FRU replacement highlights

The information you should know before replacing FRU

Service considerations

Before taking action, consider the following service factors:

- All DM systems are clustered.
  - This means that both controller A and controller B communicate over a dedicated connection using both SAS backend and two dedicated UTA 10 Gb Ethernet ports (e0a and e0b).

- Before servicing the box, you need to disable the auto-failback feature on the controller or node to be serviced to prevent it from taking ownership of resources.

- You will also need to ensure that any node or controller that is being serviced is first halted to allow all resources to transfer to the good or non-degraded controller.

- You cannot place a node that owns the quorum resource into service. The resource will need to be transferred to one of the surviving nodes.

- It is not possible to halt both node A and node B at the same time.

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# Identifying the machine type and serial number

Before taking service action, it is suggested that you identify the machine type and serial number of the DM Series storage system that will be serviced. Issue the `run local sysconfig -a` command to identify the Model Name, Machine Type, and Lenovo System SN.

```
DM5000H::> run local sysconfig -a
Lenovo Release 9.4P1: Fri Jul 20 23:30:57 EDT 2018
System ID: 0537143011 (DM5000H-1); partner ID: 0537142993 (DM5000H-2)
System Serial Number: 721822000139 (DM5000H-1)
System Rev: 20
System Storage Configuration: Multi-Path HA
System ACP Connectivity: Inband Active
All-Flash Optimized: true
Backplane Part Number: 111-02495
Backplane Rev: A4
Backplane Serial Number: 021806001720
slot 0: System Board 1.7 GHz (System Board XXII B2)
Model Name:          DM5000H
Machine Type:        7Y57-CTOWW1
Lenovo System SN:    LSSN1234
Part Number:         111-02493
Revision:            20
Serial Number:       021815016159
BIOS version:        11.2.1
```

Note: You can also get this information through the ONTAP 9.8 GUI. Select **Cluster → Overview**, and then click the **System ID** to get the machine type and serial number.

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System service labels

The labels have diagrams showing the locations of the FRU parts and the basic steps used to replace them.
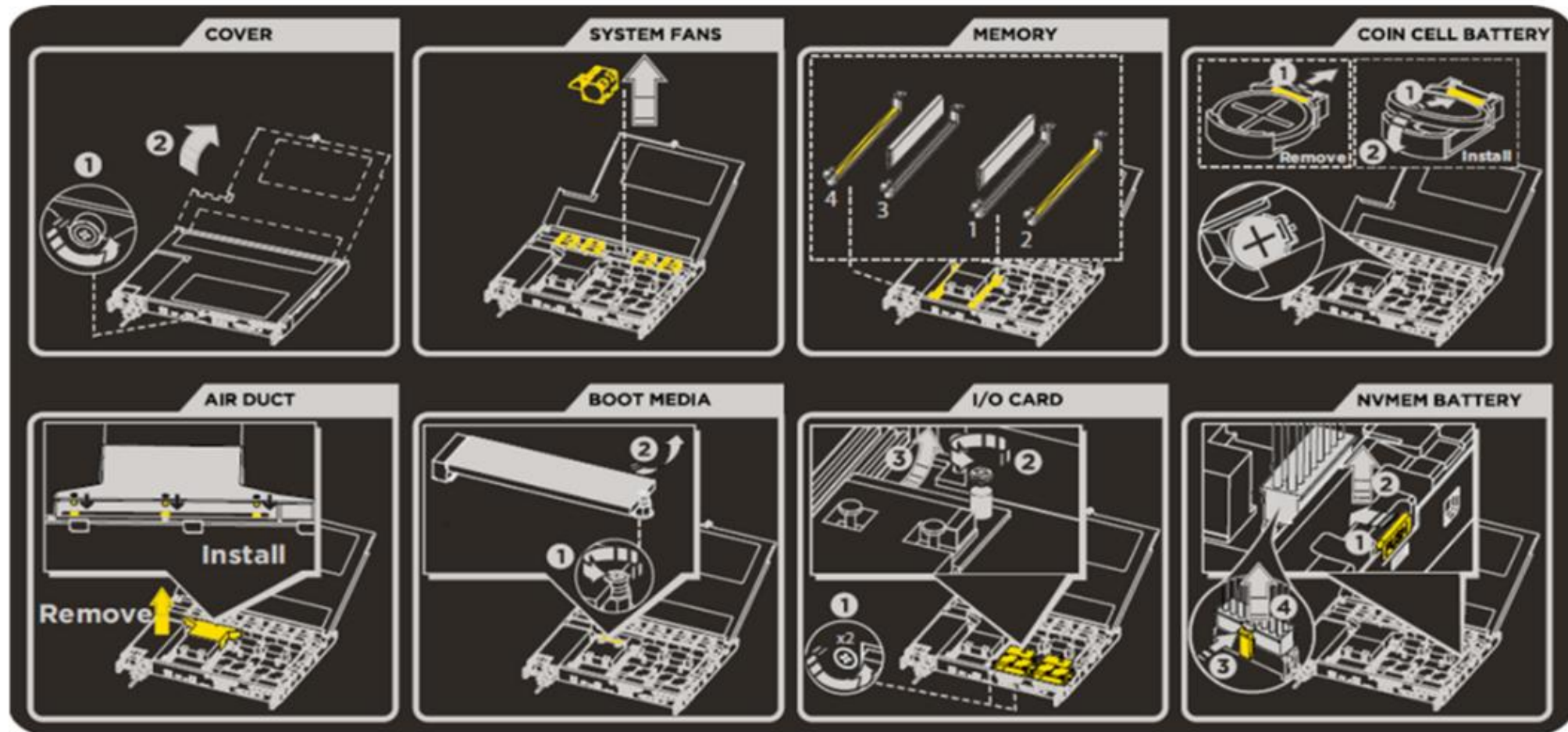
# DM 5100F repair actions

The following parts can be replaced:
- Power supply
- Controller module
- Boot media
- Fan
- NVMEM battery
- DIMM
- PCIe or Mezz card
- Coin cell battery (Real Time Clock)

The power supply is hot swappable, but before it is replaced, the following actions should be performed:
- Shut down the impacted controller
- Replace the failed part
- Run diagnostics
- Restore the controller to operation

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DM 5100F repair actions - power supply replacement

1. Unplug the power cable.
2. Rotate the cam handle so that it can be used to pull the power supply from the chassis.
3. Press the blue locking tab to release the power supply.
4. Using the cam handle, pull the power supply out of the chassis.
5. Using both hands, support and align the edges of the replacement power supply with the opening in the system chassis, and then gently push the power supply into the chassis using the cam handle.
   Power supplies are keyed and can only be installed one way.
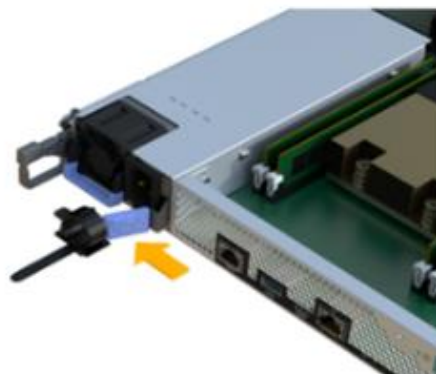
Shutting down an impaired node

Work through the following procedure to shut down an impaired node before replacing a controller or its components.

Click each step in turn to see the procedure

Step **1**—**2**

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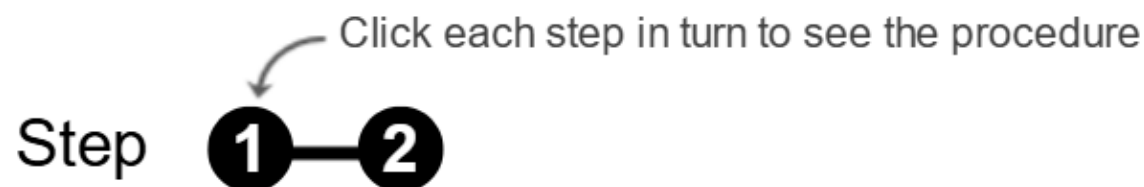
Shutting down an impaired node

To shut down an impaired node, you must determine its status and, if necessary, take over the node so that the healthy node will continue to serve data from the impaired node's storage.

If AutoSupport is enabled, suppress automatic case creation by invoking an AutoSupport message:
```
system node autosupport invoke -node * -type all -message
MAINT=number_of_hours_downh
```

Example :

• The following AutoSupport message suppresses automatic case creation for two hours:

```
– cluster1:*> system node autosupport invoke –node * -type all –message MAINT=2h
```

Step ①—❷

Shutting down an impaired node

- Disable automatic giveback from the console of the healthy node:
  - `storage failover modify -node local -auto-giveback false`
- Take the impaired node to the LOADER prompt:

If the impaired node is displaying	Then…
The LOADER prompt	Go to the next step.
`Waiting for giveback…`	Press **Ctrl-C**, and then respond with `y` when prompted.
System prompt or password prompt (enter system password)	Take over or halt the impaired node: • For an HA pair, take over the impaired node from the healthy node • `storage failover takeover -ofnode impaired_node_name` • When the impaired node shows `Waiting for giveback…`, press **Ctrl-C**, and then respond with `y`.

Step ①—②

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DM 5100F repair actions - removing a controller module

1. Remove the power cords.
2. Unplug the system and I/O cables.
3. Squeeze the handles on either side of the controller and pull back until it releases from the shelf.
4. Holding the handles with both hands, slide the controller canister out of the shelf. When the front of the controller is free of the enclosure, hold it with both hands and remove it completely.

Note: The controller module is heavy and will need to be supported as it is removed.

Running system-level diagnostics

It is suggested that you run diagnostic tests for specific components and subsystems whenever the controller is being replaced. All commands in the diagnostic procedures are issued from the node where the component is being replaced.

- Enter the `system node halt -node node_name` command to reboot the node if the node to be serviced is not at the LOADER prompt.
- At the LOADER prompt, enter the `boot_diags` command to access the special drivers specifically designed for system-level diagnostics.
- Select **Scan System** from the displayed menu to enable the diagnostics tests.
- Select **Test system** from the displayed menu to run the diagnostics tests.
  - Select **Test Memory** from the displayed menu if you only want to test the DIMM.
  - Select **NVDIMM Test** from the displayed menu if you only want to test the NVDIMM.
- Based on the results of the preceding step:
  - If the scan show problems, correct the issue, and then rerun the scan.
  - If the scan reported no failures, select **Reboot** from the menu to reboot the system.

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Restoring a controller module to operation after running diagnostics

After completing diagnostics, you must re-cable the system, give back the controller module, and then re-enable automatic giveback.

- Re-cable the system as needed.
  - If you removed the media converters (QSFPs or SFPs), remember to reinstall them if you are using fiber optic cables.
- Return the node to normal operation by giving back its storage:
  - `storage failover giveback -ofnode` *impaired_node_name*
- If automatic giveback was disabled, re-enable it:
  - `storage failover modify -node local -auto-giveback true`

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DM 5100F repair actions – replacing a boot media

1. Remove the controller from the system.
2. Remove the controller canister's cover by unscrewing the thumbscrew and lifting the lid open.
3. Remove the CPU air baffle to expose the boot media.
4. Remove the screw from the boot media.
5. Gently lift the boot media out of the socket.
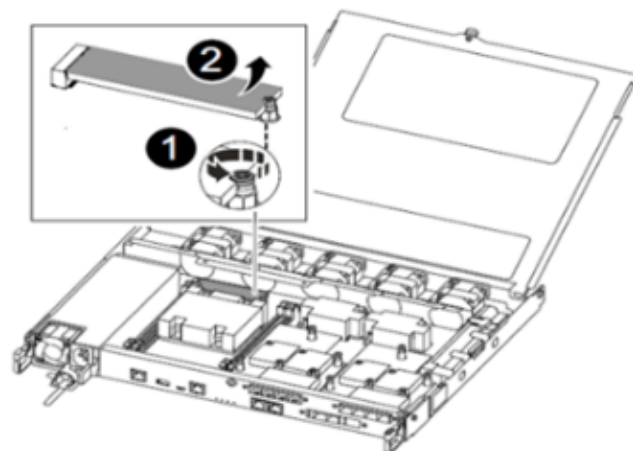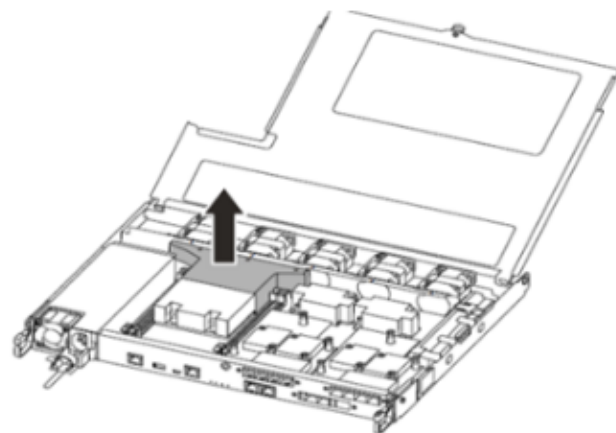
Note: The boot media will need to be re-written with information from the boot media in the alternate controller.

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Transferring a boot image to a boot media

The replacement boot media that you installed will not have a boot image, so you need to transfer a boot image using a USB flash drive. The USB drive should be formatted to FAT32 and have the following items:

- A copy of the same image version of ONTAP that the impaired controller was running. You can download the appropriate image from the Lenovo Support Site.
- If the system is an HA pair, you must have a network connection.

Click each step in turn to see the procedure.

Step **1**—**2**—**3**—**4**—**5**

Lenovo

Transferring a boot image to a boot media

- Unzip the service image.
- There will be two folders in the unzipped service image file:
  - boot
  - efi
- Copy the efi folder to the top directory on the USB flash drive.
- The USB flash drive should have the efi folder and the same image version of ONTAP that the impaired controller was running.
- Remove the USB flash drive from your laptop.

Note: If you are extracting the contents using Windows, do not use winzip to extract the netboot image. Use another extraction tool, such as 7-Zip or WinRAR.

Step ①—❷—❸—❹—❺ 📄

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Transferring a boot image to a boot media

- Gently push the controller module halfway into the system.
- Reinstall the cables and cable management device, including the media converters (SFPs or QSFPs) if they were removed.
- Insert the USB flash drive into the USB slot on the controller module (not the micro USB console port).
- Plug the power cord into the power supply, reinstall the power cable locking collar, and then connect the power supply to the power source.
- Push the controller module all the way into the system, firmly push the cam handle to finish seating the controller module, and then push the cam handle into the closed position.
- The node will begin to boot as soon as it is completely installed in the chassis.
- Interrupt the boot process to stop at the LOADER prompt by pressing **Ctrl-C** when you see `Starting AUTOBOOT press Ctrl-C to abort....`
- If you miss this message, press **Ctrl-C** to boot to Maintenance mode, and then `halt` the node to boot to LOADER.
- The system will begin to boot and then stop at the LOADER prompt.

Step ❶—②—❸—④—❺ 📄

Transferring a boot image to a boot media

- From the LOADER prompt, boot the recovery image from the USB flash drive:
  - `boot_recovery`
  - The image will be downloaded from the USB flash drive.
- When prompted, either enter the name of the image or accept the default image displayed inside the brackets on your screen.
- After the image has been installed, start the restoration process:
  - Record the IP address of the impaired node that is displayed on the screen.
  - Press `y` when prompted to restore the backup configuration.
  - Press `y` when prompted to overwrite `/etc/ssh/ssh_host_dsa_key`.
- From the partner node in advanced privilege level, start the configuration synchronization using the IP address recorded in the previous step:
  - `system node restore-backup -node local -target-address impaired_node_IP_address`
- If the restoration is successful, press `y` on the impaired node when prompted to `use the restored copy?`.
- Press `y` when you see `confirm backup procedure was successful` message, and then press `y` when prompted to reboot the node.

Step ❶—❷—③—❹—❺ 🗎

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Transferring a boot image to a boot media

Verify that the environmental variables are set as expected.
- Take the node to the LOADER prompt.
    - From the ONTAP prompt, you can issue the following command: `system node halt -skip-lif-migration-before-shutdown true -ignore-quorum-warnings true -inhibit-takeover true`.
- Check the environment variable settings with the `printenv` command.
- If an environment variable is not set as expected, modify it with the `setenv environment_variable_name changed_value` command.
- Save your changes using the `saveenv` command.
- Reboot the node.

Step ① — ② — ③ — ④ — ⑤ 🗎
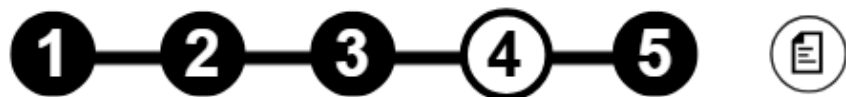
Transferring a boot image to a boot media

With the rebooted impaired node displaying the `Waiting for Giveback...` message, perform a giveback from the healthy node:

| If the system is in…	Then…

an HA pair	after the impaired node displays the `Waiting for Giveback...` message, perform a giveback from the healthy node.
	• Perform a giveback from the healthy node by entering the following command:
	  • `storage failover giveback -ofnode` *partner_node_name*
	  • The impaired node will take back its storage, finish booting, reboot, and will then be taken over again by the healthy node.
	• Monitor the progress of the giveback operation by using the `storage failover show-giveback` command.
	• After the giveback operation is complete, confirm that the HA pair is healthy and that takeover is possible by using the `storage failover show` command.
	• If you disabled automatic giveback, restore it by using the `storage failover modify` command.
	• Exit advanced privilege level on the healthy node.

Step ❶—❷—❸—❹—⑤   🖹

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DM 5100F repair actions - fan replacement

1. Remove controller from the system.
2. Remove the controller canister's cover by unscrewing the thumbscrew and lifting the lid open.
3. Gently lift the failed fan from the controller.
4. Slide the replacement fan all the way into the shelf.
5. Close and secure the lid.
6. Reinstall the controller.

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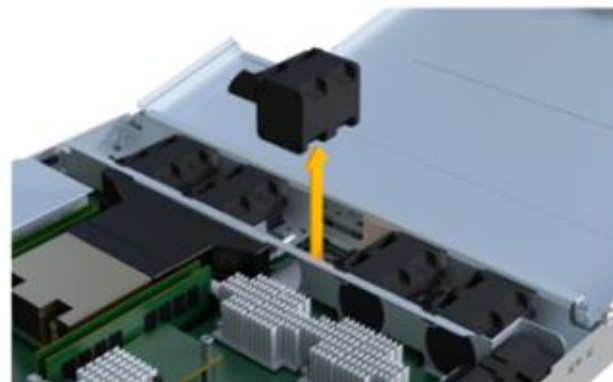
DM 5100F repair actions – removing an NVMem battery

1. Remove the controller, and then open the controller lid by unscrewing the thumbscrew and lifting the lid open.
2. Locate the "Press" tab on the side of the controller.
3. Unlatch the battery by pressing the tab and squeezing the battery casing.
4. Gently squeeze the connector housing the battery wiring. Pull up, disconnecting the battery from the board.
5. Lift the battery out of the controller.
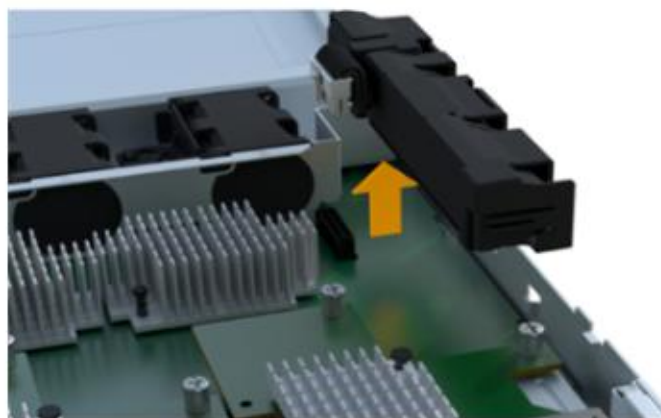
DM 5100F repair actions – inserting an NVMem battery

1. Insert the battery into the controller by lining up the battery casing with the metal latches on the side of the controller.
2. Plug the battery connector back into the board.
3. Close and secure the controller lid.
4. Reinstall the controller into the system.
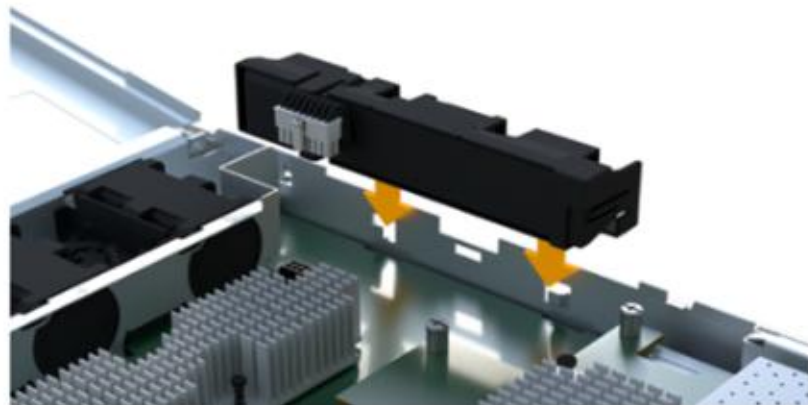
DM 5100F repair actions – replacing a DIMM

1. Remove the controller from the system.
2. Remove the controller canister's cover by unscrewing the thumbscrew and lifting the lid open.
3. Eject the DIMM from the slot by slowly pushing apart the two ejector tabs.
4. Slide the DIMM out of the socket.
5. Install the replacement DIMM by holding the DIMM by its corners and aligning it with the slot.
6. Push carefully but firmly on the top edge of the DIMM until the latches snap into place over the notches at the ends of the DIMM.

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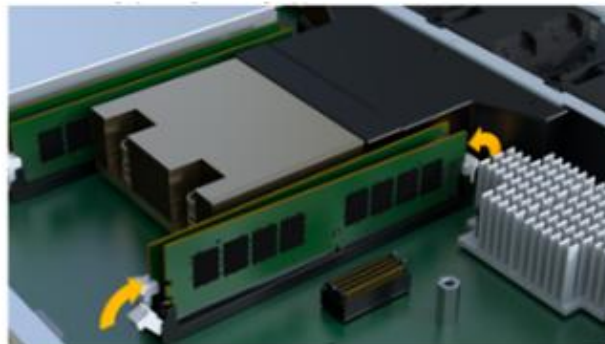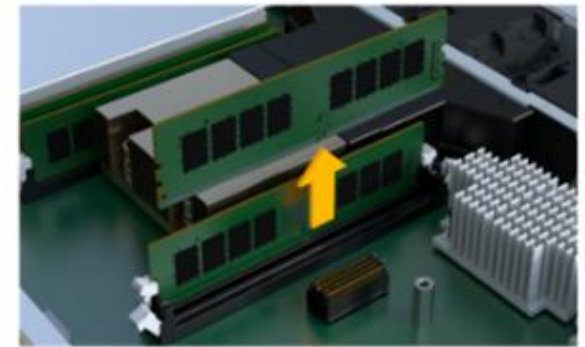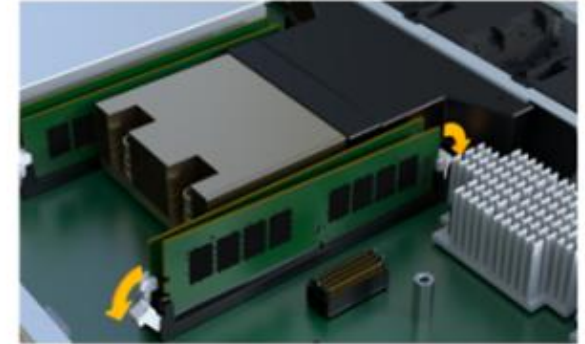
DM 5100F repair actions – replacing an HIC

1. Remove the controller from the system.
2. Remove the controller canister's cover by unscrewing the thumbscrew and lifting the lid open.
3. Using a Phillips screwdriver, remove the two screws that attach the HIC faceplate and remove the faceplate.
4. Loosen the thumbscrews that secure the HIC to the controller.
5. Carefully detach the HIC from the controller by lifting the HIC up and out of the controller.