ESC4000 G2

Configuration Guide

E7580

First Edition V1
July 2012

Contents

Revision history

Revision	Revision history	Date
V1	First release of ESC4000 G2 configuration guide	July 2012

Safety information

Electrical Safety

- Before installing or removing signal cables, ensure that the power cables for the system unit and all attached devices are unplugged.
- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.
- When adding or removing any additional devices to or from the system, contact a qualified service technician or your dealer. Ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you service.
- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your dealer.

Operation Safety

- Servicing of this product or units is to be performed by trained service personnel only.
- Before operating the server, carefully read all the manuals included with the server package.
- Before using the server, make sure all cables are correctly connected and the power cables are not damaged. If any damage is detected, contact your dealer as soon as possible.
- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.
- Avoid dust, humidity, and temperature extremes. Place the server on a stable surface.

This product is equipped with a three-wire power cable and plug for the user's safety. Use the power cable with a properly grounded electrical outlet to avoid electrical shock.

Lithium-Ion Battery Warning

CAUTION! Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

CD-ROM Drive Safety Warning

CLASS 1 LASER PRODUCT

Heavy System

CAUTION! This server system is heavy. Ask for assistance when moving or carrying the system.

Chapter 1

This chapter describes the key features of ESC4000 G2. It includes the product overview and general specifications.

Product introduction

1.1 Key features

ASUS ESC4000 G2 is the latest high-density GPU server based on dual Intel Xeon E5-2600 processor platform, featuring eight hot-swap 3.5” SATA HDD cages, 1+1 80+ Platinum 1620W redundant power supply and nine PCI-E Gen3 x16 expansion slots. It delivers high density computing power, scalable expansion capability, intelligent thermal solution and green design, making it an ideal choice for applications in the HPC field of life and medical science, engineering science, financial modeling and virtualization.

8+1 Flexible Expansion Slots

The ESC4000 supports up to eight PCI-E Gen3 x16 slots for high expandability, compatible with versatile expansion cards. In addition, there is an optional riser for a low profile/half-length card and PIKE solution.

Intelligent System Fan Control II Function

To improve heat-dispersion and a stable computing environment, independent smart fans provide cooling for each area of the GPU and CPU, and a dual-fan design for GPU cards provides an extra thermal back-up solution.

1+1 Redundant PSU (1620W 80+ Platinum)

The ESC4000 is equipped with a 1620W 80+ Platinum level redundant power supply with power efficiency up to 94% for energy savings, while the hot swappable design reduces power loss, improves power efficiency and saves more TCO for users.

Comprehensive RAID Solutions

The ESC4000 supports the optional ASUS RAID PIKE upgrade kit. With only a PIKE riser card and a PIKE card, upgrade the server from a SATA to SAS based storage system by re-connecting the cable from the onboard SATA to a PIKE riser SAS port. Users now have flexible choices for multiple storage options!

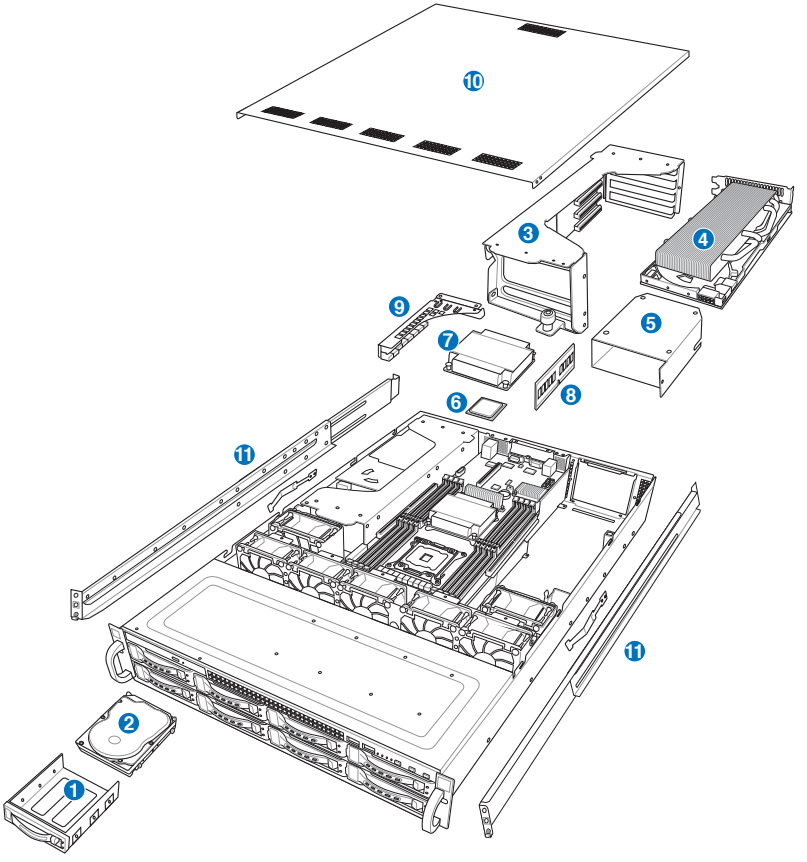
Complete Server Remote Management Solution

By installing an optional Web GUI ASMB6-iKVM module, users can have full control of the server with an out-of-band server-based management (IPMI 2.0 standard) and 24x7 real-time remote monitor. Meanwhile, ASWM Enterprise software provides one-to-multiple centralized management including BIOS flash, remote control, power control and asset management through a user-friendly interface. Users can utilize an effective tool with a user-friendly interface to control the servers remotely.

Cutting-edge Architecture

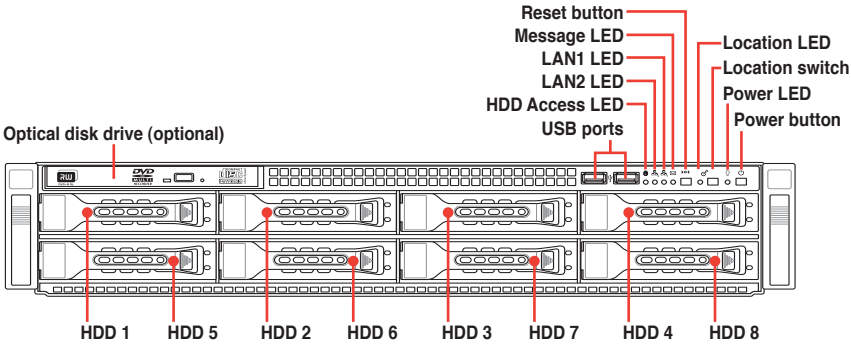
The ESC4000 G2 supports dual CPUs from the Intel® Xeon® E5-2600 processor family and with 16 DIMM sockets onboard, up to 512GBof four-channel DDR3 1600/1333 memory is supported. Combined, they provide for a high computing capability that can tackle the most difficult of tasks. Additionally, there are more PCI-E lanes with PCI-E Gen 3 support, which is suitable for systems that require high I/O connectivity and bandwidth and supports more PCI-E devices.

1.2 System overview

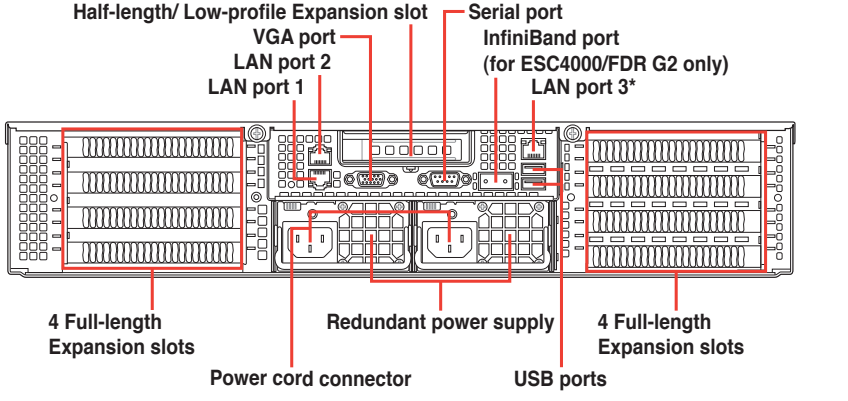


Items	Items
1. Hard disk drive bay	2. Hard disk drive
3. Computing module bracket	4. Computing module
5. Computing module airduct	6. CPU
7. CPU heatsink	8. DDR3 DIMM
9. PCI-E 2.0/3.0 x16 riser card	10. Top cover
11. Friction rackmount rail kit	

1.3 Front panel features



1.4 Rear panel features



*The port is for ASUS ASMB6-iKVM controller card only.

1.5 System specifications

Model Name		ESC4000/FDR G2	ESC4000 G2
Processor / System Bus		2 x Socket-R LGA2011	
		Intel® Xeon® E5-2600 product family	
		QPI 6.4 / 7.2 / 8.0 GT/s	
Core Logic		Intel® C602 chipset Mellanox Connectx-3 MT27514A0-FCCR-FV FDR 56Gbps controller	Intel® C602 chipset
ASUS Features	Fan Speed Control	√	
	ASWM Enterprise	√	
Memory	Total Slots	16 (4-channel per CPU, 8 DIMMs per CPU)	
	Capacity	Maximum up to 128GB (UDIMM) Maximum up to 512GB (RDIMM) Maximum up to 512GB (LRDIMM)	
	Memory Type	DDR3 800/1066/1333/1600 RDIMM DDR3 1066/1333/1600 ECC UDIMM Non-ECC UDIMM DDR3 1066/1333 LR-DIMM	
	Memory Size	1GB, 2GB, 4GB, 8GB, 16GB, 32GB* (RDIMM) 1 GB, 2GB, 4GB, 8GB* (UDIMM) 8GB, 16GB, 32GB* (LRDIMM)	
Expansion Slots	Total PCI/PCI-X/ PCI-E Slots	9	
	Slot Type	Full-length/Full-height - 8 x PCI-E 3.0 x16 (4 at x16 Link or 8 at x8 Link) (Slot CPU1_PCIE2, CPU1_PCIE4, CPU2_PCIE1, CPU2_PCIE3 auto switch to x8 Link if slots CPU1_PCIE1, CPU1_PCIE3, CPU2_PCIE2, CPU2_PCIE4 are occupied) Half-length / Low-profile - 1 x PCI-E 3.0 x16 (Gen3 x8 Link) (PIKE SAS Card for Storage Enhancement)	
	Additional Slot	PIKE Riser Card	
Storage	SATA Controller	**Intel® C602-A:** **<AHCI>** - 2 x SATA 3Gb/s ports; 2 x SATA 6Gb/s ports - Intel® RSTe (for Windows only) - Supports software RAID 0, 1, 5 & 10 - LSI MegaRAID (for Linux / Windows) - Supports software RAID 0, 1 & 10 **<SCU>** - 4 x SATA 3Gb/s ports - Intel® RSTe (for Windows only) - Supports software RAID 0, 1, 5 & 10	

(continued on the next page)

Model Name		ESC4000/FDR G2	ESC4000 G2
Storage	SAS Controller	Optional: ASUS PIKE 2008 8-port SAS 6G RAID card ASUS PIKE 2008/IMR 8-port SAS 6G RAID card ASUS PIKE 2108 8-port SAS 6G H/W RAID card	
HDD Bays	I = Internal A or S will be hot-swappable	8 x Hot-swap 3.5” HDD Bays	
Networking	LAN	2 x Intel 82574L Gigabit LAN + 1 x Mgmt LAN	
Graphic	VGA	Aspeed AST2300 / 16MB	
Auxiliary Storage Device Bay (Floppy / Optical Device)		1 x slim-type Optical Device Bay (Options: No Device / DVD-RW*) *DVD-RW default for North America	
Onboard I/O		1 x External Serial Port 3 x RJ-45 ports (1 for ASMB6) 4 x USB 2.0 ports (Front x 2, Rear x 2) 1 x Internal A Type USB Port 1 x VGA port	
		1 x QSFP Port	-
OS Support		Windows® Server 2008 R2 Windows® Server 2008 R2 Enterprise Windows® Server 2008 Enterprise 32 / 64-bit Windows® Server 2003 R2 Enterprise 32 / 64-bit RedHat® Enterprise Linux AS5.7/6.2 32 / 64-bit SuSE® Linux Enterprise Server 11.2 32 / 64-bit CentOS 5.7/6.2 32/64-bit VMWare ESX4.1/ESXi4.1 (Subject to change without any notice)	
Anti-virus Software		Optional Anti-virus Software CD	
Management Solution	Out of Band Remote Hardware	ASMB6-iKVM for KVM-over-Internet	
	Software	ASUS ASWM Enterprise	
Dimension (HH x WW x DD)		750mm x 444mm x 88mm (2U)	
Net Weight Kg (CPU, DRAM & HDD not included)		19 Kg	
Power Supply		1 + 1 Redundant 1620W (80+) Platinum Power Supply (Following different configurations by region.)	
Power Rating		Input: 1000W: 100—120 Vac, 12-10A 1200W: 120—140 Vac, 12—10A 1620W: 180—240Vac,10.5—8A 50—60Hz Class I	
Environment		Operating temperature: 10°C–35°C / Non operating temperature: -40°C–70°C Non operating humidity: 20%–90% (Non-condensing)	

***Specifications are subject to change without notice.**

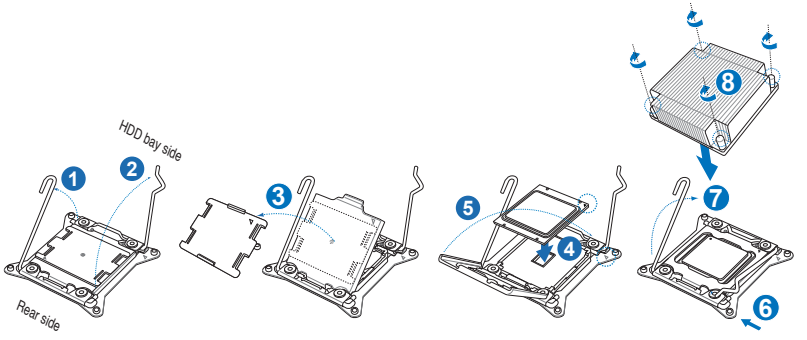
Chapter 2

This chapter lists the key components and optional accessories for the server system.

Components

2.1 Upgrading CPU and CPU heatsink

The motherboard comes with two surface mount LGA 2011 Socket R designed for the Intel® Xeon® E5-2600 series processor family.

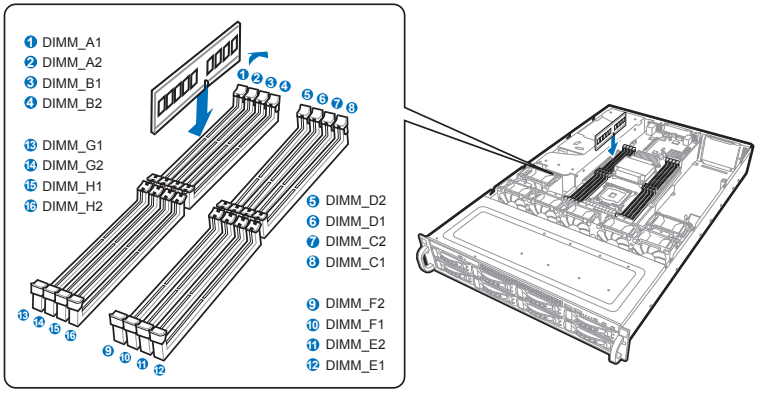


- To prevent damage to the socket pins, do not remove the PnP cap unless you are installing a CPU.
- The CPU fits in only one correct orientation. DO NOT force the CPU into the socket to prevent bending the connectors on the socket and damaging the CPU!
- To prevent contaminating the paste, DO NOT spread the paste with your finger directly.

Order P/N	Description
90-S000U0CP0T	E5-2690 2.9G (8C/20M/135W/DDR3 1600/HT/8.00 GT) with Heatsink
90-S000U0C90T	E5-2680 2.7G (8C/20M/130W/DDR3 1600/HT/8.00 GT) with Heatsink
90-S000U0C87T	E5-2670 2.6G (8C/20M/115W/DDR3 1600/8.00 GT) with Heatsink
90-S000U0C88T	E5-2665 2.4G (8C/20M/115W/DDR3 1600/8.00 GT) with Heatsink
90-S000U0C89T	E5-2660 2.2G (8C/20M/95W/DDR3 1600/8.00 GT) with Heatsink
90-S000U0C8AT	E5-2650 2.0G (8C/20M/95W/DDR3 1600/8.00 GT) with Heatsink
90-S000U0C8BT	E5-2640 2.5G (6C/15M/95W/DDR3 1333/7.20GT) with Heatsink
90-S000U0C8CT	E5-2630 2.3G (6C/15M/95W/DDR3 1333/7.20GT) with Heatsink
90-S000U0C8DT	E5-2620 2.0G (6C/15M/95W/DDR3 1333/7.20GT) with Heatsink

2.2 Upgrading system memory

The motherboard comes with sixteen (16) Double Data Rate 3 (DDR3) Dual Inline Memory Modules (DIMM) sockets.



You may install 1 GB, 2 GB, 4 GB, 8 GB, 16 GB, and 32 GB registered DDR3 DIMMs with ECC or 1GB, 2GB, 4GB, and 8GB unbuffered DDR3 DIMMs with ECC/ Non-Ecc into the DIMM sockets using the memory configurations in this section.

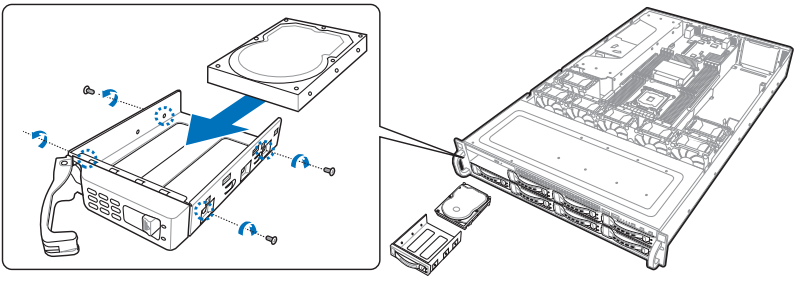
CPU1 Configuration	A2	A1	B2	B1	C2	C1	D2	D1
1 DIMMs		•						
2 DIMMs		•		•				
4 DIMMs		•		•		•		•
8 DIMMs	•	•	•	•	•	•	•	•

CPU1 + CPU2 Configuration	A2	A1	B2	B1	C2	C1	D2	D1	E2	E1	F2	F1	G2	G1	H2	H1
1 DIMMs		•														
2 DIMMs		•								•						
4 DIMMs		•		•						•		•				
8 DIMMs		•		•		•		•		•		•		•		•
12 DIMMs	•	•	•	•		•		•	•	•	•	•		•		•
16 DIMMs	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Order P/N	Description
90-S000I0620T	DDR3 1600 ECC REG 16G 240P
90-S000I0610T	DDR3 1600 ECC REG 8G 240P
90-S000I0600T	DDR3 1600 ECC REG 4G 240P

2.3 Upgrading hard disk drives

The system supports eight hot-swap SATAII/SAS hard disk drives. The hard disk drive installed on the drive tray connects to the motherboard SATAII/SAS ports via the SATAII/SAS backplane.

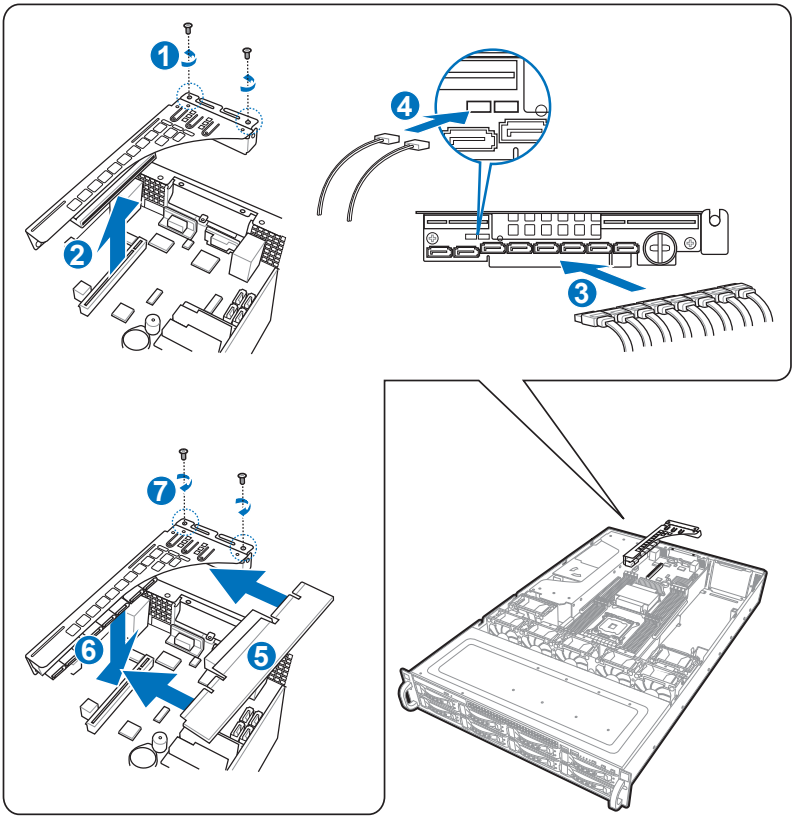


We recommend that you install identical drives of the same model and capacity for RAID configuration.

Order P/N	Description
90-S000H64R0T	300GB 6G SAS15Krpm with HDD Tray (Seagate)
90-S000H64S0T	450GB 6G SAS15Krpm with HDD Tray (Seagate)
90-S000H64T0T	600GB 6G SAS15Krpm with HDD Tray (Seagate)
90-S000H65D1T	500GB SATA3 6Gb 7200 rpm with HDD Tray (Seagate)
90-S000H65B1T	1TB SATA3 6Gb 7200 rpm with HDD Tray (Seagate)
90-S000H65V0T	500GB SATA3 7200 rpm with HDD Tray (Seagate Enterprise)
90-S000H65U0T	1TB SATA3 7200 rpm with HDD Tray (Seagate Enterprise)
90-S000H65T0T	2TB SATA3 7200 rpm with HDD Tray (Seagate Enterprise)
90-S000H65E2T	3TB SATA3 7200 rpm with HDD Tray (Seagate Enterprise)

2.4 Installing ASUS PIKE RAID module

Follow the steps below to install the optional ASUS PIKE SAS RAID card to the ASUS PIKE riser card.



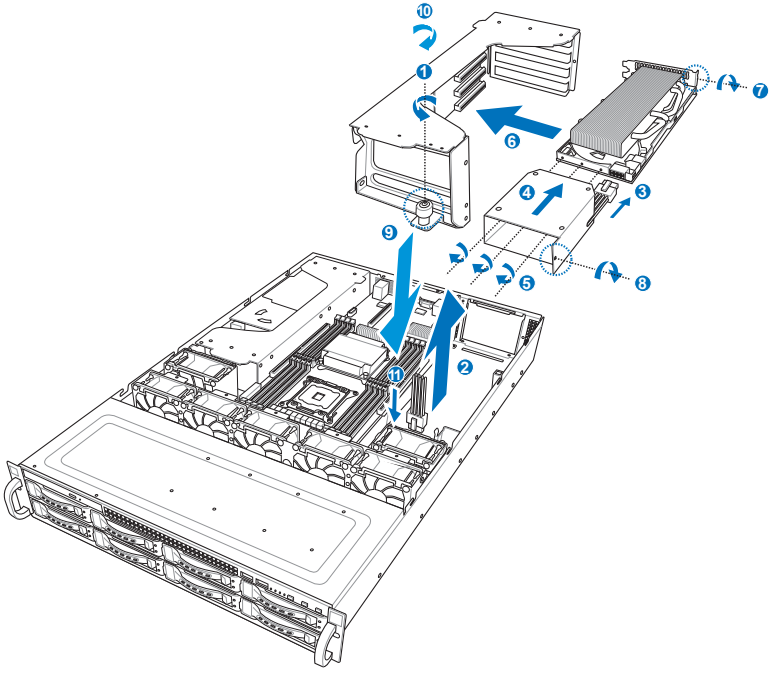
1. Remove the screws that secure the riser card bracket.
2. Hold the riser card firmly then pull it upward to detach it from the PCI Express x16 slot on the motherboard.
3. Remove the SATA/SAS cables from the onboard SATA connectors then connect them to the SAS1-8 connectors on the PIKE riser card.
4. Connect the SGPIO1 cable from the SGPIO1 connector into the SGPIO2 connector on the riser card.
5. Align and insert the golden fingers of the PIKE RAID SAS card into the card slot of the riser card. Ensure that the PIKE RAID SAS card is seated firmly into the slot.
6. Align the golden fingers of the riser card bracket with the PCI Express x16 slot on the motherboard then push it firmly into place. Ensure that the riser card bracket is aligned with the rear panel.
7. Secure that riser card bracket with the screws that you removed in step 1.

If you are using a PIKE 1078 SAS RAID card, snap the iButton into the iButton slot on the riser card.

Order P/N	Description
90-S00CS0150T	PIKE 2108 8-port SAS 6G card. RAID Kit (H/W RAID 0, 1, 10, 5, 6, 50, 60)
90-S00CS0140T	PIKE 2008/IMR 8-port SAS 6G card. RAID Kit (RAID 0, 1, 10, 5, 50)
90-S00CS0130T	PIKE2008 8-port SAS 6G card. RAID Kit (RAID 0, 1, 10, 1E)

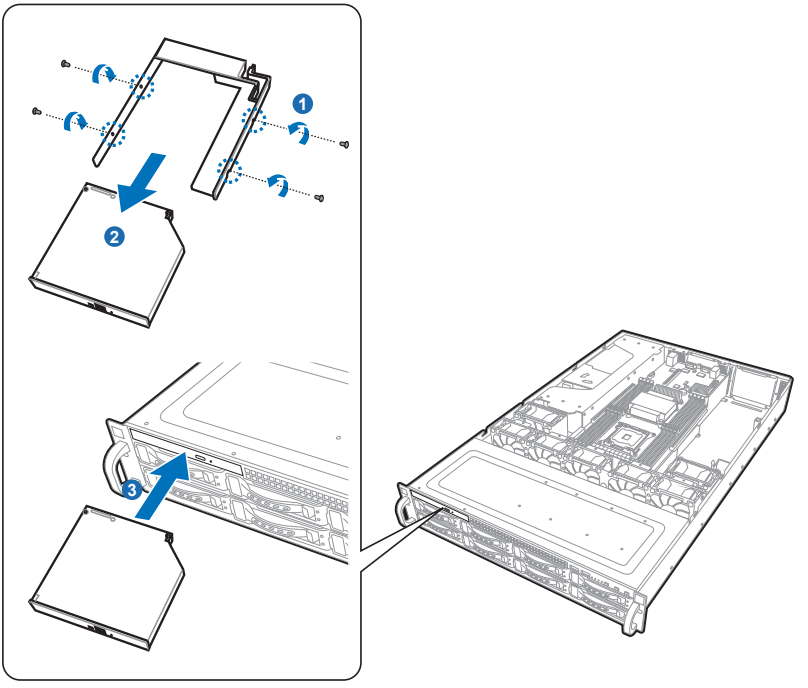
2.5 NVIDIA® Tesla™ GPU computing modules

Follow the steps below to install the optional NVIDIA® Tesla™ GPU computing modules to the system.



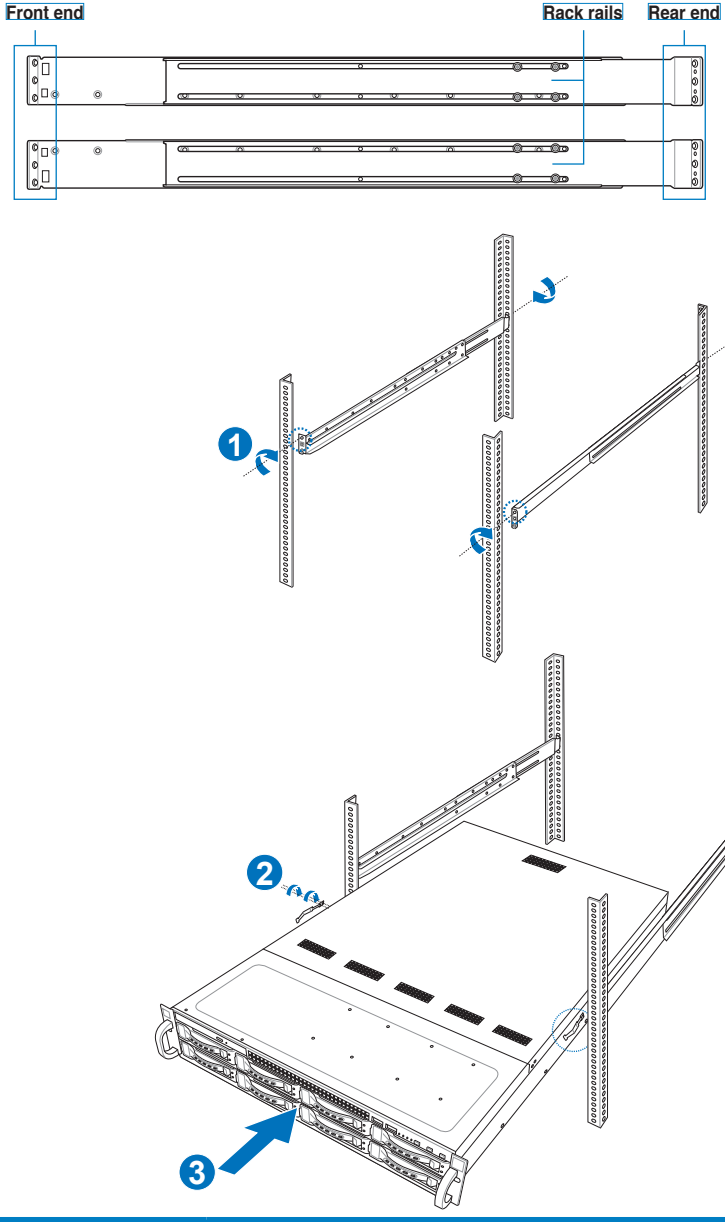
Order P/N	Description
90-S000R1M00T	TESLA C2075 6GB GPU CARD
90-S000R1M10T	TESLA M2075 6GB GPU CARD
90-S000R00D0T	TESLA M2090 6GB GPU CARD
90-S000R0080T	GRAPHIC CARD QUADRO 400
90-S000R0070T	GRAPHIC CARD QUADRO 600
90-S000R0090T	GRAPHIC CARD QUADRO 2000
90-S000R00A0T	GRAPHIC CARD QUADRO 4000
90-S000R00B0T	GRAPHIC CARD QUADRO 5000
90-S000R00C0T	GRAPHIC CARD QUADRO 6000

2.6 Installing optical drive



Order P/N	Description
90-S000C4000T	SLIM DVD-ROM 8X MODULE
90-S000C2000T	SLIM DVD-RW MODULE

2.7 Friction rail kit



Order P/N	Description
90-S00SP1360T	FRICTION RAIL KIT V2.0

2.8 OS support list

OS support list
Windows® Server 2008 R2
Windows® Server 2008 R2 Enterprise
Windows® Server 2008 Enterprise 32/64-bit
Redhat® Enterprise Linux AS 5.7/6.2 32/64-bit
SuSE® Linux Enterprise Server 11.1 32/64-bit
CentOS 5.7/6.2 32/64-bit
VMWare ESX4.1/ESXi4.1

Order P/N	Description
90-S00SW7140T	Windows® Server 2008 STD 64-bit ENG
90-S00SW7150T	Windows® Server 2008 STD 64-bit TCH