V/15mA)
环境	工作温度: -20°C ~ 60°C, 存储温度: -20°C ~ 70°C, 工作湿度: 10% ~ 90%RH (无凝露)

接口描述 Interface description



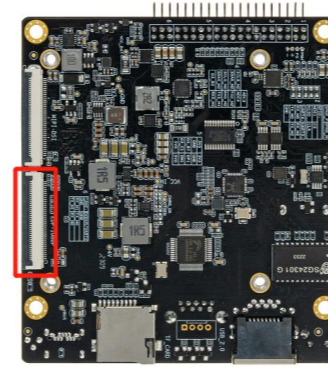
产品尺寸 Dimension





接口定义 Interface Definition

1. (J5)EDP 40 PIN 0.5mm 间距 (白色)



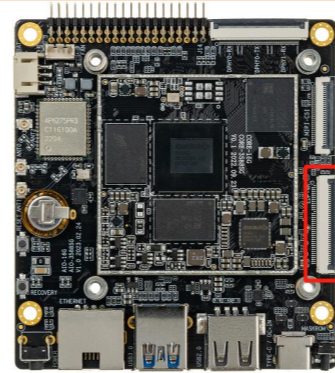
序号	定义	电平/V	序号	定义	电平/V
1	NC		21	GND	
2	GND		22	EDP_BL_EN (pull down resistance 10K)	3.3V
3	EDP_TX_D1N (series capacitor 100nF)	-	23	EDP_BL_PWM14_M1(pull up resistance 10K)	3.3V
4	EDP_TX_D1P (series capacitor 100nF)	-	24	NC	
5	GND		25	NC	
6	EDP_TX_D0N (series capacitor 100nF)	-	26	VCC_EDP (5V Output)	5V
7	EDP_TX_D0P (series capacitor 100nF)	-	27	VCC_EDP (5V Output)	5V
8	GND		28	VCC_EDP (5V Output)	5V
9	EDP_AUXP (series capacitor 100nF)	-	29	VCC_EDP (5V Output)	5V
10	EDP_AUXN (series capacitor 100nF)	-	30	NC	
11	GND		31	HUB_HOST_DM3	-
12	VCC3V3_EDP (3.3V Output)	3.3V	32	HUB_HOST_DP3	-
13	VCC3V3_EDP (3.3V Output)	3.3V	33	GND	
14	NC		34	VCC3V3_EDP (3.3V Output)	3.3V
15	GND		35	VCC3V3_EDP (3.3V Output)	3.3V
16	GND		36	EDP_TP_EN (from PCA9555)	3.3V
17	EDP_HPDI_M1 (series resistor 1K)	1.8V	37	I2C6_SCL_M3 (pull up resistance 2.2K)	3.3V



接口定义 Interface Definition

18	GND		38	I2C6_SDA_M3 (pull up resistance 2.2K)	3.3V
19	GND		39	EDP_TP_INT	3.3V
20	GND		40	EDP_TP_RST (from PCA9555)	3.3V

2. (J22)EDP 40 PIN 0.5mm 间距 (白色)



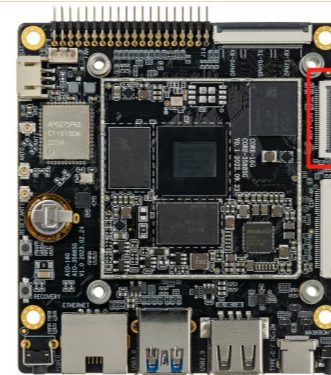
序号	定义	电平/V	序号	定义	电平/V
1	NC		21	VCC3V3_EDP (3.3V Output)	3.3V
2	GND		22	NC	
3	EDP_TX_D3N (series capacitor 100nF)	-	23	GND	
4	EDP_TX_D3P (series capacitor 100nF)	-	24	GND	
5	GND		25	GND	
6	EDP_TX_D2N (series capacitor 100nF)	-	26	GND	
7	EDP_TX_D2P (series capacitor 100nF)	-	27	EDP_HPDIN_M1 (series resistor 1K)	1.8V
8	GND		28	GND	
9	EDP_TX_D1N (series capacitor 100nF)	-	29	GND	
10	EDP_TX_D1P (series capacitor 100nF)	-	30	GND	
11	GND		31	GND	
12	EDP_TX_D0N (series capacitor 100nF)	-	32	EDP_BL_EN (pull down resistance 10K)	3.3V
13	EDP_TX_D0P (series capacitor 100nF)	-	33	EDP_BL_PWM14_M1(pull up resistance 10K)	3.3V



接口定义 Interface Definition

14	NC		34	NC	
15	EDP_AUXP (series capacitor 100nF)	-	35	NC	
16	EDP_AUXN (series capacitor 100nF)	-	36	VCC_EDP (5V Output)	5V
17	GND		37	VCC_EDP (5V Output)	5V
18	VCC3V3_EDP (3.3V Output)	3.3V	38	VCC_EDP (5V Output)	5V
19	VCC3V3_EDP (3.3V Output)	3.3V	39	VCC_EDP (5V Output)	5V
20	VCC3V3_EDP (3.3V Output)	3.3V	40	NC	

3. (J7)Camera MIPI CSI 30 PIN 0.5mm 间距 (白色)



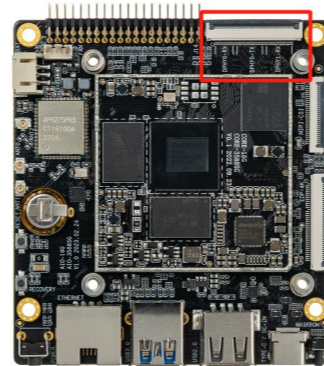
序号	定义	电平/V	序号	定义	电平/V
1	I2C7_SDA_M0_CODEEC (pull up resistance 2.2K)	1.8V	16	GND	
2	I2C7_SCL_M0_CODEEC (pull up resistance 2.2K)	1.8V	17	MIPI_CSI0_RX_CLK0P	-
3	MIPI_CAM1_PDN_L	1.8V	18	MIPI_CSI0_RX_CLK0N	-
4	MIPI_RESET0_CAM	1.8V	19	GND	
5	GND		20	MIPI_CSI0_RX_D2P	-
6	MIPI_MCLK1	1.8V	21	MIPI_CSI0_RX_D2N	-



接口定义 Interface Definition

7	MIPI_CAM2_PDN_L	1.8V	22	GND	
8	MIPI_RESET1_CAM	1.8V	23	MIPI_CSI0_RX_D3P	-
9	MIPI_MCLK2	1.8V	24	MIPI_CSI0_RX_D3N	-
10	GND		25	GND	
11	MIPI_CSI0_RX_D0P	-	26	MIPI_CSI0_RX_CLK1P	-
12	MIPI_CSI0_RX_D0N	-	27	MIPI_CSI0_RX_CLK1N	-
13	GND		28	GND	
14	MIPI_CSI0_RX_D1P	-	29	VCC5V0_SYS (5V Output)	5V
15	MIPI_CSI0_RX_D1N	-	30	VCC5V0_SYS (5V Output)	5V

4. (J19)MIPI D/C 40 PIN 0.5mm 间距 (白色)



序号	定义	电平/V	序号	定义	电平/V
1	MIPI_DPHY0_RX_D3P	-	21	MIPI_DPHY0_TX_D1N/MIPI_CPHY0_TX_TRIO0_C	-
2	MIPI_DPHY0_RX_D3N/MIPI_CPHY0_RX_TRIO2_C	-	22	MIPI_DPHY0_TX_D1P/MIPI_CPHY0_TX_TRIO1_A	-
3	MIPI_DPHY0_RX_D2P/MIPI_CPHY0_RX_TRIO2_B	-	23	GND	
4	MIPI_DPHY0_RX_D2N/MIPI_CPHY0_RX_TRIO2_A	-	24	MIPI_DPHY0_TX_D0N/MIPI_CPHY0_TX_TRIO0_A	-
5	MIPI_DPHY0_RX_CLKP/MIPI_CPHY0_RX_TRIO1_C	-	25	MIPI_DPHY0_TX_D0P/MIPI_CPHY0_TX_TRIO0_B	-
6	MIPI_DPHY0_RX_CLKN/MIPI_CPHY0_RX_TRIO1_B	-	26	GND	



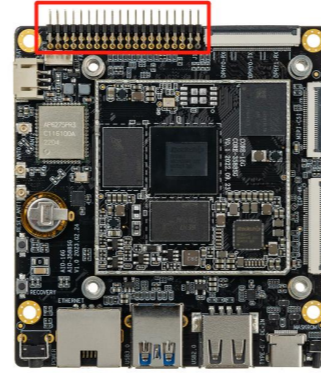
接口定义 Interface Definition

7	MIPI_DPHY0_RX_D1P/MIPI_CPHY0_RX_TRIO1_A	-	27	MIPI_DPHY1_RX_D3P	-
8	MIPI_DPHY0_RX_D1N/MIPI_CPHY0_RX_TRIO0_C	-	28	MIPI_DPHY1_RX_D3N/MIPI_CPHY1_RX_TRIO2_C	-
9	MIPI_DPHY0_RX_D0P/MIPI_CPHY0_RX_TRIO0_B	-	29	GND	
10	MIPI_DPHY0_RX_D0N/MIPI_CPHY0_RX_TRIO0_A	-	30	MIPI_DPHY1_RX_D2P/MIPI_CPHY1_RX_TRIO2_B	-
11	GND		31	MIPI_DPHY1_RX_D2N/MIPI_CPHY1_RX_TRIO2_A	-
12	MIPI_DPHY0_TX_D3N/MIPI_CPHY0_TX_TRIO2_C	-	32	GND	
13	MIPI_DPHY0_TX_D3P	-	33	MIPI_DPHY1_RX_CLKP/MIPI_CPHY1_RX_TRIO1_C	-
14	GND		34	MIPI_DPHY1_RX_CLKN/MIPI_CPHY1_RX_TRIO1_B	-
15	MIPI_DPHY0_TX_D2N/MIPI_CPHY0_TX_TRIO2_A	-	35	GND	
16	MIPI_DPHY0_TX_D2P/MIPI_CPHY0_TX_TRIO2_B	-	36	MIPI_DPHY1_RX_D1P/MIPI_CPHY1_RX_TRIO1_A	-
17	GND		37	MIPI_DPHY1_RX_D1N/MIPI_CPHY1_RX_TRIO0_C	-
18	MIPI_DPHY0_TX_CLKN/MIPI_CPHY0_TX_TRIO1_B	-	38	GND	
19	MIPI_DPHY0_TX_CLKP/MIPI_CPHY0_TX_TRIO1_C	-	39	MIPI_DPHY1_RX_D0P/MIPI_CPHY1_RX_TRIO0_B	-
20	GND		40	MIPI_DPHY1_RX_D0N/MIPI_CPHY1_RX_TRIO0_A	-



接口定义 Interface Definition

5. (J14)20*2 PIN 排针, 2.0mm 间距 (黑色)



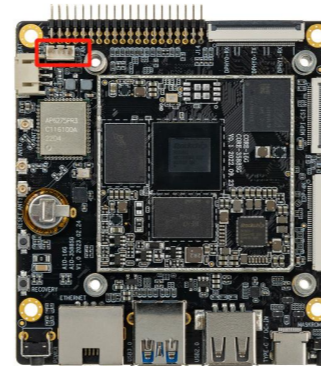
序号	定义	电平/V	序号	定义	电平/V
1	CAN2_TX_M1	1.8V	2	UART2_RX_M0	3.3V
3	CAN2_RX_M1	1.8V	4	UART2_TX_M0	3.3V
5	GND		6	GND	
7	VCC5V0_SYS (5V Output)	5V	8	VCC5V0_SYS (5V Output)	5V
9	GPIO3_C1_D	1.8V	10	USB20_HOST1_DM	-
11	GPIO3_B7_D	1.8V	12	USB20_HOST1_DP	-
13	GND		14	GND	
15	VCC3V3_SYS (3.3V Output)	3.3V	16	VCC3V3_SYS (3.3V Output)	3.3V
17	GPIO3_B2_D	1.8V	18	UART5_RX_M1	1.8V
19	I2C0_SDA_M2 (pull up resistance 2.2K)	1.8V	20	UART5_TX_M1	1.8V
21	I2C0_SCL_M2 (pull up resistance 2.2K)	1.8V	22	UART0_RX_M2	3.3V
23	I2C8_SDA_M2 (pull up resistance 2.2K)	1.8V	24	UART0_TX_M2	3.3V
25	I2C8_SCL_M2 (pull up resistance 2.2K)	1.8V	26	SARADC_VIN4_HP_HOOK	1.8V
27	GND		28	SARADC_VIN3	1.8V
29	UART4_TX_M0	1.8V	30	UART3_TX_M2	3.3V
31	UART4_RX_M0	1.8V	32	UART3_RX_M2	3.3V



接口定义 Interface Definition

33	SPI0_MISO_M2	1.8V	34	SPI0_CLK_M2	1.8V
35	SPI0_MOSI_M2	1.8V	36	SPI0_CS0_M2	1.8V
37	SPEKL_N (2.7W/4Ω, 1.65W/8Ω)	5V	38	SPEKR_N (2.7W/4Ω, 1.65W/8Ω)	5V
39	SPEKL_P (2.7W/4Ω, 1.65W/8Ω)	5V	40	SPEKR_P (2.7W/4Ω, 1.65W/8Ω)	5V

6. (J15)FAN 4 PIN 1.25mm 间距 wafer 座 (白色)

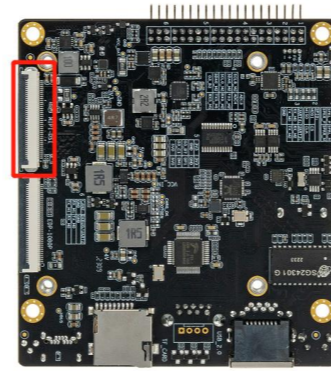


序号	定义	电平/V	序号	定义	电平/V
1	GND		2	VCC5V0_SYS (5V Output)	5V
3	FAN_FG	1.8V	4	PWM1_CONN	1.8V



接口定义 Interface Definition

7. (J18)MIPI DSI 40PIN 0.5mm 间距 (白色)



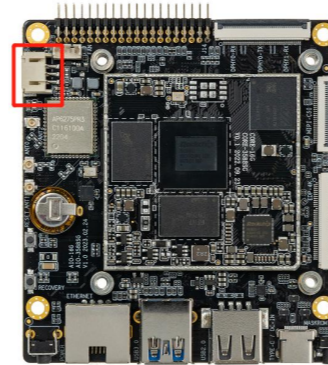
序号	定义	电平/V	序号	定义	电平/V
1	VCC3V3_EDP (3.3V Output)	3.3V	21	MIPI_DPHY1_TX_D3P	-
2	NC		22	GND	
3	TP0_RST_L (pull up resistance 10K)	3.3V	23	NC	
4	TP0_INT_L (pull up resistance 10K)	3.3V	24	NC	
5	I2C6_SDA_M3 (pull up resistance 2.2K)	3.3V	25	LCD0_RST (pull up resistance 10K)	3.3V
6	I2C6_SCL_M3 (pull up resistance 2.2K)	3.3V	26	NC	
7	GND		27	NC	
8	MIPI_DPHY1_TX_D0N	-	28	VCC_LCD1V8 (1.8V Output)	1.8V
9	MIPI_DPHY1_TX_D0P	-	29	NC	
10	GND		30	AVEE_5V5 (-5.5V Output)	-5.5V
11	MIPI_DPHY1_TX_D1N	-	31	AVEE_5V5 (-5.5V Output)	-5.5V
12	MIPI_DPHY1_TX_D1P	-	32	NC	
13	GND		33	AVDD_5V5 (+5.5V Output)	5.5V
14	MIPI_DPHY1_TX_CLKN	-	34	AVDD_5V5 (+5.5V Output)	5.5V
15	MIPI_DPHY1_TX_CLKP	-	35	VCC_LEDK	
16	GND		36	VCC_LEDK	



接口定义 Interface Definition

17	MIPI_DPHY1_TX_D2N	-	37	VCC_LEDK	
18	MIPI_DPHY1_TX_D2P	-	38	VCC_LEDA	36V
19	GND		39	VCC_LEDA	36V
20	MIPI_DPHY1_TX_D3N	-	40	VCC_LEDA	36V

8. (J11)BAT 3 PIN 2.0mm 间距 wafer 座 (白色)



序号	定义	电平/V	序号	定义	电平/V
1	VBAT+	8.4V	2	NTC	
3	VBAT-				



中山市天启智能科技有限公司



联系方式
400-151-1533



官方网址
www.t-firefly.com



公司地址
广东省中山市东区中山四路57号宏宇大厦1座2101