



Replacing a Hard Drive for a DW Blackjack® P-RACK

Affected Roles: Administrator, Owner

Complexity: High

Last Edit: January 14, 2022

Hard Drive Replacement

Over time, the hard disk drive (HDD) or solid state drive (SSD) storage inside of the DW Blackjack P-RACK may sustain excessive use and will need to be replaced due to wear. In the event that an internal storage drive must be replaced, it is recommended to contact Digital Watchdog to schedule a hard drive replacement. However, if an Installer or a customer of equivalent capability must replace a storage drive in the field, they may request that the hardware component be shipped to them, where they can make the replacement onsite.

This article will outline the process of opening a DW Blackjack P-RACK and replacing an internal hard drive.

****DISCLAIMER:** It is recommended to work with DW Support and RMA for shipping faulty hardware for the direct repair by Digital Watchdog personnel. By forgoing this option and instead opening the DW Blackjack P-RACK to replace the pre-installed storage hardware yourself, you will be waiving all claims of liability for Digital Watchdog and will be assuming responsibility for the condition of the unit. Digital Watchdog and its affiliates will not be held liable for the loss of any data or consequential damages (including without limitation, damage to recording media) resulting from this process.

****NOTE:** The stock SATA controller does not support Serial ATA port multipliers (SATA PM). Do not attempt to connect multiple SATA devices to a single SATA host port. Do not attempt to exceed the recommended maximum storage or drive count.

HDD Replacement Guide Contents

The HDD Replacement Guide is organized as follows:

Supported/Affected Devices

Necessary Equipment

Approved HDD Model List

Additional Recommended Information

Create a Database Backup

Replacing Local Disk (C:) in a RAID 5 System

Part 1: Identifying the Physical Drive

Windows Option 1: Identifying Storage Drive with Disk Management

Windows Option 2: Identifying Storage Drive with Command Prompt

Ubuntu/Linux Option: Identifying Storage Drive with Command Terminal

Part 2: Replacing the Physical Drive

Part 2-1: Locating HDD Hardware

Part 2-2: Removing an Internal Hard Drive

Part 2-3: Installing the Replacement Hard Drive

Part 3: (Optional) Run Recovery Program

Part 4: Initialization and Partition Creation

Part 5: Restore RAID 5 Configuration

Part 6: (Optional) Update DW Spectrum IPVMS

Part 7: (Optional) Restore the Database and License Keys

Supported/Affected Devices:

- DW Blackjack® P-RACK Server Series
 - DW-BJP1U, DW-BJP1U-LX
 - DW-BJP2U, DW-BJP2U-LX

- DW-BJPR2U, DW-BJPR2U-LX

Necessary Equipment

In addition to an approved HDD model, you will also need:

- Phillips head screwdriver (required)
- Compressed air (recommended)
- Replacement, compatible hard drive (required)

Approved HDD Model List

When replacing hard drives for the DW Blackjack P-RACK, Digital Watchdog will provide the replacement component to ensure that the hardware is compatible. For example, when using a RAID configuration, it is best to use the same hard drive model for all enclosures to ensure that the read/write speed has uniformity and is not bottlenecked by any single, particular drive.

The approved hard drive models used for the DW Blackjack P-RACK can be found below.

- [DW Approved HDD Model List](#)

****NOTE:** The approved HDD models are subject to change at Digital Watchdog's discretion, depending on vendor availability and any changes to the DW Blackjack system standards over time.

DW Blackjack P-RACK 1U & 2U without RAID		
(DW-BJP1U, DW-BJP2U, DW-BJP1U-LX, DW-BJP2U-LX)		
HDD Part Number	Storage Capacity	Hard Drive Description
HDSG-ST1000VX005	1 TB	Seagate Skyhawk 1TB 6Gb/s 64MB Cache 3.5"
HDSG-ST2000VX015	2 TB	Seagate Skyhawk 2TB 6Gb/s 64MB Cache 3.5"
HDSG-ST3000VX009	3 TB	Seagate Skyhawk 3TB 6Gb/s 256MB Cache 3.5"
HDSG-ST4000VX013	4 TB	Seagate Skyhawk 4TB 6Gb/s 64MB Cache 3.5"
HDSG-ST6000VX001	6 TB	Seagate Skyhawk 6TB 6Gb/s 256MB Cache 3.5"
HDSG-ST8000VE001	8 TB	Seagate Skyhawk 8TB 6Gb/s 256MB Cache 3.5"
HDSG-ST12000VE001	12 TB	Seagate Skyhawk 12TB SATA 6Gb/s 256MB Cache 3.5"

HDSG-ST16000VE002	16 TB	Seagate Skyhawk 16TB SATA 6Gb/s 256MB Cache 3.5"
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DW Blackjack P-RACK 2U with RAID (DW-BJPR2U, DW-BJPR2U-LX)		
HDD Part Number	Storage Capacity	Hard Drive Description
HDSG-ST4000NM002A	4 TB	Seagate Exos 4TB SATA 6Gb/s 128MB Cache 3.5"
HDSG-ST6000NM021A	6 TB	Seagate Exos 6TB SATA 6Gb/s 256MB Cache 3.5"
HDSG-ST8000NM000A	8 TB	Seagate Exos 8TB SATA 6Gb/s 256MB Cache 3.5"
HDSG-ST12000NM001G	12 TB	Seagate Exos 12TB SATA 6Gb/s 256MB Cache 3.5"
HDSG-ST14000NM001G	14 TB	Seagate Exos 14TB SATA 6Gb/s 256MB Cache 3.5"
HDSG-ST16000NM001G	16 TB	Seagate Exos 16TB SATA 6Gb/s 256MB Cache 3.5"
HDSG-ST18000NM000J	18 TB	Seagate Exos 18TB SATA 6Gb/s 256MB Cache 3.5"

Additional Recommended Information

Create a Database Backup

As a precaution, you must create a Database Backup copy of the DW Spectrum System before making any major changes to the affiliated DW Spectrum Server or its hardware. By doing so, recording licenses, user configurations, etc. of the DW Spectrum Server can be restored from the Database Backup if it becomes necessary.

- [Creating a Database Backup of DW Spectrum IPVMS](#)

Replacing Local Disk (C:) Storage Drive

Be aware that if you are replacing the (C:) Drive (Disk 0), the operating system files will be removed from the system. You will then need to use system recovery (USB or integrated) to restore operability to the DW Blackjack unit, regardless of RAID capability.

For more information, you may refer to:

- [USB Recovery for a DW Blackjack E-RACK or P-RACK Server \(Windows OS\)](#)
- [USB Recovery for a Non-RAID System \(Ubuntu/Linux\)](#)

Replacing Storage Drives in a RAID 5 System

When using a DW Blackjack P-RACK with RAID, the two SSDs are copies (RAID 1) of the same storage partition (*Local Drive C:*). Meanwhile, the multiple HDDs share the data storage across all of the HDDs (RAID 5) in their own group.

As the P-RACK storage drives are not hot-swappable, replacing a hard drive in a P-RACK that is equipped with RAID will require that RAID configuration be rebuilt after replacing the storage drive. In the system's RAID manager, the SSD RAID group will be "*Drive Group 0*" and the HDD RAID group will be "*Drive Group 1*".

For more information, you may refer to:

- [Configuring RAID 5 Using LSI RAID Manager](#)
- [Configuring RAID 5 Using MegaRAID WebBIOS](#)

Part 1: Identifying the Physical Drive

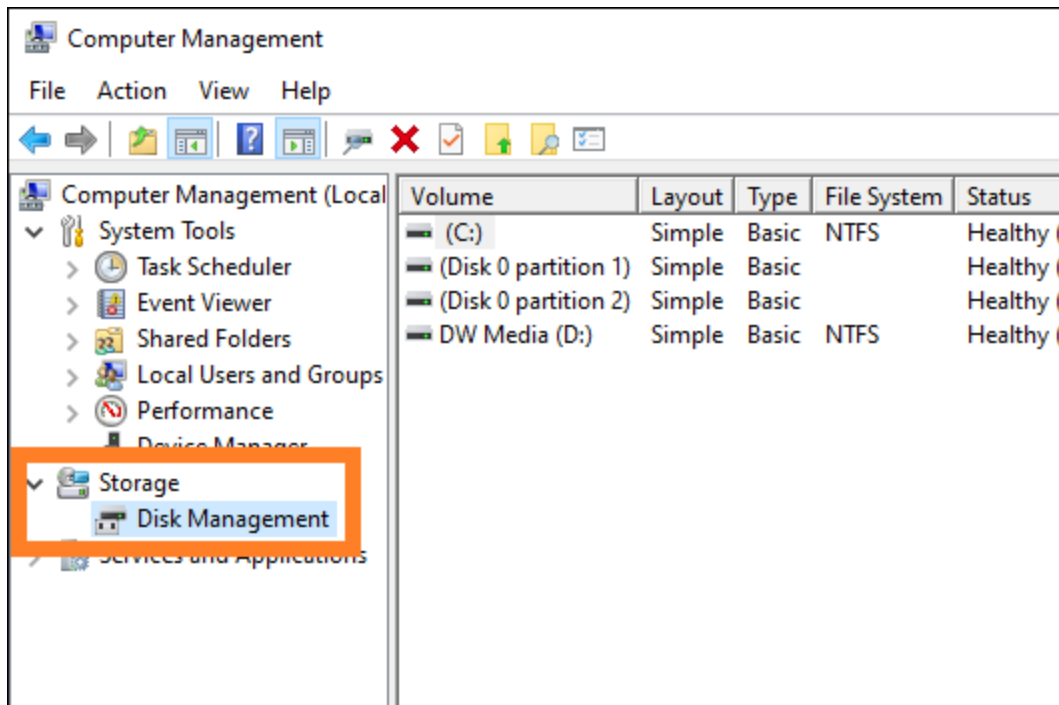
When replacing an HDD for a system that has multiple hard drives installed, you will need to know which physical SATA port on the motherboard the problematic hard drive is connected to. This can be done with a combination of knowing which disk is bad beforehand and physically looking at the motherboard.

You may use one of the methods below to identify the related SATA connector without having to open the case chassis of the DW Blackjack P-RACK.

Windows Option 1: Identifying Storage Drive with Disk Management

To identify which SATA connector the target hard drive is connected to:

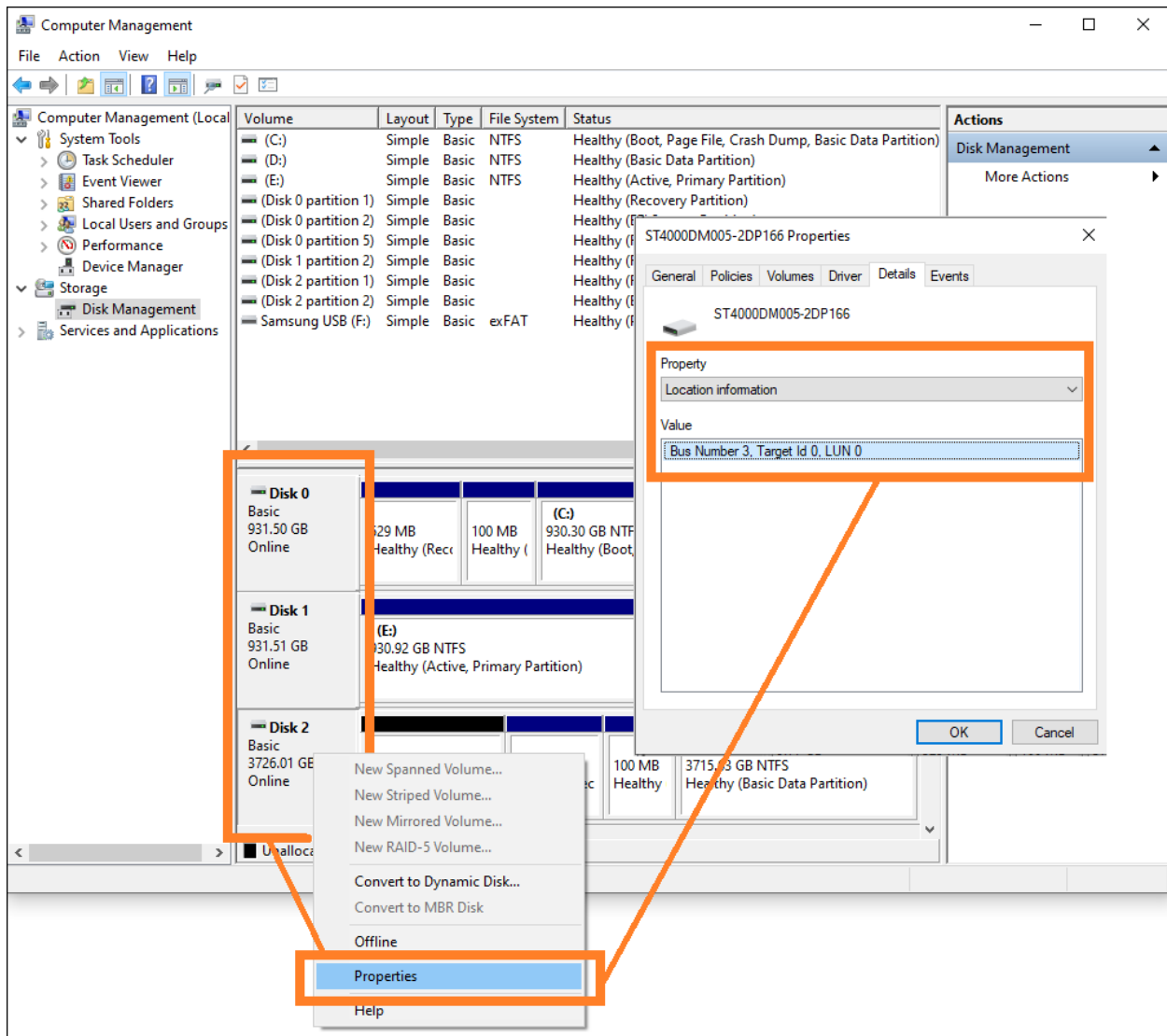
- 1) Launch the **Disk Management** program on the computer. To do so you may:
 - Click on the **Start**  menu, then search for the "**Disk Management**" tool. The search result will label this as "Create and format hard disk partitions"
 - Click on the **Start**  menu, then search for the "**Computer Management**" application. Launch the application, then (under *Storage*) select "**Disk Management**".



- 2) The *Disk Management* tool will allow you to view and manage hard drive partitions of internal hard drives.

From the list of *Disks*, **right-click** on the target drive and select "**Properties**".

In the *Properties* window, click on the "**Details**" tab, then select "**Location Information**" from the dropdown. The resulting "*Bus Number*" is the associated SATA connector for the selected drive.

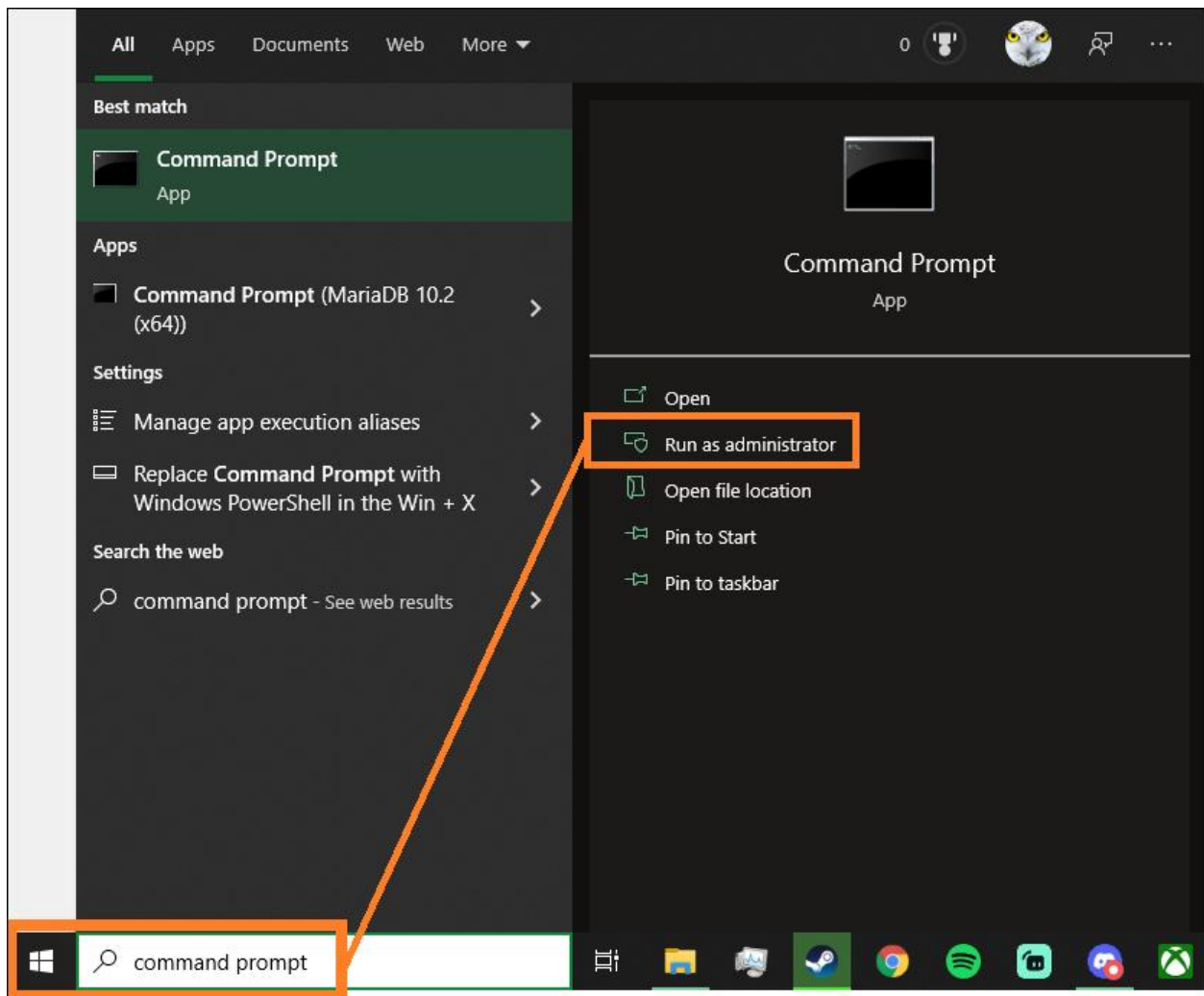


Windows Option 2: Identifying Storage Drive with Command Prompt

To identify which SATA connector the target hard drive is connected to:

- 1) Click on the **Start**  menu, then search for "**Command Prompt**".

Select "**Run as Administrator**". You may alternatively, **right-click** on the application, then select "**Run as Administrator**" to launch the program as an Administrator.



2) In the *Command Prompt*, enter the command:

```
diskpart.exe
```

Press the **“Enter”** key to run the action. The *DiskPart* command will become active. Next, enter the command:

```
list disk
```



```
Administrator: Command Prompt - diskpart.exe
Microsoft Windows [Version 10.0.19043.1415]
(c) Microsoft Corporation. All rights reserved.

C:\WINDOWS\system32>diskpart.exe

Microsoft DiskPart version 10.0.19041.964

Copyright (C) Microsoft Corporation.
On computer: PALADINMK2

DISKPART> list disk

   Disk ###  Status       Size       Free       Dyn  Gpt
   -----  -
   Disk 0      Online        931 GB         0 B
   Disk 1      Online        931 GB    1024 KB
   Disk 2      Online       3726 GB         9 GB

DISKPART> _
```

3) The *DiskPart* will list all detected disk drives belonging to the P-RACK system.

To identify the associated SATA connector, select the target disk and use the command:

```
select disk #
```

For example, to identify *Disk 2*, replace the “#” in the command with “2”.

```
Administrator: Command Prompt - diskpart.exe
Microsoft Windows [Version 10.0.19043.1415]
(c) Microsoft Corporation. All rights reserved.

C:\WINDOWS\system32>diskpart.exe

Microsoft DiskPart version 10.0.19041.964

Copyright (C) Microsoft Corporation.
On computer: PALADINMK2

DISKPART> list disk

   Disk ###  Status       Size       Free      Dyn  Gpt
   -----  -
   Disk 0      Online        931 GB         0 B
   Disk 1      Online        931 GB    1024 KB
   Disk 2      Online       3726 GB         9 GB

DISKPART> select disk 2

Disk 2 is now the selected disk.

DISKPART> _
```

4) After selecting the target disk, use the command:

```
detail disk
```

The resulting “**Path**” and “**Location Path**” information will indicate the associated SATA connector for the selected drive.

Hard Disk	PCB Port No.	Path ID	Location Path
Local Disk (C:)	0	0	C00 T00L00
Local Disk (D:)	1	1	C01 T00L00
Additional Storage	2	2	C02 T00L00
Additional Storage	3	3	C03 T00L00

For example, “*Path: 3*” or “*...#ATA(C03...)*” indicates that *Disk 2* is connected to the SATA4 port of the motherboard.

```

Select Administrator: Command Prompt - diskpart.exe

DISKPART> detail disk

ST4000DM005-2DP166
Disk ID: {D0509B48-8666-4E44-9460-2697D61C73AE}
Type : SATA
Status : Online
Path : 3
Target : 0
LUN ID : 0
Location Path : PCIROOT(0)#PCI(1700)#ATA(C03T00L00)
Current Read-only State : No
Read-only : No
Boot Disk : No
Pagefile Disk : No
Hibernation File Disk : No
Crashdump Disk : No
Clustered Disk : No

Volume ### Ltr Label Fs Type Size Status Info
-----
Volume 8 D NTFS Partition 3715 GB Healthy
Volume 9 Recovery NTFS Partition 529 MB Healthy Hidden
Volume 10 FAT32 Partition 100 MB Healthy Hidden

DISKPART>
```

Ubuntu/Linux Option: Identifying Storage Drive with Command Terminal

To identify which SATA connector the target hard drive is connected to:

- 1) Open the **Terminal** program on the Linux computer.
 - Simultaneously press the **CTRL + ALT + T** keys on the keyboard to launch the program
 - Alternatively, use the **Unity** menu search option to locate and launch the program

2) The *Terminal* program window will display.

To display the system attached storage information, use the command:

```
sudo lshw -c storage -c disk
```

- 3) The DW Blackjack P-RACK will request the submission of the *dwuser* (System Administrator) password. The keystrokes will be hidden and will not display as you type.

Use the passcode:

Dw5pectrum

****NOTE:** DW Blackjack units that were purchased prior to June 18, 2021 may still use the old (14.04, 16.04) super user login of "admin/admin" INSTEAD of the newer (18.04) "dwuser/Dw5pectrum" login.

- 4) The resulting output will display similar to the example image below. Use the following to identify the hard drive as it physically appears and the affiliated SATA connection:
- **description** – "ATA Disk" will indicate that it is a Serial ATA (SATA) connected storage device, in this case a hard drive
 - **product** – indicates the actual model number of the HDD product; this model number will also appear physically on the hard drive
 - **vendor** – additional HDD model information; the manufacturer name will also appear physically on the hard drive
 - **bus info** – this indicates the **SATA port number** that the HDD is attached to; The SATA port labeling, managed by the SATA controller, does not translate directly across.
 - To get the SATA port number, take the **bus info** number of the connector and **add +1**. For example, *bus info: scsi@0.0.0.0* indicates that the hard drive is connected to the SATA-1 port (as labeled on the motherboard).
 - **serial** – additional HDD model information; the serial number (S/N) will also appear physically on the hard drive

```
prack@BJP2U-LX:~$ sudo lshw -c storage -c disk
[sudo] password for Prack: Dw5pectrum
```

```
*-storage
```

```
description: SATA controller
product: Atom/Celeron/Pentium Processor x5-E8000/J3xxx/N3xxx Series SATA Controller
vendor: Intel Corporation
physical id: 13
bus info: pci@0000:00:13.0
version: 21
width: 32 bits
clock: 66MHz
capabilities: storage msi pm ahci_1.0 bus_master cap_list
configuration: driver=ahci latency=0
resources: irq:121 ioport:f060(size=32) memory:81515000-815157ff
```

```
*-storage
```

```
description: SATA controller
product: ASM1062 Serial ATA Controller
vendor: ASMedia Technology Inc.
physical id: 0
bus info: pci@0000:03:00.0
version: 02
width: 32 bits
clock: 33MHz
capabilities: storage msi pm pciexpress ahci_1.0 bus_master cap_list
configuration: driver=ahci latency=0
resources: irq:122 ioport:c050(size=8) ioport:c040(size=4) ioport:c030(size=8) ioport:c020
```

```
*-scsi
```

```
physical id: 1
logical name: scsi0
capabilities: emulated
```

```
*-disk
```

```
description: ATA Disk
product: WDC WD20PURX-64P
vendor: Western Digital
physical id: 0.0.0
bus info: scsi@0:0.0.0
logical name: /dev/sda
version: 0A80
serial: WD-WCC4M0VZ91Z0
size: 1863GiB (2TB)
capabilities: gpt-1.00 partitioned partitioned:gpt
configuration: ansiversion=5 guid=21787b3f-a537-4203-8801-94720dc0761f logicalsectorsi
```

Confirms SATA connected HDD

Actual HDD model name

Current SATA Port number

- add +1 to first digit for SATA number
For example, "scsi@_0.0.0.0" = SATA-1

Should match physical drive S/N

Part 2: Replacing the Physical Drive

Part 2-1: Locating HDD Hardware

Before handling any internal hardware components, discharge any static electricity that may have built up on your person. Be sure that you are working on a surface that is free of static electricity. When you are ready to replace the drive, please follow the steps below.

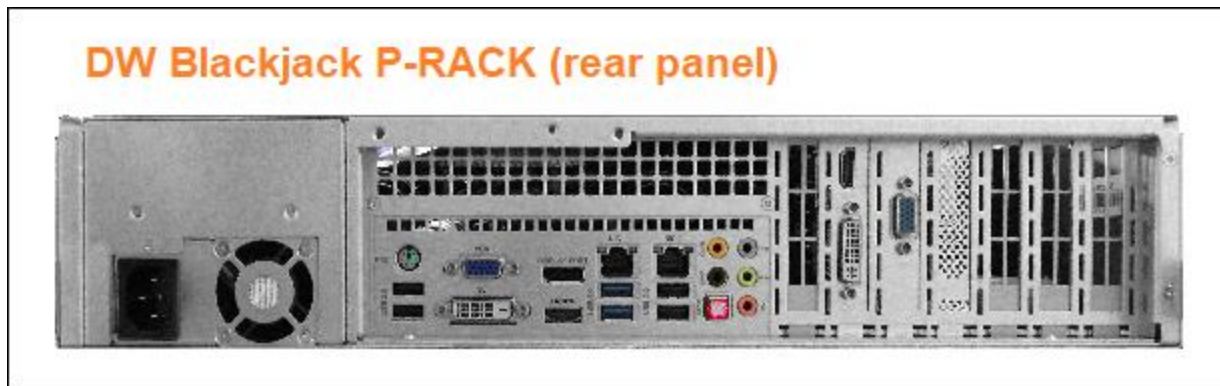
To locate an HDD storage drive in a DW Blackjack P-RACK:

- 1) If you have not already done so, **shut down** the unit completely, then **disconnect the power cable** and **network cable(s)** from the DW Blackjack P-RACK.

For easier physical access, **disconnect all peripherals** (mouse, keyboard, monitor, etc.) from the unit that may obstruct physical access.

Place the DW Blackjack P-RACK in a clean, flat area where you may easily work in and around the hardware.

****NOTE:** To avoid damage, do not open the P-RACK hardware case in areas where dust, particulates, or moisture are present.



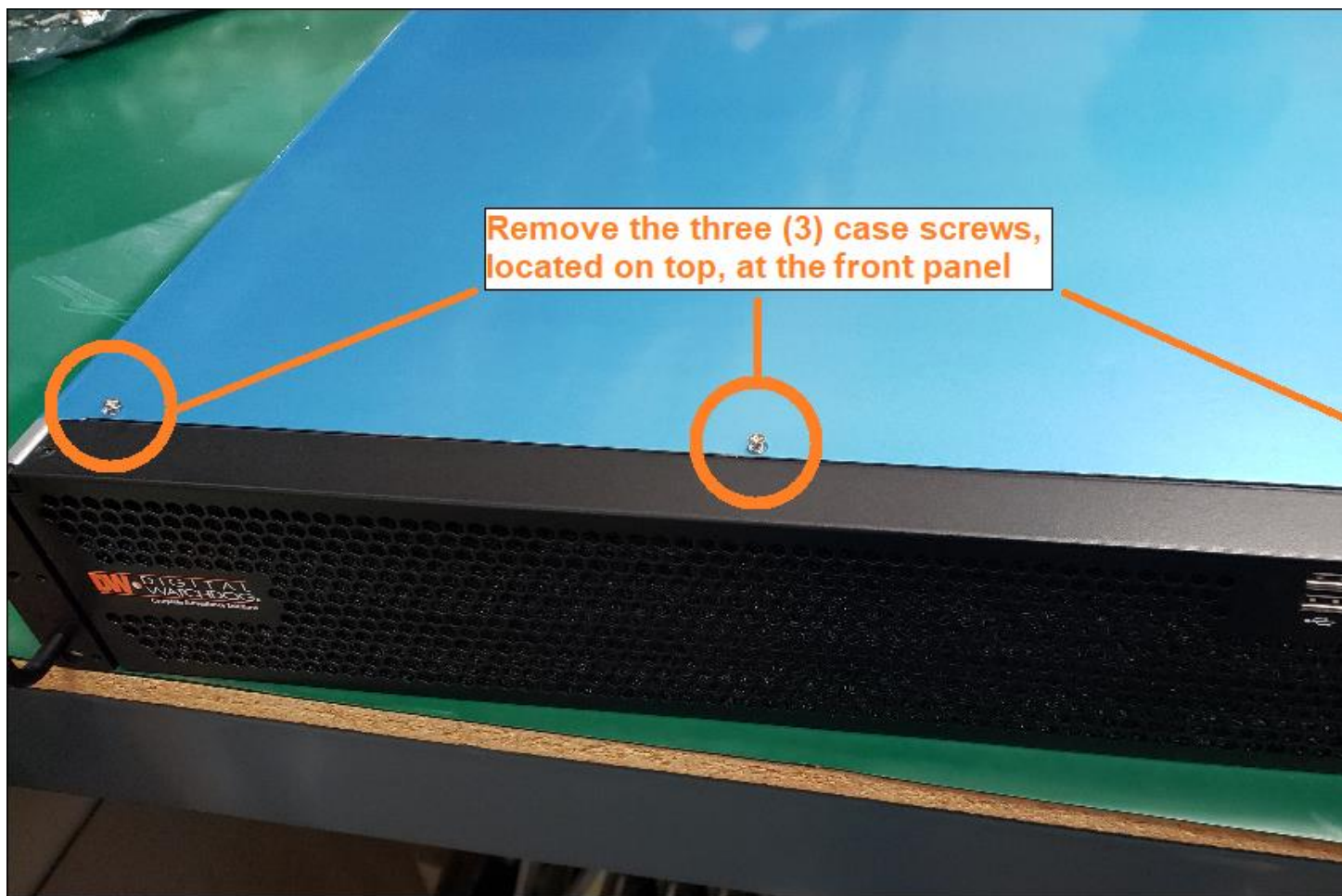
- 2) The hardware case of the P-RACK is secured by **three (3) screws** and **one (1) press-fit retractable spring plunger**.

Use a screwdriver to **remove** the **three (3) screws** from the top of the DW Blackjack P-RACK unit.

Loosen and retract the press-fit retractable spring plunger from the rear of the DW Blackjack P-RACK unit.

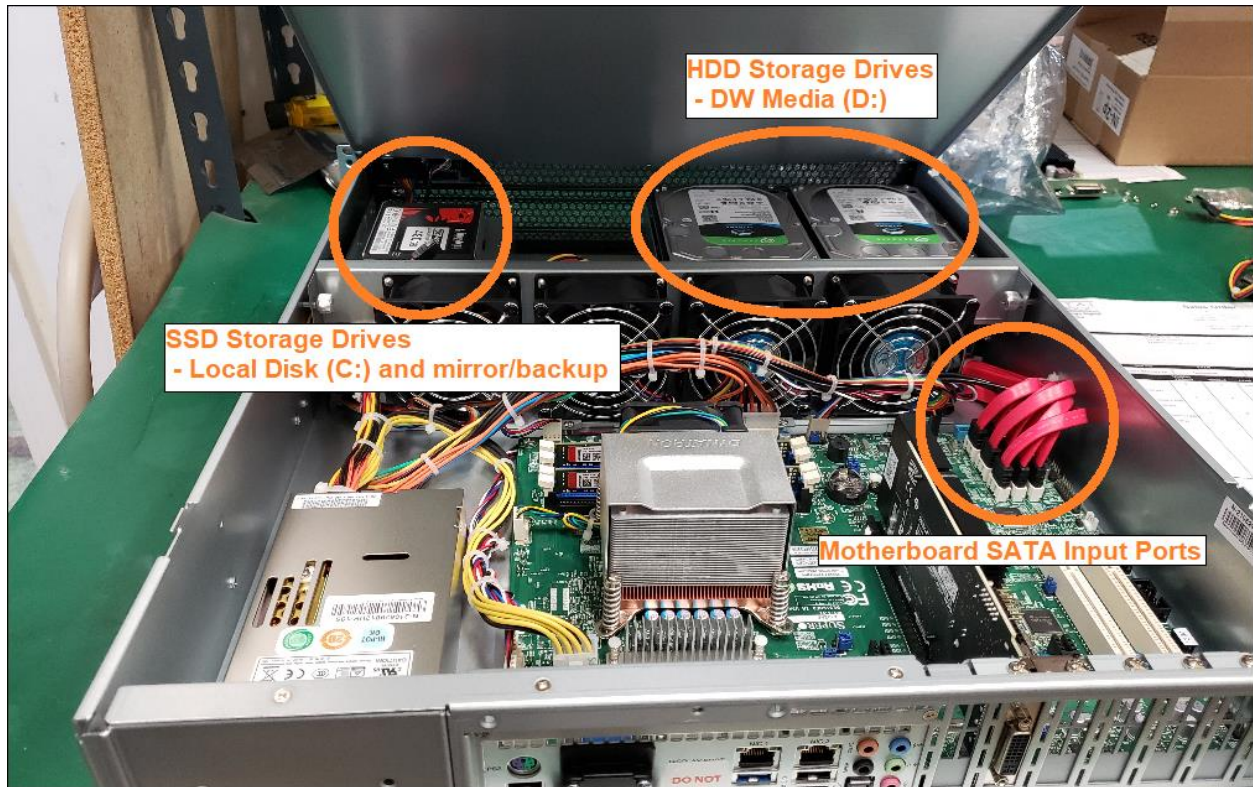
Once the screws and spring plunger no longer affix the case cover to the DW Blackjack P-RACK, carefully **slide-back** the case cover, then **lift** to remove it from the unit.

****NOTE:** The press-fit retractable spring plunger cannot be completely detached from the case cover. Please only tighten or loosen this device to secure the case cover to the unit.

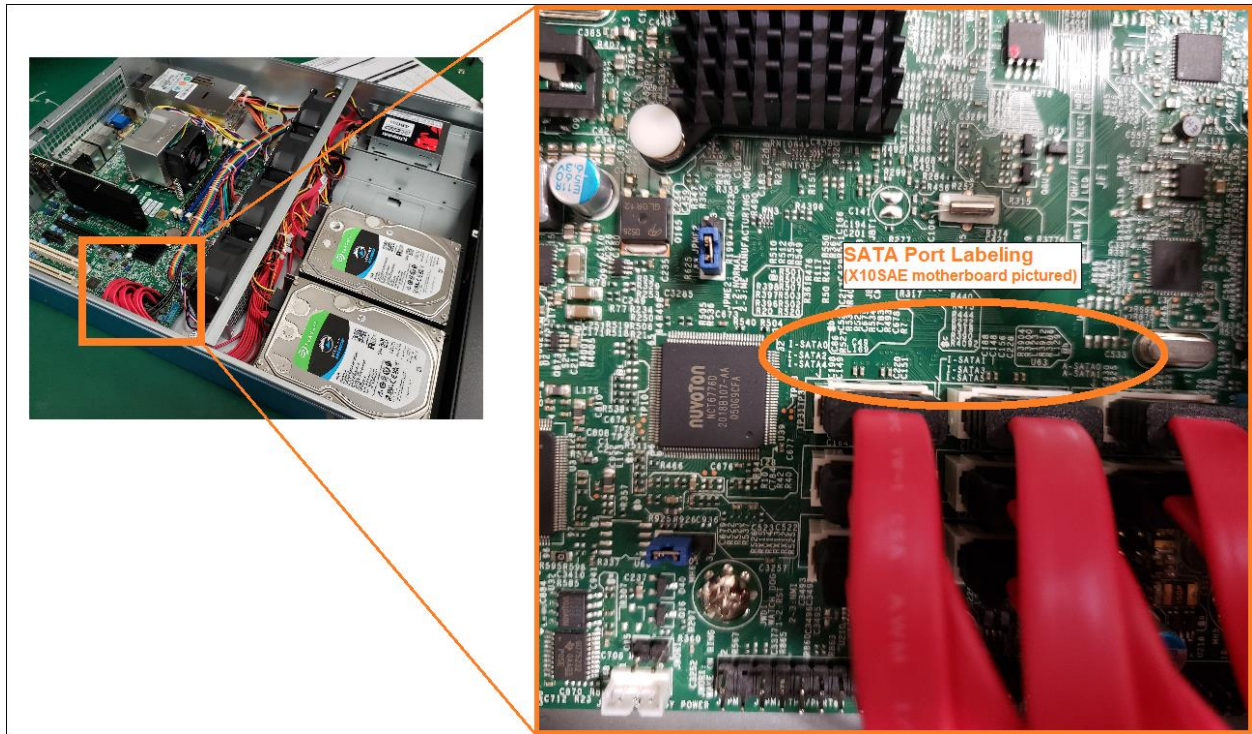




- 3) With the case cover off, locate the **HDD Storage Drives** and **identify** the target HDD that must be replaced.



- 4) On the motherboard, the SATA ports are labeled for each SATA connector. You may use the **SATA Input Ports** as a reference to identify the target HDD storage drive.



By default, the DW Blackjack P-RACK storage drives are mounted and organized as follows.

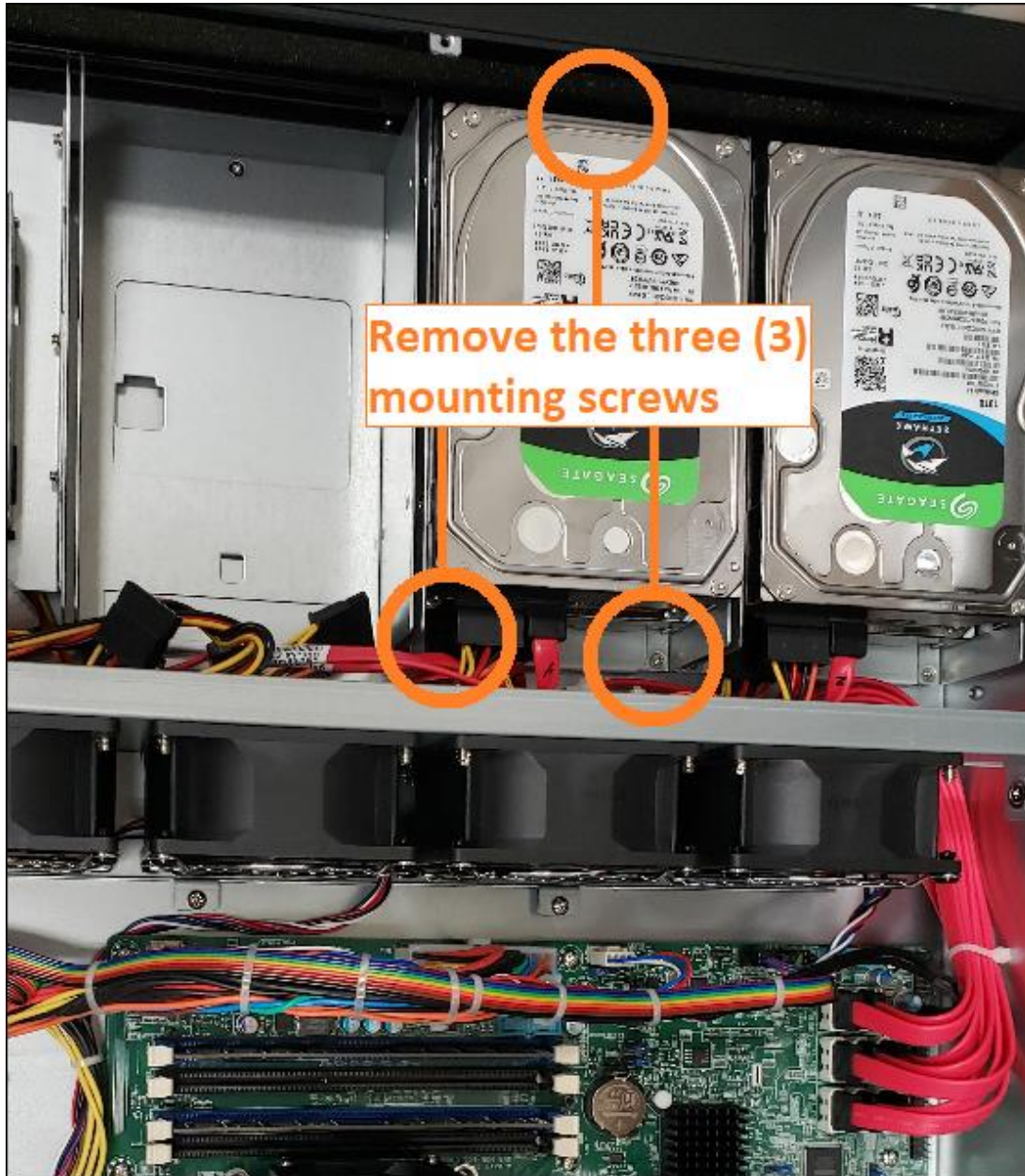


Part 2-2: Removing an Internal Hard Drive

To remove and replace a hard drive:

- 1) Remove the **three (3) mounting screws** that affix the drive bracket to the DW Blackjack P-RACK case chassis.

Once loosened, carefully **lift the entire drive bracket up and out** of the drive enclosure.

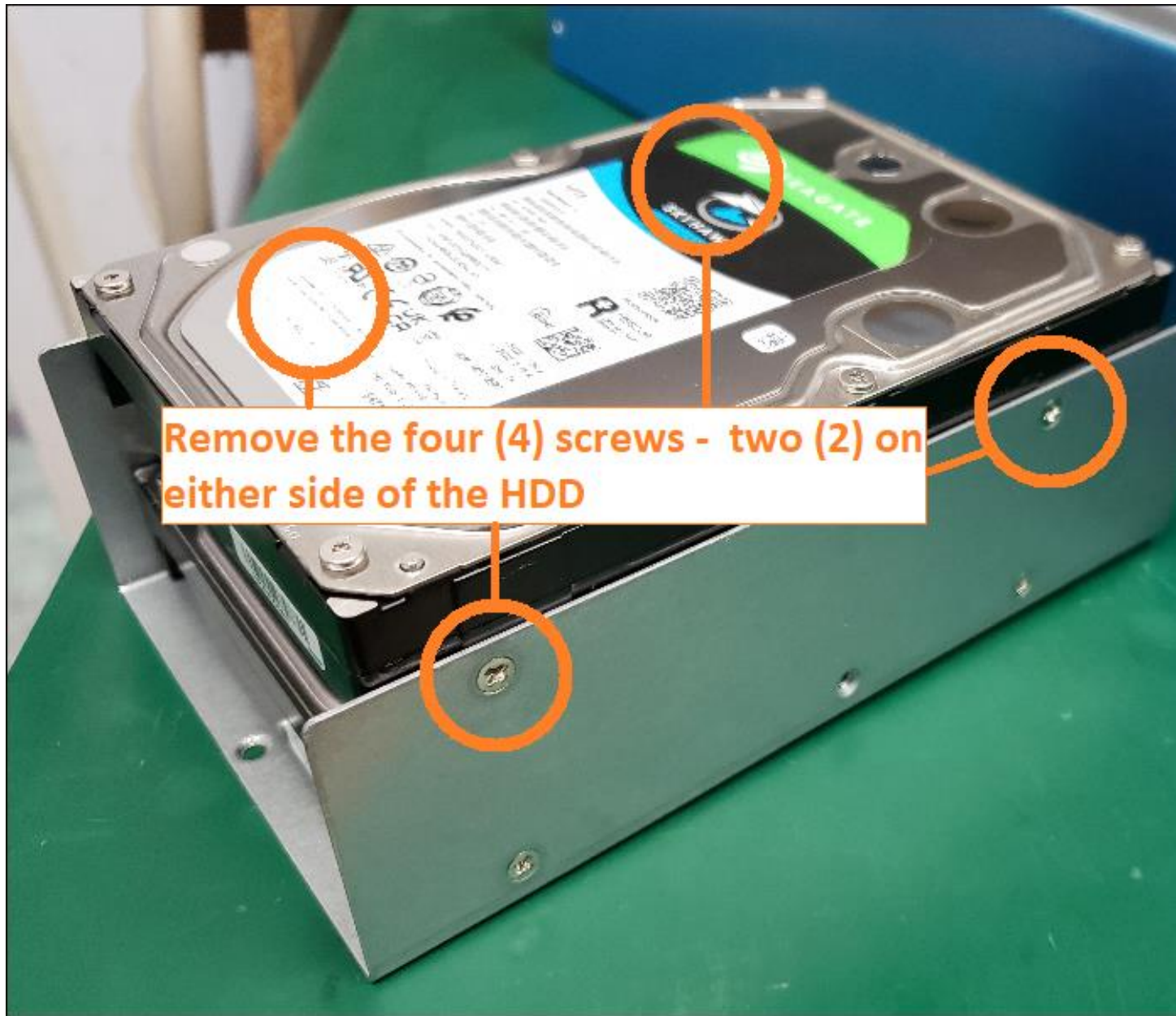


- 2) For easier access, carefully **disconnect the SATA and power supply cables** from the hard drive.

If you are replacing multiple storage drives, be sure to keep track of which pair of cables belong to each specific drive.



- 3) Remove the **four (4) mounting screws** that secure the HDD to the mounting bracket, then carefully **remove the HDD** from the mounting bracket.



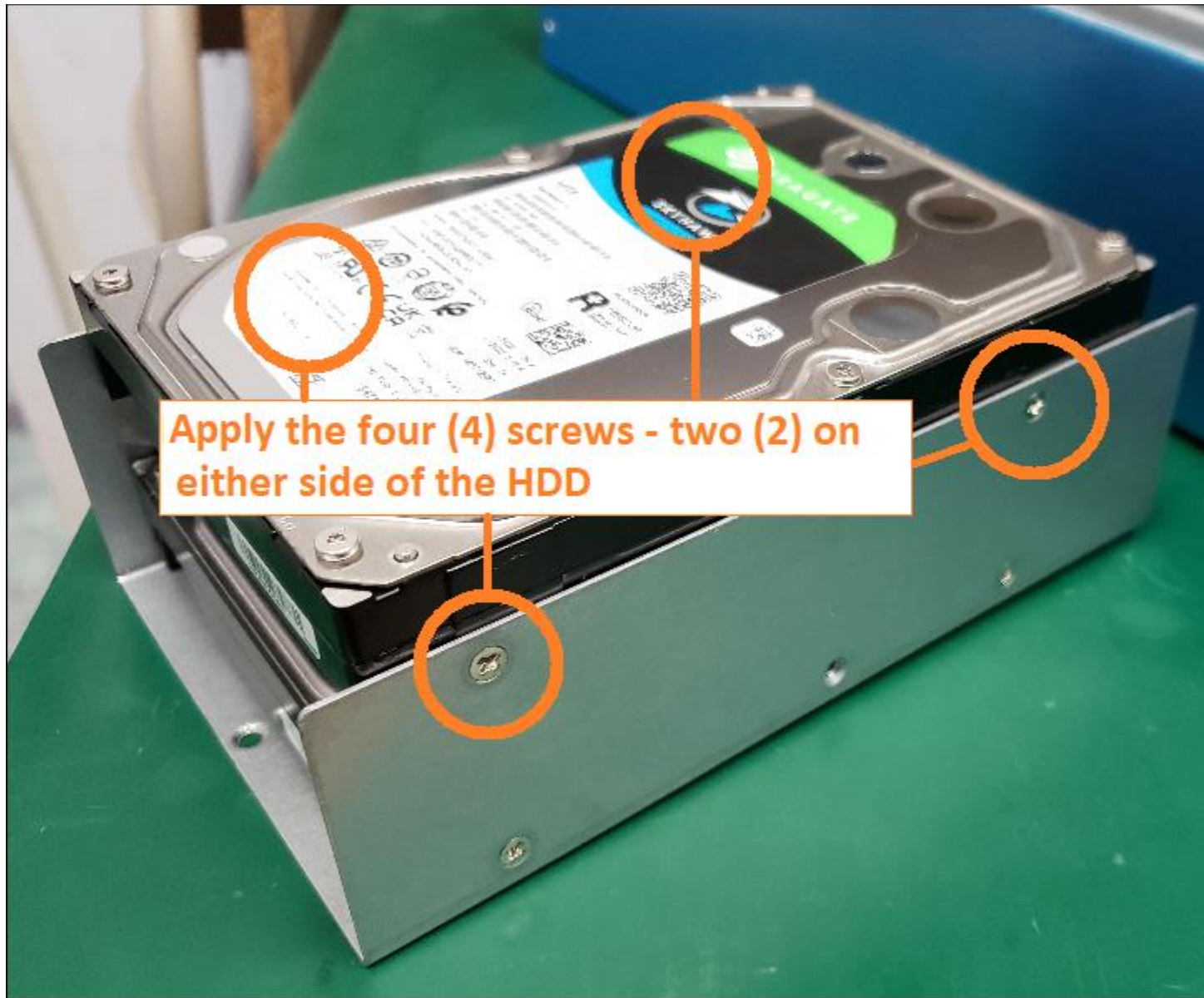
Part 2-3: Installing the Replacement Hard Drive

The process of reinstalling the mounting bracket and replacement hard drive is the same set of steps for removing the drive, but in reverse order.

After removing the old/faulty hard drive:

- 1) **Place the replacement/new HDD** into the mounting bracket.

Use the **four (4) mounting screws** to secure the new HDD to the mounting bracket.

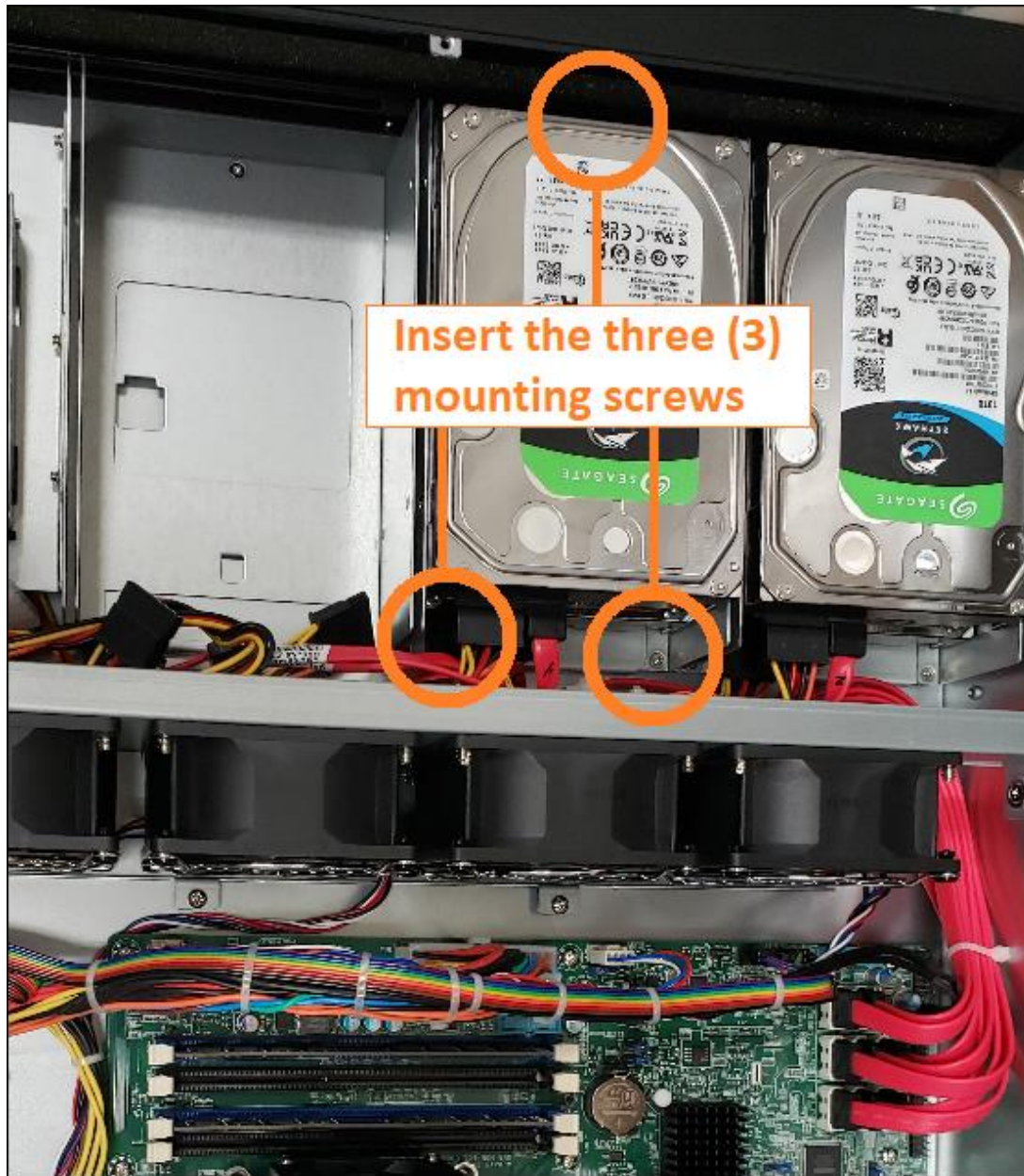


- 2) Connect the **SATA and power supply cables** to the new HDD. Be sure to use the same set of cables that were removed from the old hard drive.



- 3) Carefully **reinsert the mounting bracket and its affixed HDDs** into the DW Blackjack P-RACK hard drive enclosure.

Use the **three (3) mounting screws** to secure the mounting bracket to the case chassis.



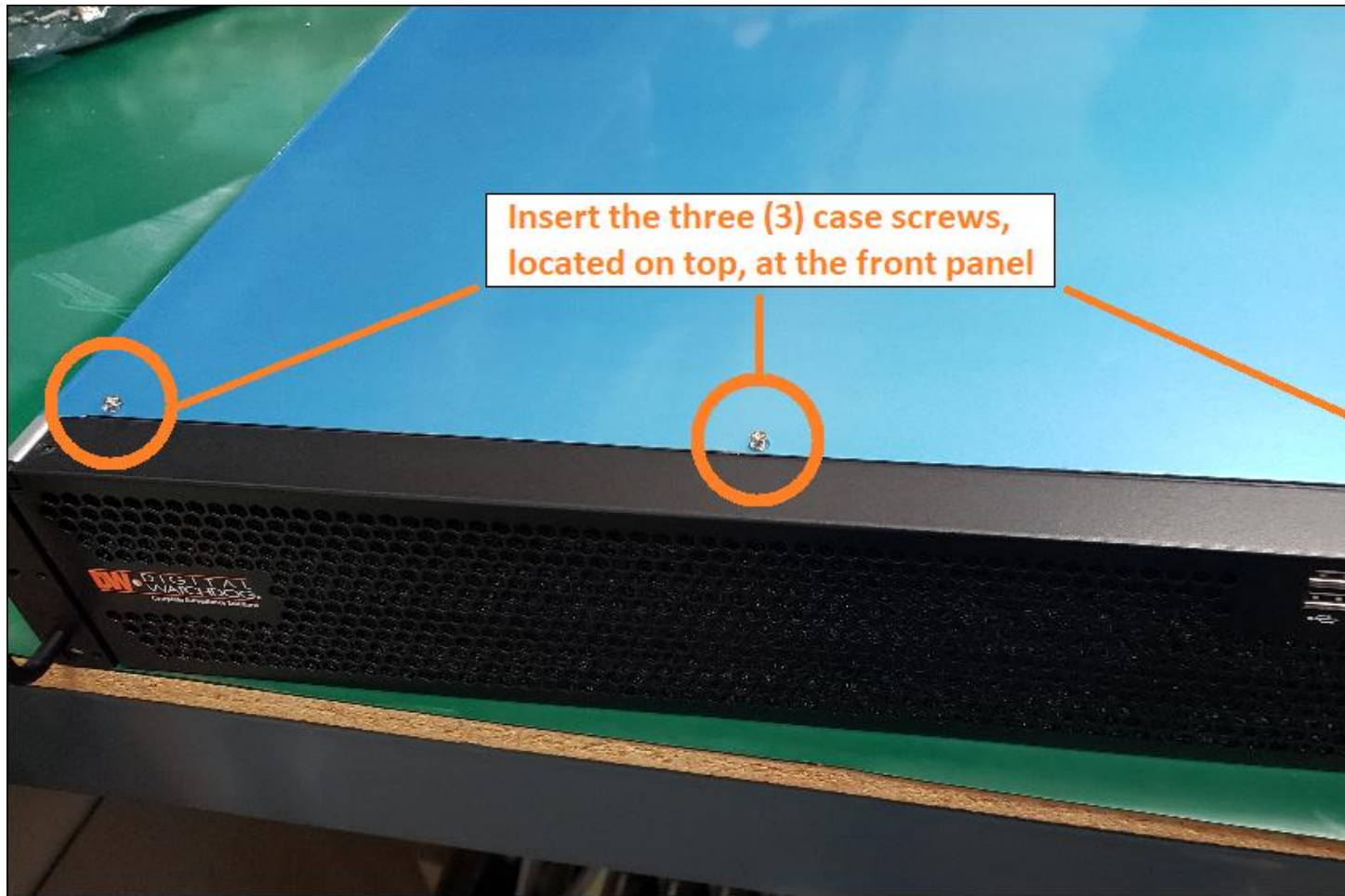
- 4) **Replace the case cover** of the DW-Blackjack P-RACK on top of the unit, then carefully **slide-forward** the case cover until it is flush with the rest of the hardware case.

Insert and tighten the press-fit retractable spring plunger at the rear of the DW Blackjack P-RACK unit.

Use a screwdriver to **insert the three (3) screws** into the top of the DW Blackjack P-RACK unit to secure the cover to the case.

Insert and tighten the spring
plunger, located at the rear panel





- 5) **Place the DW Blackjack P-RACK** into its regular location and **reconnect all power cables and necessary peripherals.**

Part 3: (Optional) Run Recovery Program

If the hard drive that was replaced was hosting the OS (Local Disk C:), then you will need to run the USB Recovery Program to restore the operating system and the integrated recovery partition to the unit. This will completely default the DW Blackjack P-RACK.

If needed, you may refer to the following guides:

- [USB Recovery for a DW Blackjack E-RACK or P-RACK Server \(Windows OS\)](#)
- [USB Recovery for a DW Blackjack System \(Ubuntu/Linux\)](#)

****NOTE:** If the main HDD (Local Disk C:) was NOT replaced, but an additional storage drive was replaced instead, you do not need to run the recovery program to restore the system operability.

****IMPORTANT:** Do not use different ISO versions of the USB recovery program for different DW Blackjack models. For example, if the USB recovery that is meant for a DW Blackjack Cube is applied to a DW Blackjack P-RACK 2U with RAID, the LSI RAID Manager software program will not be included in the recovered system as the DW Blackjack CUBE model does not come equipped for a RAID configuration.

Part 4: Initialization and Partition Creation

The replacement HDD will act as the storage location for DW Spectrum video archives, which represent the recorded camera video from the security system. After physically mounting the replacement hard drive, the new drive will need to be initialized and a new volume partition must be created. Once this has been performed, the affiliated DW Spectrum Server may begin to use the new drive for its regular media storage.

For further guidance, you may refer to the related KB articles:

- To set up a new storage drive with Windows: [Mounting a New Drive \(Windows\)](#)
- To set up a new storage drive with Ubuntu/Linux: [Mounting a New Drive \(Ubuntu/Linux\)](#)

Part 5: Restore RAID 5 Configuration

The variety of DW Blackjack P-RACK 2U models includes an option for building a server that comes equipped with a RAID controller and RAID manager software. Through this, the DW Blackjack P-RACK can utilize a RAID 5 configuration to create storage redundancies to mitigate data loss in the event of drive failure.

Please note that not all DW Blackjack models are sold with RAID capability. If your DW Blackjack P-RACK is equipped for a RAID configuration, you may refer to the following guides:

- [Configuring RAID 5 Using LSI RAID Manager](#)

- [Configuring RAID 5 Using MegaRAID WebBIOS](#)
- [Deleting a RAID Array in MEGARAID WebBIOS](#)

Part 6: (Optional) Update DW Spectrum IPVMS

The DW Spectrum IPVMS Server and Client software will come installed on the DW Blackjack P-RACK's main HDD (Local Disk C:) by default. If the main HDD has been replaced and the recovery program has been used, the DW Spectrum IPVMS software version may be outdated, depending on the age of the USB recovery ISO version that was used.

In this scenario, it is recommended to update the DW Spectrum IPVMS software at least up to the same software build version that was used by the system prior to replacing the main HDD. If the Server is not updated and uses an outdated software version, older than the build that was used prior to the HDD replacement or system recovery, there may be issues when attempting to restore the DW Spectrum Database.

If needed, you may refer to the guide:

- [Updating DW Spectrum](#)

****NOTE:** If the main HDD (Local Disk C:) was NOT replaced, but an additional storage drive was replaced instead, you do not need to update the DW Spectrum IPVMS software to restore the IPVMS database.

Part 7: (Optional) Restore the Database and License Keys

If the main HDD (Local Disk C:) was replaced, you can restore the DW Spectrum Database and Recording License Key(s) to the DW Spectrum System by using a Database Backup that was created prior to replacing the main HDD.

If it was an additional storage drive that was replaced instead, the database of the DW Spectrum System should still be intact on the main HDD.

For instructions on restoring a database, please refer to the "Restoring From a Database Backup" section of the guide:

- [Creating a Database Backup of DW Spectrum IPVMS](#)