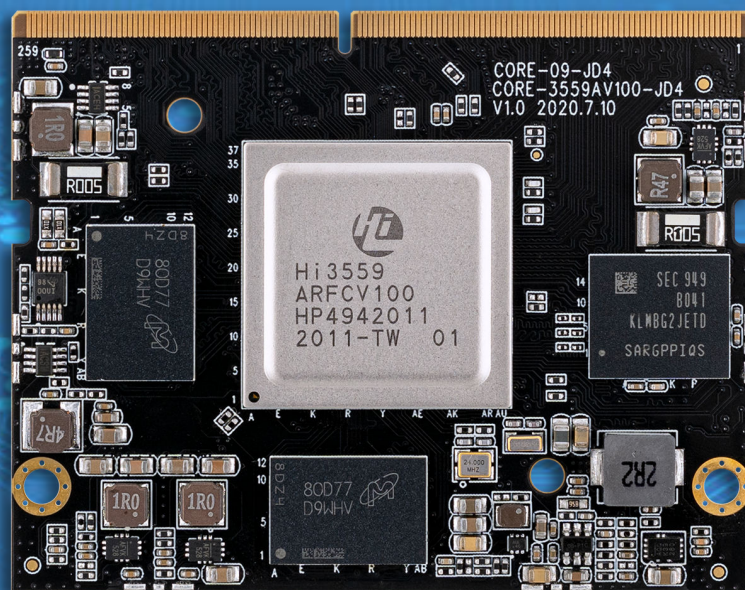


天启科技

# Core-3559AV100-JD4

人工智能核心板

V1.0



天启智能科技有限公司

[www.t-firefly.com](http://www.t-firefly.com)



### 更新记录

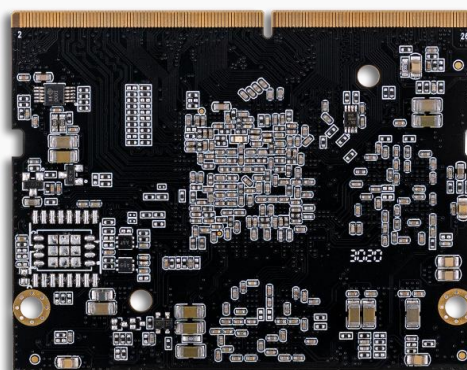
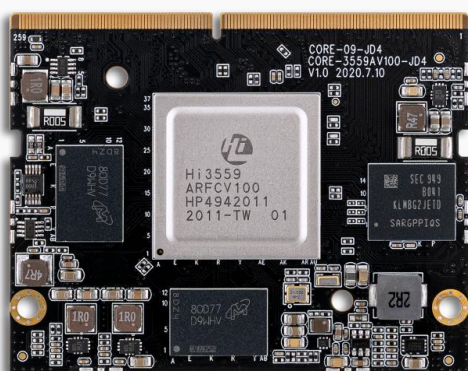
版本	更新日期	更新内容
V1.0	2020-8-11	硬件版本: V1.0

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## 一、产品简介

核心板采用华为海思 Hi3559AV100 AI 处理器，专业 8K 超高清移动相机 SoC，内置双核 NNIE 神经网络加速引擎，支持 Neon 加速，支持多种方式编码以及视频录制，提供视觉计算处理能力，拥有强劲的 AI 性能，核心板适用于边缘计算、人工智能、图像处理、运动相机、智能 AI 摄像机等领域。



### 华为海思 AI 处理器

采用了华为海思 Hi3559AV100 AI 处理器，专业的 8K 超高清移动相机 SoC，14nm 芯片制程，最高频率 1.8GHz；支持 Neon 加速，集成 FPU 处理单元，性能强悍。

### 强大的视频编解码能力

配备了视频编解码处理专用的四核 DSP 处理器，支持 8K 30 帧/4K 120 帧广播级超高质量的视频录制；以及支持 H.265 编码输出、或影视级的 RAW 数据输出。

### 多路视频录制

支持多路 ISP 接入，最高可支持 4 路摄像头输入；可同时支持 4 路 4K 30 帧或 2 路 4K 60 帧的视频录制，支持机内硬化拼接。

### 丰富的扩展接口

拥有 USB3.0、PCIe2.0、ADC、SPI、I2C、PWM、UART、MIPI、RGB、CAN 总线等扩展接口，满足用户的各种应用需求。

### 搭配高性能行业底板

核心板可与底板组合，构成完整的高性能行业应用主板，扩展接口更丰富，性能更强大，可直接应用到各种智能产品中，加速产品落地。

### 新一代移动 GPU

内置双核 Mali G71 图形处理器，相比 T 系列 GPU，全新 Bifrost 架构可提升 50% 的图像处理性能，支持 OpenCL 1.1/1.2/2.0 以及 OpenGL ES 3.0/3.1/3.2。

### AI 神经网络加速

内置双核 NNIE 神经网络加速引擎，支持深度学习算法，算力高达 4.0 TOPs。

### 支持多种操作系统

支持 Buildroot + QT，Linux 操作系统，Huawei LiteOS；支持 Linux 与 Huawei LiteOS 双系统并行启动，同时支持异构和非异构模式。

### 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。

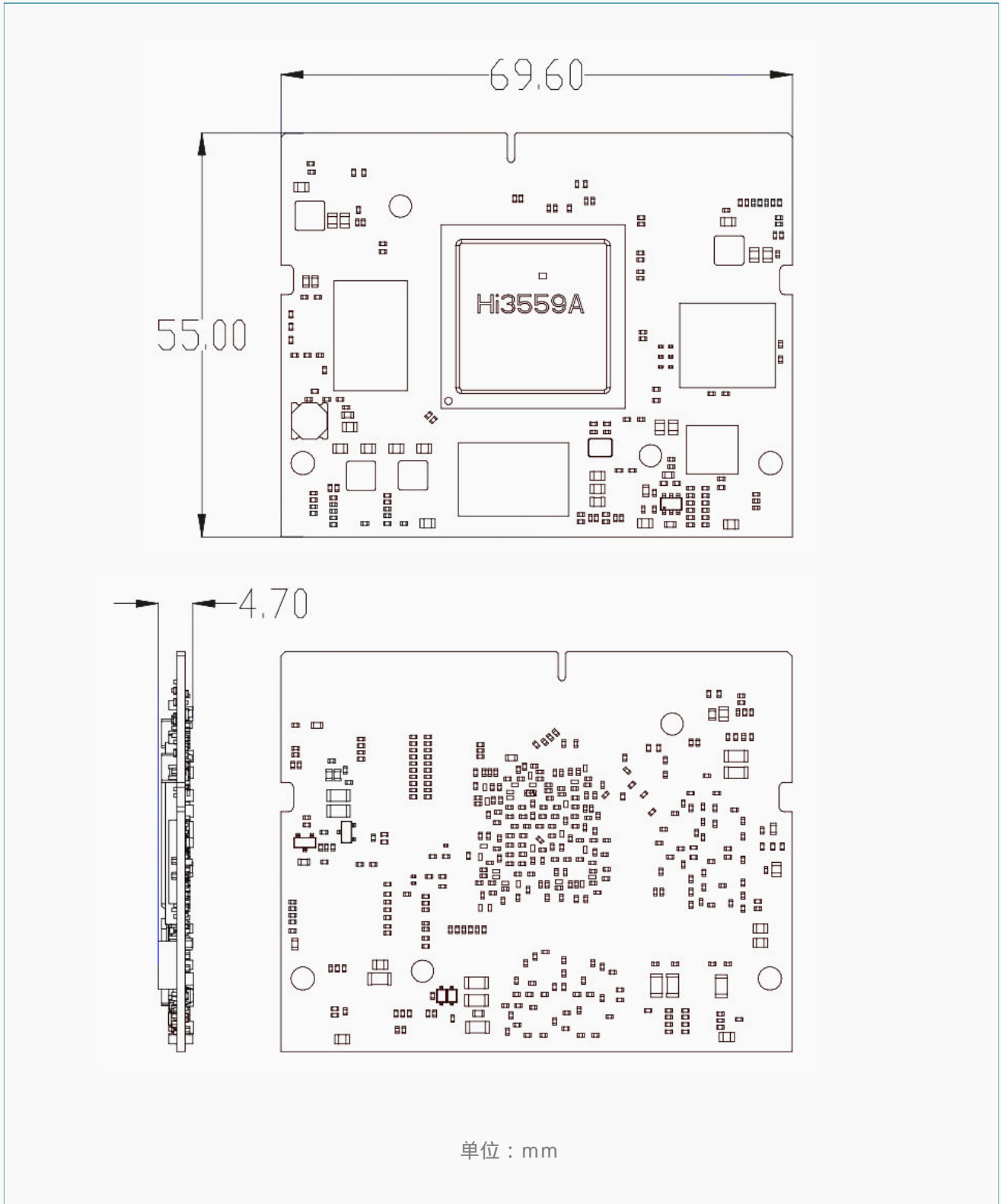
### 应用广泛

广泛适用于计算机视觉、图像处理、高性能计算/存储、集群服务器、边缘计算、人工智能、运动相机、智能 AI 摄像机等领域。

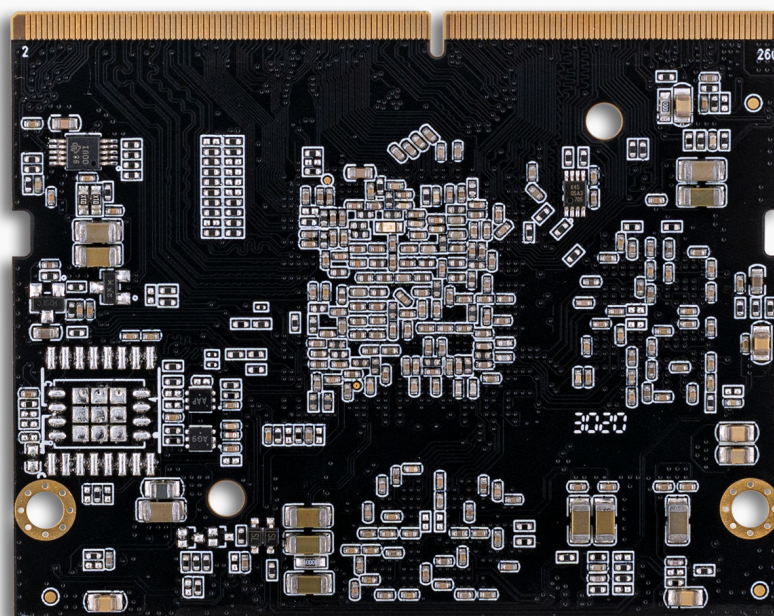
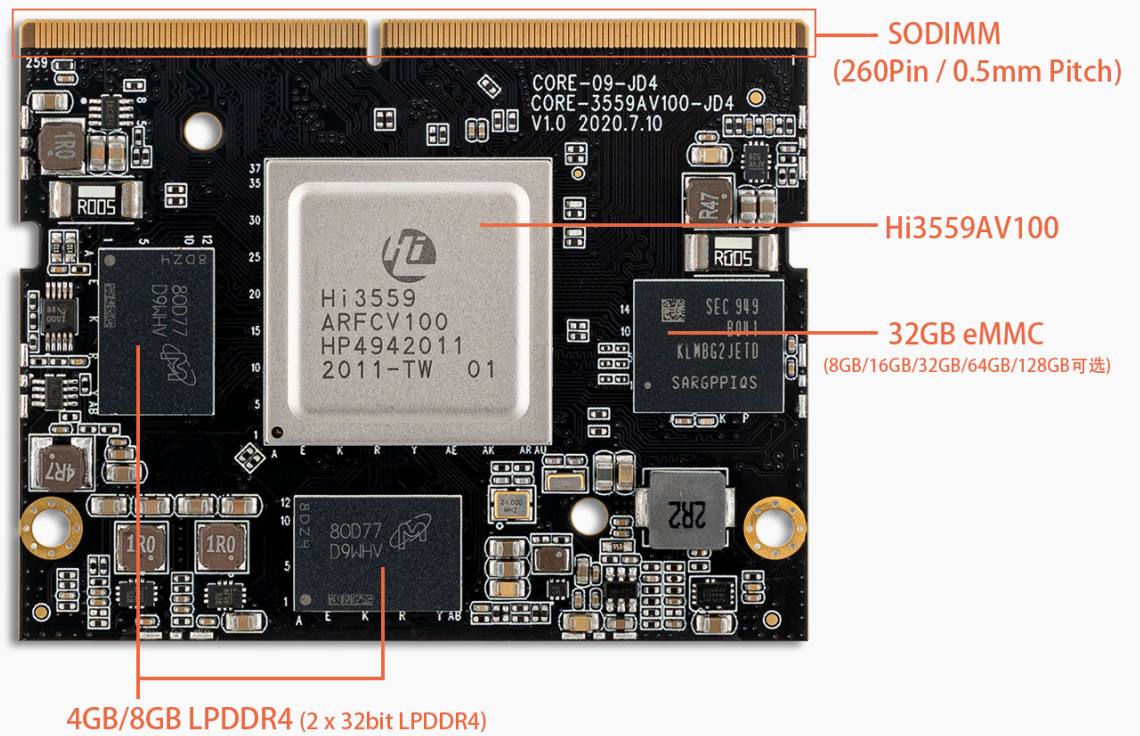
## 二、规格参数

基本参数	
主控芯片	华为海思 Hi3559AV100
处理器	双核 ARM Cortex A73@1.6GHz + 双核 ARM Cortex A53@1.2GHz + 单核 ARM Cortex A53@1.2GHz, 支持 Neon 加速, 集成 FPU 处理单元
Sernor Hub	集成 ARM Cortex M7@192Mhz 集成 PMC 电源控制单元, PMC 只支持外部复位 支持内部 POR 支持通用外设 IP (UART/SPI/I2C/PWM/GPIO/LSADC) 支持 2 通道 LSADC, 7 个 UART 接口, 8 个 PWM 接口
图形处理器 GPU	双核 ARM Mali G71@900MHz, 256KB cache 支持 OpenCL 1.1/1.2/2.0、OpenGL ES 3.0/3.1/3.2
神经网络加速	双核 NNIE@840MHz 神经网络加速引擎, 支持深度学习算法, 算力高达 4.0 TOPs 四核 DSP@700MHz, 32K I-Cache /32K IRAM/512KB DRAM 提供视觉计算处理能力、内置双目深度检测单元
视频编码	H.264 编码可支持最大分辨率为 8192 x 8640 Pixel H.265 编码可支持最大分辨率为 16384 x 8640Pixel H.264/H.265 多码流实时编码能力: 7680 x 4320@30fps+1080P@30fps+7680 x 4320@2fps 支持最大 JPEG 抓拍性能 7680 x 4320@15fps 支持专业级 4KP30 视频 RAW 输出
视频解码	支持 H.264 BP/MP/HP 支持 H.265 Main Profile/Main 10 Profile 支持 JPEG/MJPEG Baseline 最高支持到 H264/H.265 7680 x 4320@30fps 或 H.264/H.265 3840 x 2160@120fps 最高支持到 7680 x 4320@15fps JPEG 解码
内存	4GB / 8GB LPDDR4 支持 2 x 32bit LPDDR4
存储器	32GB eMMC (8GB / 16GB / 32GB / 64GB / 128GB 可选)
硬件特性	
以太网	集成 2 个 GMAC, 支持 RGMII/RMII 接口 支持扩展 RTL8211F 实现 10/100/1000Mbps 以太网
WiFi	通过 SDIO3.0 扩展 WiFi & Bluetooth
显示	支持 HDMI2.0 显示输出, HDMI 最大支持 8K(7680x4320)@30fps 分辨率 支持 6/8/16/24bit RGB 数字 LCD 输出, 最高分辨率支持到 1920 x 1080@60fps 输出 1xMIPI DSI 显示输出 (与 RGB 复用)
音频	集成 Audio codec, 支持 16bit 语音输入和输出 支持 I2S 接口, 支持对接外部 Audio codec 支持双声道 Mic 差分输入, 降低底噪
摄像头	支持 2x4KP60 或 4x4KP30 或 8x1080P30, 支持机内硬化拼接
USB	2 x USB3.0/USB2.0 Host/Device 接口
外围接口	支持 POR 支持外部复位输入 支持内部 RTC 集成 2 通道 LSADC 支持 IR 接口、I2C 接口、SSP 主接口、GPIO 接口 5 x UART 接口 2 x PWM 接口 2 x SD3.0/SDIO3.0 接口、1 x SD2.0 2 x lane PCIe2.0 RC / EP 模式
电源	核心板: 5V / 2A
系统软件	
系统支持	操作系统采用 Buildroot + QT 支持 Linux (启动核心: 2xA73+2xA53) 和 Huawei LiteOS (启动核心: 1xA53) 双系统并行启动, 同时支持异构和非异构模式
外观规格	
核心板尺寸	69.6 mm x 55 mm
接口类型	金手指 (SODIMM 260P 标准接口, 0.5mm 间距)

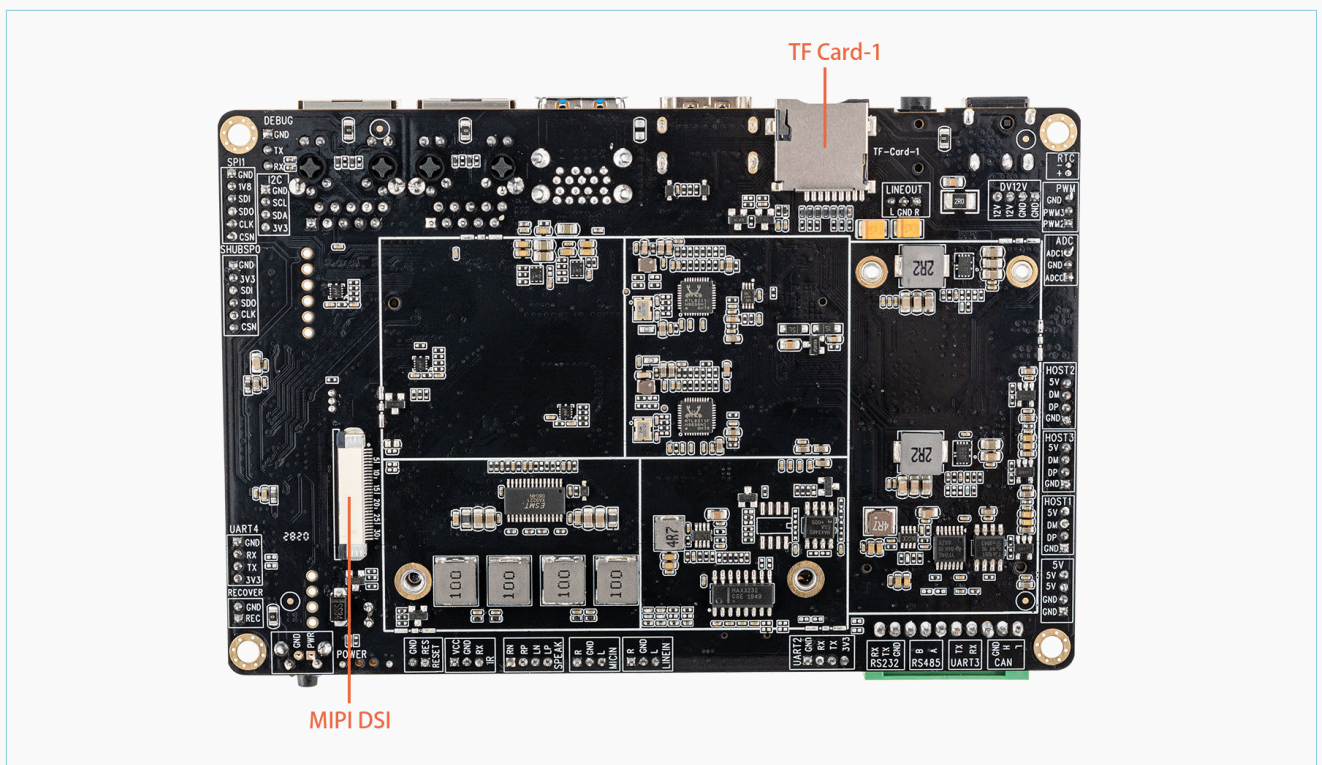
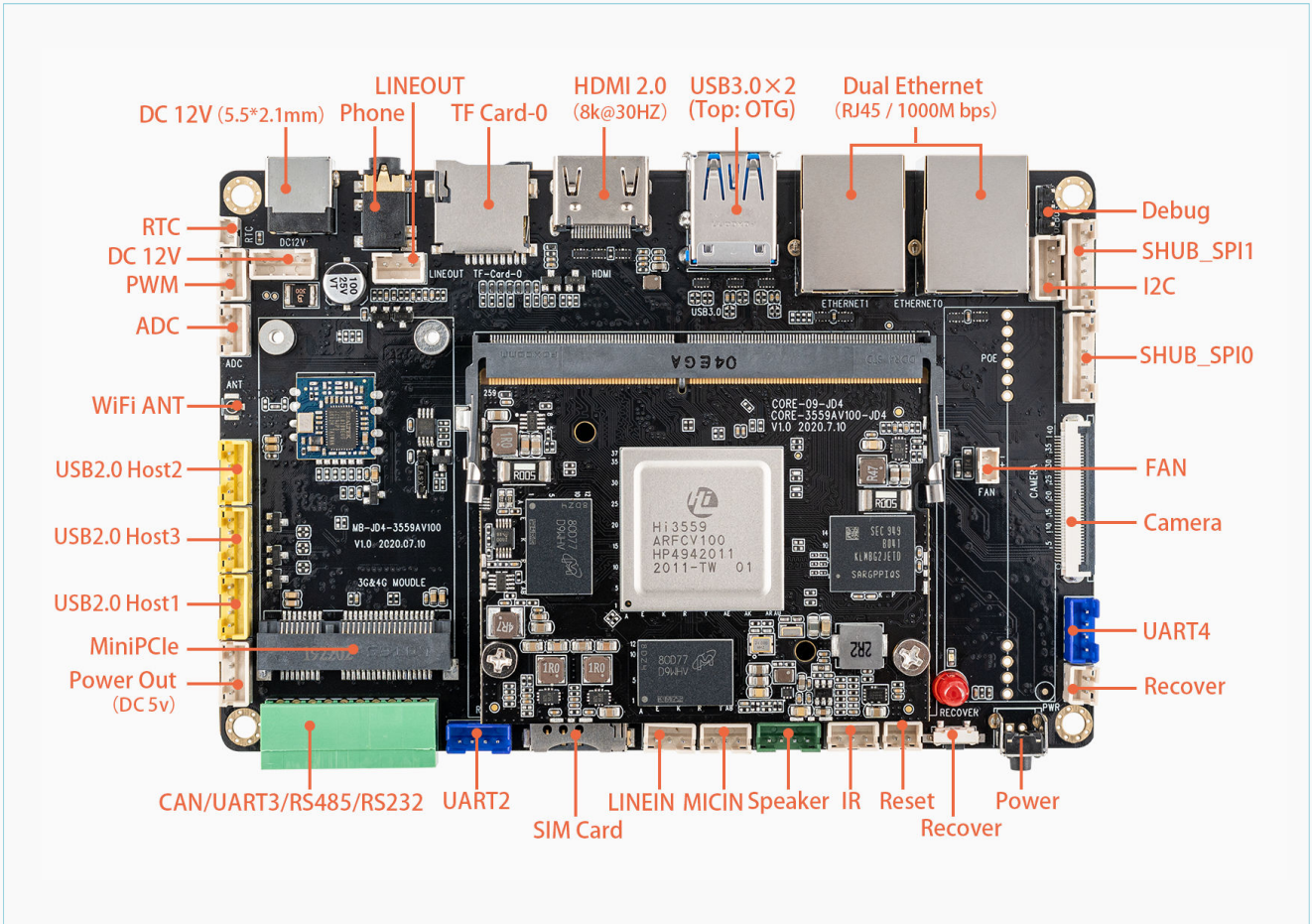
### 三、规格尺寸



## 四、接口描述



### 五、核心板与底板





## 六、核心板接口定义

Notes1:

① : Pad types: I = input, O = output, I/O = input/output (bidirectional) , G= Ground ,

P = power supply , DOWN = Internal pull down , UP = Internal pull UP

0 = Low Level 1 = High level

Part A	PIN	Core board pin definition	Pad type	Function for Main Board(MB-JD4-3559AV100)	IO Power domain/V	Pin Number	Pin Name
	1	GND	G	GND			
	3	SHUB_UART0_CTSN/SHUB_UART4_TXD	I/O	SHUB_UART4_TXD	1.8	AM1	SHUB_UART0_CTSN/SHUB_UART4_TXD
	5	SHUB_UART0_RTSN/SHUB_UART4_RXD	I	SHUB_UART4_RXD	1.8	AN2	SHUB_UART0_RTSN/SHUB_UART4_RXD
	7	SHUB_UART0_TXD/SHUB_GPIO1_7	I/O	SHUB_UART0_TXD	1.8	AN1	SHUB_UART0_TXD/SHUB_GPIO1_7
	9	SHUB_UART0_RXD/SHUB_GPIO1_5	I/O	SHUB_UART0_RXD	1.8	AM2	SHUB_UART0_RXD/SHUB_GPIO1_5
	11	PWR_BUTTON0	I	PWR_BUTTON0	1.8	AU3	PWR_BUTTON0
	13	PWR_WAKEUP0	I	PWR_WAKEUP0	1.8	AR2	PWR_WAKEUP0
	15	PWR_EN0	I	PWR_EN0 (default NC)	1.8	AR4	PWR_EN0
	17	GND	G	GND			
	19	MIPI_RX1_CK0N	I	MIPI_RX1_CK0N (default NC)	1.8	AT19	MIPI_RX1_CK0N
	21	MIPI_RX1_CK0P	I	MIPI_RX1_CK0P (default NC)	1.8	AU19	MIPI_RX1_CK0P
	23	MIPI_RX1_D1N	I	MIPI_RX1_D1N	1.8	AT20	MIPI_RX1_D1N
	25	MIPI_RX1_D1P	I	MIPI_RX1_D1P	1.8	AU20	MIPI_RX1_D1P
	27	MIPI_RX1_D3N	I	MIPI_RX1_D3N	1.8	AT21	MIPI_RX1_D3N
	29	MIPI_RX1_D3P	I	MIPI_RX1_D3P	1.8	AU20	MIPI_RX1_D3P
	31	GND	G	GND			
	33	MIPI_RX0_CK0P	I	MIPI_RX0_CK0P	1.8	AT22	MIPI_RX0_CK0P
	35	MIPI_RX0_CK0N	I	MIPI_RX0_CK0N	1.8	AU22	MIPI_RX0_CK0N
	37	MIPI_RX0_D0P	I	MIPI_RX0_D0P	1.8	AT23	MIPI_RX0_D0P
	39	MIPI_RX0_D0N	I	MIPI_RX0_D0N	1.8	AU23	MIPI_RX0_D0N
	41	MIPI_RX0_D1P	I	MIPI_RX0_D1P	1.8	AT24	MIPI_RX0_D1P
	43	MIPI_RX0_D1N	I	MIPI_RX0_D1N	1.8	AU24	MIPI_RX0_D1N
	45	GND	G	GND			
	47	SENSOR_VS0/SFC_DEVICE_MODE/GPIO2_1	I/O	SENSOR_VS0 Core board interior pull down Resistor 1K	1.8	AU25	SENSOR_VS0/SFC_DEVICE_MODE
	49	SENSOR_HS0/GPIO2_0	I/O	SENSOR_HS0	1.8	AU26	SENSOR_HS0/GPIO2_0

51	SENSOR_RSTN0/GPIO5_0	I/O	SENSOR_RSTN0	1.8	AR26	SENSOR_RSTN0/GPIO5_0
53	GND	G	GND			
55	SENSOR_CLK0_A/GPIO1_0	I/O	SENSOR_CLK0_A Core board interiorl series Resistor 33R	1.8	AU27	SENSOR_CLK0_A/GPIO1_0
57	SENSOR_CLK0_B/GPIO1_1	I/O	SENSOR_CLK0_B Core board interiorl series Resistor 33R	1.8	AT27	SENSOR_CLK0_B/GPIO1_1
59	SENSOR_CLK1_A/GPIO1_2	I/O	SENSOR_CLK1_A Core board interiorl series Resistor 33R	1.8	AU29	SENSOR_CLK1_A/GPIO1_2
61	SENSOR_CLK1_B/GPIO1_3	I/O	SENSOR_CLK1_B Core board interiorl series Resistor 33R	1.8	AT29	SENSOR_CLK1_B/GPIO1_3
63	SENSOR_VS1/PCIE_USB3_MODE0	I/O	SENSOR_VS1/PCIE_USB3_MODE0 Core board interiorl pull up Resistor 10K PCIE_USB3_MODE[1:0] 01(Default):PCIE X1+USB3 P1; 10:USB3 P0+USB3 P1	1.8	AU28	SENSOR_VS1/PCIE_USB3_MODE0
65	GND	G	GND			
67	SENSOR_HS1/SFC_EMMC_BOOT_MODE/GPIO2_2	I/O	FAN_CTL (GPIO2_2) Core board interiorl pull down Resistor 1K	1.8	AT28	SENSOR_HS1/SFC_EMMC_BOOT_MODE
69	SENSOR_HS2/PCIE_USB3_MODE1	I/O	SENSOR_HS2/PCIE_USB3_MODE1 Core board interiorl pull down Resistor 10K PCIE_USB3_MODE[1:0] 01(Default):PCIE X1+USB3 P1; 10:USB3 P0+USB3 P1	1.8	AU31	SENSOR_HS2/PCIE_USB3_MODE1
71	PWR_WAKEUP1	I	PWR_WAKEUP1_input (default NC)	1.8	AT2	PWR_WAKEUP1
73	GND	G	GND			
75	USB_DP1		USB_DP1		AP36	USB_DP1
77	USB_DM1		USB_DM1		AP37	USB_DM1
79	USB3_PCIE_TXP1	O	USB3_TXP1		AM36	USB3_PCIE_TXP1
81	USB3_PCIE_TXM1	O	USB3_TXM1		AM37	USB3_PCIE_TXM1
83	USB3_PCIE_RXP1	I	USB3_RXP1		AL36	USB3_PCIE_RXP1
85	USB3_PCIE_RXM1	I	USB3_RXM1		AL37	USB3_PCIE_RXM1
87	GND	G	GND			
89	SHUB_I2C1_SCL/SHUB_GPIO1_3	I/O	SHUB_GPIO1_3	1.8	AL3	SHUB_I2C1_SCL/SHUB_GPIO1_3
91	USB3_OVRCUR1/PWM_OUT1/GPIO14_1	I/O	USB3_OVRCUR1	1.8	AK33	PWM_OUT1/GPIO14_1/USB3_OVRCUR1
93	USB3_PWREN1/GPIO0_7	I/O	USB3_PWREN1 (Active H)	1.8	AR36	USB3_PWREN1/GPIO0_7
95	SENSOR_VS2/PCIE_REFCLK_SEL	I/O	SENSOR_VS2/PCIE_REFCLK_SEL Core board interiorl pull down Resistor 1K (0:REFCLK provided by CRG,1:Outward refclk input)		AT30	SENSOR_VS2/PCIE_REFCLK_SEL
97	GND	G	GND			
99	JTAG_TCK/GPIO17_1/I2S_BCLK_TX	I/O	BT_PCM_CLK	1.8	AC37	JTAG_TCK/GPIO17_1/I2S_BCLK_TX
101	JTAG_TDO/GPIO17_3/I2S_SD_TX	I/O	BT_PCM_IN	1.8	AD35	JTAG_TDO/GPIO17_3/I2S_SD_TX
103	JTAG_TMS/GPIO17_2/I2S_WS_TX	I/O	BT_PCM_SYNC	1.8	AC36	JTAG_TMS/GPIO17_2/I2S_WS_TX

105	JTAG_TDI/GPIO17_4/I2S_SD_RX	I/O	BT_PCM_OUT	1.8	AB37	JTAG_TDI/GPIO17_4/I2S_SD_RX
107	JTAG_TRSTN/GPIO17_0/I2S_MCLK	I/O	WIFI_SUSPEND	1.8	AB36	JTAG_TRSTN/GPIO17_0/I2S_MCLK
109	GND	G	GND			
111	PCIE_REFCLKM	O	PCIE_REFCLKM (default NC)	1.8	AH36	PCIE_REFCLKM
113	PCIE_REFCLKP	O	PCIE_REFCLKP (default NC)	1.8	AH37	PCIE_REFCLKP
115	GND	G	GND			
117	PWR_EN1	I	PWR_EN1 (default NC)	1.8	AP4	PWR_EN1
119	USB_VBUS0	I	5V0_USB2_PORT0 (USB_DET:Active H) Core board interiorl series Resistor 30K	5.0	AF37	USB3_VBUS0
121	USB3_PWREN0/GPIO0_6	I/O	USB_PWREN0 (Active H)	1.8	AF36	USB3_PWREN0/GPIO0_6
123	PCIE_CLK_REQ_N	I	PCIE_CLK_REQ_N (default NC) Core board interiorl pull down Resistor 1K (0:Not close ref CLK; 1:Close ref CLK)	3.3	AH35	PCIE_CLK_REQ_N
125	USB3_PCIE_RXM0	I	PCIE_RXM0	1.8	AK36	USB3_PCIE_RXM0
127	USB3_PCIE_RXP0	I	PCIE_RXP0	1.8	AK37	USB3_PCIE_RXP0
129	USB3_PCIE_TXP0	O	PCIE_TXP0	1.8	AJ37	USB3_PCIE_TXP0
131	USB3_PCIE_TXM0	O	PCIE_TXM0	1.8	AJ36	USB3_PCIE_TXM0
133	USB_DP0		USB_DP0		AE37	USB_DP0
135	USB_DM0		USB_DM0		AE36	USB_DM0
137	GND	G	GND			
139	PWM_OUT0/GPIO14_0/USB3_OVRCUR0	I/O	USB3_OVRCUR0	1.8	AH33	PWM_OUT0/GPIO14_0/USB3_OVRCUR0
141	HDMI_SDA	I/O	HDMI_SDA	5	M35	HDMI_SDA
143	HDMI_SCL	I/O	HDMI_SCL	5	M34	HDMI_SCL
145	HDMI_HOTPLUG	I	HDMI_HOTPLUG	5	N35	HDMI_HOTPLUG
147	HDMI_CEC	I/O	HDMI_CEC	3.3	L34	HDMI_CEC
149	GND	G	GND			
151	HDMI_TXCN	O	HDMI_TXCN	1.8	U37	HDMI_TXCN
153	HDMI_TXCP	O	HDMI_TXCP	1.8	U36	HDMI_TXCP
155	GND	G	GND			
157	HDMI_TX0N	O	HDMI_TX0N	1.8	T37	HDMI_TX0N
159	HDMI_TX0P	O	HDMI_TX0P	1.8	T36	HDMI_TX0P

161	GND	G	GND			
163	HDMI_TX1N	O	HDMI_TX1N	1.8	R37	HDMI_TX1N
165	HDMI_TX1P	O	HDMI_TX1P	1.8	R36	HDMI_TX1P
167	GND	G	GND			
169	HDMI_TX2N		HDMI_TX2N	1.8	P37	HDMI_TX2N
171	HDMI_TX2P		HDMI_TX2P	1.8	P36	HDMI_TX2P
173	GND	G	GND			
175	EPHY1_CLK/VOU1120_DATA8/LCD_DATA7	I/O	EPHY1_CLK	1.8	E36	VI0_DATA15/EPHY1_CLK
177	RGMII1_TXD2/GPIO6_3/VOU1120_DATA3/LCD_DATA1	I/O	RGMII1_TXD2	1.8	E34	VI0_DATA4/RGMII1_TXD2/GPIO6_3
179	RGMII1_RXDV/VOU1120_DATA9/LCD_DATA11	I/O	RGMII1_RXDV	1.8	D36	VI0_DATA14/RGMII1_RXDV
181	RGMII1_RXCK/SDIO2_CDATA1/VOU1120_CLK/VI0_CLK	I/O	RGMII1_RXCK	1.8	D37	RGMII1_RXCK/SDIO2_CDATA1
183	RGMII1_TXD3/GPIO6_4/VOU1120_DATA4/LCD_DATA0	I/O	RGMII1_TXD3	1.8	E35	VI0_DATA3/RGMII1_TXD3/GPIO6_4
185	RGMII1_RXD0/GPIO6_0/VOU1120_DATA10/LCD_DATA10	I/O	RGMII1_RXD0	1.8	C37	VI0_DATA13/RGMII1_RXD0
187	RGMII1_RXD1/VOU1120_DATA11/LCD_DATA9	I/O	RGMII1_RXD1	1.8	C36	VI0_DATA12/RGMII1_RXD1
189	MDCK1/SDIO2_CDATA2/VOU1120_DATA6	I/O	RGMII1_MDCK	1.8	D34	VI0_DATA1/MDCK1/SDIO2_CDATA2
191	RGMII1_RXD2/VOU1120_DATA12/LCD_DATA8	I/O	RGMII1_RXD2	1.8	B36	VI0_DATA11/RGMII1_RXD2
193	RGMII1_RXD3/VOU1120_DATA13	I/O	RGMII1_RXD3	1.8	C35	VI0_DATA10/RGMII1_RXD3
195	RGMII1_TXCKOUT/VOU1120_DATA15/LCD_DATA5	I/O	RGMII1_TXCKOUT	1.8	A35	VI0_DATA8/RGMII1_TXCKOUT
197	GND	G	GND			
199	RGMII1_TXD0/GPIO6_1/VOU1120_DATA1/LCD_DATA3	I/O	RGMII1_TXD0	1.8	A34	VI0_DATA6/RGMII1_TXD0/GPIO6_1
201	RGMII1_TXEN/GPIO6_0/VOU1120_DATA0/LCD_DATA4	I/O	RGMII1_TXEN	1.8	B34	VI0_DATA7/RGMII1_TXEN/GPIO6_0
203	RGMII1_TXD1/GPIO6_2/VOU1120_DATA2/LCD_DATA2	I/O	RGMII1_TXD1	1.8	B33	VI0_DATA5/RGMII1_TXD1/GPIO6_2
205	GND	G	GND			
207	SDIO0_CDATA1/JTAG_TDO/GPIO11_5	I/O	SDIO0_CDATA1	3.3	A32	SDIO0_CDATA1/JTAG_TDO/GPIO11_5
209	SDIO0_CCLK_OUT/JTAG_TCK	I/O	SDIO0_CCLK_OUT	3.3	A31	SDIO0_CCLK_OUT/JTAG_TCK
211	GND	G	GND			
213	SDIO0_CDATA0/JTAG_TMS/GPIO11_4	I/O	SDIO0_CDATA0	3.3	B31	SDIO0_CDATA0/JTAG_TMS/GPIO11_4
215	SDIO0_CCMD/GPIO11_3	I/O	SDIO0_CCMD	3.3	A30	SDIO0_CCMD/GPIO11_3

217	SDIO0_CDATAB3/JTAG_TRSTN	I/O	SDIO0_CDATAB3	3.3	B29	SDIO0_CDATAB3/JTAG_TRSTN	
219	GND	G	GND				
221	SDIO0_CDATAB2/JTAG_TDI/GPIO11_6	I/O	SDIO0_CDATAB2	3.3	A29	SDIO0_CDATAB2/JTAG_TDI/GPIO11_6	
223	USB_VBUS1		5V0_USB3_PORT1 (USB_DET:Active H) Core board interiorl series Resistor 30K	5	AR37	USB_VBUS1	
225	1V8	P	1V8_PER (1.8V Output, Total MAX: 300mA)	1.8			
227	3V3	P	3V3_PER (3.3V Output, Total MAX: 500mA)	3.3			
229	SYS_RSTN_OUT/WDG_RSTN	O	SYS_RSTN_OUT/WDG_RSTN (Reset Output :Core board interiorl pull up Resistor 47K)	1.8	AR11	SYS_RSTN_OUT/WDG_RSTN	
231	SHUB_PWM_OUT6/SHUB_GPIO3_6	I/O	SHUB_PWM_OUT6	1.8	AE3	SHUB_PWM_OUT6/SHUB_GPIO3_6	
233	PWR_STARTUP	I/O	PWR_STARTUP Core board interiorl series Resistor 10K	1.8	AR1		
235	3V3	P	3V3_PER (3.3V Output, Total MAX: 500mA)	3.3			
237	GPIO16_7/IR_IN/VI1_DATA9	I/O	IR_IN/GPIO16_7	1.8	C29	GPIO16_7/IR_IN/VI1_DATA9	
239	I2C11_SCL	I/O	I2C11_SCL(Core board interiorl pull up Resistor 2K)	3.3	F37	I2C11_SCL	
241	I2C11_SDA	I/O	I2C11_SDA(Core board interiorl pull up Resistor 2K)	3.3	F36	I2C11_SDA	
243	GND_28	G	GND				
245	GND_30	G	GND				
247	GND_32	G	GND				
249	GND_34	G	GND				
251	VCC_SYS_1	P		5.0			
253	VCC_SYS_3	P		5.0			
255	VCC_SYS_5	P	5V_MAIN (5.0V POWER Input ,5V /2A)	5.0			
257	VCC_SYS_7	P		5.0			
259	VCC_SYS_9	P		5.0			
<b>Part B</b>	<b>PIN</b>	<b>Core board pin definition</b>	<b>Pad type</b>	<b>Function for Floor(MB-JD4-3559AV100)</b>	<b>IO Power domain</b>	<b>Pin Number</b>	<b>Pin Name</b>
	2	GND_2	G	GND			
	4	SHUB_PWM_OUT4/SHUB_GPIO3_4/SHUB_I2C6_SCL	I/O	IR_CUT_0_CONTROL1	1.8	AE4	SHUB_PWM_OUT4/SHUB_GPIO3_4/SHUB_I2C6_SCL
	6	SHUB_PWM_OUT5/SHUB_GPIO3_5/SHUB_I2C6_SDA	I/O	IR_CUT_0_CONTROL2	1.8	AD3	SHUB_PWM_OUT5/SHUB_GPIO3_5/SHUB_I2C6_SDA
	8	SHUB_SPI0_SCLK/SHUB_GPIO0_0/SHUB_I2C2_SCL	I/O	SHUB_SPI0_SCLK	1.8	AL4	SHUB_SPI0_SCLK/SHUB_GPIO0_0/SHUB_I2C2_SCL
	10	SHUB_SPI0_SDO/SHUB_GPIO0_1/SHUB_I2C2_SDA	I/O	SHUB_SPI0_SDO	1.8	AH4	SHUB_SPI0_SDO/SHUB_GPIO0_1/SHUB_I2C2_SDA

12	SHUB_SPI0_SDI/SHUB_GPIO0_2/SHUB_I2C3_SCL	I/O	SHUB_SPI0_SDI	1.8	AH5	SHUB_SPI0_SDI/SHUB_GPIO0_2/SHUB_I2C3_SCL
14	SHUB_SPI0_CSN0/SHUB_GPIO0_3/SHUB_I2C3_SDA	I/O	SHUB_SPI0_CSN	1.8	AK3	SHUB_SPI0_CSN0/SHUB_GPIO0_3/SHUB_I2C3_SDA
16	SHUB_SPI1_SCLK/SHUB_GPIO0_4/SHUB_I2C4_SCL	I/O	SHUB_SPI1_SCLK	1.8	AK1	SHUB_SPI1_SCLK/SHUB_GPIO0_4/SHUB_I2C4_SCL
18	SHUB_SPI1_SDO/SHUB_GPIO0_5/SHUB_I2C4_SDA	I/O	SHUB_SPI1_SDO	1.8	AK2	SHUB_SPI1_SDO/SHUB_GPIO0_5/SHUB_I2C4_SDA
20	SHUB_LSADC1_CH0/SHUB_GPIO4_0	I/O	SHUB_LSADC1_CH0	1.8	AP5	SHUB_LSADC1_CH0/SHUB_GPIO4_0
22	SHUB_SPI1_CSN0/SHUB_GPIO0_7/SHUB_I2C5_SDA	I/O	SHUB_SPI1_CSN	1.8	AL2	SHUB_SPI1_CSN0/SHUB_GPIO0_7/SHUB_I2C5_SDA
24	SHUB_SPI1_SDI/SHUB_GPIO0_6/SHUB_I2C5_SCL	I/O	SHUB_SPI1_SDI	1.8	AL1	SHUB_SPI1_SDI/SHUB_GPIO0_6/SHUB_I2C5_SCL
26	GND	G	GND			
28	MIPI_RX1_CK1P	I	MIPI_RX1_CK1P	1.8	AN19	MIPI_RX1_CK1P
30	MIPI_RX1_CK1N	I	MIPI_RX1_CK1N	1.8	AM19	MIPI_RX1_CK1N
32	MIPI_RX1_D0P	I	MIPI_RX1_D0P	1.8	AM21	MIPI_RX1_D0P
34	MIPI_RX1_D0N	I	MIPI_RX1_D0N	1.8	AP21	MIPI_RX1_D0N
36	MIPI_RX1_D2P	I	MIPI_RX1_D2P	1.8	AP20	MIPI_RX1_D2P
38	MIPI_RX1_D2N	I	MIPI_RX1_D2N	1.8	AR20	MIPI_RX1_D2N
40	GND_5	G	GND_5			
42	MIPI_RX0_CK1P	I	MIPI_RX0_CK1P	1.8	AN22	MIPI_RX0_CK1P
44	MIPI_RX0_CK1N	I	MIPI_RX0_CK1N	1.8	AM22	MIPI_RX0_CK1N
46	SPI0_CSN1/SPI0_3WIRE_CS1N/I2C4_SDA/GPIO5_4	I/O	WIFI_PWR_EN(GPIO5_4)	1.8	AP27	SPI0_CSN1/SPI0_3WIRE_CS1N/I2C4_SDA/GPIO5_4
48	MIPI_RX0_D2P	I	MIPI_RX0_D2P	1.8	AR23	MIPI_RX0_D2P
50	MIPI_RX0_D2N	I	MIPI_RX0_D2N	1.8	AP23	MIPI_RX0_D2N
52	MIPI_RX0_D3P	I	MIPI_RX0_D3P	1.8	AP24	MIPI_RX0_D3P
54	MIPI_RX0_D3N	I	MIPI_RX0_D3N	1.8	AN24	MIPI_RX0_D3N
56	SPI0_SCLK/SPI0_3WIRE_CLK/I2C0_SCL/GPIO3_0	I/O	SPI0_SCLK/I2C0_SCL	1.8	AT26	SPI0_SCLK/SPI0_3WIRE_CLK/I2C0_SCL/GPIO3_0
58	SPI0_SDO/SPI0_3WIRE_DATA/I2C0_SDA/GPIO3_1	I/O	SPI0_SDO/I2C0_SDA	1.8	AN26	SPI0_SDO/SPI0_3WIRE_DATA/I2C0_SDA/GPIO3_1
60	SPI0_CSN0/SPI0_3WIRE_CS0N/I2C4_SCL/GPIO3_3	I/O	SPI0_CSN0/I2C4_SCL	1.8	AR27	SPI0_CSN0/SPI0_3WIRE_CS0N/I2C4_SCL/GPIO3_3
62	SPI0_SDI/GPIO3_2	I/O	SPI0_SDI	1.8	AN28	SPI0_SDI/GPIO3_2
64	SPI1_SCLK/SPI1_3WIRE_CLK/I2C1_SCL/GPIO3_4	I/O	SPI1_SCLK/I2C1_SCL	1.8	AN31	SPI1_SCLK/SPI1_3WIRE_CLK/I2C1_SCL/GPIO3_4
66	SPI1_SDO/SPI1_3WIRE_DATA/I2C1_SDA/GPIO3_5	I/O	SPI1_SDO/I2C1_SDA	1.8	AP30	SPI1_SDO/SPI1_3WIRE_DATA/I2C1_SDA/GPIO3_5

68	SPI1_SDI/GPIO3_6	I/O	SPI1_SDI	1.8	AR30	SPI1_SDI/GPIO3_6
70	SPI1_CSN0/SPI1_3WIRE_CS0N/I2C5_SCL/GPIO3_7	I/O	SPEAKER_MUTE(GPIO3_7)--Active H	1.8	AN32	SPI1_CSN0/SPI1_3WIRE_CS0N/I2C5_SCL/GPIO3_7
72	SPI1_CSN1/SPI1_3WIRE_CS1N/I2C5_SDA/GPIO5_5	I/O	POW_4G(GPIO5_5)--Active H	1.8	AR32	SPI1_CSN1/SPI1_3WIRE_CS1N/I2C5_SDA/GPIO5_5
74	SPI2_CSN1/SPI2_3WIRE_CS1N/I2C6_SDA/GPIO5_6	I/O	TOUCH_RST_L(GPIO5_6)--Active L	1.8	AP34	SPI2_CSN1/SPI2_3WIRE_CS1N/I2C6_SDA/GPIO5_6
76	GND_8	G	GND			
78	SHUB_UART0_RTSN/SHUB_UART4_RXD	I	UART4_RXD	3.3	AG33	UART4_RXD/UART3_RTSN/GPIO0_4
80	SHUB_UART0_CTSN/SHUB_UART4_TXD	O	UART4_TXD	3.3	AG34	UART4_TXD/UART3_CTSN/GPIO0_5
82	SPI2_SCLK/SPI2_3WIRE_CLK/I2C2_SCL/GPIO4_0	I/O	LCD_RST_L(GPIO4_0)--Active L	1.8	AP33	SPI2_SCLK/SPI2_3WIRE_CLK/I2C2_SCL/GPIO4_0
84	SPI2_CSN0/SPI2_3WIRE_CS0N/I2C6_SCL/GPIO4_3	I/O	TP_INT(GPIO4_3)--Active L	1.8	AP35	SPI2_CSN0/SPI2_3WIRE_CS0N/I2C6_SCL/GPIO4_3
86	SPI2_SDO/SPI2_3WIRE_DATA/I2C2_SDA/GPIO4_1	I/O	LCD_EN(GPIO4_1)--Active H	1.8	AR33	SPI2_SDO/SPI2_3WIRE_DATA/I2C2_SDA/GPIO4_1
88	SPI2_SDI/GPIO4_2	I/O	BL_EN (GPIO4_2)--Active H	1.8	AR34	SPI2_SDI/GPIO4_2
90	SHUB_UART2_RXD/SHUB_GPIO2_5	I/O	UART2_RXD	1.8	AF34	UART2_RXD/UART1_RTSN/GPIO13_4
92	SHUB_UART2_TXD/SHUB_GPIO2_7	I/O	UART2_TXD	1.8	AF35	UART2_TXD/UART1_CTSN/GPIO13_5
94	UART3_RXD/GPIO13_6	I/O	UART3_RXD	1.8	AE34	UART3_RXD/GPIO13_6
96	UART3_TXD/GPIO13_7	I/O	UART3_TXD	1.8	AE33	UART3_TXD/GPIO13_7
98	UART1_TXD/CANBUS1_TX/GPIO13_3	I/O	UART1_TXD	1.8	AD34	UART1_TXD/CANBUS1_TX/GPIO13_3
100	UART0_RXD/CANBUS0_RX/GPIO13_0	I/O	UART0_RXD	1.8	AA35	UART0_RXD/CANBUS0_RX/GPIO13_0
102	UART0_TXD/CANBUS0_TX/GPIO13_1	I/O	UART0_TXD	1.8	AB35	UART0_TXD/CANBUS0_TX/GPIO13_1
104	UART1_RXD/CANBUS1_RX/GPIO13_2	I/O	UART1_RXD	1.8	AD33	UART1_RXD/CANBUS1_RX/GPIO13_2
106	GND	G	GND			
108	AC_OUTL		AC_OUTL (Audio Output L)	1.8	AA34	AC_OUTL
110	AC_OUTR		AC_OUTR (Audio Output R)	1.8	Y34	AC_OUTR
112	AC_IN0L/AC_IN0P		AC_IN0L (Line_In0 L) Core board interior series Capacitor 4.7uF	1.8	W34	AC_IN0L/AC_IN0P
114	AC_IN0R/AC_IN0N		AC_IN0R (Line_In0 R) Core board interior series Capacitor 4.7uF	1.8	V33	AC_IN0R/AC_IN0N
116	AC_IN1L/AC_IN1P		AC_IN1L (Line_In0 L) Core board interior series Capacitor 4.7uF	1.8	U34	AC_IN1L/AC_IN1P
118	AC_IN1R/AC_IN1N		AC_IN1R (Line_In1 R) Core board interior series Capacitor 4.7uF	1.8	R34	AC_IN1R/AC_IN1N
120	AC_MICBIAS1	O	AC_MICBIAS1 (MICBIAS1 voltage Output)	1.8	P34	AC_MICBIAS1
122	AC_MICBIAS0	O	AC_MICBIAS0 (MICBIAS1 voltage Output)	1.8	P33	AC_MICBIAS0

124	GND	G	GND			
126	DSI_D0N	O	MIPI_DSI_D0N	1.8	M36	DSI_D0N
128	DSI_D0P	O	MIPI_DSI_D0P	1.8	M37	DSI_D0P
130	DSI_D1N	O	MIPI_DSI_D1N	1.8	L36	DSI_D1N
132	DSI_D1P	O	MIPI_DSI_D1P	1.8	L37	DSI_D1P
134	DSI_CKN	O	MIPI_DSI_CKN	1.8	K36	DSI_CKN
136	DSI_CKP	O	MIPI_DSI_CKP	1.8	K37	DSI_CKP
138	DSI_D2N	O	MIPI_DSI_D2N	1.8	J36	DSI_D2N
140	DSI_D2P	O	MIPI_DSI_D2P	1.8	J37	DSI_D2P
142	DSI_D3N	O	MIPI_DSI_D3N	1.8	H36	DSI_D3N
144	DSI_D3P	O	MIPI_DSI_D3P	1.8	H37	DSI_D3P
146	SENSOR_HS3/PCIE_DEEMPH_SEL		SENSOR_HS3/PCIE_DEEMPH_SEL--(default NC) Core board interiorl pull down Resistor 1K (0:-3.5dB,1:-6dB)	1.8	AT33	SENSOR_HS3/PCIE_DEEMPH_SEL
148	SENSOR_VS3/BOOT_SEL4		SENSOR_VS3/BOOT_SEL4--(default NC) Core board interiorl pull down Resistor 1K (0:Boot from a storage medium, 1:Boot from PCIE)	1.8	AU33	SENSOR_VS3/BOOT_SEL4
150	LSADC_CH0/GPIO14_6	I	ADC_CH0_IN	1.8	AN5	LSADC_CH0/GPIO14_6
152	GPIO0_0/UPDATE_MODE_N	I/O	UPDATE_MODE_N (Active L) Core board interiorl pull up Resistor 4.7K	1.8	AC35	GPIO0_0/UPDATE_MODE_N
154	LSADC_CH1/GPIO14_7	I	MUTE (GPIO14_7)--Active H	1.8	AN6	LSADC_CH1/GPIO14_7
156	SHUB_PWM_OUT1/SHUB_GPIO3_1	I/O	SHUB_PWM_OUT1	1.8	AD2	SHUB_PWM_OUT1/SHUB_GPIO3_1
158	SHUB_PWM_OUT2/SHUB_GPIO3_2	I/O	SHUB_PWM_OUT2 (Reset Output :Core board interiorl pull up Resistor 47K)	1.8	AE1	SHUB_PWM_OUT2/SHUB_GPIO3_2
160	SHUB_PWM_OUT3/SHUB_GPIO3_3	I/O	SHUB_PWM_OUT3	1.8	AE5	SHUB_PWM_OUT3/SHUB_GPIO3_3
162	SDIO1_CARD_DETECT/GPIO12_1	I/O	SDIO1_CARD_DETECT--Active L	3.3	E33	SDIO1_CARD_DETECT/GPIO12_1
164	GND_12	G	GND			
166	SDIO1_CARD_POWER_EN/GPIO12_0	I/O	SDIO1_CARD_POWER_EN--Active H	3.3	C30	SDIO1_CARD_POWER_EN/GPIO12_0
168	SDIO1_CDATA1/GPIO12_5	I/O	SDIO1_CDATA1	3.3	E31	SDIO1_CDATA1/GPIO12_5
170	SDIO1_CCMD/GPIO12_3	I/O	SDIO1_CCMD	3.3	E30	SDIO1_CCMD/GPIO12_3
172	SDIO1_CDATA3/GPIO12_7	I/O	SDIO1_CDATA3	3.3	E28	SDIO1_CDATA3/GPIO12_7
174	SDIO1_CDATA0/GPIO12_4	I/O	SDIO1_CDATA0	3.3	D32	SDIO1_CDATA0/GPIO12_4
176	SDIO1_CDATA2/GPIO12_6	I/O	SDIO1_CDATA2	3.3	D29	SDIO1_CDATA2/GPIO12_6



178	SDIO1_CCLK_OUT/GPIO12_2	I/O	SDIO1_CCLK_OUT	3.3	C32	SDIO1_CCLK_OUT/GPIO12_2
180	GND_16	G	GND			
182	MDIO0/GPIO9_7/VI1_DATA2	I/O	RGMII0_MDIO	1.8	C26	MDIO0/GPIO9_7/VI1_DATA2
184	MDCK0/GPIO9_6/LCD_DATA17	I/O	RGMII0_MDCK	1.8	B25	MDCK0/GPIO9_6/LCD_DATA17/VI1_DATA10
186	RGMII0_TXCKOUT/GPIO9_3	I/O	RGMII0_TXCKOUT	1.8	B28	RGMII0_TXCKOUT/GPIO9_3
188	RGMII0_RXCK/GPIO8_5/LCD_DATA16	I/O	RGMII0_RXCK	1.8	A25	RGMII0_RXCK/GPIO8_5/LCD_DATA16
190	GND_21	G	GND			
192	EPHY0_CLK/GPIO9_4/LCD_DATA19	I/O	EPHY0_CLK_3V3_Output Core board interiorl series Resistor 33R	3.3		
194	RGMII0_RXD1/GPIO8_3/LCD_DATA13	I/O	RGMII0_RXD1	1.8	E27	RGMII0_RXD1/GPIO8_3/LCD_DATA13
196	RGMII0_RXD3/GPIO8_1/VI1_DATA3	I/O	RGMII0_RXD3	1.8	D26	RGMII0_RXD3/GPIO8_1/VI1_DATA3
198	RGMII0_RXD0/GPIO8_4/LCD_DATA14	I/O	RGMII0_RXD0	1.8	C27	RGMII0_RXD0/GPIO8_4/LCD_DATA14
200	RGMII0_RXD2/GPIO8_2/LCD_DATA12	I/O	RGMII0_RXD2	1.8	E26	RGMII0_RXD2/GPIO8_2/LCD_DATA12
202	RGMII0_RXDV/GPIO8_0/LCD_DATA15	I/O	RGMII0_RXDV	1.8	B24	RGMII0_RXDV/GPIO8_0/LCD_DATA15
204	RGMII0_TXD0/GPIO9_2/LCD_DATA22	I/O	RGMII0_TXD0	1.8	A28	RGMII0_TXD0/GPIO9_2/LCD_DATA22
206	RGMII0_TXD2/GPIO9_0/LCD_DATA20	I/O	RGMII0_TXD2	1.8	A27	RGMII0_TXD2/GPIO9_0/LCD_DATA20
208	RGMII0_TXD3/GPIO8_7/LCD_DATA18	I/O	RGMII0_TXD3	1.8	A26	RGMII0_TXD3/GPIO8_7/LCD_DATA18
210	RGMII0_TXD1/GPIO9_1/LCD_DATA21	I/O	RGMII0_TXD1	1.8	B27	RGMII0_TXD1/GPIO9_1/LCD_DATA21
212	RGMII0_TXEN/GPIO8_6/VI1_DATA1	I/O	RGMII0_TXEN	1.8	C24	RGMII0_TXEN/GPIO8_6/VI1_DATA1
214	VI0_DATA2/MDIO1/GPIO6_5/VOU1120_DATA5/LCD_HSYNC	I/O	RGMII1_MDIO	1.8	D35	VI0_DATA2/MDIO1/GPIO6_5/VOU1120_DATA5/LCD_HSYNC
216	EPHY0_RSTN/GPIO9_5/VI1_DATA0	I/O	EPHY0_RSTN_3V3	3.3		
218	SENSOR_RSTN1/GPIO5_1	I/O	SENSOR_RSTN1--(default NC)	1.8	AU30	SENSOR_RSTN1/GPIO5_1
220	GPIO0_3/LCD_CLK	I/O	LCD_CLK--(default NC)	1.8	F34	GPIO0_3/LCD_CLK
222	GND_26	G	GND			
224	1V8	P	1V8_PER (1.8V Output, Total MAX: 300mA)	1.8		
226	3V3	P	3V3_PER (3.3V Output, Total MAX: 500mA)	3.3		
228	VOU1120_DATA14/LCD_DATA6/GPIO7_6	I/O	HP_DET (GPIO7_6)	1.8	B35	VOU1120_DATA14/LCD_DATA6

230	DVDD3318_SDIO_VOUT	O	SDIO_VOUT_Output (1.8V/3.3V auto switch)	1.8/3.3	C33	DVDD3318_SDIO_VOUT
232	VCC_RTC	P	VCC_RTC ( RTC BAT Input)	3.3		
234	3V3	P	3V3_PER (3.3V Output, Total MAX: 500mA)	3.3		
236	GPIO0_1/LCD_VSYNC	I/O	CAN1_SLEEP (GPIO0_1)--Active H	1.8	A33	GPIO0_1/LCD_VSYNC E
238	VOU1120_DATA7/LCD_DE/EPHY1_RSTN/GPIO6_7/TEST_OUT7	I/O	EPHY1_RSTN--Active L	1.8	C34	VOU1120_DATA7/LCD_DE/EPHY1_RSTN/GPIO6_7/TEST_OUT7
240	SDIO0_CARD_POWER_EN/GPIO11_0	I/O	SDIO0_CARD_POWER_EN--Active H	3.3	B30	SDIO0_CARD_POWER_EN/GPIO11_0
242	SDIO0_CARD_DETECT/GPIO11_1	I/O	SDIO0_CARD_DETECT--Active L	3.3	B32	SDIO0_CARD_DETECT/GPIO11_1
244	GND_27	G	GND			
246	GND_29	G	GND			
248	GND_31	G	GND			
250	GND_33	G	GND			
252	VCC_SYS_2	P	5V_MAIN (5V POWER Input ,5V /2A)	5.0		
254	VCC_SYS_4	P		5.0		
256	VCC_SYS_6	P		5.0		
258	VCC_SYS_8	P		5.0		
260	VCC_SYS_10	P		5.0		

## 关于我们

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天启科技成立于 2009 年，国家高新技术企业，专注于开源智能硬件，人工智能，物联网，数字音频产品的研发设计、生产和销售，同时提供了智能软硬件产品的整体解决方案。开源品牌“Firefly”在互联网上拥有开源社区与网上商城，目前已超过 20 万用户与 10000 多家的企业用户，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。

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