Axial AC101 Product Manual
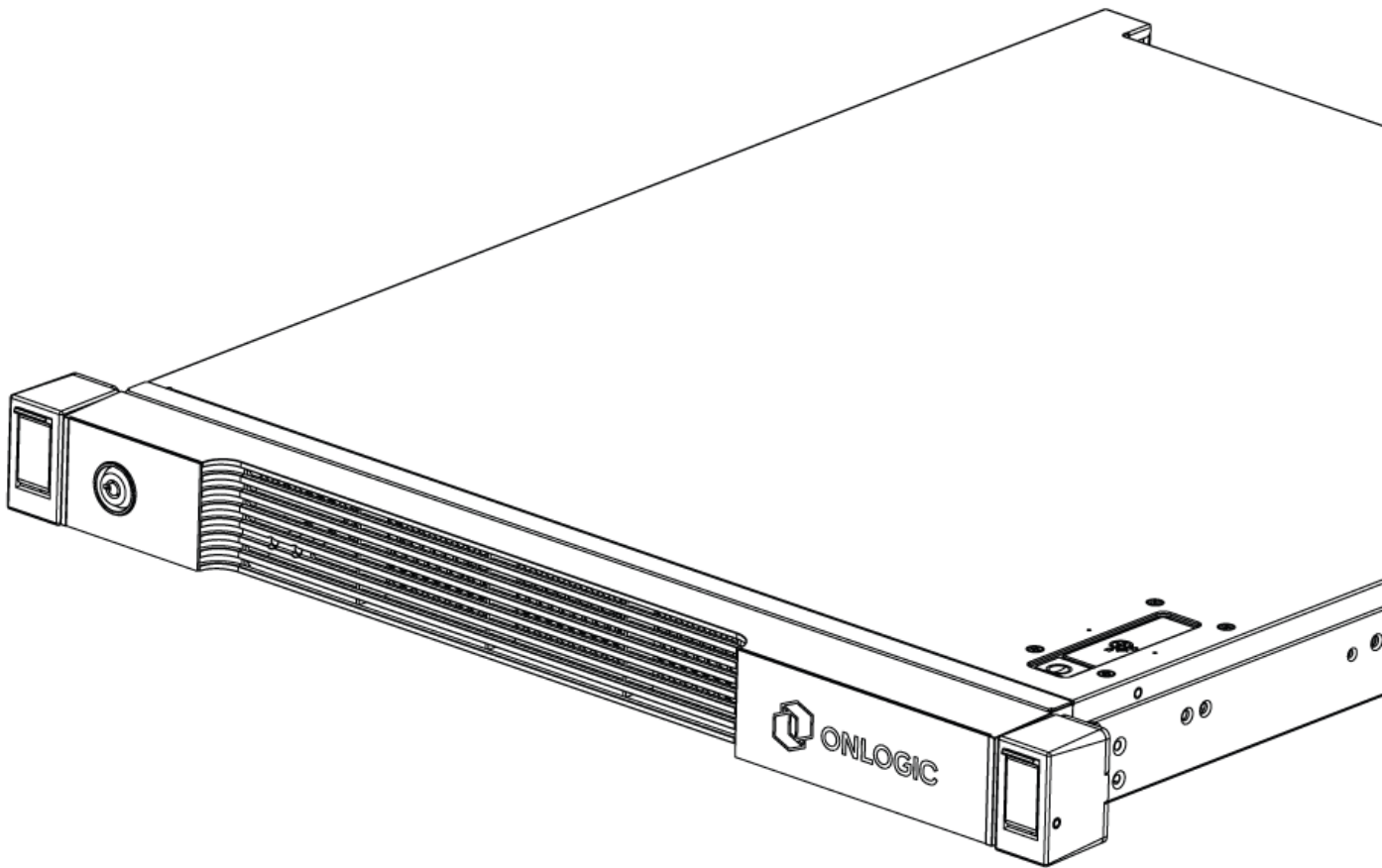
Revision History
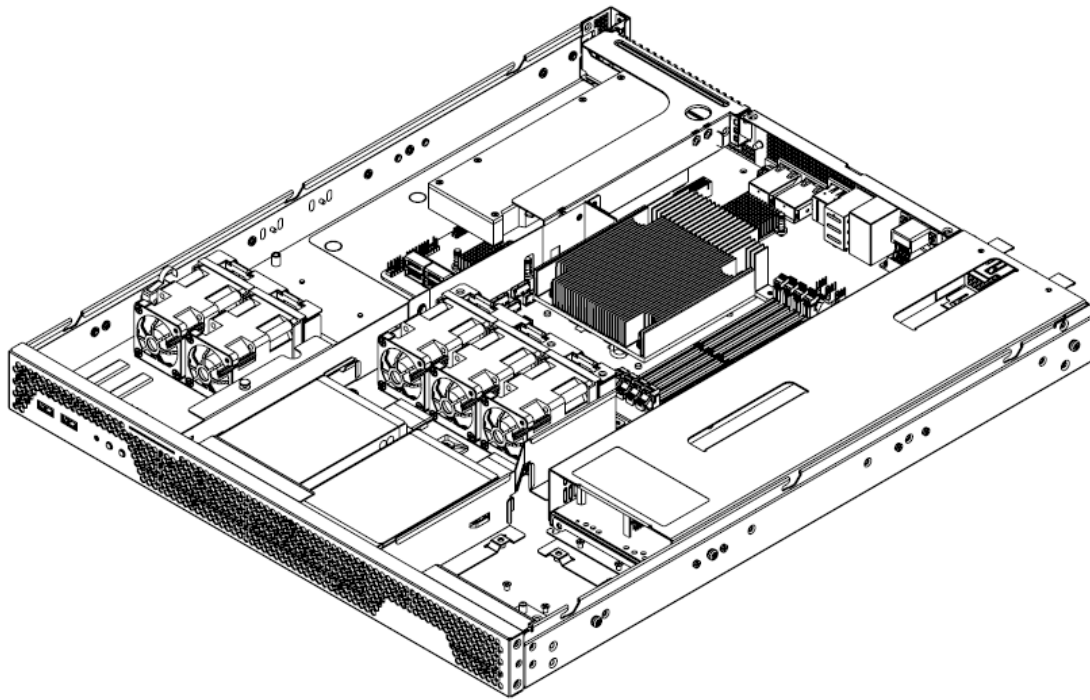
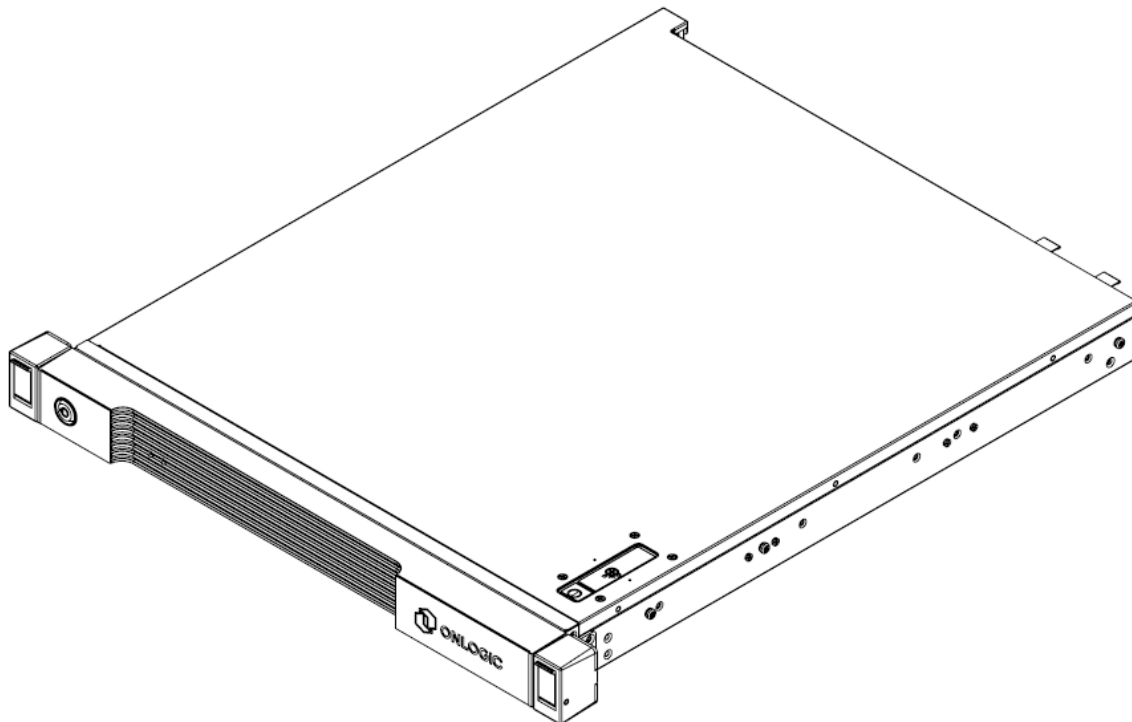| Date	Revision History
5/24/2023	First release of Axial AC101 manual
7/17/2023	Renamed Section 3 from Primary Component Connectors to Internal Connectivity SSD Header Updates, Drive Placement & Population 750W PSU recommendation note (when using 150W GPU) Red Hat Enterprise Linux OS support Added RAID Configuration (new section 7) Update to Compliance Information section Note pertaining to M5 cage nut
8/22/2023	Updated Operating System support

Table of Contents

1 - System Overview

Axial AC101 without Security Bezel

Axial AC101 with Security Bezel

1.1 - Accessories

The following accessories are included with every system:

- PSU filler (2RALXX5862A1)
- Nvidia 9.5" GPU mounting kit w/ screws (2RALXX5861A1)
- SSD cable brackets (2RALXX5859A1)
- Spare motherboard standoffs (2RALXX282300)
- Spare PCIe riser screws (2RALXX585800)
- Cable management ties
- Security bezel key

If additional items were purchased, such as rail mounting kits/brackets, they will be boxed separately.

1.2 - Latest Drivers, Firmware, and Additional Information

Drivers, firmware, and product information can be found on the Axial 101 product page.

US: https://www.onlogic.com/ac101/
EU: https://www.onlogic.com/eu-en/ac101/

1.3 - Product Specifications

OnLogic Axial 100 Series	
Variants	AC101 - High-Performance 1U with 150W PCIe 4.0 x16 Expansion
Processor	Intel® 13th Gen Raptor Lake-S (LGA1700) Core™ i3, i5, i7 & i9 up to 24-core 32-thread i3-13100E or TE, i5-13500E or TE, i7-13700E or TE, i9-13900E or TE 125W PL2 (Power Level 2)
Memory	Support up to 4x DDR5-4800 UDIMMs (non-ECC or ECC) Up to 128GB total memory Maximum operational speed: 4400 MT/s
Chipset	Intel W680
Integrated Graphics	Intel UHD Graphics 730 (i3) or 770 (i5, i7, i9)
Front I/O	2x USB 3.2 Gen 1 Type A 1x Power Button / LED (White) 1x ID button / LED (Blue)
Rear I/O	1x 1GbE Dedicated Management (BMC/IPMI) 2x 1GbE LAN Intel i210 2x 10GbE LAN Intel X710 2x USB 3.2 Gen 1 Type-A 1x DisplayPort 1x HDMI 1x VGA 1x DB9 (COM) 1x ID button / LED (Blue)
Expansion & Storage	1x M.2 2280/2260/2242/2230 M-key (PCIe Gen 3 x4) 1x PCIe Gen 4 x16 Full Height, Full Length slot (up to 150W) Up to 4x 2.5" Drives (NVMe or SATA)
Special Features	ASPEED AST2600: Full Web UI, iKVM, vMedia support 1/10 Network Controller Sideband Interface (NC-SI) Optional TPM 2.0 module (Infineon SLB9670) or Intel PTT (Native) Chassis Intrusion Detection Security Bezel Secure Boot
Operating Systems	Microsoft Windows 10 IoT Enterprise 2021 LTSC (Value/High End) 64-bit Microsoft Windows 11 Professional 64-bit Red Hat Enterprise Linux 8.8 - 8.x Red Hat Enterprise Linux 9.2 - 9.x Ubuntu Desktop 22.04 Intel IoT for 13th Gen Intel Core processors Ubuntu Server 22.04 Intel IoT for 13th Gen Intel Core processors
LAN Controllers	2x Intel i210 Controllers (2x 1GbE ports) 1x Intel X710 Controller (2 x 10GbE ports)
Power Supplies	Up to 2 PSUs with PMBUS monitoring, 100~240 VAC input 450W Gold 750W Platinum
Dimensions	430 x 43.5 x 515mm (16.9 x 1.7 x 19.7") without Security Bezel

(W x H x D)	483 x 43.5 x 534mm (19.0 x 1.7 x 21.0") with Security Bezel
Weight	System Maximum: 10.02 kg (22.1 lbs) Shipping Maximum: 12.88 kg (28.4 lbs)
Mounting	Rack Mount 28" Toolless Slide Rail Rack Mount 23" Slide Rail Rack Mount 23" Slide Rail with Cable Management Arm Wall Mount
Operating Temperature	5°C ~ 40°C (ASHRAE A3 Operating Temperature) Maximum ambient temperature decreases by 1°C for every 175m (574 ft) increase in altitude above 900m (2,953 ft)
Storage Temperature	-40°C ~ 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
Shock & Vibration	ISTA 6-FEDEX-A
Certifications	FCC 47 CFR Part 15 Subpart B (Class A) CAN ICES-003(A) / NMB-003(A) (Class A) (Class B upon request) EN 63268-1 CISPR 32/EN 55032 (Class A; Class B upon request) CISPR 35/EN 55035 Radio Equipment Directive (2014/53/EU) RoHS 3 (2015/863/EU) 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, please call

1.4 - System Dimensions and Exterior Features

1.4.1 - System Dimensions
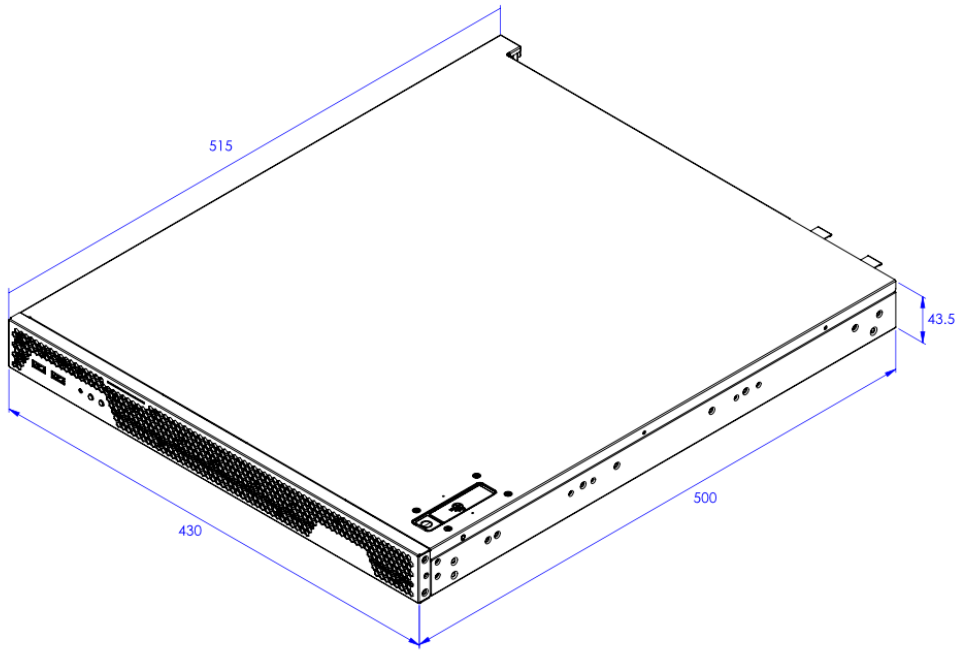
Axial AC101 without Security Bezel
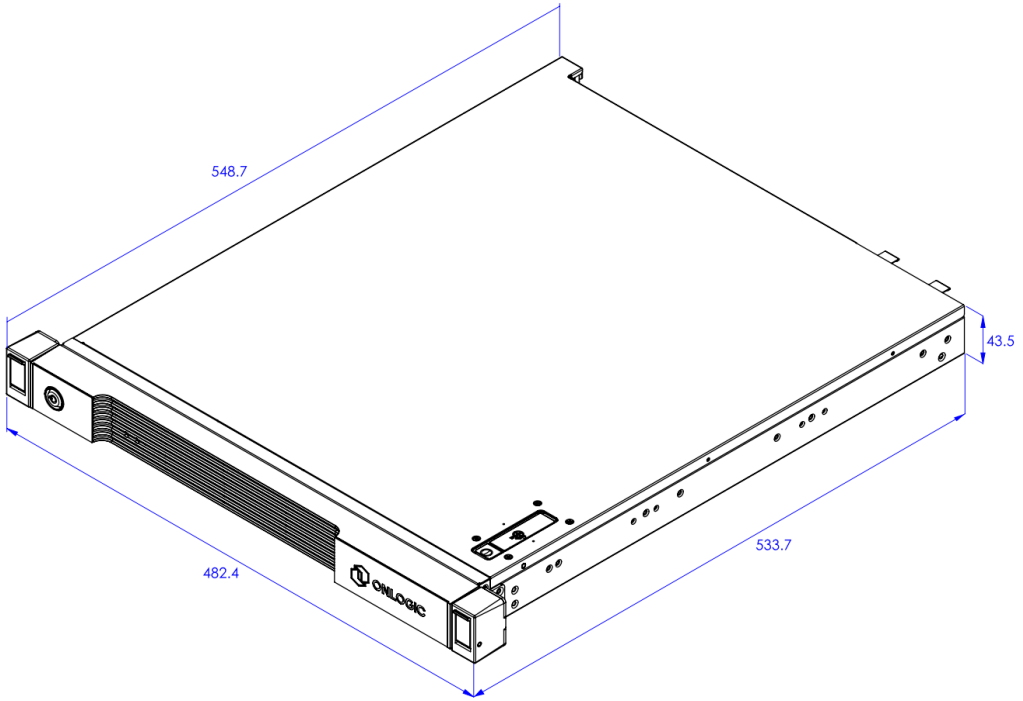
Axial AC101 with Security Bezel

1.4.2 - Front I/O Ports

USB 3.2 Gen 1
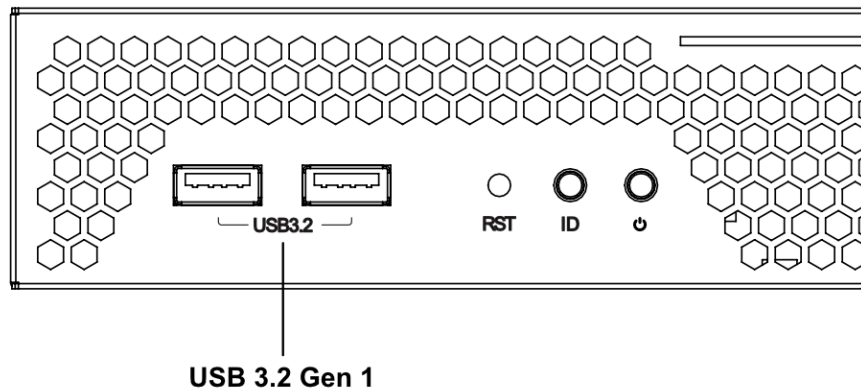
1.4.3 - Rear I/O Ports
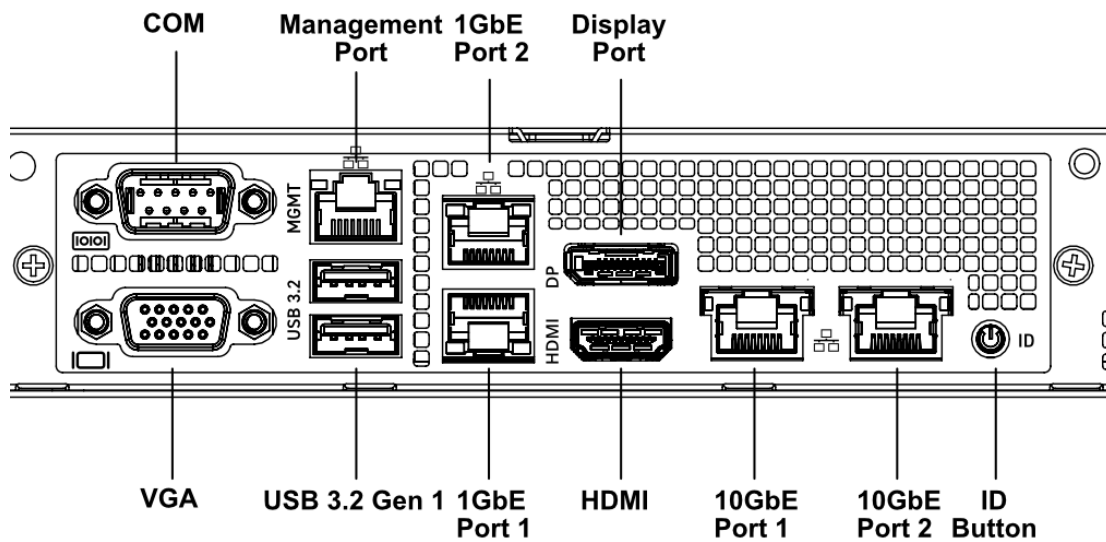
1.4.4 - Front LEDs & Buttons
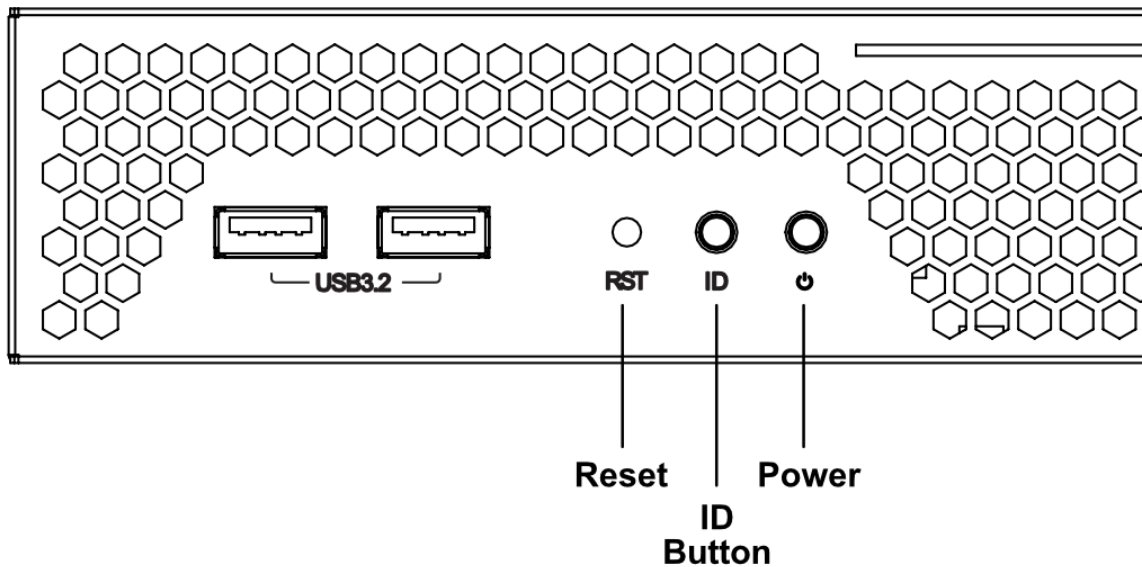
LED / Button	Color	On	Off	Blink
Power	White	Device is on	Device is off	-
ID **(Identification)**	Blue	ID indicator asserted	ID indicator is deasserted	ID indicator is blinking
RST **(Reset)**	-	-	-	-

The ID LED/Button is available to assist with locating the system. ID may be physically 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.

RST Button will reset the system.

1.4.5 - Security Bezel

The Axial AC101 Edge Server comes with a 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.
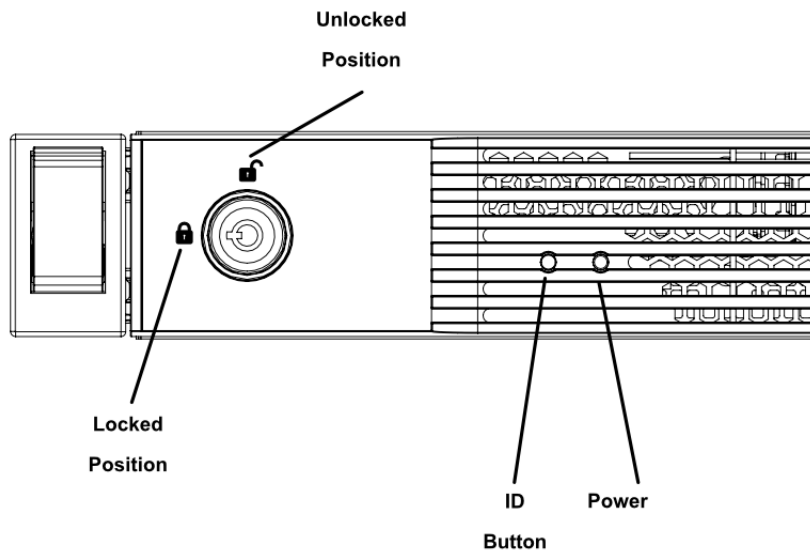
1.4.6 - Two Point Locking Lid with Intrusion Detection

The Axial AC101 Edge Server chassis lid has a two point locking 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 latch with a tamper resistant screw lock.
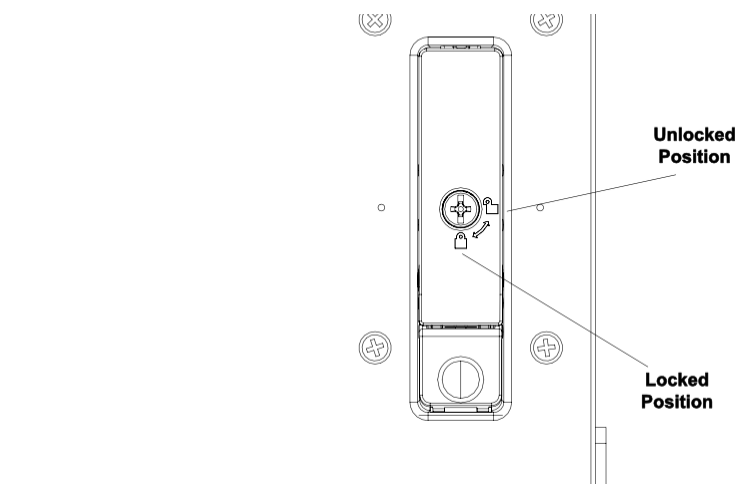
The second lid locking point is a thumb screw located in the rear of the system.

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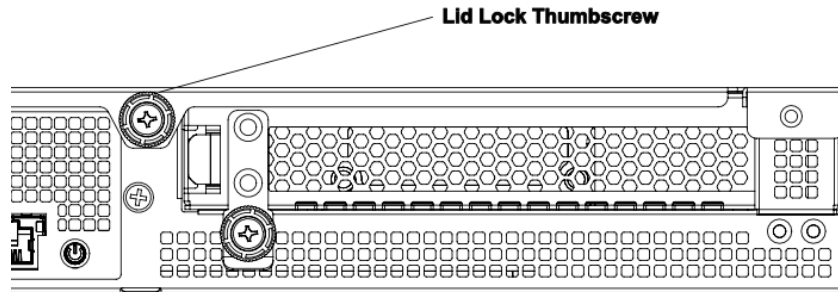
In the event that the system lid is removed while power is present to the system, the intrusion switch will detect this event and the Chassis Intrusion sensor will be asserted. Relative to the intrusion, this event will also be logged in the Baseboard Management Controller event log.

Intrusion Detection Switch
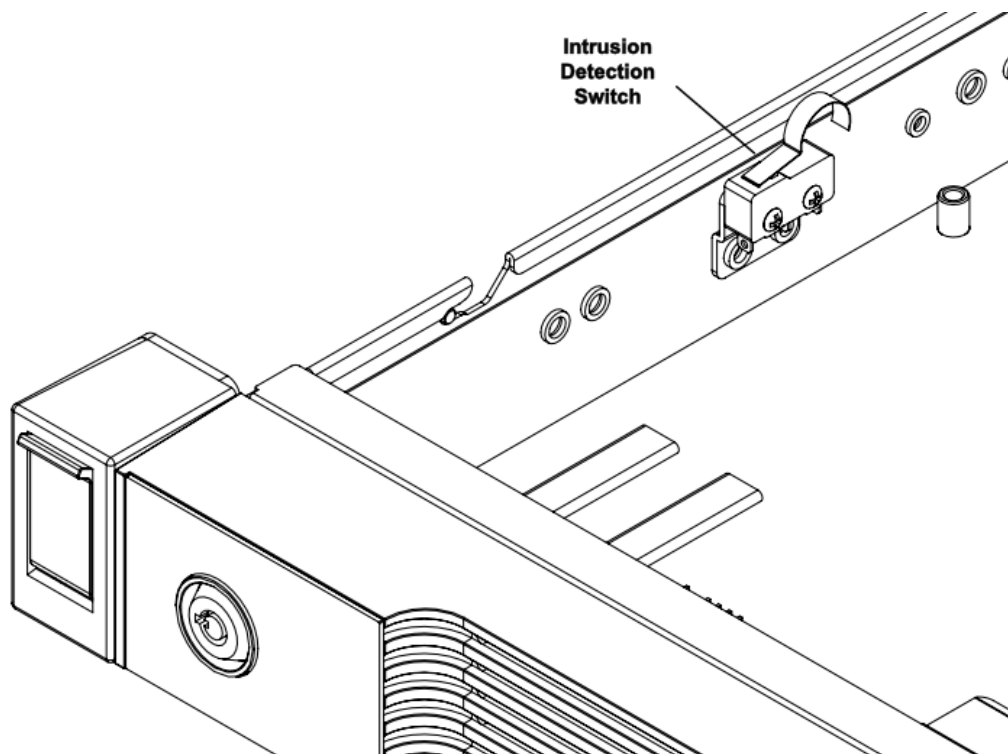
1.5 - System Label

The system label is located on the bottom 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

Approximate label location on underside of system
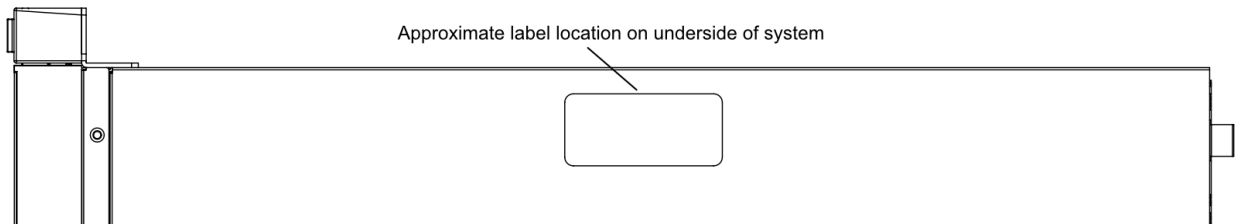
1.6 - Front Service Label

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

Label location on front tag of system
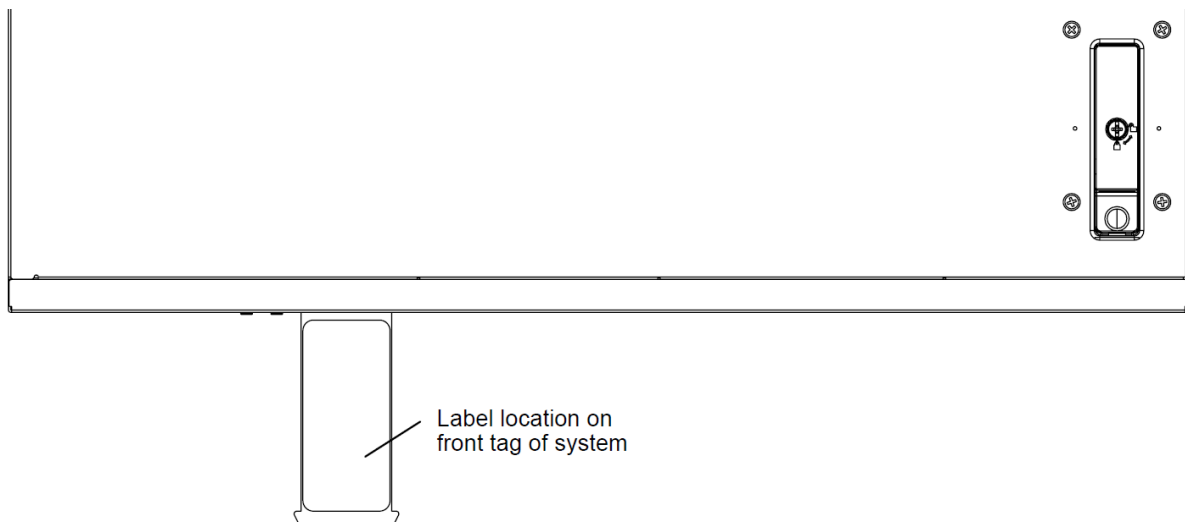
1.7 - Motherboard Overview

1.7.1 - System Block Diagram
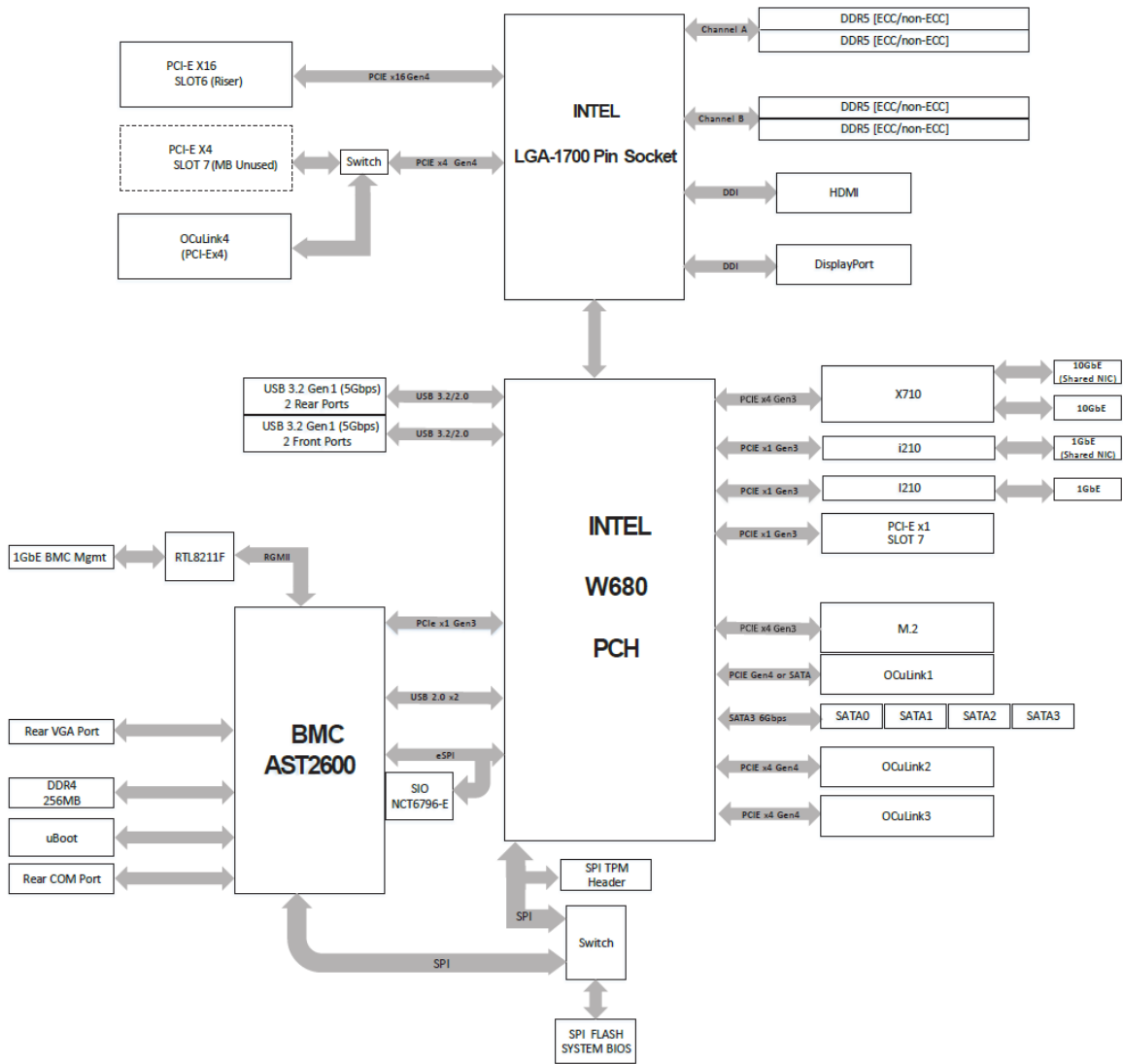
1.7.2 - Internal Motherboard Features & Headers

AC101-A01-P

Callouts:
1. Front VGA
2. PWM CFG
3. (DDR5 A2)
4. ATX12V1
5. ATX12V1
6. BATTERY
7. PSU PMBUS
8. ATX Power
9. (DDR5 B2/B1/A2/A1)
10. FAN 4
11. Speaker
12. Buzzer
13. Front USB 3.2 Gen 1 Header
14. OCuLink 4 / OCuLink 3 / OCuLink 2 / OCuLink 1
15. FAN 3
16. FAN 2
17. FAN 1
18. SATA_7 / SATA_6
19. SATA_5 / SATA_4
20. Front Panel
21. Aux Front Panel
22. SATA SGPIO
23. TPM
24. USB 2.0
25. PECI
26. Temp Sensor
27. IPMB
28. BMC SMB
29. NMI
30. SEC OR
31. LAN LED
32. Clear CMOS
33. M.2 Key M (PCIe Gen 4.0 x4)
34. FAN 5
35. FAN 7 / FAN 6

Board labels:
- Bot: VGA / Top: COM
- Front VGA
- DDR5 B2 (64 bit, 288-pin)
- DDR5 B1 (64 bit, 288-pin)
- DDR5 A2 (64 bit, 288-pin)
- DDR5 A1 (64 bit, 288-pin)
- USB 3.2 Gen 1 Top: USB 1 Bot: USB 2
- 1GbE BMC
- 1GbE Port 1 / 1GbE Port 2
- Intel i210
- Intel i210
- HDMI / DisplayPort
- 10GbE Port 3
- 10GbE Port 3
- Intel X710
- ID Button/LED
- Aspeed AST2600
- Intel LGA-1700 Pin Socket
- Intel W680
- PCIe Gen 4.0 x4 (Unused)
- PCIe Gen 4.0 x16 Riser Card
- M.2 Key M (PCIe Gen 4.0 x4)
- PCIe Gen 3.0 x1 (Unused)
- Super I/O
- Debug LED
- BIOS ROM

Item	Description	Item	Description
1	Front VGA Header, (FRNT_VGA1), Unused	19	2x SATA Header - SSATA_0_1 (SATA_4, Lower), (SATA_5, Upper)
2	PWM Configuration Header (PWM_CFG1), Unused	20	System Front Panel Header (PANEL1)
3	2x DDR5 DIMM Slots (DDR5_A1, DDR5_B1)	21	Auxiliary Front Panel Header (AUX_PANEL1)
4	ATX 12V Power Connector (ATX12V1)	22	SATA SGPIO Connector (SATA_SGPIO1), Unused
5	ATX 12V Power Connector (ATX12V2)	23	SPI TPM Header (TPM_BIOS_PH1)
6	CMOS CR2032 Battery	24	USB 2.0 Header (USB_1_2), Unused
7	PSU SMBus Header (PSU_SMB1)	25	CPU PECU Mode Jumper (PECI1)
8	ATX Power Connector (ATXPWR1)	26	Ambient Temperature Sensor Header (TR1)
9	2x DDR5 DIMM Slots (DDR5_A2, DDR5_B2)	27	Intelligent Platform Management Bus Header (IPMB_1)
10	Chassis Fan Header (FAN4)	28	BMC SMBus Header (BMC_SMB_1)
11	Chassis Speaker Header (SPEAKER1), Unused	29	Non Maskable Interrupt Button (NMI_BTN1)
12	Buzzer (Audible boot error indicator)	30	Security Override Jumper (SEC_OR1)
13	Front USB 3.2 Gen 1 Header	31	LAN LED
14	4x OCuLink PCIe 3.0 x4 for NVMe drives	32	Clear CMOS Pad (CLRMOS1)
15	Chassis Fan Header (FAN3)	33	M.2 Socket (M.2) (Type 2230/2242/2260/2280)
16	Chassis Fan Header (FAN2)	34	Chassis Fan Header (FAN5)
17	Chassis Fan Header (FAN1)	35	2x Chassis Fan Header (FAN6, FAN7), Unused
18	2x SATA Header - SSATA_2_3 (SATA_6, Lower), (SATA_7, Upper)		
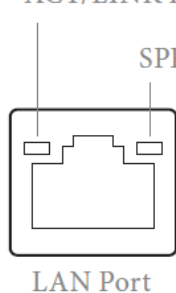
2 - I/O Definitions

2.1 - Networking
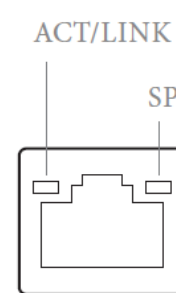
The Axial AC101 features the following onboard Ethernet ports:

Port	Chipset	Capabilities
1GbE Mgmt	Realtek RTL8211F (Attached to ASPEED AST2600)	Dedicated BMC Management port. Port is 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.
1GbE Port 1	Intel I210	1GbE Port This port may be configured to operate in a Shared NIC mode, enabling access to the BMC network connection and supporting the system management functions such as IPMI, RedFish, Remote Management, etc.
1GbE Port 2	Intel I210	1GbE Port
10GbE Port 3	Intel X710	10GbE Port This port may be configured to operate in a Shared NIC mode, enabling access to the BMC network connection and supporting the system management functions such as IPMI, RedFish, Remote Management, etc.
10GbE Port 4		10GbE Port
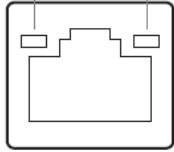
2.2 - 1GbE Dedicated BMC Port LEDs

	LED	Color	State	Condition
ACT/LINK LED ... SPEED LED ... LAN Port	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 - 1GbE Networking Port LEDs

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

2.4 - 10GbE Networking Port LEDs

	LED	Color	State	Condition
ACT/LINK LED **SPEED LED** **LAN Port**	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

2.5 - USB Ports

There are 4 USB 3.2 Gen 1 Type A ports on the Axial AC101 Edge Server.

Two ports are on the front of the system. Two ports are on the rear of the system.

All USB ports also support USB 2.0 connectivity.

2.6 - DisplayPort Video

There is one full-size DisplayPort (1.4a) located on the back of the Axial AC101 Edge Server.

2.7 - HDMI Video

There is one HDMI (High-Definition Multimedia Interface) port located on the back of the Axial AC101 Edge Server.

2.8 - VGA Video

There is one DB15 VGA port located on the back of the Axial AC101 Edge Server.

3 - Internal Connectivity
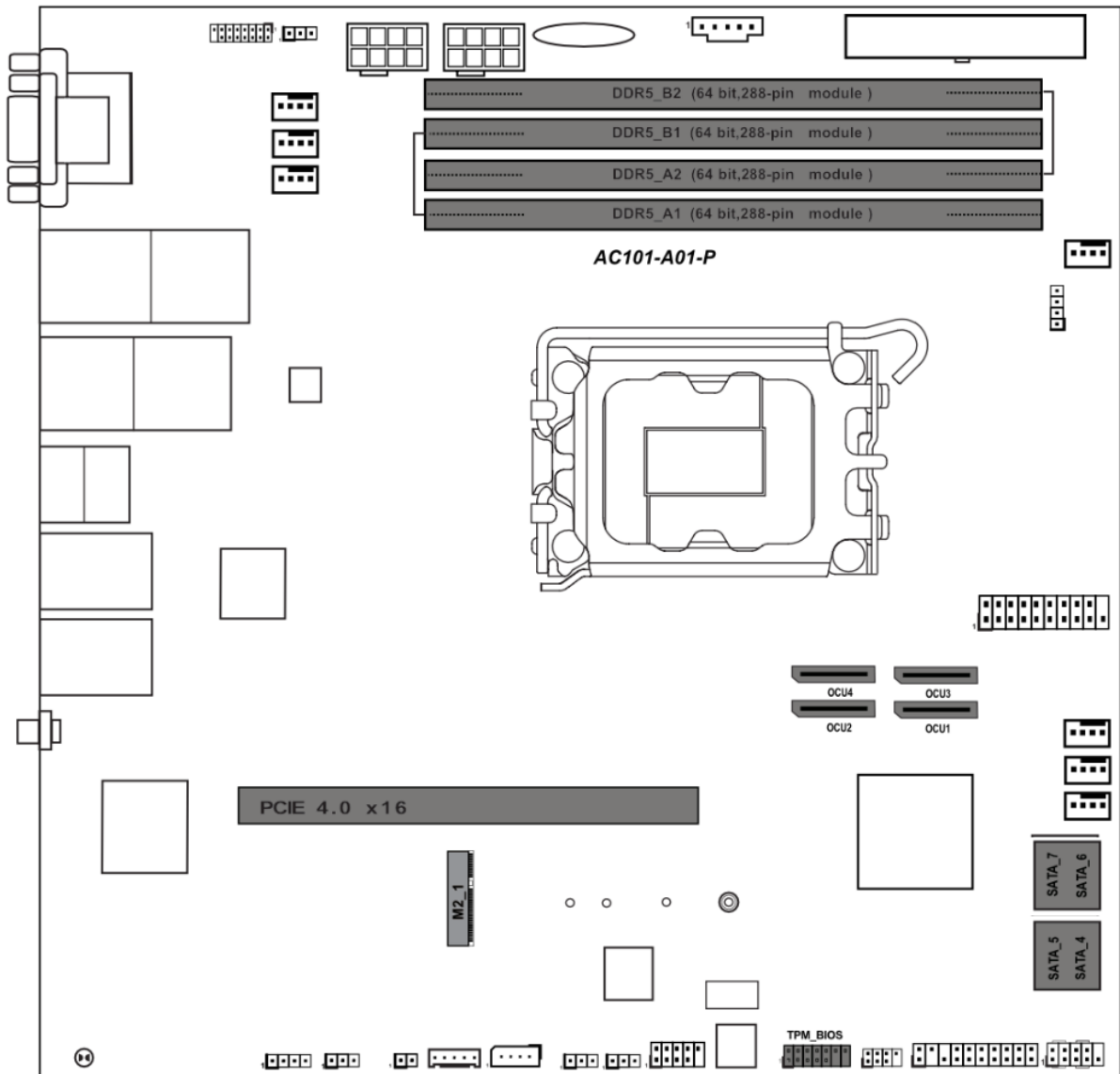
3.1 - M.2 2280/2260/2242/2230 M-key

This expansion slot is capable of supporting PCIe Gen 3 x4 and is routed directly to the W680 PCH. This slot is designed to support NVMe storage drives.

3.2 - TPM Header

The Axial AC101 supports an optional discrete TPM 2.0 module.

3.3 - Drive Headers, Labeling, and Recommended Population

3.3.1 - SATA Headers

There are four SATA data headers on the Axial AC101 Edge Server motherboard. The data ports support SATA III 6Gbps storage devices.

SATA connector labeling:
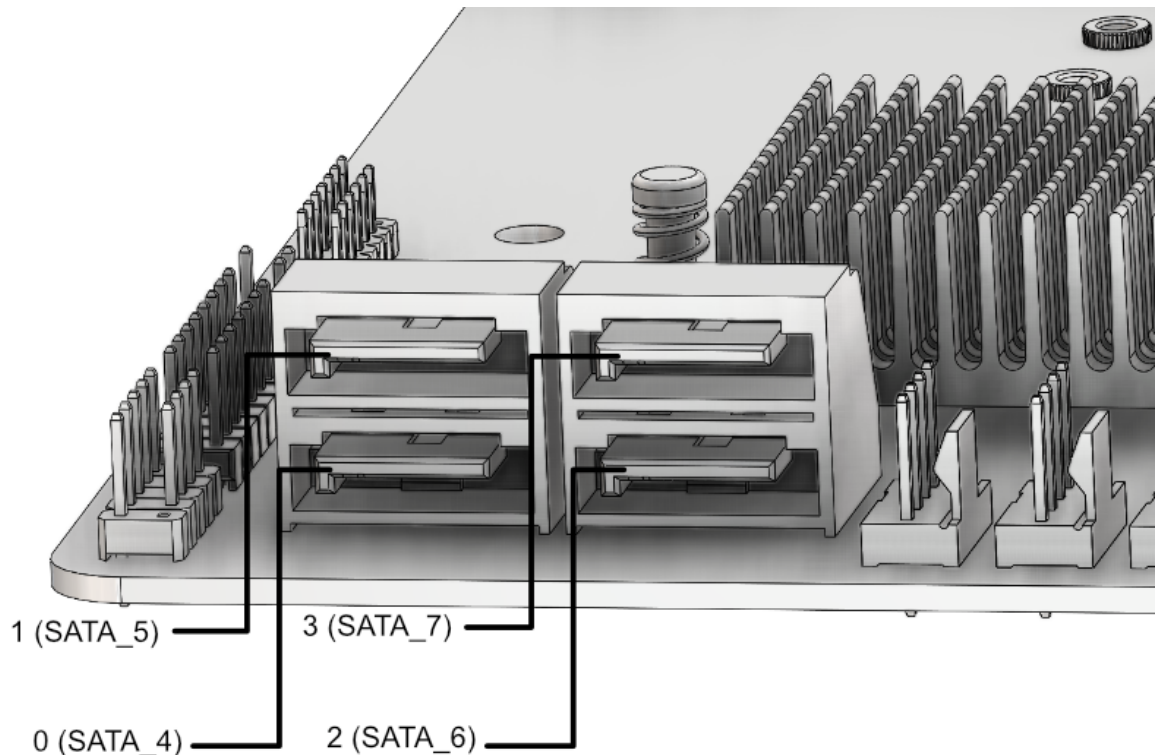
In BIOS, the SATA ports are enumerated starting with SATA_4 (e.g. sSATA0 = SATA_4, sSATA1 = SATA_5, sSATA2 = SATA_6, sSATA3 - SATA_7).

When in an operating system, drive enumeration will start with the lowest connected SATA port number.

Note: sSATA (or SSATA) is an acronym for secondary-Serial Advanced Technology Attachment and is referencing the connectivity method to the system chipset.

3.3.2 - OCuLink Headers

There are four OCuLink headers on the Axial AC101 Edge Server motherboard that support PCIe 4.0 x4 connections to enable NVMe drives.

OCuLink connector labeling:
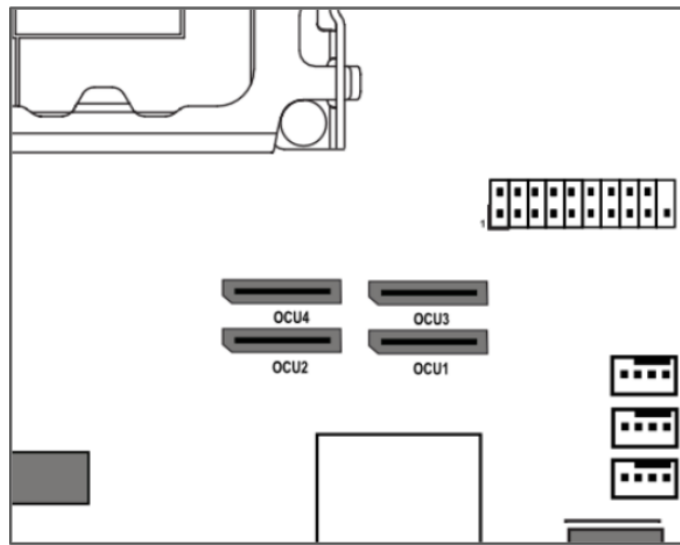
When in an operating system, based on the PCIe topology, drive enumeration will be inverted from the OCuLink silkscreen labeling as per the following table:

OCuLink Header	Drive Enumeration within Operating System
OCU4	Drive 0
OCU3	Drive 1
OCU2	Drive 2
OCU1	Drive 3

3.3.3 SSD Physical Location

The SSD Drive Bays for this system are labeled as follows:
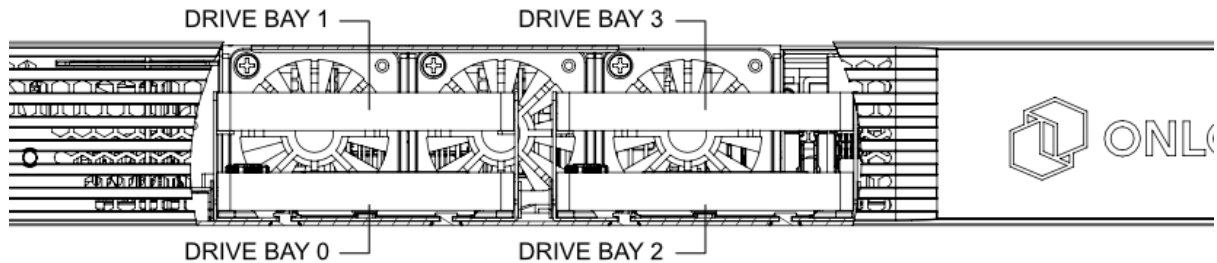
3.3.4 - Drive Population

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

Number of Drives Installed		Drive Physical Location			
		Drive Bay 0	Drive Bay 1	Drive Bay 2	Drive Bay 3
SATA	NVME	Cabled to Connector			
4	0	SATA_4 (SSATA_0_1 Bottom)	SATA_5 (SSATA_0_1 Top)	SATA_6 (SSATA_2_3 Bottom)	SATA_7 (SSATA_2_3 Top)
3	1	SATA_4 (SSATA_0_1 Bottom)	SATA_5 (SSATA_0_1 Top)	SATA_6 (SSATA_2_3 Bottom)	OCU4
2	2	SATA_4 (SSATA_0_1 Bottom)	SATA_5 (SSATA_0_1 Top)	OCU4	OCU3
1	3	SATA_4 (SSATA_0_1 Bottom)	OCU4	OCU3	OCU2
0	4	OCU4	OCU3	OCU2	OCU1

3.5 - PCIe Gen 4.0 x16 Slot

The Axial AC101 features one PCIe Gen 4.0 x16 connector on the motherboard which is accessible by the use of a right angle riser card.

The PCIe riser card edge power draw of the slot is rated to support up to 75W as defined per PCI-SIG.

PCIe adapters up to 150W are supported when using the optional PCIe 6-Pin/8-Pin auxiliary power header.

3.6 - DDR5 UDIMM Slots

The Axial AC101 supports up to four DDR5 UDIMM slots rated up to 4400MHz.

- 4400MT/s @ 2DPC-1DIMM
- 4000MT/s @ 2DPC-2DIMM 1R
- 3600MT/s @ 2DPC-2DIMM 2R

The system will support both ECC and non-ECC memory with all supported CPU options.

3.6.1 - Supported Memory Modes

The IMC (Integrated Memory Controller) of the processors supports two memory modes, single-channel and dual-channel. The ability to support the memory modes is dependent upon the DIMM population.

3.6.1.1 - Single-Channel Mode

In this mode, all memory transactions occur within a single channel. Single-Channel mode is used when DIMMs are installed in either Channel A or Channel B, but not in both.

3.6.1.2 - Dual-Channel Mode – Intel Flex Memory Technology Mode

In this mode, memory is divided into a symmetric and asymmetric zone. As per Intel documentation:

"The symmetric zone starts at the lowest address in each channel and is contiguous until the asymmetric zone begins or until the top address of the channel with the smaller capacity is reached. In this mode, the system runs with one zone of dual-channel mode and one zone of single-channel mode, simultaneously, across the whole memory array."

TOM

Non interleaved access

Dual channel interleaved access

C

B

B

B

B

B

MC A   MC B
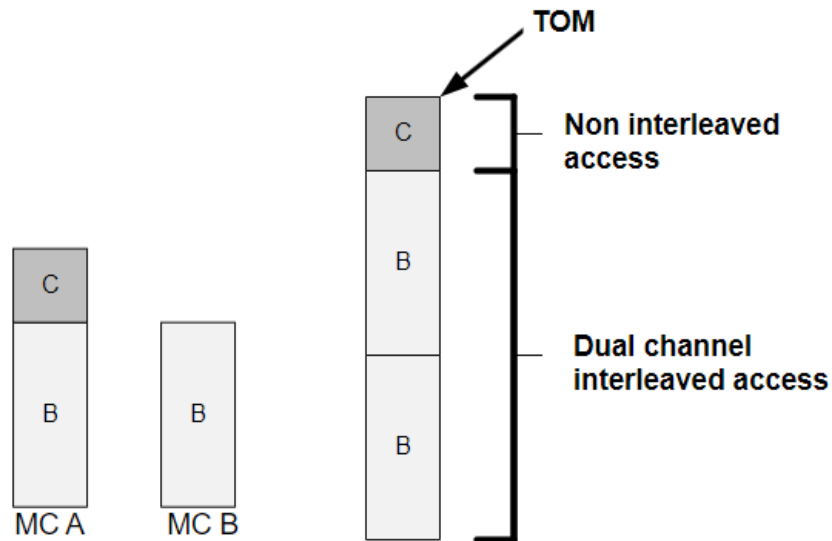
MC A and MC B can be configured to be physical channels 0 or 1
B – The largest physical memory amount of the smaller size memory module
C – The remaining physical memory amount of the larger size memory module

Source:
https://edc.intel.com/content/www/us/en/design/ipla/software-development-platforms/client/platforms/alder-lake-desktop/12th-generation-intel-core-processors-datasheet-volume-1-of-2/system-memory-controller-organization-mode-ddr4-5-only/

3.6.1.3 - Dual-Channel Symmetric Mode (Interleaved Mode)

Dual-Channel Symmetric mode is fully interleaved and provides the maximum performance.

The Axial AC101 will default to Dual-Channel Symmetric mode when both Channel A and Channel B DIMM connectors are populated in any order, with the total amount of memory in each channel being the same.

When both channels are populated with the same memory capacity and the boundary between the dual channel zone and the single channel zone is the top of memory, IMC operates completely in Dual-Channel Symmetric mode.

3.6.2 - DIMM Population Requirements

The following rules apply to when populating DIMMs in the Axial AC101 Edge 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 DIMM(s) installed in the system.
3. Dual Channel Memory Mode is only supported with 2 or 4 DIMMs installed (split equally between Channel A and Channel B as indicated in the DIMM Population table.

When populating DIMMs within the system, the following population is recommended in order to maximize overall system performance:

# DIMMs	DDR5 A1	DDR5 A2	DDR5 B1	DDR5 B2	Memory Mode
1		Populated			Single Channel
2		Populated		Populated	Dual Channel (Symmetric mode)
3	Populated	Populated		Populated	Dual Channel Mode (Flex Memory Technology Mode)
4	Populated	Populated	Populated	Populated	Dual Channel (Symmetric mode)
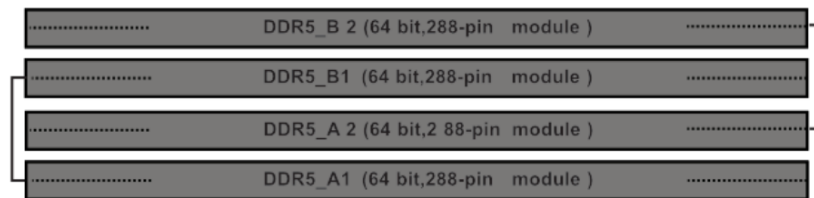
AC101-A01-P
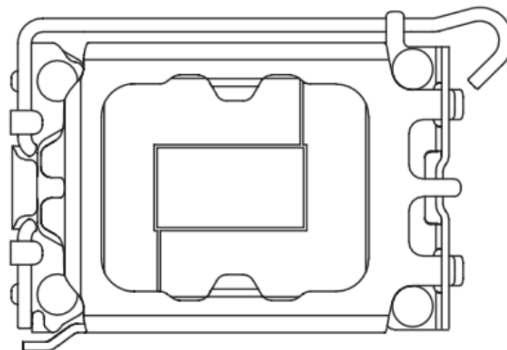
4 - Thermals and Cooling

The Axial AC101 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 thermals and cooling capabilities and behavior of the system.

4.1 - System Fans and Airflow Direction

The Axial AC101 Edge Server has five 40x40x56mm counter rotating 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.

Airflow Direction
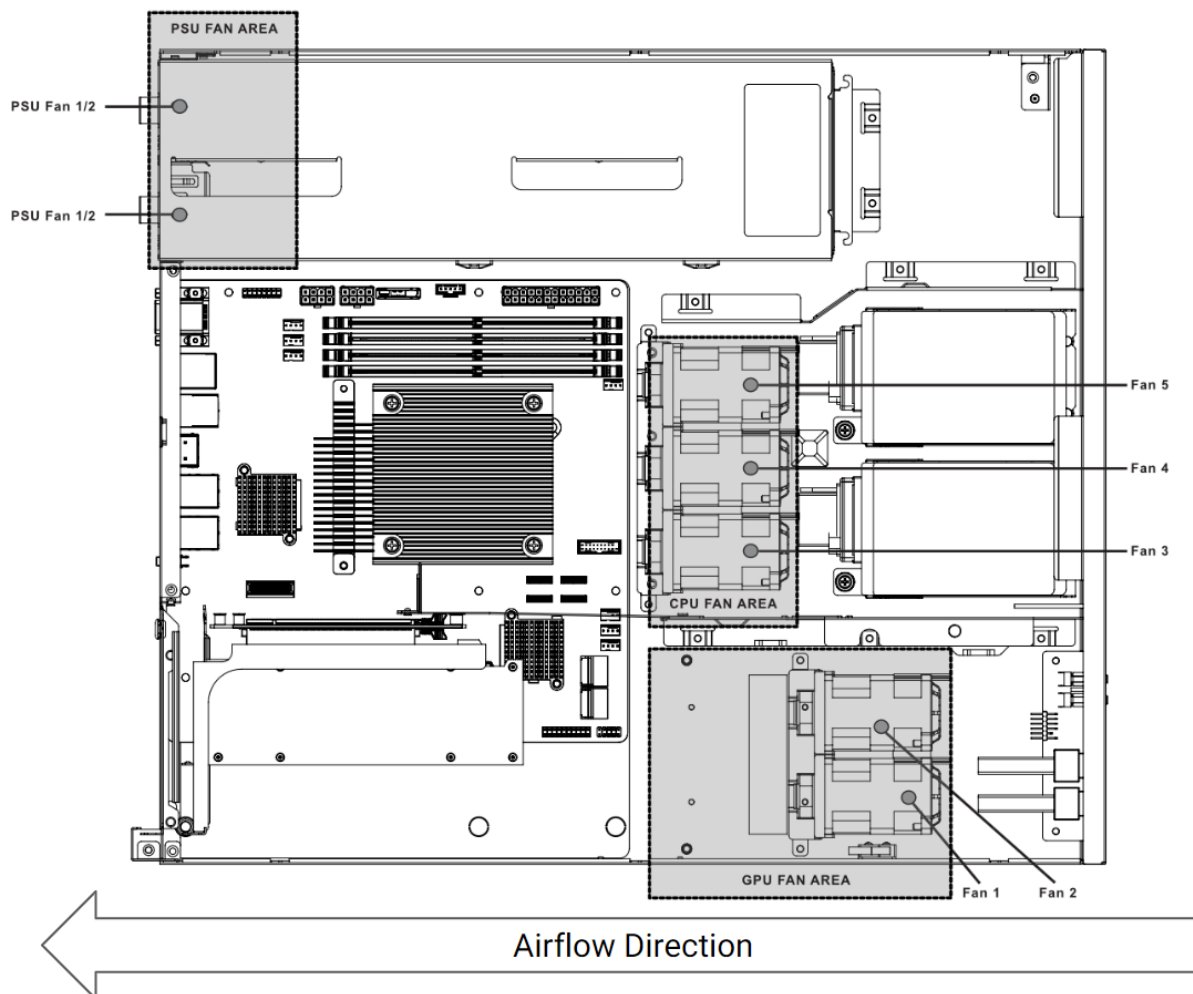
4.2 - Temperature Sensors

Temperature sensor data is available for a number of onboard temperature sensors.
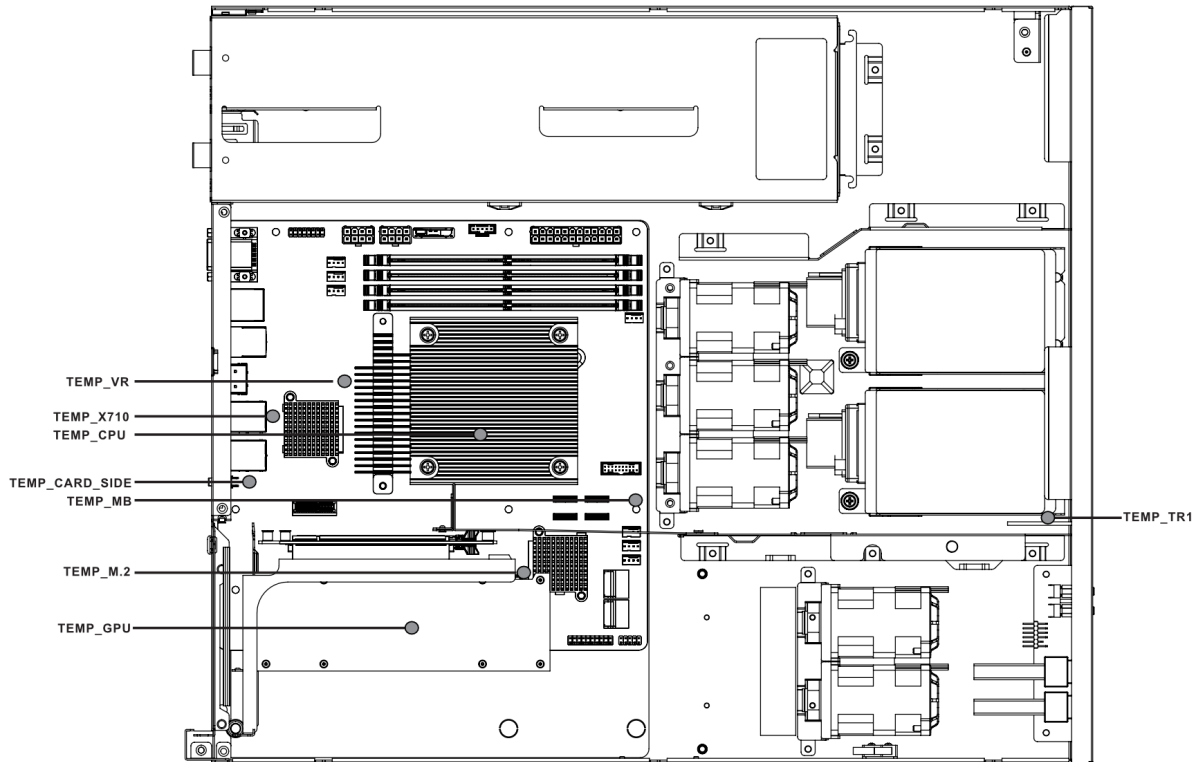
Sensor Name	Upper Non Critical Temperature °C	Upper Critical Temperature °C
TEMP_MB	54	55
TEMP_CPU	TjMax - 1	TjMax
TEMP_VR	99	100
TEMP_CARD_SIDE	69	70
TEMP_X710	99	100
TEMP_TR1	65	
TEMP_M.2	70	
TEMP_GPU	92	93

4.3 - Default Fan Settings

The system is configured to operate in accordance with a closed loop thermal algorithm which accommodates 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: TEMP_CPU

Assigned Fans: FAN3, FAN4, FAN5

Closed Loop Table 1	Value
Ramp Up Temp (°C)	80
Ramp Up Interval (sec)	3
Ramp Up Duty (%)	1
Ramp Down Temp (°C)	75
Ramp Down Interval (sec)	3
Ramp Down Duty (%)	3
Ramp Threshold (°C)	0
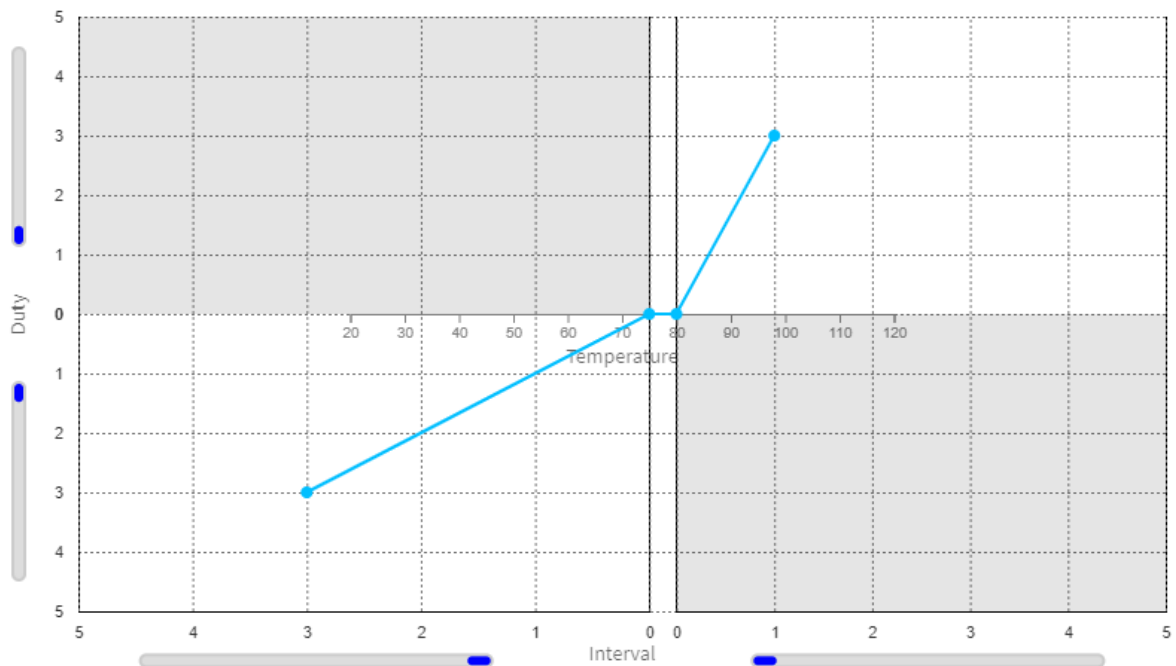
As per the default configuration settings, the system fans will increase duty cycle at 3% increments every 1 seconds when the CPU temperature is at or above 80°C. When the temperature drops below 75°C, the system fan duty cycle will reduce 3% every 3 seconds.

4.3.1.2 - Fan Zone 2 - PCIe / GPU Area

Assigned Temperature Sensor: TEMP_GPU

Assigned Fans: FAN1, FAN2

Closed Loop Table 2	Value
Ramp Up Temp (°C)	86
Ramp Up Interval (sec)	2
Ramp Up Duty (%)	3
Ramp Down Temp (°C)	76
Ramp Down Interval (sec)	1
Ramp Down Duty (%)	3
Ramp Threshold (°C)	0
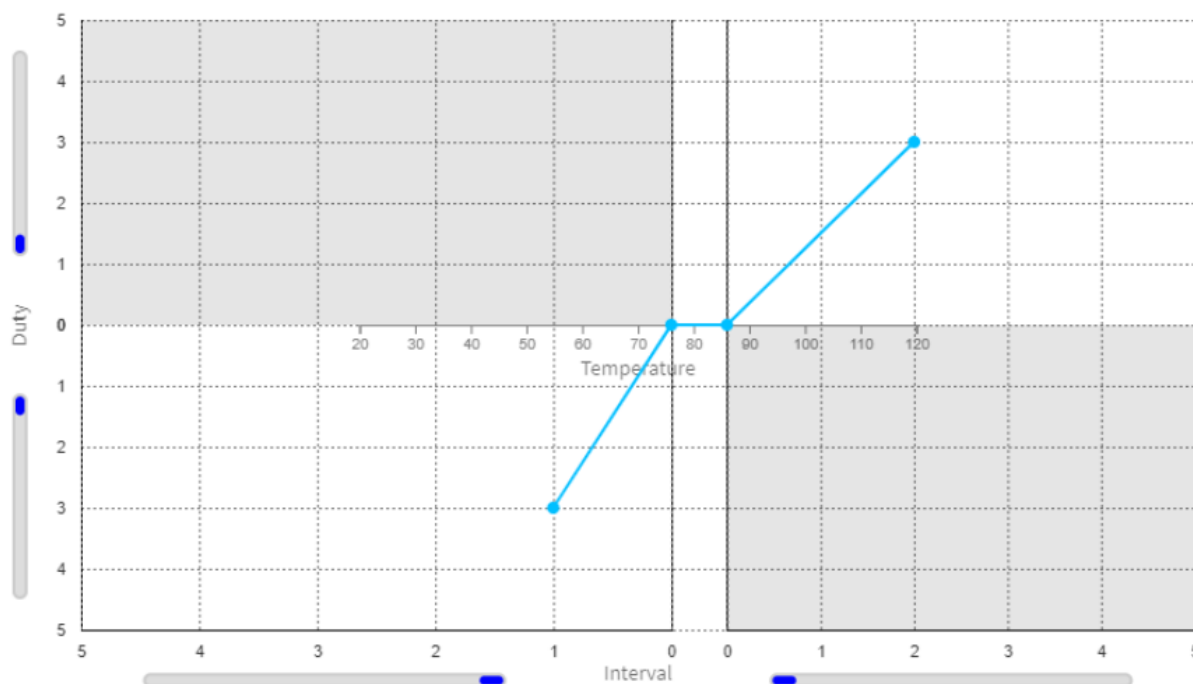
As per the default configuration settings, the system fans will increase duty cycle at 3% increments every 2 seconds when the GPU temperature is at or above 86°C. When the temperature drops below 76°C, the system fan duty cycle will reduce 3% every 1 second.

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

4.3.2 - Additional Fan Defaults

The default system idled duty cycle is 5%.

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

4.4 - Thermal Performance and Validation

As previously noted, 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

- Temperature Range: 5°C to 40°C (+5)
- System Configuration:
  - i9-13900TE Processor (125W PL2)
    - Performance-core Max Turbo Frequency: 5.00 GHz
    - Efficient-core Max Turbo Frequency: 3.90 GHz
    - Performance-core Base Frequency: 1.00 GHz
    - Efficient-core Base Frequency: 800 MHz
  - 2 TB PCIe Gen4 x4 m.2 Storage
  - 4 PCIe 4.0 2.5" Storage Drives
  - 128GB DDR5 Memory
  - Nvidia T1000 GPU
    - Max Boost Frequency: 2100 MHz
    - Base Frequency: 1065 MHz
- Workload Applications/Test:
  - Memory 80% workload with PassMark BurnInTest
  - Storage 80% workload with PassMark BurnInTest
  - 3D Graphics 80% workload with PassMark BurnInTest
  - Processor loaded 100% with Intel XTU
  - Discrete GPU loaded with Nvidia Nbody

4.4.2 - Test Results

The Axial AC101 system sustained a full processor workload and 80% workloads on memory, storage and 3D graphics, along with executing an Nbody simulation through its full rated temperature range without throttling and while maintaining greater than base clocks on all processor cores and GPU cores. 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 5ºC above and below its rated temperature range to help classify performance outside of the rated temperature range.
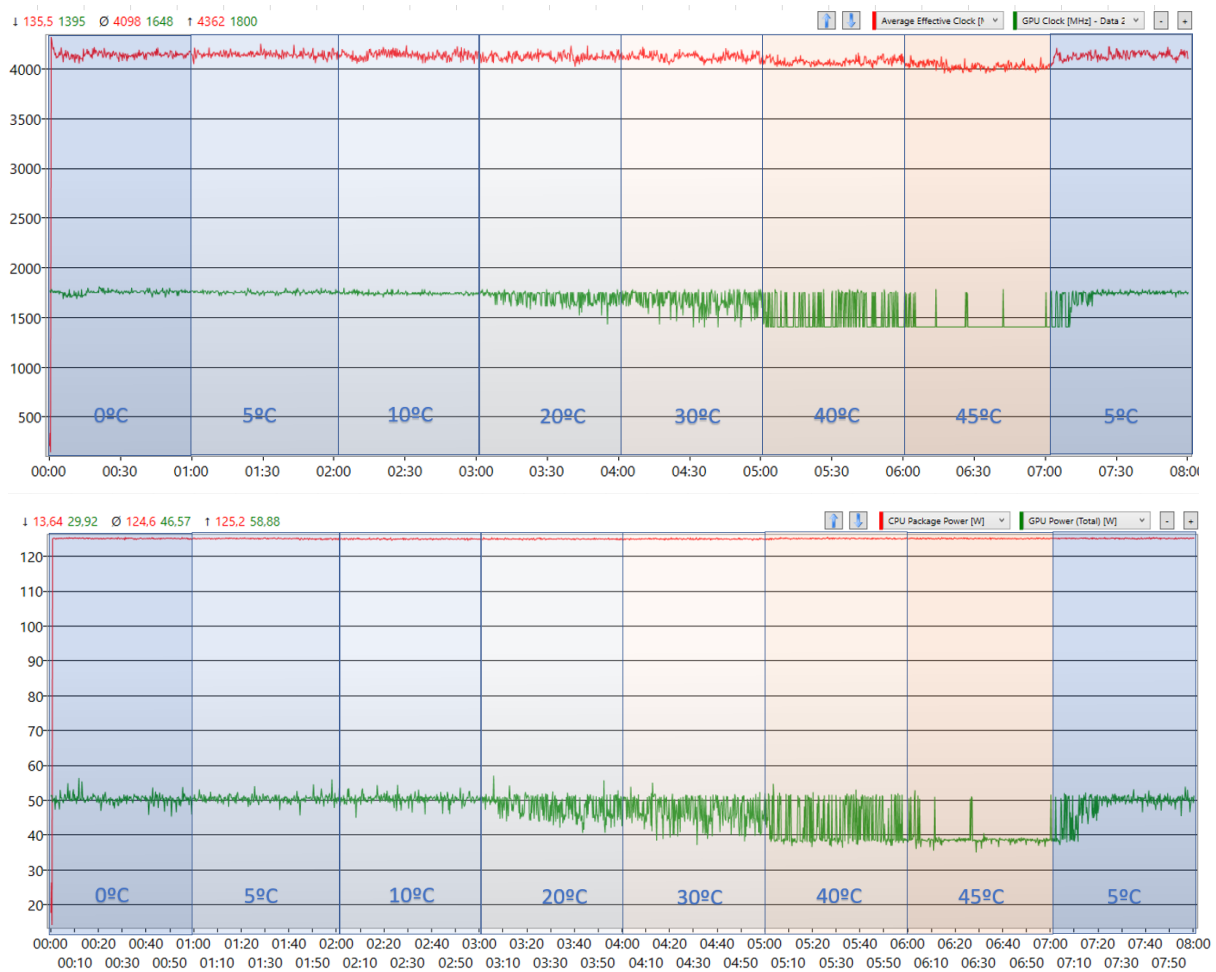
5 - Power

The sections below focus on the power features and capabilities of the Axial AC101 Edge Server.

5.1 - Supported Power Supplies

The system supports two redundant power supplies, which may either be 450W or 750W. These power supplies are hot-swappable, meaning they can be replaced while the system is running without interrupting its operation.
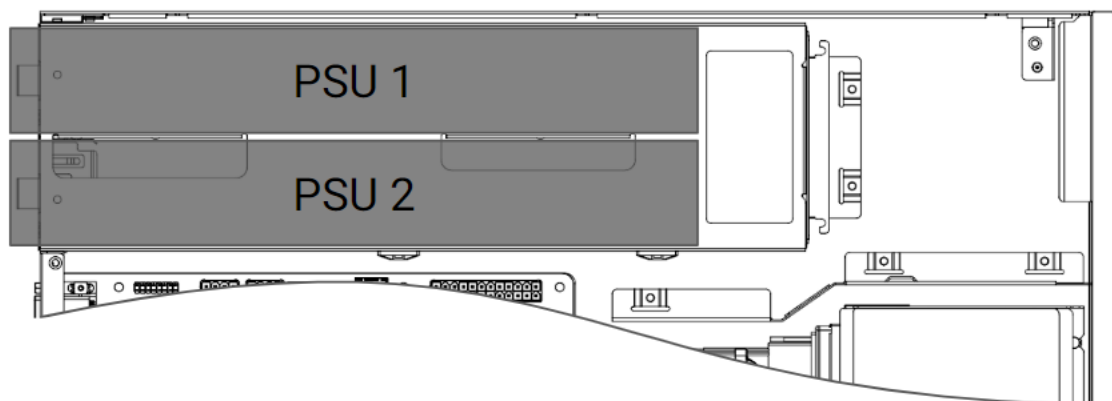
It is important to note that the two power supplies must be of the same wattage. Mixing power supplies of different wattages is not allowed. Please ensure that both power supplies are of the same wattage before installing them into the system.

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 Note: When utilizing 150W PCIe adapters (such as GPUs), a 750W power supply is recommended due to momentary power spikes (exceeding 150W) that may occur. When these power spikes occur, the power consumption of the PCIe adapter combined with power draw of other system components may exceed the available power of a 450W supply.

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) or an audible alarm may occur. 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 - Wake-Up Events

Axial AC101 supports multiple power states.

Wake-Up Event	From ACPI State	Comments
Power Button	Deep S5 , S5, S4	
PCIE/LAN	S5*, S4, S3	Must be enabled in BIOS
USB Keyboard/Mouse/Remote	S3	Must be enabled in BIOS
RTC Alarm	S5	Must be enabled in BIOS

* Onboard Intel X710 Network controller only supports wake from S5

Note: The Power LED is off when the system is in S4 sleep state or powered off (S5).

6 - Operating Systems

The Axial AC101 Edge Server supports the following operating systems:

- Microsoft Windows 10 IoT Enterprise 2021 LTSC Value (Celeron/i3/i5) - 64 Bit
- Microsoft Windows 10 IoT Enterprise 2021 LTSC High End (i7/i9/Xeon) - 64 Bit
- Microsoft Windows 11 Professional 64-bit
- Red Hat Enterprise Linux 8.8 - 8.x
- Red Hat Enterprise Linux 9.2 - 9.x
- Ubuntu Desktop 22.04 Intel IoT for 13th Gen Intel Core processors
- Ubuntu Server 22.04 Intel IoT for 13th Gen Intel Core processors

6.1 - Windows 10 IoT Enterprise 2021 LTSC Licensing

Windows 10 IoT LTSC (Long-Term Servicing Channel) is a version of the Windows 10 operating system designed for use in embedded and IoT (Internet of Things) devices.

For information pertaining to the benefits of Windows 10 IoT, please refer to the following: Windows 10 IoT and its Benefits for Businesses.

The 2021 version of Windows 10 IoT LTSC comes in two licensing editions that are supported and may be preloaded on to the Axial AC101 Edge Server:

- Microsoft Windows 10 IoT Enterprise 2021 LTSC Value
  - This version of Windows 10 IOT is suitable for systems with Intel Core-i3 and Core-i5 processors.
- Microsoft Windows 10 IoT Enterprise 2021 LTSC High End
  - This version of Windows 10 IOT is suitable for systems with Intel Core-i7 and Core-i9

Both versions support Azure IoT Edge for Linux on Windows (EFLOW), allowing for containerized Linux workloads alongside Windows applications in Windows deployments. For additional information, see What is Azure IoT Edge for Linux on Windows from Microsoft.

7 - RAID Configuration

The following contents will provide information on the RAID capabilities of the Axial AC101 Edge Server and guide users on how to configure RAID.

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 AC101 Edge Server supports onboard RAID via Intel Rapid Storage Technology as supported by the Intel W680 chipset.

Intel RST (Intel Rapid Storage Technology) is a software solution developed by Intel Corporation that provides advanced storage management capabilities for Intel chipset-based motherboards.

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

7.1 - Supported SATA RAID Types

The following sections will discuss the various SATA RAID types that are supported on the Axial AC101 Edge Server and their respective advantages/disadvantages.

7.1.3 - 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, but 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.

7.1.4 - 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, the write performance is generally 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, but 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.

7.1.5 - 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, but 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.

7.1.6 - 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.
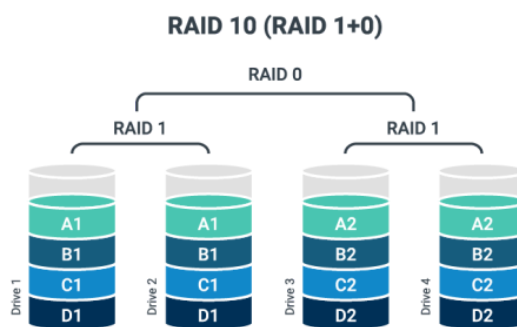
Data is striped across the mirrored pairs, so the capacity of the RAID 10 array is equal to half of the total capacity of the disks. For example, in a four-disk RAID 10 array with 1TB disks, the total capacity of the array would be 2TB.

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, but 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 Rapid Storage Technology, Intel Volume Management Device (VMD) must be appropriately configured/enabled.

1. From UEFI System Setup, navigate to Advanced → VMD Configuration → and set **Enable VMD Controller** to **Enabled**.
2. Next, configure the VMD Enabled devices to be enabled:
    a. For SATA RAID: Above the "Root Port BDF Details value" of **SATA Controller**, set the "Map this Root Port under VMD" to **Enabled**

```
                                   Aptio Setup - AMI
         Advanced

  VMD Configuration                                            Map/UnMap this Root Port to VMD

  Enable VMD controller               [Enabled]

  Enable VMD Global Mapping           [Disabled]
  Map this Root Port under VMD        [Disabled]
  Root Port BDF details               0/29/0

  Map this Root Port under VMD        [Enabled]
  Root Port BDF details               SATA Controller




                                                             →←: Select Screen
                                                             ↑↓: Select Item
                                                             Enter: Select
                                                             +/-: Change Option
                                                             F1: General Help
                                                             F7: Discard Changes
                                                             F9: Load UEFI Defaults
                                                             F10: Save and Exit
                                                             ESC: Exit




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```

b. For NVMe RAID: Above the "Root Port BDF Details value" of **XX/YY/ZZ**, set the "Map this Root Port under VMD" to **Enabled** (each root port corresponds to an NVMe drive)
   i. Alternatively, "Enable VMD Global Mapping" can be set to **Enabled** for all attached storage devices.

```
                              Aptio Setup — AMI
        Advanced

  VMD Configuration                                          Enable/Disable to VMD controller

  Enable VMD controller              [Enabled]

  Enable VMD Global Mapping          [Enabled]
  Map this Root Port under VMD       [Enabled]
  Root Port BDF details              0/6/0

  Map this Root Port under VMD       [Enabled]
  Root Port BDF details              0/29/0

  Map this Root Port under VMD       [Enabled]
  Root Port BDF details              0/29/4

  Map this Root Port under VMD       [Enabled]
  Root Port BDF details              0/27/4

  Map this Root Port under VMD       [Enabled]                ↔: Select Screen
  Root Port BDF details              0/26/0                   ↑↓: Select Item
                                                              Enter: Select
  Map this Root Port under VMD       [Enabled]                +/−: Change Option
  Root Port BDF details              SATA Controller          F1: General Help
                                                              F7: Discard Changes
                                                              F9: Load UEFI Defaults
                                                              F10: Save and Exit
                                                              ESC: Exit




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```

3. 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) Rapid Storage Technology

   The available Physical Disks should be listed under Non-RAID Physical Disks:

```
                              Aptio Setup - AMI
        Advanced

   Intel(R) RST 19.5.0.5676 RST VMD Driver                This page allows you to create a RAID
                                                          volume
 ▶ Create RAID Volume



   Non-RAID Physical Disks:
 ▶ SATA 0.4, Micron_5300_MTFDDAK480TDT 2144328D81BE, 447.1GB
 ▶ SATA 0.5, Micron_5300_MTFDDAK480TDS 220835630B8C, 447.1GB
 ▶ SATA 0.6, Micron_5300_MTFDDAK480TDS 220835630B58, 447.1GB
 ▶ SATA 0.7, Micron_5300_MTFDDAK480TDS 220233E7E70B, 447.1GB
```

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

```
                              Aptio Setup - AMI
        Advanced

   Create RAID Volume                                     Enter a unique volume name that has no
                                                          special characters and is 16 characters
   Name:                         Volume1                  or less.
   RAID Level:                   [RAID0 (Stripe)]

   Select Disks:
   SATA 0.4, Micron_5300_MTFDDAK480TDT     [ ]
   2144328D81BE, 447.1GB
   SATA 0.5, Micron_5300_MTFDDAK480TDS     [ ]
   220835630B8C, 447.1GB
   SATA 0.6, Micron_5300_MTFDDAK480TDS     [ ]
   220835630B58, 447.1GB
   SATA 0.7, Micron_5300_MTFDDAK480TDS     [ ]
   220233E7E70B, 447.1GB

   Strip Size:                   [16KB]
   Capacity (MB):                0

 ▶ Create Volume                                          ↔: Select Screen
                                                          ↑↓: Select Item
   Select at least two disks                              Enter: Select
                                                          +/-: Change Option
                                                          F1: General Help
                                                          F7: Discard Changes
                                                          F9: Load UEFI Defaults
                                                          F10: Save and Exit
                                                          ESC: Exit




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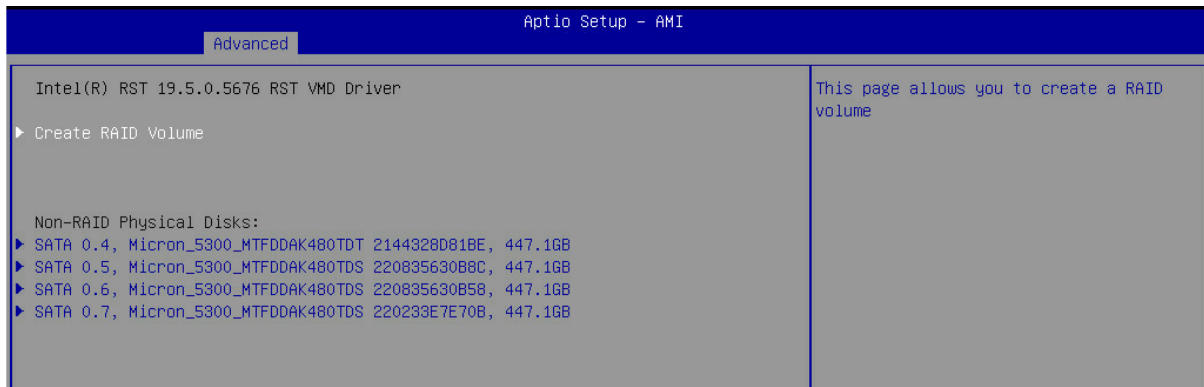
3. Assign a **Name** and Select the **RAID Level** you want to create (e.g. RAID 0, RAID 1, RAID 5, etc.) and specify the settings for the RAID volume (e.g. strip size, capacity, etc.).
4. Choose the hard drives you want to include in the RAID array and add them to the volume by assigning them with an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

```
                                      Aptio Setup - AMI
            Advanced

  Create RAID Volume                                              Capacity in MB

  Name:                           Volume1
  RAID Level:                     [RAID5 (Parity)]

  Select Disks:
  SATA 0.4, Micron_5300_MTFDDAK480TDT    [X]
  2144328D81BE, 447.1GB
  SATA 0.5, Micron_5300_MTFDDAK480TDS    [X]
  220835630B8C, 447.1GB
  SATA 0.6, Micron_5300_MTFDDAK480TDS    [X]
  220835630B58, 447.1GB
  SATA 0.7, Micron_5300_MTFDDAK480TDS    [X]
  220233E7E70B, 447.1GB

  Strip Size:                     [32KB]
  Capacity (MB):                  1373581

▶ Create Volume                                          ←→: Select Screen
                                                         ↑↓: Select Item
                                                         Enter: Select
                                                         +/-: Change Option
                                                         F1: General Help
                                                         F7: Discard Changes
                                                         F9: Load UEFI Defaults
                                                         F10: Save and Exit
                                                         ESC: Exit

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```

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.

7.2.4 - Deleting a RAID Volume via RAID Option ROM

Remember that configuring RAID will erase all data on the hard drives, so be sure to back up any important data before proceeding. The manual provides more detailed instructions and screenshots to help users navigate through the BIOS setup utility and the RAID configuration utility.

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

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. The manual provides more detailed instructions and screenshots to help users navigate through the RAID configuration utility.

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 Rapid Storage Technology driver during operating system setup:

1. Download the latest Intel Rapid Storage Technology Driver package 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.
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 Rapid Storage Technology) 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.

7.3.2 - Configuring RAID from within Windows

7.3.2.1 - Installing Intel Rapid Storage Technology Drivers

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

1. Download the latest Intel Rapid Storage Technology Driver software.
2. Save the file to a known location on your computer's hard drive.
3. Locate the file on your hard drive 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 Rapid Storage Technology icon will appear in the Windows system tray, allowing for the Intel Rapid Storage Technology application to be quickly accessed.

7.3.2.2 - Creating a RAID Volume via Intel Rapid Storage Technology

The following process outlines the procedure for creating a new RAID volume within the Intel Rapid Storage Technology application from the operating system.

1. Open the Intel Rapid Storage Technology application.
2. Click the "Create" icon to create a RAID array.
3. In "Select Volume Type", click "Real-time data protection (RAID 1)". Click "Next".
4. In "Configure Volume", key-in the Volume Name with 1-16 letters, select the RAID disks, specify the volume size and then click "Next".
5. 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 Rapid Storage Technology

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

1. Open the Intel Rapid Storage Technology 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

For additional information pertaining to the utilizing Intel Rapid Storage Technology with Linux operating systems, please refer to the following whitepaper:

Intel Rapid Storage Technology (Intel RST) in Linux* whitepaper
https://www.intel.com/content/dam/www/public/us/en/documents/white-papers/rst-linux-paper.pdf

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

Red Hat Enterprise Linux 8 - Managing RAID
https://access.redhat.com/documentation/en-us/red_hat_enterprise_linux/8/html/managing_storage_devices/managing-raid_managing-storage-devices

Red Hat Enterprise Linux 9 - Managing RAID
https://access.redhat.com/documentation/en-us/red_hat_enterprise_linux/9/html/managing_storage_devices/managing-raid_managing-storage-devices

Ubuntu Linux - Intel RST
https://help.ubuntu.com/rst/

8 - Mounting Hardware

The Axial AC101 Edge Server has been designed with flexibility in mind and can be mounted in different ways. As the system is designed to meet industry standard 19" Electronic Industries Alliance (EIA) racks, there are multiple rack mounting rail kits available. Additionally, the system may also be wall mounted using the OnLogic wall mount kit.

8.1 - Rack Mounting

The Axial AC101 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, the system supports 23" and 28" rail kits that can be used to securely mount the server in the rack. These rail kits are easy to install and include all the necessary hardware for attachment into the rack. Locking of the system into

8.1.1 - Rackmount 23" Ball Bearing Slide Rails

The 23" 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 sliding 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 23" 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):**597mm (23.5in) to 927mm (36.5in)
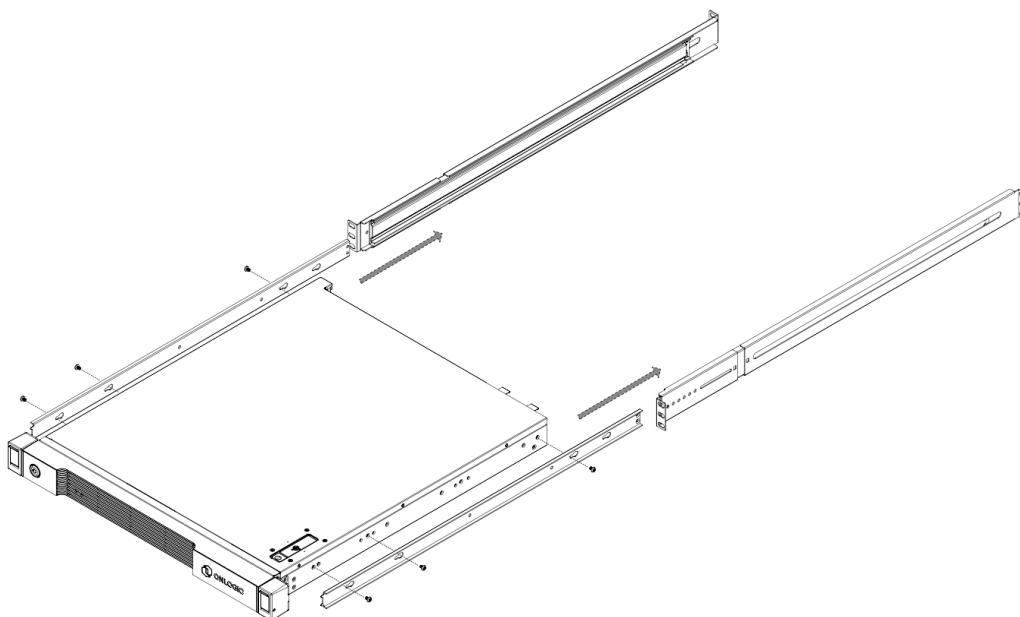
Install the six M4x0.7 L=4mm Low Profile Cheese Head screws provided with the rail kit

## 8.1.2 - Rackmount 23" Ball Bearing Cable Management Arm Slide Rail Kit

The 23" Ball Bearing Cable Management Arm Slide Rail Kit is an optional accessory that enhances the standard ball bearing slide rail options 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 23" 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):**597mm (23.5in) to 927mm (36.5in)
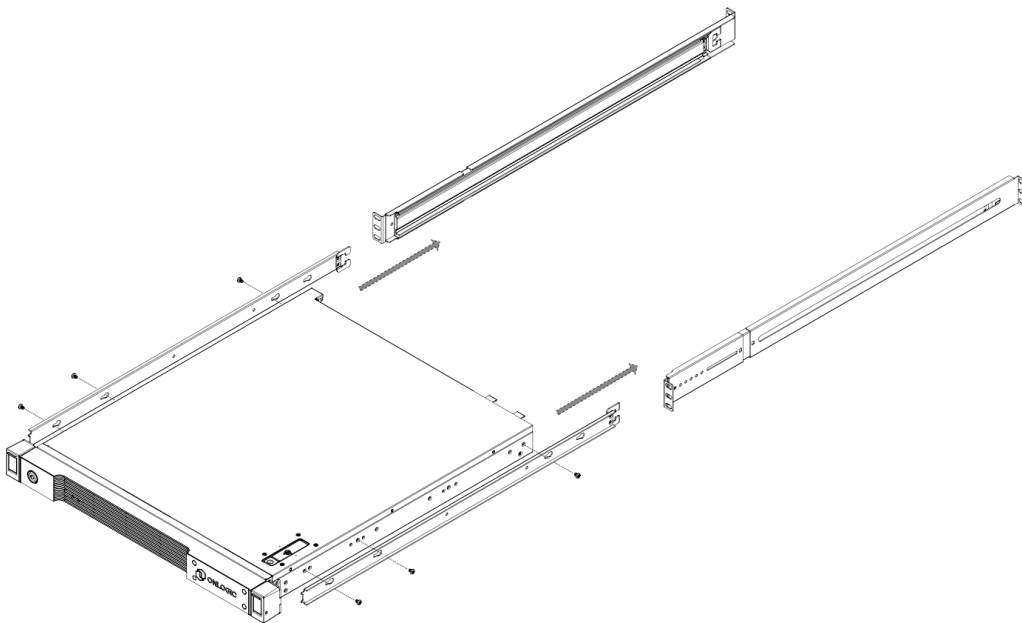
Install the six M4x0.7 L=4mm Low Profile Cheese Head screws provided with the rail kit
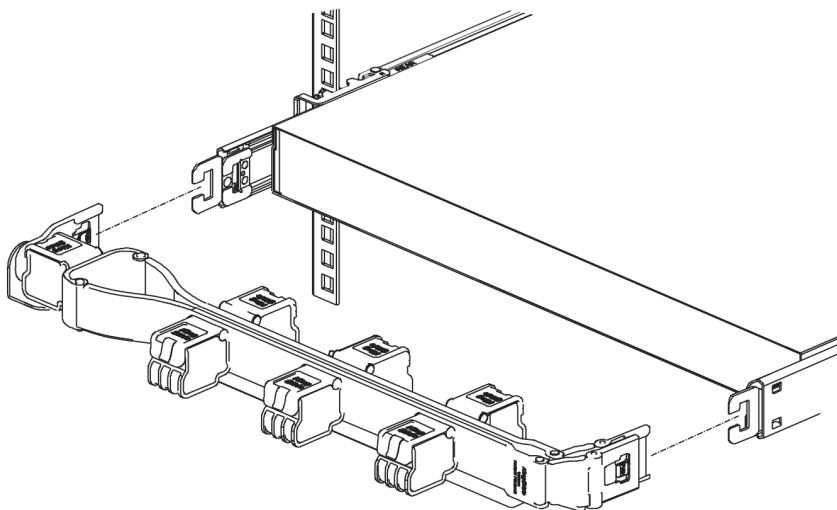
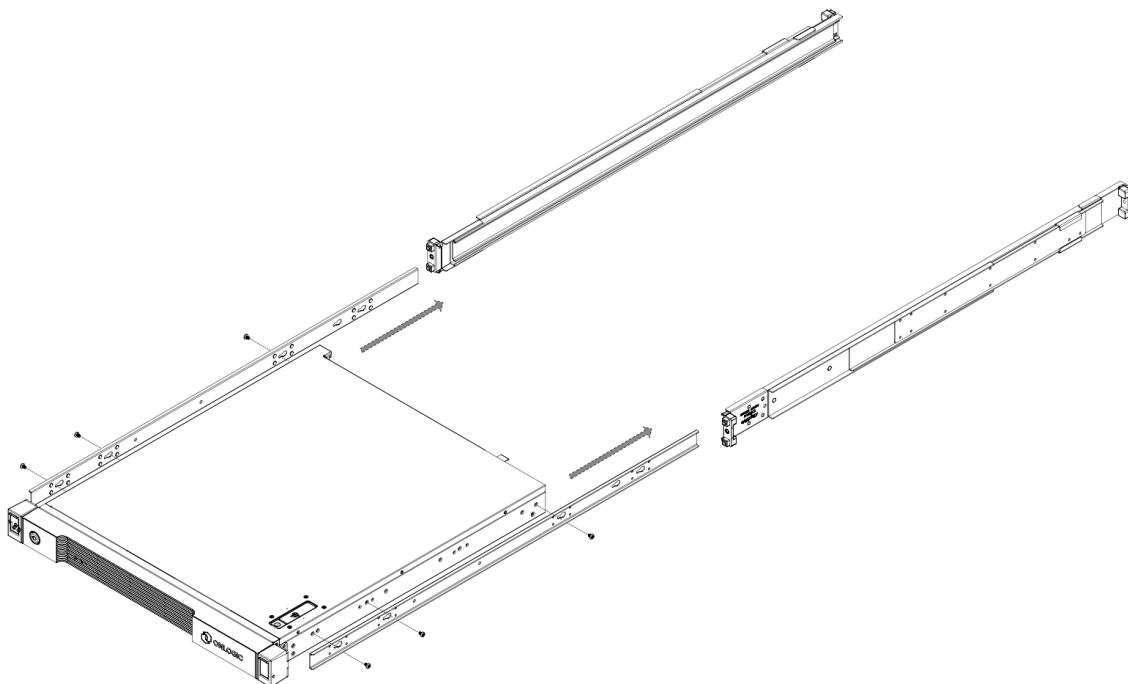## 8.1.3 - Rackmount 28" Simple Locking Ball Bearing Slide Rails

The 28" Simple Lock 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 sliding 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 simple locking mechanism allows for quick mounting into a rack without the use of any tools.

The 28" Simple Lock 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):** 609mm (24in) to 921mm (36.2 in)


Install the six M4x0.7 L=4mm Low Profile Cheese Head screws provided with the rail kit

Note: The Simple Locking Ball Bearing Slide Rails include an integral threaded feature for the two screws on the EIA mounting flange do not require the use of M5 cage nuts.

8.2 - Wall Mounting

8.2.1 - Wall mount kit

The Axial AC101 Edge Server wall mount kit 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 AC101 Edge Server system where a rack is not available or practical.
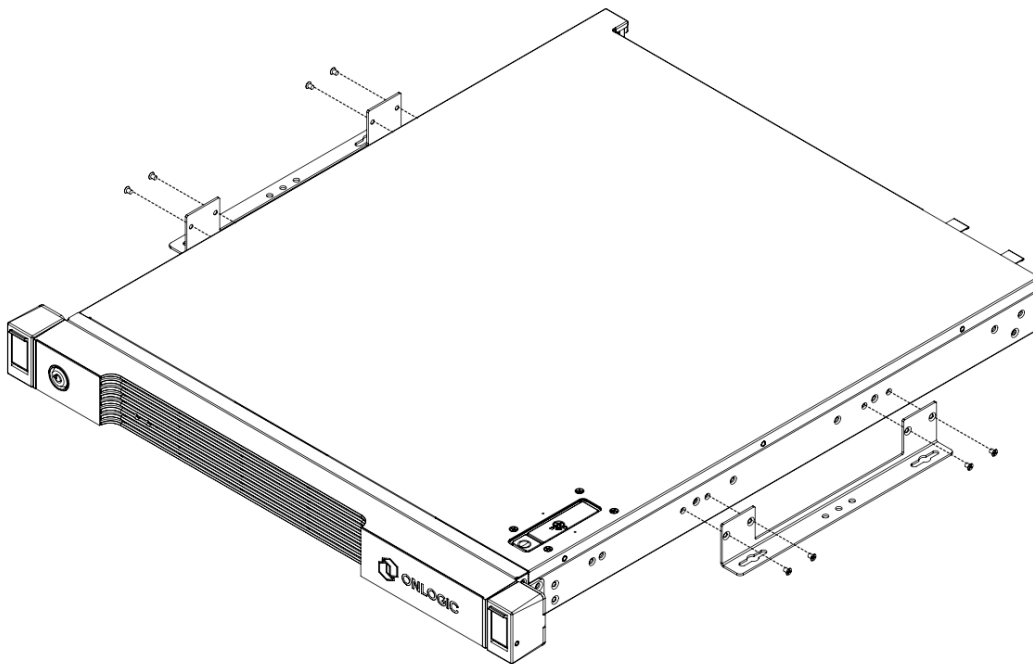
Install the eight M3x0.5 L=4mm Flathead screws provided with the wall mount kit
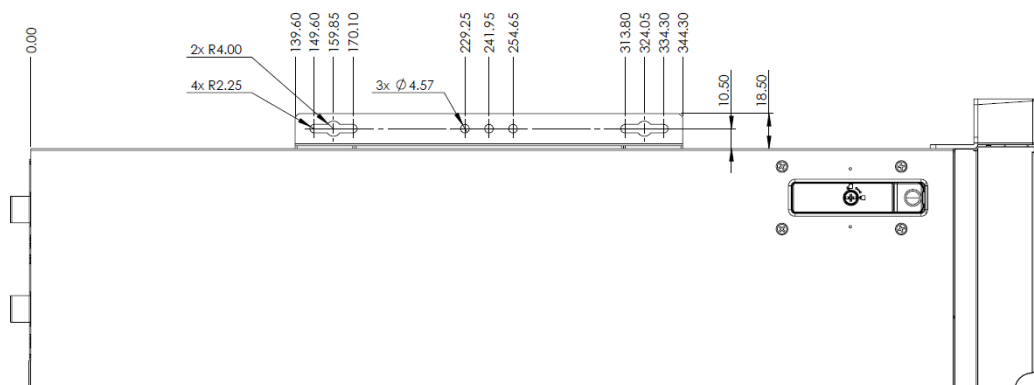
9 - Regulatory Compliance

9.1 - 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.

9.2 - 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.

9.3 - 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)

9.4 - 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 - Appendices

10.1 - 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/

10.2 - Appendix E: Compliance Information

Do not modify the device! The device complies with various national and international Safety, EMC and Environmental requirements per various standards.

Modification of the device may void certifications, warranty and/or cause possible injury to the user.

10.2.1 - Safe use and installation instructions

1. Care must be taken handling the device to prevent injury to self or possibility of damaging the unit.
2. Read the entire manual before using the product.
3. Install the device securely per users manual instructions.
4. 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 (Tma) specified by the manufacturer.
5. 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.
6. Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
7. 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.
8. 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).
9. **Caution, Risk of Electric Shock! All power sources shall be disconnected before servicing to avoid shock hazard!**
10. Ambient operating temperature must be between 0 °C to 40 °C with a non-condensing relative humidity of 8-85%.
11. The device can be stored at temperatures between -40 °C to 85 °C.
12. Keep the device away from liquids and flammable materials.
13. Do not clean the device with liquids. The chassis can be cleaned with a cloth.
14. Allow at least 2 inches of space around the front and back of the device for proper cooling.
15. This device is intended for indoor operation only.
16. Install the device only with shielded network cables.
17. The installer should be experienced in aftermarket installation and familiar with general practices for installing electronics.
18. 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 original.

19. Proper disposal of CMOS battery must comply with local governance.
20. This equipment is not suitable for use in locations where children are likely to be present.

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.

10.2.2 - Précautions de sécurité, sauvegardes et informations

Ne pas modifier l'appareil ! L'appareil est conforme à diverses exigences nationales et internationales en matière de sécurité, de CEM et d'environnement selon diverses normes.

La modification de l'appareil peut annuler les certifications, la garantie et/ou causer des blessures à l'utilisateur.

1. Des précautions doivent être prises lors de la manipulation de l'appareil pour éviter de se blesser ou d'endommager l'appareil.
2. Lisez l'intégralité du manuel avant d'utiliser le produit.
3. Installez l'appareil en toute sécurité selon les instructions du manuel de l'utilisateur.
4. Ambiance de fonctionnement élevée - En cas d'installation dans un assemblage de rack fermé ou à plusieurs unités, la température ambiante de fonctionnement de l'environnement de rack peut être supérieure à la température ambiante de la pièce. Par conséquent, il convient d'envisager d'installer l'équipement dans un environnement compatible avec la température ambiante maximale (Tma) spécifiée par le fabricant.
5. Flux d'air réduit - L'installation de l'équipement dans un rack doit être telle que la quantité de flux d'air requise pour un fonctionnement sûr de l'équipement ne soit pas compromise.
6. Chargement mécanique - Le montage de l'équipement dans le rack doit être tel qu'un condition n'est pas atteinte en raison d'une charge mécanique inégale.
7. Surcharge du circuit - Il faut 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 considération appropriée des caractéristiques nominales de l'équipement doit être utilisée pour répondre à cette préoccupation.
8. 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 connexions d'alimentation autres que les connexions directes au circuit de dérivation (par exemple, utilisation de multiprises).
9. **Attention, risque de choc électrique ! Toutes les sources d'alimentation doivent être déconnectées avant l'entretien pour éviter tout risque d'électrocution !**
10. La plage de températures de fonctionnement doit être de 0 °C à 40 °C avec une humidité relative de 8 à 85% sans condensation. La température de fonctionnement dépend du choix du composant, y compris de l'adaptateur d'alimentation. Voir le tableau 1 ci-dessous pour le déclassement.
11. La plage de températures de stockage doit être de -40 °C à 85 °C.
12. Gardez l'appareil à l'écart des liquides et des matières inflammables.
13. Ne nettoyez pas l'appareil avec des liquides. Le châssis peut être nettoyé avec un chiffon.
14. Laissez au moins 5 centimètres d'espace à l'avant et à l'arrière de l'appareil pour un refroidissement correct.
15. Cet appareil est conçu uniquement pour une utilisation en intérieur.
16. Installez l'appareil uniquement avec des câbles réseau blindés.
17. L'installateur doit avoir de l'expérience dans l'installation du marché secondaire et être familiarisé avec les pratiques générales d'installation de l'électronique.
18. L'entretien et la réparation de l'appareil doivent être effectués par du personnel qualifié. Cela inclut, sans toutefois s'y limiter, le remplacement de la batterie CMOS. La batterie CMOS de remplacement doit être du même type que l'originale.

19. La mise au rebut des batteries usagées doit être réalisée conformément aux réglementations environnementales.
20. Cet équipement n'est pas adapté à une utilisation dans des endroits où des enfants sont susceptibles d'être présents.

ATTENTION: Risque d'explosion si la batterie est remplacée par une batterie de type incorrect. Les batterie doivent être recyclées dans la mesure du possible.

End of Document