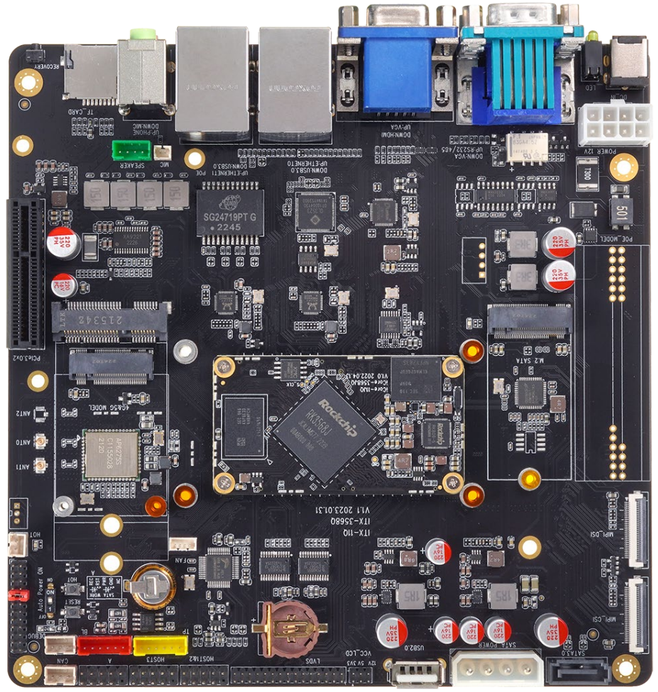
四核ITX标准主板

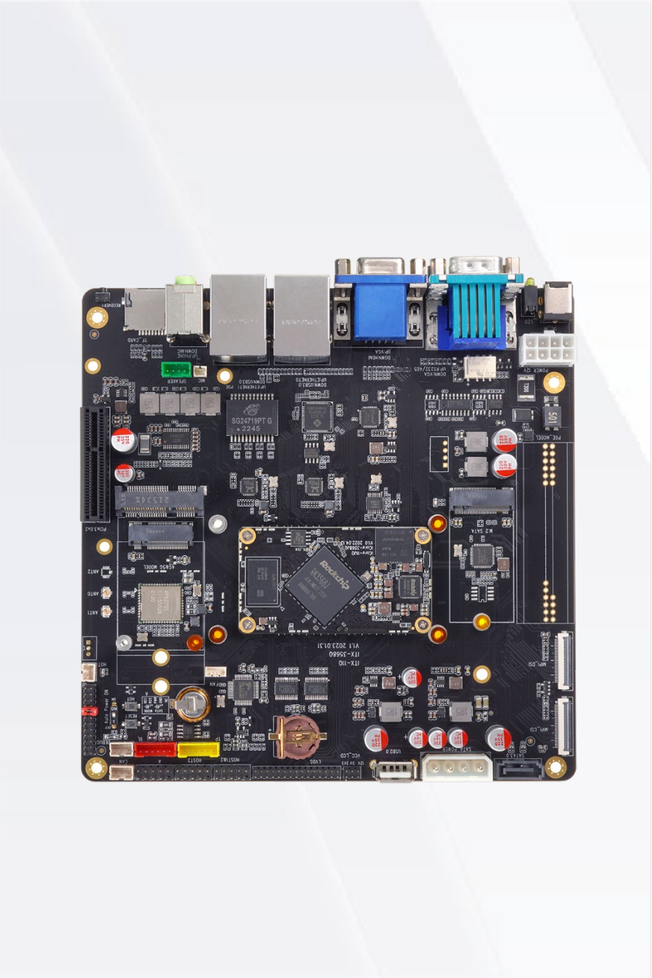
- ITX-3568Q(商用级)
- ITX-3568JQ(工规级)
- ITX-3568MQ(车规级)



V1.1 2024-2-20

天 启 智 能 科 技

产品特点 Product features



四核工业级处理器

四核64位Cortex-A55处理器RK3568J
22nm先进工艺
主频最高2.0GHz

8 G B 大 内 存

最高可配8GB内存容量
32 Bit位宽，频率高达1600MHz
支持全链路ECC

多路视频输入输出

HDMI 2.0/MIPI/LVDS/VGA
最高可以实现三屏异显
集成8M ISP支持HDR/双摄像头

G P U / V P U / N P U

ARM G52 2EE GPU
VPU 4K 60fps H.265/VP9视频解码
NPU算力1Tops

支持多种操作系统

Android 11.0
Ubuntu桌面版/Server版
RTLinux 实时内核

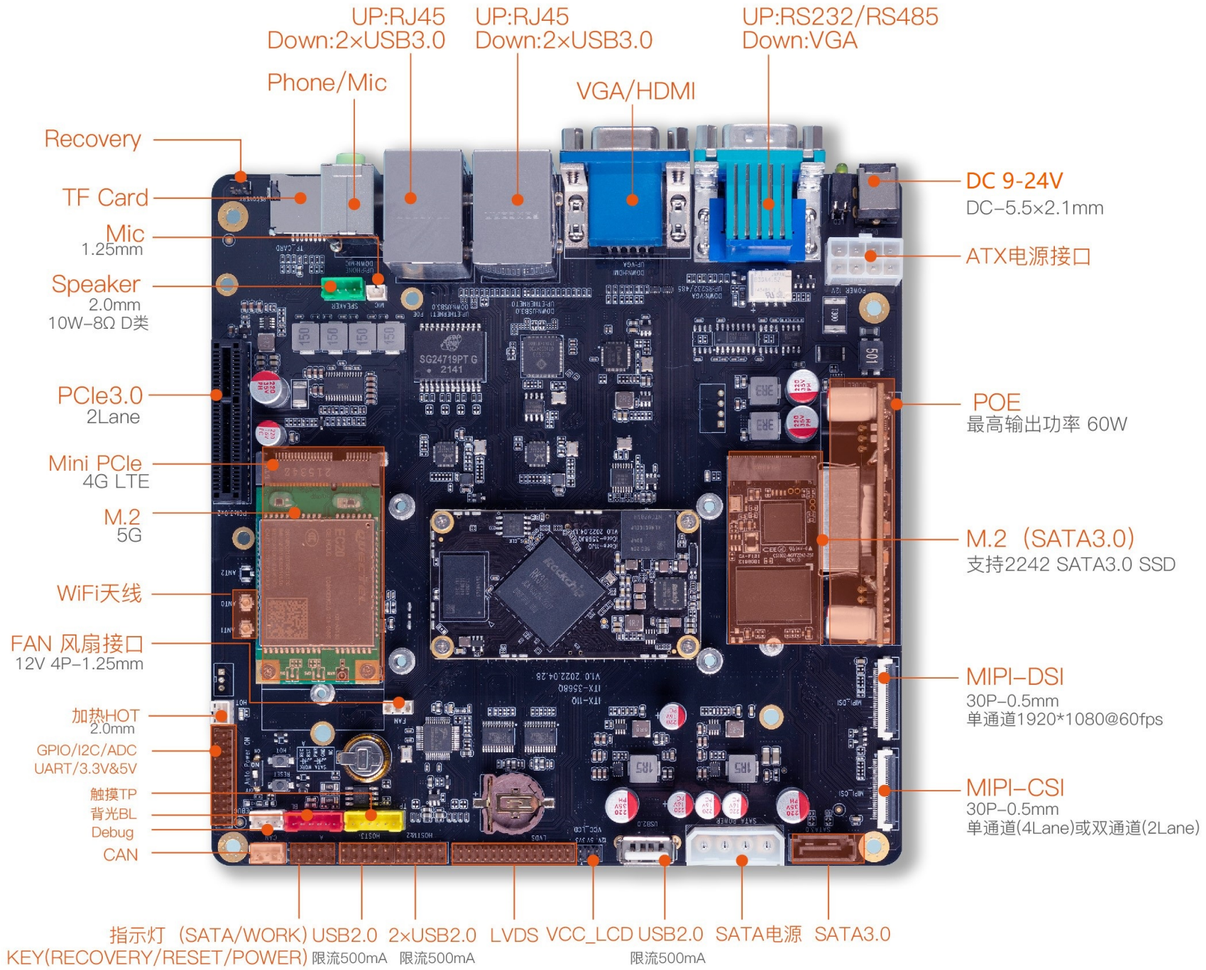
丰富的扩展接口

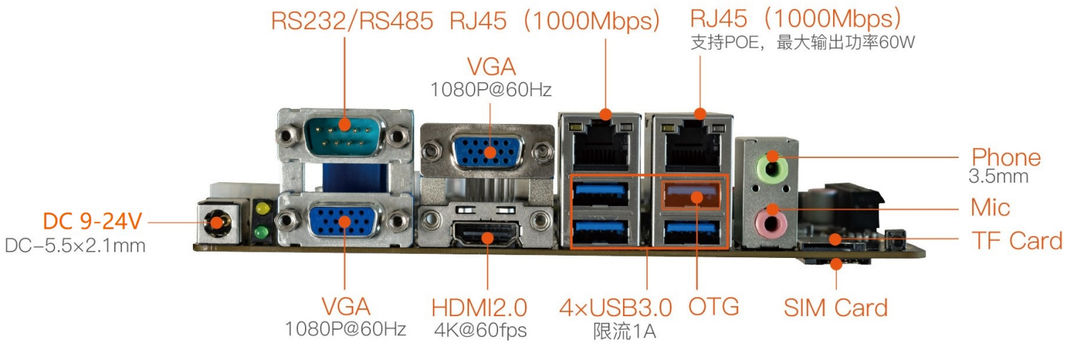
PCIe3.0、SATA、MIPI CSI、MIPI DSI、LVDS、VGA、CAN、RS232、RS485、UART、I2C、GPIO、USB3.0、USB2.0、SDMMC

规格参数 Specifications

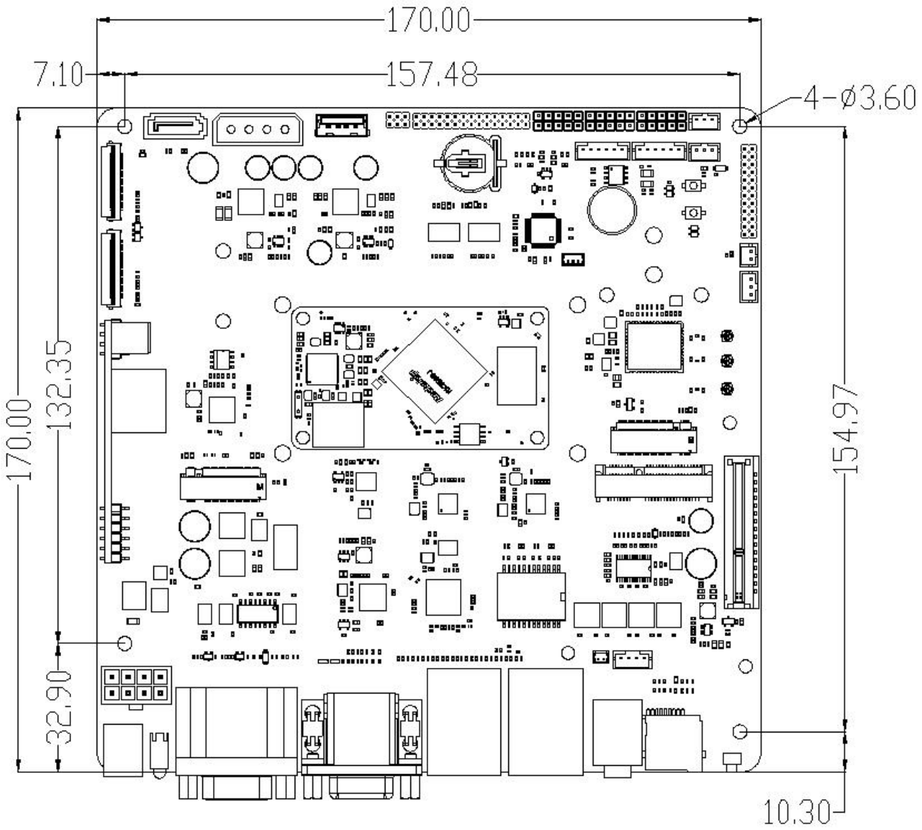
		ITX-3568Q（商用级）	ITX-3568JQ（工规级）	ITX-3568MQ（车规级）
基本参数	CPU	RK3568J 四核64位Cortex-A55处理器，22nm先进工艺，主频2.0GHz	RK3568J 四核64位Cortex-A55处理器，22nm先进工艺，主频1.4GHz	RK3568M 四核64位Cortex-A55处理器，22nm先进工艺，主频最高1.6GHz
	GPU	ARM G52 2EE， 支持OpenGL ES 1.1/2.0/3.2，OpenCL 2.0，Vulkan 1.1， 内嵌高性能2D加速硬件		
	NPU	集成AI加速器RKNN NPU，1.0Tops@INT8（商用级），512MAC NPU（工规级、车规级）， 支持Caffe/TensorFlow/TFLite/ONNX/PyTorch/Keras/Darknet 等系列框架的网络模型转换		
	ISP	8M ISP，支持HDR		
	VPU/编解码	4K@60fps H.265/H.264/VP9视频解码（或8路1080P 30fps多格式解码） 1080P@60fps H.265/H.264视频编码		
	内存	LPDDR4（1GB/2GB/4GB/8GB 可选）		
	存储	eMMC（8GB/16GB/32GB/64GB/128GB 可选） 16 MB SPI Flash		
	电源	多种供电方式： DC 9-24V电压输入（DC 5.5×2.1mm，推荐12V/1.5A以上） 机箱电源12V输入（标准ATX电源接口） POE 48V电源输入（最高支持60W）		
	系统	支持Android 11.0 、Ubuntu 18.04系统、Ubuntu 20.04系统、RTLinux		
	尺寸	17cm×17cm（标准Mini-ITX ），适配通用ITX电脑机箱		
	重量	约 400g（不含外设）		
	功耗	典型功耗：6W(12V/0.5A)　最大功耗：12W(12V/1A)		
	环境	工作温度：-20℃～60℃ 工作湿度: 10%～90%RH（无凝露）	工作温度：-40℃～85℃ 工作湿度: 10%～90%RH（无凝露）	工作温度：-40℃～85℃ 工作湿度: 10%～90%RH（无凝露）
接口参数	网络	2×1000Mbps千兆以太网（RJ45），支持POE（输出功率60W） 支持2.4GHz / 5GHz双频WiFi，WiFi6，802.11a/b/g/n/ac/ax协议，支持Bluetooth 5.0，支持扩展5G / 4G LTE 无线通讯		
	摄像头	1 × MIPI CSI 摄像头接口(可配置成单通道（4Lane）或双通道（2Lane）)		
	视频	1 × HDMI2.0，支持4K@60 Hz 1 × MIPI DSI，支持单通道1920 * 1080@60fps 1 × LVDS显示接口（由排针引出） 2 × VGA (1080P) * 最多可支持三屏异显输出		
	音频	1 × HDMI音频输出 1 × 3.5mm耳机音频输出 1 × Speaker喇叭输出（10W-8Ω D类）		
	SATA	1 × SATA 3.0 标准接口 1 × M.2 SATA3.0 (可扩展2242 SATA SSD)		
	PCIe	1 × PCIe 3.0（2Lane），可扩展标准PCIe3.0设备		
	USB	4 × USB3.0（限流1A） 4 × USB2.0（其中3个USB2.0由主板插针引出）（限流500mA）		
	其它接口	RS485、RS232、I2C、CAN、UART、ADC、GPIO、Debug、FAN、MIC		

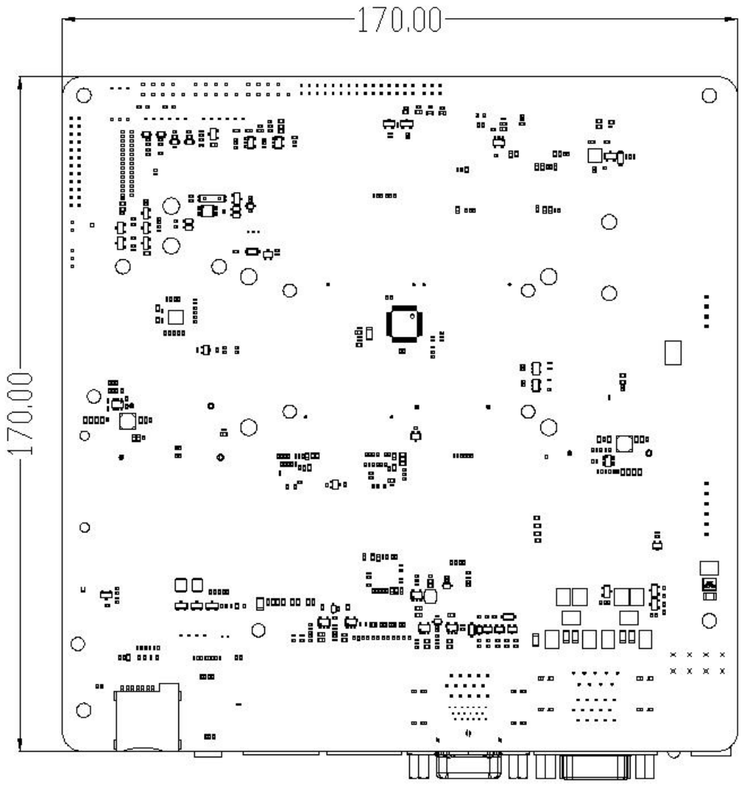
接口描述 Interface description





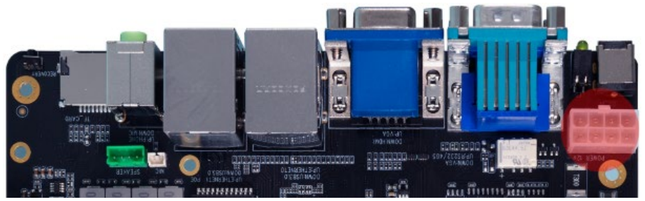
产品尺寸 Dimension





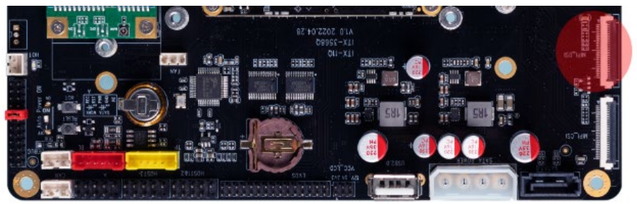
接口定义 Interface Definition

1. (J10) POWER 8 PIN 4.2mm间距



序号	定义	电平/V	序号	定义	电平/V
1	DC_IN (12V Input)	12V	2	GND	
3	DC_IN (12V Input)	12V	4	GND	
5	DC_IN (12V Input)	12V	6	GND	
7	DC_IN (12V Input)	12V	8	GND	

2. (J20) MIPI_Display_Interface 30 PIN



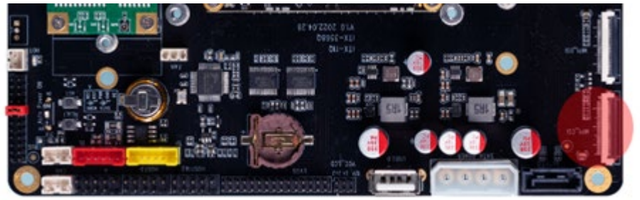
序号	定义	电平/V	序号	定义	电平/V
1	VCC5V0_SYS（5V Output)	5V	16	MIPI_DSI_TX1_D0P	1.8V
2	VCC5V0_SYS（5V Output)	5V	17	MIPI_DSI_TX1_D0N	1.8V

接口定义 Interface Definition

3	VCC5V0_SYS (5V Output)	5V	18	GND	
4	GND		19	MIPI_DSI_TX1_D1P	1.8V
5	I2C_ID (pull down resistance 10K)	3.3V	20	MIPI_DSI_TX1_D1N	1.8V
6	VCC3V3_SYS (3.3V Output)	3.3V	21	GND	
7	I2C4_SDA_M0_TP (pull up resistance 2.2K)	3.3V	22	MIPI_DSI_TX1_CLKP	1.8V
8	I2C4_SCL_M0_TP (pull up resistance 2.2K)	3.3V	23	MIPI_DSI_TX1_CLKN	1.8V
9	LCD_VCC_EN【from PCA9555】	3.3V	24	GND	
10	MIPI_TP_INT【GPIO0_C4】 (pull up resistance 2.2K)	3.3V	25	MIPI_DSI_TX1_D2P	1.8V
11	MIPI_BL_EN 【from PCA9555】	3.3V	26	MIPI_DSI_TX1_D2N	1.8V
12	MIPI_BL_PWM【GPIO0_C3】	3.3V	27	GND	0V
13	LCD1_RST【GPIO0_B0】	3.3V	28	MIPI_DSI_TX1_D3P	1.8V
14	MIPI_TP_RESET【from PCA9555】	3.3V	29	MIPI_DSI_TX1_D3N	1.8V
15	GND		30	GND	

接口定义 Interface Definition

3. (J14) MIPI CAMERA 30 PIN

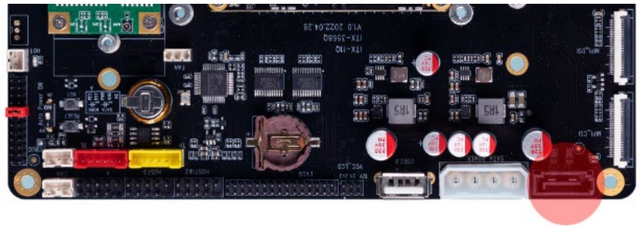


序号	定义	电平/V	序号	定义	电平/V
1	I2C4_SDA_M0 (Core board Pull up resistance 2.2K)	1.8V	17	MIPI_CSI_RX_CLK0P	1.8V
2	I2C4_SCL_M0 (Core board Pull up resistance 2.2K)	1.8V	18	MIPI_CSI_RX_CLK0N	1.8V
3	MIPI_PDN0CAM【from PCA9555】	1.8V	19	GND	
4	RESET0_CAM【from PCA9555】	1.8V	20	MIPI_CSI_RX_D2P	1.8V
5	GND		21	MIPI_CSI_RX_D2N	1.8V
6	MIPI_MCLK0 (Clock0 Output)	1.8V	22	GND	
7	MIPI_PDN1CAM【from PCA9555】	1.8V	23	MIPI_CSI_RX_D3P	1.8V
8	RESET1_CAM【from PCA9555】	1.8V	24	MIPI_CSI_RX_D3N	1.8V
9	MIPI_MCLK1 (Clock1 Output)	1.8V	25	GND	
10	GND		26	MIPI_CSI_RX_CLK1P	1.8V
11	MIPI_CSI_RX_D0P	1.8V	27	MIPI_CSI_RX_CLK1N	1.8V
12	MIPI_CSI_RX_D0N	1.8V	28	GND	
13	GND		29	VCC5V0_SYS (5V Output)	5.0V
14	MIPI_CSI_RX_D1P	1.8V	30	VCC5V0_SYS (5V Output)	5.0V
15	MIPI_CSI_RX_D1N	1.8V			

接口定义 Interface Definition

16	GND				

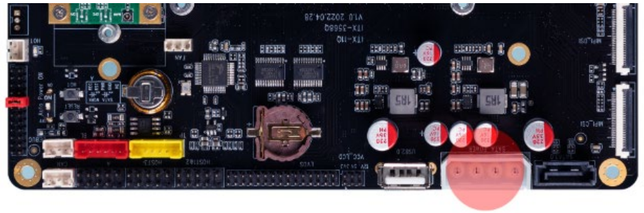
4. (SATA1) SATA 3.0 Socket



序号	定义	电平/V	序号	定义	电平/V
1	GND		6	SATA_A_RXP	1.8V
2	SATA_A_TXP	1.8V	7	GND	
3	SATA_A_TXN	1.8V			
4	GND				
5	SATA_A_RXN	1.8V			

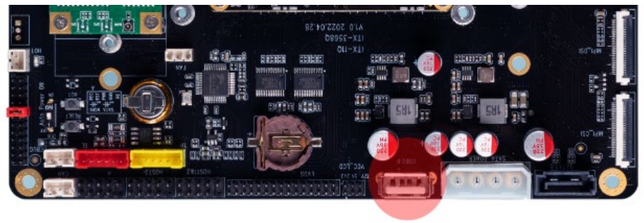
接口定义 Interface Definition

5. (J8) SATA POWER 4 PIN 5.0mm间距



序号	定义	电平/V	序号	定义	电平/V
1	VCC12V0_SATA（12V Output)	12V	3	GND	
2	GND		4	VCC5V0_SATA（5V Output)	5V

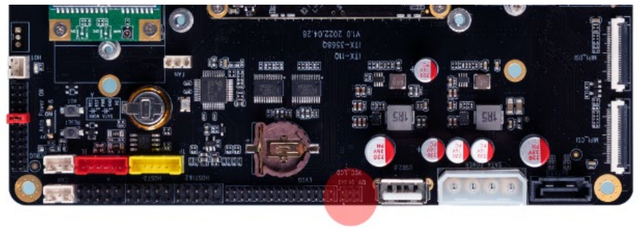
6. (USB1) USB2.0 Socket



序号	定义	电平/V	序号	定义	电平/V
1	VCC5V0_USB20_HOST3 (5V Output)	5V	3	USB2_HOST3_DP	3.3V
2	USB2_HOST3_DM	3.3V	4	GND	

接口定义 Interface Definition

7. (J24) VCC_LCD Power select jumper 6PIN 2.0mm间距



序号	定义	电平/V	序号	定义	电平/V
1	VCC_LCD_S	3.3/5/12V	2	VCC3V3_SYS	3.3V
3	VCC_LCD_S	3.3/5/12V	4	VCC5V0_SYS	5V
5	VCC_LCD_S	3.3/5/12V	6	VCC_12V_EXT	12V

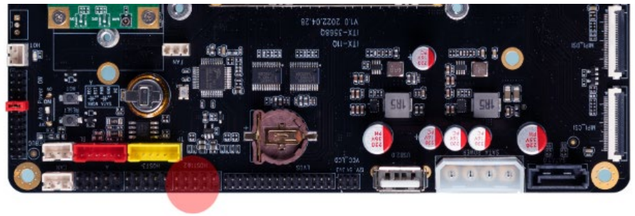
接口定义 Interface Definition

8. (CON1)LVDS 15X2 PIN 2.0mm间距排针

序号	定义	电平/V	序号	定义	电平/V
1	VCC_LCD (LCD power Output)	3.3/5/12V	16	LVDS_CLKP	1.8V
2	VCC_LCD (LCD power Output)	3.3/5/12V	17	LVDS_TX3N	1.8V
3	VCC_LCD (LCD power Output)	3.3/5/12V	18	LVDS_TX3P	1.8V
4	GND		19	NC	
5	GND		20	NC	
6	GND		21	NC	
7	LVDS_TX0N	1.8V	22	NC	
8	LVDS_TX0P	1.8V	23	NC	
9	LVDS_TX1N	1.8V	24	NC	
10	LVDS_TX1P	1.8V	25	NC	
11	LVDS_TX2N	1.8V	26	NC	
12	LVDS_TX2P	1.8V	27	NC	
13	GND		28	NC	
14	GND		29	NC	
15	LVDS_CLKN	1.8V	30	NC	

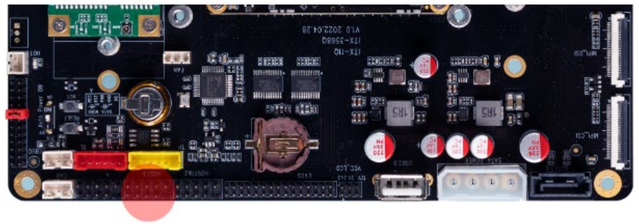
接口定义 Interface Definition

9. (JUSB1)HOST1&2 9 PIN 2.54mm间距排针



序号	定义	电平/V	序号	定义	电平/V
1	VCC5V0_USB20_HOST2 (5V Output)	5V	2	VCC5V0_USB20_HOST2 (5V Output)	5V
3	DM1	3.3V	4	DM2	3.3V
5	DP1	3.3V	6	DP2	3.3V
7	GND		8	GND	
			10	NC	

10. (JUSB2)HOST3 9PIN 2.54mm间距排针

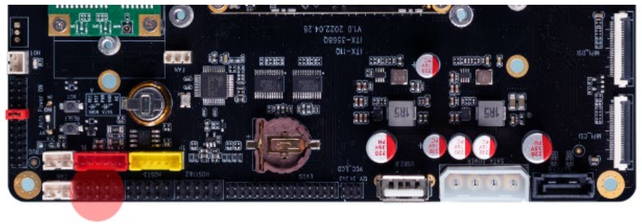


序号	定义	电平/V	序号	定义	电平/V
1	NC		2	VCC5V0_USB20_HOST1 (5V Output)	5V
3	NC		4	DM3	3.3V

接口定义 Interface Definition

5	NC		6	DP3	3.3V
7	NC		8	GND	
			10	NC	

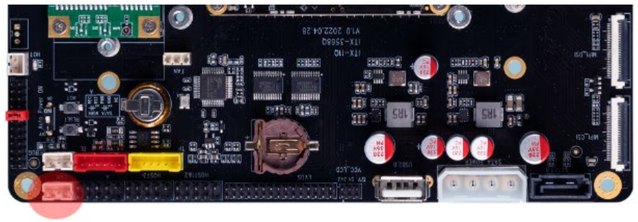
11. (JUSB6) LED/KEY 9 PIN 2.54mm间距排针



序号	定义	电平/V	序号	定义	电平/V
1	VCC3V3_SYS (3.3V Output)	3.3V	2	RECOVERY_KEY (Active L) (Core board Pull up resistance 10K)	1.8V
3	LED_WORK (Work LED- Active L)	3.3V	4	RESET_KEY (Active L) (Core board Pull up resistance 10K)	3.3V
5	VCC3V3_SYS (3.3V Output)	3.3V	6	PWRON_KEY (Active L) (series resistance 100R)	3.3V
7	SATA_LED (SATA LED- Active L)	3.3V	8	GND	
			10	NC	

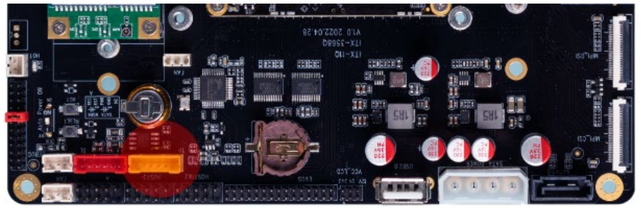
接口定义 Interface Definition

12. (J4)CAN 3PIN 2.0mm间距wafer 座(WHITE)



序号	定义	电平/V	序号	定义	电平/V
1	CANH_2	3.3V	3	CANL_2	3.3V
2	CAN_VSS_2 (GND)				

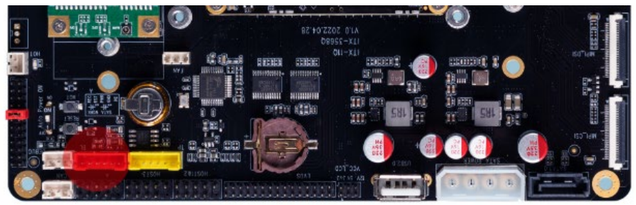
13. (J12)TP 6PIN 2.0mm间距wafer 座 (YELLOW)



序号	定义	电平/V	序号	定义	电平/V
1	VCC3V3_TP (3.3V Output)	3.3V	4	I2C1_SCL_TP [Pull up resistance 2.2K]	3.3V
2	TP_INT (GPIO0_C7_d) (Pull up resistance 10K)	3.3V	5	I2C1_SDA_TP [Pull up resistance 2.2K]	3.3V
3	TP_RESET(Pull up resistance 10K)	3.3V	6	GND	

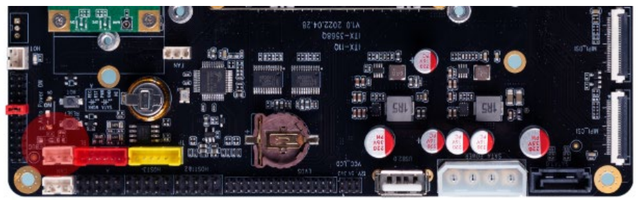
接口定义 Interface Definition

14. (J11)BL 6 PIN 2.0mm间距wafer 座 (RED)



序号	定义	电平/V	序号	定义	电平/V
1	GND		4	BL_EN (from PCA9555) (Pull down resistance 10K) [series resistance 100R]	3.3V
2	GND		5	VCC_12V_EXT (12V Output)	12V
3	BL_PWM15 (Pull down resistance 10K) [series resistance 100R]	3.3V	6	VCC_12V_EXT (12V Output)	12V

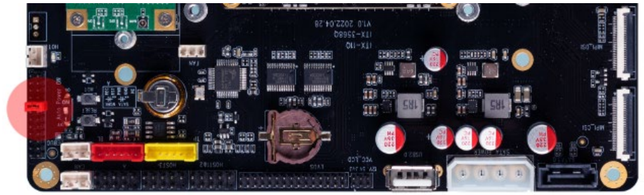
15. (J7)DEBUG 3 PIN 2.0mm间距wafer 座 (WHITE)



序号	定义	电平/V	序号	定义	电平/V
1	UART2_RX_M0 (GPIO0_D0_u)	3.3V	3	GND	
2	UART2_TX_M0 (GPIO0_D1_u)	3.3V			

接口定义 Interface Definition

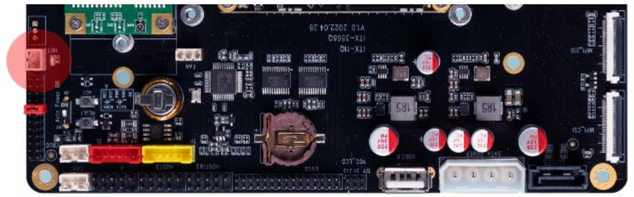
16. (J15) EXT Connector 12X2 PIN 2.0mm间距排针



序号	定义	电平/V	序号	定义	电平/V
1	VCC5V0_SYS (5V Output)	5V	2	VCC5V0_SYS (5V Output)	5V
3	GND		4	GND	
5	VCC3V3_SYS (3.3V Output)	3.3V	6	VCC3V3_SYS (3.3V Output)	3.3V
7	GND		8	GND	
9	UART9_RX_M1 (GPIO4_C6_d)	3.3V	10	UART9_TX_M1 (GPIO4_C5_d)	3.3V
11	NC	3.3V	12	NC	3.3V
13	ADC2 (ADC2 Input)	1.8V	14	ADC5 (ADC5 Input)	1.8V
15	ADC6 (ADC6 Input)	1.8V	16	ADC7 (ADC7 Input)	1.8V
17	I2C4_SCL_M0 (GPIO4_B3_d) (Pull up resistance 2.2K)	1.8V	18	I2C4_SDA_M0 (GPIO4_B2_d) (Pull up resistance 2.2K)	1.8V
19	I2C1_SCL (GPIO0_B3_u) [Pull up resistance 2.2K]	3.3V	20	I2C4_SDA (GPIO0_B4_u) (Pull up resistance 2.2K)	3.3V
21	PCA9555_IO02 (from PCA9555) (Pull down resistance 10K)	3.3V	22	PCA9555_IO03 (from PCA9555) (Pull down resistance 10K)	3.3V
23	GPIO4_D2_D(GPIO4_D2_d)	3.3V	24	PCA9555_IO07 (from PCA9555) (Pull down resistance 10K)	3.3V

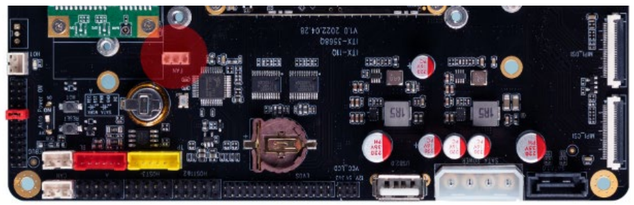
接口定义 Interface Definition

17. (J29)HOT 2 PIN 2.0mm间距wafer 座 (WHITE)



序号	定义	电平/V	序号	定义	电平/V
1	GND		2	VCC_12_EXT (12V Output)	12V

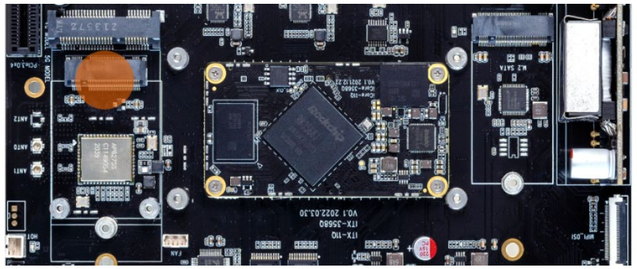
18. (J19)FAN 4 PIN 1.25mm间距wafer 座 (WHITE)



序号	定义	电平/V	序号	定义	电平/V
1	FAN_PWM_CTL(PWM14_M0)	12V	3	VCC_FAN+	12V
2	FAN_FG (ADC2 Input)	3.3V	4	VCC_FAN-	12V

接口定义 Interface Definition

19. (U30) 5G MODEL (PCIE M.2 NGFF B-Key Socket)



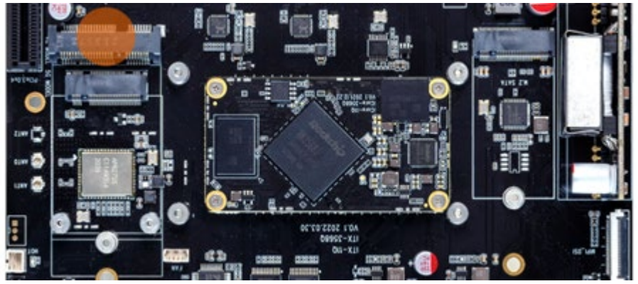
序号	定义	电平/V	序号	定义	电平/V
1	NC		2	VCC3V8_4G (3.8V Output)	3.8V
3	GND		4	VCC3V8_4G (3.8V Output)	3.8V
5	GND		6	Power Off# (Pull up resistance 10K)	3.8V
7	HUB_USB4_DP	3.3V	8	NC	
9	HUB_USB4_DM	3.3V	10	NC	
11	GND		20	NC	
21	NC		22	NC	
23	NC		24	NC	
25	NC		26	NC	
27	GND		28	NC	
29	USB3RXN (MB series capacitor 0.1uF)	1.8V	30	UIM_RST	1.8/3.0V
31	USB3RXP (MB series capacitor 0.1uF)	1.8V	32	UIM_CLK	1.8/3.0V
33	GND		34	UIM_DAT	1.8/3.0V
35	USB3TXN (MB series capacitor 0.1uF)	1.8V	36	UIM_PWR	1.8/3.0V

接口定义 Interface Definition

37	USB3TXP (MB series capacitor 0.1uF)	1.8V	38	NC	
39	GND		40	NC	
41	NC		42	NC	
43	NC		44	NC	
45	GND		46	NC	
47	NC		48	NC	
49	NC		50	NC	
51	GND		52	NC	
53	NC		54	NC	
55	NC		56	NC	
57	GND		58	NC	
59	NC		60	NC	
61	NC		62	NC	
63	NC		64	NC	
65	NC		66	SIM_DET	1.8V
67	4G_RESET	1.8V	68	NC	
69	NC		70	VCC3V8_4G (3.8V Output)	3.8V
71	GND		72	VCC3V8_4G (3.8V Output)	3.8V
73	GND		74	VCC3V8_4G (3.8V Output)	3.8V
75	NC				

接口定义 Interface Definition

20. (U13) 4G MODEL (Mini PCI)

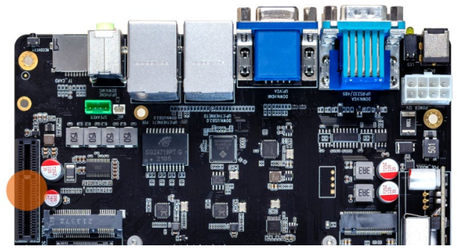


序号	定义	电平/V	序号	定义	电平/V
1	NC		2	VCC3V8_4G (3.8V Output)	3.8V
3	NC		4	GND	
5	NC		6	NC	
7	NC		8	UIM_PWR	1.8/3.0V
9	GND		10	UIM_DAT	1.8/3.0V
11	NC		12	UIM_CLK	1.8/3.0V
13	NC		14	UIM_RST	1.8/3.0V
15	GND		16	NC	
17	NC		18	GND	
19	NC		20	NC	
21	GND		22	4G_RESET	1.8V
23	NC		24	NC	
25	NC		26	GND	
27	GND		28	NC	

接口定义 Interface Definition

29	GND		30	NC	
31	NC		32	NC	
33	NC		34	GND	
35	GND		36	HUB_HOST20_DM4	3.3V
37	GND		38	HUB_HOST20_DP4	3.3V
39	VCC3V8_4G (3.8V Output)	3.8V	40	GND	
41	VCC3V8_4G (3.8V Output)	3.8V	42	NC	
43	GND		44	SIM_DET	1.8V
45	NC		46	NC	
47	NC		48	NC	
49	NC		50	GND	
51	NC		52	VCC3V8_4G (3.8V Output)	3.8V

21. (J51)PCIe3.0x2 Socket 64 PIN



序号	定义	电平/V	序号	定义	电平/V
A1	GND		B1	VCC12V_PCIE30 (12V Output)	12V
A2	VCC12V_PCIE30 (12V Output)	12V	B2	VCC12V_PCIE30 (12V Output)	12V

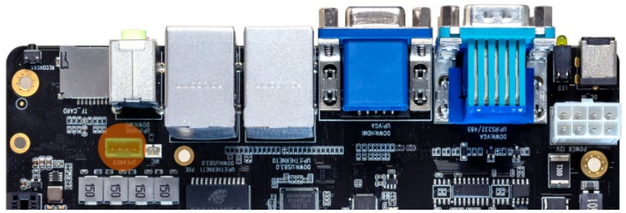
接口定义 Interface Definition

A3	VCC12V_PCIE30 (12V Output)	12V	B3	VCC12V_PCIE30 (12V Output)	12V
A4	GND		B4	GND	
A5	NC		B5	NC	
A6	NC		B6	NC	
A7	NC		B7	GND	
A8	NC		B8	VCC3V3_PCIE30 (3.3V Output)	3.3V
A9	VCC3V3_PCIE30 (3.3V Output)	3.3V	B9	NC	
A10	VCC3V3_PCIE30 (3.3V Output)	3.3V	B10	VCC3V3_PCIE30 (3.3V Output)	3.3V
A11	PCIE30X2_PERSTn_L(GPIO0_C6_d)	3.3V	B11	PCIE30X2_WAKEn_L(GPIO0_C5_d)	3.3V
A12	GND		B12	PCIE30X2_CLKREQn_L (GPIO0_A6_d)	3.3V
A13	PCIE30_REFCLKP_CON	1.8V	B13	GND	
A14	PCIE30_REFCLKN_CON	1.8V	B14	PCIE30_TX0_P (MB series capacitor 0.1uF)	1.8V
A15	GND		B15	PCIE30_TX0_N (MB series capacitor 0.1uF)	1.8V
A16	PCIE30_RX0P	1.8V	B16	GND	
A17	PCIE30_RX0N	1.8V	B17	PCIE30X2_PRSNT_L(GPIO0_B5_u)	3.3V
A18	GND		B18	GND	
A19	NC		B19	PCIE30_TX1_P (MB series capacitor 0.1uF)	1.8V
A20	GND		B20	PCIE30_TX1_N (MB series capacitor 0.1uF)	1.8V
A21	PCIE30_RX1P	1.8V	B21	GND	
A22	PCIE30_RX1N	1.8V	B22	GND	

接口定义 Interface Definition

A23	GND		B23	NC	
A24	GND		B24	NC	
A25	NC		B25	GND	
A26	NC		B26	GND	
A27	GND		B27	NC	
A28	GND		B28	NC	
A29	NC		B29	GND	
A30	NC		B30	NC	
A31	GND		B31	PCIE30X2_PRSNT_L(GPIO0_B5_u)	3.3V
A32	NC		B32	GND	

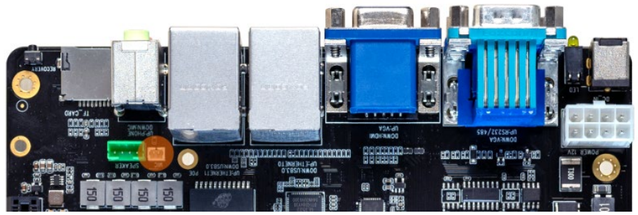
22. (J6)SPEAKER 4 PIN 2.0mm间距 wafer 座 (GREEN)



序号	定义	电平/V	序号	定义	电平/V
1	SPK_RP	12V	3	SKP_LP	12V
2	SPK_RN	12V	4	SKP_LN	12V

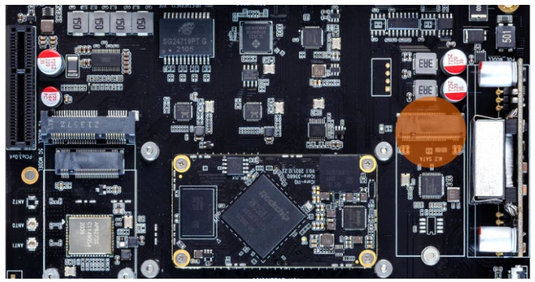
接口定义 Interface Definition

23. (J28)MIC 2 PIN 1.25mm 间距wafer 座 (WHITE)



序号	定义	电平/V	序号	定义	电平/V
1	MIC1_INN	3.3V	2	MIC1_INP	3.3V

24. (U1)M.2 SATA (PCIE M.2 NGFF B-Key Socket)



序号	定义	电平/V	序号	定义	电平/V
1	GND		2	VCC3V3_SATA (3.3V Output)	3.3V
3	GND		4	VCC3V3_SATA (3.3V Output)	3.3V
5	NC		6	NC	
7	NC		8	NC	

接口定义 Interface Definition

9	GND		10	DAS/DSS	3.3V
11	NC		20	NC	
21	GND		22	NC	
23	NC		24	NC	
25	NC		26	NC	
27	GND		28	NC	
29	NC		30	NC	
31	NC		32	NC	
33	GND		34	NC	
35	NC		36	NC	
37	NC		38	SATA Sleep (Pull up resistance 10K)	3.3V
39	GND		40	NC	
41	SATA_B_RXP (MB series capacitor 0.1uF)	1.8V	42	NC	
43	SATA_B_RXN (MB series capacitor 0.1uF)	1.8V	44	NC	
45	GND		46	NC	
47	SATA_B_TXN	1.8V	48	NC	
49	SATA_B_TXP	1.8V	50	NC	
51	GND		52	NC	
53	NC		54	NC	
55	NC		56	NC	
57	GND		58	NC	
67	NC		68	NC	

接口定义 Interface Definition

69	GND		70	VCC3V3_SATA (3.3V Output)	3.3V
71	GND		72	VCC3V3_SATA (3.3V Output)	3.3V
73	GND		74	VCC3V3_SATA (3.3V Output)	3.3V
75	GND				

25. (J17--NC) I2C4 3 PIN 2.0mm间距

序号	定义	电平/V	序号	定义	电平/V
1	I2C4_SDA_M0 (Pull up resistance 4.7K)	3.3V	3	GND	
2	I2C4_SDA_M0 (Pull up resistance 4.7K)	3.3V			

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