Connect to Western Digital Ultrastar® Hybrid Storage Guide

Application Note

August, 2023

ANNOUNCEMENT

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PREFACE

Executive Summary

This application note provides technical guidance for connecting to Western Digital hybrid storage platform, Ultrastar Data60 and Data102, which are fully redundant hybrid 4U JBOD disk enclosures, as expansion solutions of QSAN storage system. The new expansion solutions expand the capacity of QSAN's storage with high density.

Audience

This document is applicable for QSAN customers and partners who are interested in purchasing Ultrastar Data60 / Data102 as the expansion units of QSAN storage system. It assumes the reader is familiar with QSAN products and has general IT experience, including knowledge as a system or network administrator. If there is any question, please refer to the user manuals of products, or contact QSAN support for further assistance.

Technical Support

Do you have any questions or need help trouble-shooting a problem? Please contact QSAN Support, we will reply to you as soon as possible.

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- Via Telephone: +886-2-77206355
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Information, Tip, and Caution

This document uses the following symbols to draw attention to important safety and operational information.

INFORMATION

INFORMATION provides useful knowledge, definition, or terminology for reference.

TIP

TIP provides helpful suggestions for performing tasks more effectively.

CAUTION

CAUTION indicates that failure to take a specified action could result in damage to the system.

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1. GUIDELINES

With today's rapid increase in data volumes, our partnership with Western Digital ensures that our joint enterprise customers receive high density expansion solution at a highly competitive price point. Western Digital Ultrastar Data60 / Data102 hybrid storage platform has dual IO modules with 6 Mini-SAS HD ports per module and can be populated with up to 60 / 102 SAS / SATA drives, respectively. Ultrastar Data60 / Data102's compact and efficient form factor provides the flexibility to specify the HDD and SSD combinations for balancing capacity, performance, and cost.

INFORMATION

Western Digital Ultrastar hybrid storage platform, Data60 (hereinafter referred to as WD Data60) and Data102 (hereinafter referred to as WD Data102).

1.1. Expansion Configuration Rules

According to chapter 4.10 in the Ultrastar Data60 / Data102 user guide, the Ultrastar Data60 / Data102 support configurations up to four enclosures. The expansion capability is up to 4 expansion units using Ultrastar Data60 / Data102, whether or not there are mixed XCubeDAS series models. By connecting up to 4 expansion units of Ultrastar Data60 / Data102, XCubeSAN or XCubeNXT can support up to 266 / 434 disk drives or up to 5.3 PB / 8.6 PB of raw storage space when using 20 TB Ultrastar DC HC650 HDDs.

INFORMATION

Document information:

- [Western Digital Ultrastar Data60 User Guide](#)
- [Western Digital Ultrastar Data102 User Guide](#)

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1.2. Expansion Topology and Deployment

The following images illustrate some examples of deployment types for dual controller storage system plus Ultrastar Data60 / Data102 expansion units. MPIO (MultiPath I/O) configurations are designed to provide HA (High Availability) data connections to ensure data consistency in the rare event of a failure in the host connectivity from a single path.

1.2.1. One QSAN Storage / One Ultrastar JBOD / Dual Path

The following figure shows an example of an XCubeSAN or XCubeNXT series connected to a Ultrastar Data60 or Data102 using mini SAS HD to mini SAS HD cable (SAS 12G expansion cable, SFF-8644 to SFF-8644).

Step details are described below.

1. Connect the SAS cable from QSAN CTRL 1 EXP1 to JBOD A6 port.
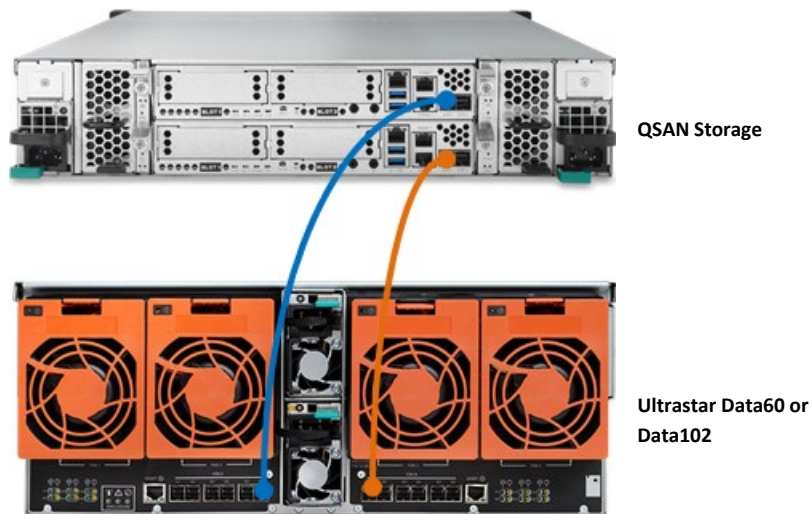2. Connect the SAS cable from QSAN CTRL 2 EXP1 to JBOD B1 port.

QSAN Storage

Ultrastar Data60 or Data102

Figure 1-1   One QSAN Storage / One Ultrastar Data60 or Data102 / Dual Path

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⚠ CAUTION

Ultrastar Data60 / Data102 **DO NOT** support SAS 12G expansion cable with Wake-on-SAS.

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1.2.2. One QSAN Storage / Two Ultrastar JBODs / Dual Path

The following figure shows an example of an XCubeSAN or XCubeNXT series connected to two Ultrastar Data60 or Data102 using mini SAS HD to mini SAS HD cables (SAS 12G expansion cable, SFF-8644 to SFF-8644).

Step details are described below.

1. Connect the SAS cable from QSAN CTRL 1 EXP1 to No.1 JBOD A6 port.
2. Connect the SAS cable from QSAN CTRL 2 EXP1 to No.1 JBOD B1 port.
3. Connect the SAS cable from QSAN CTRL 1 EXP2 to No.2 JBOD A6 port.
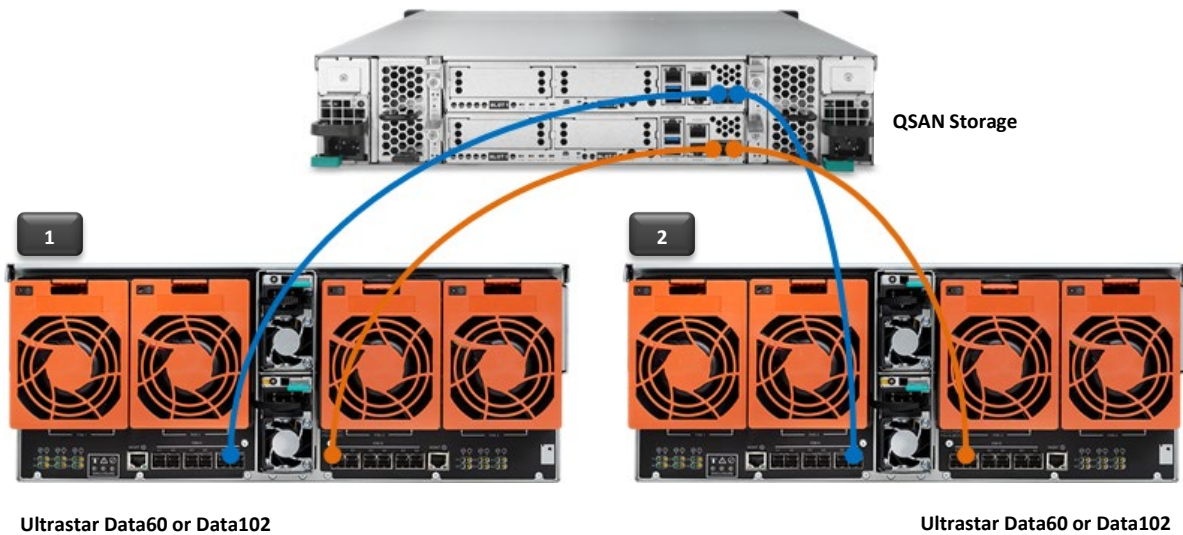4. Connect the SAS cable from QSAN CTRL 2 EXP2 to No.2 JBOD B1 port.

Figure 1-2   One QSAN Storage / Two Ultrastar Data60 or Data102 / Dual Path

CAUTION

QSAN storage **DOES NOT** support active cables.

1.2.3. One QSAN Storage / Four Ultrastar JBODs / Dual Path

The following figure shows an example of an XCubeSAN or XCubeNXT series connected to four Ultrastar Data60 or Data102 using mini SAS HD to mini SAS HD cables (SAS 12G expansion cable,

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SFF-8644 to SFF-8644) which is in turn connected to the third and fourth Ultrastar Data60 or Data102 using mini SAS HD to mini SAS HD cable (SAS 12G expansion active cable, SFF-8644 to SFF-8644).

Step details are described below.

1. Connect the SAS cable from QSAN CTRL 1 EXP1 to No.1 JBOD A6 port.
2. Connect the SAS cable from QSAN CTRL 2 EXP1 to No.3 JBOD B1 port.
3. Connect the SAS cable from QSAN CTRL 1 EXP2 to No.4 JBOD A6 port.
4. Connect the SAS cable from QSAN CTRL 2 EXP2 to No.2 JBOD B1 port.
5. Connect the active SAS cable from No.1 JBOD A1 port to No.3 JBOD A2 port.
6. Connect the active SAS cable from No.1 JBOD B6 port to No.3 JBOD B5 port.
7. Connect the active SAS cable from No.2 JBOD A1 port to No.4 JBOD A2 port.
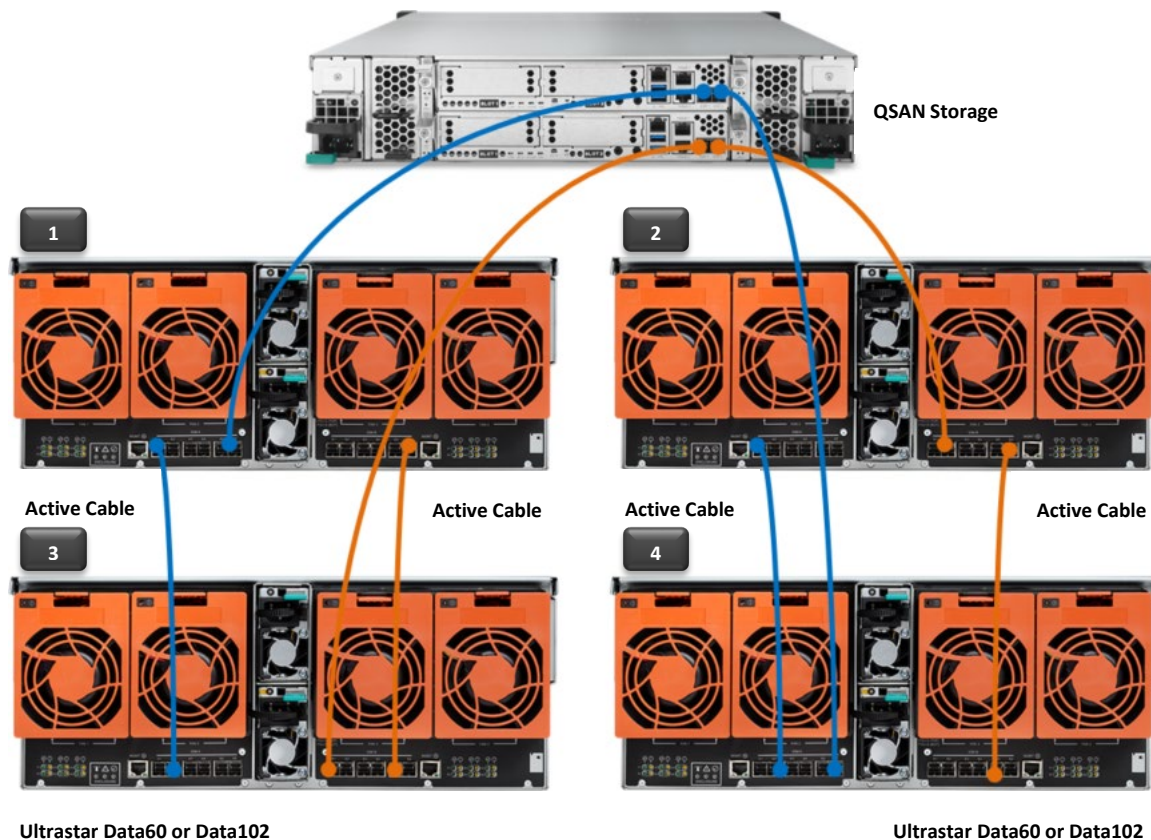8. Connect the active SAS cable from No.2 JBOD B6 port to No.4 JBOD B5 port.

Figure 1-3   One QSAN Storage / Four Ultrastar Data60 or Data102 / Dual Path

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INFORMATION

Using **active cables** between two Ultrastar Data60(s) / Data102(s).

1.2.4. One QSAN Storage / One XCubeDAS / One Ultrastar JBOD / Dual Path

The following figure shows an example of an XCubeSAN or XCubeNXT series connected to an XCubeDAS XD5300 series which is in turn connected to the second Ultrastar Data60 / Data102 using mini SAS HD to mini SAS HD cable (SAS 12G expansion cable, SFF-8644 to SFF-8644).

Step details are described below.

1. Connect the SAS cable from QSAN CTRL 1 EXP1 to QSAN JBOD CTRL 1 EXP1 port.
2. Connect the SAS cable from QSAN CTRL 2 EXP1 to QSAN JBOD CTRL 2 EXP1 port.
3. Connect the SAS cable from QSAN JBOD CTRL 1 EXP3 to JBOD A6 port.
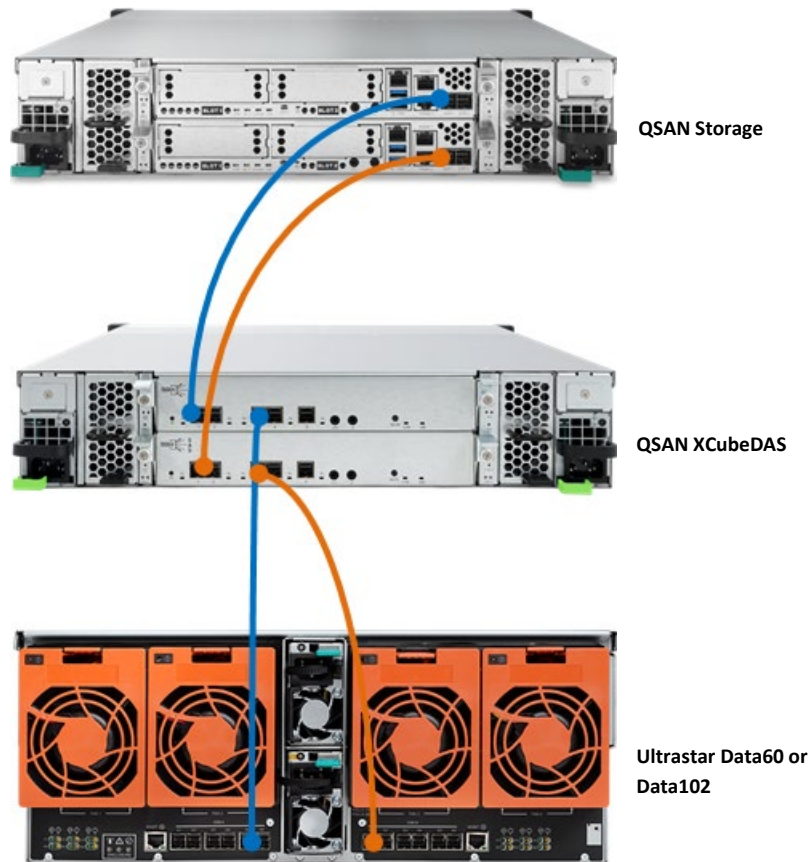4. Connect the SAS cable from QSAN JBOD CTRL 2 EXP3 to JBOD B1 port.

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QSAN XCubeDAS

Ultrastar Data60 or
Data102

Figure 1-4   One QSAN Storage / One XCubeDAS / One Ultrastar Data60 or Data102 / Dual Path

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TIP

If you have multiple XCubeDAS and Ultrastar Data60 / Data102 as the expansion units of QSAN storage, connect XCubeDAS series models before Ultrastar Data60 / Data102.

1.3.   Cautions and Limitations

To summarize the above, list the following cautions and limitations. You should be aware of the purchase and installation of Ultrastar Data60 / Data102.

1.   The expansion capability is up to 4 expansion units using Ultrastar Data60 / Data102 whether or not there are mixed XCubeDAS series models.

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2. According to the Ultrastar Data60 / Data102 datasheet, hybrid support for up to 24 SSDs (SAS or SATA) to create a data acceleration tier.

3. QSAN storage does not support firmware update for Ultrastar Data60 / Data102.

4. QSAN storage does not support active cables.

5. Ultrastar Data60 / Data102 do not support SAS 12G expansion cable with Wake-on-SAS.

6. If you have multiple XCubeDAS and Ultrastar Data60 / Data102 as the expansion units of QSAN storage, connect XCbueDAS series models before Ultrastar Data60 / Data102.

7. In order to obtain the best stability and performance, it is recommended to use the firmware version in the Appendix, and only 1.5M or 2M cables are qualified.

1.4. Installation Suggestions

Due to the short cable length between QSAN storage and Ultrastar Data60 / Data102, it is recommended to install Ultrastar Data60 / Data102 on top of QSAN storage to better replace the HDD in the cabinet. The following image shows the installation diagram.
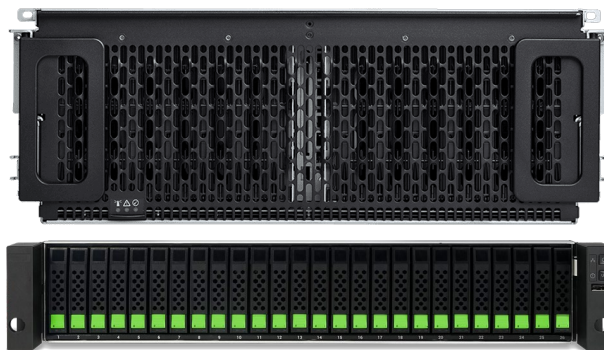

Figure 1-5   Installation Suggestions for Ultrastar Data60 / Data102

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2. APPENDIX

2.1. Apply To

- XEVO firmware 2.2.0 or later.

- QSM firmware 3.3.1 or later.

- SANOS firmware 2.0.3 or later.

2.2. Reference

Western Digital Ultrastar Data60

- [Western Digital Ultrastar Data60 Datasheet](#)

- [Western Digital Ultrastar Data60 User Guide](#)

Western Digital Ultrastar Data102

- [Western Digital Ultrastar Data102 Datasheet](#)

- [Western Digital Ultrastar Data102 User Guide](#)

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