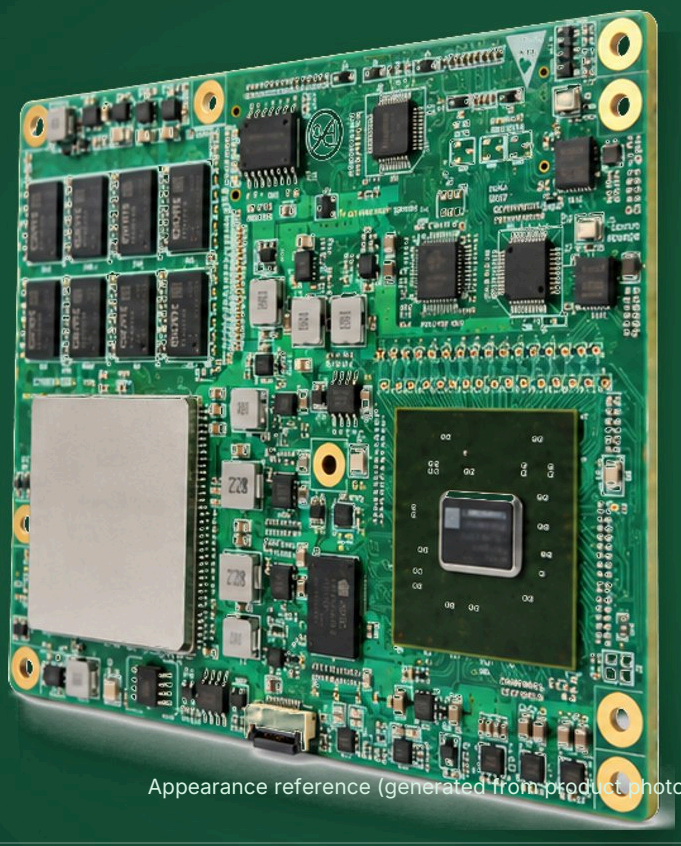
EQIO

COMe-3A5000

PRODUCT MANUAL

Loongson 3A5000 COM Express Type 6 Module

Loongson 3A5000 4-core processor



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

Measurement and control, made easy.

Easy · Quick · Input · Output

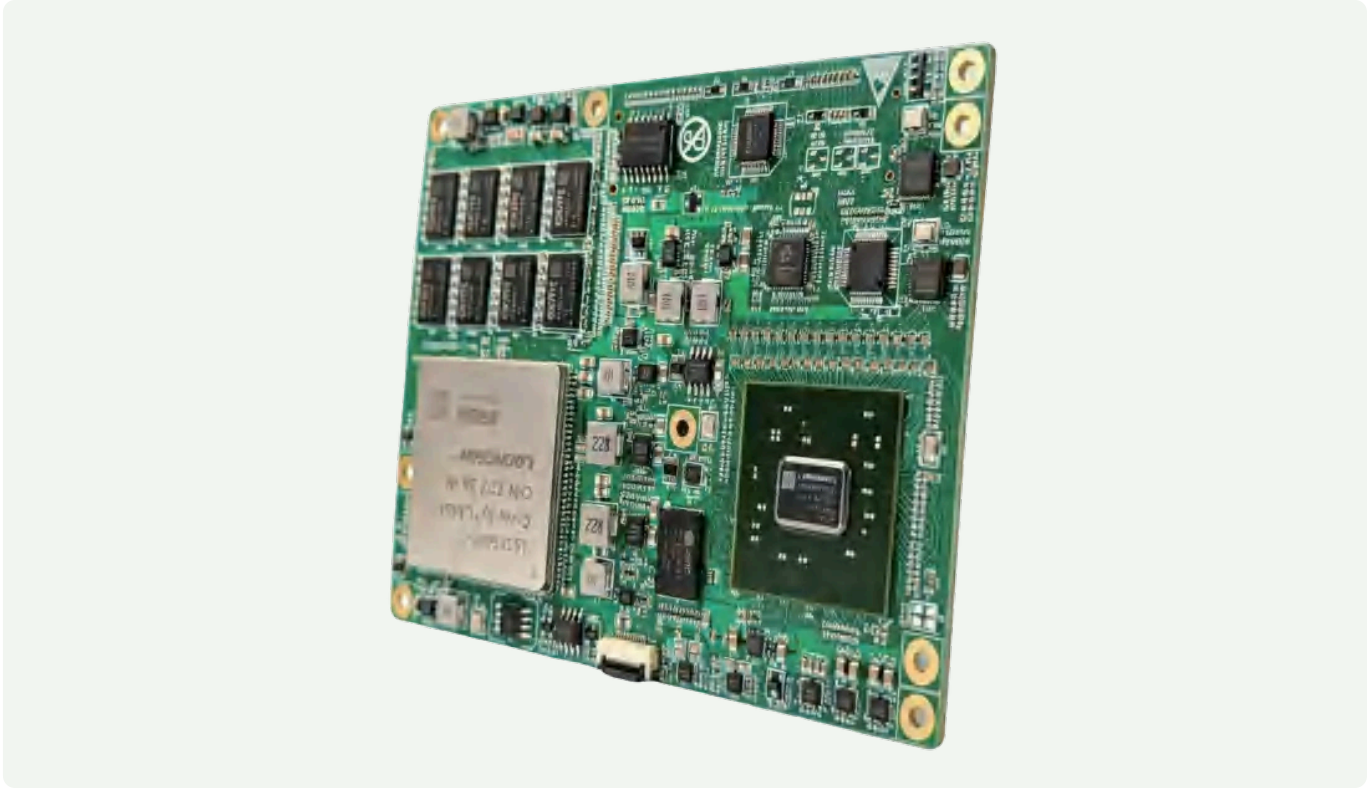
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01 OVERVIEW

Loongson 3A5000 COM Express Type 6 Module

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

COMe-3A5000 uses Loongson 3A5000 4-core processor and 7A1000 bridge chip, soldered DDR4 memory, integrates display, network, SATA and PCIe I/O, supports Loongnix, Kylin and UOS system, used for industrial control, network devices and embedded terminal.
Dual Gigabit Ethernet, 3-ch TTL serial, GPIO and USB used for field device connection, VGA and DVO can via carrier organize display. Module compute, storage and expansion resources centralized layout, facilitates automation control, industrial gateway and people unit terminal design dedicated carrier.



Product appearance reference; shipped units may differ.

Key features

- Loongson 3A5000 4-core and 7A1000
- Up to 16GB soldered DDR4
- Dual Gigabit BASE-T I/O
- VGA, DVO display connection
- PCIe, SATA and industrial peripheral I/O

02 FUNCTIONS

Functions and engineering value

4-core compute and bridge chip resources

Loongson 3A5000 4-core and 7A1000 bridge chip consists of compute and I/O expansion platform, soldered DDR4 up to 16GB. Module uses PMON firmware, software deployment should select and LoongArch architecture match system and driver, and firmware, carrier and application version as overall performs compatible confirm.

Dual network and industrial peripherals organize

Dual Gigabit BASE-T can respectively used for different device network connect, 3-ch TTL serial, 8-ch GPIO and 6-ch USB2.0 facilitates carrier organize control peripherals. Network purpose and isolated policy from system software determines, dual Ethernet port this body not means already has safety gateway or network redundant function.

Display, storage and expansion connect

VGA used for display connection, DVO can via carrier expansion into required display protocol; 3-ch SATA2.0 and multi-channel PCIe2.0 storage and expansion card provides resources. 125 × 95mm module suited to compute platform from application I/O in isolation, actual link assign and equipment quantity must per carrier definition check.

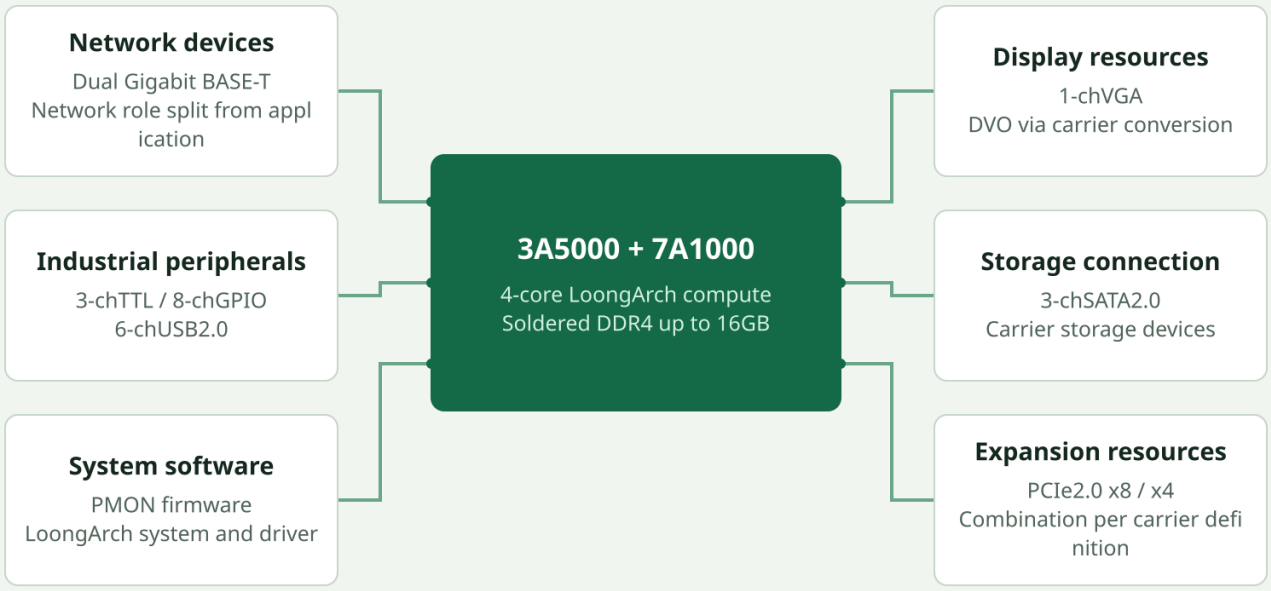
The functional notes explain the product’s role from published configuration. Optional functions, software and peripherals follow the project definition. Chip capability is not the same as implemented I/O.

03 ARCHITECTURE

Compute platform and functional relationships

FUNCTIONAL BLOCK DIAGRAM

COMe-3A5000



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

Based on product specification note functional relationship; DVO display conversion and PCIe combination from carrier implements, does not show internal circuits or fixed topology.

Platform and I/O

3A5000 provides 4-core LoongArch compute, 7A1000 handles graphics and I/O expansion, module memory, PMON firmware and carrier connect forms system basic. Product external resources including dual Gigabit, VGA/DVO, SATA2.0 and PCIe2.0, function block diagram not inferred processor and bridge chip actual routing relationship.

> **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 4-core 3A5000; chip group 7A1000
System memory	Soldered DDR4 memory, maximum 16GB
Display	Loongson 7A1000
BIOS	PMON firmware
Operating system	Loongnix, Kylin OS, UOS etc.

Environmental conditions

Operating temperature	-40°C ~ 65°C (operating temperature), -40°C ~ 85°C (storage temperature)
Humidity	5%~95%humidity non-condensing

Mechanical specifications and system requirements

Specification	125mm×95mm

I/O and expansion

USB	6-chUSB 2.0
DIO/MIO	8-chGPIO, can configured with input or output
Serial	3-chTTL serial, maximum baud rate 115200 bps
Display interfaces	1-chDVO, supports base plate expansion implements DVI/HDMI/VGA/EDP, 1-chVGA I/O, maximum resolution 1920*1080@60Hz
Network interfaces	2-ch Gigabit BASE-T I/O
Storage interfaces	3-chSATA 2.0 I/O
Expansion slots	2-chPCIe2.0 × 8, 4-chPCIe2.0 × 4

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 3A5000

ISA	LoongArch
Physical core number	4-core
Processor core	64-bitLA464, 4-issue out-of-order actuation
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
Native low-speed I/O	1-chSPI, 1-chUART, 2-chI2C, 16-chGPIO
Chip on temperature detection	Integrates temperature sensing unit

Loongson Chinese Academy 7A1000 bridge chip

Device role	CPU matching bridge chip, integrates 2D/3D graphics unit
Processor connect	HyperTransport 3.0 x16, vendor rated 3.2Gbps
Graphics capability	Integrates 2D/3D GPU
GPU memory I/O	16-bitDDR3 GPU memory I/O
Native display interfaces	2-chDVO
Other native I/O	SPI, 4-chUART, 6-chI2C, GPIO
Power consumption range	5–8W

Sources: Loongson Chinese Academy, Loongson 3A5000/3B5000 Processor Datasheet V1.7; Loongson Chinese Academy, Loongson 7A1000 bridge chip product parameters.

06 APPLICATIONS

From product capability to applications

Industrial automation control host

Via PCIe expansion acquisition or communications equipment, and uses serial and GPIO attach control unit, can consists of equipment controller platform. Dual Gigabit Ethernet facilitates planning on position communications and device communications path, application software should verification and communications, data cache and UI run when response behaviour.

Dual network industrial data gateway

Module dual Gigabit I/O and 4-core compute capability can used for network between data forwarding, protocol processing and local application logic. Specific safety, access control or packet filter function from software implements, selection when needed according to target protocol and data stream amount verification performance, not can I/O configured with etc.same to safety certification.

Embedded display and log terminal

Around VGA or DVO carrier conversion solution configured with display, combined with SATA2.0 storage can build equipment status show and data retain node. Memory capacity, HDD configured with and display I/O should per specific terminal selected, and system boot, fault recovery and long-term log procedure performs bring-up.

Integration checks

Platform compatible	3A5000 uses LoongArch; confirm PMON and selected Loongnix, Kylin or UOS version supports actual carrier.
I/O signal level	3-ch serial TTL, GPIO required check signal level; field RS-232/422/485 and isolated from carrier matching implements.
Display and link	DVO required carrier conversion; PCIe2.0 lists 2-ch x8 and 4-ch x4, actual parallel combination must check module pins table.
Memory and environment	Soldered DDR4 up to 16GB; check 125 × 95mm cooling installation and −40–65°Coperating temperature conditions.

07 CONFIGURATION

Appearance, configuration and selection



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

Configuration

Uses 125 × 95mm module dimensions and PMON firmware, provides Loongnix, Kylin and UOS system 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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