
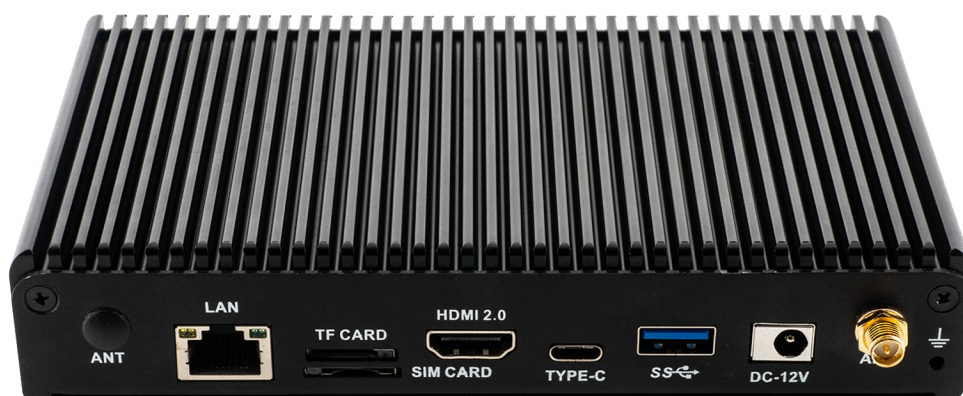


DOCTYPE	VERSION	DATE	CONFIDENTIALITY	
Specification	V1.1	2019-6-5	Public	



T-CHIP TECHNOLOGY

AI Embedded Computer EC-A3399C (AI) V1.1



Version	Date	Updated content
V1.0	2019-05-25	Original version
V1.1	2019-06-05	Update the description of NPU



Directory

1. Overview.....	2
2. Specifications.....	4
2.1 Main Specifications.....	4
2.2 Power Parameter.....	5
2.3 Environmental Parameter.....	5
2.4 Appearance Structure.....	5
3. Interfaces.....	6
4. mainboard	7
5. Size.....	8
6.Appendix.....	9
1. Company Profile	9
2. Source code acquisition.....	10
3.Contact Us	10



1. Overview

Six-core AI Embedded Computer, Based on AIO-3399C (AI version) high-performance open-source platform, industrial-grade metal case and fan-off design configured, with high-efficiency cooling ability, complete interface, strong applicability and computing power and ultrahigh performance. It can be applicable to high-performance edge computing to accelerate in-depth learning computation and AI algorithm. It can be rapidly applied in the field of mobile edge computing, smart home, face recognition, etc.

EC-A3399C(AI) including "with NPU" and "without NPU" versions.

Main characteristics:

1. AI Neural Network Processor NPU

1) Ultrahigh Performance

Onboard AI embedded neural network processor NPU, with 28000 parallel neural calculation cores, on-chip parallel and in-situ computation supported, with a peak performance reaching up to 5.6 Tops and 2.8 Tops computing performance, with an efficiency energy-consumption ratio reaching up to 9.3 Tops/W. It has strong computing power. In the meantime, extremely low energy consumption is also maintained, making it extremely advantageous in the application of edge computing of terminal device.

2) Unique AI Architecture

Dedicated MPE matrix engine and APiM (AI processing in Memory) framework for AI adopted, local parallel AI computation integrated with storage and calculation. one-time upgrade network preload with no need for instructions, bus, and external DDR cache. This configuration improves the processing speed hugely and lowers processing energy consumption a lot compared with processors built in traditional architecture approaches.

3) Supporting Model Training Tool

Complete easy-to-use model-training tool PLAI (People Learn AI) based on PyTorch is offered. It can be developed on Windows 10 and Ubuntu 16.04 system, and user-defined network model is added easier, greatly lowering the technical threshold of using AI.

4) Provide Network Training Model

Three kinds of network training model sample including GNet1, GNet18 and GNetfc based on VGG are supported. Subsequently, network samples will be continuously added, contributing to easy test of a large amount of in-depth learning application on device.

2. Six-core 64-bit High-performance Processor

Adopts RK3399 six-core 64-bit (A72x2+A53x4) high-performance processor, frequency up to 1.8GHz, integrated quad-core ARM high-end GPU Mali-T860. Provide a variety of storage configuration options, users only need to expand the function backplane to quickly achieve project development.

3. Rich External Interfaces

HDMI2.0, LAN, Type-C, USB3.0, RS485, RS232 and other interfaces owned to make it possible to be widely applied in various industries

4. Configuring Metal Case

High-quality metal case and fanless design configured, heat-conducting aluminum alloy structure, high-efficiency cooling, 60℃ high-temperature aging, stable operation for 7x24 hours, various installation ways contributing to its embedding into various smart devices more convenient.

5. Embed Into Industrial Equipment

Compact and space-saving design supports multiple installation modes; Compatible with RS232, RS485 and onboard two-way TTL, allowing connecting to various industrial equipment. The performance is stable and reliable.

6. Open Source

Complete with SDK, tutorial, technical information and development tools can be downloaded on the website , making development and learning easier.

7. Application

It is suitable for cluster servers, high-performance computing/storage, computer vision, gaming equipment, commercial display equipment, medical equipment, vending machines, industrial computers, etc.

2、Specification

2.1 Main Specifications

Specification	
SOC	Rockchip RK3399 (28nm HKMG Process)
CPU	Six-Core ARM 64-bit processor, up to 1.8GHz Based on Big.Little architecture, Dual-Core Cortex-A72 and Quad-Core Cortex-A53 with separate NEON coprocessor
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)
NPU	Onboard AI neural network processor SPR2801S: Computing power up to 2.8 TOPS , peak up to 5.6Tops , 9.3Tops/W ultra-high efficiency Support PLAI (PyTorch) and MDK (Caffe) model training tools Follow-up support TensorFlow Support Image Classification Model VGG-16(GNet1)、 GNet18 and Gnetfc Support Target Detection Model: SSD (Based on VGG)
RAM	2GB/4GB LPDDR4
Storage	16GB High-Speed eMMC, Support TF Card Slot
Network	Gigabit Ethernet (RJ45 interface) WIFI/BT module, support 2.4GHz / 5GHz dual-band WiFi, 802.11a/b/g/n/ac protocol Support Bluetooth 4.1 Mini PCIe (Used to expand 3G/4G modules, use with Micro SIM card slot)
Multimedia	Support 4K VP9 and 4K 10bits H265/H264 video decoding, up to 60fps 1080P Multi-format video decoding (VC-1 , MPEG-1/2/4 , VP8) 1080P video encoding , Support H.264 , VP8 formats Video post processor: deinterlacing, denoising, edge/ detail/ color optimization
Display	HDMI2.0 support 4K 60Hz display, support HDCP 1.4/2.2 Support DisplayPort 1.2 (4 lines, up to 4K 60Hz) Dual VOP: Support 4096X2160 and 2560X1600 Support dual-screen identical display/dual-screen differential display Scalable: eDP 1.3(4 lines10.8Gbps), Dual LVDS (6/8 bit, up to 24-bit 1920x1200 resolution) Support single channel MIPI DSI, up to 1920x1080 resolution (customized interface)
Other	Support USB3.0 HOST and Type-C interface ADCx1, SPI / GPIO, Controllable LEDx2, I²Cx1, Gravity sensorx1(Scalable)
Audio	1xPHONE, 2xSPEAKER(L/R), 1xLINE-IN, 1xLINE-OUT
USB	Type-C (OTG), 1 x USB3.0, 4 x USB2.0(Interface x 2, socket x 2)
Key	Power (Key x 1, socket x 1), Recover(Key x 1, socket x 1)
Serial port	RS232x1, RS485x1, Debug serial portx1, Onboard 2-way TTL
IR	With a one-way infrared receiver, Support infrared remote control
OS	Support Android, Linux, Ubuntu System
Power	DC 9-24V (DC 5.5 x2.1mm)

2.2 Power Parameter

Type	Min	Typical	Max
Operating Voltage	9 v	12 v	24v
Operating Current	500mA	1 A	2A

2.3 Environmental Parameter

Type	Min	Typical	Max
Operating Temperature	-20 °C	25 °C	60 °C
Storage Temperature	-40 °C	25 °C	125 °C

2.4 Appearance Structure

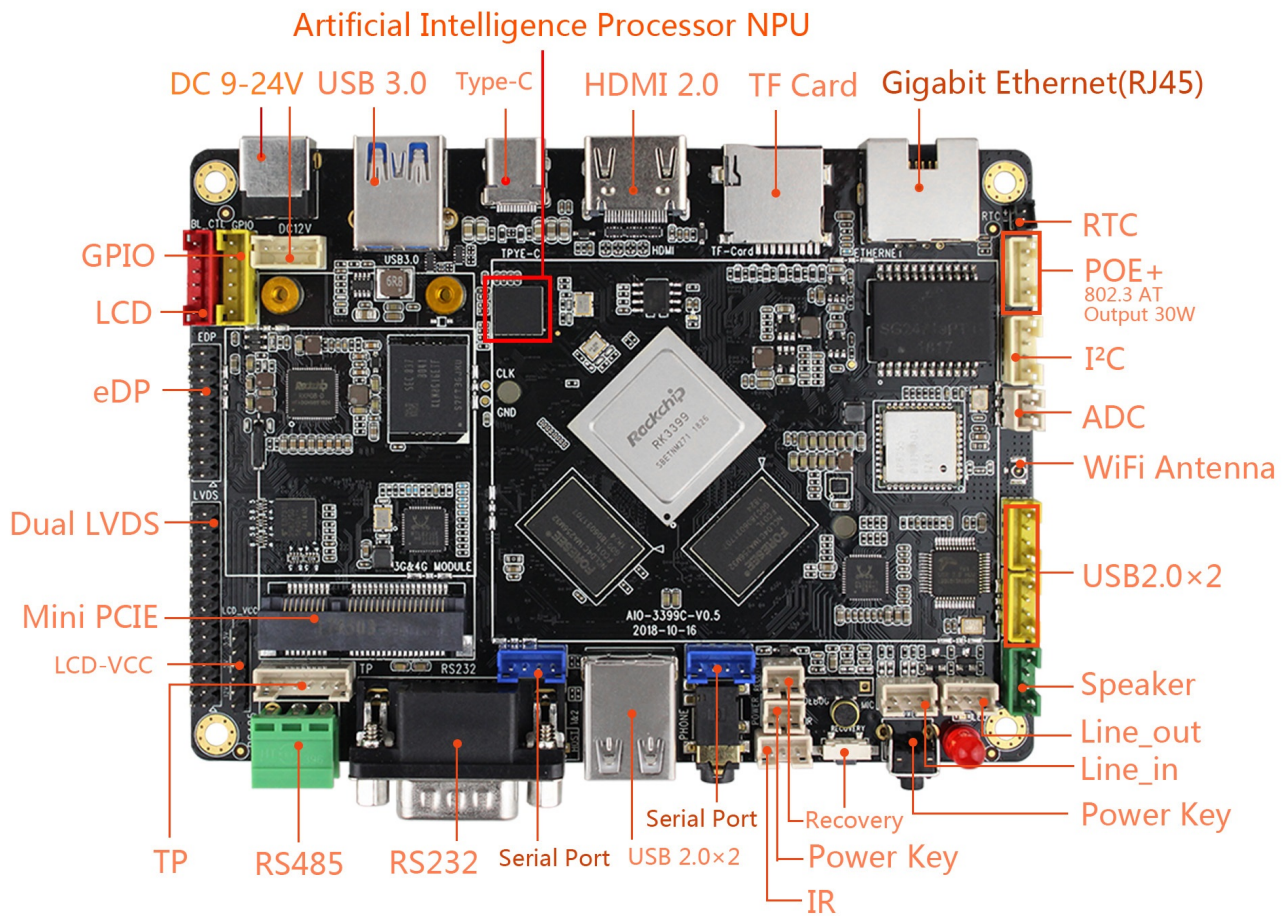
Type	Min
Size	160 x 94 x 26 mm
Appearance	AL6063 aluminum profile

3. Interface

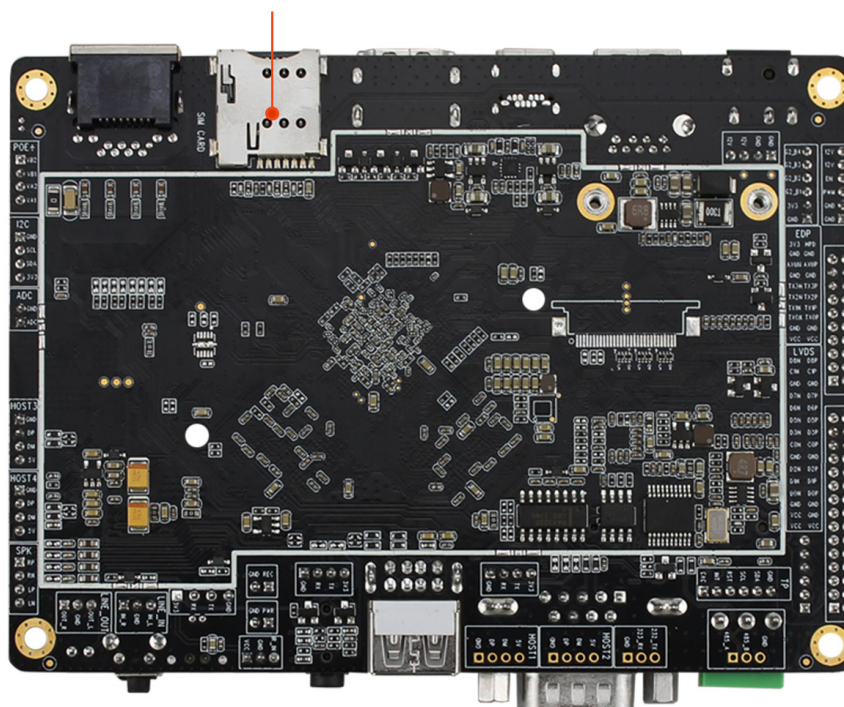
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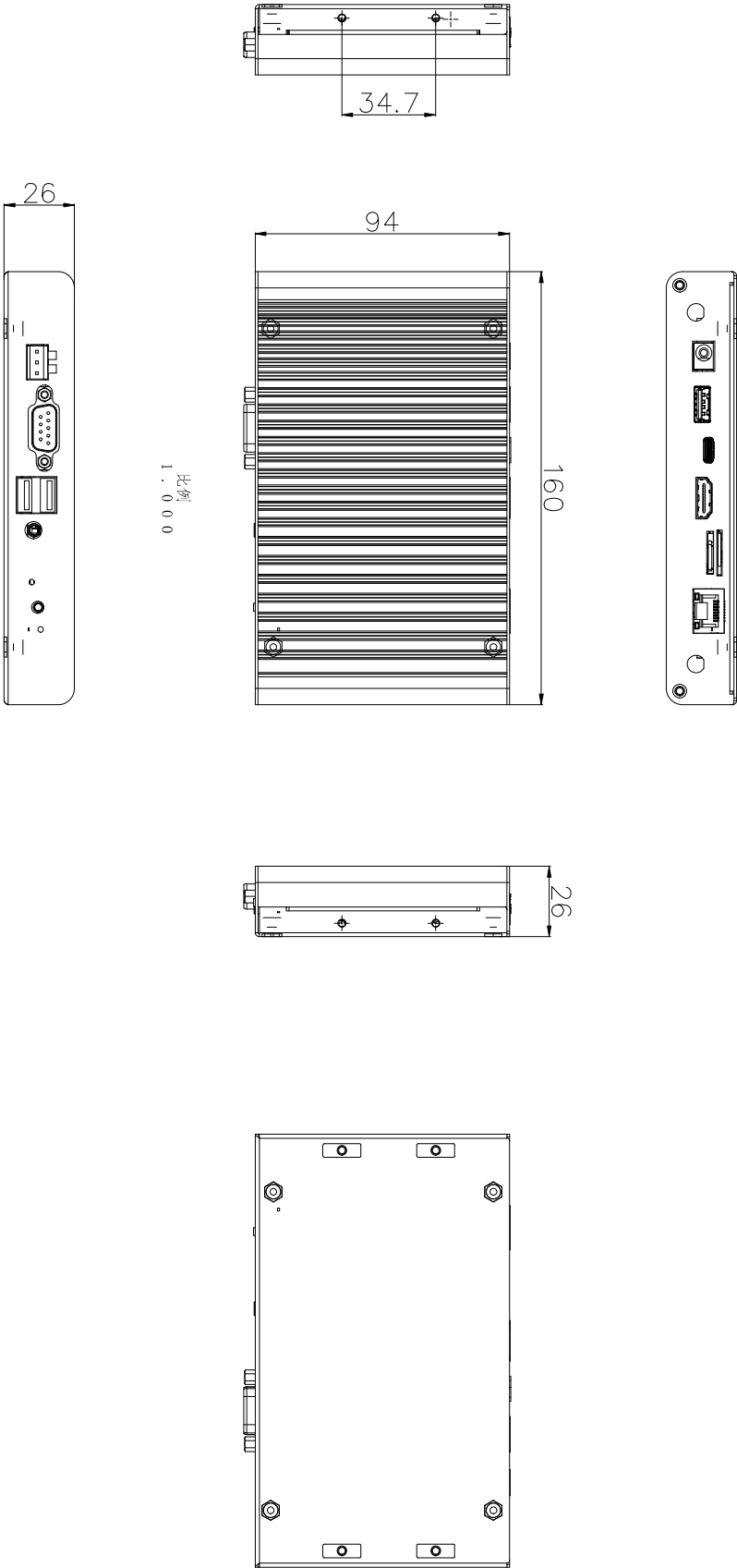
4.Interface description



SIM Card (MicroSIM)



5. Size



Appendix:

1. 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.



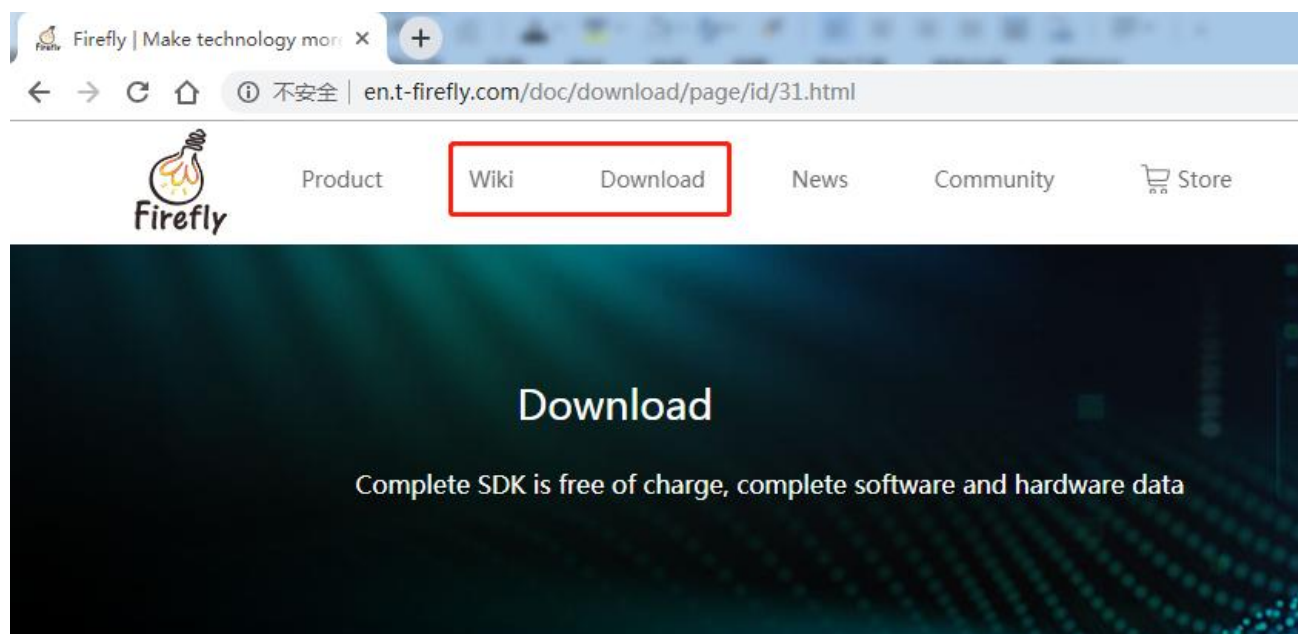
Firefly is a brand owned by T-chip Technology. It operates open source products, open source communities and online stores. It has a large number of enterprise users and developer users, and its products are well received by users. Firefly open source products include open source boards, core boards, 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.

2. Source code acquisition

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



3.Contact Us



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