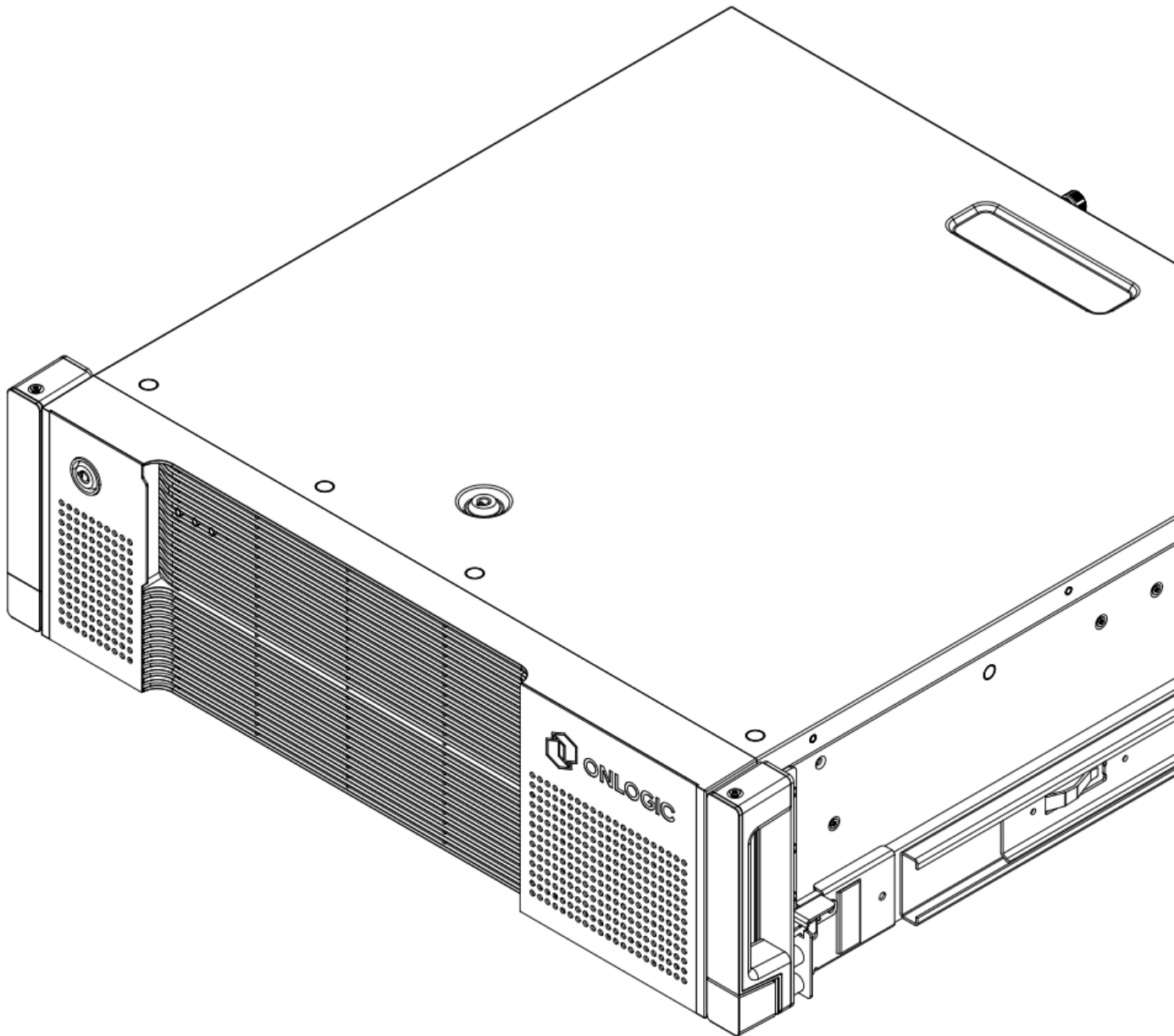


AX300 Series Edge Server Product Manual



Revision History

Date	Revision History
01 Dec 2024	First release of Axial AX300 Series Server manual

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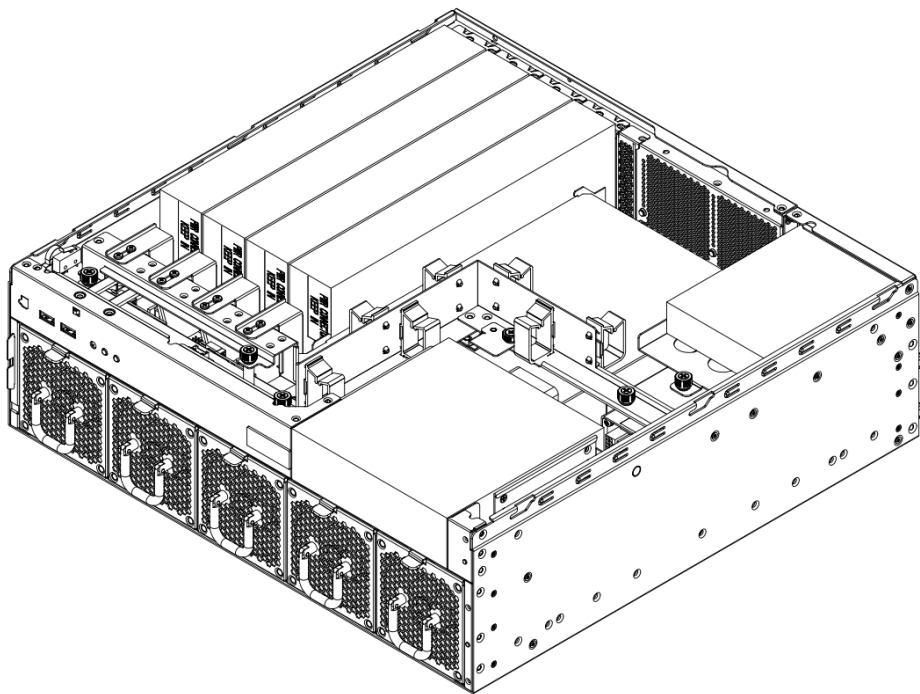
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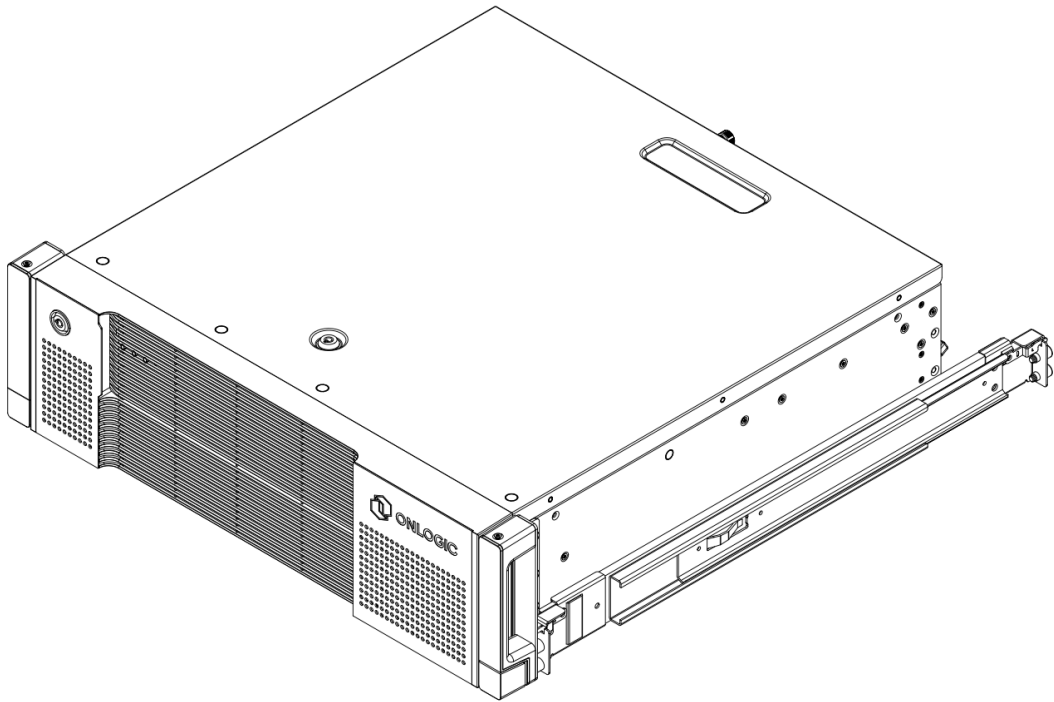
1 - System Overview

1.1 - System Introduction

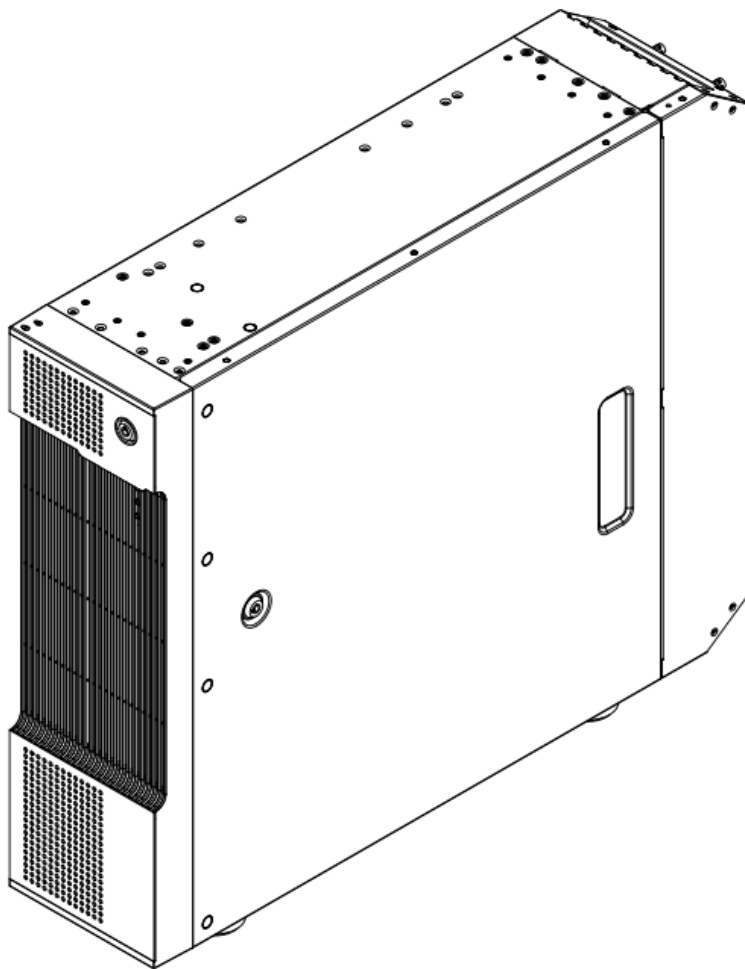
The Axial AX300 Series of powerful, high-density edge servers are specifically engineered for complex computing workloads. Equipped with 4th 5th Gen Intel® Xeon® Scalable processing and a huge range of expansion and storage options, the AX300 Series delivers exceptional performance in a shallow depth, 3U form factor. Its industrial design and versatile installation capabilities make it the perfect fit for challenging edge computing environments. With incredible configuration flexibility, the AX300 Series is ideally suited for AI training and AI inferencing, virtualization, advanced automation, or any application that demands scalable, low latency computing capabilities at the edge.



Axial AX300 Series with lid removed



Axial AX300 Series with Security Bezel and Slide Rails



Axial AX300 Series with Tower Stand, Security Bezel, and Rear Cable Security Bezel

1.2 - Accessories

The following accessories are included with every system:

- Cable management ties (2RALXX220400)
- 3.5" bay mounting bracket (Pre-Installed with needed screws kit)
- 5.25" bay mounting brackets (2RALXX6751A1)
- Spare M4 screws for slide rail (2RALXX6755A0)
- Chassis keys

If additional items were purchased, such as rail mounting kits/brackets, they will be included in the system packaging.





1.3 - Drivers, Firmware, and Additional Information

Drivers, firmware, and product information can be found on the product pages of AX300 Series systems. Visit the AX300 Series page to learn more - <https://www.onlogic.com/ax300>

1.4 - Product Specifications

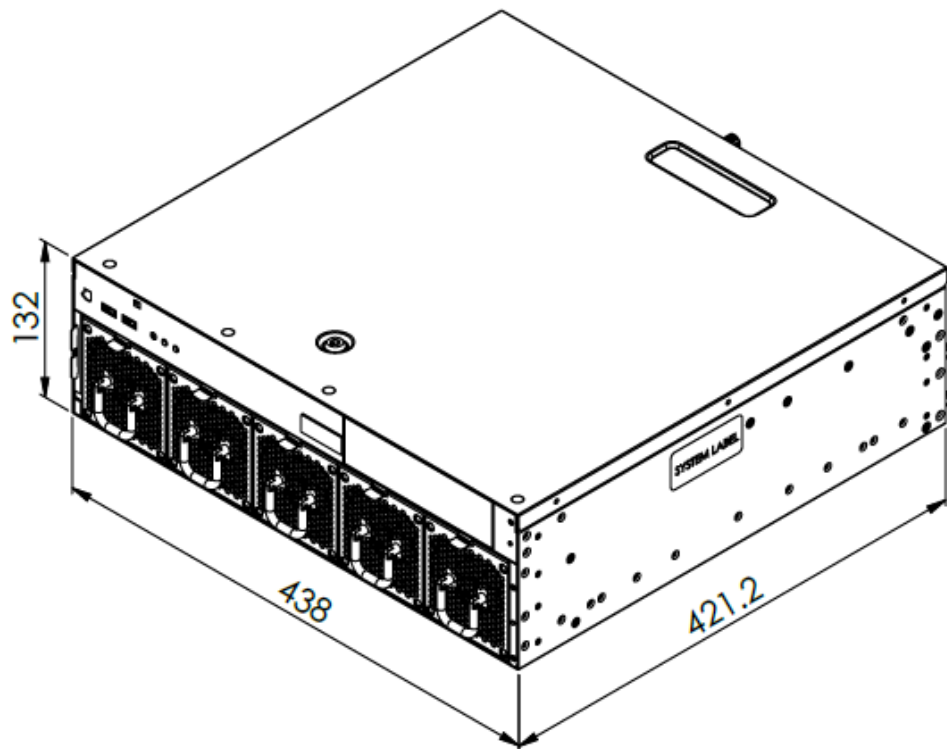
OnLogic Axial 300 Series																							
Variants	<p>AX300 - Unrestricted Configuration</p> <p>AX301 - Single CPU, Up to 2x Dual Slot PCIe Adapters + 1x additional Network Adapter - 8x SATA SSD Front Drive Bay</p> <p>AX302 - Single CPU, Up to 2x Dual Slot PCIe Adapters + 1x additional Network Adapter - 4x NVMe SSD Front Drive Bay</p> <p>AX303 - Dual CPU, 2x Dual Slot GPUs + 2x Network Adapters with 1x additional Network/GPU/RAID Adapter (Future) - 8x SATA SSD Front Drive Bay</p> <p>AX304 - Dual CPU, 2x Dual Slot GPUs + 2x Network Adapters with 1x additional Network/GPU/RAID Adapter (Future) - 4x NVMe SSD Front Drive Bay</p> <p>AX305 - Dual CPU, Up to 7x Single Slot GPUs - 8x SATA SSD Front Drive Bay</p> <p>AX306 - Dual CPU, Up to 7x Single Slot GPUs - 4x NVMe SSD Front Drive Bay</p> <p>AX307 - Dual CPU, Up to 4x Dual Slot GPUs - 8x SATA SSD Front Drive Bay</p> <p>AX308 - Dual CPU, Up to 4x Dual Slot GPUs - 4x NVMe SSD Front Drive Bay</p>																						
Processor	<p>5th Gen Intel® Xeon® Scalable Processors Socket: 1+1 Socket E (LGA 4677)</p> <p><u>Supported CPUs</u></p> <table> <tr> <td>Intel 6548Y+</td> <td>32 Cores/64 Threads, 205W - 250W TDP¹</td> </tr> <tr> <td>Intel 6548N</td> <td>32 Cores/64 Threads, 205W - 250W TDP¹²</td> </tr> <tr> <td>Intel 6538N</td> <td>32 Cores/64 Threads, 185W - 205W TDP¹²</td> </tr> <tr> <td>Intel 6526Y</td> <td>16 Cores/32 Threads, 150W - 195W TDP¹</td> </tr> </table> <table> <tr> <td>Intel 5520+</td> <td>28 Cores/56 Threads, 205W TDP</td> </tr> <tr> <td>Intel 5515+</td> <td>8 Cores/16 Threads, 165W TDP²</td> </tr> </table> <table> <tr> <td>Intel 4516Y+</td> <td>24 Cores/48 Threads, 150W - 185W TDP¹</td> </tr> <tr> <td>Intel 4514Y</td> <td>16 Cores/32 Threads, 135W - 185W TDP¹</td> </tr> <tr> <td>Intel 4510T</td> <td>12 Cores/24 Threads, 105W - 115W TDP¹</td> </tr> <tr> <td>Intel 4510</td> <td>12 Cores/24 Threads, 150W TDP²</td> </tr> <tr> <td>Intel 4509Y</td> <td>8 Cores/16 Threads, 105W - 125W TDP¹</td> </tr> </table> <p>¹Intel Speed Select Technology (Intel SST-PP) can be used to adjust TDP ²Support for CPU models may be delayed from initial release. Additional CPU models may be supported based on customer request. Consult OnLogic sales.</p>	Intel 6548Y+	32 Cores/64 Threads, 205W - 250W TDP ¹	Intel 6548N	32 Cores/64 Threads, 205W - 250W TDP ¹²	Intel 6538N	32 Cores/64 Threads, 185W - 205W TDP ¹²	Intel 6526Y	16 Cores/32 Threads, 150W - 195W TDP ¹	Intel 5520+	28 Cores/56 Threads, 205W TDP	Intel 5515+	8 Cores/16 Threads, 165W TDP ²	Intel 4516Y+	24 Cores/48 Threads, 150W - 185W TDP ¹	Intel 4514Y	16 Cores/32 Threads, 135W - 185W TDP ¹	Intel 4510T	12 Cores/24 Threads, 105W - 115W TDP ¹	Intel 4510	12 Cores/24 Threads, 150W TDP ²	Intel 4509Y	8 Cores/16 Threads, 105W - 125W TDP ¹
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Intel 4509Y	8 Cores/16 Threads, 105W - 125W TDP ¹																						
Memory	<p>Up to 16x DDR5 RDIMM from 16 to 64 GB in EC8 Maximum operational speed*: 5600 MT/s on 5th Gen Intel Xeon Scalable Processors</p> <p>*Where higher-speed SKUs do not exist, select 5th Gen Intel Xeon CPUs will use the lower (4800MT/s) speed</p>																						
Chipset	Intel C741																						
Integrated Graphics	VGA Graphics through AST2600 BMC																						
Front I/O Front I/O	2x USB 3.2 Gen 1 Type-A 1x Power Button / LED (White)																						

	<p>1x ID button / LED (Blue) 1x Error LED (Orange)</p>
Rear I/O	<p>1x 1GbE Dedicated Management (BMC/IPMI) 2x 10GbE LAN, Intel X710-AT2 2x USB 2.0 Type-A 1x VGA (BMC Video Output) 1x ID button / LED (Blue) 1x COM DB9</p>
Expansion & Storage	<p>1x M.2 2280/221100 M-key (PCIe Gen 5 x4) 6x PCIe Gen 5 x16 / CXL 1.1 Full Height, Full Length Slot 1x PCIe Gen 5 x8 / CXL 1.1 (x8 Electrical, x16 Compatible) Slot 2x MCIO (PCIe5.0 x8) [CPU0] 3x OCuLink (PCIe3.0 x4 or 4 SATA 6Gb/s) [PCH] Up to 13 SATA 6Gb/s, support RAID 0/1/5/10 <u>All AX300 Series Servers</u> 1x 2.5" SATA Rear Drive Bay <u>AX301, AX303, AX305, AX307</u> Support for up to 8x 2.5" 7mm SATA Drives in front bay <u>AX302, AX304, AX306, AX308</u> Support for up to 4x 2.5" 15mm NVMe Drives in front bay RAID 0/1/5/10 Support through Intel VROC* *VROC Standard only supports RAID 0/1/10</p>
Special Features	<p>ASPEED AST2600: Full Web UI, iKVM, vMedia support Optional TPM 2.0 module (Infineon SLB9670) or Intel PTT (Native) Chassis Intrusion Detection Security Bezel Secure Boot Hot Swap Fans Bezel Detection</p>
Operating Systems	<p>Microsoft Windows Server 2022 Essentials Microsoft Windows Server 2022 Standard Ubuntu 22.04 - Server Ubuntu 24.04 - Server Red Hat Enterprise Linux 8.10 (or newer) Red Hat Enterprise Linux 9.x VMware vSphere and ESXi 8</p>
LAN Controllers	<p>1x Intel X710-AT2 Controller (2 x 10GBASE-T ports on Rear) 1x GbE Dedicated Management (BMC/IPMI)</p>
Power Supplies	<p>Up to 2 PSUs with PMBUS monitoring, 120~220 VAC 50-60Hz input Delta 1000W/2400W CRPS 80 Plus Titanium AC Power Supply Forward Airflow (110V/220V Autoranging)</p>
Dimensions (W x H x D)	<p>438 x 132 x 421.2mm (17.3 x 5.2 x 16.6") without Security Bezel 482.6 x 132 x 455mm (19.0 x 5.2 x 17.9") with Security Bezel & Handles 132 x 448.2 x 553.6mm (5.2 x 17.6 x 21.8") with Tower Stand, Security Bezel and Rear Cable Security Bezel</p>
Weight	<p>System Maximum: 24 kg (52.9 lbs) Shipping Maximum: 35 kg (77.2 lbs)</p>
Mounting	<p>Rack Mount 17" (430-600mm) slide rail</p>

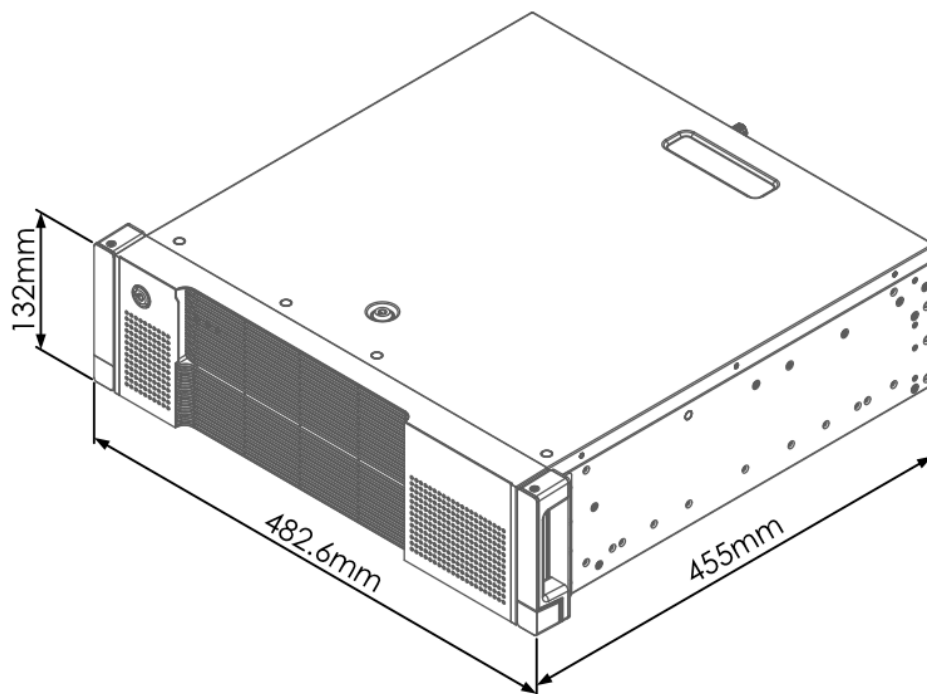
	Rack Mount 23" (564-850mm) slide rail with Optional Cable Management Arm 2-post 19" EIA Mounting Bracket Wall Mount Tower Stand
Operating Temperature	5-40°C (ASHRAE A3 Operating Temperature) (Configuration Dependent) Maximum ambient temperature decreases by 1°C for every 175m (574 ft) increase in altitude above 900m (2,953 ft)
Storage Temperature	-40-70°C
Operating Humidity	8~85% Relative, non-condensing Maximum dew point 24°C
Storage Humidity	0~95% Relative, non-condensing Maximum dew point 24°C
Package Test	ISTA 6-FEDEX-A
Certifications	 FCC 47 CFR Part 15 Subpart B (Class A) CAN ICES-003(A) / NMB-003(A) (Class A)  EN 63268-1 CISPR 32/EN 55032 (Class A) CISPR 35/EN 55035 RoHS RoHS (2011/65/EU, (EU) 2015/863)  WEEE Directive (2012/19/EU)  IEC/EN/UL 62368-1 (UL File No. E490677)
Countries of Use	Available countries: Americas: Canada, United States Europe: Austria, Belgium, Bulgaria, Croatia, Czech Republic, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Liechtenstein, Luxembourg, Malta, Norway, The Netherlands, United Kingdom, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden Available countries upon request: Asia: Australia, China, Japan, New Zealand Other countries may be available, contact us to learn more.

1.5 - System Dimensions and Exterior Features

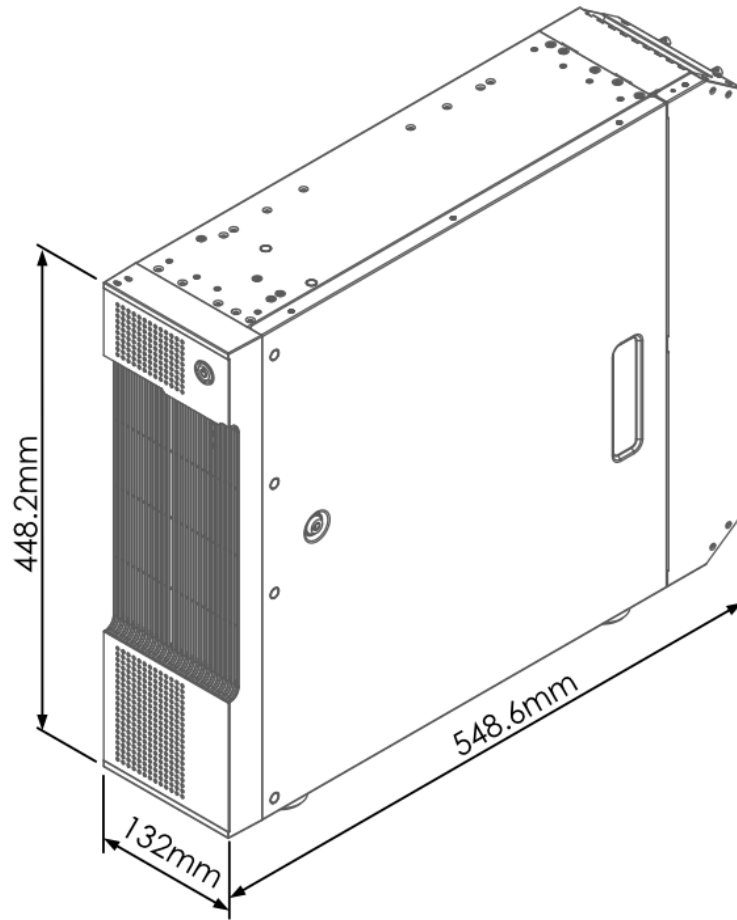
1.5.1 - System Dimensions



Axial AX300 Series without Security Bezel

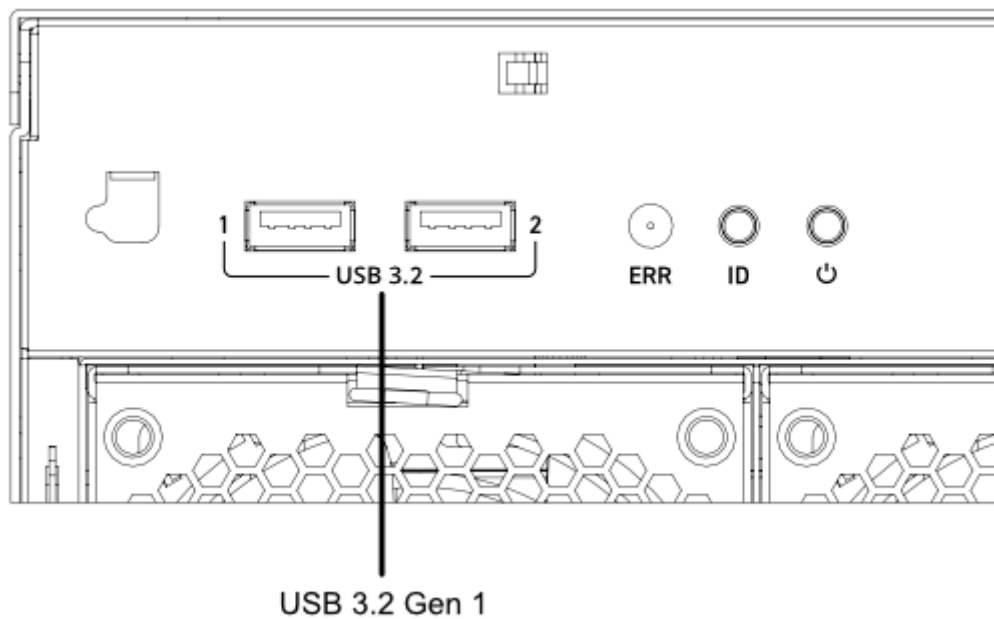


Axial AX300 Series with Front Security Bezel

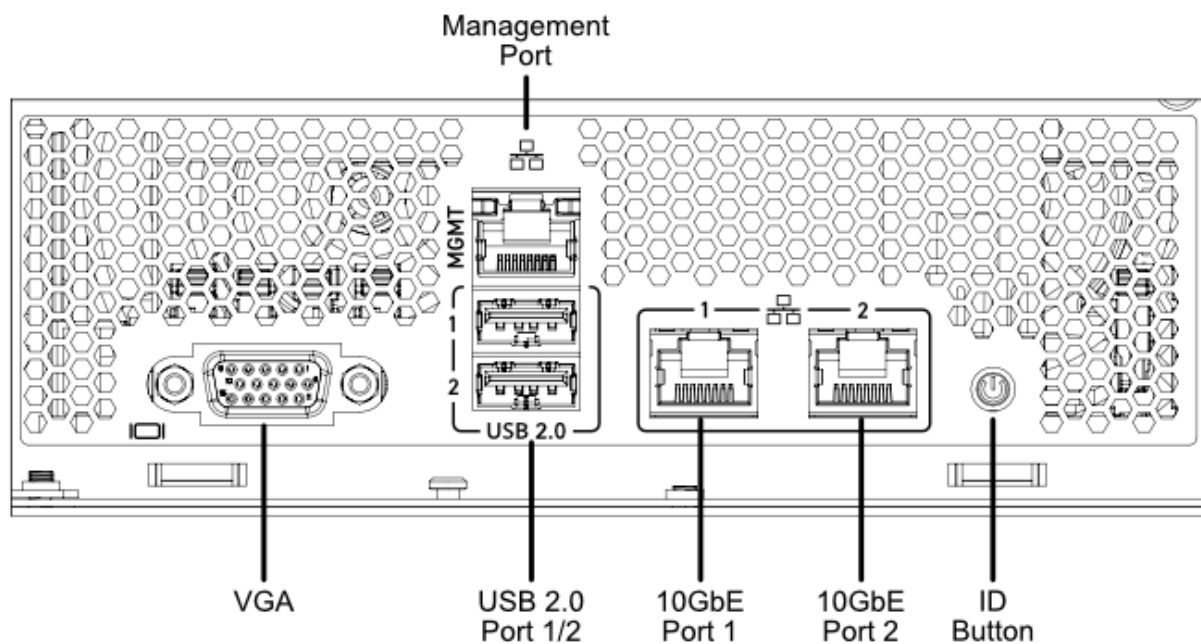


Axial AX300 Series with Tower Stand, Front Security Bezel, and Rear Cable Security Bezel

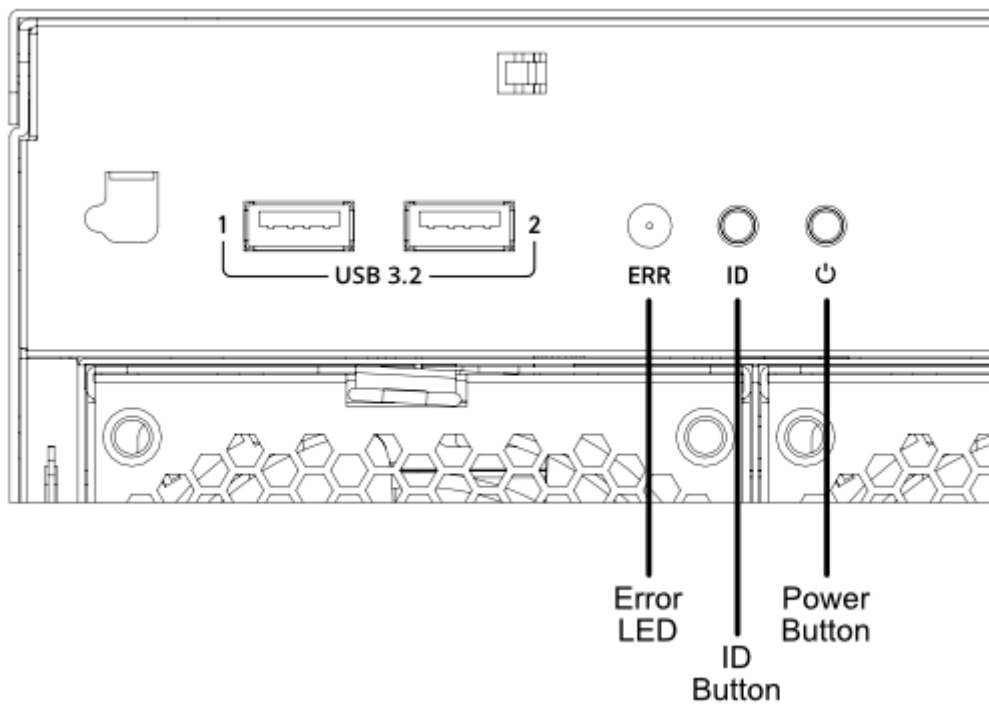
1.5.2 - Front I/O Ports



1.5.3 - Rear I/O Ports



1.5.4 - Front LEDs & Buttons



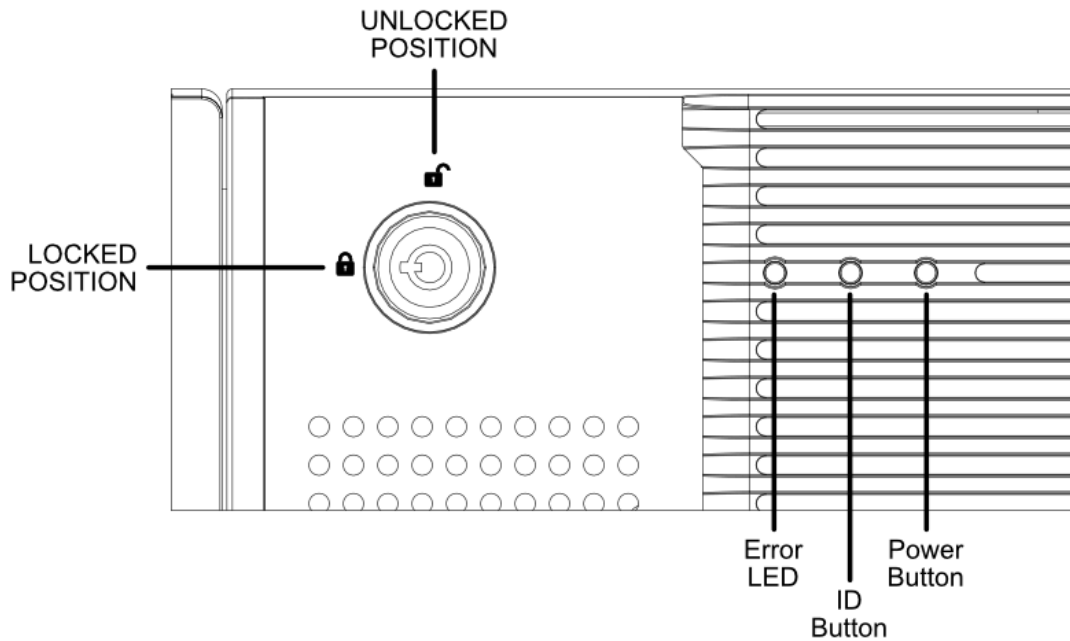
LED / Button	Color	On	Off	Blink
Power	White	Device is on	Device is off	-
ID (Identification)	Blue	ID indicator asserted	ID indicator is deasserted	ID indicator is blinking
ERR (Error)	Orange	System fault asserted	No active fault	-

The ID LED/Button is available to assist with locating the system. ID may be turned On / Off by physically pressing the ID button. ID may also be turned On, Off, or set to Blink from the Baseboard Management Controller (BMC) Web UI.

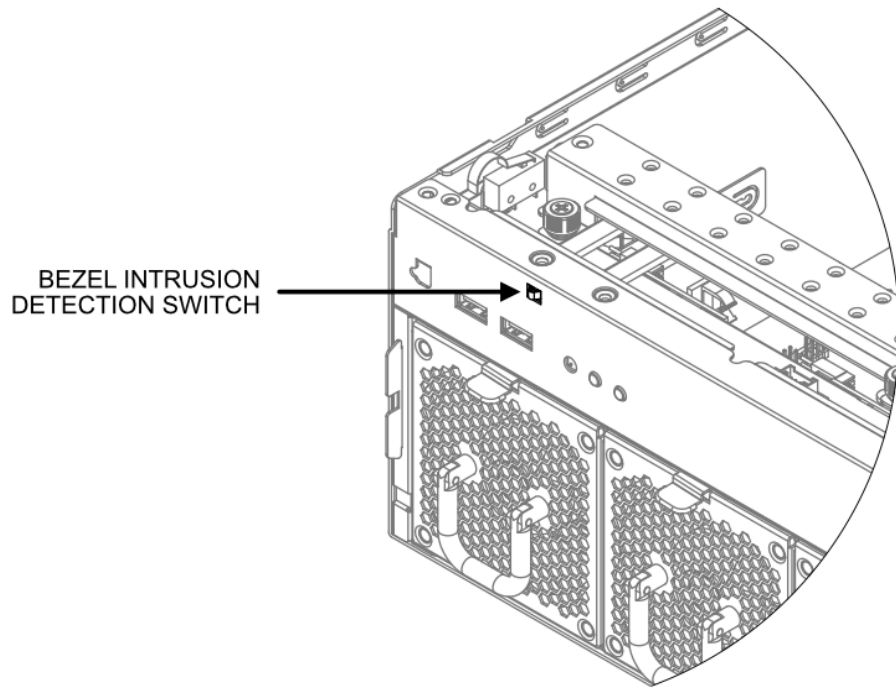
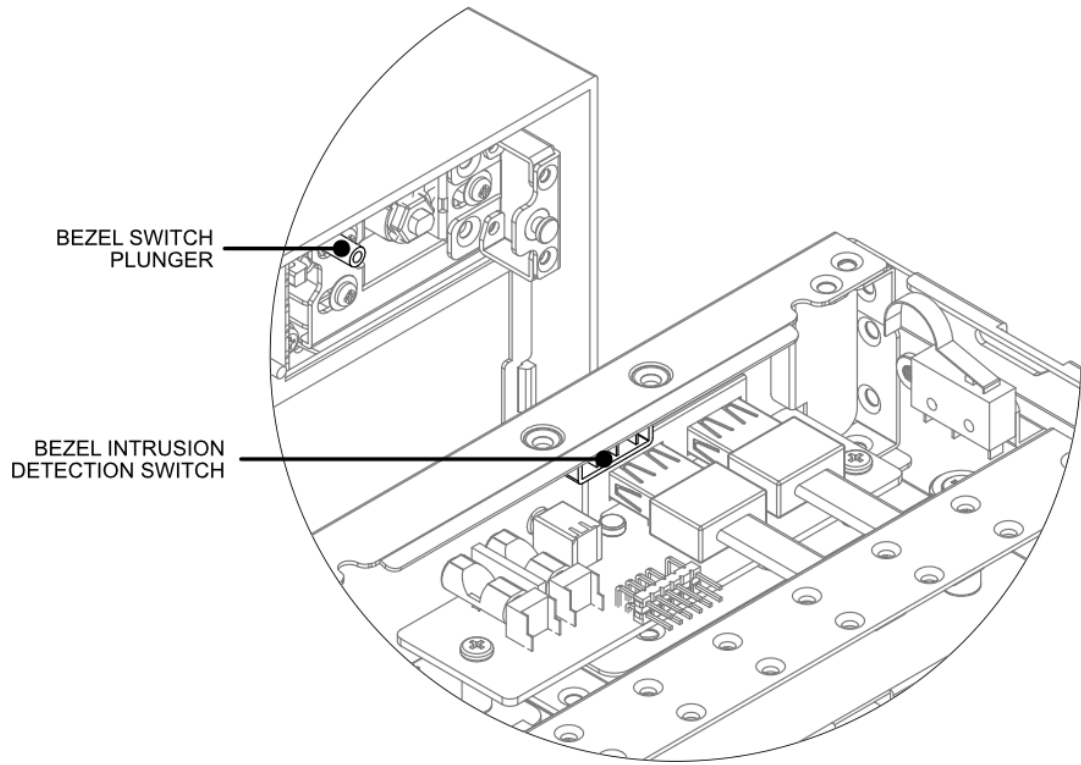
1.5.5 - Front Security Bezel with Intrusion Detection

The Axial AX300 Series Edge Server supports an optional front security bezel. The security bezel helps prevent unauthorized access and tampering with the front ports and buttons of the system.

A barrel lock is used to secure the security bezel in place. A key for the barrel lock is included in the accessory package. The key is shared with the top lid lock and the rear cable bezel lock.



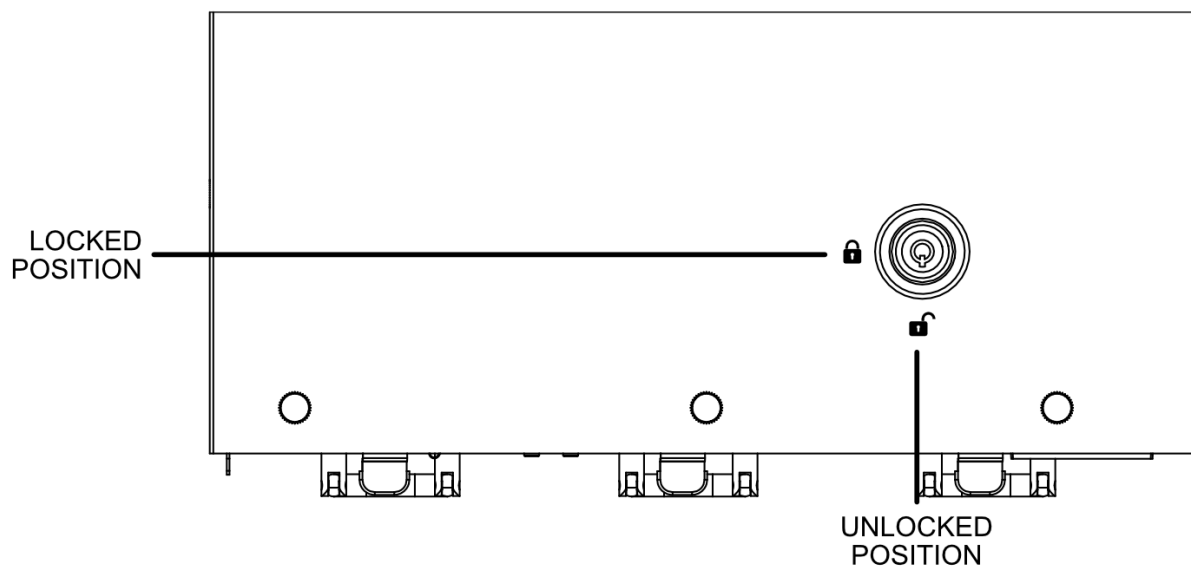
In the event that the bezel is removed while power is present to the system, the bezel intrusion switch will detect this event and the Front Bezel Intrusion sensor will be asserted. Relative to the intrusion, this event will also be logged in the Baseboard Management Controller event log.



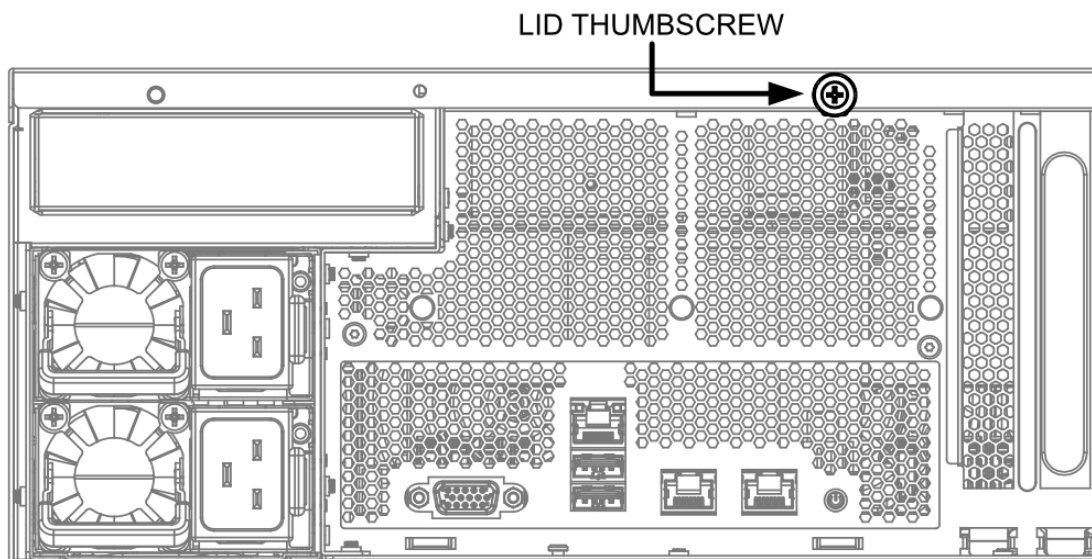
1.5.6 - Two Point Locking Lid with Intrusion Detection

The Axial AX300 Series Edge Server chassis lid has a two point locking mechanism with an intrusion mechanism built natively into the system chassis.

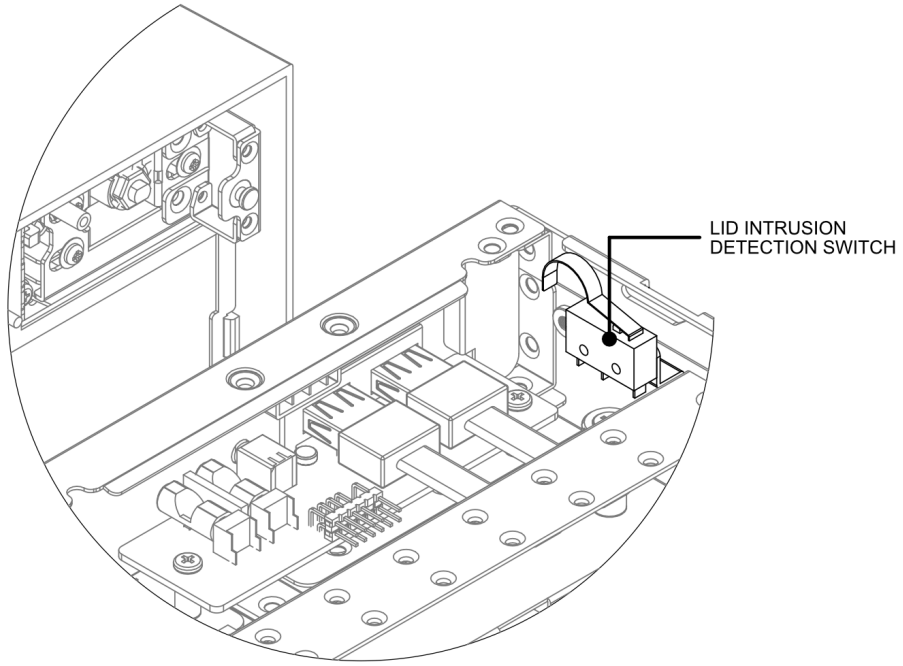
For the two point locking mechanisms, the first locking point is the top barrel lock. A key for the top barrel lock is included in the accessory box, and is shared with the front security bezel and the cable bezel.



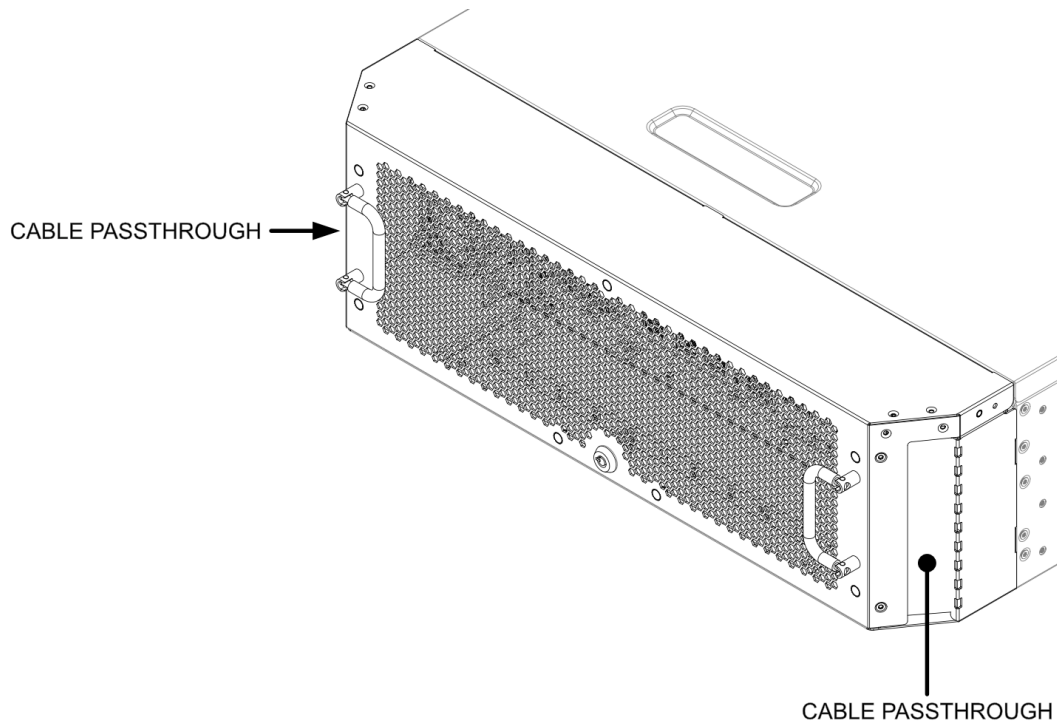
The second lid locking point is a thumb screw located in the rear of the system.



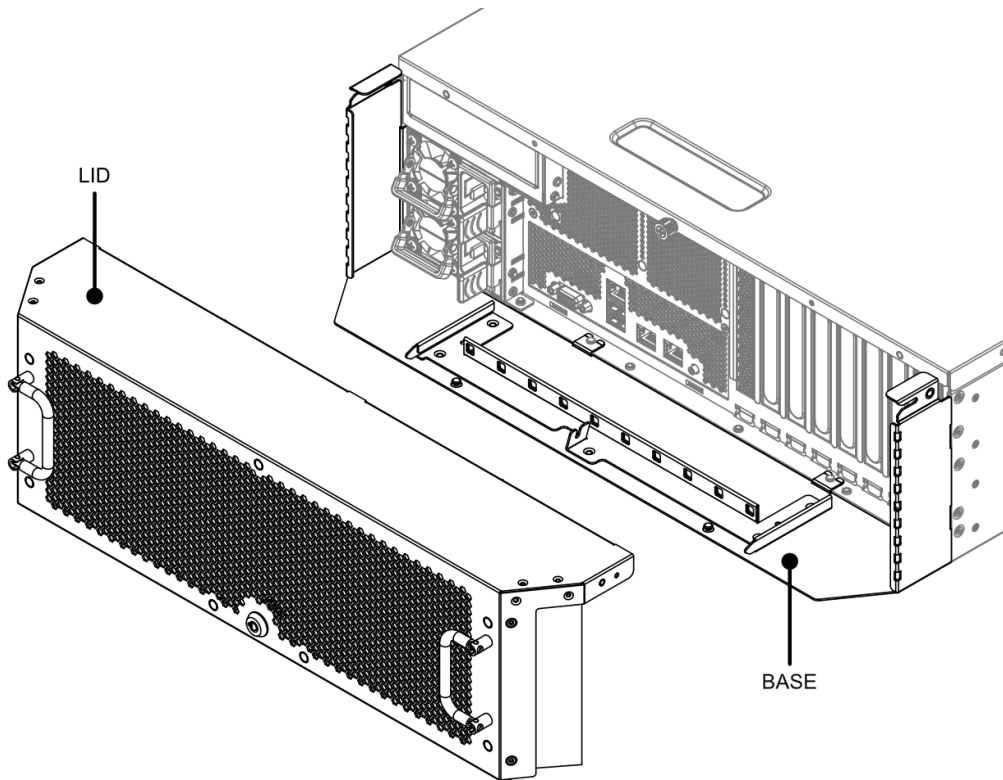
In the event that the system lid is removed while power is present to the system, the intrusion switch will detect this event and the Chassis Intrusion sensor will be asserted. Relative to the intrusion, this event will also be logged in the Baseboard Management Controller event log.



1.5.7 - Optional Rear Cable Security Bezel



The Axial AX300 Series Edge Server supports an optional rear cable bezel (Part Number: **B2-AX301**). The cable bezel helps prevent unauthorized access and tampering with the rear ports, power supplies, buttons and cables of the system. The lid has brush pass throughs on either side to allow routing of connected cables.

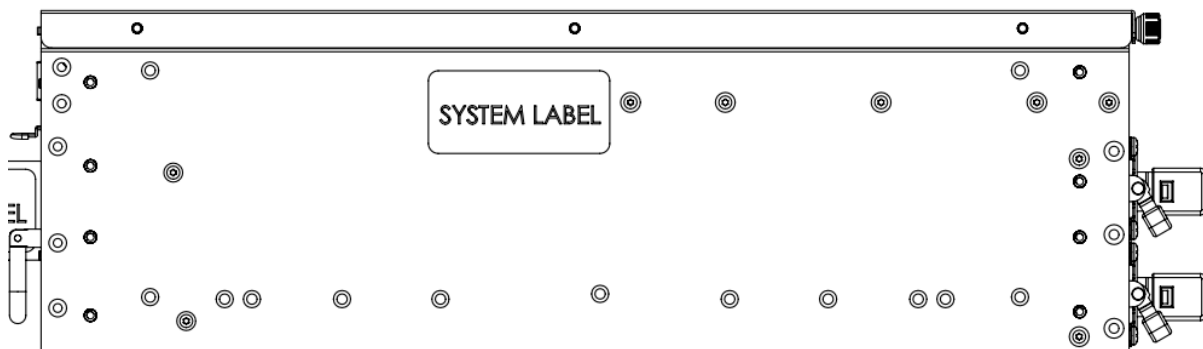


The rear cable bezel is composed of two pieces: a base that is screwed to the main chassis and a lid that is secured with a barrel lock. A key for the barrel lock is included in the accessory package. The key is shared with the top lid lock and the front security bezel lock.

1.6 - System Label

The system label is located on the right side of the chassis as depicted in the image below. The system label will contain the following information:

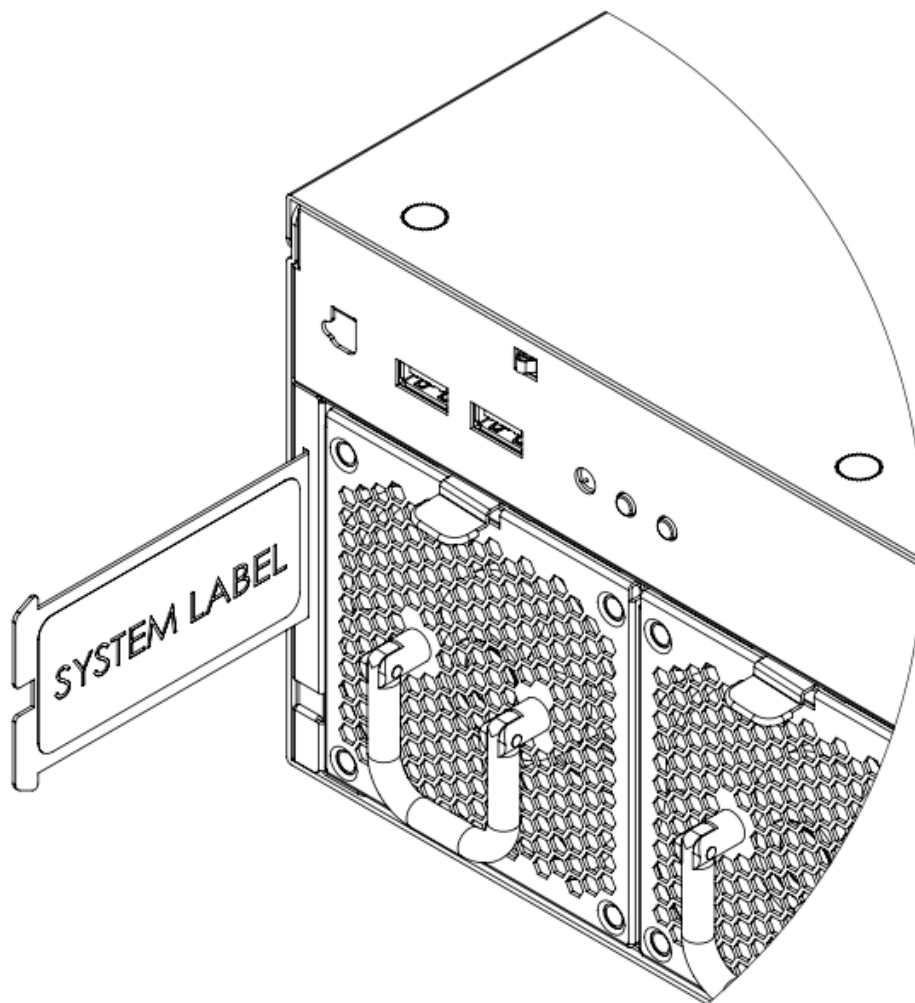
- System Model
- OnLogic Serial Number
- Regulatory & Compliance Certification Logos



1.7 - Front Service Label

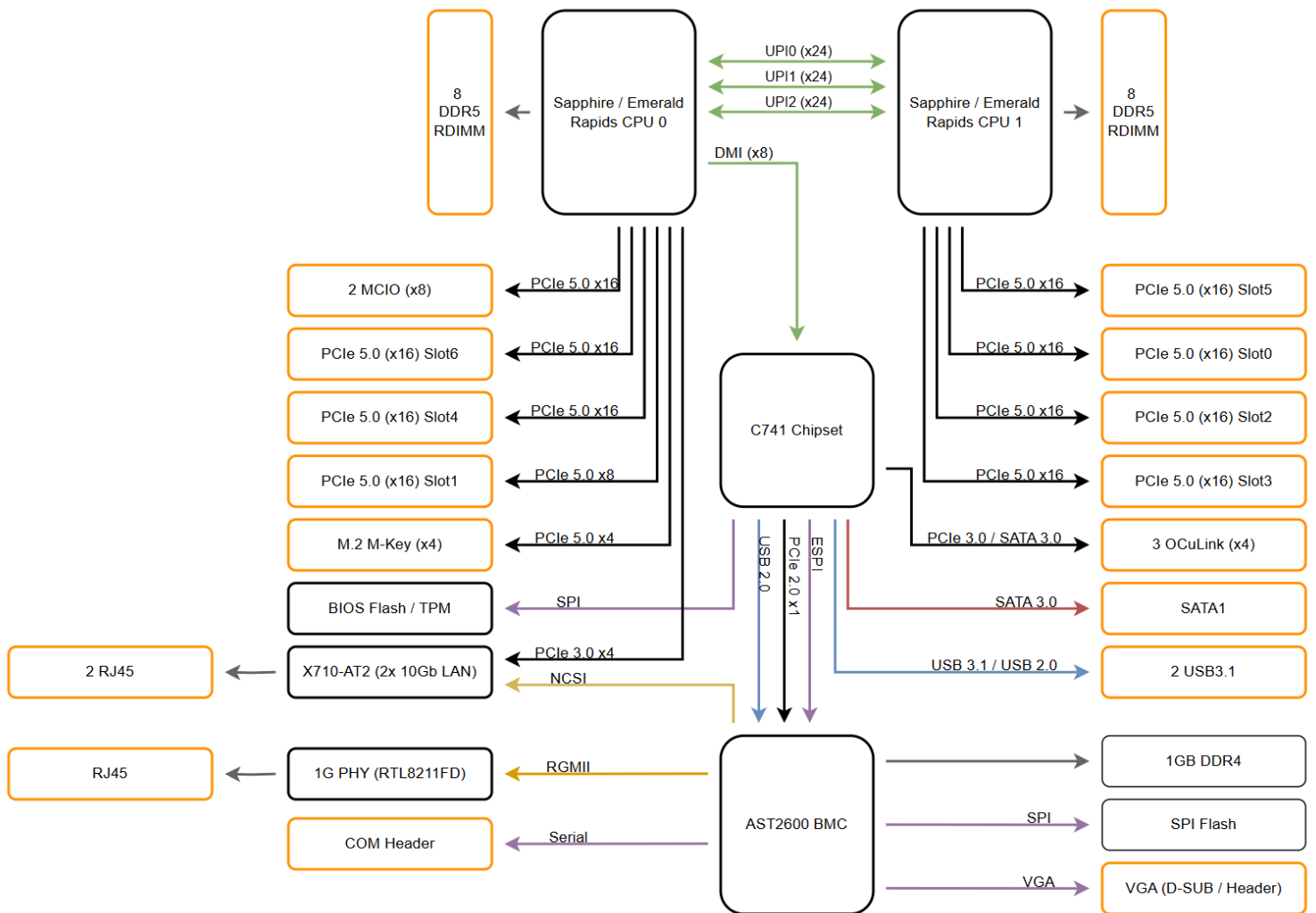
On the front of the chassis, there is a retractable product information label containing pertinent product information such as:

- System Model
- OnLogic Serial Number
- BMC MAC addresses

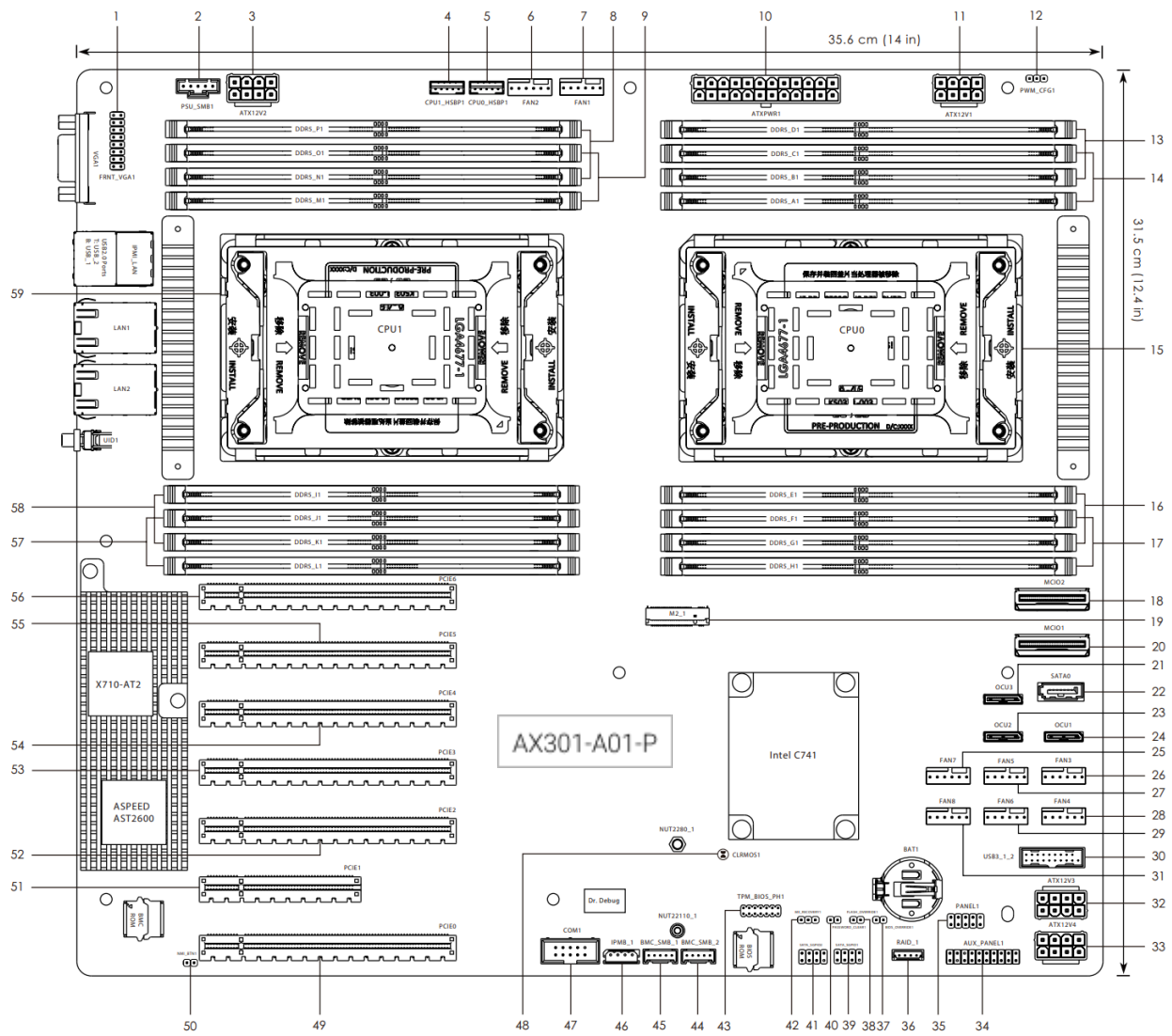


1.8 - Motherboard Overview

1.8.1 - System Block Diagram



1.8.2 - Internal Motherboard Features & Headers

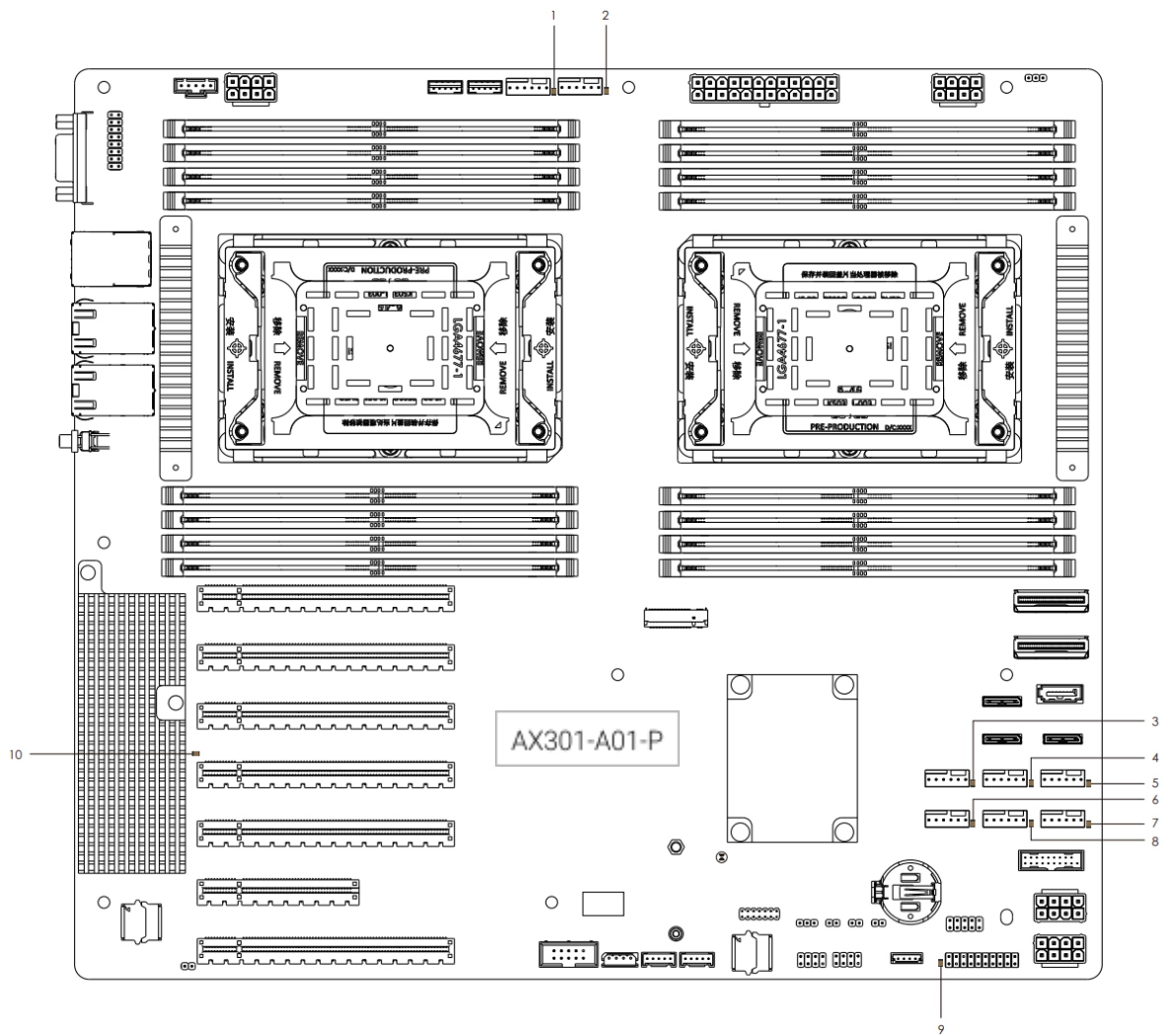


Item	Description	Item	Description
1	Front VGA Header (FRNT_VGA1)	31	System Fan Connector (FAN8)
2	PSU SMBus Header (PSU_SMB1)	32	ATX 12V Power Connector (ATX12V3)
3	ATX 12V Power Connector (ATX12V2)	33	ATX 12V Power Connector (ATX12V4)
4	Backplane PCI Express Hot-Plug Connector (CPU1_HSBP1)	34	Auxiliary Panel Header (AUX_PANEL1)
5	Backplane PCI Express Hot-Plug Connector (CPU0_HSBP1)	35	System Panel Header (PANEL1)
6	System Fan Connector (FAN2)	36	Virtual RAID On CPU Header (RAID_1)
7	System Fan Connector (FAN1)	37	BIOS Swap Override Jumper (BIOS_OVERRIDE1)
8	2 x 288-pin DDR5 DIMM Slots (DDR5_N1, DDR5_P1)*	38	Flash Override Jumper (FLASH_OVERRIDE1)
9	2 x 288-pin DDR5 DIMM Slots (DDR5_M1, DDR5_O1)*	39	SATA SGPIO Connector (SATA_SGPIO1)
10	ATX Power Connector (ATXPWR1)	40	Password Reset Jumper (PASSWORD_CLEAR1)
11	ATX 12V Power Connector (ATX12V1)	41	SATA SGPIO Connector (SATA_SGPIO2)
12	PWM Configuration Header (PWM_CFG1)	42	ME Recovery Jumper (ME_RECOVERY1)
13	2 x 288-pin DDR5 DIMM Slots (DDR5_B1, DDR5_D1)*	43	TPM-SPI Header (TPM_BIOS_PH1)
14	2 x 288-pin DDR5 DIMM Slots (DDR5_A1, DDR5_C1)*	44	BMC SMBus Header (BMC_SMB_2)
15	LGA 4677 CPU Socket (CPU0)	45	BMC SMBus Header (BMC_SMB_1)
16	2 x 288-pin DDR5 DIMM Slots (DDR5_E1, DDR5_G1)*	46	Intelligent Platform Management Bus Header (IPMB_1)
17	2 x 288-pin DDR5 DIMM Slots (DDR5_F1, DDR5_H1)*	47	COM Header (COM1)
18	Mini Cool Edge IO Connector (MCIO2)	48	Clear CMOS Pad (CLRMOS1)
19	M-key M.2 Socket (M2_1) (Type 2280/22110)	49	PCI Express 5.0 x16 Slot (PCIE0)
20	Mini Cool Edge IO Connector (MCIO1)	50	Non Maskable Interrupt Button (NMI_BTN1)
21	OCuLink Connector (4 SATA 6Gb/s) (OCU3)	51	PCI Express 5.0 x8 Slot (PCIE1)
22	SATA Connector (SATA0)	52	PCI Express 5.0 x16 Slot (PCIE2)

Item	Description	Item	Description
23	OCuLink Connector (4 SATA 6Gb/s) (OCU2)	53	PCI Express 5.0 x16 Slot (PCIE3)
24	OCuLink Connector (4 SATA 6Gb/s) (OCU1)	54	PCI Express 5.0 x16 Slot (PCIE4)
25	System Fan Connector (FAN7)	55	PCI Express 5.0 x16 Slot (PCIE5)
26	System Fan Connector (FAN3)	56	PCI Express 5.0 x16 Slot (PCIE6)
27	System Fan Connector (FAN5)	57	2 x 288-pin DDR5 DIMM Slots (DDR5_J1, DDR5_L1)*
28	System Fan Connector (FAN4)	58	2 x 288-pin DDR5 DIMM Slots (DDR5_I1, DDR5_K1)*
29	System Fan Connector (FAN6)	59	LGA 4677 CPU Socket (CPU1)
30	USB 3.2 Gen1 Header (USB3_1_2)		

* For DIMM installation and configurations instructions please see section 3.16.3 - DIMM Population Requirements

1.8.3 - Onboard Motherboard LED Indicators



Item	LED	Status	Description
1	FAN_LED2	Red	FAN2 failed (Unused)
2	FAN_LED1	Red	FAN1 failed (Unused)
3	FAN_LED7	Red	FAN7 failed
4	FAN_LED5	Red	FAN5 failed
5	FAN_LED3	Red	FAN3 failed

Item	LED	Status	Description
6	FAN_LED8	Red	FAN8 failed
7	FAN_LED4	Red	FAN4 failed
8	FAN_LED6	Red	FAN6 failed
9	SB_PWR1	Green	STB PWR ready
10	BMC_LED1	Green	BMC heartbeat LED

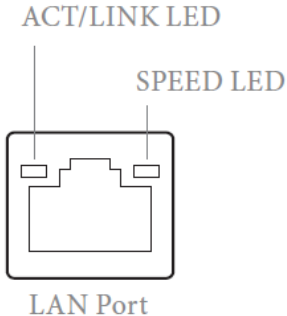
2 - I/O Definitions

2.1 - Networking

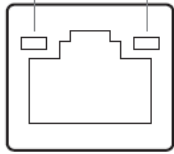
The AX300 Series features the following onboard Ethernet ports:

Port	Chipset	Capabilities
1GbE Mgmt	Realtek RTL8211FD (Attached to ASPEED AST2600)	Dedicated BMC Management port. Only used for system management functions such as IPMI, RedFish, Remote Management, etc. This port is not usable as an Ethernet port by the operating system.
10GbE Port 1	Intel X710	10GBASE-T Port
10GbE Port 2		10GBASE-T Port

2.2 - 1GbE Dedicated BMC Port LEDs

	LED	Color	State	Condition
 <p>ACT/LINK LED</p> <p>SPEED LED</p> <p>LAN Port</p>	Link	-	Off	No Link
		Yellow	On	Link established
			Blinking	Data activity
	Speed	-	Off	10Mbps data rate or no link
		Yellow	On	100Mbps data rate
		Green	On	1Gbps data rate

2.3 - 10GbE Networking Port LEDs

	LED	Color	State	Condition
 <p>ACT/LINK LED</p> <p>SPEED LED</p> <p>LAN Port</p>	Link	-	Off	No Link
		Green	On	Link established
			Blinking	Data activity
Speed	-	Off	100 Mb/s data rate or no link	
	Yellow	On	1Gbps data rate	
	Green	On	10Gbps data rate	

The 2 ports on the AX300 Series are 10GBASE-T ports

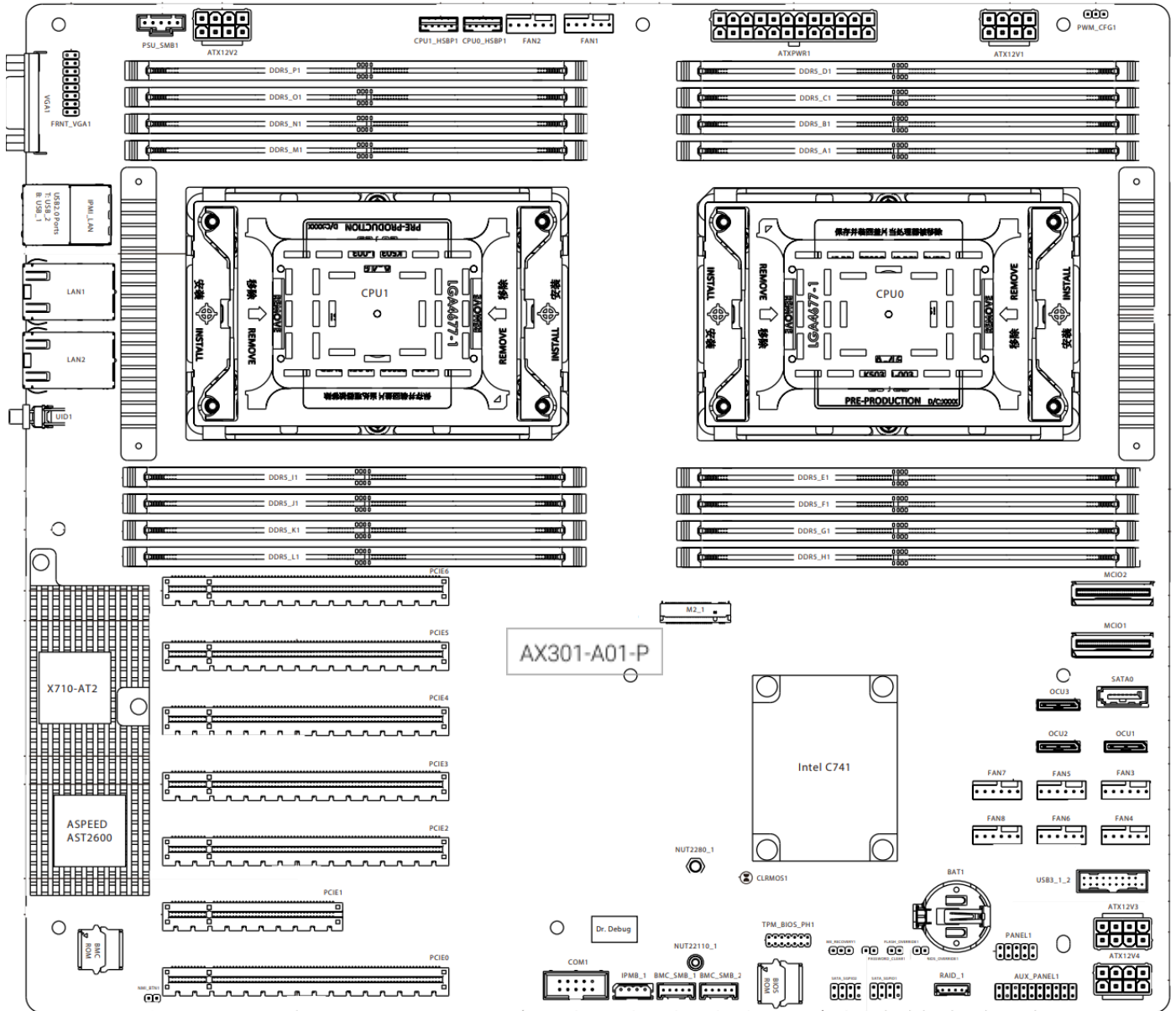
2.4 - USB Ports

There are 2x USB 2.0 Type-A in the rear and 2x USB 3.1 Gen 1 Type-A ports in the front of the Axial AX300 Series Server.

2.5 - VGA Video

There is one VGA Video port located on the back of the Axial AX300 Series Server. This is connected to the AST2600 BMC Chip.

3 - Internal Connectivity

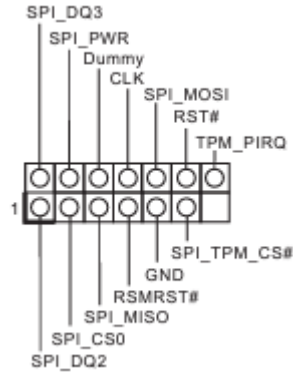


3.1 - M.2 2280/22110 M-key

The M.2 Socket (M2_1, Key M) supports type 2280/22110 M.2 PCI Express modules up to Gen5 x4 (32GT/s x4).

3.2 - TPM Header

The Axial AX300 Series supports an optional discrete TPM 2.0 module. The TPM module included with the AX300 Series Server is the Infineon SLB9670 TPM2.0 (13-pin SPI module)

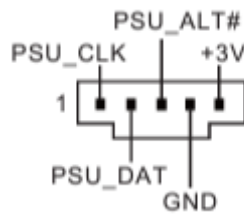


3.3 - CR2032 CMOS Battery Socket

A socket is provided for a CR2032 battery. Regulatory requirements dictate the installed battery shall be rated for operation to at least 85°C.

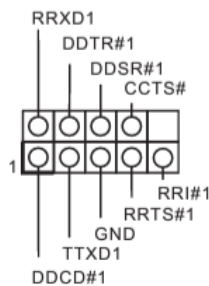
3.4 - PMBus

A connector is provided for a cable connection to the power supply PDB.



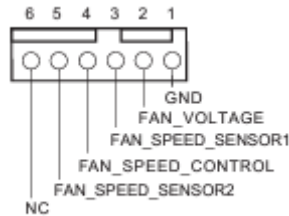
3.5 - RS232 COM Header

A 10-pin (9 electrical) header is provided for cabled serial port, for diagnostics or legacy remote management.



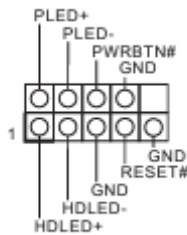
3.6 - Dual Rotor Fan Header

Seven fan headers are included. Hotswap is supported at the motherboard level.



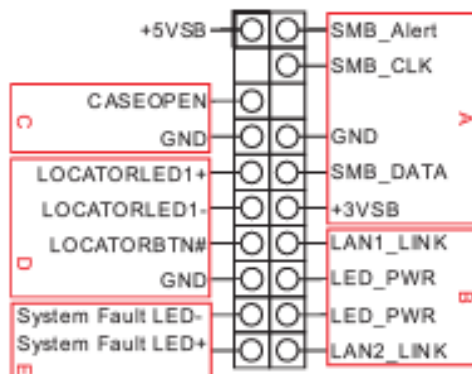
3.7 - Front Panel Header

The front panel header provides power button and LED, reset button and hard disk activity connections. AX300 exposes the power button and LED on the chassis and leaves the others disconnected.



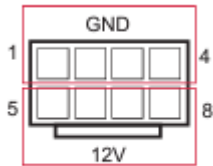
3.8 - AUX Front Panel Header

The AUX front panel header provides connections for some auxiliary features as indicated. The Locator LED and System Fault LED are exposed on the AX301 chassis front, and CASEOPEN detection is used to report the lid status.



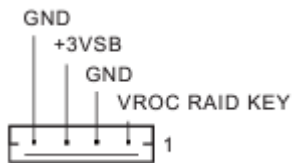
3.9 - ATX 12V Power

Four (4) 12V Aux power inputs are present. All four inputs are used in units built by OnLogic and can only be used with the CBPW166 cable.



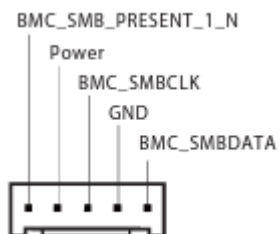
3.10 - VROC

A VROC key header is included to enable Intel Virtual RAID on CPU and NCME/AHCI RAID on CPU PCIE.



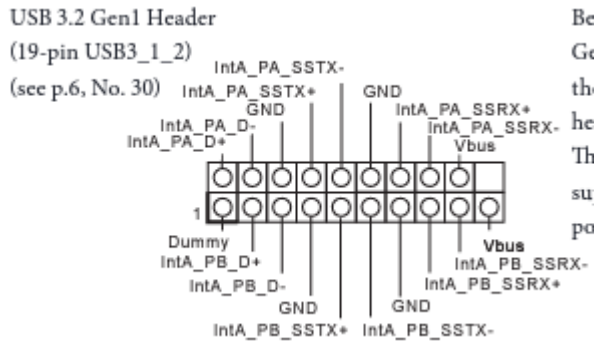
3.11 - BMC SMBus

An SMBus connection to the BMC is provided.



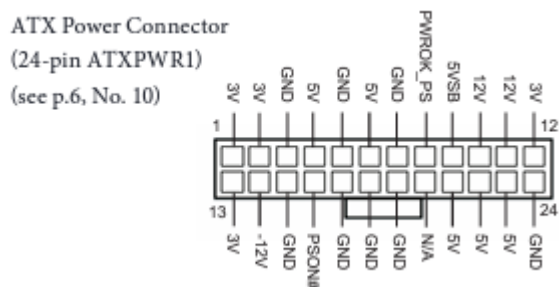
3.12 - USB 3.2 Gen1

A USB 3.2 Gen 1 connection is cabled to the front of the chassis to enable the front USB ports.



3.13 - ATX Power

System voltages are provided to the motherboard through a standard 24-pin ATX power connector.



3.14 - Drive Headers, Labeling, and Recommended Population

3.14.1 - SATA Headers

There is one SATA header on the AX300 Series Server motherboard. The data ports support SATA III 6Gbps storage devices.

3.14.2 - MCIO Header

There are 2 MCIO headers on the Axial AX300 Series motherboard. Each supports up to PCIe5.0 x8. By default these connections are used for the 4x Front Drive Bay option and uses the CBDT119 cable (4x OCuLink to 2x MCIO)

3.14.3 - OCuLink Headers

There are three OCuLink headers on the Axial AX300 Series motherboard that each support PCIe3.0x4 or 4 SATA 6Gb/s per port.

When configured for SATA,

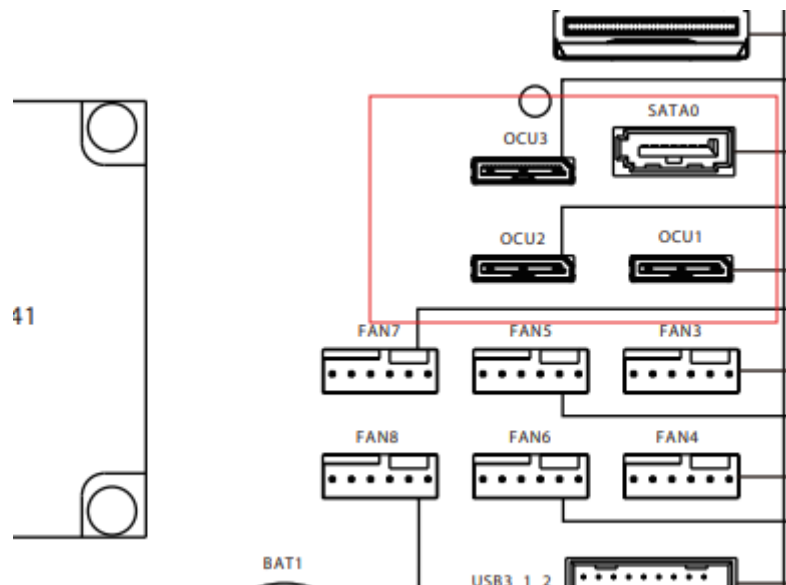
OCU 1 provides ports SATA0_0, SATA0_1, SATA0_2 and SATA0_3

OCU 2 provides ports SATA0_4, SATA0_5, SATA0_6 and SATA0_7

OCU 3 provides ports SATA1_4, SATA1_5, SATA1_6 and SATA1_7

Note that when configured as SATA, OCU 1 and 2 occupy a single VROC RAID instance apart from OCU 3, and therefore a RAID volume spanning all 3 OCuLink ports cannot be created.

OCuLink connector labeling:



Part Number	Cable Description
CBDT118	OCuLink x2 to 8x SATA Data
CBDT119	4x OCuLink Dock Cable Harness
CBDT120	3x OCuLink Dock Cable Harness

3.14.4 Expansion Storage Physical Location

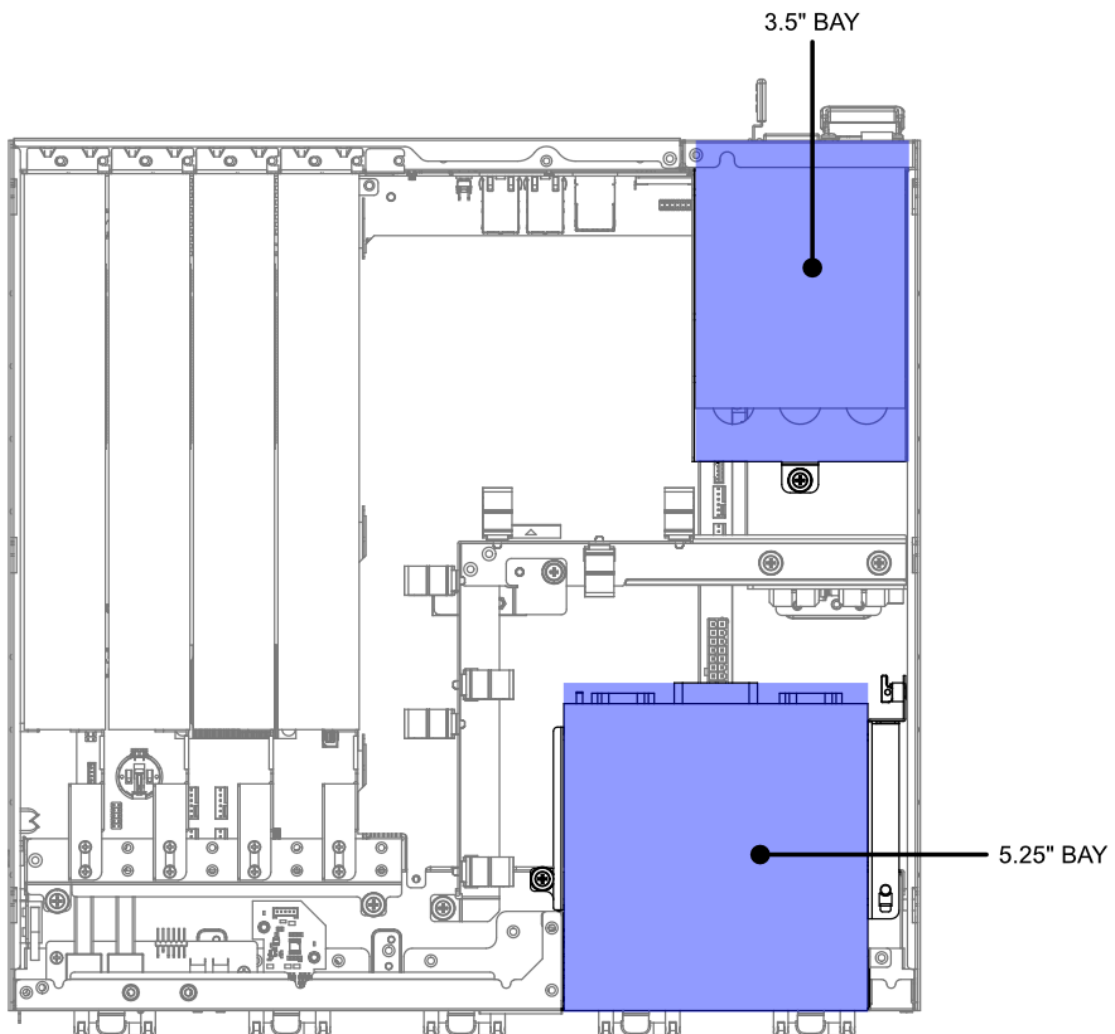
All expansion storage options are located in either the 3.5" or 5.25" expansion bays:

5.25" Front Bay Options:

- **8x SATA SSD Bay** - 8x 2.5", 5mm to 7mm, SATA Drives (8x SATA)
- **4x NVMe SSD Bay** - 4x 2.5" U.2/U.3 (SFF-8643) NVMe SSD Drives (4x OCUlink)
- **12x M.2 Bay** - 12x M.2 SATA Drives (3x OCUlink, 4 drives per connection)

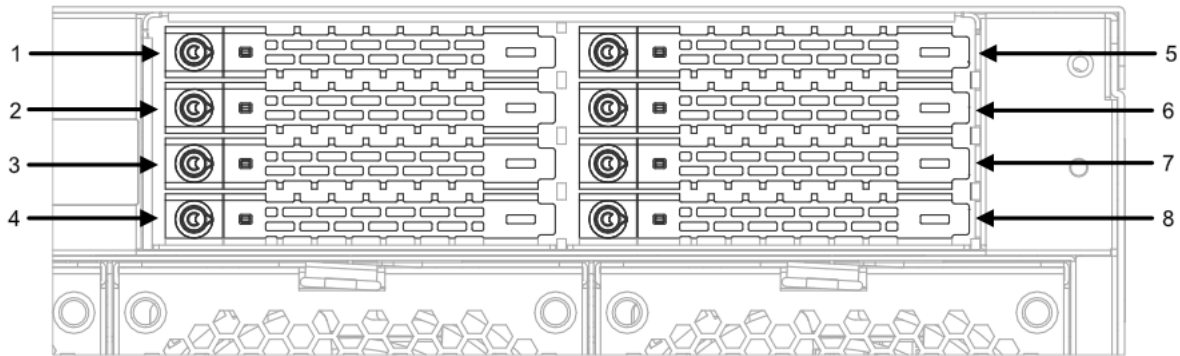
3.5" Rear Bay Options:

- **1x SATA HDD/SSD Bay** - 1x 2.5", 5mm to 15mm, SATA HDD & SSD Drive (1x SATA)

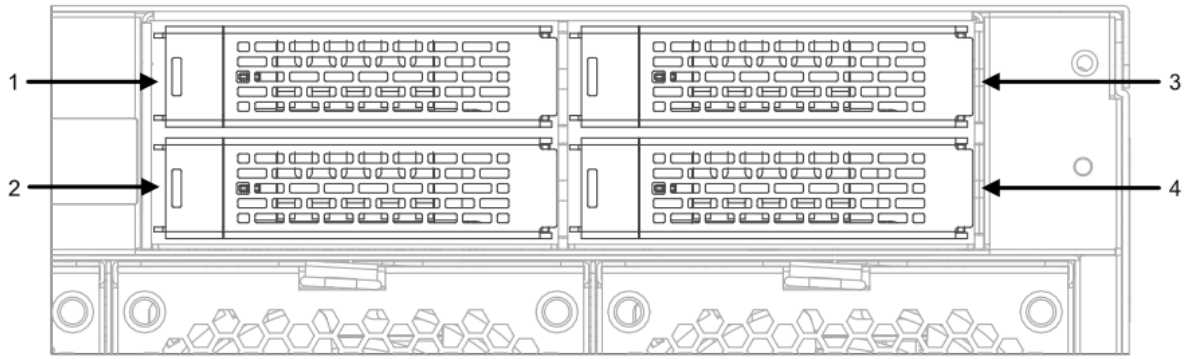


3.14.5 - Front 5.25" Drive Bay Population

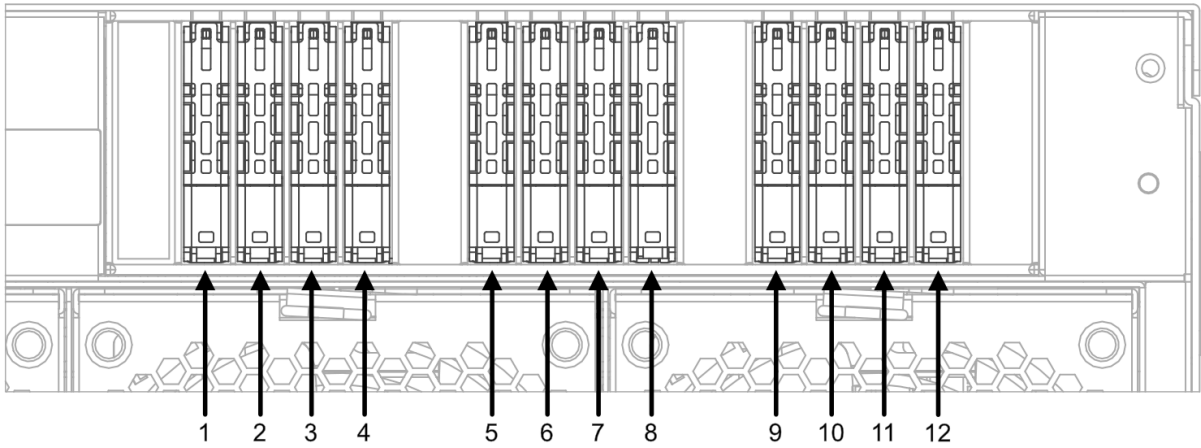
The following drive population recommendations are provided to ensure consistency of connectivity, operation, and OS drive enumeration aligned to physical drive bay locations.



8x SATA SSD Bay		
Bay Number	Enumerates As:	Physical Port
1	SATA0_0	OCU1
2	SATA0_1	OCU1
3	SATA0_2	OCU1
4	SATA0_3	OCU1
5	SATA0_4	OCU2
6	SATA0_5	OCU2
7	SATA0_6	OCU2
8	SATA0_7	OCU2

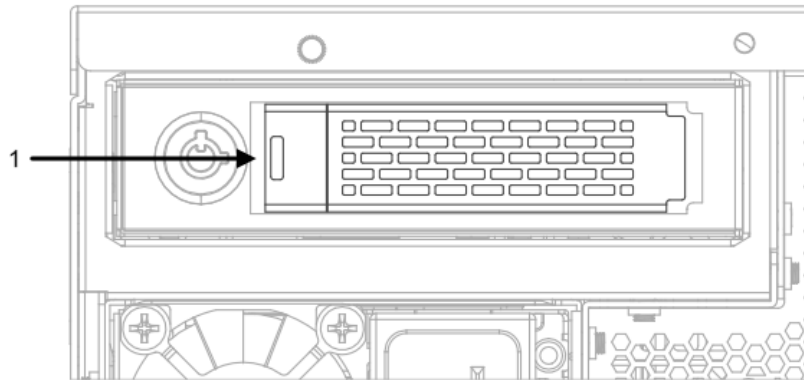


4x NVMe SSD Bay		
Bay Number	Enumerates As:	Physical Port
1	MCIO1-1	MCIO1
2	MCIO1-2	MCIO1
3	MCIO2-1	MCIO2
4	MCIO2-2	MCIO2



12x M.2 Bay		
Bay Number	Enumerates As:	Physical Port
1	SATA0_0	OCU1
2	SATA0_1	OCU1
3	SATA0_2	OCU1
4	SATA0_3	OCU1
5	SATA0_4	OCU2
6	SATA0_5	OCU2
7	SATA0_6	OCU2
8	SATA0_7	OCU2
9	SATA1_4	OCU3
10	SATA1_5	OCU3
11	SATA1_6	OCU3
12	SATA1_7	OCU3

3.14.6 - Rear 3.5" Drive Bay Population



1x SATA HDD/SSD Bay		
Bay Number	Enumerates As:	Physical Port
1	SATA1_2	SATA0

3.14.7 - Drive Bay Locks

The front 8x SATA SSD Bay and rear 1x SATA HDD/SSD Bay option both feature locking mechanisms to prevent unauthorized drive removal.

3.15 - PCIe Gen 5.0 Slots (Six x16 & One x8)

The AX300 Series features 7 PCI 5.0 Express slots on the motherboard (Note: PCIE1 is electrically x8). The PCIe lanes are routed to the listed CPU and offer support for various types of devices.

PCIe Slot	CPU Route	Electrical	Mechanical
PCIE0	CPU1	x16	x16
PCIE1	CPU0	x8	x16
PCIE2	CPU1	x16	x16
PCIE3	CPU1	x16	x16
PCIE4	CPU0	x16	x16
PCIE5	CPU1	x16	x16
PCIE6	CPU0	x16	x16

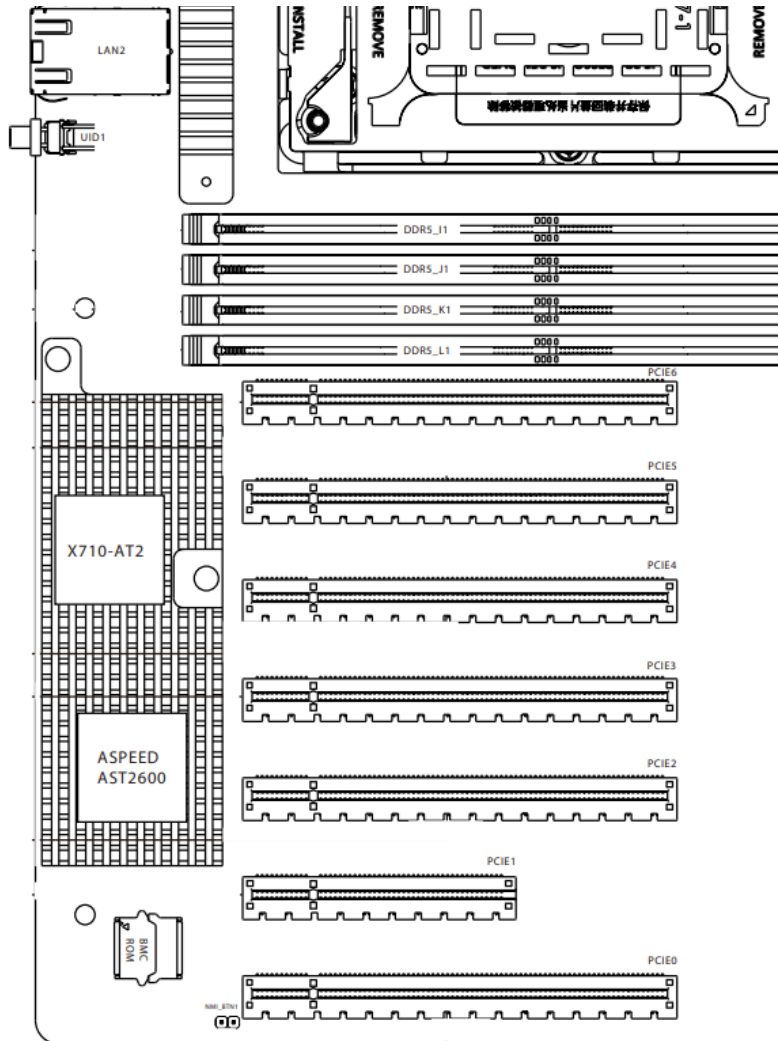
AX300 Variant	Device Support by PCIe Lane						
	CPU1	CPU0	CPU1	CPU1	CPU0	CPU1	CPU0
	Slot #0	Slot #1 (x8)	Slot #2	Slot #3	Slot #4	Slot #5	Slot #6
AX301	x	Network Only	x	x	Any	x	Any
AX302	x	Network Only	x	x	Any	x	Any
AX303	Any (No Passive GPU)	Network Only	x	Dual Slot GPU	Network Only	x	Dual Slot GPU
AX304	Any (No Passive GPU)	Network Only	x	Dual Slot GPU	Network Only	x	Dual Slot GPU
AX305	Any (No Passive GPU)	Single Slot GPU (Not Passive)	Single Slot GPU (Not Passive)	Single Slot GPU	Single Slot GPU	Single Slot GPU	Single Slot GPU
AX306	Any (No Passive GPU)	Single Slot GPU (Not Passive)	Single Slot GPU (Not Passive)	Single Slot GPU	Single Slot GPU	Single Slot GPU	Single Slot GPU
AX307	Any (No Passive GPU)	x	Any (No Passive GPU)	x	Any	x	Any
AX308	Any (No Passive GPU)	x	Any (No Passive GPU)	x	Any	x	Any

3.15.1 - Recommended PCIe lane population order

To maximize performance and compatibility of PCIe adapters, the following PCIe lane population order should be followed when adding PCIe adapters to the system.

System SKU	PCIe Population Recommendation
AX301 / AX302	<p>Maximum Single Slot PCIe Adapters: 3 Maximum Dual Slot Adapters: 2</p> <p>Populate First: GPU/Other PCIe x16 Adapter Install in slot order: 6, 4, 1</p> <p>Populate Next: Network/RAID/Other PCIe Adapter Install in slot: 1</p>
AX303 / AX304	<p>Maximum Single Slot PCIe Adapters: 4 Maximum Dual Slot Adapters: 3</p> <p>Populate First: Dual Slot GPU Install in slot order: 6, 3, 0</p> <p>Populate Next: Network/RAID/Other PCIe Adapter Install in slot order: 1, 4, (0, 3, 6)</p>
AX305 / AX306	<p>Maximum Single Slot PCIe Adapters: 7 Maximum Dual Slot Adapters: 1</p> <p>Populate First: Dual Slot GPU Install in slot: 0</p> <p>Populate Next: Single Slot GPU Install in slot order: 6,4,5,3,2,0,1</p> <p>Populate Next: Network/RAID/Other PCIe Adapter Install in slot order: 1, 4, 6, 2, 3, 5, (0)</p>
AX307 / AX308	<p>Maximum Single Slot PCIe Adapters: 4 Maximum Dual Slot Adapters: 4</p> <p>Populate First: Dual Slot GPU Install in slot order: 6,4,2,0</p> <p>Populate Next: Single Slot GPU/Network/RAID/Other PCIe Adapter Install in slot order: 6,4,2,0</p>

PCIe lanes are numbered below for reference.



3.16 - DDR5 DIMM Slots

The AX300 Series supports up to sixteen (eight per CPU) 288-pin DDR5 DIMM slots in two groups, and supports Single Channel Memory Technology.

5th Gen Intel Xeon Scalable Processors support transfer speeds between 4800MT/s and 5600MT/s depending on the processor SKU.

3.16.1 - Supported Memory Modes

The IMC (Integrated Memory Controller) of the processors supports two mirror modes. The ability to support the memory modes is dependent upon the DIMM population. There are 2 IMC per CPU.

3.16.1.1 - Mirror Modes

Full Mirror Mode will set the entire memory in the system to be mirrored, consequently reducing the memory capacity by half. One half will remain active while the other half will be left in reserve.

Partial Mirror Mode will enable the required size of memory to be mirrored. If rank sparing is enabled, partial mirroring of RAM will not take effect.

Enabling any type of Mirror Mode will disable XPT Prefetch.

3.16.2 - Memory R.A.S. Features

3.16.2.1 - ADDDC Sparing

ADDDC Sparing enables Memory Rank Sparing to reserve memory ranks to replace failed memory ranks when an error is detected. This will reduce the total memory available to the OS. This feature is disabled by default in the BIOS.

3.16.2.2 - Patrol Scrub

Patrol Scrub is a background activity initiated by the processor to seek out and fix memory errors. This feature is disabled by default in the BIOS.

3.16.3 - DIMM Population Requirements

The following rules apply to when populating DIMMs in the AX300 Series Server:

1. Only DDR5 DIMMs may be installed into the system.
2. The maximum frequency of the system memory will never exceed that of the lowest frequency DIMM(s) installed in the system.

When populating DIMMs within the system, the following population is recommended for each CPU configuration in order to maximize overall system performance (**V** indicated populated slot):

Single CPU configurations:

x1 CPU Configuration												
CPU 0	Number of Total DIMMs											
DIMM Slot	1	1	1	1	2	2	4	6	6	6	6	8
A1	V				V		V	V	V		V	V
B1			V						V	V	V	V
C1						V	V	V	V	V		V
D1								V		V	V	V
E1		V				V	V	V	V	V		V
F1				V				V		V	V	V
G1					V		V	V	V		V	V
H1									V	V	V	V

Dual CPU configurations:

x2 CPU Configuration												
CPU 0	Number of Total DIMMs											
DIMM Slot	1	1	1	1	2	2	4	6	6	6	6	8
A1	V				V		V	V	V		V	V
B1			V						V	V	V	V
C1						V	V	V	V	V		V
D1								V		V	V	V
E1		V				V	V	V	V	V		V
F1				V				V		V	V	V
G1					V		V	V	V		V	V
H1									V	V	V	V
CPU 1	Number of Total DIMMs											
DIMM Slot	1	1	1	1	2	2	4	6	6	6	6	8
I1	V				V		V	V	V		V	V
J1			V						V	V	V	V
K1						V	V	V	V	V		V
L1								V		V	V	V
M1		V				V	V	V	V	V		V
N1				V				V		V	V	V
O1					V		V	V	V		V	V
P1									V	V	V	V

3.16.4 - Memory recommendations when using GPUs

When GPUs are installed in the system, it is recommended that the minimum system memory should be at least 1.5 times the total GPU memory. For superior performance and to accommodate future workloads, it is strongly recommended that the system memory be 2.0 times the total GPU memory. Failure to meet these memory requirements may result in degraded performance or unexpected application behavior.

3.17 - Dr. Debug - Onboard LED Debug

Dr. Debug is used to provide code information, making debugging easier. Please see the charts below for Dr. Debug code information.

Code	Description	Code	Description
0x10	PEI_CORE_STARTED	0xB0	RT_SET_VIRTUAL_ADDRESS_MAP_BEGIN
0x11	PEI_CAR_CPU_INIT	0xB1	RT_SET_VIRTUAL_ADDRESS_MAP_END
0x15	PEI_CAR_NB_INIT	0xB2	DXE_LEGACY_OPROM_INIT
0x19	PEI_CAR_SB_INIT	0xB3	DXE_RESET_SYSTEM
0x31	PEI_MEMORY_INSTALLED	0xB4	DXE_USB_HOTPLUG
0x32	PEI_CPU_INIT	0xB5	DXE_PCI_BUS_HOTPLUG
0x33	PEI_CPU_CACHE_INIT	0xB6	DXE_NVRAM_CLEANUP
0x34	PEI_CPU_AP_INIT	0xB7	DXE_CONFIGURATION_RESET
0x35	PEI_CPU_BSP_SELECT	0xF0	PEI_RECOVERY_AUTO
0x36	PEI_CPU_SMM_INIT	0xF1	PEI_RECOVERY_USER
0x37	PEI_MEM_NB_INIT	0xF2	PEI_RECOVERY_STARTED
0x3B	PEI_MEM_SB_INIT	0xF3	PEI_RECOVERY_CAPSULE_FOUND
0x4F	PEI_DXE_IPL_STARTED	0xF4	PEI_RECOVERY_CAPSULE_LOADED
0x60	DXE_CORE_STARTED	0xE0	PEI_S3_STARTED
0x61	DXE_NVRAM_INIT	0xE1	PEI_S3_BOOT_SCRIPT
0x62	DXE_SBRUN_INIT	0xE2	PEI_S3_VIDEO_REPOST
0x63	DXE_CPU_INIT	0xE3	PEI_S3_OS_WAKE
0x68	DXE_NB_HB_INIT	0x50	PEI_MEMORY_INVALID_TYPE
0x69	DXE_NB_INIT	0x53	PEI_MEMORY_NOT_DETECTED
0x6A	DXE_NB_SMM_INIT	0x55	PEI_MEMORY_NOT_INSTALLED
0x70	DXE_SB_INIT	0x57	PEI_CPU_MISMATCH
0x71	DXE_SB_SMM_INIT	0x58	PEI_CPU_SELF_TEST_FAILED
0x72	DXE_SB_DEVICES_INIT	0x59	PEI_CPU_NO_MICROCODE
0x78	DXE_ACPI_INIT	0x5A	PEI_CPU_ERROR
0x79	DXE_CSM_INIT	0x5B	PEI_RESET_NOT_AVAILABLE
0x90	DXE_BDS_STARTED	0xD0	DXE_CPU_ERROR

Code	Description	Code	Description
0x91	PEI_CORE_STARTED	0xD1	DXE_NB_ERROR
0x92	DXE_PCI_BUS_BEGIN	0xD2	DXE_SB_ERROR
0x93	DXE_PCI_BUS_HPC_INIT	0xD3	DXE_ARCH_PROTOCOL_NOT_AVAILABLE
0x94	DXE_PCI_BUS_ENUM	0xD4	DXE_PCI_BUS_OUT_OF_RESOURCES
0x95	DXE_PCI_BUS_REQUEST_RESOURCES	0xD5	DXE_LEGACY_OPROM_NO_SPACE
0x96	DXE_PCI_BUS_ASSIGN_RESOURCES	0xD6	DXE_NO_CON_OUT
0x97	DXE_CON_OUT_CONNECT	0xD7	DXE_NO_CON_IN
0x98	DXE_CON_IN_CONNECT	0xD8	DXE_INVALID_PASSWORD
0x99	DXE_SIO_INIT	0xD9	DXE_BOOT_OPTION_LOAD_ERROR
0x9A	DXE_USB_BEGIN	0xDA	DXE_BOOT_OPTION_FAILED
0x9B	DXE_USB_RESET	0xDB	DXE_FLASH_UPDATE_FAILED
0x9C	DXE_USB_DETECT	0xDC	DXE_RESET_NOT_AVAILABLE
0x9D	DXE_USB_ENABLE	0xE8	PEI_MEMORY_S3_RESUME_FAILED
0xA0	DXE_IDE_BEGIN	0xE9	PEI_S3_RESUME_PPI_NOT_FOUND
0xA1	DXE_IDE_RESET	0xEA	PEI_S3_BOOT_SCRIPT_ERROR
0xA2	DXE_IDE_DETECT	0xEB	PEI_S3_OS_WAKE_ERROR
0xA3	DXE_IDE_ENABLE		
0xA4	DXE_SCSI_BEGIN		
0xA5	DXE_SCSI_RESET		
0xA6	DXE_SCSI_DETECT		
0xA7	DXE_SCSI_ENABLE		
0xA8	DXE_SETUP_VERIFYING_PASSWORD		
0xA9	DXE_SETUP_START		
0xAB	DXE_SETUP_INPUT_WAIT		
0xAD	DXE_READY_TO_BOOT		
0xAE	DXE_LEGACY_BOOT		
0xAF	DXE_EXIT_BOOT_SERVICES		

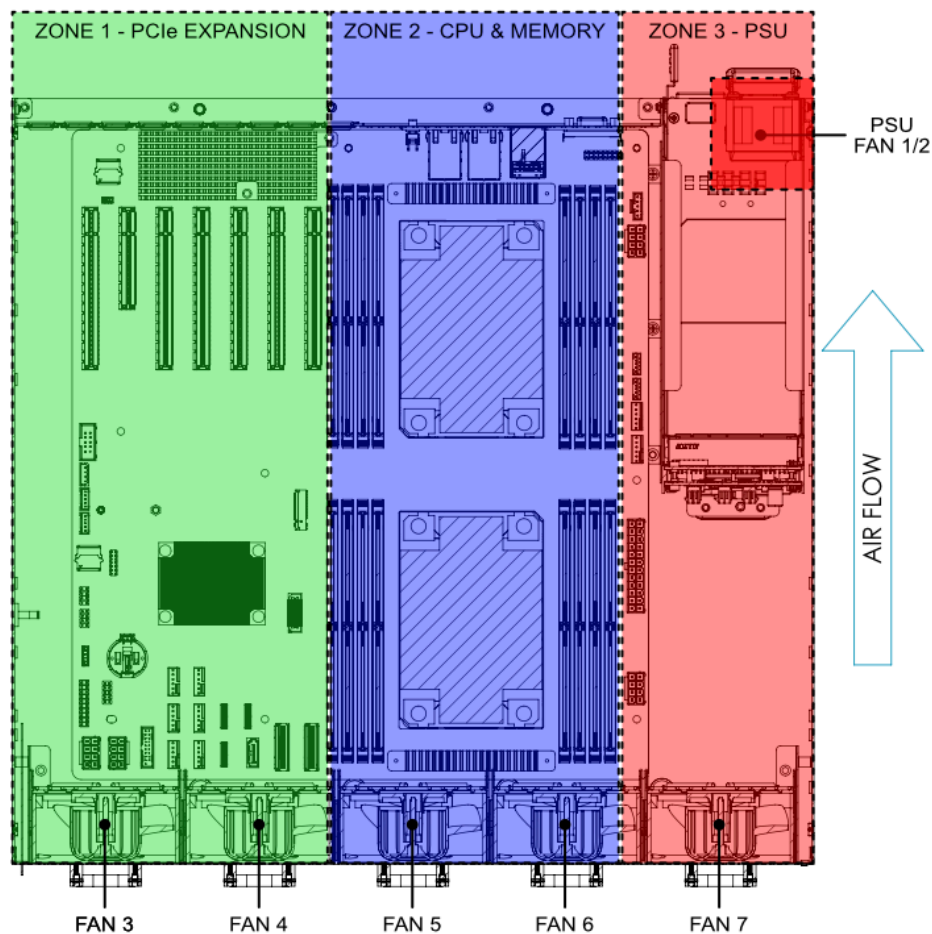
4 - Thermals and Cooling

The Axial AX300 Series Edge Server is designed to operate and function across a wide temperature (5 to 40°C) and humidity range (8 to 85% RH non-condensing). The following sections describe the thermal and cooling capabilities of the system and its expected behavior in various conditions.

4.1 - System Fans and Airflow Direction

The Axial AX300 Series Edge Server has five 80 x 80 x 38mm system fans, which can be independently controlled and configured via the Baseboard Management Controller (BMC) relative to the supported system temperature sensors. The default fan duty and configuration settings have been validated to operate in accordance with the supported temperature range (up to 40°C). If the ambient operating temperature is tightly controlled, additional fan configuration optimizations may be manually adjusted to optimize acoustics and reduce power consumption. For additional information pertaining to manual fan configuration settings, please consult the Axial Edge Server BMC User Guide.

The power supply fans operate independently and have their own closed-loop cooling algorithm.



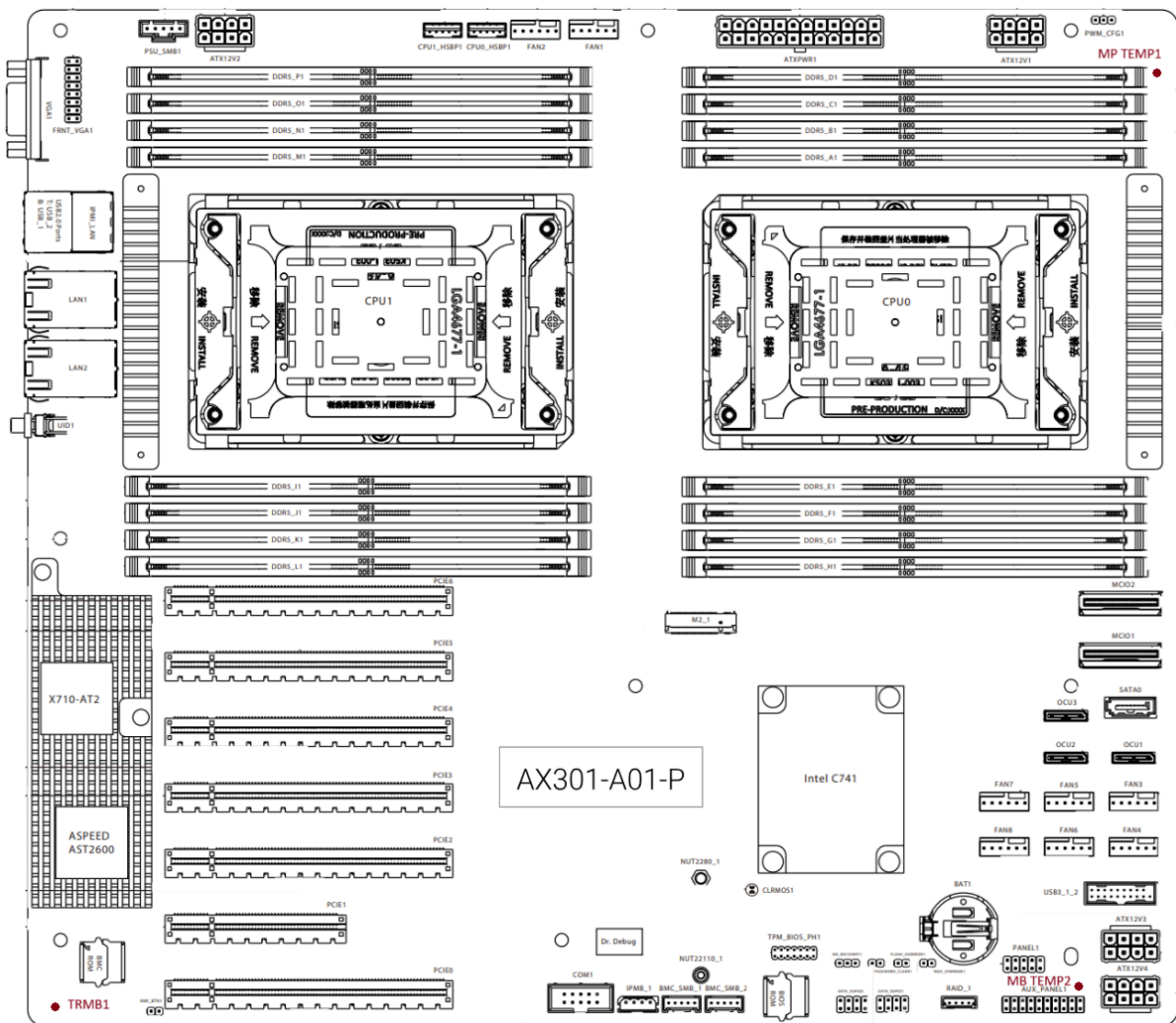
By default, the fans are divided into 3 cooling zones: PCIe Expansion, CPU and Memory, and Power Supply and Storage. Internal baffling ensures CPU air flow is directed through the CPU heatsinks. A partial diverting duct directs some of the exhaust air from CPU0 around CPU1 and bypass air from the inlet to CPU1.

Note: In the case of a configuration with only 1 CPU installed, there will be no diverting duct installed in the chassis

In addition to the system fans, some PCIe and 5.25" bay devices will have their own independently controlled fans.

4.2 - Temperature Sensors

Temperature sensor data is available for many onboard temperature sensors.



Sensor Name	Upper Non Critical Temperature °C	Upper Critical Temperature °C
MB TEMP1	54	55
MB TEMP2	54	55
TRMB1	-	-
TEMP_CPU	TjMax - 1	TjMax
TEMP_VR	99	100
TEMP_CARD_SIDE	69	70
TEMP_X710	99	100
TEMP_TR1	65	
TEMP_M.2	70	
TEMP_GPU	92	93

4.3 - Default Fan Settings

The system is configured to operate in accordance with a closed loop thermal algorithm which accounts for components' temperature maximums, reduced acoustics, lower power consumption, and optimal performance.

4.3.1 - Fan Zone Assignments

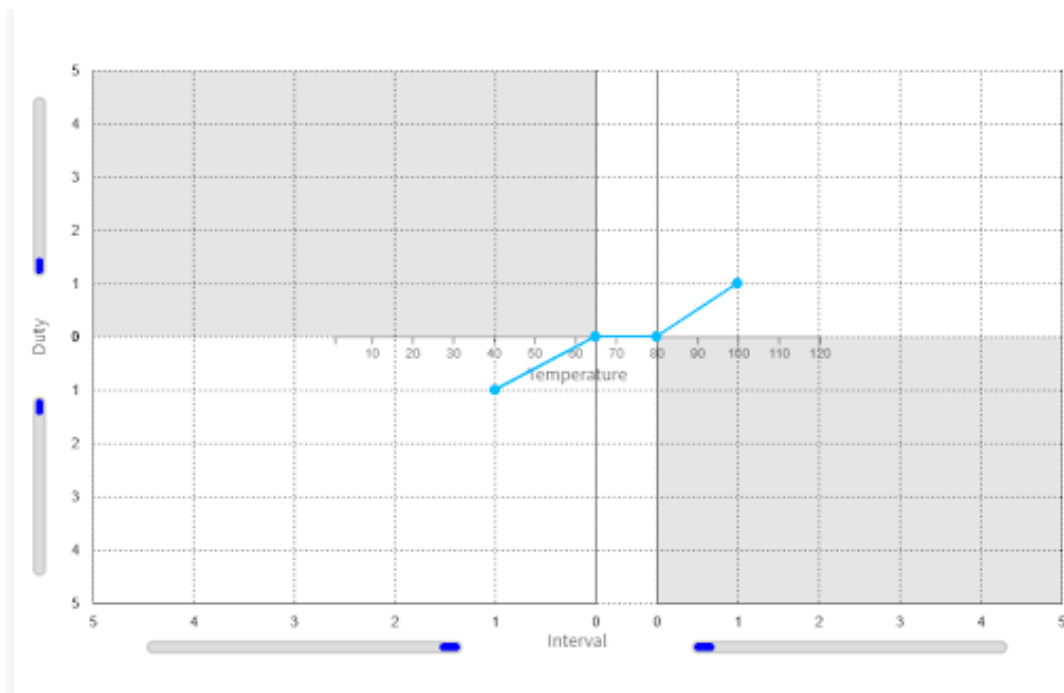
The fan zone assignments, default closed loop tables, and associated temperature sensors are outlined in this section.

4.3.1.1 - Fan Zone 1 - CPU Area

Assigned Temperature Sensor: CPU1 Temp, CPU2 Temp

Assigned Fans: FAN5, FAN6

Closed Loop Table 1	Value
Ramp Up Temp (°C)	80
Ramp Up Interval (sec)	1
Ramp Up Duty (%)	1
Ramp Down Temp (°C)	65
Ramp Down Interval (sec)	1
Ramp Down Duty (%)	1
Ramp Threshold (°C)	0



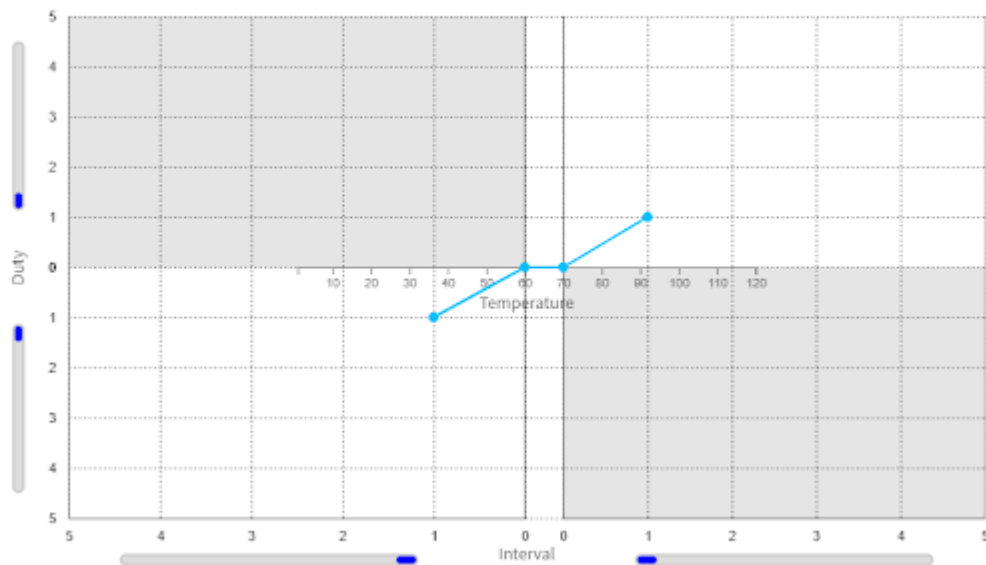
As per the default configuration settings, the system fans will increase duty cycle at 1% increments every second when the CPU temperature is at or above 80°C. When the temperature drops below 65°C, the system fan duty cycle will reduce by 1% every second.

4.3.1.2 - Fan Zone 2 - PCIe / GPU Area

Assigned Temperature Sensor: TEMP_GPUx, M.2 Temp

Assigned Fans: FAN3, FAN4

Closed Loop Table 2	Value
Ramp Up Temp (°C)	70
Ramp Up Interval (sec)	1
Ramp Up Duty (%)	1
Ramp Down Temp (°C)	60
Ramp Down Interval (sec)	1
Ramp Down Duty (%)	1
Ramp Threshold (°C)	0



As per the default configuration settings, the system fans will increase duty cycle at 1% increments every second when the GPU temperature is at or above 70°C. When the temperature drops below 60°C, the system fan duty cycle will reduce by 1% every second.

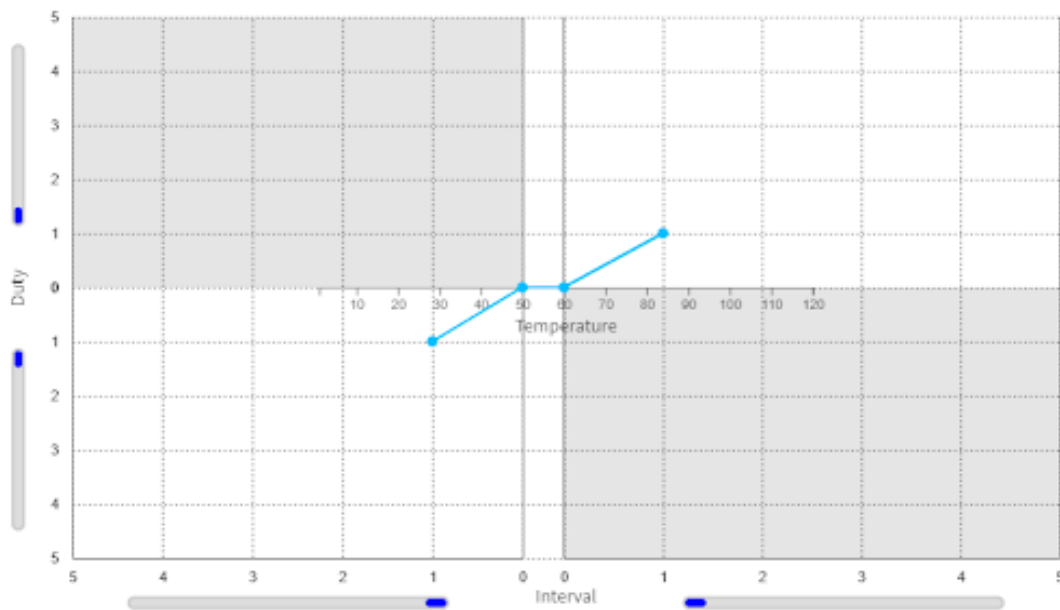
Note: GPU temperature sensing is only supported with Nvidia professional grade or Intel Datacenter GPUs

4.3.1.3 - Fan Zone 3 - PSU / Storage Area

Assigned Temperature Sensor: TRMB1 (Ambient Temperature Sensor)

Assigned Fans: FAN7

Closed Loop Table 3	Value
Ramp Up Temp (°C)	60
Ramp Up Interval (sec)	1
Ramp Up Duty (%)	1
Ramp Down Temp (°C)	50
Ramp Down Interval (sec)	1
Ramp Down Duty (%)	1
Ramp Threshold (°C)	0



As per the default configuration settings, the system fan will increase duty cycle at 1% increments every second when the ambient temperature is at or above 60°C. When the temperature drops below 50°C, the system fan duty cycle will reduce by 1% every second.

4.3.2 - Additional Fan Defaults

The default system idle duty cycle is 15% and the default maximum duty is 95%.

Due to the chassis air inlet and outlet sizing, the fan performance does not marginally improve above 95% duty cycle, while fan noise increases.

Upon System Fan Failure or BMC Firmware Update, System Fans will ramp to maximum speed.

4.4 - Thermal Performance and Validation

The default fan duty and configuration settings have been validated to operate in accordance with the supported temperature range (up to 40°C) as per the following test scenario and results.

4.4.1 - Test Conditions

4.4.1.1 - System Configurations

Entry Configuration		
Component	Description	Quantity
Processor	Intel Xeon Silver 4509Y	1
Memory	16Gb DDR5 RAM	2
PCIe Expansion	NVIDIA RTX2000 ADA Series GPU	1
Storage	M.2 NVMe Wide-Temp Storage	1
Power Supply	Delta 2400W CRPS	1
Typical Configuration		
Component	Description	Quantity
Processor	Intel Xeon Silver 4510	2
Memory	16Gb DDR5 RAM	4
PCIe Expansion	NVIDIA RTX4500 ADA Series GPU	1
Storage	M.2 NVMe Wide-Temp Storage	1
Power Supply	Delta 2400W CRPS	1
Maximum Configuration		
Component	Description	Quantity
Processor	Intel Xeon Silver 6458Y+	2

Memory	16Gb DDR5 RAM	16
PCIe Expansion	NVIDIA RTX6000 ADA Series GPU	4
Front Storage Expansion	128Gb SATA SSD inside 8-Bay Drive Enclosure	8
Rear Storage Expansion	128GB SATA SSD inside 1-bay Drive Enclosure	1
Power Supply	Delta 2400W CRPS	2

4.4.1.2 - Workload Applications/Test

Component	Workload
Processor	80% load applied using PassMark Burn-In Test
Memory	80% load applied using PassMark Burn-In Test
GPU	100% load applied using n-body simulation from Nvidia CUDA suite

4.4.1.3 - Temperature Range

The system performance was tested along a ramp with the following levels at two hours per level. During the test sequence numerous points throughout the system were monitored to ensure adequate cooling was provided to components in the system. The system was also tested 5°C and 10°C above its rated temperature range to help classify performance outside of the rated temperature range.

Tested Temperature Levels[°C]
0C
10C
20C
30C
35C
40C
45C
50C

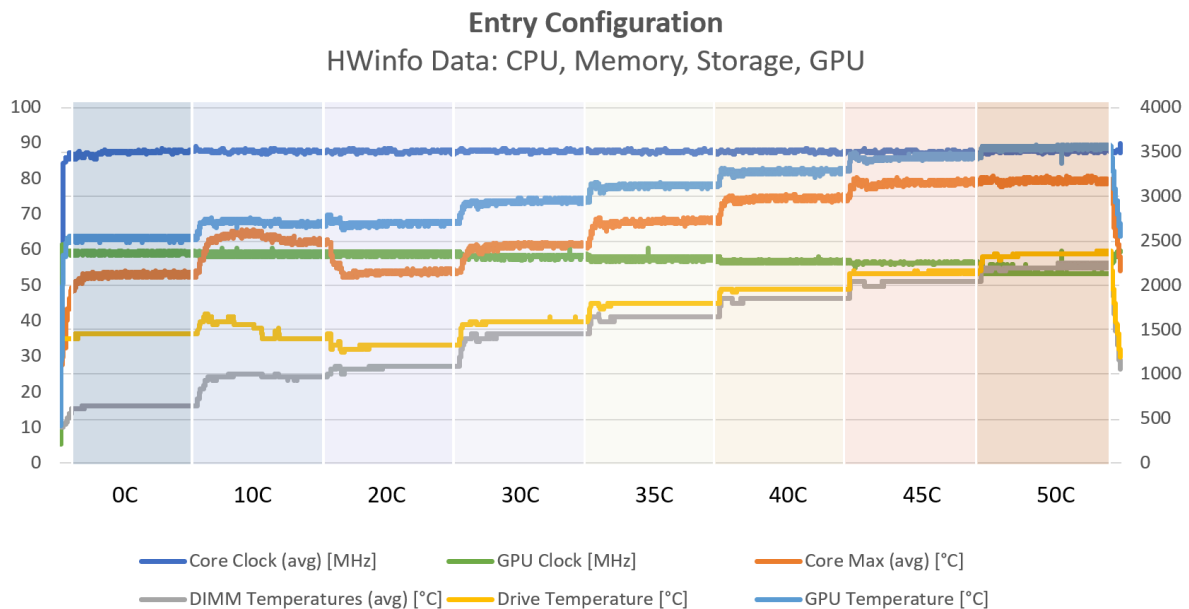
4.4.2 - Test Results

4.4.2.1 - Maximum Temperature Recorded for Critical Components

	CPU T _{MAX}	GPU T _{MAX}	RAM T _{MAX}
Entry Configuration	84C	89C	56C
Typical Configuration	79C	92C	56C
Max Configuration	87C	94C	60C

4.4.2.2 - Entry Configuration Thermal Performance Test

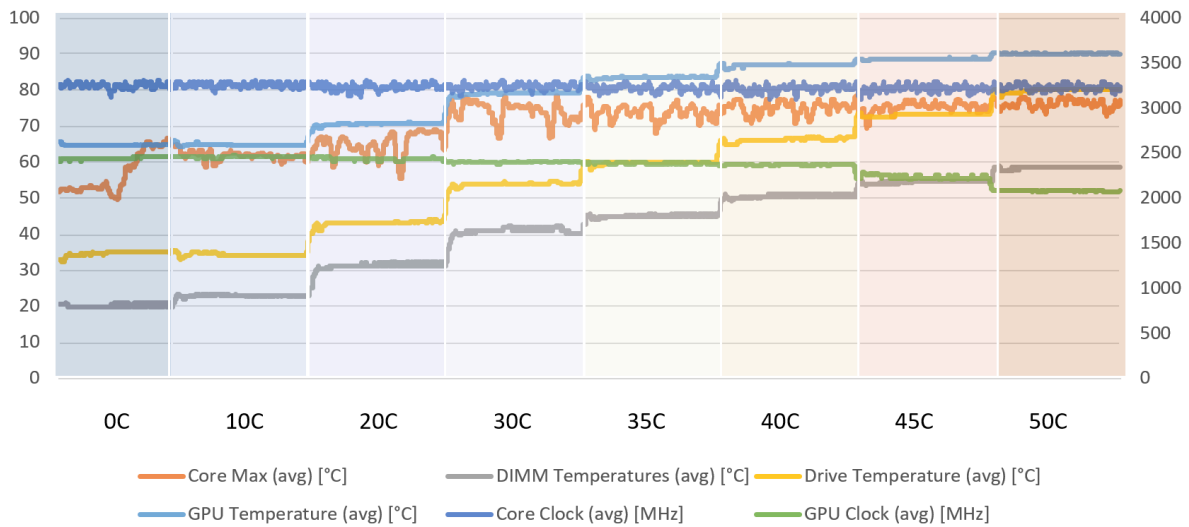
Summary: The Axial AX300 Series system configured with entry level hardware performed at full capacity under the workload across the full thermal range (0C-40°C) without the CPU or GPU throttling.



4.4.2.3 - Typical Configuration Thermal Performance Test

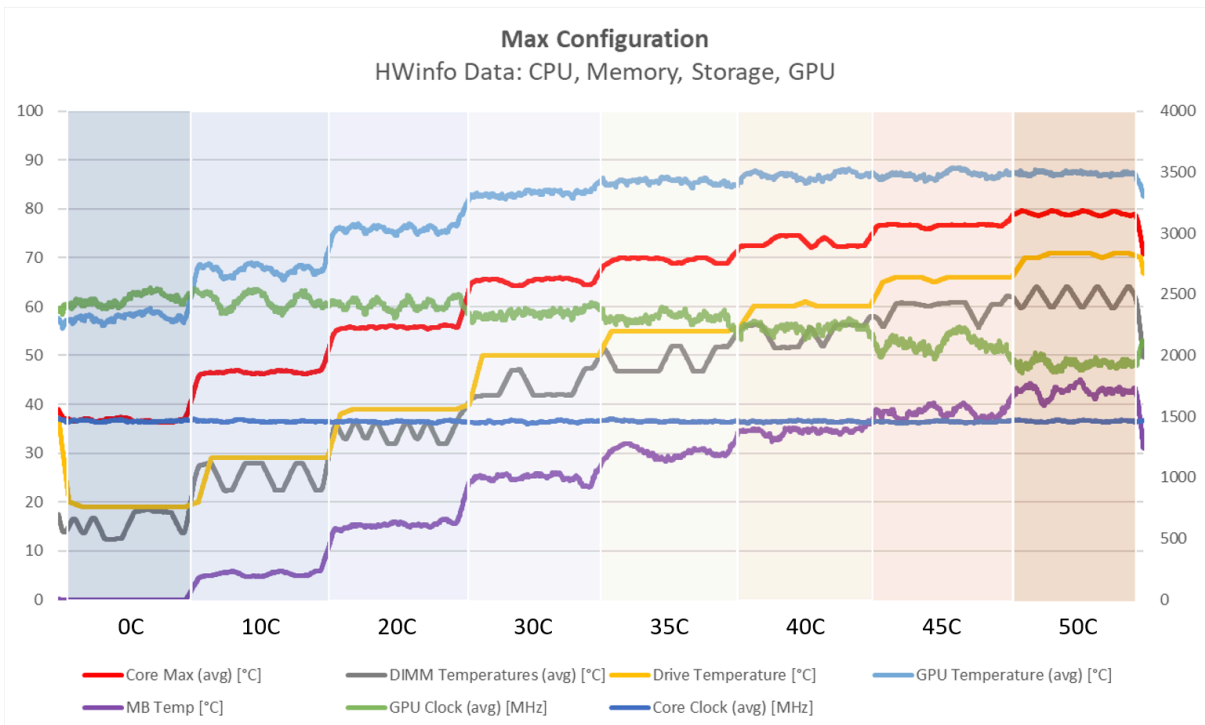
Summary: The Axial AX300 Series system built with a typical hardware configuration performs at full capacity under the workload up to 40°C. CPUs maintain the full workload across the full temperature sweep. The Nvidia RTX 4500 ADA remains below critical temperatures for the operational range and begins throttling above 40°C as critical temperatures are reached.

Typical Configuration
 HWinfo Data: CPU, Memory, Storage, GPU



4.4.2.4 - Maximum Configuration Thermal Performance Test

Summary: The Axial AX300 Series system built with a maximized hardware configuration performs at full capacity under the workload up to 40°C. CPUs maintain the full workload across the full temperature sweep. The four Nvidia RTX 6000 ADA cards remain below critical temperatures for the operational range and begin throttling above 40°C as critical temperatures are reached.



4.4.3 - CPU Performance Relative to High Ambient Temperatures

CPUs with high Thermal Design Power (TDP) ratings may experience performance throttling under sustained, maximum workloads, particularly in high ambient temperature environments.

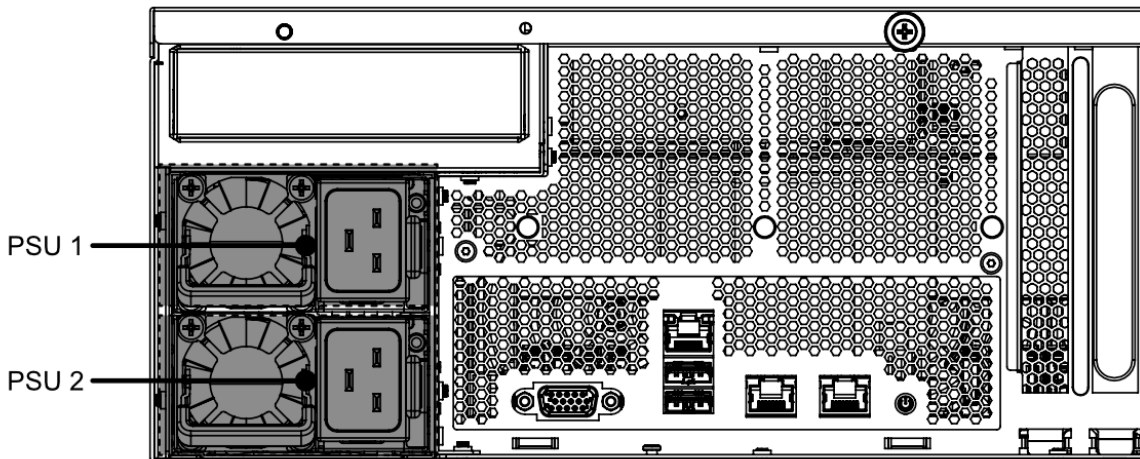
To optimize performance in high ambient temperature environments, it is recommended to characterize workloads accordingly and adjust system settings as needed.

5 - Power

The sections below focus on the power features and capabilities of the AX300 Series Server.

5.1 - Supported Power Supplies

The system supports two redundant power supplies, which may be 1000W/2400W depending on the selected mode and input voltage (110V/240V respectively). These power supplies are hot-swappable, meaning they can be replaced while the system is running without interrupting its operation.



The power input into both supplies must be the same as they will automatically adjust their power mode depending on the input voltage. 110V input will have a maximum output of 1000W and 240V input will have a maximum output of 2400W.

If you need to replace a failed power supply, simply remove the failed unit and insert a new one of the same wattage. The system will automatically recognize the replacement power supply and bring it online to restore redundancy.

IMPORTANT: When utilizing multiple 300W-350W or the maximum of seven 150W PCIe adapters (such as GPUs), the 2400W power supply mode is recommended on both power supplies due to momentary power spikes (exceeding the rated wattage of the adapters) that may occur. When these power spikes occur, the power consumption of the PCIe adapters combined with power draw of other system components may exceed the available power of the supplies.

5.2 - Power Redundancy

The power supplies in this system are fully redundant in a primary/backup mode. This means that the two power supplies work in parallel, with one power supply acting as the primary source of power and the other as a backup.

In normal operation, the primary power supply is responsible for supplying power to the system, while the backup power supply remains idle. If the primary power supply fails, the backup power supply automatically takes over, ensuring that the system continues to receive power without interruption.

The power supplies are designed to work seamlessly together, with the primary power supply handling the majority of the load and the backup power supply providing additional power as needed. This redundancy ensures that the system can continue to operate even if one power supply fails, providing a high level of reliability for critical systems.

If a power supply failure occurs, the alerts will be presented via the Baseboard Management Controller (BMC), an audible alarm may occur, and the error LED will assert. If this happens, the failing supply can be serviced while the system remains operational on the backup power supply. Once the replacement power supply is installed, the system will automatically detect it and bring it online, restoring full redundancy.

5.3 - Power Table

This table represents the max power draw of a max configuration AX300 Series Server with two 6548Y+ CPUs, a selection of GPUs, and 1 of the 3 options for storage docks in the front.

Component	Device Max Power Draw (W)	Max Quantity (Worst Case)	Total Power Draw (W)
CPU	250W	2x 6548Y+	500W
GPU	Up to 350W	4 (6000 ADA @ 300W) ¹	1200W ¹
RDIMM	5W	16	80W
Fan	34W	5	170W
Motherboard	34W	1 (including maximum USB output)	34W
Front Storage	17W	4 (2.5" NVMe) ²	68W ²
Rear Storage	4W	1	4W
M.2 NVME	7W	1	7W
Max Power Draw			2063W

¹ Worst Case Consumption (other GPUs): 7x 4000 ADA @ 135W = 945W, 4x 4500 @ 130W = 520W, 4x 5000 ADA @ 250W = 1000W, 2x L40s @ 350W = 700W, 4x Flex 170 @ 150W = 600W, 4x Flex 140 @ 75W = 300W

² Power Consumption (other storage options): 8x SATA (32W), 12x M.2 (48W)

5.3 - Input Voltage and Line Cords

Based on the total power consumption of the system, the following guidelines should be followed relative to the power supply input voltages, quantities, and line cords:

PSU Quantity	Input Voltage (V)	Line Cord Amperage (A) (Recommended)	Maximum Power (W)
1	110 - 127V	15A	1032 W
	220 - 240V	15A	2400 W
2	110 - 127V	15A	2064 W
	220 - 240V	15A	2400 W

6 - Operating Systems

The AX300 Series Server supports the following operating systems:

- Microsoft Windows Server 2022 Essentials
- Microsoft Windows Server 2022 Standard
- Ubuntu 22.04 - Server
- Ubuntu 24.04 - Server
- Red Hat Enterprise Linux 8.10
- Red Hat Enterprise Linux 9.x
- VMware vSphere and ESXi 8

7 - RAID Configuration

RAID (Redundant Array of Independent Disks) is a technology that allows multiple hard drives to work together as a single logical drive, providing increased performance and data redundancy. The idea behind RAID is to combine the storage capacity of multiple drives to create a larger virtual drive that appears to the operating system as a single disk.

RAID can improve system performance by distributing data across multiple drives, allowing for faster read and write speeds. Additionally, RAID can provide data redundancy by using multiple drives to store the same data, so that if one drive fails, data can still be accessed from the other drives. There

are several RAID levels with different configurations and benefits, each offering varying levels of performance and data redundancy.

The Axial AX300 Series Server supports onboard RAID via Intel Virtual RAID on CPU (Intel VROC) supported by the Intel Xeon Scalable processors.

Intel VROC is an enterprise RAID solution that unleashes the performance of NVMe SSDs, enabled by a feature in Intel Xeon Scalable processors called Intel Volume Management Device (Intel VMD), an integrated controller inside the CPU PCIe root complex.

Prior to configuration of RAID, users are advised to back up their data as the process may erase all data on the hard drives.

Note: SATA RAID is limited to volumes from disks on the same controller. SATA0_0 through SATA0_8 (OCuLink ports 1 and 2) may be used to create up to an 8-disk RAID volume, and SATA1_4 through SATA1_7 (OCuLink port 3) may be used to create a separate, up to 4-disk RAID volume. This limitation does not apply to NVMe RAIDs created using the OCuLink ports.

7.1 - Supported RAID Types

The following sections will discuss the various RAID types that are supported on the AX300 Series Server and their respective advantages/disadvantages.

7.1.1 - VROC Options

Intel VROC allows for RAID volumes to be created and controlled by the Intel Volume Management Device (Intel VMD) controller. There are 2 VROC options that can be purchased with the system:

VROC Standard - Allows for RAID 0/1/10 volumes to be created

VROC Premium - Allows for RAID 0/1/5/10 volumes to be created

7.1.2 - RAID 0: Striping

RAID 0 (Redundant Array of Inexpensive Disks level 0), also known as striping, is a method of combining multiple physical hard drives into a single logical volume for improved performance.

In RAID 0, data is divided into blocks and spread across two or more physical drives simultaneously. The blocks are written to the drives in a way that balances the load and optimizes performance. When data is read, the blocks are retrieved from multiple drives at the same time, increasing the read and write speed of the overall system.



An advantage of RAID 0 is its improved performance due to the parallel access to multiple drives. However, RAID 0 does not provide any fault tolerance or redundancy. If one drive fails, the entire RAID

0 volume will be lost, along with all data stored on it. Therefore, it is recommended to use RAID 0 only for non-critical data or as part of a larger backup and disaster recovery strategy.

RAID 0 requires a minimum of two drives..

For RAID 0, it is recommended to use disks of the same interface, speed, and capacity. If the disks in a RAID 0 array have different sizes, performance may be limited and the capacity of the array will be limited by the size of the smallest disk.

7.1.3 - RAID 1: Mirroring

RAID 1 (Redundant Array of Inexpensive Disks level 1) is a type of data storage technology that provides data redundancy and fault tolerance by creating an exact copy, or mirror, of data on two or more physical drives.

In RAID 1, when data is written to one drive, it is simultaneously written to the other drive(s), creating an exact duplicate of the data on each drive. This ensures that if one drive fails, the data can still be accessed from the remaining drive(s). The read performance of RAID 1 can be faster than that of a single drive because data can be read from multiple drives at the same time. However, write performance is typically slower because data must be written to multiple drives.



An advantage of RAID 1 is its data redundancy and fault tolerance. If one drive fails, the data is still available on the other drive(s). Additionally, RAID 1 can be hot-swappable, meaning that if a drive fails, it can be replaced without having to shut down the system.

However, RAID 1 has some disadvantages, including lower storage capacity compared to other RAID configurations and higher cost due to the need for multiple drives. RAID 1 is recommended for applications that require high data availability and reliability, such as mission-critical systems, servers, and database applications.

RAID 1 requires a minimum of two drives.

For RAID 1, it is recommended to use disks of the same interface, speed, and capacity. If the disks in a RAID 1 array have different sizes, performance may be limited and the capacity of the array will be limited by the size of the smallest disk.

7.1.4 - RAID 5: Striping with Parity

RAID 5 (Redundant Array of Inexpensive Disks level 5) is a type of data storage technology that uses striping with distributed parity.

In a RAID 5 configuration, data is striped across multiple disks, with parity information distributed across all the disks. This provides fault tolerance and redundancy,



allowing data to be reconstructed in the event of a single drive failure.

RAID 5 offers good performance and fault tolerance for small to medium-sized businesses, but it has a higher overhead and is more complex than some other RAID configurations. Additionally, in the event of a second drive failure, data loss can occur. RAID 5 is often used in applications that require a balance between performance, fault tolerance, and cost.

RAID 5 requires a minimum of three disks, and the capacity of one disk is used for parity information.

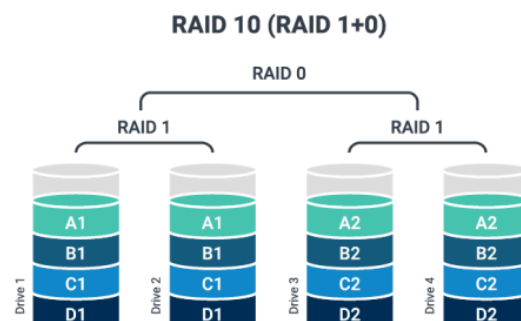
For RAID 5, it is recommended to use disks of the same interface, speed, and capacity. If the disks in a RAID 5 array have different sizes, performance may be limited and the capacity of the array will be limited by the size of the smallest disk.

7.1.5 - RAID 10: Mirrored Striped

RAID 10 (Redundant Array of Inexpensive Disks level 10), also known as RAID 1+0 or mirrored striped volumes, is a combination of RAID 1 and RAID 0. It provides both data redundancy and improved performance.

In a RAID 10 configuration, multiple pairs of disks are configured as RAID 1 arrays, where data is mirrored between each pair of disks for redundancy. The resulting RAID 1 arrays are then striped together in a RAID 0 array, where data is striped across all of the mirrored pairs for increased performance.

Data is striped across the mirrored pairs, so the capacity of the RAID 10 array is equal to half of the total capacity of the disks. For example, in a four-disk RAID 10 array with 1TB disks, the total capacity of the array would be 2TB.



RAID 10 provides both performance and redundancy benefits, as it offers the performance benefits of RAID 0 while also providing the redundancy of RAID 1. In the event of a single disk failure, the mirrored pair can continue to provide access to the data. However, if both disks in a mirrored pair fail, data may be lost.

RAID 10 requires a minimum of four disks, and must have an even number of disks.

For RAID 10, it is recommended to use disks of the same interface, speed, and capacity. If the disks in a RAID 10 array have different sizes, performance may be limited and the capacity of the array will be limited by the size of the smallest disk.

7.2 - RAID Configuration via BIOS

RAID volumes can be configured and created via the BIOS or from an operating system (OS).

If an operating system is to be installed on to a RAID volume, the processes outlined in this section must be followed in order to appropriately enable RAID and create the RAID volume where the OS will be deployed.

This section will outline the process for creating RAID volumes outside of the OS via the BIOS.

7.2.1 - Enabling VMD Configuration

Prior to configuring or creating any RAID volumes using Intel Virtual RAID on CPU, Intel Volume Management Device (VMD) must be appropriately configured/enabled.

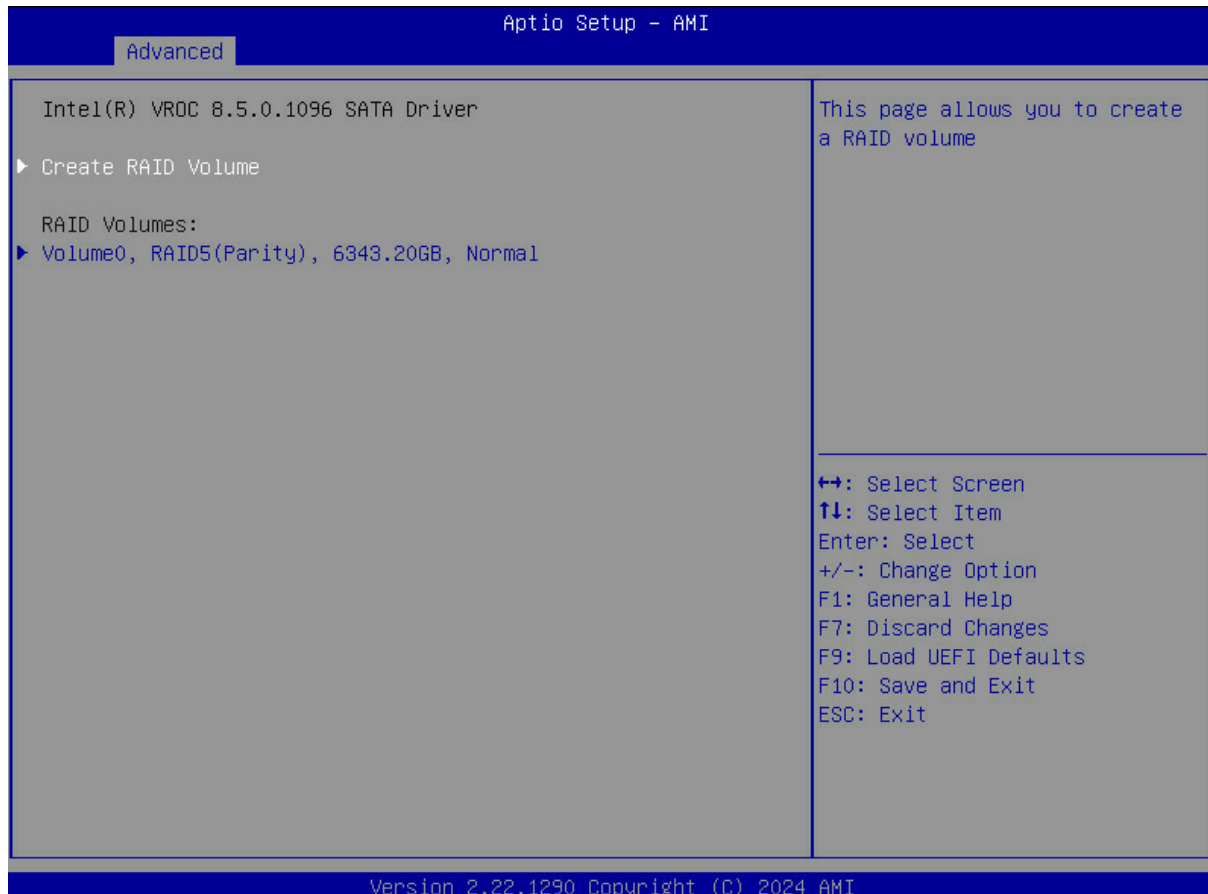
1. From UEFI System Setup, navigate to Advanced → Intel VMD Technology → VMD Config for PCH ports → set to **Enabled**. New options will appear
2. Next, configure the VMD Enabled devices to be enabled:
 - a. Enable/Disable VMD → **Enabled**
 - b. Go to PCH Root Port (OCU1/2/3) and enable the Intel VMD on the Specific Root Port as needed
 - c. Enable Hot Pluggable if desired
3. Go into **Intel VMD for Volume Management Device on Socket 0/1**
 - a. Enable VMD on PCIE 0/1/2/3/4/5/6 and MCI01/2 as needed
4. Press **F10** to Save and Exit. The system will then reboot.



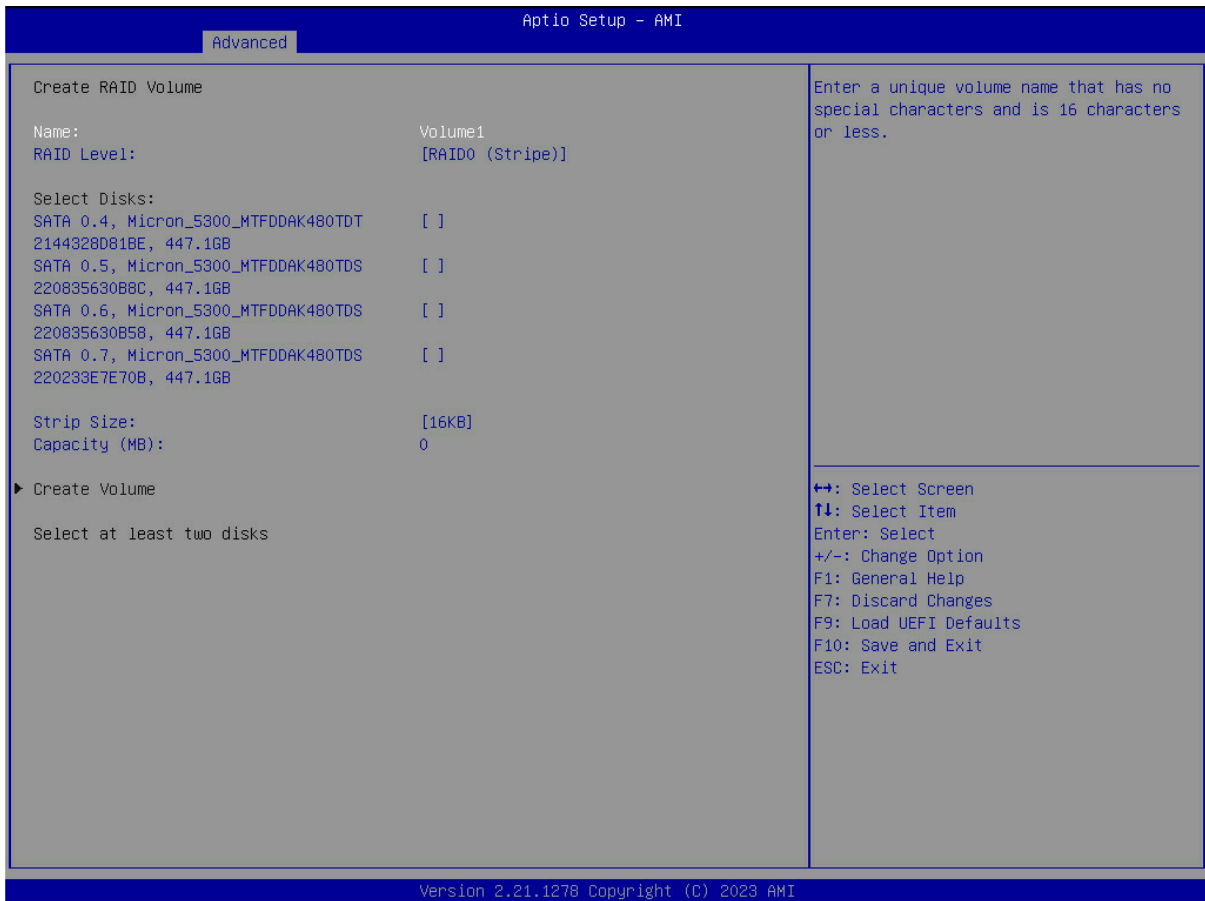
7.2.2 - Creating a RAID Volume in BIOS

After VMD has been enabled, a RAID volume can be created. The following procedure outlines the process to create a RAID volume using the RAID configuration utility:

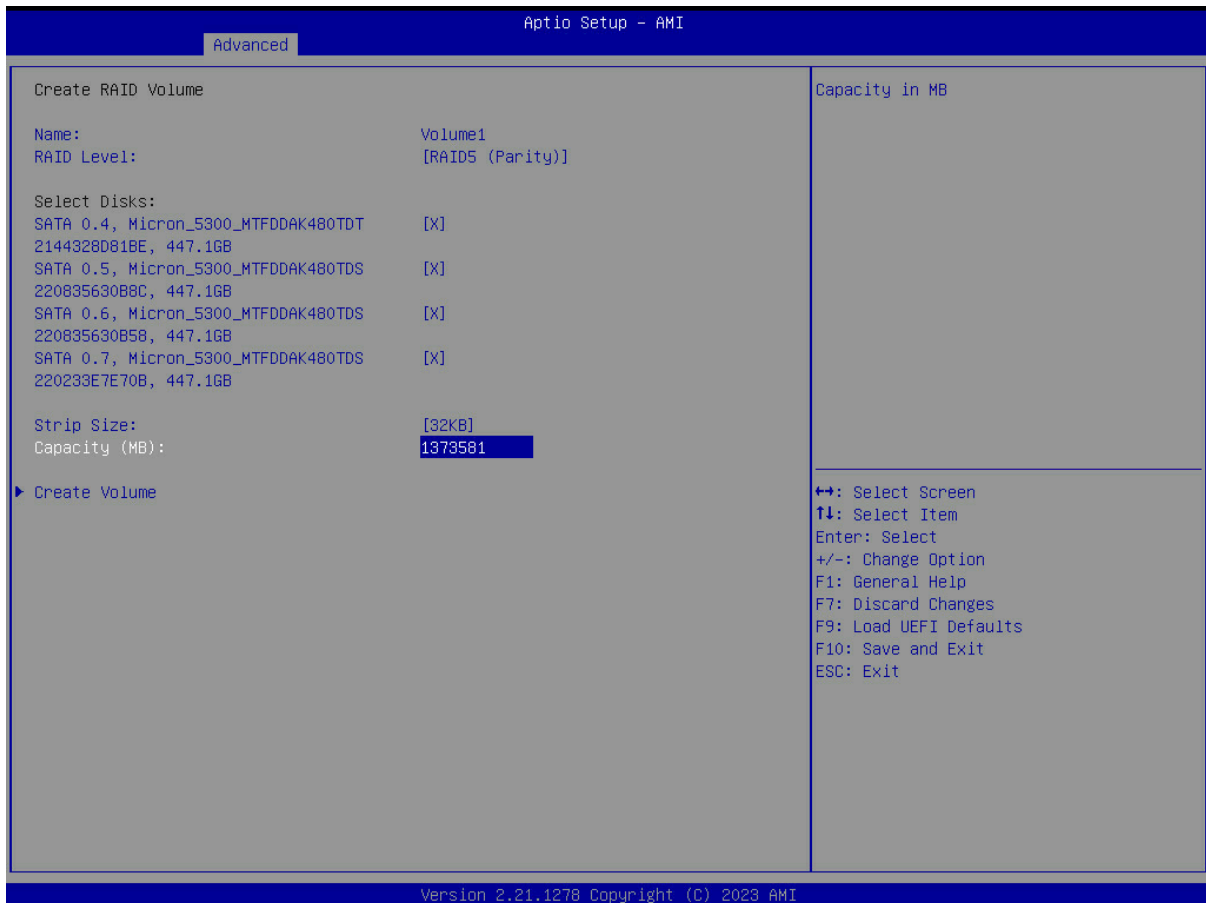
1. Press **F2** or **Del** to enter UEFI System Setup and navigate to Advanced → Intel(R) VROC SATA Controller



2. Select "Create RAID Volume" to create a new RAID volume.



3. Assign a **Name** and Select the **RAID Level** you want to create (e.g. RAID 0, RAID 1, RAID 5, etc.) and specify the settings for the RAID volume (e.g. strip size, capacity, etc.).
4. Choose the hard drives you want to include in the RAID array and add them to the volume by assigning them with an **X**.



5. Select **Create Volume**
6. Reboot the system and verify that the RAID array has been detected by the operating system or OS installation media.

7.2.3 - Deleting a RAID Volume via RAID Option ROM

It's important to note that deleting a RAID volume will erase all data on the hard drives in the array, so be sure to back up any important data before proceeding. The specific steps to delete a RAID volume may vary depending on the RAID configuration utility used and the RAID level in use.

To delete a RAID volume, follow these steps:

1. During the system boot-up process, press "Ctrl+I" to enter the RAID configuration utility.
2. Select the RAID volume you want to delete and choose the "Delete RAID Volume" option.
3. Confirm that you want to delete the RAID volume.
4. Save the changes and exit the RAID configuration utility.
5. Reboot the system and verify that the RAID volume has been deleted.

7.3 - Windows RAID Installation & Configuration

RAID volumes can be created, configured and managed from within Windows. This section will outline the requirements and processes for doing so.

7.3.1 - Installing Windows on to a RAID volume (F6 install method)

Note: [Section 7.2.1](#) and [Section 7.2.2](#) are prerequisites for installing an OS to a RAID volume.

To install an OS on to a created RAID volume, perform the following steps to install the Intel Virtual RAID on CPU driver during operating system setup:

1. Download the latest Intel Virtual RAID on CPU Driver package from the OnLogic Support Site or [Intel](#) and extract the contents to a USB drive.
2. Connect the USB drive to the computer where you want to install Windows.
3. Power off the system.
4. Connect or remotely mount (via BMC) the Windows installation media and power on the system.
5. When the system starts, press F11 to bring up the boot menu and select the option to boot from the Windows installation media.
6. When the Windows Setup screen appears, press the "F6" key to install third-party RAID drivers or use the "Load Driver" option to load the F6 drivers.
7. Windows Setup will prompt you to insert the driver disk for the RAID controller. Insert the USB drive containing the RAID driver package and click "OK".
8. Windows Setup will scan the USB drive and display a list of compatible RAID drivers. Select the appropriate driver for the RAID controller (e.g. Intel RAID on Chip) and click "Next".
9. Windows Setup should now detect the created RAID volume(s) and allow for installation of Windows onto them as if they were a singular physical disk.
10. Continue with the Windows installation as usual.

These steps and more are provided by Intel here: [Intel® Virtual RAID on CPU \(VROC\) for Windows*](#)

7.3.2 - Configuring RAID from within Windows

7.3.2.1 - Installing Intel® Virtual RAID on CPU Software

Prior to configuring a RAID volume within the Windows OS environment, it is necessary to download the required drivers. The following procedure will outline the steps to ensure the proper drivers are downloaded and installed:

1. Download the Intel Virtual RAID on CPU software from OnLogic or Intel's website.
 - a. [Intel Download](#)
2. Save the file to a known location on your computer's hard drive.
3. Extract the files and locate **SetupVROC.exe** in the download and double-click it.
4. Click Continue (if needed) to launch the installation program.
5. Click Next at the Welcome screen.

6. After reading and reviewing the warnings, Click Next.
7. Read the license agreement. To agree and proceed, click Yes to accept the terms and continue.
8. From the Readme file information, Click Next. The application files will now be installed.
9. When the appropriate installation files have been installed, you will be prompted to Click Next to continue.
10. Click Yes to the restart option and then click Finish to restart the system.
11. After restarting the system, an Intel Virtual RAID on CPU application will be installed onto the system which can be used to manage RAID volumes on the system using
12. The Userguide provided by Intel on the download site provides steps on setting up different RAID profiles and adjusting settings as needed

7.3.2.2 - Creating a RAID Volume via Intel Virtual RAID on CPU

The following document outlines the procedure for creating a new RAID volume within the Intel Virtual RAID on CPU application from the operating system: [Intel® Virtual RAID on CPU \(VROC\) for Windows*](#)

1. Open the Intel Virtual RAID on CPU application.
2. Click the "Create" icon to create a RAID array.
3. In "Select Volume Type", click the desired RAID configuration. Click "Next".
4. In "Configure Volume", select the RAID disks then click "Next".
5. In "Configure Volume Name and Size" select the volume name, volume size and strip size for your configuration then click "Next".
6. In "Confirm Volume Creation", you may review the selected configuration, then click "Create Volume".

After creation of the volume, to make the RAID volume usable from within the OS, it will need to be initialized, partitioned, and formatted (similar to a standard physical disk). To do so, follow the procedure below:

1. From the Windows Disk Management application, initialize the disk (the newly created RAID volume) such that Logical Disk Management can access it.
2. Right-click on the Disk associated with the RAID Volume and select "New Simple Volume"
3. Follow the instructions on the New Simple Volume Wizard.

After the volume wizard process is completed, the RAID volume should now be operational and the RAID volume will appear as if it were a single storage drive.

7.3.2.3 - Deleting a RAID Volume via Intel Virtual RAID on CPU

The following process outlines the procedure for deleting a RAID volume within the Intel Virtual RAID application from the operating system.

1. Open the Intel Virtual RAID on CPU application.
2. Click the "Manage" icon.
3. Select the RAID volume that is to be deleted.
4. Select "Delete Volume"

Warning: Deleting a RAID volume will destroy all contents held within the RAID array.

7.4 - Linux RAID Installation & Configuration

Intel VROC for Linux is mostly delivered through open-source operating system kernel and user space tools, with no additional software download required for specific Linux* distribution releases. It is up to the specific operating system vendor to pull-in Intel VROC features and patches. The distributions below have Intel VROC support, with newer releases being more complete.

Intel Virtual Raid on CPU (Intel VROC) in Linux Support Page

<https://www.intel.com/content/www/us/en/support/articles/000094694/memory-and-storage/datacenter-storage-solutions.html>

Additionally, as the configuration and implementation details for Intel VROC RAID in Linux may vary between distributions, please refer to the additional documentation below:

Red Hat Enterprise Linux 8 - Managing RAID

<https://www.intel.com/content/www/us/en/support/articles/000096169/memory-and-storage/datacenter-storage-solutions.html>

Red Hat Enterprise Linux 9 - Managing RAID

<https://www.intel.com/content/www/us/en/support/articles/000096169/memory-and-storage/datacenter-storage-solutions.html>

OS Support List:

<https://www.intel.com/content/www/us/en/support/articles/000099710/memory-and-storage/datacenter-storage-solutions.html>

8 - Mounting Hardware

The Axial AX300 Series Edge Server has been designed with flexibility in mind and can be mounted in different ways. As the system is designed to fit industry standard 19" Electronic Industries Alliance (EIA) racks, there are multiple rack mounting rail kits available. Additionally, a 19" EIA two-post rack mounting option is available.

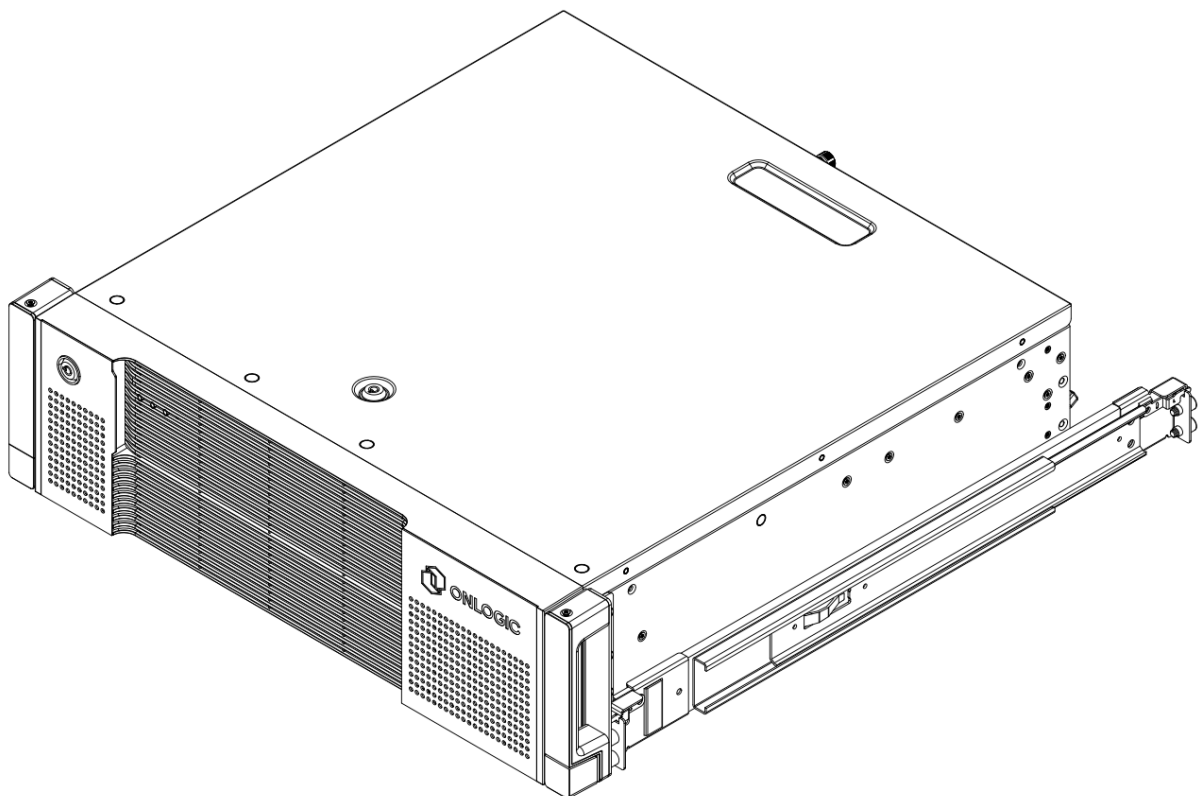
Two options are available for mounting outside of a traditional rack. The system may be wall mounted using the OnLogic wall mount kit. Alternatively, the system supports feet for a vertical desktop configuration.

In addition to the mounting options, the Axial AX300 Series Edge Server supports locking front and rear security bezels.

8.1 - Rack Mounting

The Axial AX300 Series Edge Server has been designed to support standard 19" EIA rack mounting, which is a common form factor used in data centers and server rooms. To accommodate different rack depths, 4 different rail options support 16.5" - 47" rack depths. These rail kits can be used to securely mount the server in the rack, are easy to install, and include all the necessary hardware for attachment into the rack.

All rail kit options are also supported in a "reverse" orientation, with I/O and power supplies facing the front of the rack.

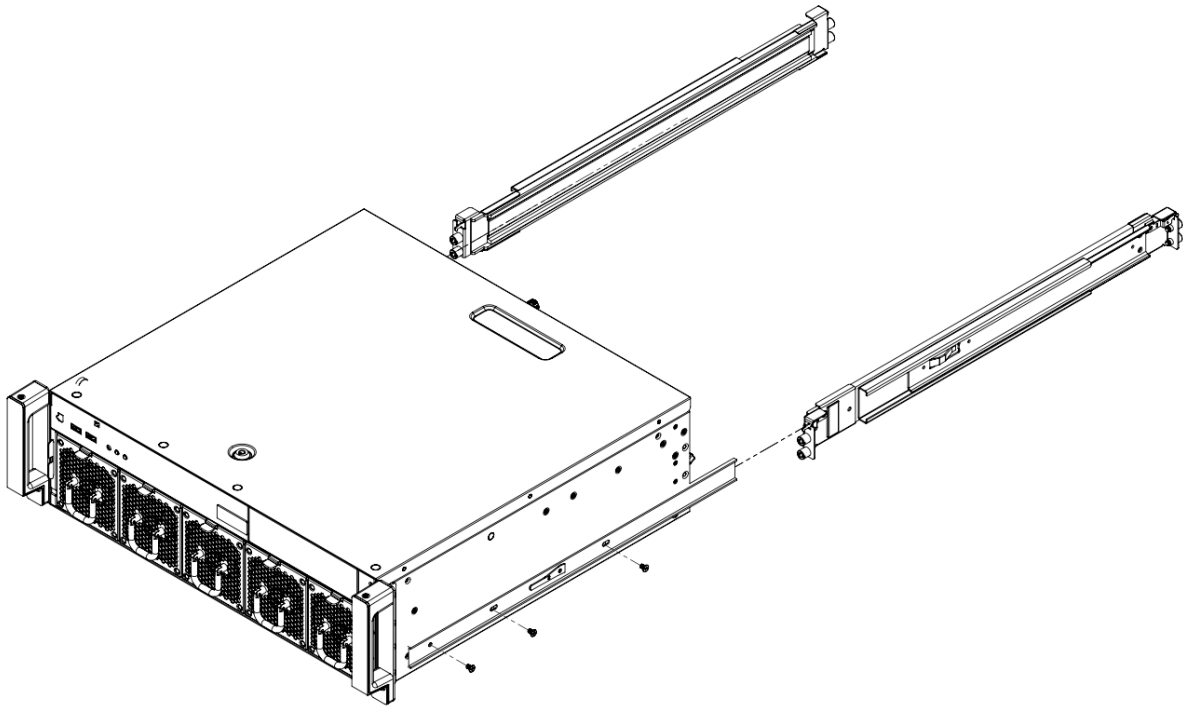


8.1.1 - Rackmount Ball Bearing Slide Rails

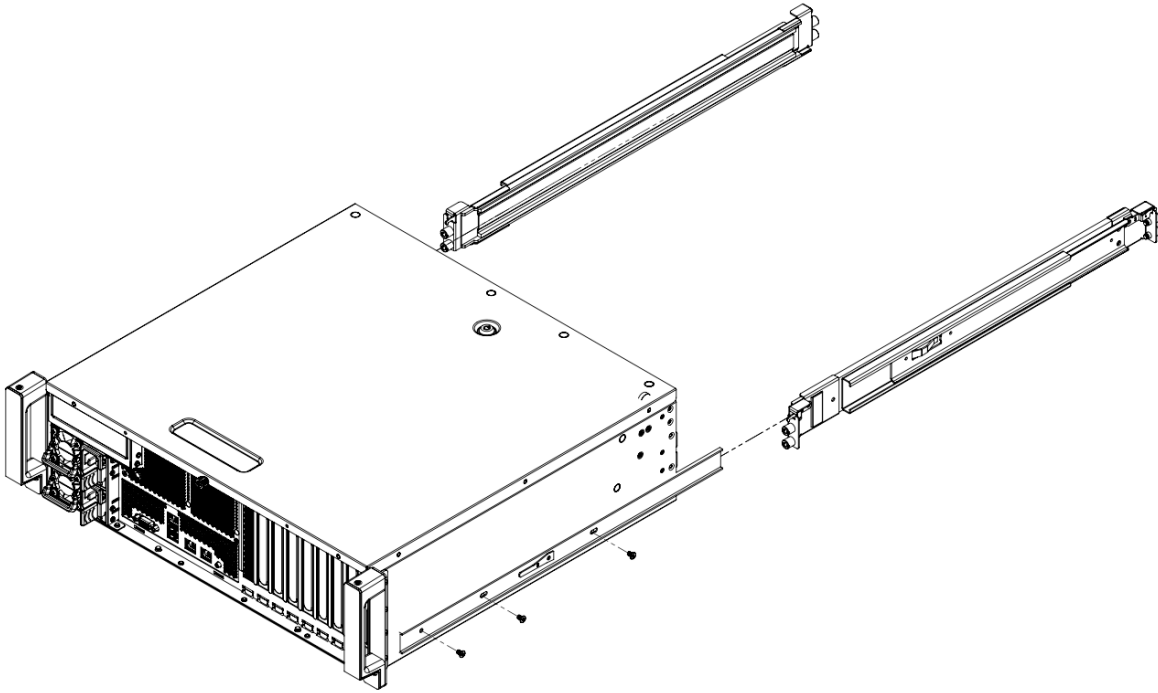
The Ball Bearing Slide Rails are an optional accessory designed to enhance the functionality and ease of use of the Edge Server. These slide rails are designed to be used with standard 19" EIA racks and allow for easy installation and removal of the server from the rack. The ball bearing design ensures smooth and effortless motion, while the sturdy construction provides a secure and stable platform for the server. With these slide rails, you can easily access the server for maintenance or upgrades without the need for complex disassembly or cumbersome lifting.

The desired length Ball Bearing Slide rail kit can be chosen at time of configuration based on the rack depth requirements.

Mounting Hole: Square, **Rack Depth Range (front to back flange):** 420mm (16.5in) to 850mm (33.5in)



Forward Orientation: Install the six M4x0.7 L=4mm Low Profile Cheesehead screws provided with the rail kit. Align the first hole in the rail with the hole label specified in the table below.



Reverse Orientation: Install the six M4x0.7 L=4mm Low Profile Cheesehead screws provided with the rail kit. Align the first hole in the rail with the hole label specified in the table below.

Rail SKU	Minimum Span	Maximum Span	Forward Mounting Hole Label	Reverse Mounting Hole Label	Compatible with Cable Management Arm
3RAMISBBG002	430.4mm (16.9")	600mm (23.6")	F2	B2	No
3RAMIS205200	564mm (22.2")	850mm (33.4")	F1	B1	Yes

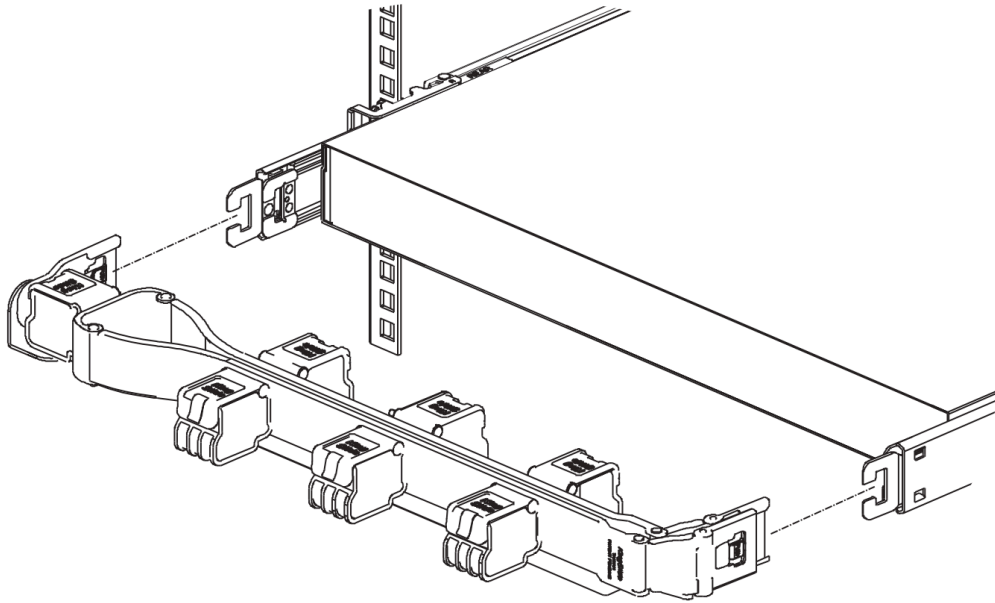
8.1.2 - Cable Management Arm Slide Rail Kit

The Cable Management Arm Slide Rail Kit (Part Number: **3RAMIS205300**) is an optional accessory that enhances the standard ball bearing slide rails by providing a cable management arm to neatly organize and secure cable connections to the Edge Server system while still supporting easy removal of the server from the rack for maintenance and upgrades.

The Cable Management Arm is not compatible with the 420mm (16.5") to 600mm (23.5") slide rail.

For slide rail options 23.5" and up, the Cable Management Arm can be chosen at time of configuration based on the rack depth requirements.

Mounting: Integrated with slide rail, **Rack Depth Range (front to back flange):** 597mm (23.5in) to 850mm (33.5in).



Clip the cable management arm into the brackets on the slide rail

8.1.3 - Two-Post Rack Bracket Kit

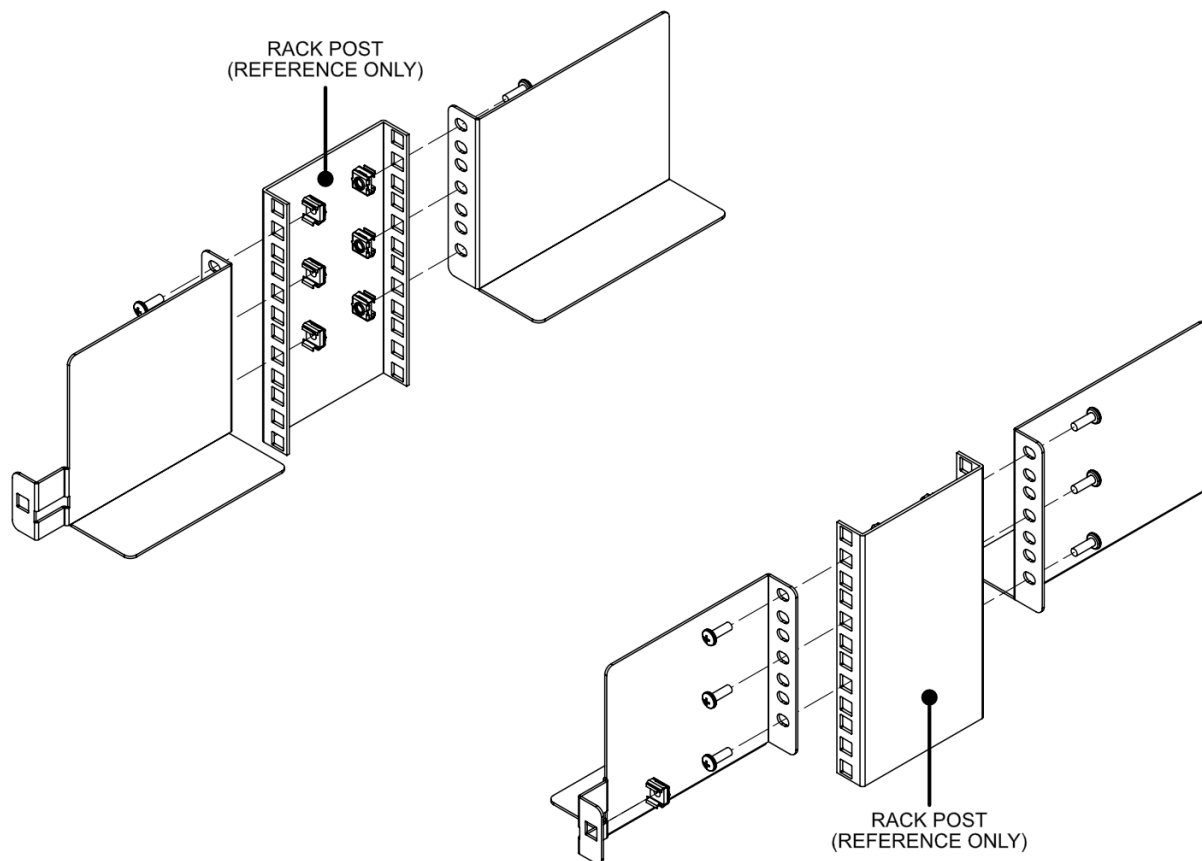
The Two-Post Rack Bracket Kit (Part Number: **MTR-2POST-AX301**) is an optional accessory designed to enable flexible mounting of the Edge Server. These brackets are designed to be used with standard 19" EIA Two-Post racks and allow for stable and secure mounting of the server in a rack.

The Two-Post Rack Bracket Kit supports both forward and reverse mounting. To convert to a reverse mounting orientation, remove the handle.

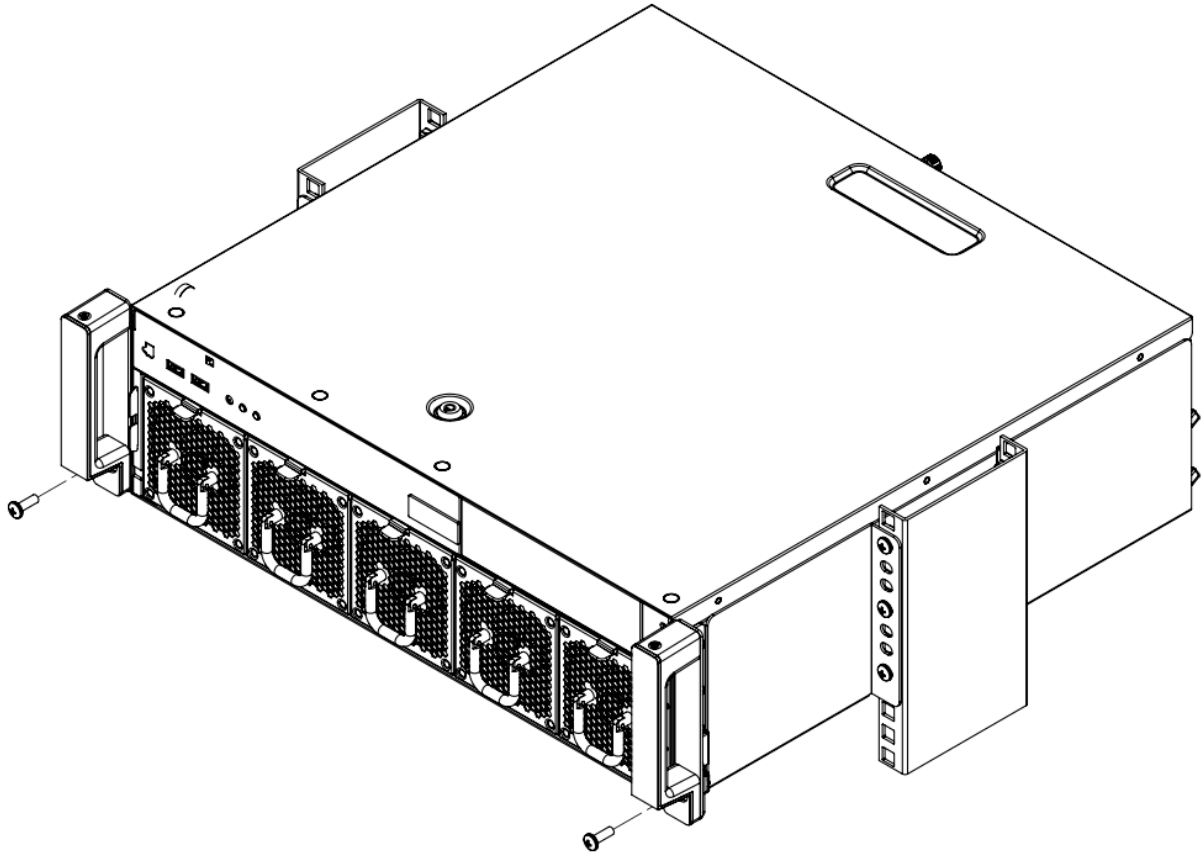
The Kit includes all required hardware for square or M5 threaded racks. Additional hardware may be required for racks with other mounting holes.

Mounting Hole: Square or M5 threaded with included hardware. #10-32, #12-24 or round hole with appropriate additional hardware.

Rack Post Range (front to back flange): 50mm (2in) to 150mm (6 in)



Step 1: Install twelve M5 cage nuts in the rack as shown. Secure the four brackets to the rack posts using twelve M5x0.8 L=15mm Pan Head Screws. Install two M5 cage nuts in the front brackets.

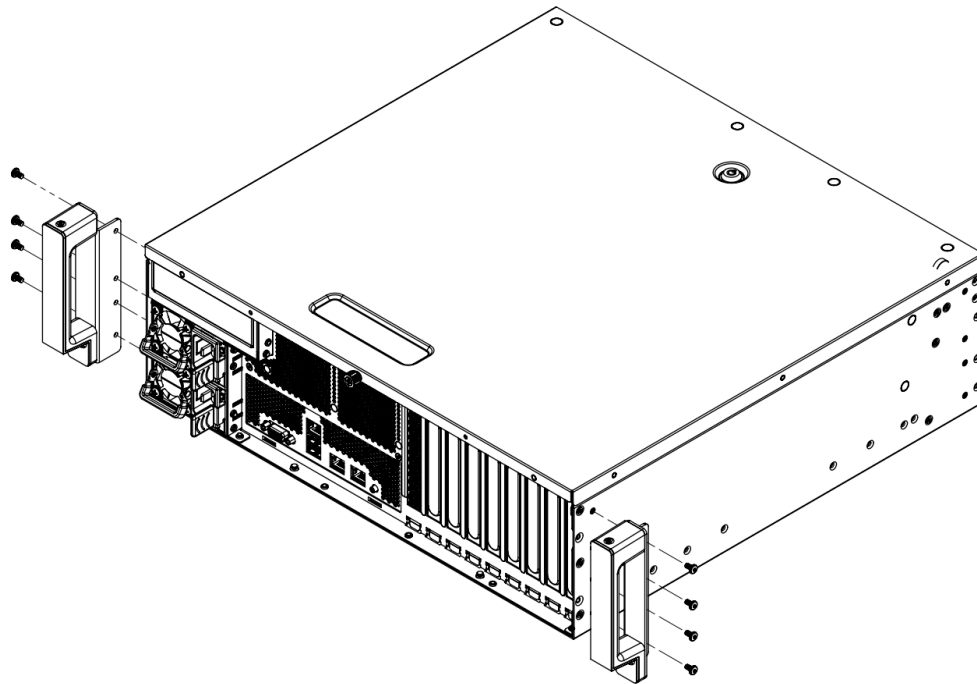


*Step 2: Install the edge server in the brackets.
Secure the server using two M5x0.8 L=15mm Pan Head Screws.*

8.1.4 - Reverse Rail Mounting

The Axial AX300 Series Edge Server is designed to accommodate a reversed, front I/O rackmount orientation, with the I/O and power supplies facing the front of the rack.

All rail kit options with supported rear I/O are also supported in a “reverse” orientation, with I/O and power supplies facing the front of the rack. To convert to a reverse orientation, remove the rack handles and reattach them at the rear of the chassis.



Reverse Orientation: Install rack handles at the rear of the chassis using eight #6-32 L=1/4" Pan Head Screws.

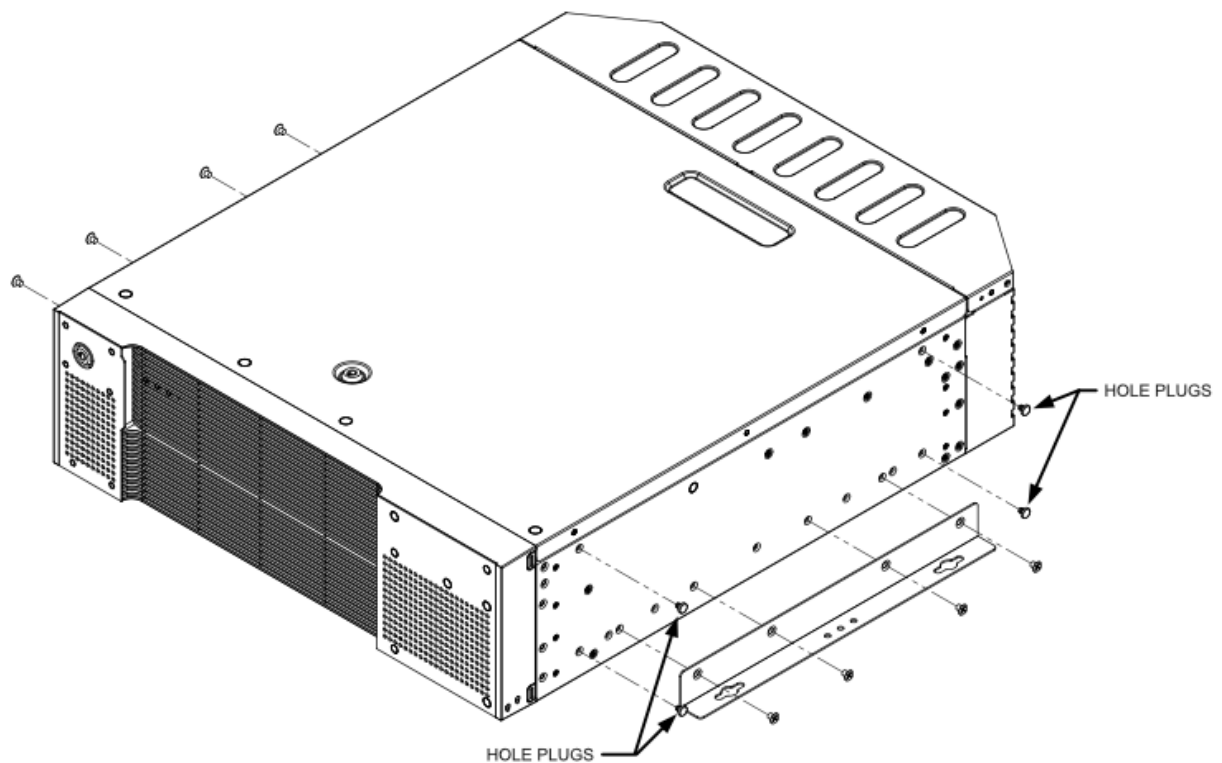
Airflow Implications: Most racks have a front-to-back airflow expectation, where cooling air is supplied at the front and exhaust air is removed at the rear of the rack. Mounting a standard AX300 Series server in the reverse configuration, without accommodations for reversing airflow, will violate this convention and may cause cooling problems for either the AX300 or other devices in the rack.

Options to enable front-to-back airflow with front I/O orientations are available. Consult OnLogic for additional information.

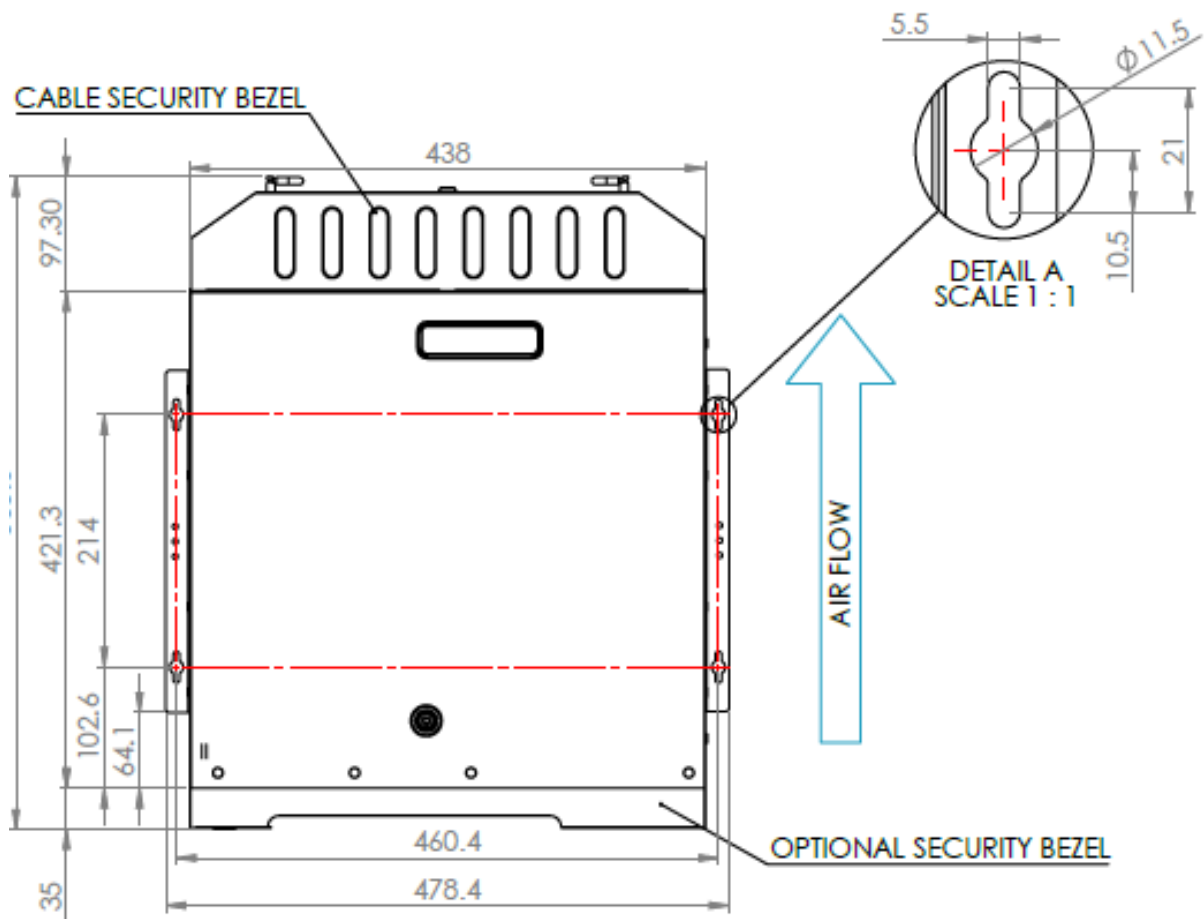
8.2 - Other Mounting

8.2.1 - Wall Mount Kit

The Axial AX300 Series Edge Server wall mount kit (Part Number: **MTW116**) is made of sturdy metal and designed to securely hold the server in place against a wall. This optional accessory includes the necessary wall mounting brackets and hardware to flexibly mount the Axial AX300 Series Edge Server system where a rack is not available or practical. It is strongly recommended to include the front security bezel and rear cable security bezel when wall mounting the edge server. If installed, the front security bezel can also support an optional dust filter.

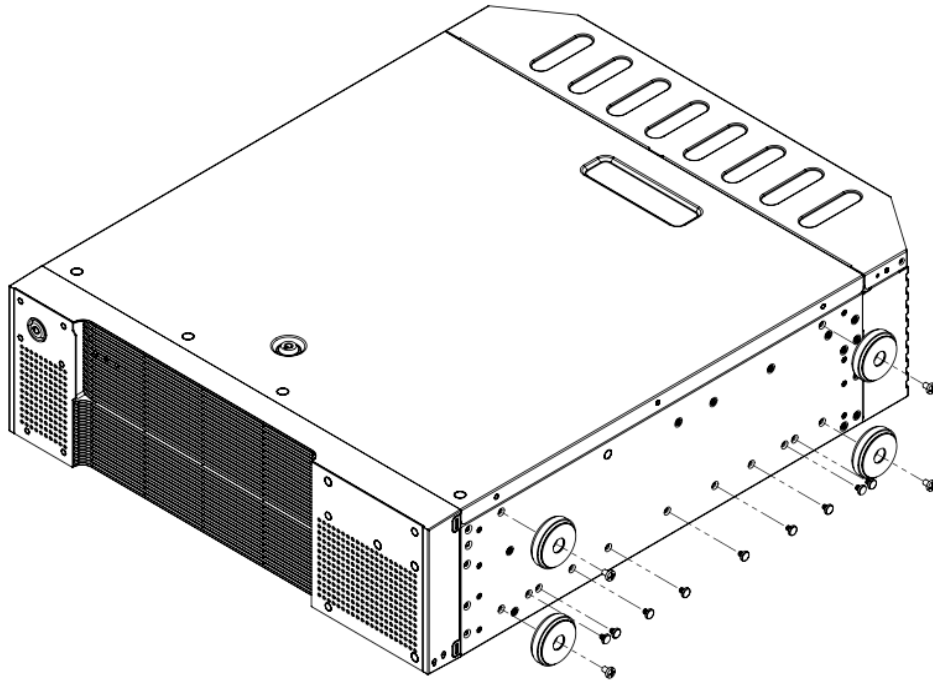


Install the eight M4x0.7 L=4mm Flathead screws provided with the wall mount kit. Use holes "F1" and "B1" for the outermost holes on the bracket. Install four plugs in holes labeled "T". (right side only)

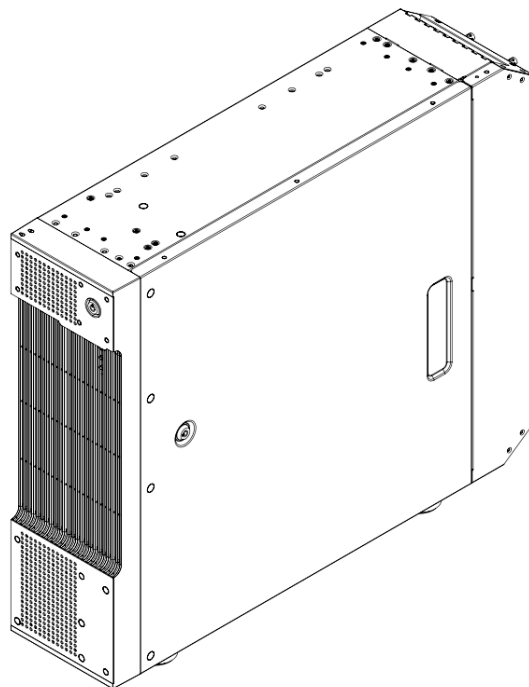


8.2.2 - Tower Feet

The optional tower feet (Part Number: **MTT-AX301**) allow the Axial AX300 Series Edge Server to be used vertically in a desktop tower configuration. Using the front and rear security bezels in conjunction with the tower feet is strongly recommended.



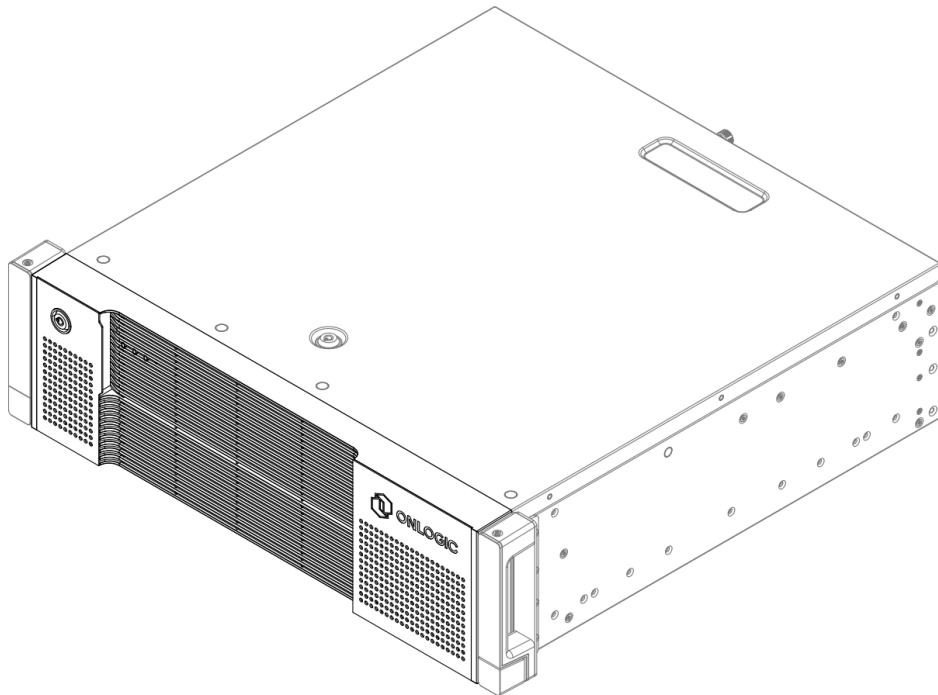
Install the four tower feet using one M4x0.7 L=6mm Pan Head screw each. Use M4 holes marked "T" on the right side of the chassis. Install nine plugs in slide rail holes "F2" through "B2" (right side only)



Stand the system onto the four tower feet.

8.3 - Bezels

8.3.1 - Front Security Bezel

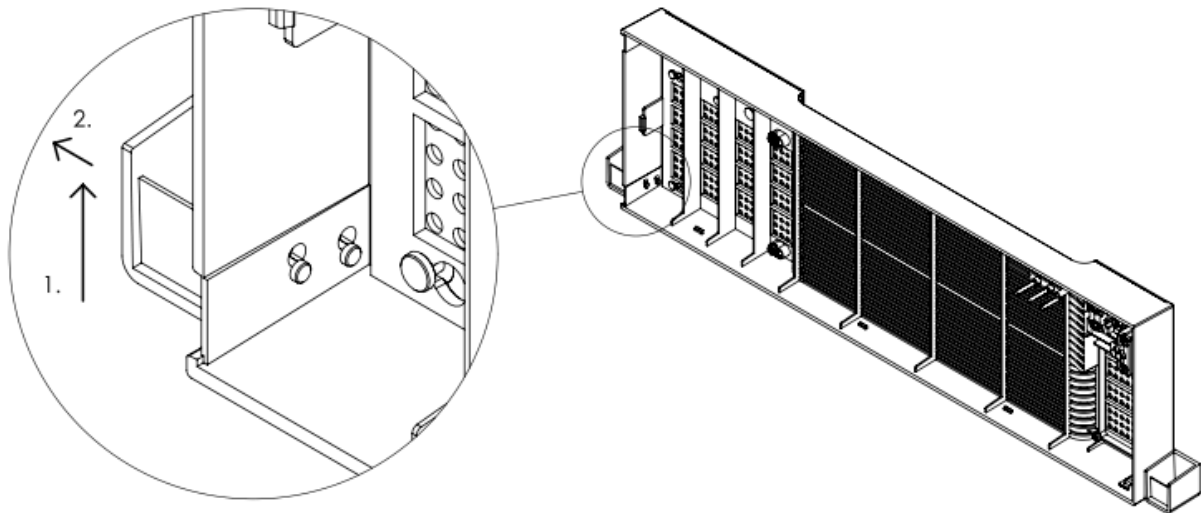


The Axial AX300 Series Edge Server offers an optional front security bezel (Part Number: **F1-AX301**) that prevents access to the front USB ports, buttons and hot-swap chassis fans. For rack mounted configurations, the front bezel also prevents access to the rack screws to prevent unauthorized removal from the rack. In addition to the security features, the front bezel also contains a replaceable dust filter.

Replacement dust filters are available:

SKU	Description	Filtration
F1-AX301-FILTER	AX300 Front Dust Filter	Debris and large fibers
F1-AX301-FILTER-MERV4	AX300 MERV 4 Front Dust Filter	80% Dust Arrestance (MERV 4)

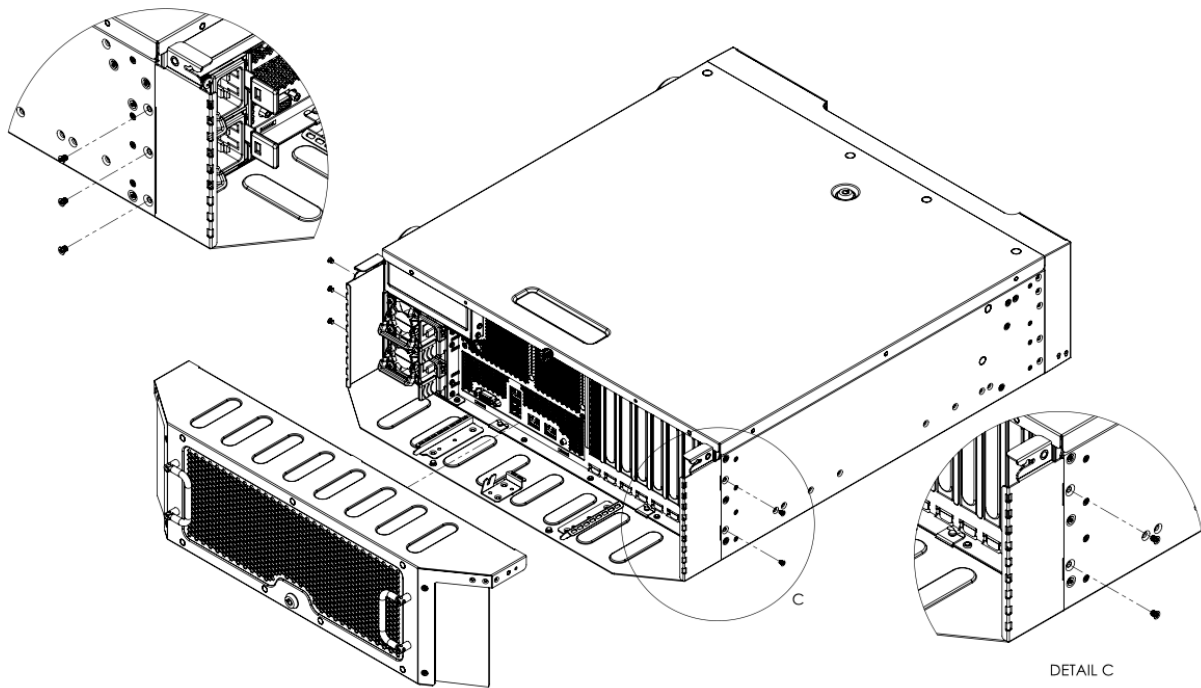
The rack-out protection prohibits the removal of the system through the tabs on the bottom corners, offering an additional layer of security.



If the rack-out protection is not desired, the screw covers can be removed. Press firmly upward on the screw cover until the pegs pop out of the keyhole slots.

8.3.2 - Rear Cable Security Bezel

The rear cable security bezel (Part Number: **B2-AX301**) for the Axial AX300 Series Edge Server prevents unauthorized removal or installation of cables or devices from the rear I/O ports. The bezel has openings on the left and right sides to allow cables to pass through. These openings are protected with dust brushes, and the rear bezel supports an optional dust filter for use in reverse airflow configurations.



Use the included five #6-32 Flat Head T10 Screws to attach the base of the rear security bezel.

9 - System Servicing Instructions

The Axial AX300 Series Edge Server is designed to be compact while maintaining easy serviceability. Please follow the instructions below to service the specified component or device.

Important Note: Except for hot-swapping the chassis fans/power supplies, the system should be powered off and the power disconnected before performing any service.

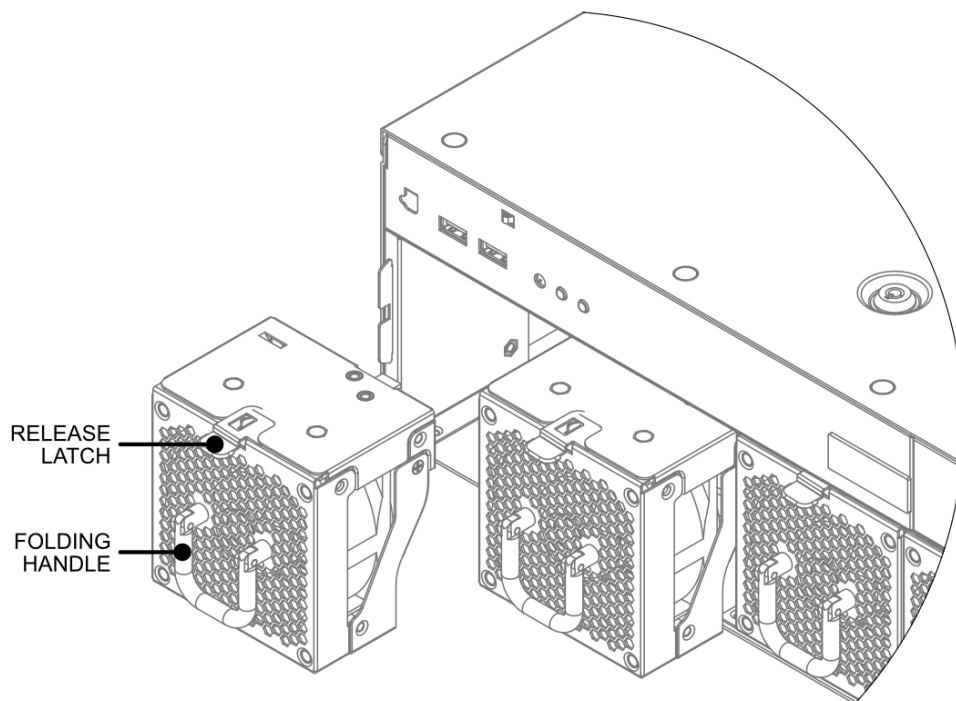
9.1 - Replacing Hot-Swap Chassis Fans

The 5 chassis fans on the front of the system are hot swappable.

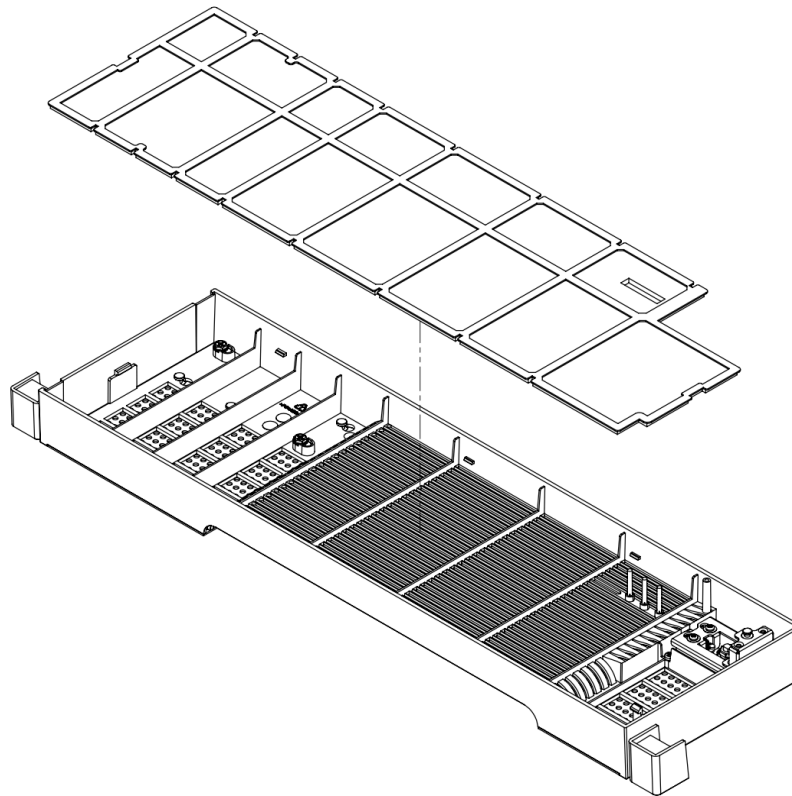
Step 1: Grip the handle and the release latch on the front of the fan cage.

Step 2: Depress the release latch and pull straight out to remove the fan.

Step 3: Insert the replacement fan into the socket. Press the fan until the latch clicks. Check that the replacement fan is secure by gently pulling the handle.



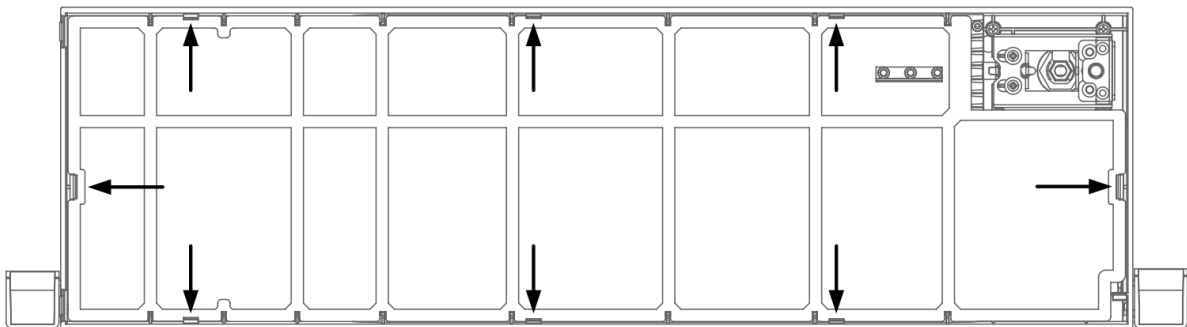
9.2 - Replacing Front Bezel Dust Filter



Step 1: Unlock and remove the Front Security Bezel

Step 2: Remove the dust filter from the bezel. The filter frame is flexible and can be removed by gently lifting one corner until the retaining tabs disengage.

Step 3: To install a new filter, simply press the filter into the bezel. Ensure all 8 retaining tabs are engaged:



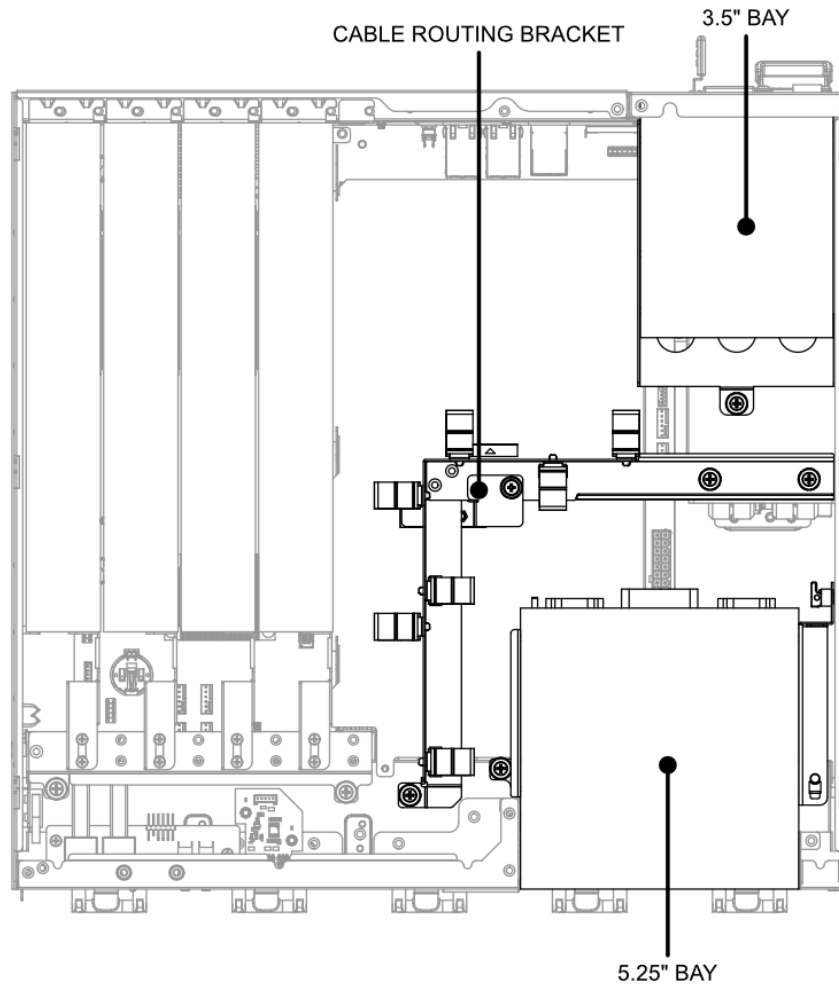
9.3 - Accessing CPU and Memory Devices

Step 1: Unlock and open the chassis lid.

Step 2: Disconnect data and power cables on the cable routing bracket at the PSU side. The other end of these cables can be left connected to the motherboard or PCIe devices as appropriate.

Step 3: Remove (or fold to one side) the cable routing bracket.

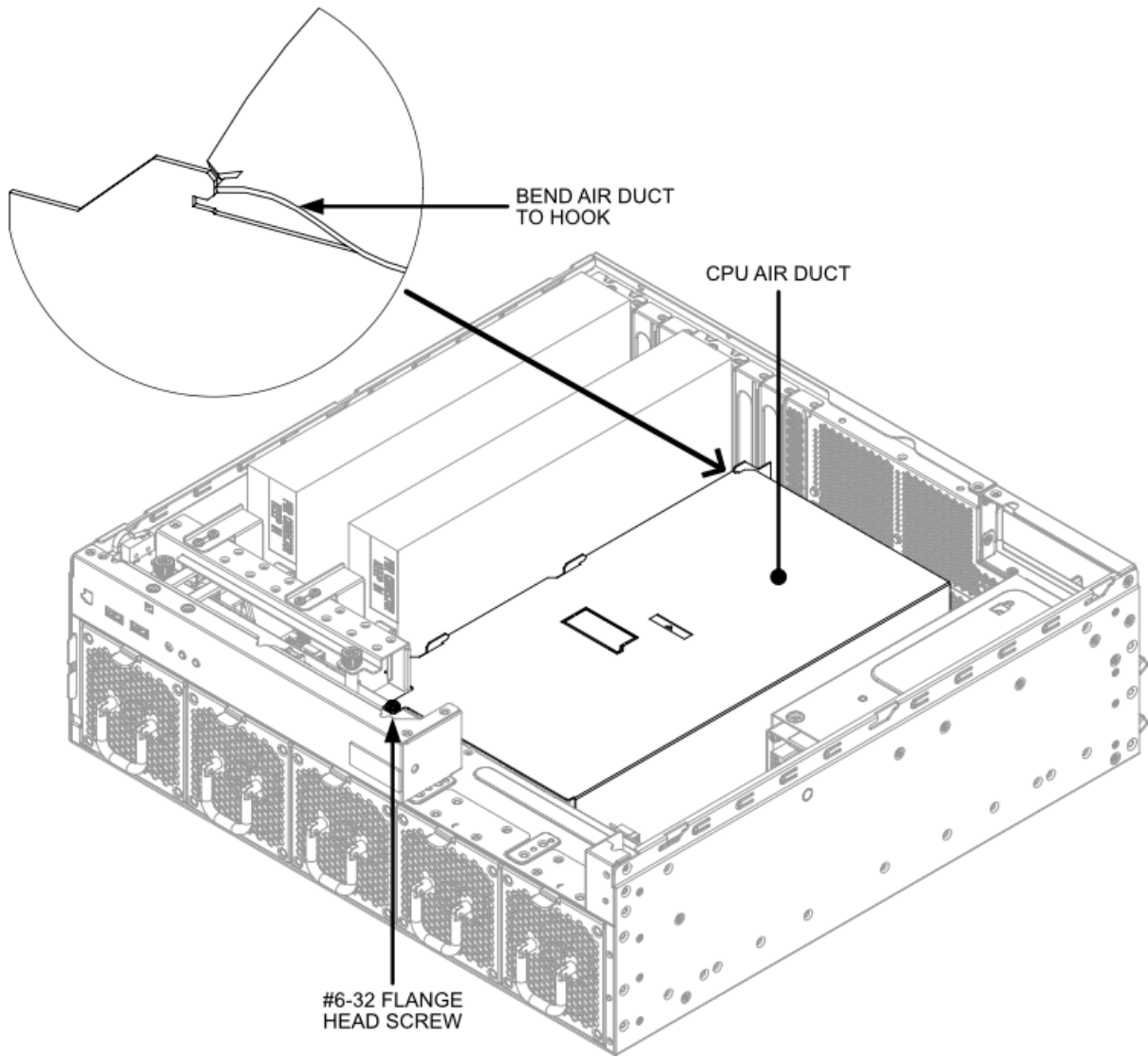
Step 4: Remove the 3.5" bay bracket and 5.25" bay device (if populated).



Step 5: Remove the #6-32 Flange Head Screw securing the CPU air duct.

Step 6: Bend the CPU air duct material to unlatch the opposing hooks at the back left corner.

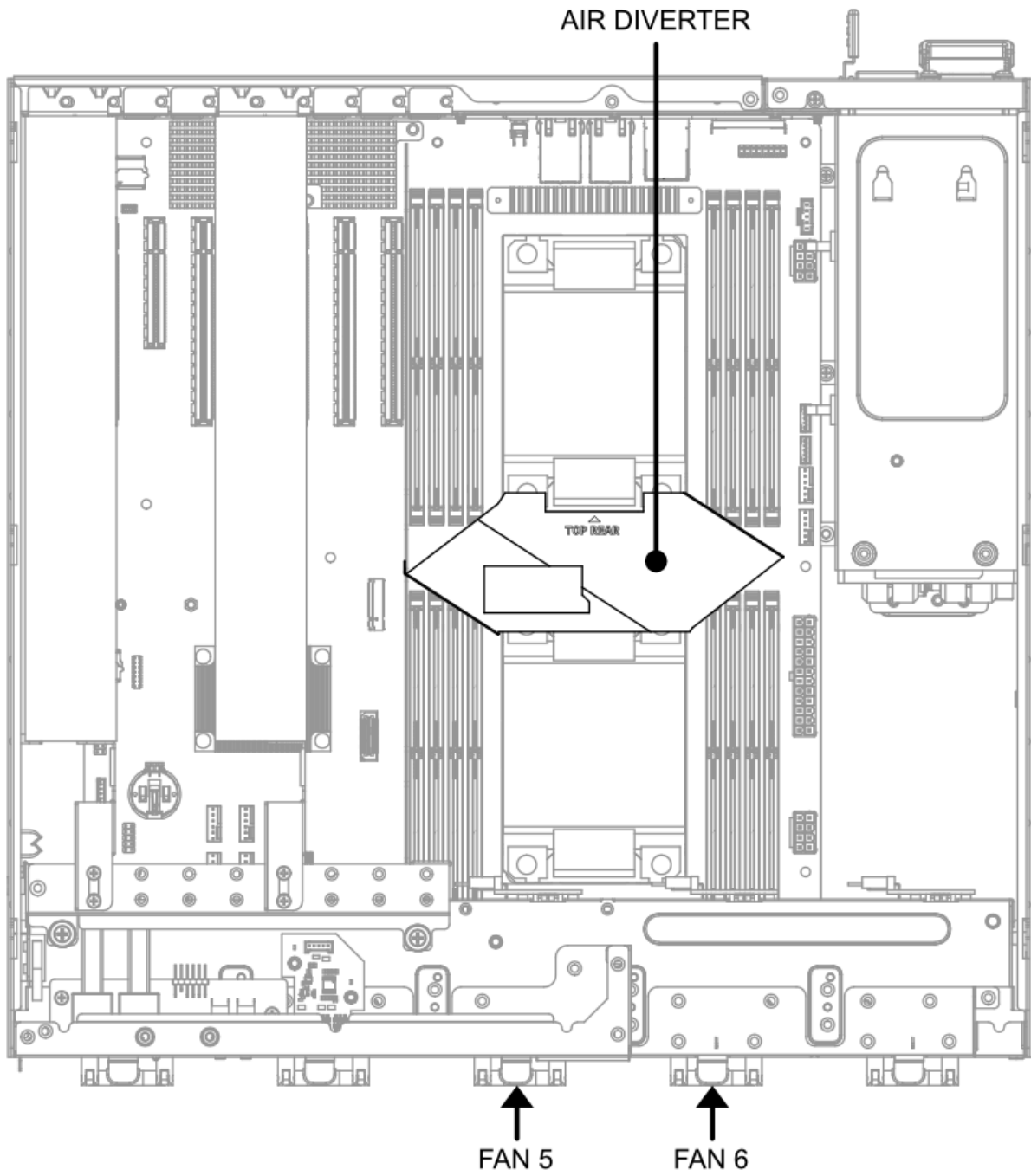
Step 7: Remove the right side (L-shaped piece) of the CPU air duct.



Step 8: Remove air diverter from between the CPU sockets.

Step 9: Service CPU or Memory devices. **Tip:** Access to memory release levers can be improved by

removing chassis FAN 5 or FAN 6.



9.4 - Remove/Replace CPU

To remove the CPU:

Step 1: Using a T30 bit, loosen the 4 corner fasteners on the cooler in a star pattern to ensure even pressure release.

Step 2: Pull the wire clips up toward the CPU to unlatch the CPU cooler.

Step 3: Gently pull the CPU cooler up by the edges as the CPU is connected to the cooler.

Step 4: Once cooler is removed, the CPU carrier needs to be removed from the cooler by unlatching it gently.

Step 5: Remove the CPU from the CPU carrier by lifting the latch release handle found on the bottom of the carrier.

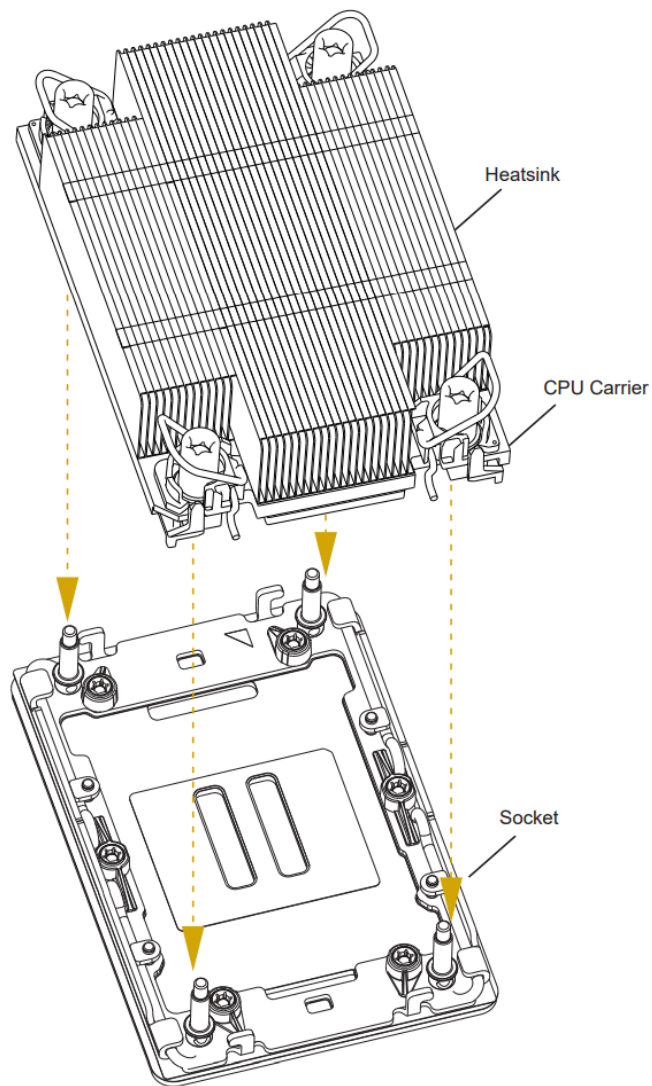
To replace the CPU:

Step 1: Line the CPU up on the CPU carrier using the golden triangle found on the corner of the CPU and additionally using the notches found on the CPU and CPU carrier.

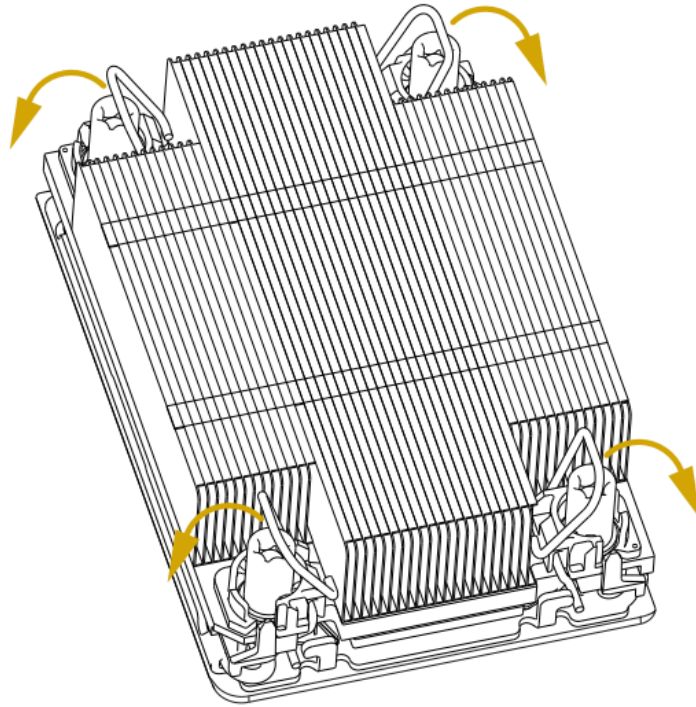
Step 2: Push down metal handle to lock CPU into the carrier.

Step 3: Flip CPU carrier over and apply thermal paste to the top of the CPU.

Step 4: Clip the CPU carrier onto the CPU cooler with the TOP of the CPU making contact with the BOTTOM of the cooler. Keep in mind the corner of the CPU that contains the triangle for alignment.



Step 5: Line up the cooler + CPU carrier with the socket on the motherboard making sure the screws align with the stand offs found on the motherboard and the triangle lines up with the triangle found in the corner of the socket.



Step 6: Flip clips found on the cooler fasteners down, away from the CPU to latch the cooler to the board.

Step 7: Using a T30 bit, tighten the CPU cooler fasteners to the motherboard in a star pattern to ensure even distribution of pressure

9.5 - Remove/Replace DIMMS

To remove DIMMS:

Step 1: Press down on the latches on the DIMM slots on the motherboard until they are tilted away from the DIMM.

Step 2: Gently pull the DIMM out of the slot.

To replace DIMMS:

Step 1: Press down on the latches on each side of the DIMM slot on the motherboard until they are tilted away from the DIMM slot.

Step 2: Line up the notch in the DIMM with the notch in the slot to ensure the DIMM goes in correctly.

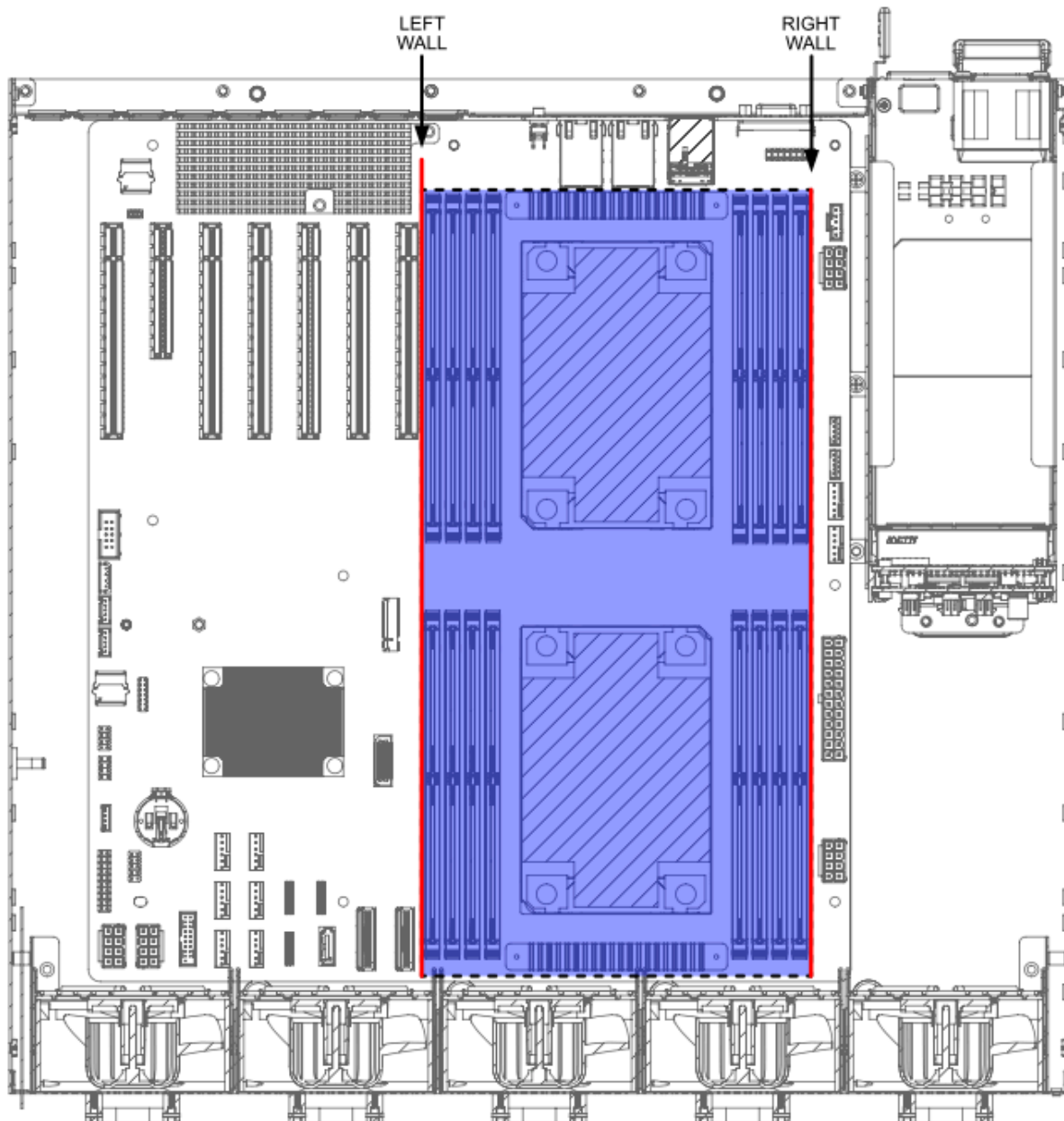
Step 3: Gently press the DIMM into the slot until an audible click is heard which indicates the latches have been engaged and are holding the DIMM in place.

9.6 - Reassembling after CPU or Memory Service

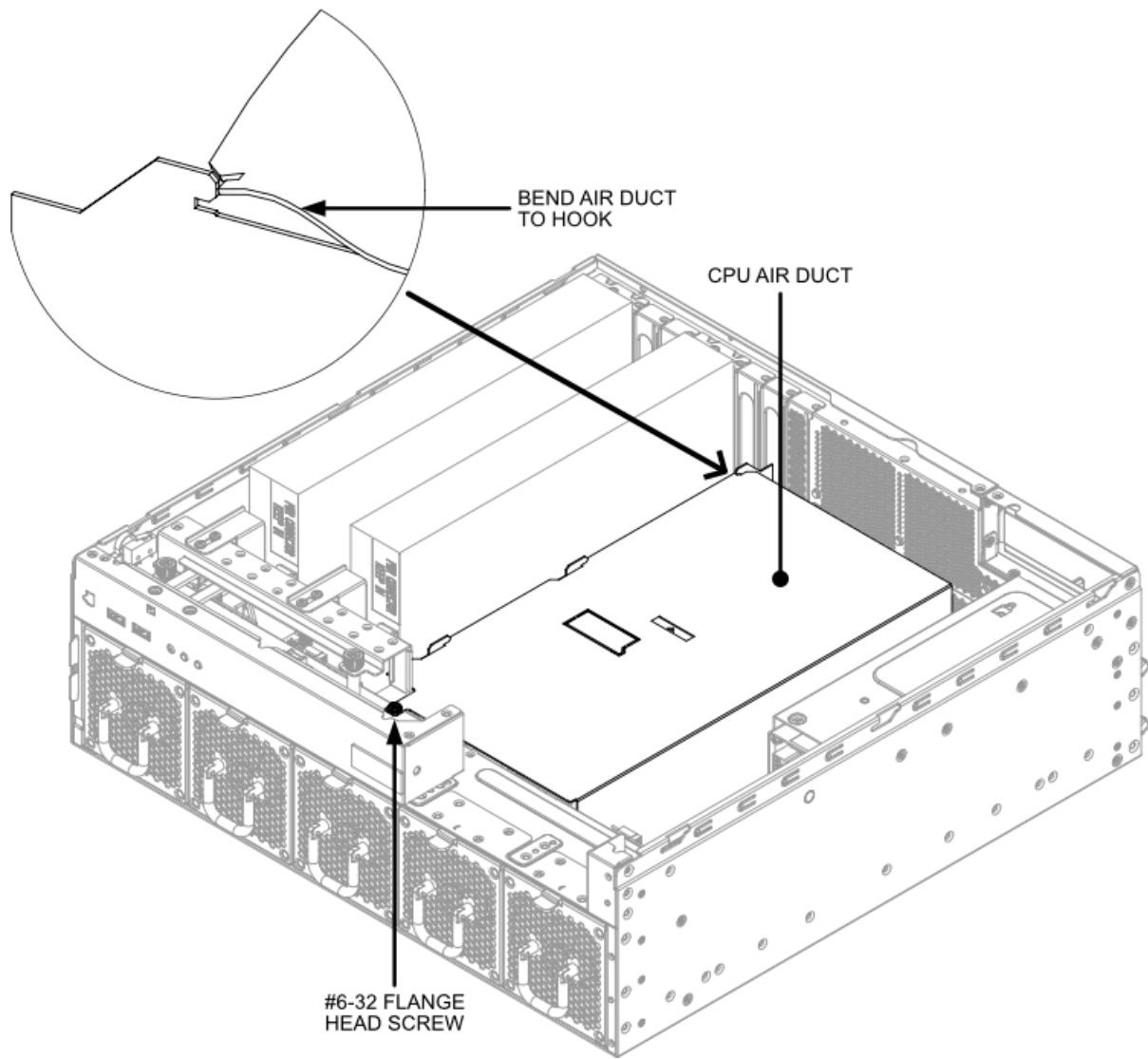
Step 1: Replace the left wall of the air duct immediately to the left of the outermost RAM slot as shown below.

Step 2: Replace air diverter between the CPU sockets. Connect the hook into the corresponding notch in the left wall of the air duct. Note orientation label on the air diverter.

Step 3: Replace air duct right wall in chassis. Each wall of the air duct should be inserted just outside the outermost RAM slot, such that all RAM slots are inside the duct. See below:



Step 4: Align hooks on left side of air duct, then bend duct material to latch rear most opposing hook.



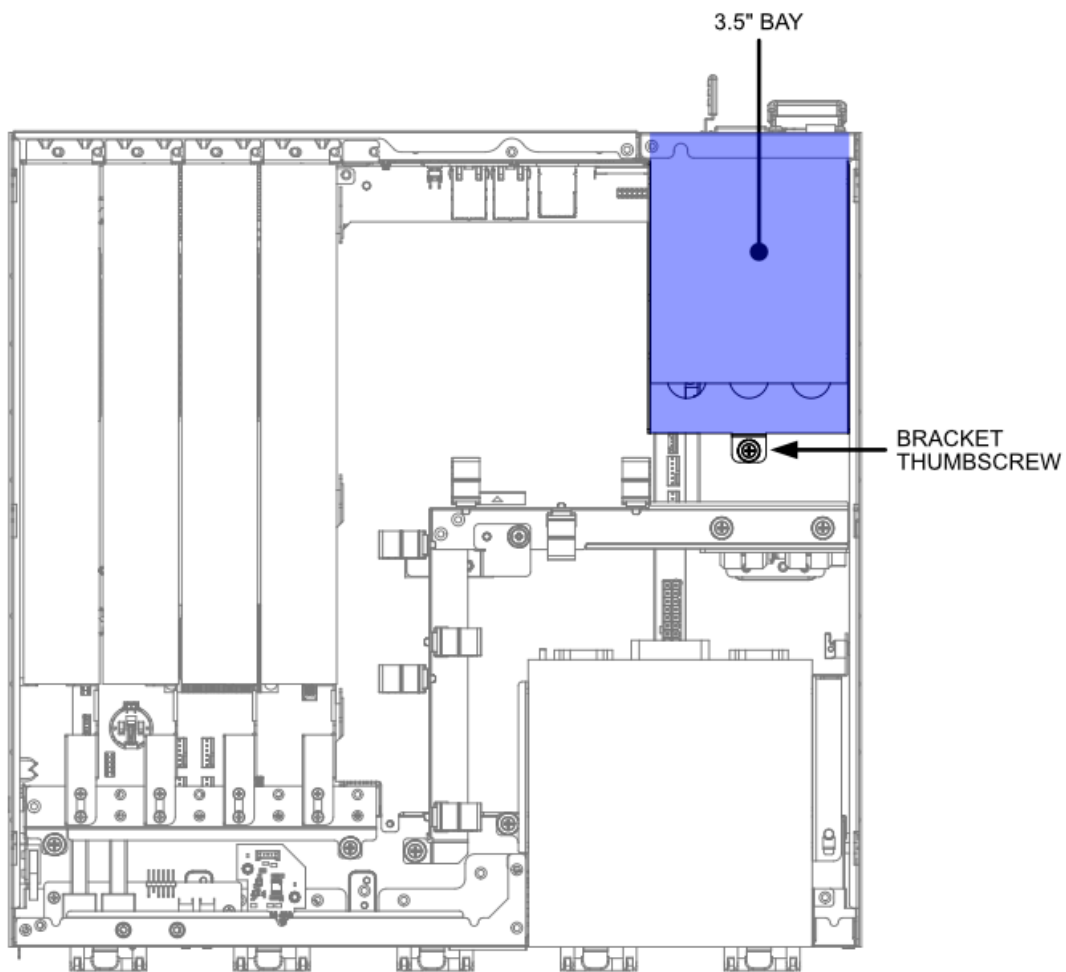
Step 5: Install the #6-32 Flange Head Screw to secure the CPU air duct.

Step 6: Reinstall cable routing bracket and connect cables.

Step 7: Reinstall 3.5" and 5.25" devices.

Step 8: Close and lock lid.

9.7 - Servicing 3.5" Bay Device



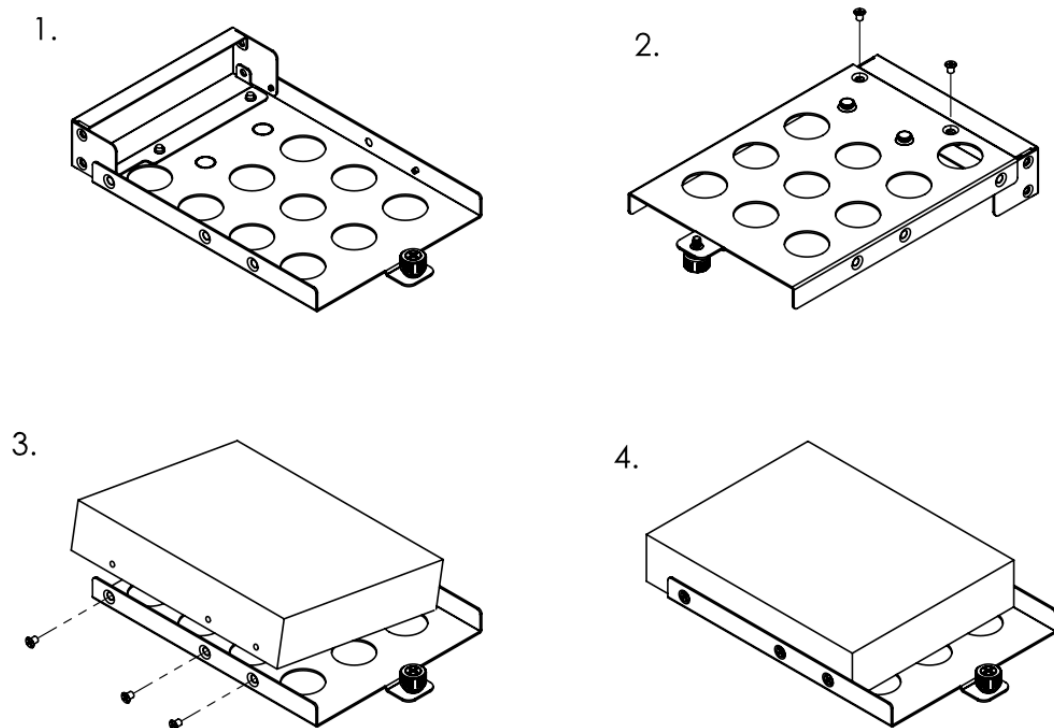
Step 1: Unlock and open the chassis lid.

Step 2: If a 3.5" Device is already installed, disconnect power and data cables.

Step 3: Remove the 3.5" bay bracket from the chassis. Loosen the thumbscrew, then pull the bracket backward into the chassis before lifting upward.

Step 4: If no device is installed in the bay, turn the bracket upside down and remove the two screws

holding the blank plate onto the bracket. (Figure 2 below)

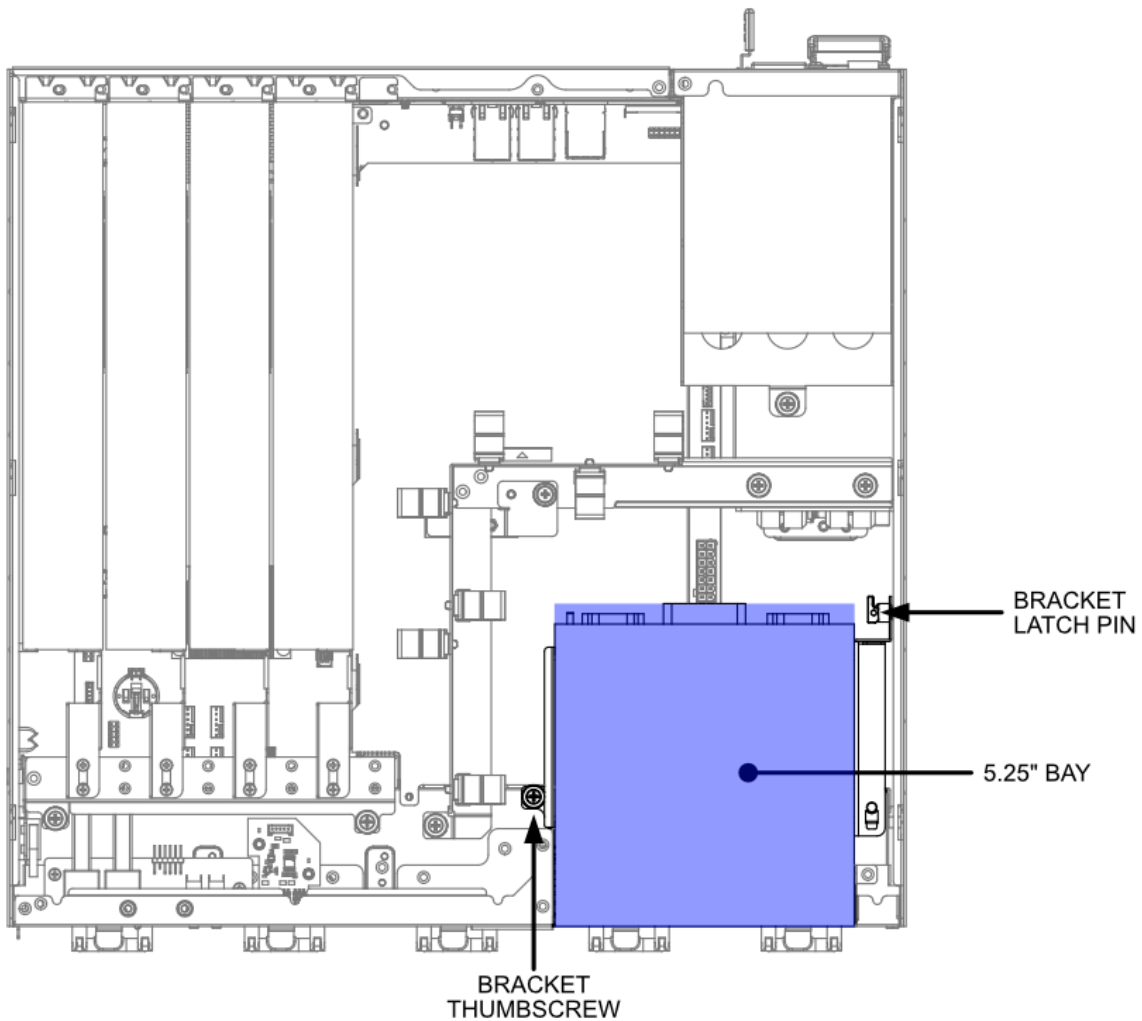


Step 5: Insert the new 3.5" device at a slight angle onto the 2 pins on the right side of the bracket. Secure the device using M3 screws. (Figure 3 above)

Step 8: To install the bracket into the chassis, align the slot pins on the underside of the bracket with the corresponding holes in the chassis. Then slide the bracket forward and secure the thumbscrew. The front of the device should be flush with the rear of the chassis.

Step 9: Connect power and data cables to the device.

9.8 - Servicing 5.25" Bay Device

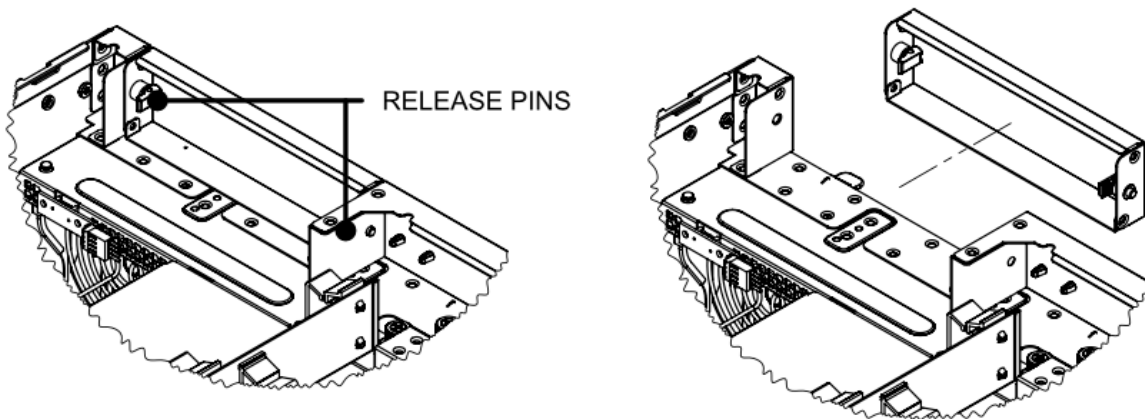


Step 1: Unlock and open the chassis lid.

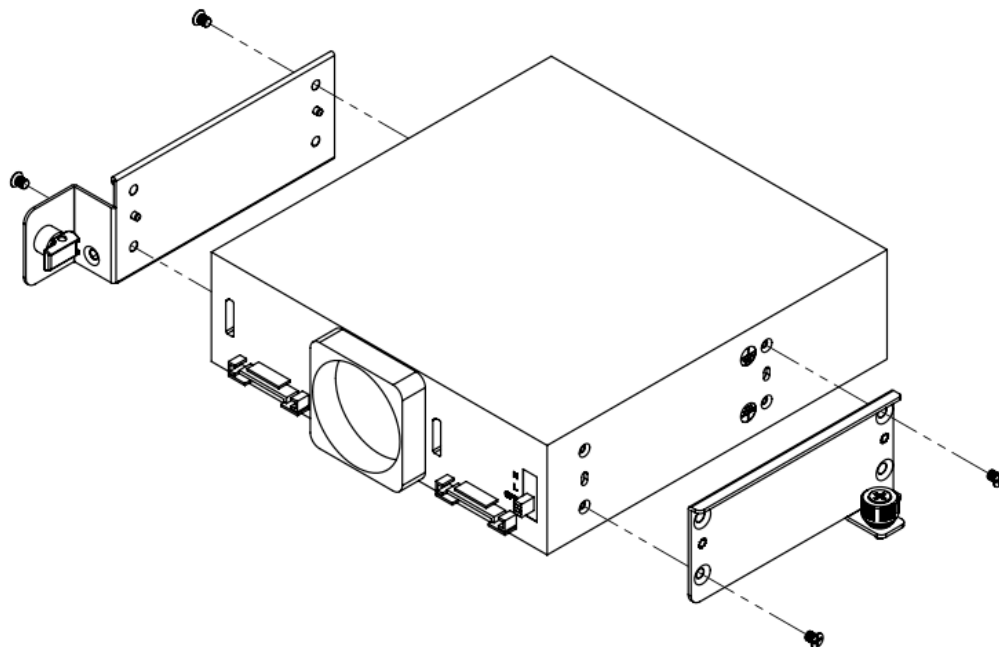
Step 2: If a 5.25" Device is already installed, disconnect power and data cables, then proceed with Step 3a. If the 5.25" blank cover is installed, skip to step 3b.

Step 3a: Remove the 5.25" bay bracket from the chassis. Loosen the thumbscrew and pull the tab on the release pin, then pull the bracket backward into the chassis before lifting upward.

Step 3b: If no device is installed in the bay, remove the empty bracket by pulling the two levers on the release pins:



Step 4: Locate the 5.25" brackets in the accessory box, then secure them to the sides of the device using M3 screws as shown below:



Step 5: To install the bracket into the chassis, align the slot pin on the underside of the bracket with the corresponding hole in the chassis. Then slide the bracket forward and secure the latch pin and thumbscrew. The front of the device should be flush with the front of the chassis.

Step 6: Connect power and data cables to the device. Set the fan speed switch to desired "LOW" or "HIGH" speed indicated by "L" and "H" located at the bottom right of the bay.

9.9 - PCIe Devices and GPUs

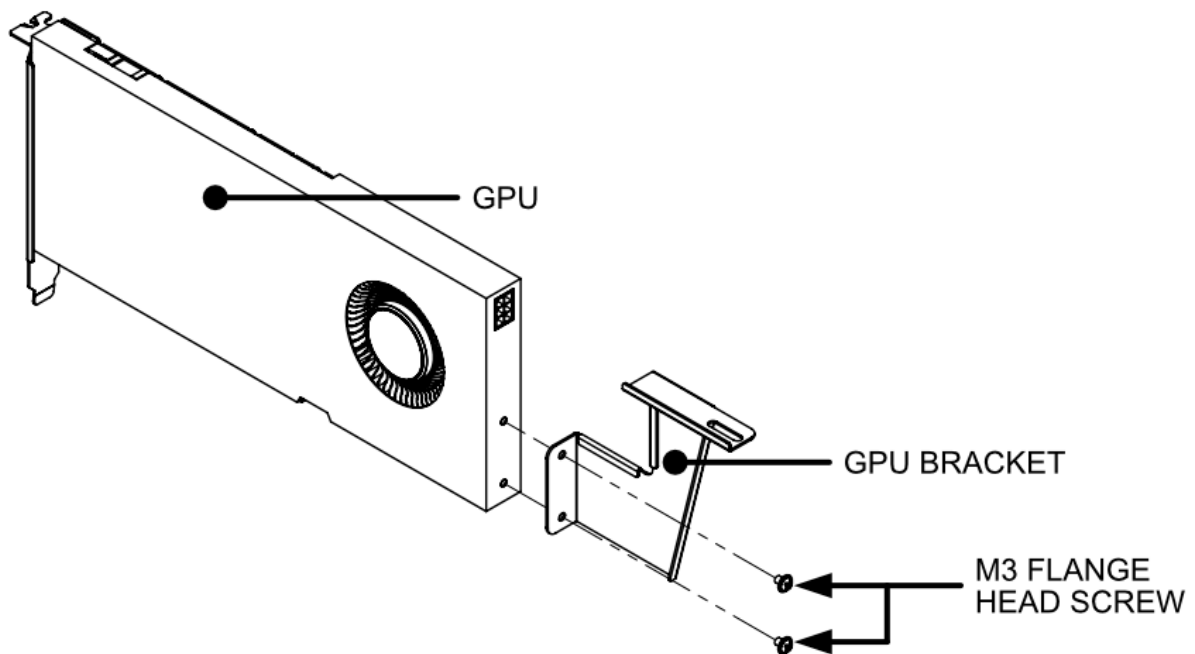
To help protect large PCIe devices (such as GPUs) in high vibration environments, the server supports the addition of brackets to the back end of the device.

Note: Half-length/low profile PCIe devices do not have a bracket

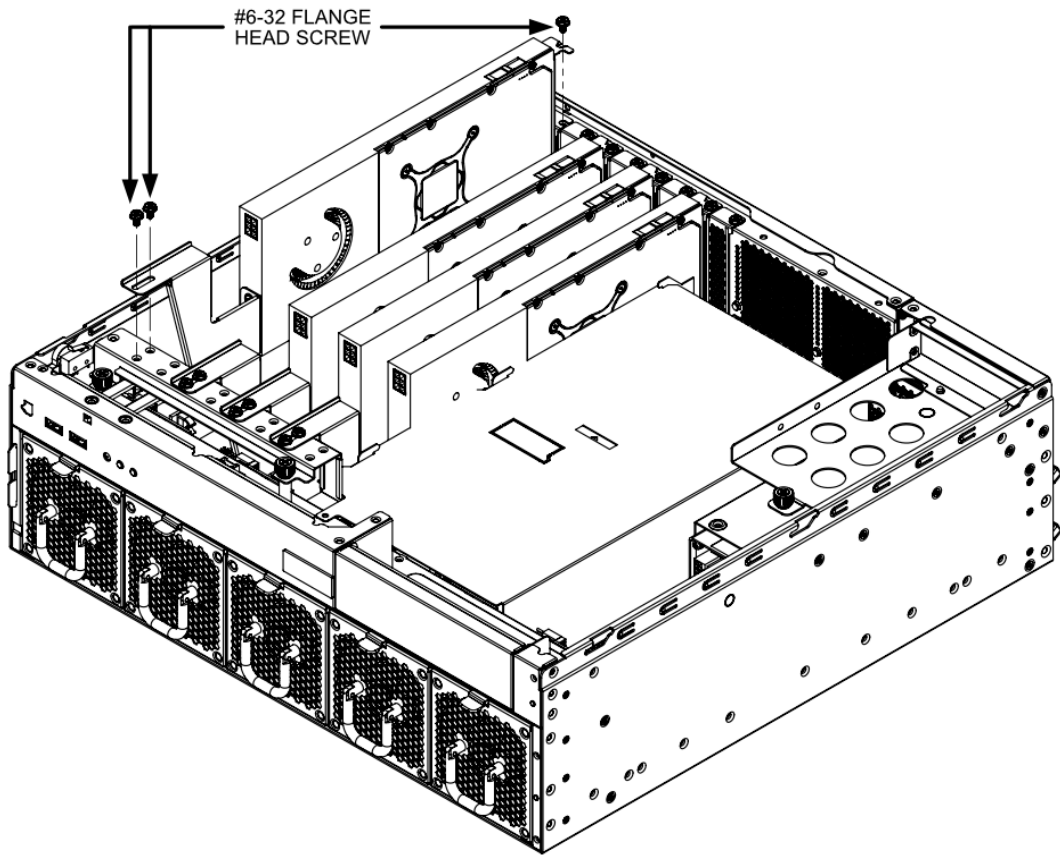
Step 1: Unlock and open the chassis lid.

Step 2: If installing a new device, start by removing the PCIe blank plate.

Step 3: Attach the bracket to the GPU using M3 screws. Bracket dimensions and screw location will vary depending on the GPU. An example installation is shown below. Consult Onlogic for supported GPU brackets.



Step 4: Install the GPU and bracket assembly into the chassis. Secure with #6-32 flange head screws.



GPU Brackets	
Bracket SKU	Compatible GPU
BRKT-AX301-GPU-Flex170	Intel Flex 170 Datacenter GPU
BRKT-AX301-GPU-Nvidia095	Nvidia RTX 4000 ADA Intel Flex 140 Datacenter GPU Nvidia L4 24GB GPU
BRKT-AX301-GPU-Nvidia105	Nvidia RTX 4500 ADA Nvidia RTX 5000 ADA Nvidia RTX 6000 ADA Nvidia L40S 48GB GPU

10 - Regulatory Compliance

10.1 - CE

The computer system was evaluated for IT equipment EMC standards as a class A device. The computer complies with the relevant IT equipment directives for the CE mark. Modification of the system may void the certifications. Testing includes: EN 55032, EN 55035, EN 60601-1, EN 62368-1, EN 60950-1.

10.2 - FCC Statement

This device complies with part 15 of the FCC rules as a Class A device. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

10.3 - ISED

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

CAN ICES-003(A) / NMB-003(A)

10.4 - UKCA

The computer system was evaluated for medical, IT equipment, automotive, maritime and railway EMC standards as a class A device. The computer complies with the relevant IT equipment directives for the UKCA mark

10.5 - VCCI

This is a Class A product based on the standard of the Voluntary Control Council for Interference (VCCI). If this equipment is used in a domestic environment, radio interference may occur, in which case the user may be required to take corrective actions.

この装置は、クラス A 情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

VCCI-A

10.6 - Compliance Information

Do not open or modify the device. The device uses components that comply with FCC and CE regulations. Modification of the device may void these certifications.

The use of shielded cables for connection of a monitor to the GPU is required to assure compliance with FCC and CE regulations.

11 - Appendices

11.1 - Appendix A: Technical Support

Additional technical support and information can be found on our support website at the following link:

<https://support.onlogic.com/documentation/>

11.2 - Appendix E: Safe Use and Installation Instructions

Please follow the Safe Use and Installation Instructions below to ensure the meets compliance standards.

11.2.1 - Safe Use and Installation Instructions

1. Install the device securely. Be careful handling the device to prevent injury and do not drop.
2. Equipment is intended for installation in a Restricted Access Area.
3. 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.
4. Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
5. Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
6. 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.
7. Reliable Earthing - Reliable earthing 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).
8. Ambient operating temperature must be between 5 °C to 40 °C with a non-condensing relative humidity of 8-85%.
9. The device can be stored at temperatures between -40 °C to 70 °C.
10. Keep the device away from liquids and flammable materials.
11. Do not clean the device with liquids. The chassis can be cleaned with a cloth.
12. Allow at least 2 inches of space around all sides of the device for proper cooling. If the device is mounted to a vertical surface then recommended device orientation is so that heatsink fins allow air to rise unobstructed. Alternative orientations may result in reduced operational temperature range.
13. This device is intended for indoor operation only.
14. Install the device only with shielded network cables.
15. Service and repair of the device must be done by qualified service personnel. This includes, but is not limited to, replacement of the CMOS battery. Replacement CMOS battery must be of the same type as the original.
16. Proper disposal of CMOS battery must comply with local governance.
17. Product must only be connected to a certified router, switch or similar network equipment.
18. Product is intended for indoor use only.
19. Product cannot be connected to the public network.



WARNING: There is danger of explosion if the CMOS battery is replaced incorrectly. Disposal of battery into fire or a hot oven, or mechanically crushing or cutting of a battery can result in an explosion.

11.2.2 - Précautions et guide d'installation

Ne pas ouvrir ou modifier l'appareil. L'appareil utilise des composants conformes aux réglementations FCC et EC. La modification de l'appareil peut annuler ces certifications.

1. Installez l'appareil en toute sécurité. Manipulez l'appareil avec précaution pour éviter de vous blesser et ne le laissez pas tomber.
2. L'équipement est destiné à être installé dans une zone à accès restreint.
3. Température ambiante de fonctionnement élevée - En cas d'installation dans un rack fermé ou à plusieurs unités, la température ambiante de fonctionnement de l'environnement du rack peut être supérieure à la température ambiante de la pièce. Par conséquent, il convient de veiller à installer l'équipement dans un environnement compatible avec la température ambiante maximale (T_{ma}) spécifiée par le fabricant.
4. Débit d'air réduit - L'installation de l'équipement dans un rack doit être telle que la quantité de débit d'air requise pour un fonctionnement sûr de l'équipement ne soit pas compromise.
5. Chargement mécanique - Le montage de l'équipement dans le rack doit être tel qu'une condition n'est pas atteinte en raison d'une charge mécanique inégale.
6. Surcharge de circuit - Il convient de tenir compte de la connexion de l'équipement au circuit d'alimentation et de l'effet que la surcharge des circuits pourrait avoir sur la protection contre les surintensités et le câblage d'alimentation. Une prise en compte appropriée des valeurs nominales de la plaque signalétique de l'équipement doit être utilisée pour répondre à cette préoccupation.
7. Mise à la terre fiable - Une mise à la terre fiable de l'équipement monté en rack doit être maintenue. Une attention particulière doit être accordée aux raccordements d'alimentation autres que les raccordements directs au circuit de dérivation (par exemple, utilisation de multiprises).
8. La température ambiante de fonctionnement doit être comprise entre 5 °C et 40 °C avec une humidité relative sans condensation de 8 à 85 %.
9. L'appareil peut être stocké à des températures comprises entre -40 °C et 70 °C.
10. Gardez l'appareil à l'écart des liquides et des matériaux inflammables.
11. Ne nettoyez pas l'appareil avec des liquides. Le châssis peut être nettoyé avec un chiffon.
12. Laissez au moins 2 pouces d'espace autour de tous les côtés de l'appareil pour un refroidissement correct. Si l'appareil est monté sur une surface verticale, l'orientation recommandée de l'appareil est de sorte que les ailettes du dissipateur thermique permettent à l'air de monter sans obstruction. Des orientations alternatives peuvent entraîner une plage de températures de fonctionnement réduite.
13. Cet appareil est destiné à une utilisation en intérieur uniquement.
14. Installez l'appareil uniquement avec des câbles réseau blindés.
15. L'entretien et la réparation de l'appareil doivent être effectués par un personnel qualifié. Cela inclut, mais sans s'y limiter, le remplacement de la batterie CMOS. La batterie CMOS de remplacement doit être du même type que celle d'origine.
16. L'élimination appropriée de la batterie CMOS doit être conforme à la gouvernance locale.
17. Le produit doit uniquement être connecté à un routeur, un commutateur ou un équipement réseau similaire certifié.
18. Le produit est destiné à une utilisation en intérieur uniquement.
19. Utilisez uniquement des connecteurs répertoriés UL pour la connexion aux panneaux de fusibles automobiles.
20. Le produit ne peut pas être connecté au réseau public.



ATTENTION: Il existe un risque d'explosion si la pile CMOS n'est pas remplacée correctement. L'élimination de la batterie dans le feu ou dans un four chaud, ou l'écrasement ou le découpage mécanique d'une batterie peut entraîner une explosion.