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产品规格书	V1.0	2020-3-25	公开	

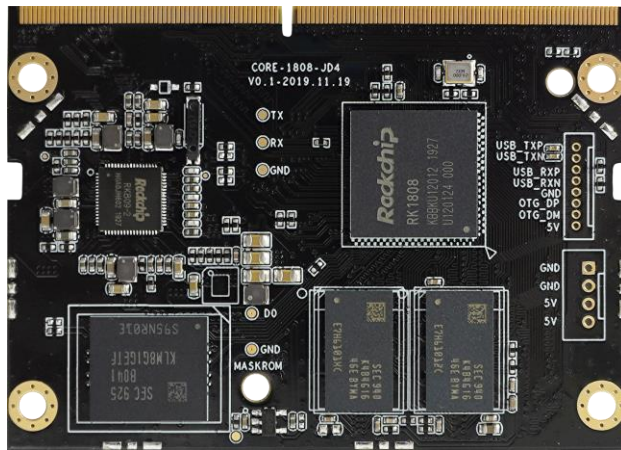


# 天启科技

## 人工智能核心板

### Core-1808-JD4

### V1.0



版本	更新日期	更新内容
V1.0	2020-3-25	原始版本

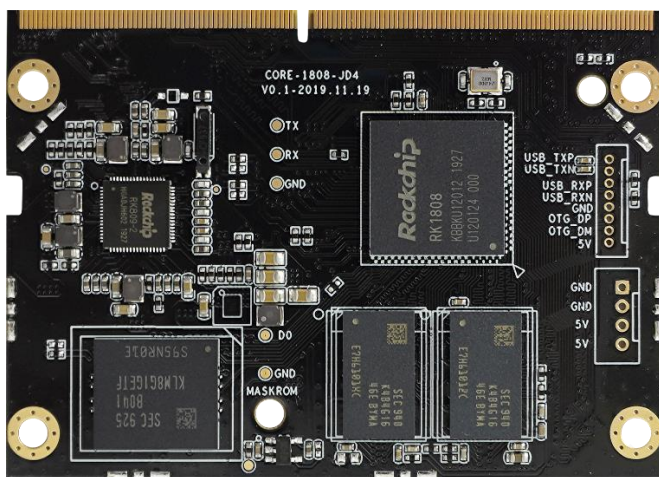


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## 一、产品简介

Core-1808-JD4 人工智能核心板, 板载 RK1808 AI 芯片, 内置高效 NPU, 拥有强劲算力, 支持多种 AI 框架和 AI 应用开发 SDK, 易于开发, 拥有面向 AI 应用的丰富接口, 便于扩展, 适用于语音唤醒、语音识别、人脸识别等功能应用场景。



主要特点:

### 1、高效能 NPU 的 AI 芯片

RK1808 AI 芯片 CPU 采用双核 Cortex-A35 架构, 最高频率 1.6GHz, VPU 支持 1080P 常规视频格式编码和解码, 支持摄像头视频信号输入并内置了 ISP。多种存储配置选择, 仅需扩展功能底板即可快速实现研产。

### 2、强大 AI 运算能力

内置的 NPU 算力最高可达 3.0 TOPs, 支持 INT8/INT16/FP16 混合运算, 最大程度兼顾性能、功耗及运算精度, 支持 TensorFlow、Caffe、ONNX、Darknet 等框架的网络模型转换, 兼容性强

### 3、独立运算加速单元

通过与 RK3399 配合使用, 组合成 1+1、1+N 的 NPU 高性能的 AI 神经网络加速集群。

### 4、沉金接口, 稳定可靠

采用 SODIMM 260P 接口, 数据传输和扩展性能得到最好发挥, 沉金工艺引脚, 耐腐蚀, 牢固可靠。

### 5、丰富的扩展接口

拥有 1×USB2.0、1×USB3.0 (TX、RX 与 PCIE 共用) 等高速设备接口, PWM/I2C/SPI/UART 等一系列输入输出接口, 视频支持 MIPI/CIF/BT1120 输入, 支持 MIPI/RGB 显示输出, 支持千兆以太网及外置 WiFi/BT 模块。

### 6、AI 应用开发 SDK

AI 应用开发 SDK 支持 C/C++ 及 Python, 支持快速开发的 Rock-X SDK, 支持在 PC 和 RK3399 上运行 RKNN-Toolkit 开发套件, 非常的方便客户进行快速地搭建神经网络运行平台, 开发便捷度极强。

### 7、开放资料

提供配套的源代码、教程、技术资料 and 开发工具, 让开发变得更加简单方便。

### 8、应用广泛

广泛应用在语音唤醒、语音识别、人脸检测及属性分析、人脸识别、姿态分析、目标检测及识别、图像处理等场景。

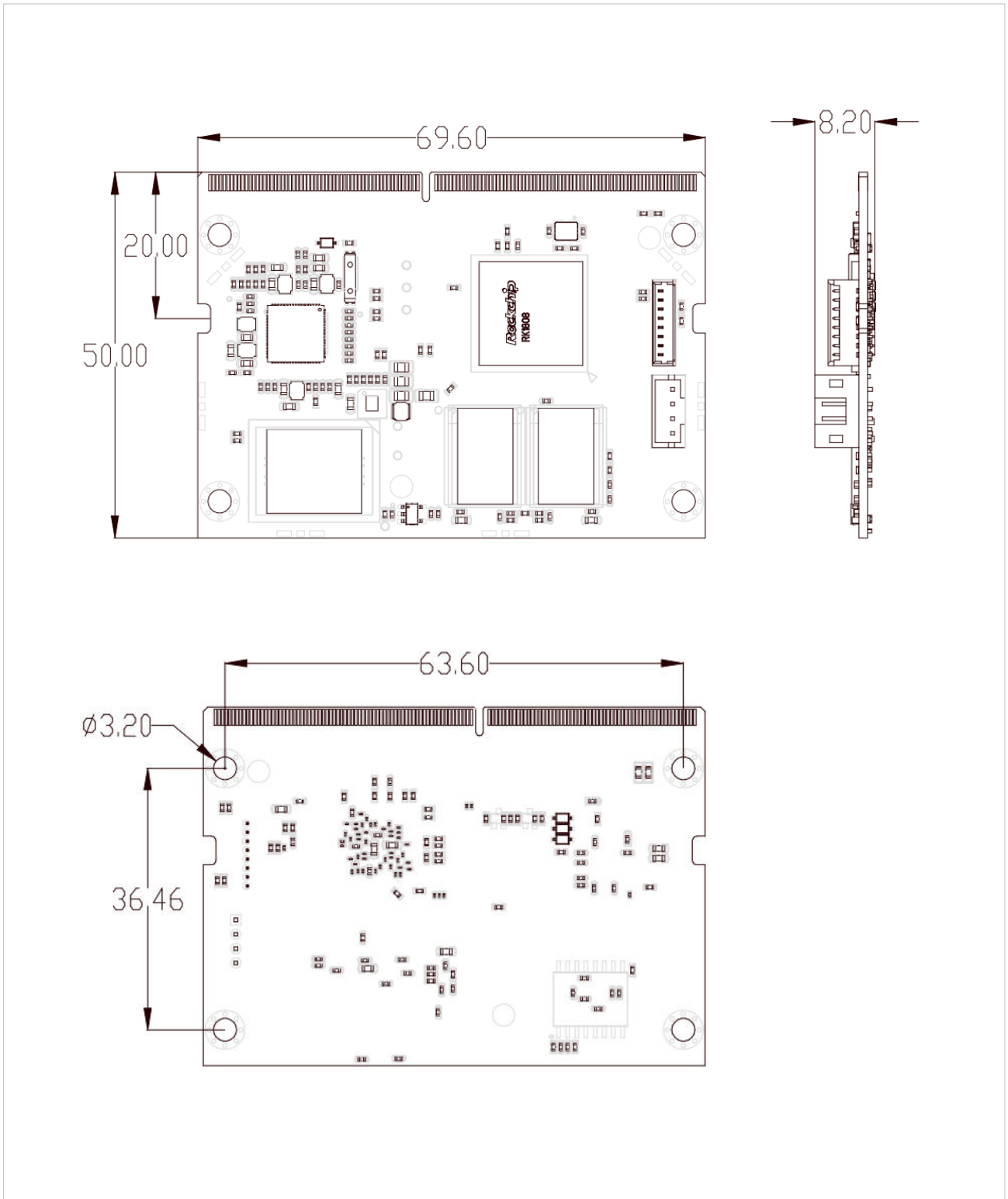


## 二、规格参数

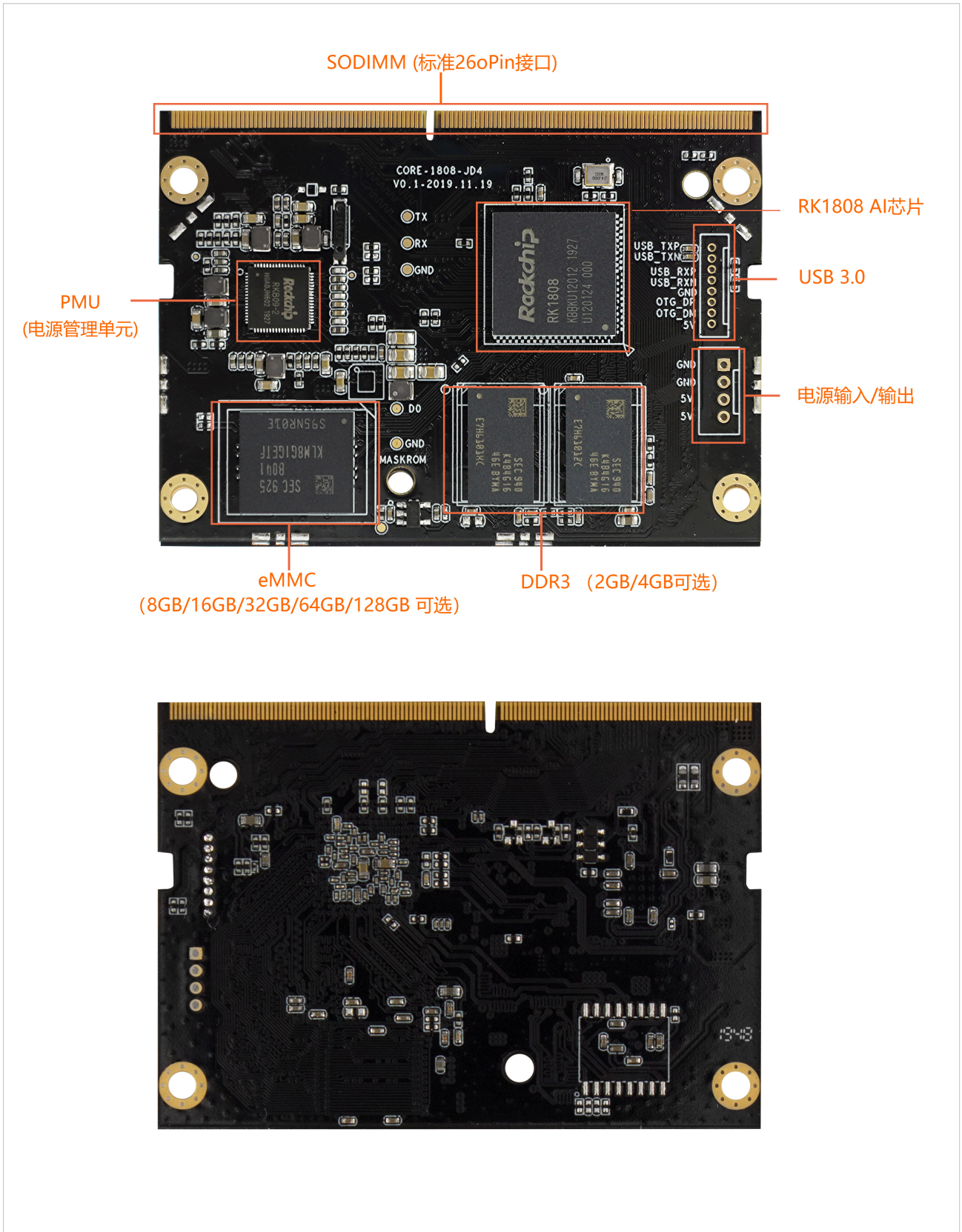
基本参数	
主控芯片	Rockchip RK1808
处理器	双核 Cortex-A35, 最高频率 1.6GHz
NPU	峰值算力高达 3.0TOPs, 支持 OpenCL/OpenVX, 支持 INT8/INT16/FP16 支持 TensorFlow、Caffe、ONNX、Darknet 模型
图形处理器	支持 2MP, AE/AWB/AF
视频处理器	1080p@60FPS H.264 解码 1080p@30FPS H.264 编码
内存	1GB DDR3 (2GB 可选配)
存储器	8GB 高速 eMMC 4.51 (16GB/32GB/128GB 可选配) 支持 TF 卡扩展、支持 PCIe 2.1
硬件特性	
以太网	10 / 100 / 1000 Mbps 以太网接口
WiFi	通过 SDIO3.0 扩展 WiFi & Bluetooth
显示	1 x MIPI-DSI, 支持单通道 1080P@60fps 输出 1 x RGB, 18-bit(RGB666) 最高支持 1280x800@60fps
音频	1 x I2S 用于音频输入输出 耳机×1 (左右声道)、单声道 Speaker (8Ω, 1.3W)、MIC x 2
摄像头	1x MIPI-CSI 摄像头接口 (内置双硬件 ISP, 最高支持单 13Mpixel 或 双 8Mpixel) 1xDVP
USB	1 x USB3.0 (与 PCIe 复用)、1 x USB2.0
其它接口	支持 USB3.0 / PCIe2.1 内置 1-ch & 8-ch I2S & 8-ch PDM, 内置 VAD 7 x UART、3 x SPI、5 x I2C、10 x PWM、4 x SARADC
系统软件	
系统支持	Linux+QT
外观规格	
核心板尺寸	69.6mm × 50 mm
接口类型	金手指 (SODIMM 260P 标准接口, 0.5mm 间距)
PCB 规格	8 层板设计

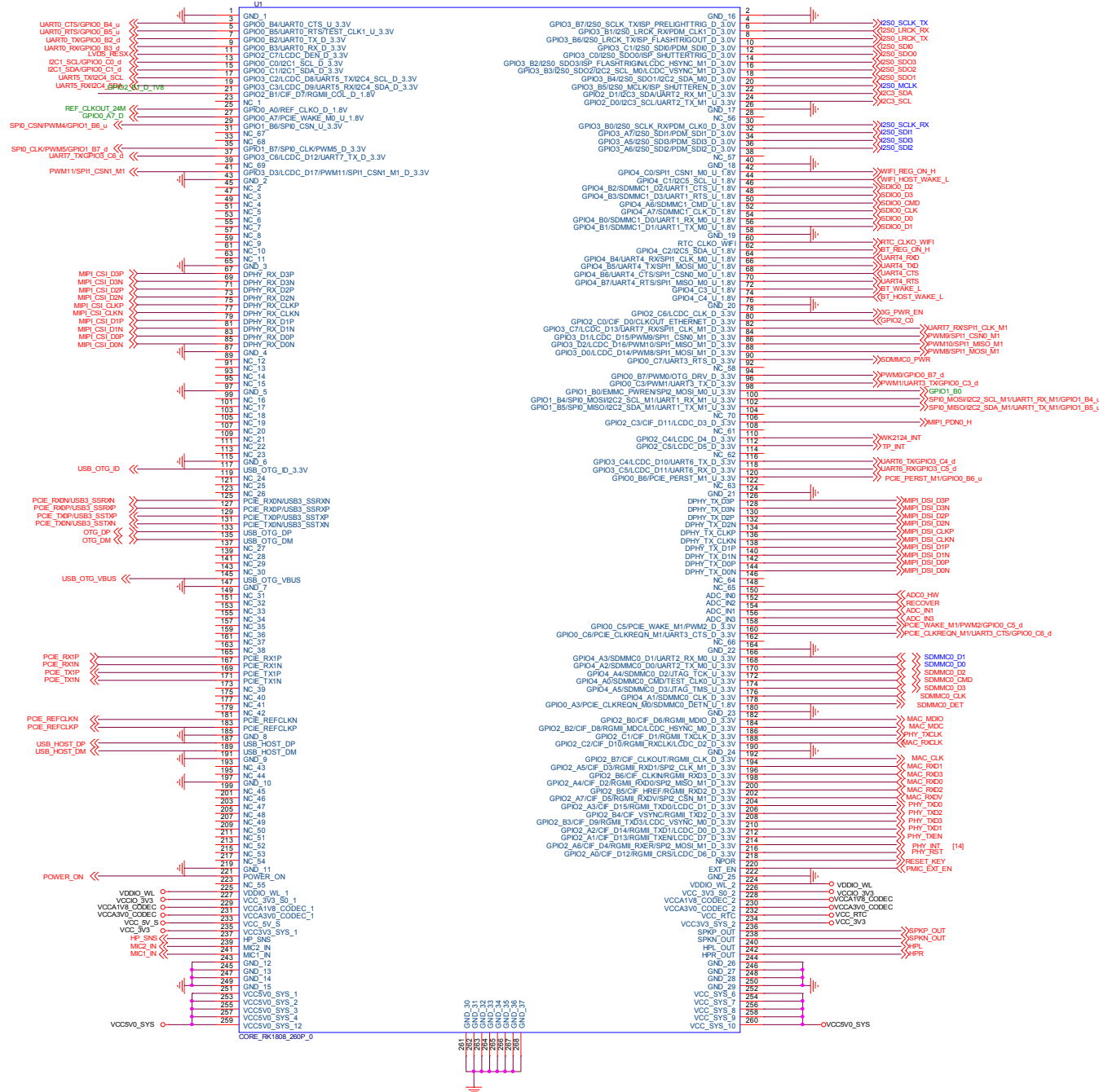



### 三、规格尺寸



### 四、接口定义






**www.t-firefly.com**

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**Firefly**  
**MXM Connector**  
 File: CORE-1808-1D4 REV:V0.0  
 Create Date: Thursday, May 09, 2019 Page Num:22  
 Modify Date: Friday, March 27, 2020 Page Total: 23

Part A	pin	Core board pin definition	Pad type	IO Pull	Reset State	function for Floor	Default function description	IO Power domain	RK1808 Pin Number	RK1808 Pin Name
	1	GND_1	G		GND	GND	GND	GND		GND_1
	3	GPIO0_B4/UART0_CTS_u_3.3V	I/O	UP	I/GPIO	WORK_LED	System LED control 1:Enable 0:Disable	3.3V	AR15	GPIO0_B4/UART0_CTS
	5	GPIO0_B5/UART0_RTS/TEST_CLK1_u_3.3V	I/O	UP	I/GPIO	DIY_LED	Diy led control 1:Enable 0:Disable	3.3V	AV10	GPIO0_B5/UART0_RTS/TEST_CLK1
	7	GPIO0_B2/UART0_TX_d_3.3V	I/O	DOWN	I/GPIO	VCC5V0_HOST_EN	Host usb 5v power enable 1:Enable 0:Disable	3.3V	AU15	GPIO0_B2/UART0_TX
	9	GPIO0_B3/UART0_RX_d_3.3V	I/O	DOWN	I/GPIO	VCC5V0_OTG_EN	OTG 5v power enable 1:Enable 0:Disable	3.3V	AW9	GPIO0_B3/UART0_RX
	11	GPIO2_C7/LCDC_DEN_d_3.3V	I/O	DOWN	I/GPIO	LVDS_RESX	LVDS Reset	3.3V	AV34	GPIO2_C7/LCDC_DEN
	13	GPIO0_C0/I2C1_SCL_d_3.3V	I/O	DOWN	I/GPIO	I2C1_SCL	I2C clock , Core board interior pull up Resistor 2.2K	3.3V	AN13	GPIO0_C0/I2C1_SCL
	15	GPIO0_C1/I2C1_SDA_d_3.3V	I/O	DOWN	I/GPIO	I2C1_SDA	I2C data , Core board interior pull up Resistor 2.2K	3.3V	AV12	GPIO0_C1/I2C1_SDA
	17	GPIO3_C2/LCDC_D8/UART5_TX/I2C4_SCL_d_3.3V	I/O	DOWN	I/GPIO	LCD_EN	Lcd enable , Core board interior pull up Resistor 2.2K	3.3V	AN37	GPIO3_C2/LCDC_D8/UART5_TX/I2C4_SCL
	19	GPIO3_C3/LCDC_D9/UART5_RX/I2C4_SDA_d_3.3V	I/O	DOWN	I/GPIO	CAM_PWR	Camera power enable , Core board interior pull up Resistor 2.2K	3.3V	AM38	GPIO3_C3/LCDC_D9/UART5_RX/I2C4_SDA
	21	GPIO2_B1/CIF_D7/RGMII_COL_d_1.8V	I/O	DOWN	I/GPIO	MIPI_PWR_EN	MIPI power enable , Core board internal pull-down resistor 12K, parallel 10K	1.8V	AW27	GPIO2_B1/CIF_D7/RGMII_COL
	23	NC_1								
	25	GPIO0_A0/REF_CLKO_d_1.8V	I/O	DOWN	I/GPIO	MIPI_RST	Mipi reset	1.8V	AV22	GPIO0_A0/REF_CLKO
	27	GPIO0_A7/PCIE_WAKE_M0_u_1.8V	I/O	UP	I/GPIO	LCD_BL_EN	LCD panel power enable	1.8V	AR21	GPIO0_A7/PCIE_WAKE_M0
	29	GPIO1_B6/SPI0_CSN_u_3.3V	I/O	UP	I/GPIO	GPIO1_B6/SPI0_CSN	SPI bus port 1 , Core board interior pull up Resistor 10K	3.3V	G25	GPIO1_B6/SPI0_CSN
	31	NC_67								
	33	NC_68								
	35	GPIO1_B7/SPI0_CLK/PWM5_d_3.3V	I/O	DOWN	I/GPIO	SPI0_CLK/PWM5/GPIO1_B7	SPI serial clock	3.3V	E25	GPIO1_B7/SPI0_CLK/PWM5
	37	GPIO3_C6/LCDC_D12/UART7_TX_d_3.3V	I/O	DOWN	I/GPIO	TP_RST	TP reset	3.3V	AN39	GPIO3_C6/LCDC_D12/UART7_TX
	39	NC_69								
	41	GPIO3_D3/LCDC_D17/PWM11/SPI1_CSN1_M1_d_3.3V	I/O	DOWN	I/GPIO	SPK_CTL_H	Control play and stop of spk	3.3V	AJ37	GPIO3_D3/LCDC_D17/PWM11/SPI1_CSN1_M1
	43	GND_2	G		GND	GND	GND	GND		GND_2
	45	NC_2								
	47	NC_3								
	49	NC_4								
	51	NC_5								
	53	NC_6								
	55	NC_7								
	57	NC_8								
	59	NC_9								
	61	NC_10								
	63	NC_11								
	65	GND_3	G		GND	GND	GND	GND		GND_3
	67	DPHY_RX_D3P	A			MIPI_RX0_D3P	MIPI-CSIO differential lane 3 positive	1.8V	T38	DPHY_RX_D3P
	69	DPHY_RX_D3N	A			MIPI_RX0_D3N	MIPI-CSIO differential lane 3 positive	1.8V	R39	DPHY_RX_D3N
	71	DPHY_RX_D2P	A			MIPI_RX0_D2P	MIPI-CSIO differential lane 2 positive	1.8V	P38	DPHY_RX_D2P
	73	DPHY_RX_D2N	A			MIPI_RX0_D2N	MIPI-CSIO differential lane 2 negative	1.8V	N39	DPHY_RX_D2N
	75	DPHY_RX_CLKP	A			MIPI_RX0_CLKP	MIPI-CSIO differential clock lane positive	1.8V	M38	DPHY_RX_CLKP
	77	DPHY_RX_CLKN	A			MIPI_RX0_CLKN	MIPI-CSIO differential clock lane negative	1.8V	L39	DPHY_RX_CLKN
	79	DPHY_RX_D1P	A			MIPI_RX0_D1P	MIPI-CSIO differential lane 1 positive	1.8V	K38	DPHY_RX_D1P
	81	DPHY_RX_D1N	A			MIPI_RX0_D1N	MIPI-CSIO differential lane 1 negative	1.8V	J39	DPHY_RX_D1N
	83	DPHY_RX_D0P	A			MIPI_RX0_D0P	MIPI-CSIO differential lane 0 positive	1.8V	N35	DPHY_RX_D0P
	85	DPHY_RX_D0N	A			MIPI_RX0_D0N	MIPI-CSIO differential lane 0 negative	1.8V	L35	DPHY_RX_D0N
	87	GND_4	G		GND	GND	GND	GND		GND_4
	89	NC_12								
	91	NC_13								
	93	NC_14								
	95	NC_15								
	97	GND_5	G		GND	GND	GND	GND		GND_5
	99	NC_16								
	101	NC_17								
	103	NC_18								

105	NC_19							
107	NC_20							
109	NC_21							
111	NC_22							
113	NC_23							
115	GND_6	G		GND	GND			GND_6
117	USB_OTG_ID_3.3V	A		USB_OTG_ID	OTG Role switching Input (no used) 0: HOST Mode 1: Slave Mode	3.3V	AJ9	USB_OTG_ID
119	NC_24							
121	NC_25							
123	NC_26							
125	PCIE_RX0N/USB3_SSRXN	A		USB3_SSRXN	Channel 0 negative serial input	1.8V	AP2	PCIE_RX0N/USB3_SSRXN
127	PCIE_RX0P/USB3_SSRXP	A		USB3_SSRXP	Channel 0 positive serial input	1.8V	AR1	PCIE_RX0P/USB3_SSRXP
129	PCIE_TX0P/USB3_SSTXP	A		USB3_SSTXP	Channel 0 positive serial output	1.8V	AU1	PCIE_TX0P/USB3_SSTXP
131	PCIE_TX0N/USB3_SSTXN	A		USB3_SSTXN	Channel 0 negative serial output	1.8V	AT2	PCIE_TX0N/USB3_SSTXN
133	USB_OTG_DP	A		USB_OTG_DP	OTG_DP	3.3V	AL1	USB_OTG_DP
135	USB_OTG_DM	A		USB_OTG_DM	OTG_DM	3.3V	AK2	USB_OTG_DM
137	NC_27							
139	NC_28							
141	NC_29							
143	NC_30							
145	USB_OTG_VBUS	A		VBUS_DET	Vbus power detect for USB3.0 , Core board interior pull up Resistor 10K	3.3V	AL9	USB_OTG_VBUS
147	GND_7	G		GND	GND			GND_7
149	NC_31							
151	NC_32							
153	NC_33							
155	NC_34							
157	NC_35							
159	NC_36							
161	NC_37							
163	NC_38							
165	PCIE_RX1P	A		PCIE_RX1_P	Channel 1 positive serial input	1.8V	AW3	PCIE_RX1P
167	PCIE_RX1N	A		PCIE_RX1_N	Channel 1 negative serial input	1.8V	AV4	PCIE_RX1N
169	PCIE_TX1P	A		PCIE_TX1P	Channel 1 positive serial output	1.8V	AR5	PCIE_TX1P
171	PCIE_TX1N	A		PCIE_TX1N	Channel 1 negative serial output	1.8V	AR7	PCIE_TX1N
173	NC_39							
175	NC_40							
177	NC_41							
179	NC_42							
181	PCIE_REFCLKN	A		PCIE_REF_CLKN	Low-swing differential clock pair	1.8V	AN7	PCIE_REFCLKN
183	PCIE_REFCLKP	A		PCIE_REF_CLKP	Low-swing differential clock pair	1.8V	AN5	PCIE_REFCLKP
185	GND_8	G		GND	GND			GND_8
187	USB_HOST_DP	A		HOST0_DP	USB 2.0 Data signal DP	3.3V	AN1	USB_HOST_DP
189	USB_HOST_DM	A		HOST0_DM	USB 2.0 Data signal DM	3.3V	AM2	USB_HOST_DM
191	GND_9	G		GND	GND			GND_9
193	NC_43							
195	NC_44							
197	GND_10	G		GND	GND			GND_10
199	NC_45							
201	NC_46							
203	NC_47							
205	NC_48							
207	NC_49							
209	NC_50							
211	NC_51							
213	NC_52							
215	NC_53							
217	NC_54							
219	GND_11	G		GND	GND			GND_11

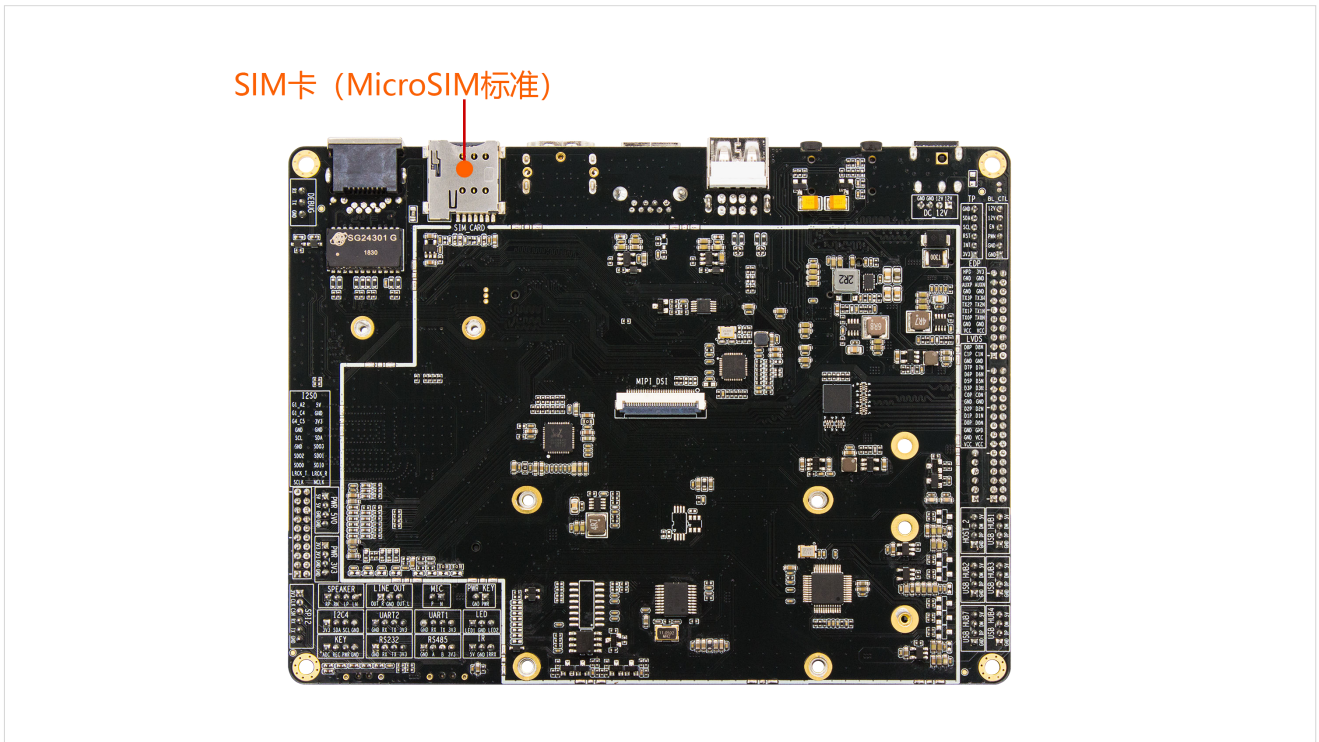
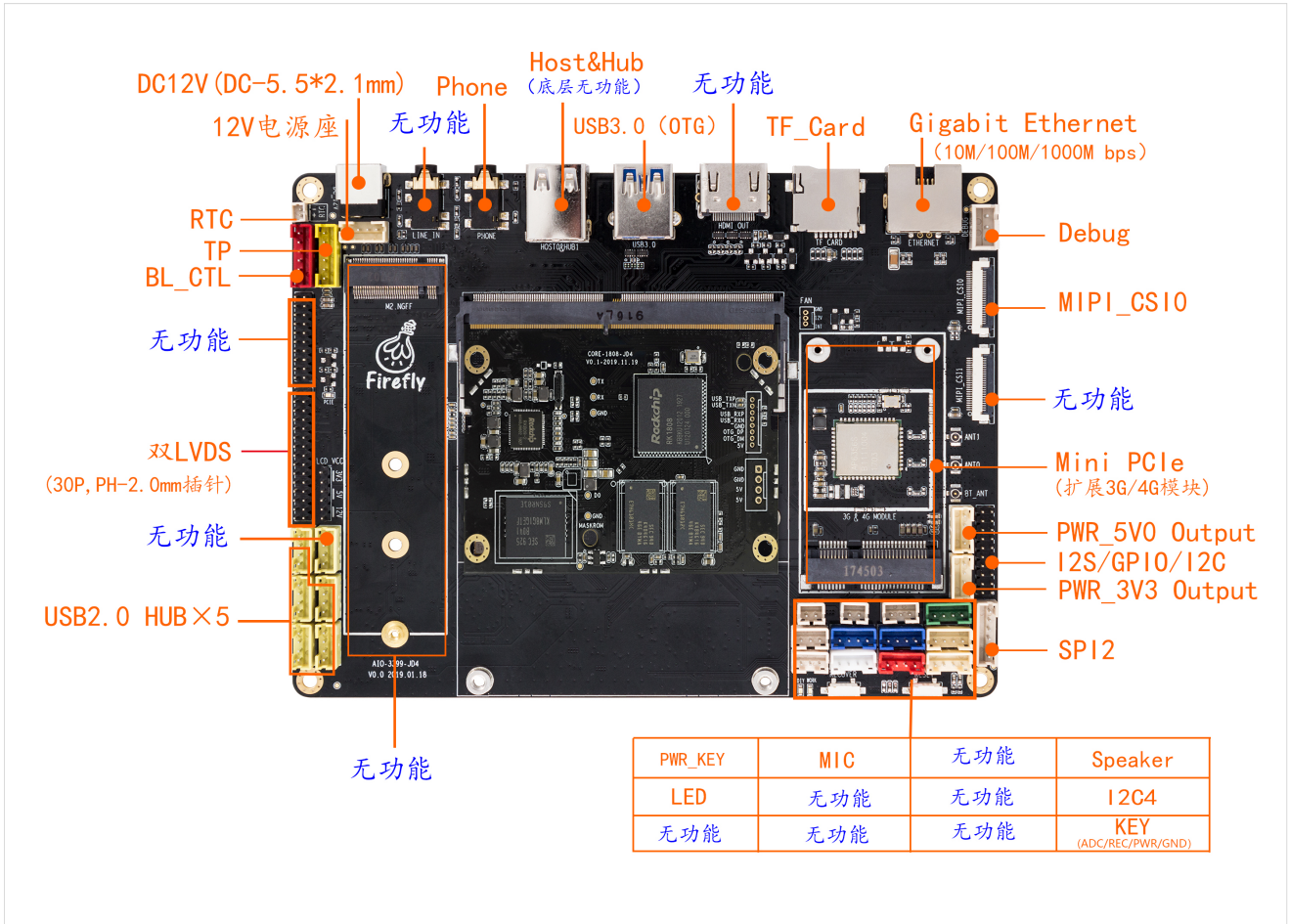
221	POWER_ON				POWER_ON	Power on Signal Input, External connection Power key , active low	To POWER _KEY			
223	NC_55									
225	VDDIO_WL_1	P			VDDIO_WL (LDO)	Output Voltage 1.8V,Rated output current 300mA	1.8V			
227	VCC_3V3_S0_1	P			VCC_LAN (LDO)	(VCCIO_3V3) Output Voltage 3.3V,Rated output current 500mA	3.3V			
229	VCCA1V8_CODEEC_1	P			VCCA1V8_CODEEC (LDO)	Output Voltage 1.8V,Rated output current 300mA	1.8V			
231	VCCA3V0_CODEEC_1	P			VCCA3V0_CODEEC (LDO)	Output Voltage 3.0V,Rated output current 100mA	3.0V			
233	VCC_5V_S	P			VCC_5V_S	Input Voltage 3.3V-5.5V, Rated input current 50mA	5.0V			
235	VCC3V3_SYS_1	P			VCC_3V3 (DCDC)	Output Voltage 3.3V,Rated output current 1A	3.3V			
237	HP_SNS				HP_SNS	Reference ground for the headphone				
239	MIC2_IN				MIC2_IN	Negative input of the Microphone				
241	MIC1_IN				MIC1_IN	Positive input of the Microphone				
243	GND_12	G			GND	Power ground	GND		GND_12	
245	GND_13	G			GND		GND		GND_13	
247	GND_14	G			GND		GND		GND_14	
249	GND_15	G			GND		GND		GND_15	
251	VCC5V0_SYS_1	P			VCC5V0_SYS		System Power supply Input Voltag : Min 4.8V,Typ 5.0V, Max 5.2V Input current: Typ 400mA ;Max 700mA	5.0V		
253	VCC5V0_SYS_2	P			VCC5V0_SYS	5.0V				
255	VCC5V0_SYS_3	P			VCC5V0_SYS	5.0V				
257	VCC5V0_SYS_4	P			VCC5V0_SYS	5.0V				
259	VCC5V0_SYS_12	P			VCC5V0_SYS	5.0V				
<b>Part B</b>	<b>pin</b>	<b>Core board pin definition</b>	<b>Pad type</b>	<b>IO Pull</b>	<b>Reset State</b>	<b>function for Floor</b>	<b>Default function description</b>	<b>IO Power domain</b>	<b>RK1808 Pin Number</b>	<b>RK1808 Pin Name</b>
	2	GND_16	G			GND	GND	GND		GND_16
	4	GPIO3_B7/I2S0_SCLK_TX/ISP_PRELIGHTRIG_d_3.0V	I/O	DOWN	I/GPIO	I2S0_SCLK_TX	I2S 0 port, for audio codec	3.0V	AD38	GPIO3_B7/I2S0_SCLK_TX/ISP_PRELIGHTRIG
	6	GPIO3_B1/I2S0_LRCK_RX/PDM_CLK1_d_3.0V	I/O	DOWN	I/GPIO	I2S0_LRCK_RX	I2S 0 port, for audio codec	3.0V	AB38	GPIO3_B1/I2S0_LRCK_RX/PDM_CLK1
	8	GPIO3_B6/I2S0_LRCK_TX/ISP_FLASHTRIGOUT_d_3.0V	I/O	DOWN	I/GPIO	I2S0_LRCK_TX	I2S 0 port, for audio codec	3.0V	AE39	GPIO3_B6/I2S0_LRCK_TX/ISP_FLASHTRIGOUT
	10	GPIO3_C1/I2S0_SDIO/PDM_SDIO_d_3.0V	I/O	DOWN	I/GPIO	I2S0_SDIO	I2S 0 port, for audio codec	3.0V	AA39	GPIO3_C1/I2S0_SDIO/PDM_SDIO
	12	GPIO3_C0/I2S0_SDO0/ISP_SHUTTRERIG_d_3.0V	I/O	DOWN	I/GPIO	I2S0_SDO0	I2S 0 port, for audio codec	3.0V	AC37	GPIO3_C0/I2S0_SDO0/ISP_SHUTTRERIG
	14	GPIO3_B2/I2S0_SDO3/ISP_FLASHTRIGIN/LCDC_HSYNC_M1_d_3.0V	I/O	DOWN	I/GPIO	I2S0_SDO3	I2S 0 port, for audio codec	3.0V	AC33	GPIO3_B2/I2S0_SDO3/ISP_FLASHTRIGIN/LCDC_HSYNC_M1
	16	GPIO3_B3/I2S0_SDO2/I2C2_SCL_M0/LCDC_VSYNC_M1_d_3.0V	I/O	DOWN	I/GPIO	I2S0_SDO2	I2S 0 port, for audio codec	3.0V	AC31	GPIO3_B3/I2S0_SDO2/I2C2_SCL_M0/LCDC_VSYNC_M1
	18	GPIO3_B4/I2S0_SDO1/I2C2_SDA_M0_d_3.0V	I/O	DOWN	I/GPIO	I2S0_SDO1	I2S 0 port, for audio codec	3.0V	AC35	GPIO3_B4/I2S0_SDO1/I2C2_SDA_M0
	20	GPIO3_B5/I2S0_MCLK/ISP_SHUTTEREN_d_3.0V	I/O	DOWN	I/GPIO	I2S_CLK	I2S MCLK, for both I2S0 and I2S1	3.0V	AC39	GPIO3_B5/I2S0_MCLK/ISP_SHUTTEREN
	22	GPIO2_D1/I2C3_SDA/UART2_RX_M1_u_3.3V	I/O	UP	I/GPIO	I2C3_SDA	I2C serial port 1,for Audio, Core board interior pull up Resistor 2.2K	3.3V	AV36	GPIO2_D1/I2C3_SDA/UART2_RX_M1
	24	GPIO2_D0/I2C3_SCL/UART2_TX_M1_u_3.3V	I/O	UP	I/GPIO	I2C3_SCL	I2C serial port 1,for Audio, Core board interior pull up Resistor 2.2K	3.3V	AW37	GPIO2_D0/I2C3_SCL/UART2_TX_M1
	26	GND_17	G			GND	GND	GND		GND_17
	28	NC_56								
	30	GPIO3_B0/I2S0_SCLK_RX/PDM_CLK0_d_3.0V	I/O	DOWN		I2S0_SCLK_RX	I2S serial clock	3.0V	Y38	GPIO3_B0/I2S0_SCLK_RX/PDM_CLK0
	32	GPIO3_A7/I2S0_SDIO/PDM_SDIO_d_3.0V	I/O	DOWN		I2S0_SDIO1	I2S serial data input	3.0V	AC29	GPIO3_A7/I2S0_SDIO/PDM_SDIO1
	34	GPIO3_A5/I2S0_SDI3/PDM_SDI3_d_3.0V	I/O	DOWN		I2S0_SDI3	I2S serial data input	3.0V	AA31	GPIO3_A5/I2S0_SDI3/PDM_SDI3
	36	GPIO3_A6/I2S0_SDI2/PDM_SDI2_d_3.0V	I/O	DOWN		I2S0_SDI2	I2S serial data input	3.0V	W35	GPIO3_A6/I2S0_SDI2/PDM_SDI2
	38	NC_57								
	40	GND_18	G			GND	GND	GND		GND_18
	42	GPIO4_C0/SPI1_CSN1_M0_u_1.8V	I/O	UP		WIFI_REG_ON_H	WIFI module power enable	1.8V	AL33	GPIO4_C0/SPI1_CSN1_M0
	44	GPIO4_C1/I2C5_SCL_u_1.8V	I/O	UP		WIFI_HOST_WAKE_L	WIFI module wake up AP	1.8V	AR39	GPIO4_C1/I2C5_SCL
	46	GPIO4_B2/SDMMC1_D2/UART1_CTS_u_1.8V	I/O	UP		SDIO0_D2	SDIO1 data port , for WIFI module	1.8V	AT38	GPIO4_B2/SDMMC1_D2/UART1_CTS
	48	GPIO4_B3/SDMMC1_D3/UART1_RTS_u_1.8V	I/O	UP		SDIO0_D3	SDIO1 data port , for WIFI module	1.8V	AP38	GPIO4_B3/SDMMC1_D3/UART1_RTS
	50	GPIO4_A6/SDMMC1_CMD_u_1.8V	I/O	UP		SDIO0_CMD	SDIO0 command output , for WIFI module	1.8V	AR31	GPIO4_A6/SDMMC1_CMD
	52	GPIO4_A7/SDMMC1_CLK_d_1.8V	I/O	DOWN		SDIO0_CLK	SDIO0 clock output, for WIFI module	1.8V	AR35	GPIO4_A7/SDMMC1_CLK
	54	GPIO4_B0/SDMMC1_D0/UART1_RX_M0_u_1.8V	I/O	UP		SDIO0_D0	SDIO0 data port , for WIFI module	1.8V	AN31	GPIO4_B0/SDMMC1_D0/UART1_RX_M0
	56	GPIO4_B1/SDMMC1_D1/UART1_TX_M0_u_1.8V	I/O	UP		SDIO0_D1	SDIO0 data port , for WIFI module	1.8V	AP34	GPIO4_B1/SDMMC1_D1/UART1_TX_M0
	58	GND_19	G			GND	GND	GND		GND_19
	60	RTC_CLKO_WIFI				RTC_CLKO_WIFI	32.768K clock output to WIFI	1.8V		
	62	GPIO4_C2/I2C5_SDA_u_1.8V	I/O	UP		BT_REG_ON_H	BT module power enable 1:Enable 0:Disable	1.8V	AL29	GPIO4_C2/I2C5_SDA
	64	GPIO4_B4/UART4_RX/SPI1_CLK_M0_u_1.8V	I/O	UP		UART4_RXD	UART0 serial port, for BT module	1.8V	AN33	GPIO4_B4/UART4_RX/SPI1_CLK_M0

66	GPIO4_B5/UART4_TX/SPI1_MOSI_M0_u_1.8V	I/O	UP	UART4_TXD	UART0 serial port, for BT module	1.8V	AJ29	GPIO4_B5/UART4_TX/SPI1_MOSI_M0
68	GPIO4_B6/UART4_CTS/SPI1_CSN0_M0_u_1.8V	I/O	UP	UART4_CTS	UART0 serial port, for BT module	1.8V	AU39	GPIO4_B6/UART4_CTS/SPI1_CSN0_M0
70	GPIO4_B7/UART4_RTS/SPI1_MISO_M0_u_1.8V	I/O	UP	UART4_RTS	UART0 serial port, for BT module	1.8V	AR33	GPIO4_B7/UART4_RTS/SPI1_MISO_M0
72	GPIO4_C3_u_1.8V	I/O	UP	BT_WAKE_L	AP wake up BT module	1.8V	AL27	GPIO4_C3
74	GPIO4_C4_u_1.8V	I/O	UP	BT_HOST_WAKE_L	WiFi module wake up AP	1.8V	AL31	GPIO4_C4
76	GND_20	G		GND	GND	GND		GND_20
78	GPIO2_C6/LCDC_CLK_d_3.3V	I/O	DOWN	3G_PWR_EN	3G power enable	3.3V	AW33	GPIO2_C6/LCDC_CLK
80	GPIO2_C0/CIF_D0/CLKOUT_ETHERNET_d_3.3V	I/O	DOWN	TP_INT1	Touch panel interrupt input (Not debugged)	3.3V	AR25	GPIO2_C0/CIF_D0/CLKOUT_ETHERNET
82	GPIO3_C7/LCDC_D13/UART7_RX/SPI1_CLK_M1_d_3.3V	I/O	DOWN	SPI1_CLK_M1/GPIO3_C7	SPI bus port 2	3.3V	AL35	GPIO3_C7/LCDC_D13/UART7_RX/SPI1_CLK_M1
84	GPIO3_D1/LCDC_D15/PWM9/SPI1_CSN0_M1_d_3.3V	I/O	DOWN	SPI1_CSN0_M1/PWM9	SPI bus port 2	3.3V	AG31	GPIO3_D1/LCDC_D15/PWM9/SPI1_CSN0_M1
86	GPIO3_D2/LCDC_D16/PWM10/SPI1_MISO_M1_d_3.3V	I/O	DOWN	SPI1_MISO_M1/PWM10	SPI bus port 2	3.3V	AK38	GPIO3_D2/LCDC_D16/PWM10/SPI1_MISO_M1
88	GPIO3_D0/LCDC_D14/PWM8/SPI1_MOSI_M1_d_3.3V	I/O	DOWN	SPI1_MOSI_M1/PWM8	SPI bus port 2	3.3V	AJ35	GPIO3_D0/LCDC_D14/PWM8/SPI1_MOSI_M1
90	GPIO0_C7/UART3_RTS_d_3.3V	I/O	DOWN	SDMMC0_PWR	SD card power supply enabled	3.3V	AR13	GPIO0_C7/UART3_RTS
92	NC_58							
94	GPIO0_B7/PWM0/OTG_DRV_d_3.3V	I/O	DOWN	LCD_BL_PWM0	LCD panel backlight brightness control output	3.3V	AV14	GPIO0_B7/PWM0/OTG_DRV
96	GPIO0_C3/PWM1/UART3_TX_d_3.3V	I/O	DOWN	LCD_BL_PWM1	PWM1	3.3V	AV18	GPIO0_C3/PWM1/UART3_TX
98	GPIO1_B0/EMMC_PWREN/SPI2_MOSI_M0_u_3.3V	I/O	UP	GPIO1_B0	GPIO (no used)	3.3V	G31	GPIO1_B0/EMMC_PWREN/SPI2_MOSI_M0
100	GPIO1_B4/SPI0_MOSI/I2C2_SCL_M1/UART1_RX_M1_u_3.3V	I/O	UP	UART1DBG_RX	UART1 serial port data input, for AP debug	3.3V	C27	GPIO1_B4/SPI0_MOSI/I2C2_SCL_M1/UART1_RX_M1
102	GPIO1_B5/SPI0_MISO/I2C2_SDA_M1/UART1_TX_M1_u_3.3V	I/O	UP	UART1DBG_TX	UART1 serial port data output, for AP debug	3.3V	A27	GPIO1_B5/SPI0_MISO/I2C2_SDA_M1/UART1_TX_M1
104	NC_70							
106	GPIO2_C3/CIF_D11/LCDC_D3_d_3.3V	I/O	DOWN	MIPI_PDN0_H	Mipi camera power down, low when the camera is working	3.3V	AL23	GPIO2_C3/CIF_D11/LCDC_D3
108	NC_61							
110	GPIO2_C4/LCDC_D4_d_3.3V	I/O	DOWN	WK2124_INT	INT interrupt trigger, notify CPU, CPU gets related information	3.3V	AL25	GPIO2_C4/LCDC_D4
112	GPIO2_C5/LCDC_D5_d_3.3V	I/O	DOWN	TP_INT	Touch panel interrupt input	3.3V	AW35	GPIO2_C5/LCDC_D5
114	NC_62							
116	GPIO3_C4/LCDC_D10/UART6_TX_d_3.3V	I/O	DOWN	WK2124_RST	WK2124 Reset	3.3V	AL39	GPIO3_C4/LCDC_D10/UART6_TX
118	GPIO3_C5/LCDC_D11/UART6_RX_d_3.3V	I/O	DOWN	LCD_RST	LCD Reset	3.3V	AJ33	GPIO3_C5/LCDC_D11/UART6_RX
120	GPIO0_B6/PCIE_PERST_M1_u_3.3V	I/O	UP	PCIE_RST	PCIE Reset	3.3V	AU9	GPIO0_B6/PCIE_PERST_M1
122	NC_63							
124	GND_21	G		GND	GND	GND		GND_21
126	DPHY_TX_D3P	A		MIPI_DSI_D3P	MIPI-DSIO differential lane 3 positive	1.8V	H38	DPHY_TX_D3P
128	DPHY_TX_D3N	A		MIPI_DSI_D3N	MIPI-DSIO differential lane 3 negative	1.8V	G39	DPHY_TX_D3N
130	DPHY_TX_D2P	A		MIPI_DSI_D2P	MIPI-DSIO differential lane 2 positive	1.8V	F38	DPHY_TX_D2P
132	DPHY_TX_D2N	A		MIPI_DSI_D2N	MIPI-DSIO differential lane 2 negative	1.8V	E39	DPHY_TX_D2N
134	DPHY_TX_CLKP	A		MIPI_DSI_CLKP	MIPI-DSIO differential clock lane positive	1.8V	G35	DPHY_TX_CLKP
136	DPHY_TX_CLKN	A		MIPI_DSI_CLKN	MIPI-DSIO differential clock lane negative	1.8V	E35	DPHY_TX_CLKN
138	DPHY_TX_D1P	A		MIPI_DSI_D1P	MIPI-DSIO differential lane 1 positive	1.8V	D38	DPHY_TX_D1P
140	DPHY_TX_D1N	A		MIPI_DSI_D1N	MIPI-DSIO differential lane 1 negativ	1.8V	C39	DPHY_TX_D1N
142	DPHY_TX_D0P	A		MIPI_DSI_D0P	MIPI-DSIO differential lane 0 positive	1.8V	A37	DPHY_TX_D0P
144	DPHY_TX_D0N	A		MIPI_DSI_D0N	MIPI-DSIO differential lane 0 negativ	1.8V	B38	DPHY_TX_D0N
146	NC_64							
148	NC_65							
150	ADC_IN0	A		ADC_IN0	ADC input, Core board interior pull up Resistor 10K	1.8V	W31	ADC_IN0
152	ADC_IN2	A		RECOVER	AD keyboard input, Core board interior pull up Resistor 10K	1.8V	W33	ADC_IN2
154	ADC_IN1	A		LINE_IN_DET	LINE_IN detect input, Core board interior pull up Resistor 10K	1.8V	U31	ADC_IN1
156	ADC_IN3	A		HP_DET	Headphone insert detect input, Core board interior pull up Resistor 10K	1.8V	U33	ADC_IN3
158	GPIO0_C5/PCIE_WAKE_M1/PWM2_d_3.3V	I/O	DOWN	PCIE_WAKE	AP wake up PCIE	3.3V	AV16	GPIO0_C5/PCIE_WAKE_M1/PWM2
160	GPIO0_C6/PCIE_CLKREQN_M1/UART3_CTS_d_3.3V	I/O	DOWN	PCIE_CLKREQ	PCIE CLKREQN	3.3V	AN15	GPIO0_C6/PCIE_CLKREQN_M1/UART3_CTS
162	NC_66							
164	GND_22	G		GND	GND	GND		GND_22
166	GPIO4_A3/SDMMC0_D1/UART2_RX_M0_u_3.3V	I/O	UP	SDMMC0_D1	SDMMC_D1 data port, for TF Card	3.3V	AE35	GPIO4_A3/SDMMC0_D1/UART2_RX_M0
168	GPIO4_A2/SDMMC0_D0/UART2_TX_M0_u_3.3V	I/O	UP	SDMMC0_D0	SDMMC_D0 data port, for TF Card	3.3V	AG39	GPIO4_A2/SDMMC0_D0/UART2_TX_M0
170	GPIO4_A4/SDMMC0_D2/JTAG_TCK_u_3.3V	I/O	UP	SDMMC0_D2	SDMMC_D2 data port, for TF Card	3.3V	AF38	GPIO4_A4/SDMMC0_D2/JTAG_TCK
172	GPIO4_A0/SDMMC0_CMD/TEST_CLK0_u_3.3V	I/O	UP	SDMMC0_CMD	SDMMC command output, for TF Card	3.3V	AJ39	GPIO4_A0/SDMMC0_CMD/TEST_CLK0
174	GPIO4_A5/SDMMC0_D3/JTAG_TMS_u_3.3V	I/O	UP	SDMMC0_D3	SDMMC_D3 data port, for TF Card	3.3V	AE33	GPIO4_A5/SDMMC0_D3/JTAG_TMS
176	GPIO4_A1/SDMMC0_CLK_d_3.3V	I/O	DOWN	SDMMC0_CLK	SDMMC clock output is used for TF card.	3.3V	AH38	GPIO4_A1/SDMMC0_CLK
178	GPIO0_A3/PCIE_CLKREQN_M0/SDMMC0_DET_N_u_1.8V	I/O	UP	SDMMC0_DET	Sdmmc card detect signal, 0: TF card insert 1: TF card no insert	1.8V	AV20	GPIO0_A3/PCIE_CLKREQN_M0/SDMMC0_DET_N



180	GND_23	G			GND	GND		GND_23	
182	GPIO2_B0/CIF_D6/RGMII_MDIO_d_3.3V	I/O	DOWN		MAC_MDIO	MAC management interface data	3.3V	AW29	GPIO2_B0/CIF_D6/RGMII_MDIO
184	GPIO2_B2/CIF_D8/RGMII_MDC/LCDC_HSYNC_M0_d_3.3V	I/O	DOWN		MAC_MDC	MAC management interface clock	3.3V	AW31	GPIO2_B2/CIF_D8/RGMII_MDC/LCDC_HSYNC_M0
186	GPIO2_C1/CIF_D1/RGMII_TXCLK_d_3.3V	I/O	DOWN		PHY_TXCLK	MAC transmit clock	3.3V	AN27	GPIO2_C1/CIF_D1/RGMII_TXCLK
188	GPIO2_C2/CIF_D10/RGMII_RXCLK/LCDC_D2_d_3.3V	I/O	DOWN		MAC_RXCLK	MAC RX clock	3.3V	AN25	GPIO2_C2/CIF_D10/RGMII_RXCLK/LCDC_D2
190	GND_24	G			GND	GND			GND_24
192	GPIO2_B7/CIF_CLKOUT/RGMII_CLK_d_3.3V	I/O	DOWN		MAC_CLK	MAC reference clock output	3.3V	AR27	I/O DOWN
194	GPIO2_A5/CIF_D3/RGMII_RXD1/SPI2_CLK_M1_d_3.3V	I/O	DOWN		MAC_RXD1	MAC receive data	3.3V	AL21	I/O DOWN
196	GPIO2_B6/CIF_CLKIN/RGMII_RXD3_d_3.3V	I/O	DOWN		MAC_RXD3	MAC receive data	3.3V	AU31	I/O DOWN
198	GPIO2_A4/CIF_D2/RGMII_RXD0/SPI2_MISO_M1_d_3.3V	I/O	DOWN		MAC_RXD0	MAC receive data	3.3V	AN21	I/O DOWN
200	GPIO2_B5/CIF_HREF/RGMII_RXD2_d_3.3V	I/O	DOWN		MAC_RXD2	MAC receive data	3.3V	AV32	I/O DOWN
202	GPIO2_A7/CIF_D5/RGMII_RXDV/SPI2_CSN_M1_d_3.3V	I/O	DOWN		MAC_RXDV	MAC receive data valid	3.3V	AU25	I/O DOWN
204	GPIO2_A3/CIF_D15/RGMII_TXD0/LCDC_D1_d_3.3V	I/O	DOWN		PHY_TXD0	MAC transmit data	3.3V	AJ21	I/O DOWN
206	GPIO2_B4/CIF_VSYNC/RGMII_TXD2_d_3.3V	I/O	DOWN		PHY_TXD2	MAC transmit data	3.3V	AV30	I/O DOWN
208	GPIO2_B3/CIF_D9/RGMII_TXD3/LCDC_VSYNC_M0_d_3.3V	I/O	DOWN		PHY_TXD3	MAC transmit data	3.3V	AV28	I/O DOWN
210	GPIO2_A2/CIF_D14/RGMII_TXD1/LCDC_D0_d_3.3V	I/O	DOWN		PHY_TXD1	MAC transmit data	3.3V	AL19	I/O DOWN
212	GPIO2_A1/CIF_D13/RGMII_TXEN/LCDC_D7_d_3.3V	I/O	DOWN		PHY_TXEN	MAC transmit enable	3.3V	AR19	I/O DOWN
214	GPIO2_A6/CIF_D4/RGMII_RXER/SPI2_MOSI_M1_d_3.3V	I/O	DOWN		FAN_CTL	FAN_EN:H	3.3V	AV26	I/O DOWN
216	GPIO2_A0/CIF_D12/RGMII_CRS/LCDC_D6_d_3.3V	I/O	DOWN		PHY_RST	PHY_Reset:L	3.3V	AW25	I/O DOWN
218	NPOR	I	fix up		RESET_KEY	Core board pull up 10K, System reset signal input. 0 : System Reset 1 : Normal	1.8V	AW23	NPOR
220	EXT_EN				PMIC_EXT_EN	External Power enable output, Voltage 5V 1:Enable 0:Disable	5.0V		
222	GND_25	G			GND	GND			GND_25
224	VDDIO_WL_2	P			VDDIO_WL (LDO)	Output Voltage 1.8V, Rated output current 300mA	1.8V		
226	VCC_3V3_S0_2	P			VCC_LAN (LDO)	(VCCIO_3V3) Output Voltage 3.3V, Rated output current 500mA	3.3V		
228	VCCA1V8_CODEC_2	P			VCCA1V8_CODEC (LDO)	Output Voltage 1.8V, Rated output current 300mA	1.8V		
230	VCCA3V0_CODEC_2	P			VCCA3V0_CODEC (LDO)	Output Voltage 3.0V, Rated output current 100mA	3.0V		
232	VCC_RTC	P			VCC_RTC	Input Voltage 3.3V-5.5V, Rated input current 50mA	5.0V		
234	VCC3V3_SYS_2	P			VCC_3V3 (DCDC)	Output Voltage 3.3V, Rated output current 1A	3.3V		
236	SPKP_OUT				SPKP_OUT	Positive speaker driver output. (no used)			
238	SPKN_OUT				SPKN_OUT	Negative speaker driver output. (no used)			
240	HPL_OUT				HPL	Left channel output of the headphone.			
242	HPR_OUT				HPR	Right channel output of the headphone.			
244	GND_26	G			GND		GND		GND_26
246	GND_27	G			GND		GND		GND_27
248	GND_28	G			GND		GND		GND_28
250	GND_29	G			GND		GND		GND_29
252	VCC_SYS_6	P			VCC5V0_SYS		5.0V		
254	VCC_SYS_7	P			VCC5V0_SYS		5.0V		
256	VCC_SYS_8	P			VCC5V0_SYS	System Power supply Input Voltag : Min 4.8V, Typ 5.0V, Max 5.2V	5.0V		
258	VCC_SYS_9	P			VCC5V0_SYS	Input current: Typ 400mA ;Max 700mA	5.0V		
260	VCC_SYS_10	P			VCC5V0_SYS		5.0V		

## 五、核心板+底板



## 附录

## 公司简介

天启智能科技有限公司，成立于 2005 年，是国家高新技术企业。拥有超过 10 年科技产品的研发经验、6 项发明专利、30 多项软件著作权，专注于开源智能硬件，物联网、数字音频产品的研发设计、生产和销售，同时提供了智能硬件产品的整体解决方案。



Firefly 是天启科技旗下的品牌，经营开源产品、开源社区与网上商城，拥有庞大的企业用户与开发者用户，产品深受用户好评。Firefly 开源产品包括开源板、核心板、行业主板等。开源板是瑞芯微公司（Rockchip）推荐板卡，获得原生 SDK 支持。核心板与行业主板广泛应用于商业显示、广告一体机、智能 POS、人脸识别终端、物联网、智慧城市等领域。目前有超过 10 万用户，包括 2000 多家企业用户，知名用户有 ARM、Google、百度、腾讯、阿里巴巴等。

Firefly 团队研发成员超过 60 人，拥有原理图设计、PCB Layout、主板量产、嵌入式开发、系统开发、应用程序开发等研发能力，为众多科技创业者与初创企业加速研发进程，并提供专业的技术服务。

“让科技更简单，让生活更智能”是 Firefly 团队的理念，我们希望能通过 Firefly 的开源产品与技术服务，让各种科技产品的研发变得高效简单，让智能科技融入生活。



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