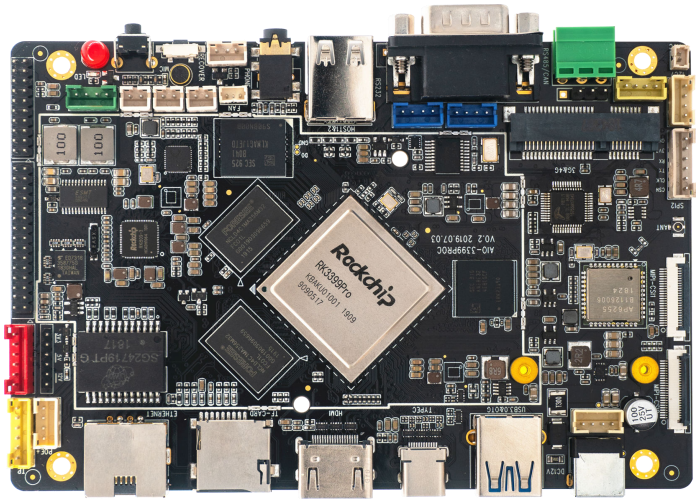
DOCTYPE	VERSION	DATE	CONFIDENTIALITY	
Specification	V1.0	2019-11-7	Public	

T-CHIP TECHNOLOGY

Six-core High-performance AI Main Board

AIO-3399ProC

V1.0

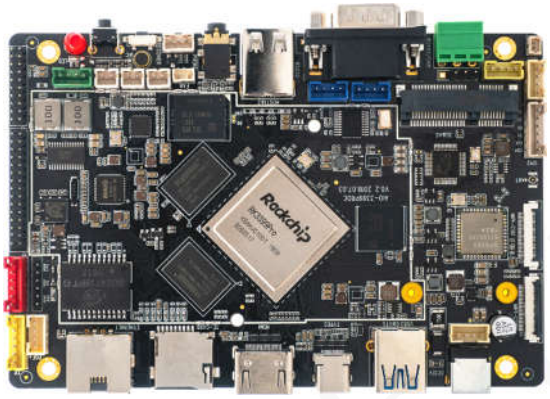


Version	Date	Updated content
V1.0	2019-11-7	Original version

Directory

1. Product Overview

It runs on Rockchip RK3399Pro high-performance AI processor with built-in neural network unit (NPU), supports multiple AI development tools and interfaces, and has rich expansion interfaces and powerful hardware encoding and decoding abilities, which can be applied to AI industry easily.



Main characteristics:

1. RK3399Pro Six-core High-performance Processor

Rockchip RK3399Pro processor adopts the architecture of dual-core Cortex-A72 and quad-core Cortex-A53 with its frequency up to 1.8GHz, showing an ultra-strong general-purpose computing performance. Quad-core ARM high-end GPU Mali-T860 integrates more bandwidth compression techniques and therefore has an excellent overall performance.

2. NPU With Ultra-strong AI Performance

CPU internally integrates AI neural network unit NPU and supports 8bit/16bit operation with its computing performance up to 3.0TOPS. Compared with using the traditional GPU as the large chip scheme of AI computing unit, the power consumption of NPU is merely 1% of that of GPU. Therefore, NPU has an extremely high computing-power performance ratio.

3. With Rich AI Capability

AIO-3399ProC can directly adopt TensorFlow/Caffe/Mxnet general-purpose model and provides AI development tools like model transformation and end-to-side API. It also supports the development interfaces of Android NN API, RKNN cross-platform API and TensorFlow.

4. Powerful Hardware Decoding Capability

It supports various display and output interfaces including HDMI 2.0, MIPI-DSI, eDP and dual LVDS. It also supports dual-screen identical display/dual-screen differential display, showing powerful hardware encoding and decoding abilities. Besides, and supports 4K VP9, 4K 10bits H265/H264, 1080P multi-format (VC-1, MPEG-1/2/4, VP8) video decoding and 1080P (H.264/VP8 format) video encoding.

5. Highly-efficient and Stable Hardware

It supports CAN bus data communications with highly-efficient real-time, farther transmission distance and stronger anti-electromagnetic interference ability. It configures independent external hardware watchdog and makes the device work continuously in the unmanned state which better promotes the system's stability.

6. Support Dual MIPI Cameras

With dual MIPI CSI interfaces and in-built dual ISP, supporting single 13 Mpixel or dual 8Mpixel at the maximum. It can achieve the simultaneous input of dual-camera data and supports high-level processing like gesture detection, deep detection and 3D.

7. Support Multiple OS

With stable and reliable performance, AIO-3399ProC supports multiple operating systems including Android、Linux+QT and Ubuntu.

8. Rich Expansion Interfaces

On-board I2C, SPI, UART, ADC, PWM, GPIO, PCIe, USB3.0, RS232, RS485, I2S (supporting 8-way digital microphone array input) and other interfaces. It supports the power supply mode of POE+ (802.3 AT, 30W output power).

9. Various Product Forms

AIO-3399ProC can be equipped with an industrial metal case and 10.1-inch IPS HD multi-point touching screen which is integrated into high-performance application PC. It can also be equipped with industrial case independently and embedded into all kinds of smart devices flexibly.

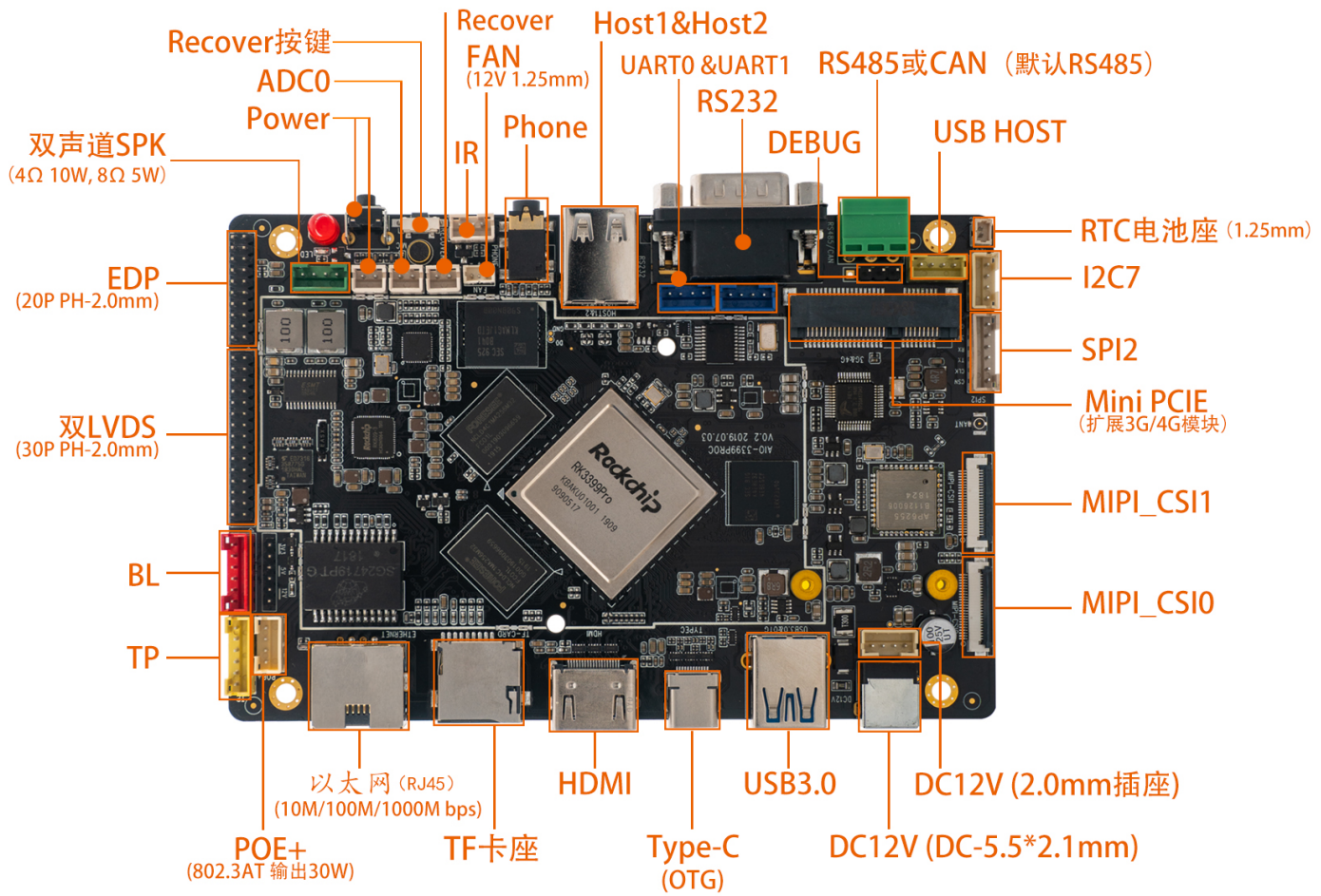
10. Application

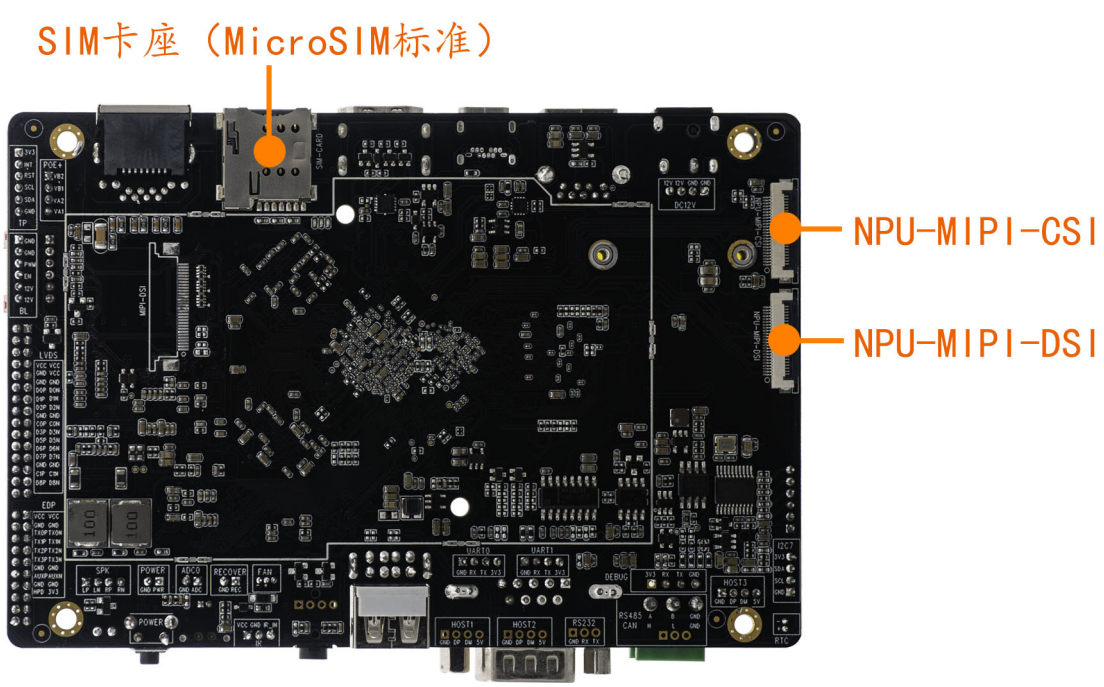
AI driving monitoring、Industrial computer、AI server、Self-service retail shelves、Face-scanning payment devices、Face recognition devices、Smart vending counter、Smart education.

2. Specification

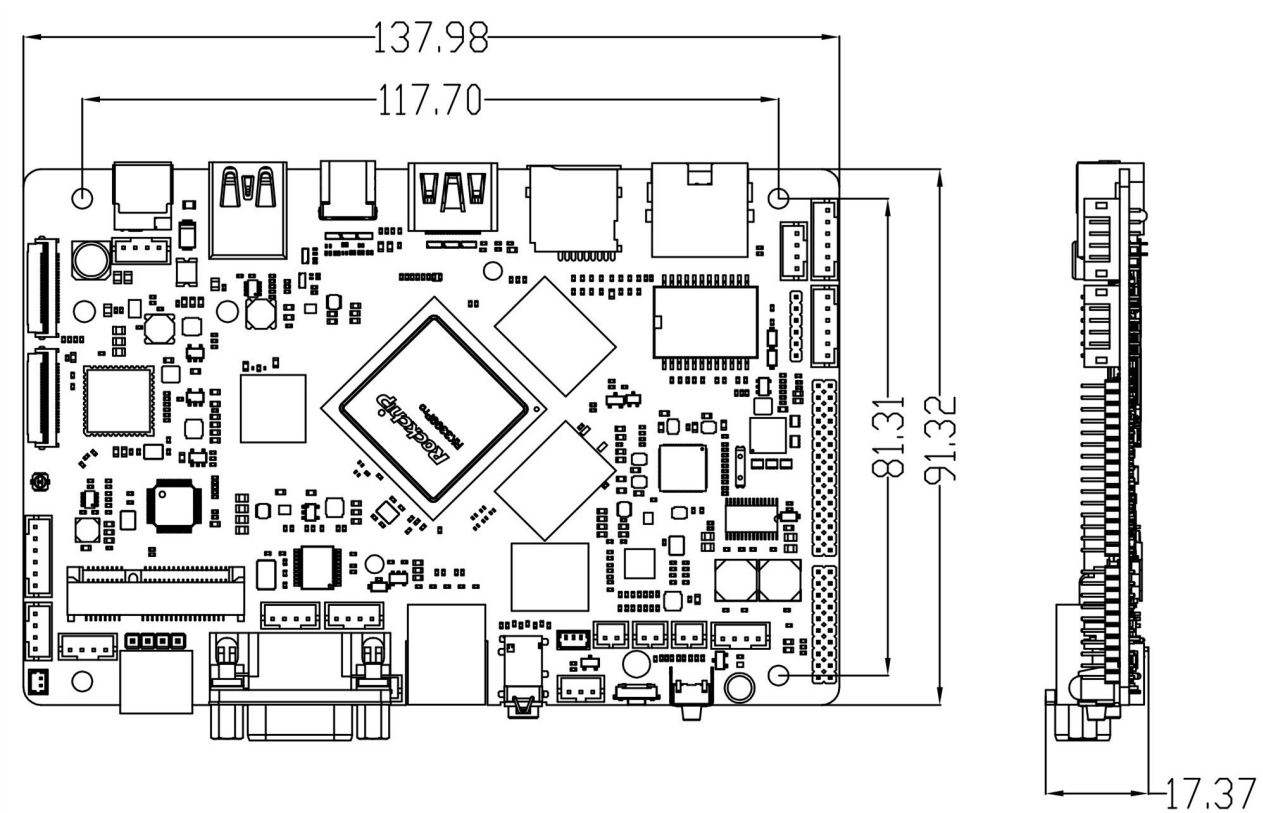
Specification	
SoC	Rockchip RK3399Pro
CPU	Dual-core Cortex-A72+ Quad-core Cortex-A53 big.LITTLE core CPU architecture, frequency up to 1.8G Hz
GPU	ARM® Mali-T860 MP4 Quad-core GPU Support OpenGL ES1.1/2.0/3.0/3.1, OpenVG1.1, OpenCL, DX11 Support AFBC（frame buffer compression）
NPU	Built-in neural network processor NPU, powerful AI computing performance: 1. Support 8bit/16bit operation, computing performance up to 3.0TOPS. 2. Compared with using the traditional GPU as the large chip scheme of AI computing unit, the power consumption of NPU is merely 1% of that of GPU. 3. Load Caffe / Mxnet / TensorFlow models directly. 4. Provide AI development tools: Support model fast conversion, support end-to-side API, support TensorFlow / TF Lite / Caffe / ONNX / Darknet models. 5. Provide AI application development interface: Support Android NN API, provide RKNN cross-platform API, Linux support for TensorFlow development.
VPU	Support 4K VP9 and 4K 10bits H265/H264 video decoding, up to 60fps 1080P multi-format video decoding (WMV, MPEG-1/2/4, VP8) 1080P video coding, support H.264, VP8 format Video post processor, de-interlacing, de-noising, edge/detail/color optimization
RAM	LPDDR3 3GB（NPU 1GB + CPU 2GB）, LPDDR3 6GB（NPU 2GB + CPU 4GB）
Storage	High-speed eMMC 5.1 （16GB / 32GB / 64GB / 128GB） Support TF card expansion
Hardware Features	
Ethernet	/ 100 / 1000 Mbps Ethernet Interface（RJ45）
Display	- 1 x HDMI 2.0 , Support 4K@60HZ output and HDCP 1.4/2.2 - 1 x MIPI-DSI , Support single channel 1080P@60fps output or dual-channel LVDS 1920x1200@60fps output （AIO-3399ProC defaults to dual LVDS） - 1 x eDP 1.3 (4 lanes with 10.8Gbps) - Support dual-screen identical display/dual-screen differential display
Audio	1 x HDMI 2.0 Audio output 1 x I2S For audio input and output (supports 8-way digital microphone array inputs) 1 x Speaker Two-channel speaker（4Ω,10W / 8Ω, 5W） 1 x Headset output 1 x Mic Audio input
Camera	2x MIPI-CSI camera interfaces (built-in dual-ISP, Maximum support single 13Mpixel or dual 8Mpixel)
USB	3×USB2.0 Hub, 1 x USB3.0, 1xTYPE-C(OTG)
Interface	SPI×1, UART×2, Debug×1, RS485×1(CANx1 and RS485 share the same interface), RS232×1, ADC×1, TPx1, IRx1, I2C, PWM, GPIO
Power	12V DC input voltage
Operating temperature	0℃ - 60℃
OS/Software	
OS	Android 、Linux + QT、Ubuntu
Software	Provide AI development tools: Support model fast conversion, support end-to-side API, support TensorFlow / TF Lite / Caffe / ONNX / Darknet models. Provide AI application development interface: Support Android NN API, provide RKNN cross-platform API, Linux support for TensorFlow development.
Appearance	
Size	138 mm × 91.3 mm

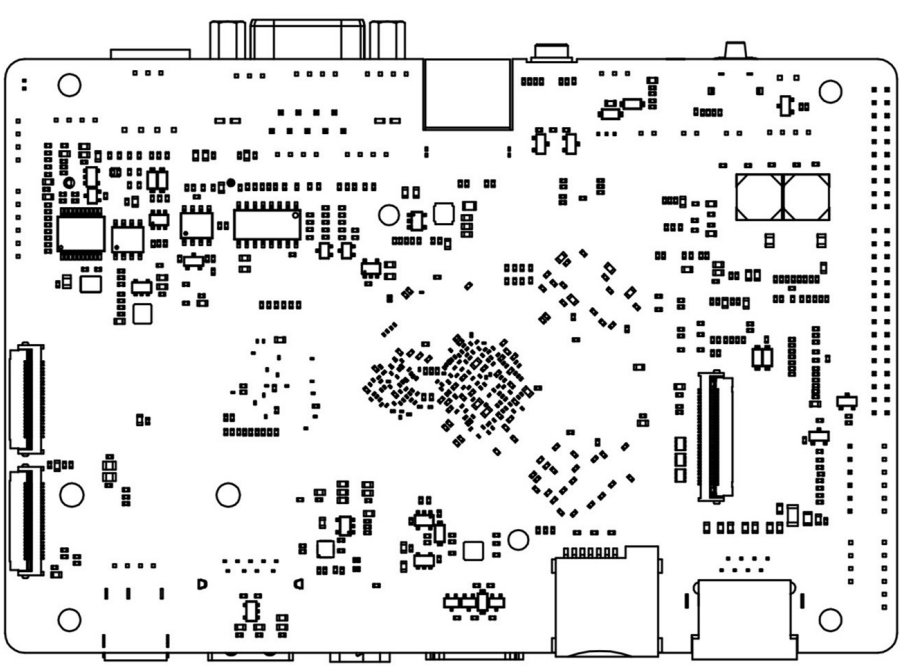
3. Interface


Recover按键
ADC0
Power
双声道SPK
(4Ω 10W, 8Ω 5W)
Recover
FAN
(12V 1.25mm)
IR
Phone
Host1&Host2
UART0 &UART1
RS232
RS485或CAN（默认RS485）
DEBUG
USB HOST
RTC电池座（1.25mm）
I2C7
SPI2
Mini PCIE
(扩展3G/4G模块)
MIPI_CSI1
MIPI_CSI0
EDP
(20P PH-2.0mm)
双LVDS
(30P PH-2.0mm)
BL
TP
以太网（RJ45）
(10M/100M/1000M bps)
HDMI
USB3.0
DC12V (2.0mm插座)
POE+
(802.3AT 输出30W)
TF卡座
Type-C
(OTG)
DC12V (DC-5.5*2.1mm)


SIM卡座（MicroSIM标准）
NPU-MIPI-CSI
NPU-MIPI-DSI

4. PCB Size





5. Industrial Metal Case

AIO-3399ProC can be equipped with an industrial metal case and 10.1-inch IPS HD multi-point touching screen which is integrated into
high-performance application PC. It can also be equipped with industrial case independently and embedded into all kinds of smart devices flexibly.

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.

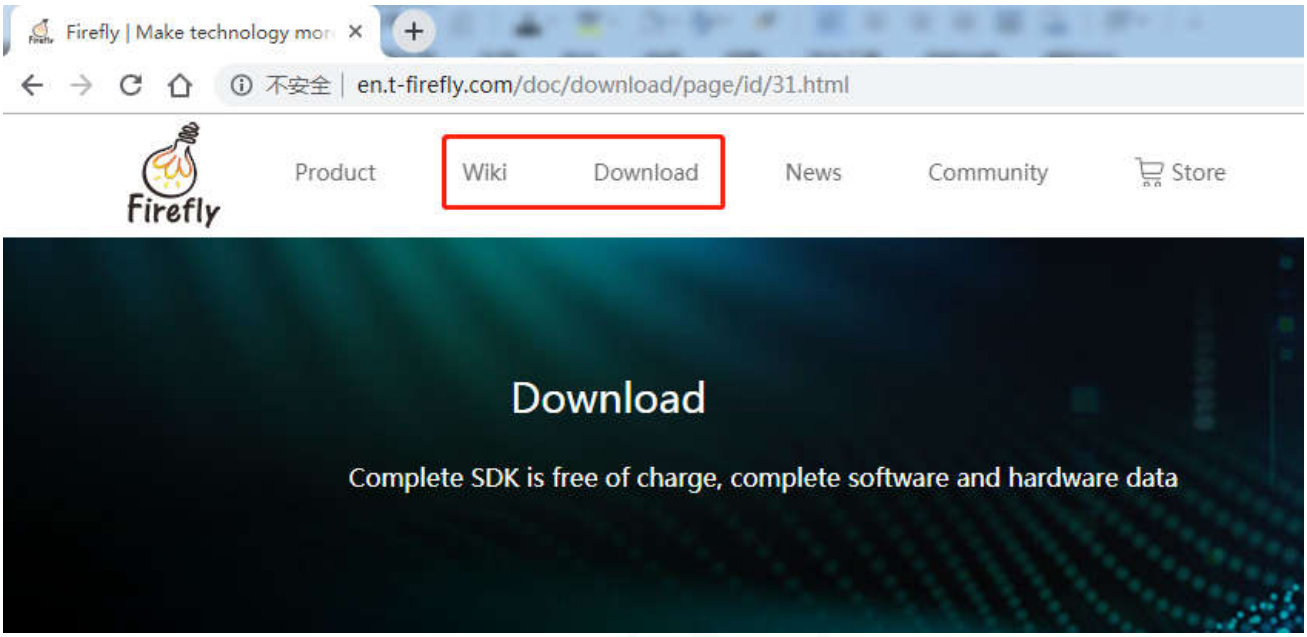
Firefly is a brand owned by T-chip Technology. It operates open source products, open source communities and online stores. It has a large number of enterprise users and developer users, and its products are well received by users. Firefly open source products include open source boards, core boards,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