# EC-A1688JD4

## 16T Industrial-Grade Intelligent Computing AI Computer


V1.0 2024-12-9

T-CHIP INTELLIGENCE TECHNOLOGY

# Product features

## 32T INT4/16T INT8 Computing power

Equipped with SOPHON computing AI processor BM1688, it has an octa-core ARM Cortex-A53, with a maximum frequency of 1.6GHz, and a built-in neural network acceleration engine TPU, with 32T@INT4 peak computing power, 16T@INT8 peak computing power, 4T@FP16/BF16 computing power, and 0.5T@FP32 computing power.

## Powerful multi-channel video AI processing performance

It supports up to 16 channels of H.265/H.264 1080P video decoding, 10 channels of H.265/H.264 1080P video encoding, and 16 channels of 1080P HD video full-process processing (decoding + AI analysis), meeting the needs of various AI application scenarios such as video streaming face detection, license plate recognition, and smart cities.

## The private deployment of large language models

Support the private deployment of ultra-large-scale parameter models under the Transformer architecture, including large language models such as Gemma-2B, LlaMa2-7B, and Qwen1.5-1.8B, ChatGLM3-6B. Support Docker container management technology.

## Multiple deep learning frameworks

Support traditional network architectures such as CNN, RNN, and LSTM;
a variety of deep learning frameworks, including TensorFlow, Pytorch, PaddlePaddle, Caffe and ONNX, as well as custom operator development.

# Product features

## All-aluminum alloy enclosure for passive heat dissipation

The industrial-grade all-metal enclosure with aluminum alloy structure for thermal conduction. The side of the top cover features a grille design for external airflow and efficient passive heat dissipation.

## Abundant expansion interfaces

It has HDMI2.0, PCIe2.0, USB3.0, RS485, RS232, CAN, TF Card, SIM Card, Type-C and other expansion interfaces. These interfaces facilitate theconnection of various peripherals, supporting product applications across various fields.

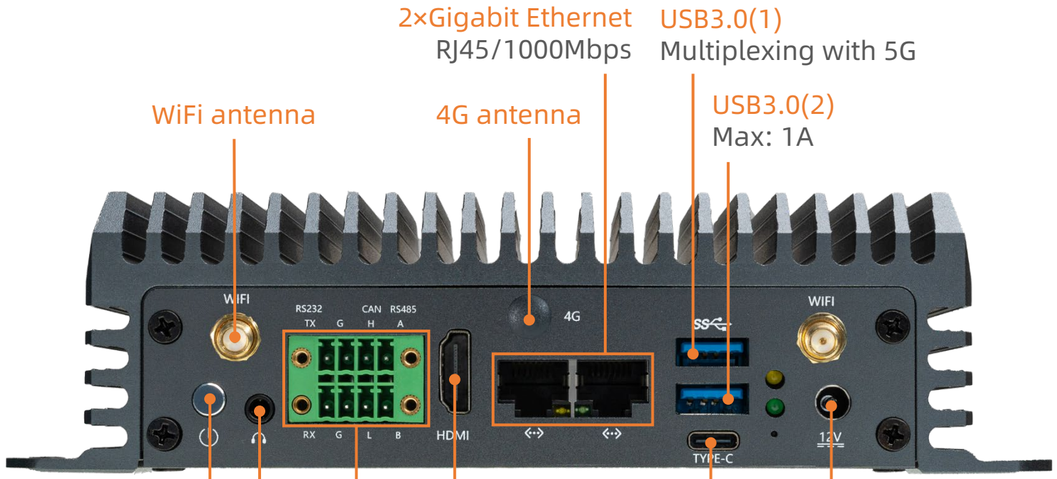
## A wide range of applications

Efficiently compatible with all AI algorithms on the market, it is widely applied to AI servers, edge computing boxes, industrial PCs, smart IP cameras, and AIoT devices, improving various industries through AI.

# Specifications

| Specification | | |
|---|---|---|
| Basic Specifications | SOC | SOPHON BM1688 |
| | CPU | Octa-core 64-bit ARM Cortex-A53 @ 1.6GHz |
| | TPU | Built-in SOPHGO neural network acceleration engine TPU, 32T@INT4 peak computing power, 16T@INT8 peak computing power, 4T@FP16/BF16 computing power, 0.5T@FP32 computing power |
| | ISP | Time-sharing multiplexing for up to 6 sensor input videos, with maximum widths of 4608 (non-tile mode) and 8192 (tile mode)<br>Supports Sensor self-band dynamic and 2-frame wide dynamic range, and the maximum performance supports: 12M@30 HDR or 8K@15 SDR or 16M@30 SDR<br>Support RGB-IR, AI ISP interface, 3A (AE/AWB/AF, 3A control user adjustable)<br>Support fixed mode noise removal, dead pixel correction, shadow correction, lens distortion correction, purple edge correction, Bayer noise reduction, 3D denoising, image edge enhancement, dehazing, dynamic contrast enhancement, image video Mirror, Flip and other functions |
| | Decoding/ Encoding | Video decoding: H.265/H.264 decoding (maximum performance: 1920×1080@480fps or 8192×4320@30fps)<br>Video encoding: H.265/H.264 encoding (maximum performance: 1920×1080@300fps or 8192×4320@15fps)<br>Image codec: Support JPEG/MJPEG Baseline codec (JPEG codec: 1080P@480fps, maximum resolution 32768×32768) |
| | RAM | 8GB LPDDR4 (4GB/8GB/16GB optional) |
| | Storage | 32GB eMMC (32GB/64GB/128GB/256GB optional) |
| | Storage Expansion | 1 × TF Card, M.2 SATA3.0/PCIe NVMe SSD 2242/2260/2280 (inside the device), scalable SATA3.0 SSD (inside the device) |
| | OS | Linux OS (Ubuntu) |
| | Software Support | · The private deployment of ultra-large-scale parameter models under the Transformer architecture, including large language models such as Gemma-2B, LlaMa2-7B, ChatGLM3-6B, Qwen1.5-1.8B.<br>· Traditional network architectures such as CNN, RNN, and LSTM; a variety of deep learning frameworks, including TensorFlow, Pytorch, PaddlePaddle, Caffe and ONNX, as well as custom operator development<br>· Docker container management technology |
| | Power | DC 12V (5.5mm × 2.1mm, support 9V~24V wide voltage input) |
| | Power consumption | Normal: 7.2W(12V/600mA), Max: 12W(12V/1000mA) |
| | Size | 188.0mm × 88.44mm × 50.65mm |
| | Environment | Operating Temperature: -20℃ ~ 60℃, Storage Temperature: -20℃ ~ 70℃, Storage Humidity: 10% ~ 90%RH (non-condensing) |
| Interface Specifications | Internet | Ethernet: 2 × RJ45 (1000Mbps)<br>WiFi: Extend WiFi/Bluetooth module via M.2 E-KEY (2230), supports 2.4GHz/5GHz dual band WiFi6 (802.11a/b/g/n/ac/ax) and Bluetooth 5.2<br>4G: Extend 4G LTE via Mini PCIe (Reused with 5G)<br>5G: Extend 5G via M.2 B-KEY (Reused with 4G and USB3.0(1), not pasted by default) |
| | Video output | 1 × HDMI2.0 (4K@60fps) |
| | Audio output | 1 × 3.5mm Audio jack (support MIC recording, American standard CTIA) |
| | USB | 2 × USB3.0 (Max: 1A; UP: USB3.0(1), reused with 5G; DOWN: USB3.0(2)) |
| | Other interface | 1 × Type-C (DEBUG), 1 × SIM Card<br>1 × Phoenix connector (2×4PIN, 3.5mm pitch): 1 × RS485, 1 × RS232, 1 × CAN 2.0 |

# Interface description




2×Gigabit Ethernet
RJ45/1000Mbps

USB3.0(1)
Multiplexing with 5G

WiFi antenna

4G antenna

USB3.0(2)
Max: 1A

Power button

3.5mm Audio jack
Support Mic recording

Phoenix connector
2×4Pin, 3.5mm Pitch

HDMI2.0
4K@60fps

Type-C
DEBUG

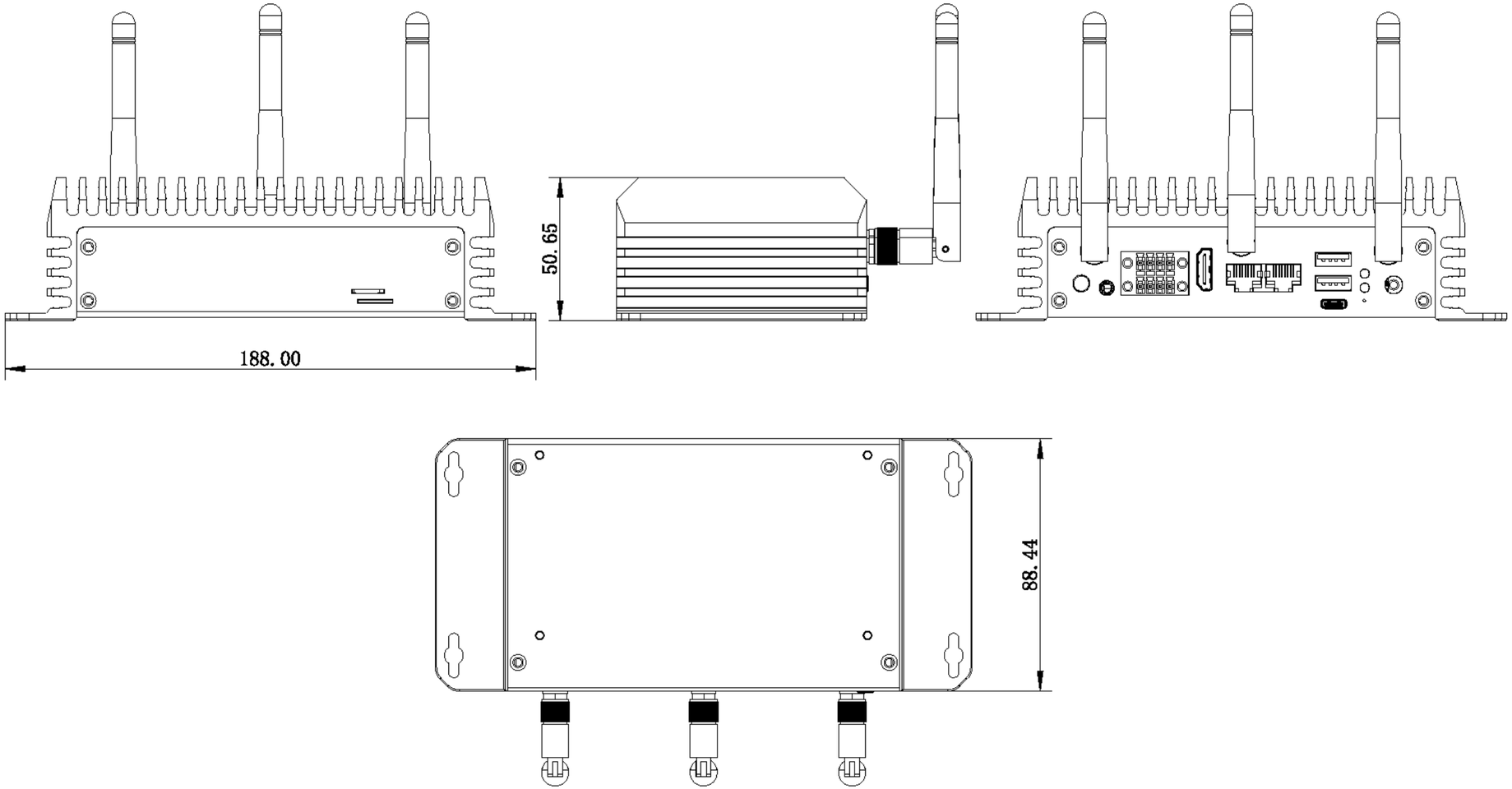
DC 12V
5.5mm×2.1mm,
9V~24V input

| | | | |
|---|---|---|---|
| 232-TX | GND | CAN_H | 485_A |
| 232-RX | GND | CAN_L | 485_B |


TF Card

SIM Card
5G/4G

# Dimension



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