# T-CHIP TECHNOLOGY

# EC-A3568J

## Quad-Core 64-Bit AI Embedded Computer

## V1.0

Firefly

# Update history

| Version | Date | Details |
|---------|------|---------|
| V1.0 | 2021-6-2 | Original version |
| | | |
| | | |

# Directory

# 1. Overview

The embedded computer is equipped with Rockchip quad-core processor RK3568 which is configured with dual-core GPU and high-performance NPU, supporting up to 8G RAM. It supports POE+ power supplying, dual Gigabit Ethernet ports and WiFi 6 wireless transmission. Providing various interfaces, it is suitable for applications such as smart NVR, cloud terminal, IoT gateway and industrial control.

**1. RK3568 quad-core 64-bit processor**
RK3568 quad-core 64-bit Cortex-A55 processor, with brand new ARM v8.2-A architecture, has frequency up to 2.0GHz — the efficiency is greatly improved. With 22nm lithography process, it features low power consumption and high performance.

**2. 8GB large RAM**
It supports up to 8GB RAM,  meeting therequirements of running large-memory products.

**3. Integrated co-processors**
It is integrated with dual-core GPU, high-performance VPU and high-efficiency NPU. The GPU supports OpenGL ES3.2/2.0/1.1, Vulkan1.1. The VPU can achieve 4K 60fps H.265/H.264/VP9 video decoding and 1080P 60fps H.265/ H.264 video encoding. The NPU supports one-click switching of mainstream frameworks like Caffe/TensorFlow.

**4. Dual Gigabit Ethernet ports**
It is equipped with dual adaptive RJ45 Gigabit Ethernet ports, through which internal and external network data can be accessed and transmitted, improving network transmission efficiency, and meeting the needs of products with multiple network ports such as NVR and industrial gateway. The LAN (POE) network port supports POE+ (802.3AT, output power 30W) power supplying — while transmitting network data, it can also supply power to the device to ensure the normal operation of the device.

**5. Powerful wireless network communication**
Supporting WiFi 6 (802.11ax) wireless network communication, it features high-speed transmission, lower packet loss rate and retransmission rate, which more effectively reduces data congestion, making the transmission more stable and secure. It can also be connected to 5G/4G module, enabling the product to have a higher-rate, larger-capacity and lower-latency communication.

**6. Onboard M.2 and SATA3.0 interfaces**
The onboard M.2 PCIe3.0 and SATA3.0 interfaces can be connected with an M.2 NVMe SSD and a 2.5-inch SATA SSD/HDD respectively, owning the advantages of high-speed reading and writing and large capacity.

**7. Excellent heat dissipation**
Industrial-grade aluminium alloy enclosure delivers excellent heat dissipation without fans. It passes high temperature aging test at 60℃  and supports stable operation for 7x24 hours. A variety of installation methods can be used, which make it be quickly embedded into various smart products.

**8. Android and Ubuntu supported**
Android 11.0, Ubuntu 18.04 OS are supported. The stable and reliable operation provides a safe and stable system environment for product research and production.

**9. A variety of interfaces**
Dual Gigabit Ethernet port, USB3.0 x2, USB2.0 x2, HDMI2.0, RS485 x2, RS232 x2, CAN, it can be directly used in various intelligent products to facilitate the completion of products.

**10. Abundant resources for customization**
A complete SDK, development documents, examples, technology documents, tutorials and other resources are provided for the users to make a further customization.

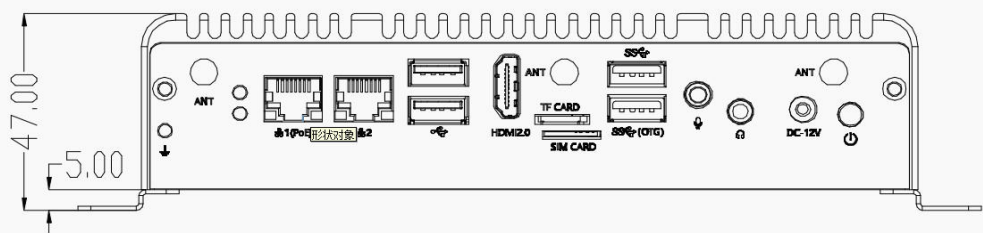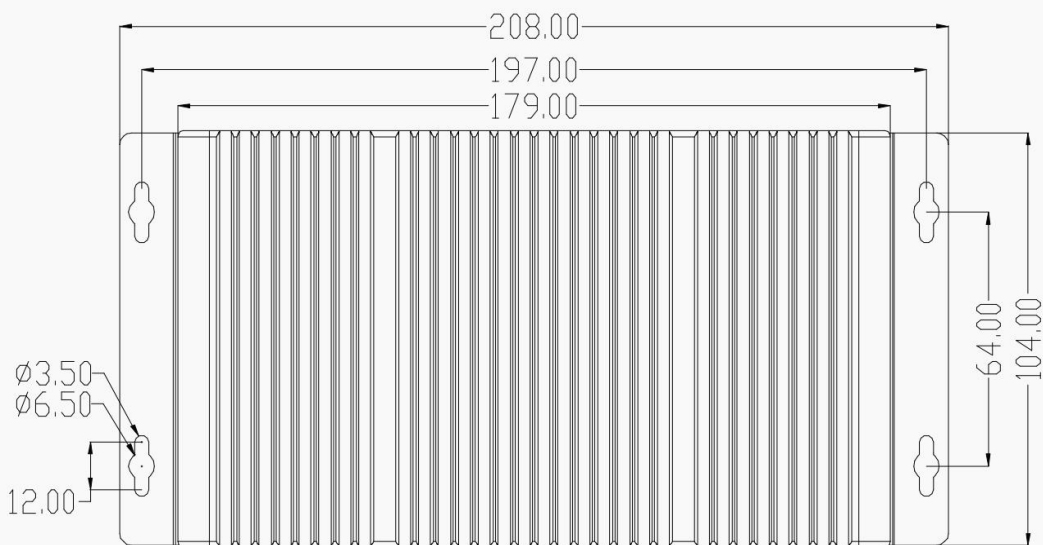**11. A wide range of applications**
This embedded computer can be widely used in smart NVRs, cloud terminals, IoT gateways, industrial control, edge computing, face recognition gates, NASs, vehicle center consoles, etc.
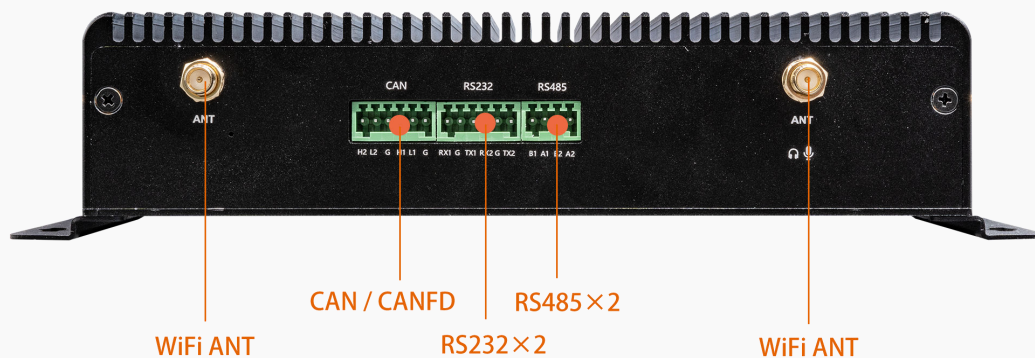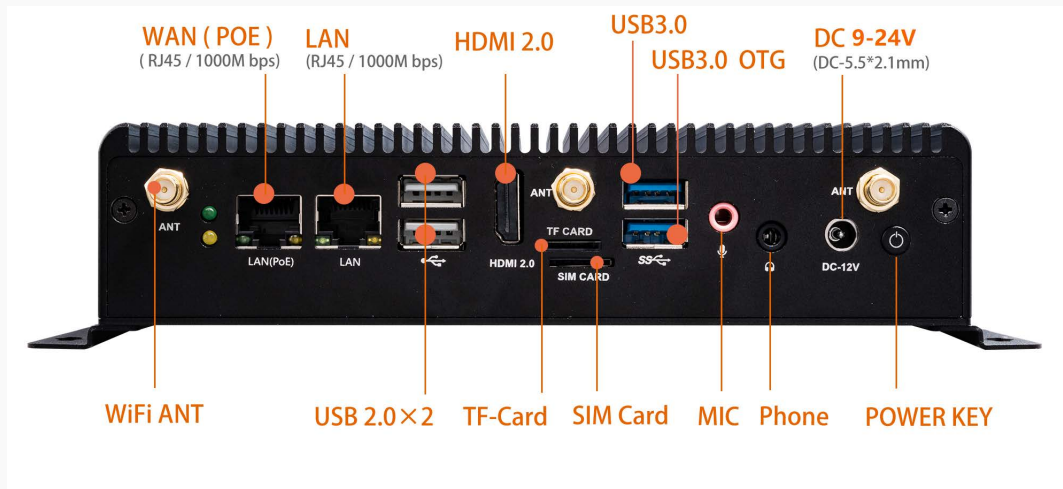
# 2. Specifications

| Basic Specifications | |
|---|---|
| SOC | RockChip RK3568 |
| CPU | Quad-core 64-bit Cortex-A55, 22nm lithography process, frequency up to 2.0GHz |
| GPU | ARM G52 2EE<br>Support OpenGL ES 1.1/2.0/3.2, OpenCL 2.0, Vulkan 1.1<br>Embedded high-performance 2D acceleration hardware |
| NPU | 0.8Tops@INT8, integrated high-performance AI accelerator RKNN NPU<br>Supports one-click switching of<br>Caffe/TensorFlow/TFLite/ONNX/PyTorch/Keras/Darknet |
| VPU | Supports 4K 60fps H.265/H.264/VP9 video decoding<br>Supports 1080P 60fps H.265/H.264 video encoding<br>Supports 8M ISP, supports HDR |
| RAM | 2GB / 4GB / 8GB   LPDDR4 |
| Storage | 32GB / 64GB / 128GB eMMC<br>Supports 2242 / 2280 NVMe SSD (M.2 PCIe 3.0)<br>Supports 2.5" SSD/HDD(SATA 3.0)<br>TF-Card Slot x1 (Supports TF card expansion) |
| **Hardware Features** | |
| Ethernet | Supports dual Gigabit Ethernet ports(1000 Mbps)<br>Among them, LAN (PoE) port supports POE+ (802.3 AT, output power 30W) power supply<br>Meets the needs of products with multiple network ports such as NVR and industrial gateway |
| WiFi | Supports M.2 to connect 5G, Mini PCIe to connect 4G LTE<br>Supports 2.4G/5GHz Dual-band WiFi, 802.11 a/b/g/n/ac/ax, WiFi 6<br>Supports BT5.0 |
| Display | 1 × HDMI2.0, supports 4K@60fps output |
| Audio | 1 × HDMI audio output<br>1 × Earphone output<br>1 × Microphone onboard audio input |
| Interface | 2 × CANFD / CAN,<br>2 × RS232,<br>2 × RS485,<br>1 × M.2 PCIe3.0   (Expand with NVMe SSD) ,<br>1 × SATA 3.0   (Expand with 2.5" SATA SSD/HDD) ,<br>1 × M.2 Expand with 5G (or 1 × Mini PCIe Expand with 4G LTE) ,<br>2 × USB3.0,<br>2 × USB 2.0,<br>1 × Phone,<br>1 × Mic |
| **OS/Software** | |
| OS | Supports Android 11.0, Ubuntu 18.04 OS |
| **Others** | |
| Power | DC 12V~2A(support 9V~24V wide voltage input |
| Power consumption | Max: 8.4W(12V/700mA), Normal: 3.6W(12V/300mA),<br>Min: 0.096W(12V/8mA) |
| Size | 179.0mm × 105.2mm × 41.5mm |
| Operating Temperature | -10℃ ~ 60℃ |
| Storage Temperature | -20℃ ~ 70℃ |
| Storage Humidity | 10% ~ 80%RH(non-condensing) |

# 3. Size

# 4. Interface definitions



WAN ( POE )
( RJ45 / 1000M bps)

LAN
(RJ45 / 1000M bps)

HDMI 2.0

USB3.0

USB3.0  OTG

DC 9-24V
(DC-5.5*2.1mm)

WiFi ANT

USB 2.0×2

TF-Card

SIM Card

MIC

Phone

POWER KEY



CAN / CANFD

RS485×2

WiFi ANT

RS232×2

WiFi ANT

SATA 3.0 x 1 （2.5-inch SSD/HDD）

# Company profile

T-Chip Intelligent Technology (Zhongshan) Co., Ltd. , established in 2005, has more than ten years of technological product research and development capabilities, and has nearly 100 patents and software copyrights. As a national high-tech enterprise, we focus on the research and development, production and sales of open source smart hardware, Internet of Things, and digital audio products, while also provide overall solutions with smart hardware products.

T-Chip is an IDH (Independent Design House) officially authorized by Rockchip in Fuzhou, and also a strategic partner of Rockchip, with a close cooperative relationship for more than 10 years.

Firefly is a brand established by T-Chip, with open source community and online store. Firefly products include core boards, mainboards, embedded computers, cluster servers, development kits and other products. Currently, we have more than 100,000 users, including more than 10,000 enterprise users such as Arm, Google, Baidu, Tencent and Alibaba.

Firefly team has more than 70 R&D members, with excellent research and development capabilities of schematic design, PCB layout, board mass production, embedded development, system development, application development and so on. We accelerate the research and development process for many technology entrepreneurs and start-ups, and provide professional technical services.

Make technology simpler, Make life smarter - is the idea of Firefly team. We hope that through Firefly's open source products and technical services, the research and development of various technological products will become efficient and simple, and intelligent technology can be integrated into life.

Firefly is committed to providing enterprise customers with long-term stable and reliable industrial products and services, and continuously creating value for customers.

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