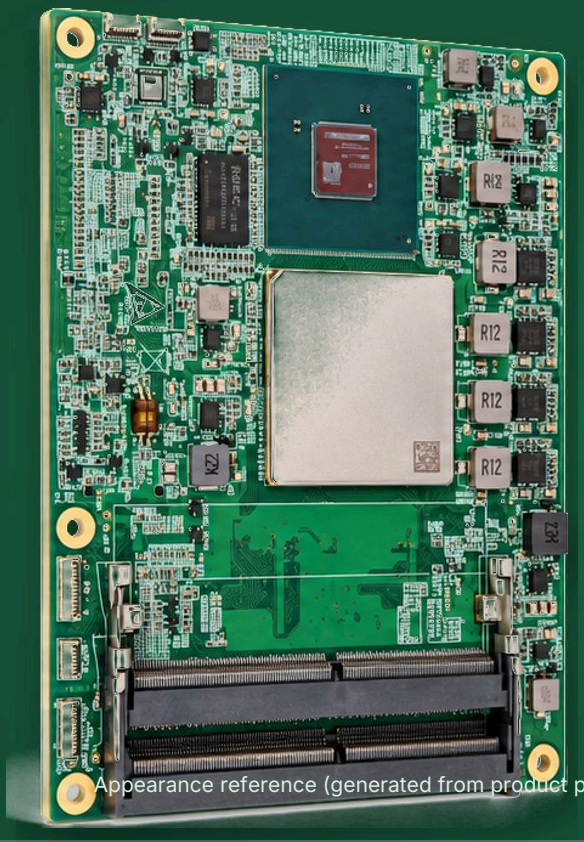
EQIO

COMe-3A6000

PRODUCT MANUAL

Loongson 3A6000 COM Express Type 6 Module

Loongson 3A6000, 4 physical core / 8 logic core



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

Measurement and control, made easy.

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01 OVERVIEW

Loongson 3A6000 COM Express Type 6 Module

COM Express compute module · Industrial control · Embedded compute · Network safety equipment · COM Express · Loongson

COMe-3A6000 uses 125 × 95mm compute module structure, matching Loongson 7A2000 bridge chip and DDR4 memory expansion, provides multi-channel PCIe, SATA, USB and display interfaces, used for embedded compute, industrial control and network devices integrates.
Standard 8GB memory, matching display, audio, Gigabit Ethernet and industrial bus connect, USB and GPIO facilitates attach control peripherals. Module via carrier organize expansion card and storage devices, suited to data acquisition, equipment control and cabinet internal embedded compute node.



Product appearance reference; shipped units may differ.

Key features

- 125 × 95mm Type6 module
- Loongson platform and 7A2000 bridge chip
- 8GB DDR4, up to 32GB configured with
- 4-ch SATA3.0 and multi-channel USB
- HDMI, VGA and Gigabit Ethernet

02 FUNCTIONS

Functions and engineering value

Multi threads compute and memory configured with

3A6000 provides 4 physical core, 8 logic core, together with 7A2000 bridge chip forms LoongArch compute platform. Module standard 8GB DDR4, up to 32GB, suited to per application parallel task and cache requirement selection capacity; logic core count amount not should wording 8 independent physical processor core.

Graphics display and equipment HMI

7A2000 integrates graphics unit and configured 1GB DDR4 GPU memory, product lists VGA, HDMI, HDA and Gigabit Ethernet resources. 2-ch TTL, 4-ch GPI and 4-ch GPO can used for carrier control connect, actual display combination, audio conversion and signal signal level required combined with peripheral circuit design confirm.

Expansion and power layered design

Product provides multi group PCIe channel and 4-ch SATA3.0, can according to acquisition, communications and storage requirement selection link split. Module power distinguish 12V main power, 5V standby and 3V RTC, carrier must follow timing organize each power domain; can signal SE only reserved supports, not cannot be used as standard safety chip promotion.

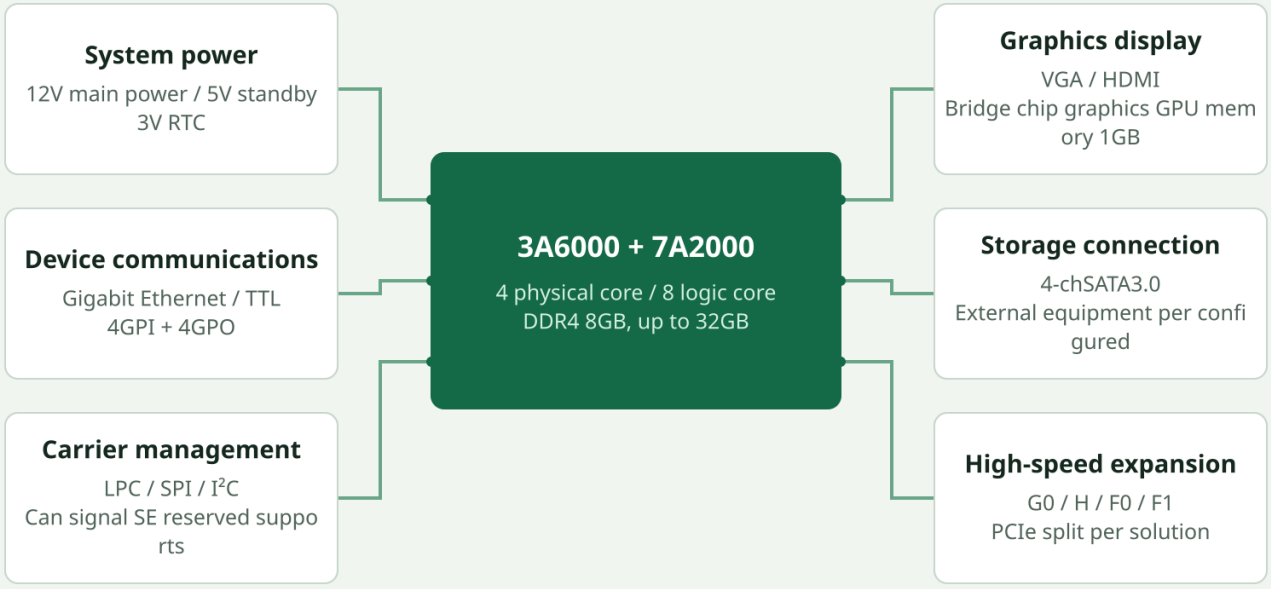
The functional notes explain the product’s role from published configuration. Optional functions, software and peripherals follow the project definition. Chip capability is not the same as implemented I/O.

03 ARCHITECTURE

Compute platform and functional relationships

FUNCTIONAL BLOCK DIAGRAM

COMe-3A6000



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

Functional relationship is not the same as on-board topology; 4-core eight threads, memory standard and upper limit, PCIe mutually exclusive configured with and can signal SE reserved respectively marked.

Platform and I/O

3A6000 four physical core, eight logic core actuation LoongArch application, 7A2000 responsible for graphics and peripherals expansion, product listed separately 1GB graphics GPU memory. Module compute, SATA, PCIe and industrial signal connect organize to Type6 board outline, link split, memory capacity and can signal SE assembly should per delivery solution respectively confirm.

> **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 3A6000, 4 physical core, 8 logic core, 2.5G Hz
Chip group	Loongson 7A2000 bridge chip, integrates independent GPU, GPU memory DDR4 1GB
Memory	Standard DDR4 8GB, maximum capacity 32GB
Can Xingen	Can signal SE, reserved supports

Power and consumption

Power and processor TDP	RTC3.0V; standby 5V; main power 12V

Mechanical specifications and system requirements

Specification	125×95mm

I/O and expansion

PCIE	Supports 28 PCIE channel G0: standard 1-chPCI-E3.0 × 16, H: standard 1-chPCI-E × 4 F1: standard 1-chPCI-E × 4, optional 2-chPCI-E × 1, F0: standard 1-chPCI-E × 4, optional 4-chPCI-E × 1
USB	8-chUSB2.0 I/O, 4-chUSB3.0
SATA	4-chSATA3.0 I/O
Network	1-ch10/100/1000Mb adaptive Gigabit Ethernet port
Audio	1-chHDA
Display	1-chVGA, 1-chHDMI
Bus communications I/O	1-ch LPC, 1-ch SPI, 2-ch I²C
Serial debug interface	2-ch TTL serial
GPIO	4-ch GPI, 4-ch GPO

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 3A6000

ISA	LoongArch
Physical core number	4-core
Logic processor number	8 threads
Processor core	64-bitLA664, 6-issue out-of-order actuation
Frequency	2.0–2.5GHz
Vector unit	128-bit and 256-bit
Per core layer-1 command cache	64 KB/core
Per core layer-1 data cache	64 KB/core
Per-core private has layer-2 cache	256 KB/core
Shared L3 cache	16 MB
Memory controller	2-ch72-bitDDR4-3200, supports ECC

Loongson Chinese Academy 3A6000 (continued)

High-speed bridge chip interconnect	1-chHyperTransport 3.0
Native low-speed I/O	1-chSPI, 1-chUART, 2-chI2C, 16-chGPIO
Package	BGA, 35 × 35mm, 1190 pins
Typical power consumption	38W@2.5GHz
Dual accuracy peak compute	240 GFLOPS

Loongson Chinese Academy 7A2000 bridge chip

Device role	CPU matching bridge chip, integrates 3D graphics unit
Processor connect	HyperTransport 3.0 x16, vendor rated 6.4Gbps
Graphics capability	Integrates 3D GPU

05 COMPONENTS

Processor and device specifications (continued)

Loongson Chinese Academy 7A2000 bridge chip (continued)

Native PCIe resources	32 item PCIe Gen 3-channel
Native SATA	4-chSATA 3.0
Website native USB resources	4-chUSB 3.0, 8-chUSB 2.0
Native display interfaces	2-chHDMI, 1-chVGA
Other native I/O	SPI, LPC, 6-chI2C, 4-chCAN, UART, GPIO

Sources: Loongson Chinese Academy, Loongson 3A6000 product parameters; Loongson Chinese Academy, Loongson 7A2000 bridge chip product parameters.

06 APPLICATIONS

From product capability to applications

Multi task industrial control host

Uses 4-core eight threads platform hosts device communications, data processing and HMI, and via PCIe connect required expansion card, can build industrial controller. First fixed memory capacity and link mode, again verification parallel application CPU occupancy and storage throughput, avoid only from logic core count claim real-time performance.

Equipment data processing and retain

4-ch SATA3.0 provides multi storage devices connect basic, can used for system disk, data log and maintenance media solution arrangement. Whether uses redundant or specific storage management method from software and media configured with determines, product I/O quantity this body not forms array function or continuous write performance guarantee.

Network devices embedded compute

Gigabit Ethernet and PCIe expansion resources suited to used for with dedicated communications module equipment internal compute node, VGA or HDMI can provides local maintenance UI. Can Xingen requirement should selection stage stated device and software solution, reserved SE I/O not can replace complete safety function implement and verification.

Integration checks

Processor and memory	Four physical core, eight logic core, 2.5G Hz; DDR4 8GB standard, 32GB belongs to up to configured with.
PCIe assign	Per G0, H, F0, F1 each group channel and optional split design carrier, not mutually exclusive link solution overlay compute.
Power timing	Confirm 12V main power, 5V standby, 3V RTC voltage, tolerance and timing, published the table does not gives whole board power consumption.
Function option	Can signal SE reserved supports; check actual assembly, firmware, safety software and required environment etc.grade, do not per all standard delivery.

07 CONFIGURATION

Appearance, configuration and selection



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

Configuration

Uses 12V main power, 5V standby and RTC power, PCIe link provides different split solution.

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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