White Paper for KAYTUS KE4160V1 Series Servers

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1 Product Overview

In the era of the digital economy, 5G and artificial intelligence technologies continue to evolve. The market for the Internet of Things (IoT) is rapidly developing. As more and more devices become connected, the data generated by massive devices is growing exponentially. Complementing the high-speed and low-latency features of 5G, edge computing technology has become a promising opportunity in the overall trend of the smart IoT. According to International Data Corporation (IDC), the percentage of worldwide enterprise infrastructure deployment at the edge will rise from 10% in 2020 to 50% in 2023. Edge computing will continue to increase in size, becoming a comparable emerging market to cloud computing. We design edge computing products to maximize support for server environment demands and performance in edge scenarios.

As our first portable server product for edge scenarios, KE4160V1 inherits the design concepts of openness, high performance, intelligence and flexibility of the M5 product platform while providing strong performance, flexible scalability, and keen insights into edge AI in a healthy and open ecology. It is particularly suited for all types of enterprises and industry users from the Internet, communication, transportation, manufacturing, and finance sectors who have special development needs for edge computing or intelligent edge services. It is suitable for application scenarios such as industrial Internet, smart security, smart manufacturing, and the Internet of Vehicles (IoV) that have strict requirements for the deployment environment, bandwidth, and latency, while meeting the server architecture design and computing performance requirements.

2 Features

KE4160V1 maintains the high quality, performance and reliability of our servers for edge computing applications, keeping the ultimate design concept and exquisite manufacturing process in every aspect of the product.

Figure 2-1 KE4160V1

2.1 Powerful Performance

- New-generation Intel® Xeon® Scalable Processors (up to 105 W TDP)
- Each CPU supports 8 DDR4 DIMMs of up to 2933 MHz
- Supports up to 9 × 2.5" or 3.5" SATA SSDs/HDDs, allowing for high-capacity storage and data migration in edge applications.

2.2 Strong Environmental Adaptation

- Operating temperature: 5°C – 45°C (41°F – 113°F) (continuous), 0°C – 50°C (32°F to 122°F) (short-term); humidity: 5% – 95% RH
- Class A electromagnetic compatibility, dust-proof, and corrosion-resistant

- Supports direct deployment at the edge and rack mounting

2.3 Flexible Expansion

- Up to 3 × PCIe 3.0 slots or 2 × PCIe x16 slots + 1 × PCIe x8 slot
- Up to 1 × dual-width PCIe x16 GPU of up to 320 W TDP

2.4 Flexible GPU and Storage Configurations

Supports two configurations:

- GPU configuration: up to 3 × 2.5" or 3.5" SATA drives + 1 × dual-width GPU, suitable for edge AI processing scenarios
- Storage configuration: up to 9 × 2.5" or 3.5" SATA drives, suitable for data storage, data migration and similar scenarios

2.5 Reliable Chassis

- The portable chassis is not only attractive, but also secure and stable. Furthermore, it employs 25 g shock resistance, IPX5 waterproof, and other designs to adapt to a variety of edge scenarios.

3 Logical Architecture of Motherboard

- KE4160V1 supports 1 Intel® Xeon® Scalable processor. Each processor supports 8 DDR4 memory modules. It supports a memory speed of up to 2933 MHz and a total capacity of up to 512 GB (64 GB for each module).

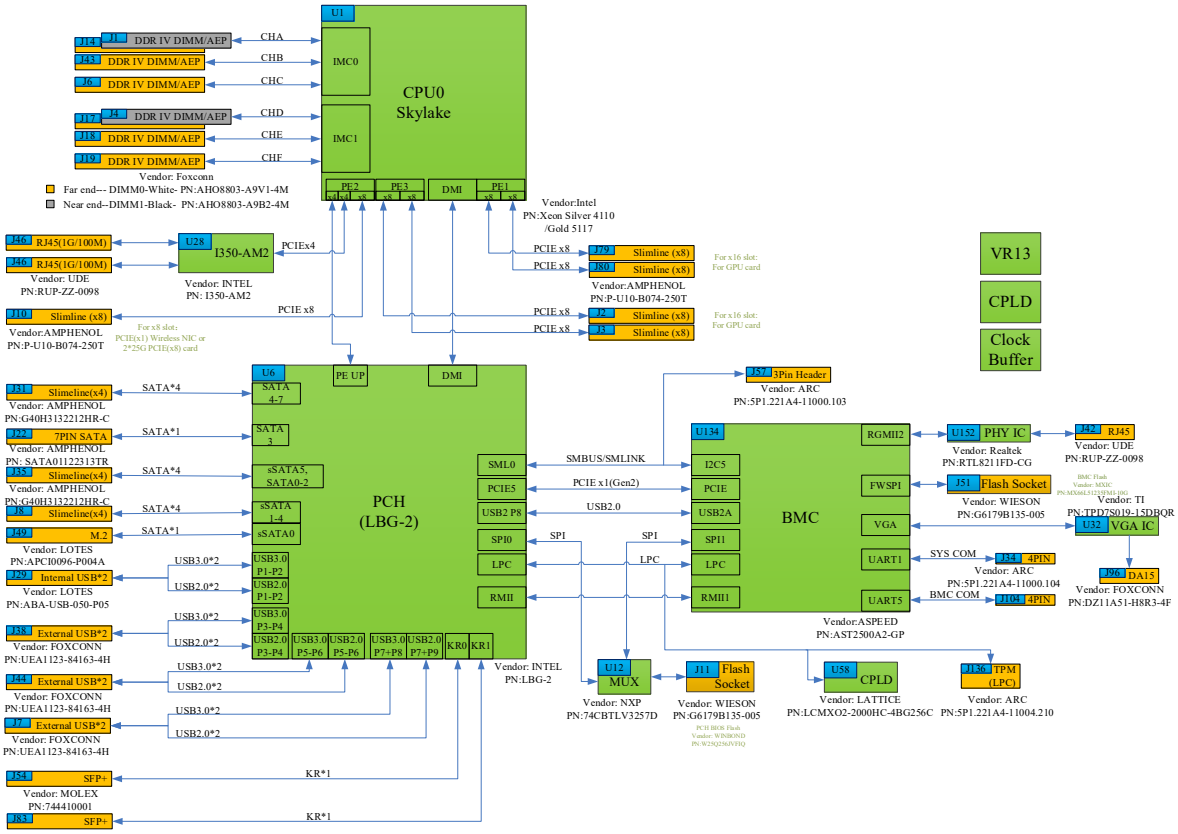

Figure 3-1 Logical Block Diagram

4 Specifications

4.1 Front/Rear Panel Components

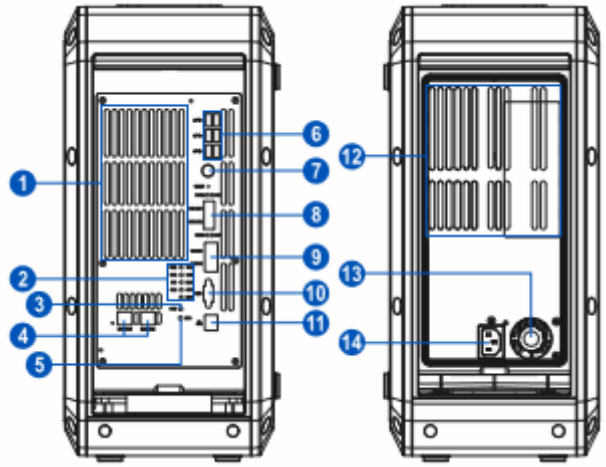

Figure 4-1 Front/Rear Panel

Item	Feature	Item	Feature
1	Heat Dissipation Holes	8	10 Gbps Network Port
2	LEDs	9	1 Gbps Network Port
3	Left Indicator Switch Button	10	VGA port
4	Network Port	11	Management Network Port
5	Right Indicator Switch Button	12	Heat Dissipation Holes
6	USB	13	PSU Fan Vent
7	Power Button	14	Power Plug

Table 4-2 Front/Rear Panel Description

Note: System status LED: solid green = Normal; solid red = Error;

Power LED: solid green = Power on; solid orange = Standby; long press 4 s to force a shutdown;

UID LED: blue = UID on; off = UID off

4.2 Motherboard Layout

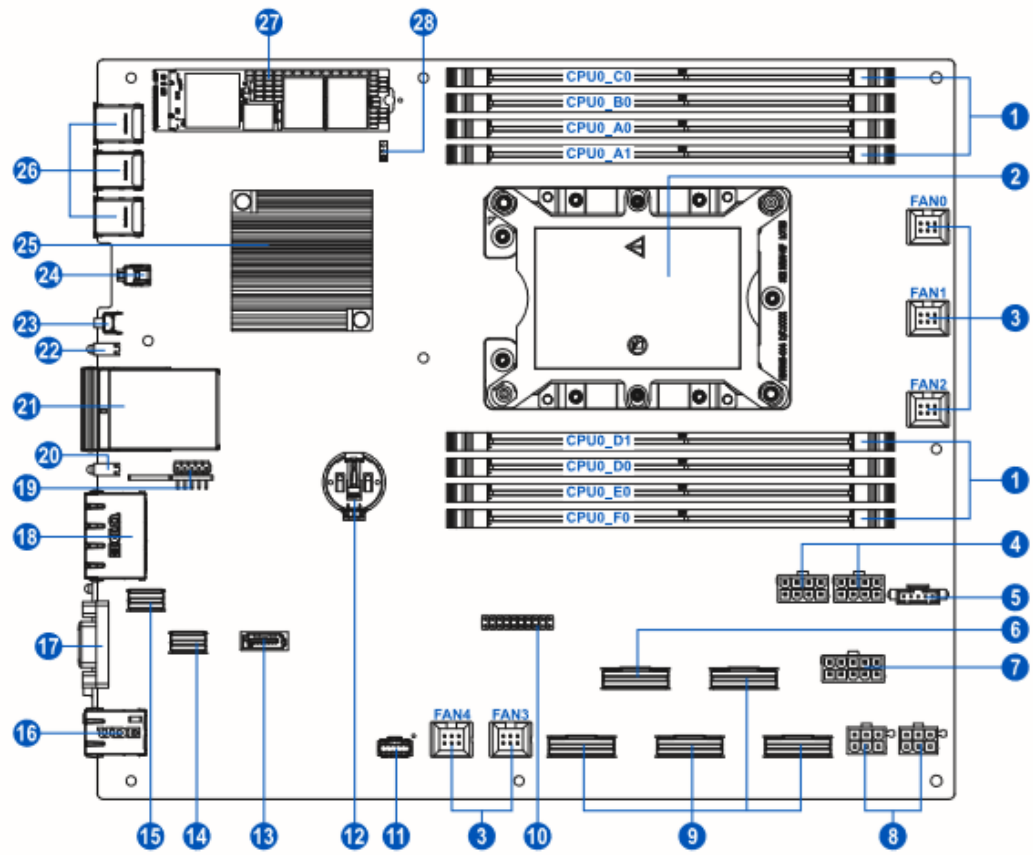

Figure 4-3 Motherboard Layout

Item	Feature	Item	Feature
1	Memory Slots	15	sSATA1-4
2	CPU0	16	BMC Management Network Port
3	Fan0-4	17	VGA Port
4	PSU_12V_8pin Connector	18	1000/100/10 Mbps Network Port 1/2
5	PSU_PSMI Connector	19	Sensor Board
6	SLIM4	20	10 Gbps Optical Port 2 + LED
7	PSU_10pin Connector	21	10 Gbps Optical Port 1/2
8	Riser Card Power Connector	22	10 Gbps Optical Port 1 + LED

9	SLIM0/1/2/3	23	Reset Button
10	TPM Connector	24	Power Button
11	Front Control Panel Connector	25	PCH
12	Battery	26	Dual-port USB
13	SATA3	27	M.2 (sSATA0)
14	sSATA5 + SATA0-2	28	Short-circuit Pin 2 and Pin 3 of J56 to Clear CMOS

Table 4-4 Motherboard Description

CMOS clear jumper

Jumper Location	Description	Function
CLR_CMOS	CMOS clear jumper	Short-circuit pin 1 and pin 2 to restore to normal status; short-circuit pin 2 and pin 3 to clear CMOS.

Note:

It is required to shut down the system and disconnect the power supply during CMOS clearing. Hold for 5 seconds after short-circuiting pin 2 and pin 3, and then short-circuit pin 1 and pin 2 (the default status) of CLR_CMOS jumper with a jumper cap, to restore to its original status.

5 System Specifications

Processor	
Processor Type	Intel® Cascade Lake/CLX-R processors (up to 105 W TDP) Single-socket CPU solution
Chipset	
Chipset Type	Intel® C620 series chipset (Lewisburg-2)
Memory	
Memory Type	DDR4, up to 2933 MHz
Memory Slots	8
Total Memory Capacity	Up to 512 GB (64 GB per memory module)
GPU	
RTX 3070 Tesla T4	1 × RTX 3070 or Tesla T4
I/O Port	
USB Port	6 × front USB 3.0 ports, 2 × internal USB 2.0 ports
COM Port	Onboard header
VGA Port	1 × front VGA port
Management Network Port	1 × front RJ45 port
PCIe	5 × Slimline x8 connectors, supports 2 × PCIe x16 + 1 × PCIe x8
Display	
Controller Type	Integrated with ASPEED AST2500 chip (max. resolution: 1900 x 1200)

Drives	
Drive Type	Up to 9 × 3.5" SATA drives 1 × onboard M.2 SSD
PSU	
Specifications	1 × 850 W ATX PSU, no redundancy
Power Input	100 V – 240 V, 10 A – 6 A, 50 Hz – 60 Hz

Table 5-1 System Specifications

6 Component Compatibility

6.1 Processor

Model	Cores	Threads	Base Frequency	Max. Turbo Frequency	Cache	Max. Capacity	UPIs	Power Consumption
4216	16	32	2.10 GHz	3.20 GHz	22 MB L3	1 TB	2	100 W
4214	12	24	2.20 GHz	3.20 GHz	16.5 MB L3	1 TB	2	85 W
4210	10	20	2.20 GHz	3.20 GHz	13.75 MB L3	1 TB	2	85 W
4208	8	16	2.10 GHz	3.20 GHz	11 MB L3	1 TB	2	85 W
3206R	8	8	1.90 GHz	1.90 GHz	11 MB L3	1 TB	2	85 W
3204	6	12	1.90 GHz	1.90 GHz	8.25 MB L3	768 GB	2	85 W

Table 6-1 CPU Performance

6.2 Memory

Type	Capacity	Speed	Data Width	Organization
RDIMM	16 GB	2933	X72	2R8
RDIMM	32 GB	2666	X72	2R4
RDIMM	32 GB	2933	X72	2R4

Table 6-2 Memory

Note:

This server does not support mixed use of different types of DIMMs.

All DIMMs installed in the server must be of the same type.

DIMM slot layout is as shown in the following figure:

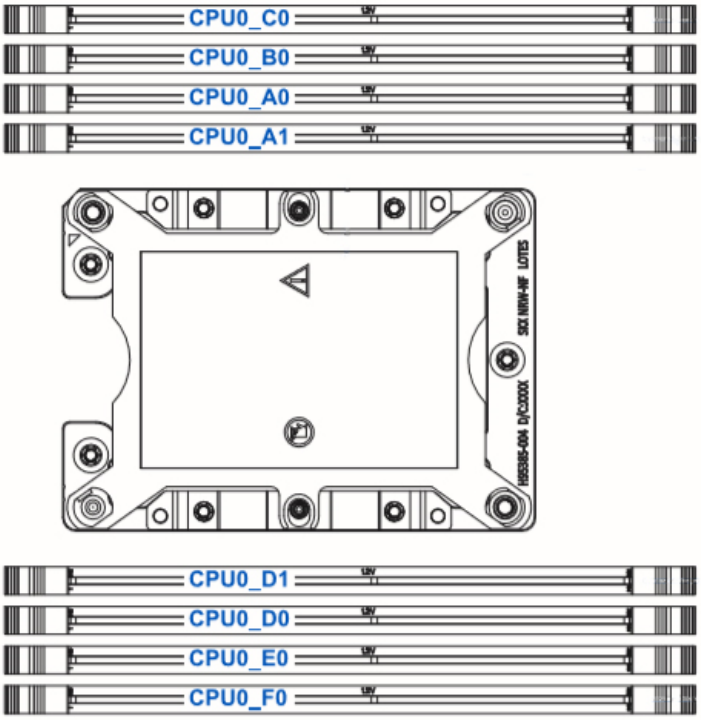

Figure 6-3 DIMM Slot Layout

- DIMM population guidelines:

1. Equal division of DIMMs to CPU0

2. The population positions are shown in the table below:

DIMM Slots Supported		DIMM Quantity and Population			
		1	2	4	8
DIMM slots supported by CPU0	CPU0_A0	●	●	●	●
	CPU0_A1				●
	CPU0_B0			●	●
	CPU0_C0				●
	CPU0_D0		●	●	●
	CPU0_D1				●
	CPU0_E0			●	●
	CPU0_F0				●

Table 6-4 DIMM Population Principles

Step 1: Open the retaining clips on both ends of the DIMM slot.

Step 2: Align the DIMM alignment notch with the receptive point on the slot. Insert and gently press down the DIMM into the slot until the retaining clips are fully seated into the slot. Make sure that the retaining clips are firmly engaged with the notches on the DIMM.

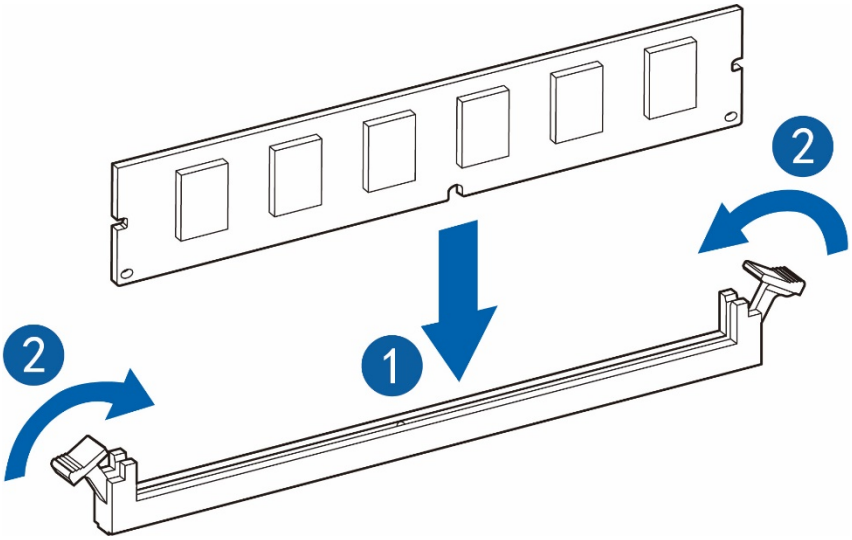

Figure 6-5 DIMM Population

6.3 Storage

6.3.1 SATA Drive Models

Model	Speed (rpm)	Capacity
3.5" SATA	7200	2 TB/4 TB/8 TB/12 TB/16 TB

Table 6-6 Drive Options

Note: For models not listed in the above table, please contact our Customer Service.

6.3.2 SSD Models

Model	Capacity
M.2 SSD	240 GB/ 480 GB

SATA SSD	960 GB/1.92 TB/3.84 TB

Table 6-7 SSD Options

Note: For models not listed in the above table, please contact our Customer Service.

6.4 NIC

1 Gbps NIC (quad-port)	NIC_I_1G_I350-T4V2_RJ_PCIEx4_4_XR
	NIC_W_I350AM4_1G_RJ45_PCIEX8_TETRAD
1 Gbps NIC (dual-port)	NIC_SND_W_I350-AM2_RJ_PCI-E4X_1KM_DUAL
	NIC_Intel_W_I350-T2V2_RJ_PCI-E4X_1KM_DUAL

Table 6-8 NIC Compatibility

6.5 PSU

Power	Brand	Model	Input Voltage	Redundancy	Max. Qty.
800 w	FSP	PSU_FSP_M_FSP850-50FGPH1_850W_ATX_P	100 V – 240 V	No	1

Table 6-9 PSU Compatibility

6.6 Operating System

Vendor	OS Version
Microsoft	Windows Server 2016
Red Hat	Red Hat Enterprise Linux 7.2
CentOS	CentOS 7.2

Table 6-10 Operating System

6.7 GPU

GPU	Model	Video Memory	Bus	Height	Width	Max. Qty.
	GPU_NV_16G_ Tesla-T4_256b_P	16 GB	PCI 3.0 x16	Half-height	Single-width	1
	GPU_SND_8G_ RTX2070S_256b_P	8 GB	PCI 3.0 x16	Full-height	Dual-width	1
	GPU_CF_8G_ RTX3070_256b_P	8 GB	PCI 3.0 x16	Full-height	Dual-width	1

7 Configuration Restrictions

- We are only responsible for the configurations of initial deliverables. We are not responsible for any problems arising from unauthorized modification to any parts.
- Only the 850 W PSU with no redundancy is available.
- The server only supports SATA M.2, and does not support PCIe M.2 or NVMe SSDs.
- It supports up to 9 drives.
- It does not support a RAID card when more than three drives are loaded. You can use the RAID feature provided by Intel PCH. Data backup using RAID 0/1/5/10 is supported.

8 System Management

ISBMC intelligent management system is a server remote management system independently developed by us. It is compatible with the server industry management standard, IPMI specification and has highly reliable and more intelligent hardware monitoring and management functions. The main features of ISBMC intelligent management system include:

- Support intelligent platform management interface (IPMI)
- Support redirection of keyboard, mouse, video and text console
- Support remote virtual media
- Support Redfish protocol
- Support simple network management protocol (SNMP)
- Support login to BMC via Web browser
- The main specifications of the intelligent management system are shown in the following table.
- Specifications of BMC intelligent management system:

Specification	Description
Management interface	It supports various management interfaces to meet system integration of various methods, and can be integrated with any standard management system, and supports the following interfaces: IPMI CLI SNMP HTTPS Redfish
Fault detection	Provide rich fault detection functions to accurately locate hardware faults.
Alarm management	Support alarm management and SNMP Trap(v1/v2c/v3), Email Alert and syslog services to report alarms in various formats to ensure high-reliability operation of the equipment for 7*24 hours.
Virtual media	Support to virtualize the local media device or mirror image, USB device and folder to media device of remote server,

Specification	Description
	simplify the complexity of operating system installation.
Web-based user interface	Support visual image interface, and the setup and query tasks can be completed quickly through a simple click on the interface.
Screen shot	View the screen shot without log-in, making regular patrol inspection convenient.
Software double mirror backup	When the software completely running currently crashes, it can be started from the backup image.
Support intelligent power management	Power capping technology helps you easily increase deployment density, while dynamic energy saving technology helps you effectively reduce operating costs.
IPv6	Support IPv6 functions to facilitate the construction of a full IPv6 environment and provide you with abundant IP address resources.
NC-SI function	Support NC-SI (Network Controller Side Band Interface) function to allow you to easily access BMC system through business network port.
Hardware watchdog timer	When the BMC has no response for a period longer than the safety setting time, the control fan enters the full speed protection mode.
Power supply control	on/off/cycle/status
UID remote control	The UID lamp of a single machine is manually lit, which is convenient to find equipment in the machine room.
Firmware upgrade	BMC/BIOS can be upgraded
Serial port redirection	Serial port I/O in IPMI session redirection system based on IP
Storage information viewing	Display Raid logical array information and information of corresponding physical disks under logical array

Figure 8-1 System management specifications

9 Physical Specifications

Physical	
Outer Packaging Dimensions	657 × 585 × 432 mm (25.87 × 23.03 × 17.01 in) (W × H × D)
Chassis Dimensions	190 × 420 × 460 mm (7.48 × 16.54 × 18.11 in) (W × H × D)
Product Weight	Net weight (with all drives loaded): 22 kg (48.50 lbs) Gross weight: 26 kg (57.32 lbs) (chassis + package + accessory box)
Environment Parameters	
Operating Temperature	0°C – 45°C (32°F – 113°F)
Storage and Transportation Temperature	-40°C to 70°C (-40°F to 158°F)
Operating Humidity	5% – 95% RH
Storage and Transportation Humidity	5% – 95% RH

Table 9-1 Physical Specifications

10 Certifications

* Certification information will be updated from time to time. Please consult our Edge Computing Department for the latest certification information.

Country/Region	Certification
China	CCC
U.S.	FCC, UL
Europe	CE

Table 10-1 Certifications

11 Support and Services

Global service hotline:

- 1-844-860-0011 (toll-free)
- 1-646-517-4966 (direct line)
- Email: servicesupport@kaytus.com

Required customer information:

- Name
- Telephone number
- Email address
- Product model

12 Relevant Documents

For more information, go and visit:

https://www.kaytus.com

There you can find resources to solve problems and learn about our products, such as product manuals, drivers, and firmware.