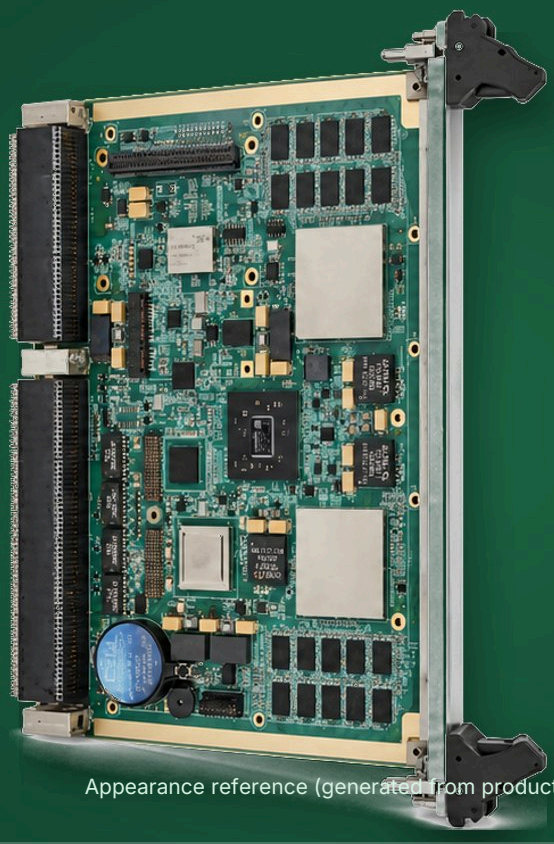
EQIO

VPX-3A5000

PRODUCT MANUAL

6U Dual Loongson VPX System Controller

Loongson 3A5000 / 3A4000 processor solution (optional)



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

Measurement and control, made easy.

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Easy · Quick · Input · Output

01 OVERVIEW

6U Dual Loongson VPX System Controller

VPX system controller · Industrial automation · Embedded terminal · Edge computing · VPX · Loongson

VPX-3A5000 uses 6U VPX dual Loongson processor solution, matching 7A1000 bridge chip, supports up to 32GB soldered DDR4 memory, integrates display, network, storage and PCIe I/O.
Dual Gigabit rear I/O network, VGA and DVI facilitates connect system communications and display equipment, front rear I/O USB and RS-232 used for debug and peripherals attach. 6U board outline can and acquisition, communications board card combination, used for multi task measurement and control, industrial data processing and equipment management system.



Product appearance reference; shipped units may differ.

Key features

- 6U VPX dual Loongson platform
- 7A1000 matching bridge chip
- Up to 32GB soldered DDR4
- Dual Gigabit rear I/O network
- VGA, DVI and PCIe2.0 connect

02 FUNCTIONS

Functions and engineering value

Dual compute solution distinguish

Product provides dual 3A5000 or dual 3A4000 two kinds of processor solution, together with 7A1000 bridge chip and up to 32GB soldered DDR4. Two kinds of CPU belongs to different ISA system, software image, driver and application en target should respectively determine, not can because module name and connect as if view can directly replace.

Front rear I/O and system management

Front rear total 6-ch USB2.0 and rear I/O serial facilitates organize operation and device connection, including 1-ch RS-232 CPU debug purpose, additional 1-ch function port. Dual Gigabit rear I/O network used for system communications, VGA and DVI provides display resources, final I/O location and combination required delivery board definition confirm.

Storage and expansion resources arrangement

2-ch rear I/O SATA2.0 and 1-ch PCIe2.0 x8 can used for storage and function expansion, suited to compute node to 6U modular chassis. Data not gives dual processor interconnect method or memory domain relationship, system diagram only express functional relationship, not from dual name inferred internal topology.

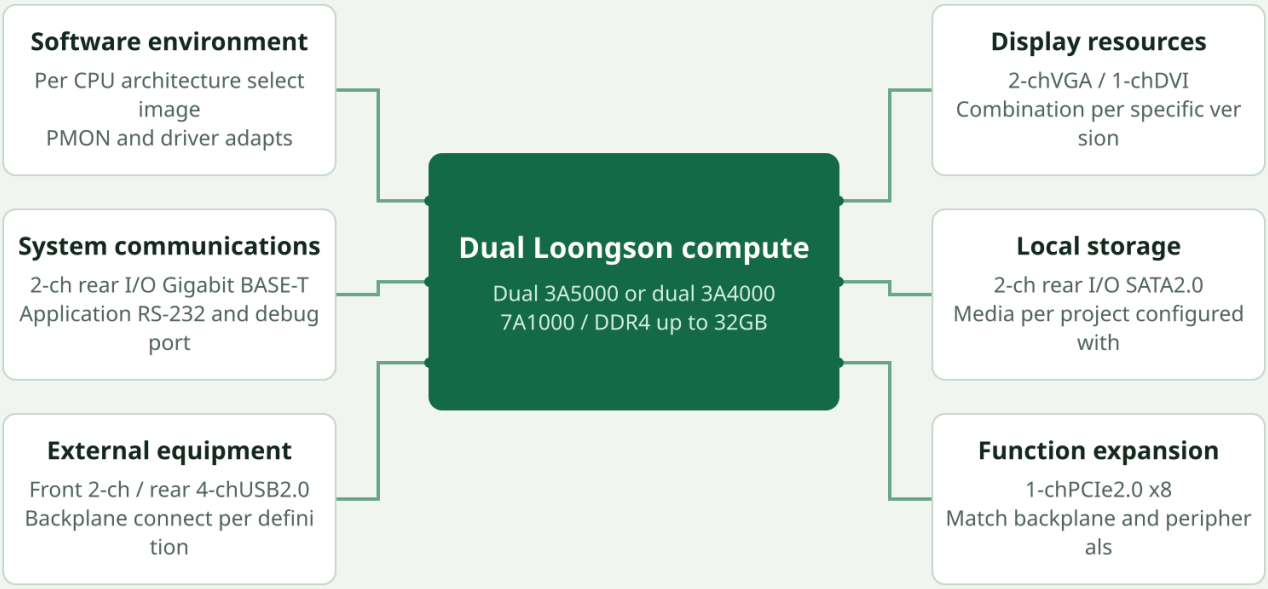
The functional notes explain the product’s role from published configuration. Optional functions, software and peripherals follow the project definition. Chip capability is not the same as implemented I/O.

03 ARCHITECTURE

Platform and functional relationships

FUNCTIONAL BLOCK DIAGRAM

VPX-3A5000



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

Dual internal interconnect not published, this diagram not indicates CPU topology; 3A5000 and 3A4000 different architecture solution, not default software can directly interchange.

Platform and I/O

Dual 3A5000 and dual 3A4000 belongs to different configured with, respectively should LoongArch and MIPS compatible 64-bit architecture, all lists 7A1000 and up to 32GB DDR4. Published data not enough confirm CPU interconnect or memory topology, block diagram only note compute platform and network, display, storage and peripherals function 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	Dual Loongson 3A5000/3A4000 processor, chip group Loongson 7A1000
System memory	Soldered DDR4 memory, maximum 32GB
BIOS	PMON firmware
Operating system	Loongnix, Kylin OS, Kylin OS, UOS etc.

Environmental conditions

Operating temperature	-40°C– 65°C (operating temperature), -45°C ~ 85°C (storage temperature)
Relative humidity	40°C @ 95% relative humidity, non-condensing

Mechanical specifications and system requirements

Specification	233.35mm*158.5mm

I/O and expansion

USB	6-chUSB2.0, including 2-ch front I/O, 4-ch rear I/O
Storage	2-chSATA 2.0 I/O, rear I/O
Serial	2-ch RS-232 rear I/O, maximum baud rate 115200 BPS, including 1-chCPU debug serial, 1-ch function serial
Display interfaces	2-ch VGA, maximum resolution 1920*1080@60Hz; 1-ch DVI, maximum resolution 1920*1080@60Hz
Network interfaces	2-ch rear I/O Gigabit BASE-T I/O, supports 1000M/100M/10M adaptive
Expansion I/O	1-chPCIe2.0 × 8

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 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

Loongson Chinese Academy 3A5000 (Optional) (continued)

Chip on temperature detection	Integrates temperature sensing unit

Loongson Chinese Academy 3A5000 (Optional)

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

05 COMPONENTS

Processor and device specifications (continued)

Loongson Chinese Academy 3A4000 (Optional)

ISA family	MIPS compatible 64-bit architecture; not belongs to LoongArch
Processor core	GS464V
Physical core number	4-core
Process	28 nm
Review up to clock	2 GHz

Sources: Loongson Chinese Academy, Loongson 7A1000 bridge chip product parameters; Loongson Chinese Academy, Loongson 3A5000/3B5000 Processor Datasheet V1.7; Loongson Chinese Academy, Loongson 3A4000 commercial terminal vendor report; Loongson Chinese Academy, Loongson Chinese Academy vendor expand review (3A4000 process and clock); Linux kernel upstream, Linux kernel official method text position: LoongArch introduction.

06 APPLICATIONS

From product capability to applications

Multi task industrial control platform

Dual processing platform can used for planning device communications, data compiled and operation task, but should first selection 3A5000 or 3A4000 solution and establish should software environment. Actual parallel effect result depends on to application design and system scheduling, required delivery configured with on verification, not can per processor quantity directly×increase performance.

Embedded equipment compute node

Uses PCIe expansion and dual Gigabit rear I/O network, can the board as chassis internal compute and equipment management node. Carrier and backplane required match I/O definition, project software should per selected architecture again check depends on library, driver and peripherals adapts, avoid across architecture replace with from deployment issue.

Local data and display terminal

VGA or DVI can provides maintenance and status UI, 2-ch SATA2.0 used for configured with system and data media. Front I/O USB convenient attach local peripherals, debug serial required single independent marking; if required unmanned attended run, should application layer complete log, boot recovery and fault processing, and completes actual load test.

Integration checks

Processor selection	Dual 3A5000 uses LoongArch, dual 3A4000 MIPS compatible architecture; respectively confirm system, driver and application image.
Dual structure	Published data not stated CPU interconnect and memory domain partition, performance and topology required delivery technical file and test confirm.
I/O purpose	2-ch rear I/O RS-232 including 1-ch CPU debug port; check dual Gigabit, VGA/DVI and PCIe x8 backplane pinout definition.
Installation and temperature	Dimensions 233.35 × 158.5mm, up to 32GB DDR4; check SATA storage installation and −40–65°Ccooling conditions.

07 CONFIGURATION

Appearance, configuration and selection



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

Configuration

Provides different Loongson processor solution, uses PMON firmware, supports Loongnix, Kylin and UOS system.

Processor solution	Dual 3A5000 / dual 3A4000

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