

IBM DS4800
Firmware Update
(Course Code SE181501)

Self-Study Booklet

ERC 1.1

IBM Certified Course Material

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Course Description

IBM DS4800 Firmware Update

Duration: 1 hour

Purpose

This course is designed to teach DS4800 trained SSRs how to download and install firmware on the DS4800 to support the DS4800 Firmware FBM.

Audience

This course is to be designed to train IGS ITS hardware service representatives.

Prerequisite Skills

Students should possess the following prerequisite skills prior to taking this course:

- Describe the role of the DS4800 in its current SAN environment. Distinguish the differences in the DS4800 and its predecessor, DS4500.

- Recognize all components of the DS4800.

- Recognize the processes for removal and replacement for all FRUs and CRUs for the DS4800.

- Follow documented steps required for established cable configuration.

- Follow documented steps for startup and shutdown sequences. Accurately follow support center direction in troubleshooting and running routines.

Skills above can be obtained by successfully completing the following course(s):

- IBM TotalStorage DS4800 Service Training M/T 1815 (SE181500)

Reference Material

The student will use the following as reference:

*IBM System Storage DS4800 Series Installation, User's and
Maintenance Guide GC26-7845-01*

The latest version of the reference material is available on the DS4800 Engineering Change CD and at the following Web site:

<http://www-304.ibm.com/jct01004c/systems/support/storage/disk/ds4800/support1.html>

Course Objectives (Terminal Objectives Only)

After completing this course, you will be able to:

- Identify the process to download and install the latest firmware to a DS4800 Subsystem, including ESM, DDM, Controller and Controller NVSRAM

Course Completion Criteria

Successful completion of this course requires demonstrated mastery of course objectives through the end-of-course test.

Topic 1. DS4800 Firmware Upgrade FBM

What this topic is about:

IBM has made numerous attempts to update, advise, and recommend that our DS4800 customers download and install new microcode releases on their subsystems, but only a small percentage have typically complied each time. In the meantime, the incidence of unplanned disruptions has slowly risen within the DS4800 population across the United States. We believe that nearly 85% of these unplanned disruptions could have been entirely preventable, or more rapidly resolved, had the recent code releases been deployed. In order to prevent unplanned outages and improve customer satisfaction with the DS4800, IBM is releasing a mandatory firmware FBM.

This course is designed to train existing DS4800 SSR to install this FBM. It is intended to provide step by step guidelines for updating the code on the DS4800. For the code update activity, the 06.23.05.02 or later package as delivered from the Super Shipper CD will be used.

What you will be able to do:

After completing this topic you will be able to:

- Describe the process to download and install the latest firmware to a DS4800 Subsystem, including ESM, DDM, Controller and Controller NVSRAM.

1.1 DS4800 Firmware Update Process

IBM has decided to fund a mandatory microcode update for all applicable DS4800 boxes installed across the United States. This FBM is designed specifically to get each DS4800 to the minimum required level of microcode. The current maintenance strategy for the FAStT/DS4000 product line is that the customer is responsible for firmware updates.

This topic will guide you through the process of installing this firmware FBM.

Prerequisites

The DS4800 FBM will be shipped on a CD-ROM with all of the firmware files to update the DS4800. Included with the firmware files will be a set of *Installation Instructions* and the *readme* file that normally is used by the customer to install DS4000 firmware. The FBM instructions refer to the *readme* file to check the Dependencies and pre-requisite firmware levels for the Disk Drive Modules (DDMs), ESMs and Controllers.

Depending upon the firmware level of these components, you may be required to update certain components before starting the FBM. In most cases, a Branch Office coordinator, working with the customer, will identify the machines that will need to be updated prior to starting the FBM.

Prior to the code update, the all the following items must be completed before continuing the process.

Items	Responsible Party
Host Pre-Check	Area Coordinator to be returned by the Client
Super Shipper Order Form	Area Coordinator
Survey sheet	Area Coordinator to be returned by the Client
Configuration	Area Coordinator to be returned by the Client
Current code level installed	Area Coordinator to be returned by the Client
Pre-verify tools	Area Coordinator to be returned by the Client
Cabling	Area Coordinator to be returned by the Client
Current ESM password	To be provided by the Client
Current Profile Saved	Client
Process reviewed and approved at the daily meeting	Team

Super Shippers

Super Shippers is a Lotus Notes database that has been selected for the distribution of the DS4800 Firmware FBM. Each Branch Office in the U.S. has a coordinator responsible for contacting the customer and scheduling the FBM. The Branch Office coordinator is responsible for ordering the FBM through the Super Shippers database (shown below).

Alias	Code Level	Prereq Code	Code description, comments, and/or WARNINGS
▼ SW			
▼ eRCMF			
ERC MF PFE	ERC MF PFE	None	**Special Approval Only - Licenced IGS Service Offering
▼ DS4800			
4800-AIX	DS4800-AIX	None	DS4800 Field Upgrade- Version 9.23/6.23 (Model 1815) Code Level 06.23.05.02
4800-HPUX	DS4800-HPUX	None	DS4800 Field Upgrade- Version 9.23/6.23 (Model 1815) Code Level 06.23.05.02
4800-LIN	DS4800-LIN	None	DS4800 Field Upgrade- Version 9.23/6.23 (Model 1815) Code Level 06.23.05.02
4800-LOP	DS4800-LOP	None	DS4800 Field Upgrade- Version 9.23/6.23 (Model 1815) Code Level 06.23.05.02
4800-MULTI	DS4800-MULTI	None	DS4800 Field Upgrade- Version 9.23 / 6.23 (Model 1815) Code Level 06.23.05.02 All Platforms
4800-NOV	DS4800-NOV	None	DS4800 Field Upgrade- Version 9.23/6.23 (Model 1815) Code Level 06.23.05.02
4800-SOL	DS4800-SOL	None	DS4800 Field Upgrade- Version 9.23/6.23 (Model 1815) Code Level 06.23.05.02
4800-VM	DS4800-VM	None	DS4800 Field Upgrade- Version 9.23/6.23 (Model 1815) Code Level 06.23.05.02
4800-WIND	DS4800-WIND	None	DS4800 Field Upgrade- Version 9.23 / 6.23 (Model 1815) Code Level 06.23.05.02
4800 PFE	4800 PFE	None	Select this "Code" if PFE has provided a non-standard code alias for you to order.
▼ 3990			

Recommended Tools:

Approved Serial Interface

Serial Cable Kit P/N: 62H4857 (09-25)

Private Network - see **Appendix A**

Ethernet Cable

Putty

DS4000 Storage Manager

The first item covered in the *readme* file is to load the latest version of DS4000 Storage Manager on the host server. Assuming that you will be performing the FBM using your service terminal, it would be advantageous to load the current version of DS4000 Storage Manager on your service terminal.

The latest version can be downloaded from the following website:

<http://www-304.ibm.com/jct01004c/systems/support/storage/disk/ds4800/stormgr1.html>

The screenshot shows the IBM Systems Storage Support website. The main heading is "Downloads for System Storage DS4700 Express". Below this, there are tabs for "Firmware", "Storage Mgr", "HBA", "Tools", and "Support & pubs". The "Storage Mgr" tab is selected, and the "Current version" sub-tab is active. A table lists the following publications:

IBM DS4000 Storage Manager v9.23 software and publications	Publication	Current version and readmes
IBM DS4000 Storage Manager v9.23 for Microsoft Windows 2000 and Server 2003 (32-bit)	GC26-7847-02	14 May 2007 v9.23
IBM DS4000 Storage Manager v9.23 for Microsoft Windows Server 2003 (64-bit IA64)	GC26-7847-02	14 May 2007 v9.23
IBM DS4000 Storage Manager v9.23 for Microsoft Windows Server 2003 (64-bit x64)	GC26-7847-02	14 May 2007 v9.23
IBM DS4000 Storage Manager V9.23 for x86 Linux	GC26-7847-02	14 May 2007 v9.23
IBM DS4000 Storage Manager v9.23 for IA-64 Linux	GC26-7847-02	14 May 2007 v9.23
IBM DS4000 Storage Manager v9.23 for Novell NetWare	GC26-7847-02	14 May 2007 v9.23
IBM DS4000 Storage Manager v9.23 for VMware	GC26-7847-02	14 May 2007 v9.23
IBM DS4000 Storage Manager v9.23 for AIX	GC26-7848-03	14 May 2007 v9.23
IBM DS4000 Storage Manager v9.23 for Solaris	GC26-7848-03	14 May 2007 v9.23
IBM DS4000 Storage Manager v9.23 for HP-UX	GC26-7848-03	14 May 2007 v9.23
IBM DS4000 Storage Manager V9.23 for Linux on Power	GC26-7848-03	14 May 2007 v9.23
IBM DS4000 Storage Manager V9.19 Linux 2.4 RDAC Note: There is no new release for this version	n/a	03 Nov 2006 v9.00.A3.22

As you proceed through the installation process, you will only need to load the Management Station version of the Storage Manager. You should ensure the customer has also loaded the updated version of Storage Manager as he may not be able to connect to the DS48000 after the FBM with the older versions. See the *IBM System Storage DS4800 Installation, User's and Reference Guide* for installation details.

FBM Instruction Warnings

The following two Warning statements are taken from the FBM *Installation Instructions* and provide additional details on the Dependencies.

ATTENTION

If you have not already done so, please check the “Dependencies” section of the Firmware README file for ANY MINIMUM FIRMWARE REQUIREMENTS for the DS4000 storage server controllers, the drive expansion enclosure ESMs, and the hard drives in the DS4800 configurations before upgrading the controller firmware.

If drive firmware upgrades are required, down time will need to be scheduled. The drive firmware upgrades require that there are no Host I/Os sent to the DS4000 controllers during the download.

The README and CHANGE HISTORY files are located on the DS4800 Firmware CD-ROMs.

The next visual identifies the order that the firmware should be installed if all of the dependencies have been met.

ATTENTION

Attention: Read the *readme* file that is included in each firmware or DS4000 Storage Manager software package for any limitations, subsystem firmware prerequisites, or download-sequence information. For example, the controller firmware code might require the storage expansion enclosure ESM firmware to be upgraded first to a particular version, or the controller firmware download might require the halting of I/Os to the DS4800's logical drives. **Failure to observe the limitations, prerequisites, and dependencies in the readme file might result in a loss of data access.**

Unless the *readme* file contains special requirements for the sequence in which you upgrade firmware, you should perform firmware upgrades in the following sequence:

1. Controller firmware
2. ESM firmware for the storage expansion enclosures
3. Controller NVSRAM
4. Drive firmware

DS4800 Firmware Update Overview

The bulleted list below identifies reference material and some basic guidelines for performing the firmware FBM.

- Use the *IBM System Storage DS4800 Series Installation, User's and Maintenance Guide* for reference.
- Before upgrading the ESM firmware, controller firmware and NVSRAM, make sure that the system is in an optimal state. If not, run the Recovery Guru to diagnose and fix the problem before you proceed with the upgrade.

The NVSRAM package, including the settings for booting the DS4000 storage server. The NVSRAM is similar to the settings in the BIOS of a host system. The controller firmware and the NVSRAM are closely tied to each other and are therefore not independent. Be sure to install the correct combination of the two packages.

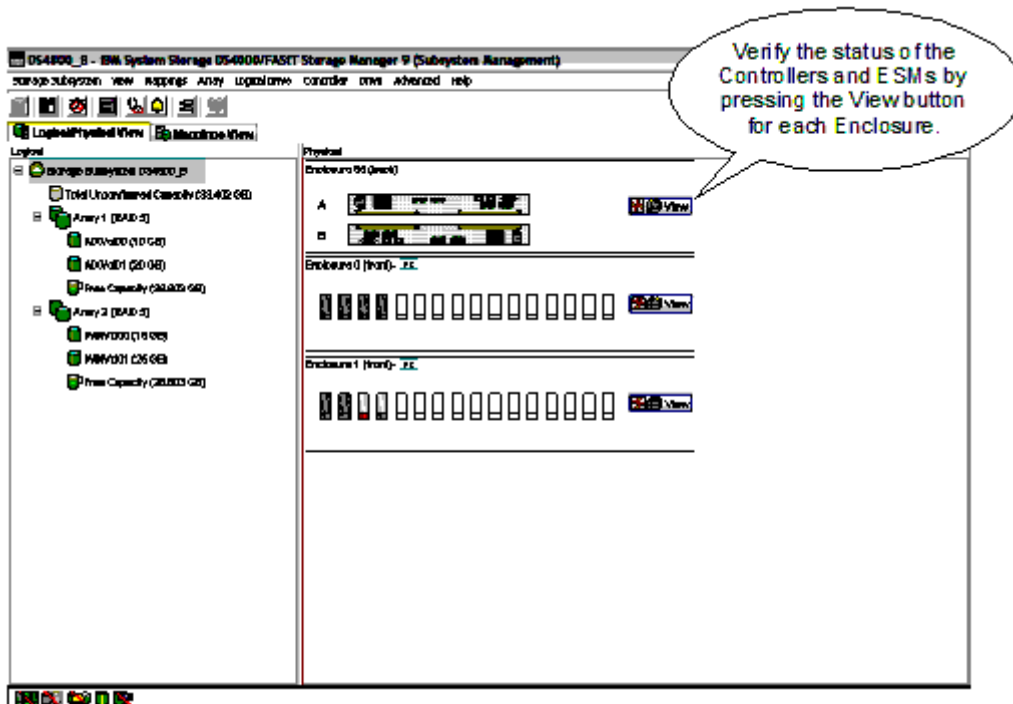
- The upgrade procedure needs two independent connections to the DS4800 storage server, one for each controller. It is not possible to perform a microcode update with only one controller connected. Therefore, both controllers must be accessible either via Fibre Channel or Ethernet. Both controllers must also be in the active state.

The second bullet above reminds you that the FBM should only be installed on a fully functional DS4800 subsystem. That includes the Controller Enclosure and all of the attached Expansion Enclosures. The Expansion Enclosures may include EXP100s, EXP710s and EXP810s. The status of all enclosures need to be verified.

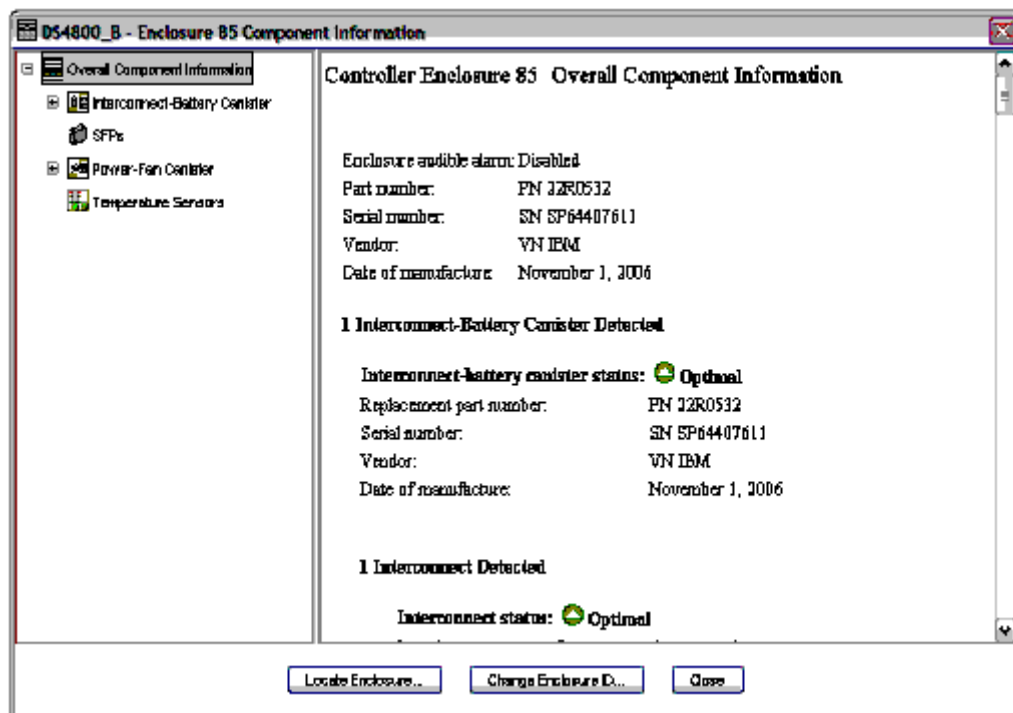
The next three visuals show the DS4000 Storage Manager screens used to identify the status of the Controller and Expansion Enclosures.

Verification of Controllers and Enclosures

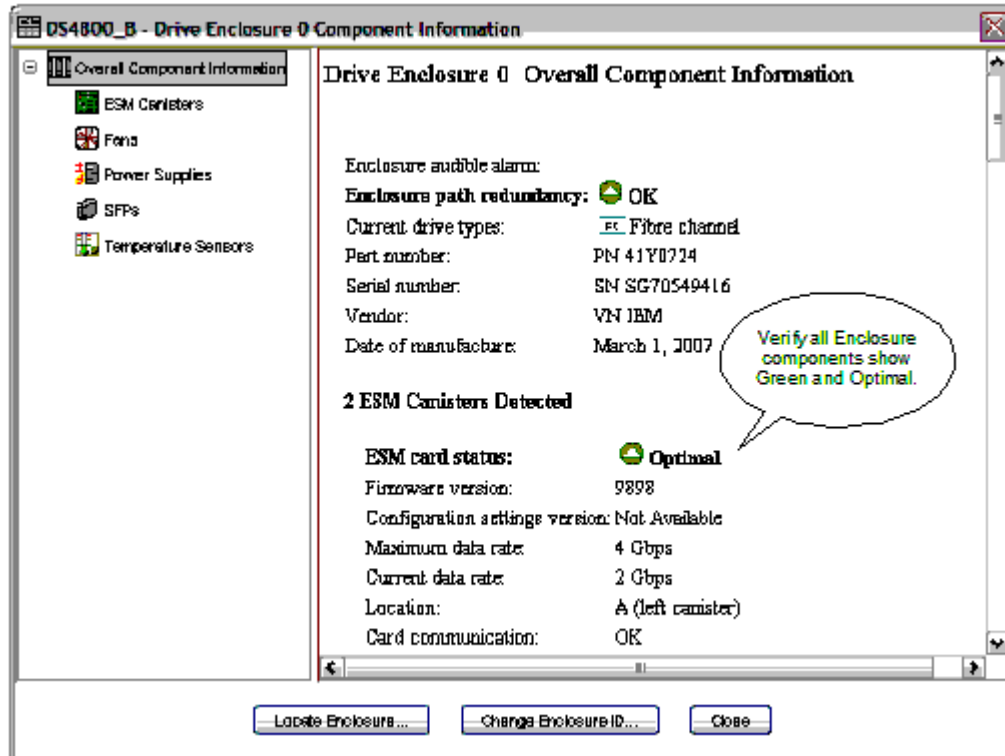
Verifying Optimal State of Controllers and ESMs



Verifying Controller Enclosure Status



Verifying Each Expansion Enclosure Status



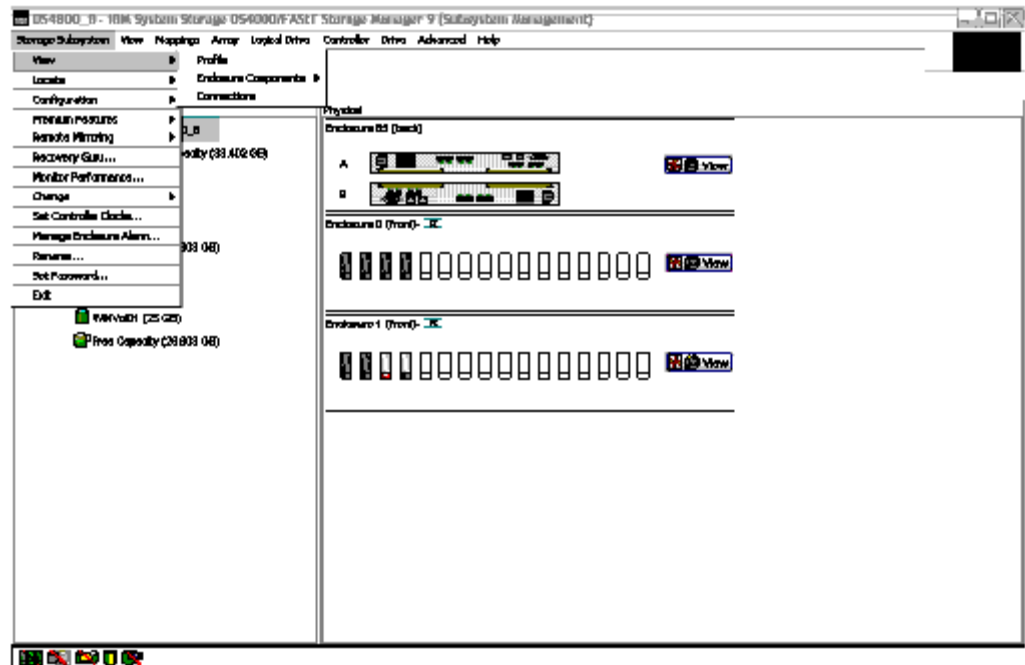
The next portion of the process is to create and save the DS4800 Profile.

DS4800 Profile

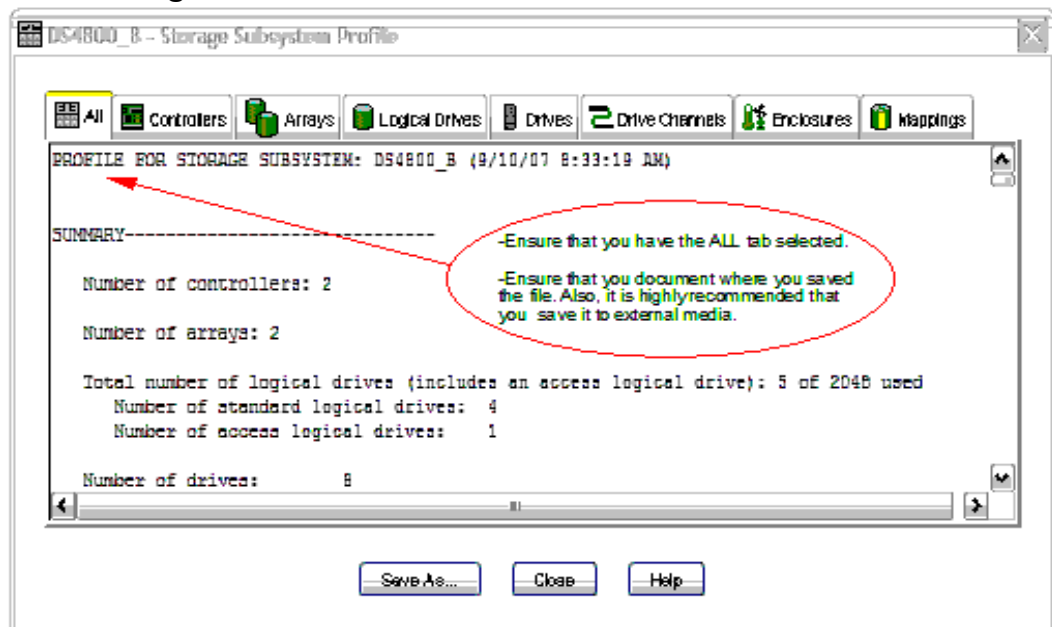
The DS4800 Profile is a text file that identifies logical and physical information about the subsystem. If the installation of the FBM fails, the Profile data may be needed to help restore the subsystem to its original configuration.

The next two visuals detail the process to create the Profile and save it to your Desktop.

Viewing the DS4800 Profile



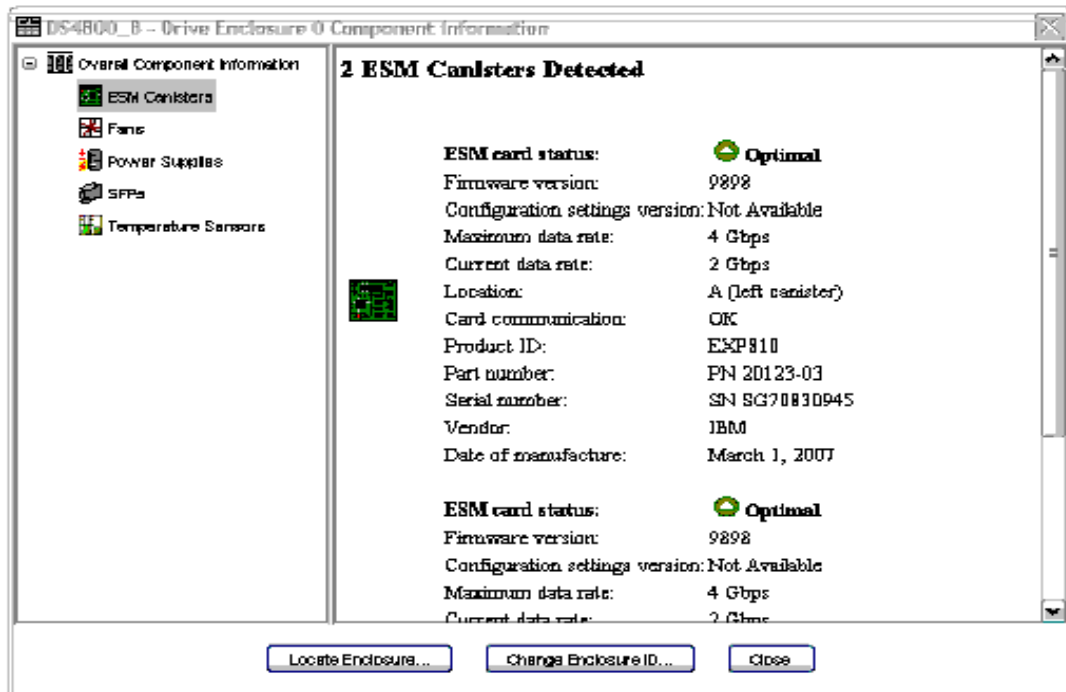
Saving the DS4800 Profile



Continuing through the pre-check process, the ESM firmware level needs to be identified.

ESM Firmware Version Verification

The ESM firmware level is identified by selecting the *View* icon from the initial DS4800 screen, then selecting the *ESM Canisters* from the *Overall Component Information*.



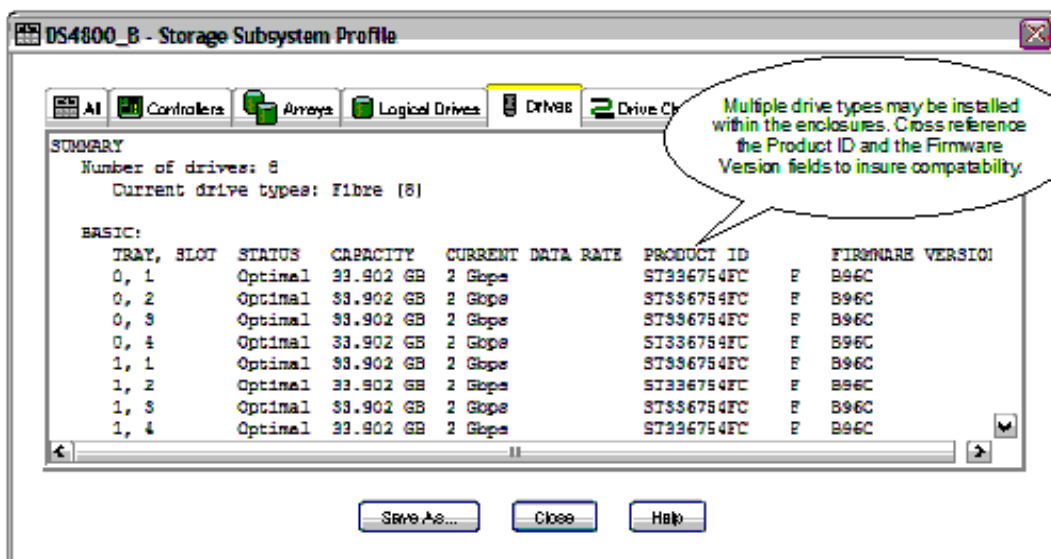
Verify the ESM firmware level with the chart in the *readme* file.

The next step is to verify the Drive Firmware level.

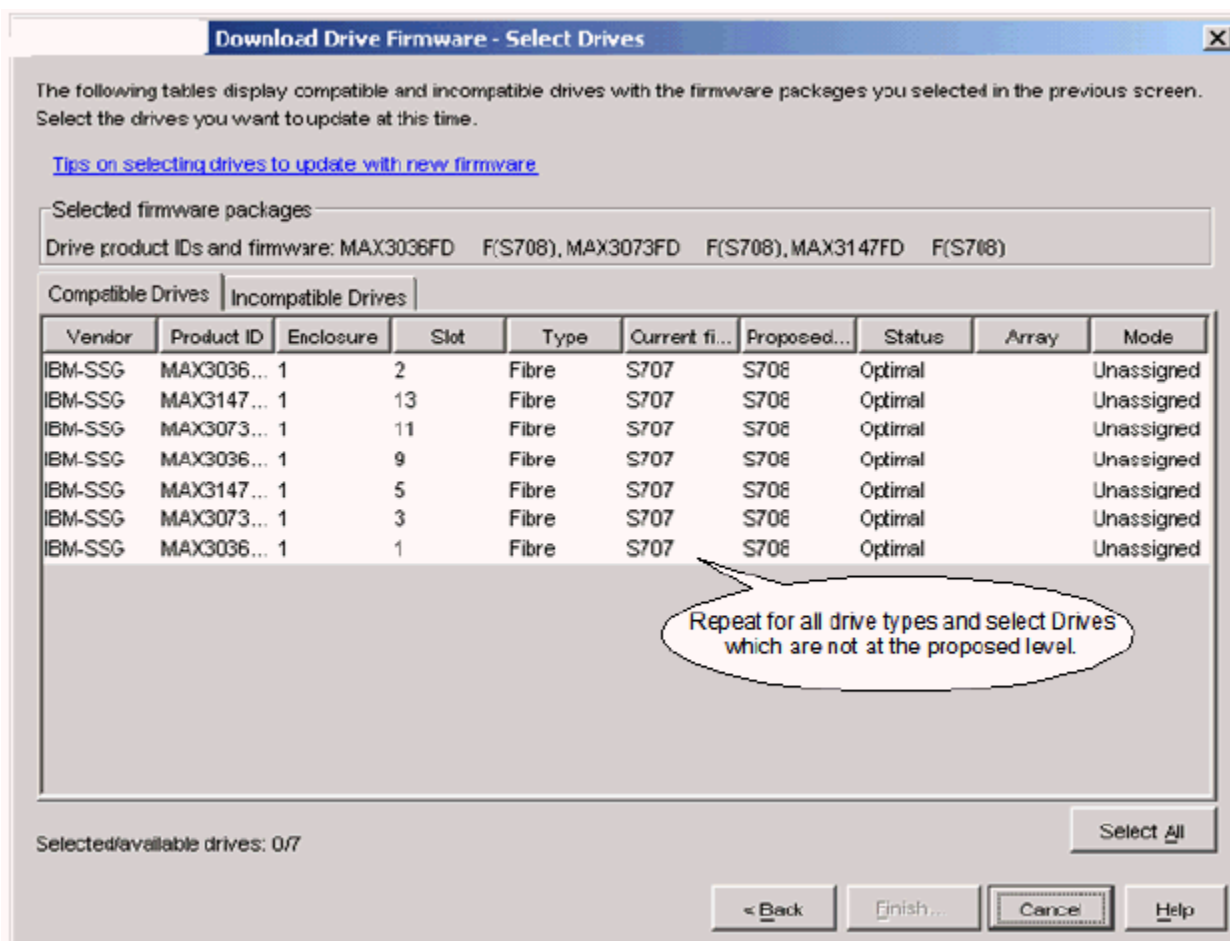
Drive Firmware Level Verification

It is possible that there are multiple drive types within an enclosure or subsystem. The *readme* file has a chart showing the different drive types (Product IDs) and the required firmware levels. **If drive firmware needs to be installed, it is a non-concurrent upgrade and scheduled downtime must be arranged with the customer.** The Drive Firmware update process will be detailed shortly.

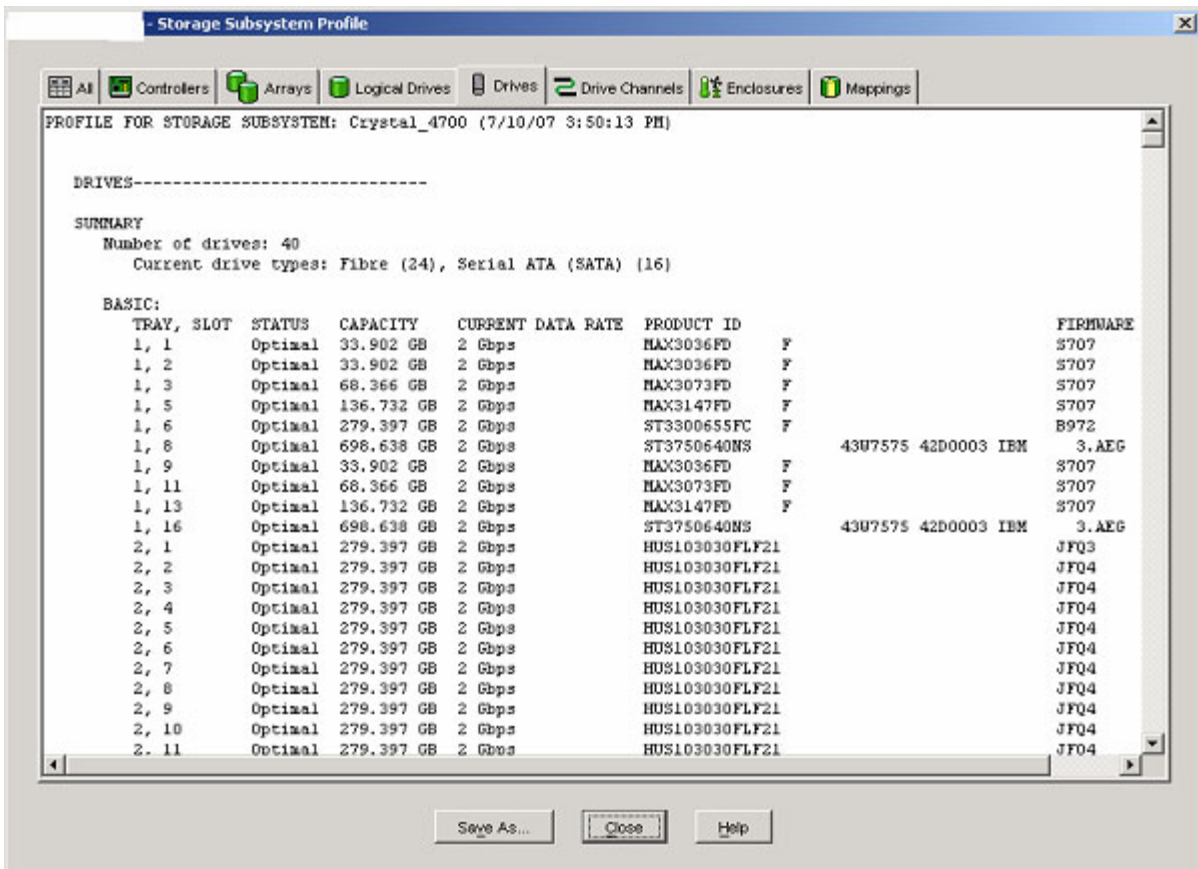
The Drive Firmware level can be viewed from the Profile by selecting the *Drives* tab. See the visual below.



Drive Firmware Identification

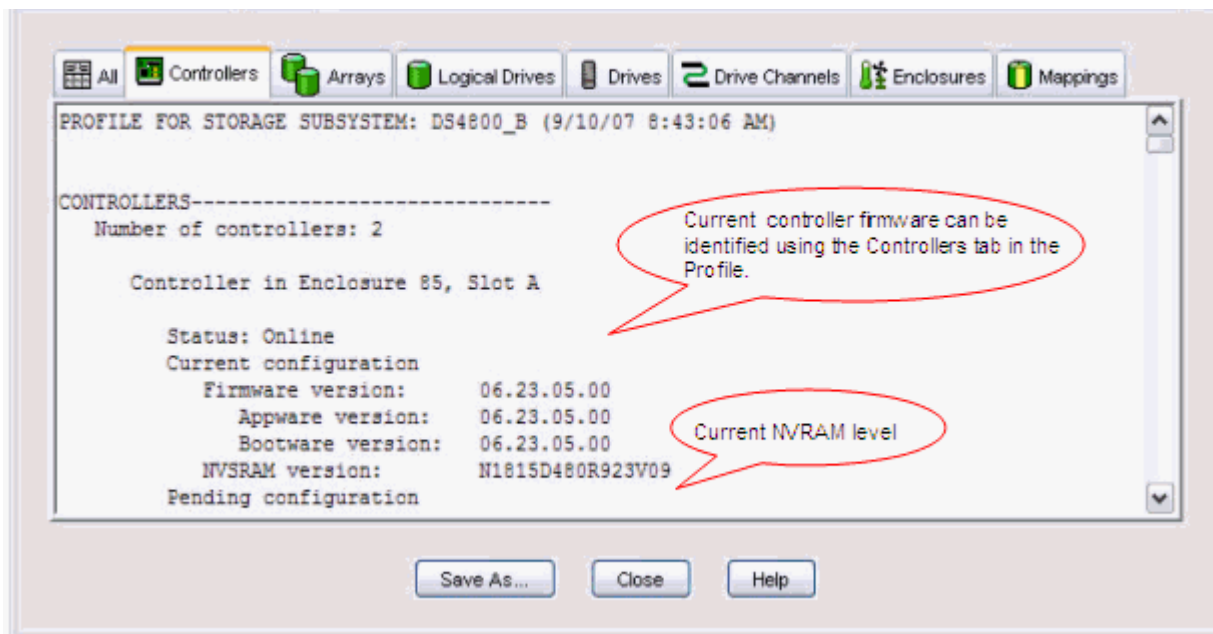


Note: Expand the Product ID tab (see visual below) to view the complete field.



Using the Profile for Controller Firmware Verification

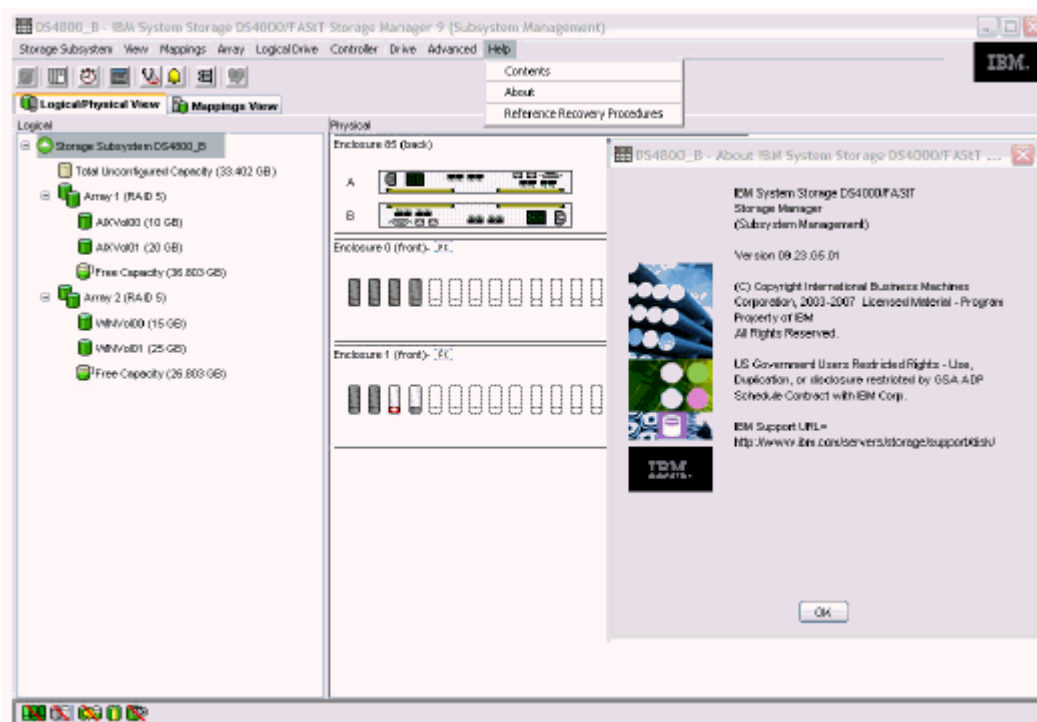
Continuing with the pre-check process, you can use the Profile data to identify the controller and NVSRAM firmware levels by selecting the *Controller* tab.



DS4000 Storage Manager Version Verification

As mentioned earlier in the process, the customer's DS4000 Storage Manager needs to be at the current level to work with the upgraded DS4800. **The DS4000 Storage Manager software is downward compatible, so the new version will work with older FASTT/DS4000 product types and firmware levels.**

To verify the DS4000 Storage Manager version press *Help* then *About* from the toolbar.



If the pre-check are completed and no addition firmware processes need to be completed, follow the latest set of instructions to install the DS4800 firmware. The basic process is covered in the remaining visuals in this course.

Firmware CD-ROM Files

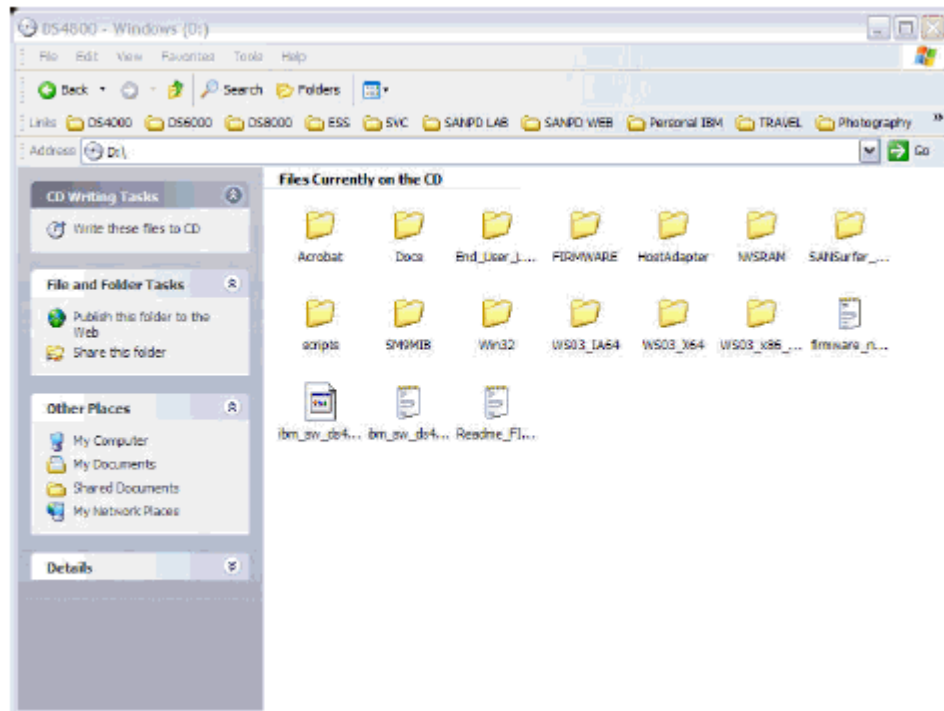
It is important to follow the latest version of the FBM instructions as certain steps may change. Additionally, as you progress through the FBM, be sure to read carefully any warning and confirmation screens. If the process does not exactly follow the instructions, contact your next level of support before proceeding.

Files Included on the CD-ROM

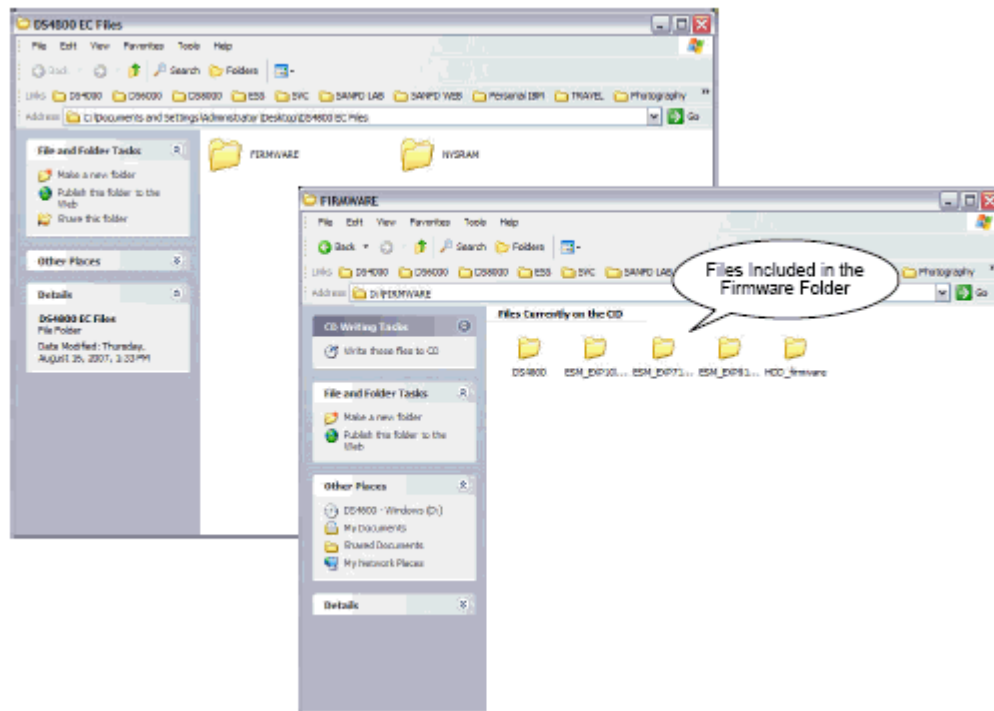
The next step in the process is to copy the needed firmware from the CD-ROM, obtained from Super Shippers, to your service terminal or

customer's server. The next two visuals display the directory on the CD-ROM and the copy process.

Windows Display Example of CD-ROM Contents



Example of Files Copied from CD-ROM to the Desktop



Controller Firmware Update

For the SM Firmware Load Procedure, perform the following steps:

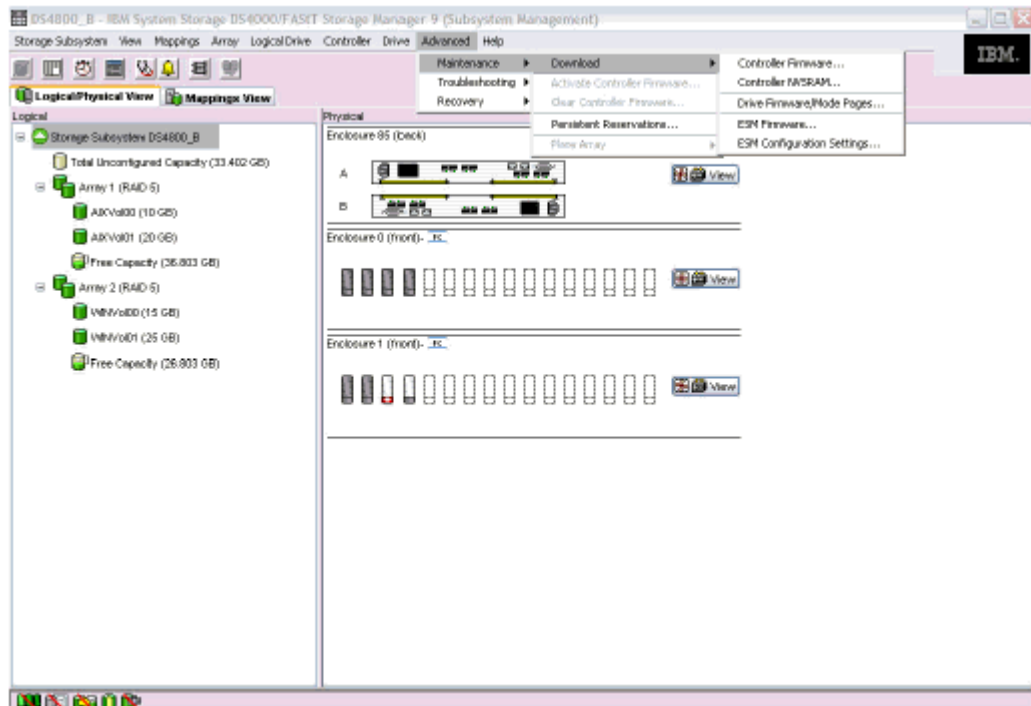
1. From the menu bar, use the pull-down to select **Advanced**
2. Select **Maintenance**
3. Select **Down load**
4. Select **Controller**

The Controller Firmware is located in the DS4800 folder and the NVSRAM Firmware is located in its own directory.

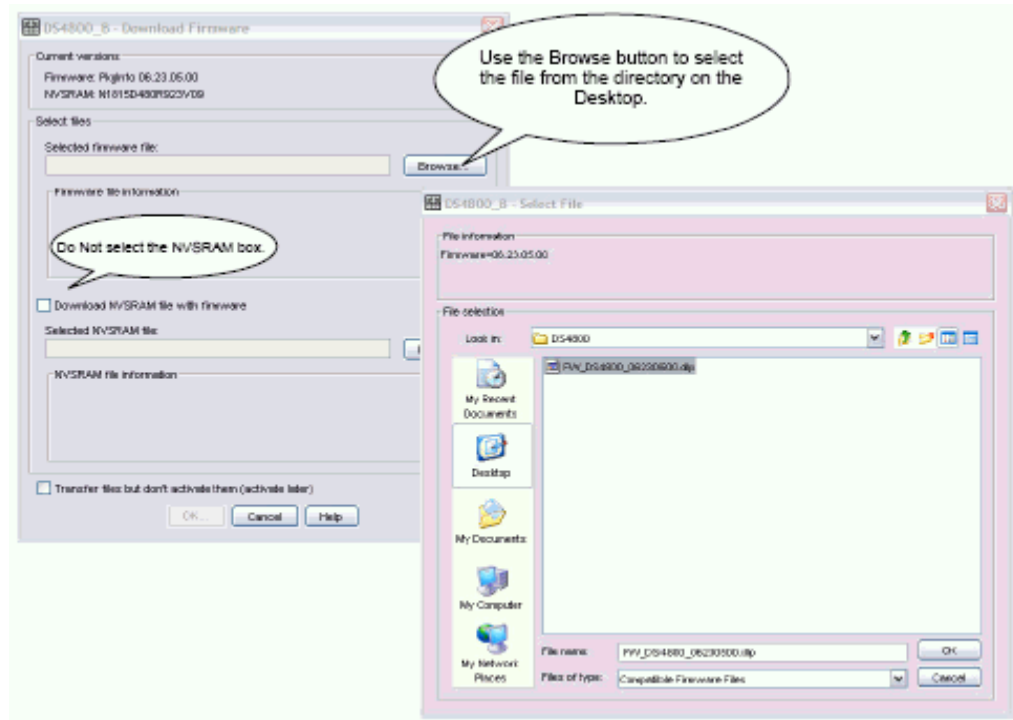
Note: Depending upon the level of code on the DS4800, the Controller and NVSRAM Firmware can be downloaded together. See the README file for details. In the example that follows, both the Controller and NVSRAM are downloaded together.

For this FBM, we will do the Controller and NVSRAM Firmware separately.

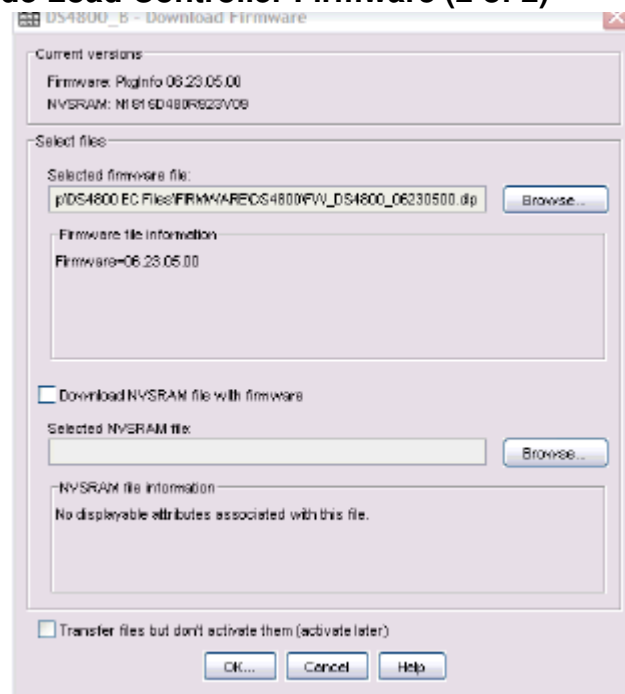
Controller Firmware Download Process



DS4800 Code Load - Controller Firmware (1 of 2)



DS4800 Code Load Controller Firmware (2 of 2)



Now that the Controller download is done, the *Installation Instructions* will have you update the all the Expansion Enclosures.

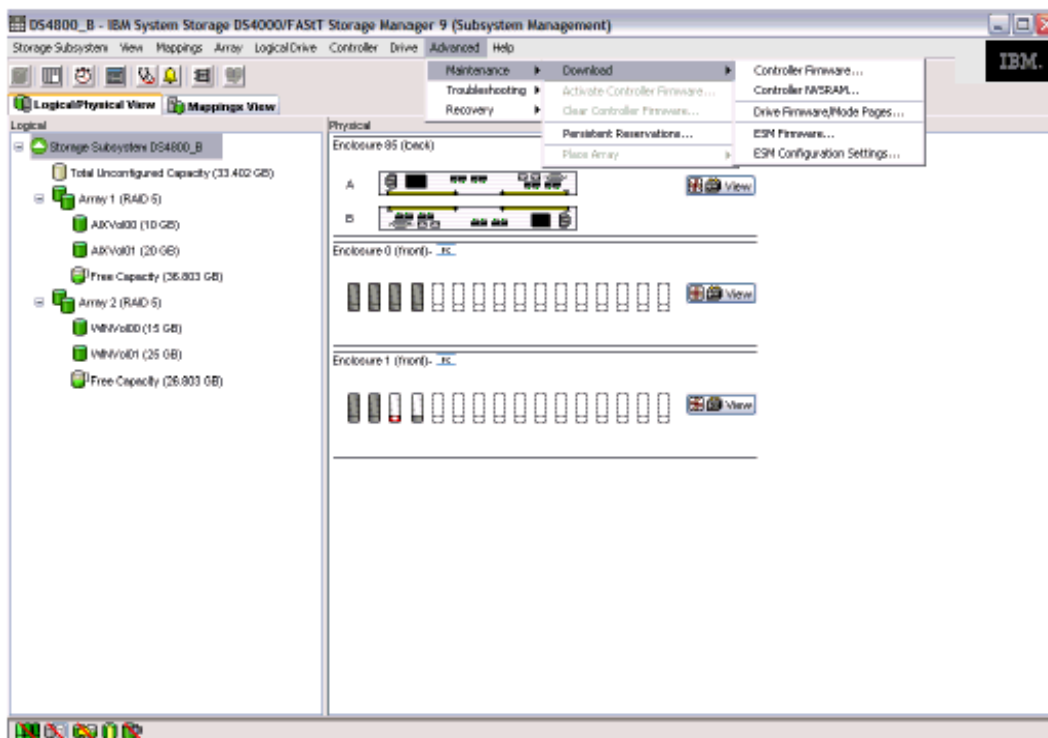
ESM Preparation

The next group of visuals detail the ESM Firmware Download process. During the ESM process, only one enclosure at a time should be selected. The DS4800 supports intermix of EXP100, EXP710 and EXP810 enclosures. Therefore, the entire process may need to be done multiple times.

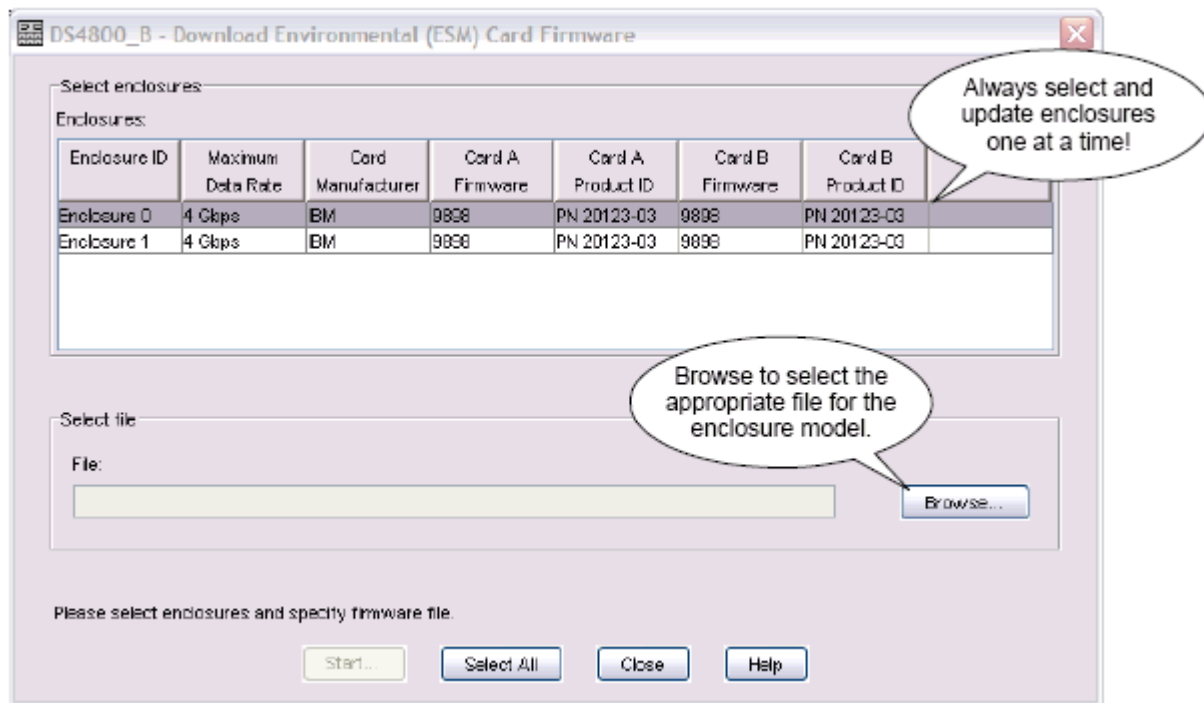
During this process, a confirmation screen should be displayed. Read it carefully before responding **yes**.

Important! It is import to wait 10 minutes between each ESM load. Failure to do so could lead to system instability.

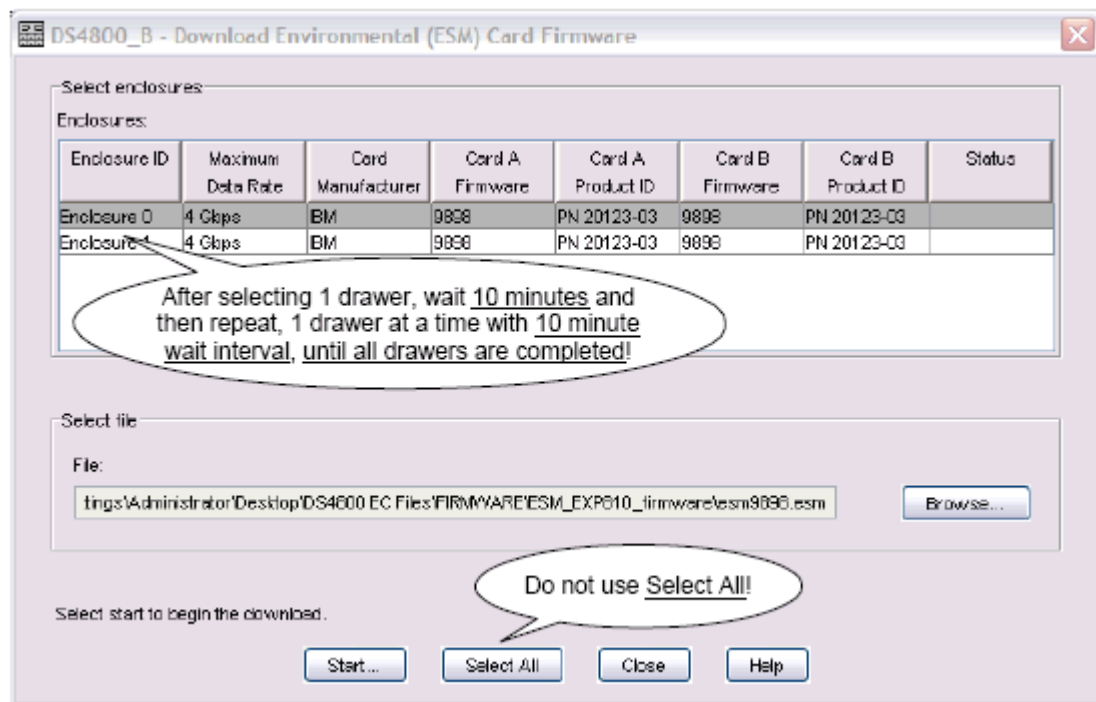
ESM Download Selection



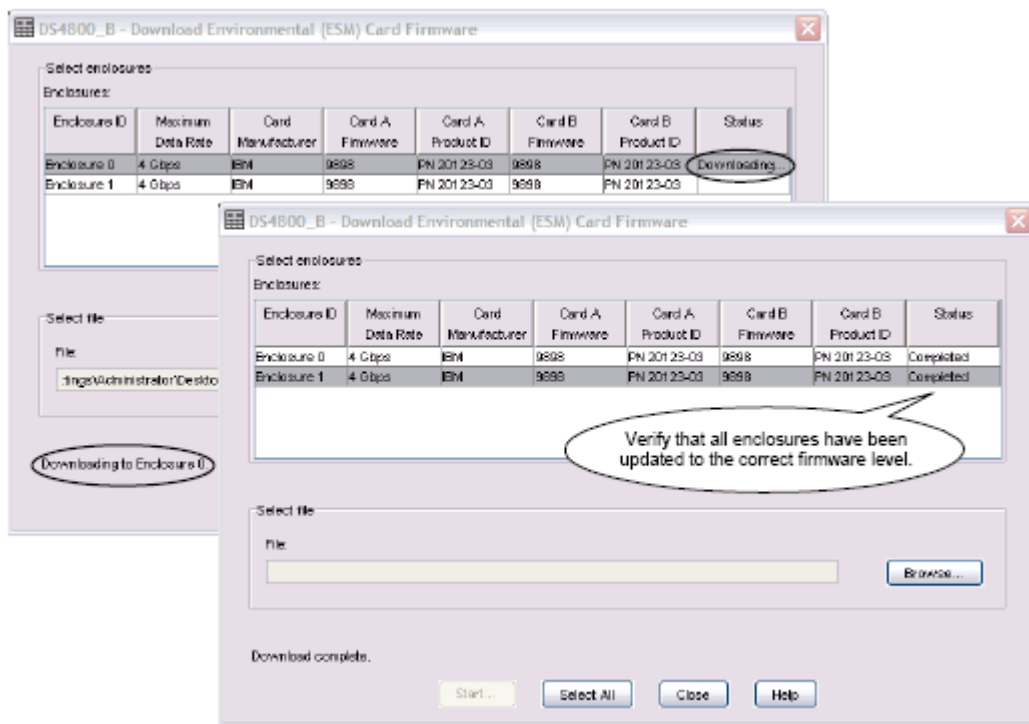
Enclosure Selection



ESM Download Start



ESM Download Status



Now that all the Controllers and ESMs have been updated, the *Installation Instructions* will have you download the NVSRAM.

NVSRAM Download

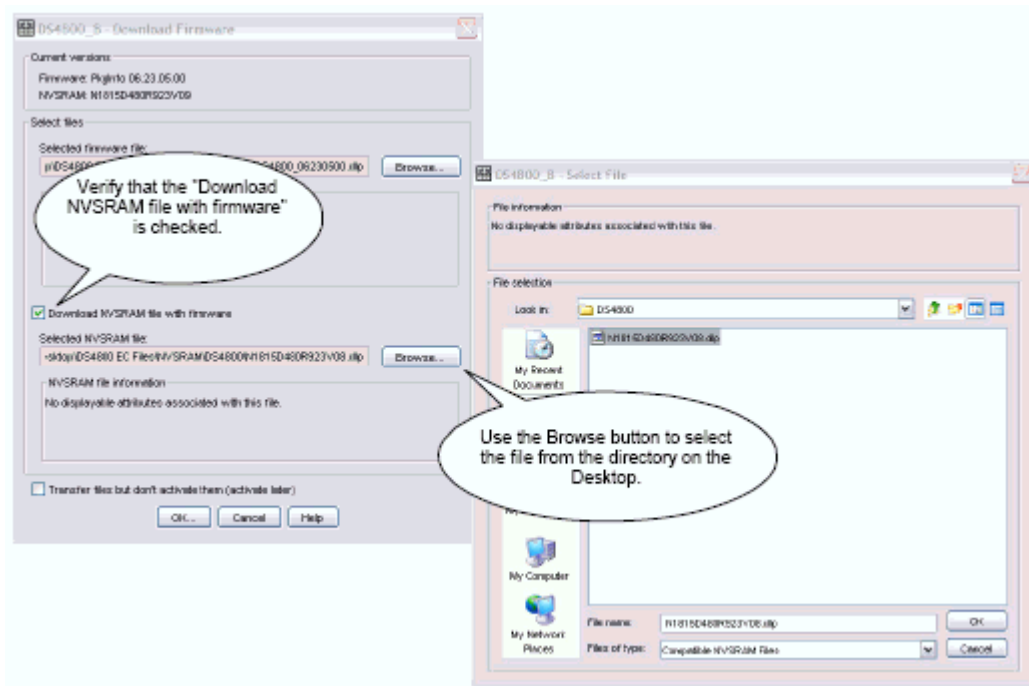
The NVSRAM file is located in the NVSRAM folder, inside the DS4800 folder.

Path: **d:\NVSRAM\DS4800**

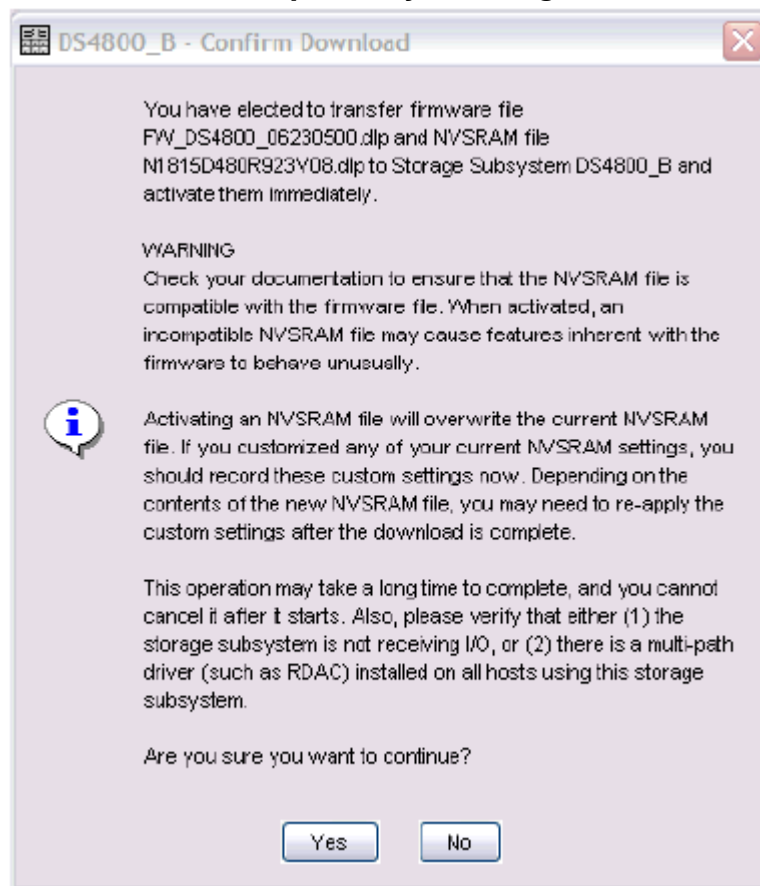
Depending upon the level of code on the DS4800, the Controller and the NVSRAM Firmware can be downloaded together. See the *readme* file for details.

For this update, process only select NVSRAM as shown in the following visual.

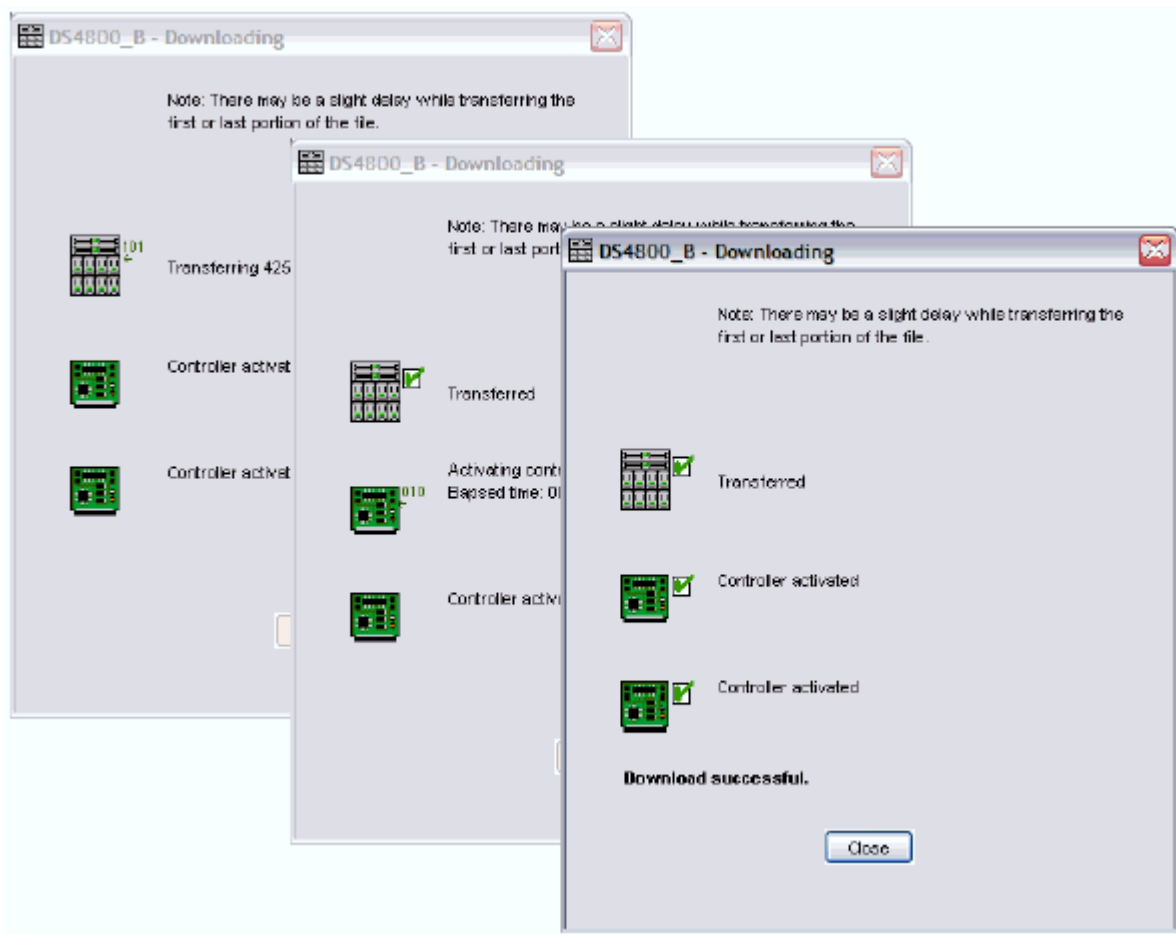
DS4800 Code Load - NVSRAM File



NVSRAM / Firmware Compatibility Warning



Firmware and NVSRAM Downloading

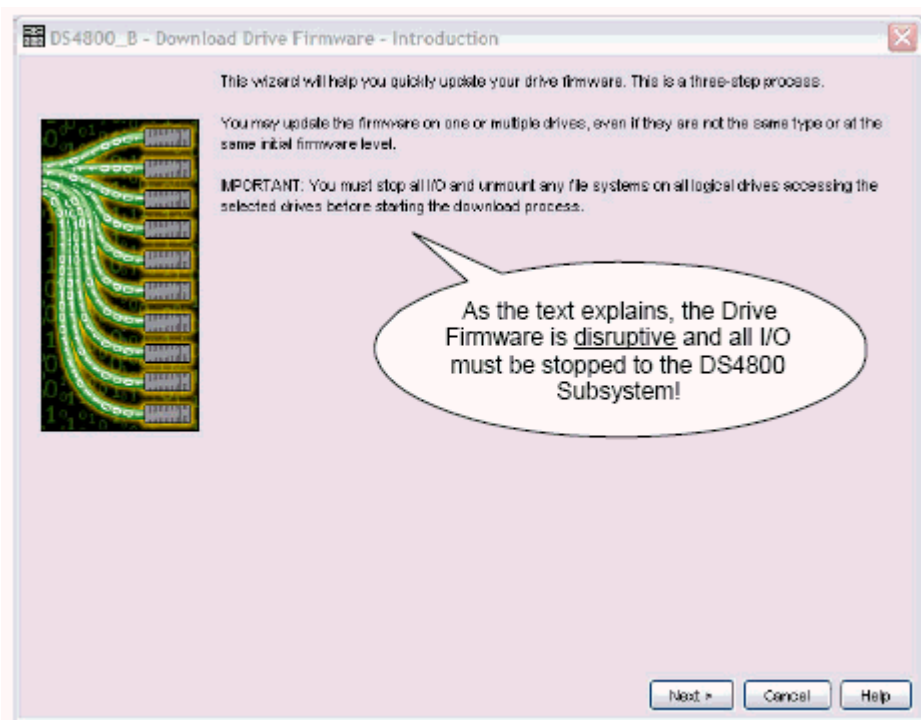


Drive Firmware Update

The final installation process shown is the Drive Firmware Update. Depending upon the level of firmware on the drives, this process may not be needed.

As mentioned earlier, the customer can have many different drives installed in the subsystem. All of the drives need to be at the recommended levels. The download (update) process is disruptive as explained on the initial screen below. If the Drive Firmware is not down level, this should be the last process in the FBM.

Drive Firmware Update Introduction

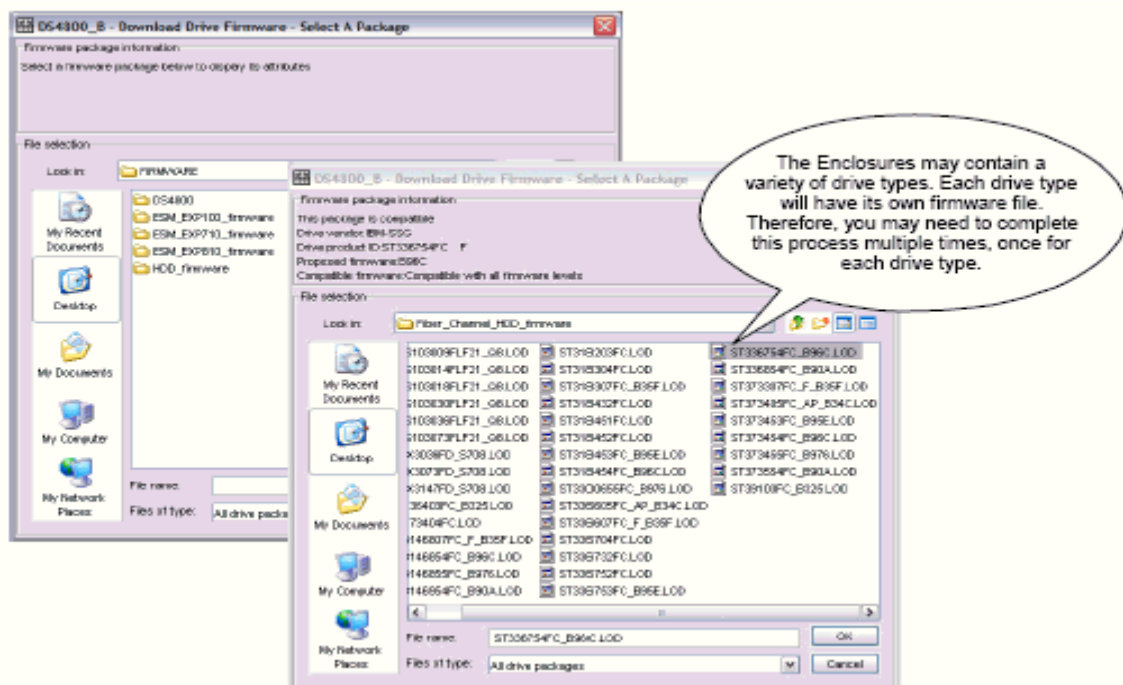


Updating drive code is disruptive. Ensure that no I/O is active to the system.

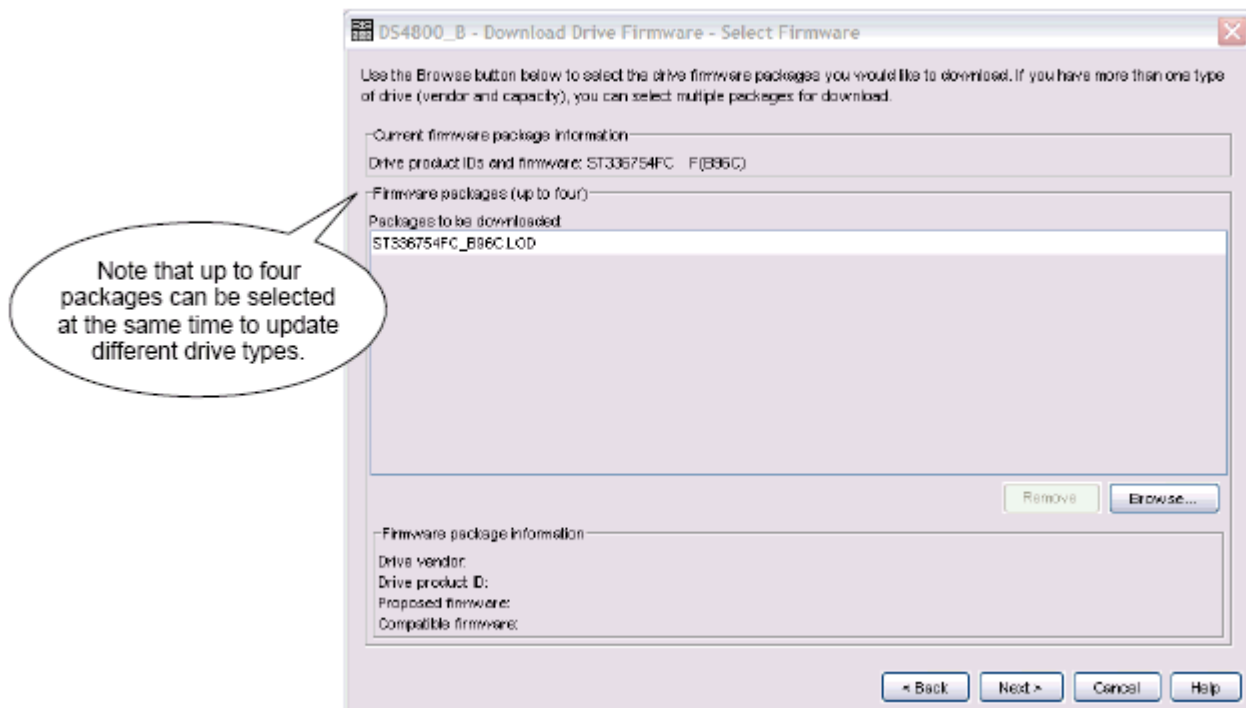
The following visuals show how to check the drive identifications and code update process shown in the Drive Firmware Update.

As you follow the process to select the drive firmware, you will notice that you can download four different firmware versions at the same time. In the example used here, only one version was used, and it was downloaded to a single drive. All drives of the selected types can be upgraded together.

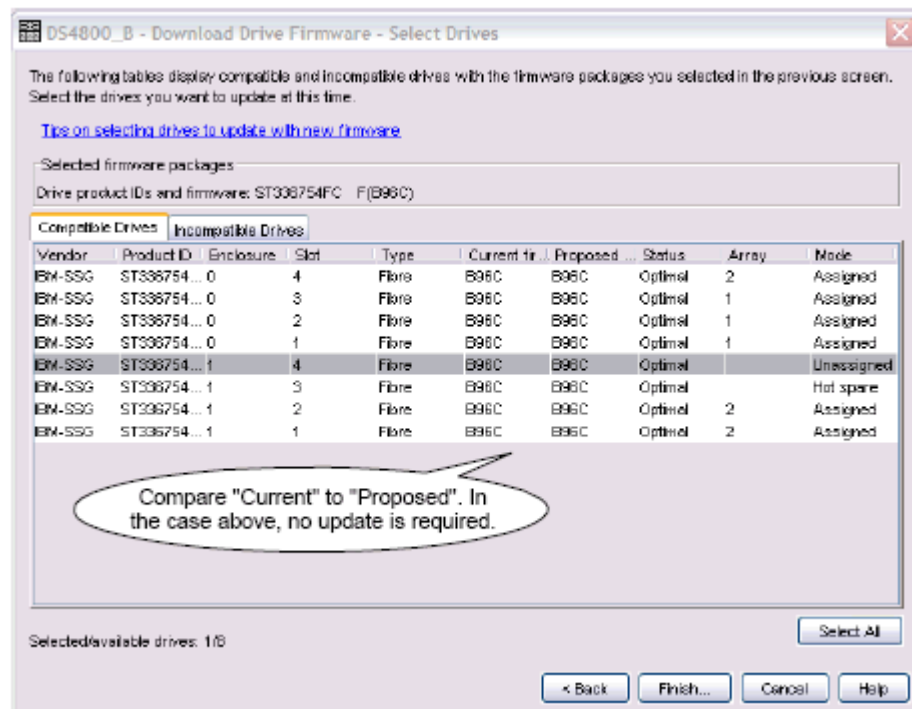
Drive Firmware Package Selection



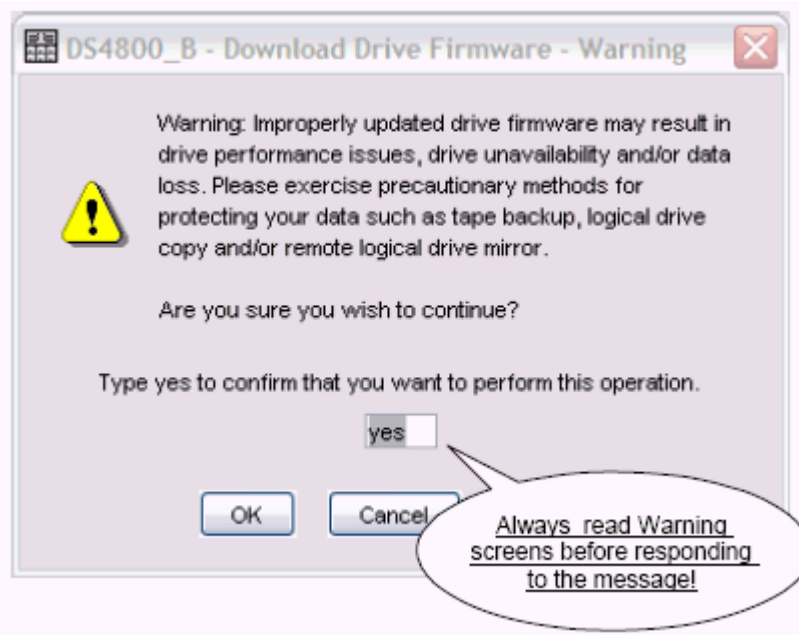
Download Drive Firmware



Select Drives to Upgrade



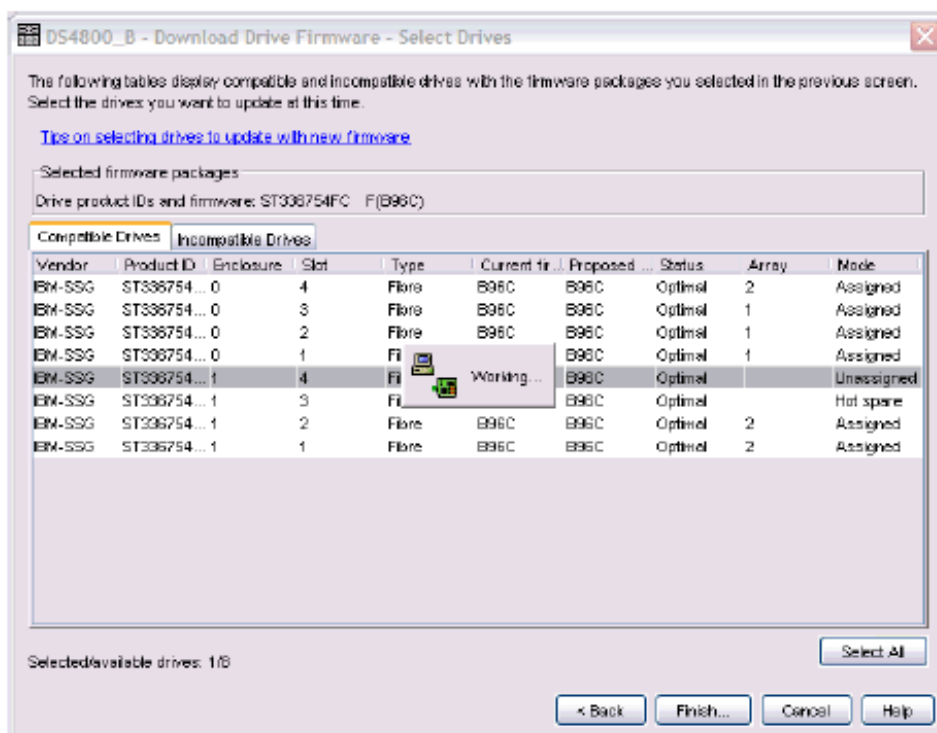
Download Drive Firmware - Warning



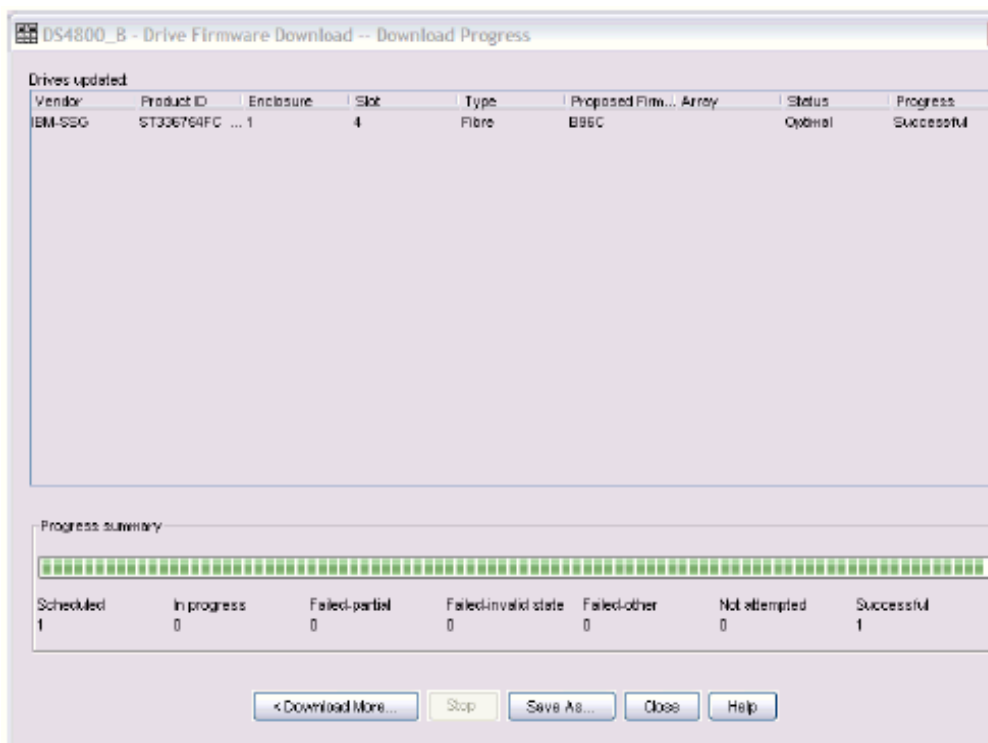
As a reminder, all warning and confirmation screen should be read carefully before responding **yes**.

The next two visual show the Drive Firmware download process through it's completion.

Download Drive Firmware in Process



Download Progress - Complete



Utilizing the steps that were previously outlined, review the Controller, ESM, NVSRAM, and DDM code levels to ensure they are correct.

At this point, the DS4800 Firmware FBM is complete.

Course Summary

This completes the information presented in this self-study course.

The maintenance strategy for the DS4800 subsystem dictates that the customer is responsible for firmware updates. Currently, there are many older versions of firmware running on the DS4800, and IBM is seeing an increase in the number of critical situations that could have been avoided if the current level of firmware was installed. IBM has decided to release a no charge firmware FBM. This document is intended to provide IBM hardware trained DS4000 service representatives with the skills required to update DS4800 Firmware.

The DS4800 FBM will be ordered through the Super Shippers process by a Branch Office coordinator. In addition, the coordinator will be responsible for working with the customer to determine the firmware level they are currently running and to schedule the FBM.

The FBM *Installation Instructions* and the *readme* file contain the detailed information about the upgrade. You will use these two documents to verify the current firmware levels of the Controllers, NVSRAM, ESMs, and Drives.

If the current firmware levels do not meet the pre-requisite levels, an intermediate level of code may need to be downloaded. Remember, the Drive Firmware is a disruptive installation, and time will need to be scheduled with the customer.

This course stepped through the FBM installation process to allow you to feel comfortable with the firmware upgrade process.

You will need to successfully complete an on-line end of course quiz to receive course completion status in your training record.

Refer to instructions in the SE181501 course description in Learning@IBM (formerly Global Campus) for appropriate directions to access the on-line test.

Successful completion of the quiz will cause your training record to be updated - no other action is required.

Appendix A. How to Build a Private Network

The items required to build a private network include:

- Service terminal (Thinkpad, laptop)
- Small Ethernet hub
- Three (3) Ethernet cables

Use the following steps to build the private network.

- ___ 1. If you have the IP addresses of the DS4800, configure your service terminal to be on the same subnet by performing the following steps. Otherwise, skip to the next step.
 - ___ a. From the Desktop, use the following path:
Start > Settings > Control Panel > Network Connections.
 - ___ b. Highlight **local area connection** and right click.
 - ___ c. Select **Properties** and left click.
 - ___ d. Check **Use the following IP address.**
 - ___ e. Pick the address for your service terminal that is in the same subnet.
(If the DS4800 is 172.18.22.20 and 21, you would set your service terminal to 172.18.22.10).
 - ___ f. Leave the gateway blank.
 - ___ g. Continue to step 3.
- ___ 2. If you do not know the IP addresses, you will need to enter the shell and issue the **netCfgShow** command.

Once you have obtained the addresses, return to step 1 and complete steps starting with step 1a.
- ___ 3. Connect each controller to a hub port and your service terminal to another.
- ___ 4. Issue the **ping** command to verify connectivity.

(ping 172.18.22.20 should respond with the length of time it took to receive a response.)
- ___ 5. Add the storage subsystem to the Storage Manager and do the code load.

