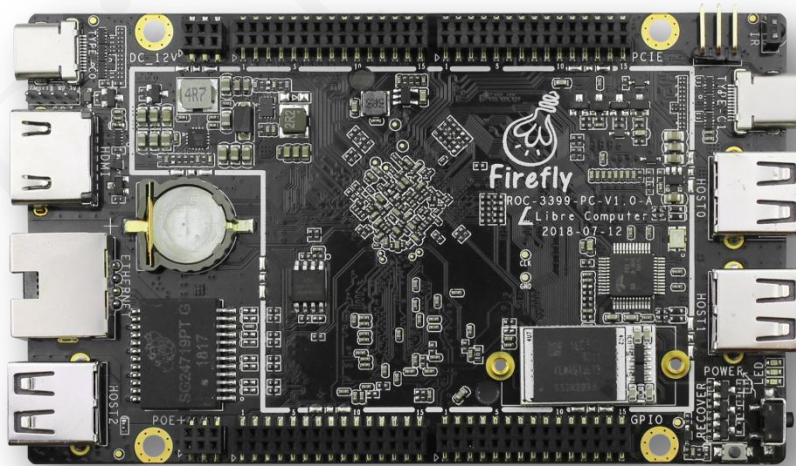




# T-Chip technology

## ROC-RK3399-PC Specifications V1.0



Version	Date	Updated content
V1.0	2018-10-15	Original version



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## Company Profile

T-Chip Intelligent Technology Co., Ltd. was founded in 2005. It has more than 10 years of research and development experience in scientific and technological products, has 6 invention patents and more than 30 computer software copyrights, and is a national high-tech enterprise. We focus on the research and development, design, production and sales of open source intelligent hardware, internet of things and digital audio products, and provide the overall solution for intelligent hardware products meanwhile.



Firefly is a brand owned by T-chip Technology. It operates open source products, open source communities and online stores. It has a large number of enterprise users and developer users, and its products are well received by users. Firefly open source products include open source boards, core boards, industry mainboards, etc. The open-source board series is the recommended board card by chip original factory Rockchip and obtain the support of native SDK. The core boards and industrial mainboards are widely used in commercial displays, advertisement integrated machines, intelligent POS, face recognition terminals, internet of things, intelligent cities, etc. At present, there are more than 100,000 users, including over 2,000 enterprise users. And well-known users include ARM, Google, Baidu, Tencent, Alibaba, etc.

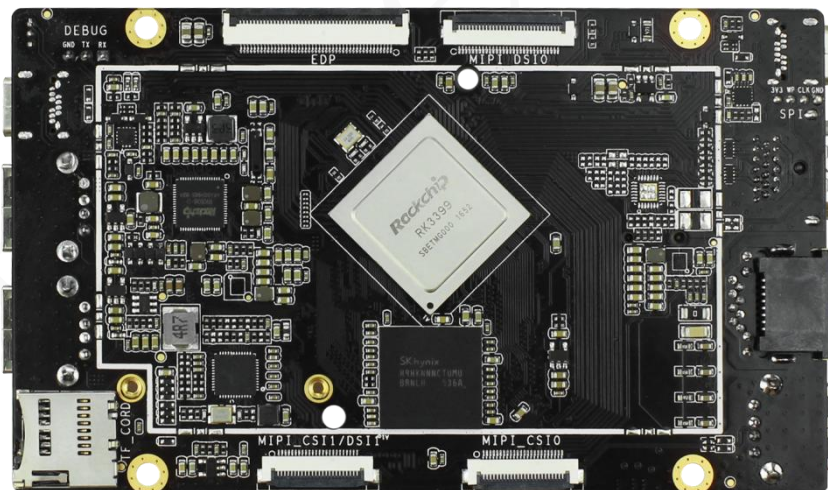
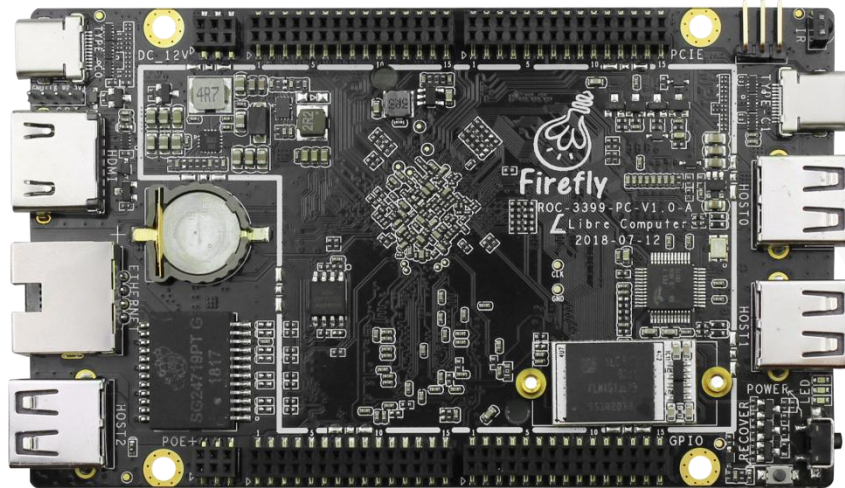
Firefly team has more than 60 research and development members and has the research and development capabilities in schematic design, PCB layout, mainboard production, embedded development, system development, application program development, etc., which accelerates the research and development process for many technology entrepreneurs and start-ups, and provides professional technical services..

" **Make technology more simple, Make life more intelligent** " is the idea of Firefly team. We hope to make the research and development of various technology products efficient and simple, and let intelligent technology integrate in our lives through the open source products and technical services of Firefly.

# 1. Product Overview

## 1.1 Overview

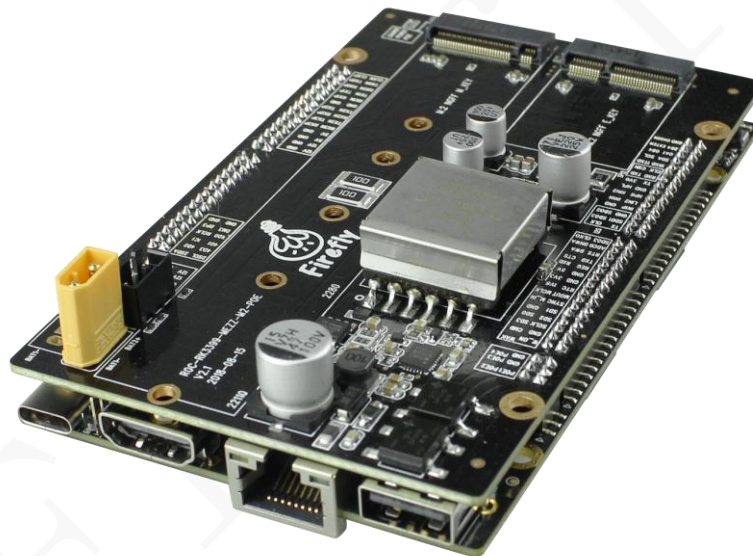
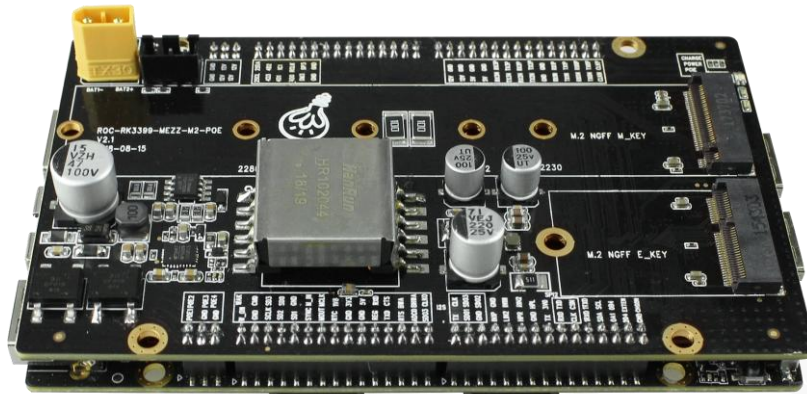
ROC-RK3399-PC adopts Rockchip high-performance core configuration, unique multiple power supply mode and unique plate design. It can be connected to the expansion board, making the performance stronger and superior. When combined with the metal casing, it becomes a pocket portable personal computer.



With "server-level" dual-core Cortex-72+ quad-core Cortex-A53 architecture, the frequency is up to 1.8 GHz, and 4GB LPDDR4 dual-channel 64-bit RAM high-performance memory is configured to comprehensively improve the performance of mainboard.

Unique plate design, golden ratio, only 120 x 72 x 11.9 mm in size. When combined with the metal casing, it becomes a pocket portable personal computer.

The expansion board onboard balanced charging circuit to charge the battery, and it can also be powered by POE+. It has M.2 M-Key interface to expand SSD and M.2 E-Key interface to provide SDIO 3.0 and USB 2.0 signals. ROC-RK3399-PC main board combined with the expansion board can greatly improve the performance.



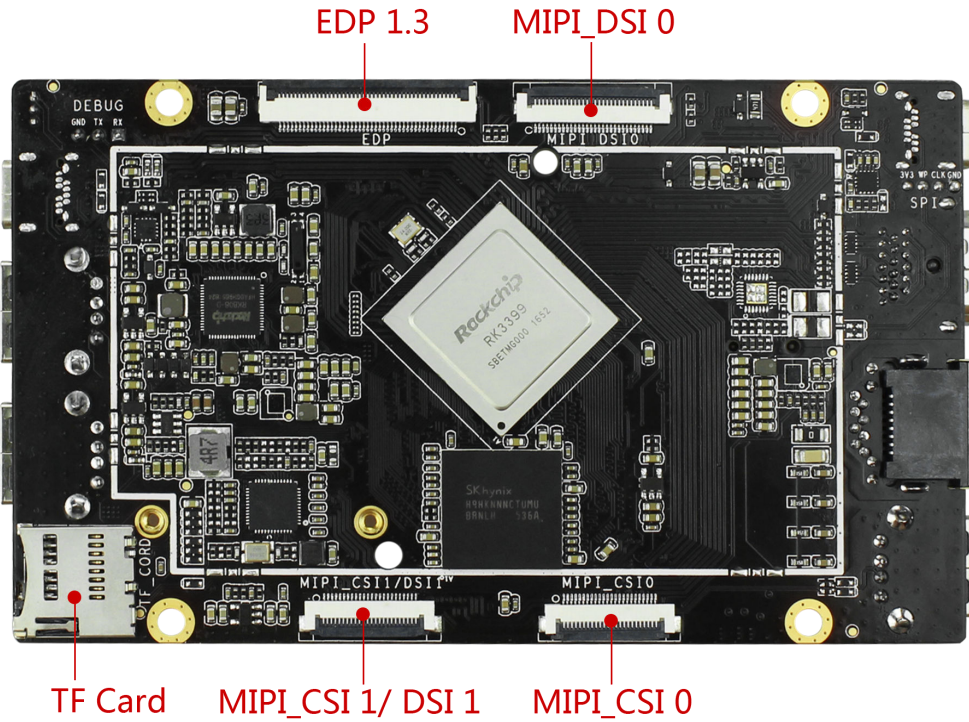
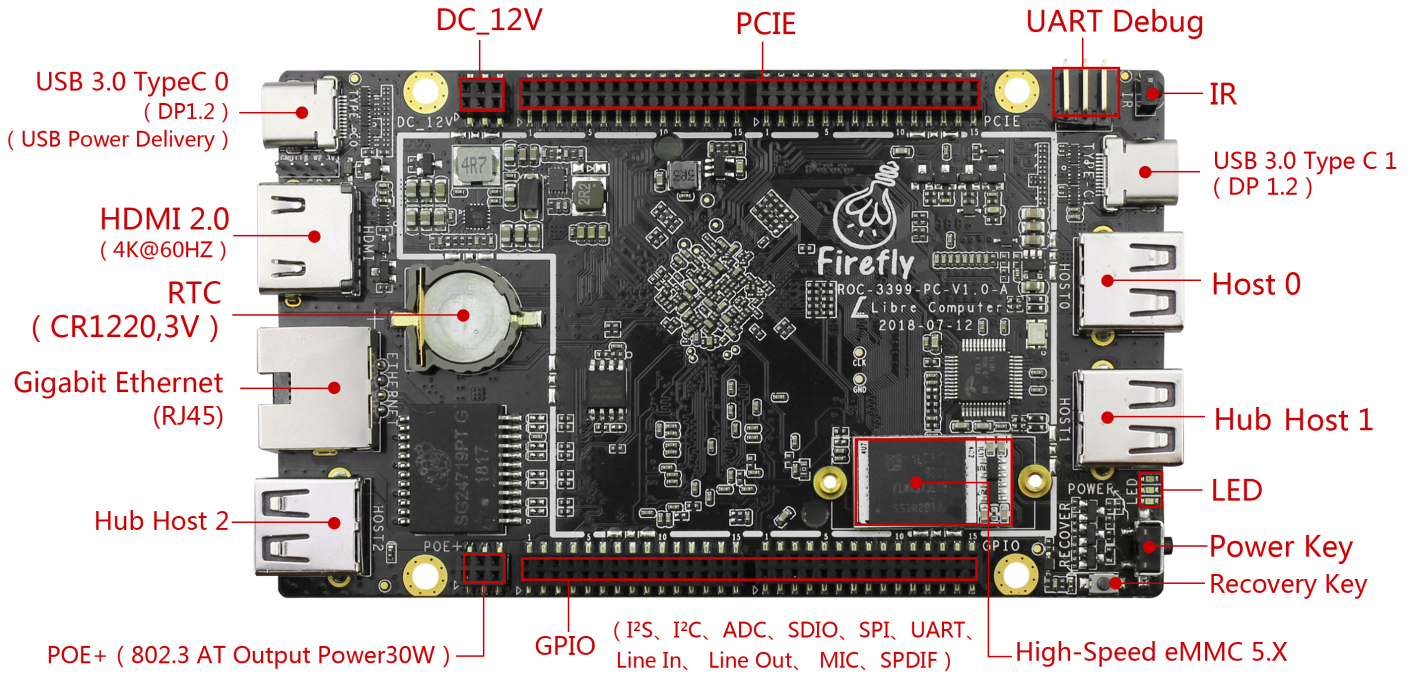
Supports xserver, wayland display framework and multiple operating systems, such as Android, Ubuntu, Debian9, Linux+QT, etc. It has onboard SPI flash and supports boot with TF card, EMMC, SSD, USB flash disk, making system startup more convenient.

ROC-RK3399-PC can be powered by POE+ (802.3 AT, output power 30W) or dual-cell battery. It has a Type-C PD 2.0 power control chip and supports wide voltage (5V~15V) input. A variety of power supply modes can meet the choices of users in different scenarios.

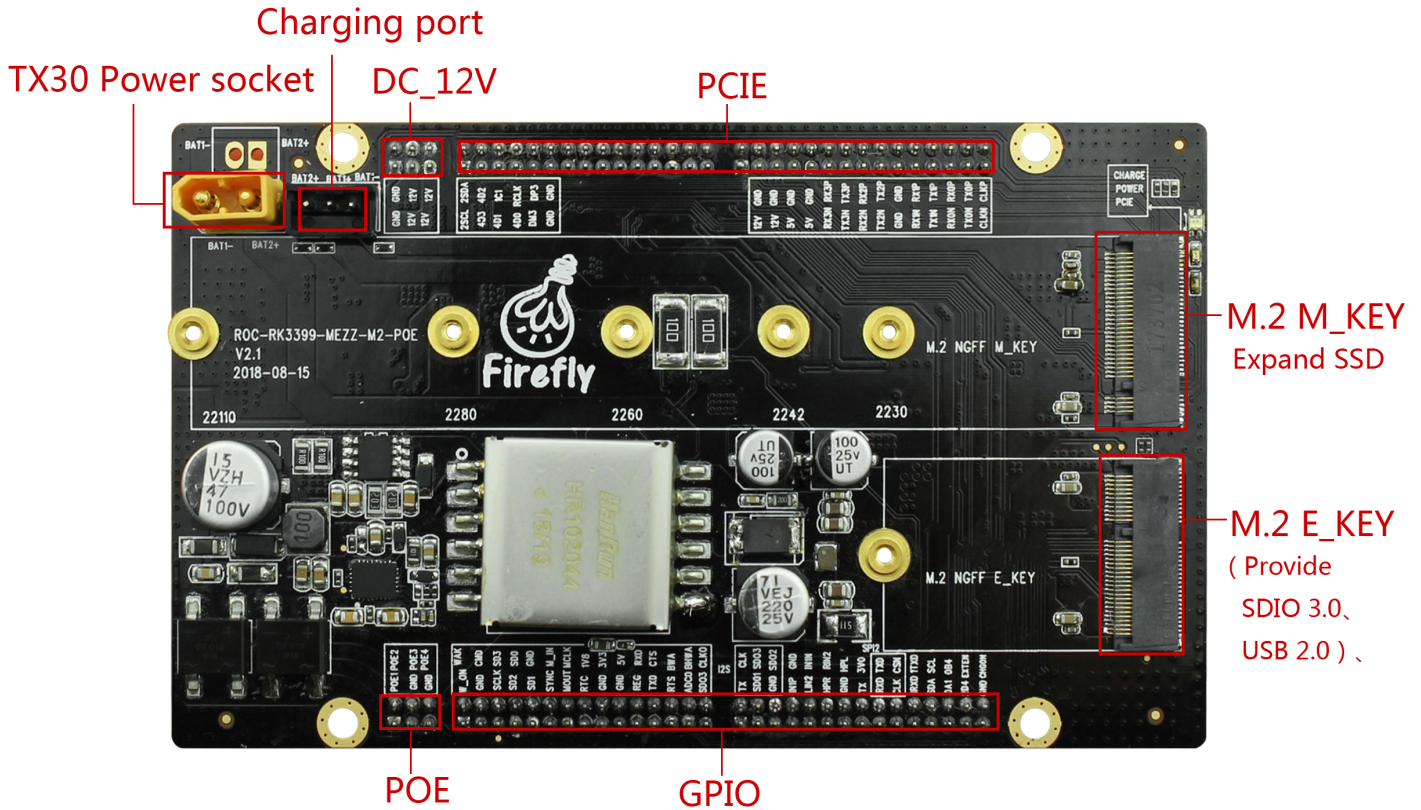
It has rich interfaces, such as MIPI/eDP screen interface, dual-channel MIPI CSI(supporting dual-channel cameras), Type-C x 2, USB 2.0 Host x 3, HDMI 2.0, Gigabit Ethernet (RJ45), GPIO, etc.

It is applicable for Personal computers, cluster servers, IOT, NAS, etc. Open SDK, tutorials, technical materials and development tools to make development easier and more convenient.

## 2. Interface description



# Expansion Board





### 3. Hardware Specifications

Specification	
Soc	Rockchip RK3399 (28 nm HKMG manufacture procedure)
CPU	Six-core ARM® 64-bit processor. Main frequency is up to 1.8 GHz Based on the big.LITTLE core architecture, dual-core Cortex-A72 (big core) + quad-core Cortex-A53 (little core)
GPU	ARM Mali-T860 MP4 quad core GPU Support OpenGL ES1.1/2.0/3.0/3.1, OpenVG1.1, OpenCL, DX11 Support AFBC (frame buffer compression)
VPU	Support 4K VP9 and 4K 10bits H265/H264 video decoding, up to 60 fps 1080P multi-format video decoding (WMV, MPEG-1/2/4, VP8) 1080P video encoding, support H.264, VP8 formats Video post processor, de-interlacing, de-noising, edge/detail/color optimization
PMU	RK808-D PMU chip
RAM	4GB LPDDR4 dual-channel 64-bit RAM
Storage	Onboard SPI flash (16M Byte) 16 GB/32 GB/128 GB high-speed eMMC (optional) Support MicroSD (TF) card, USB flash disk expansion Support expansion board M.2 M-Key to expand SSD

Hardware Features	
Ethernet	Gigabit Ethernet (RJ45 interface)
WiFi/Bluetooth	Through the expansion board M.2 E-Key interface (providing SDIO 3.0 signal)
Display	HDMI2.0 supports 4K 60Hz display, support HDCP 1.4/2.2 DisplayPort 1.2 ( up to 4K 60 Hz ) Support eDP 1.3. Support MIPI-DSI (dual-channel) Support dual-screen display (Type-C + HDMI), support 4K + 2K output
Audio	1 x HDMI audio frequency output, DP audio frequency output
Camera	Dual-channel MIPI CSI interface (supporting dual-channel camera at the same time)
USB	USB 2.0 Host × 3、Type-C × 2
Debugging	Debug serial port × 1, for development and debugging





Key	Recovery × 1、Power × 1
IR	One channel infrared receiving head, support infrared remote control function
RTC	RTC real time clock x 1, onboard battery socket
Power	1) POE+ (802.3 AT, output power 30 W) 2) Type-C PD 2.0 power control chip, support wide voltage input (5 V-15 V) 3) Dual battery power supply (7.4 V lithium battery)
Dual Type-C	Support 4K@60fps output (not supporting simultaneous output) TypeC0 interface: Support DisplayPort 1.2 + Power Delivery 2.0+ USB3.0 OTG + USB2.0 Host, Board power and DP output can be achieved simultaneously using a Type-C line TypeC1 interface: Support DisplayPort 1.2 + USB3.0 HOST+ USB2.0 HOST, support external power supply
Expansion board	1) POE+ (802.3 AT, output power 30 W) 2) M.2 M-Key (extending SSD) and M.2 E-Key interface (providing SDIO 3.0, USB 2.0 signals) 3) Onboard battery (dual 7.4V lithium battery) 4) Onboard balanced charging circuit to charge the onboard battery

### OS / Software

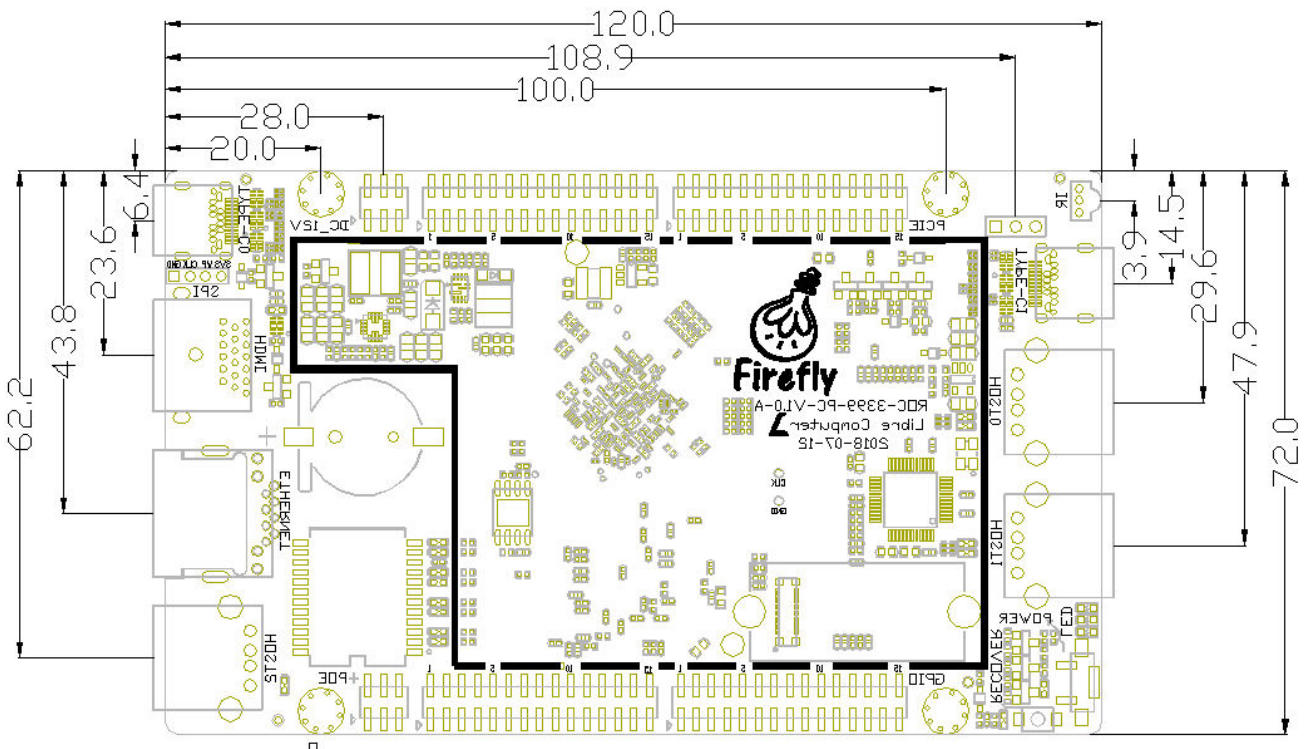
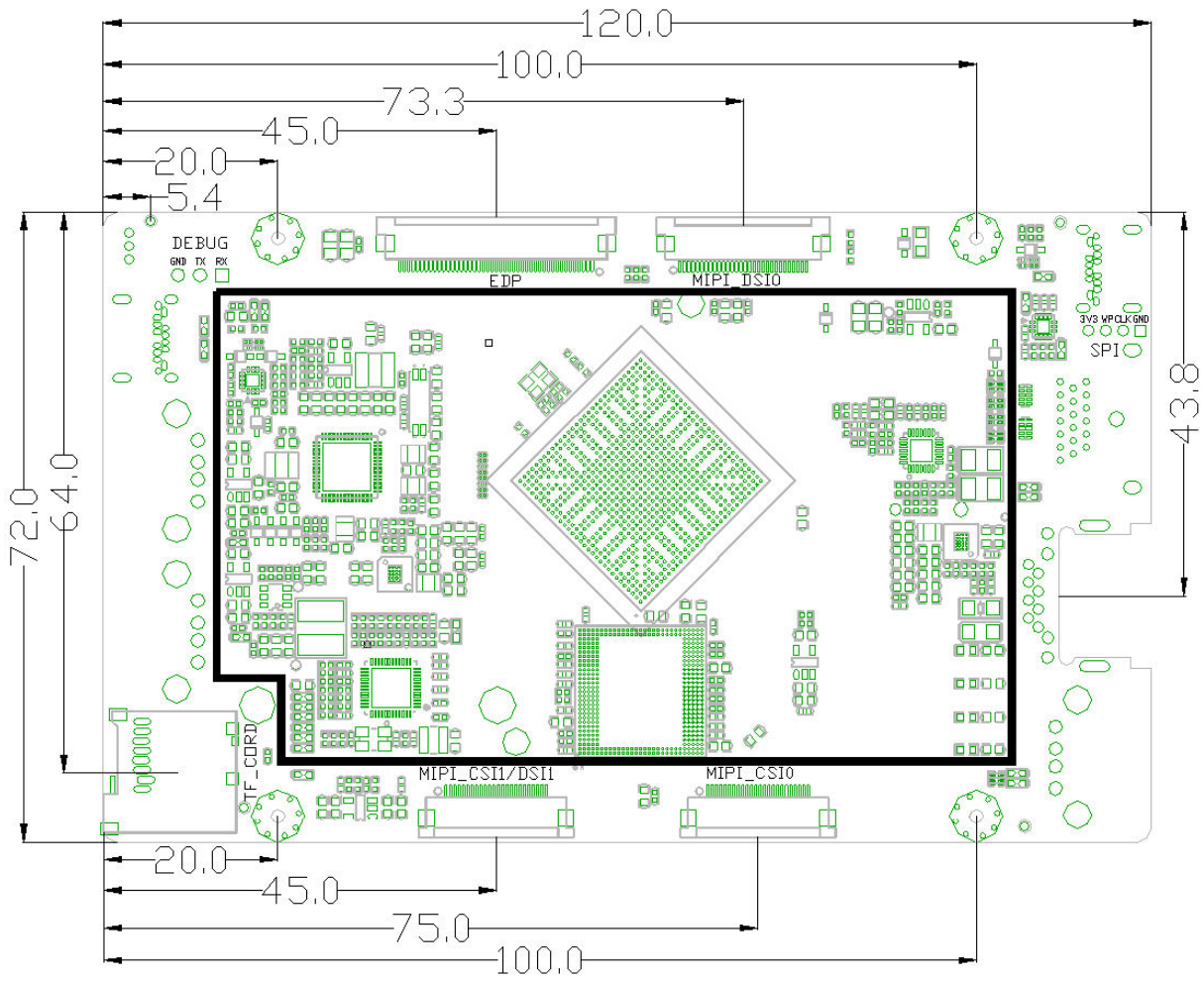
System	Support Ubuntu18.04 (supporting OpenGL es3.0, OpenCL, TensorFlow Lite), Debian9, Linux+QT, support xserver and wayland display frameworks Android 8.1 (supporting Android NN API )
Upgrade	Onboard SPI flash, support boot from TF card, EMMC, SSD, USB flash disk

### Appearance

Size	120 x 72 x 11.9 ( mm )
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# 4.PCB Size

Unit : mm





## 5. Interface definition

### 1. GPIO

Num	Definition	Num	Definition
1	GPIO0_B2_d	2	GPIO0_A3_d
3	GND	4	GPIO2_D0/SDIO0_CMD_u
5	GPIO2_D1/SDIO0_CLKOUT_u	6	GPIO2_C7/SDIO0_D3/SPI5_CSn0_u
7	GPIO2_C6/SDIO0_D2/SPI5_CLK_u	8	GPIO2_C4/SDIO0_D0/SPI5_RXD_u
9	GPIO2_C5/SDIO0_D1/SPI5_TXD_u	10	GND
11	GPIO3_D1/I2S0_LRCK_RX_d	12	GPIO3_D7/I2S0_SDO0_d
13	GPIO3_D3/I2S0_SDI0_d	14	GPIO3_D0/I2S0_SCLK_d
15	CLK32K_OUT	16	VCC_1V8
17	GND	18	VCC3V3_SYS
19	GND	20	VCC5V_SYS
21	GPIO0_B1_d	22	GPIO2_C0/UART0_RX_u
23	GPIO2_C1/UART0_TX_u	24	GPIO2_C2/UART0_CTSn_u
25	GPIO2_C3/UART0_RTSn_u	26	GPIO2_D2_u
27	ADC_IN0	28	GPIO0_A4_d
29	ADC_IN2	30	ADC_IN3

Num	Definition	Num	Definition
1	GPIO3_D2/I2S0_LRCK_TX_d	2	GPIO4_A0/I2S_CLK_d
3	GPIO3_D6/I2S0_SDI3SDO1_d	4	GPIO3_D4/I2S0_SDI1SDO3_d
5	GND	6	GPIO3_D5/I2S0_SDI2SDO2_d
7	MIC_IN1P	8	GND
9	LINE_IN_L	10	MIC_IN1N
11	LINE_OUT_R	12	LINE_IN_R
13	GND	14	LINE_OUT_L
15	GPIO3_C0 / SPDIF_TX_u	16	VCCA3V0_CODEC
17	GPIO2_B1/SPI2_RXD/I2C6_SDA_u	18	GPIO2_B2/SPI2_TXD/I2C6_SCL_u
19	GPIO2_B3/SPI2_CLK/_u	20	GPIO2_B4/SPI2_CSn0_u
21	GPIO1_A7/SPI1_RXD/UART4_RX_u	22	GPIO1_B0/SPI1_TXD/UART4_TX_u
23	I2C1_SDA	24	I2C1_SCL
25	GPIO0_A1_u	26	GPIO0_B4_d
27	GPIO2_D4_d	28	GND
29	GND	30	GND



## 2 .PCIE

序号	定义	序号	定义
1	GPIO2_A1/I2C2_SCL	2	GPIO2_A0/I2C2_SDA
3	GPIO4_D3	4	GPIO4_D2
5	GPIO4_D1	6	GPIO1_C1
7	GPIO4_D0 / PCIE_CLKREQnB_u	8	CLK32K_OUT
9	HUB_HOST_DM3	10	HUB_HOST_DP3
11	GND	12	GND
13	NC	14	NC
15	NC	16	NC
17	NC	18	NC
19	NC	20	NC
21	NC	22	NC
23	NC	24	NC
25	NC	26	NC
27	NC	28	NC
29	NC	30	NC

Num	Definition	Num	Definition
1	NC	2	NC
3	SYS_12V	4	GND
5	SYS_12V	6	GND
7	VCC5V_SYS	8	GND
9	VCC5V_SYS	10	GND
11	PCIE_RX3_N	12	PCIE_RX3_P
13	PCIE_TX3N	14	PCIE_TX3P
15	PCIE_RX2_N	16	PCIE_RX2_P
17	PCIE_TX2N	18	PCIE_TX2P
19	GND	20	GND
21	PCIE_RX1_N	22	PCIE_RX1_P
23	PCIE_TX1N	24	PCIE_TX1P
25	PCIE_RX0_N	26	PCIE_RX0_P
27	PCIE_TX0N	28	PCIE_TX0P
29	PCIE_REF_CLKN	30	PCIE_REF_CLKP



### 3. EDP

Num	Definition	Num	Definition
1	GND	24	GND
2	GND	25	EDP_TX3N
3	NC	26	EDP_TX3P
4	EDP_HPDP (GPIO1_C4_u)	27	GND
5	VCC_LCD (3.3V)	28	NC
6	VCC_LCD (3.3V)	29	NC
7	VCC_LCD (3.3V)	30	NC
8	VCC_LCD (3.3V)	31	NC
9	VCC_LCD (3.3V)	32	NC
10	NC	33	NC
11	NC	34	GND
12	GND	35	NC
13	EDP_AUXP	36	SYS_12V
14	EDP_AUXN	37	SYS_12V
15	GND	38	SYS_12V
16	EDP_TX0N	39	SYS_12V
17	EDP_TX0P	40	NC
18	GND	41	BL_PWM0(GPIO4_C2/PWM0_d)
19	EDP_TX1N	42	BL_EN (GPIO1_D0_d)
20	EDP_TX1P	43	I2C4_SCL_TP
21	GND	44	I2C4_SDA_TP
22	EDP_TX2N	45	GND
23	EDP_TX2P		

## 6. Industrial-grade case



## 7. Appendix

### 1 Source code acquisition

Please visit the official website "Resource Download": ( [please click here](#) )

### 2 Contact us



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