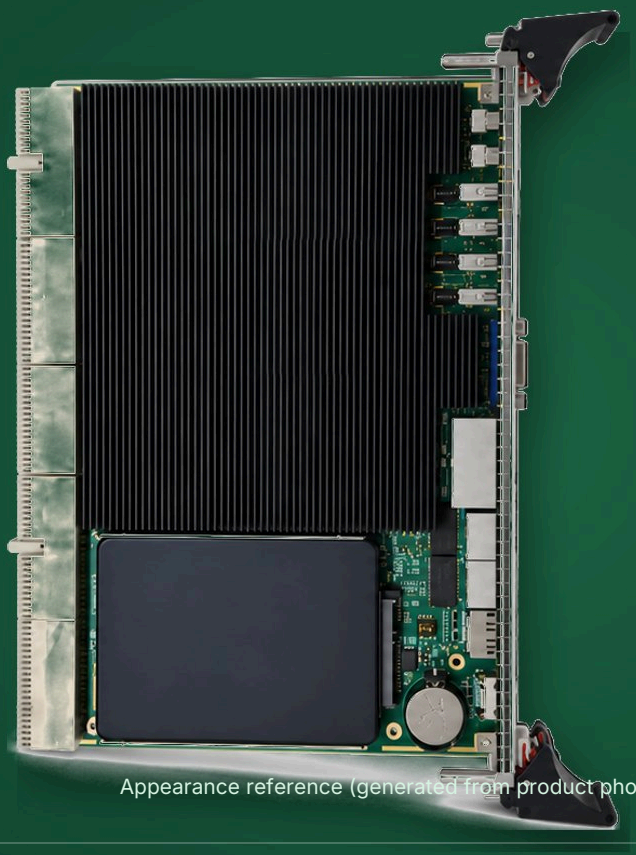
EQIO

CPCI-6540

PRODUCT MANUAL

6U Loongson 3A5000 CompactPCI System Controller

Loongson 3A5000 4-core processor



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

Measurement and control, made easy.

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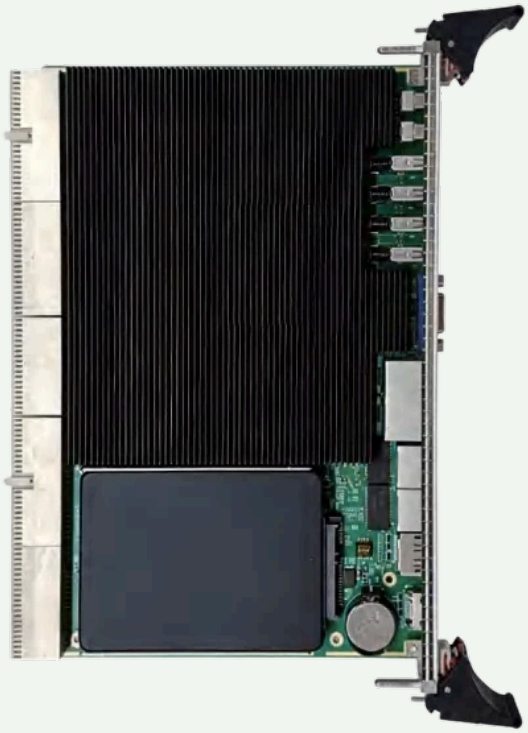
Easy · Quick · Input · Output

01 OVERVIEW

6U Loongson 3A5000 CompactPCI System Controller

CPCI system controller · Industrial control · Rail transit · Embedded measurement and control · CompactPCI · Loongson

CPCI-6540 uses Loongson 3A5000 4-core processor and 7A1000 bridge chip, onboard 16GB DDR4 memory, provides multi-channel serial, network and front rear I/O display interfaces, and lists multi position temperature configured with.
Dual Gigabit Ethernet used for device communications, front panel VGA, USB and RS-232 suited to local operation, rear I/O brought out display, TTL and audio signal. 6U board outline can and acquisition, communications module combination, used for equipment control, industrial test and data processing host.



Product appearance reference; shipped units may differ.

Key features

- Loongson 3A5000 4-core and 7A1000
- Onboard 16GB DDR4
- Dual Gigabit Ethernet
- Front I/O VGA, dual RS-232 and 4-ch USB
- Rear I/O display, serial and audio

02 FUNCTIONS

Functions and engineering value

LoongArch controller platform

3A5000 4-core and 7A1000 bridge chip together with onboard 16GB DDR4, forms 6U CompactPCI compute node. Application deployment should used should LoongArch architecture software and driver, data in lists system name still requires confirm to specific image version, not cannot only per brand name determine compatible.

Dual network and multi serial connect

Dual Gigabit Ethernet can respectively arrangement different device communications, front panel dual RS-232 and rear I/O 3-ch TTL provides multi type serial connect. TTL and RS-232 belongs to different electrical standard, attach field equipment when needed check signal level and conversion circuit, not can because all called serial and directly used same cables.

Front rear display and chassis selection

Front I/O VGA and USB facilitates local operation, rear I/O carries display, USB, TTL and audio, suited to chassis internal unified routing. Product provides multi position temperature and 4HP/8HP panel solution, current has data commercial temperature upper limit storage wording difference, selection when needed confirm rear delivery specification fixed environmental conditions.

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

CPCI-6540



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

Base to already published function express relationship; TTL and RS-232 signal level different, rear I/O display protocol and commercial temperature upper limit must per confirm rear delivery data fill in.

Platform and I/O

3A5000 uses 4-core LoongArch architecture, 7A1000 handles graphics and I/O expansion, onboard 16GB DDR4 together with CPCI bus forms system basic. Dual Gigabit, RS-232 and TTL belongs to different communications resources, rear I/O display protocol and commercial temperature upper limit storage required in one step confirm data wording, not can directly add infer value.

> **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 3A5000 4-core processor; Loongson 7A1000 bridge chip
Bus	PCI64Bit/66MHZ bus, 3.3V/5V general-purpose voltage (I/O)
BIOS	Storage SPI I/O FLASH in, SPI FLASH select SM25QH128M, capacity 16MB
System memory	Onboard 16GB DDR4 memory
PICMG standard	PICMG®R2.0 CompactPCI®specification R3.0, PICMG®R2.16 CompactPCI®specification R1.0
Operating system	Ubuntu 18.4, Kylin OS V10, UnionTech UOS, Loongnix

Mechanical specifications and system requirements

Specification	6U 4HP/8HP CompactPCI®, dimensions 233.3mm × 160mm

I/O and expansion

USB	Front panel 4 USB2.0 I/O, 2 USB2.0 connect to rear wiring board
Display	Front panel supports 1 VGA I/O, 1 DVI/NGA/LVDS connect to rear wiring board
Serial	2 RS-232 I/O, position to front panel, 3 TTL serial connect to rear wiring board
Network	2-ch Gigabit Ethernet controller, provides 10/100/1000M adaptive Ethernet
Audio	HD Audio signal connect to rear wiring board

Environmental conditions

Operating temperature	Commercial temperature grade: operation 0–40°C, storage−20–70°C; industrial grade: operation−20–60°C, storage−40–75°C; wide temperature grade: operation−40–65°C, storage−55–80°C
Humidity	40°C@95%, non-condensing

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 equipment controller and acquisition

Via match CPCI function module connect acquisition or control equipment, dual Gigabit Ethernet used for equipment end and management end communications, can forms LoongArch industrial host. Actual control cycle, data throughput and peripherals compatible must selected system in verification, not can from bus and Ethernet port quantity directly derive.

Multi serial equipment monitoring

Front I/O RS-232 suited to attach should standard equipment, rear I/O TTL can via matching circuit connect chassis internal control unit, software unified management status and application protocol. Design when needed establish each channel serial signal level, purpose and wiring log, prevent rear I/O TTL miswire to without conversion external standard serial.

Modular traffic equipment compute

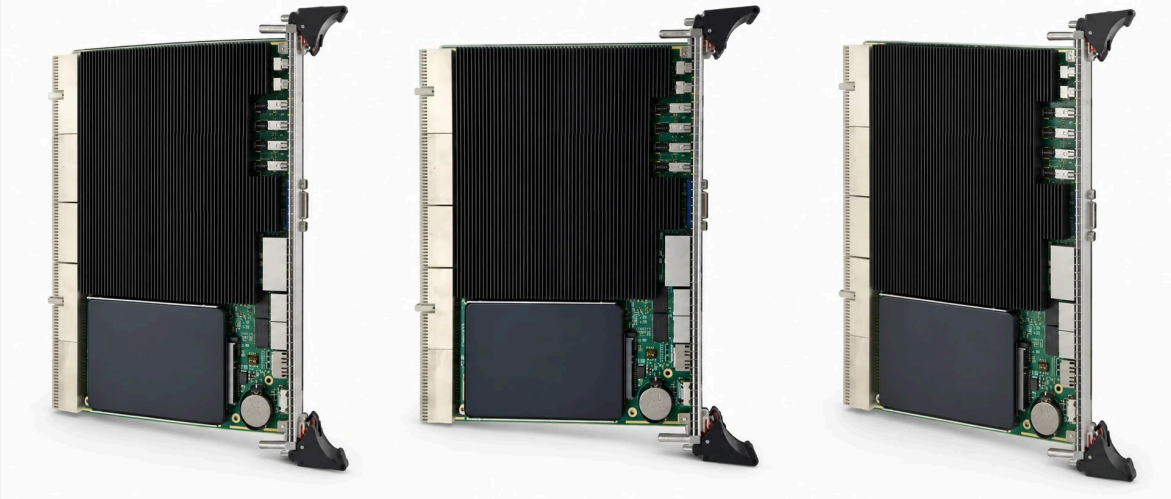
6U board outline and different temperature version can used for match chassis in compute node selection, VGA and rear I/O display provides maintenance UI. Involve and rail etc.specific application when, should separately check product environment and industry verification, especially requires first remove commercial temperature upper limit data difference, again determine acceptance conditions.

Integration checks

Architecture and system	3A5000 LoongArch 4-core platform, confirm Kylin, UOS, Loongnix etc.image actual architecture and driver version.
Serial signal level	Front I/O 2-ch RS-232, rear I/O 3-ch TTL; check rear I/O signal level conversion and grounding, not directly mix used cables.
Temperature conflict	Data commercial temperature upper limit storage 40°C/60°Ctwo kinds of wording, required confirm rear fixed; industrial−20–60°C, wide temperature−40–65°Cseparate option.
Backplane and display	Check 64-bit66MHz bus, 4HP/8HP and rear I/O display protocol, original table in display shrink write must per delivery drawing confirm.

07 CONFIGURATION

Appearance, configuration and selection



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

Configuration

Provides industrial grade-20–60°C and wide temperature grade-40–65°Csolution, supports 4HP or 8HP panel configured with.

Temperature version	Commercial temperature grade 0~40°C; industrial grade-20~60°C; wide temperature grade-40~65°C; commercial temperature upper limit two places respectively write 40°C and 60°C

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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