



Western Digital®

User Guide

Ultrastar® Edge

Regulatory Models:
A2U24-S and A2U24-C
D018-000097-000
Version 02
September 2023

Table of Contents

Revision History..... iv

Notices..... v

Points of Contact..... vi

Chapter 1. Overview..... 1

 Ultrastar Edge Transport Appliance Description..... 2

 Technical Features..... 3

 Electrical Specification..... 5

 Environmental Specification..... 5

 Mechanical Specification..... 6

 System Specification..... 6

 Ruggedized Transit Case MIL-STDs..... 6

 Ultrastar Edge Physical Design..... 8

 LEDs..... 9

 System Level Block Diagram..... 10

 Supported Operating Systems..... 11

 Restrictions and Limitations..... 11

 Supported SKUs..... 11

 List of CRUs..... 11

Chapter 2. Components..... 13

 System Fan Module..... 14

 System Fan Module Specifications..... 14

 Power Supply Unit (PSU)..... 15

 PSU Specifications..... 15

 Solid State Drive (SSD)..... 16

 SSD Specifications..... 16

 M.2 Solid State Drive (SSD)..... 17

M.2 Solid State Drive (SSD) Specifications.....	17
DIMM Description.....	18
DIMM Specifications.....	18
Host Bus Adapter (HBA).....	19
HBA Specifications.....	19
Network Interface Card (NIC).....	20
NIC Specifications.....	20
Graphics Processing Unit (GPU).....	21
GPU Specifications.....	21
Rail Kit.....	22
Rail Kit Specifications.....	22
Cable Adapter Kit.....	23
Cable Adapter Kit Specifications.....	23
Ruggedized Transit Case.....	24
Ruggedized Transit Case Specifications.....	24
Commercial Transit Case.....	25
Commercial Transit Case Specifications.....	25
Chapter 3. Management.....	26
Overview of Device Firmware and Vendor-Specific Utilities.....	27
Updating Firmware on the System, BIOS, BMC, ME, and SDR.....	31
Updating Firmware on the Intel® Ethernet Connection X722 adapter LAN on Motherboard.....	38
Updating Firmware on the Western Digital SN720 M.2 SSD.....	40
Updating Firmware on the Broadcom 9400-16i Controller.....	42
Updating Firmware on the Ultrastar SN640 NVMe SSD.....	44
Updating Firmware on the Mellanox MCX-516A-CCAT 100GbE Network Controller.....	48
Chapter 4. Configuration.....	53
Ruggedized Transit Case and Commercial Transit Case Configurations.....	54
Rail Kit Configuration.....	55

Chapter 5. Safety.....

57

Electrostatic Discharge.....

58

Optimizing Location.....

58

Power Connections.....

58

Power Cords.....

59

Rack-Mountable Systems.....

59

Replaceable Batteries.....

59

Safety and Service.....

60

Safety Warnings and Cautions.....

60

Chapter 6. Regulatory.....

62

Country Certifications.....

63

Electromagnetic Compatibility (EMC) Class A Compliance.....

63

Regulatory Statement of Compliance.....

64

System and Ruggedized Case Regulatory Labels.....

64

Europe (CE Declaration of Conformity).....

66

FCC Class A Notice.....

66

ICES-003 Class A Notice—Avis NMB-003, Classe A.....

67

Japanese Compliance Statement, Class A ITE.....

67

Scandinavian Safety Warnings.....

67

Revision History

Date	Revision	Comment
June 2021	01	Initial Release
September 2023	02	- Updated the Overview of Device Firmware and Vendor-Specific Utilities (page 27) section - Added Cable Adapter Kit (page 23) to the Components (page 13) section. - Updated the Country Certifications. See Country Certifications (page 63). - Updated the Environmental Specification MIL-STD-810G CH1. - Updated document to new branding. - Updated Updating Firmware on the System, BIOS, BMC, ME, and SDR (page 31)

Notices

Western Digital Technologies, Inc. or its affiliates' (collectively "Western Digital") general policy does not recommend the use of its products in life support applications wherein a failure or malfunction of the product may directly threaten life or injury. Per Western Digital Terms and Conditions of Sale, the user of Western Digital products in life support applications assumes all risk of such use and indemnifies Western Digital against all damages.

This document is for information use only and is subject to change without prior notice. Western Digital assumes no responsibility for any errors that may appear in this document, nor for incidental or consequential damages resulting from the furnishing, performance or use of this material.

Absent a written agreement signed by Western Digital or its authorized representative to the contrary, Western Digital explicitly disclaims any express and implied warranties and indemnities of any kind that may, or could, be associated with this document and related material, and any user of this document or related material agrees to such disclaimer as a precondition to receipt and usage hereof.

Each user of this document or any product referred to herein expressly waives all guaranties and warranties of any kind associated with this document any related materials or such product, whether expressed or implied, including without limitation, any implied warranty of merchantability or fitness for a particular purpose or non-infringement. Each user of this document or any product referred to herein also expressly agrees Western Digital shall not be liable for any incidental, punitive, indirect, special, or consequential damages, including without limitation physical injury or death, property damage, lost data, loss of profits or costs of procurement of substitute goods, technology, or services, arising out of or related to this document, any related materials or any product referred to herein, regardless of whether such damages are based on tort, warranty, contract, or any other legal theory, even if advised of the possibility of such damages.

This document and its contents, including diagrams, schematics, methodology, work product, and intellectual property rights described in, associated with, or implied by this document, are the sole and exclusive property of Western Digital. No intellectual property license, express or implied, is granted by Western Digital associated with the document recipient's receipt, access and/or use of this document or the products referred to herein; Western Digital retains all rights hereto.

Western Digital, the Western Digital design, the Western Digital logo, and Ultrastar are registered trademarks or trademarks of Western Digital Corporation or its affiliates in the US and/or other countries. Broadcom is among the trademarks of Broadcom. The NVMe word mark is a trademark of NVM Express, Inc. NVIDIA and Tesla are trademarks and/or registered trademarks of NVIDIA Corporation in the U.S. and/or other countries. Mellanox is a registered trademark of NVIDIA Corporation. Linux® is the registered trademark of Linus Torvalds in the U.S. and other countries. Intel and Xeon are trademarks of Intel Corporation or its subsidiaries. All other marks are the property of their respective owners. Product specifications subject to change without notice. Pictures shown may vary from actual products. Not all products are available in all regions of the world.

Western Digital
5601 Great Oaks Parkway
San Jose, CA 95119

© 2023 Western Digital Corporation or its affiliates. All Rights Reserved.

Points of Contact

For further assistance with a Western Digital product, contact Western Digital Datacenter Platforms technical support. Please be prepared to provide the following information, as applicable: part number (P/N), serial number (S/N), product name and/or model number, software version, and a brief description of the issue.

Email:

support@hgst.com

Website:

<https://portal.wdc.com/s/>

UK Import Representation Contact

Western Digital UK Limited

PO Box 471
Leatherhead KT22 2LU
UK

Telephone: +44 1372 366000

EU Import Representation Contact

Western Digital EU Limited

PO Box 13379
Swords, Co
Dublin, Ireland



Overview

This section provides an overview of the design and features of the Ultrastar® Edge portable storage server, the components within it, and the environment in which it operates.

In This Chapter:

- Ultrastar Edge Transport Appliance Description.....	2
- Electrical Specification.....	5
- Environmental Specification.....	5
- Mechanical Specification.....	6
- System Specification.....	6
- Ruggedized Transit Case MIL-STDs.....	6
- Ultrastar Edge Physical Design.....	8
- Supported Operating Systems.....	11
- Restrictions and Limitations.....	11
- Supported SKUs.....	11
- List of CRUs.....	11

1.1 Ultrastar Edge Transport Appliance Description

The Ultrastar® Edge is a high-performance edge server that enables organizations to deploy remote data capture and analytics at the cloud edge. It can operate in harsh environments such as extremes of temperature, humidity, dust, shock, and vibration. The faster processing close to where the data is generated reduces the latency associated with sending data from a remote location to the core for processing which enables faster decision making.

The Ultrastar Edge can be transported using either the Ruggedized Transit Case or Commercial Transit Case. The system may also be installed into a datacenter rack using optional rack mounted rails.



Data Ingest & Storage

The Ultrastar Edge provides a PCIe Gen3 connection to each of its drives. Utilizing eight Western Digital Ultrastar DC SN640 NVMe™ SSDs for a total raw data storage capacity of 61.44TB¹. Combining high-speed ingest using the 100GbE QSFP28 Ethernet connection with high-capacity storage, the Ultrastar Edge is designed for fast, efficient performance. The built-in GPU allows for on-board distributed computing and multi-precision performance for deep learning and machine learning.

Security

The Ultrastar Edge contains multiple security features designed to ensure the safety of user data, including an onboard TPM 2.0 module to keep data secure against intrusion during ingest. With no external USB or VGA connections, the Ultrastar Edge's limited external connectivity is designed to help prevent unauthorized access to the data stored on the enclosure. In addition, the single-piece aluminum case and bezel screws provide a tamper-evident barrier to the enclosure's internal components.

Portability

The Ultrastar Edge fits within a standard 19 in. rack on an L-bracket or shelf or on a table top. With a base enclosure weight of 15.2 kg / 33.6 lbs. and an integrated handle, the enclosure is designed to be maneuvered by a single individual during operation. The Ultrastar Edge also has the option to be installed into and operate within a Ruggedized Transit Case. In addition, the 3U Ruggedized Transit Case contains EMI filters to protect the system from electromagnetic interference. Another option for Ultrastar Edge transportation is the Commercial Transit Case.

- 61.44TB max data storage capacity
- Eight 64GB RDIMMs - 512GB DDR4 ECC DRAM
- One dual port Mellanox® MCX516A-CCAT 100GbE QSFP28 adapter
- One Serial console port via a DTE DB-9 connector
- Dual Cascade Lake processor design with Lewisburg PCH - 2x 6230T 20C 2.1GHz 125W CPUs
- Two Western Digital SN720 M.2 SSD boot drives - 2x 1TB NVMe
- Two embedded 10GBaseT RJ45 connections
- One 850W CRPS PSU - C14 receptacle, 100 - 240VAC
- Eight Western Digital Ultrastar DC SN640 NVMe SSDs
- Two Broadcom® 9400-16i HBAs
- One NVIDIA Tesla T4 GPU

1.1.1 Technical Features

High Speed Data Ingest



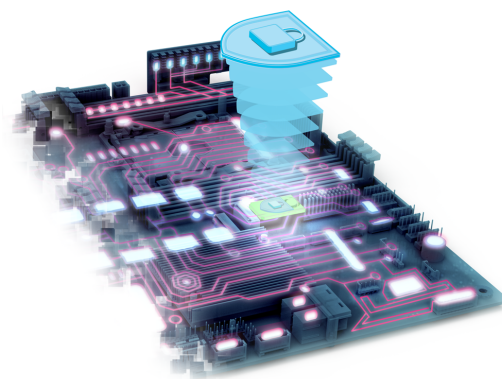
The Ultrastar Edge leverages the speed of Ultrastar DC SN640 NVMe SSDs and a high-speed storage interface to perform high-speed data ingest. Moving large amounts of data securely with the Ultrastar Edge can be significantly faster than with the typical 10GbE network interfaces found in other data transfer appliances.

- 8 Ultrastar DC SN640 NVMe SSDs
- PCIe Gen3 interface, 2x 100GbE QSFP28 Ethernet connection

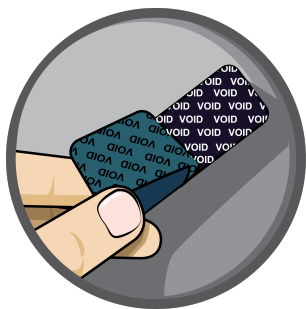
TPM 2.0

The Trusted Platform Module (TPM) 2.0 is a small chip, providing hardware-based security features that track and monitor state changes in the system and verify data against digital signatures stored in the module itself. This provides a hardware data verification capability that is central to the security features of the platform. The module allows a user to establish platform authentication and attestation to ensure a safer computing environment without physically manipulating the TPM 2.0 module itself. Coupling this feature with the tamper evident design means that data intrusion on anything but internal hardware is unlikely, and the internal hardware cannot be accessed without leaving positive tamper evidence behind.

- Hardware based data security



Tamper-Evident Design



The Ultrastar Edge has been designed to be tamper-evident. Any method to physically access the platform is limited by the design of the outer bezel, aluminum outer shell, and internal physical construction. Any method that might be used to access the internal compartment of the platform will be evident by the damage required to access it. The front bezel screws are tamper evident and any attempt to pry away the bezel will result in damage that will be evident upon inspection. This adds a layer of security that addresses the unique complexities of physically transporting critical data.

- Front screws-holes covered with tamper evident labels
- Single-piece aluminum body cannot be accessed without significant force

Portability

The Ultrastar Edge is designed to be portable. With a built in handle and single-piece aluminum outer shell construction, the platform can be deployed in many situations. It can be stored inside a server rack on a shelf style support system, on a bench or cart, or anywhere that power and connectivity can be achieved safely. After a successful data transfer, the platform can be quickly shut down, disconnected, and moved with ease to wherever the data will be ingested.

- Comfortable handle design
- No protruding components
- Lightweight aluminum construction



1.2 Electrical Specification

Table 2: Electrical Specifications

Specification	Value
Max Power Consumption	850W
Input Voltage	100 - 240VAC, auto-ranging
PSU Connector Type	C14
Inrush Current Maximum	AC line inrush current will not exceed 40A peak, for up to one-quarter of the AC cycle.
PSU Efficiency	80 PLUS Platinum

1.3 Environmental Specification

Environmental Specifications

Table 3: Environmental Specifications

Specification	Non-Operational	Operational
Temperature	-20°C to 63°C	0° to 43°C ²
	w/ Data: -5°C to 40°C	w/ Data: 0° to 43°C
Temperature Gradient	20°C per hour max	20°C per hour max
Temperature De-rating	1°C per 300m above 3000m	Data Center: 1°C per 300m above 3000m
		MIL-STD: AECTP-230 Leaflet 2311/2
Relative Humidity	8-85% Non-Condensing	8-85% Non-Condensing
Relative Humidity Gradient	30% per hour maximum	30% per hour maximum
Altitude	0 m to 12,192 m / 0 ft to 40,000 ft	0 m to 3,000 m / 0 ft to 9,843 ft
Cooling	N/A	4 System Fan Modules

Information about Temperature Specifications

The Environmental Specifications are defined by Sections 501.5 and 502.5 of MIL-STD-810G CH-1 as requested by the customer. Many internal components, controlled by 3rd party vendors, do not meet these requirements. These limits will be assessed collectively to define the limits that the Ultrastar Edge as a whole can support.

2. The compute base (**A2U24-S**) when used by itself is certified for safety to 35°C.

The storage and transportation temperature of a loaded system (defined as user data stored on the system, consuming more than 10% of PE cycles) is limited by the Ultrastar SN640 NVMe SSDs to no less than -5°C, and no more than 40°C, to preserve data integrity. A system without data may be subjected to more extreme temperature ranges. This will serve as the minimum and maximum allowable storage and transport temperature for Ultrastar Edge.

1.4 Mechanical Specification

Table 4: Mechanical Specifications

Specification	Value
System Weight	15.2 kg / 33.6 lbs.
System Dimensions	W: 432.8 mm x L: 504 mm x H: 88.1 mm / W: 17.03 in. x L: 19.84 in. x H: 3.46 in.
Required Rack Depth	508 mm (20 in.) of usable rack space, door to door
Required Rack Width	483 mm (19 in.) with 465mm (18.31in.) ± 1.5mm nominal hole spacing. See EIA-310 Rack Standard
Rack Units (U)	2U
Adjustable Rail Spacing	711.2 mm – 914.4 mm / 28 in. – 36 in.

1.5 System Specification

Table 5: System Specifications

Specification	Value
Data Transfer Rate	PCIe Gen3
Max Raw Data Storage Capacity	61.44TB using Western Digital Ultrastar DC SN640 NVMe SSDs
Drives	8x Western Digital Ultrastar DC SN640 NVMe SSDs
Boot Drives	2x Western Digital SN720 M.2 SSDs 1TB
CPUs	2x Cascade Lake processor design with Lewisburg PCH, 2.10GHz, 20 C, 125W TDP
Memory	512GB DDR4 Installed (8x 64GB DIMMs)
I/O	Dual 10GBase-T Embedded Dual 100G QSFP28
Management	IPMI 2.0 system management over RJ45
Cooling	4x 60mm fans, fixed

1.6 Ruggedized Transit Case MIL-STDs

The Ruggedized Transit Case is supported by MIL-STD level testing. The following table lists the qualified MIL-STDs.

Table 6: Ruggedized Transit Case MIL-STDs

Number	Title
MIL-STD-461G CE102	Radiated & Conducted Emissions & Susceptibility for Army Ground
MIL-STD-461G CE102	Conducted Emissions, Radio Frequency Potentials, Power Leads
MIL-STD-461G CS101	Conducted Susceptibility, Power leads
MIL-STD-461G CS114	Conducted susceptibility - Bulk Cable Injection
MIL-STD-461G CS115	Conducted Susceptibility - Bulk Cable Injection, Impulse Excitation
MIL-STD-461G CS116	Conducted Susceptibility, Damped Sinusoidal Transients, Cables and power leads
MIL-STD-461G CS118	Conducted susceptibility, Personnel Borne ESD
MIL-STD-461G RE102	Radiated Emissions, Electric field
MIL-STD-461G RS103	Radiated susceptibility - Electric field
MIL-STD-1472G	Lifting Limits
MIL-STD-810G CH-1, Method 501.6, Procedure I, II	High Temperature Storage and Operation, basic hot
MIL-STD-810G CH-1, Method 516.7, Procedure I	Operating unpackaged shock
MIL-STD-810G CH-1, Method 516.7, Procedure II	Non-operating packaged shock
MIL-STD-810G CH-1, Method 516.7, Procedure IV	Non-operating packaged drop
MIL-STD-810G CH-1, Method 514.7, Procedure III	Large assembly (trucks and trailers) transportation

1.7 Ultrastar Edge Physical Design

This section shows the dimensions and layout of the primary physical features of the Ultrastar Edge.

Figure 10: Ultrastar Edge Dimensions

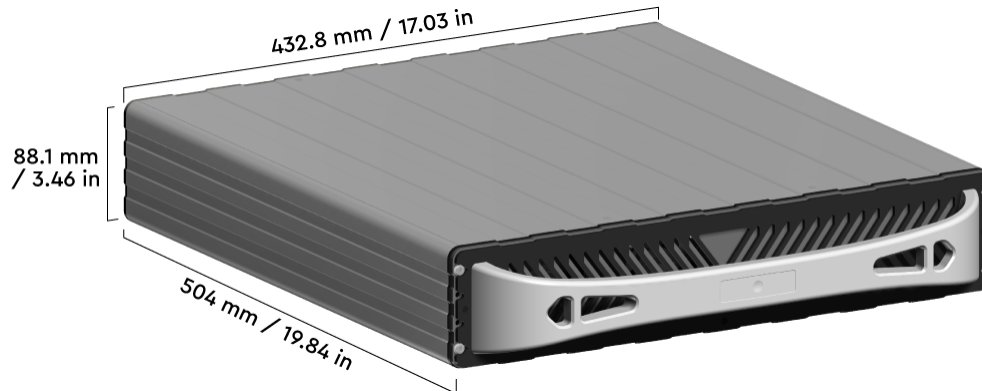
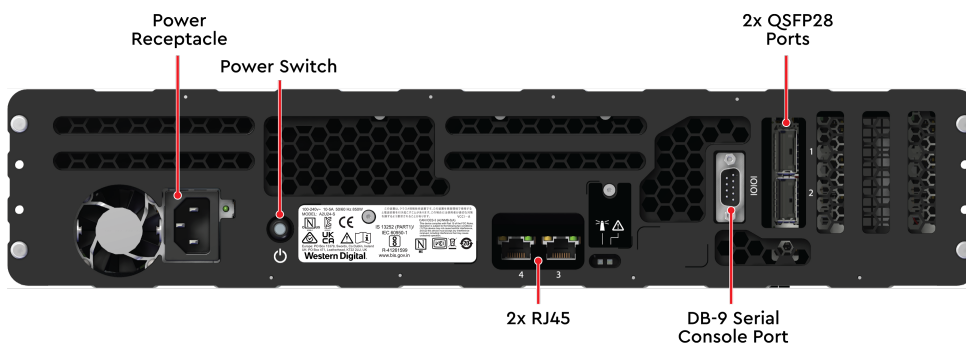


Figure 11: Ultrastar Edge Primary External Features



Figure 12: Ultrastar Edge Rear Ports and Features



1.7.1 LEDs

The Ultrastar Edge has a number of LEDs at the rear exterior of the enclosure that display various system statuses.

LED Locations

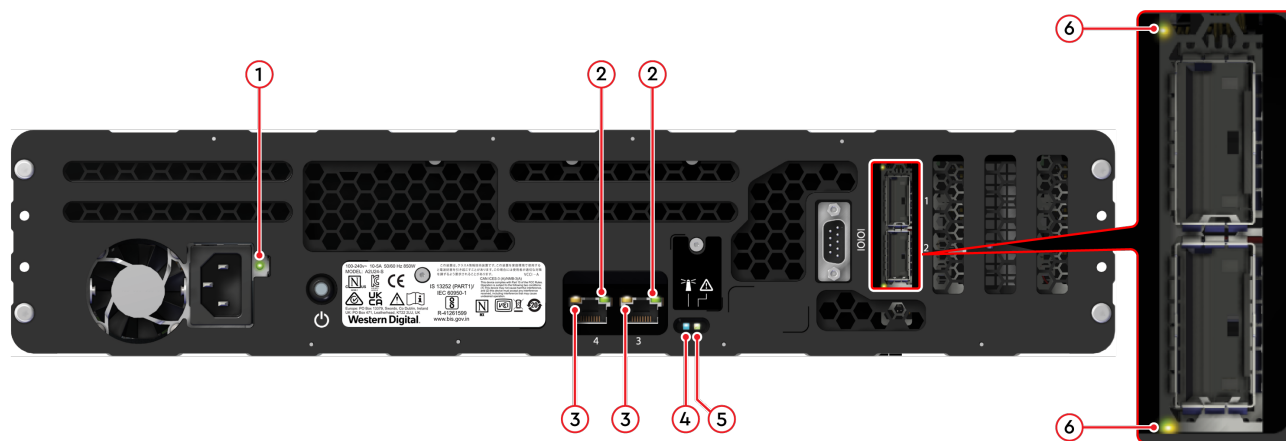


Table 7: LED Identification

#	LED Name	Color	Behavior
1	Power Supply Fault/ Output Status	Green/ Amber	Solid Green – On and providing power to the system Blink Green @ 1 Hz – AC Present/Only 5VSB on (power supply off) Solid Amber - Fault on power supply
2	10GBase-T RJ45 Ethernet Connectors Link/Activity	Green	Link/Activity: Solid – LAN link is established Blink – Transmitting or receiving activity Off – LAN link is not established
3	10GBase-T RJ45 Ethernet Connectors Speed	Green/ Amber	Speed: Green – Highest supported data rate (10Gbps) Amber – Mid-range supported data rate (1Gbps) Off – Lowest supported data rate (100Mbps)
4	Identification	Blue	Solid – System ID/locate/BMC boot status
5	System Status	Green/ Amber	Green solid – System is operational Amber blink @ 1 Hz – Warning: system failure
6	NIC Link/Activity	Green/ Amber	Green Solid – LAN link is established Green blink – Transmitting or receiving activity Amber blink @ 4Hz - Indicates a problem with the link Off – Link is not established

1.7.2 System Level Block Diagram

The system block diagram for the Ultrastar Edge is a conceptual depiction of the communication and power relationships between major components within the system.

Figure 14: System Block Diagram

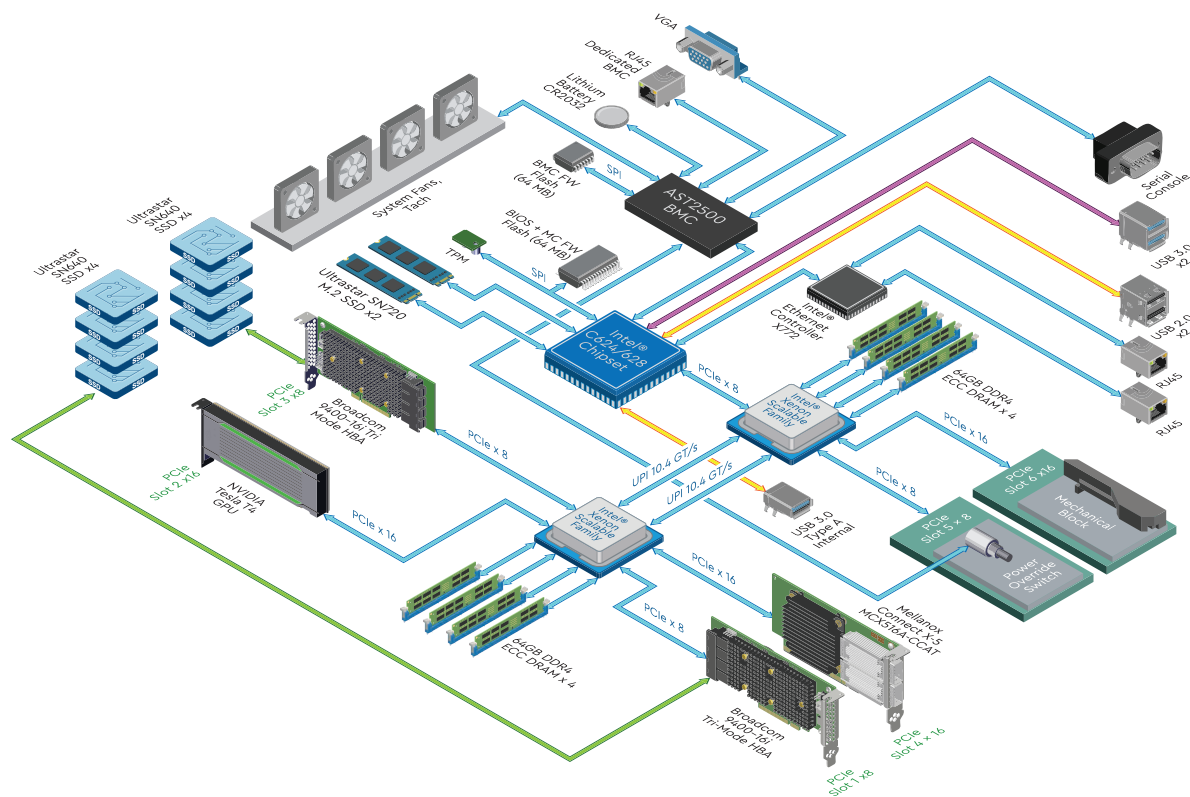


Table 8: Port Accessibility

Externally Accessible	Not Externally Accessible
Serial Console	BMC Management (RJ45)
RJ45 Ports	VGA
QSFP28 Ports	USB 2.0
Power Override Switch	USB 3.0

1.8 Supported Operating Systems

The following table lists the operating systems tested on the Ultrastar Edge.

Operating System	Version
Oracle Linux®	7.7

1.9 Restrictions and Limitations

The Ultrastar Edge has the following restrictions and limitations on functionality:

- The Western Digital SN720 M.2 SSDs contained within the Ultrastar Edge cannot be setup in a Hardware RAID configuration. This is a limitation of the Intel® Motherboard.

1.10 Supported SKUs

The following table lists the versions of Western Digital product that are supported by this document.

Table 10: System Configurations

System	Volume	Part Number
Ultrastar Edge SN640 B6230T-5-2-2I-1D-CM nTAA PCIe RI-0.8DW/D ISE - CRPS	61.44TB	1ES2114
Ultrastar Edge SN640 B6230T-5-2-2I-1D-RG nTAA PCIe RI-0.8DW/D ISE - CRPS	61.44TB	1ES2115

Table 11: Rail

Component	Part Number
Rail Kit	1EX2861

1.11 List of CRUs

Table 12: List of Replaceable Components

Component	Packaged Dimensions	Packaged Weight	Part Number
Power Cord 1.8m NEMA 5-15P to IEC-320-C13 14AWG	W: 330.2 mm x L: 254 mm x H: 101.6 mm / W: 13 in x L: 10 in x H: 4 in	0.85 kg / 1.88 lbs	1EX2859
USB to Serial Adapter Cable 1.52m	W: 330.2 mm x L: 254 mm x H: 101.6 mm / W: 13 in x L: 10 in x H: 4 in	0.26 kg / 0.59 lbs	1EX2857

Component	Packaged Dimensions	Packaged Weight	Part Number
Packaging for Ruggedized Transit Case	W: 968.2 mm x L: 628.6 mm x H: 304.8 mm / W: 38.12 in x L: 24.75 in x H: 12 in	3.6 kg / 8 lbs	1EX2855
Packaging for Ultrastar Edge	W: 608.3 mm x L: 533.4 mm x H: 266.7 mm / W: 23.95 in x L: 21 in x H: 10.5 in	2.97 kg / 6.55 lbs	1EX2856
Packaging for Commercial Transit Case	W: 673.1 mm x L: 622.3 mm x H: 266.7 mm / W: 26.5 in x L: 24.5 in x H: 10.5 in	1.95 kg / 4.3 lbs	1EX2858



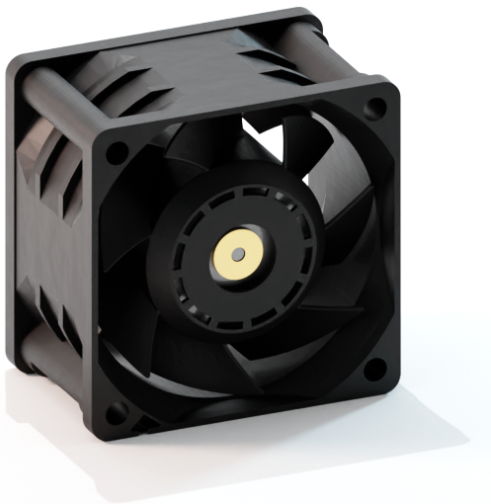
Components

This section provides information about the major internal and external components of the Ultrastar Edge portable storage server.

In This Chapter:

- System Fan Module.....	14
- Power Supply Unit (PSU).....	15
- Solid State Drive (SSD).....	16
- M.2 Solid State Drive (SSD).....	17
- DIMM Description.....	18
- Host Bus Adapter (HBA).....	19
- Network Interface Card (NIC).....	20
- Graphics Processing Unit (GPU).....	21
- Rail Kit.....	22
- Cable Adapter Kit.....	23
- Ruggedized Transit Case.....	24
- Commercial Transit Case.....	25

2.1 System Fan Module



The Ultrastar Edge contains four internal fan modules mounted to the front of the chassis to maintain proper cooling across the entire system and its components.

2.1.1 System Fan Module Specifications

Table 13: System Fan Module Specification Summary

Specification	Value
Number per Enclosure	4
Dimensions	W: 38 mm x L: 60 mm x H: 60 mm / W: 1.5 in x L: 2.36 in x H: 2.36 in
Fan RPMs	16,000 RPM
Acoustics	66.0 dB(A)
Rated Voltage	12V
Component Weight	326 g / 11.5 oz

2.2 Power Supply Unit (PSU)



The Ultrastar Edge contains a 850W PSU requiring an input voltage between 100 - 240VAC. The PSU is 80 PLUS Platinum certified and utilizes a C14 power cable receptacle.

2.2.1 PSU Specifications

Table 14: Power Supply Unit (PSU) Specification Summary

Specification	Value
Number per Enclosure	1
Dimensions	W: 40 mm x L: 240 mm x H: 100 mm / W: 1.57 in x L: 9.44 in x H: 3.93 in
Power Output	850W
Input Voltage	100 - 240VAC
Output Voltage	12VDC (main) 12VDC (standby)
kVA	10% load (0.9 PF) = 0.944 kVA 20% load (0.95 PF) = 0.8947 kVA 50% load (0.98 PF) = 0.8673 kVA 100% load (0.99 PF) = 0.8585 kVA
80 PLUS Standard	80 PLUS Platinum
Connector Type	C14
Component Weight	1.67 kg / 3.7 lbs

2.3 Solid State Drive (SSD)



The Ultrastar Edge is configured with eight (8) NVMe SSDs. The drives are connected to the system via a cable harness that provides power and data. The drives are housed in three (3) drive cages with the bottom drive attached directly to the drive tray and the remaining drives connected to the drive cage.

2.3.1 SSD Specifications

Table 15: Solid State Drive (SSD) Specification Summary

Specification	Value
Number per Enclosure	8
Dimensions	W: 69.8 mm x L: 100.45 mm x H: 7 mm / W: 2.74 in x L: 3.95 in x H: 0.27 in
Capacity per drive	7.68TB
Interface	PCIe® Gen3 NVMe (8 GT/s)
Physical Mounting	Drive cage
Component Weight	95 g / 3.35 oz

2.4 M.2 Solid State Drive (SSD)



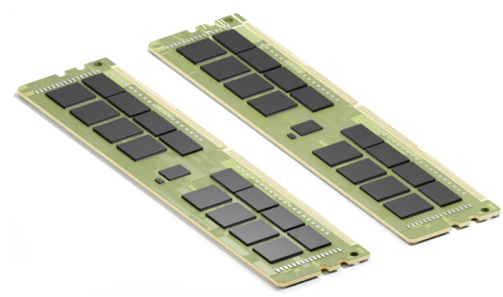
The Ultrastar Edge contains two Western Digital SN720 M.2 SSD boot drives that hold the operating system.

2.4.1 M.2 Solid State Drive (SSD) Specifications

Table 16: M.2 Solid State Drive (SSD) Specification Summary

Specification	Value
Number per Enclosure	2
Dimensions	W: 22 mm x L: 80 mm / W: 0.86 in x L: 3.15 in
Capacity	1TB per drive
Form Factor	M.2
Interface	PCIe Gen3 NVMe (8 GT/s)
Component Weight	7 g / 0.24 oz

2.5 DIMM Description



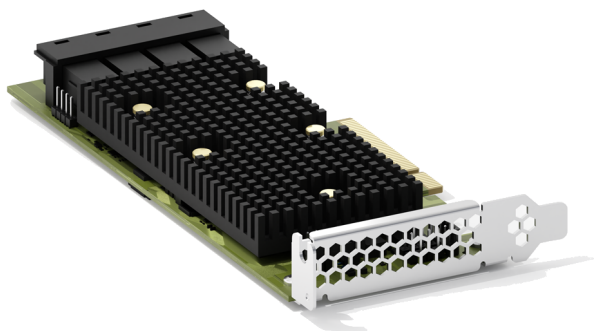
The Ultrastar Edge contains eight (8) 64GiB DIMMs installed into slots A1, B1, D1 and E1 for each CPU. The DIMMs are prepopulated into the approved configuration to maximize system performance.

2.5.1 DIMM Specifications

DIMM Specification Summary

Specification	Value
Number per Enclosure	8
Dimensions	W: 330.2 mm x L: 254 mm x H: 101.6 mm / W: 13 in x L: 10 in x H: 4 in
Memory	64GB
Voltage	1.2V
Speed	2933 MHz
DDR	DDR4
Component Weight	9.07 g / 0.32 oz
Packaged Weight	0.46 kg / 1.02 lb

2.6 Host Bus Adapter (HBA)



The Ultrastar Edge contains two Broadcom® 9400-16i HBAs that provide the connection between all of the system drives. Each HBA handles the connections for four drives.

2.6.1 HBA Specifications

Table 18: Host Bus Adapter (HBA) Specification Summary

Specification	Value
Number per Enclosure	2
Dimensions	W: 68.5 mm x L: 155 mm / W: 2.7 in x L: 6.1 in
Connectors	Four (SFF-8643)
Component Weight	257.9 g / 9.1 oz

2.7 Network Interface Card (NIC)



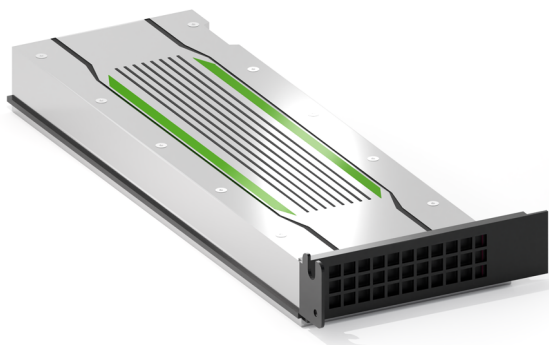
The Ultrastar Edge contains a Mellanox® MCX516A-CCAT 100GbE QSFP28 NIC that controls the wired network connections. The dual 100GbE-capable port can be accessed from the rear of the system. The NIC is physically installed into slot 4 on the motherboard.

2.7.1 NIC Specifications

Table 19: Network Interface Card (NIC) Specification Summary

Specification	Value
Number per Enclosure	1
Dimensions	W: 68.6mm x L: 139mm / W: 2.7in x L: 5.5in
Port Configuration	Dual
Data Rate Per Port	100GbE
System Interface Type	PCIe Gen3 NVMe (8 GT/s)
Component Weight	54.43 g / 1.92 oz

2.8 Graphics Processing Unit (GPU)



The Ultrastar Edge contains one NVIDIA® Tesla® T4 GPU for parallel processing of system tasks and applications.

2.8.1 GPU Specifications

Table 20: Graphics Processing Unit (GPU) Specification Summary

Specification	Value
Number per Enclosure	1
Dimensions	W: 68.9 mm x L: 169.5 mm / W: 2.7 in x L: 6.6 in
Power Output	70W
Memory Size	16GB
Component Weight	301 g / 10.6 oz

2.9 Rail Kit



The Ultrastar Edge can be installed into a rack using rack mounted rails. The rail kit contains a set of two 2U, shelf-style rails with spring-loaded inner arms that accommodate different rack rail lengths. The rails include mounting hardware with captive screws to secure the rails and system in place without the need for tools.

2.9.1 Rail Kit Specifications

Table 21: Rail Kit Specification Summary

Specification	Value
Number Per Enclosure	1 Pair w/ mounting hardware
Rail Length	711.2 mm / 28 in (min) - 914.4 mm / 36 in (max)
Component Weight	3.49 kg / 7.7 lbs

2.10 Cable Adapter Kit



The Ultrastar Edge ships with a Cable Adapter Kit to provide access via the DB9 serial port. The Cable Adapter Kit includes a DB9F to RJ45F Modular Serial Adapter, a 1 m / 3.28 ft RJ45 CAT5E Network Ethernet Cable, and a 3 m / 9.8 ft C13 to C14 PDU Power Cable.

2.10.1 Cable Adapter Kit Specifications

Table 22: DB9F to RJ45F Modular Serial Adapter Specification Summary

Specification	Value
Number Per Enclosure	1
Accessory Type	Straight-Wired Serial Adapter
Connector Type	DB9 (Female) RJ45 (Female)
Component Weight	.02 kg / .05 lbs (approx.)

Table 23: RJ45 CAT5E Network Ethernet Cable Specification Summary

Specification	Value
Number Per Enclosure	1
Accessory Type	Network Cable
Connector Type	RJ45 (Male)
Component Length	1 m / 3.28 ft
Component Weight	.03 kg / .07 lbs (approx.)

Table 24: RJ45 CAT5E Network Ethernet Cable Specification Summary

Specification	Value
Number Per Enclosure	1
Accessory Type	Network Cable
Connector Type	C13 C14
Component Length	3 m / 9.8 ft
Component Weight	.30 kg / .66 lbs (approx.)

2.11 Ruggedized Transit Case



The Ultrastar Edge can be transported in this ruggedized hardshell case that is designed to protect the system from damage. The Ruggedized Transit Case is a re-usable shipping container that meets the requirements of the ATA Spec 300 Category 1. It supports the use of tamper evident ties and rolling wheels for ease of transport.

2.11.1 Ruggedized Transit Case Specifications

Table 25: Ruggedized Transit Case Specification Summary

Specification	Value
Dimensions	W: 599.9 mm x L: 965.2 mm x H: 300.2 mm / W: 23.6 in x L: 38 in x H: 11.8 in
Physical Security	Includes features for tamper evident tags and ties.
Component Weight	22.2 kg / 49 lbs

2.12 Commercial Transit Case



The Ultrastar Edge can be transported in a hardshell case that is designed to protect the system from damage during transportation. The Commercial Transit Case is an ESD foam-padded, re-usable shipping container.

2.12.1 Commercial Transit Case Specifications

Table 26: Commercial Transit Case Specification Summary

Specification	Value
Dimensions	W: 609.6 mm x L: 647.7 mm x H: 247.6 mm / W: 24 in x L: 25.5 in x H: 9.75 in
Physical Security	D-rings for padlocks
Vibration	0.6 Grms 10-300 Hz
Component Weight	9.97 kg / 22 lbs



Management

This section provides information about managing the functionality of the Ultrastar Edge portable storage server.

In This Chapter:

- Overview of Device Firmware and Vendor-Specific Utilities..... 27
- Updating Firmware on the System, BIOS, BMC, ME, and SDR..... 31
- Updating Firmware on the Intel Ethernet Connection X722 adapter LAN on Motherboard.....38
- Updating Firmware on the Western Digital SN720 M.2 SSD.....40
- Updating Firmware on the Broadcom 9400-16i Controller..... 42
- Updating Firmware on the Ultrastar SN640 NVMe SSD..... 44
- Updating Firmware on the Mellanox MCX-516A-CCAT 100GbE Network Controller.....48

3.1 Overview of Device Firmware and Vendor-Specific Utilities

The Ultrastar Edge Transport Appliance contains a number of components with firmware that can be upgraded, or reloaded, depending on the maintenance need. Some components require vendor-specific utilities, while others require only a file from the Western Digital Customer Support portal. The following table displays all the devices with supported firmware updates, the firmware filenames and download locations, and the vendor-specific utilities (if required). Following the table are procedures for updating the firmware for each of these components.

Component	Software Type	Software Details
System, BIOS, BMC, ME, SDR/FRU	Firmware	Revision: v02.01.0015_BIOS_BMC_ME_FRUSDR_wdc Filename: v02.01.0015_BIOS_BMC_ME_FRUSDR_wdc.zip Western Digital Part Number: 1EV1391 Download at: https://portal.wdc.com/Support/s/ Includes firmware for: • BIOS: Revision R02.01.0015 w/ WDC required settings • BMC: 2.88.6999D21A • ME: 04.01.04.601 • FRU/SDR: 1.82 Firmware update procedure: Updating Firmware on the System, BIOS, BMC, ME, and SDR (page 31)
Component	Software Type	Software Details
Intel® Trusted Platform Module (TPM)	Firmware	Revision: FIRMWARE TPM 7.85.4555.0 Filename: FIRMWARE TPM 7.85.4555.0 .zip Western Digital Part Number: 1EV1420 Download at: https://portal.wdc.com/Support/s/ Firmware update procedure:
	Utility	Utility: Syscfg_v14_1_build32_allos Filename: Syscfg_v14_1_build32_allos.zip Western Digital Part Number: Part of the 1EV1420 download

3.1 Overview of Device Firmware and Vendor-Specific Utilities

Component	Software Type	Software Details
Intel X722–DA2 Ethernet Controller embedded in PCH X722	Firmware	Revision: LAN on Motherboard (LOM) Filename: S2600ST_NVUpdatePackage_v3.51.zip Western Digital Part Number: 1EV1360 Download at: https://portal.wdc.com/Support/s/ Firmware update procedure: Updating Firmware on the Intel Ethernet Connection X722 adapter LAN on Motherboard (page 38)
	Utility	Utility: nvupdate64e Download at: https://portal.wdc.com/Support/s/
Component	Software Type	Software Details
Western Digital SN720 M.2 1TB NVMe SSD	Firmware	Revision: 10109122 Filename: 10109122.fluf Western Digital Part Number: 1EV1358 Download at: https://portal.wdc.com/Support/s/ Firmware update procedure: Updating Firmware on the Western Digital SN720 M.2 SSD (page 40)
	Utility	Utility: nvme-cli
Component	Software Type	Software Details
Broadcom 9400-16i HBA	Firmware	Revision: 17.00.00.00 Filename: 9400_16i_Pkg_P17_SAS_SATA_NVMe_FW_BIOS_UEFI.zip Western Digital Part Number: 1EV1390 Download at: https://docs.broadcom.com/docs/9400_16i_Pkg_P17_SAS_SATA_NVMe_FW_BIOS_UEFI.zip Firmware update procedure: Updating Firmware on the Broadcom 9400-16i Controller (page 42)
	Utility	Utility: HBA Update Tool Broadcom Storcli version 007.1504.0000.0000 Download at: https://docs.broadcom.com/docs/STORCLI_SAS3.5_P16.zip

3.1 Overview of Device Firmware and Vendor-Specific Utilities

Component	Software Type	Software Details
NVIDIA Tesla T4 GPU	Firmware	Revision: 450.51.05 (driver)  Note: Only the driver needs to be updated for the T4. Filename: NVIDIA-Linux-x86_64-450.51.05.run Western Digital Part Number: 1EV1337 Driver update procedure: https://docs.nvidia.com/datacenter/tesla/tesla-installation-notes/index.html#introduction  Note: Follow the procedure available on the NVIDIA website to install the GPU drivers. Download at: https://www.nvidia.com/Download/driverResults.aspx/161771/en-us
		Utility N/A
Component	Software Type	Software Details
Western Digital Ultrastar SN640 7.68TB NVMe	Firmware	Revision: R1110021 Filename: aspenplus_GN_R1110021.vpkg Western Digital Part Number: 1EV1393 Download at: https://portal.wdc.com/Support/s/ Firmware update procedure: Updating Firmware on the Ultrastar SN640 NVMe SSD (page 44)
	Utility	Utility: Drive Update Tool Broadcom Storcli version 007.1504.0000.0000 Download at: https://portal.wdc.com/Support/s/
Component	Software Type	Software Details
Mellanox MCX516A-CCAT Dual-Port 100GbE QSFP28	Firmware	Revision: Mellanox MCX516A-CCAT FW 16.27.2008 Filename: fw-ConnectX5-rel-16_27_2008-MCX516A-CCA_Ax-UEFI-14.20.22-FlexBoot-3.5.901.bin.zip Western Digital Part Number: 1EV1392 Download at: www.mellanox.com/downloads/firmware/fw-ConnectX5-rel-16_27_2008-MCX516A-CCA_Ax-UEFI-14.20.22-FlexBoot-3.5.901.bin.zip Firmware update procedure: Updating Firmware on the Mellanox MCX-516A-CCAT 100GbE Network Controller (page 48)

Component	Software Type	Software Details
	Utility	Utility: Mellanox MFT toolkit v4.15.1 Western Digital Part Number: 1EV1403 Download at: https://www.mellanox.com/products/adaptersoftware/firmware-tools

3.2 Updating Firmware on the System, BIOS, BMC, ME, and SDR

The Ultrastar Edge System is a sealed compute node, preventing BIOS updates from being performed via USB. The following steps provide instructions for transferring the BIOS files to the EFI partition and updating through the EFI Shell.



Attention: A functional, Linux, Operating system must be present on the system.

Step 1: Connect to system using serial cable attached to a host

Step 2: From a terminal, create a temporary folder to store the .zip files by issuing the following command:

```
# mkdir tmp
```

The temporary directory is created.

Step 3: Download BIOS Firmware Update package from the from the Support Portal.

Step 4: Copy the BIOS Firmware Update zip file to the temporary folder by issuing the following command:

```
# cp v02.01.0015_BIOS_BMC_ME_FRUSDR_wdc.zip tmp/
```

The file is copied into the temporary directory.

Step 5: Change the Terminal directory to the temporary folder by issuing the following command:

```
# cd tmp/
```

The directory is changed to the temporary directory.

Step 6: Unzip the BIOS Firmware Update Package by issuing the following command:

```
# unzip v02.01.0015_BIOS_BMC_ME_FRUSDR_wdc.zip
```

Step 7: With root privileges, navigate to `/boot/efi` , and copy the unzipped package into this directory by issuing the following command:

```
# cd /boot/efi
```

```
# cp -r </home/user/Downloads/v13_wdc_BiosBmcMeFrusdr> .
```

The the unzipped package has been copied to the EFI partition.

Step 8: Reboot system, press <F6> during POST to enter boot manager.

Step 9: Select "Launch the EFI Shell" to launch the EFI Shell.

3.2 Updating Firmware on the System, BIOS, BMC, ME, and SDR

```

-----\
|                                     |
|                               Boot Manager                               |
|                                     |
|-----/

ubuntu                               Select this option to
UEFI Misc Device                     boot now.
UEFI IPv4: Intel Network 00 at Baseboard  Note: This list is
UEFI IPv6: Intel Network 00 at Baseboard  not the system boot
UEFI IPv4: Intel Network 01 at Baseboard  option order. Use the
UEFI IPv6: Intel Network 01 at Baseboard  Boot Maintenance
UEFI HTTPv6: Intel Network 00 at Baseboard Manager menu to view
UEFI HTTPv4: Intel Network 00 at Baseboard and configure the
UEFI HTTPv6: Intel Network 01 at Baseboard system boot option
UEFI HTTPv4: Intel Network 01 at Baseboard order.
Launch EFI Shell

-----\
|                                     |
| F10=Save Changes and Exit F9=Reset to Defaults                       |
| ^v=Move Highlight      <Enter>=Select Entry      Esc=Exit           |
|-----/
|-----Copyright (c) 2006-2022, Intel Corporation-----/

```

Step 10: Press <ESC> or any other key to access EFI Shell.



Note: If no action is taken, the EFI Shell will launch after five (5) seconds.

Step 11: Access USB drive by mapping to FS0 by issuing the following command:

```
Shell> FS0:
```

Step 12: Verify the contents of the folder by issuing the following command:

```
# ls
```

The contents of the unzipped file is displayed. Verify that the latest Firmware Update Package and the Utility appear in the output.

```

Directory of: FS0:\FIELD_v02.01.0015_BIOS_BMC_ME_FRUSDR_wdc
MM/DD/YYYY HH:MN <DIR>          4,096
MM/DD/YYYY HH:MN <DIR>           0
MM/DD/YYYY HH:MN          25,089  BMC-MIB.mib
MM/DD/YYYY HH:MN          458,928  frudr.efi
MM/DD/YYYY HH:MN        10,358,832  frudr_temp.efi
MM/DD/YYYY HH:MN          458,928  fwiaupd.efi
MM/DD/YYYY HH:MN        10,841,648  fwiaupd_temp.efi
MM/DD/YYYY HH:MN           250     fwUpdateBMC.nsh
MM/DD/YYYY HH:MN          458,928  iflash32_temp.efi
MM/DD/YYYY HH:MN          252,080  impi.efi
MM/DD/YYYY HH:MN           65     Purley_2.86.2da97d3f.bin.sha1
MM/DD/YYYY HH:MN        14,180,352  Purley_2.88.6999d21a.bin
MM/DD/YYYY HH:MN        12,976,208
R0201005_BOOT_SP_PWR_ON_VT100_TPM_V004.singed.cap
MM/DD/YYYY HH:MN          168,016
R0201005_Production_ACM_TXT_FD.singed.cap
MM/DD/YYYY HH:MN          9,392,208
R0201005_Production_ACM_TXT_ME.singed.cap
MM/DD/YYYY HH:MN           245     RstBIOS.nsh
MM/DD/YYYY HH:MN           4,800     S2600STB.fru
MM/DD/YYYY HH:MN        531,360     S2600STB.sdr

```

3.2 Updating Firmware on the System, BIOS, BMC, ME, and SDR

```

MM/DD/YYYY HH:MN      1,912 UpdBIOS.nsh
MM/DD/YYYY HH:MN      1,746 UpdFD.nsh
MM/DD/YYYY HH:MN      7,600 UpdIntelFW.nsh
MM/DD/YYYY HH:MN      1,728 UpdMe.nsh
MM/DD/YYYY HH:MN         48 upd2600ST.nsh
MM/DD/YYYY HH:MN     30,786 wd-field.cfg
MM/DD/YYYY HH:MN <DIR>   4,096 Licences
MM/DD/YYYY HH:MN      5,997 CacheRiver.log
MM/DD/YYYY HH:MN        112 UpdIntelFW_pass.txt
      25 File(s) 70,521,306 bytes
      3 Dir(s)
FS0:\FIELD_v02.01.0015_BIOS_BMC_ME_FRUSDR_wdc\>

```

Step 13: Initiate the Firmware Update by issuing the following command:

```
FS0:\FIELD_v02.01.0015_BIOS_BMC_ME_FRUSDR_wdc\> UpdIntelFW.nsh
```

- a. When prompted, press any key to continue

```

Primary BIOS Version:..... SE5C620.86B.02.01.0015.CV004.032120220358
Secondary BIOS Version: ..... SE5C620.86B.02.01.0015.032120220358
BIOS Boot Region:..... Primary Boot
ME Firmware Version:..... 04.01.04.601

=====
Update Sequence:
1. BMC - No SUT reset after update completes
2. ME - No SUT reset after update completes
3. BIOS- No SUT reset after update completes
4. FD - No SUT reset after update completes
5. FRUSDR - No SUT reset after update completes
6. WD added -> Reset BIOS defaults - The SUT will reset after this
  completes!
!!! Steps 1-6 will be completed at the first time startup.nsh is
  invoked !!!
Reset SUT to make updated firmware effective.
See the Readme and Update Instructions file for additional information.

=====
BMC --> ME --> BIOS --> FD --> FRUSDR --> Reset BIOS defaults
Enter 'q' to quit, any other key to continue:

```

Step 14: Observe the updates as they complete. Verify there are no failures during the update. This update bundle is designed to reset the system as needed in the update process. Do not disrupt the update process. Do not disrupt power during updates. Ignore messages that call for you to “please reboot for this update to take effect” during the update. A final reboot and update verification will be performed after all updates have been completed.

```

Integrated BMC Firmware Update Package 02 58
The BMC image being installed is revision 2.88.6999d21a
Firmware and PIA Flash Update Utility Version 14.1 Build 19
Copyright (c) 2020 Intel Corporation
Entering BMC Update Mode...
Using USB Interface...
Transferring BMC Firmware Image:
100%

```

3.2 Updating Firmware on the System, BIOS, BMC, ME, and SDR

```
Done
BMC Firmware Update Status:
100% Done
BMC Firmware Update Successful
This may take up to 50 seconds to exit. Please wait...
Successful Termination

=====
Continuing system ME update....
DO NOT remove the USB flash drive
=====

Flashing ME FW...

        System BIOS and ME Update Utility Version 14.1 Build 15
        Copyright (c) 2020 Intel Corporation

Processing Capsule File - R02010015_Production_ACM_TXT_ME.signed.cap

The ME Update In Progress: 100%
The ME Firmware has been updated successfully.

Please restart the server for the new update to take effect.

Echo is off.
=====
Continuing the system BIOS update.....
DO NOT remove the USB flash drive

Flashing BIOS...
        System BIOS and ME Update Utility Version 14.1 Build 15
        Copyright (c) 2020 Intel Corporation

Processing Capsule File - R02010015_BOOT_SP_PWR_ON_VT100_TPM_V004.signed.cap
BIOS Update In Progress: 100%
Primary Update completed, Backup BIOS will be completed in next boot.
BIOS has been updated successfully.

Please restart the server for the new update to take effect.

=====
Continuing the system Flash Description update.....

Flashing FD...
        System BIOS and ME Update Utility Version 14.1 Build 15
        Copyright (c) 2020 Intel Corporation

Processing Capsule File - R02010015_Production_ACM_TXT_FD.signed.cap

Flash Descriptor In Progress: 100%
Flash Descriptor has been updated successfully.

Please restart the server for the new update to take effect.

=====
DO NOT remove the USB flash drive
=====

Update file Configuration: Revision 2600STB_1.82
```

3.2 Updating Firmware on the System, BIOS, BMC, ME, and SDR

```
FRU & SDR Update Package for Intel (R) Server Board 2600STB (2600STB 1.82)
Copyright (c) 2021 Intel Corporation
```

```
Intel (R) Server Board S2600STB detected
Setting the SDR values.
Auto-detecting chassis model and attached hardware.
This may take up to 1 minute to complete.
Front panel FRU device not detected
```

```
Power supply 1 detected but unable to identify model.
Sensors for power supply 1 will not be installed.
```

Detected Hardware

```
*****
```

```
System Fan 1 is detected.
System Fan 2 is detected.
System Fan 3 is detected.
System Fan 4 is detected.
```

```
Intel(R) Xeon(R) Scalable Processor in socket 1.
Intel(R) Xeon(R) Scalable Processor in socket 2.
```

```
*****
```

```
Fans set
```

```
Update for SDR through CFG Started
Updateing SDR.....
SDR Update Suuessful
ReInitializing IPMI Stack.....
BMCI ReInitialization completed.
```

```
Successfully Completed
```

```
System BIOS and ME Update Utility Version 14.1 Build 15
Copyright (c) 2020 Intel Corporation
```

```
BIOS Settings are restored to default
```

```
A system reboot is required for the udate to take effect
```

```
Echo is off.
Deleting 'FS0:\FIELD_v02.01.0015_BIOS_BMC_ME_FRUSDR_wdc\BMC_pass.tmp'
Delete successful.
Deleting 'FS0:\FIELD_v02.01.0015_BIOS_BMC_ME_FRUSDR_wdc\ME_pass.tmp'
Delete successful.
Deleting 'FS0:\FIELD_v02.01.0015_BIOS_BMC_ME_FRUSDR_wdc\BIOS_pass.tmp'
Delete successful.
Deleting 'FS0:\FIELD_v02.01.0015_BIOS_BMC_ME_FRUSDR_wdc\FC_pass.tmp'
Delete successful.
Deleting 'FS0:\FIELD_v02.01.0015_BIOS_BMC_ME_FRUSDR_wdc\FRUSDR_pass.tmp'
Delete successful.
Deleting 'FS0:\FIELD_v02.01.0015_BIOS_BMC_ME_FRUSDR_wdc\RST_pass.tmp'
Delete successful.
```

```
Echo is off.
```

```
=====
All Intel MB FW components updates have been completed now
```

3.2 Updating Firmware on the System, BIOS, BMC, ME, and SDR

There is a one time SUT reset after backup bios is updated successfully. After that, access the BIOS Setup utility via pressing <F2> during POST to confirm all updates have been installed properly.



Note: At this stage the update is still in progress. Do not disrupt power during this step and allow the update a few minutes to complete. Once complete, the system will report the following message.

Updated Backup BIOS Successfully!!!

Step 15: Reboot the system, press <F2> during POST to enter the BIOS menu. If your system loads to the EFI Shell, press the <Esc> key to return to the BIOS menu.

Entering Setup...



Note: This may take a few minutes.

Step 16: Verify the BIOS displays R02.01.0015.

```

S2600ST
Intel(R) Xeon(R) Gold 6230T CPU @ 2.10GHz           @2.10 GHz
IFWI Version:SE5C620.86B.OR.64.2022.13.1.07.0358.selfboot
SE5C620.86B.02.01.0015.CV004.032120220358           524288 MB RAM
Copyright (c) 2006-2022, Intel Corporation

> Main
> Advanced
> Security
> Server Management
> Error Manager
> Boot Manager
> Boot Maintenance Manager
> Save & Exit
> Tls Auth Configuration

Press <Enter> to
select the Main
System Setup options.

^v=Move Highlight      F10=Save Changes and Exit F9=Reset to Defaults
<Enter>=Select Entry
  
```

Step 17: Navigate to "Server Management" and press <Enter> to access "System Information" to verify BMS, ME and SDR versions are correct.

a. Verify the following in the BMC, ME, and SDR:

- BMC Firmware Revision: **2.88.6999D21A**
- ME Firmware Revision: **04.01.04.601**
- SDR Revision: **SDR Package 1.82**

3.2 Updating Firmware on the System, BIOS, BMC, ME, and SDR

```

> Main
> Advanced
> Security
> Server Management
> Error Manager
> Boot Manager
> Boot Maintenance Manager
> Save & Exit
> Tls Auth Configuration

Press <Enter> to
select the Server
Management System
Setup options.

^v=Move Highlight      F10=Save Changes and Exit F9=Reset to Defaults
                        <Enter>=Select Entry

```

```

/-----\
|-----| Server Management |-----|
\-----/

FRB-2 Enable          <Enabled>      View System
                                      Information.

OS Boot Watchdog Timer <Disabled>
OS Boot Watchdog Timer <Power Off>
Policy
OS Boot Watchdog Timer <10 minutes>
Timeout

Plug & Play BMC Detection <Disabled>

> Console Redirection
> System Information
> BMC LAN Configuration

/-----\
|-----| F10=Save Changes and Exit F9=Reset to Defaults
|-----| <Enter>=Select Entry      Esc=Exit
\-----/
-----Copyright (c) 2006-2022, Intel Cor

```

```

/-----\
|-----| System Information |-----|
\-----/

Board Part Number      J17012-552
Board Serial Number    FWSP01520103
System Part Number     .....
System Serial Number   .....
Chassis Part Number    1ES2005
Chassis Serial Number  FWSP01520103
Asset Tag
BMC Status             OK
BMC Firmware Revision  2.88.6999D21A
ME Status              OK
ME Firmware Revision   04.01.04.601
SDR Revision           SDR Package 1.82
UUID                  C198296B7B0C11EAB6E2A4BF01
                      6EF974

/-----\
|-----| F10=Save Changes and Exit F9=Reset to Defaults
|-----| ^v=Move Highlight          Esc=Exit
\-----/
-----Copyright (c) 2006-2022, Intel Cor

```



Important: If the SDR revision displayed does not match the SDR Revision 1.82, immediate manual intervention is required. Return to the EFI Shell and navigate to the update bundle. Run UpdS2600STBFRUSDR.nsh to manually update the SDR again.

Result: The system BIOS files have transferred to the EFI partition and the firmware files have been updated.

3.3 Updating Firmware on the Intel® Ethernet Connection X722 adapter LAN on Motherboard

Step 1: From a terminal, create a temporary folder to store the .zip files by issuing the following command:

```
# mkdir tmp
```

The tmp directory is created.

Step 2: Download the Ethernet Controller firmware package from the Support Portal to the tmp directory.

Step 3: Copy the Firmware file into the temporary folder by issuing the following command:

```
# cp S2600ST_NVUpdatePackage_v3.51.zip tmp/
```

The file is copied into the temporary directory.

Step 4: Change the Terminal directory to the temporary folder by issuing the following command:

```
# cd tmp/
```

The directory is changed to the temporary directory.

Step 5: Unzip the Firmware file by issuing the following command:

```
# unzip S2600ST_NVUpdatePackage_v3.51.zip
```

The Firmware file is unzipped.

```
Archive: S2600ST_NVUpdatePackage_v3.51.zip
inflating: readme.txt
creating: X722_NVUpdate_v3_51_EFIx64/
creating: X722_NVUpdate_v3_51_EFIx64/Disable SFP ports/
...
---OUTPUT TRUNCATED---
...
inflating: X722_NVUpdate_v3_51_Winx64/Enable SFP ports/nvupdate.cfg
inflating: X722_NVUpdate_v3_51_Winx64/Enable SFP ports/nvupdatew64e.exe
```

Step 6: Navigate to the disable SFP ports directory by issuing the following command:

```
# cd X722_NVUpdate_v3_51_Linux_x64/'Disable SFP ports'
```

The directory is changed to Disable SFP ports.

Step 7: Verify that nvmpdate64e has execute permissions by issuing the following command:

```
# chmod +x nvupdate64e
```

Execute permissions are applied.

Step 8: Upgrade the Firmware by issuing the following command:



Note: To reflash the same firmware version, issue the following command:

```
# ./nvupdate64e -f -c nvupdate.cfg -rd
```

The -f addition to the command that forces the update to reflash.

```
# ./nvupdate64e -c nvupdate.cfg -rd
```

The Firmware upgrade begins.

```
Intel(R) Ethernet NVM Update Tool
NVUpdate version 1.30.2.11
Copyright (C) 2013 - 2017 Intel Corporation.
WARNING: To avoid damage to your device, do not stop the update or reboot or
power off the system during this
update.
Inventory in progress. Please wait [***+.....]
Num Description                               Ver. DevId S:B      Status
===
=====
01) Intel(R) Ethernet Connection X722 for      3.51  37D2 00:026 Up to date
    10GBASE-T

Tool execution completed with the following status: All operations completed
successfully
Press any key to exit.
```

Step 9: When prompted to select the Adapter Index List and back up the NVM images, press A and Y respectively.

```
Options: Adapter Index List (comma-separated), [A]ll, e[X]it
Enter selection: a
Would you like to back up the NVM images? [Y]es/[N]o: y
```

The Firmware Upgrade is completed.

```
Update in progress.
This operation may take several minutes.
[.....-***]
Num Description Ver.(hex) DevId S:B Status
===
=====
01) Intel(R) Ethernet Connection X722 3.51(3.33) 37D2 00:026 Update
    for 10GBASE-T successful
Reboot is required to complete the update process.
Tool execution completed with the following status: All operations completed
successfully.
Press any key to exit.
```

Step 10: Reset the system.

a. Shut the system down by issuing the following command:

```
# shutdown
```

The session is ended and the system shuts down.

- b. After the system shuts down, remove the Power Cable from the rear of the system.
- c. Wait at least 30 seconds before connecting the system to power.

3.4 Updating Firmware on the Western Digital SN720 M.2 SSD



Note: The M.2 SSDs in Ultrastar Edge are connected to the M.2 slots on the system's motherboard. The M.2 SSDs are listed as NVMe drives and listed under the "nvme list".

Step 1: Download the nvme cli utility.

Step 2: Verify the M.2 SSDs are identified by the system by issuing the following command:



Note: Each of the two M.2 SSDs should be identified by `/dev/<nvmeX>`.

```
# nvme list
```

The M.2 SSD information is displayed.

```
Node SN Model Namespace
Usage Format FW Rev
-----
-----
/dev/nvme0n1 19416D800179 WDC CL SN720 SDAQNTW-1T00-1022 1 1.02 TB / 1.02
TB 512 B + 0 B 10104122
/dev/nvme1n1 19416D800246 WDC CL SN720 SDAQNTW-1T00-1022 1 1.02 TB / 1.02
TB 512 B + 0 B 10104122
```

Step 3: From a terminal, create a temporary folder to store the .zip files by issuing the following command:

```
# mkdir tmp
```

The tmp directory is created.

Step 4: Download the M.2 SSD firmware package from the Support Portal to the desired directory.

Step 5: Copy the Firmware file into the temporary folder by issuing the following command:

```
# cp 10109122.fluf tmp/
```

The file is copied to the temporary directory.

Step 6: Change the Terminal directory to the temporary folder by issuing the following command:

```
# cd tmp/
```

The directory is changed to the temporary directory.

3.4 Updating Firmware on the Western Digital SN720 M.2 SSD

Step 7: Download the Firmware onto the first M.2 SSD:

```
# nvme fw-download /dev/<nvme0> --fw=10109122.fluf
```

The Firmware is downloaded onto the first M.2 SSD.

```
Firmware download success
```

Step 8: Download the Firmware onto the second M.2 SSD:

```
# nvme fw-download /dev/<nvme1> --fw=10109122.fluf
```

The Firmware is downloaded onto the second M.2 SSD.

```
Firmware download success
```

Step 9: Activate the Firmware on the first M.2 SSD by issuing the following command:



Note: The Activation Action selected in the following command indicates that the downloaded image replaces the image indicated by the Firmware Slot field. This image is activated at the next reset.

```
# nvme fw-commit /dev/<nvme0> --slot 1 --action 1
```

The Firmware is upgraded on the first M.2 SSD.

```
Success committing firmware action:1 slot:1
```

Step 10: Reset the first M.2 SSD by issuing the following command:

```
# nvme reset /dev/<nvme0>
```

The first device is reset.

Step 11: Activate the Firmware on the second M.2 SSD by issuing the following command:



Note: The Activation Action selected in the following command indicates that the downloaded image replaces the image indicated by the Firmware Slot field. This image is activated at the next reset.

```
# nvme fw-commit /dev/<nvme1> --slot 1 --action 1
```

The Firmware is upgraded on the second M.2 SSD.

```
Success committing firmware action:1 slot:1
```

Step 12: Reset the second M.2 SSD by issuing the following command:

```
# nvme reset /dev/<nvme1>
```

The second device is reset.

Step 13: Execute `nvme list` to verify the firmware has been updated:

```
# nvme list
```

The M.2 SSD information is displayed. Identify that the firmware version appears at the end of each drive line and is listed as **10109122**.

```
Node SN Model Namespace
Usage Format FW Rev
-----
-----
/dev/nvme0n1 19416D800179 WDC CL SN720 SDAQNTW-1T00-1022 1 1.02 TB / 1.02
TB 512 B + 0 B 10109122
/dev/nvme1n1 19416D800246 WDC CL SN720 SDAQNTW-1T00-1022 1 1.02 TB / 1.02
TB 512 B + 0 B 10109122
```

3.5 Updating Firmware on the Broadcom 9400-16i Controller



Note: This update requires you to connect a serial cable to the DB-9 Serial Console Port and have access to the BIOS from this port.

Step 1: Download the latest version of the HBA firmware package from the Broadcom website.

Step 2: Unzip the Firmware file by issuing the following command:

```
#
unzip 9400_16i_Pkg_P17_SAS_SATA_NVMe_FW_BIOS_UEFI.zip9400_16i_Pkg_P16_SAS_SATA_NVMe_FW_BI
```

The Firmware file is unzipped.

```
Archive: 9400_16i_Pkg_P17_SAS_SATA_NVMe_FW_BIOS_UEFI.zip
creating: 9400_16i_Pkg_P17_SAS_SATA_NVMe_FW_BIOS_UEFI/Firmware/
inflating: 9400_16i_Pkg_P17_SAS_SATA_NVMe_FW_BIOS_UEFI/Firmware/
HBA_9400-16i_Mixed_Profile.bin
inflating: 9400_16i_Pkg_P17_SAS_SATA_NVMe_FW_BIOS_UEFI/Firmware/
HBA_9400-16i_SAS_SATA_Profile.bin
...
---OUTPUT TRUNCATED---
...
inflating: 9400_16i_Pkg_P17_SAS_SATA_NVMe_FW_BIOS_UEFI/
UEFI_BSD_HII_SAS3.5_IT_X64/Signed/mpt35sas_x64.rom
inflating: 9400_16i_Pkg_P17_SAS_SATA_NVMe_FW_BIOS_UEFI/VSES Counts IT FW
P16.pdf
```

Step 3: Copy the Firmware file into the EFI directory by issuing the following command:

```
# cp 9400_16i_Pkg_P17_SAS_SATA_NVMe_FW_BIOS_UEFI/Firmware/
HBA_9400-16i_Mixed_Profile.bin /boot/efi/EFI/
# cp 9400_16i_Pkg_P17_SAS_SATA_NVMe_FW_BIOS_UEFI/UEFI_BSD_HII_SAS3.5_IT_X64/
mpt35sas_x64.rom /boot/efi/EFI/
```

The file is copied to the EFI directory.

Step 4: Unzip the HBA Update Tool Broadcom Storcli file by issuing the following command:

3.5 Updating Firmware on the Broadcom 9400-16i Controller

```
# unzip STORCLI_SAS3.5_P16.zip
```

The HBA Update Tool file is unzipped.

```
inflating: STORCLI_SAS3.5_P16/MR_SAS_Unified_StorCLI-007.1504.0000.0000.pdf
creating: STORCLI_SAS3.5_P16/univ_viva_cli_rel/
creating: STORCLI_SAS3.5_P16/univ_viva_cli_rel/Unified_storcli_all_os/
...
---OUTPUT TRUNCATED---
...
inflating: STORCLI_SAS3.5_P16/univ_viva_cli_rel/Unified_storcli_all_os/
Windows/license.txt
inflating: STORCLI_SAS3.5_P16/univ_viva_cli_rel/Unified_storcli_all_os/
Windows/storcli64.exe
```

Step 5: Copy the EFI file into the EFI directory by issuing the following command:

```
cp STORCLI_SAS3.5_P16.zip/STORCLI_SAS3.5_P16/univ_viva_cli_rel/
Unified_storcli_all_os/EFI/storcli.efi /boot/efi/EFI/
```

The EFI file is copied to the EFI directory.

Step 6: Access the system BIOS by rebooting the system and entering the boot option menu.

- a. Launch the boot options menu by pressing **F6** while the OS boot screen is visible.
The Boot Options Menu loads.
- b. From the Boot Options menu, select the **EFI shell** option.
A Command Prompt will display.

Step 7: Access the HBA Update Tool by issuing the following command:

```
fs0:
cd EFI
```

Step 8: Flash the first HBA from the EFI shell.

- a. Erase/Format the HBA by issuing the following command:

```
storcli.efi /c0 erase all excludemfg
```

A message stating the Erase of the flash region was successful will display.

- b. Restart the HBA by issuing the following command:

```
storcli.efi /c0 restart
```

The HBA is restarted and a **Reset Controller failed** message will appear. This message is expected and appears as a result of firmware being erased and storcli cannot query the adapter for a status.

- c. Download the Firmware Update file to the HBA by issuing the following command:

```
storcli.efi /c0 download file=HBA_9400-16i_Mixed_Profile.bin
```

The Firmware Update file is downloaded to the HBA.

- d. Download the EFI BIOS file to the HBA by issuing the following command:

```
storcli.efi /c0 download efibios file=mpt35sas_x64.rom
```

The EFI BIOS file is downloaded to the HBA.

Step 9: Flash the second HBA from the EFI shell.

- a. Erase/Format the HBA by issuing the following command:

```
storcli.efi /c1 erase all excludemfg
```

A message stating the Erase of the flash region was successful will display.

- b. Restart the HBA by issuing the following command:

```
storcli.efi /c1 restart
```

The HBA is restarted and a **Reset Controller failed** message will appear. This message is expected and appears as a result of firmware being erased and storcli cannot query the adapter for a status.

- c. Download the Firmware Update file to the HBA by issuing the following command:

```
storcli.efi /c1 download file=HBA_9400-16i_Mixed_Profile.bin
```

The Firmware Update file is downloaded to the HBA.

- d. Download the EFI BIOS file to the HBA by issuing the following command:

```
storcli.efi /c1 download efibios file=mpt35sas_x64.rom
```

The EFI BIOS file is downloaded to the HBA.

Step 10: Reset the system.

- a. Shut the system down by issuing the following command:

```
# reset
```

The session is ended and the system shuts down.

- b. After the system shuts down, remove the Power Cable from the rear of the system.
c. Wait at least 30 seconds before connecting the system to power.

3.6 Updating Firmware on the Ultrastar SN640 NVMe SSD

Step 1: Verify the SSDs are identified by the system by issuing the following command:



Note: Each of the SSDs should be identified by `/dev/<nvmeX>`.

```
# ls SCSI
```

The SSD information is displayed.

```
[14:0:0:0] enclosu BROADCOM VirtualSES 03 -
```

3.6 Updating Firmware on the Ultrastar SN640 NVMe SSD

```
[14:2:0:0] disk NVMe WUS4BB076D7P3E3 0007 /dev/sda
[14:2:1:0] disk NVMe WUS4BB076D7P3E3 0007 /dev/sdb
[14:2:2:0] disk NVMe WUS4BB076D7P3E3 0007 /dev/sdc
[14:2:3:0] disk NVMe WUS4BB076D7P3E3 0007 /dev/sdd
[15:0:0:0] enclosu BROADCOM VirtualSES 03 -
[15:2:0:0] disk NVMe WUS4BB076D7P3E3 0007 /dev/sde
[15:2:1:0] disk NVMe WUS4BB076D7P3E3 0007 /dev/sdf
[15:2:2:0] disk NVMe WUS4BB076D7P3E3 0007 /dev/sdg
[15:2:3:0] disk NVMe WUS3BA119C7P3E3 9005 /dev/sdh
```

Step 2: Identify both HBAs are communicating with the system by issuing the following command:

```
# lspci | grep -i Broadcom
```

The HBA information is displayed.

```
d8:00.0 Serial Attached SCSI controller: Broadcom / LSI SAS3416 Fusion-MPT
Tri-Mode I/O Controller Chip (IOC)
(rev 01)
d9:00.0 Serial Attached SCSI controller: Broadcom / LSI SAS3416 Fusion-MPT
Tri-Mode I/O Controller Chip (IOC)
(rev 01)
```

Step 3: Download the HBA Update Tool utility from the Broadcom website.



Note: The HBA Update Tool utility is utilized to update the SSDs because the SSDs are located behind the HBAs.

Step 4: Copy the HBA Update Tool Broadcom Storcli file into the temporary folder by issuing the following command:

```
# cp STORCLI_SAS3.5_P16.zip tmp/
```

The file is copied to the temporary directory.

Step 5: Unzip the HBA Update Tool Broadcom Storcli file by issuing the following command:

```
# unzip STORCLI_SAS3.5_P16.zip
```

The Firmware file is unzipped.

```
inflating: STORCLI_SAS3.5_P16/MR_SAS_Unified_StorCLI-007.1504.0000.0000.pdf
creating: STORCLI_SAS3.5_P16/univ_viva_cli_rel/
creating: STORCLI_SAS3.5_P16/univ_viva_cli_rel/Unified_storcli_all_os/
...
---OUTPUT TRUNCATED---
...
inflating: STORCLI_SAS3.5_P16/univ_viva_cli_rel/Unified_storcli_all_os/
Windows/license.txt
inflating: STORCLI_SAS3.5_P16/univ_viva_cli_rel/Unified_storcli_all_os/
Windows/storcli64.exe
```

Step 6: Navigate to the Linux directory by issuing the following command:

```
# cd STORCLI_SAS3.5_P16/univ_viva_cli_rel/Unified_storcli_all_os/Linux/
```

The directory is changed to the Linux directory.

Step 7: Install the rpm by issuing the following command:

```
# rpm -ivh storcli-007.1504.0000.0000-1.noarch.rpm
```

The installation is completed and display a status of 100%.

```
warning: storcli-007.1504.0000.0000-1.noarch.rpm: Header V3 RSA/SHA256
Signature, key ID a120b85f: NOKEY
Preparing... ##### [100%]
Updating / installing...
 1:storcli-007.1504.0000.0000-1 ##### [100%]
```

Step 8: Identify the HBA firmware and data SSD information by issuing the following command:

```
# /opt/MegaRAID/storcli/storcli64 /call show
```

The HBA firmware and SSD information is displayed.

```
CLI Version = 007.1504.0000.0000 June 22, 2020
Operating system = Linux 4.14.35-1902.3.2.el7uek.x86_64
Controller =
0
<< Controller ID X
Status = Success
Description = None
Product Name = HBA 9400-16i
Serial Number = SP00705349
SAS Address = 500605b00fdf6940
PCI Address = 00:d8:00:00
System Time = 11/04/2020 16:06:43
FW Version = 16.00.00.00
...
---OUTPUT TRUNCATED---
...
PD LIST :
=====
-----
EID:SlT DID State DG Size Intf Med SED PI SeSz Model Sp
-----
0:4 3 JBOD - 6.985 TB NVMe SSD N N 4 KB WUS4BB076D7P3E3 U
0:6 4 JBOD - 6.985 TB NVMe SSD N N 4 KB WUS4BB076D7P3E3 U
0:8 1 JBOD - 6.985 TB NVMe SSD N N 4 KB WUS4BB076D7P3E3 U
0:10 2 JBOD - 6.985 TB NVMe SSD N N 4 KB WUS4BB076D7P3E3
U << Enclosure Device ID Y and Slot ID Z
-----
...
---OUTPUT TRUNCATED---
...
CLI Version = 007.1504.0000.0000 June 22, 2020
Operating system = Linux 4.14.35-1902.3.2.el7uek.x86_64
Controller = 1
Status = Success
Description = None
Product Name = HBA 9400-16i
Serial Number = SP00705388
SAS Address = 500605b00fdf6920
PCI Address = 00:d9:00:00
System Time = 11/04/2020 16:06:43
FW Package Build = 16.00.00.00
```

3.6 Updating Firmware on the Ultrastar SN640 NVMe SSD

```
FW Version = 16.00.00.00
...
---OUTPUT TRUNCATED---
...
PD LIST :
=====
-----
EID:SlT DID State DG Size Intf Med SED PI SeSz Model Sp
-----
0:4 3 JBOD - 6.985 TB NVMe SSD N N 4 KB WUS4BB076D7P3E3 U
0:6 4 JBOD - 1.746 TB NVMe SSD N N 4 KB WUS3BA119C7P3E3 U
0:12 1 JBOD - 6.985 TB NVMe SSD N N 4 KB WUS4BB076D7P3E3 U
0:14 2 JBOD - 6.985 TB NVMe SSD N N 4 KB WUS4BB076D7P3E3 U
-----
...
---OUTPUT TRUNCATED---
...
```

Step 9: From a terminal, create a temporary folder to store the .zip files by issuing the following command:

```
# mkdir tmp
```

The tmp directory is created.

Step 10: Download the SSD firmware package from the Support Portal to the tmp directory.

Step 11: Verify the current drive firmware by issuing the following command:



Note: This version of firmware should be incrementally less than the version of firmware being updated.

```
# /opt/MegaRAID/storcli/storcli64 /c0 /e0 /s10 show all | grep -i firmware
```

The current SSD firmware version information is displayed.

```
Firmware Revision = R1110007
```

Step 12: Activate the new SSD firmware by issuing the following command:

```
# /opt/MegaRAID/storcli/storcli64 /c0 /e0 /s10 download
src=aspenplus_GN_R1110021.vpkg mode=e offline activatenow
```

The SSD firmware is upgraded.

```
Starting microcode update.please wait...
CLI Version = 007.1504.0000.0000 June 22, 2020
Operating system = Linux 4.14.35-1902.3.2.el7uek.x86_64
Controller = 0
Status = Success
Description = None
```

Step 13: Verify that the SSDs have been updated to the latest version of firmware by issuing the following command:

```
# /opt/MegaRAID/storcli/storcli64 /c0 /e0 /s10 show all | grep -i firmware
```

The latest firmware version information is displayed.

```
Firmware Revision = R1110021
```

Step 14: Repeat SSD firmware the activation for each data SSD in the system.

Step 15: Complete the update on all of the SSDs before rebooting the system.

Step 16: Reboot the system by issuing the following command:

```
# reboot
```

The session is ended and the system is rebooted.

3.7 Updating Firmware on the Mellanox MCX-516A-CCAT 100GbE Network Controller

Step 1: Download the Mellanox ConnectX-5 firmware file and Mellanox Firmware Tools from the Mellanox website to the desired directory.

Step 2: From a terminal, create a temporary folder to store the .zip files by issuing the following command:

```
# mkdir tmp
```

The tmp directory is created.

Step 3: Copy the Firmware file into the temporary folder by issuing the following command:

```
# cp fw-ConnectX5-rel-16_27_2008-MCX516A-CCA_Ax-UEFI-14.20.22-  
FlexBoot-3.5.901.bin.zip tmp/
```

The file is copied into the temporary directory.

Step 4: Copy the Mellanox MFT toolkit into the temporary folder by issuing the following command:

```
# cp mft-4.15.1-9-x86_64-rpm.tgz tmp/
```

The Mellanox MFT toolkit is copied into the temporary directory.

Step 5: Change the Terminal directory to the temporary folder by issuing the following command:

```
# cd tmp/
```

The directory is changed to the temporary directory.

Step 6: Unzip the Firmware file by issuing the following command:

```
# unzip fw-ConnectX5-rel-16_27_2008-MCX516A-CCA_Ax-UEFI-14.20.22-  
FlexBoot-3.5.901.bin.zip
```

The Firmware file is unzipped.

```
Archive: fw-ConnectX5-rel-16_27_2008-MCX516A-CCA_Ax-UEFI-14.20.22-  
FlexBoot-3.5.901.bin.zip  
inflating: fw-ConnectX5-rel-16_27_2008-MCX516A-CCA_Ax-UEFI-14.20.22-  
FlexBoot-3.5.901.bin
```

Step 7: Unzip the Mellanox MFT toolkit by issuing the following command:

```
# tar -xvzf mft-4.15.1-9-x86_64-rpm.tgz
```

The Mellanox MFT toolkit is unzipped.

```
mft-4.15.1-9-x86_64-rpm/  
mft-4.15.1-9-x86_64-rpm/RPMS/  
mft-4.15.1-9-x86_64-rpm/RPMS/mft-4.15.1-9.x86_64.rpm  
mft-4.15.1-9-x86_64-rpm/RPMS/mft-oem-4.15.1-9.x86_64.rpm  
mft-4.15.1-9-x86_64-rpm/SRPMS/  
mft-4.15.1-9-x86_64-rpm/SRPMS/kernel-mft-4.15.1-9.src.rpm  
mft-4.15.1-9-x86_64-rpm/install.sh  
mft-4.15.1-9-x86_64-rpm/uninstall.sh  
mft-4.15.1-9-x86_64-rpm/old-mft-uninstall.sh  
mft-4.15.1-9-x86_64-rpm/LICENSE.txt
```

Step 8: Navigate to the mft-4.15.1-9-x86_64-rpm/ directory by issuing the following command:

```
# cd mft-4.15.1-9-x86_64-rpm/
```

The directory is changed to the new directory.

Step 9: Verify that the install.sh package has installation permissions by issuing the following command:

```
# chmod +x install.sh
```

Step 10: Install the install.sh packages by issuing the following command:

```
# ./install.sh
```

The install.sh packages are installed.

```
-I- Removing the packages: kernel-  
mft-4.15.1-4.14.35_1902.3.2.el7uek.x86_64.x86_64...  
-I- Removing any old MFT file if exists...  
-I- Building the MFT kernel binary RPM...  
-I- Installing the MFT RPMs...  
Preparing... ##### [100%]  
Updating / installing...  
1:kernel-mft-4.15.1-4.14.35_1902.3.##### [100%]  
Preparing... ##### [100%]  
Updating / installing...  
1:mft-4.15.1-9 ##### [100%]  
-I- In order to start mst, please run "mst start".
```

Step 11: Use the Mellanox Software Tools (mst) utility to start the driver by issuing the following command:

```
# mst start
```

The mst utility starts the driver.

```
Starting MST (Mellanox Software Tools) driver set  
Loading MST PCI module - Success  
Loading MST PCI configuration module - Success  
Create devices  
Unloading MST PCI module (unused) - Success
```

Step 12: Verify the PCI Device Address of the Mellanox Adapter ports by issuing the following command:

```
# lspci | grep -i Mellanox
```

The Mellanox Adapter port information is displayed.

```
af:00.0 Ethernet controller: Mellanox Technologies MT27800 Family [ConnectX-5]  
af:00.1 Ethernet controller: Mellanox Technologies MT27800 Family [ConnectX-5]
```

Step 13: Verify the current version of firmware for the first PCI device address by issuing the following command:



Note: The format of the command for the first PCI address is: `mlxfwmanager - query -d <PCI_Device_Address>`

```
# mlxfwmanager -query -d af:00.0
```

```
Querying Mellanox devices firmware ...  
Device #1:  
-----  
Device Type: ConnectX5  
Part Number: MCX516A-CCA_Ax  
Description: ConnectX-5 EN network interface card; 100GbE dual-port QSFP28;  
PCIe3.0 x16; tall bracket;  
ROHS R6  
PSID: MT_0000000012  
PCI Device Name: af:00.0  
Base GUID: 0c42a1030066d442  
Base MAC: 0c42a166d442  
Versions: Current Available  
FW 16.26.1040 16.27.2008  
PXE 3.5.0803 3.5.0901  
UEFI 14.19.0014 14.20.0022  
Status: Update required
```

Step 14: Verify the current version of firmware for the second PCI device address by issuing the following command:



Note: The format of the command for the second PCI address is: `mlxfwmanager - query -d <PCI_Device_Address>`

```
# mlxfwmanager -query -d af:00.1
```

```
Querying Mellanox devices firmware ...  
Device #1:  
-----  
Device Type: ConnectX5  
Part Number: MCX516A-CCA_Ax  
Description: ConnectX-5 EN network interface card; 100GbE dual-port QSFP28;  
PCIe3.0 x16; tall bracket;  
ROHS R6  
PSID: MT_0000000012  
PCI Device Name: af:00.1  
Base GUID: 0c42a1030066d442  
Base MAC: 0c42a166d442  
Versions: Current Available  
FW 16.26.1040 16.27.2008
```

```
PXE 3.5.0803 3.5.0901
UEFI 14.19.0014 14.20.0022
Status: Update required
```

Step 15: Navigate to the fw-ConnectX5-rel-16_27_2008-MCX516A-CCA_Ax-UEFI-14.20.22-FlexBoot-3.5.901.bin/ directory by issuing the following command:

```
# cd fw-ConnectX5-rel-16_27_2008-MCX516A-CCA_Ax-UEFI-14.20.22-
FlexBoot-3.5.901.bin/
```

Step 16: Update the firmware by issuing the following command:



Note: Updating the firmware on either Device ID will update the firmware for both the ports.

```
# flint -d af:00.0 -i fw-ConnectX5-rel-16_27_2008-MCX516A-CCA_Ax-
UEFI-14.20.22-FlexBoot-3.5.901.bin burn
```

The firmware is updated.

```
Current FW version on flash: 16.26.1040
New FW version: 16.27.2008
Initializing image partition - OK
Writing Boot image component - OK
-I- To load new FW run mlxfwreset or reboot machine.
```

Step 17: Complete the firmware update by issuing a reset command:

```
# mlxfwreset -d af:00.0 reset
```

The system reset is started.

```
Minimal reset level for device, /dev/mst/mt4119_pciconf0:
3: Driver restart and PCI reset
Continue with reset?[y/N]
```

Step 18: When prompted, press Y.

The firmware is loaded successfully.

```
y
-I- Sending Reset Command To Fw -Done
-I- Stopping Driver -Done
-I- Resetting PCI -Done
-I- Starting Driver -Done
-I- Restarting MST -Done
-I- FW was loaded successfully.
```

Step 19: Verify the updated version of firmware for the first PCI device address by issuing a reset command:



Note: The format of the command for the first PCI address is: `mlxfwmanager -query -d <PCI_Device_Address>`

```
# mlxfwmanager -query -d af:00.0
```

The information for the first PCI device is displayed.

```
Querying Mellanox devices firmware ...
Device #1:
-----
Device Type: ConnectX5
Part Number: MCX516A-CCA_Ax
Description: ConnectX-5 EN network interface card; 100GbE dual-port QSFP28;
  PCIe3.0 x16; tall bracket;
  ROHS R6
PSID: MT_0000000012
PCI Device Name: af:00.0
Base GUID: 0c42a1030066d442
Base MAC: 0c42a166d442
Versions: Current Available
FW 16.27.2008 16.27.2008
PXE 3.5.0901 3.5.0901
UEFI 14.20.0022 14.20.0022
Status: Up to date
```

Step 20: Verify the updated version of firmware for the second PCI device address by issuing a reset command:



Note: The format of the command for the second PCI address is: `mlxfwmanager -query -d <PCI_Device_Address>`

```
# mlxfwmanager -query -d af:00.1
```

The information for the second PCI device is displayed.

```
Querying Mellanox devices firmware ...
Device #1:
-----
Device Type: ConnectX5
Part Number: MCX516A-CCA_Ax
Description: ConnectX-5 EN network interface card; 100GbE dual-port QSFP28;
  PCIe3.0 x16; tall bracket;
  ROHS R6
PSID: MT_0000000012
PCI Device Name: af:00.1
Base GUID: 0c42a1030066d442
Base MAC: 0c42a166d442
Versions: Current Available
FW 16.27.2008 16.27.2008
PXE 3.5.0901 3.5.0901
UEFI 14.20.0022 14.20.0022
Status: Up to date
```



Configuration

This section provides information about configuring the Ultrastar Edge portable storage server for use.

In This Chapter:

- Ruggedized Transit Case and Commercial Transit Case Configurations.....54
- Rail Kit Configuration.....55

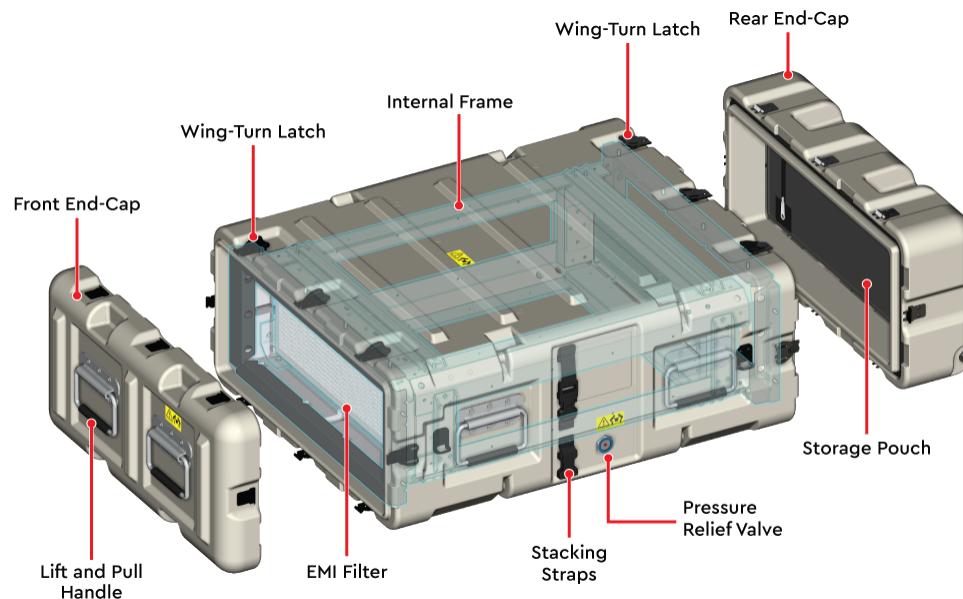
4.1 Ruggedized Transit Case and Commercial Transit Case Configurations

The Ultrastar Edge comes in two different case configurations depending on the specific environment it will be contained in. The Ruggedized Transit Case is a durable hardshell case that is designed to protect the system from damage in more extreme cases. The Commercial Transit Case is standard hardshell case that protects the system during normal transportation from one site to another.

Ruggedized Transit Case

In the Ruggedized Transit Case, the Ultrastar Edge is installed and secured to an internal frame. EMI filters, mounted at the front and rear of the internal frame, provide electromagnetic noise suppression while the Ultrastar Edge is being transported and while the system is in operation. The Ruggedized Transit Case has a total of eight (8) lift and pull handles and mold-in-edge wheels for portability. The front and rear end-caps are secured by spring-loaded wing-turn latches. A zippered pouch in the rear end-cap has been added for cable storage and, with the addition of the pressure relief valve (PRV), the Ruggedized Transit Case is an airtight/watertight transport solution.

Figure 31: Ruggedized Transit Case Layout



Commercial Transit Case

The Commercial Transit Case is a foam-padded, re-usable, hardshell case that is designed to protect the Ultrastar Edge system from damage during transport. In the Commercial Transit Case, the Ultrastar Edge is installed into an ESD-safe bag and the external case is closed and secured using the case's latch system. The Commercial Transit Case has two (2) lift and pull handles, a telescopic handle, and mold-in-edge wheels for portability.

Figure 32: Commercial Transit Case Layout

4.2 Rail Kit Configuration

Rail Kit

The Ultrastar Edge may be installed into a datacenter rack using rack mounted rails. The rail system provided for the Ultrastar Edge can be mounted easily and secured using thumbscrews. The system is then installed onto the rails and secured using nut mount plates.

Figure 33: Rack Mount Rail Kit

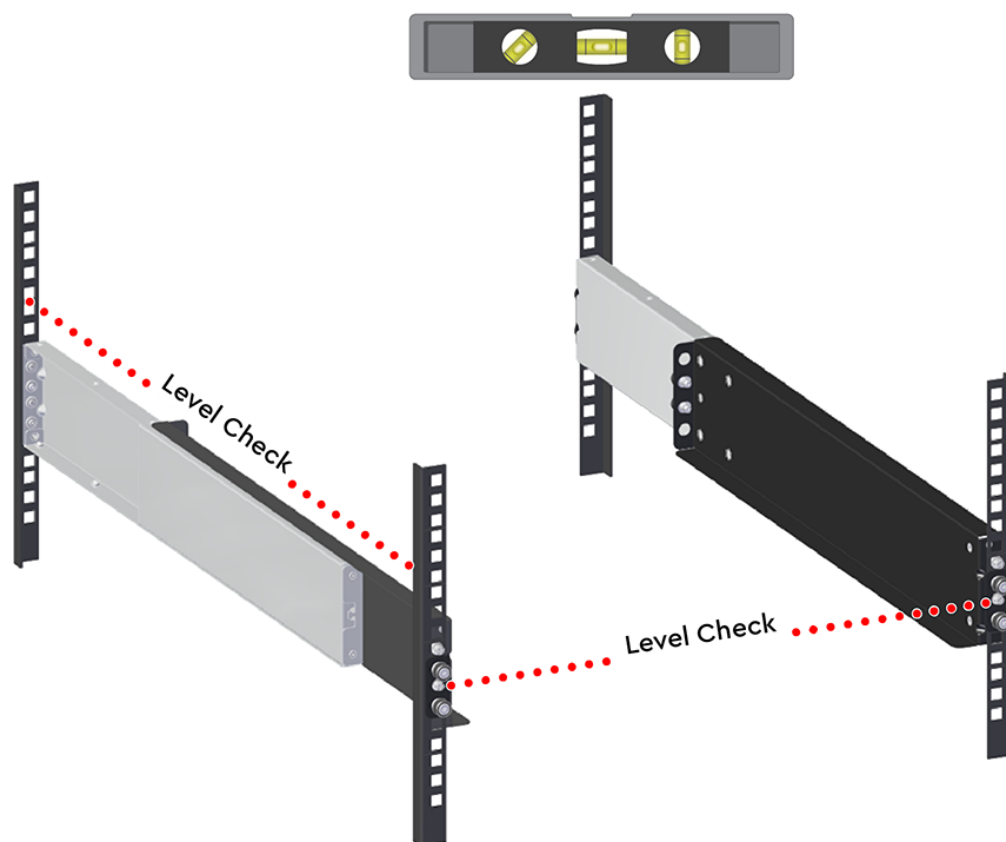
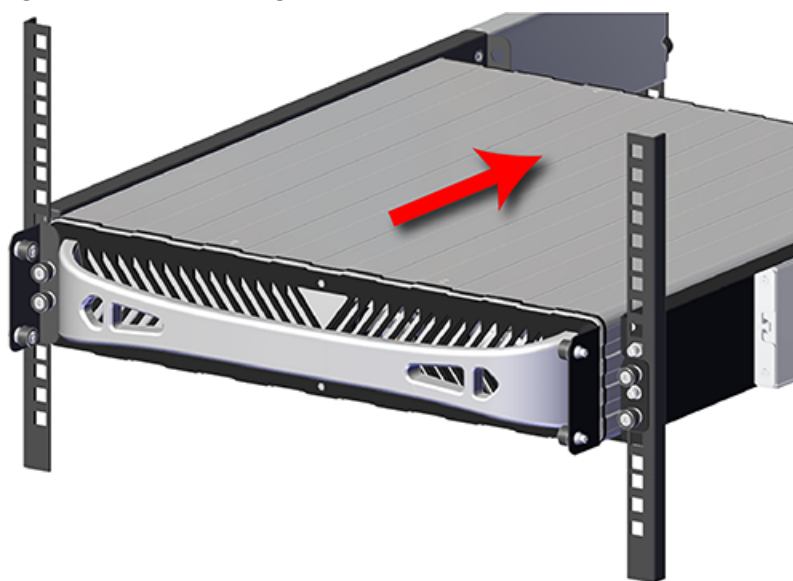


Figure 34: Ultrastar Edge Installed on Rail Kit





Safety

In This Chapter:

- Electrostatic Discharge.....	58
- Optimizing Location.....	58
- Power Connections.....	58
- Power Cords.....	59
- Rack-Mountable Systems.....	59
- Replaceable Batteries.....	59
- Safety and Service.....	60
- Safety Warnings and Cautions.....	60

5.1 Electrostatic Discharge



CAUTION

Electrostatic discharge can harm delicate components inside Western Digital products.

Electrostatic discharge (ESD) is a discharge of stored static electricity that can damage equipment and impair electrical circuitry. It occurs when electronic components are improperly handled and can result in complete or intermittent failures.

Wear an ESD wrist strap for installation, service and maintenance to prevent damage to components in the product. Ensure the antistatic wrist strap is attached to a chassis ground (any unpainted metal surface). If possible, keep one hand on the frame when you install or remove an ESD-sensitive part.

Before moving ESD-sensitive parts, place them in ESD static-protective bags until you are ready to install the part.

5.2 Optimizing Location

- Failure to recognize the importance of optimally locating your product and failure to protect against electrostatic discharge (ESD) when handling your product can result in lowered system performance or system failure.
- Do not position the unit in an environment that has extreme high temperatures or extreme low temperatures. Be aware of the proximity of the unit to heaters, radiators, and air conditioners.
- Position the unit so that there is adequate space around it for proper cooling and ventilation.
- Keep the unit away from direct strong magnetic fields, excessive dust, and electronic/electrical equipment that generate electrical noise.
- Do not place this product on an unstable surface. The product may fall, causing damage to the product.
- Set up the unit on a stable surface, resting in the horizontal position, with the top or bottom side facing up.
- Do not set up or use the Ultrastar Edge in the upright position. This may cause the unit to tip over and result in personal injury or damage to the unit.

5.3 Power Connections

Be aware of the ampere limit on any power supply or extension cables being used. The total ampere rating being pulled on a circuit by all devices combined should not exceed 80% of the maximum limit for the circuit.

CAUTION The power outlet must be easily accessible close to the unit.



Always use properly grounded, unmodified electrical outlets and cables. Ensure all outlets and cables are rated to supply the proper voltage and current.



This unit has a power supply connection; the power cord must be removed from the power supply to completely remove power from the unit. There is no switch or other disconnect device.

When power cycling the unit, wait 10 seconds before re-applying power. Failure to do so may cause the enclosure to boot up in an inaccessible state. If this is encountered, remove power, wait 10 seconds, and then reapply power.

5.4 Power Cords



Use only tested and approved power cords to connect to properly grounded power outlets or insulated sockets of the rack's internal power supply.

If an AC power cord was not provided with your product, purchase one that is approved for use in your country or region.

CAUTION To avoid electrical shock or fire, check the power cord(s) that will be used with the product as follows:

- The power cord must have an electrical rating that is greater than that of the electrical current rating marked on the product.
- Do not attempt to modify or use the AC power cord(s) if they are not the exact type required to fit into the grounded electrical outlets.
- The power supply cord(s) must be plugged into socket-outlet(s) that is / are provided with a suitable earth ground.
- The power supply cord(s) is / are the main disconnect device to AC power. The socket outlet(s) must be near the equipment and readily accessible for disconnection.

5.5 Rack-Mountable Systems

CAUTION: Always install rack rails and storage enclosure according to product documentation. Follow all cautions, warnings, labels, and instructions provided within the rackmount instructions.

Reliable grounding of rack-mounted equipment should be maintained.

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.

Observe the maximum rated ambient temperature, which is specified in the product documentation.

For safe operation of the equipment, installation of the equipment in a rack should be such that the amount of air flow is not impeded so that the safe operation of the equipment is not compromised.

5.6 Replaceable Batteries

If an equipment is provided with a replaceable battery, and if replacement by an incorrect type could result in an explosion (for example, with some lithium batteries), the following applies:

- if the battery is placed in an OPERATOR ACCESS AREA, there shall be a marking close to the battery or a statement in both the operating and servicing instructions;
- if the battery is placed elsewhere in the equipment, there shall be a marking close to the battery or a statement in the servicing instructions.

This marking or statement shall include the following or similar text:

CAUTION

**RISK OF EXPLOSION IF BATTERY IS REPLACED
BY AN INCORRECT TYPE.
DISPOSE OF THE USED BATTERIES ACCORDING
TO THE INSTRUCTIONS**

5.7 Safety and Service



All maintenance and service actions appropriate to the end-users are described in the product documentation. All other servicing should be referred to a Western Digital-authorized service technician.



To avoid shock hazard, turn off power to the unit by unplugging both power cords before servicing the unit. Use extreme caution around the chassis because potentially harmful voltages are present.



When replacing a hot-plug power supply, unplug the power cord to the power supply being replaced before removing it from the .



The power supply in this product contains no user-serviceable parts. Do not open the power supply. Hazardous voltage, current and energy levels are present inside the power supply. Return to manufacturer for servicing.



Use caution when accessing part of the product that are labeled as potential shock hazards, hazardous access to moving parts such as fan blades.

5.8 Safety Warnings and Cautions

To avoid personal injury or property damage, before you begin installing the product, read, observe, and adhere to all of the following safety instructions and information. The following safety symbols may be used throughout the documentation and may be marked on the product and/or the product packaging.

CAUTION Indicates the presence of a hazard that may cause minor personal injury or property damage if the CAUTION is ignored.

WARNING Indicates the presence of a hazard that may result in serious personal injury if the WARNING is ignored.



Indicates potential hazard if indicated information is ignored.



Indicates shock hazards that result in serious injury or death if safety instructions are not followed.



Indicates do not touch fan blades, may result in injury.



Indicates disconnect all power sources before servicing.



Regulatory

In This Chapter:

- Country Certifications.....	63
- Electromagnetic Compatibility (EMC) Class A Compliance.....	63
- Regulatory Statement of Compliance.....	64
- System and Ruggedized Case Regulatory Labels.....	64
- Europe (CE Declaration of Conformity).....	66
- FCC Class A Notice.....	66
- ICES-003 Class A Notice—Avis NMB-003, Classe A.....	67
- Japanese Compliance Statement, Class A ITE.....	67
- Scandinavian Safety Warnings.....	67

6.1 Country Certifications

Ultrastar Edge

The Ultrastar Edge (**A2U24-S**) complies to the latest country certifications:

Table 35: Ultrastar Edge Country Certifications

Country/Region	Authority or Mark
Australia/New Zealand	RCM
European Union	CE
India	BIS
Japan	VCCI
Mexico	NOM
North America (Canada, USA)	Nemko
South Africa	SABS/NRCS
United Kingdom	UKCA

Ruggedized Case

The Ruggedized Case (**A2U24-C**) complies to the latest country certifications:

Table 36: Ruggedized Case Country Certifications

Country/Region	Authority or Mark
Australia/New Zealand	RCM
European Union	CE
North America (Canada, USA)	Nemko
United Kingdom	UKCA

6.2 Electromagnetic Compatibility (EMC) Class A Compliance

The **A2U24-S** and **A2U24-C** comply with and conform to the latest international standards as applicable:

Emissions

- AS/NZS CISPR 32
- BSMI_CNS13438-1
- CE – EMC Directive 2014/30/EU
- CISPR 32
- EN 55032
- FCC CFR 47 Part 15, Subpart B
- ICES-003 Issue 7

- KSC9832
- VCCI V-3

Immunity

- EN 55035
- EN 61000-3-2 Harmonic Current Emissions
- EN 61000-3-3 Voltage Fluctuations and Flicker
- EN 61000-4-2 ESD
- EN 61000-4-3 Radiated Immunity
- EN 61000-4-4 EFT
- EN 61000-4-5 Surge
- EN 61000-4-6 RF Common Mode
- EN 61000-4-8 Power Frequency Magnetic Field
- EN 61000-4-11 Voltage Dips and Interruptions
- KSC9835

6.3 Regulatory Statement of Compliance

Product Name: **Ultrastar Edge**

System Regulatory Model: **A2U24-S**

Ruggedized Case Model: **A2U24-C**

Electromagnetic Compatibility Emissions: **Class A**

This product has been tested and evaluated as Information Technology Equipment (ITE) at accredited third-party laboratories for all safety, emissions and immunity testing required for the countries and regions where the product is marketed and sold. The product has been verified as compliant with the latest applicable standards, regulations and directives for those regions/countries. The suitability of this product for other product categories other than ITE may require further evaluation.

The product is labeled with a unique regulatory model that is printed on the label and affixed to every unit. The label will provide traceability to the regulatory approvals listed in this document. The document applies to any product that bears the regulatory model and type names including marketing names other than those listed in this document.

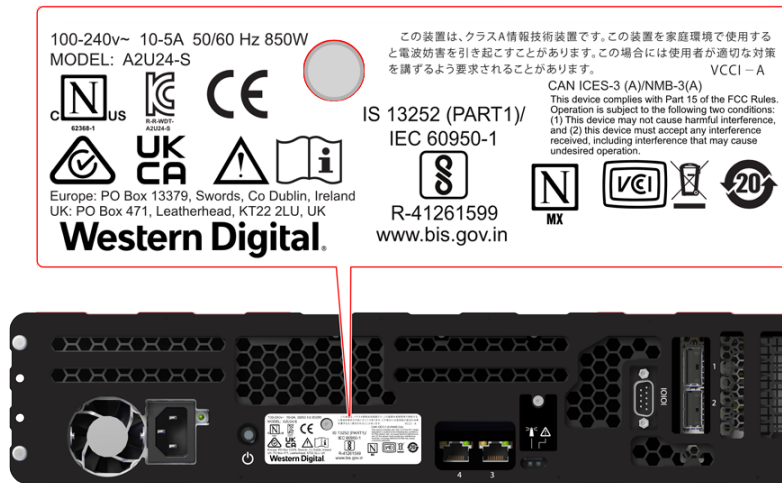
Safety Compliance

- BSMI CNS14336
- CE – Low Voltage Directive
- CSA C22.2 No. 62368-1
- EN 62368-1
- IEC 60950-1
- IEC 62368-1
- IS 13252(PART 1):2010/ IEC 60950-1
- NOM-019-SCFI-1998
- UL 60950-1

6.4 System and Ruggedized Case Regulatory Labels

System Regulator Labels

The system contains a regulatory label on the rear I/O that displays electrical specifications, system model number, and required agency markings. The following is an example label. The format of the actual label may differ from this example:

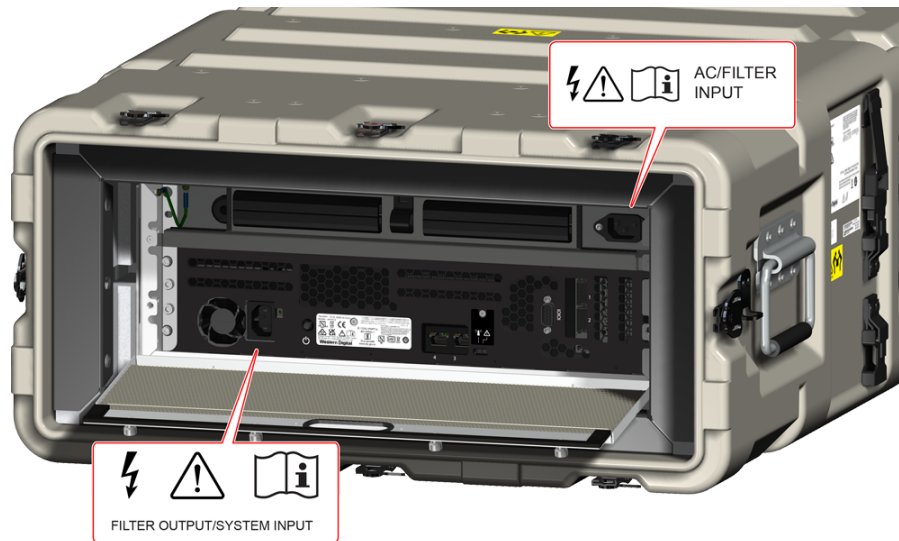


Ruggedized Case Regulatory Labels

The Ruggedized case contains a regulatory label on the right side that displays electrical specifications, system model number, and required agency markings. The following is an example label. The format of the actual label may differ from this example:



The Ruggedized case contains two regulatory labels on the rear of the cage frame that displays warnings related to Electromagnetic Interference (EMI). The label also notifies the user to refer to the product documentation for information related to installation and configuration. The following is an example label. The format of the actual label may differ from this example:



6.5 Europe (CE Declaration of Conformity)

Marking by the symbol indicates compliance of this system to the applicable Council Directives of the European Union, including the Electromagnetic Compatibility Directive (2014/30/EU) and the Low Voltage Directive (2014/30/EU). A “Declaration of Conformity” in accordance with the applicable directives has been made and is on file at Western Digital Europe.

UK Import Representation Contact

Western Digital UK Limited

PO Box 471
Leatherhead KT22 2LU
UK

Telephone: +44 1372 366000

EU Import Representation Contact

Western Digital EU Limited

PO Box 13379
Swords, Co
Dublin, Ireland

6.6 FCC Class A Notice

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.

2. This device must accept any interference received, including interference that may cause undesired operation.



Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if it is not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communications. Any modifications made to this device that are not approved by Western Digital may void the authority granted to the user by the FCC to operate equipment.

6.7 ICES-003 Class A Notice—Avis NMB-003, Classe A

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

6.8 Japanese Compliance Statement, Class A ITE

The following Japanese compliance statement pertains to VCCI EMI regulations:

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

English translation:

This is a Class A product based on the Technical Requirement of the Voluntary Control Council for Interference by Information Technology (VCCI). In a domestic environment, this product may cause radio interference, in which case the user may be required to take corrective actions.

6.9 Scandinavian Safety Warnings

Apparatets stikprop skal tilsluttes en stikkontakt med jord som giver forbindelse til stikproppens jord.

Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan

Apparatet må tilkoples jordet stikkontakt

Apparaten skall anslutas till jordat uttag