

IBM TotalStorage DS4100 Storage Subsystem Single Controller to Dual Controller Upgrade Kit Instructions



Note: IBM has renamed some FAStT family products. Note that this change of **product name only** indicates no change in functionality or warranty. Each DS4000 product retains full IBM service as outlined in service contracts issued for analogous FAStT products. For a complete list of each DS4000 product name with its corresponding previous FAStT product name, see the *IBM TotalStorage DS4100 Storage Subsystem Installation, User's, and Maintenance Guide* and the *IBM TotalStorage Safety Manual*.

Getting started

The IBM TotalStorage DS4100 Storage Subsystem Single Controller to Dual Controller Upgrade Kit enables you to upgrade the DS4100 Storage Subsystem with Single Controller Option to the DS4100 Storage Subsystem with Dual Controller Option.

Important Notes:

1. The machine type and model for the DS4100 are printed on the product label that is affixed to the DS4100 storage subsystem chassis. After you perform the DS4100 dual controller upgrade, the DS4100 storage subsystem functions as and is recognized as the DS4100 model with dual controller (base) option. If you perform a future controller replacement, make sure that you identify the correct controller part number for your DS4100 and mention that you previously upgraded the DS4100 storage subsystem from the single controller option to the dual controller (base) option.
2. Whenever you add options to your DS4100 storage subsystem, be sure to update the MAC information in Appendix A of the *IBM TotalStorage DS4100 Storage Subsystem Installation, User's, and Maintenance Guide*.

The DS4100 single controller (SCU) to dual controller (base) upgrade kit contains the following items:

- One DS4100 controller with 256MB of cache (Part Number: 39M5960)
- One 400W power supply (Part Number: 19K1290)
- One rack power jumper cord (Part Number: 36L8886)
- The IBM TotalStorage DS4100 Storage Subsystem Single Controller to Dual Controller Upgrade Kit Instructions

Upgrade preparations requirements

Perform the following steps before you upgrade from the DS4100 Single Controller Option to the DS4100 Dual Controller Option:

Note: There are several references to the *IBM TotalStorage DS4100 Storage Subsystem Installation, User's, and Maintenance Guide*. You should use the *IBM TotalStorage DS4100 Storage Subsystem Installation, User's, and Maintenance Guide* in conjunction with these upgrade kit instructions during the

upgrade process. A hard copy of this guide was included in the original DS4100 shipment. The guide is also available in PDF format on the DS4000 TotalStorage Disk Support Web site:

www.ibm.com/servers/storage/support/disk/

1. Read all safety information first.
2. Save the DS4100 storage subsystem profile. Store the profile in a different location than the disks that are attached to the DS4100 storage subsystem that you want to upgrade. Also, save the configuration of the setup, including the topology and logical drives, to logical unit number (LUN) mapping. Refer to the online help in the Subsystem Management window for instructions on how to save the subsystem profile and configuration information.
3. Perform a full system backup.
4. Upgrade the DS4000 Storage Manager client host software to DS4000 Storage Manager version 9.15 or later. Refer to the appropriate IBM TotalStorage DS4000 Storage Manager 9 Installation, User's, and Maintenance Guide for your operating system environment for more information on how to uninstall the existing Storage Manager host software and install the Storage Manager version 9.15 or later host software.
5. Schedule down time for the upgrade. Any controller reboots or synchronizations with the new controller might cause momentary loss of data access to the DS4100 storage subsystem because there is no controller redundancy in the DS4100 single controller storage subsystem configuration.

Note: The host servers do not need to be powered down but any applications or services that might generate I/Os to the DS4100 single controller configuration must be stopped.

6. Use the performance monitor in the DS4000 subsystem management window to check for any I/Os to the LUNs in the DS4100 that you want to upgrade.
7. If the controller firmware version of the DS4100 storage subsystem is at 5.42.xx.xx or earlier, you must upgrade the DS4100 storage subsystem controller firmware to version 06.12.xx.xx or later before you perform the DS4100 single controller to dual controller upgrade. Refer to the README file that is included in the firmware package, the Storage Manager client online help, or the IBM TotalStorage DS4000 Storage Manager 9 Installation, User's, and Maintenance Guide for your operating system for firmware upgrade instructions. Controller firmware version 06.12.1x.xx or later can be downloaded from the IBM System Storage support web site:
www.ibm.com/servers/storage/support/disk/
8. Use the DS4000 Storage Manager client host software to verify that the DS4100 storage subsystem is in an optimal state.
9. If the DS4100 host ports are connected to a Fibre Channel switch, use the switch monitor tool to make sure that the DS4100 host ports and the server Fibre Channel HBA ports are operating optimally. There should not be any unexpected port log-out or log-in events reported. If there are, make sure that the cause or causes of these events are corrected before you begin the DS4100 single to dual controller upgrade.
10. Verify that the premium feature keys are available. Also, locate all premium feature and entitlement proofs of purchase and make sure that they can be accessed during the upgrade process.
11. If you use out-of-band (direct) management and use Dynamic Host Configuration Protocol (DHCP) based on the DS4100 controller MAC addresses to assign IP addresses to the DS4100 controllers, you must create a new record in the DHCP server with the MAC addresses for the new DS4100 controllers in the upgrade kit.

DS4100 Dual Controller upgrade procedure

Important: The DS4100 single to dual controller upgrade must only be performed when the subsystem is down.

The following procedure outlines the steps necessary to perform a dual controller upgrade.

1. Perform all of the prerequisite tasks listed in the section, "Upgrade preparations requirements," in the *IBM TotalStorage DS4100 Storage Subsystem Installation, User's, and Maintenance Guide*.
2. Schedule down time for the upgrade process. Any controller reboots or synchronizations with the new controller might cause momentary loss of data access to the DS4100 storage subsystem because there is no controller redundancy in the single controller DS4100 storage subsystem configuration.

Note: The host servers do not need to be powered down; but any applications or services that might generate I/Os to the DS4100 single controller configuration must be stopped.

3. To ensure that there are no I/Os to the logical drives, either unmount or unassign the drive letters for the logical drives, whichever is applicable for your operating system environment.
4. Use the DS4000 Storage Manager client program to verify the controller firmware in the DS4100 storage subsystem with single controller option. If the controller firmware is not version 6.12.1x.xx or later, you must upgrade the controller firmware to the latest 06.12.xx.xx firmware version before you continue with the download process. You can download the firmware from the DS4000 TotalStorage Support Web site:

www.ibm.com/servers/storage/support/disk/

Check the readme file for any prerequisites that you need (such as required hard drive firmware versions) before you apply the firmware and NVSRAM upgrade.

5. Put on antistatic protection.

Important: Do not power down the DS4100 storage subsystem during the upgrade process.

6. Perform the following steps to remove the power supply blank tray from the DS4100 storage subsystem chassis. When you look at the back of the DS4100 storage subsystem, the power supply blank tray is in the right-hand power supply slot.
 - a. Grasp the pull-ring on the power-supply blank tray lever and squeeze the latch to release it.
 - b. Pull the lever open and remove the power supply blank tray.
7. Perform the following steps to install the new power supply.



DANGER

Hazardous voltage, current, or energy levels are present inside any component that has this label attached.

(L001)

- a. Unpack the power supply CRU.
- b. Make sure that the lever is mounted correctly to insert it in the right-hand power supply slot.

- c. See the "Installing the Power Supply" section of the *IBM TotalStorage DS4100 Storage Subsystem Installation, User's, and Maintenance Guide* for information on how to install the power supply CRU.
- d. Power on the new power supply CRU.
8. In the Enterprise Management window of the Storage Manager Client, right-click the name of the DS4100 Storage Subsystem with Single Controller option that you plan to upgrade and select the **Execute Script** menu option.
9. When the Script Editor window opens, enter the following command in the script pane as shown in Figure 1:
set storageSubsystem redundancyMode=duplex;

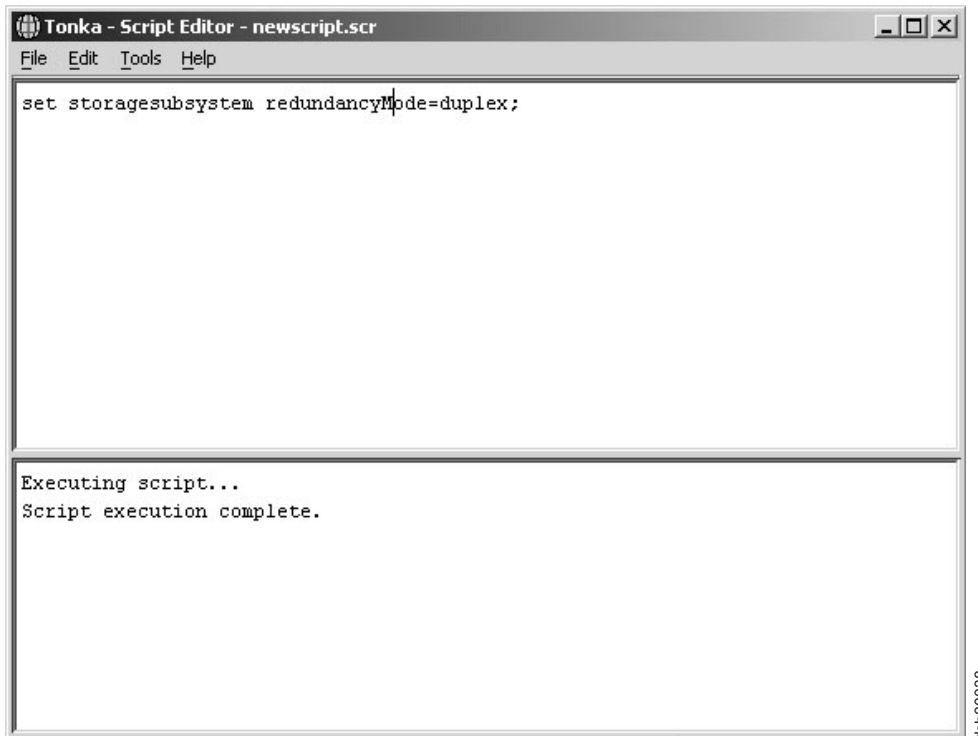


Figure 1. Dual controller upgrade command in the script editor

10. At the top of the Script Editor window, select **Verify and Execute** from the Tools menu to verify and execute the command to change the DS4100 storage subsystem from a single controller to a dual controller.
11. Perform the following steps to remove the controller blank tray, shown in Figure 2 on page 5, that is in the right-hand controller slot when you view it from the back of the DS4100 storage subsystem chassis.
 - a. Push down on the latch that is centered above the RAID controller.
 - b. Pull both levers out of the locked position at the same time.
 - c. Grasp the pull-rings then pull on the levers to remove the RAID controller blank tray.



Figure 2. The controller blank tray

12. Perform the following steps to unpack the DS4100 controller CRU and install it in the right-hand controller slot.
 - a. Unpack the controller CRU.
 - b. Push down the center latch to release both controller levers.
 - c. Pull both levers away from the controller CRU until they are almost perpendicular to the front of the controller CRU.
 - d. Make sure the controller CRU is in the correct position and slide the RAID controller all the way into the empty controller slot until both of the levers engage the notches along the sides of the controller slot.
 - e. Close both levers until the latch locks into place.

Note: If DHCP/BOOTP was used to automatically set the IP address of the controller, record the MAC address of the new controller and create a DHCP/BOOTP record for the new RAID controller. Make sure that the DHCP record changes are in effect.

13. Insert the SFPs in the new controller CRU according to the instructions in “Installing SFP modules” in the *IBM TotalStorage DS4100 Storage Subsystem Installation, User’s, and Maintenance Guide* and complete the Fibre Channel cabling to the new controller host ports.



Class I

DANGER

This product may contain one or more of the following: CD-ROM, DVD-ROM, DVD-RAM, or laser module, which are Class 1 laser products. Please note the following:

- Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.
- Use of the controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.

(C026)

DANGER

Data processing environments can contain equipment transmitting on system links with laser modules that operate at greater than Class 1 power levels. For this reason, never look into the end of an optical fiber cable or open receptacle.

(C027)

14. Wait up to 10 minutes for the DS4100 controller to come online and the DS4000 Storage Manager client software to recognize the new controller.

Note: The amount of time that the controller recognition will take depends on the number of drives in the configuration, the I/O loads to the DS4100 subsystem, and whether the firmware and NVSRAM of the new controller are automatically synchronized with the firmware and NVSRAM of the existing controller.

15. Verify the state of the LEDs on the newly inserted controller. See the section "RAID controller LEDs" in the *IBM TotalStorage DS4100 Storage Subsystem Installation, User's, and Maintenance Guide*.
16. Verify the LEDs status for the power supply-fan CRUs.
 - None of the Fault LEDs should be lit.
 - The Batteries Charging LEDs should be flashing.
 - The Fault (Needs Attention) LED on the controller should not be lit.
17. Remove the antistatic protection.
18. Close the existing DS4100 storage subsystem management window.

Out-of band management

If the DS4100 storage subsystem is managed through the out-of-band management method, perform the following steps:

1. Select **Edit** → **Add storage subsystem** in the DS4000 Storage Manager Client Enterprise Management window to add the second controller to the DS4000 storage Manager management domain.
2. When the Add Storage Subsystem window opens, as shown in Figure 3 on page 7, enter the IP address of the new controller in the appropriate area of the window and click **Add**.

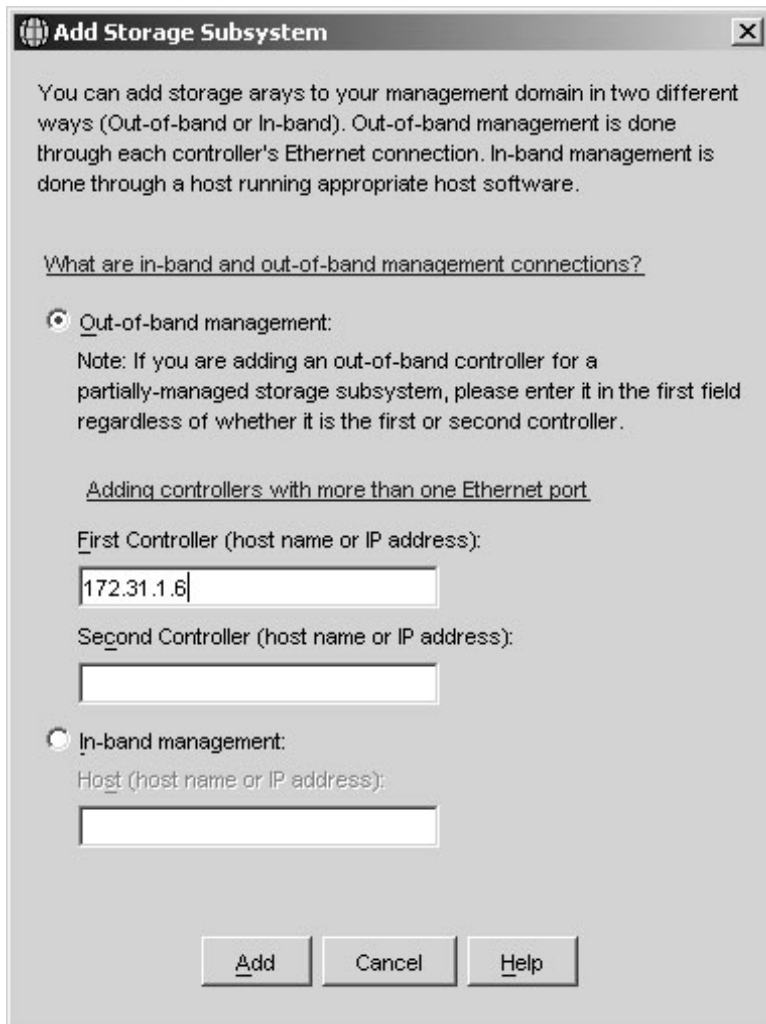
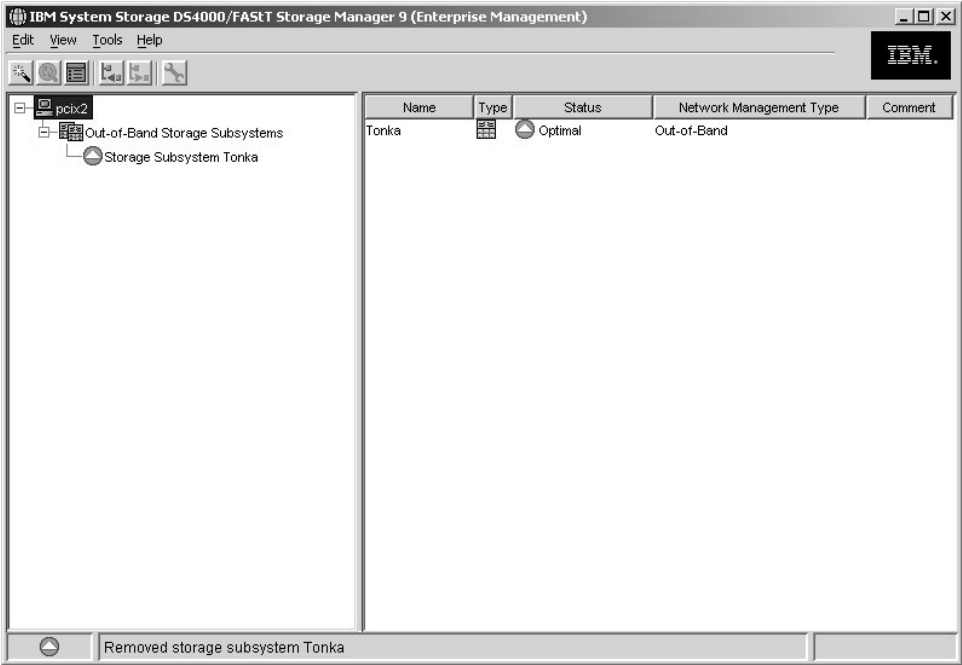


Figure 3. The Add Storage Subsystem window

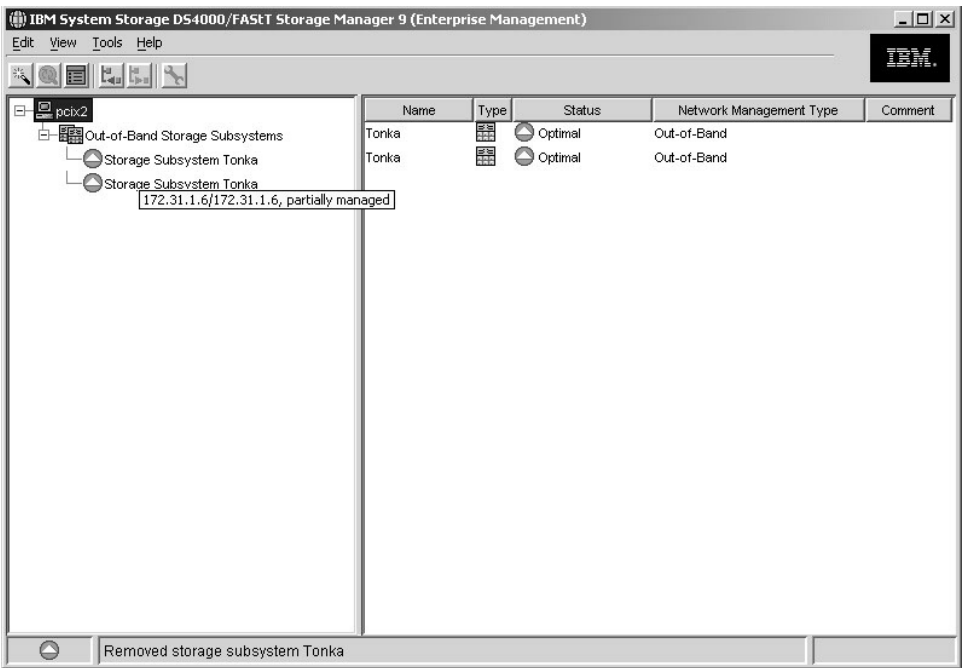
3. Check that the new controller is properly recognized by the existing controller. If the new controller is properly recognized by the existing controller, there should be only one entry for the DS4100 subsystem in the Enterprise Management window, as shown in Figure 4 on page 8, in which case you can proceed with step 4 on page 9.



dsh00040

Figure 4. Single entry for DS4100 subsystem in the Enterprise Management window

If there are two entries, as shown in Figure 5, perform the following steps:



dsh00041

Figure 5. Two entries for DS4100 subsystem in the Enterprise Management window

- Remove both entries from the Enterprise Management window.
- Add the IP address for the existing controller in the Enterprise Management window.
- Turn off the DS4100 subsystem, wait at least 1 minute, and then remove the new controller CRU from the DS4100 controller slot.

- d. Turn on the DS4100 subsystem and wait at least 5 minutes for the DS4100 to boot up and be recognized by the DS4000 Storage Manager client program.
 - e. Reinsert the new controller and wait at least 10 minutes for the new controller to complete the reboot process and synchronize with the existing controller.
 - f. Initiate the scan for new hardware devices on the host server that is connected to the DS4100 via the Fibre Channel bus. Add the IP address of the new controller to the Enterprise Management window.
 - g. If there are still two entries displayed in the Enterprise Management window, call IBM support for assistance.
4. Use the DS4000 Storage Manager client Subsystem Management window to check the status of all components in the storage subsystem.
- If the new controller is online and the DS4000 Storage Manager client Subsystem Management window indicates normal operation, go to step “Completing the upgrade” on page 10.
 - If the new controller is online but the DS4000 Storage Manager client Subsystem Management window indicates a problem status, go to “Troubleshooting the storage subsystem” in the *IBM TotalStorage DS4100 Storage Subsystem Installation, User’s, and Maintenance Guide*.
 - If the new controller is offline, use the DS41000 subsystem management window to bring the controller to an online state.
- In the DS41000 subsystem management window, select the “offline” controller icon and select the **Advanced → Recovery → Place Controller → Online** menu function.
- If the problem persists, call IBM Support for assistance.
5. If the DS4100 storage subsystem is in a Fibre Channel switch configuration with Fibre Channel switch zoning enabled, make modifications to the Fibre Channel switch zone tables to reflect the WWNN of the new controller before they can be seen by the Fibre Channel HBAs on the host servers. Ensure that the new Fibre Channel switch zone tables are activated before you proceed to step “Completing the upgrade” on page 10.

In-band management

If you are managing your subsystem through in-band management, perform the following steps:

1. If the DS4100 storage subsystem is in a Fibre Channel switch configuration with Fibre Channel switch zoning enabled, make modifications to the Fibre Channel switch zone tables to reflect the WWNN of the new controller before they can be seen by the Fibre Channel HBAs on the host servers. Ensure that the new Fibre Channel switch zone tables are activated before you proceed to step “Completing the upgrade” on page 10.
2. Re-scan for new devices on the Fibre Channel bus.
3. To recognize the new controller, restart the DS4000 Storage Manager Agent service on the host server that has an in-band management connection to the DS4100 storage subsystem.
4. To add the second controller to the DS4000 storage Manager management domain, go to the DS4000 Storage Manager Client Enterprise Management window.
5. Right-click the host server that has an in-band management connection to the DS4100 subsystem and select **Rescan** from the pull-down menu.
6. Check that the new controller is properly recognize by the existing controller. If the new controller is properly recognized by the existing controller, there should be only one entry for the DS4100 subsystem under the host server entry in the Enterprise Management window, in which case, proceed with step 7 on page 10. If there are two entries, perform the following steps:
 - a. Remove both entries from the Enterprise Management window.
 - b. Turn off the DS4100 subsystem, and wait at least 1 minute and then remove the new controller CRU from the DS4100 controller slot.
 - c. Turn on the DS41000 subsystem wait at least 5 minutes for the DS4100 to boot up and be recognized by the DS4000 Storage Manager client program.

- d. Reinsert the new controller and wait at least 10 minutes for the new controller to complete the reboot process and synchronize with the existing controller.
 - e. Initiate the scan for new hardware devices in the host server that is connected to the DS4100 via the Fibre Channel bus.
 - f. Restart the DS4000 Storage Manager Agent service so that it will recognize the new controller.
 - g. In the Enterprise Management window, right-click the IP address (or the host name) of the host server in which the DS4000 Storage Manager Agent service is running, and select **Rescan** from the pull-down menu.
 - h. If there are still two entries for the DS4100 subsystem displayed in the Enterprise Management window, call IBM support for assistance.
7. Use the DS4000 Storage Manager client Subsystem Management window to check the status of all components in the storage subsystem.
- If the new controller is online and the DS4000 Storage Manager client Subsystem Management window indicates normal operation, go to step “Completing the upgrade.”
 - If the new controller is online but the DS4000 Storage Manager client Subsystem Management window indicates a problem status, go to “Troubleshooting the storage subsystem” in the *IBM TotalStorage DS4100 Storage Subsystem Installation, User’s, and Maintenance Guide*.
 - If the new controller is offline, use the DS41000 subsystem management window to bring the controller to an online state.
- In the DS41000 subsystem management window, select the “offline” controller icon and select the **Advanced → Recovery → Place Controller → Online** menu function.
- If the problem persists, call IBM Support for assistance.

Completing the upgrade

Perform the following steps to complete the upgrade procedure:

1. Make sure that a multipath driver (such as RDAC) is installed on the host server. Re-scan for new devices in the host server. Verify that the host server sees logical drives on both Fibre Channel paths to the DS4100 controllers using programs like IBM FASTT Management Suite Java or Qlogic SANSurfer HBA. These tools are available for download at the IBM support web site:
www.ibm.com/servers/storage/support/disk/
- Note:** You might be able to scan for new devices and have the new devices recognized by the multipath driver without the need to reboot the host server. In addition, in certain operating system environments like Linux, you might have to unload and reload the Fibre Channel HBA device driver and the multipath driver, instead of rebooting the server, for it to properly configure for the logical drives on new Fibre Channel paths.
2. Use the DS4000 Storage Manager client Subsystem Management window to change the LUN preferred owner.
 3. If required by the multipath driver, modify the failover/failback settings for the logical drives to account for them being on a different controller preferred path. You may have to restart the multipath driver for the new settings to take affect.
 4. Reboot the host server if scanning for new hardware devices and multipath driver unloading and reloading failed to get the host server to recognize the logical drives on the new Fibre Channel path. When you reboot, the host server operating system recognizes the logical drives on the new controller paths and the multipath driver properly configures the logical drives on the new controller paths.
 5. Use the DS4000 Storage Manager client software to save a new storage subsystem profile. Record the date that you upgraded the DS4100 subsystem to the dual controller model. Even though the model number printed on the Machine Type/Model label affixed to the rear of your DS4100 chassis states that the machine is a DS4100 single controller unit, your DS4100 subsystem will function the same as

and can support all of the premium features that are available for the DS4100 subsystems that are shipped from the factory as the dual controller (base) models.

6. If you perform step 3 on page 3, either mount or assign the drive letter for the logical drives depending on your operating system environment.
7. Restart your applications and services.

Printed in USA - First Edition

October 2005

© Copyright International Business Machines Corporation 2005. All rights reserved.

US Government Users Restricted Rights – Use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM Corp.

GC26-7782-00

(1P) P/N: 39M5968

