Compatibility Matrix

Ultrastar® Data102

Firmware 4011-005

D018-000234-000

Revision 14

March 2024

The Western Digital System Integration Lab tested the Ultrastar Data102 for the following hardware components and operating systems to demonstrate functional compatibility. Other combinations of hardware and software are expected to function with this product family but have not been evaluated.

Newly qualified device models are listed by category on the right. To use this document, click on the provided link to be taken to a detailed listing of the compatibility information for that specific device type. Or scroll down to view details for all tested devices.

HBAs & RAID Adapters

- Adaptec 1100-8e
- Areca ARC-1886-8x, 1883x
- ATTO ExpressSAS H1280GT
- Broadcom 9300-8e, -4i4e, -16e
- Broadcom 9302-16e
- Broadcom 9305-16e
- Broadcom MegaRAID 9380-8e
- Broadcom 9400-16e, -8i8e, -8e
- Broadcom 9405w-16e
- Broadcom MegaRAID 9480-8i8e
- Broadcom 9500-8e, -16e
- Broadcom MegaRAID 9580-8i8e
- QNAP QXP-820S-B3408, QXP-1620S-B3616W

Drives

- Ultrastar DC HC570
- Ultrastar DC HC580
- Ultrastar DC HC650
- Ultrastar DC HC670

Cables

- Molex 106415-2103
- CS Electronics 12G-HD-4444/2M
- The Mate Company (TMC) C5555-2M
- Amphenol ICC (FCI) 601760008

1.1 HBA Compatibility

Adaptec 1100-8e

Table 1: Adaptec 1100-8e Interoperability Notes

	Linux	Windows
BIOS	N/A	N/A
Firmware	2.10[0]	2.10[0]
Driver	1.2.4.065	106.84.2.64
Operating System Support		
Microsoft® Windows	**2016** R1 x64 Server	Supported
	2019 R1 x64 Server	Supported
	2022 R1 x64 Server	Supported
CentOS/RedHat® Enterprise Linux (RHEL)	**7.6** (x86_64) Kernel: 3.10.0-957	Not Supported
	8.0 (x86_64) Kernel: 4.18.0-80	Not Supported
	8.2 (x86_64) Kernel: 4.18.0-193	Not Supported
	8.3 (x86_64) Kernel: 4.18.0-240	Not Supported
	8.4 (x86_64) Kernel: 4.18.0-305	Not Supported
	8.6 (x86_64) Kernel: 4.18.0-372	Not Supported
	9 (x86_64) Kernel: 5.14.0-70	Not Supported
Ubuntu® Server	**16.04** Kernel: 4.4	Not Supported
	18.04 Kernel: 4.15	Not Supported
	20.04 Kernel: 5.4	Not Supported
	22.04 Kernel: 5.15	Not Supported
Debian GNU/Linux	**9.8** Kernel: 4.9	Not Supported
	10 Kernel: 4.19	Not Supported
	11 Kernel: 5.10	Not Supported

Attention: For all HBAs using CentOS/RedHat® Enterprise Linux (RHEL), Ubuntu® Server, or Debian GNU/Linux . If the drives being used exceed 16TiB (equivalent to 16.37 TB) capacity, you must use the Ext4 or XFS file system. Using the Ext3 files system with a drive capacity higher than 16TiB (equivalent to 16.37 TB) will result in an **"too big to be expressed"** error message.

Areca ARC-1886-8x, 1883x

Table 2: Areca ARC-1886-8x, 1883x Interoperability Notes

	Linux	Windows
BIOS	N/A	N/A
Firmware	1.58	1.58
Driver	1.50.0X.07	6.20.00.38
Operating System Support		
Microsoft® Windows	**2016** R1 x64 Server	Not Supported
	2019 R1 x64 Server	Supported
	2022 R1 x64 Server	Supported
CentOS/RedHat® Enterprise Linux (RHEL)	**7.6** (x86_64) Kernel: 3.10.0-957	Not Supported
	8.0 (x86_64) Kernel: 4.18.0-80	Not Supported
	8.2 (x86_64) Kernel: 4.18.0-193	Not Supported
	8.3 (x86_64) Kernel: 4.18.0-240	Not Supported
	8.4 (x86_64) Kernel: 4.18.0-305	Supported
	8.6 (x86_64) Kernel: 4.18.0-372	Supported
	9 (x86_64) Kernel: 5.14.0-70	Supported
Ubuntu® Server	**16.04** Kernel: 4.4	Not Supported
	18.04 Kernel: 4.15	Not Supported
	20.04 Kernel: 5.4	Not Supported
	22.04 Kernel: 5.15	Not Supported
Debian GNU/Linux	**9.8** Kernel: 4.9	Not Supported
	10 Kernel: 4.19	Not Supported
	11 Kernel: 5.10	Not Supported

Attention: For all HBAs using CentOS/RedHat® Enterprise Linux (RHEL), Ubuntu® Server, or Debian GNU/Linux . If the drives being used exceed 16TiB (equivalent to 16.37 TB) capacity, you must use the Ext4 or XFS file system. Using the Ext3 files system with a drive capacity higher than 16TiB (equivalent to 16.37 TB) will result in an **"too big to be expressed"** error message.

ATTO ExpressSAS® H1280GT

Table 3: ATTO ExpressSAS H1280GT Interoperability Notes

	Linux	Windows
BIOS	N/A	N/A
Firmware	FW version: 19.0.0.0 (14) Flash version: 2021_06_15	FW version: 19.0.0.0 (14) Flash version: 2021_06_15
Driver	1.02 (Full version: 1.02.0f1)	1.02 (Full version: 1.02.0f1)
Operating System Support		
Microsoft® Windows	**2016** R1 x64 Server	Not Supported
	2019 R1 x64 Server	Supported
	2022 R1 x64 Server	Not Supported
CentOS/RedHat® Enterprise Linux (RHEL)	**7.6** (x86_64) Kernel: 3.10.0-957	Not Supported
	8.0 (x86_64) Kernel: 4.18.0-80	Not Supported
	8.2 (x86_64) Kernel: 4.18.0-193	Not Supported
	8.3 (x86_64) Kernel: 4.18.0-240	Supported
	8.4 (x86_64) Kernel: 4.18.0-305	Supported
	8.6 (x86_64) Kernel: 4.18.0-372	Not Supported
	9 (x86_64) Kernel: 5.14.0-70	Not Supported
Ubuntu® Server	**16.04** Kernel: 4.4	Not Supported
	18.04 Kernel: 4.15	Not Supported
	20.04 Kernel: 5.4	Not Supported
	22.04 Kernel: 5.15	Not Supported
Debian GNU/Linux	**9.8** Kernel: 4.9	Not Supported
	10 Kernel: 4.19	Not Supported
	11 Kernel: 5.10	Not Supported

Note: As per the design of this adapter, disabling or resetting the PHYs connected from the expander/IOM to the adapter will cause the enclosure's drives to be dropped (unable to be discovered). Rebooting the enclosure or the attached host will allow the drives to be discovered again.

Attention: For all HBAs using CentOS/RedHat® Enterprise Linux (RHEL), Ubuntu® Server, or Debian GNU/Linux . If the drives being used exceed 16TiB (equivalent to 16.37 TB) capacity, you must use the Ext4 or XFS file system. Using the Ext3 files system with a drive capacity higher than 16TiB (equivalent to 16.37 TB) will result in an **"too big to be expressed"** error message.

Broadcom 9300-8e, -4i4e, -16e

Table 4: Broadcom 9300-8e, -4i4e, -16e Interoperability Notes

	Linux	Windows
BIOS	08.37.00.00	08.37.00.00
Firmware	16.00.11.00 / 16.00.17.00	16.00.11.00 / 16.00.17.00
Driver	26.00.00.00-1 **CentOS/RHEL 8.0, 8.2, 8.3, 8.4, 8.6, 9**: 41.00.00.00-1	2.51.27.01
Operating System Support		
Microsoft® Windows	**2016** R1 x64 Server	Supported
	2019 R1 x64 Server	Supported
	2022 R1 x64 Server	Supported
CentOS/RedHat® Enterprise Linux (RHEL)	**7.6** (x86_64) Kernel: 3.10.0-957	Supported
	8.0 (x86_64) Kernel: 4.18.0-80	Supported
	8.2 (x86_64) Kernel: 4.18.0-193	Supported
	8.3 (x86_64) Kernel: 4.18.0-240	Supported
	8.4 (x86_64) Kernel: 4.18.0-305	Supported
	8.6 (x86_64) Kernel: 4.18.0-372	Supported
	9 (x86_64) Kernel: 5.14.0-70	Supported
Ubuntu® Server	**16.04** Kernel: 4.4	Supported
	18.04 Kernel: 4.15	Supported
	20.04 Kernel: 5.4	Supported
	22.04 Kernel: 5.15	Supported
Debian GNU/Linux	**9.8** Kernel: 4.9	Supported
	10 Kernel: 4.19	Supported
	11 Kernel: 5.10	Supported

Note: Using ScrutinyCLI (version 32 or later), changing the `Task Management Reset Type` on the HBA(s) from `Target Reset` to `I_T Nexus Reset` will increase the responsiveness of the topology during the event of a cable pull, IOM/ESM reset, or drive pull. See https://support-en.westerndigital.com/app/answers/detail/a_id/32058 for more details.

Important: Active Optical SAS cable support is limited to Broadcom 9300-, 9302-, 9305-, 9400-, 9500-series HBAs.

Attention: For all HBAs using CentOS/RedHat® Enterprise Linux (RHEL), Ubuntu® Server, or Debian GNU/Linux . If the drives being used exceed 16TiB (equivalent to 16.37 TB) capacity, you must use the Ext4 or XFS file system. Using the Ext3 files system with a drive capacity higher than 16TiB (equivalent to 16.37 TB) will result in an **"too big to be expressed"** error message.

Broadcom 9302-16e

Table 5: Broadcom 9302-16e Interoperability Notes

	Linux	Windows
BIOS	08.37.00.00	08.37.00.00
Firmware	16.00.17.00	16.00.17.00
Driver	39.100.00.00	2.51.27.01
Operating System Support		
Microsoft® Windows	**2016** R1 x64 Server	Supported
	2019 R1 x64 Server	Supported
	2022 R1 x64 Server	Supported
CentOS/RedHat® Enterprise Linux (RHEL)	**7.6** (x86_64) Kernel: 3.10.0-957	Supported
	8.0 (x86_64) Kernel: 4.18.0-80	Supported
	8.2 (x86_64) Kernel: 4.18.0-193	Supported
	8.3 (x86_64) Kernel: 4.18.0-240	Supported
	8.4 (x86_64) Kernel: 4.18.0-305	Supported
	8.6 (x86_64) Kernel: 4.18.0-372	Supported
	9 (x86_64) Kernel: 5.14.0-70	Supported
Ubuntu® Server	**16.04** Kernel: 4.4	Supported
	18.04 Kernel: 4.15	Supported
	20.04 Kernel: 5.4	Supported
	22.04 Kernel: 5.15	Supported
Debian GNU/Linux	**9.8** Kernel: 4.9	Not Supported
	10 Kernel: 4.19	Not Supported
	11 Kernel: 5.10	Not Supported

Note: Using ScrutinyCLI (version 32 or later), changing the `Task Management Reset Type` on the HBA(s) from `Target Reset` to `I_T Nexus Reset` will increase the responsiveness of the topology during the event of a cable pull, IOM/ESM reset, or drive pull. See https://support-en.westerndigital.com/app/answers/detail/a_id/32058 for more details.

Important: Active Optical SAS cable support is limited to Broadcom 9300-, 9302-, 9305-, 9400-, 9500-series HBAs.

Attention: For all HBAs using CentOS/RedHat® Enterprise Linux (RHEL), Ubuntu® Server, or Debian GNU/Linux . If the drives being used exceed 16TiB (equivalent to 16.37 TB) capacity, you must use the Ext4 or XFS file system. Using the Ext3 files system with a drive capacity higher than 16TiB (equivalent to 16.37 TB) will result in an **"too big to be expressed"** error message.

Broadcom 9305-16e

Table 6: Broadcom 9305-16e Interoperability Notes

	Linux	Windows
BIOS	08.37.00.00	08.37.00.00
Firmware	16.00.13.00	16.00.13.00
Driver	39.100.00.00	2.51.27.01
Operating System Support		
Microsoft® Windows	**2016** R1 x64 Server	Supported
	2019 R1 x64 Server	Supported
	2022 R1 x64 Server	Supported
CentOS/RedHat® Enterprise Linux (RHEL)	**7.6** (x86_64) Kernel: 3.10.0-957	Supported
	8.0 (x86_64) Kernel: 4.18.0-80	Supported
	8.2 (x86_64) Kernel: 4.18.0-193	Supported
	8.3 (x86_64) Kernel: 4.18.0-240	Supported
	8.4 (x86_64) Kernel: 4.18.0-305	Supported
	8.6 (x86_64) Kernel: 4.18.0-372	Supported
	9 (x86_64) Kernel: 5.14.0-70	Supported
Ubuntu® Server	**16.04** Kernel: 4.4	Supported
	18.04 Kernel: 4.15	Supported
	20.04 Kernel: 5.4	Supported
	22.04 Kernel: 5.15	Supported
Debian GNU/Linux	**9.8** Kernel: 4.9	Not Supported
	10 Kernel: 4.19	Not Supported
	11 Kernel: 5.10	Not Supported

Note: Using ScrutinyCLI (version 32 or later), changing the `Task Management Reset Type` on the HBA(s) from `Target Reset` to `I_T Nexus Reset` will increase the responsiveness of the topology during the event of a cable pull, IOM/ESM reset, or drive pull. See https://support-en.westerndigital.com/app/answers/detail/a_id/32058 for more details.

Important: Active Optical SAS cable support is limited to Broadcom 9300-, 9302-, 9305-, 9400-, 9500-series HBAs.

Attention: For all HBAs using CentOS/RedHat® Enterprise Linux (RHEL), Ubuntu® Server, or Debian GNU/Linux . If the drives being used exceed 16TiB (equivalent to 16.37 TB) capacity, you must use the Ext4 or XFS file system. Using the Ext3 files system with a drive capacity higher than 16TiB (equivalent to 16.37 TB) will result in an **"too big to be expressed"** error message.

Broadcom MegaRAID 9380-8e

Table 7: Broadcom MegaRAID 9380-8e Interoperability Notes

	Linux	Windows
BIOS	N/A	N/A
Firmware	24.21.0-0159	24.21.0-0159
Driver	07.723.02.00	06.714.18.00
Operating System Support		
Microsoft® Windows	**2016** R1 x64 Server	Supported
	2019 R1 x64 Server	Supported
	2022 R1 x64 Server	Supported
CentOS/RedHat® Enterprise Linux (RHEL)	**7.6** (x86_64) Kernel: 3.10.0-957	Supported
	8.0 (x86_64) Kernel: 4.18.0-80	Supported
	8.2 (x86_64) Kernel: 4.18.0-193	Supported
	8.3 (x86_64) Kernel: 4.18.0-240	Supported
	8.4 (x86_64) Kernel: 4.18.0-305	Supported
	8.6 (x86_64) Kernel: 4.18.0-372	Supported
	9 (x86_64) Kernel: 5.14.0-70	Supported
Ubuntu® Server	**16.04** Kernel: 4.4	Supported
	18.04 Kernel: 4.15	Supported
	20.04 Kernel: 5.4	Supported
	22.04 Kernel: 5.15	Supported
Debian GNU/Linux	**9.8** Kernel: 4.9	Not Supported
	10 Kernel: 4.19	Not Supported
	11 Kernel: 5.10	Not Supported

Attention: For all HBAs using CentOS/RedHat® Enterprise Linux (RHEL), Ubuntu® Server, or Debian GNU/Linux . If the drives being used exceed 16TiB (equivalent to 16.37 TB) capacity, you must use the Ext4 or XFS file system. Using the Ext3 files system with a drive capacity higher than 16TiB (equivalent to 16.37 TB) will result in an **"too big to be expressed"** error message.

Broadcom 9400-16e, -8i8e, -8e

Table 8: Broadcom 9400-16e, -8i8e, -8e Interoperability Notes

	Linux	Windows
BIOS	09.23.00.00	09.23.00.00
Firmware	24.00.00.00	24.00.00.00
Driver	43.00.00.00-1	2.61.48.00
Operating System Support		
Microsoft® Windows	**2016** R1 x64 Server	Supported
	2019 R1 x64 Server	Supported
	2022 R1 x64 Server	Supported
CentOS/RedHat® Enterprise Linux (RHEL)	**7.6** (x86_64) Kernel: 3.10.0-957	Supported
	8.0 (x86_64) Kernel: 4.18.0-80	Supported
	8.2 (x86_64) Kernel: 4.18.0-193	Supported
	8.3 (x86_64) Kernel: 4.18.0-240	Supported
	8.4 (x86_64) Kernel: 4.18.0-305	Supported
	8.6 (x86_64) Kernel: 4.18.0-372	Supported
	9 (x86_64) Kernel: 5.14.0-70	Supported
Ubuntu® Server	**16.04** Kernel: 4.4	Supported
	18.04 Kernel: 4.15	Supported
	20.04 Kernel: 5.4	Supported
	22.04 Kernel: 5.15	Supported
Debian GNU/Linux	**9.8** Kernel: 4.9	Not Supported
	10 Kernel: 4.19	Supported
	11 Kernel: 5.10	Supported

Note: Using ScrutinyCLI (version 32 or later), changing the `Task Management Reset Type` on the HBA(s) from `Target Reset` to `I_T Nexus Reset` will increase the responsiveness of the topology during the event of a cable pull, IOM/ESM reset, or drive pull. See https://support-en.westerndigital.com/app/answers/detail/a_id/32058 for more details.

Attention: For all HBAs using CentOS/RedHat® Enterprise Linux (RHEL), Ubuntu® Server, or Debian GNU/Linux . If the drives being used exceed 16TiB (equivalent to 16.37 TB) capacity, you must use the Ext4 or XFS file system. Using the Ext3 files system with a drive capacity higher than 16TiB (equivalent to 16.37 TB) will result in an **"too big to be expressed"** error message.

Broadcom 9405w-16e

Table 9: Broadcom 9405w-16e Interoperability Notes

	Linux	Windows
BIOS	09.23.00.00	09.23.00.00
Firmware	24.00.00.00	24.00.00.00
Driver	43.00.00.00-1	2.61.48.00
Operating System Support		
Microsoft® Windows	**2016** R1 x64 Server	Supported
	2019 R1 x64 Server	Supported
	2022 R1 x64 Server	Supported
CentOS/RedHat® Enterprise Linux (RHEL)	**7.6** (x86_64) Kernel: 3.10.0-957	Supported
	8.0 (x86_64) Kernel: 4.18.0-80	Supported
	8.2 (x86_64) Kernel: 4.18.0-193	Supported
	8.3 (x86_64) Kernel: 4.18.0-240	Supported
	8.4 (x86_64) Kernel: 4.18.0-305	Supported
	8.6 (x86_64) Kernel: 4.18.0-372	Supported
	9 (x86_64) Kernel: 5.14.0-70	Supported
Ubuntu® Server	**16.04** Kernel: 4.4	Supported
	18.04 Kernel: 4.15	Supported
	20.04 Kernel: 5.4	Supported
	22.04 Kernel: 5.15	Supported
Debian GNU/Linux	**9.8** Kernel: 4.9	Not Supported
	10 Kernel: 4.19	Not Supported
	11 Kernel: 5.10	Not Supported

Note: Using ScrutinyCLI (version 32 or later), changing the `Task Management Reset Type` on the HBA(s) from `Target Reset` to `I_T Nexus Reset` will increase the responsiveness of the topology during the event of a cable pull, IOM/ESM reset, or drive pull. See https://support-en.westerndigital.com/app/answers/detail/a_id/32058 for more details.

Attention: For all HBAs using CentOS/RedHat® Enterprise Linux (RHEL), Ubuntu® Server, or Debian GNU/Linux . If the drives being used exceed 16TiB (equivalent to 16.37 TB) capacity, you must use the Ext4 or XFS file system. Using the Ext3 files system with a drive capacity higher than 16TiB (equivalent to 16.37 TB) will result in an **"too big to be expressed"** error message.

Broadcom MegaRAID 9480-8i8e

Table 10: Broadcom MegaRAID 9480-8i8e Interoperability Notes

	Linux	Windows
BIOS	N/A	N/A
Firmware	51.23.0-4637	51.23.0-4637
Driver	07.723.02.00	07.723.02.00
Operating System Support		
Microsoft® Windows	**2016** R1 x64 Server	Supported
	2019 R1 x64 Server	Supported
	2022 R1 x64 Server	Supported
CentOS/RedHat® Enterprise Linux (RHEL)	**7.6** (x86_64) Kernel: 3.10.0-957	Supported
	8.0 (x86_64) Kernel: 4.18.0-80	Supported
	8.2 (x86_64) Kernel: 4.18.0-193	Supported
	8.3 (x86_64) Kernel: 4.18.0-240	Supported
	8.4 (x86_64) Kernel: 4.18.0-305	Supported
	8.6 (x86_64) Kernel: 4.18.0-372	Supported
	9 (x86_64) Kernel: 5.14.0-70	Supported
Ubuntu® Server	**16.04** Kernel: 4.4	Supported
	18.04 Kernel: 4.15	Supported
	20.04 Kernel: 5.4	Supported
	22.04 Kernel: 5.15	Supported
Debian GNU/Linux	**9.8** Kernel: 4.9	Not Supported
	10 Kernel: 4.19	Not Supported
	11 Kernel: 5.10	Not Supported

Attention: For all HBAs using CentOS/RedHat® Enterprise Linux (RHEL), Ubuntu® Server, or Debian GNU/Linux . If the drives being used exceed 16TiB (equivalent to 16.37 TB) capacity, you must use the Ext4 or XFS file system. Using the Ext3 files system with a drive capacity higher than 16TiB (equivalent to 16.37 TB) will result in an **"too big to be expressed"** error message.

Broadcom 9500-8e, -16e

Table 11: Broadcom 9500-8e, -16e Interoperability Notes

	Linux	Windows	FreeBSD
BIOS	N/A	N/A	N/A
Firmware	25.00.00.00	25.00.00.00	25.00.00.00
Driver	44.00.00.00-1	2.61.54.00	23.00.00.00
Operating System Support			
Microsoft® Windows		**2016** R1 x64 Server	Not Supported
		2019 R1 x64 Server	Supported
		2022 R1 x64 Server	Supported
CentOS/RedHat® Enterprise Linux (RHEL)		**7.6** (x86_64) Kernel: 3.10.0-957	Supported
		8.0 (x86_64) Kernel: 4.18.0-80	Supported
		8.2 (x86_64) Kernel: 4.18.0-193	Supported
		8.3 (x86_64) Kernel: 4.18.0-240	Supported
		8.4 (x86_64) Kernel: 4.18.0-305	Supported
		8.6 (x86_64) Kernel: 4.18.0-372	Supported
		9 (x86_64) Kernel: 5.14.0-70	Supported
Ubuntu® Server		**16.04** Kernel: 4.4	Supported
		18.04 Kernel: 4.15	Supported
		20.04 Kernel: 5.4	Supported
		22.04 Kernel: 5.15	Supported
Debian GNU/Linux		**9.8** Kernel: 4.9	Not Supported
		10 Kernel: 4.19	Not Supported
		11 Kernel: 5.10	Not Supported
FreeBSD®		13.2	Supported[1]

Note: Using ScrutinyCLI (version 32 or later), changing the `Task Management Reset Type` on the HBA(s) from `Target Reset` to `I_T Nexus Reset` will increase the responsiveness of the topology during the event of a cable pull, IOM/ESM reset, or drive pull. See https://support-en.westerndigital.com/app/answers/detail/a_id/32058 for more details.

Attention: For all HBAs using CentOS/RedHat® Enterprise Linux (RHEL), Ubuntu® Server, or Debian GNU/Linux . If the drives being used exceed 16TiB (equivalent to 16.37 TB) capacity, you must use the Ext4 or XFS file system. Using the Ext3 files system with a drive capacity higher than 16TiB (equivalent to 16.37 TB) will result in an **"too big to be expressed"** error message.

1. WDDCS tool and sg_scan tool will not work in FreeBSD. Camcontrol tool which has limited functionality can be used.

Broadcom MegaRAID 9580-8i8e

Table 12: Broadcom MegaRAID 9580-8i8e Interoperability Notes

	Linux	Windows
BIOS	N/A	N/A
Firmware	52.23.0-4636	52.23.0-4636
Driver	07.723.02.00	07.723.02.00-1
Operating System Support		
Microsoft® Windows	**2016** R1 x64 Server	Not Supported
	2019 R1 x64 Server	Supported
	2022 R1 x64 Server	Supported
CentOS/RedHat® Enterprise Linux (RHEL)	**7.6** (x86_64) Kernel: 3.10.0-957	Supported
	8.0 (x86_64) Kernel: 4.18.0-80	Supported
	8.2 (x86_64) Kernel: 4.18.0-193	Supported
	8.3 (x86_64) Kernel: 4.18.0-240	Supported
	8.4 (x86_64) Kernel: 4.18.0-305	Supported
	8.6 (x86_64) Kernel: 4.18.0-372	Supported
	9 (x86_64) Kernel: 5.14.0-70	Supported
Ubuntu® Server	**16.04** Kernel: 4.4	Supported
	18.04 Kernel: 4.15	Supported
	20.04 Kernel: 5.4	Supported
	22.04 Kernel: 5.15	Supported
Debian GNU/Linux	**9.8** Kernel: 4.9	Not Supported
	10 Kernel: 4.19	Not Supported
	11 Kernel: 5.10	Not Supported

Attention: For all HBAs using CentOS/RedHat® Enterprise Linux (RHEL), Ubuntu® Server, or Debian GNU/Linux . If the drives being used exceed 16TiB (equivalent to 16.37 TB) capacity, you must use the Ext4 or XFS file system. Using the Ext3 files system with a drive capacity higher than 16TiB (equivalent to 16.37 TB) will result in an **"too big to be expressed"** error message.

QNAP QXP-820S-B3408, QXP-1620S-B3616

Table 13: QNAP QXP-820S-B3408, QXP-1620S-B3616W Interoperability Notes

	Linux	Windows
BIOS	N/A	N/A
Firmware	18.00.00.00	N/A
Driver	41.00.00.00	N/A
Operating System Support		
Microsoft® Windows	**2016** R1 x64 Server	Not Supported
	2019 R1 x64 Server	Not Supported
CentOS/RedHat® Enterprise Linux (RHEL)	**7.6** (x86_64) Kernel: 3.10.0-957	Not Supported
	8.0 (x86_64) Kernel: 4.18.0-80	Not Supported
	8.2 (x86_64) Kernel: 4.18.0-193	Not Supported
	8.3 (x86_64) Kernel: 4.18.0-240	Not Supported
	8.4 (x86_64) Kernel: 4.18.0-305	Not Supported
Ubuntu® Server	**16.04** Kernel: 4.4	Not Supported
	18.04 Kernel: 4.15	Supported
	20.04 Kernel: 5.4	Not Supported
Debian GNU/Linux	**9.8** Kernel: 4.9	Not Supported
	10 Kernel: 4.19	Not Supported
	11 Kernel: 5.10	Not Supported

Attention: For all HBAs using CentOS/RedHat® Enterprise Linux (RHEL), Ubuntu® Server, or Debian GNU/Linux . If the drives being used exceed 16TiB (equivalent to 16.37 TB) capacity, you must use the Ext4 or XFS file system. Using the Ext3 files system with a drive capacity higher than 16TiB (equivalent to 16.37 TB) will result in an **"too big to be expressed"** error message.

1.2 Cable Compatibility

Active Cables

Active cables can be used for both direct (host-to-enclosure) and daisy-chain (enclosure-to-enclosure) connections.

Important: Active Optical SAS cable support is limited to Broadcom 9300-, 9302-, 9305-, 9400-, 9500-series HBAs.

Note: MegaRAID adapters do not support the use of active SAS cables. If your configuration requires the use of MegaRAID adapters, passive cables must be used.

Table 14: Approved Active Optical HD Mini-SAS to HD Mini-SAS Cables

Length	Manufacturer	Vendor Part Number
2m	JPC Connectivity (Jess-Link)	P5388FC3002M-1[2]
3m	Amphenol ICC (FCI)	FOHHB23P00003[3]
	JPC Connectivity (Jess-Link)	P5388FC3003M-1
	Molex	106415-2103
4m	Amphenol ICC (FCI)	FOHHB23P00004
	JPC Connectivity (Jess-Link)	P5388FC3004M-1
	JPC Connectivity (Jess-Link)	P5388FC3004M-3
5m	Amphenol ICC (FCI)	FOHHB23P00005
	Molex	106415-2105
6m	Amphenol ICC (FCI)	FOHHB23P00006
	JPC Connectivity (Jess-Link)	P5388FC3006M-1
10m	Molex	106415-2110

Passive Cables

Passive cables should only be used for direct (host-to-enclosure) connections.

Table 15: Approved Passive HD Mini-SAS to HD Mini-SAS Cables

Length	Manufacturer	Vendor Part Number
1m	Amphenol ICC (FCI)	10112041-2010LF
2m	Amphenol ICC (FCI)	601760006
		10117949-2020LF

2. Listed JPC P5388FC300xxx cables are compatible, beginning with firmware version 4008-020 and later.

3. Listed FOHHB23P00xxx cables are compatible, beginning with firmware version 2052-020 and later.

Length	Manufacturer	Vendor Part Number
		10112041-2020LF
	CS Electronics	12G-HD-4444/2M
	Data Storage Cables (DSC)	C5555-2M
	Molex	1110751002
	The Mate Company (TMC)	C5555-2M
3m	Amphenol ICC (FCI)	601760008
		10117949-4030LF
		10112041-2030LF
	CS Electronics	12G-HD-4444/3M
	Molex	1110751003

1.3 Drive Compatibility

Ultrastar DC HC310 CMR, 6TB HDD with 3.5" Drive Carrier

Table 16: DC HC310 Part / Model Numbers

Sector Size	SATA		SAS		
	SE	TCG	SE	TCG	TCG-FIPS
512e	1EX1189 / HUS726T6TAL-E604	1EX1188 / HUS726T6TAL-E601	1EX1185 / HUS726T6TAL-5204	1EX1184 / HUS726T6TAL-5201	1EX1853 / HUS726T6TAL-5205
4Kn	1EX1187 / HUS726T6TAL-N604	1EX1186 / HUS726T6TAL-N601	1EX1183 / HUS726T6TAL-4204	1EX1182 / HUS726T6TAL-4201	1EX1852 / HUS726T6TAL-4205

Ultrastar DC HC310 drives are only compatible with the OSs and HBAs listed in the following table:

OS	Kernel	HBA	HBA FW	HBA Driver
Ubuntu 18.04	4.15.0-76-generic	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9405-16e		
		9500-8e	24.00.00.00	
		9500-16e		
Ubuntu 20.04	5.4.0-47-generic	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9405-16e		
		9500-8e	24.00.00.00	
		9500-16e		
Ubuntu 22.04	5.15	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9400-16e		
		9500-8e	24.00.00.00	
		9500-16e		

OS	Kernel	HBA	HBA FW	HBA Driver
CentOS/RedHat Enterprise Linux (RHEL)	5.14.0.70.13.1	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9400-16e		
		9500-8e	24.00.00.00	
		9500-16e		

Ultrastar DC HC320 CMR, 8TB HDD with 3.5" Drive Carrier

Table 18: DC HC320 Part / Model Numbers

Sector Size	SATA			SAS		
	SE	SED	TCG	SE	TCG	TCG-FIPS
512e	1EX1227 / HUS728T8TAL-E604	1EX1226 / HUS728T8TAL-E601		1EX1223 / HUS728T8TAL-5204	1EX1222 / HUS728T8TAL-5201	1EX1343 / HUS728T8TAL-5205
4Kn	1EX1225 / HUS728T8TAL-N604		1EX1224 / HUS728T8TAL-N601	1EX1221 / HUS728T8TAL-4204	1EX1220 / HUS728T8TAL-4201	1EX1342 / HUS728T8TAL-4205

Ultrastar DC HC320 drives are only compatible with the OSs and HBAs listed in the following table:

OS	Kernel	HBA	HBA FW	HBA Driver
Ubuntu 18.04	4.15.0-76-generic	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9405-16e		
		9500-8e	24.00.00.00	
		9500-16e		
Ubuntu 20.04	5.4.0-47-generic	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9405-16e		
		9500-8e	24.00.00.00	
		9500-16e		
Ubuntu 22.04	5.15	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		

OS	Kernel	HBA	HBA FW	HBA Driver
		9300-4i4e		
		9400-8e		
		9400-16e		
		9500-8e	24.00.00.00	
		9500-16e		
CentOS/RedHat Enterprise Linux (RHEL)	5.14.0.70.13.1	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9400-16e		
		9500-8e	24.00.00.00	
		9500-16e		

Ultrastar DC HC330 CMR, 10TB HDD with 3.5" Drive Carrier

Table 20: DC HC330 Part / Model Numbers

Sector Size	SATA		SAS		
	SE	SED	SE	TCG	TCG-FIPS
512e	1EX2440 / WUS721010AL-E604	1EX2441 / WUS721010AL-E601	1EX2435 / WUS721010AL-5204	1EX2436 / WUS721010AL-5201	1EX2437 / WUS721010AL-5205
4Kn	1EX2438 / WUS721010AL-N604	1EX2439 / WUS721010AL-N601	1EX2432 / WUS721010AL-4204	1EX2433 / WUS721010AL-4201	1EX2434 / WUS721010AL-4205

Ultrastar DC HC330 drives are only compatible with the OSs and HBAs listed in the following table:

OS	Kernel	HBA	HBA FW	HBA Driver
Ubuntu 18.04	4.15.0-76-generic	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9405-16e		
		9500-8e	24.00.00.00	
		9500-16e		
Ubuntu 20.04	5.4.0-47-generic	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		

OS	Kernel	HBA	HBA FW	HBA Driver
		9405-16e		
		9500-8e	24.00.00.00	
		9500-16e		
Ubuntu 22.04	5.15	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9400-16e		
		9500-8e	24.00.00.00	
		9500-16e		
CentOS/RedHat Enterprise Linux (RHEL)	5.14.0.70.13.1	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9400-16e		
		9500-8e	24.00.00.00	
		9500-16e		

Ultrastar DC HC510 CMR, 10TB HDD with 3.5" Drive Carrier

Table 22: DC HC510 Part / Model Numbers

Sector Size	SATA			SAS			
	SE	ISE	SED	SE	ISE	TCG	TCG-FIPS
512e	1EX0499 / HUH721010AL-E604	1EX0497 / HUH721010AL-E600	1EX0498 / HUH721010AL-E601	1EX0487 / HUH721010AL-5204	1EX0485 / HUH721010AL-5200	1EX0486 / HUH721010AL-5201	1EX1341 / HUH721010AL-5205
4Kn	1EX0496 / HUH721010AL-N604	1EX0494 / HUH721010AL-N600	1EX0495 / HUH721010AL-N601	1EX0484 / HUH721010AL-4204	1EX0482 / HUH721010AL-4200	1EX0483 / HUH721010AL-4201	1EX1340 / HUH721010AL-4205

Ultrastar DC HC510 drives are only compatible with the OSs and HBAs listed in the following table:

OS	Kernel	HBA	HBA FW	HBA Driver
Ubuntu 18.04	4.15.0-76-generic	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9405-16e		
		9500-8e	24.00.00.00	

OS	Kernel	HBA	HBA FW	HBA Driver
		9500-16e		
Ubuntu 20.04	5.4.0-47-generic	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9405-16e		
		9500-8e	24.00.00.00	
		9500-16e		
Ubuntu 22.04	5.15	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9400-16e		
		9500-8e	24.00.00.00	
		9500-16e		
CentOS/RedHat Enterprise Linux (RHEL)	5.14.0.70.13.1	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9400-16e		
		9500-8e	24.00.00.00	
		9500-16e		

Ultrastar DC HC520 CMR, 12TB HDD with 3.5" Drive Carrier

Table 24: DC HC520 Part / Model Numbers

Sector Size	SATA			SAS			
	SE	ISE	SED	SE	ISE	TCG	TCG-FIPS
512e	1EX1015 / HUH721212AL-E604	1EX1013 / HUH721212AL-E600	1EX1014 / HUH721212AL-E601	1EX1009 / HUH721212AL-5204	1EX1007 / HUH721212AL-5200	1EX1008 / HUH721212AL-5201	1EX1338 / HUH721212AL-5205
4Kn	1EX1012 / HUH721212AL-N604	1EX1010 / HUH721212AL-N600	1EX1011 / HUH721212AL-N601	1EX1006 / HUH721212AL-4204	1EX1004 / HUH721212AL-4200	1EX1005 / HUH721212AL-4201	1EX1339 / HUH721212AL-4205

Ultrastar DC HC520 drives are only compatible with the OSs and HBAs listed in the following table:

OS	Kernel	HBA	HBA FW	HBA Driver
Ubuntu 18.04	4.15.0-76-generic	9300-8e	22.00.00.00	43.00.00.00

OS	Kernel	HBA	HBA FW	HBA Driver
		9300-16e		
		9300-4i4e		
		9400-8e		
		9405-16e		
		9500-8e	24.00.00.00	
		9500-16e		
Ubuntu 20.04	5.4.0-47-generic	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9405-16e		
		9500-8e	24.00.00.00	
		9500-16e		
Ubuntu 22.04	5.15	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9400-16e		
		9500-8e	24.00.00.00	
		9500-16e		
CentOS/RedHat Enterprise Linux (RHEL)	5.14.0.70.13.1	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9400-16e		
		9500-8e	24.00.00.00	
		9500-16e		

Ultrastar DC HC530 CMR, 14TB HDD with 3.5" Drive Carrier

Attention: Lower performance observed for multiple (2, 4, and 8) write streams when using I/O Queue Depths of less than 4 on Ultrastar DC HC530 14TB SAS drives.

Table 26: DC HC530 Part / Model Numbers

Sector Size	SATA		SAS			
	SE	SED	SE	ISE	TCG	TCG-FIPS
512e	1EX1793* / WUH721414AL-E604 1EX3046 / WUH721814AL-E6L4	1EX1794* / WUH721414AL-E6L1	1EX1791* / WUH721414AL-5204 1EX3045 / WUH721814AL-520	1EX1583 / WUH721414AL-5200	1EX1792* / WUH721414AL-5201	1EX1855 / WUH721414AL-5205
4Kn	1EX1790* / WUH721414AL-N604		1EX1788* / WUH721414AL-4204		1EX1789* / WUH721414AL-4201	1EX1854 / WUH721414AL-4205

** This part number is no longer available.*

Ultrastar DC HC530 drives are only compatible with the OSs and HBAs listed in the following table:

OS	Kernel	HBA	HBA FW	HBA Driver
Ubuntu 18.04	4.15.0-76-generic	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9405-16e		
		9500-8e	24.00.00.00	
		9500-16e		
Ubuntu 20.04	5.4.0-47-generic	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9405-16e		
		9500-8e	24.00.00.00	
		9500-16e		
Ubuntu 22.04	5.15	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9400-16e		
		9500-8e	24.00.00.00	
		9500-16e		
CentOS/RedHat Enterprise Linux (RHEL)	5.14.0.70.13.1	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		

OS	Kernel	HBA	HBA FW	HBA Driver
		9400-8e		
		9400-16e		
		9500-8e	24.00.00.00	
		9500-16e		

Ultrastar DC HC550 CMR, 16TB HDD with 3.5" Drive Carrier

Table 28: DC HC550 Part / Model Numbers

Sector Size	SATA		SAS		
	SE	SED	SE	TCG	TCG-FIPS
512e	1EX2476 / WUH721816AL-E604	1EX2477 / WUH721816AL-E601	1EX2473 / WUH721816AL-5204	1EX2474 / WUH721816AL-5201	1EX2475 / WUH721816AL-5205

Ultrastar DC HC550 drives are only compatible with the OSs and HBAs listed in the following table:

OS	Kernel	HBA	HBA FW	HBA Driver
Ubuntu 18.04	4.15.0-76-generic	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9405-16e		
		9500-8e	24.00.00.00	
		9500-16e		
Ubuntu 20.04	5.4.0-47-generic	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9405-16e		
		9500-8e	24.00.00.00	
		9500-16e		
Ubuntu 22.04	5.15	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9400-16e		
		9500-8e	24.00.00.00	
		9500-16e		

OS	Kernel	HBA	HBA FW	HBA Driver
CentOS/RedHat Enterprise Linux (RHEL)	5.14.0.70.13.1	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9400-16e		
		9500-8e	24.00.00.00	
		9500-16e		

Ultrastar DC HC550 CMR, 18TB HDD with 3.5" Drive Carrier

Table 30: DC HC550 Part / Model Numbers

Sector Size	SATA		SAS		
	SE	SED	SE	TCG	TCG-FIPS
512e	1EX2481 / WUH721818AL-E604	1EX2482 / WUH721818AL-E601	1EX2478 / WUH721818AL-5204	1EX2479 / WUH721818AL-5201	1EX2480 / WUH721818AL-5205

Ultrastar DC HC550 drives are only compatible with the OSs and HBAs listed in the following table:

OS	Kernel	HBA	HBA FW	HBA Driver
Ubuntu 18.04	4.15.0-76-generic	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9405-16e		
		9500-8e	24.00.00.00	
		9500-16e		
Ubuntu 20.04	5.4.0-47-generic	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9405-16e		
		9500-8e	24.00.00.00	
		9500-16e		
Ubuntu 22.04	5.15	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		

OS	Kernel	HBA	HBA FW	HBA Driver
		9400-16e		
		9500-8e	24.00.00.00	
		9500-16e		
CentOS/RedHat Enterprise Linux (RHEL)	5.14.0.70.13.1	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9400-16e		
		9500-8e	24.00.00.00	
		9500-16e		

Ultrastar DC HC560 CMR, 20TB HDD with 3.5" Drive Carrier

Table 32: DC HC560 Part / Model Numbers

Sector Size	SATA		SAS	
	SE	SED	SE	TCG
512e	1EX2909 / WUH722020BL-E604	1EX2910 / WUH722020BL-E601	1EX2906 / WUH722020BL-5204	1EX2907 / WUH722020BL-5201

Ultrastar DC HC560 drives are only compatible with the OSs and HBAs listed in the following table:

OS	Kernel	HBA	HBA FW	HBA Driver
Ubuntu 18.04	4.15.0-76-generic	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9405-16e		
		9500-8e	24.00.00.00	
		9500-16e		
Ubuntu 20.04	5.4.0-47-generic	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9405-16e		
		9500-8e	24.00.00.00	
		9500-16e		
Ubuntu 22.04	5.15	9300-8e	22.00.00.00	43.00.00.00

OS	Kernel	HBA	HBA FW	HBA Driver
		9300-16e		
		9300-4i4e		
		9400-8e		
		9400-16e		
		9500-8e	24.00.00.00	
		9500-16e		
CentOS/RedHat Enterprise Linux (RHEL)	5.14.0.70.13.1	9300-8e		43.00.00.00
		9300-16e	22.00.00.00	
		9300-4i4e		
		9400-8e		
		9400-16e		
		9500-8e	24.00.00.00	
		9500-16e		

Ultrastar DC HC570 CMR, 22TB HDD with 3.5" Drive Carrier

Table 34: DC HC570 Part / Model Numbers

Sector Size	SATA		SAS	
	SE	SED	SE	TCG
512e	1EX2966/ WUH722222AL-E604	1EX2967/ WUH722222AL-E601	1EX2963/ WUH722222AL-5204	1EX2964/ WUH722222AL-5201

Ultrastar DC HC570 drives are only compatible with the OSs and HBAs listed in the following table:

OS	Kernel	HBA	HBA FW	HBA Driver
Ubuntu 18.04	4.15.0-76-generic	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9405-16e		
		9500-8e	24.00.00.00	
		9500-16e		
Ubuntu 20.04	5.4.0-47-generic	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9405-16e		

OS	Kernel	HBA	HBA FW	HBA Driver
		9500-8e	24.00.00.00	
		9500-16e		
Ubuntu 22.04	5.15	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9400-16e		
		9500-8e	24.00.00.00	
		9500-16e		
CentOS/RedHat Enterprise Linux (RHEL)	5.14.0.70.13.1	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9400-16e		
		9500-8e	24.00.00.00	
		9500-16e		

Ultrastar DC HC580 CMR, 22TB HDD with 3.5" Drive Carrier

Table 36: DC HC580 Part / Model Numbers

Sector Size	SATA
	SE
512e	1EX3169/ WUH722422AL-E6L4

Ultrastar DC HC570 drives are only compatible with the OSs and HBAs listed in the following table:

OS	Kernel	HBA	HBA FW	HBA Driver
Ubuntu 18.04	4.15.0-76-generic	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9405-16e		
		9500-8e	24.00.00.00	
		9500-16e		
Ubuntu 20.04	5.4.0-47-generic	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		

OS	Kernel	HBA	HBA FW	HBA Driver
		9300-4i4e		
		9400-8e		
		9405-16e		
		9500-8e	24.00.00.00	
		9500-16e		
Ubuntu 22.04	5.15	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9400-16e		
		9500-8e	24.00.00.00	
		9500-16e		
CentOS/RedHat Enterprise Linux (RHEL)	5.14.0.70.13.1	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9400-16e		
		9500-8e	24.00.00.00	
		9500-16e		

Ultrastar DC HC580 CMR, 24TB HDD with 3.5" Drive Carrier

Table 38: DC HC580 Part / Model Numbers

Sector Size	SATA
	SE
512e	1EX3171/ WUH722424AL-E6L4

Ultrastar DC HC580 drives are only compatible with the OSs and HBAs listed in the following table:

OS	Kernel	HBA	HBA FW	HBA Driver
Ubuntu 18.04	4.15.0-76-generic	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9405-16e		
		9500-8e	24.00.00.00	

OS	Kernel	HBA	HBA FW	HBA Driver
		9500-16e		
Ubuntu 20.04	5.4.0-47-generic	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9405-16e		
		9500-8e	24.00.00.00	
		9500-16e		
Ubuntu 22.04	5.15	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9400-16e		
		9500-8e	24.00.00.00	
		9500-16e		
CentOS/RedHat Enterprise Linux (RHEL)	5.14.0.70.13.1	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9400-16e		
		9500-8e	24.00.00.00	
		9500-16e		

Ultrastar DC HC650 SMR, 20TB HDD with 3.5" Drive Carrier

Table 40: DC HC650 Part / Model Numbers

Sector Size	SATA		SAS	
	SE	SED	SE	TCG
4Kn	1EX2719 / WSH722020AL-N604	1EX2720 / WSH722020AL-N601	1EX2716 / WSH722020AL-4204	1EX2717 / WSH722020AL-4201

Ultrastar DC HC650 drives are only compatible with the OSs and HBAs listed in the following table:

Caution: Known Issue

- The host or application is required to send an explicit write pointer reset before rewriting zones.
- This issue will only occur with SATA SMR drives when a zone is full. The application is required to add a check and apply the write pointer reset command that is appropriate for the zone state.
- The sg_rep_zones command will report the following zone state information: empty, partially filled, or full.

OS	Kernel	HBA	HBA FW	HBA Driver
Ubuntu 18.04	4.15.0-76-generic	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9405-16e		
		9500-8e	24.00.00.00	
		9500-16e		
Ubuntu 20.04	5.4.0-47-generic	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9405-16e		
		9500-8e	24.00.00.00	
		9500-16e		
Ubuntu 22.04	5.15	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9400-16e		

OS	Kernel	HBA	HBA FW	HBA Driver
		9500-8e	24.00.00.00	
		9500-16e		
CentOS/RedHat Enterprise Linux (RHEL)	5.14.0.70.13.1	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9400-16e		
		9500-8e	24.00.00.00	
		9500-16e		

Ultrastar DC HC670 SMR, 26TB HDD with 3.5" Drive Carrier

Table 42: DC HC670 Part / Model Numbers

Sector Size	SATA		SAS	
	SE	SED	SE	TCG
4Kn	1EX3013 / WSH722626ALN604	1EX3014 / WSH722626ALN601	1EX3010 / WSH722626AL4204	1EX3011 / WSH722626AL4201

Ultrastar DC HC670 drives are only compatible with the OSs and HBAs listed in the following table:

Caution: Known Issue

- The host or application is required to send an explicit write pointer reset before rewriting zones.
- This issue will only occur with SATA SMR drives when a zone is full. The application is required to add a check and apply the write pointer reset command that is appropriate for the zone state.
- The sg_rep_zones command will report the following zone state information: empty, partially filled, or full.

OS	Kernel	HBA	HBA FW	HBA Driver
Ubuntu 18.04	4.15.0-76-generic	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9405-16e		
		9500-8e	24.00.00.00	
		9500-16e		
Ubuntu 20.04	5.4.0-47-generic	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		

OS	Kernel	HBA	HBA FW	HBA Driver
		9300-4i4e		
		9400-8e		
		9405-16e		
		9500-8e	24.00.00.00	
		9500-16e		
Ubuntu 22.04	5.15	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9400-16e		
		9500-8e	24.00.00.00	
		9500-16e		
CentOS/RedHat Enterprise Linux (RHEL)	5.14.0.70.13.1	9300-8e	22.00.00.00	43.00.00.00
		9300-16e		
		9300-4i4e		
		9400-8e		
		9400-16e		
		9500-8e	24.00.00.00	
		9500-16e		

1.4 Compatible Third-Party Drives

Attention: All drives have been tested with version 4008-020 enclosure firmware.

Device	Volume	Encryption	Drive Firmware	Manufacturer Part Number
Kioxia SAS PM7-M/V/R Series SSD	Up to 3.84TB	SE	0101	KPM7XRUG3T84
Samsung SAS PM1653A SSD	Up to 3.84TB	SE	GXG3	MZILG3T8HCLS-00A07

Note: Ultrastar Data102 supports third-party device features that are within SAS specification as mandatory. Any third-party drive features that are vendor specific are not guaranteed to function.

1.5 nTAA SKUs for Fully Populated Configurations

Table 45: Fully Populated Configurations

Capacity	Drive Type	Sector Size	SATA			SAS			
			SE	SED	ISE	SE	ISE	TCG	TCG-FIPS
2448TB	HC580	512e	1ES2484						
		512e	1ES2498						
2244TB	HC570	512e	1ES2191	1ES2192		1ES2061		1ES2186	
	HC580	512e	1ES2480						
		512e	1ES2494						
2040TB	HC560	512e	1ES2151	1ES2152		1ES2155		1ES2153	
1836TB	HC550	512e	1ES1851	1ES1852		1ES1885		1ES1846	
1632TB	HC550	512e	1ES1861	1ES1862		1ES1855		1ES1856	
1428TB	HC550	512e	1ES2337			1ES2336			
		512e	1ES2340			1ES2341			
	HC530	512e	1ES1452*	1ES1453*		1ES1450*		1ES1451*	1ES1999*
		4Kn	1ES1449*			1ES1447*		1ES1448*	
1224TB	HC520	512e	1ES0317	1ES0316	1ES0315	1ES0311	1ES0309	1ES0310	
		4Kn	1ES0314	1ES0313	1ES0312	1ES0308	1ES0306	1ES0307	
1020TB	HC330	512e	1ES1815	1ES1814		1ES1807		1ES1802	
		4Kn	1ES1816	1ES1817		1ES1804		1ES1805	
816TB	HC320	512e	1ES1225	1ES1224		1ES1221		1ES1220	
		4Kn	1ES1223	1ES1222		1ES1219		1ES1218	
612TB	HC310	512e	1ES1146	1ES1145		1ES1142		1ES1141	
		4Kn	1ES1144	1ES1143		1ES1135		1ES1134	

** This part number is no longer available.*

1.6 nTAA SKUs for Partially Populated Configurations

Table 46: Partially Populated Configurations

Capacity	Drive Type	Sector Size	SATA			SAS			
			SE	SED	ISE	SE	ISE	TCG	TCG-FIPS
1440TB	HC580	512e	1ES2485						
		512e	1ES2499						
1320TB	HC570	512e	1ES2193	1ES2194		1ES2188		1ES2189	
	HC580	512e	1ES2481						
		512e	1ES2495						
1200TB	HC560	512e	1ES2156	1ES2157		1ES2158		1ES2159	
1080TB	HC550	512e	1ES1853	1ES1854		1ES1848		1ES1849	
960TB	HC550	512e	1ES1863	1ES1864		1ES1858		1ES1859	
840TB	HC550	512e	1ES2343			1ES2342			
		512e	1ES2339			1ES2338			
	HC530	512e	1ES1459*	1ES1460*		1ES1457*	1ES1494	1ES1458*	
		4Kn	1ES1456*			1ES1454*		1ES1455*	
720TB	HC520	512e	1ES0341	1ES0340	1ES0339	1ES0335	1ES0333	1ES0334	
		4Kn	1ES0338	1ES0337	1ES0336	1ES0332	1ES0330	1ES0331	
600TB	HC330	512e	1ES1818	1ES1819		1ES1808		1ES1809	
		4Kn	1ES1820	1ES1821		1ES1811		1ES1812	
480TB	HC320	512e	1ES1233	1ES1232		1ES1229		1ES1228	
		4Kn	1ES1231	1ES1230		1ES1227		1ES1226	
360TB	HC310	512e	1ES1154	1ES1153		1ES1150		1ES1149	
		4Kn	1ES1152	1ES1151		1ES1148		1ES1147	

** This part number is no longer available.*

1.7 TAA SKUs for Fully Populated Configurations

Table 47: Fully Populated Configurations

Capacity	Drive Type	Sector Size	SATA			SAS			
			SE	SED	ISE	SE	ISE	TCG	TCG-FIPS
2448TB	HC580	512e	1ES2509						
		512e	1ES2516						
2244TB	HC570	512e	1ES2211	1ES2197		1ES2212		1ES2195	
	HC580	512e	1ES2507						
		512e	1ES2514						
2040TB	HC560	512e	1ES2213	1ES2180		1ES2214		1ES2178	
1836TB	HC550	512e	1ES2215	1ES2089		1ES2216		1ES2087	1ES2088
1632TB	HC550	512e	1ES2217	1ES2086		1ES2218		1ES2084	1ES2085
1428TB	HC550	512e	1ES2335			1ES2334			
	HC530	512e	1ES2219*	1ES2083*		1ES2220*		1ES2081*	1ES2082*
1224TB	HC520	512e	1ES2221	1ES2126		1ES2222		1ES2122	1ES2123

** This part number is no longer available.*

1.8 nTAA SKUs for Scale-Up Modules

Table 48: 14-Pack nTAA Scale-Up Modules

Capacity	Drive Type	Sector Size	SATA			SAS			
			SE	SED	ISE	SE	ISE	TCG	TCG-FIPS
364TB	HC670	4Kn	1EX3003	1EX3004		1EX3000		1EX3001	
336TB	HC580	512e	1EX3157						
308TB	HC570	512e	1EX2956	1EX2957		1EX2953		1EX2954	
	HC580	512e	1EX3155						
280TB	HC560	512e	1EX2899	1EX2900		1EX2891		1EX2892	
252TB	HC550	512e	1EX2471	1EX2472		1EX2468		1EX2469	1EX2470
224TB	HC550	512e	1EX2466	1EX2467		1EX2463		1EX2464	1EX2465
196TB	HC550	512e	1EX3042			1EX3041			
	HC530		1EX1840*	1EX1841*		1EX1838*		1EX1839*	
		4Kn	1EX1837*			1EX1835*		1EX1836*	
168TB	HC520	512e	1EX0535		1EX0533	1EX0529	1EX0527	1EX0528	
		4Kn	1EX0532		1EX0530	1EX0526	1EX0524	1EX0525	
140TB	HC330	512e	1EX2450	1EX2451		1EX2445		1EX2446	
		4Kn	1EX2448	1EX2449		1EX2442		1EX2443	
112TB	HC320	512e	1EX1235	1EX1234		1EX1231		1EX1230	
		4Kn	1EX1233	1EX1232		1EX1229		1EX1228	
84TB	HC310	512e	1EX1197	1EX1196		1EX1193		1EX1192	
		4Kn	1EX1195	1EX1194		1EX1191		1EX1190	

** This part number is no longer available.*

Table 49: 12-Pack nTAA Scale-Up Modules

Capacity	Drive Type	Sector Size	SATA			SAS			
			SE	SED	ISE	SE	ISE	TCG	TCG-FIPS
312TB	HC670	4Kn	1EX3008	1EX3009		1EX3005		1EX3006	
288TB	HC580	512e	1EX3164						
264TB	HC570	512e	1EX2961	1EX2962		1EX2958		1EX2959	
	HC580	512e	1EX3162						
240TB	HC560	512e	1EX2904	1EX2905		1EX2901		1EX2902	
216TB	HC550	512e	1EX2491	1EX2492		1EX2488		1EX2489	1EX2490
		4Kn				1EX2785			
192TB	HC550	512e	1EX2486	1EX2487		1EX2483		1EX2484	1EX2485
168TB	HC550	512e	1EX3044			1EX3043			
	HC530		1EX1847*	1EX1848*		1EX1845*		1EX1846*	
		4Kn	1EX1844*			1EX1842*		1EX1843*	
144TB	HC520	512e	1EX0553		1EX0551	1EX0547	1EX0545	1EX0546	
		4Kn	1EX0550		1EX0548	1EX0544	1EX0542	1EX0543	
120TB	HC330	512e	1EX2460	1EX2461		1EX2455		1EX2456	
		4Kn	1EX2458	1EX2459		1EX2452		1EX2453	
96TB	HC320	512e	1EX1243	1EX1242		1EX1239		1EX1238	
		4Kn	1EX1241	1EX1240		1EX1237		1EX1236	
72TB	HC310	512e	1EX1213	1EX1212		1EX1209		1EX1208	
		4Kn	1EX1211	1EX1210		1EX1207		1EX1206	
48TB	HC310	512e				1EX2250		1EX2251	1EX2252
		4Kn				1EX2247		1EX2248	1EX2249

** This part number is no longer available.*

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