Lanner

Network Appliance Platform

Hardware Platforms for Network Computing

FX-3420
User Manual

Version: 1.0

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About this Document

This manual describes the overview of the various functionalities of this product, and the information you need to get it ready for operation. It is intended for those who are:

- responsible for installing, administering and troubleshooting this system or Information Technology professionals.
- assumed to be qualified in the servicing of computer equipment, such as professional system integrators, or service personnel and technicians.

The latest version of this document can be found on Lanner's official website, available either through the product page or through the Lanner Download Center page with a login account and password.

Conventions & Icons

The icons are used in the manual to serve as an indication of interest topics or important messages.

Icon	Usage
 **Note or Information**	This mark indicates that there is something you should pay special attention to while using the product.
 **Warning or Important**	This mark indicates that there is a caution or warning and it is something that could damage your property or product.

Online Resources

To obtain additional documentation resources and software updates for your system, please visit the Lanner Download Center. As certain categories of documents are only available to users who are logged in, please be registered for a Lanner Account at http://www.lannerinc.com/ to access published documents and downloadable resources.

Technical Support

In addition to contacting your distributor or sales representative, you could submit a request at our **Lanner Technical Support** and fill in a support ticket to our technical support department.

Documentation Feedback

Your feedback is valuable to us, as it will help us continue to provide you with more accurate and relevant documentation. To provide any feedback, comments or to report an error, please email contact@lannerinc.com. Thank you for your time.

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Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution

- Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.
- This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Note

1. An unshielded-type power cord is required in order to meet FCC emission limits and also to prevent interference to the nearby radio and television reception. It is essential that only the supplied power cord be used.
2. Use only shielded cables to connect I/O devices to this equipment.
3. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Important

1. Operations in the 5.15-5.25GHz band are restricted to indoor usage only.
2. This device meets all the other requirements specified in Part 15E, Section 15.407 of the FCC Rules.

Safety Guidelines

Follow these guidelines to ensure general safety:

- Keep the chassis area clear and dust-free during and after installation.
- Do not wear loose clothing or jewelry that could get caught in the chassis. Fasten your tie or scarf and roll up your sleeves.
- Wear safety glasses if you are working under any conditions that might be hazardous to your eyes.
- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.
- Disconnect all power by turning off the power and unplugging the power cord before installing or removing a chassis or working near power supplies
- Do not work alone if potentially hazardous conditions exist.
- Never assume that power is disconnected from a circuit; always check the circuit.

Consignes de sécurité

Suivez ces consignes pour assurer la sécurité générale :

- Laissez la zone du châssis propre et sans poussière pendant et après l'installation.
- Ne portez pas de vêtements amples ou de bijoux qui pourraient être pris dans le châssis. Attachez votre cravate ou écharpe et remontez vos manches.
- Portez des lunettes de sécurité pour protéger vos yeux.
- N'effectuez aucune action qui pourrait créer un danger pour d'autres ou rendre l'équipement dangereux.
- Coupez complètement l'alimentation en éteignant l'alimentation et en débranchant le cordon d'alimentation avant d'installer ou de retirer un châssis ou de travailler à proximité de sources d'alimentation.
- Ne travaillez pas seul si des conditions dangereuses sont présentes.
- Ne considérez jamais que l'alimentation est coupée d'un circuit, vérifiez toujours le circuit. Cet appareil génère, utilise et émet une énergie radiofréquence et, s'il n'est pas installé et utilisé conformément aux instructions des fournisseurs de composants sans fil, il risque de provoquer des interférences dans les communications radio.

Lithium Battery Caution

- There is risk of Explosion if Battery is replaced by an incorrect type.
- Dispose of used batteries according to the instructions.
- Installation only by a skilled person who knows all Installation and Device Specifications which are to be applied.
- Do not carry the handle of power supplies when moving to another place.
- Please conform to your local laws and regulations regarding safe disposal of lithium BATTERY.
- Disposal of a battery into fire or a hot oven, or mechanically crushing or cutting of a battery can result in an explosion.
- Leaving a battery in an extremely high temperature surrounding environment can result in an explosion or the leakage of flammable liquid or gas.
- A battery subjected to extremely low air pressure that may result in an explosion or the leakage of flammable liquid or gas.

Avertissement concernant la pile au lithium

- Risque d'explosion si la pile est remplacée par une autre d'un mauvais type.
- Jetez les piles usagées conformément aux instructions.
- L'installation doit être effectuée par un électricien formé ou une personne formée à l'électricité connaissant toutes les spécifications d'installation et d'appareil du produit.
- Ne transportez pas l'unité en la tenant par le câble d'alimentation lorsque vous déplacez l'appareil.

Operating Safety

- Electrical equipment generates heat. Ambient air temperature may not be adequate to cool equipment to acceptable operating temperatures without adequate circulation. Be sure that the room in which you choose to operate your system has adequate air circulation.
- Ensure that the chassis cover is secure. The chassis design allows cooling air to circulate effectively. An open chassis permits air leaks, which may interrupt and redirect the flow of cooling air from internal components.
- Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. ESD damage occurs when electronic components are improperly handled and can result in complete or intermittent failures. Be sure to follow ESD-prevention procedures when removing and replacing components to avoid these problems.
- Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact. If no wrist strap is available, ground

yourself by touching the metal part of the chassis.
- Periodically check the resistance value of the antistatic strap, which should be between 1 and 10 megohms (Mohms).

Sécurité de fonctionnement

- L'équipement électrique génère de la chaleur. La température ambiante peut ne pas être adéquate pour refroidir l'équipement à une température de fonctionnement acceptable sans circulation adaptée. Vérifiez que votre site propose une circulation d'air adéquate.
- Vérifiez que le couvercle du châssis est bien fixé. La conception du châssis permet à l'air de refroidissement de bien circuler. Un châssis ouvert laisse l'air s'échapper, ce qui peut interrompre et rediriger le flux d'air frais destiné aux composants internes.
- Les décharges électrostatiques (ESD) peuvent endommager l'équipement et gêner les circuits électriques. Des dégâts d'ESD surviennent lorsque des composants électroniques sont mal manipulés et peuvent causer des pannes totales ou intermittentes. Suivez les procédures de prévention d'ESD lors du retrait et du remplacement de composants.
- Portez un bracelet anti-ESD et veillez à ce qu'il soit bien au contact de la peau. Si aucun bracelet n'est disponible, reliez votre corps à la terre en touchant la partie métallique du châssis.
- Vérifiez régulièrement la valeur de résistance du bracelet antistatique, qui doit être comprise entre 1 et 10 mégohms (Mohms).

Mounting Installation Precaution

- Do not install and/or operate this unit in any place that flammable objects are stored or used in.
- If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.
- Installation of the equipment (especially in a rack) should consider the ventilation of the system's intake (for taking chilled air) and exhaust (for emitting hot air) openings so that the amount of airflow required for safe operation of the equipment is not compromised.
- To avoid a hazardous load condition, be sure the mechanical loading is even when mounting.
- Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on over-current protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- Reliable earthing should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g., use of power strips).

Installation & Operation:

- This equipment must be grounded. The power cord for product should be connected to a socket-outlet with earthing connection.
  Cet équipement doit être mis à la terre. La fiche d'alimentation doit être connectée à une prise de terre correctement câblée

- Suitable for installation in Information Technology Rooms in accordance with Article 645 of the National Electrical Code and NFPA 75.
  Peut être installé dans des salles de matériel de traitement de l'information conformément à l'article 645 du National Electrical Code et à la NFPA 75.

- The machine can only be used in a restricted access location and must be installed by a skilled person.
  Les matériels sont destinés à être installés dans des EMPLACEMENTS À ACCÈS RESTREINT.

Warning

Class I Equipment. This equipment must be earthed. The power plug must be connected to a properly wired earth ground socket outlet. An improperly wired socket outlet could place hazardous voltages on accessible metal parts.
"Product shall be used with Class 1 laser device modules."

Avertissement

Équipement de classe I. Ce matériel doit être relié à la terre. La fiche d'alimentation doit être raccordée à une prise de terre correctement câblée. Une prise de courant mal câblée pourrait induire des tensions dangereuses sur des parties métalliques accessibles.
"Le produit doit être utilisé avec des modules de dispositifs laser de classe 1."

Electrical Safety Instructions

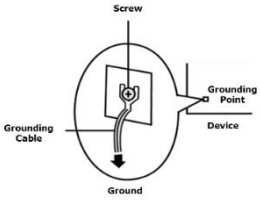
Before turning on the device, ground the grounding cable of the equipment. Proper grounding (grounding) is very important to protect the equipment against the harmful effects of external noise and to reduce the risk of electrocution in the event of a lightning strike. To uninstall the equipment, disconnect the ground wire after turning off the power. A ground wire is required and the part connecting the conductor must be greater than 4 mm2 or 10 AWG.

Consignes de sécurité électrique

- Avant d'allumer l'appareil, reliez le câble de mise à la terre de l'équipement à la terre.
- Une bonne mise à la terre (connexion à la terre) est très importante pour protéger l'équipement contre les effets néfastes du bruit externe et réduire les risques d'électrocution en cas de foudre.
- Pour désinstaller l'équipement, débranchez le câble de mise à la terre après avoir éteint l'appareil.
- Un câble de mise à la terre est requis et la zone reliant les sections du conducteur doit faire plus de 4 mm2 ou 10 AWG.

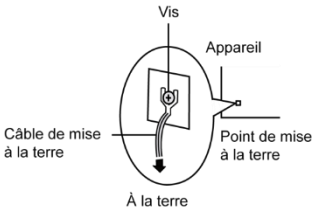
Grounding Procedure for Power Source

- Loosen the screw of the earthing point.
- Connect the grounding cable to the ground.
- The protection device for the power source must provide 30 A current.
- This protection device must be connected to the power source before power.
- The cable hould 16 AWG



Procédure de mise à la terre pour source d'alimentation

- Desserrez la vis du terminal de mise à la terre.
- Branchez le câble de mise à la terre à la terre.
- L'appareil de protection pour la source d'alimentation doit fournir 30 A de courant.
- Cet appareil de protection doit être branché à la source d'alimentation avant l'alimentation.
- Le câble doit 16 AWG



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CHAPTER 1: PRODUCT OVERVIEW

FX-3420 offers a secure, high-performance, and high storage density in just 2RU of space for next-gen Lanner HCI appliances. FX-3420 can support up to 768GB of memory through multiple DDR4 2666 MHz REG DIMM modules and comes with 12x SATA 3.5" swappable disk drive bays. In addition, FX-3420 provides other I/O functionality including one onboard M.2 slot, one RJ-45 console, one IPMI port for remote management, and two double-width PCIe*16 sockets for GPU acceleration card. FX-3420 is built with 1200W 1+1 redundant power supply. FX-3420 is optimal for VDI, cloud computing, software defined storage platforms and HPC server where performance and storage are critical.

Main Features

- 2U High Performance Hyper-converged Appliance
- Support Dual 2nd Gen Intel® Xeon® Scalable SP processor family up to 205w and
- 12 x swappable 3.5" storage bays on the front
- 2 x swappable 2.5" storage bays on the rear
- Up to 24x DDR4 2600 MHz REG DIMM. Max. 768GB
- Console, LOM port, MGT port, 2x USB 3.0 ports, RJ45, SFP+ ports
- 2x PCI-E by 16 FH/HL+ 1 x PCIE by 8 FHHL
- 1+1 redundant power supply

Package Content

Your package contains the following items:

- 1x FX-3420 Network Security Platform
- 2x Power Cord (Default US Type)
- 2x CPU Heat Sink
- 1x Console cable (D-sub Type)
- 1x LAN Cable (Grey)
- 1x Slider

Ordering Information

SKU No.	Main Features
FX-3420A	2U 19" Rackmount Storage Network Appliance Built with Intel® Xeon® Processor Scalable Family (Skylake-SP)

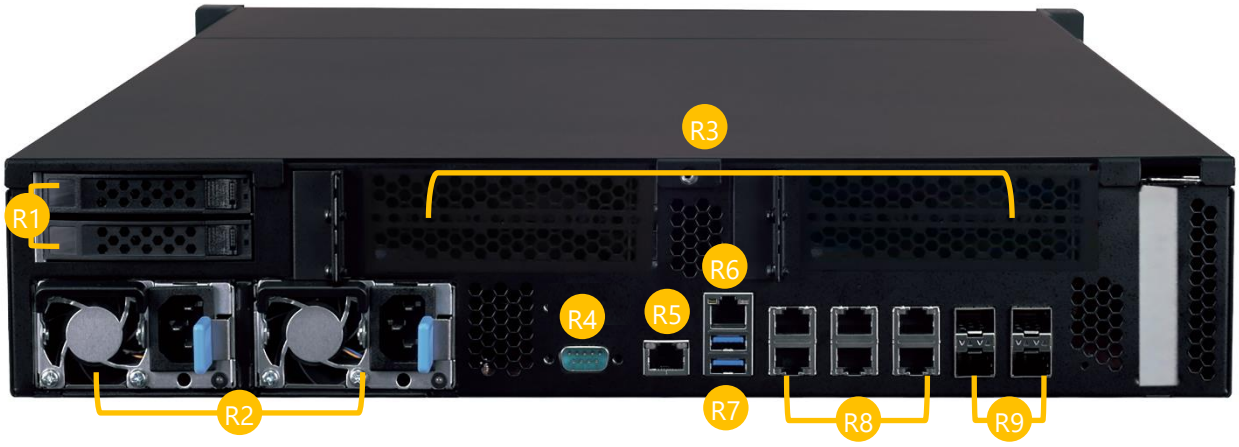
System Specifications

Form Factor		2U 19" Rackmount
Platform	Processor Options	Intel® Xeon® Processor Scalable Family (codenamed Skylake-SP/Cascade Lake-SP)
	CPU Socket	1x FCPGA
	Chipset	Intel C621 Lewisburg PCH
	Security Acceleration	Optional module
BIOS		AMI SPI Flash BIOS
System Memory	Technology	DDR4 2666 MHz REG DIMM
	Max. Capacity	768 GB
	Socket	24x 288pin DIMM
Networking	Ethernet Ports (By SKU)	4x 10G SFP+6 x GbE RJ45
	Bypass	N/A
	NIC Module Slot	N/A
LOM	IO Interface	1x RJ45
	OPMA slot	IPMI Chip Onboard
I/O Interface	Reset Button	1x Reset Button
	LED Indicator	Power/Status/Storage LED Indicator
	Power Button	1x ATX Power Switch
	Console Port	1x DB9 Console Port
	USB Port	2x USB 2.0 and 2 x USB 3.0 Ports at rear
	Serial COM Port	2x Serial COM Ports
	Display Port	1x DB-15 VGA Port
	Power Input	AC Power Inlet on PSU
Storage	HDD/SSD Support	Front: 12x 3.5" HDD SATA 6G / SAS 12G or 12x 2.5" NVME Back: 2x 2.5" SATA 6G
	Onboard Slots	2x M.2
Expansion	PCIe	2x PCI-E*16 FH/FL + 1x PCI-E*8 HH/HL
	M.2	M.2 PCI-e SSD
Miscellaneous	Watchdog	Yes
	Internal RTC with Li Battery	Yes
	TPM	Yes (Optional)
Cooling	Processor	Passive CPU heat sink
	System	6x individual hot-swappable cooling fans with smart fan
Environmental Parameters	Temperature	0~40ºC Operating -20~70ºC Non-Operating
	Humidity (RH)	5~90% Operating 5~ 95% Non-Operating
System Dimensions	(WxDxH)	445 x 760 x 88 mm
	Weight	TBD
Package Dimensions	(WxDxH)	790 x 800 x 220 mm
	Weight	26 kg
Power	Type/Watts	850W 1+1 Redundant PSU
	Input	AC 100V~240V @47~63Hz
Approvals and Compliance		CE/FCC Class A

Front Panel

No.	Description	
F1	VGA Port	1x DB-15 Connector
F2	USB Ports	2x USB 2.0 ports
F3	HDD Bay	12x 3.5” Swappable HDD Bays
F4	LED Indicators	 **A**: System Power **B**: Show ID Button **C**: Reset Button **D**: System Failure LED **E**: Memory Failure LED **F**: FAN Failure LED **G**: Power Failure LED **H**: System Overheat LED **I**: Onboard NIC Status LED

Rear Panel

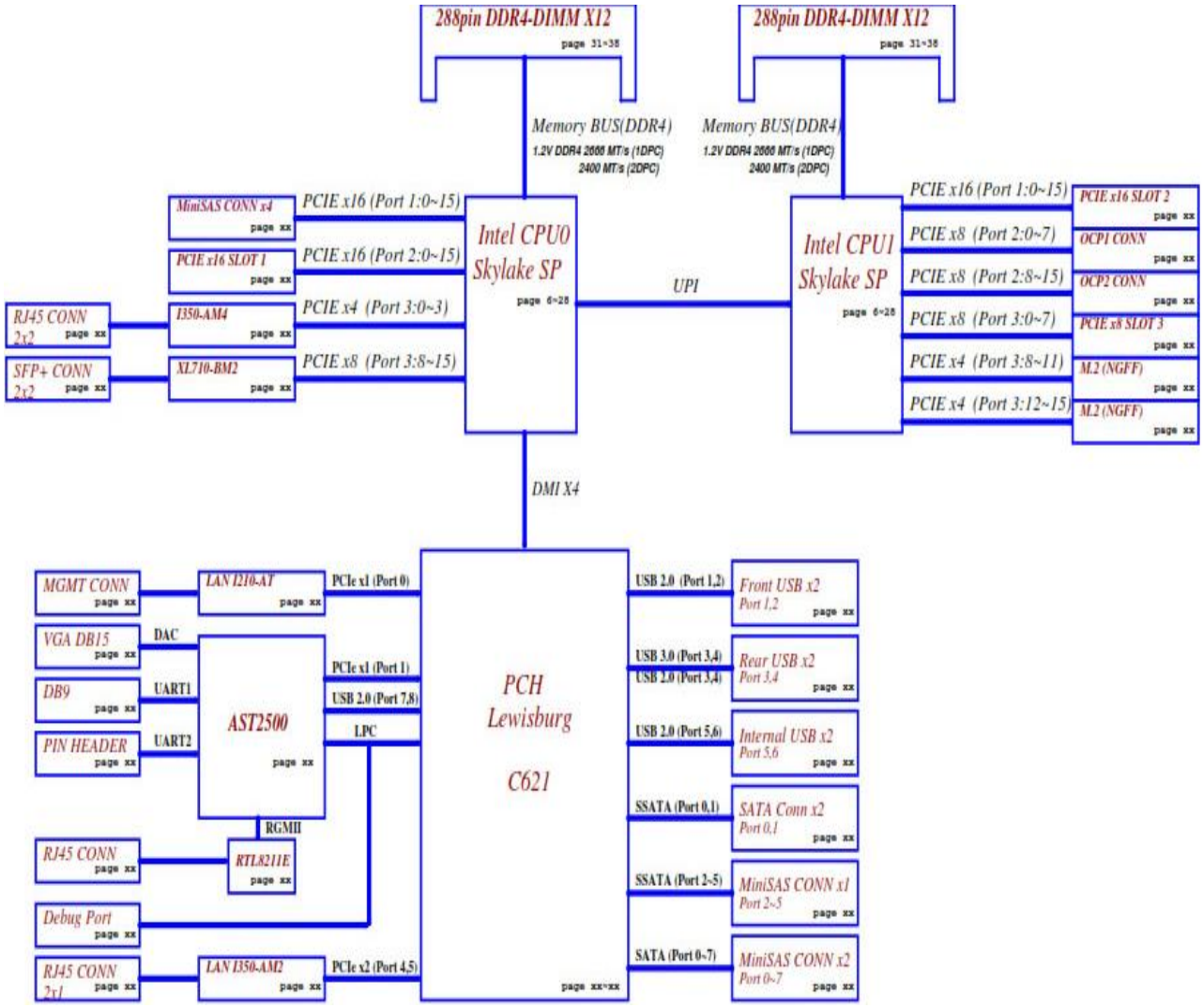


No.	Description	
R1	HDD Bay	2x 2.5" Swappable HDD Bays
R2	PSU	AC 850W (1+1) Redundant PSU
R3	PCIe Slot	1x PCIE x8 slot Half Height, Half Length Size Card At Rear (HHHL) 2 x PCI-E x16 slot Full Height, Length – 266.7 mm (Standard Length is 312mm)
R4	COM Port	1x D-sub COM1 port (1x reserved COM2 internal pin header)
R5	MGMT Port	1x Management RJ-45 port
R6	LOM Port	1x LOM port from AST2500(IPMI)
R7	USB Port	2x USB 3.0 Port
R8	LAN Port	6x RJ-45 Gigabit LAN Port
R9	SFP+ Port	4x 10G SFP+ Port

Motherboard Information

Block Diagram

The block diagram indicates how data flows among components on the motherboard. Please refer to the following figure for your motherboard's layout design.

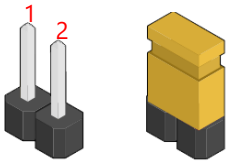
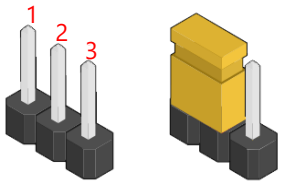
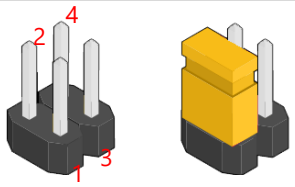


Internal Jumpers

The pin headers on the motherboard are often associated with important functions. With the shunt (Jumper) pushed down on the designated pins (the pin numbers are printed on the circuit board, surrounding the pin header), certain feature can be enabled or disabled. While changing the jumpers, make sure your system is turned off.

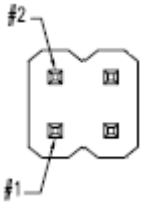
Jumper Setting

To short the designated pins, push the jumper down on them so that they become **SHORT**. To make the pins setting **OPEN**, simply remove the jumper cap.

2-pin Header		3-pin Header		4-pin Header	
					
Open	Short	Open	(1-2) Jumped	Open	(1-2) Jumped

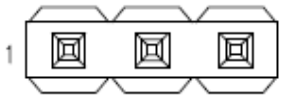
1. JDUAL1: 1st/2nd BIOS select

Jumper	DESCRIPTION
1-2 ; 3-4 (Default)	1st BIOS flash
1-3 ; 2-4	2nd BIOS flash



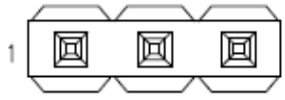
2. JCMOS1: Clear CMOS

Jumper	DESCRIPTION
1-2 (Default)	Normal
2-3	Clear CMOS



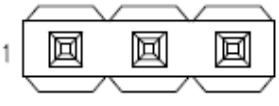
3. JPMB2: PMBUS clock select

Jumper	DESCRIPTION
1-2	PMBUS clock to PCH
2-3 (Default)	PMBUS clock to BMC



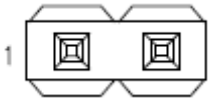
4. JPMB3: PMBUS data select

Jumper	DESCRIPTION
1-2	PMBUS data to PCH
2-3 (Default)	PMBUS data to BMC



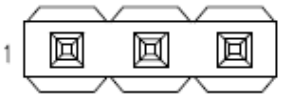
5. JPWR1: Power ON/OFF

Jumper	Description
1-2	Power ON/OFF
NC (Default)	Normal



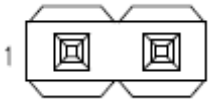
6. JRST1: Hardware / Software reset select

Jumper	Description
1-2	Hardware reset
2-3 (Default)	Software reset



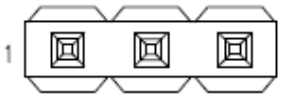
7. JBZ1: Buzzer function

Jumper	Description
1-2 (Default)	Normal
NC	No buzzer function



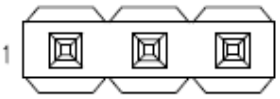
8. JDTRIP1: CPU1 DIMM event

Jumper	Description
1-2 (Default)	Normal
2-3	Disconnect function



9. JDTRIP2: CPU2 DIMM event

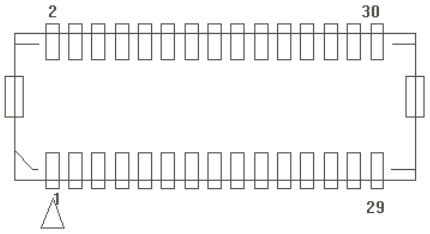
Jumper	Description
1-2 (Default)	Normal
2-3	Disconnect function



Connector Pin Assignment

1. FPC1: Front LED board Connector

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+P3V3	2	+P3V3_AUX
3	+P3V3	4	+P3V3_AUX
5	+P3V3	6	+P3V3_AUX
7	GND	8	GND
9	PWRON#	10	FM_SLP_S3#
11	GND	12	GND
13	BMC_SYSF_LED#	14	FM_SLP_S4#
15	GND	16	GND
17	BMC_MEM_FAIL#	18	BMC_UUID_BUT#
19	GND	20	GND
21	BMC_FAN_FAIL#	22	BMC_UUID_LED#
23	GND	24	GND
25	BMC_PWR_FAIL#	26	BMC_SYSF_BUT#
27	GND	28	GND
29	BMC_TRM_FAIL#	30	LAN_LINK_ACT#



2. FPC2: Front I/O board Connector

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	GND
3	USB20_P1	4	USB20_P2
5	USB20_N1	6	USB20_N2
7	GND	8	GND
9	+P5V_USB1	10	+P5V_USB1
11	+P5V_USB1	12	+P5V_USB1
13	+P5V_USB1	14	+P5V_USB1
15	DDC_DATA	16	GND
17	HSYNC_O	18	GND
19	GND	20	DAC_RO

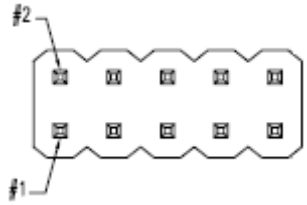
21	VSYNC_O	22	GND
23	GND	24	DAC_GO
25	DDC_CLK	26	GND
27	GND	28	DAC_BO
29	GND	30	GND

3. J1: LC4064ZE JTAG

Pin no.	Description	Pin no.	Description
1	P1V8LC	5	NC
2	TDO_4032	6	TMS_4032
3	TDI_4032	7	GND
4	NC	8	TCK_4032

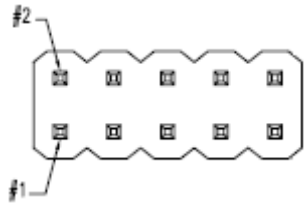
4. J80P1: Debug 80 port

Pin no.	Description	Pin no.	Description
1	CLK_24M_DB	2	LPC_LAD1
3	PLT_RST#	4	LPC_LAD0
5	LPC_LFRAME#	6	+P3V3
7	LPC_LAD3	8	NC
9	LPC_LAD2	10	GND



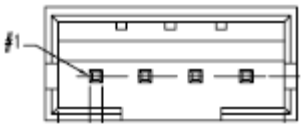
5. JCOM2: BMC UART2 port

Pin no.	Description	Pin no.	Description
1	BMC_COM2_DCD	2	BMC_COM2_DSR
3	BMC_COM2_RX	4	BMC_COM2_RTS
5	BMC_COM2_TX	6	BMC_COM2_CTS
7	BMC_COM2_DTR	8	BMC_COM2_RI
9	COM2_GND	10	NC



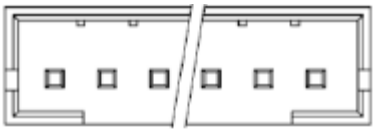
6. JDB1: BMC UART5 port

Pin no.	Description
1	+P3V3_AUX
2	UART_RXD5
3	GND
4	UART_TXD5



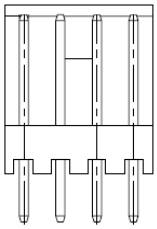
7. JPMB1: Power management connector

Pin no.	Description	Pin no.	Description
1	PSU_TTL1	5	ATXPWGD
2	PSU_TTL2	6	PMBUS_CLK
3	ATX_PSON#	7	PMBUS_DAT
4	GND	8	PMBUS_ALERT#



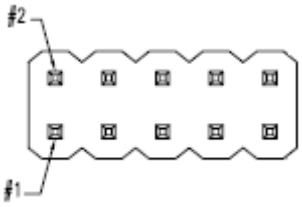
8. JSATAPW1, JSATAPW2: SATA Power Connector

Pin no.	Description
1	+P12V
2	GND
3	GND
4	+P5V



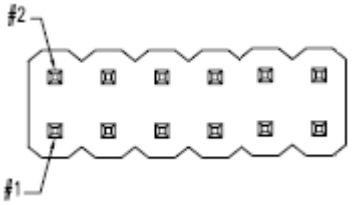
9. JSPIROM1: SPI ROM Pin Header

Pin no.	Description	Pin no.	Description
1	SPI_HD1#	2	SPI_CS1#_DUAL
3	SPI_CS0#_DUAL	4	+P3V3_SPI_ME
5	SPI_MISO	6	SPI_PCH_IO3
7	NC	8	SPI_CLK
9	GND	10	SPI_MOSI



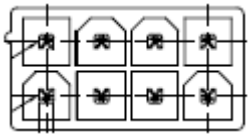
10. JTPM1: TPM Pin Header

Pin no.	Description	Pin no.	Description
1	IRQ_SERIAL	2	LPC_LFRAME#
3	LPC_LAD0	4	CLK_24M_LPC
5	LPC_LAD1	6	+P3V3_AUX
7	LPC_LAD2	8	NC
9	LPC_LAD3	10	+P3V3
11	TPM_RST#	12	GND



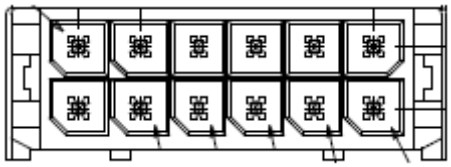
11. ATX2, ATX3, ATX4, ATX5: Power connector

Pin no.	Description	Pin no.	Description
1	GND	2	+P12V
3	GND	4	+P12V
5	GND	6	+P12V
7	GND	8	+P12V



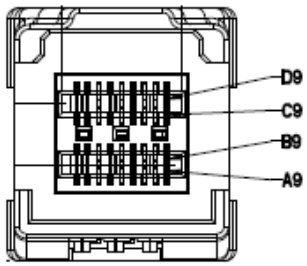
12. PW1, PW2: Power connector

Pin no.	Description	Pin no.	Description
1	+P12V	7	+P12V
2	+P12V	8	GND
3	NC	9	GND
4	+P5V	10	+P5V
5	GND	11	GND
6	+P3V3	12	+P3V3



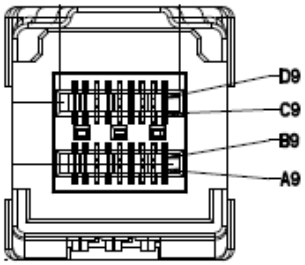
13. JNVME1, JNVME2, JNVME3, JNVME4: NVME connector

Pin no.	Description	Pin no.	Description	Pin no.	Description	Pin no.	Description
A1	CLK_PCIE_U2_x_P	B1	U2_RST#	C1	U.2_LED1_N	D1	SMB_3V3_DAT
A2	CLK_PCIE_U2_x_N	B2	GND	C2	NC	D2	SMB_3V3_CLK
A3	GND	B3	GND	C3	GND	D3	GND
A4	PCIE_U2_RX_P1	B4	PCIE_U2_RX_P0	C4	PCIE_U2_TX_P1	D4	PCIE_U2_TX_P0
A5	PCIE_U2_RX_N1	B5	PCIE_U2_RX_N0	C5	PCIE_U2_TX_N1	D5	PCIE_U2_TX_N0
A6	GND	B6	GND	C6	GND	D6	GND
A7	PCIE_U2_RX_P3	B7	PCIE_U2_RX_P2	C7	PCIE_U2_TX_P3	D7	PCIE_U2_TX_P2
A8	PCIE_U2_RX_N3	B8	PCIE_U2_RX_N2	C8	PCIE_U2_TX_N3	D8	PCIE_U2_TX_N2
A9	GND	B9	GND	C9	GND	D9	GND



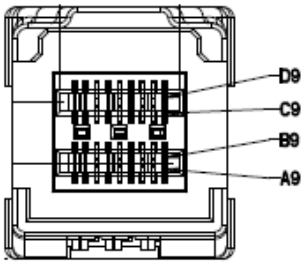
14. JSASHD1, JSASHD2: SATA connector

Pin no.	Description	Pin no.	Description	Pin no.	Description	Pin no.	Description
A1	FM_QAT_ENABLE#	B1	GND	C1	SGPIO_SATA_DATA0	D1	DATAIN_SATA0
A2	SGPIO_SATA_CLK	B2	SGPIO_SATA_LOAD	C2	GND	D2	SATA0_TYPE
A3	GND	B3	GND	C3	GND	D3	GND
A4	PSATA_RX_P1	B4	PSATA_RX_P0	C4	PSATA_TX_P1	D4	PSATA_TX_P0
A5	PSATA_RX_N1	B5	PSATA_RX_N0	C5	PSATA_TX_N1	D5	PSATA_TX_N0
A6	GND	B6	GND	C6	GND	D6	GND
A7	PSATA_RX_P3	B7	PSATA_RX_P2	C7	PSATA_TX_P3	D7	PSATA_TX_P2
A8	PSATA_RX_N3	B8	PSATA_RX_N2	C8	PSATA_TX_N3	D8	PSATA_TX_N2
A9	GND	B9	GND	C9	GND	D9	GND



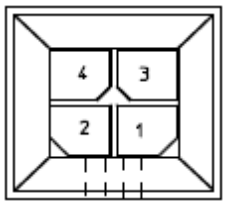
15. JSASHD3: SSATA connector

Pin no.	Description	Pin no.	Description	Pin no.	Description	Pin no.	Description
A1	FM_QAT_ENABLE#	B1	GND	C1	SGPIO_SSATA_DATA0	D1	DATAIN_SSATA0
A2	SGPIO_SSATA_CLK	B2	SGPIO_SSATA_LOAD	C2	GND	D2	SSATA0_TYPE
A3	GND	B3	GND	C3	GND	D3	GND
A4	SSATA_RX_P3	B4	SSATA_RX_P2	C4	SSATA_TX_P3	D4	SSATA_TX_P2
A5	SSATA_RX_N3	B5	SSATA_RX_N2	C5	SSATA_TX_N3	D5	SSATA_TX_N2
A6	GND	B6	GND	C6	GND	D6	GND
A7	SSATA_RX_P5	B7	SSATA_RX_P4	C7	SSATA_TX_P5	D7	SSATA_TX_P4
A8	SSATA_RX_N5	B8	SSATA_RX_N4	C8	SSATA_TX_N5	D8	SSATA_TX_N4
A9	GND	B9	GND	C9	GND	D9	GND



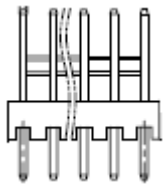
16. JFAN1~ JFAN6: FAN connector

Pin no.	Description	Pin no.	Description
1	GND	3	+P12V
2	BMC_PWMOUT	4	BMC_FAN_TECH_IN



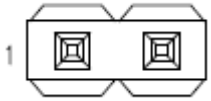
17. JFAN7~ JFAN10: FAN connector

Pin no.	Description	Pin no.	Description
1	GND	4	BMC_FAN_TECH_IN
2	+P12V	5	BMC_PWMOUT
3	BMC_FAN_TECH_IN		



18. JPWR2: Power connector

Jumper	Description
1	+P3V3
2	GND



CHAPTER 2: HARDWARE SETUP

To reduce the risk of personal injury, electric shock, or damage to the system, please remove all power connections to shut down the device completely. Also, please wear ESD protection gloves when conducting the steps in this chapter.

Opening the Chassis

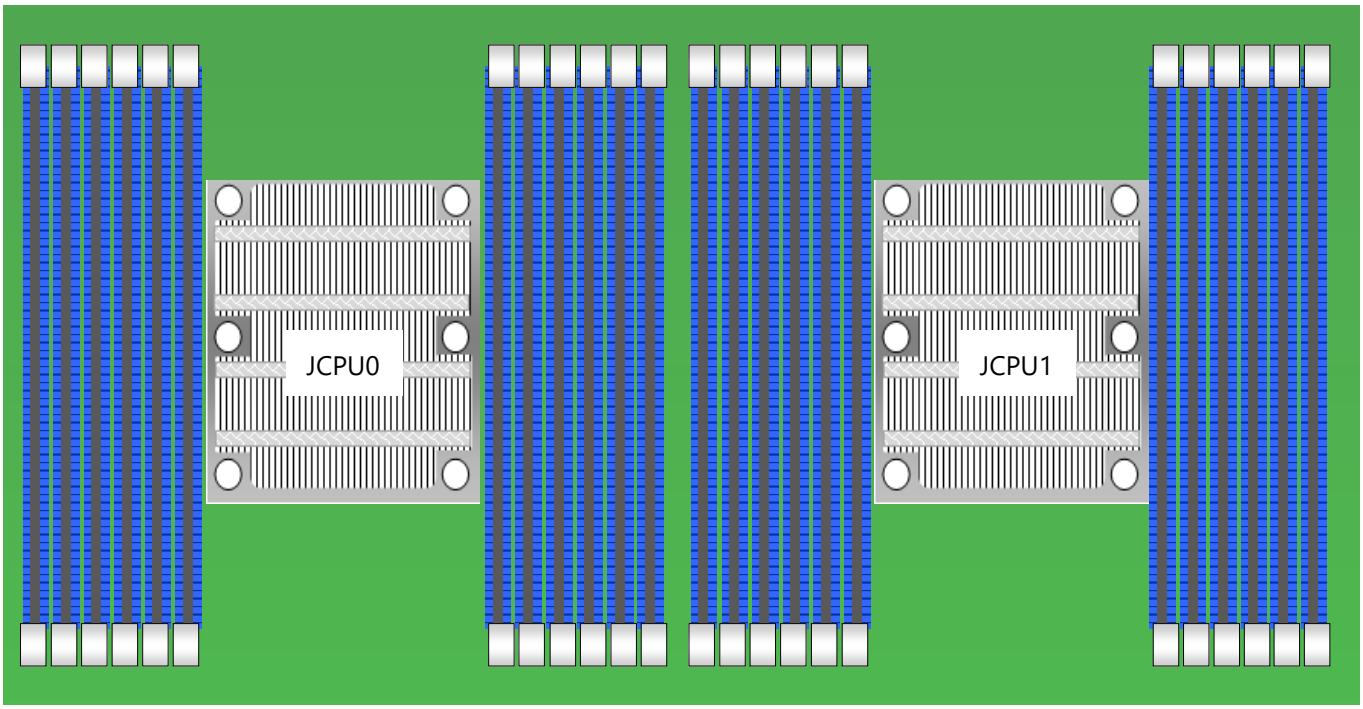
1. Loosen the 2 thumb screws from the rear panel of FX-3420.
2. Gently pull the cover backward a bit, and lift the cover up to remove it.
3. Remove the cover that encloses the CPUs and the fans.

Installing the System Memory

The motherboard supports 24 memory slots for DDR4 registered DIMM.

Supported System Memory Summary

Total Slots	24 (12 slots per processor)
Number of Channels	1 channel for 2 sockets
Supported DIMM Capacity	4GB, 8GB, 16GB, 32GB
Memory Size	Maximum 768 GB RDIMM (32GB*24)
Memory Type	DDR4-2133/2400/2666 MHz R-DIMM support
Minimum DIMM Installed	Each processor requires at least 6 memory modules to boot and run from.



DIMM Population Guidelines

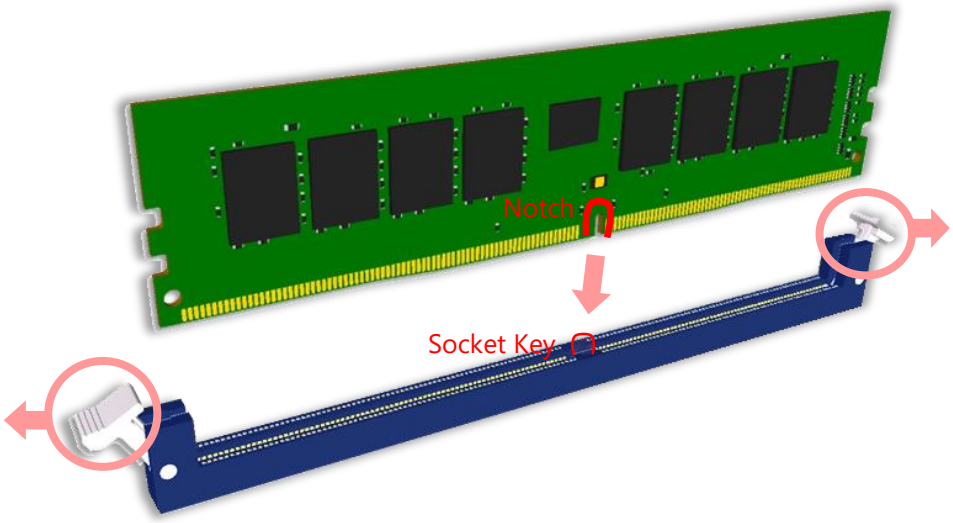
Please do follow the memory module installation instructions to install the DIMMs, and make sure

- Do not mix RDIMMs with LRDIMMs.
- For optimal performance, split the DIMMs evenly across the CPUs when two CPUs are installed.
- Using memory modules of the same capacity, speed and from the same manufacturer are highly recommended. However, with mixed module speeds, the overall speed will be that of the slowest installed memory module.

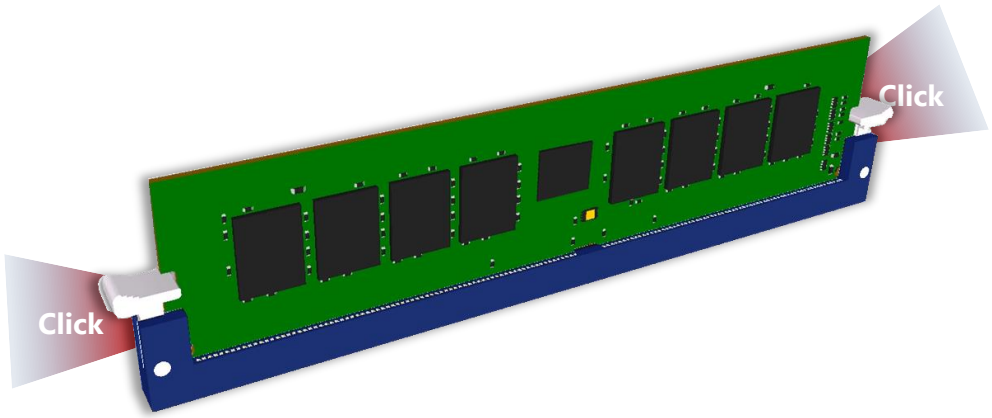
Memory Module Installation Instructions

Please follow the steps below to install the DIMM memory modules.

1. Power off the system.
2. Pull open the DIMM slot latches.
3. Align the notch of the module with the socket key in the slot and carefully insert the card into the slot.



4. Push the module down into the slot until it is firmly seated. Press vertically on both corners of the card until it clicks into place.

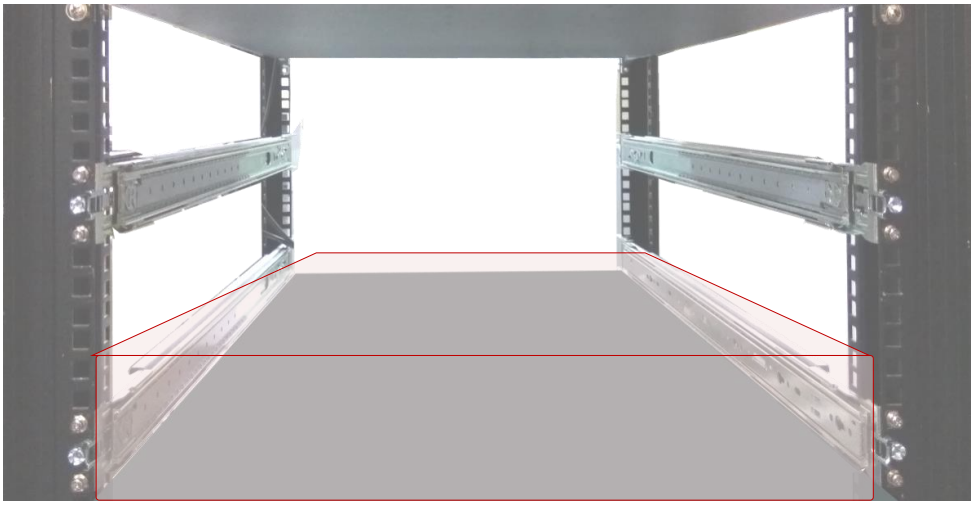


Mounting the System

There are various methods to mount this system based on your application and the environment. This system came with two types of mounting kits for a typical rack or enclosure mounting installation or installing this system in a rack:

- **Ear Brackets**

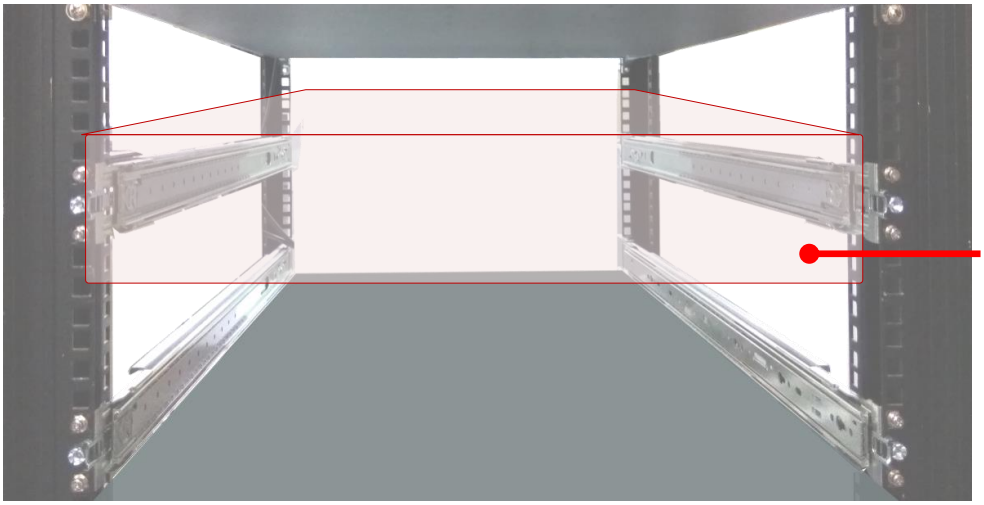
This method is quick and easy by fixing this system to the front posts of the rack while being the most unstable method, for the bracket assembly alone cannot provide sufficient support to the chassis. Please ensure the use of these brackets goes with a shelf or slide rails to prevent the chassis from falling over.



The system shall be installed on the rack along with a shelf or slide rails, for the "Mounting Ears" are meant to secure the system, not to support it.

- **Slide Rail Kit + Short Ear Brackets**

Although this method is rather complicated, the slidable rails allow you to access the system easily while securing it in the rack solidly.



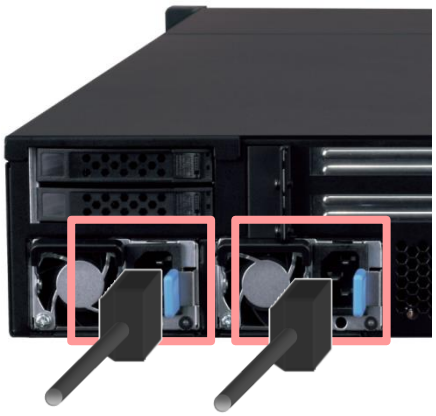
The Slide Rail Kit can secure the system while providing sufficient weight support for the device.

Installing the AC Power Supply

Power supply units wear down eventually. Please be noted that this system supports only 850W PSU. Please prepare the power supply units matching this capacity.

1. On the rear panel, locate the power supply units and disconnect the power cords.

2. Pull the original unit out and replace it with a new one.



CHAPTER 3: SOFTWARE SETUP

Remote Server Management

Overview

This document specifies the BMC firmware features of Lanner. The BMC firmware implements IPMI 2.0 based on ASPEED service processor. It performs all the BMC management tasks defined by IPMI 2.0.

In addition, Lanner's BMC firmware runs an embedded web-server for full configuration using Web UI, which has a low learning curve.

For detailed instructions on using each function, please refer to the full version of NCA-4020 BMC manuals available on.

BMC Main Features

Feature		Description
IPMI 2.0 Standard Features	System Interface support	• KCS (System Interface Support) • LAN (RMCP+)
	IPMI 2.0 based Management	• BMC stack with an IPMI 2.0 implementation
	System Management	• Sensor monitoring • System power management • Watchdog timer • Fan speed monitor and control • FRU information
	Event Log	• System Event Log (SEL)
	Text Console Redirection: SOL	• Support in IPMI stack for SOL to remotely access BIOS and text console before OS booting
	User Management	• IPMI based user management • Multiple user permission level
Non-IPMI functions	Web User Interfaces	• BMC management via web user interface • Integrated KVM and Virtual Media
	User authorization	• RADIUS support • LDAP support
	Security	• SSL and HTTPS support
	Maintenance	• Auto-sync time with NTP server • Remote firmware update by Web UI or Linux tool

BMC Firmware Functional Description

System health monitoring

The BMC implements system sensor monitoring feature. It could monitor voltage, temperature, and current of critical components.

System Power Management

The BMC implements chassis power and resets functions for system administrators to control and manage the system power behavior. These functions can be activated by sending the IPMI 2.0 compatible chassis commands to the BMC over messaging interfaces. The following list summaries the supported functions.

- Chassis power on
- Chassis power off
- Chassis power cycle
- Chassis power reset
- Chassis power soft
- Server's power status report

Watchdog Timer

The BMC provides an IPMI 2.0 compatible watchdog timer which can prevent the system from system hanging.

Fan Speed Control

BMC is in charge of fan speed control. The fan speed can be modified by varying the duty cycle of PWM signal. The fan speed control algorithm mainly refers to the readings of on-board temperature sensors.

Field Replaceable Unit (FRU)

The BMC implements an interface for logical FRU inventory devices as specified in IPMI 2.0 specification. This functionality provides commands for system administrators to access and management the FRU inventory information.

System Event Log (SEL)

A non-volatile storage space is allocated to store system events for system status tracking.

Serial over LAN (SOL)

IPMI 2.0 SOL is implemented to redirect the system serial controller traffic over an IPMI session. System administrators are able to establish a SOL connection with a standard IPMI client, like IPMITOOL, to remotely interact with serial text-based interfaces such as OS command-line and serial redirected BIOS interfaces.

User Management

The BMC supports 9 IDs for IPMI user accounts. The maximum length of the username and password are 16 and 20 respectively, and the possible privilege levels are Callback, User, Operator, and Administrator. Moreover, the account creator is allowed to enable/disable the user account at any time. If not specified, the default user accounts are listed follows:

User Name	Password	User Access	Characteristics
admin	admin	Enabled	Password can be changed

Keyboard, Video, Mouse (KVM) Redirection

- The BMC provides keyboard, video, and mouse (KVM) redirection over LAN. This application is available remotely from the embedded web server.
- Support video recording, recorded videos to be downloaded & playable.

Virtual Media Redirection

- The BMC provides remote virtual CD, HD and FD redirection. CD image could be mounted directly in KVM window. HD, FD could be mounted by NFS and SAMBA.
- Efficient USB 2.0 based CD/DVD redirection with a typical speed of 20XCD.
- Completely secured transmission.

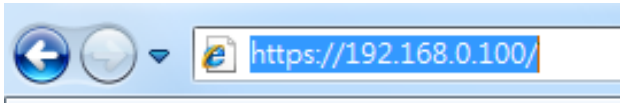
IPMI Commands Support List

COMMANDS	NETFN	CMD
IPM Device "Global" Commands		
Get Device ID	APP (06h)	00h
Cold Reset	APP (06h)	02h
Warm Reset	APP (06h)	03h
Get Device GUID	APP (06h)	08h
BMC Watchdog Timer Commands		
Reset Watchdog Timer	APP (06h)	22h
Set Watchdog Timer	APP (06h)	24h
Get Watchdog Timer	APP (06h)	25h
BMC Device and Messaging Commands		
Get System GUID	APP (06h)	37h
Get Channel Info	APP (06h)	42h
Set User Access	APP (06h)	43h
Get User Access	APP (06h)	44h
Set User Name	APP (06h)	45h
Get User Name	APP (06h)	46h
Set User Password	APP (06h)	47h
Chassis Device Commands		
Get Chassis Capabilities	Chassis (00h)	00h
Get Chassis Status	Chassis (00h)	01h
Chassis Control	Chassis (00h)	02h
Chassis Reset	Chassis (00h)	03h
Sensor Device Commands		
Get Sensor Reading Factors	S/E (04h)	23h
Get Sensor Hysteresis	S/E (04h)	25h
Get Sensor Threshold	S/E (04h)	27h
Get Sensor Event Enable	S/E (04h)	29h
Get Sensor Event Status	S/E (04h)	2Bh
Get Sensor Reading	S/E (04h)	2Dh
Get Sensor Type	S/E (04h)	2Fh
FRU Device Commands		
Get FRU Inventory Area Info	Storage (0Ah)	10h
Read FRU Data	Storage (0Ah)	11h
Write FRU Data	Storage (0Ah)	12h
SDR Device Commands		
Get SDR Repository Info	Storage (0Ah)	20h
Get SDR Repository Allocation Info	Storage (0Ah)	21h
Get SDR	Storage (0Ah)	23h
Get SDR Repository Time	Storage (0Ah)	28h
SEL Device Commands		
Get SEL Info	Storage (0Ah)	40h
Get SEL Allocation Info	Storage (0Ah)	41h
Get SEL Entry	Storage (0Ah)	43h

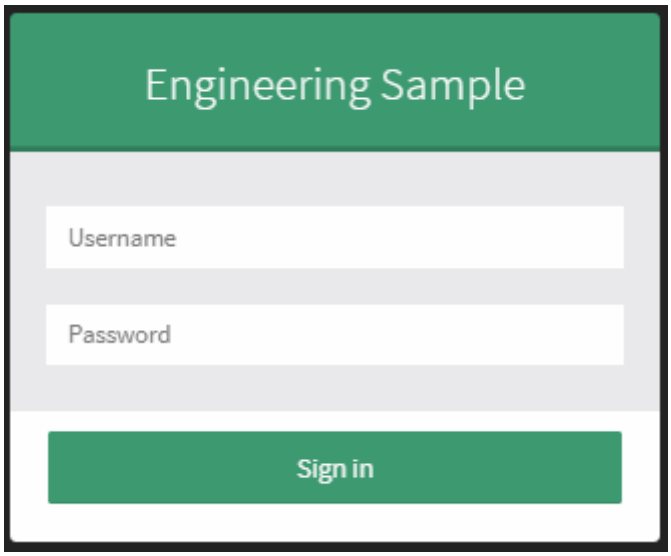
Delete SEL Entry	Storage (0Ah)	46h
Clear SEL	Storage (0Ah)	47h
Get SEL Time	Storage (0Ah)	48h
Set SEL Time	Storage (0Ah)	49h
Get SEL Time UTC Offset	Storage (0Ah)	5Ch
Set SEL Time UTC Offset	Storage (0Ah)	5Dh
LAN Device Commands		
Set LAN Configuration Parameters	Transport (0Ch)	01h
Get LAN Configuration Parameters	Transport (0Ch)	02h
Serial/Modem Device Commands		
Set User Callback Options	Transport (0Ch)	1Ah
Get User Callback Options	Transport (0Ch)	1Bh
SOL Activating	Transport (0Ch)	20h
Set SOL Configuration Parameters	Transport (0Ch)	21h
Get SOL Configuration Parameters	Transport (0Ch)	22h

Using BMC Web UI

In the address bar of your Internet browser, input the IP address of the remote server to access the BMC interface of that server.



Initial access of BMC prompts you to enter username and password. A screenshot of the login screen is given below:



Login Page

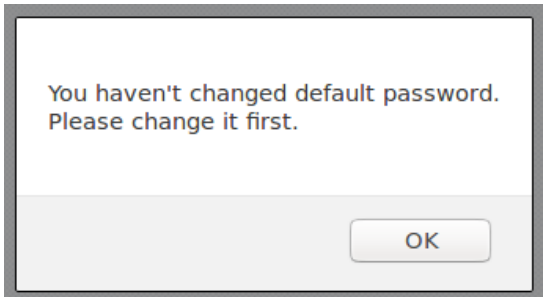
- **Username**: Enter your username in this field.
- **Password**: Enter your password in this field.
- **Sign me in**: After entering the required credentials, click the **Sign me in** to log in to Web UI.

Note: (1) If not specified, the default IP to access BMC is https://192.168.0.100.
(2) Please use **https** to access Web UI.

Default User Name and Password

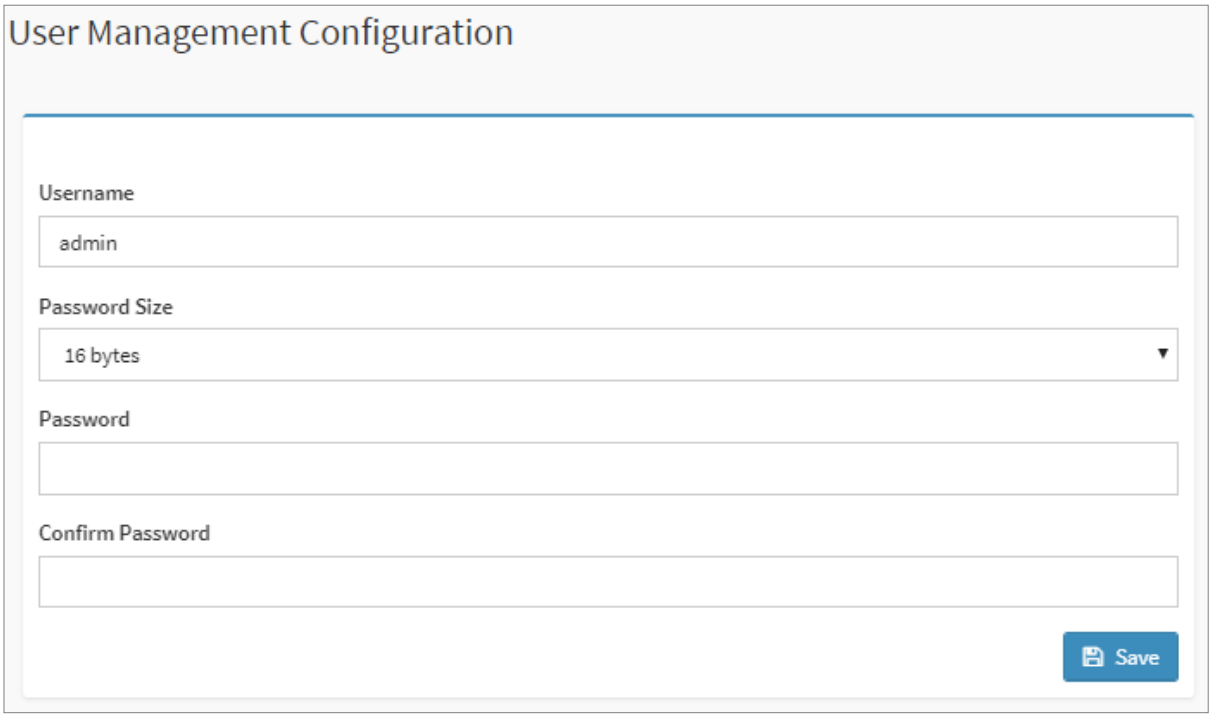
- **Username:** admin
- **Password**: admin

The default username and password are in lower-case characters. When you log in using the default username and password, you will get full administrative rights, and it will ask you to change the default password once you log in. The dialog is shown below:



Change the default password - Dialog

Clicking **OK** will take you to the User Management Configuration page to set a password.



Change the default password – Set password

Note: Duplicate usernames shouldn't exist across various authentication methods like LDAP, RADIUS or IPMI since the privilege of one Authentication method is overwritten by another authentication method during logging in, and hence the correct privilege cannot be returned properly.

Web UI Layout

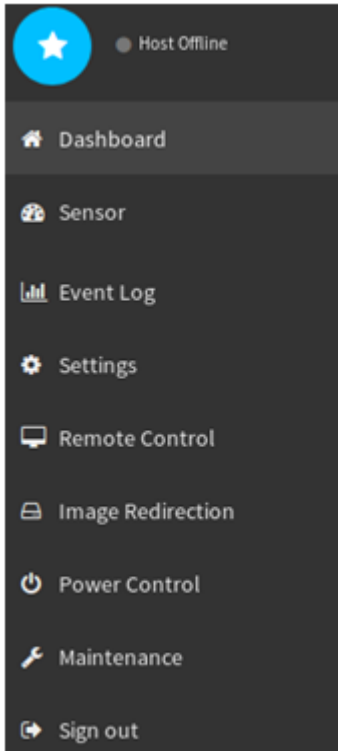
The BMC Web UI consists of various menu items:

Menu Bar

The menu bar displays the following:

- Dashboard
- Sensor
- Event Log
- Settings
- Remote Control
- Image Redirection
- Power Control
- Maintenance
- Sign out

A screenshot of the menu bar is shown below:



Menu Bar

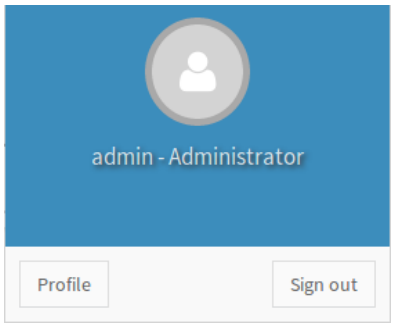
Quick Button and Logged-in User

The user information and quick buttons are located at the top right of the Web UI.

User Information

Logged-in user information: Click the icon admin to view the logged-in user information.

A screenshot of the logged-in user information is shown below:



Logged-in User Information

The logged-in user information shows the logged-in user's username, privilege, with the quick buttons allowing you to perform the following functions:

- **Notification**: Click the icon to view the notification messages.
- **Refresh**: Click the icon Refresh to reload the current page.
- **Sign out**: Click the icon Sign out to log out of the Web UI.

Logged-in user and its privilege level

This option shows the logged-in username and privilege. There are four kinds of privileges:

- **User**: Only valid commands are allowed.
- **Operator**: All BMC commands are allowed except for the configuration commands that can change the behavior of the out-of-hand interfaces.
- **Administrator**: All BMC commands are allowed.
- **No Access:** Login access denied.

Help

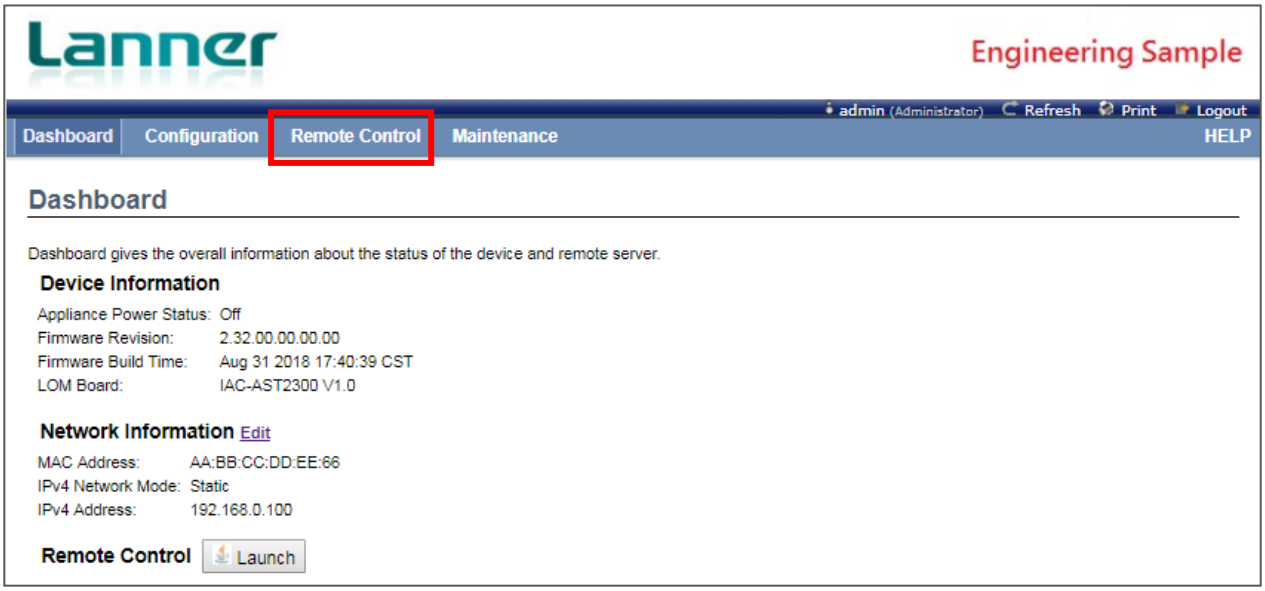
Help: The **Help** icon is located at the top right of each page in Web UI. Click this help icon to view more detailed field descriptions.

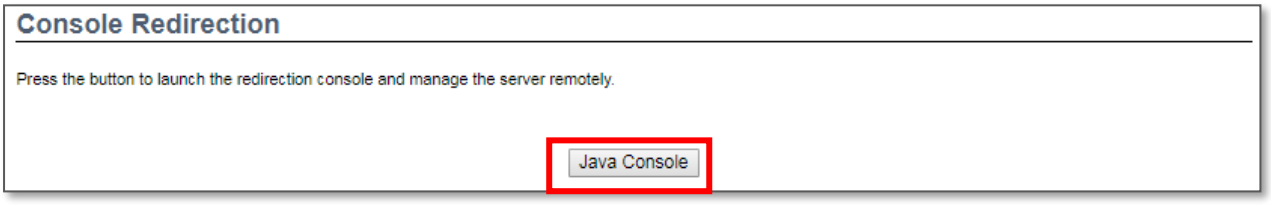
Installing Operating System

If your system is shipped without an operating system, install the supported operating system using the following resources.

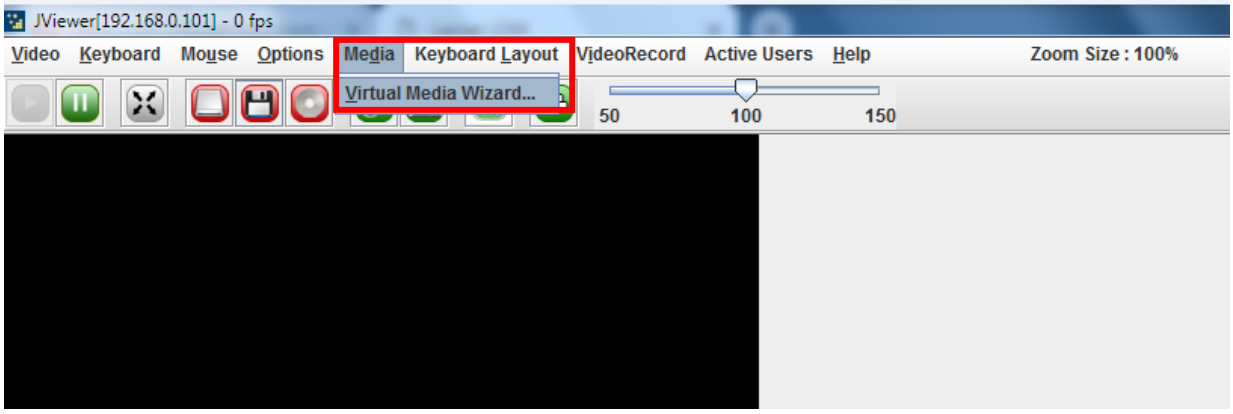
Via IPMI Interface

1. Download the ISO image and make a bootable DVD from it.
2. Connect a DVD player or other type of readers (floppy disk, or a drive) to a computer.
3. Connect to your target system from this computer. (Refer to Remote Server Management for instructions on how to access the target system through Web UI.
4. After entering the main screen, select "Remote Control">"Console Redirection," and then click on "Java Console."

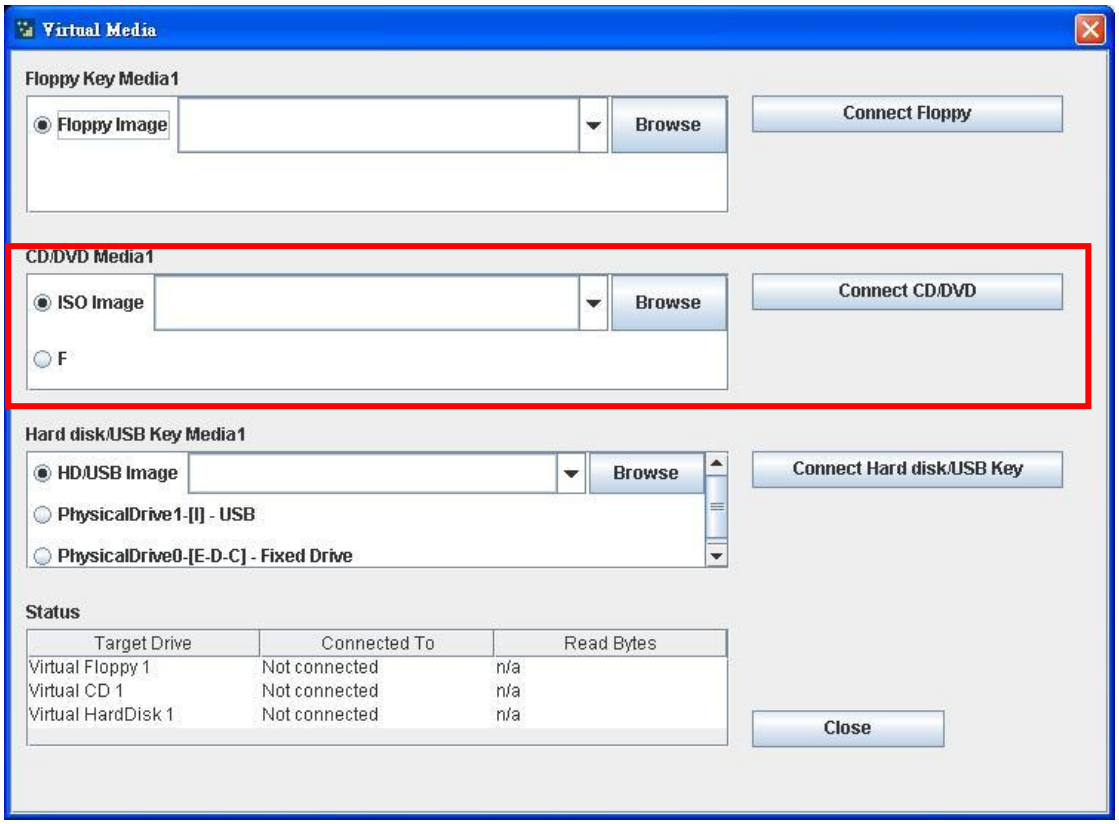




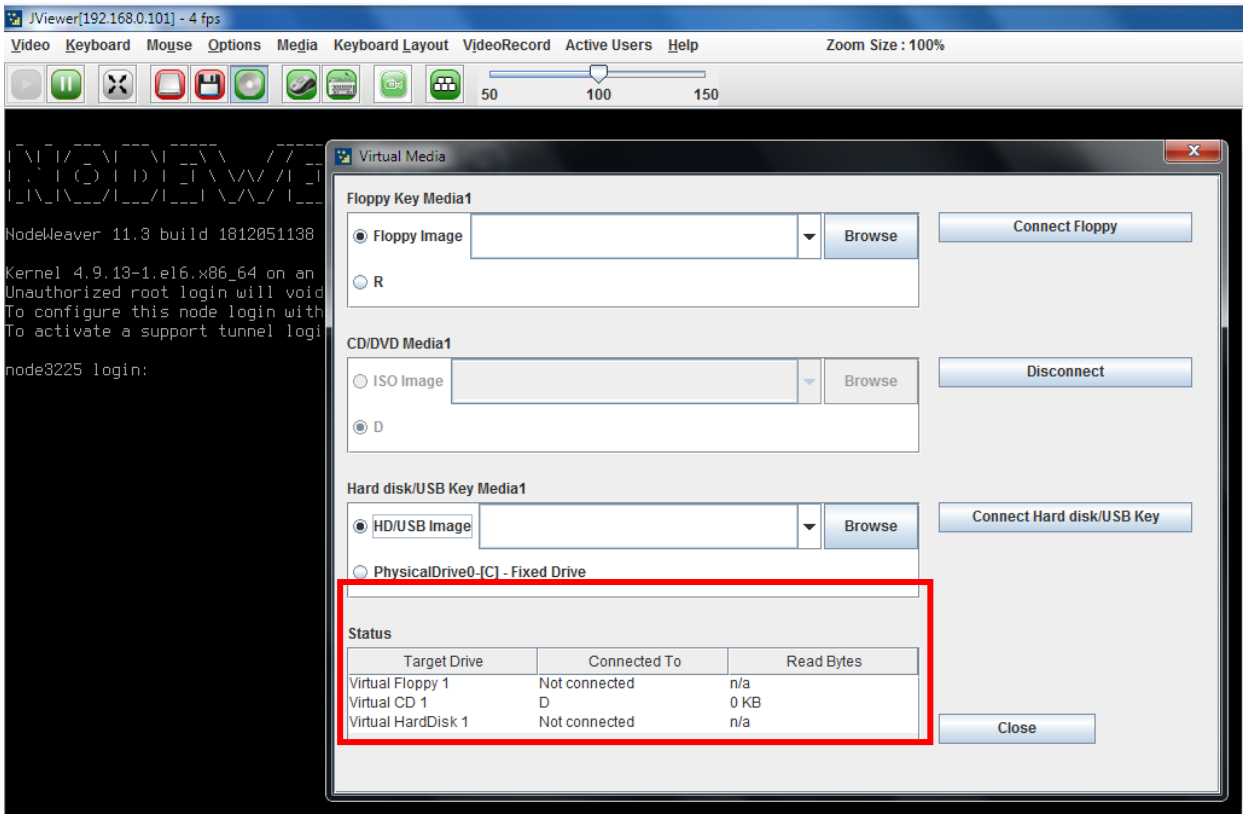
5. After a JViewer screen pops up, select "Media" and then "Virtual Media Wizard" from the toolbar.



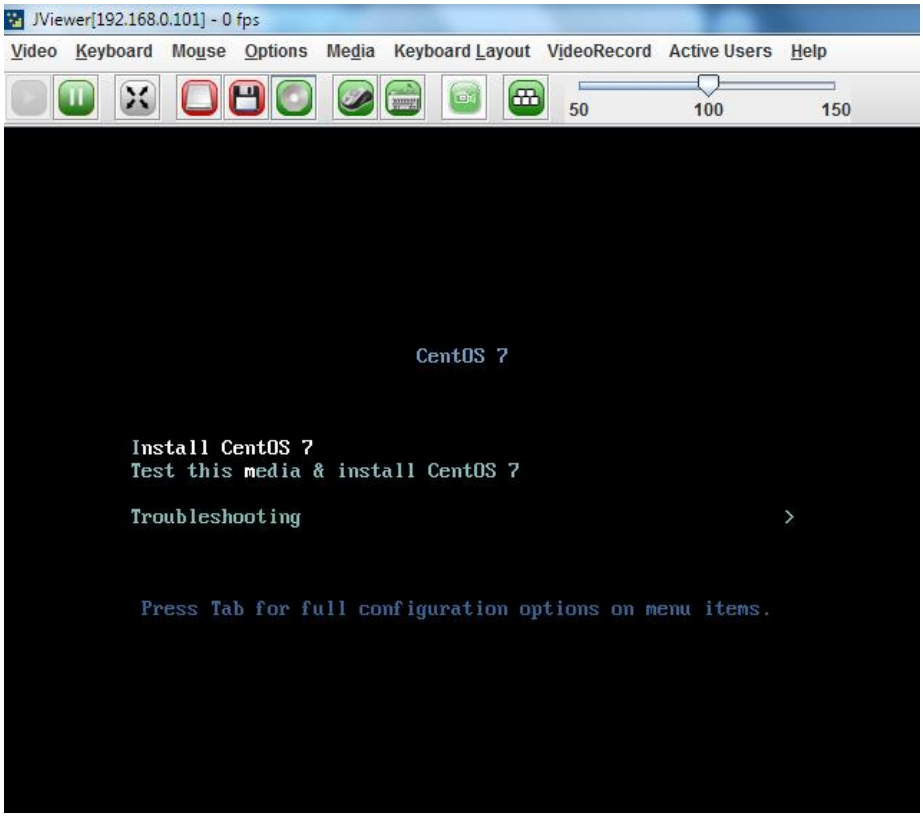
6. On **Virtual Media** screen, select your media type to load the image. For example, click on "Browse" of **CD/DVD Media 1** and then "Connect CD/DVD."



7. The **Status** window will display the connection status.



8. The installation process will automatically start. Please follow the onscreen instruction to complete the rest of the steps and restart the target system manually.



BIOS Setup

BIOS is a firmware embedded on an exclusive chip on the system's motherboard. Lanner's BIOS firmware offering including market-proven technologies such as Secure Boot and Intel Boot Guard technology deliver solid commitments for the shield protection against malware, uncertified sequences and other named cyber threats.

Main Setup Page

To enter the BIOS setup utility, simply follow the steps below:

1. Boot up the system.
2. Pressing the **<Tab>** or **<Del>** key immediately allows you to enter the Setup utility, and then you will be directed to the BIOS main screen. The instructions for BIOS navigations are as below:

Control Keys	Description
→←	select a setup screen
↑↓	select an item/option on a setup screen
<Enter>	select an item/option or enter a sub-menu
+/-	adjust values for the selected setup item/option
F1	display General Help screen
F2	retrieve previous values, such as the last configured parameters during the last time you entered BIOS
F3	load optimized default values
F4	save configurations and exit BIOS
<Esc>	exit the current screen

APPENDIX A: LED INDICATOR EXPLANATIONS

Link Activity  Speed

RJ45 Port

- **Link Activity**

Blinking Amber	*Link has been established and there is activity on this port*
Solid Amber	*Link has been established and there is no activity on this port*
Off	*No link is established*

- **Speed**

Solid Amber	*Operating as a Gigabit connection (1000 Mbps)*
Solid Green	*Operating as a 100-Mbps connection*
Off	*Operating as a 10-Mbps connection*

Link Activity  Speed

SPF+ Port

- **Link Activity**

Blinking Green	*Link has been established and there is activity on this port*
Solid Green	*Link has been established and there is no activity on this port*
Off	*No link is established*

- **Speed**

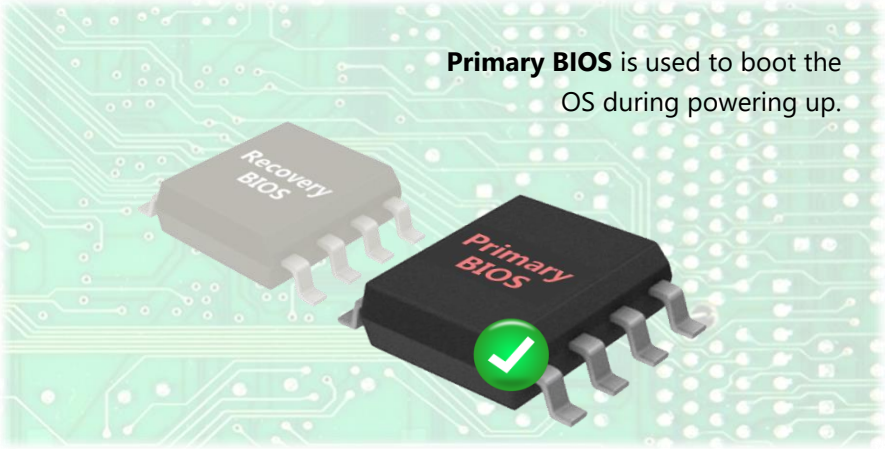
Solid Green	*Operating as 10 Gigabit connection*
Solid Amber	*Operating as a Gigabit connection*
Off	*Operating as a 100 Mbps connection*

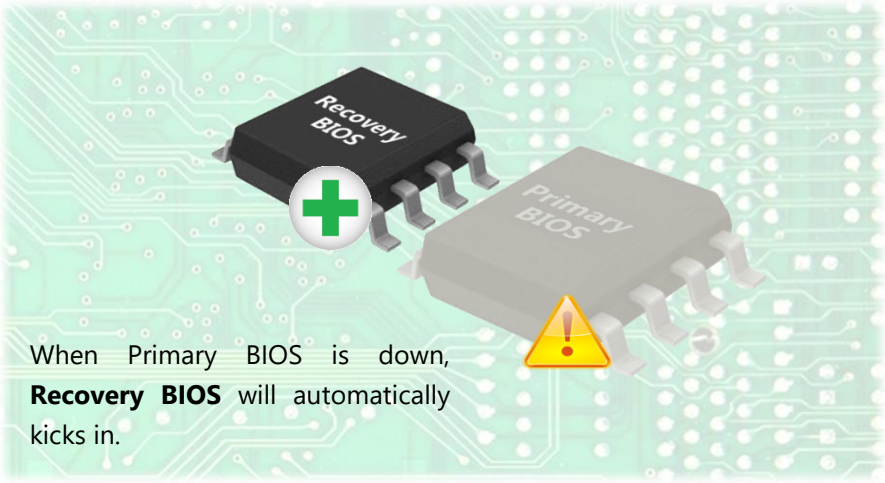
APPENDIX B: DUAL BIOS INTRODUCTION

Why Dual BIOS?

Failure of booting up BIOS is not uncommon to most experienced users, yet it can be the worst nightmare. This occurs mostly during a power failure or a mishandled BIOS update, after a malware's attack that corrupted the data on the chip, or, at worst, due to physical damage that caused the BIOS not to function. When it happens, not merely will the recovering procedures consume considerable time and effort, but all you work might also be to no avail. Eventually, you are left with no choice but to ship the board back to the manufacturer.

Lanner understands this pain and has empowered our products with the Dual BIOS feature. Normally, the Primary BIOS is used to boot the OS during powering up; when Primary BIOS is down, the Recovery BIOS automatically jumps in to boot up the OS for the User to take further steps such as performing data backup and BIOS upgrade.



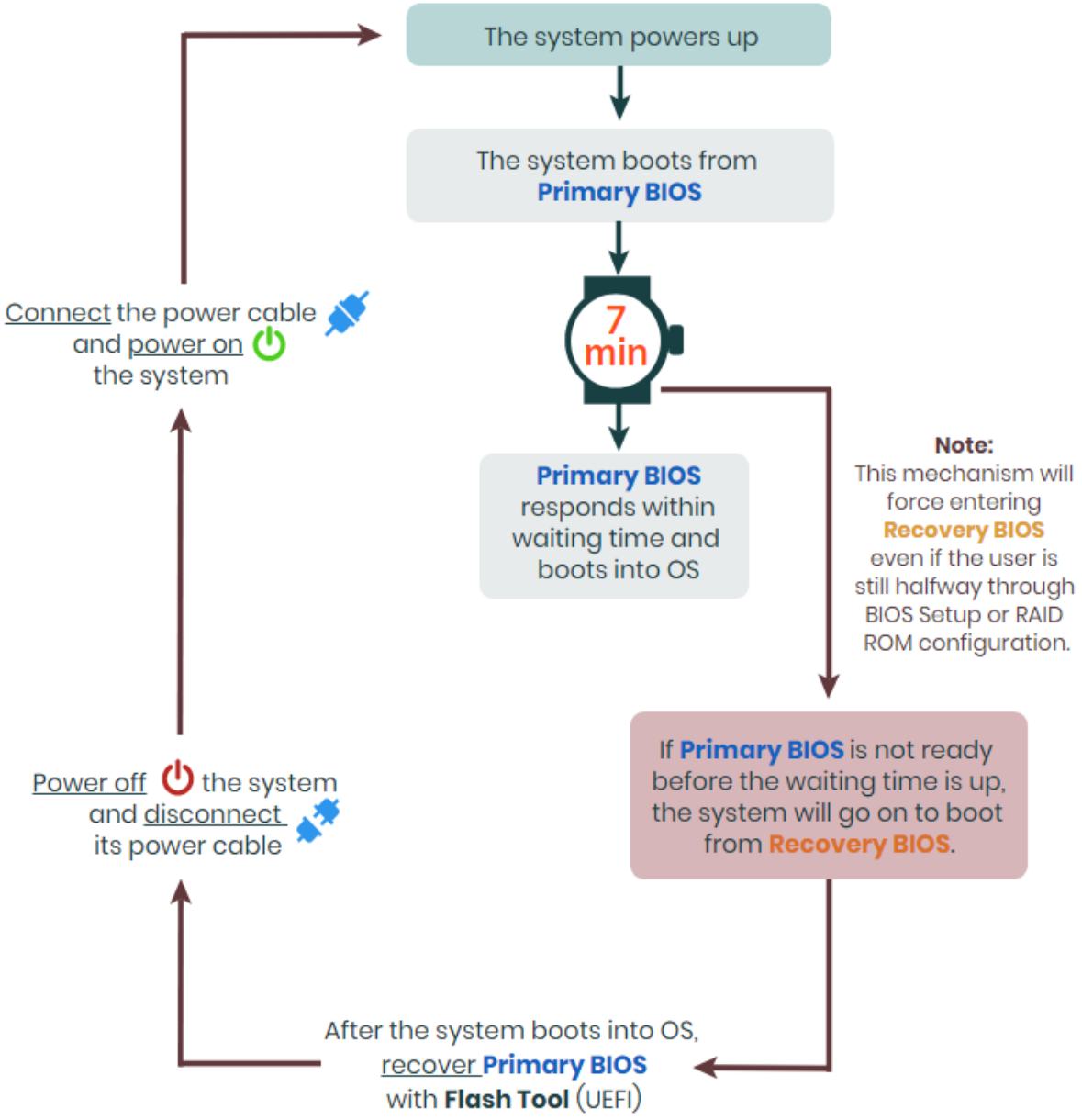


Addressing BIOS Start-up Failure with Dual BIOS

Few things can shut down a computer as completely as a corrupted BIOS. With Dual BIOS feature, you will be guaranteed to enter a healthy OS to perform thorough troubleshooting before the situation is irreparable.

How Dual BIOS Works

Dual BIOS features two physical BIOS ROMs soldered onto the motherboard, carrying two separate BIOS images. The Primary BIOS carries the image for system bootup, the parameters of which can be overwritten, while the Recovery BIOS carries the image locked to the factory default, which guarantees a safe and successful system bootup. If the Primary BIOS is not functioning correctly and fails to respond within 7 minutes, the system will invoke a bootup from the Recovery BIOS, automatically restart the system and launch the operating system.



How do I know which BIOS the system is booting from?

On POST screen, the **Boot Bios** information will display the BIOS used for this bootup.

I just found the system being booted from the Recovery BIOS, what's next?

With the Recovery BIOS at work, it can be asserted that the Primary BIOS is having such severe problem that it failed to function. Before you make certain the BIOS chip is completely corrupted, it is definitely sensible to try the last resort—updating BIOS.

Get Ready for BIOS Update

Flashing a corrupted BOS can never be taken lightly, for once done wrongly, it is almost certain to lead to an unusable system. To get ready for a BIOS update, acquire the following BIOS resources from Lanner technical support:

- Firmware and Flash Tool
- BIOS Engineering Spec
- Release Note

Before you start, make sure you select the correct firmware version and go through the instructions for BIOS update in *BIOS Engineering Spec* and BIOS fix information in the *Release Note* thoroughly. If you cannot be certain if this version is correct for your system, please contact Lanner Technical Support.

Disclaimer
Under no circumstances will Lanner accept responsibility or liability for damages of any kind whatsoever resulting or arising directly or indirectly from a BIOS update.

 Warning
DO NOT power off or reset the system during BIOS updating process.

APPENDIX C: TERMS AND CONDITIONS

Warranty Policy

1. All products are under warranty against defects in materials and workmanship for a period of one year from the date of purchase.
2. The buyer will bear the return freight charges for goods returned for repair within the warranty period; whereas the manufacturer will bear the after service freight charges for goods returned to the user.
3. The buyer will pay for the repair (for replaced components plus service time) and transportation charges (both ways) for items after the expiration of the warranty period.
4. If the RMA Service Request Form does not meet the stated requirement as listed on "RMA Service," RMA goods will be returned at customer's expense.
5. The following conditions are excluded from this warranty:
   - Improper or inadequate maintenance by the customer
   - Unauthorized modification, misuse, or reversed engineering of the product
   - Operation outside of the environmental specifications for the product.

RMA Service

Requesting an RMA#

1. To obtain an RMA number, simply fill out and fax the "RMA Request Form" to your supplier.
2. The customer is required to fill out the problem code as listed. If your problem is not among the codes listed, please write the symptom description in the remarks box.
3. Ship the defective unit(s) on freight prepaid terms. Use the original packing materials when possible.
4. Mark the RMA# clearly on the box.

Note: Customer is responsible for shipping damage(s) resulting from inadequate/loose packing of the defective unit(s). All RMA# are valid for 30 days only; RMA goods received after the effective RMA# period will be rejected.

RMA Service Request Form

When requesting RMA service, please fill out the following form. Without this form enclosed, your RMA cannot be processed.

RMA No:	Reasons to Return: ▫ Repair(Please include failure details) ▫ Testing Purpose
Company:	Contact Person:
Phone No.	Purchased Date:
Fax No.:	Applied Date:
Return Shipping Address: _____ Shipping by: ▫ Air Freight ▫ Sea ▫ Express_____ ▫ Others:_____	

Item	Model Name	Serial Number	Configuration

Item	Problem Code	Failure Status

*Problem Code:

01:D.O.A.	07: BIOS Problem	13: SCSI	19: DIO
02: Second Time R.M.A.	08: Keyboard Controller Fail	14: LPT Port	20: Buzzer
	09: Cache RMA Problem	15: PS2	21: Shut Down
03: CMOS Data Lost	10: Memory Socket Bad	16: LAN	22: Panel Fail
04: FDC Fail	11: Hang Up Software	17: COM Port	23: CRT Fail
05: HDC Fail	12: Out Look Damage	18: Watchdog Timer	24: Others (Pls specify)
06: Bad Slot			

Request Party

Authorized Signature / Date

Confirmed By Supplier

Authorized Signature / Date