EQIO

COMe-2K3000

PRODUCT MANUAL

Loongson 2K3000 COM Express Type 10 Module

Loongson 2K3000 8-core processor



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

Measurement and control, made easy.

Easy · Quick · Input · Output

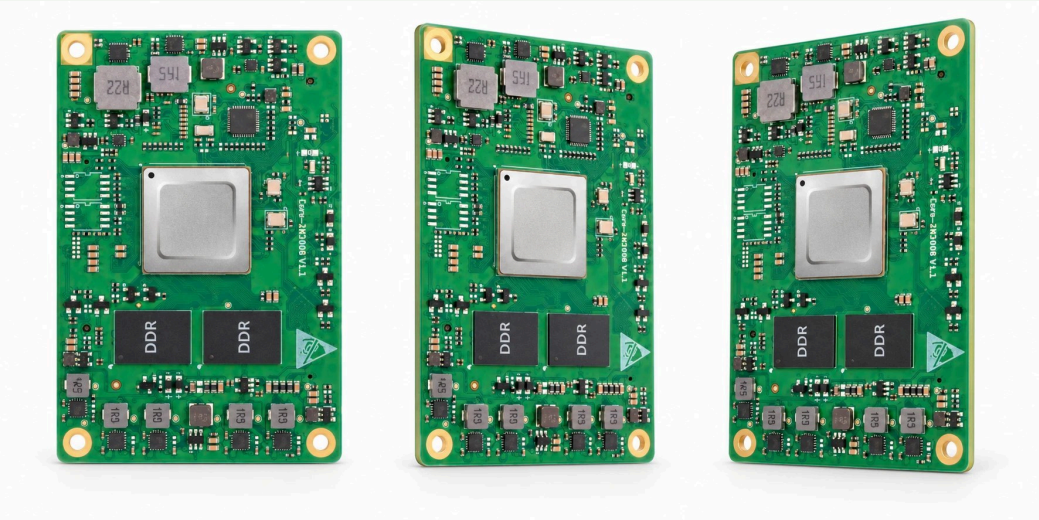
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01 OVERVIEW

Loongson 2K3000 COM Express Type 10 Module

COM Express compute module · Industrial control · Electrical power monitoring · Embedded terminal · COM Express · Loongson

COMe-2K3000 uses Loongson 2K3000 8-core processor and LoongArch architecture, configured with 8 GB DDR4 and 64GB eMMC, provides display, network, SATA and multi type peripherals expansion, uses 84 × 55mm module dimensions.
HDMI and LVDS conversion connect facilitates attach equipment display, 6-ch UART, GPIO and USB used for peripherals communications. Gigabit Ethernet, GMAC and SATA storage interfaces centralized compact carrier connect zone, suited to industrial terminal, data acquisition and equipment status display. Suited to equipment internal modular installation.



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

Key features

- Loongson 2K3000 8-core LoongArch platform
- 8GB DDR4 and 64GB eMMC
- 84 × 55mm Type10 module
- 6-ch UART and 8-ch GPIO
- HDMI, Gigabit Ethernet and SATA3.0

02 FUNCTIONS

Functions and engineering value

8-core LoongArch controller

2K3000 platform used 8-core LA364E and LoongArch ISA, onboard 8GB DDR4 and 64GB eMMC, compact equipment provides compute and local storage basic. UEFI firmware and Kylin OS desktop system forms software run environment, application and driver required uses should architecture software version.

Multi type peripherals signal centralized attach

Module provides USB, SPI, GPIO and 6-ch UART, facilitates carrier centralized organize device connection. 6-ch UART in 1-ch used for debug, GPIO stated divided into 4-ch input and 4-ch output, therefore peripherals wiring and software mapping should per actual direction assign, not can one general treat as any can switch channel.

Display and storage expansion

1-ch HDMI provides up to 1080p display, onboard conversion unit supports HDMI transfer LVDS expansion solution, facilitates adapts embedded display. SATA3.0 can connect external solid-state HDD, PCIe3.0 x4 and list split mode used for expansion, carrier design required check channel multiplexed and equipment compatible.

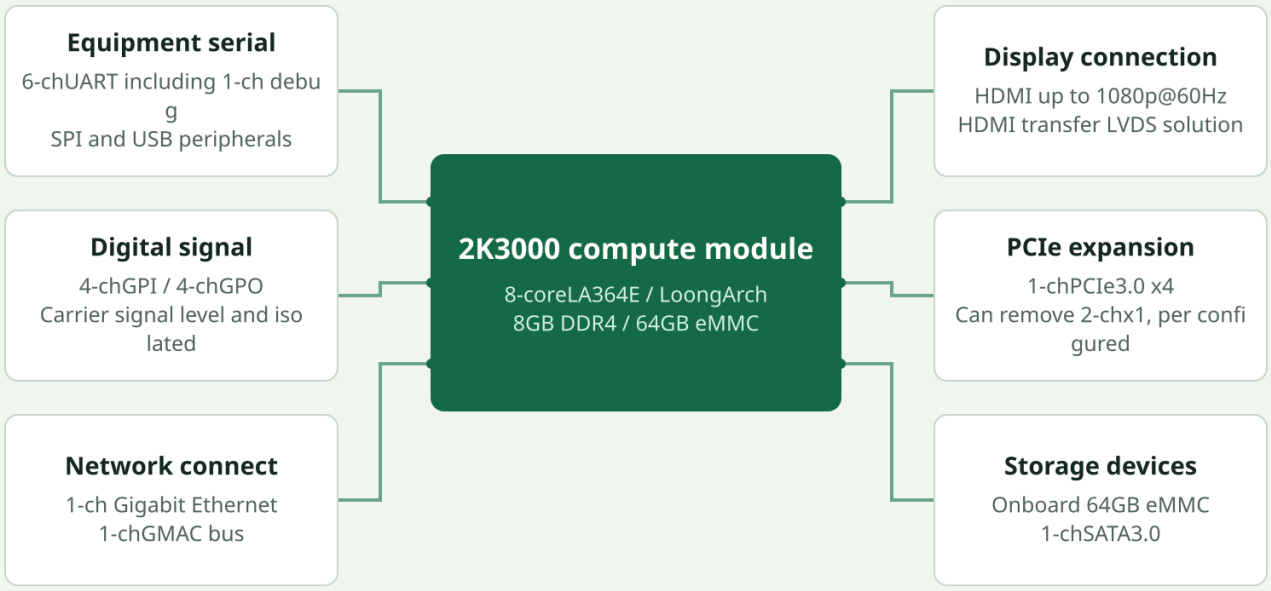
The functional notes explain the product’s role from published configuration. Optional functions, software and peripherals follow the project definition. Chip capability is not the same as implemented I/O.

03 ARCHITECTURE

Compute platform and functional relationships

FUNCTIONAL BLOCK DIAGRAM

COMe-2K3000



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

Only express published functional relationship; LVDS from conversion chip implements, UART debug purpose, GPIO direction and PCIe split all per board-level specification mark.

Platform and I/O

2K3000 uses 8-core LA364E and LoongArch ISA, this module standard 8GB DDR4, 64GB eMMC and UEFI firmware. Carrier connect responsible for carries display, industrial peripherals and expansion equipment, GPIO direction, debug serial and HDMI transfer LVDS relationship should per product board-level definition de. General-purpose I/O signal level conversion and external protection from carrier design handles.

> **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	Loongson 2K3000, 8-coreLA364E, LoongArch ISA, up to 2.2GHz
System memory	Standard onboard 8GB DDR4 industrial grade memory particle, onboard 64GB eMMC
BIOS	UEFI standard firmware
Operating system	Kylin OS desktop version

Environmental conditions

Operating temperature	Operating temperature: -40°C ~ +85°C (industrial grade wide temperature), storage temperature: -45°C ~ +85°C
Humidity	5%~95%humidity non-condensing

Mechanical specifications and system requirements

Specification	84 × 55mm (COM Express Type10 standard dimensions)

I/O and expansion

Peripheral I/O	8-chUSB2.0 + 2-chUSB3.0 8-chGPIO (4GPI + 4GPO), 1-chSPI bus 6-chUART serial (1-ch debug serial + 5-ch general-purpose serial)
Display interfaces	1-chHDMI independent display output, maximum supports 1920 × 1080@60Hz resolution onboard CS5211AN-I conversion chip, supports HDMI transfer LVDS signal extend
Network interfaces	1-ch Gigabit Ethernet, 1-chGMAC bus
Storage interfaces	1-chSATA3.0 I/O, supports standard SATA solid-state HDD
Expansion slots	1-chPCIe 3.0 × 4 (can split 2-chPCIe 3.0 × 1)

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.

Loongson Chinese Academy 2K3000

Physical core number	8-core
Processor core	LA364E, 3-issue out-of-order actuation
Clock	≥2.0GHz
Vector unit	128 bit
Layer-1 command cache	64 KB
Layer-1 data cache	64 KB
Shared layer-2 cache	6 MB
Memory controller	Single channel 64-bitDDR4, or dual channel 32-bitLPDDR4
Integrates GPU	2nd-generation LG200; OpenGL 3.3, OpenGL ES3.1, OpenCL 1.1
AI acceleration capability	⩾6 TOPS（INT8）

Loongson Chinese Academy 2K3000 (continued)

Video processing reference	Up to 4K60fps
Native display capability	Dual triple display; eDP, DP, HDMI; up to 4K@30Hz
Native high-speed I/O	PCIe 3.0、SATA 3.0、USB 3.1、RapidIO 2.0
Other native I/O	USB2.0, GMAC, audio, SDIO/eMMC, CAN FD
ISA	LoongArch
Manual up to clock	2.2 GHz
Memory controller data rate	DDR4-3200 / LPDDR4-3200
Memory controller capacity upper limit	DDR4 mode 32GB; LPDDR4 mode 16GB
PCIe controller mode	2 PCIe3.0 x4 RC; respectively can split 4 × x1 and 2 × x1
Native USB resources	Most multi 4-chUSB 3.1 Gen1, 8-chUSB 2.0

05 COMPONENTS

Processor and device specifications (continued)

Loongson Chinese Academy 2K3000 (continued)

Native SATA resources	1-chSATA 3.0, and 1-chUSB3 multiplexed
Native Ethernet MAC	2-ch10/100/1000Mb/s RGMII MAC
Hardware video format	De code HEVC/H.264/VP8/VP7/AV1/MPEG-4/JPEG; en code HEVC/H.264/JPEG
Native display combination	HDMI, DP, eDP each 1-ch, up to 4K@30Hz; HDMI/DP same content; DP/eDP not with audio
Package	FC-BGA-951，21×21mm
Power consumption management	Supports CPU/GPU dynamic adjust frequency voltage regulation (DVFS)

Sources: Loongson Chinese Academy, Loongson 2K3000 product parameters; Loongson Chinese Academy, Loongson 2K3000 processor datasheet V1.0 (2026-08).

06 APPLICATIONS

From product capability to applications

Industrial equipment control terminal

Via serial, GPIO and USB connect control peripherals, can operator UI and equipment data management integrate compact Type10 platform in. Onboard 64GB eMMC suited to arrangement system and basic log, external SATA storage can according to data retain requires configured with, storage policy should combined with field write load verification.

Electrical power equipment information monitoring

Gigabit Ethernet and multi-channel UART can used for equipment status and measurement information aggregation, HDMI or LVDS solution used for local monitoring UI. Such application should single independent implements communications protocol, time mark and alarm policy, and check field signal level and isolated requirements, not GPIO directly attach high voltage signal.

Compact acquisition and display node

84 × 55mm module matching carrier on layout acquisition expansion and display connect, can used for instrument internal data processing and display. Selection PCIe link mode when needed and actual acquisition equipment match, board-level published split solution only has list form, not per processor native channel capability by itself expansion.

Integration checks

System architecture	Uses LoongArch version system, driver and application; check UEFI and Kylin OS image specific version and peripherals adapts.
GPIO and serial	GPIO4GPI+4GPO; 6-ch UART including 1-ch debug port, application channel, signal level and isolated must respectively confirm.
Display and PCIe	HDMI1920 × 1080@60Hz; LVDS via conversion solution implements; PCIe x4 remove 2-ch x1 per product definition check.
Storage and temperature	Standard 8GB DDR4 and 64GB eMMC; external SATA SSD separately supplied, and verification−40–85°Ctemperature conditions.

07 CONFIGURATION

Appearance, configuration and selection

Reference views



Product appearance reference; shipped units may differ.

Configuration

Equipped with UEFI firmware and Kylin OS desktop system, PCIe3.0 link can per board-level mode selection.

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

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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

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