Replacing Controller Canisters in the E5560 Controller-Drive Tray to Upgrade Host Interface Cards

To access this product, go to the NetApp® support site at mysupport.netapp.com.

Planning the Host Interface Card Upgrade

Use these procedures to upgrade the host interface in a controller-drive tray by replacing all of the controllers. For duplex controller-drive trays, you replace both controllers. For simplex controller-drive trays, you replace the one controller. In both cases, you must power off the controller-drive tray. As a result, you cannot access data on the storage array until you successfully complete the replacement.

If your storage array participates in remote volume mirroring, only iSCSI or Fibre Channel connections are supported between the primary site and the remote site. If your new HIC configuration does not include iSCSI or Fibre Channel connections, remote volume mirroring will not be supported.

If you upgrade to 56 Gb/s InfiniBand, you must perform the steps from the *InfiniBand Configuration and Provisioning for Linux® Express Guide* to configure your storage array to use the iSCSI Extensions for RDMA (iSER) protocol. Make sure that you have access to that document before you start these procedures.

To complete this procedure, you will need antistatic protection and one or two new controller canisters. Depending on your new host interface, you might need new host bus adapters (HBAs), host channel adapters (HCAs), switches, cables, Small Form-factor Pluggable (SFP) transceivers, or quad SFP (QSFP) transceivers to re-cable your host connections. Table 1 summarizes requirements for cabling and SFP transceivers.

Your new controller canisters are shipped without a battery installed. You will remove the battery from each of your old controllers and then install those batteries in the new controllers.

ATTENTION Possible loss of data access – If any controller that you are replacing manages any secure volumes, the new controller needs the correct security key to manage those volumes. After you replace the controller and restore power to the controller-drive tray, you can use SANtricity Storage Manager to load the key from the file in which it was saved. Be sure that such a file exists and that you know the pass phrase required to install the security key before you replace the controller.

Cabling Considerations for the E5500 Controller-Drive Trays

Compare your current host cabling to the supported cabling for your new controllers to determine whether you can reuse SFPs, QSFPs, or cables from your old cabling configuration. The HBAs, HCAs, or Ethernet adapters, as well as switches in the network fabric used to connect your hosts to your storage array must match the HICs in your controller canisters.

Table 1. Host Cabling Configurations

HIC		Cable		
Data Rate and Protocol	**Number of Connectors**	**Connector**	**Type**	**Length**
12 Gb/s SAS	4	MiniSAS-HD	passive copper	1-5m
		MiniSAS-HD	active copper	8-15m
		MiniSAS-HD	optical	5-100m
		Fan-out cable type #2	passive copper	2m
		Fan-out cable type #3	passive copper	2m
6 Gb/s SAS	4	MiniSAS-HD	passive copper	1-10m
		MiniSAS-HD	active copper	5-20m
		Fan-out cable type #1	passive copper	2m
56 Gb/s InfiniBand	2	QSFP+	passive copper	1-3m
		QSFP+	optical	5-100m
40 Gb/s InfiniBand	2	QSFP+	passive copper	1-5m
		QSFP+	optical	10-300m
16 Gb/s Fibre Channel	4	SFP+	OM2 SW optical	2,3,5,10,25m
		SFP+	OM3 SW optical	50-150m
		SFP+	OS2 LW optical	50-300m
10 Gb/s iSCSI	4	SFP+	OM2 optical	2,3,5,10,25m
		SFP+	OM3 optical	50-150m
		Twin-Ax	passive copper	2-7m
1 Gb/s iSCSI	4	RJ-45	passive copper	2-70m

Preparing to Replace the Controllers

1. Make sure that the existing storage array is updated to the latest released controller firmware.

2. If an FDE security key exists on the storage array, save the FDE security key to a location not on the storage array.

3. Perform the following steps to record the serial number for your storage array:

   a. In the **EMW** tree view, double-click your storage array.

   The **AMW** opens

   b. In the **Summary** tab of the **AMW**, click the **View Storage Array Profile** link.

   c. Make a record of the value for Chassis Serial Number.

   You need this serial number to perform the steps in Powering On the E5500 Storage Array.

4. Gather support data about your storage array by using one of these methods:

   - Use the storage management software to collect and save a support bundle of your storage array. From the Array Management Window toolbar, select **Monitor** > **Health** > **Collect Support Data Manually**. Then name and specify a location on your system where you want to store the support bundle.

- Use the command line interface (CLI) to run the `save storageArray supportData` command to gather comprehensive support data about the storage array. For more information about this command, refer to the current version of the *Command Line Interface and Script Commands Programming Guide*.

> **NOTE** Gathering support data can temporarily impact performance on your storage array.

5. Stop all I/O operations between the storage array and all connected hosts.

> **ATTENTION Possible data loss** – If you continue with the steps to replace a controller while I/O operations are occurring between the storage array and attached hosts, you might lose data.

6. On each host that is connected to the storage array, unmount all file systems associated with volumes on the storage array.

7. Wait for five minutes.

8. In the **Hardware** tab of the **AMW**, select the graphic representation of the storage array, and then select **Monitor** > **Reports** > **Operations in Progress** to make sure that there are no background operations in progress.

   The **Operations in Progress** window shows the time remaining for any operations. Wait for those operations to complete before you continue with the next step.

9. Turn off power to the controller-drive tray.

10. Wait for all of the LEDs on the controller-drive tray to go dark.

11. Turn off power to each drive tray that is connected to the controller-drive tray.

12. Wait for two minutes for all of the drives to spin down.

Removing the Controller Canisters from the E5560 Controller-Drive Tray

> **ATTENTION Possible hardware damage** – To prevent electrostatic discharge damage to the tray, use proper antistatic protection when handling tray components.

1. Put on antistatic protection.

> **ATTENTION Potential degraded performance** – To prevent degraded performance, do not twist, fold, pinch, or step on the cables. Many cables have a minimum bending radius. Check the specifications for your cables, and do not bend any cable tighter than the minimum specified radius.

2. Label each of the interface cables and Ethernet cables attached to the controller canisters. Depending on your new HIC configuration, you might be able to reconnect some cables after you replace the controller canister.

3. Disconnect all of the interface cables and Ethernet cables from the controller canisters.

4. If the old controller canister contains a Fibre Channel HIC or an InfiniBand HIC, remove the small form-factor pluggable (SFP+) transceivers (for Fibre Channel) or quad SFP (QSFP+) transceivers (for InfiniBand) from the HIC and save them for possible reuse.
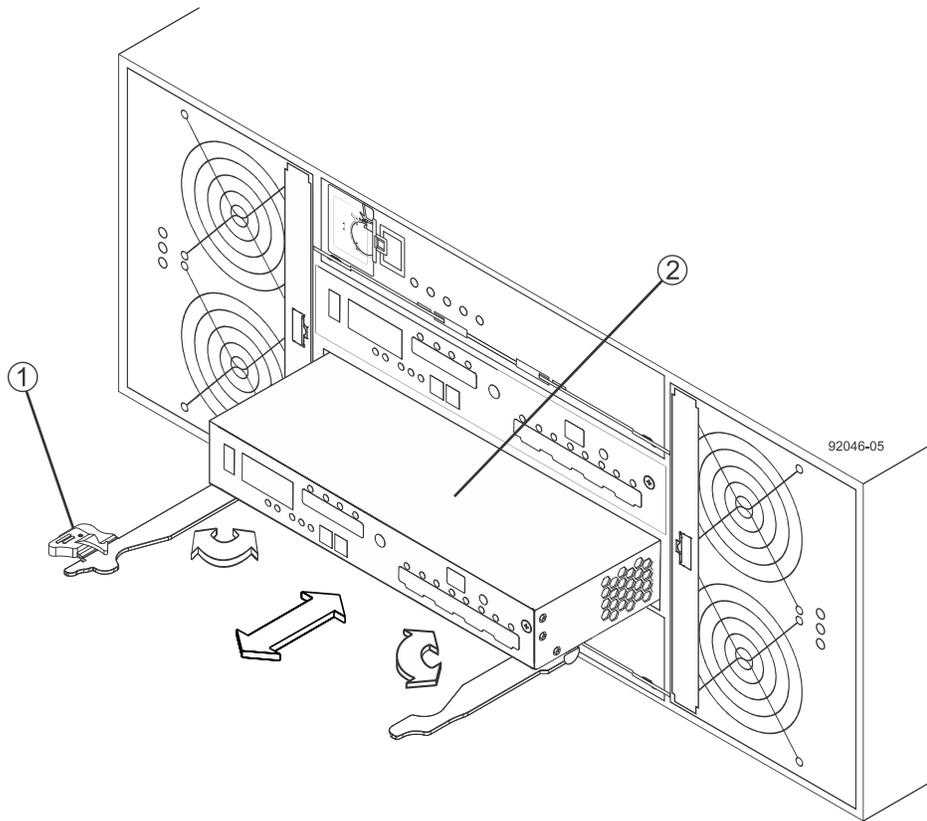
5. Remove controller A.

> **NOTE** The following figures show the controller in the bottom position within the controller-drive tray. However, you might be removing the controller from the top position. The required actions are similar.

   a. Unlock and pull out the release levers to release the controller canister.

b. Using the release levers and your hands, pull the controller canister out of the controller-drive tray.

**Figure 1. Removing and Replacing a Controller Canister**

1. Release Levers
2. Controller Canister

c. Set the controller canister on a flat, static-free surface with the release levers up.

6. Remove the battery from the controller canister by performing these steps:

a. Press down on both of the top cover latch buttons as you slide the top cover off the controller canister.

b. Move the battery locking tab down to pull the battery out of the controller canister.

Figure 2. Controller Cover and Internal Parts
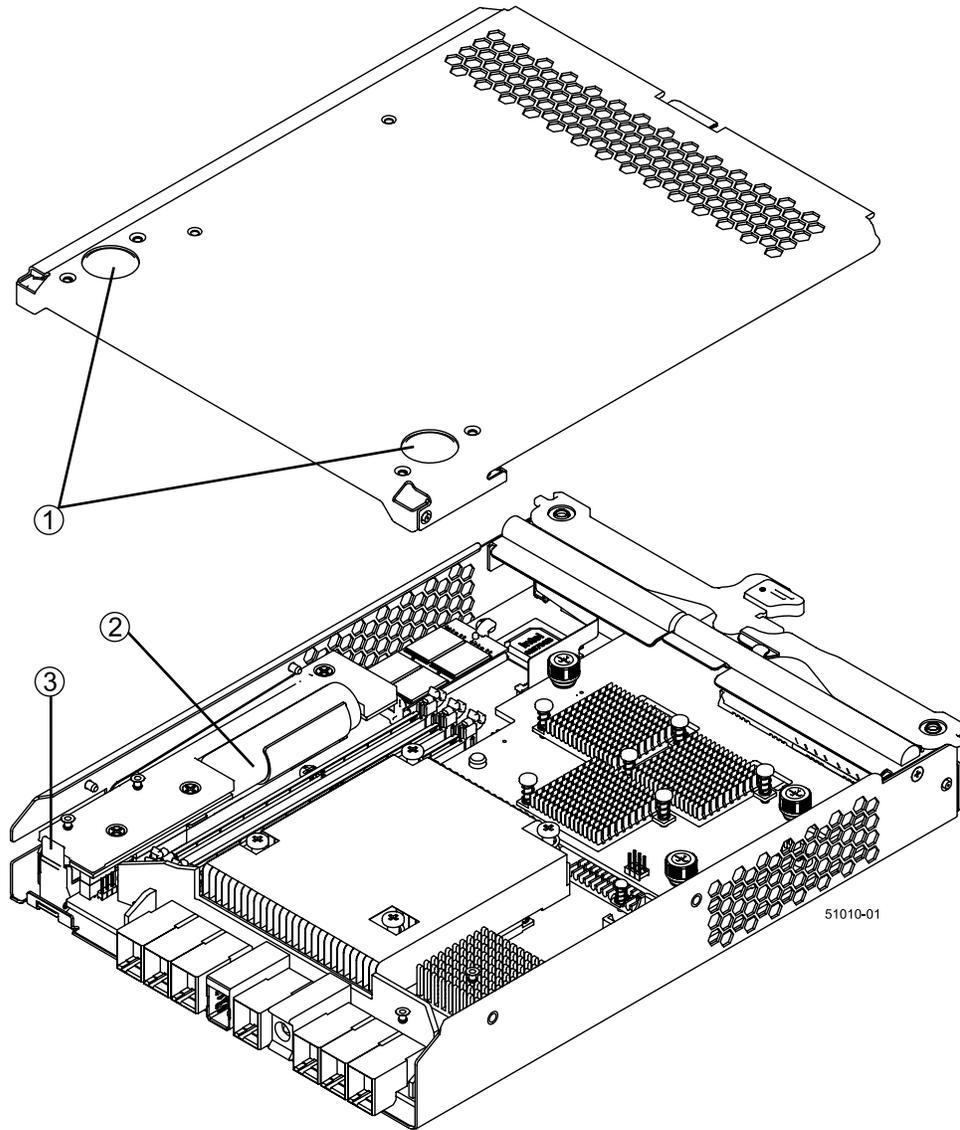
1. Top Cover Latch Buttons
2. Battery Circuit Board
3. Battery Locking Tab

c. Remove the controller battery by sliding it towards the rear of the controller canister.

7. For a duplex controller-drive tray, repeat step 5 through step 6 for controller B.

Installing a Controller Canister in the E5500 Controller-Drive Tray

1. Unpack a new controller canister.

   a. Set the new controller canister on a flat, static-free surface near the controller-drive tray with the top cover up.

   b. Save all of the packing materials so that you can ship the old controller canister.

2. Push down the two top cover latch buttons that secure the top cover to the new controller canister.

3. Remove the top cover by sliding it to the rear of the new controller canister.

4. Insert the battery that you removed from the old controller canister at a slight downward angle into the new controller canister. Slide the battery towards the front of the controller canister making sure that the battery slides under the side guide pins as you continue to slide the battery to correctly seat it against the back surface.

   ATTENTION If the battery is not correctly seated, you cannot reinstall the top cover on the controller canister as directed later. To make sure that the controller battery is seated correctly, you might need to slide it out and insert it again. You know it is secure when you hear it click into place, and the locking handle does not move out of its upright position when you wiggle it.

5. Move the locking tab up to secure the new battery circuit board to the controller canister.

6. Reinstall the top cover on the new controller canister by sliding the top cover forward until the top cover latch buttons click.

7. Slide the new controller canister all the way into the controller-drive tray. Rotate the release levers towards the center of the controller canister to lock it into place.

8. If your new controller canister has a Fibre Channel HIC or an InfiniBand HIC, install the SFP+ transceivers (Fibre Channel) or QSFP+ transceiver (InfiniBand) into the controller canister.

   Depending on the HICs involved in your upgrade, you might be able to reuse SFP+ transceiver or QSFP + transceivers that you removed from your old controller canister. See Table 1 for details about cabling requirements.

9. Connect all host cables between the controller canister and the hosts or the switches.

   Depending on the HICs involved in your upgrade, you might be able to reuse cables that you removed from your old controller canister. See Table 1 for details about cabling requirements.

10. Reconnect all of the cables between the controller-drive tray and the drive trays.

11. For a duplex controller-drive tray, repeat step 1 through step 10 for controller B.

Powering On the E5500 Storage Array

1. Turn on the Power switches on the rear of each drive tray that is connected to the controller-drive tray.

2. Wait two minutes for the drives to spin up.

3. Turn on the Power switches on the rear of the controller-drive tray.

4. Wait three minutes for the power-up process to complete.

5. If you saved a security key in step Preparing to Replace the Controllers, perform the following steps on each controller to import that security key.

   a. If there is a mix of secured and unsecured drives in the storage array, create a new FDE security key.

      Unsecured drives are unassigned drives, GHS drives, or drives that are part of a volume group or a disk pool that is not secured by FDE. Secured drives are assigned drives that are a part of an FDE secured volume group or Disk Pool.

   b. Import the FDE security key that you saved in Preparing to Replace the Controllers.

   c. If there were only secured drives (no unsecured drives) in the storage array, the controller(s) will automatically reboot to complete the import operation. Wait for all controllers to boot up. When a controller finishes booting, its icon will appear in the Enterprise Management Window (EMW).

6. Execute these steps if there is a mix of secured and unsecured drives in the storage array:

   a. Run the `set allDrives nativeState` SMcli command.

b. Reset all controllers using SANtricity Storage Manager.

c. Wait for all controllers to boot up. When a controller has finished booting, it appears in the EMW.

7. Look at the LEDs on controller A to make sure that it is booting correctly.

The Host Link Service Action Required LEDs turn green during the reboot. The seven-segment display shows the sequence **OS**+ **Sd**+ blank- to indicate that the controller is performing Start-of-day (SOD) processing. After the controller successfully completes rebooting, the seven-segment display shows the tray ID matching the seven-segment display on the second controller. You can then discover the new controller by using the storage management software.

NOTE Your controller might have a different number and type of host interface connectors than what is shown in the following figure.

Figure 3. LED Status and Seven-Segment Display
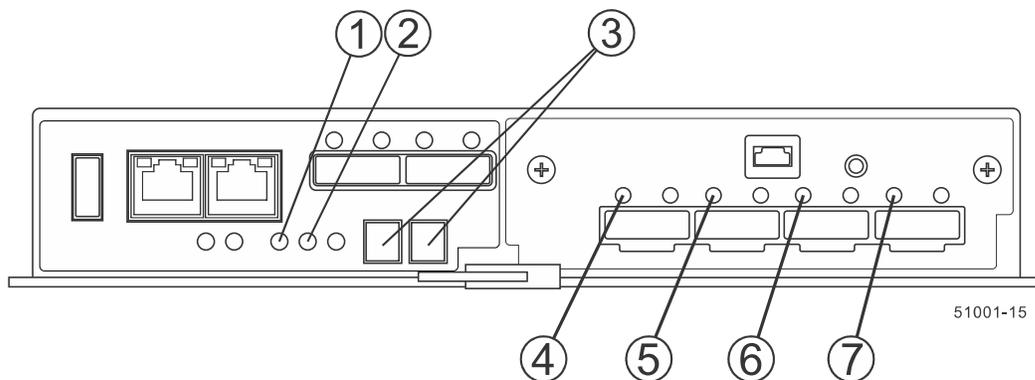
1. Controller Service Action Allowed LED (Blue)
2. Controller Service Action Required LED (Amber)
3. Seven-Segment Display
4. Host Link 1 Service Action Required LED (Amber)
5. Host Link 2 Service Action Required LED (Amber)
6. Host Link 3 Service Action Required LED (Amber)
7. Host Link 4 Service Action Required LED (Amber)

8. Execute these steps if any of the controller-drive tray's Service Action Required LEDs are *on*, or if the Controller Service Action Required LED is *on*:

a. Check that the controller canister has been installed correctly and that all of the cables are correctly seated. Reinstall the controller canister, if necessary.

b. Check the controller-drive tray's Service Action Required LEDs and the Controller Service Action Required LED again. If the problem is not corrected, contact your Technical Support Representative.

9. For a duplex configuration, repeat step 7 through step 8 for controller B.

10. Using the LEDs and the storage management software, check the status of all of the trays in the storage array.

11. Does any component have a Needs Attention status?

- **Yes –** Click the Recovery Guru toolbar button in the **Array Management Window**, and then complete the recovery procedure. If the problem is not resolved, contact your Technical Support Representative.

- **No –** Go to step 12.

12. Remove the antistatic protection.

13. If you are upgrading to 56 Gb/s InfiniBand, perform the steps from the *InfiniBand Configuration and Provisioning for Linux® Express Guide* to configure your storage array to use the iSCSI Extensions for RDMA (iSER) protocol.

    InfiniBand connections at 40 Gb/s might use the SCSI RDMA protocol (SRP). When you upgrade to 56 Gb/s InfiniBand connections, your storage array configuration must be set to use the iSER protocol.

14. If your controller upgrade involves a protocol change (for example, Fibre Channel to iSCSI), and you already have hosts defined for your storage array, perform the following steps to associate the new host ports with your hosts:

    a. In the Array Management Window, select the **Host Mappings** tab.

    b. From the **Storage Array** tree on the left of the window, select the host to associate with a port.

    c. From the Array Management Window toolbar, select **Host Mappings** > **Manage Host Port Identifiers**.

    d. To update the host port identifier information associated with each host, replace the host port IDs from the old host adapters with the new host port IDs for the new host adapter.

    e. Repeat step d for each host.

15. Gather support data about your updated storage array by using one of these methods:

    - Use the storage management software to collect and save a support bundle of your storage array. From the Array Management Window toolbar, select **Monitor** > **Health** > **Collect Support Data Manually**. Then name and specify a location on your system where you want to store the support bundle.

    - Use the CLI to run the `save storageArray supportData` command to gather comprehensive support data about the storage array.

    For more information about the CLI command, refer to the current version of the *Command Line Interface and Script Commands Programming Guide*.

    NOTE Gathering support data can temporarily impact performance on your storage array.

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16. Perform the following steps to open a non-technical case with NetApp Technical Support. This action alerts NetApp Technical Support to the changes that you made to the configuration of your storage array.

    a. Get the serial number of the controller-drive tray that you recorded in Preparing to Replace the Controllers.

    b. Go to the NetApp support site at mysupport.netapp.com/eservice/assistant.

    c. If the **Login** page appears, enter your username and password, and select **Login**.

       The **Give Us Feedback** page opens.

    d. Select **Product Registration** from the drop-down list under **Category 1**.

    e. Enter the following text in the **Comments** text box, substituting the serial number of your controller-drive tray for *serial number*:

       Please create alert against Serial Number: *serial number*. The alert name should be "E-Series Upgrade". The alert text should read as follows:

       "Attention: The controllers in this system have been upgraded from the original configuration. Verify the controller configuration before ordering replacement controllers and notify dispatch that the system has been upgraded."

    f. Click the **Submit** button at the bottom of the form.

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