

Network Appliance Platform

Hardware Platforms for Network Computing

HAN-8360B Technical Overview

Version: 1.6

Date of Release: 16 July 2023

About this Document



This document is the overview of the various functionalities of this product, and the information you need to check before 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.

Icon Description

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. |

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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 the battery is replaced by an incorrect type.
- ▶ Dispose of used batteries according to the instructions.
- ▶ Installation should be conducted only by a trained electrician or only by an electrically trained person who knows all installation procedures 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 environment can result in an explosion or the leakage of flammable liquid or gas.
- ▶ A battery subjected to extremely low air pressure 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 Precautions

The following should be put into consideration for rack-mount or similar mounting installations:

- ▶ Do not install and/or operate this unit in any place that flammable objects are stored or used in.
- ▶ The installation of this product must be performed by trained specialists; otherwise, a non-specialist might create the risk of the system's falling to the ground or other damages.
- ▶ Lanner Electronics Inc. shall not be held liable for any losses resulting from insufficient strength for supporting the system or use of inappropriate installation components.
- ▶ Elevated Operating Ambient - 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 (T_{ma}) specified by the manufacturer.
- ▶ Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of airflow required for safe operation of the equipment is not compromised.
- ▶ Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- ▶ Circuit Overloading - 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 overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- ▶ Reliable Grounding - Reliable grounding of rack mounted equipment 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).
- ▶ Instruction for the installation of the conductor to building earth by a skilled person.

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 (green-and-yellow) is required and the part connecting the conductor must be greater than 6 mm² or 8AWG.

Consignes de sécurité électrique

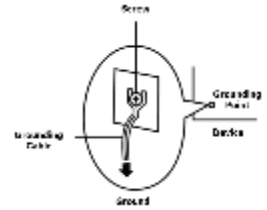
- ▶ Avant d'allumer l'appareil, reliez le câble de mise à la terre de l'équipement à la terre.
- ▶ Une bonne mise à la terre (connexion à la terre) est très importante pour protéger l'équipement contre les effets

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 6 mm² ou 8 AWG.

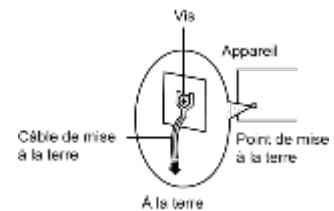
Grounding Procedure for This Device

- Connect the grounding cable to the ground.
- The protection device for the DC power source must provide 40A current.
- This protection device must be connected to the power source before DC power.



Procédure de mise à la terre l'équipement

- Branchez le câble de mise à la terre à la terre.
- L'appareil de protection pour la source d'alimentation CC doit fournir 40A de courant.
- Cet appareil de protection doit être branché à la source d'alimentation avant l'alimentation CC.



Warning

- This equipment must be grounded. The power cord for product should be connected to a socket-outlet with earthing connection.
- Product shall be used with Class 1 laser device modules.
- Suitable for installation in Information Technology Rooms in accordance with Article 645 of the National Electrical Code and NFPA 75.
- The machine can only be used in a restricted access location and be installed and serviced by skilled person.

Avertissement

- Cet équipement doit être mis à la terre. La fiche d'alimentation doit être connectée à une prise de terre correctement câblée
- Le produit doit être utilisé avec des modules de dispositifs laser de classe 1.
- 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.
- Les matériels sont destinés à être installés dans des EMPLACEMENTS À ACCÈS RESTREINT.

For DC input, this unit is intended to be supplied by an UL listed power source, rated 48 to 72Vdc, 40A min, and an altitude operation 5000m min.




CAUTION: TO DISCONNECT POWER, REMOVE ALL POWER CORDS FROM UNIT.

注意：要断开电源，请将所有电源线从本机上拔下。

注意：要斷開電源，請將所有電源線從本機上拔下。

WARNUNG: Wenn Sie das Gerät zwecks Wartungsarbeiten vom Netz trennen müssen, müssen Sie beide Netzteile abnehmen.

ATTENTION: DÉBRANCHER TOUS LES CORDONS D'ALIMENTATION POUR DÉCONNECTER L'UNITÉ DU SECTEUR.

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CHAPTER 1: PRODUCT OVERVIEW

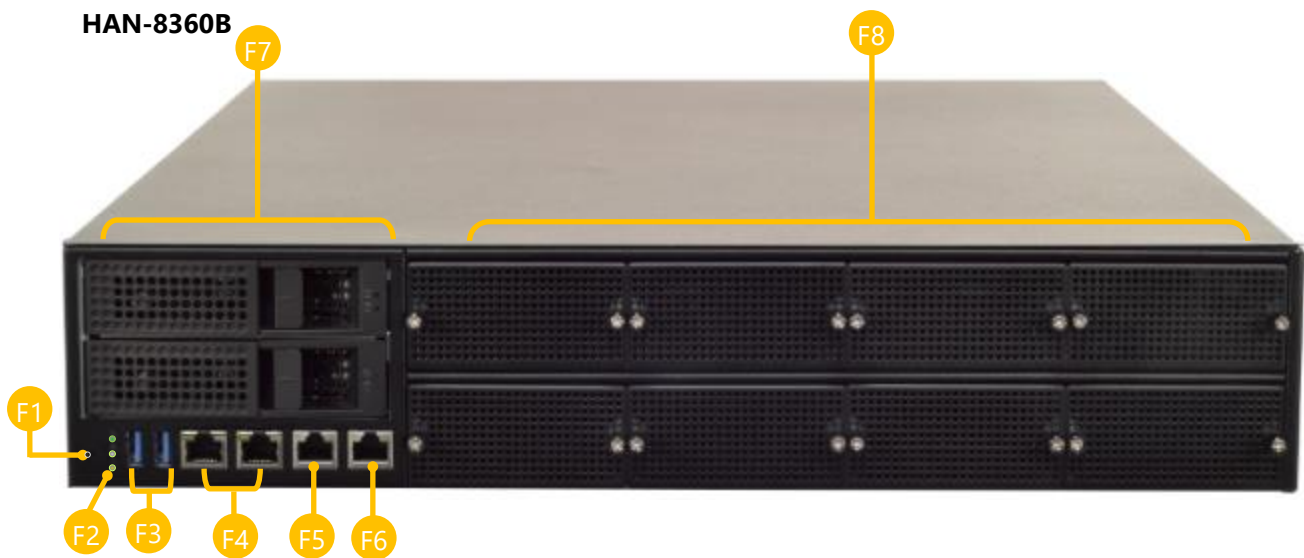
Thank you for choosing HAN-8360B. HAN-8360B is a 2U 19" rackmount network security features deliver maximized packet processing efficiency for virtual network functions, cryptography acceleration (for deep packet inspection) and next-generation firewall and UTM/IPS/IDS.



System Specifications

| | | |
|---------------------------------|-------------------------------|--|
| Form Factor | | 2U 19" Rackmount |
| Platform | Processor Options | Intel® Xeon® Processor Scalable Family (Sapphire Rapids-SP) |
| | CPU Socket | 1x LGA 4677 |
| | Chipset | Intel® Emmisburg PCH |
| | Security Acceleration | Intel® QuickAssist Technology |
| BIOS | | AMI SPI Flash BIOS |
| System Memory | Technology | DDR4 or newer speed upto 4400MHz |
| | Max. Capacity | 768GB |
| | Socket | 12x 288-pin DIMM |
| Networking | Ethernet Ports | 2x 2.5GbE RJ45 With LED Dual MGT By Intel® I226-LM |
| | Bypass | Based on request |
| | NIC Module Slot | Module up to 16 port GbE RJ45 |
| Light Out Management | IO Interface | Yes, 1x LOM Port (Via BMC Chip) |
| | OPMA Slot | Yes (Support IPMI 2.0 standard) |
| I/O Interface | Reset Button | 1x Reset Button |
| | LED | Power/Status/Storage |
| | Power Button | 1x ATX Power Switch |
| | Console Port | 1x RJ45 Console Port |
| | USB Port | 2x USB 3.0 Port |
| | LCD Module | 2x20CharacterLCMw/4xKeypads for system info and debug) |
| | Display Port | 1x VGA Port |
| | Power Input | AC Power Inlet On PSU |
| Storage | HDD/SSD Sata Support | 8/16 x 2.5" HDD/SSD hotswap up to 128TB (based on capacity of installed disk) |
| | Onboard Slots | 1x M.2 (SATA) 2280 B+M Key 2x M.2 NvME (PCIe) 2280 M Key |
| Expansion | PCIe | 1x PCI-E*8 FH/HL |
| | SD/micro SD (optional) | 2x micro SD/SD support 16/32/64 GB |
| System | Security | Silicon root of trust, Secure Boot Secure Erase, Security using TSL 1.3 over HTTPS |
| | Remote management | Integrated Remote Access Controller (memory 1024 MB) |
| Cooling | Processor | Passive CPU heat sink |
| | System | 4 x Individual Hot-swappable Cooling Fans With Smart Fan |
| Environmental Parameters | Anti-Vibration | 3Hz~5Hz |
| | Temperature | 0~40°C Operating |
| | Humidity | 5~90% Operating |
| System Dimensions | (WxDxH) | 438 x 720 x 88 mm |
| | Weight | 24.0 kg |
| Operating system | Windows Server | 2012/2012R/2016/2019 |
| | Linux kernel 4.19.x or higher | Red Hat/SUSE/Ubuntu/Debian/Centos |
| Power | Type/Watts | 1x 1300W CRPS AC PSU (Default) |

| | | |
|--------------------------|-------|-----------------------------------|
| | | 2x 1600W CRPS AC PSU (By Request) |
| | Input | AC 115V-240V, 50/60Hz |
| Approvals and Compliance | | RoHS, CE Class A, FCC Class A, UL |

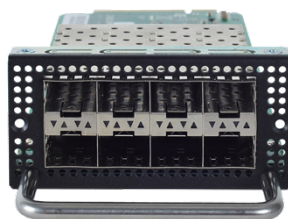
Front Panel



| No. | Description | |
|-----|----------------------------|---|
| F1 | Reset Button | 1x Software reset button |
| F2 | LED Indicators |  <ul style="list-style-type: none"> System Power System Status HDD Activity |
| F3 | USB Port | 2x USB 3.0 Ports |
| F4 | RJ45 Port | 2x RJ45 Ports w/ LED for Dual MGT (support PXE; enabled as default) |
| F5 | LOM Port | 1x LOM Port for remote management |
| F6 | Console Port | 1x RJ45 Console Port |
| F7 | HDD Tray w/ LED Indicators | 2x 2.5"/3.5" HDD Tray  <ul style="list-style-type: none"> HDD Status HDD Activity |
| F8 | NCS2 Module | 8x Standard NIC/Storage/ Module Slots (each Storage module support 2x2.5 inch SATA SDD/HDD) |



NCS2 Module
LCD



NCS2 Module
SFP Gbps
Network port



NCS2 Module
RJ-45 Gbps
Network port

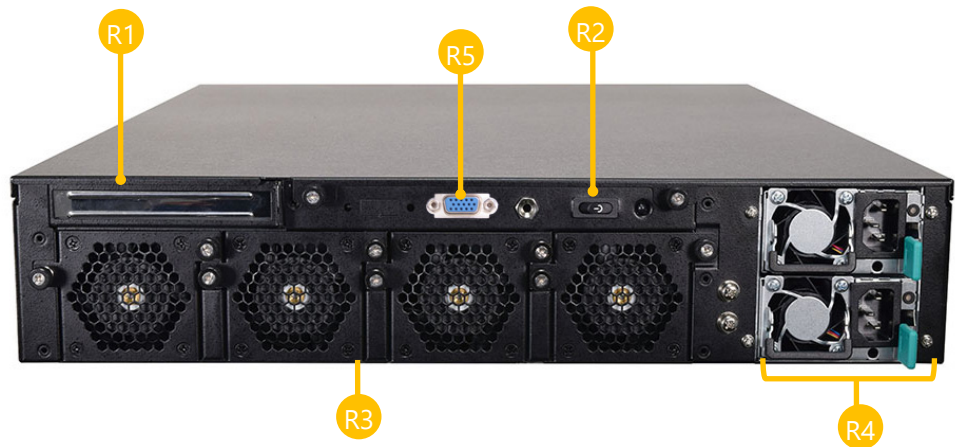


NCS2 Module
2x 2.5 inch
HDD/SSD Sata

Note: Please refer to Appendix A: LED Indicator Explanations for descriptions of the LED Indicators.

Rear Panel

HAN-8360B

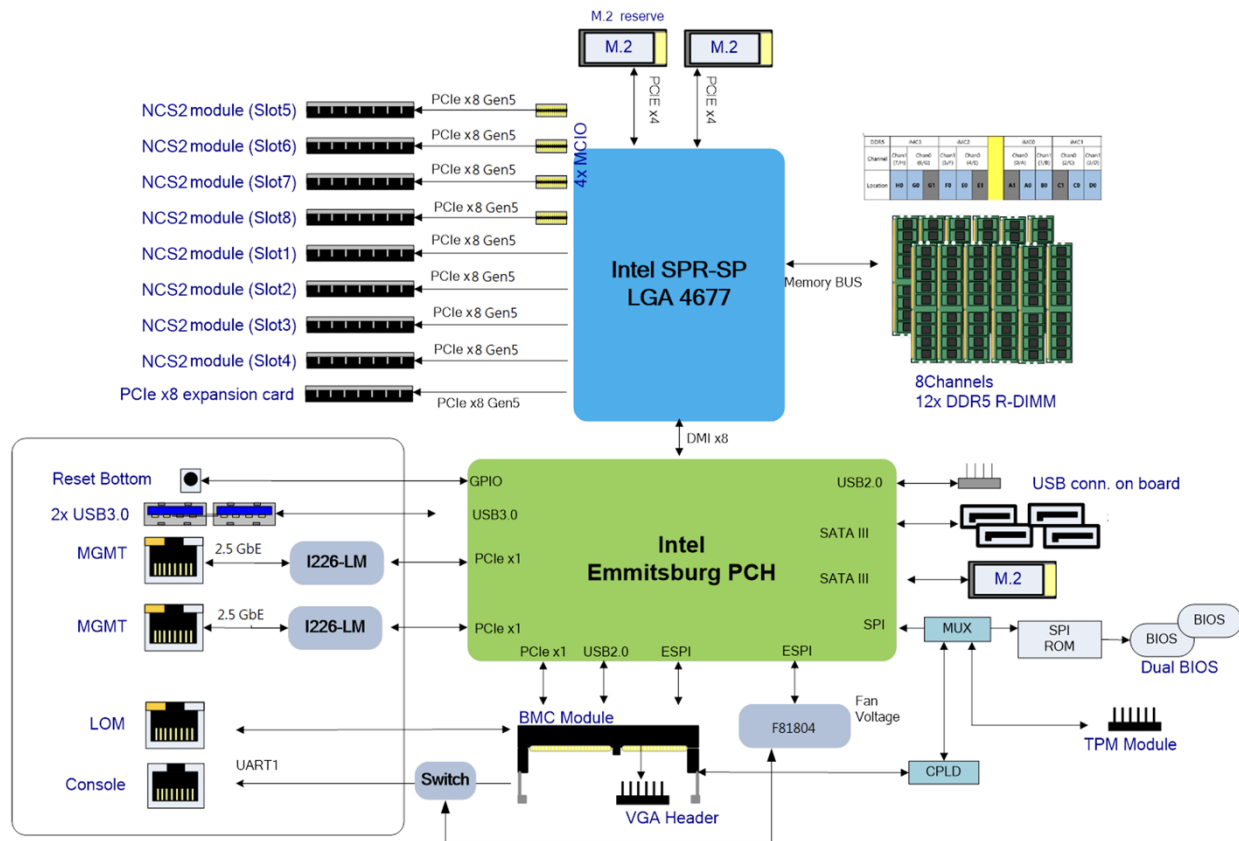


| No. | Description | |
|-----|---------------------|-------------------------------------|
| R1 | Rear PCIe Expansion | 1x PCIe expansion slot (Optional) |
| R2 | Power Switch | 1x Power Button |
| R3 | Fans | 4x Swappable Smart Fans |
| R4 | Power Supply | 2x 1300W Redundant (N+1 Design) PSU |
| R5 | VGA | 1x VGA |

CHAPTER 2: MOTHERBOARD INFORMATION

Block Diagram

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



CHAPTER 3: HARDWARE COMPONENTS

System Chassis

1. Loosen the two (2) thumb screws from the rear panel.



2. Gently pull the cover backwards slightly.



3. Lift the cover up to remove.





System the CPU

Please note that the system delivered to you includes the heatsink and processor. This processor comes with a rather sophisticated design, therefore, the assembly of which must be handled with exclusive tools and extreme care by professionals. Please read through the instructions in this section and refer to the [official tutorial](#) released by Intel® to make sure you have acquired the necessary knowledge and comply with the requirements.

Installing the processor onto the motherboard involves two stages:

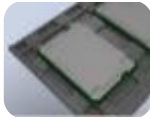

1. Mount the processor onto the heat sink to make a PHM (Processor + Heat Sink Module)
2. Install the PHM onto the motherboard.

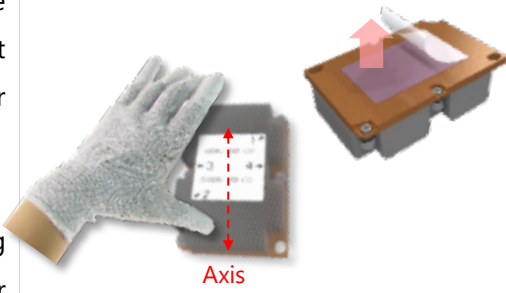
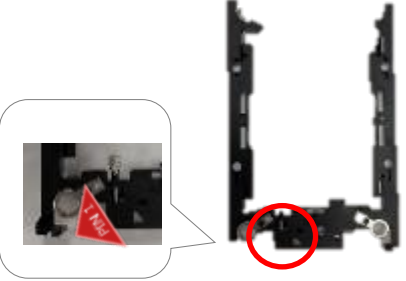
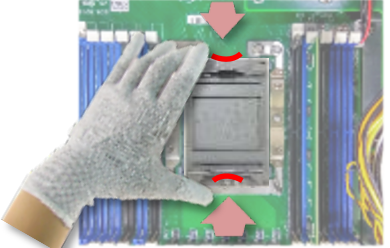

Tools Required

| Tool | Description | |
|--|---|---|
| (T-30 Torx Bit®) | Set to <u>8in/lb</u> for tightening the nuts which fasten the PHM on the bolster plate. |  |
| ESD Protection (ESD gloves, ESD-safe work surface, ESD-safe shoes, grounded wrist strap etc.) | During the entire assembly process, at least wear a pair of ESD gloves to avoid damaging or contaminating the electronic parts while enhancing your own safety. |  |

Note: The images of tools shown in this document are merely for reference; the actual tools you use might differ.

Parts Explanation:

| Item | Description | |
|------------------|--|--|
| Processor | Please avoid touching the gold fingers or package lands of the processor even if you are wearing ESD gloves. |   |

| | | |
|--------------------------|---|---|
| Heat Sink | <p>If a TIM (Thermal Interface Material) protective film is already attached to the base of the heat sink, remove it before you mount the processor on it.</p> <p>When holding the heatsink, please grip it along the axis of its fins with your thumb and your index finger.</p> |  |
| Processor Carrier | <p>This is packed along with the processor. Before performing any assembly involving this part, please locate PIN1 on one of the corners, an important indicator used to align this carrier with the processor and the bolster plate correctly.</p> |  |
| Socket Cover | <p>This cover is used to protect the package land surface of the processor from contamination. To remove it from the processor, grasp the holding features with your thumb and your index finger while pulling the cover off vertically.</p> |  |
| Bolster Plate | <p>A robust bolster plate is used to assist in PHM alignment for installation, while effectively helping eliminate PCB bowing during compression. Please locate the Cutout on one of the four corners before starting PHM installation.</p> |  |

CPU compatible list

This system support Intel® Xeon® Processor Scalable Family (Sapphire Rapids-SP). Below is official list of compatible CPU by Intel®

| Product Name | Launch Date | Total Cores | Max Turbo Frequency | Processor Base Frequency | Cache | TDP |
|--|-------------|-------------|---------------------|--------------------------|---------|-------|
| Intel® Xeon® Platinum 8470Q Processor (105M Cache, 2.10 GHz) | Q1'23 | 52 | 3.80 GHz | 2.10 GHz | 105 MB | 350 W |
| Intel® Xeon® Platinum 8470 Processor (105M Cache, 2.00 GHz) | Q1'23 | 52 | 3.80 GHz | 2.00 GHz | 105 MB | 350 W |
| Intel® Xeon® Platinum 8470N Processor (97.5M Cache, 1.70 GHz) | Q1'23 | 52 | 3.60 GHz | 1.70 GHz | 97.5 MB | 300 W |
| Intel® Xeon® Platinum 8444H Processor (45M Cache, 2.90 GHz) | Q1'23 | 16 | 4.00 GHz | 2.90 GHz | 45 MB | 270 W |
| Intel® Xeon® Platinum 8468H Processor (105M Cache, 2.10 GHz) | Q1'23 | 48 | 3.80 GHz | 2.10 GHz | 105 MB | 330 W |
| Intel® Xeon® Platinum 8450H Processor (75M Cache, 2.00 GHz) | Q1'23 | 28 | 3.50 GHz | 2.00 GHz | 75 MB | 250 W |
| Intel® Xeon® Platinum 8468 Processor (105M Cache, 2.10 GHz) | Q1'23 | 48 | 3.80 GHz | 2.10 GHz | 105 MB | 350 W |

| Product Name | Launch Date | Total Cores | Max Turbo Frequency | Processor Base Frequency | Cache | TDP |
|---|-------------|-------------|---------------------|--------------------------|----------|-------|
| Intel® Xeon® Platinum 8460Y+ Processor (105M Cache, 2.00 GHz) | Q1'23 | 40 | 3.70 GHz | 2.00 GHz | 105 MB | 300 W |
| Intel® Xeon® Platinum 8460H Processor (105M Cache, 2.20 GHz) | Q1'23 | 40 | 3.80 GHz | 2.20 GHz | 105 MB | 330 W |
| Intel® Xeon® Platinum 8471N Processor (97.5M Cache, 1.80 GHz) | Q1'23 | 52 | 3.60 GHz | 1.80 GHz | 97.5 MB | 300 W |
| Intel® Xeon® Platinum 8480+ Processor (105M Cache, 2.00 GHz) | Q1'23 | 56 | 3.80 GHz | 2.00 GHz | 105 MB | 350 W |
| Intel® Xeon® Platinum 8490H Processor (112.5M Cache, 1.90 GHz) | Q1'23 | 60 | 3.50 GHz | 1.90 GHz | 112.5 MB | 350 W |
| Intel® Xeon® Platinum 8454H Processor (82.5M Cache, 2.10 GHz) | Q1'23 | 32 | 3.40 GHz | 2.10 GHz | 82.5 MB | 270 W |
| Intel® Xeon® Platinum 8468V Processor (97.5M Cache, 2.40 GHz) | Q1'23 | 48 | 3.80 GHz | 2.40 GHz | 97.5 MB | 330 W |
| Intel® Xeon® Platinum 8461V Processor (97.5M Cache, 2.20 GHz) | Q1'23 | 48 | 3.70 GHz | 2.20 GHz | 97.5 MB | 300 W |

| Product Name | Launch Date | Total Cores | Max Turbo Frequency | Processor Base Frequency | Cache | TDP |
|--|-------------|-------------|---------------------|--------------------------|---------|-------|
| Intel® Xeon® Platinum 8458P Processor (82.5M Cache, 2.70 GHz) | Q1'23 | 44 | 3.80 GHz | 2.70 GHz | 82.5 MB | 350 W |
| Intel® Xeon® Platinum 8452Y Processor (67.5M Cache, 2.00 GHz) | Q1'23 | 36 | 3.20 GHz | 2.00 GHz | 67.5 MB | 300 W |
| Intel® Xeon® Platinum 8462Y+ Processor (60M Cache, 2.80 GHz) | Q1'23 | 32 | 4.10 GHz | 2.80 GHz | 60 MB | 300 W |
| Intel® Xeon® Gold 6448Y Processor (60M Cache, 2.10 GHz) | Q1'23 | 32 | 4.10 GHz | 2.10 GHz | 60 MB | 225 W |
| Intel® Xeon® Gold 6444Y Processor (45M Cache, 3.60 GHz) | Q1'23 | 16 | 4.00 GHz | 3.60 GHz | 45 MB | 270 W |
| Intel® Xeon® Gold 6458Q Processor (60M Cache, 3.10 GHz) | Q1'23 | 32 | 4.00 GHz | 3.10 GHz | 60 MB | 350 W |
| Intel® Xeon® Gold 6448H Processor (60M Cache, 2.40 GHz) | Q1'23 | 32 | 4.10 GHz | 2.40 GHz | 60 MB | 250 W |
| Intel® Xeon® Gold 5418N Processor (45M Cache, 1.80 GHz) | Q1'23 | 24 | 3.80 GHz | 1.80 GHz | 45 MB | 165 W |
| Intel® Xeon® Gold 5411N Processor (45M Cache, 1.90 GHz) | Q1'23 | 24 | 3.90 GHz | 1.90 GHz | 45 MB | 165 W |
| Intel® Xeon® Gold 6428N Processor (60M Cache, 1.80 GHz) | Q1'23 | 32 | 3.80 GHz | 1.80 GHz | 60 MB | 185 W |

| Product Name | Launch Date | Total Cores | Max Turbo Frequency | Processor Base Frequency | Cache | TDP |
|--|-------------|-------------|---------------------|--------------------------|---------|-------|
| <u>Intel® Xeon® Gold 6421N Processor (60M Cache, 1.80 GHz)</u> | Q1'23 | 32 | 3.60 GHz | 1.80 GHz | 60 MB | 185 W |
| <u>Intel® Xeon® Gold 5416S Processor (30M Cache, 2.00 GHz)</u> | Q1'23 | 16 | 4.00 GHz | 2.00 GHz | 30 MB | 150 W |
| <u>Intel® Xeon® Gold 6438N Processor (60M Cache, 2.00 GHz)</u> | Q1'23 | 32 | 3.60 GHz | 2.00 GHz | 60 MB | 205 W |
| <u>Intel® Xeon® Gold 6438M Processor (60M Cache, 2.20 GHz)</u> | Q1'23 | 32 | 3.90 GHz | 2.20 GHz | 60 MB | 205 W |
| <u>Intel® Xeon® Gold 6434H Processor (22.5M Cache, 3.70 GHz)</u> | Q1'23 | 8 | 4.10 GHz | 3.70 GHz | 22.5 MB | 195 W |
| <u>Intel® Xeon® Gold 6416H Processor (45M Cache, 2.20 GHz)</u> | Q1'23 | 18 | 4.20 GHz | 2.20 GHz | 45 MB | 165 W |
| <u>Intel® Xeon® Gold 6418H Processor (60M Cache, 2.10 GHz)</u> | Q1'23 | 24 | 4.00 GHz | 2.10 GHz | 60 MB | 185 W |
| <u>Intel® Xeon® Gold 5418Y Processor (45M Cache, 2.00 GHz)</u> | Q1'23 | 24 | 3.80 GHz | 2.00 GHz | 45 MB | 185 W |
| <u>Intel® Xeon® Gold 6442Y Processor (60M Cache, 2.60 GHz)</u> | Q1'23 | 24 | 4.00 GHz | 2.60 GHz | 60 MB | 225 W |
| <u>Intel® Xeon® Gold 5420+ Processor (52.5M Cache, 2.00 GHz)</u> | Q1'23 | 28 | 4.10 GHz | 2.00 GHz | 52.5 MB | 205 W |
| <u>Intel® Xeon® Gold 6438Y+</u> | Q1'23 | 32 | 4.00 GHz | 2.00 | 60 MB | 205 |

| Product Name | Launch Date | Total Cores | Max Turbo Frequency | Processor Base Frequency | Cache | TDP |
|--|-------------|-------------|---------------------|--------------------------|---------|-------|
| Processor (60M Cache, 2.00 GHz) | | | | GHz | | W |
| Intel® Xeon® Gold 5415+ Processor (22.5M Cache, 2.90 GHz) | Q1'23 | 8 | 4.10 GHz | 2.90 GHz | 22.5 MB | 150 W |
| Intel® Xeon® Gold 5412U Processor (45M Cache, 2.10 GHz) | Q1'23 | 24 | 3.90 GHz | 2.10 GHz | 45 MB | 185 W |
| Intel® Xeon® Gold 6454S Processor (60M Cache, 2.20 GHz) | Q1'23 | 32 | 3.40 GHz | 2.20 GHz | 60 MB | 270 W |
| Intel® Xeon® Gold 6430 Processor (60M Cache, 2.10 GHz) | Q1'23 | 32 | 3.40 GHz | 2.10 GHz | 60 MB | 270 W |
| Intel® Xeon® Gold 6414U Processor (60M Cache, 2.00 GHz) | Q1'23 | 32 | 3.40 GHz | 2.00 GHz | 60 MB | 250 W |
| Intel® Xeon® Gold 6434 Processor (22.5M Cache, 3.70 GHz) | Q1'23 | 8 | 4.10 GHz | 3.70 GHz | 22.5 MB | 195 W |
| Intel® Xeon® Gold 6426Y Processor (37.5M Cache, 2.50 GHz) | Q1'23 | 16 | 4.10 GHz | 2.50 GHz | 37.5 MB | 185 W |
| Intel® Xeon® Silver 4410Y Processor (30M Cache, 2.00 GHz) | Q1'23 | 12 | 3.90 GHz | 2.00 GHz | 30 MB | 150 W |
| Intel® Xeon® Silver 4416+ Processor (37.5M Cache, 2.00 GHz) | Q1'23 | 20 | 3.90 GHz | 2.00 GHz | 37.5 MB | 165 W |
| Intel® Xeon® Silver 4410T Processor | Q1'23 | 10 | 4.00 GHz | 2.70 | 26.25 | 150 |

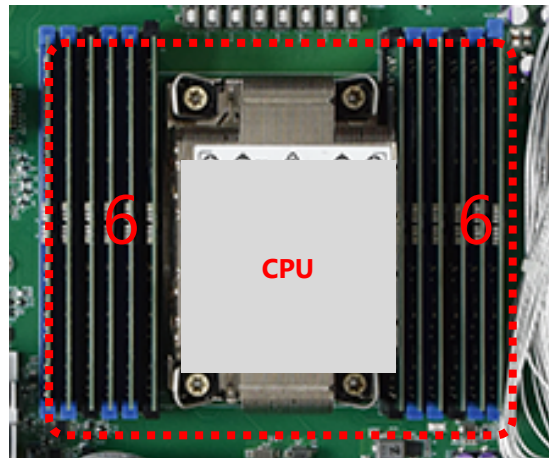
| Product Name | Launch Date | Total Cores | Max Turbo Frequency | Processor Base Frequency | Cache | TDP |
|--|-------------|-------------|---------------------|--------------------------|-------------------------------|-------|
| (26.25M Cache, 2.70 GHz) | | | | GHz | MB | W |
| Intel® Xeon® Bronze 3408U Processor (22.5M Cache, 1.80 GHz) | Q1'23 | 8 | 1.90 GHz | 1.80 GHz | 22.5 MB | 125 W |
| Intel® Xeon® w9-3495X Processor (105M Cache, 1.90 GHz) | Q1'23 | 56 | 4.80 GHz | 1.90 GHz | 105 MB Intel® Smart Cache | |
| Intel® Xeon® w3-2423 Processor (15M Cache, 2.10 GHz) | Q1'23 | 6 | 4.20 GHz | 2.10 GHz | 15 MB Intel® Smart Cache | |
| Intel® Xeon® w3-2425 Processor (15M Cache, 3.00 GHz) | Q1'23 | 6 | 4.40 GHz | 3.00 GHz | 15 MB Intel® Smart Cache | |
| Intel® Xeon® w7-3455 Processor (67.5M Cache, 2.50 GHz) | Q1'23 | 24 | 4.80 GHz | 2.50 GHz | 67.5 MB Intel® Smart Cache | |
| Intel® Xeon® w3-2435 Processor (22.5M Cache, 3.10 GHz) | Q1'23 | 8 | 4.50 GHz | 3.10 GHz | 22.5 MB Intel® Smart | |

| Product Name | Launch Date | Total Cores | Max Turbo Frequency | Processor Base Frequency | Cache | TDP |
|---|-------------|-------------|---------------------|--------------------------|-----------------------------|-----|
| | | | | | Cache | |
| Intel® Xeon® w5-2445 Processor (26.25M Cache, 3.10 GHz) | Q1'23 | 10 | 4.60 GHz | 3.10 GHz | 26.25 MB Intel® Smart Cache | |
| Intel® Xeon® w5-3425 Processor (30M Cache, 3.20 GHz) | Q1'23 | 12 | 4.60 GHz | 3.20 GHz | 30 MB Intel® Smart Cache | |
| Intel® Xeon® w9-3475X Processor (82.5M Cache, 2.20 GHz) | Q1'23 | 36 | 4.80 GHz | 2.20 GHz | 82.5 MB Intel® Smart Cache | |
| Intel® Xeon® w5-2455X Processor (30M Cache, 3.20 GHz) | Q1'23 | 12 | 4.60 GHz | 3.20 GHz | 30 MB Intel® Smart Cache | |
| Intel® Xeon® w5-3435X Processor (45M Cache, 3.10 GHz) | Q1'23 | 16 | 4.70 GHz | 3.10 GHz | 45 MB Intel® Smart Cache | |
| Intel® Xeon® w7-3445 Processor (52.5M Cache, 2.60 GHz) | Q1'23 | 20 | 4.80 GHz | 2.60 GHz | 52.5 MB Intel® | |

| Product Name | Launch Date | Total Cores | Max Turbo Frequency | Processor Base Frequency | Cache | TDP |
|--|-------------|-------------|---------------------|--------------------------|-----------------------------|-----|
| | | | | | Smart Cache | |
| Intel® Xeon® w5-2465X Processor (33.75M Cache, 3.10 GHz) | Q1'23 | 16 | 4.70 GHz | 3.10 GHz | 33.75 MB Intel® Smart Cache | |
| Intel® Xeon® w7-2495X Processor (45M Cache, 2.50 GHz) | Q1'23 | 24 | 4.80 GHz | 2.50 GHz | 45 MB Intel® Smart Cache | |
| Intel® Xeon® w7-3465X Processor (75M Cache, 2.50 GHz) | Q1'23 | 28 | 4.80 GHz | 2.50 GHz | 75 MB Intel® Smart Cache | |
| Intel® Xeon® w7-2475X Processor (37.5M Cache, 2.60 GHz) | Q1'23 | 20 | 4.80 GHz | 2.60 GHz | 37.5 MB Intel® Smart Cache | |

System Memory

The motherboard supports DDR4 or newer registered DIMM memory with bus up to 4400MHz for heavy-duty operations. Please follow the steps below to install the DIMM memory modules. The CPU have 12 DIMM sockets (6 on each sides)

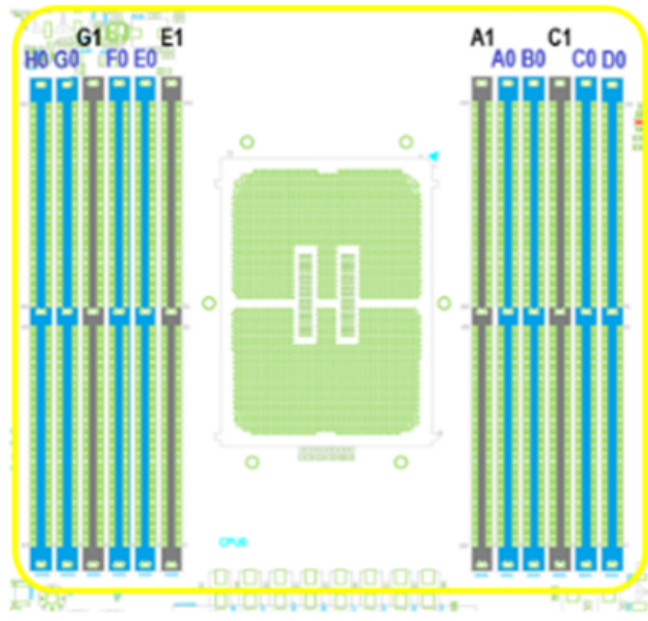


- Supported Capacities: 8/16/32/64 GB
- Maximum RAM: **768GB** (64GB per slot)

DIMM Population Guidelines

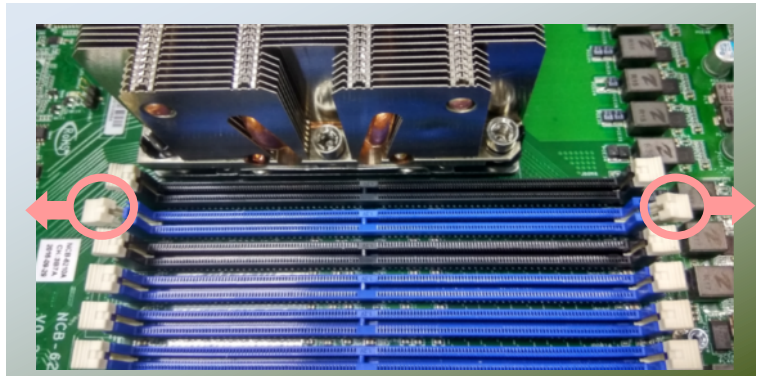
Please do follow the memory module installation instructions to install the DIMM, and make sure the DIMM population guidelines are met:

- Each CPU requires at least 1 memory module to boot and run from.
- If you do not plan to fill up all the sockets with 20 memory modules, always start with the blue ones for optimal performance.
- Try to split the DIMMs evenly across the CPUs.
- Please use memory modules of the same capacity, speed and from the same manufacturer to avoid compatibility issues.

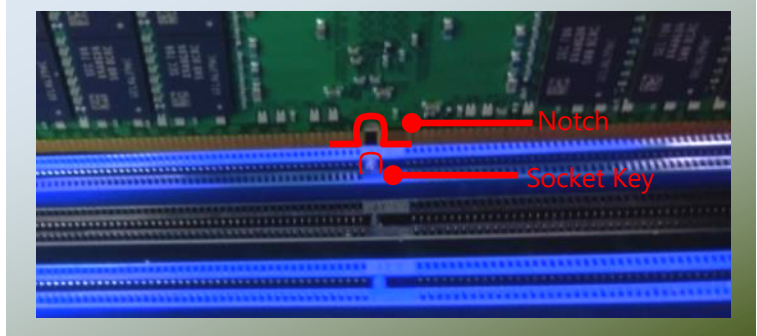


Memory Module installation

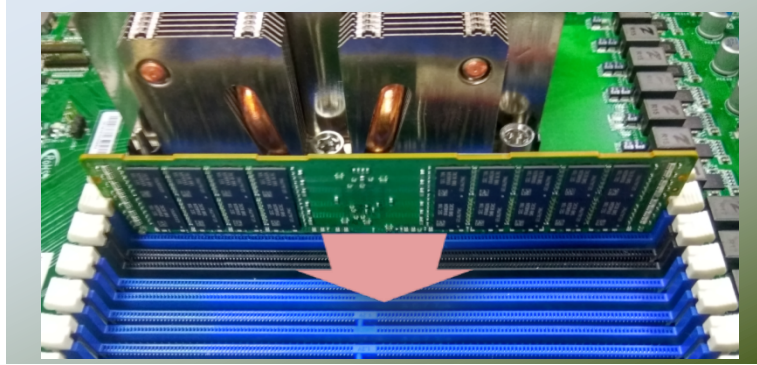
1. Power off the system.
2. Pull open the DIMM slot latches.



3. Align the notch of the DIMM module with the socket key in the slot.



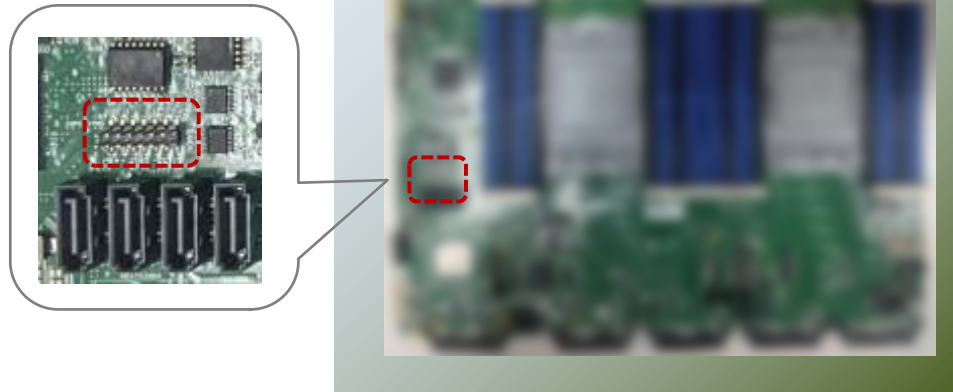
4. Insert the module into the slot until it is firmly seated.



TPM Module (Optional)

The motherboard provides one TPM slot. Follow the procedures below for installing a TPM module.

1. Locate the TPM pin on the motherboard.



2. Insert the module into the TPM pins until it is fully seated.



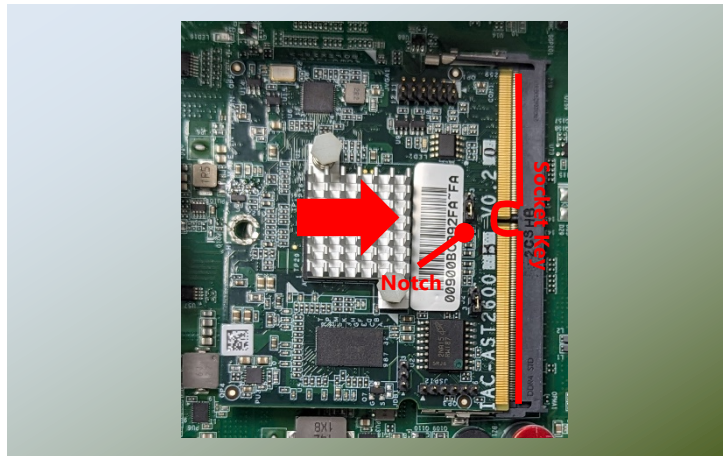
IPMI Card

The system provides one IPMI slot for remote monitoring expansion. Follow the procedure below for installation.

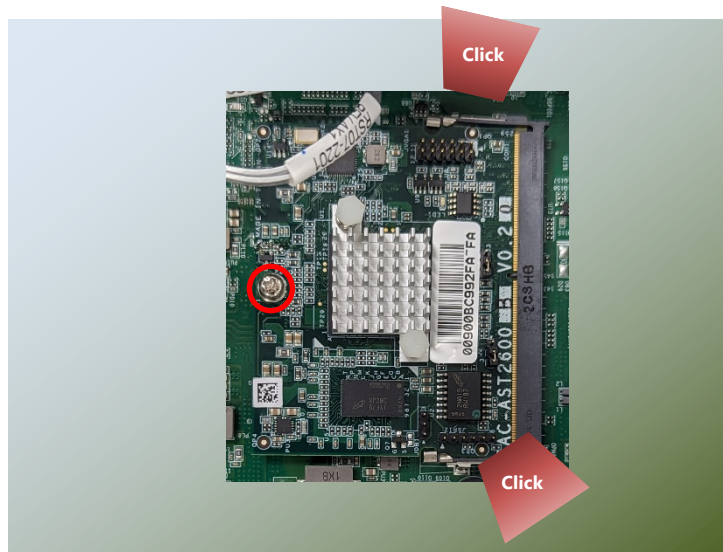
1. Power off the system and open the chassis cover.
2. Locate the IPMI socket on the motherboard.



3. Align the notch of the IPMI card with the socket key in the slot.
4. Insert at 30 degrees into the socket until it is fully seated in the connector.



5. Push down on the IPMI card and secure it with one (1) screw.



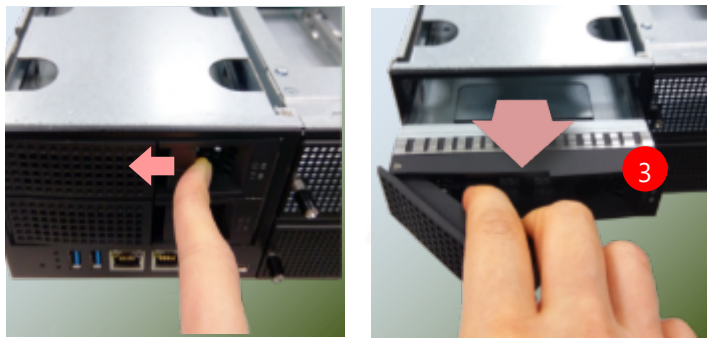
Disk Drive(s) (Optional)

HAN-8360B is built with two 3.5" HDD/SSD drive bay and NCS2 Module for 8x Standard NIC/Storage/Module Slots (each Storage module support 2x2.5 inch SATA SDD/HDD). The following will discuss disk drive installation procedures based on their HDD/SSD designs. The total system storage based on capacity of HDD/SSD installed and can be up to 128 TB

1. Power off the system.
2. Locate the 3.5" disk bay on the front panel.



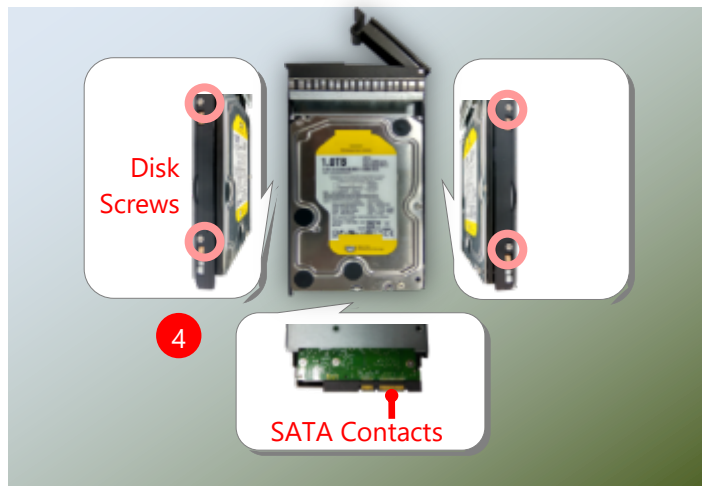
3. To remove the tray, put your finger on the tab and push it to the left to slide it open, hold the tab lever and pull out the tray.



4. The tray is designed to accommodate one 3.5" hard disk or one 2.5" hard disk.

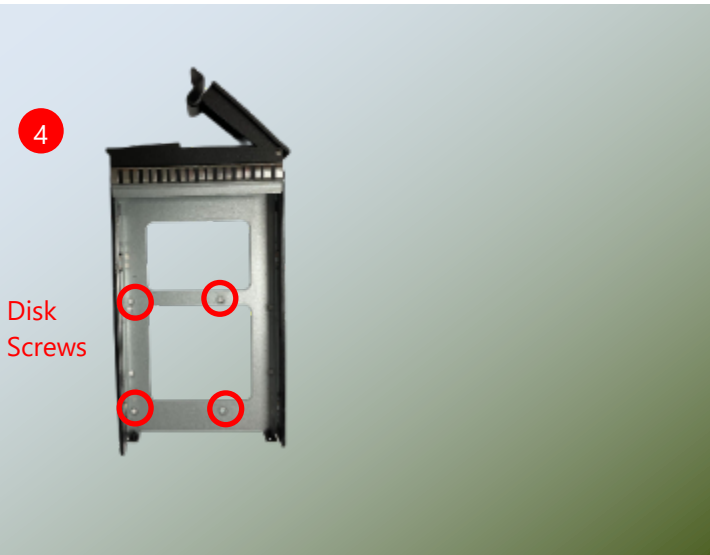
Mounting a 3.5" hard disk

Secure the hard disk on the tray with the provided disk screws. Make sure the disk SATA connector faces towards the SATA contacts inside the system.



Mounting a 2.5" hard disk

Secure the hard disk on the tray with the provided disk screws. Make sure the disk SATA connector faces towards the SATA connector inside the system.



5. To install the mounted disk tray, push the tray into position in the chassis. Press the hinge tab until it clicks into place.



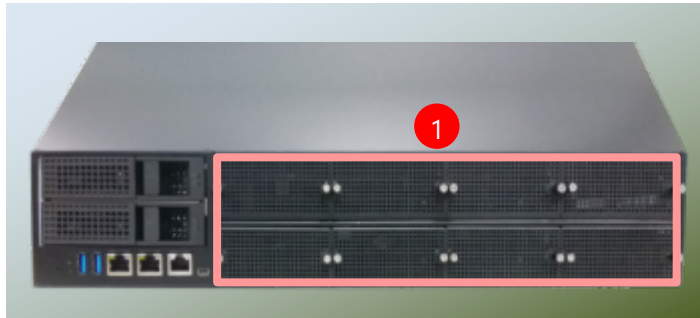
Supported Disk Drive

| Form Factor | Type | Communication Speed | Disk Rotation speed | Disk Capacities |
|-------------|----------|---------------------|---------------------|--|
| 2.5 inch | SATA III | 6Gb/s | SSD | 240 GB, 256 GB, 480 GB, 960 GB, 1.92 TB, 3.84 TB, 7.68 TB, 16 TB |
| 2.5 inch | SATA III | 6Gb/s | 5.4K | 500 GB, 1 TB, 2 TB |
| 3.5 inch | SATA III | 6Gb/s | 5.4K, 7.2K | 2 TB, 4 TB, 8 TB, 12 TB, 16 TB, 20 TB |
| M.2 | SATA III | 6Gb/s | SSD | 240 GB, 480 GB |

NIC Modules (Optional)

HAN-8360B comes with NCS2 Module for 8x Standard NIC/Storage/ Module Slots (each Storage module support 2x2.5 inch SATA SDD/HDD). The total network port can be up to 16 port Gbps. Please follow the steps for network bandwidth expansion.

1. On the front panel, select a NIC Ethernet module slot.

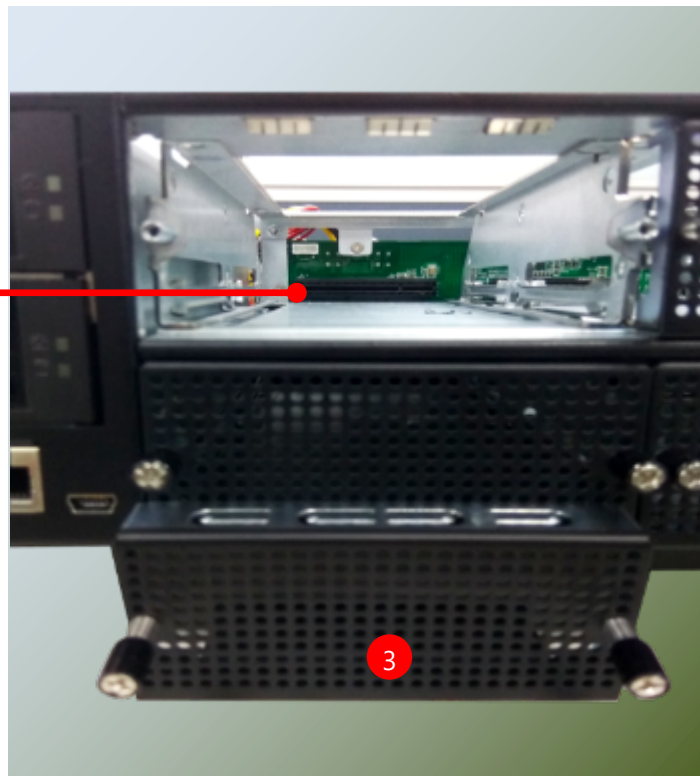


2. Rotate clockwise and loosen the two lock-screws.

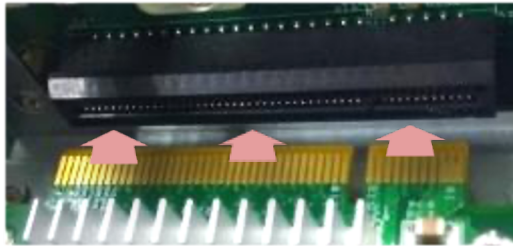


3. Remove the door and locate the PCIe socket for module insertion.

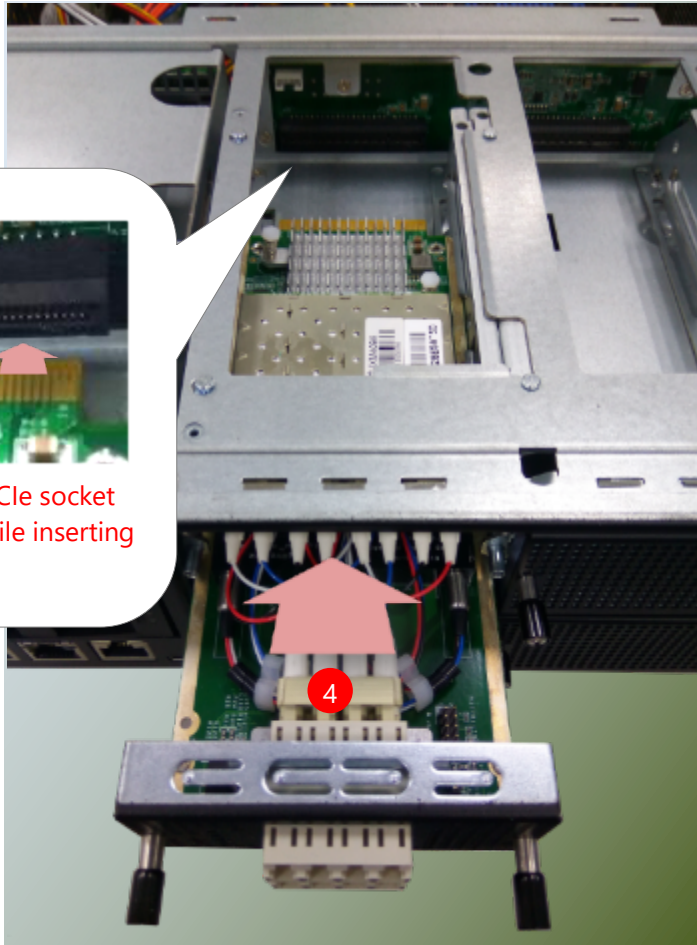
PCIe Socket



4. Insert your NIC Ethernet module.
(The module shown in the image below is for reference only).



Align the golden fingers to the PCIe socket on the motherboard carefully while inserting this module.



5. Once the module is firmly seated, rotate counter-clockwise and tighten the two lock-screws.

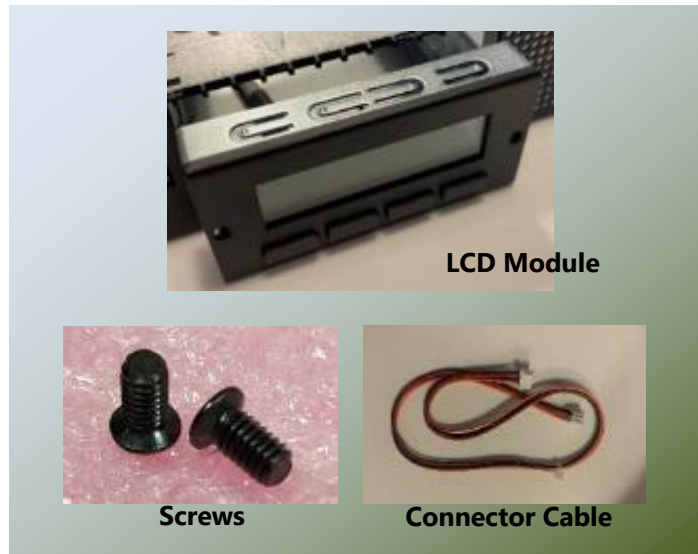


LCD Module (Optional)

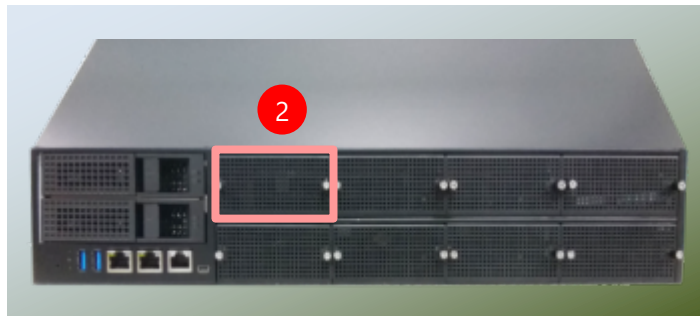
HAN-8360B comes with LCD module expansion, which can install into NCS2 Module. It is a window into the health and integrity of computing systems. These modules offer users the critical ability to monitor firmware and system status, providing real-time feedback and error detection. You can programmable it to adapt with requirement purpose.

Please follow the steps for installation.

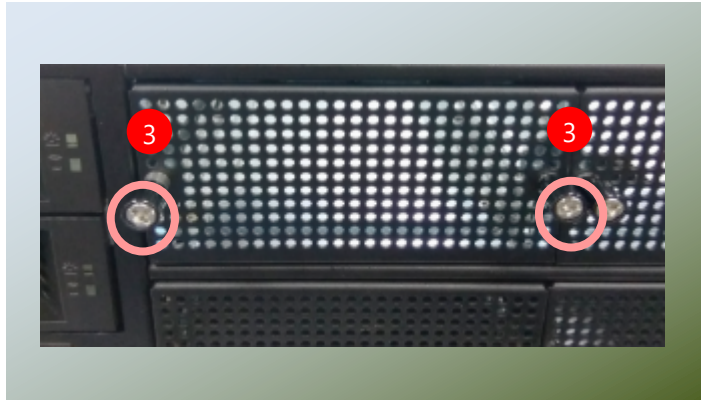
1. The LCD module package will include:
 - ▶ 1x LCD Panel with 4 control key (programmable)
 - ▶ 1x LCD connector cable
 - ▶ 2x screws



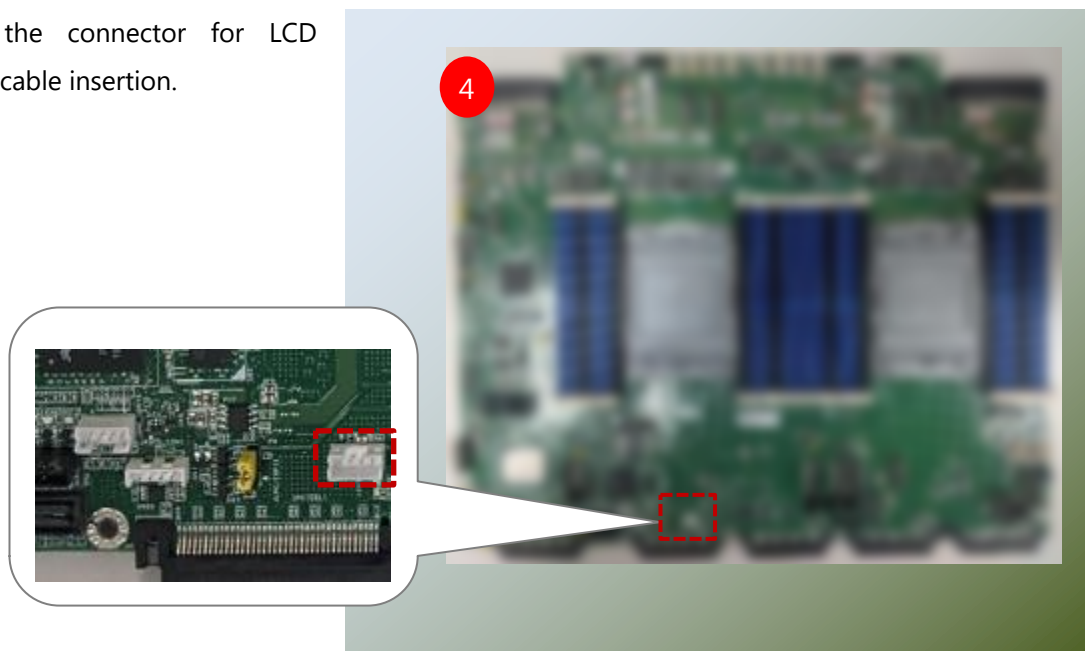
2. On the front panel of HAN-8360B, select the upper first module slot for LCD Module placement.



3. Loosen the two lock-screws and remove the door.



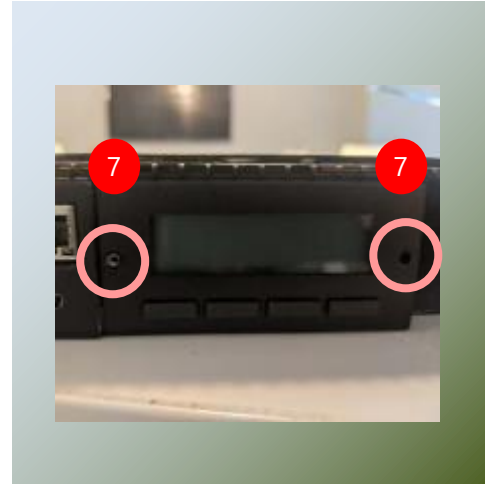
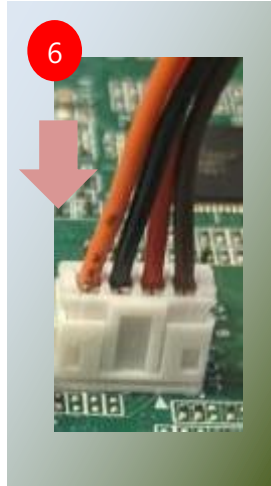
4. Locate the connector for LCD module cable insertion.



5. Install the LCD module into the module slot.



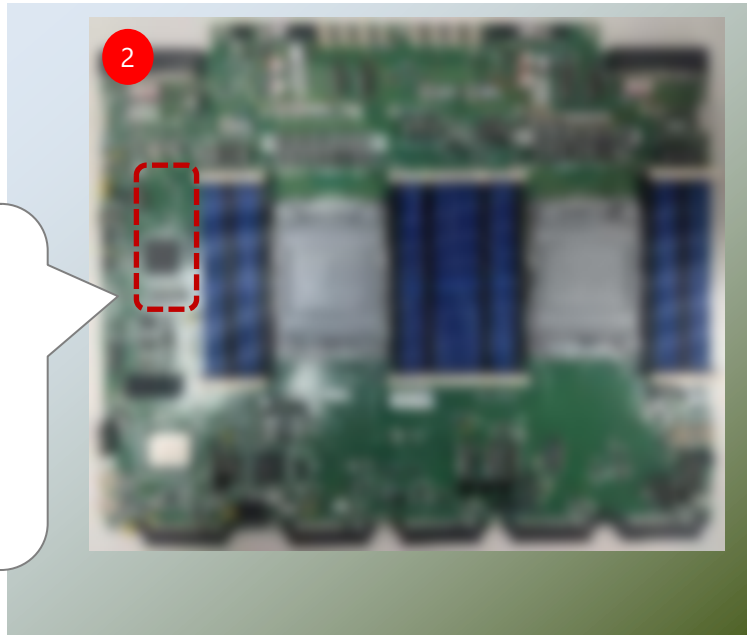
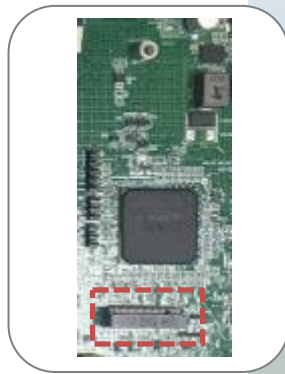
6. Insert the connector cable into the connector.
7. Rotate and screw in the two lock screws. The LCD module has been successfully installed.



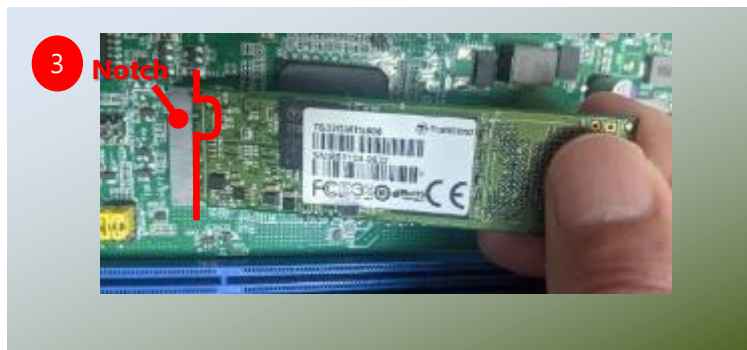
M.2 SSD memory card (Optional)

HAN-8360B comes with an additional M.2 SSD memory card slot. Please follow the steps for installation.

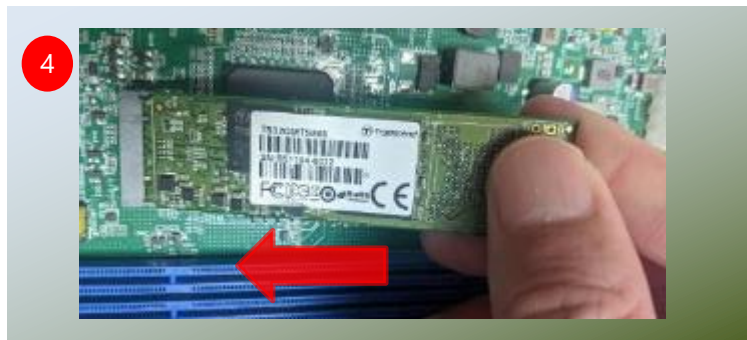
1. Power off the system.
2. Locate the M.2 slot on the motherboard.



3. Align the notch of the M.2 memory card with the socket key in the pin slot.



4. Insert the M.2 memory card pins at 30 degrees into the socket until it is fully seated.



5. Push down on the module and secure it with a screw.

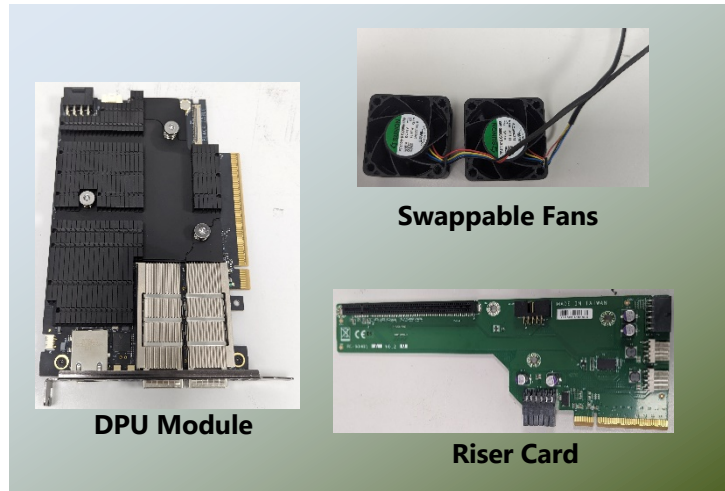


DPU Expansion Card (Optional)

HAN-8360B supports one PCIe x8 FH/HL slot for DPU card expansion. The DPU card requires a rather complex installation process; therefore, the assembly must be handled with care. Please read through the instructions in this section to make sure you have acquired the necessary knowledge and comply with the requirements.

1. The DPU Expansion Kit will include:

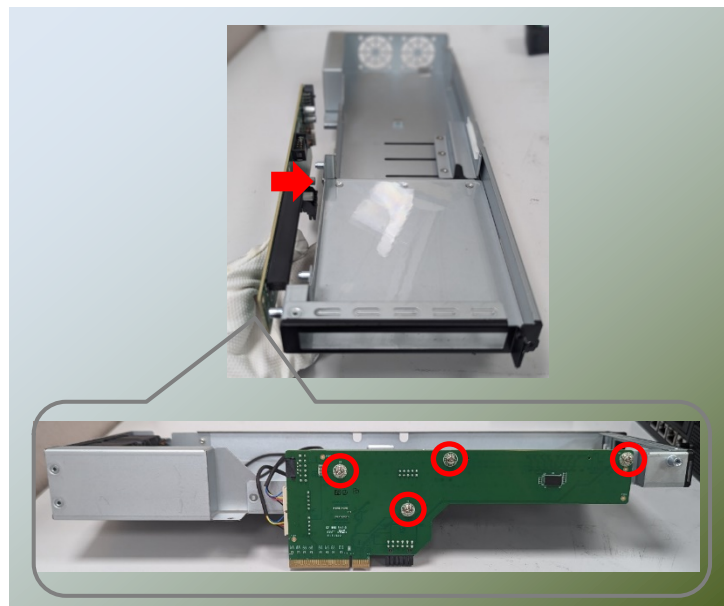
- ▶ 1x DPU Module
- ▶ 1x Riser Card
- ▶ 2x Swappable Fans
- ▶ Screw packet



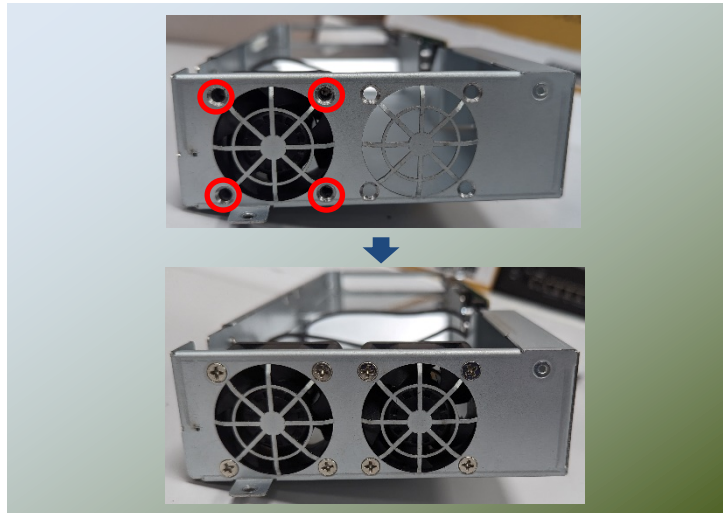
2. Power off the system and open the chassis cover.
3. Unscrew the seven (7) screws of the fan hood/shroud and PCIe bracket cover, on the rear panel. Lift up the fan hood/shroud and PCIe slot bracket cover.



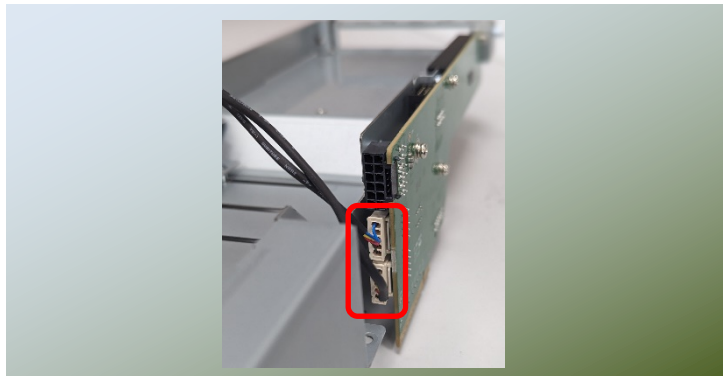
4. Pick up the PCIe bracket, and the Riser card. Place the Riser card on the side of the bracket and secure with four (4) screws.



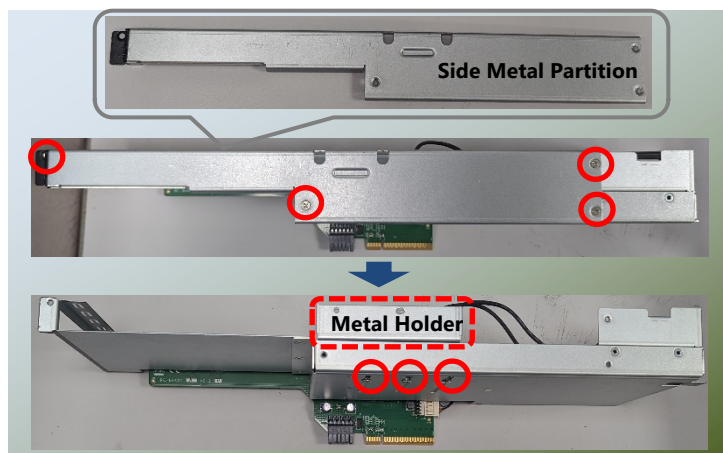
5. Next, we install the fans to the PCIe bracket. Secure the fan with four (4) screws each.



6. Then, connect the fan power cables to the Riser Card.

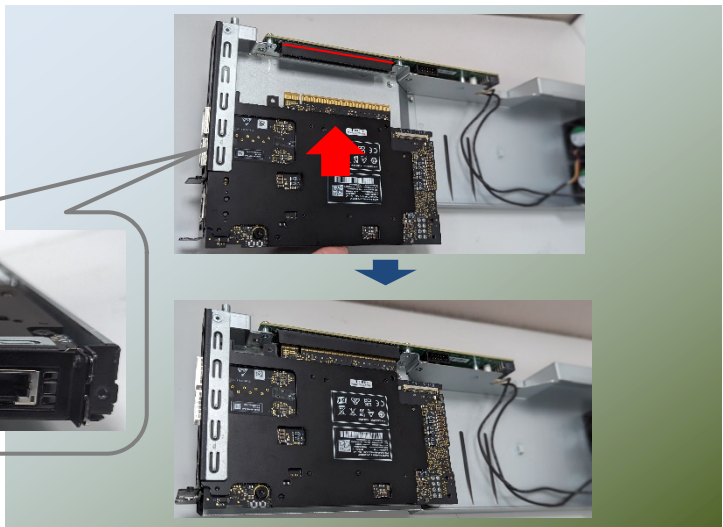


7. Pick up the PCIe bracket, unscrew the four (4) screws on the side to remove the side metal partition. And unscrew the three (3) screws to remove the metal holder.

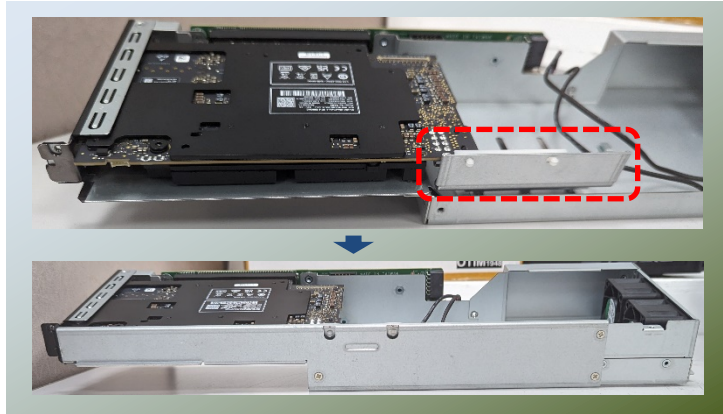


8. Align the DPU module to the PCIe socket. Slide the DPU module into the PCIe socket until it is completely seated.

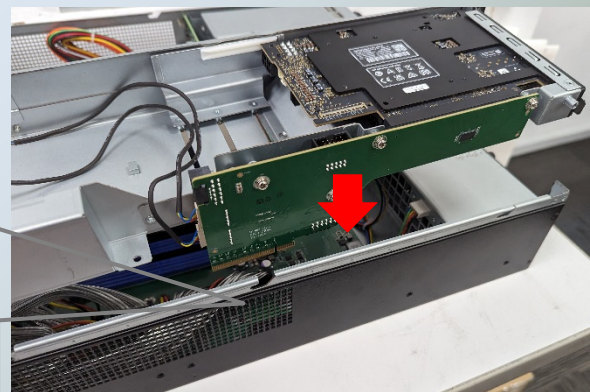
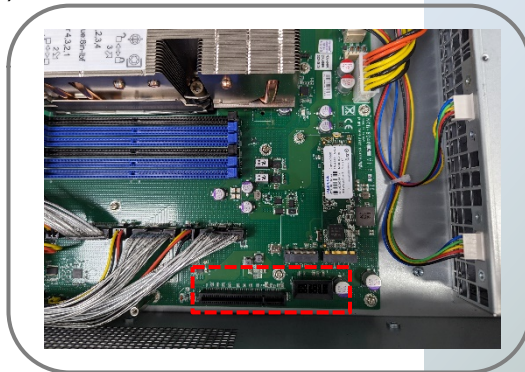
Make sure the side bar slides in properly (as pictured below).



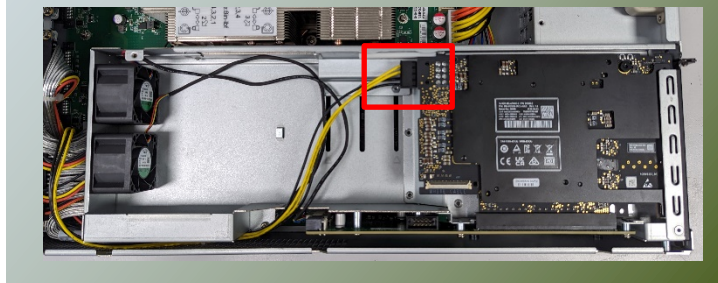
9. Place the metal holder on the side of the DPU module, and secure with the original three (3) screws. Then place the metal partition back in place and secure with the original four (4) screws.



10. Align the socket key of the Riser Card to the socket key on the motherboard. Gently insert until it is firmly seated. Then, secure the PCIe bracket with the original three (3) screws.



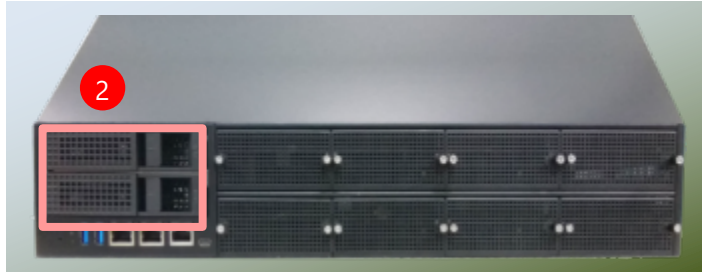
11. Lastly, insert the DPU power cable to the DPU module. The fan hood/shroud can also be secured back on the motherboard.



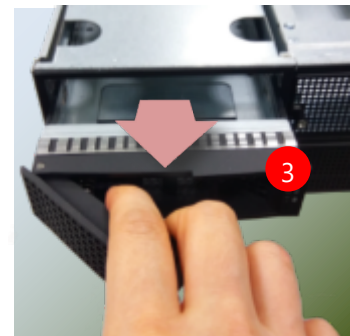
Dual SD card (Optional)

HAN-8360B is built with two 3.5" HDD/SSD drive bay which can be used for a dual SD card with capacity support 16/32/64GB. Dual SD Card Redundancy is a feature that adds a significant layer of reliability to Lanner's products, especially those deployed in industrial and mission-critical environments.

1. Power off the system.
2. Locate the 3.5" disk bay on the front panel.

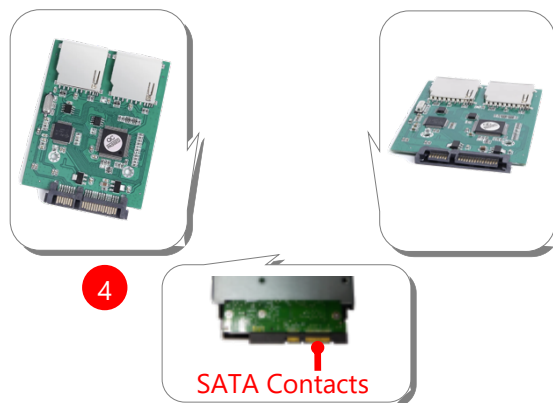


3. To remove the tray, put your finger on the tab and push it to the left to slide it open, hold the tab lever and pull out the tray.



4. The tray is designed to accommodate one dual SD card.

Secure board on the tray with the provided disk screws. Make sure the disk SATA connector faces towards the SATA contacts inside the system.



Cooling Fans

Cooling fans may wear down eventually. Please refer to the steps below for replacing cooling fans. When using a new cooling fan, simply reverse the steps to install the fan back onto the enclosure and the system.

1. Locate the cooling fans at the rear panel.



2. Using a screwdriver, loosen the two (2) lock-screws of the fan you would like to replace.



3. Hold onto the two lock-screws and pull it out.



4. Insert a new fan. Push the fan unit in until it clicks into place and secure with the two (2) lock-screws.

Power Supply Units

Power supply units may wear down eventually. Please be noted that HAN-8360B series supports 1300W 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. Press and hold the handle to pull out the power supply unit.

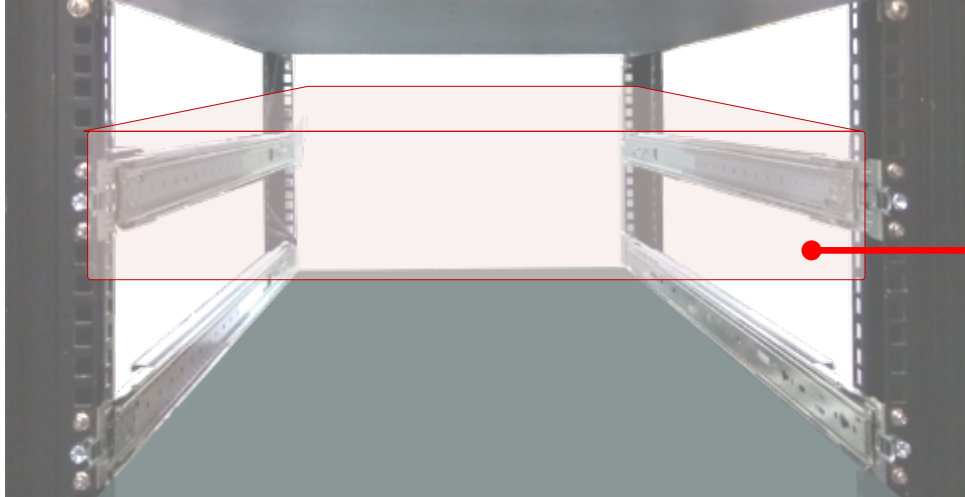


3. Insert a new power supply unit. Push the unit in until it clicks into place.



Mounting the System

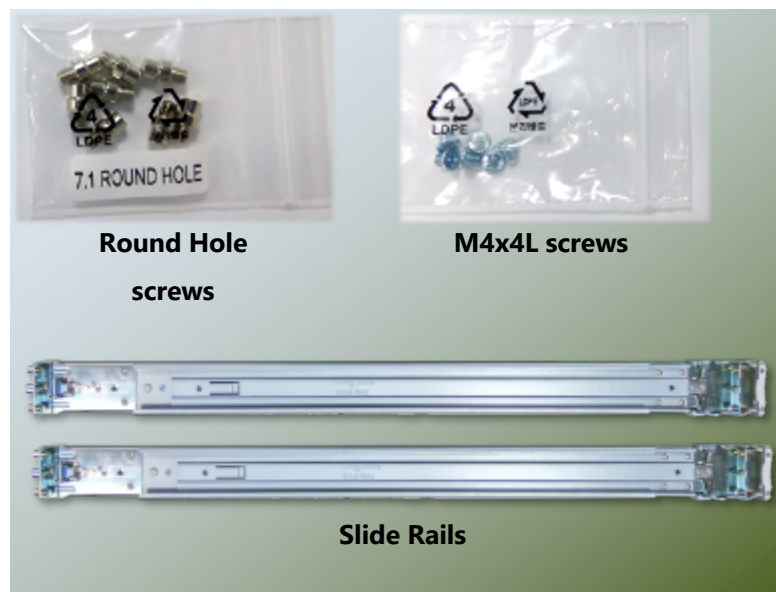
The system can be installed in a rack using the Slide Rail Kit plus Short Mounting Ear brackets (optional). This method is rather complicated, but the slidable rails allow you to access the system easily while solidly securing the system in the rack. Please follow the steps below for installation.



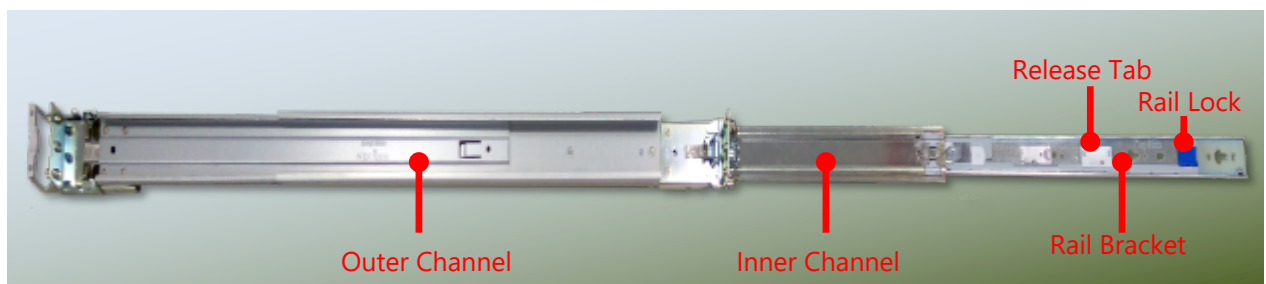
The Slide Rail Kit can secure the system while providing sufficient weight support for the device.

1. Check the package contents of the Slide Rail Kit. The kit shall include the following items:

- ▶ 1x pack of M4X4L screws (for securing the sliding rail on the system)
- ▶ 1x pack of 7.1mm Round Hole screws (for securing the system on the rail posts)
- ▶ 2x Slide Rails

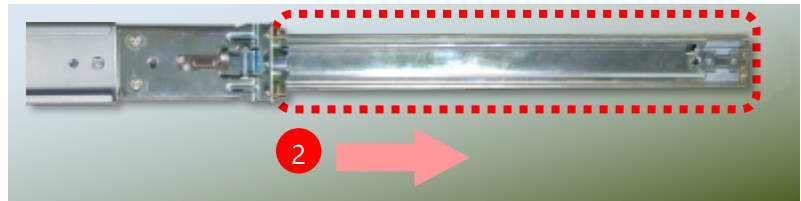


The rail consists of the following parts:

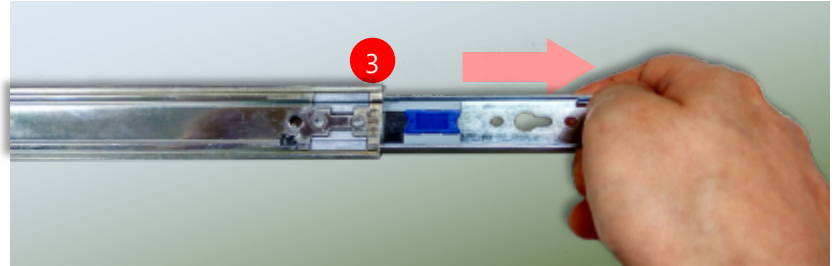


Attaching the Rail Brackets

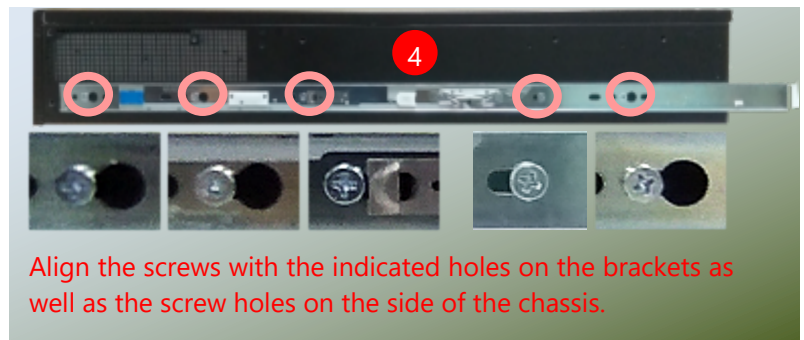
2. Unpack a slide rail and slide the inner channel all the way to the end.



3. Remove the bracket from the Inner Rail by pushing the Release Tab on the bracket outwards while sliding it out. Stretch the bracket to the fullest.



4. Align the bracket to the side of the chassis and make sure the screw-holes are matched, and then secure the bracket onto the chassis with five provided M4X4L screws.

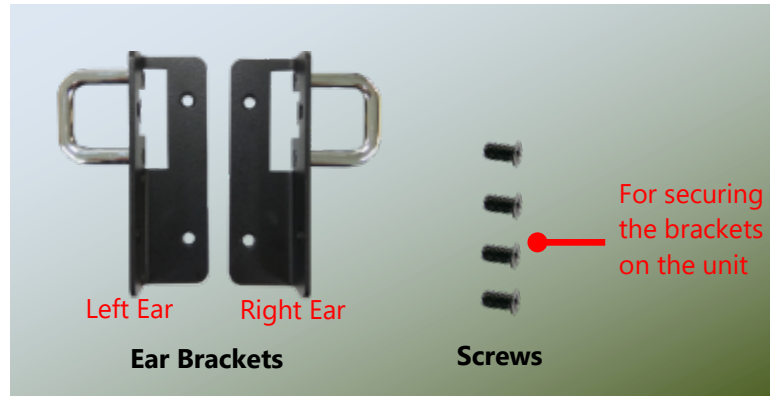


5. Repeat Steps 2~5 to attach the bracket to the other side of the chassis.

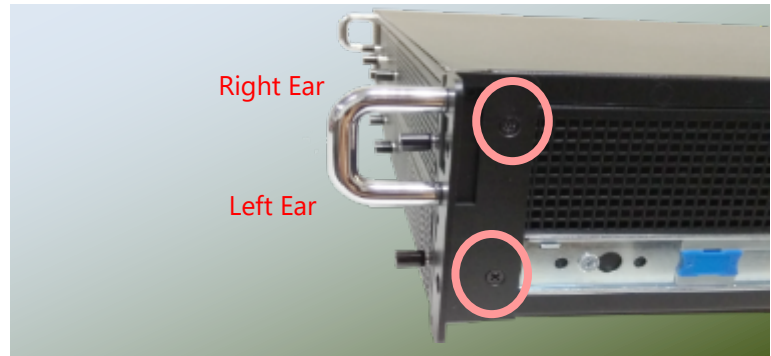


Assembling the Ear Brackets

1. Check the package contents. The supplied mounting kit shall include the items below:
 - ▶ 1x pack of screws
 - ▶ 2x Standard Ear Brackets



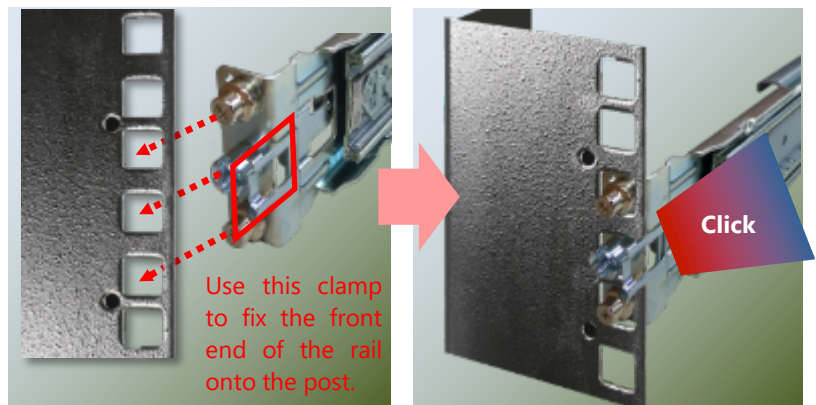
- 2.** Install the brackets on both sides of the system using the provided screws.



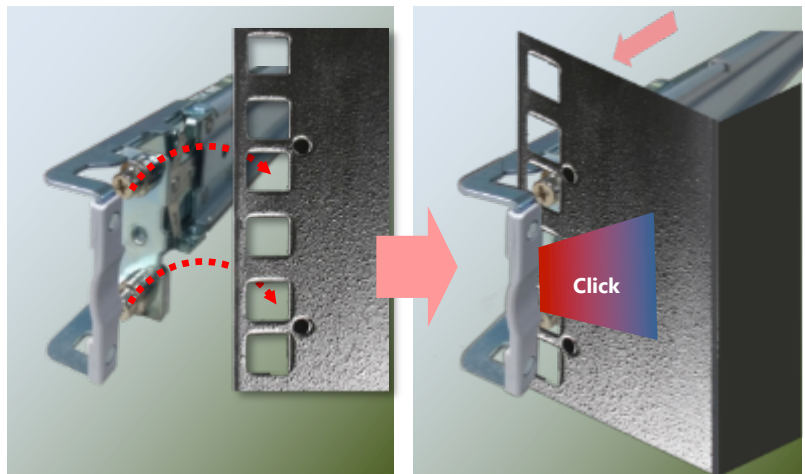
Installing the Slide Rails

Next, you shall install the slide rail assemblies onto the rack.

1. This slide-rail kit does NOT require screw-fixing. Simply aim at three (3) available screw holes on the rack front and snap the rail front into the rack post as shown in the image below. You should hear a "click" sound once it is firmly attached.

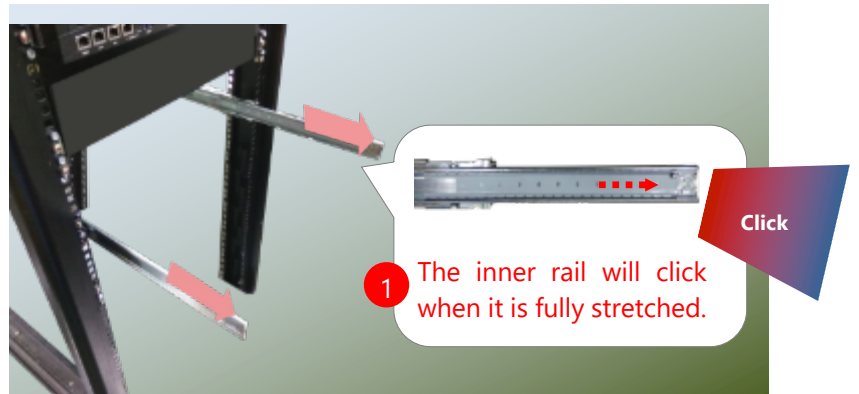


2. For the rear rack installation, slide the rail to aim and engage the bolts on the rail's rear end with the 2 available holes on the post, and the rail assembly will click into place.

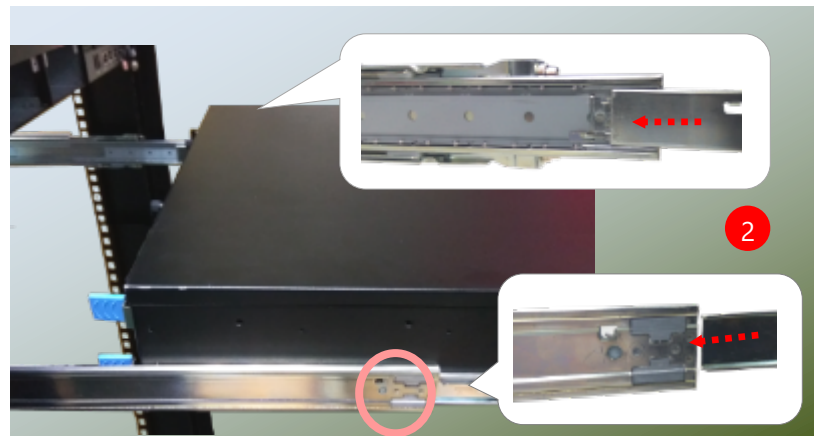


Installing the System into the Rack

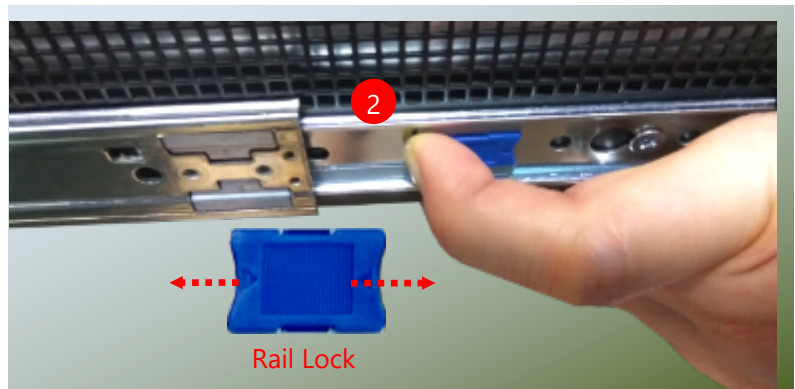
1. Stretch both of the inner rails out to their fullest extent. You will hear a click sound when they are fully stretched and locked.



2. Hold the system with its front facing you, lift the chassis and gently engage the brackets on the model while aligning them with the slide-rail assemblies as shown in the image below, and then push the system into the cabinet.



3. While pushing in the system, please also push and hold the Rail Lock tab on both brackets.



The system has completed installation in the rack.



Removing the System from the Rack

1. To remove the system from the rack, gently pull it outwards towards you while pushing the Release Tab on both sides of the brackets.



CHAPTER 4: REMOTE SERVER MANAGEMENT

Overview

This chapter will introduce the features of Lanner's BMC firmware and how to perform server remote management through it. Lanner has implemented IPMI 2.0 based on ASPEED service processor and support for the TLS 1.3 encryption protocol over HTTPS. The AST2500 is powered by 1024MB of RAM is a highly versatile System-on-Chip (SoC), solution designed to provide comprehensive remote access and management capabilities for servers and data center infrastructure. Its extensive feature set, coupled with integration into Lanner product, makes it an ideal choice for demanding server management scenarios. In addition, Lanner's BMC firmware runs an embedded web-server for full configuration using Web UI, which has a low learning curve.

BMC Main Features

| Feature | | Description |
|----------------------------|-------------------------------|--|
| IPMI 2.0 Standard Features | System Interface support | <ul style="list-style-type: none"> • KCS (System Interface Support) • LAN (RMCP+) |
| | IPMI 2.0 based Management | <ul style="list-style-type: none"> • BMC stack with an IPMI 2.0 implementation |
| | System Management | <ul style="list-style-type: none"> • Sensor monitoring • System power management • Watchdog timer • Fan speed monitor and control • FRU information |
| | Event Log | <ul style="list-style-type: none"> • System Event Log (SEL) |
| | Text Console Redirection: SOL | <ul style="list-style-type: none"> • Support in IPMI stack for SOL to remotely access BIOS and text console before OS booting |
| Non-IPMI functions | User Management | <ul style="list-style-type: none"> • IPMI based user management • Multiple user permission level |
| | Web User Interfaces | <ul style="list-style-type: none"> • BMC management via web user interface • Integrated KVM and Virtual Media |
| | User authorization | <ul style="list-style-type: none"> • RADIUS support • LDAP support |
| | Security | <ul style="list-style-type: none"> • SSL and HTTPS support • TLS 1.3 support |
| | Maintenance | <ul style="list-style-type: none"> • 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 summarizes 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 2.0 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 |

References

Please refer the followings document and video for more detail information

- AST 2500 & AST 2600 BMC LTC Specification Manual
 - <https://www.lannerinc.com/support/download-center/software/category/31-network-appliances?download=617:ast2500-ast2600-bmc-ltc-specification-manual>
- IPMI Remote Monitoring
 - <https://www.youtube.com/watch?v=O2gmiYMdrb4>

CHAPTER 5: BIOS FUNCTION

The system has AMI BIOS built-in, with a SETUP utility that allows users to configure required settings or to activate certain system features. Pressing the <Tab> or key immediately allows you to enter the Setup Utility.

Enter BIOS Setup

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

1. Boot up the system.
2. Press **<Delete>** during the boot-up if you connect a keyboard to this unit. But if you connect a PC to this unit through console USB/Serial connection, then press **<Tab>**. Your system should be running POST (Power-On-Self-Test) upon booting up.
3. Then you will be directed to the BIOS main screen.
4. Instructions of BIOS navigations:

| Control Keys | Description |
|--------------|---|
| →← | select a setup screen, for instance, [Main], [Advanced], [Platform], [Socket], [Server Mgmt], [Security], [Boot], and [Save & Exit] |
| ↑↓ | select an item/option on a setup screen |
| <Enter> | select an item/option or enter a sub-menu |
| +/- | to adjust values for the selected setup item/option |
| F1 | to display General Help screen |
| F2 | to retrieve previous values, such as the parameters configured the last time you had entered BIOS. |
| F3 | to load optimized default values |
| F4 | to save configurations and exit BIOS |
| <Esc> | exit the current screen |

Main Page

Setup Main Page contains BIOS information and project version information.

| Item | Description |
|--------------------|---|
| BIOS Information | BIOS Vendor: American Megatrends Core Version: AMI Kernel version, CRB code base, X64 Compliance : UEFI version, PI version Project Version: BIOS release version Build Date and Time: MM/DD/YYYY Access Level: Administrator / User |
| Memory Information | Total Memory: by case |
| System Date | To set the Date, use <Tab> to switch between Date elements. Default range of Year: 2005-2099 Default range of Month: 1-12 Days: dependent on Month. |
| System Time | To set the Date, use <Tab> to switch between Date elements. |

Advanced Setup

Select the Advanced menu tab from the BIOS setup screen to enter the “Advanced” setup screen. Users can select any of the items in the left frame of the screen.

Trusted Computing

This option allows you to configure parameters regarding BIOS support for security device.

| Feature | Options | Description |
|-------------------------|---------------------|---|
| Security Device Support | Enabled Disabled | Enables or disables BIOS support for security device. By disabling this function, OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available. |

Trusted Computing (TPM1.2)

| Item | Option | Description |
|-------------------------|----------------------------|--|
| Security Device Support | Enabled Disabled | Enables or disables BIOS support for the security device. By disabling this function, OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available. |
| TPM State | Enabled Disabled | Enables or disables Security Device. NOTE: Your computer will reboot during a restart in order to change State of the Device. |
| Pending operation | None TPM Clear | Schedules an Operation for the Security Device. NOTE: Your computer will reboot during a restart in order to change State of Security Device. |
| Device Select | TPM 1.2 TPM 2.0 Auto | TPM 1.2 will restrict support to TPM 1.2 devices; while TPM 2.0 will restrict support to TPM 2.0 devices; Auto will support both with the default set to TPM 2.0 devices. If not found, TPM 1.2 devices will be enumerated. |

Trusted Computing (TPM 2.0)

| Item | Option | Description |
|--------------------------------|----------------------------|--|
| Security Device Support | Enabled Disabled | Enables or disables BIOS support for security device. By disabling this function, OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available. |
| SHA-1 PCR Bank | Enabled Disabled | Enables or disables SHA-1 PCR Bank. |
| SHA256 PCR Bank | Enabled Disabled | Enables or disables SHA256 PCR Bank. |
| Pending operation | None TPM Clear | Schedules an Operation for the Security Device. NOTE: Your computer will reboot during restart in order to change State of Security Device. |
| Platform Hierarchy | Enabled Disabled | Enables or disables Platform Hierarchy. |
| Storage Hierarchy | Enabled Disabled | Enables or disables Storage Hierarchy. |
| Endorsement Hierarchy | Enabled Disabled | Enables or disables Endorsement Hierarchy. |
| TPM2.0 UEFI Spec Version | TCG_1_2 TCG_2 | Select the TCG2 Spec Version, TCG_1_2: Supports the Compatible mode for Win8/Win10 TCG_2: Supports new TCG2 protocol and event format for Win10 or later. |
| Physical Presence Spec Version | 1.2 1.3 | Select to tell OS to support PPI Spec Version 1.2 or 1.3. NOTE: Some HCK tests might not support 1.3. |
| TPM 20 Interface Type | TIS | Select TPM 20 Device for the Communication Interface. |
| Device Select | TPM 1.2 TPM 2.0 Auto | TPM 1.2 will restrict support to TPM 1.2 devices; while TPM 2.0 will restrict support to TPM 2.0 devices; Auto will support both with the default set to TPM 2.0 devices. If not found, TPM 1.2 devices will be enumerated. |

Super IO Configuration

This option allows you to configure parameters about Super IO Chip.

Serial Port 1 Configuration

Select "Serial Port 1 Configuration" or "Serial Port 2 Configuration" to enter sub setting screen.

| Item | Option | Description |
|-----------------|---------------------|------------------------------------|
| Serial Port | Enabled Disabled | Enables or disables Serial Port 1. |
| Device Settings | NA | IO=3F8h; IRQ = 4 |

Serial Port 2 Configuration

| Item | Option | Description |
|-----------------|---------------------|-----------------------------------|
| Serial Port | Enabled Disabled | Enables or disables Serial Port 2 |
| Device Settings | NA | IO=2F8h; IRQ = 3 |

Digital IO Configuration

This option allows you to configure parameters about Digital IO pins.

| Item | Option | Description |
|----------------------|---------------------------|----------------------------|
| Digital I/O Output 1 | Output High Output Low | Configure Digital I/O Pin5 |
| Digital I/O Output 2 | Output High Output Low | Configure Digital I/O Pin6 |
| Digital I/O Output 3 | Output High Output Low | Configure Digital I/O Pin7 |
| Digital I/O Output 4 | Output High Output Low | Configure Digital I/O Pin8 |

Status LED Configuration

This option allows you to change the color of status LED.

| Item | Option | Description |
|------------|---------------------|-----------------------------|
| Status LED | OFF GREEN RED | Configures Status LED color |

Watch Dog Timer Configuration

This option allows you to enable or disable the watchdog timer function.

| Item | Option | Description |
|-----------------|---------------------|--|
| Watch Dog Timer | Enabled Disabled | Enables or disables Watch Dog Timer function |

Serial Port Console Redirection

This option allows you to configure parameters about serial port console redirection. Press <Enter> to access the submenu.

| Item | Option | Description |
|-----------------------------|---------------------|---|
| COM0 Console Redirection | Enabled Disabled | Enables or disables Console Redirection |

Console Redirection Settings

These settings specify how the host computer and the remote computer will exchange data. Both computers should have the same or compatible settings.

| Item | Option | Description |
|------------------------------|---|--|
| Terminal Type | VT100 VT100+ VT-UTF8 ANSI | VT100: ASCII char set VT100+: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes ANSI: Extended ASCII char set |
| Bits per second | 9600 19200 38400 57600 115200 | Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds. |
| Data Bits | 7 8 | Data Bits |
| Parity | None Even Odd Mark Space | A parity bit can be sent with the data bits to detect some transmission errors. |
| Stop Bits | 1 2 | Indicates the end of a serial data packet. |
| Flow Control | None Hardware RTS/CTS | Flow Control can prevent data loss from buffer overflow. |
| VT-UTF8 Combo Key Support | Disabled Enabled | Enables VT-UTF8 Combination Key Support for ANSI/VT100 terminals |
| Recorder Mode | Disabled Enabled | With this mode enabled, only text will be sent. This is to capture Terminal data. |
| Resolution | Disabled | Enables or disables extended terminal resolution |

| | | |
|--------------|--|--|
| 100x31 | Enabled | |
| Putty KeyPad | VT100 LINUX XTERM86 SCO ESCN VT400 | Selects FunctionKey and KeyPad on Putty. |

Legacy Console Redirection Settings

This option allows you to configure legacy console redirection options. Press <**Enter**> to access the submenu.

| Item | Option | Description |
|----------------------------------|-------------------------------------|---|
| Legacy Serial Redirection Port | COM0 | Select a COM port to display redirection of Legacy OS and Legacy OPROM Messages |
| Legacy OS Redirection Resolution | 80x24 80x25 | On Legacy OS, the Number of Rows and Columns supported redirection. |
| Redirection After BIOS POST | Always Enable Boot Loader | When Bootloader is selected, legacy Console Redirection is disabled before booting to legacy OS. When Always Enable is selected, then Legacy Console Redirection is enabled for legacy OS. Default setting for this option is set to Always Enable . |

PCI Subsystem Settings

This option allows you to change the PCI, PCI-X and PCI Express settings.

| Item | Option | Description |
|----------------------|----------------------------|---|
| Above 4G Decoding | Disabled Enabled | Enables or disables 64bit capable Devices to be Decoded in Above 4G Address Space (Only if System Supports 64-bit PCI Decoding) |
| SR-IOV Support | Disabled Enabled | If the system has SR-IOV capable PCIe Devices, this option enables or disables Single Root IO Virtualization Support. |

USB Configuration

This option allows you to change USB configuration parameters.

| Item | Option | Description |
|---------------------------------|------------------------------------|---|
| Legacy USB Support | Enabled Disabled Auto | Enables Legacy USB support. Auto option disables legacy support if no USB devices are connected; Disabled option will keep USB devices available only for EFI applications. |
| XHCI Hand-off | Enabled Disabled | This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver. |
| USB Mass Storage Driver Support | Enabled Disabled | Enables or disables USB Mass Storage Driver Support. |
| USB transfer time-out | 1 sec 5 sec 10 sec 20 sec | The time-out value for Control, Bulk, and Interrupt transfers |
| Device reset time-out | 1 sec 5 sec 10 sec 20 sec | USB mass storage device Start Unit command time-out |
| Device power-up delay | Auto Manual | Maximum time the device will take before it properly reports itself to the Host Controller. Auto uses default value: for a Root port, it is 100 ms, for a Hub port the delay is taken from Hub descriptor. |

Network Stack Configuration

This option enables or disables UEFI network stack.

| Item | Option | Description |
|-------------------------|---------------------|--|
| Network Stack | Disabled Enabled | Enables or disables UEFI Network Stack |
| Ipv4 PXE Support | Disabled Enabled | Enables Ipv4 PXE Boot Support. If IPV4 is disabled, PXE boot option will not be created. |
| Ipv4 HTTP/HTTPS Support | Disabled Enabled | Enables Ipv4 HTTP/HTTPS Boot Support. If IPV4 is disabled, HTTP boot option will not be created. |
| Ipv6 PXE Support | Disabled Enabled | Enables Ipv6 PXE Boot Support. If IPV6 is disabled, PXE boot option will not be created. |
| Ipv6 HTTP/HTTPS Support | Disabled Enabled | Enables Ipv6 HTTP/HTTPS Boot Support. If IPV6 is disabled, HTTP/HTTPS boot option will not be created. |
| PXE boot wait time | 0 | Wait time to press <ESC> key to abort the PXE boot |
| Media detect count | 1 | Number of times the presence of media will be checked |

CSM Configuration

This option allows you to enable or disable ROM execution settings.

| Item | Option | Description |
|------------------|---------------------------------|---|
| CSM Support | Disabled Enabled | Enables or disables CSM Support |
| Network | Do Not Launch UEFI Legacy | Controls the execution of UEFI and Legacy PXE OpROM |
| Storage | Do Not Launch UEFI Legacy | Controls the execution of UEFI and Legacy Storage OpROM |
| Video | Do Not Launch UEFI Legacy | Controls the execution of UEFI and Legacy Video OpROM |
| Other PCI device | Do Not Launch UEFI Legacy | Determines OpROM execution policy for devices other than Network, Storage, or Video |

Control Legacy PXE Boot

This option allows you to configure Legacy PXE boot settings.

| Item | Option | Description |
|---------------------------------|--------------------------------------|---------------------------|
| Control Legacy PXE Boot from | Disabled LAN1(i350) LAN2(i350) | Select On Board LAN# Boot |

Platform Setup

Use [→] or [←] to select [Platform] setup screen. Under this screen, you may use [↑] [↓] to select an item you want to configure.

| Item | Option | Description |
|-------------------------|--------|--|
| PCH Configuration | None | Displays and provides option to change the PCH Settings |
| Server ME Configuration | None | Configure Server ME Technology Parameters |
| Runtime Error Logging | None | Press <Enter> to view or change the runtime error log configuration. |

PCH Configuration

This option displays and provides options to change the PCH Settings.

| Item | Option | Description |
|---------------------------|-------------------------------------|--|
| PCI Express Configuration | None | PCI Express Configuration settings |
| PCH sSATA Configuration | None | sSATA devices and settings |
| Restore AC Power Loss | Power On Power Off Last State | Select S0/S5 for ACPI state after a G3 |
| Serial IRQ Mode | Quiet Continuous | Configure Serial IRQ Mode. |

PCI Express Configuration

This option allows you to configure PCI express related options.

| Item | Option | Description |
|-------------------------------------|--|--|
| PCIe Root Port Function Swapping | Disabled Enabled | Enable PCIe root port function swapping feature to dynamically assign function 0 to enabled root port. |
| Max Read Request Size | MRRS 128B MRRS 256B MRRS 512B MRRS 1024B MRRS 2048B MRRS 4096B | PCIE Max Read Request Size Selection. |

PCH sSATA Configuration

This option allows you to configure SATA devices related options.

| Item | Option | Description |
|--|--|--|
| SATA Controller | Disabled Enabled | Enables or disables SATA Controller |
| Configure SATA as | AHCI RAID | This will configure SATA as RAID or AHCI . |
| Support Aggressive Link Power Management | Disabled Enabled | Enables or disables SALP |
| Port 0/2/3/4/5 | Disabled Enabled | Enable or Disable SATA Port |
| Hot Plug | Disabled Enabled | Designates this port as Hot Pluggable. |
| Configure as eSATA | Disabled Enabled | Configures port as External SATA (eSATA) |
| Spin Up Device | Disabled Enabled | If enabled for any of ports Staggered Spin Up will be performed and only the drives witch have this option enabled will spin up at boot. Otherwise all drives spin up at boot. |
| SATA Device Type | Hard Disk Drive Solid State Drive | Identify the SATA port is connected to Solid State Drive or Hard Disk Drive |
| SATA Topology | Unknown ISATA Direct Connect Flex M2 | Identify the SATA Topology if it is Default or ISATA or Flex or Direct Connect or M2 |

Runtime Error Logging

This option configures runtime error logging parameters.

| Item | Option | Description |
|---------------|---------------------|--|
| System Errors | Disabled Enabled | System Error Enable/Disable setup options. |

Socket Setup

Use [→] or [←] to select [Socket] setup screen. Under this screen, you may use [↑] [↓] to select an item you want to configure.

| Item | Option | Description |
|---|---------------------|--|
| Processor Configuration | None | Displays and provides option to change the Processor Settings |
| Memory Configuration | None | Displays and provides option to change the Memory Settings |
| IIO Configuration | None | Displays and provides option to change the IIO Settings |
| Advanced Power Management Configuration | None | Displays and provides option to change the Power Management Settings |
| Numa | Disabled Enabled | Displays and provides option to change the Power Management Settings |

Processor Configuration

In Processor Configuration, you can change the processor settings and view the current parameters.

| Item | Option | Description |
|---------------------------|---------------------|---|
| Hyper-Threading [ALL] | Disabled Enabled | Enables Hyper Threading (Software Method to Enable/Disable Logical Processor threads. |
| Machine Check | Disabled Enabled | Enable or Disable the Machine Check |
| Hardware Prefetcher | Disabled Enabled | = MLC Streamer Prefetcher (MSR 1A4h Bit[0]) |
| Adjacent Cache Prefetcher | Disabled Enabled | = MLC Spatial Prefetcher (MSR 1A4h Bit[1]) |
| Extended APIC | Disabled Enabled | Enables or disables extended APIC support |
| Enable Intel® TXT | Disabled Enabled | Enables Intel(R) TXT |
| VMX | Disabled Enabled | Enables the Vanderpool Technology, which takes effect after reboot. |
| Enable SMX | Disabled Enabled | Enables Safer Mode Extensions |
| AES-NI | Disabled Enabled | Enables or disables AES-NI support |

Per-Socket Configuration

Enter to configure the settings related to processor socket options.

| Item | Option | Description |
|---------------------------|--------|-------------|
| CPU Socket0 Configuration | None | None |
| CPU Socket1 Configuration | None | None |

CPU Socket 0 Configuration

| Item | Option | Description |
|---------------------------|--------|---|
| Core Disable Bitmap (Hex) | 0 | 0: Enable all cores. FFFFFFFF: Disable all cores least one core per CPU must be enabled. Disabling all cores is an invalid configuration. |

CPU Socket 1 Configuration

| Item | Option | Description |
|------------------------------|--------|---|
| Core Disable Bitmap (Hex) | 0 | 0: Enable all cores. FFFFFFFF: Disable all cores least one core per CPU must be enabled. Disabling all cores is an invalid configuration. |

Memory Configuration

In Memory Configuration, you can change memory settings.

| Item | Option | Description |
|------------------|-------------|--|
| Memory Frequency | Auto | Maximum Memory Frequency Selections in Mhz. Do not select Reserved |
| | 1200 | |
| | 1333 | |
| | 1400 | |
| | 1600 | |
| | 1800 | |
| | 1866 | |
| | 2000 | |
| | 2133 | |
| | 2200 | |
| | 2400 | |
| | 2600 | |
| | 2666 | |
| | 2800 | |
| | 2933 | |
| | 3000 | |
| | 3200 | |
| | 3400-OvrClk | |
| | 3466-OvrClk | |
| | 3600-OvrClk | |
| | 3733-OvrClk | |
| | 3800-OvrClk | |
| | 4000-OvrClk | |
| | 4200-OvrClk | |
| | 4266-OvrClk | |
| | 4400-OvrClk | |
| | 4800-OvrClk | |
| Memory Topology | None | Displays memory topology with Dimm population information |

I/O Configuration

In I/O Configuration, you can change socket settings and view the current parameters.

| Item | Option | Description |
|-----------------------------------|---|--|
| Socket0 Configuration | None | None |
| Socket1 Configuration | None | None |
| IOAT Configuration | None | All IOAT configuration options |
| Intel® VT for Directed I/O (VT-d) | None | Press <Enter> to bring up the Intel® VT for Directed I/O (VT-d) Configuration menu. |
| Intel® VMD technology | None | Press <Enter> to bring up the Intel® VMD for Volume Management Device Configuration menu. |
| PCI-E ASPM Support (Global) | No Per-Port L1 Only | This option enables / disables the ASPM support for all downstream devices. |
| PCIe Extended Tag Enable | Auto No Yes | Auto/Enable - BIOS sets 8-bit Tag Field for PCIe Root Port/End Point. Disable - BIOS sets 5-bit Tag Field for PCIe Root Port/End Point |
| PCIe Max Read Request Size | Auto 128B 256B 512B 1024B 2048B 4096B | Set Max Read Request Size in End Points |
| Socket0 Configuration | None | None |

Socket 0 Configuration

Enter to configure the settings related to PCI Express ports under Socket0.

| Item | Option | Description |
|------------------|--------|---|
| Socket 0 Port 1A | None | Settings related to PCI Express Port 1A |
| Socket 0 Port 2A | None | Settings related to PCI Express Port 2A |
| Socket 0 Port 2C | None | Settings related to PCI Express Port 2C |
| Socket 0 Port 4A | None | Settings related to PCI Express Port 4A |
| Socket 0 Port 4C | None | Settings related to PCI Express Port 4C |

| | | |
|---------------------|------|---|
| Socket 0 Port 5A | None | Settings related to PCI Express Port 5A |
|---------------------|------|---|

Socket 1 Configuration

Enter to configure the settings related to PCI Express ports under Socket1.

| Item | Option | Description |
|---------------------|--------|---|
| Socket 1 Port 1A | None | Settings related to PCI Express Port 1A |
| Socket 1 Port 1C | None | Settings related to PCI Express Port 1C |
| Socket 1 Port 1D | None | Settings related to PCI Express Port 1D |
| Socket 1 Port 2A | None | Settings related to PCI Express Port 2A |
| Socket 1 Port 2C | None | Settings related to PCI Express Port 2C |
| Socket 1 Port 4A | None | Settings related to PCI Express Port 4A |
| Socket 1 Port 4C | None | Settings related to PCI Express Port 4C |
| Socket 1 Port 5A | None | Settings related to PCI Express Port 5A |

IOAT Configuration

| Item | Option | Description |
|------------------|---------------------|---------------------------------|
| Sck0 IOAT Config | None | None |
| Sck1 IOAT Config | None | None |
| Disable TPH | No Yes | TLP Processing Hint disable |
| Prioritize TPH | Disabled Enabled | Prioritize TPH |
| Relaxed Ordering | No Yes | Relaxed Ordering Enable/Disable |

Intel® VT for Directed I/O (VT-d)

| Item | Option | Description |
|--------------------------------------|-----------|---|
| Intel® VT for Directed I/O (VT-d) | No Yes | Press <Enter> to bring up the Intel® VT for Directed I/O (VT-d) Configuration menu. |

Advanced Power Management Configuration

In Advanced Power Management Configuration, you can modify power management settings.

| Item | Option | Description |
|---------------------|--------|--|
| CPU P State Control | None | P State Control Configuration Sub Menu, include Turbo, XE and etc. |
| CPU C State Control | None | CPU C State setting |

CPU P State Control

| Item | Option | Description |
|-------------------------|---|---|
| SpeedStep(Pstates) | Disabled Enabled | Enables or disables EIST (P-States) |
| Boot performance mode | Max Performance Max Efficient Set by Intel Node Manager | Select the performance state that the BIOS will set before OS hand off. |
| CPU Flex Ratio Override | Disabled Enabled | Enable/Disable CPU Flex Ratio Programming |
| CPU Core Flex Ratio | 23 | Non-Turbo Mode Processor Core Ratio Multiplier |

CPU C State Control

| Item | Option | Description |
|---------------------------|---------------------|---|
| CPU C1 auto demotion | Disabled Enabled | Autonomous Core C-State Control |
| CPU C6 report | Disabled Enabled | Enables or disables CPU C6(ACPI C3) report to OS |
| Enhanced Halt State (C1E) | Disabled Enabled | Core C1E auto promotion Control. Takes effect after reboot. |

Server Mgmt Setup

Use [→] or [←] to select [Server Mgmt] setup screen. Under this screen, you may use [↑] [↓] to select an item you want to configure.

| Item | Option | Description |
|---------------------------|---|--|
| BMC Support | Enabled Disabled | Enable or disables interfaces to communicate with BMC. |
| Wait For BMC | Enabled Disabled | Wait for BMC response for specified time-out. In PILOTII, BMC starts at the same time when BIOS starts during AC power ON. It takes around 30 seconds to initialize Host to BMC interfaces. |
| FRB-2 Timer | Enabled Disabled | Enables or disables FRB-2 timer (POST timer). |
| FRB-2 Timer timeout | 3 minutes 4 minutes 5 minutes 6 minutes | Enter value Between 3 to 6 min for FRB-2 Timer Expiration value. |
| FRB-2 Timer Policy | Do Nothing Reset Power Down Power Cycle | Configure how the system should respond if the FRB-2 Timer expires. Not available if FRB-2 Timer is disabled. |
| OS Watchdog Timer | Enabled Disabled | If enabled, it starts a BIOS timer which can only be shut off by Management Software after the OS loads. It also helps verify that the OS is successfully loaded or follows the OS Boot Watchdog Timer policy. |
| OS Wtd Timer Timeout | 5 minutes 10 minutes 15 minutes 20 minutes | Configure the length of the OS Boot Watchdog Timer. Not available if OS Boot Watchdog Timer is disabled. |
| OS Wtd Timer Policy | Do Nothing Reset Power Down Power Cycle | Configure how the system should respond if the OS Boot Watchdog Timer expires. Not available if OS Boot Watchdog Timer is disabled. |
| System Event Log | NA | Press <Enter> to change the SEL event log configuration. |
| BMC network configuration | NA | Configure BMC network parameters. |
| View System Event Log | NA | Press <Enter> to view the System Event Log Records. |
| BMC Warm Reset | NA | Press <Enter> to do Warm Reset BMC. |

System Event Log

Use this option to change the SEL event log configuration.

| Item | Option | Description |
|------------------|--|---|
| SEL Components | Disabled Enabled | Enables or disables all features of System Event Logging during boot. |
| Erase SEL | NO Yes, On next reset Yes, On every reset | Choose options for erasing SEL. |
| When SEL is Full | Do Nothing Erase Immediately Delete Oldest Record | Choose options for reactions to a full SEL. |

BMC Network Configuration

This option allows you to configure BMC network parameters.

| Item | Option | Description |
|---------------------------------|--|--|
| Configuration Address source | Unspecified Static DynamicBmcDhcp | Select to configure LAN channel parameters statically or dynamically (by BIOS or BMC). The unspecified option will not modify any BMC network parameters during BIOS phase. |

View System Event Log

This option allows you to view the System Event Log Records.

Security Setup

Use [←] / [→] to select [Security] setup screen. Under this screen, you may use [↑] [↓] to select an item you would like to configure.

| Item | Description |
|------------------------|---|
| Administrator Password | If ONLY the Administrator's password is set, it only limits access to Setup and is only asked for when entering Setup. |
| User Password | If ONLY the User's password is set, it serves as a power-on password and must be entered to boot or enter Setup. In Setup, the User will have Administrator rights. |

Secure Boot

This option allows you to customize Secure Boot settings.

| Item | Option | Description |
|------------------|---------------------|--|
| Secure Boot | Disabled Enabled | Secure Boot is activated when Platform Key (PK) is enrolled, System mode is User/Deployed, and CSM function is disabled. |
| Secure Boot Mode | Standard Custom | Secure Boot mode selector: In Custom mode, Secure Boot Variables can be configured without authentication |

Key Management

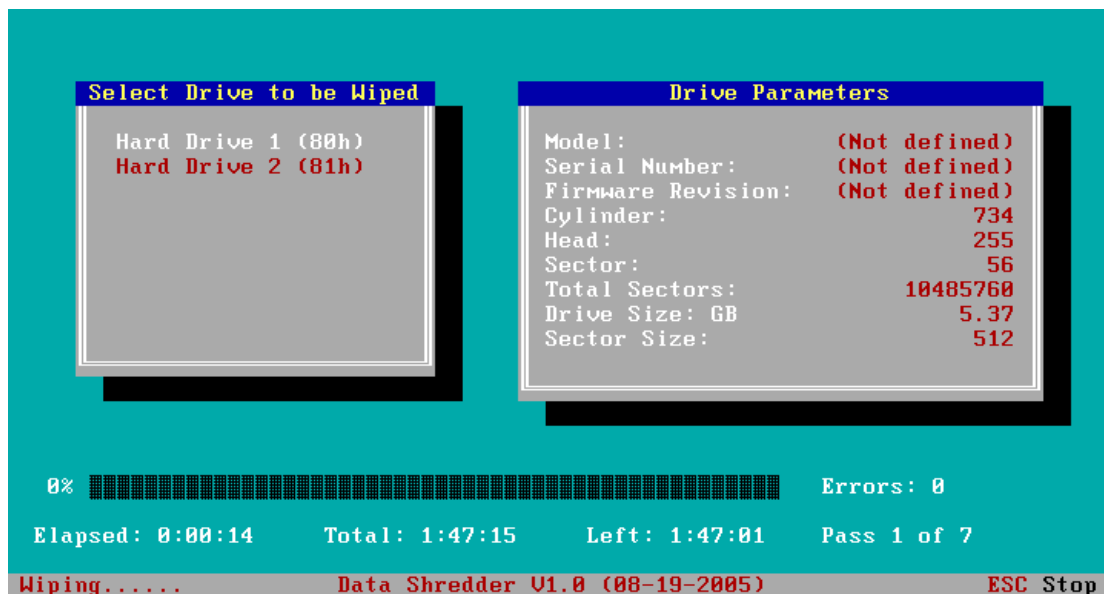
Allows you to provision advanced Secure Boot settings.

| Item | Option | Description |
|-----------------------|---------------------|---|
| Factory Key Provision | Disabled Enabled | Provision factory default keys on next re-boot only when System in Setup Mode. |
| Restore Factory keys | None | Force System to User Mode. Configure NVRAM to contain OEM-defined factory default Secure Boot keys. |
| Enroll Efi Image | None | Allows the image to run in Secure Boot mode. Enroll SHA256 hash of the binary into Authorized Signature Database (db) |

Secure Erase

This option allows you to secure erase any or all HDD/SSD in system. Please note that all data cannot be recovered through data recovery techniques. This process is crucial in scenarios where data confidentiality and security are paramount, such as in industries like finance, healthcare, and government.

| Item | Option | Description |
|--------------|-----------------------|---|
| Secure Erase | Active Back | System will kick-off an utility to allow you wipe all data in any or all HDD/SDD in system. |



Boot Setup

Use [←] / [→] to select [Boot] setup screen. Under this screen, you may use [↑] [↓] to select an item you would like to configure.

| Item | Option | Description |
|----------------------|------------------------|---|
| Setup Prompt Timeout | 5 | The Number of seconds to wait for setup activation key. 65535 means indefinite waiting. |
| BootupNumLock State | On Off | Select the keyboard NumLock state. |
| Quiet Boot | Disabled Enabled | Enables or disables Quiet Boot option. |
| Boot mode select | LEGACY UEFI DUAL | Select boot mode for LEGACY or UEFI. |

- Choose boot priority from boot option group.
- Choose specific boot device priority sequence from available Group device.

Save and Exit Setup

Use [←] / [→] to select [Save & Exit] setup screen. Under this screen, you may use [↑] [↓] to select an item you would like to configure.

■Discard Changes and Exit

Select this option to quit Setup without saving any modifications to the system configuration. The following window will appear after the "Discard Changes and Exit" option is selected. Select **"Yes"** to discard changes and Exit Setup.

■Save Changes and Reset

When Users have completed the system configuration changes, select this option to save the changes and reset from BIOS Setup in order for the new system configuration parameters to take effect. The following window will appear after selecting the **"Save Changes and Reset"** option is selected. Select **"Yes"** to Save Changes and reset.

■Restore Defaults

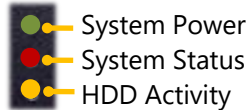
Restore default values for all setup options. Select **"Yes"** to load Optimized defaults.

Note: The items under Boot Override may not be the same images, it would depend on devices connected on the system.

APPENDIX A: LED INDICATOR EXPLANATIONS

The status explanations of LED indicators on Front Panel are as follows:

LED indicators



► System Power

| | |
|--------------------|----------------------------------|
| Solid Green | <i>The system is powered on</i> |
| Off | <i>The system is powered off</i> |

► System Status

This LED indicator is programmable. You could program it to display the operating status of the behaviors described below:

| | |
|--------------------|------------------------|
| Solid Green | <i>Defined by GPIO</i> |
| Solid Red | <i>Defined by GPIO</i> |
| Off | <i>Defined by GPIO</i> |

► HDD Activity

If this LED blinks, it indicates data access activities; otherwise, it remains off.

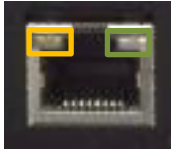
| | |
|-----------------------|---|
| Blinking Amber | <i>Indicates HDD activity including SATA / NVME</i> |
| Off | <i>No data access activity OR No power on</i> |

Note:

1. When cable is plug-in and network is linked. Both LED will be light up.
2. Without the Cable plug-in, the LED should be off.
3. If LAN Driver control the LED, the behavior will follow the driver.

► **RJ-45 LAN LED Indicators**

10/100/1G
*Amber Green/
 Amber*



2.5G/10G
*Green Green/
 Amber*



► **10M/100M/1GB RJ-45 Define:**

| Speed | Amber (Active) | Green/Amber (Link) |
|-------------|--|---------------------------|
| 10M | Blinking Amber – Indicates data access | OFF |
| 100M | Blinking Amber – Indicates data access | ON (Green) |
| 1G | Blinking Amber – Indicates data access | ON (Amber) |

► **2.5G / 10G RJ-45 define:**

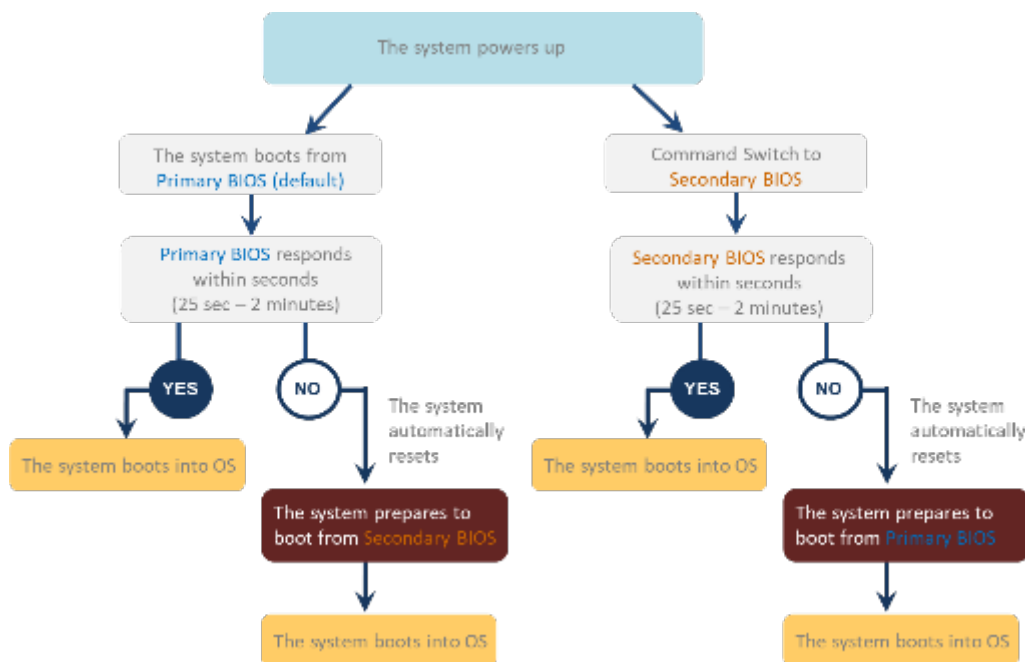
| Speed | Amber (Active) | Green/Amber (Link) |
|-------------|--|---------------------------|
| 2.4G | Blinking Amber – Indicates data access | ON (Green) |
| 10G | Blinking Amber – Indicates data access | ON (Green) |

APPENDIX B: DUAL BIOS FOR RECOVERY

Failure when booting up BIOS is not uncommon and can occur most often during a power failure, a mishandled BIOS update, a malware attack resulting in data corruption. When it happens, recovering procedures consume considerable time and effort. Lanner understands this pain and have empowered our products with the Dual BIOS feature.

How Dual BIOS Works

Dual BIOS features two physical BIOS ROMs soldered onto the motherboard, carrying two separate BIOS images. If the Primary BIOS (default) is not functioning correctly and fails to respond within seconds (~25 seconds to 2 minutes, depend upon appliance), the system will invoke a bootup from the Secondary BIOS, automatically restarting the system and launch the operating system.



2nd Gen Dual BIOS

To provide increased flexibility and usage protection, Lanner has released the 2nd Gen Dual BIOS function on Lanner appliances. With 2nd Gen Dual BIOS, both the primary BIOS and secondary BIOS can be updated and flashed using the BIOS Tool to run different versions of BIOS ROMs independently for maximum compatibility. This additionally allow users to switch BIOS ROMs for booting up, toggling between primary BIOS and secondary BIOS.

- **Flexible recovery timer control**

Users can designate the amount of time before recovery BIOS launch. The amount of time is no longer fixed to 7 minutes.

- **Flexible Dual BIOS ROMs control.**

Users can flash both the Primary BIOS and Secondary BIOS, thus run different versions of BIOS ROMs independently for maximum compatibility.

• Flexible Dual BIOS ROMs switch

The 2nd Gen Dual BIOS allow users to choose one of the BIOS ROMS (Primary BIOS/Secondary BIOS) for booting up. Use software command prompt to toggle between Primary BIOS and Secondary BIOS.

| | Gen1 Dual BIOS | Gen2 Dual BIOS |
|------------------------------------|---|---|
| Function | Primary / Recovery 2 ND BIOS for recovery purpose | Primary / Secondary (Peer to Peer) Both BIOS can let the system work |
| Detection Time | 7 min | Seconds (By platform design) |
| 2nd BIOS updated | Only using the SPI facility | By BIOS tool command or SPI facility |
| MAC/DMI | Only for BIOS1 | For both BIOS |
| CPLD Interface | GPIO | LPC or eSPI (By Platform) |

Figure 1. Gen 1 vs Gen 2 Dual BIOS comparison chart

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.

Get Ready for BIOS Update

Flashing a BIOS needs to be carefully completed, especially pertaining to a corrupted BIOS, which can lead to an unusable system if done incorrectly. To get ready for a BIOS update, acquire the following BIOS resources from Lanner technical support:

- Firmware and Flash Tool
- BIOS Engineering Spec

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

Note:

1. Dual BIOS feature cannot work with BIOS Boot Guard function
2. To update BIOS, it is mandatory to have both BIOS updated first. This is to avoid both BIOS having ME code variations, which could lead to unexpected risk and errors.
3. When the system enters BIOS menu or Option ROM, the system will not reboot automatically.



Warning

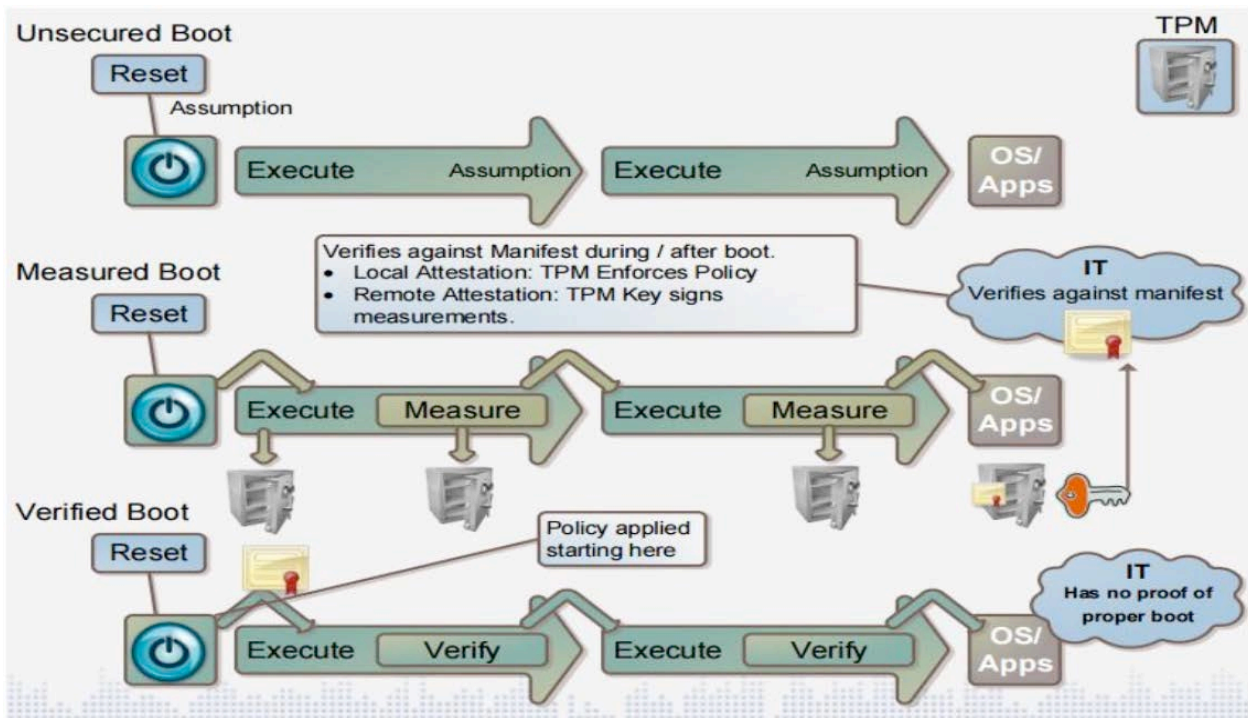
DO NOT power off or reset the system during BIOS updating process.

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.

APPENDIX C: SILICON ROOT OF TRUST

Security is paramount in the digital age, and the Silicon Root of Trust stands as an unwavering guardian. This concept revolves around the notion of embedding a hardware-based trust anchor into a device's silicon infrastructure. The SRT serves as the cornerstone of security by ensuring the integrity of the device's boot process, key management, and overall security posture.



How Lanner's Silicon Root of Trust Works

Lanner has made significant strides in enhancing security by embedding the Silicon Root of Trust into their products. Here's how this pivotal feature operates:

Boot Process Security:

The security journey begins at the device's boot process, where Lanner's Silicon Root of Trust plays a pivotal role. It verifies the integrity of the firmware, ensuring that it is unaltered and originates from a trusted source.

Chain of Trust:

The Silicon Root of Trust establishes a chain of trust, where each subsequent component in the boot process is verified. This includes the bootloader, the operating system kernel, and other critical components. Any inconsistency or unauthorized alteration halts the boot process, safeguarding the device from potential threats.

Secure Key Management:

Lanner's Silicon Root of Trust often includes secure key management. Cryptographic keys are generated, stored, and managed within the secure enclave. These keys serve a wide range of security functions, such as encryption, authentication, and digital signatures, ensuring data protection and secure communication.

Remote Attestation:

Lanner's SRT can also provide remote attestation capabilities. This involves generating a secure report about the device's configuration and security state. Remote parties can use this report to ensure that the device is in a trusted and secure condition, even in distributed and cloud-based environments.

Hardware-Backed Security:

The hardware-based security of Lanner's Silicon Root of Trust is a crucial asset. It provides robust resilience against software-based attacks and vulnerabilities, guaranteeing the highest level of trustworthiness.

Advantages of Lanner's Silicon Root of Trust

The integration of the Silicon Root of Trust into Lanner's products yields several critical advantages:

Security Assurance: Lanner's SRT establishes trust from the very core, ensuring that every aspect of a device's operation remains secure.

Protection Against Tampering: Unauthorized alterations to the boot process or critical components are thwarted, mitigating risks of cyberattacks.

Confidence in Key Management: Secure key management safeguards cryptographic keys, which are essential for data protection, privacy, and secure communication.

Remote Attestation for Trust: Remote attestation facilitates trust verification in distributed and cloud-based settings, assuring the device's security.

Resilience to Cyber Threats: Hardware-backed security provided by the SRT makes Lanner's products highly resilient to software-based attacks.

APPENDIX D: REDUNDANT POWER MODULE BEHAVIOR

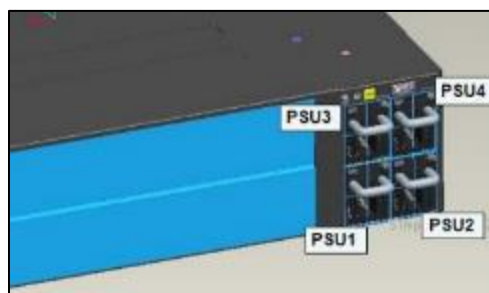
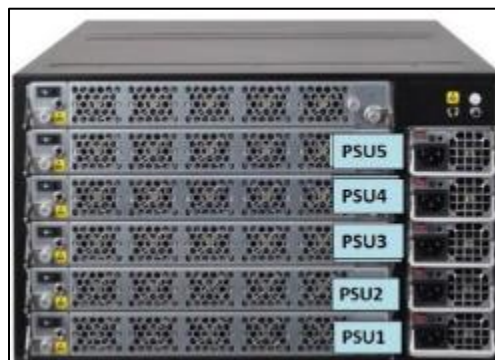
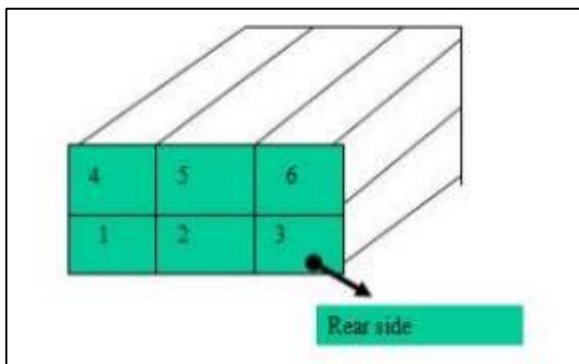
Define the Alarm and Mute behavior

| | Power Module Fail | Power Module Remove | Power Cord Remove |
|---------------|--|--|---|
| Buzzer | Alarm | Alarm | Alarm |
| Mute | Change back the Good PSU Module or Press the Mute Button | Put back the PSU Module or Press the Mute Button | Plug-in the Power cord or Press the Mute Button |

Define the sequence of the Power Module

PSU Sequence The detection is from the left to the right side , from the bottom to the top side

Example :

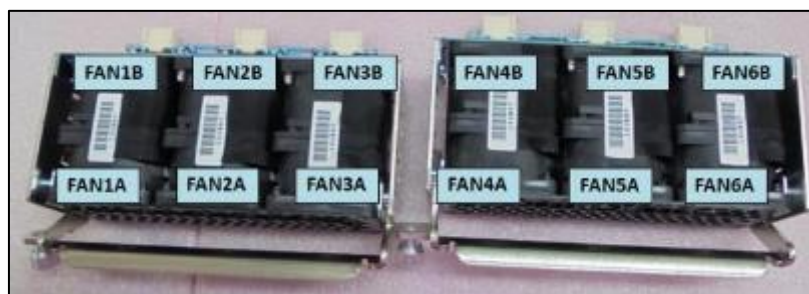
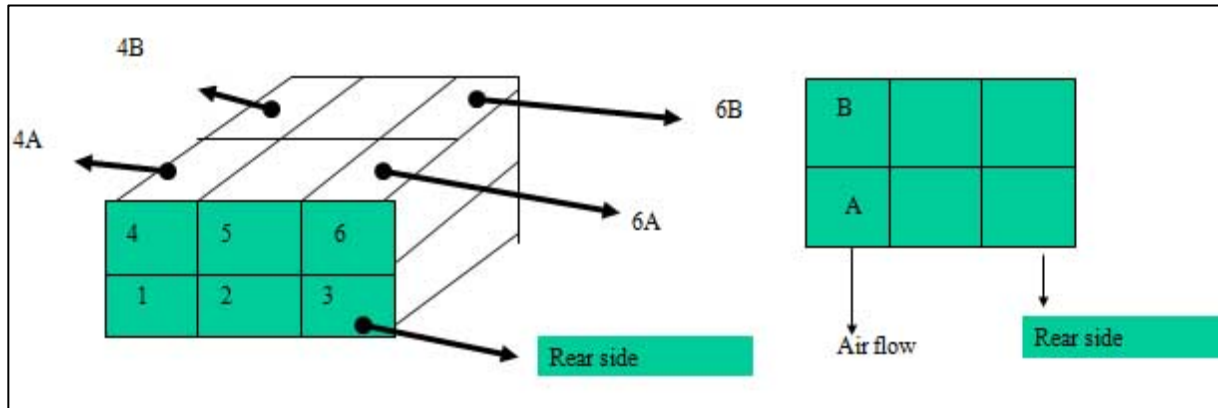


APPENDIX E: FAN SEQUENCE

Define the sequence of the FAN

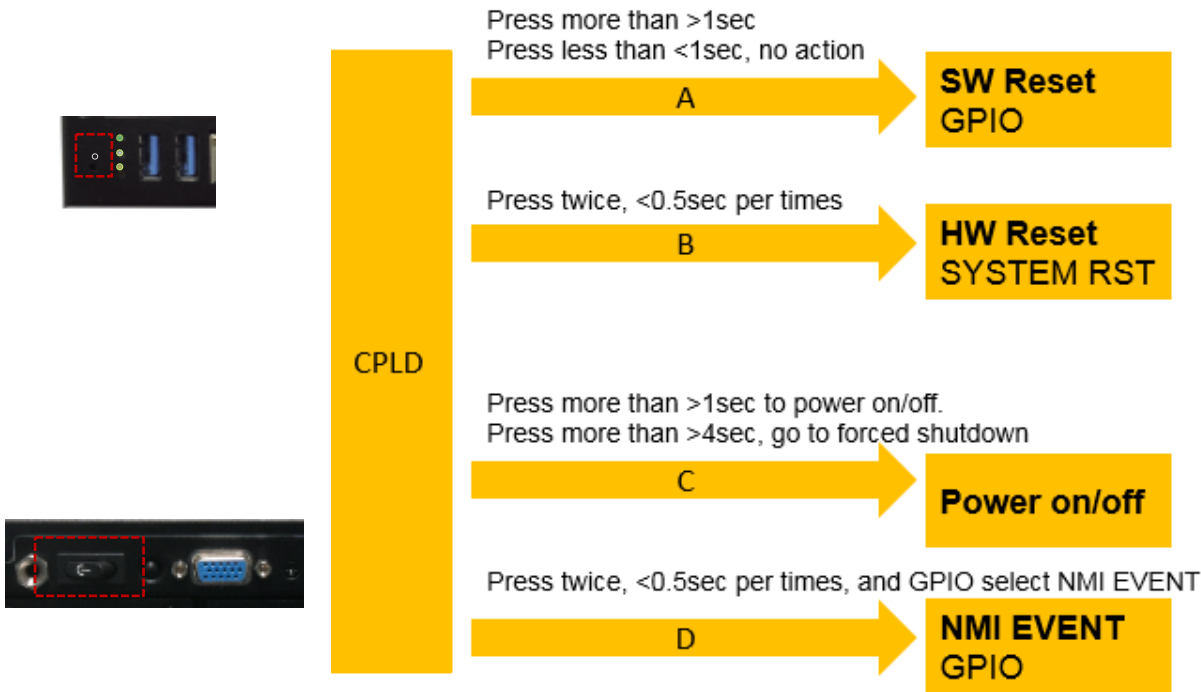
FAN Sequence The detection is from the left to the right side , from the bottom to the top side

Example:



APPENDIX F: SMART POWER & RESET BUTTON

Smart Power and Reset Button – Control by CPLD



APPENDIX G: ESD/SURGE ENHANCEMENT

| Electrostatic Discharge (ESD): IEC-61000-4-2 | Contact discharge | Air discharge | STD |
|--|-------------------|---------------|-----------------|
| Level 1 | ±2 kV | ±2 kV | |
| Level 2 | ±4 kV | ±4 kV | 4K Contact |
| Level 3 | ±6 kV | ±8 kV | 8K Air |
| Level 4 (TBD) | ±8 kV | ±15 kV | New Requirement |
| | | | STD |
| Surge Immunity (LAN) IEC-61000-4-5 | Test Level | | |
| Level 0 | 25V | | |
| Level 1 | 500V | | |
| Level 2 | 1kV | | V (Current) |
| Level 3 (TBD) | 2kV | | New Requirement |
| Level 4 | 4kV | | |
| | | | STD |
| Electrical Fast Transient (EFT): IEC-61000-4-4 | | | |
| Level 1 | 0.5kV | | |
| Level 2 | 1kV | | V (Current) |
| Level 3 (TBD) | 2kV | | New Requirement |
| Level 4 | 4kV | | |

APPENDIX H: 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 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: <input type="checkbox"/> Repair(Please include failure details) | |
|---|------------|--|---------------|
| | | <input type="checkbox"/> Testing Purpose | |
| Company: | | Contact Person: | |
| Phone No. | | Purchased Date: | |
| Fax No.: | | Applied Date: | |
| Return Shipping Address: _____ | | | |
| Shipping by: <input type="checkbox"/> Air Freight <input type="checkbox"/> Sea <input type="checkbox"/> Express _____ | | | |
| <input type="checkbox"/> Others: _____ | | | |
| | | | |
| Item | Model Name | Serial Number | Configuration |
| | | | |
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| Item | Problem Code | Failure Status |
|------|--------------|----------------|
| | | |
| | | |
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| | | |
| | | |

*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 |
| 03: CMOS Data Lost | 09: Cache RMA Problem | 15: PS2 | 21: Shut Down |
| 04: FDC Fail | 10: Memory Socket Bad | 16: LAN | 22: Panel Fail |
| 05: HDC Fail | 11: Hang Up Software | 17: COM Port | 23: CRT Fail |
| 06: Bad Slot | 12: Out Look Damage | 18: Watchdog Timer | 24: Others (Pls specify) |

Request Party

Confirmed By Supplier

Authorized Signature / Date

Authorized Signature / Date