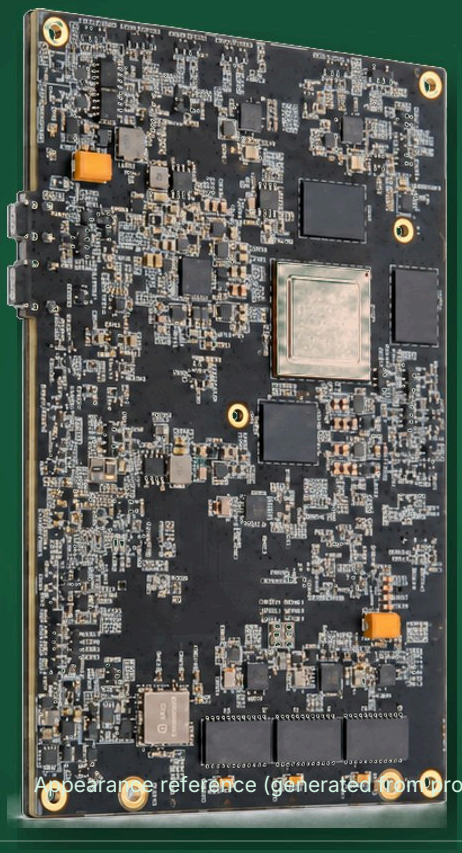
EQIO

VISION-358-RB

PRODUCT MANUAL

RK3588 Perception Compute Board

Rockchip RK3588 8-core processor



Appearance reference (generated from product photos); shipped units may differ.

Measurement and control, made easy.

Easy · Quick · Input · Output

EQIO.COM

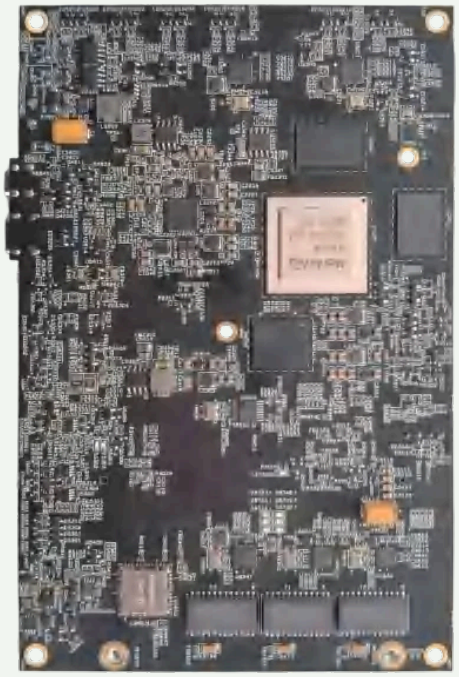
01 OVERVIEW

RK3588 Perception Compute Board

Robot perception and motion control · Robot perception · Payload control · Multi source data HMI · Rockchip

VISION-358-RB uses RK3588 processor, integrates Wi-Fi 6, Bluetooth 5.0 and 4G/5G module I/O, provides multi-channel network, USB, serial bus and GPIO, used for perception compute and payload control integrates.

3-ch Gigabit Ethernet and multi-channel USB facilitates connect sensing and acquisition peripherals, TTL, RS-485, CAN and GPIO carries equipment control signal. Board uses 12V input and supports on electrical auto-start, suited to inspection equipment, robot perception node and multi peripherals data aggregation.



Product appearance reference; shipped units may differ.

Key features

- RK3588 compute platform
- 3-ch Gigabit Ethernet, onboard Wi-Fi6
- 7-ch USB3.0 and 2-ch USB2.0
- 8-ch TTL, dual RS-485 and dual CAN
- GPIO, PWM and fan control I/O

02 FUNCTIONS

Functions and engineering value

Perception compute and software environment

Board RK3588 compute platform, website clock at least 2.0GHz, run Ubuntu and equipped with QT development environment. Can hosts sensing data processing and local application, chip graphics and NPU capability requires corresponding software supports, not can directly view specific algorithm processing speed or end to end latency.

Multi source equipment data attach

3-ch Gigabit Ethernet and 7-ch USB3.0, 2-ch USB2.0 multi type peripherals provides connect, onboard Wi-Fi6 and Bluetooth 5.0 supports wireless HMI, additional provides 4G/5G module I/O. Different input can application layer aggregation processing, cellular communications still requires option combined suited module and software supports.

Payload control and cooling management

8-ch TTL serial, dual RS-485, dual CAN and GPIO connect external control and status signal, SPI and I2C used for matching expansion. 2-ch fan I/O supports PWM speed control and speed detection, can supply system cooling control used; I/O signal level and power conditions must follow specific wiring confirm.

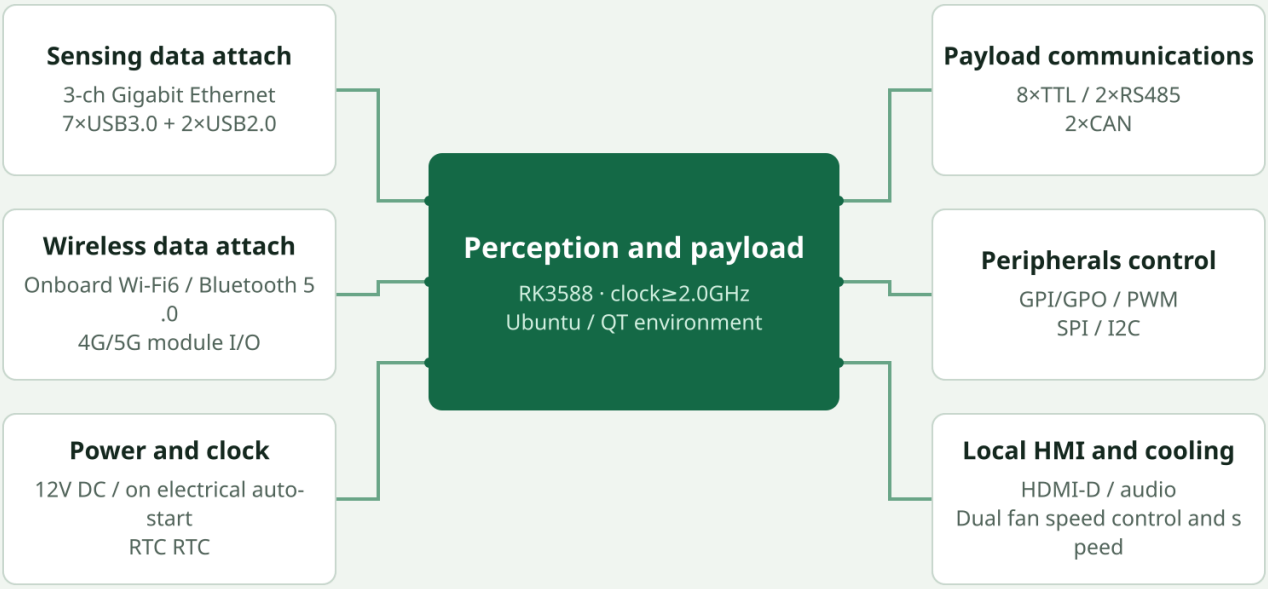
The functional notes explain the product’s role from published configuration. Optional functions, software and peripherals follow the project definition. Chip capability is not the same as implemented I/O.

03 ARCHITECTURE

Functional blocks and system connections

FUNCTIONAL BLOCK DIAGRAM

VISION-358-RB



Functional relationships · lines do not show internal circuits, pins or dedicated bus topology

Function relationship illustration, based on website I/O and configured with compiled; not indicates actual on-board circuit, independent bandwidth or not published chip interconnect implements.

Platform and I/O

RK3588 uses big.LITTLE cores compute architecture and has graphics and NPU resources, can as perception and payload data processing basic. Chip native MAC and bus resources and this board actual brought out 3-ch Gigabit Ethernet, multi-channel USB and non-one one should, on-board expansion method not published, block diagram only express function connect.

> **Reading the diagram**
>
> Solid lines show published functional relationships, not on-board buses, bridge chips or connector pins. Optional controllers, radios, storage and software follow the configuration and interface files.

04 SPECIFICATIONS

Technical specifications

Compiled from published product data. Batch, I/O and environmental ratings follow the order confirmation.

Core system

CPU	Rockchip RK3588, clock≥2.0GHz
Operating system	Ubuntu operating system, built-in QT development environment
Clock	Supports RTC RTC function

Environmental conditions

Operating temperature	Operating temperature: -20°C ~ 50°C, storage temperature: -20°C ~ 60°C
Humidity	Relative humidity (RH) 20%–80%

Mechanical specifications and system requirements

Specification	160mm × 100mm × 15mm (±2mm, long × wide × high)
Power	12V DC power input, uses XT30UPB-M I/O, supports on electrical auto-start

I/O and expansion

Network and wireless communications	Gigabit Ethernet (GBE) * 3-ch, WiFi 6* 1-ch (onboard), Bluetooth 5.0* 1-ch (onboard), 4G/5G module I/O* 1-ch
USB	USB3.0* 7-ch, USB2.0* 2-ch, Type-C* 1-ch
Serial communications	8 × TTL serial (UART, 3.3V with power), 2 × RS-485 I/O (3.3V with power), CAN bus 2-ch
AV interfaces	HDMI-D I/O 1-ch, microphone air I/O (MIC1) 1-ch, speaker unit I/O (SPK) 1-ch
Peripherals control I/O	Fan I/O 2-ch, supports PWM speed control and speed detection, used for system cooling control
Expansion bus	SPI I/O (3.3V) 1-ch, I2C I/O (3.3V) 1-ch
GPIO	Digital input (GPI) 4-ch, digital output (GPO) 4-ch, PWM output 2-ch

05 COMPONENTS

Processor and device specifications

Device figures come from vendor publications and describe the chip or module. The implemented product follows the specification tables. Optional devices are supplied with the selected configuration.

Rockchip RK3588

Manufacturing process	8 nm
CPU architecture	4 × Arm Cortex-A76 + 4 × Arm Cortex-A55, 64-bit 8-core
Clock reference	Up to 2.4GHz
Graphics processor	Arm Mali-G610 MC4, integrates 2D graphics acceleration
Graphics and compute API	OpenGL ES 3.2；Vulkan 1.1；OpenCL 2.0
NPU rated peak	6 TOPS
NPU structure and accuracy	3-core NPU; supports INT4/INT8/INT16/FP16/BF16/TF32
Memory controller	LPDDR4/LPDDR4X/LPDDR5, 4-channel × 16bit
L3 cache	3 MB
Native storage interfaces	eMMC 5.1、SD3.0/MMC4.5

Rockchip RK3588 (continued)

PCIe3.0-channel combination	1×4 / 2×2 / 4×1
Native Gigabit Ethernet MAC	2-ch
Native low-speed controller	10×UART、6×SPI、9×I2C
Video decode upper limit note	H.265/H.264/AV1/AVS2 etc.format, up to 8K@60fps, per en code format and code stream configured with
Video encode upper limit	H.264/H.265 up to 8K@30fps
Chip display interfaces	EDP, DP, HDMI2.1, MIPI, multi-display display engine
Video input	MIPI CSI-2/DVP; HDMI2.0 RX up to 4K@60fps

Sources: Rockchip, Rockchip RK3588 official product specification; Rockchip, RK3588 Brief Datasheet V1.0 2025-08-28; Rockchip, Rockchip Toybrick TB-RK3588X development board released.

06 APPLICATIONS

From product capability to applications

Robot perception node

Can via network and USB attach robot sensing peripherals, RK3588 platform run data compiled, UI or inference application, again via serial I/O and control equipment switch status. Actual sensing unit quantity, processing frame rate and model adapts should combined with driver, memory configured with and software implements verification.

Mobile inspection data aggregation

Suited to spread sensing and acquisition peripherals aggregation to board, via has line network or onboard wireless resources and system HMI. Requires cellular uplink when, can around 4G/5G module I/O design communications solution, and single independent confirm module model, power, antenna layout and operation environment.

Payload control and HMI

Can uses TTL, RS-485, CAN and GPIO carries payload control and status feedback, QT environment build local operation UI. Board provides communications and compute resources, specific control protocol, actuation logic and interlock method from application system definition, I/O signal level not can per name default interchange.

Integration checks

Memory configured with	Website not listed this on-board storage and storage capacity, not cannot apply used AXIS-358-RB16GB configured with.
Wireless configured with	Wi-Fi6 and Bluetooth 5.0 onboard; 4G/5G module I/O, not can directly write into already fitted cellular communications module.
Power and dimensions	12V DC, XT30UPB-M I/O, on electrical auto-start; 160 × 100 × 15mm, dimensions allow±2mm.
I/O and environment	Check 3.3V control I/O, sensing unit protocol and fan load; operation−20–50°C, humidity 20%–80%.

07 CONFIGURATION

Appearance, configuration and selection



Multi-angle reference (generated from product photos); shipped units may differ.

Configuration

Uses 12V DC input, provides 4G/5G module I/O, run Ubuntu and equipped with QT development environment.

Selection guide

Order confirmation	Batch, I/O and environmental ratings follow the order confirmation
Published data	Compiled from published product data; EQIO provides selection and system integration
Configuration talk	Share the application, I/O count, environment and software so a configuration can be proposed

Request a quotation and selection support

Email lyping@eqio.com Phone +86 182 8191 2988
Web eqio.com

EQIO

Easy · Quick · Input · Output

BRAND

Measurement and control, made easy.



EQIO product family · concept rendering

Brand story

EQIO builds measurement and control products and systems. The name stands for Easy Quick Input Output: Easy is a clear structure that is quick to learn, Quick is a direct path to efficient delivery, and Input / Output is every link between the device under test and the control system.
The soft single-cycle wave inside the Q links the brand to signals, acquisition and I/O. “Measurement and control, made easy” is our promise for every selection, integration and delivery.

What we do

Products

Data acquisition, test instruments, control and I/O, modular platforms, software, cables

Systems

Configured to the measurand, channels, accuracy and software, from design to commissioning

Support

Selection advice, training, maintenance and calibration

How we deliver

01
Requirements

02
Solution design

03
Build & integration

04
Factory test

05
Delivery & training

06
Ongoing support

Email lyping@eqio.com Phone +86 182 8191 2988 Web EQIO.COM