

ORION HF X410R-G6

User Manual



About this User Manual

This user manual provides the information on Installation and maintenance of the ORION HF X410R-G6.

Caution: Experienced technicians should perform the Installation and maintenance.

Document title: ORION HF X410R-G6 Rev.2 Document number: 2nd Revision Document update date: May 2024 Change Log: New PCIe Slots mapping table on Page 7

The following Notes, Cautions and Warnings might appear in this user manual.

(i) Note: Explains an important point or tip to help you to better use of the product.

Caution: Indicates the potential damage to hardware or loss of data, security problems, or performance issues and tells you to avoid the problem.

Warning: Indicates that an action or step can result in physical harm, property or hardware damage.

To avoid damaging your server, perform the following steps before you begin working inside the server.

- 1. Ensure that you follow the Safety Instruction.
- 2. Ensure that your work surface is flat and clean to prevent the server cover from being scratched.
- 3. Turn off your server.
- 4. Disconnect all network cables from the server.

CAUTION: To disconnect a network cable, first unplug the cable from your server and then unplug the cable from the network device. After you finish working inside the server, replace all covers, panels, and screws before connecting to the power source.

Safety instructions

Use the following safety guidelines to protect your server from potential damage and to ensure your personal safety. Unless otherwise noted, each procedure included in this document assumes that the following conditions exist:

You have read the safety information that shipped with your server.

A component can be replaced or, if purchased separately, installed by performing the removal procedure in the reverse order.

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1. ORION HF410-G6 Specifications

The ORION HFX410R-G6 is a single socket, 1U rackmount form factor server and supports the following specification.

Form Factor	10
Chipset	Intel® W790
Processor	Intel® Xeon™ W-2475X - 20 Cores, 37.5 MB Cache, LGA4677 Intel® Xeon™ W-2495X - 24 Cores, 37.5 MB Cache, LGA4677 Intel® Xeon™ W-3475X - 36 Cores, 82.5 MB Cache, LGA4677 (CX410 only) Intel® Xeon™ W-3495X - 56 Cores, 105 MB Cache, LGA4677 (CX410 only)
Cooling System	High Performance Liquid Cooled System, Closed Loop and Maintenance Free
Memory	Up to 128 Gb DDR5-6400 MHz ECC, Quad-channel Up to 1024 Gb DDR5-4800 MHz ECC, Quad-channel
Network Controller	(2) Intel X710 10 GbE LAN Controller + (1) Dedicated Management 1GbE RJ45 Port
Storage Controller	Onboard Intel® W790 Chipset SATA 6Gbps Controller Support RAID 0, 1, 5 and 10 Intel® Rapid Storage Technology (Optional Hardware RAID)
Drive Bays	(4) 2.5" SATA 6Gbps or (2) 2.5" NVME U.2 hot-swap drives HDD/SSD
Expansion Slots	(1) PCI-E 5.0 x16 FHFLDW (or 2 x PCI-E 5.0 x16 FHFLSW) (2) PCI-E 5.0 x16 FHHL (1) PCI-E 5.0 x16 FHHL (Internal Slot)
Validated Network Adapters	Nvidia Mellanox ConnectX-7 Series Xilinx SolarFlare X3522
Validated FPGA Adapters	AMD Xilinx UL3524
I/O Ports	(1) VGA, (2) USB 3.0, (2) 10GbE RJ45 LAN, (1) 1GbE RJ45 Management LAN
System Management	AST2600 Advanced Graphics & Remote Management Processor IPMI 2.0 and Redfish 1.11 Compliant Web-based user interface for remote management & iKVM Remote, unblocked, BIOS-level access and control
Chassis Features	Toolless mounting motherboard and toolless rail kit, QCode for easy troubleshooting, exclusive leak detection technology
Power Supply	2000W Redundant (1+1) High Efficiency 80 PLUS® Titanium Certified
Environment	Operating: 10°C to 25°C (50°F to 77°F) @ 8% to 90% (non-condensing) Non-operating: -20°C to 70°C (-4°F to 158°F) @ 5% to 95% (non-condensing)
Dimensions (DxWxH)	854mm x 438mm x 44mm (33.6" x 17.3" x 1.7")
Estimated Weight	17.5kg (38.6lbs)
Warranty	CIARA's limited hardware warranty includes a one year, parts and labour with return to CIARA USA or Canada. Customers may purchase an extended warranty of up to 3 years on parts and labour with different support levels. Please contact CIARA at 1-877-242-7272 for complete warranty details including limitations and transferability.
OS Support	Linux® RHEL/CentOS/Rocky Linux 8.6+, Ubuntu 22.04.1 LTS, support for other versions available upon request.
Notes	*Maximum clock speed may vary depending on applications and workloads.

2. Chassis Overview

The following illustrations are the ORION HF X410R-G6 chassis Front, Back and Side views.

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Front



Back



3. Front Panel Components



ITEM	DESCRIPTION
1	Power Button
2	Reset
3	Power LED
4	2 x USB 2.0 Type B
5	Q-Code Display
6	4 x SATA or 2 SATA/NVMe Drive Bay

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4. Back Panel Components



ITEM	DESCRIPTION
1	2 x Power Inlet
2	UID Switch
3	VGA Port
4	Management LAN (BMC)
5	Power Button)
6	2 x 10Gb LAN RJ45 Port
7	2 x USB 3.0
8	PCIe Slot #4, up to x16 (LP/HL/SW)
9	PCIe Slot #3, up to x16 (LP/HL/SW
10	PCIe Slot #1, up to x16 (FH/FL/SW)
11	PCIe Slot #2, up to x16 (FH/FL/SW)

5. Accessory Boxes & Rails

The ORION HF X410R-G6 server includes (2) accessory boxes:

Accessory Box #1 with Brackets and Screws*



Accessory Box #2 with (2) Cables*



The rails, bezel box and both accessory boxes are placed as shown below in the box with the server. *



*ALL PICTURES SHOWN ARE FOR ILLUSTRATION PURPOSE ONLY.ACTUAL PRODUCT MAY VARY.

8 | P a g e

6. Labelling

This section provides information on the different labels found on the server.

6.1 Power supplies cage



6.2 Serial Number and Model Number Labels on Mylar



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6.3 HDD trays

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6.4 Support and Certification Labels

:: CIARA				X410
MODEL CODE ORION HFX41	OR-G6 MFG [DATE 2023-06	SERIAL	
SUPPORT INFORMA	ΓΙΟΝ		XXXXXX	XXXXXXX
T: E	:			27706
1: CIARA				X410
MODEL CODE ORION HFX41	DR-G6		INPUT 100)-240V∼ 50/60 Hz 15A
CUSTOM SN XXXXXXXXXXX	X ASSET 1	TAG		CE F©
SERIAL NUMBE	R Rul the (1)1 inte (2)1	s device complies with Part 15 es. Operation of this device is following two conditions: This device may not cause han rference, and This device must accept any in eved including interference th	of the FCC subject to mful terference	Made in Canada
XXXXXXXXXXXXX	(X	se undesired operation. CAN I	CES3[A]	27706
計CIARA 型号 (Model): Orion HFX410R-G6	This device complies Operation is subject (1) this device may n (2) this device must a including interference CAN ICES-3 (A)/NMB	with Part 15 of the FCC Rul to the following two condit to cause harmful interferen accept any interference rec to that may cause undesired I-3(A)	les. ions: nce, and eived, d operation.	R-R-HYP-HF314-G4
AC າ (INPUT): 100-127V, 12A 50-60H 200-240V, 6.5A 50-60 警告! 在进行维修之前,请断开所有电源 此為甲類資訊技術設備,於居住環境中使 在此種情況下,使用者會被要求採取某些 警告: 此为A级产品,在生活环境中,该产 在这种情况下,可能需要用户对其干扰平	z X2 Hz X2 连接 用時,可能會造成射頻擾動, 適當的對策。 *品可能会造成无线电干扰。 取可行的措施	Risk of explosion if L batery is replaced w by an incorrect s type. C Dispose of used exige batteries acording	aite on liitettävä suojamm varustettuun pistorasiaan. tikkontakt. Apparaten skal Cet appareil numérique de ences du Règlement sur le 制读範 (mapufacture	doituskoskettimilla Apparatet må tilkoples jordet I anslutas till jordat uttag. Ia classe A respecte toutes les matériel brouilleur du Canada

	to the instructions.	服务器 Rack-Mountable Server
CAUTION: Slide/rail mounted equipment is not to be used as	a shelf	加拿大制造 Assembled in Canada
or a work space. Disconnect all power to the unit before serv	icing.	制造商 Manufactured on: /

7. Chassis Layout

The following illusration shows inside of the ORION HF X410R-G6 system.



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8. Detailed Motherboard Layout



ITEM	DESCRIPTION	PAGE
1	CPU SOCKET	14
2	DIMM SLOTS	15
3	FAN AND PUMP CONNECTORS	16
4	POWER SUPPLY CONNECTORS	17
5	POWER CONNECTORS	18
6	SATA 6GB/S CONNECTOR	19
7	MICRO SD CARD SOCKET	20
8	USB 2.0 HEADER	21
9	BMC SWITCH HEADER	22
10	BMC THERMAL SENSOR HEADER	23

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11	CLEAR CMOS HEADER	24
12	FAN CONTROL HEADER	25
13	FIXED DEDICATED BMC LAN IP HEADER	26
14	GENZ SLOT POWER CONNECTOR	27
15	IPMI SWITCH HEADER	28
16	LN2 MODE JUMPER	29
17	PCIE SIGNAL (CPU) CONNECTOR	30
18	PCIE SIGNAL (PCH) CONNECTOR	31
19	Q-CODE CARD HEADER	32
20	SMART PSU SWITCH HEADER	33
21	SYSTEM PANEL HEADER	34
22	TPM HEADER	35
23	VGA SWITCH HEADER	36
24	EXT 9100 HEADER	37
25	VROC KEY HEADER	38

8.1 Jumpers & Buttons Functionality



8.2 CPU Socket

The motherboard comes with a LGA4677 socket designed for Intel W-3400 and W-2400 Series Processors



- Ensure that you install the correct CPU designed for LGA4677 socket only. DO NOT install a CPU designed for other sockets on the LGA4677 socket.
- 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.
- Ensure that all power cables are unplugged before installing the CPU.
- Upon purchase of the motherboard, ensure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. ASUS will shoulder the cost of repair only if the damage is shipment/transit-related.
- Keep the cap after installing the motherboard. ASUS will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the cap on the socket.
- The product warranty does not cover damage to the socket contacts resulting from incorrect CPU installation/removal, or misplacement/loss/incorrect removal of the PnP cap.

8.3 DIMM Slots

The motherboard comes with Dual Inline Memory Modules (DIMM) slots for DDR5 (Double Data Rate 5) memory modules.



A DDR5 memory module is notched differently from a DDR, DDR2, DDR3, or DDR4 module. DO NOT install a DDR, DDR2, DDR3, or DDR4 memory module to the DDR5 slot.

Memory configurations

You may install ECC DDR5 RDIMMs into the DIMM sockets



- You may install varying memory sizes in between channels. The system maps the total size of the lower-sized channel for the dual-channel configuration. Any excess memory from the higher-sized channel is then mapped for single-channel operation.
- The default memory operation frequency is dependent on its Serial Presence Detect (SPD), which is the standard way of accessing information from a memory module. Under the default state, some memory modules for overclocking may operate at a lower frequency than the vendor-marked value.
- For system stability, use a more efficient memory cooling system to support a full memory load or overclocking condition.
- Always install the DIMMS with the same CAS Latency. For an optimum compatibility, we recommend that you install memory modules of the same version or data code (D/C) from the same vendor. Check with the vendor to get the correct memory modules.

Memory Config	gurations							
	DIMM							
	A1	A2	B1	B2	E1	E2	F1	F2
1 DIMM	V							
2 DIMMs	V				V			
4 DIMMs	V		V		V		V	
8 DIMMs	V	V	V	V	V	V	V	V

8.4 Fan and Pump Headers

The Fan and Pump headers allow you to connect fans and pumps to cool the system.





- DO NOT forget to connect the fan cables to the fan headers. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! Do not place jumper caps on the fan headers!
- Ensure the cable is fully inserted into the header.



For water cooling kits, connect the pump connector to the **PUMP_FAN** header.

8.5 Power Supply Connectors

These Power connectors allow you to connect your motherboard to a power supply.



8.6 Power Connectors

These Power connectors allow you to connect your motherboard to different expansion cards.



8.7 SATA 6Gb/s Connector

These Power connectors allow you to connect your motherboard to different expansion cards.





8.8 MicroSD Card Slot

The microSD card slot allows you to install a microSD memory card v2.00 (SDHC) / v3.00 (SDXC) to log BMC events.



Disconnect all power (including redundant PSUs) from the existing system before you add or remove a memory card, then reboot the system to access the memory card.

• Some memory cards may not be compatible with your motherboard. Ensure that you use only compatible memory cards to prevent loss of data, damage to your device, or memory card, or both.

• The MicroSD Slot is only supported with BMC Function and not supported for normal use under the OS.

8.9 USB 2.0 Header

The USB 2.0 header allows you to connect to a USB module for additional USB 2.0 ports. The USB 2.0 header provides data transfer speeds of up to 480 MB/s connection speed.

DO NOT connect a 1394 cable to the USB connectors. Doing so will damage the motherboard!

The USB 2.0 module is purchased separately.

8.10 BMC Switch Header

The BMC Switch header allows you to enable or disable the BMC

Description	Pins
Enable BMC	1-2 (Default)
Disable BMC	2-3

BMC_SW

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8.11 BMC Thermal Sensor Header

The BMC Thermal Sensor header allows you to connect a sensor to monitor temperature of the devices and the critical components inside the system through BMC. Connecting the T Sensor cables and setting **BMC_SW** to enable will allow you to view the sensor readings in both the BIOS and on the web UI.

8.12 Clear CMOS Header

The Clear CMOS header allows you to clear Real Time Clock (RTC) RAM in the CMOS, which contains the date, time, system passwords, and system setup parameters.

To erase the RTC RAM:

- 1. Turn OFF the system and unplug the power cord.
- 2. Short-circuit pin 1-2 with a metal object or jumper cap for about 5-10 seconds.
- 3. Plug the power cord and turn ON the system.
- 4. Hold down the key during the boot process and enter the BIOS setup to re-enter data.

DO NOT short-circuit the pins except when clearing the RTC RAM. Shor-circuiting or placing a jumper cap will cause system boot failure.

If the steps above do not help, remove the onboard button cell battery and short the two pins again to clear the CMOS RTC RAM data. After clearing the CMOS, reinstall the button cell battery.

8.13 Fan Control Header

The Fan Control header allows you to connect to the Fan Control board.

8.14 Fixed Dedicated BMC LAN IP Header

The Fixed Dedicated BMC LAN IP header allows you to set a fixed IP (10.10.10.10) when set to enabled.

Description	Pins
Enable IP FIX function	1-2 (Default)
Disable IP FIX function	2-3

8.15 GenZ Slot Power Connector

The GenZ Slot Power connector provides power to the HPT DUAL X16 Gen5 Riser.

GENZPWR1

8.16 IPMI Switch Header

The IPMI Switch header allows you to switch I2C BUS for instances where I2C may clash due to all PCIe slots being occupied with the same expansion cards.

Description	Pins
Enable IPMI I2C BUS	1-2 (Default)
Disable IPMI I2C BUS	2-3

8.17 LN2 Mode Jumper

Set to pins 2-3 to optimize the motherboard to remedy the cold boot bug during POST and help the system boot successfully.

8.18 MCIO PCIe Signal (CPU) Connector

The MCIO PCIe connector allows you to provide PCIe signals from the CPU to the backplane or riser. These connectors support VROC/RAID, and will support backplane functions (ie. Storage LEDs, etc.) with a 9100 extension card.

- CPU_PEG5_C1 (A) and CPU PEG5_C2 (B) are compatible with XCC (112L) CPUs
- CPU_PEG5_B1 (C) and CPU PEG5_B2 (D) are compatible with XCC (112L) CPUs and MCC (64L) CPUs

8.19 MCIO PCIe Signal (PCH) Connector

The MCIO PCIe connector allows you to provide PCIe signals from the PCH to the backplane or riser. These connectors support VROC/RAID, and will support backplane functions (ie. Storage LEDs, etc.) with a 9100 extension card.

• If PCH_PEG4_1 (B) cannot be recognized, please enter the BIOS, then go to AI Tweaker > Tweaker's Paradise, and set BCLK Spread Spectrum to [Disabled].

8.20 Q-Code Card Header

The Q-Code Card header allows you to connect the Q-Code expansion card.

8.21 SMART PSU Switch Header

The SMART PSU Switch header allows you to select PSU PMBus version.

Description	Pins
Enable PSU PMBus	1-2 (Default)
Disable PSU PMBus	2-3

8.22 System Panel Header

The System Panel header supports several chassis-mounted functions.

• System Power LED header (PLED)

The 2-pin header allows you to connect the System Power LED. The System Power LED lights up when the system is connected to a power source, or when you turn on the system power, and blinks when the system is in sleep mode.

• Power Button/Soft-off Button header (PWRBTN)

The 3-1 pin header allows you to connect the system power button. Press the power button to power up the system, or put the system into sleep or soft-off mode (depending on the operating system settings).

• Reset button header (RSTCON)

The 2-pin header allows you to connect the chassis-mounted reset button. Press the reset button to reboot the system. You may also set this header to other functions.

8.23 TPM Header

The TPM header allows you yo connect a TPM module, which securely stores keys, digital certificates, passwords, and data. A TPM system also helps enhance network security, protect digital identities, and ensures platform integrity.

The TPM module is purchased separately.
8.24 VGA Switch

The VGA Switch allows you to enable or disable the onboard VGA controller





Description	Pins
Enable VGA Controller	1-2 (Default)
Disable VGA Controller	2-3



Ensure the power supply is switched off or the power cord is detached from the power supply when enabling or disabling the VGA controller settings using the switch.



- If a VGA Card is installed into a PCI Express x16 Slot, the onboard VGA function will still be enabled.
- BMC Remote Management Function will still be available when the VGA controller setting is set to disabled, but the display will be disabled on the client device

8.25 EXT 9100 Header

The EXT 9100 header is used to connect the 9100 Extension card for backplane functions such as hot-plug and LED lighting.



8.26 VROC Key Header

The VROC (Virtual Raid on CPU) Key header allows you to connect a VROC hardware key to enable additional CPU RAID functions with Intel[®] VROC.





The VROC hardware key is purchased separately.

VROC Model	Raid Type	Intel [®] SSD Support	Other SSD Support	Self-Encrypting drive Key Management
Intel VROC Pass Thru (without	RAID 0	V	N/A	N/A
key)				
Intel VROC Standard	RAID 0/1/10	V	V	N/A
Intel VROC Premium	RAID 0/1/5/10	V	V	V
Intel VROC				
Intel SSD only	KAID 0/ 1/ 5/ 10	V	IN/A	V

* SATA RAID supports RAID 0/1/5/10 but cannot be used in a mixed RAID configuration with NVMe

Also take note of the following regarding the VMD Domain in the VROC software:

- Bootable RAID can only be created in the same VMD Domain
- Data RAID can be created across different VMD Domains
- The following PCIe slots from individual VMD Domains:
 - \circ CPU_PEG5_B1 and CPU_PEG5_B2
 - CPU_PEG5_C1 and CPU_PEG5_C2
 - PCH_PEG4_1 and PCH_PEG4_2
- If you wish to create a bootable RAID using the PCIe slots from CPU or PCIe from the PCH, you can only do so on individual VMD Domains, for more information please refer to the table below.

PCIe Slot	Individual VMD Domain	Bootable RAID	Data RAID	Notes
CPU_PEG5_B1			Can be created	 Supports MCC (64L) CPU and XCC (112L) CPU
CPU_PEG5_B2	1	V	across different VMD Domains	 OS RAID can be built when both connections are connected to the backplane (supports backplane LED Management functions)
CPU_PEG5_C1				 Supports MCC (64L) CPU and XCC (112L) CPU
CPU_PEG5_C2	1	V		 OS RAID can be built when both connections are connected to the header lange
				the backplane
PCH_PEG4_1				- Supports Micc (64L) CPU and XCC (112L) CPU
PCH_PEG4_2	1	V		 OS RAID can be built when both connections are connected to
				the backplane

Backplane Board

The backplane connects to the motherboard and allows you to install NVMe storage devices to the NVME1 and NVME2 connectors.





Fan Control Board

The fan control board controls the system fans



Q-Code Expansion Card

The Q-Code expansion card allows you to view the Q-Code from the motherboard



X16 G5 Riser Card (Riser A)

The X16 G5 Riser cards are installed to the **GENZ_X16(G5)_A1** and **GENZ_X16(G5)_A2** slots on the motherboard. Make sure the riser cards are carefully seated in the GENZ slots and the golden fingers are properly pushed down into the slots



MCIO Dual X8 G5 Riser Card (Riser B)

The signals for PCIE_X16(G5)_C1 comes from the MCIO_X8(G5)_C1 and MCIO_X8(G5)_C2 connectors



Dual X16 G5 Riser Card (Riser C)

The Dual X16 G5 Riser card is installed to the **GENZ_X16(G5)_B** and **GENZPWR1** slots on the motherboard. The signal for **PCIE_X16(G5)_B1** comes from the golden fingers. The signals for **PCIE_X16(G5)_B2** comes from the **MCIO_X8(G5)_B1** and **MCIO_X8(G5)_B2** connectors. Make sure the riser card is carefully seated in the GENZ slots and the golden fingers are properly pushed down into the slots.



9100 Extension Card

The 9100 extension card allows support for the backplane functions such as hot-plug and LED lighting



	SHP_IS_SEL1		SHF	P_ID_S	ELO	
	1	2	3	1	2	3
CPU_PEG5_B1		V	V		V	V
CPU_PEG5_B2	V	V			V	V

VID1_SEL1			
	1	2	3
INTEL VROC		V	V
AMD SHP	V	V	

MODE_SEL1			
	1	2	3
VPP/VROC		V	V
UMB RAID	V	V	
CARD			

10. Motherboard Block Diagram



11.1 Installing the CPU and Cold Plate

- Ensure that you install the correct CPU designed for LGA4677 socket only. DO NOT install a CPU designed for other sockets.
- The CPU carrier is different for different CPUs, ensure to use the appropriate CPU carrier with the corresponding CPU. Failure to do so may cause damages to the CPU and CPU carrier. The carrier model is printed on the carrier, please refer to the following table for the CPU and the corresponding carrier to use.

CPU	Spec	Carrier
XCC	112L	E1A
MCC	64L	E1B

• HYPERTEC will not cover damages resulting from incorrect CPU installation/removal, incorrect CPU orientation/placement, or other damages resulting from negligence by the user.





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11.2 Motherboard Installation

1) Place the motherboard into the chassis, ensuring the notches in the chassis are aligned with the notches on the motherboard.



Push the motherboard towards the front of the chassis and ensure the front I/O ports are properly aligned to the front panel openings.
 Place two (2) screws into the holes indicated by the circles to secure the motherboard to the chassis.



DO NOT over tighten the screws! Doing so can damage the motherboard

11.3 Cable Connections

Please refer to the following tables and illustrations for the cable connections when connecting the motherboard and expansion cards.

Motherboard



No.	Connector/Header/Slot	Connects to
1	BPB_6P_PWR	PWR1 on the Backplane board
2	PCH_SATA6G	SLIMSAS1 on the Backplane board
3	VPP_I2C	VPP_I2C on the 9100 Extension card
4	FAN_CTL	J1FAN1 on the Fan Control card
5	FAN_6P_PWR	FAN_6P(1)_PWR on the Fan Control card
6	Q_CODE	Q_CODE on the Q-Code expansion card
7	RISER(C)_6P_PWR	RISER(C)_6P_PWR on the Riser Card C
8	CPU_PEG_B1 and CPU_PEG_B2	MCIO_X8(G5)_B1 and MCIO_X8(G5)_B2 on Riser Card B
9	CPU_PEG_C1 and CPU_PEG_C2	MCIO_X8(G5)_C1 and MCIO_X8(G5)_C2 on Riser Card C

- Riser Card B: Dual X16 G5 Riser
- Riser Card C: MCIO Dual X8 Riser

Backplane Board



No.	Connector/Header/Slot	Connects to
1	PWR1	BPB_6P_PWR on the motherboard
2	SLIMSAS1	PCH_SATA6G on the motherboard
3	HDD1	HDD1 on the 9100 Extension card

Fan Control Board



No.	Connector/Header/Slot	Connects to
1	FAN_6P(1)_PWR	FAN_6P_PWR on the motherboard
2	J1FAN1	FAN_CTL on the motherboard

Q-Code Expansion Board



No.	Connector/Header/Slot	Connects to
1	Q_CODE	Q_CODE on the motherboard

9100 Extension Board



No.	Connector/Header/Slot	Connects to
1	VPP_I2C	VPP_I2C on the motherboard
2	J1FAN1	FAN_CTL on the motherboard

12. Removing the Chassis Cover

This section provides information on how to remove the chassis cover from the system.

Step 1: Remove the screws anti-clockwise by using Philips screwdriver type 2.



Step 2: Slide the Rear Top Cover towards the back of the system to release the cover.



13. Installing the Chassis Cover

This section provides information on how to install the Chassis cover in the system.

Step 1: Slide the cover towards the front of the system to close the cover.



Step 2: Turn the screws clockwise by using Philips screwdriver type 2.



14. Replacing PCIE Card

14.1 PCIe configuration introduction

The HFX410-GG system can support up to 5 PCIE cards includes 4 at rear and 1 in the chassis.

4 PCIE slots at rear:



Slot	DESCRIPTION
PCle 1	Full-Height Full-Length Dual-Width/Single-Width, Up to x16
PCle 2	Full-Height Full-Length Single-Width, Up to x16
PCIe 3	Full-Height Full-Length Single-Width, Up to x16
PCIe 4	Half-Height Half-Length Single-Width, Up to x16





This slot is specific for RAID Card. If using W-2400 Series CPU, PCIe Slot 2 not available when populated.

14.2 Replacing PCIE Card 1

This section provides information on how to replace the PCIE card 1.



Step 1: Rotate the Thumb screws counter-clockwise to loosen the cage.

Step 2: Pull the PCIe card out of the slot.



Step 3: Insert PCIe Card into Slot 1 or 2 or Slot 1 if Double Width.



Step 4: Carefully lower the PCIe cage back into the chassis.



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Step 5: Carefully align the holes in the PCIe cage with the dimples in the chassis.



Step 6: Secure the PCIe cage by turning the thumbscrews clock-wise.



14.3 Replacing PCIE Card 3 & 4

This section provides information on how to install a card in the PCIE slot 3 & 4.

Step 1: Turn the Thumbscrew Counter-Clockwise to loosen the PCIe Cage, then carefully lift the cage out from the chassis.



Step 2: Rotate to open the release latch and remove the PCIe filler bracket.



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Step 3: Insert the Low Profile PCIe Card in toto the riser



Step 4: Rotate and close the release latch to secure the Card.



Step 5: Rotate and close the PCIe release latch.



15. Removing and Installing Memory Modules

This section provides information on how to remove and install the Memory Modules.



Caution: Handle each memory module only by the meomry cards edges, ensuring not touching the middle of memory module or mettalic contacts.

15.1 Removing Memory Module

Step 1: Identify the memory module socket.

Step 2: Press the Memory Module Ejectors (2) on both ends of the memory module socket as show below.

Step 3: Lift the memory module (1) from the memory socket.

- 1. Memory Module
- 2. Memory Module Ejector



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15.2 Installing Memory Module

Step 1: Identify the memory module socket.

Step 2: Make sure that the Memory Module Ejectors on both ends are released.

Step 3: Vertically press the memory module with your thumbs until the memory sits firmly in the memory socket.





16. Replacing Swappable SSD

This section contains information on how to replace the swappable SSD in the front of the system.

Step 1: SATA 7mm SSD. Flip the button to the right and the latch pops out.



Step 2: Pull out the SSD cage.



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Step 3: Turn over the cage and unscrew 4 screws.



Step 4: Replace the SSD.



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Step 1: NVMe / SATA 15mm SSD. Press the release button and the latch will pop out.



17. Rack Mounting

This section provides information on how to mount a system into the rack with the rack rails.

Step 1. Install rails into the rack





Step 2. Pull the inner and middle rails fully extended in lock position. Pull the white release button to slide out the inner rail.



Step 3. Align the inner rail with the chassis mounting key, push and slide to lock. (The chassis shown below is only for reference)

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Step 4. Horizontally slide the chassis into the middle rail until click.



Step 5. Pull/Push the blue release button on the inner rail to unlock the chassis and then push the chassis into rack. (The chassis shown below is only for reference)



18. Plugging the Power Cords

The following illustration shows how to connect the power cords to the back of the system.



19. Turning on the System

The following illustration indicates where the power button is located on the front of the server.



20. QCodes:

AMI_Debug code :

{ PEI_CORE_STARTED, 0x10 },		
{ PEI_CAR_CPU_INIT, 0x11 },		
{ PEI_CAR_NB_INIT, 0x15 },		
{ PEI_CAR_SB_INIT, 0x19 },		
{ PEI_MEMORY_SPD_READ, 0x2B },		
{ PEI_MEMORY_PRESENCE_DETECT, 0x2C },		
{ PEI_MEMORY_TIMING, 0x2D},		
{ PEI_MEMORY_CONFIGURING, 0x2E },		
{ PEI_MEMORY_INIT, 0x2F },		
{ PEI_MEMORY_INSTALLED, 0x31 },		
{ PEI_CPU_INIT, 0x32 },		
{ PEI_CPU_CACHE_INIT, 0x33 },		
{ PEI_CPU_AP_INIT, 0x34 },		
{ PEI_CPU_BSP_SELECT, 0x35 },		
{ PEI_CPU_SMM_INIT, 0x36 },		
{ PEI_MEM_NB_INIT, 0x37 },		
{ PEI_MEM_SB_INIT, 0x3B },		
{ PEI_DXE_IPL_STARTED, 0x4F },		
{ PEI_RECOVERY_AUTO, 0xF0 },		
{ PEI_RECOVERY_USER, 0xF1 },		
{ PEI_RECOVERY_STARTED, 0xF2 },		
{ PEI_RECOVERY_CAPSULE_FOUND, 0xF3 },		
{ PEI_RECOVERY_CAPSULE_LOADED, 0xF4 },		
{ PEI_MEMORY_INVALID_TYPE, 0x50 },		
{ PEI_MEMORY_INVALID_SPEED, 0x50 },		
{ PEI_MEMORY_SPD_FAIL, 0x51 },		
{ PEI_MEMORY_INVALID_SIZE, 0x52 },		

{ PEI_MEMORY_MISMATCH, 0x52 },
{ PEI_MEMORY_NOT_DETECTED, 0x53 },
{ PEI_MEMORY_NONE_USEFUL, 0x53 },
{ PEI_MEMORY_ERROR, 0x54 },
{ PEI_MEMORY_NOT_INSTALLED, 0x55 },
{ PEI_CPU_INVALID_TYPE, 0x56 },
{ PEI_CPU_INVALID_SPEED, 0x56 },
{ PEI_CPU_MISMATCH, 0x57 },

{ PEI_CPU_SELF_TEST_FAILED, 0x58 },
{ PEI_CPU_CACHE_ERROR, 0x58 },
{ PEI_CPU_MICROCODE_UPDATE_FAILED, 0x59 },
{ PEI_CPU_NO_MICROCODE, 0x59 },
{ PEI_CPU_INTERNAL_ERROR, 0x5A },
{ PEI_CPU_ERROR, 0x5A },
{ PEI_RESET_NOT_AVAILABLE,0x5B },
{ PEI_RECOVERY_PPI_NOT_FOUND, 0xF8 },
{ PEI_RECOVERY_NO_CAPSULE, 0xF9 },
{ PEI_RECOVERY_INVALID_CAPSULE, 0xFA },
{ DXE_CORE_STARTED, 0x60 },
{ DXE_NVRAM_INIT, 0x61 },
{ DXE_SBRUN_INIT, 0x62 },
{ DXE_CPU_INIT, 0x63 },
{ DXE_NB_HB_INIT, 0x68 },
{ DXE_NB_INIT, 0x69 },
{ DXE_NB_SMM_INIT, 0x6A },
{ DXE_SB_INIT, 0x70 },
{ DXE_SB_SMM_INIT, 0x71 },
{ DXE_SB_DEVICES_INIT, 0x72 },
{ DXE_ACPI_INIT, 0x78 },
{ DXE_CSM_INIT, 0x79 },
{ DXE_BDS_STARTED, 0x90 },
{ DXE_BDS_CONNECT_DRIVERS, 0x91 },
{ DXE_PCI_BUS_BEGIN, 0x92 },
{ DXE_PCI_BUS_HPC_INIT, 0x93 },
{ DXE_PCI_BUS_ENUM, 0x94 },
{ DXE_PCI_BUS_REQUEST_RESOURCES, 0x95 },
{ DXE_PCI_BUS_ASSIGN_RESOURCES, 0x96 },
{ DXE_CON_OUT_CONNECT, 0x97 },
{ DXE_CON_IN_CONNECT, 0x98 },
{ DXE_SIO_INIT, 0x99 },
{ DXE_USB_BEGIN, 0x9A },
{ DXE_USB_RESET, 0x9B },
{ DXE_USB_DETECT, 0x9C },
{ DXE_USB_ENABLE, 0x9D },
{ DXE_IDE_BEGIN, 0xA0 },
{ DXE_IDE_RESET, 0xA1 },
{ DXE_IDE_DETECT, 0xA2 },

{ DXE_IDE_ENABLE, 0xA3 },		
{ DXE_SCSI_BEGIN, 0xA4 },		
{ DXE_SCSI_RESET, 0xA5 },		
{ DXE_SCSI_DETECT, 0xA6 },		
{ DXE_SCSI_ENABLE, 0xA7 },		
{ DXE_SETUP_VERIFYING_PASSWORD, 0xA8 },		
{ DXE_SETUP_START, 0xA9 },		
{ DXE_SETUP_INPUT_WAIT, 0xAB },		
{ DXE_READY_TO_BOOT, 0xAD },		
{ DXE_LEGACY_BOOT, 0xAE },		
{ DXE_EXIT_BOOT_SERVICES, 0xAF },		
{ RT_SET_VIRTUAL_ADDRESS_MAP_BEGIN, 0xB0 },		
{ RT_SET_VIRTUAL_ADDRESS_MAP_END, 0xB1 },		
{ DXE_LEGACY_OPROM_INIT, 0xB2 },		
{ DXE_RESET_SYSTEM, 0xB3 },		
{ DXE_USB_HOTPLUG, 0xB4 },		
{ DXE_PCI_BUS_HOTPLUG, 0xB5 },		
{ DXE_NVRAM_CLEANUP, 0xB6 },		
{ DXE_CONFIGURATION_RESET, 0xB7 },		
{ DXE_CPU_ERROR, 0xD0 },		
{ DXE_NB_ERROR, 0xD1 },		
{ DXE_SB_ERROR, 0xD2 },		
{ DXE_ARCH_PROTOCOL_NOT_AVAILABLE, 0xD3 },		
{ DXE_PCI_BUS_OUT_OF_RESOURCES, 0xD4 },		
{ DXE_LEGACY_OPROM_NO_SPACE, 0xD5 },		
{ DXE_NO_CON_OUT, 0xD6 },		
{ DXE_NO_CON_IN, 0xD7 },		
{ DXE_INVALID_PASSWORD, 0xD8 },		
{ DXE_BOOT_OPTION_LOAD_ERROR, 0xD9 },		
{ DXE_BOOT_OPTION_FAILED, 0xDA },		
{ DXE_FLASH_UPDATE_FAILED, 0xDB },		

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{ DXE_RESET_NOT_AVAILABLE, 0xDC },
21. RC_Debug code:

Major Checkpoint progress indicators written to debug port

define STS_DIMM_DETECT 0xB0
define STS_CLOCK_INIT 0xB1
define STS_SPD_DATA 0xB2
define STS_GLOBAL_EARLY 0xB3
define STS_RANK_DETECT 0xB4
define STS_CHANNEL_EARLY 0xB5
define STS_DDRIO_INIT 0xB6
define STS_CHANNEL_TRAINING 0xB7
define STS_INIT_THROTTLING 0xB8
define STS_MEMBIST 0xB9
define STS_MEMINIT 0xBA
define STS_DDR_MEMMAP 0xBB
define STS_RAS_CONFIG 0xBC
define STS_GET_MARGINS 0xBD
define SSA_API_INIT 0xBE
define STS_MRC_DONE 0xBF
define STS_JEDEC_INIT 0xC0

**/

#define STS_IIO_EARLY_INIT_ENTRY	0xE0 // IIO early init entry
#define STS_EARLY_PRELINK_TRAINI	NG 0xE1 // Early Pre-link training setting
#define STS_GEN3_EQ_PROGRAMM	ING 0xE2 // IIO Gen3 EQ programming
#define STS_LINK_TRAINING	0xE3 // IIO Link training
#define STS_GEN3_OVERRIDE	0xE4 // IIO Gen3 override
#define STS_IIO_EARLY_INIT_EXIT	0xE5 // IIO early init exit
#define STS_IIO_LATE_INIT_ENTRY	0xE6 // IIO late init entry
#define STS_IIO_PCIE_PORT_INIT	0xE7 // PCIE port init
#define STS_IIO_IOAPIC_INIT	0xE8 // IOAPIC init
#define STS_IIO_VTD_INIT	0xE9 // VTD init
#define STS_IIO_IOAT_INIT	0xEA // IOAT init
#define STS_IIO_DFX_INIT	0xEB // IIO DFX init
#define STS_IIO_NTB_INIT	OxEC // NTB init
#define STS_IIO_SECURITY_INIT	OxED // Security init
#define STS_IIO_LATE_INIT_EXIT	OxEE // IIO late init exit

#define STS_IIO_ON_READY_TO_BOOT 0xEF // IIO On ready to boot

/* CPUPM POST code - Major */

#define STS_PPM_STRUCT_INIT 0xD0 // CPU PM Structure Init	
#define STS_PPM_CSR_PROGRAMMING 0xD1 // CPU PM CSR programming	
#define STS_PPM_MSR_PROGRAMMING 0xD2 // CPU PM MSR programming	
#define STS_PPM_PSTATE_TRANSITION 0xD3 // CPU PM PSTATE transition	
#define STS_PPM_EXIT 0xD4 // CPU PM driver exit	
#define STS_PPM_ON_READY_TO_BOOT 0xD5 // CPU PM On ready to boot event	