

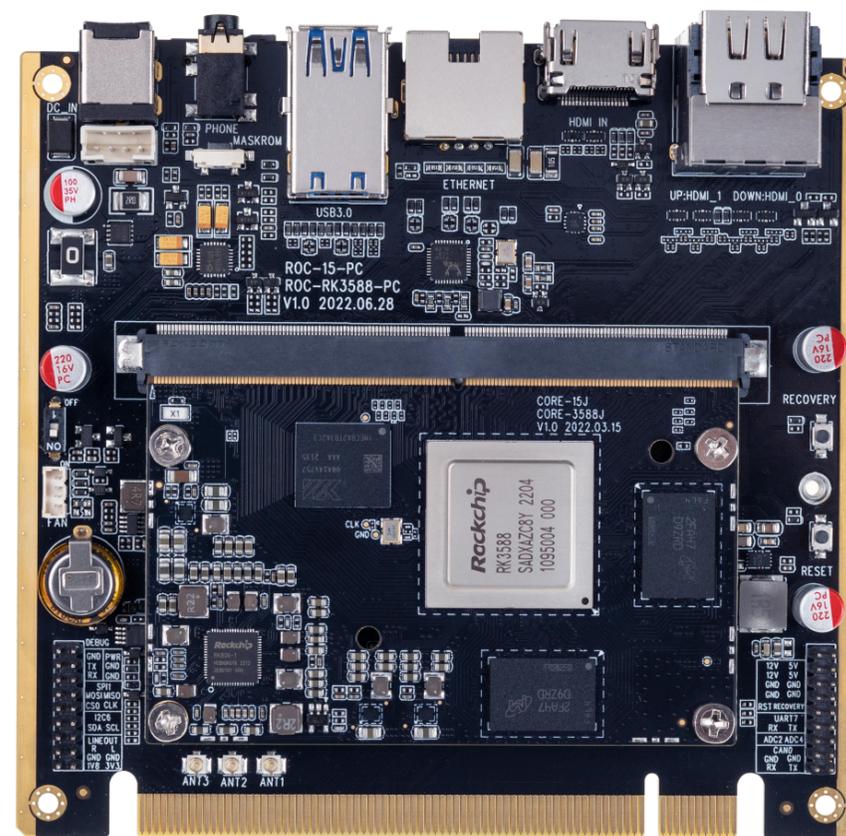


ROC-RK3588-PC

八核8K人工智能开源主板

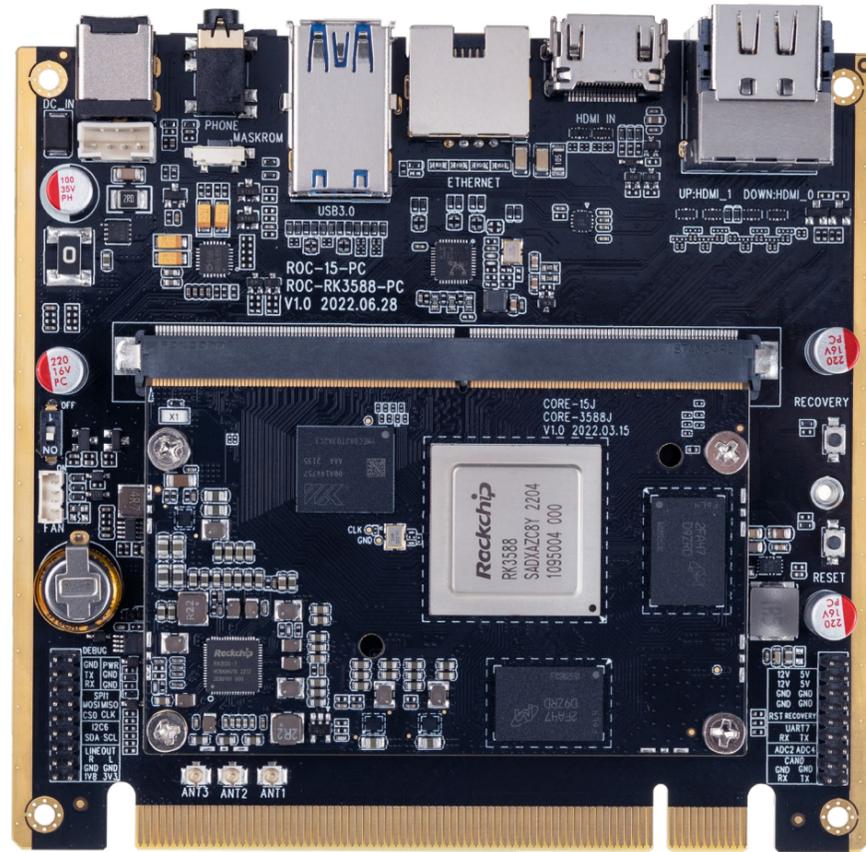
天启智能科技

V1.0





产品特点 Product features



八核64位处理器

八核64位A76+A55 处理器RK3588
采用8nm先进工艺
主频高达2.4GHz，低功耗高性能



集成GPU/VPU/NPU

OpenGL ES3.2/2.0, Vulkan1.1
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 12.0、Ubuntu桌面版和
Server版、Debian11、Buildroot;
支持RTLinux 内核、麒麟、统信等
国产操作系统



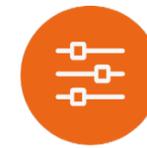
可高配32GB大内存

最高可配32GB内存容量
响应速度更快，可满足对内存要求
高、存储容量大的产品应用需求



强大的网络通讯功能

1路千兆以太网 (RJ45)
2.4G/5G双频WiFi6(802.11 ax)
蓝牙5.0



丰富的扩展接口

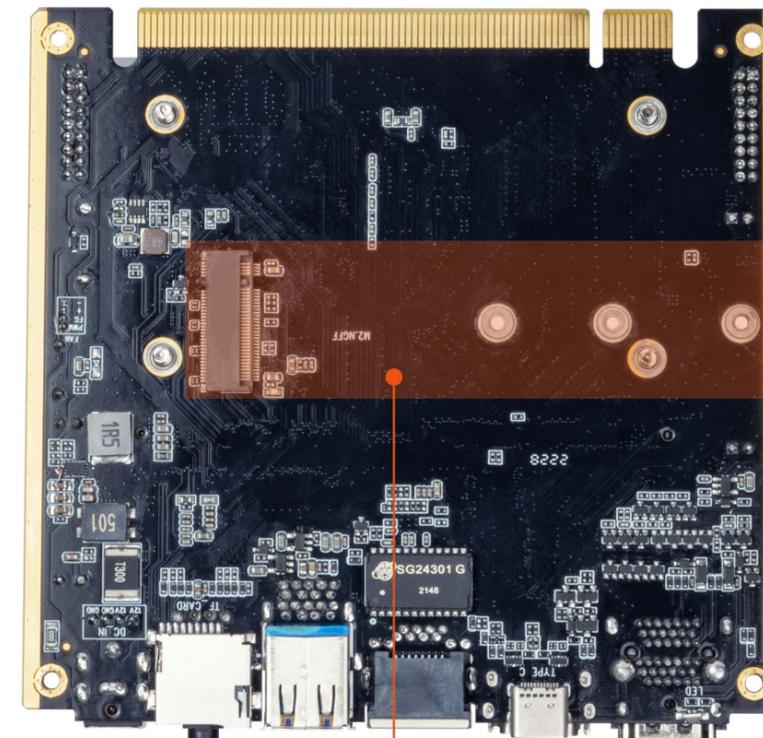
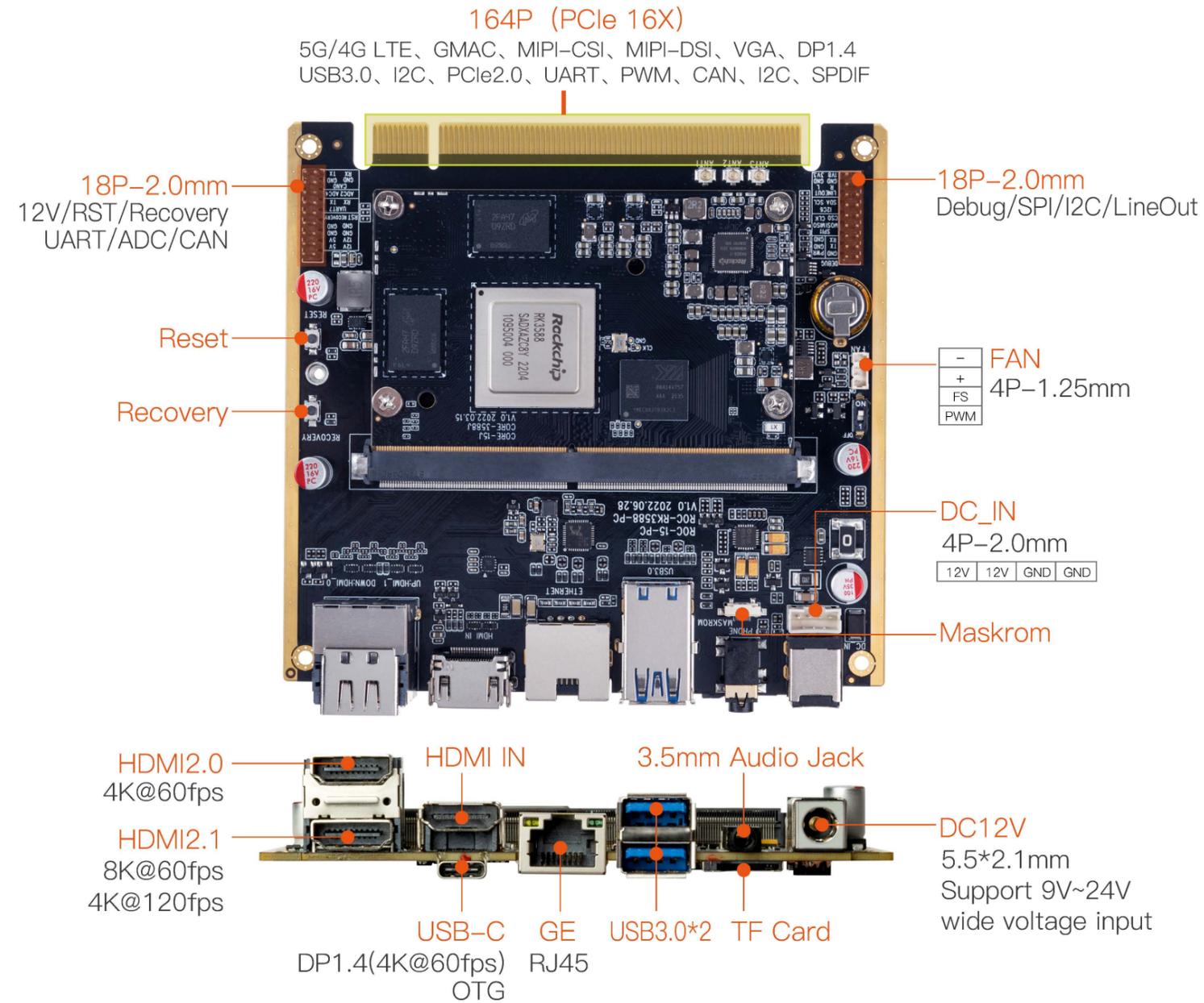
HDMI2.1、HDMI2.0、HDMI-IN、
USB-C (USB3.0、DP1.4)、USB
3.0、PH2.0排针 (UART、ADC、
Debug、SPI、I2C、LINE OUT)

规格参数 Specifications



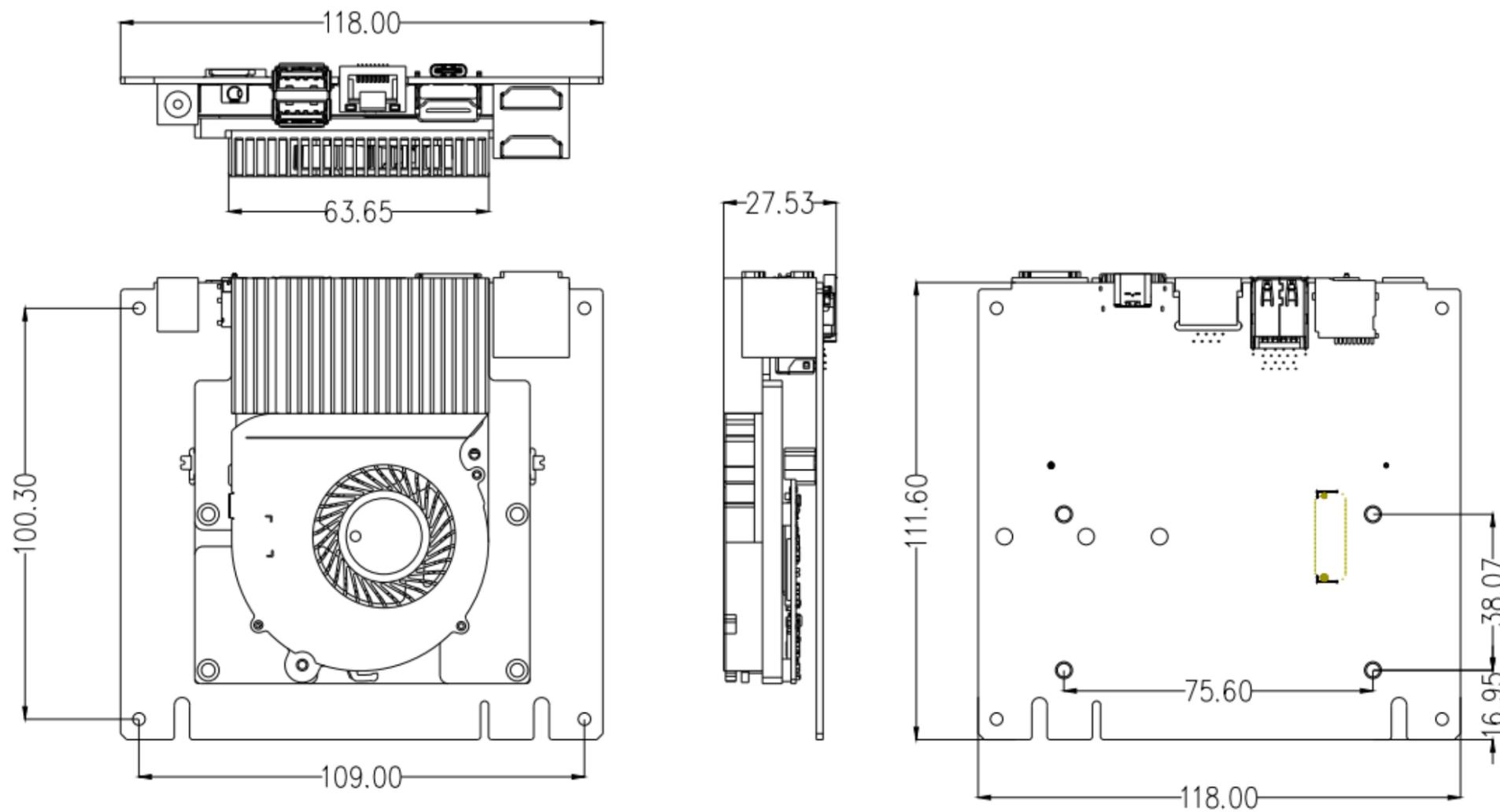
类 型	主要参数
SOC	RK3588
CPU	八核64位 (4xCortex-A76+4xCortex-A55) , 8nm 先进工艺, 主频高达2.4GHz
GPU	ARM Mali-G610 MP4四核GPU, 支持 OpenGL ES3.2 / OpenCL 2.2 / Vulkan1.1, 450 GFLOPS
NPU	NPU算力高达6 TOPS, 支持INT4/INT8/INT16混合运算, 可实现基于TensorFlow / MXNet / PyTorch / Caffe等系列框架的网络模型转换
编解码	视频解码: 8K@60fps H.265/VP9/AVS2、8K@30fps 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 eMMC
扩展存储	1×M.2接口, 可扩展PCIe3.0 NVMe SSD (2242/2260/2280) 、1×TF Card Slot
以太网	1×1000Mbps以太网 (RJ45)
无线网	2.4GHz/5GHz双频WiFi 6 (802.11a/b/g/n/ac/ax) 、蓝牙5.0
显示屏	1×HDMI2.1 (8K@60fps)、1×HDMI2.0 (4K@60fps)、1×DP1.4视频输出接口、1×HDMI IN视频输入接口 *支持双屏异显 (HDMI2.1 (8K) +DP1.4 (4K))
USB	2×USB3.0、1×USB-C (DP1.4/OTG)
扩展接口	标准164P (PCIe 16X) 金手指: 5G/4G LTE、千兆网、MIPI-CSI、MIPI-DSI、VGA、DP1.4、USB3.0、I2C、PCIe2.0、UART、PWM、CAN、I2C、SPDIF PH2.0排针接口: UART、ADC、CAN、Debug、SPI、I2C、LINEOUT
电源	DC 12V (5.5*2.1mm接口, 支持 9V~24V 宽电压输入)
系统	支持Android 12.0、Ubuntu桌面版和Server版、Debian11、Buildroot; 支持RTLinux 内核, 实时性能优秀; 支持麒麟、统信等国产操作系统
尺寸	118mm*111.6mm*27.53mm
功耗	待机功耗: 约1.2W (12V/100mA)、典型功耗: 约8.04W (12V/670mA)、最大功耗: 约14.4W (12V/1200mA)
环境	工作温度: -20°C- 60°C、存储温度: -20°C- 70°C、存储湿度: 10%~80%RH (无凝露)

接口描述 Interface description



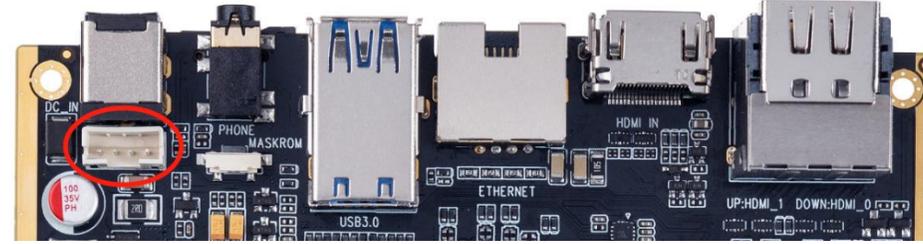
M.2 PCIe3.0
NVMe SSD (2242/2260/2280)

产品尺寸 Dimension



接口定义 Interface definition

1、DC_IN_Interface: 4 PIN 2.0mm 间距(J27)



序号	定义	电平/V	序号	定义	电平/V
1	DC_IN (12.0V Input)	12.0V	3	GND_IN	
2	DC_IN (12.0V Input)	12.0V	4	GND_IN	

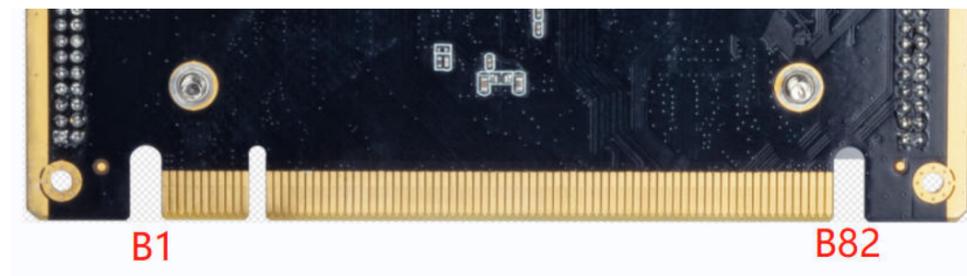
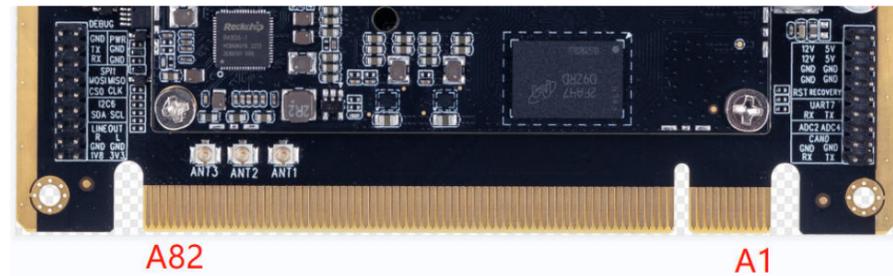
2、FAN_Interface 4 PIN 1.25mm 间距(J13)



序号	定义	电平/V	序号	定义	电平/V
1	GND	5.0V	3	FAN_FG Input	5.0V
2	VCC5V0_SYS (5.0V Output)	5.0V	4	FAN_PWM Output	5.0V

接口定义 Interface definition

3、164 PIN PCI connecting finger_Interface 间距 1.0mm(PCI2)



序号	定义	电平/V	序号	定义	电平/V
A1	VCC5V0_SYS (5.5V Output, Total Max 1.0A)	5.0V	B1	VCC5V0_SYS (5.5V Output, Total Max 1.0A)	5.0V
A2	VCC5V0_SYS (5.5V Output, Total Max 1.0A)	5.0V	B2	VCC5V0_SYS (5.5V Output, Total Max 1.0A)	5.0V
A3	GND		B3	GND	
A4	GND		B4	TYPEC1_SSRX1N	-
A5	USB20_HOST0_DP	-	B5	TYPEC1_SSRX1P	-
A6	USB20_HOST0_DM	-	B6	TYPEC1_SSTX1P	-
A7	TYPEC1_OTG_DM	-	B7	TYPEC1_SSTX1N	-
A8	TYPEC1_OTG_DP	-	B8	DP1_TX2N	-
A9	GND		B9	DP1_TX2P	-
A10	DP1_AUXP	-	B10	DP1_TX3P	-
A11	DP1_AUXN	-	B11	DP1_TX3N	-
A12	TYPEC1_USB20_VBUS_DET	3.3V	B12	DIY_LED	1.8V
A13	TYPEC1_USB20_OTG_ID	1.8V	B13	PWM11_M3	3.3V
A14	GND		B14	UART7_TX_M0 /GPIO2_B5_u	1.8V
A15	MIPI_CAMERA1_CLK_Output/ GPIO1_B6_u	1.8V	B15	UART7_RX_M0 /GPIO2_B4_u	1.8V
A16	MIPI_CAMERA 3_CLK_Output/GPIO1_D6_u	1.8V	B16	MIPI_DPHY1_TX_D0P	-
A17	MIPI_CAMERA2_CLK_Output/GPIO1_B7_u	1.8V	B17	MIPI_DPHY1_TX_D0N	-



接口定义 Interface definition

A18	MIPI_CAM4_CLK_CLK_Output /GPIO1_D7_u	1.8V	B18	MIPI_DPHY1_TX_D1P	-
A19	GND		B19	MIPI_DPHY1_TX_D1N	-
A20	GMAC1_TXER /GPIO3_B2_d	3.3V	B20	MIPI_DPHY1_TX_CLKP	-
A21	GMAC1_PPSTRING /GPIO3_C0_d	3.3V	B21	MIPI_DPHY1_TX_CLKN	-
A22	GMAC1_PPSCCLK /GPIO3_C1_d	3.3V	B22	MIPI_DPHY1_TX_D2P	-
A23	WORK_LED /GPIO2_C3_d	1.8V	B23	MIPI_DPHY1_TX_D2N	-
A24	ADC1_Input /RECOVERY_KEY	1.8V	B24	MIPI_DPHY1_TX_D3P	-
A25	ADC0_Input / BOOT_Mode core board pull up resistance 100K BOOT MODE: FSPI_M2-FSPI_M1-FSPI_M0-EMMC-SD Card-USB	1.8V	B25	MIPI_DPHY1_TX_D3N	-
A26	ADC2_Input	1.8V	B26	GND	
A27	ADC4_Input	1.8V	B27	MIPI_DPHY0_TX_D0P	-
A28	PCIE30X1_2_WAKEN_M0	3.3V	B28	MIPI_DPHY0_TX_D0N	-
A29	CAN1_RX_M1/GPIO4_B2	3.3V	B29	MIPI_DPHY0_TX_D1P	-
A30	CAN1_TX_M1/GPIO4_B3	3.3V	B30	MIPI_DPHY0_TX_D1N	-
A31	ETH1_REFCLKO_25M /GPIO3_A6_d	3.3V	B31	MIPI_DPHY0_TX_CLKP	-
A32	GMAC1_RXD3	3.3V	B32	MIPI_DPHY0_TX_CLKN	-
A33	GMAC1_RXD2	3.3V	B33	MIPI_DPHY0_TX_D2P	-
A34	GMAC1_RXDV_CRS	3.3V	B34	MIPI_DPHY0_TX_D2N	-
A35	GMAC1_RXD1	3.3V	B35	MIPI_DPHY0_TX_D3P	-
A36	GMAC1_RXCLK	3.3V	B36	MIPI_DPHY0_TX_D3N	-
A37	GMAC1_TXD0	3.3V	B37	GND	
A38	GMAC1_RXD0	3.3V	B38	MIPI_CSI0_RX_CLK1P	-
A39	GMAC1_TXCLK	3.3V	B39	MIPI_CSI0_RX_CLK1N	-
A40	GMAC1_TXD1	3.3V	B40	MIPI_CSI0_RX_D3P	-



接口定义 Interface definition

A41	GMAC1_TXEN	3.3V	B41	MIPI_CSI0_RX_D3N	-
A42	GMAC1_TXD2	3.3V	B42	MIPI_CSI0_RX_D2P	-
A43	GMAC1_TXD3	3.3V	B43	MIPI_CSI0_RX_D2N	-
A44	GND		B44	MIPI_CSI0_RX_CLKOP	-
A45	GMAC1_MCLKINOUT	3.3V	B45	MIPI_CSI0_RX_CLKON	-
A46	GMAC1_MDC	3.3V	B46	MIPI_CSI0_RX_D1P	-
A47	GMAC1_MDIO	3.3V	B47	MIPI_CSI0_RX_D1N	-
A48	GMAC1_RSTn_L	3.3V	B48	MIPI_CSI0_RX_D0P	-
A49	GND		B49	MIPI_CSI0_RX_D0N	-
A50	PCIE30X1_2_CLKREQN_M0	3.3V	B50	GND	
A51	SATA0_ACT_LED_M0/PCIE30X4_PERSTn_M1_L	3.3V	B51	PCIE20_0_RXP/SATA30_0_RXP	-
A52	GND		B52	PCIE20_0_RXN/SATA30_0_RXN	-
A53	HUB_USB3_SSRXP	-	B53	PCIE20_0_TXP/SATA30_0_TXP	-
A54	HUB_USB3_SSRXN	-	B54	PCIE20_0_TXN/SATA30_0_TXN	-
A55	HUB_USB3_SSTXP	-	B55	PCIE20_0_REFCLKP	-
A56	HUB_USB3_SSTXN	-	B56	PCIE20_0_REFCLKN	-
A57	HUB_USB3_DM	-	B57	GND	
A58	HUB_USB3_DP	-	B58	HUB_USB4_DP	-
A59	GND		B59	HUB_USB4_DM	-
A60	SPI1_MOSI_M2/I2C7_SDA_M0	1.8V	B60	HUB_USB4_SSRXN	-
A61	SPI1_MISO_M2/I2C7_SCL_M0	1.8V	B61	HUB_USB4_SSRXP	-
A62	SPI1_CS0_M2/UART4_RX_M0/I2C1_SDA_M4	1.8V	B62	HUB_USB4_SSTXN	-
A63	SPI1_CLK_M2/UART4_TX_M0/I2C1_SCL_M4	1.8V	B63	HUB_USB4_SSTXP	-
A64	PWM3_IR_M3/GPIO0_A7	1.8V	B64	I2C0_SDA_M2 (I2C only)	1.8V
A65	I2C6_SCL_M0 /GPIO0_D0_d	1.8V	B65	I2C0_SCL_M2 (I2C only)	1.8V
A66	I2C6_SDA_M0 /GPIO0_C7_d	1.8V	B66	I2C3_SDA_M0 /GPIO1_C0_z	1.8V



接口定义 Interface definition

A67	I2C1_SCL_M2_TP (I2C only)	1.8V	B67	I2C3_SCL_M0 /GPIO1_C1_z	1.8V
A68	I2C1_SDA_M2_TP (I2C only)	1.8V	B68	RESET_L	1.8V
A69	GND		B69	PMIC_EXT_EN_OUT	5.0V
A70	WIFI_ANT0	-	B70	PWRON_L	5.0V
A71	GND		B71	MIC2N_Input (series capacitor 0.1uF)	3.3V
A72	WIFI_ANT1	-	B72	MIC2P_Input (series capacitor 0.1uF)	3.3V
A73	GND		B73	R_Output2 (series capacitor 10uF)	3.3V
A74	BT_ANT	-	B74	L_Output2 (series capacitor 10uF)	3.3V
A75	GND		B75	GND	
A76	VCC3V3_SYS(3.3V Output, Total Max 1.0A)	3.3V	B76	VCC_1V8_S3 (1.8V Output, Total Max 200mA)	1.8V
A77	GND		B77	GND	
A78	GND		B78	GND	
A79	GND		B79	GND	
A80	VCC_12V (12V Output) , Total Max 1.0A	12V	B80	VCC_12V (12V Output) , Total Max 1.0A	12V
A81	VCC_12V (12V Output) , Total Max 1.0A	12V	B81	VCC_12V (12V Output) , Total Max 1.0A	12V
A82	VCC_12V (12V Output) , Total Max 1.0A	12V	B82	VCC_12V (12V Output) , Total Max 1.0A	12V



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