# Precision 7865 Tower

RAID Guide

**D&LL**Technologies

## Notes, cautions, and warnings

**NOTE:** A NOTE indicates important information that helps you make better use of your product.

**CAUTION: A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.**

**WARNING: A WARNING indicates a potential for property damage, personal injury, or death.**

# Contents

# Overview

This document describes the procedure to configure the Redundant Array of Independent Disks (RAID) volumes on Serial Advanced Technology Attachment (SATA) and Non-Volatile Memory express (NVMe) drives using the AMD RAID application, AMD RAIDXpert2.

This document provides a high-level overview of how to manage the RAID configurations. For more information, refer to AMD documentation, in particular the AMD-RAIDXpert2 User Guide and AMD NVMe/SATA RAID Quick Start Guide for Windows Operating Systems, both available at www.amd.com.

## Scope

This document provides examples of RAID configurations using the Precision 7865 Tower.

In some of the screenshots, a firmware version may be listed as examples. The firmware version on your system may be different.

NVMe-related sections are subject to change as the technology evolves.

# Introduction

The following RAID types are supported on Precision 7865 Tower workstations:

- RAID 0
- RAID 1
- RAID 5
- RAID 10
- Volume (Just a Bunch Of Disks - JBOD)
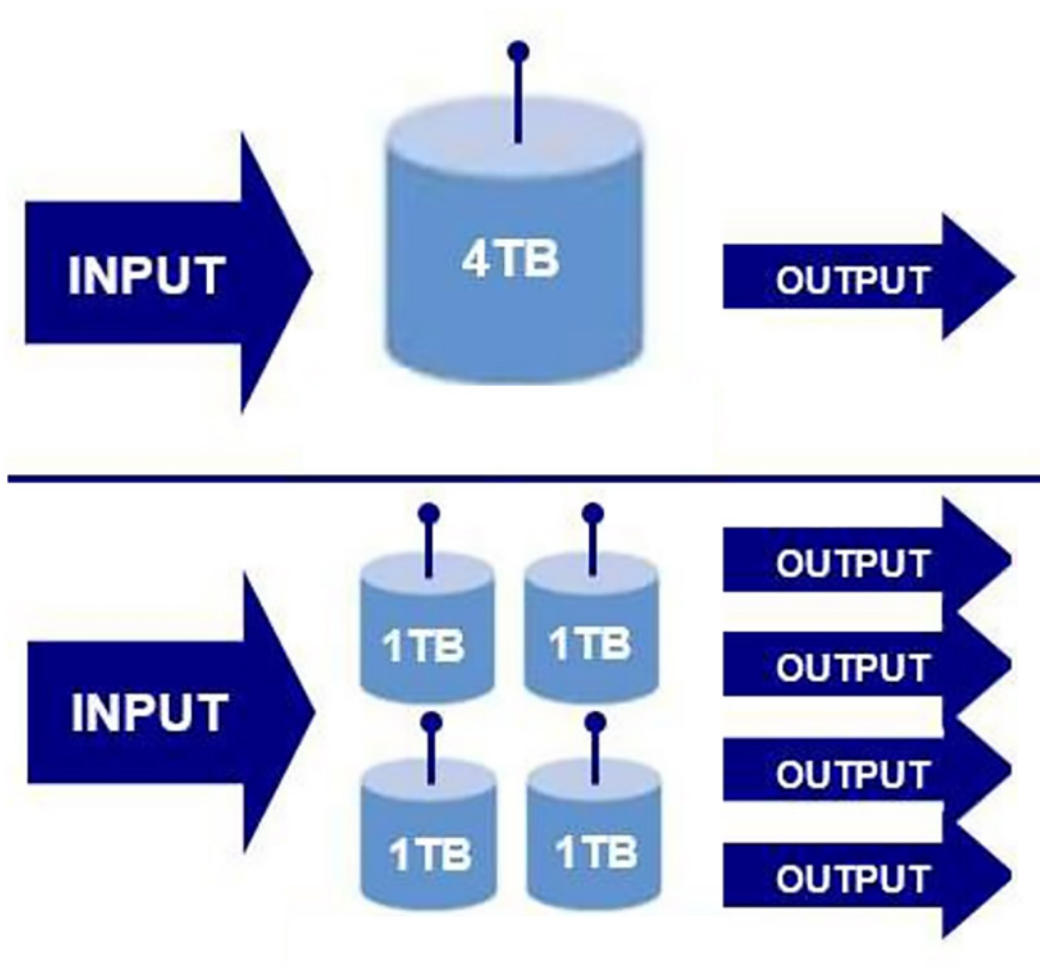- RAIDABLE or RAID Ready

## RAID 0

RAID 0 splits or stripes data across two or more drives for faster read and write performance. It uses more space compared to other RAID types, and performance increases as the number of drives increases. However, if any drive in the array fails, all the data is lost because there is no data redundancy.

The following are the key features of RAID 0:

- Two or more drives of the same size are required for RAID 0.
- A single-drive RAID 0 volume is almost equivalent to using raw drives in JBOD mode.
- In multiple-drive RAID 0 volumes, read and write operations are shared concurrently across multiple platters and heads. Therefore, it provides better performance.
- The total volume capacity as seen by the operating system is equal to the sum of the individual-drive capacities. For example, if you use four drives of 1 TB size, you get 4 x 1 TB = 4 TB.

The following figure illustrates that the total volume capacity of four 1 TB hard drives in a RAID 0 array is equivalent to one 4 TB hard drive, and that there is no data redundancy.
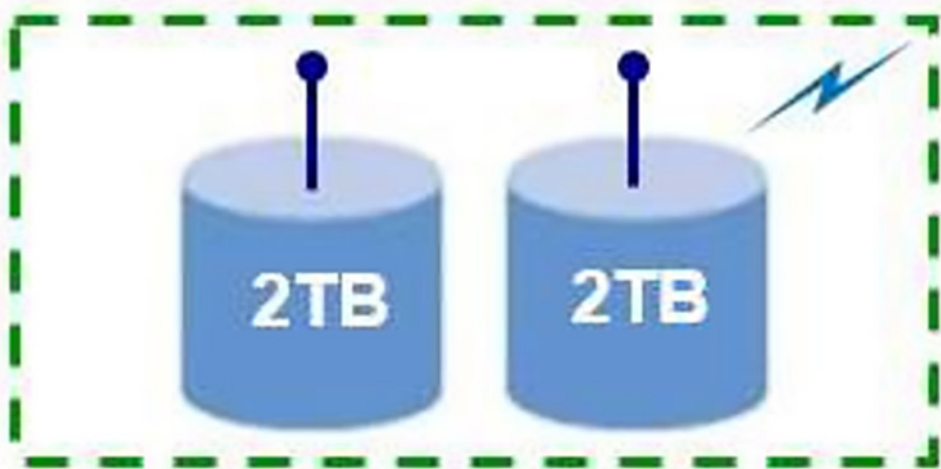
# RAID 1

RAID 1, also known as the data mirroring, provides 100% redundancy for data protection.

By balancing the load, read performance can be twice as that of a single drive; write performance is almost same as a single drive. RAID 1 volumes are suitable for operating system volumes. A disadvantage is cost, as twice as many drives are required for RAID 1.

The following are the key features of RAID 1:
- 100% duplication of data with instant failover.
- Requires two drives, preferably of the same capacity. When two different capacity drives are used, the volume size is same as the capacity of the smaller drive. For example, if you use one 1 TB drive and one 2 TB drive in a RAID 1 array, the volume size is 1 TB.

The following figure shows that if one 2 TB drive fails, data is lost. However, when there are two 2 TB drives in a RAID 1 volume, data is still available even if one of the disks fails.
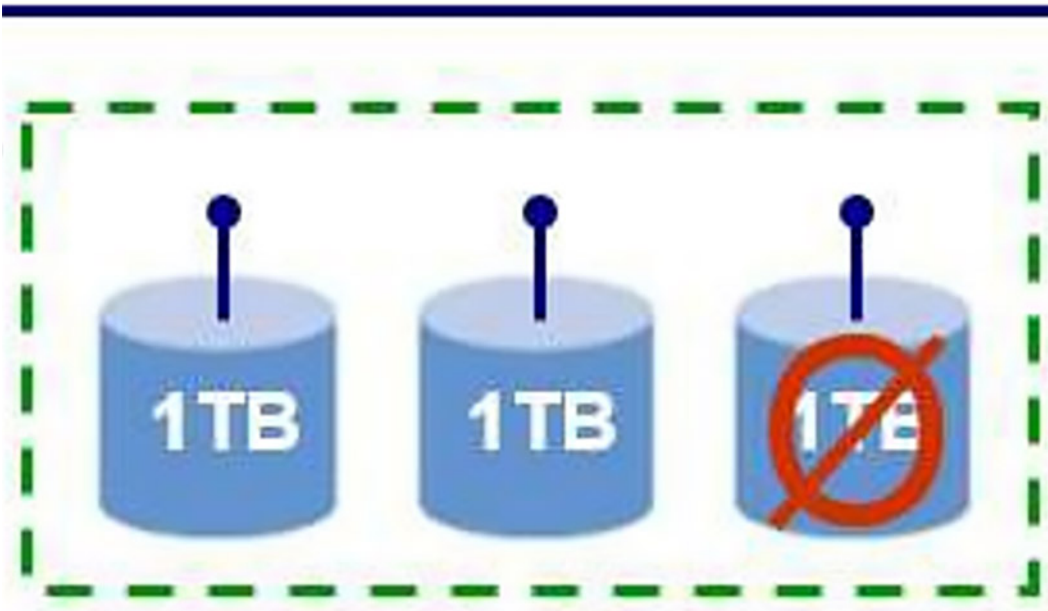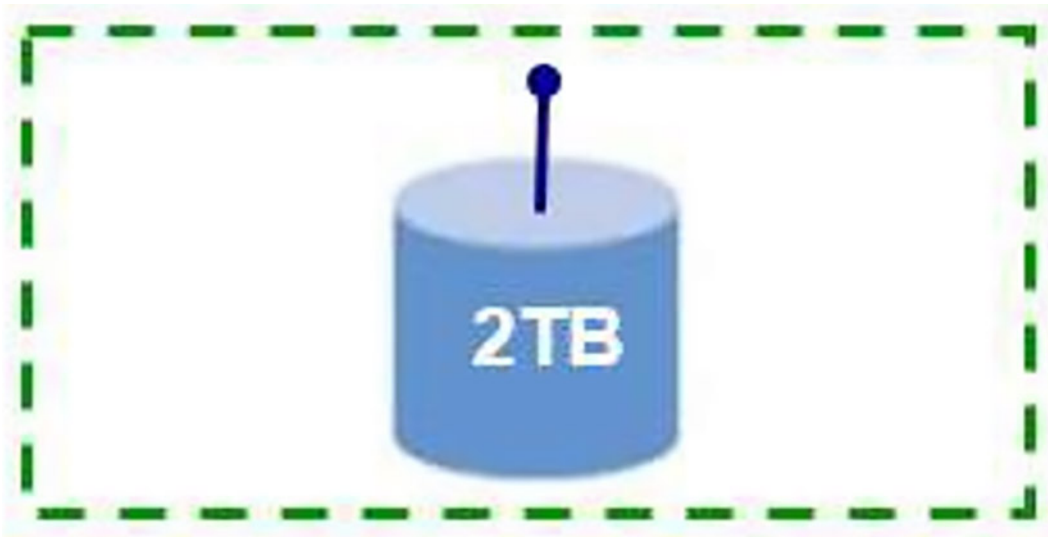
# RAID 5

RAID 5 provides better performance by using data striping and protection through parity. The disadvantage of RAID 5 is that rebuilding a large RAID 5 volume requires a longer period of time.

The following are the key features of RAID 5:
- Requires at least three drives.
- Data is available even if one of the drives present in the volume fails. The failed drive must be replaced, and the volume must be rebuilt for the data to be accessible.
- The total capacity is $N$-1, where $N$ is the total capacity of the drives in the array. For example, if you use three 1 TB drives in a RAID 5 array, the total volume size is 2 TB.

The following figure shows that if one 2 TB drive fails, data is lost. However, if there are three 1 TB drives in a RAID 5 array, the data is still available even if one of the drives fails.
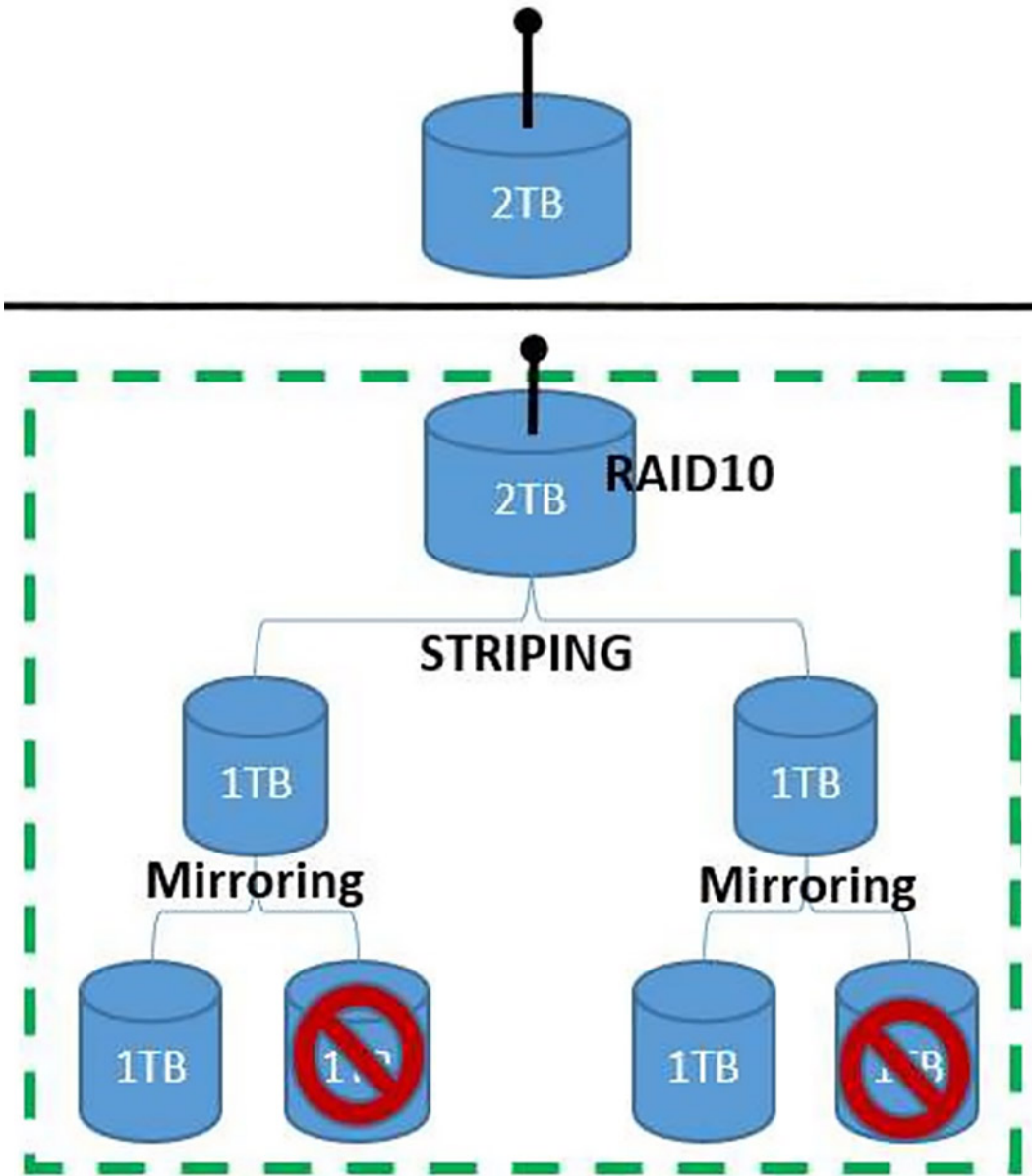
# RAID 10

RAID 10 is a stripe of mirrors that combines the features of RAID 0 and RAID 1. As the blocks are striped and mirrored, the performance and redundancy are higher. The disadvantage of RAID 10 is that it is more expensive than other RAID levels, with a higher number of drives required.

The following are the key features of RAID 10:

- Requires a minimum of four drives. Only an even number of drives can be used, and an odd number of drives are not possible.
- The total volume capacity is half the sum of individual drives capacity. For example, when you use four drives of 1 TB, you get a RAID 10 volume of 2 TB.

The following figure shows that the data is still available even if one disk drive fails in each mirror.

## Volume

Volume, also named as JBOD, uses raw drives without any RAID configuration. AMD RAIDXpert2 treats one or more disks or the unused space on a disk as a single array. It supports one to eight disks.

## RAIDABLE

RAIDABLE is also known as RAID Ready. RAIDABLE disk can be transformed to RAID 0 or RAID 1. It supports only one disk.

# Configuring RAID with AMD RAIDXpert2

## Creating the RAID volume

1. When your computer boots up, press **F2** to enter the BIOS Setup menu.
2. Click **Storage** in the main menu.
3. In the SATA Operation section, select the **RAID On** mode.
4. Click **APPLY CHANGES** to save the settings, then click **EXIT**.
5. When your computer reboots, press the **F12** key to enter the One-Time Boot Settings menu.
6. In the Pre-Boot Tasks menu, select **Device Configuration**.
   The TPV EFI Device Manager appears.
7. From the Devices List, select **RAIDXpert2 Configuration Utility**.
8. On the Array Management pane, select **Manage Array Properties**.
9. Select **Create Array**.
10. On the Create Array pane, select **Select Physical Disks** to create the RAID mode.
    The list of RAID types is displayed.
11. From the list, select the desired RAID type.
12. In the Select Media Type section, select the disk.
    Ensure **[X]** is selected next to the disk.
13. Select **Apply Changes** to save the settings.

ⓘ **NOTE:** To check if the RAID array is created, on the Create Array pane, click **Create Array**. On the Array Management pane, click **Manage Array Properties** to view the RAID volume that is created.

## Downloading the RAID driver

ⓘ **NOTE:** These steps are to be performed only if you want to change or re-install the operating system.

1. Visit www.dell.com/support and search for your product.
2. Click **Drivers & Downloads** and download the AMD Chipset Device Software.
3. Double-click the `.exe` file of the downloaded chipset driver.
4. Select **Extract** and save the package to your system.

## Installing an operating system to the RAID array

ⓘ **NOTE:** You must configure the RAID volume before installing the operating system to the RAID array.

1. Insert the **Windows operating system installation media** or **disk**.
2. In the Windows setup box, click **Browse**.
3. Go to the folder containing the downloaded AMD RAID driver.
4. Load the **rcbottom.inf** in the folder.
5. Repeat steps 2 to 3 to load the **rcraid.inf** file, followed by the **rccfg.inf** file.
6. Complete the installation by following the instructions that are displayed on the screen.

ⓘ **NOTE:** You can verify if the RAID driver installation is complete by checking in the Device Manager. The installation of the operating system is supported only on the first RAID volume.

7.  Reboot the operating system and install the AMD RAIDXpert2 application from the AMD Chipset Device Software that is downloaded previously.
8.  Open the AMD RAIDXpert2 app from the Windows Start icon.
9.  From the menu select **Disk** > **Properties**.
10. Select the required **Disk**.
    The Disk properties are displayed.

    ⓘ **NOTE:** If the Disk Write Back Caching and Disk Read Ahead are already enabled, skip steps 11 and 12.

11. In the Disk Write Back Caching, select **Enable**.
12. In the Disk Read Ahead, select **Enable**.

    ⓘ **NOTE:** You must not use Shingled Magnetic Recording (SMR) Hard Disk Drives (HDDs). For redundant arrays, the Create process starts after the operating system and RAID drivers are installed and the computer is booted to the operating system. However, the arrays are immediately available for use as a boot array or data array. You must confirm that the RAID Create process is completed for redundancy to be active.

# Deleting the RAID volume

1.  Press the **F12** key to enter the One-Time Boot Settings menu.
2.  Select **Device Configuration**.
    The TPV EFI Device Manager pane appears.
3.  From the Devices List, select **RAIDXpert2 Configuration Utility**.
4.  On the Array Management pane, select **Manage Array Properties**.
5.  Select **Delete Array**.

    Ensure **[X]** is selected next to the Delete Array.

6.  Select **Check All**.
7.  Select **Delete Array(s)** .

**4**

# Conclusion

There are multiple ways to manage the RAID configuration in Precision workstations.

Only the basic methods under pre-boot environment are specified in this document. However, there are advanced methods and applications available to do these basic steps and advanced configurations options.

# Getting help and contacting Dell

## Self-help resources

You can get information and help on Dell products and services using these self-help resources:

**Table 1. Self-help resources**

| Self-help resources | Resource location |
|---|---|
| Information about Dell products and services | www.dell.com |
| My Dell app | |
| Tips | |
| Contact Support | In Windows search, type `Contact Support`, and press Enter. |
| Online help for operating system | www.dell.com/support/windows |
| Access top solutions, diagnostics, drivers and downloads, and learn more about your computer through videos, manuals and documents. | Your Dell computer is uniquely identified by a Service Tag or Express Service Code. To view relevant support resources for your Dell computer, enter the Service Tag or Express Service Code at www.dell.com/support.<br><br>For more information on how to find the Service Tag for your computer, see Locate the Service Tag on your computer. |
| Dell knowledge base articles for a variety of computer concerns | 1. Go to www.dell.com/support.<br>2. On the menu bar at the top of the Support page, select **Support** > **Knowledge Base**.<br>3. In the Search field on the Knowledge Base page, type the keyword, topic, or model number, and then click or tap the search icon to view the related articles. |

## Contacting Dell

To contact Dell for sales, technical support, or customer service issues, see www.dell.com/contactdell.

(i) **NOTE:** Availability varies by country/region and product, and some services may not be available in your country/region.

(i) **NOTE:** If you do not have an active Internet connection, you can find contact information about your purchase invoice, packing slip, bill, or Dell product catalog.