Sun StorageTek™ 6540 Array Product Overview

Sun Microsystems, Inc.
www.sun.com

Part No. 819-6146-10
May 2006, Revision A

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Preface

This *StorageTek™ 6540 Product Overview* provides information about what's new for disk storage system sales and service personnel. It explains the past product names, and introduces the reader to the new product names and terminology. Terminology differences in both hardware and software are explained, to better prepare field personnel on what to expect. Also there are different documents available depending on what gets ordered, and some document titles are different. There are presently two different online distribution systems.

This manual provides information to keep you informed about what's new in the Sun StorageTek 6000 Series disk offerings. This document is written for technicians, system administrators, authorized service providers (ASPs), and users who have experience selling, installing, troubleshooting and replacing hardware.

How This Document Is Organized

Chapter 1 describes the product differences, primarily explaining the differences in terminology, software, information distribution, and in backend cabling.

Chapter 2 describes the new Common Array Manager (CAM) software in more depth, providing various screens and explaining some of the functionality of the software.

Chapter 3 describes the Sun Web ordering process, showing the various configurator windows that are used to assemble your storage solution.

Glossary is a list of words and phrases and their definitions.

Documentation, Support, and Training

Sun Function	URL	Description
Documentation	`http://www.sun.com/documentation/`	Download PDF and HTML documents, and order printed documents
Support and Training	`http://www.sun.com/supportraining/`	Obtain technical support, download patches, and learn about Sun courses

Note – The Customer Resource Center (CRC) is another site that is currently available through PowerPort. This site can be accessed through the SunWeb.

Documentation

The standard set of documents for FLX380 have been modified for the release of the Sun StorageTek 6540 Array; and the Sun StorageTek 6140 Array documents have been updated to incorporate the required 6540 Array information. Both CAM and SANtricity Storage Manager (SSM) documentation will be available—depending on your customer's order.

Documentation is available at `http://www.sun.com/documentation/` as well as on the CRC at:
https://www.support.storagetek.com/globalnavigation/support/generalpublic/default.htm

Training

The Sun Louisville facility will offer differences training to all field support personnel who have taken the FlexLine storage system training to support the all customers who are using SANtricity to manage their storage. The objective of this differences training is to get the field familiar and experienced with the new CAM software.

The regular installation and maintenance course will continue to be offered to all employees who need to support the current customer base that uses SSM.

Field Technical Support

Field Support has been organized with new Sun US Call Center contact numbers, as well as a new link to the global technical support information.

For more information go to: http://www.sun.com/service/contacting/solution.html

Call Centers

There are currently three call centers (Newark, Broomfield, and Burlington). The phone number to reach these technical support sites is:

(United States): 1-800-USA-4SUN (872-4786)

(Canada): 1-800-722-4SUN (4786)

View Phone Tree at http://www.sun.com/service/phonetree/index.html

Online Information Sites

Product documents for the FlexLine 200/300 Series product line can be found on the Customer Resource Center (CRC) at: http://www.support.storagetek.com/ and all current 6540 documentation can be found at: http://www.sun.com/documentation/

Once you log in select Current Products > Disk, and then scroll down to the FlexLine 200/300 Series product names.

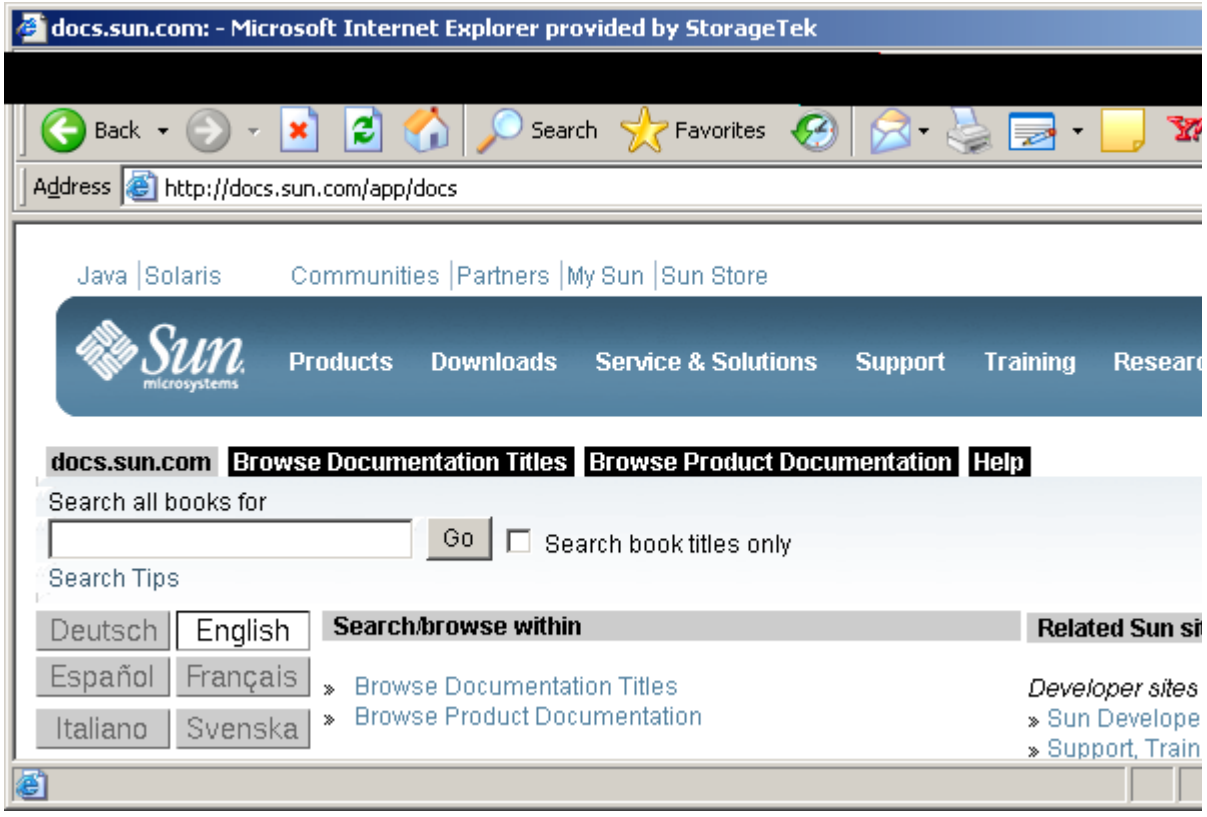
Another vital site for verifying an acceptable network configuration is at:

https://extranet.stortek.com/interop/interop

The above site provides the Interop Tool, which is typically accessed through Power Port at http://portal.stortek.com/index_pport.html

Product documents for the StorEdge 6130 Array can be found at:
http://docs.sun.com

FIGURE P-1 Sun Documentation Web Page



On the documents web page, choose either the **Browse Documentation Titles** or the **Browse Product Documentation** to locate the information you need. The pages are in alphabetical order, so you need to scroll down (for example) to Sun StorEdge 6130 Array (under Titles) or select Storage > Hardware or Software (under Product), then select StorEdge and make your way down to the Sun StorEdge 6130 Array product documentation.

Use this same method to locate online documentation (in PDF) for the new Sun StorageTek 6140 Array and Sun StorageTek 6540 Array.

If you have problems with the above site, try going to:
http://www.sun.com/documentation/

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StorageTek 6540 Product Overview, part number 819-6146

CHAPTER 1

Product Introduction

The Sun StorageTek™ 6140 Array and Sun StorageTek™ 6540 Array were preceded by FlexLine 200/300 Series disk storage system products and by the StorEdge 6130 (now known as the StorageTek 6130). This chapter clarifies the differences in the new products and terminology, as well as the differences in ordering, installing, and cabling. The following topics are covered in this chapter.

"Understanding Product Types" on page 2

"Cabinet Types" on page 3

"Product Terminology" on page 3

"Standard Cabling" on page 5

- "Host Interface Cabling" on page 5
- "Drive Interface Cabling" on page 8

"Rack Ready Cabling" on page 17

"Sun Rack 1000-38 Differences" on page 18

"Firmware and Premium Features" on page 20

Understanding Product Types

The following table provides information that compares the old product types to the new product names and characteristics. TABLE 1-1 columns indicate controller type, software in use, maximum number of drives, and the storage processer speed..

TABLE 1-1 Old and New Product Name and Feature Comparisons

FLX210	Controller model 2880	SANtricity (SSM)	up to 112 drives	2Gb	
FLX240	Controller model 2882	SANtricity (SSM)	up to 112 drives	2Gb	
FLX280	Controller model 5884	SANtricity (SSM)	up to 224 drives	2Gb	
FLX380	Controller model 6998	SANtricity (SSM)	up to 224 drives	4Gb	
6130	Controller model 2882	CBEM, CAM upgrades	up to 112 drives	2Gb	
6140	Controller model 3994	CAM	up to 112 drives	4Gb	
6540	Controller model 6998 (viewable via "controller properties")	CAM or SSM SANtricity (see note)	up to 224 drives	4Gb	

Note – SANtricity is available for existing customers, per a special order. Note also that both the 6140 and 6540 use the new 16-slot CSM200 (CSM2) expansion tray.

Cabinet Types

The FlexLine 200/300 Series product used the F40 rackmount cabinet. Information about this cabinet type is in the *F40 Cabinet User Guide*, PN 96100.

The StorEdge 6130 product uses the Sun StorEdge Expansion cabinet, Sun Fire cabinet, and the Sun Rack 900/1000 cabinet. Information about these cabinet types is available on Sun's online documentation sites. See Preface.

The new StorageTek 6140 uses the standard cabinets (includes the Sun Rack 900/1000) as well as any 19-inch, 4-post EIA-compliant racks and cabinets.

The StorageTek 6540 Arrays will ship out in the 1038 Next Generation Rack (NGR) cabinet, which is offically called the Sun Rack 1000-38. The stack-up for the 6540 Array is similar to what is shown in FIGURE 1-1.

FIGURE 1-1 Sun StorageTek 6540 Array in a 1000-38 cabinet

Product Terminology

There are a few hardware and software terms that are different between the **old** FlexLine and StorEdge product lines and the **new** Sun StorageTek 6000 series products. For FlexLine the solution was known as a *storage system*, and the new terminology is referring to the solution as an *array*. The main component of the

solution is known as a *controller tray*, however, you might also see the term *control module* used in both the Common Array Manager (CAM) software and in the hardware documentation. The part of the solution that houses the drives is called the expansion trays also known or previously known as *drive modules* or *drive trays*. The 6140 has a combination tray that houses both controllers and drives. This tray is also called a controller tray.

The Field Replaceable Units (FRUs) are typically called drives, controllers, DC power supplies, fans, and Input Output Modules (IOMs) or Environmental Services Monitoring (ESMs). The IOM/ESM is located only in an expansion tray—allowing communications between controller trays and expansion trays.

Some software terminology is also different. A Volume Group is also known as a Virtual Disk. SANtricity documents will refer to volume groups, and CAM documents will refer to a virtual disk (groups of drives where volumes are created [striped]). TABLE 1-2 provides information to help you understand the differences.

Note – Refer to the product's specific documents for more information.

TABLE 1-2 6540 Array Terminology Differences

Old Terminology	New Terminology	Subsequent Terminology
FlexLine FLX380 storage system	Sun StorageTek 6540 Array	array or storage system
FLX380 Control Module	6540 controller tray	controller tray
FLA300 Drive Module FLC200 Drive Module	expansion tray	CSM2* expansion tray, drive tray
ESM	expansion module or IOM	
volume group	virtual disk (see note)	
storage partitions	storage domains	
GUI	browser interface	

* the CSM200 is a new expansion tray. It is not the same as the FLA300, FLC200, or CSM100.

Note – In the past when a number of physical disk drives were grouped, this was called a Volume Group, and when a RAID level of protection was assigned, it became a RAID group. And only when a storage capacity was assigned to a volume, then it became a virtual disk, which then could be assigned as a LUN. The Common Array Manager (CAM) software may refer to a Volume Group and some of these terms as a Virtual Disk.

CAM Terminology

In CAM's browser interface the software premium features are simply called domains, snapshot, copy, and replicate. Also, the Recovery Guru in SANtricity Storage Manager (SSM) is called the Service Advisor in CAM, and the Event Log in SSM is called the Activity Log in CAM.

CAM has a Sun Connection Readiness Kit (SCRK) that provides call home and remote monitoring capabilities. A multi-directional enhancement is being developed.

Another term that is new is Fault Management Services (FMS), which tracks various failure types (FailureTypeList, FailureTypeEntry, and FailureTypeEntries) and sends them to the service advisor.

Note – The objective of the software developers is to embrace the terminology used by the Storage Networking Industry Association (SNIA).

See "Common Array Manager" on page 21 for more information about the new CAM software.

SSM Terminology

Refer to the SANtricity Storage Manager documents.

Standard Cabling

The Sun StorageTek™ 6000 series products will continue to use Fibre Channel cables. Products, for the most part, will come installed in the cabinet with either FC copper or FC optical cables.

Host Interface Cabling

A cabinet patch panel (similar to the 9176 dashboard) has been designed to accommodate most signal cables going to and from the cabinet. Eight host interface ports will plug into this "patch panel" rather than being directly plugged into the controller tray. Internally Fibre Channel cables are already routed from the patch panel to the eight host interface ports.

The controller tray's serial ports and Ethernet ports have also been extended to the patch panel. A modem for remote monitoring and other maintenance activities is mounted on the patch panel, and it has a serial connector and phone line to enable the transmission of status information back to headquarters.

The purpose of the patch panel is to make it easier for the customer (and field service personnel) to do installation and service activities.

The following drawings in FIGURE 1-2 show the outside and inside of the patch panel.

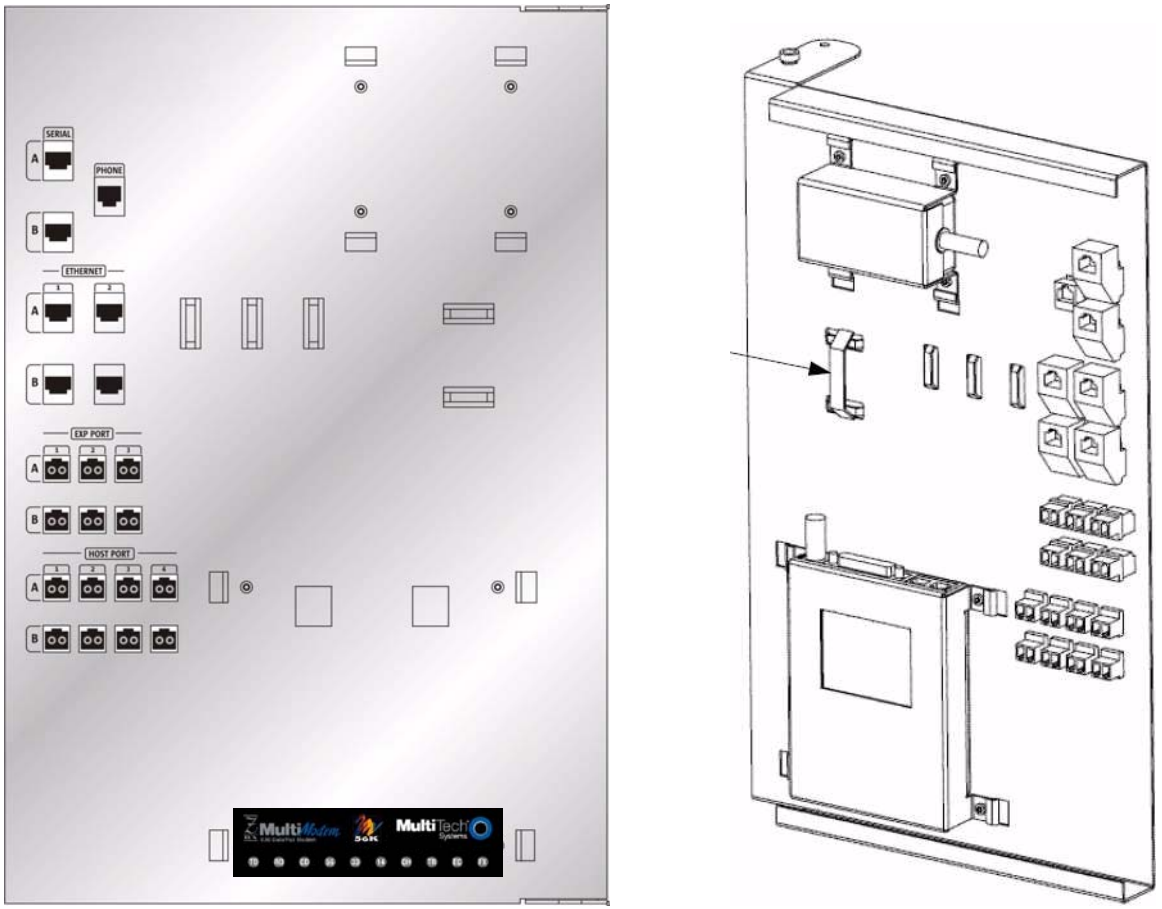


FIGURE 1-2 Service - Patch Panel

Note – The modem is a FRU. It can be removed from the patch panel and replaced in the event of a failure.

The following photograph shows the back of Sun Rack 1000-38 with patch panel (slightly open). Host interface and drive interface cables are routed to their respective host interface and drive interface ports on the controller tray.

FIGURE 1-3 Patch Panel Cabling

Note – The coiled FC cables that are seen on the customer-facing portion of the patch panel are represented by the dotted lines depicted in FIGURE 1-5, FIGURE 1-6, and FIGURE 1-7. These FC cables only serve to route signals through the patch panel. The drive interface cabling will not extend past the patch panel until a second cabinet is used (for a 1x12 or greater configuration).

Drive Interface Cabling

One other area on the patch panel has FC input and output ports is labeled EXP PORT. This is for expansion trays that extend beyond a one-cabinet configuration. Cabling diagrams are provided for these two-cabinet configurations.

The backend cabling of solutions using model 2882 controllers is different. The following drawings depict the difference.

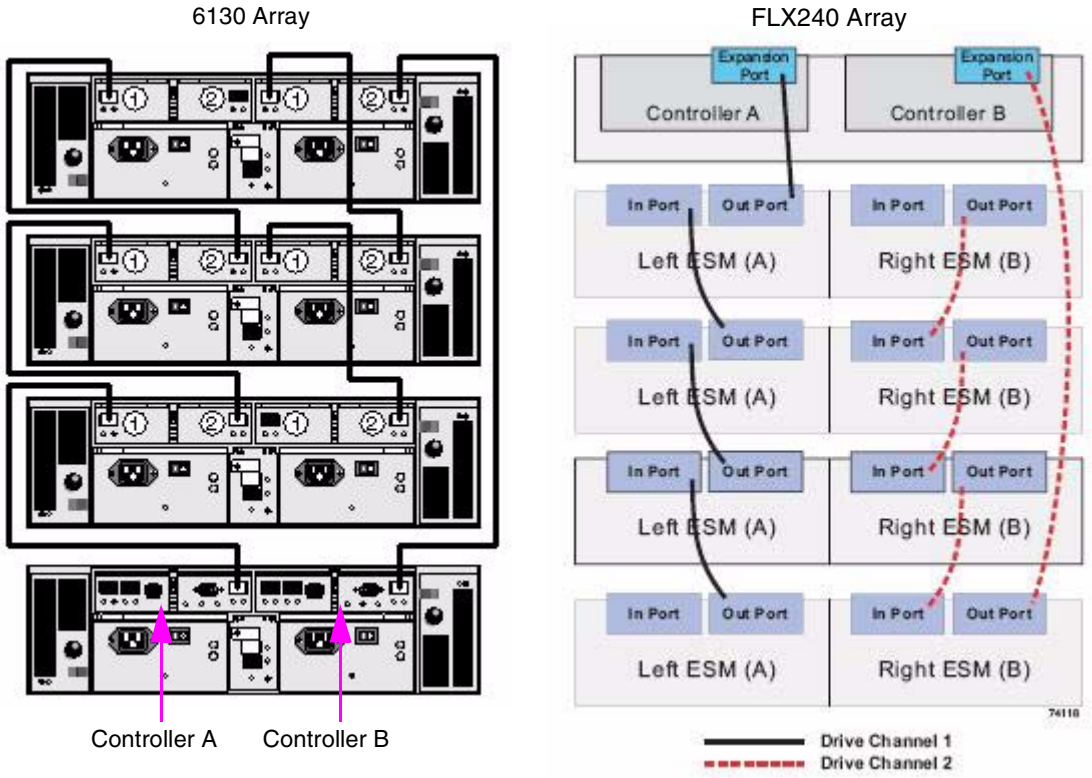


FIGURE 1-4 6130 and FLX240 Cabling Differences

It is important to note that the controller tray is at the bottom in the 6130, and that the controller tray is on top in the FLX240. This knowledge is important when validating the cable routing. If we follow the output from controller A on the left drawing, we see that the Fibre Channel cable goes to the **in** port on the first expansion tray; and if we follow the output from controller A in the right drawing, we see that the cable goes to an **out** port.

Controller B cabling is the same for 6130 and FLX240.

The StorageTek 6140 Array is cabled similar to the FLX240. The Hardware Cabling Guide has various examples of both 6140 and 6540 Array configurations.

6540 Drive Interface Cabling

The Sun Rack 1000-38 ships with the FC cables embedded. So, when new expansion trays are added, the cables will already be present. Also, a patch panel is used, which has FC input and output ports labeled EXP PORT (as shown in FIGURE 1-2) for the expansion trays that extend (connect) beyond a one-cabinet configuration. Cabling diagrams are provided later for these two-cabinet configurations.

We will, however, first describe the cabling configuration with one controller tray and four expansion trays, which is needed to take advantage of the 6540 controller tray's performance capabilities. This configuration uses all eight drive interface ports. See FIGURE 1-5.

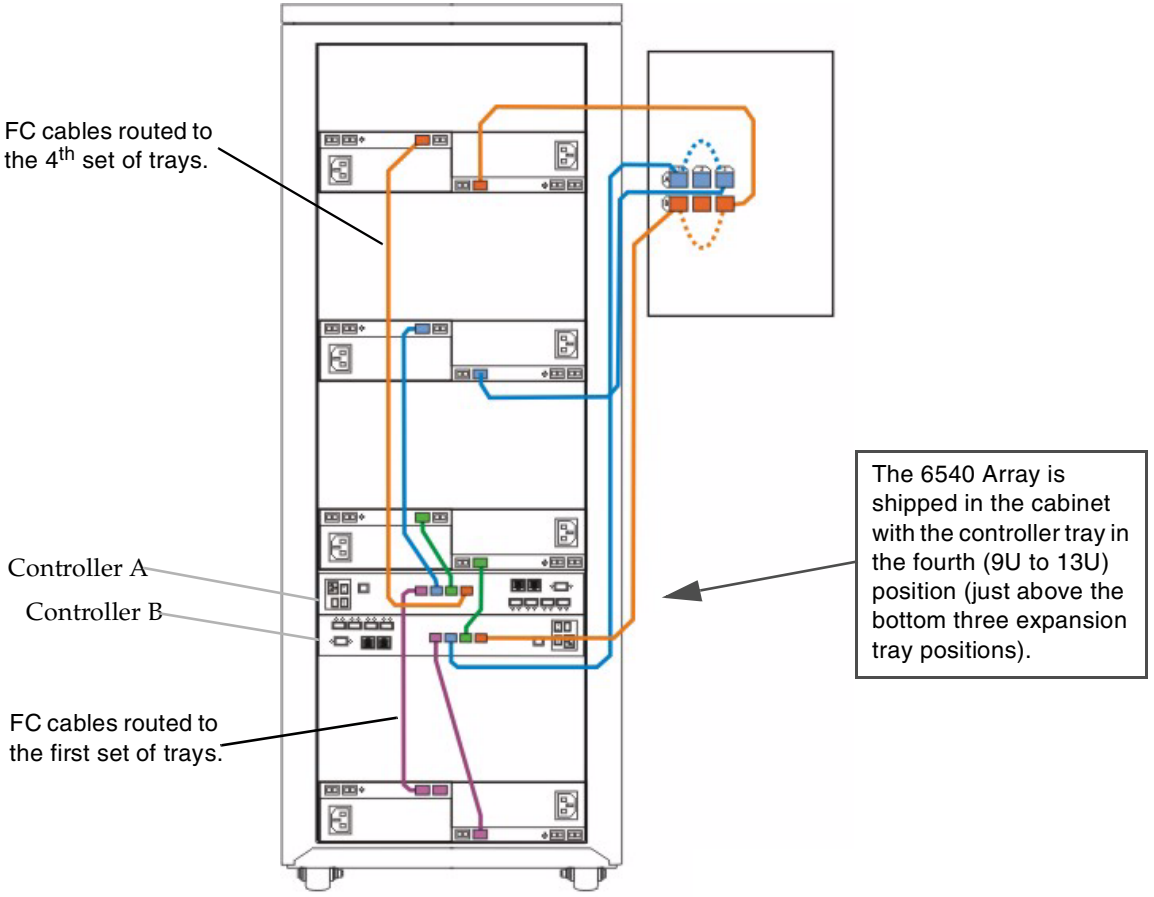


FIGURE 1-5 One Controller Tray and Four Expansion Tray Cabling Scheme

Note the location of each tray and the ports used on both the controller tray end and the expansion tray end. These exact ports must be used when cabling one, two, three, or four expansion trays.

FIGURE 1-5 shows that controller A communicates with the left side of the expansion trays, and controller B communicates with the right side. Also note that each drive interface port only goes to one expansion module, which means FC communications stops at one tray (per controller), and one tray in each expansion tray grouping. The space above each expansion tray is for the new expansion trays that will be added to the group (as new storage capacity is added to the 6540 Array).

Adding an Expansion Tray

To add another expansion trays, you must make one port on both controller A and controller B connect to the new expansion tray (as shown in the process steps in FIGURE 1-6's two lowest trays).

Caution – You must first extend the FC cables to the new tray's expansion module.

The process starts by adding a new (fifth) expansion tray as shown in FIGURE 1-6. Next you need to extend the FC path on the controller A side by adding FC cable [1]. Wait for the software to acknowledge the new capacity, and then breaking the path on the controller B side by removing the FC cable to the lowest tray and moving it [2] to the new tray. Next, reestablish path to the lowest tray in the group by adding a new FC cable [3] to the lowest (original) tray.

FIGURE 1-6 shows three new expansion trays added to the Sun Rack 1000-38 cabinet.

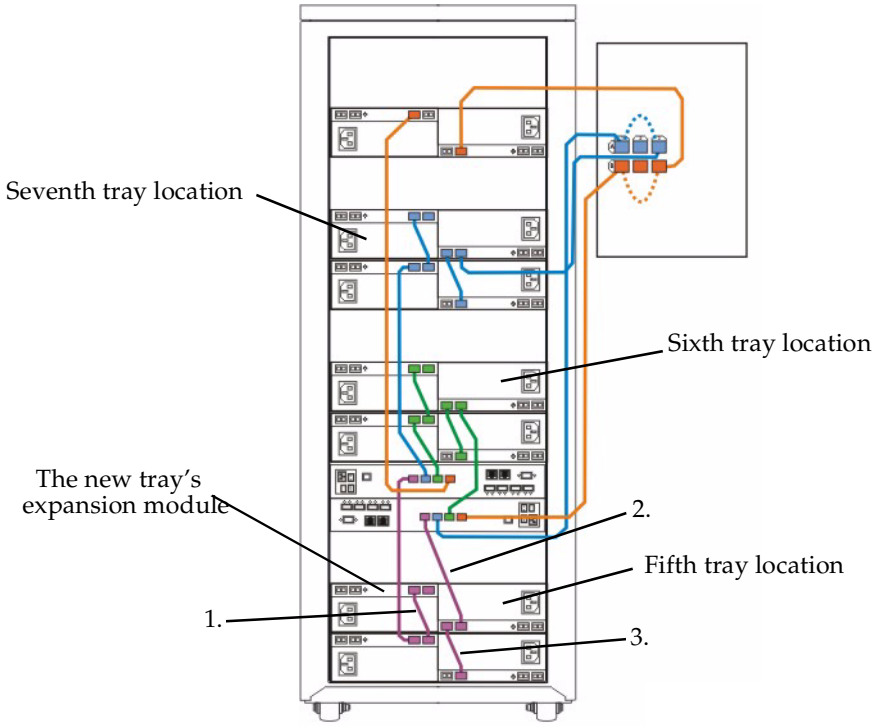


FIGURE 1-6 Drive Interface Cabling for One Controller Tray and Seven Expansion Trays

To expand from seven to eight expansion trays, place the eighth expansion tray on top as shown in FIGURE 1-7. This illustration again shows the three step process for attaching FC cables to your new expansion tray.

Use this StorageTek 6540 Array cabling methodology for the one controller tray and eight expansion tray cabling configuration.

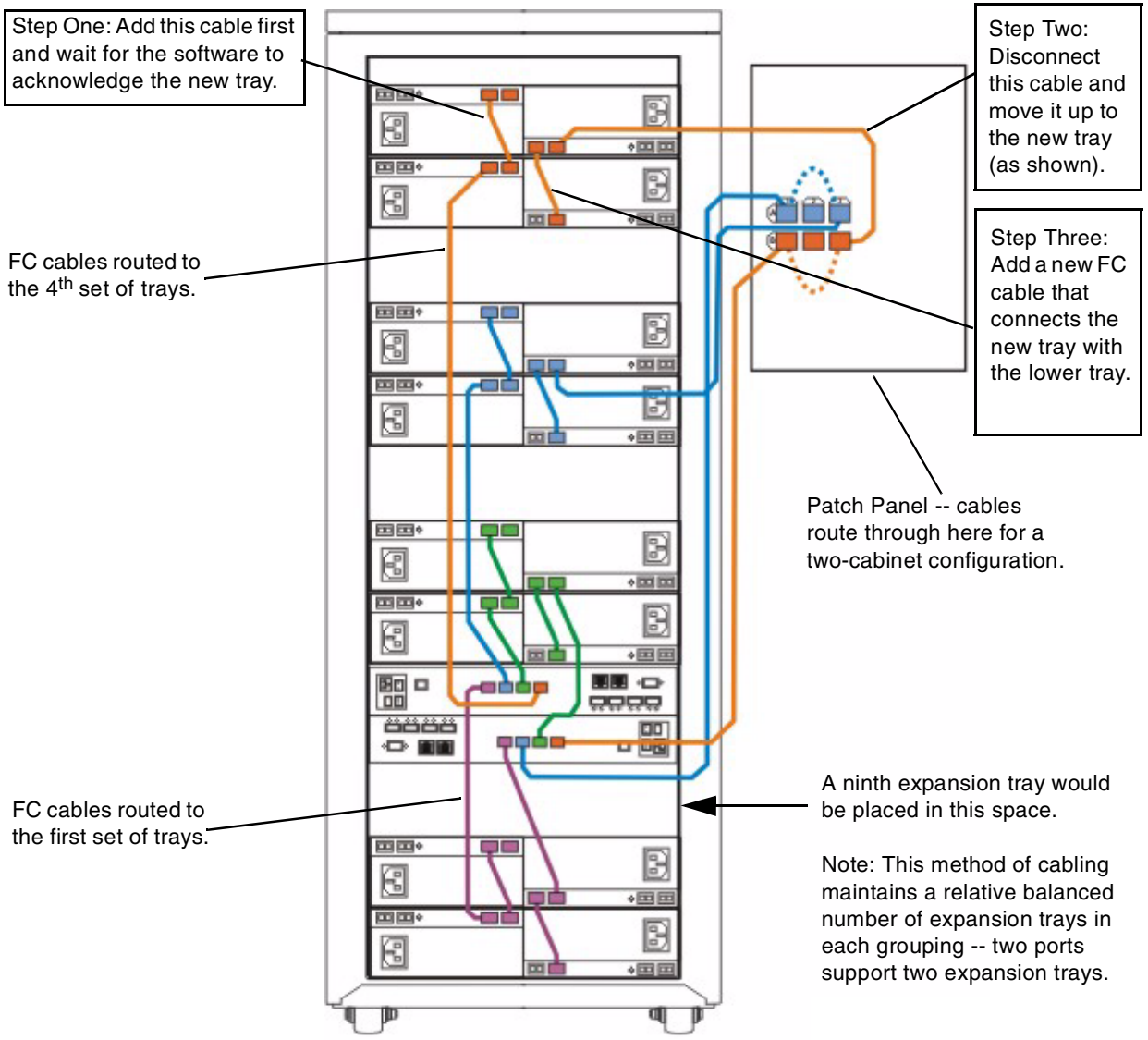


FIGURE 1-7 Sample 6540 Array Cabling to Eight Expansion Trays

To upgrade storage capacity, add a third tray to each expansion tray group (presently shown in groups of two), starting from the bottom. Maintaining a balanced number of trays in each group (attached together via FC cables) ensures that your 6540 array operates at high levels of performance.

Upgrades to larger configurations (FIGURE 1-8) can result in an unbalanced number of trays in each group. Best practices recommend having an equal number of trays attached to each drive interface port.

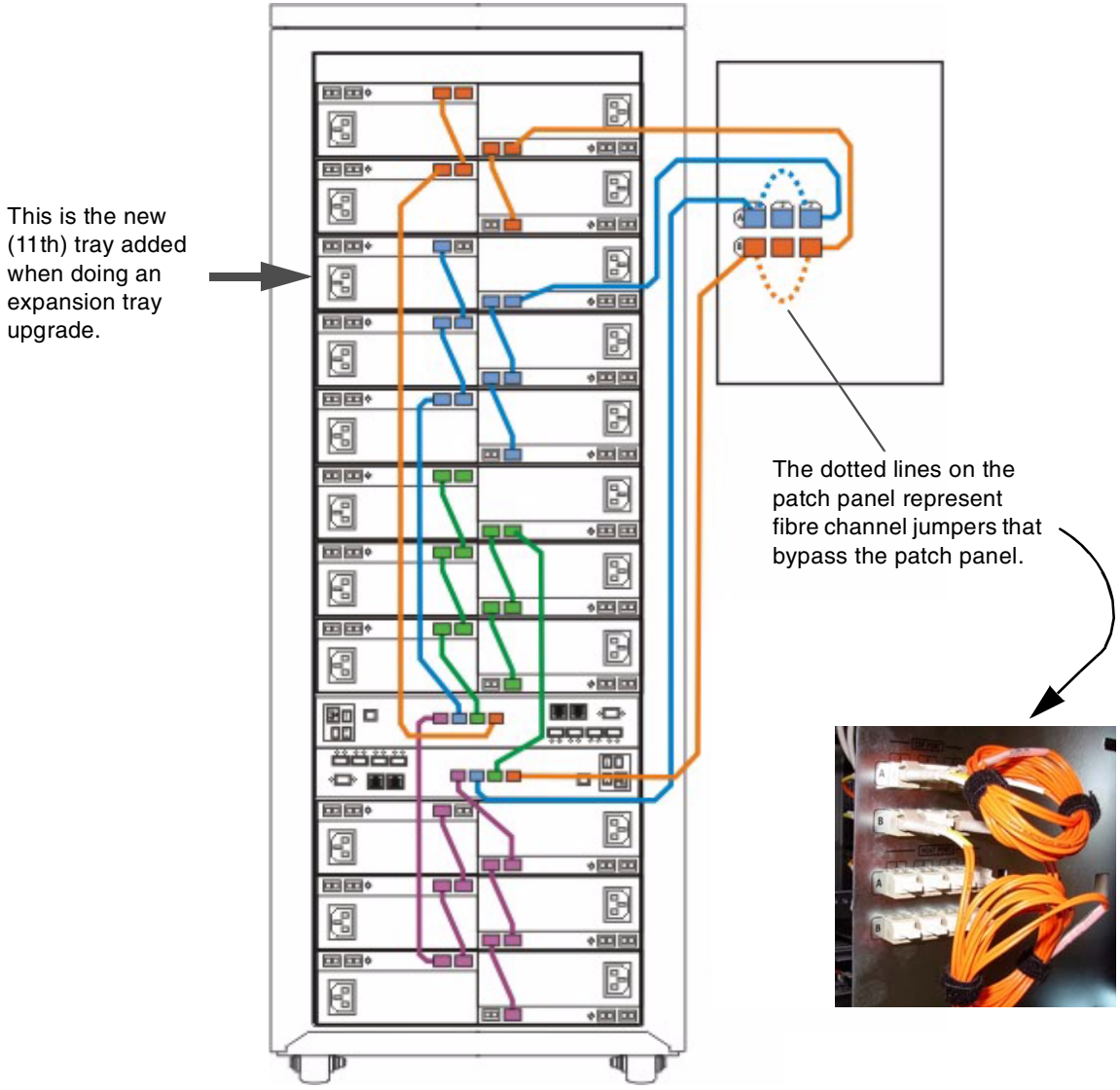


FIGURE 1-8 Sample 6540 Array Cabling to Eleven Expansion Trays

FIGURE 1-9 shows a configuration with one controller tray and twelve expansion trays. Controller A communicates with 12 trays, and Controller B communicates with the same 12 trays using the right-side expansion module.

In this configuration there are three expansion trays grouped together on each drive interface port.

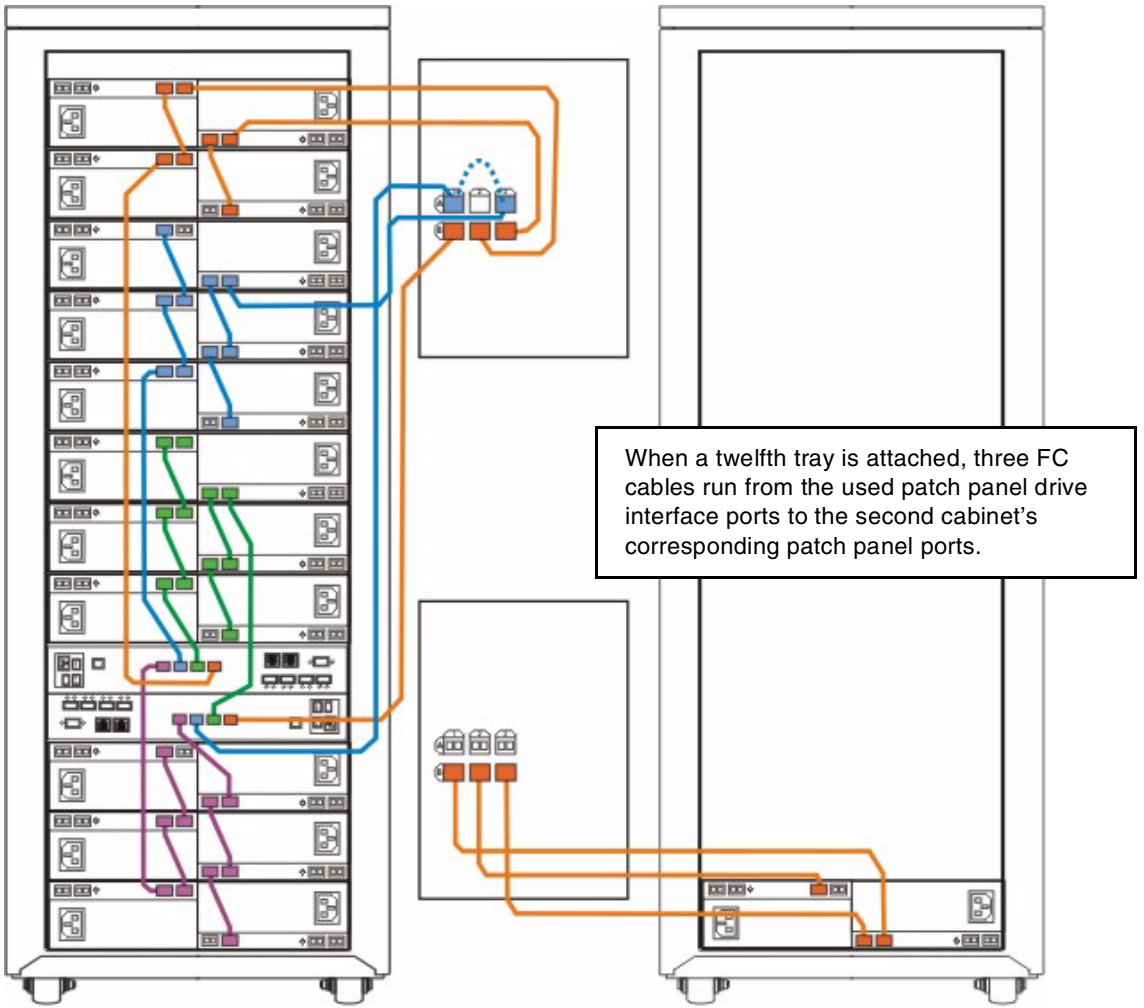


FIGURE 1-9 Sample 6540 Array Cabling with Twelve Expansion Trays

Outside of the cabinet are three FC cables that connect patch panel ports B1, B2, and B3 to the same labeled port on the other cabinet's patch panel. To understand the cabling you should trace the cables going through the patch panel to make sure you can follow the FC signals from controller A to the twelfth, eleventh, and tenth expansion tray; and from controller B to the twelfth, eleventh, and tenth expansion tray.

Note – The above cabling methodology incorporates the patch panel to route cables to a second cabinet. Remember that the patch panel is used to route three external FC cables to the new trays in a second cabinet. These external cables are not shown in the illustrations, but they are used whenever there is a second cabinet involved.

In FIGURE 1-9 the important thing to remember when cabling is that there are four channels, and each set of controller ports serves six expansion trays. Controller A communicates with 12 trays using two channels, and Controller B communicates with the same 12 trays using two channels. This is explained more in "Internal Channel Circuitry" on page 16.

Cabling for a Maximum Configuration

FIGURE 1-10 shows the drive interface cabling configuration for a maximum one controller tray and fourteen expansion trays.

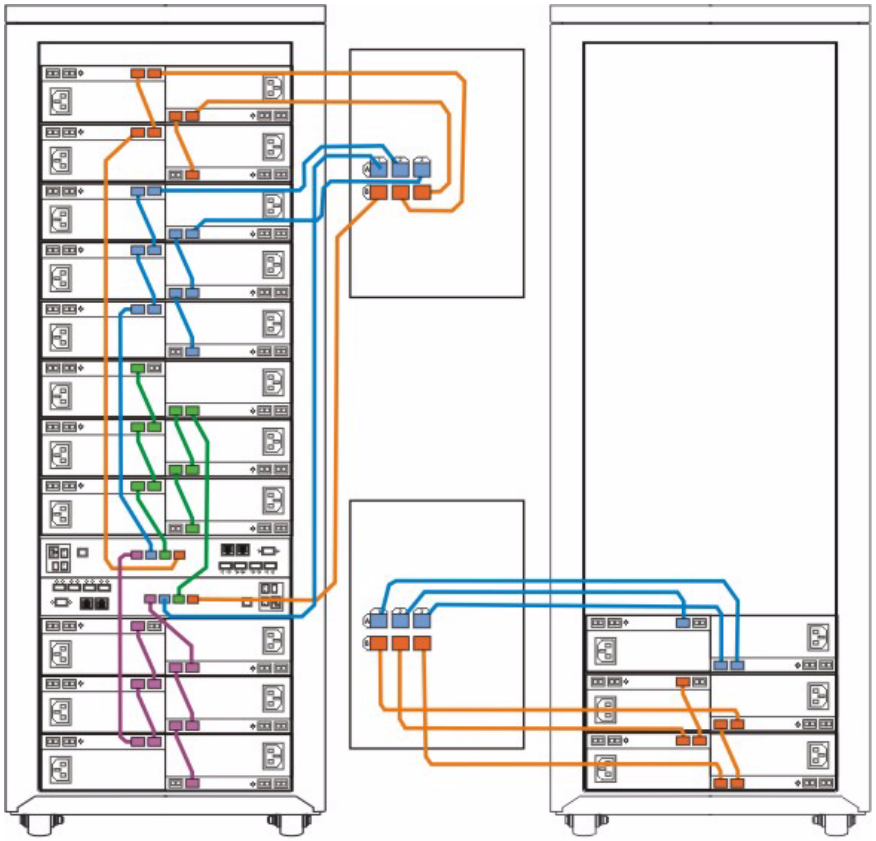


FIGURE 1-10 Sample 6540 Array Cabling with Fourteen Expansion Trays

Internal Channel Circuitry

The following diagram shows what is meant by a channel. Typically it is a pair of drive interface ports that are internally connected together between the controllers. This provides path redundancy to the expansion trays.

For example, channel three provides the alternate or redundant connection to the same trays as channel one, and channel four provides the redundant connection for channel two. It should also be noted that channels two and four are routed through the patch panel to accommodate storage capacity upgrades to twelve and thirteen expansion trays, and channels one and three are used for 14. See FIGURE 1-11.

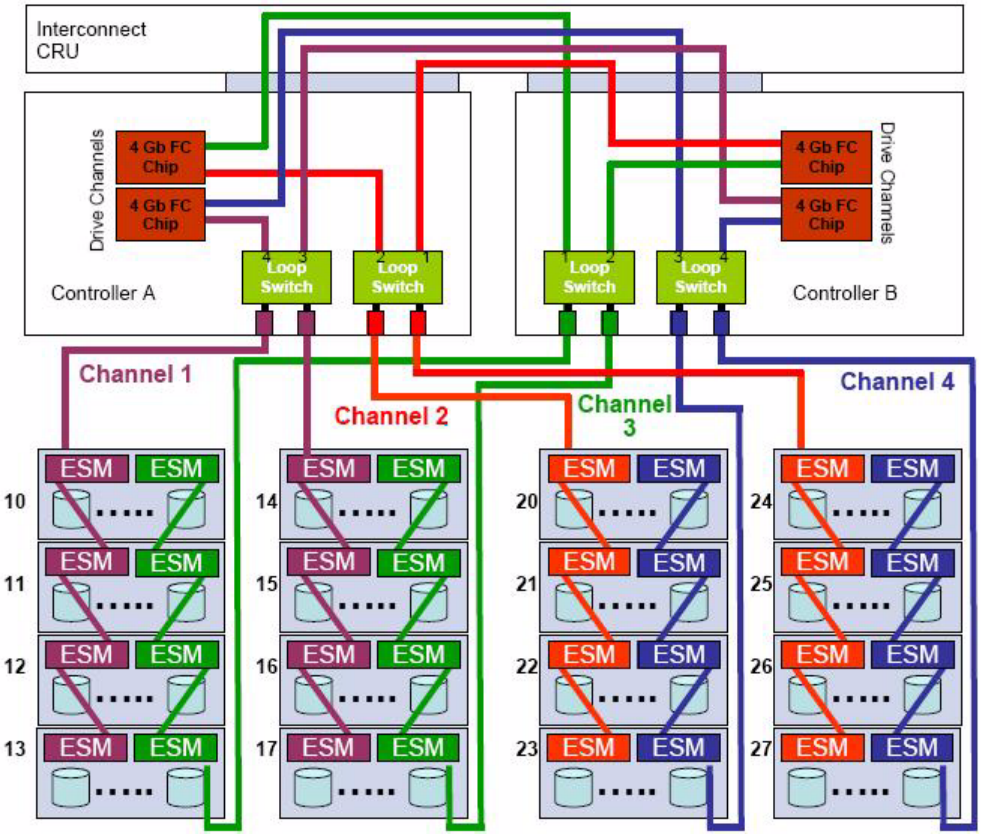


FIGURE 1-11 Internal Controller Circuitry

Note – In the above drawing a maximum configuration of 14 (CSM2) expansion trays (with 16 drives each) is typical. There are four channels—one and two come from Controller A, and three and four come from Controller B.

Rack Ready Cabling

In the case of a customer-supplied cabinet (without a patch panel), the controller tray should be placed in the fourth position (9U to 13U) with host and drive interface cables directly attached. Drive interface cabling should be the same (port-port) as in the Sun Rack 1000-38. See FIGURE 1-12.

IT IS RECOMMENDED THAT CUSTOMERS WHO CHOOSE TO PUT THE CONTROLLER TRAY AT THE BOTTOM, ENSURE THAT ALL FOUR CHANNELS ARE USED (IF POSSIBLE), AND THAT EACH CHANNEL IS BALANCED (WITH APPROXIMATELY THE SAME NUMBER OF DRIVES).

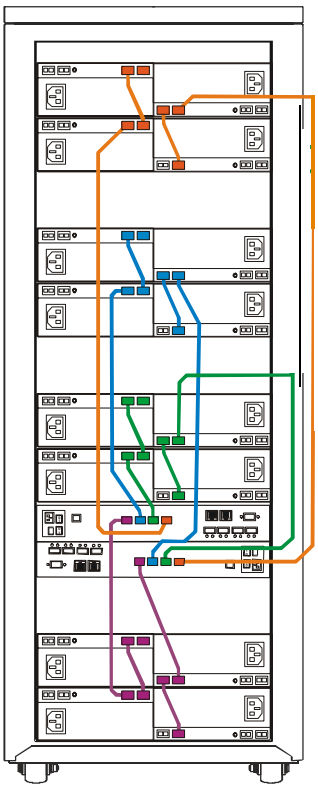


FIGURE 1-12 Rack Ready Cabling Alternatives

A *Rack Ready Site Preparation and Installation Support Guide*, p/n 819-6136-10 is available for technical support personnel to help the customer install a Sun StorageTek 6540 Array into a customer-supplied EIA-compliant cabinet. This manual is available at the Customer Resource Center (CRC), which is accessible through the PowerPort at `http://portal.stortek.com/index_pport.html` or available direct from the CRC at `https://www.support.storagetek.com/`

Sun Rack 1000-38 Differences

There are a few things that are different inside the cabinet. First of all there are four power input cables needed for the Sun Rack 1000-38. Two of the four IEC 320 C-19 receptacles are shown below.

The other end of the 1000-38 power cord (shown below) has a NEMA L6-20P plug (Hubbell HBL2321), and as with the F40 cabinet, uses single phase 240 VAC power circuits. Customers supply the four NEMA L6-20 (or IEC 309 for Intl) receptacles, thereby providing power to all Sun Rack 1000-38 power strips and groups.

The Sun Rack 1000-38 power cord part number is 180-2005-02 Rev. 50. It plugs into the customer's L6-20R receptacle.

THE INTERNATIONAL POWER CORD (C19 TO IEC 309).

THE NEMA L6-20P (HBL2321) IS SIMILAR TO THE NEMA L6-30P (HBL2621) PLUG (SHOWN RIGHT), HOWEVER, THE CONNECTING PINS ARE SPREAD OUT MORE AND DO NOT LINE UP WITH THE PROPER (L6-20R) TWIST AND LOCK RECEPTACLE.

The cabinet distributes the AC input to the power strips. Power strips and groups (shown below) are used instead of PDUs. The following photographs show the power strips, located on the left-side of the cabinet (looking from the back).

IEC 320 C13 to C14 power cords are used to route power from the power strips to the DCPSs in the controller trays and expansion trays.

Firmware and Premium Features

For those customers with a maintenance agreement, SANtricity firmware upgrades may be downloaded from the CRC by selecting Current Products > Disk > Code.

Also, premium features for the FlexLine solutions may be ordered, activated, and downloaded from the CRC by going to: Tools and Services > Software Keys. Once there scroll down to the FlexLine product line and select the desired Licensing activity.

For CAM upgrades and premium feature information, go to:
`http://sunsolve.sun.com/search/startadvsearch.do?pageId=bycollection`

Upgrading Firmware

CAM provides an enhanced feature, whereby you are able to install a CD and upload all of the latest firmware files at once. See chapter two for more information.

Feature Licenses

As before always keep your card with the license activation code stored in a safe place.

CHAPTER 2

Common Array Manager

The Sun StorageTek 6000 products use the Common Array Manager (CAM) software to do storage management. This software falls under the Enterprise Storage Manager (ESM) Portfolio.

This chapter is meant only to provide a brief introduction to CAM. For more about CAM, refer to the *Sun StorageTek 6540 Array Getting Started Guide*, which is available at: `www.sun.com/documentation/`. Old and new software documents are also available on the Customer Resource Center (CRC).

The following topics are covered in this chapter.

"CAM Structure" on page 21

"CAM Screens" on page 23

CAM Structure

CAM is an SMI-S compliant storage management software that uses a browser interface. It manages data per this standard, configuring data using storage profiles and establishing storage pools, virtual disk, and volumes. Premium features can also be used to create storage domains, or to snapshot, replicate, or copy. The following tables provide new acronyms and a comparison chart on terminology differences.

TABLE 2-1 Software Acronyms

Acronyms	Meaning
FMS	Fault Management Services
SCRK	Sun Connection Readiness Kit
SPRI	Serial Port Recovery Interface

TABLE 2-2 Storage Management Software Terminology

SANtricity	CAM
volume group	virtual disk (see note on page 4)
storage partition	storage domain
snapshot	snapshot
replication volume manager (RVM)	replicate
volume copy	copy

CAM has three basic components:

- Sun StorageTek Management Host Software
- Sun StorageTek Data Host Software
- Sun StorageTek Remote Management Host Software

These components handle such things as SSCS, GUI, CLI, JAVA web console, diagnostics and monitoring, data management, traffic management (multipathing), and communications with the operating system.

Note – You should also be aware of hardware terminology differences used in the software. The solution terminology of *disk subsystem* or *storage system* has changed to *array*. A control module and a drive module has changed to controller tray and expansion tray; however, you might still see the old terms and terms like common raid module and common expansion module. Also, the replacement parts (FRUs/CRUs) may have slightly different names in the software. The expansion tray FRU name of the Environmental Services Monitoring (ESM) FRU is known as the Input/Output Module (IOM) in the CAM software.

The *CAM Software Installation Guide* includes information on the basics of logging in and navigating. The following CAM screens provide a brief overview of the software so that you may be aware of the differences between the SANtricity GUI and the CAM browser interface.

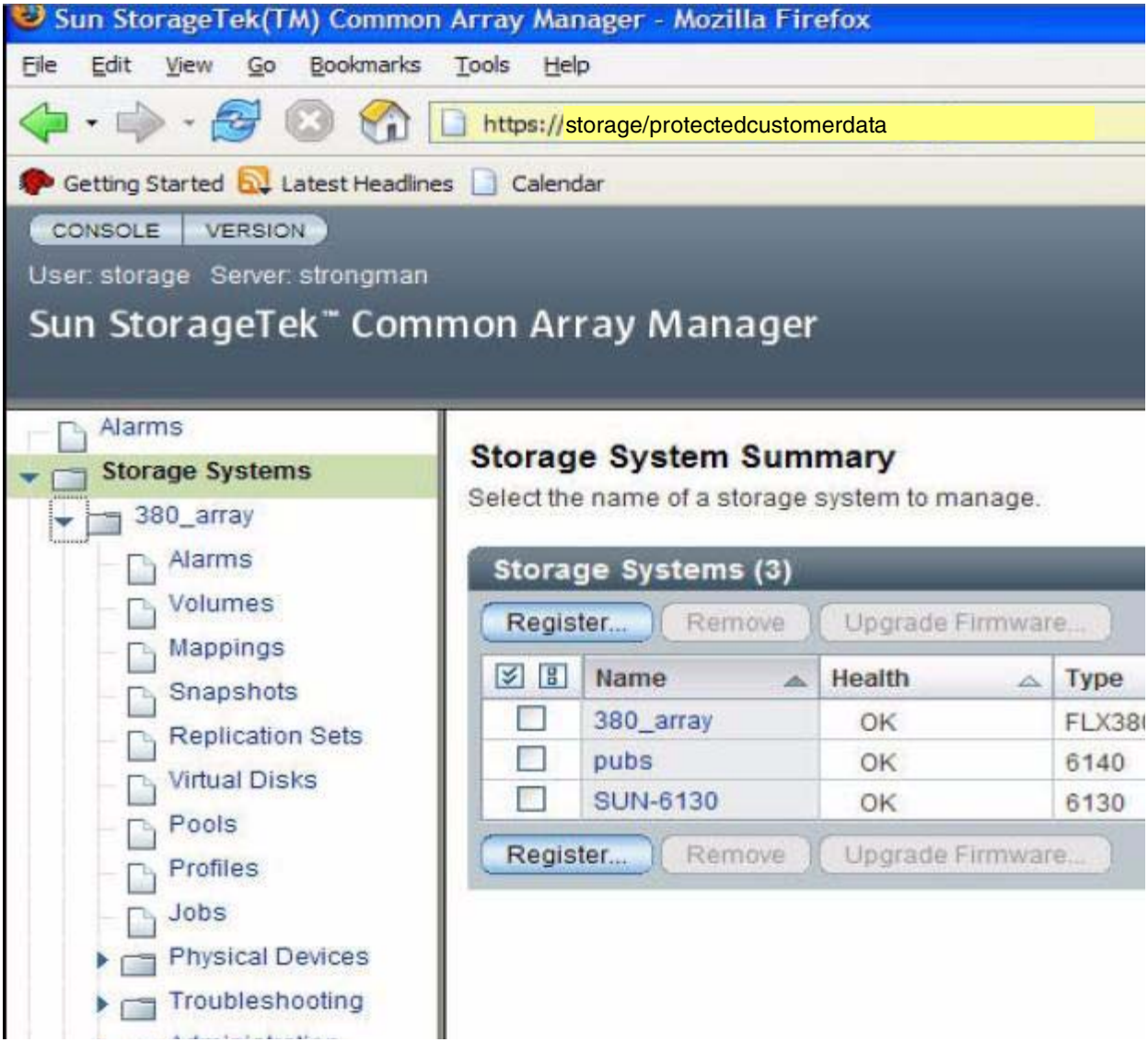
Common Array Manager Features and Functions Support Readiness Training (WZT-NWS-2300) provides students with basic knowledge of the CAM management interface. The course is web based and covers the use of CAM for array administration and management, including features and services such as: lab reviews, simulations, and demonstrations.

This online course is located on the Sun™ Learning Platform (SLP). Request a password at `https://keystone.central/` and then enroll in the course via the SLP website at `https://slp.sun.com/sun`

CAM Screens

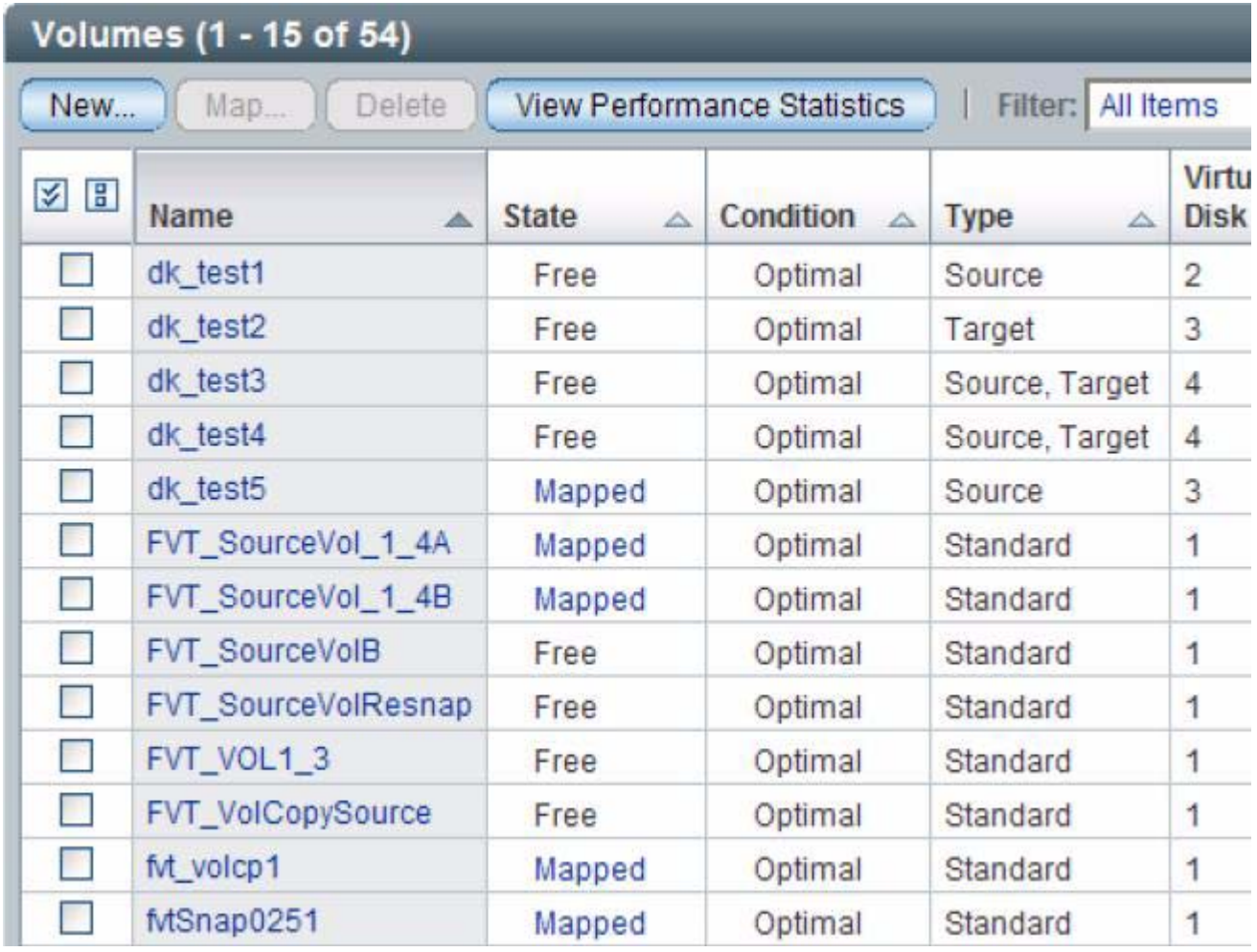
The following screen is typically the first screen that you might encounter.

FIGURE 2-1 CAM - Storage System Summary Screen



Simply click on the array you are interested in managing, as shown in FIGURE 2-1. Then if we want to view a volume summary, for example, we would click the *Volumes* button to display:

FIGURE 2-2 CAM - Volumes Screen



Name	State	Condition	Type	Virtu Disk
dk_test1	Free	Optimal	Source	2
dk_test2	Free	Optimal	Target	3
dk_test3	Free	Optimal	Source, Target	4
dk_test4	Free	Optimal	Source, Target	4
dk_test5	Mapped	Optimal	Source	3
FVT_SourceVol_1_4A	Mapped	Optimal	Standard	1
FVT_SourceVol_1_4B	Mapped	Optimal	Standard	1
FVT_SourceVolB	Free	Optimal	Standard	1
FVT_SourceVolResnap	Free	Optimal	Standard	1
FVT_VOL1_3	Free	Optimal	Standard	1
FVT_VolCopySource	Free	Optimal	Standard	1
fvt_volcp1	Mapped	Optimal	Standard	1
fvtSnap0251	Mapped	Optimal	Standard	1

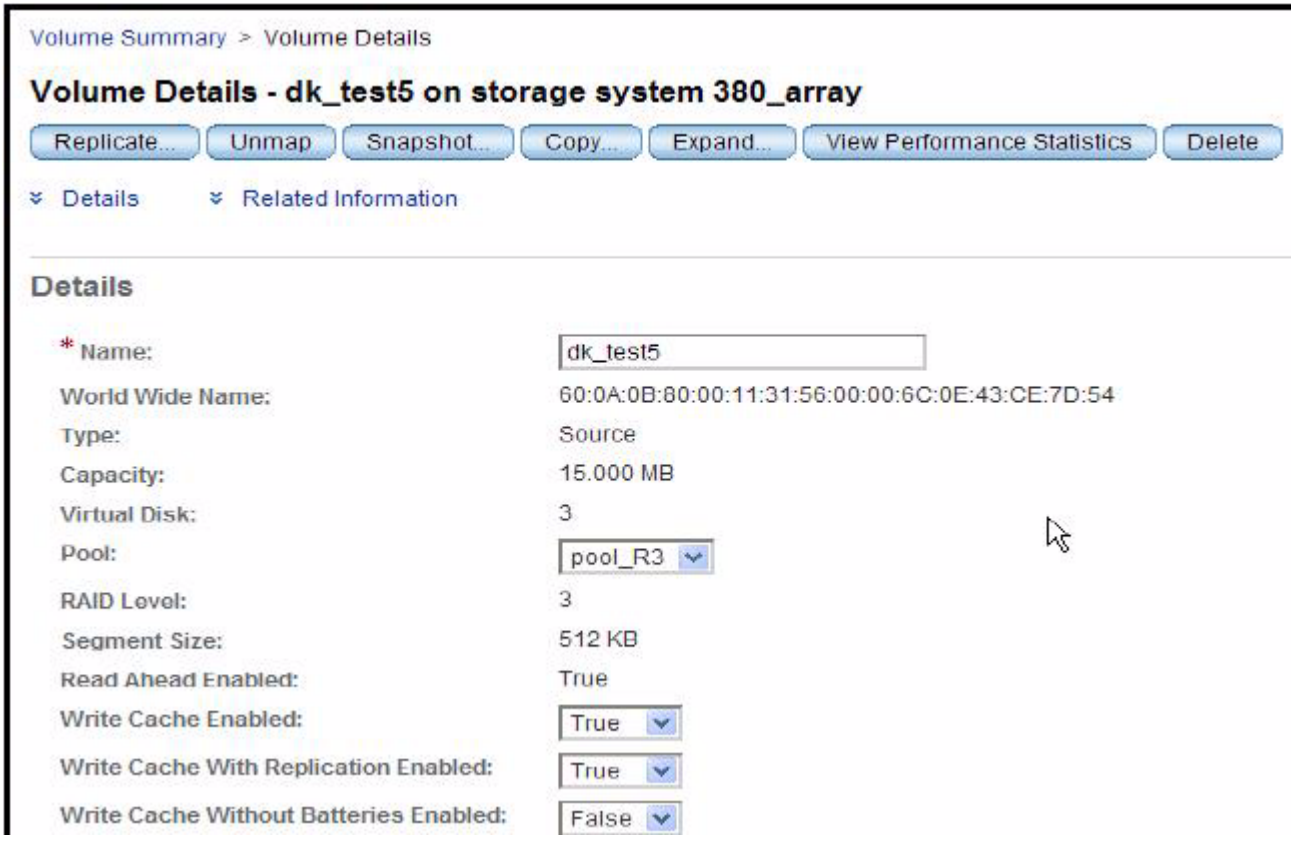
As you can see each volume is named and displays its use, state, and configurations.

So, from this display we can determine:

- whether the volume is part of a storage domain
- its health
- the virtual disk that it belongs to.

Clicking on dk_test5 (see FIGURE 2-2) will display detailed information, as shown in FIGURE 2-3.

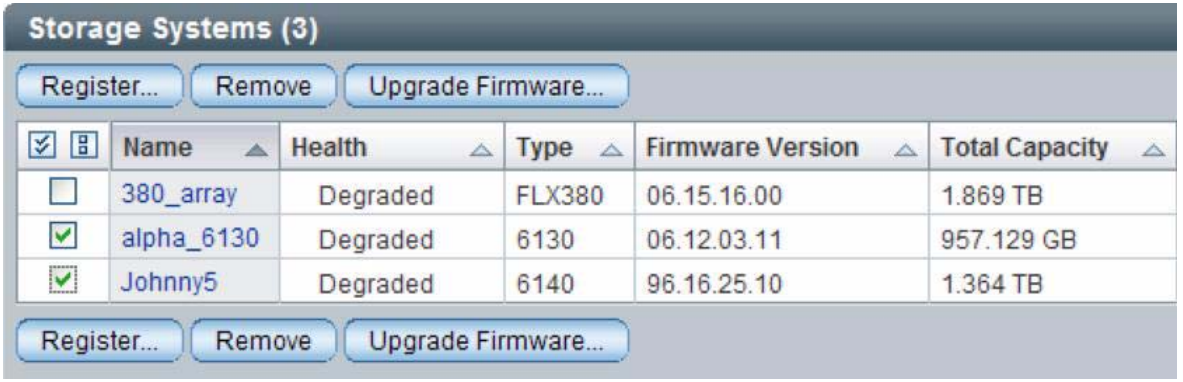
FIGURE 2-3 CAM - Volume Details Screen



The CAM software summary screens indicate the health of our array, and indicate to us the appropriate action to remedy the situation. In FIGURE 2-4, three arrays have been identified as degraded. So, to upgrade the firmware, install the Firmware CD, select the arrays to upgrade, and then select *Upgrade Firmware*.

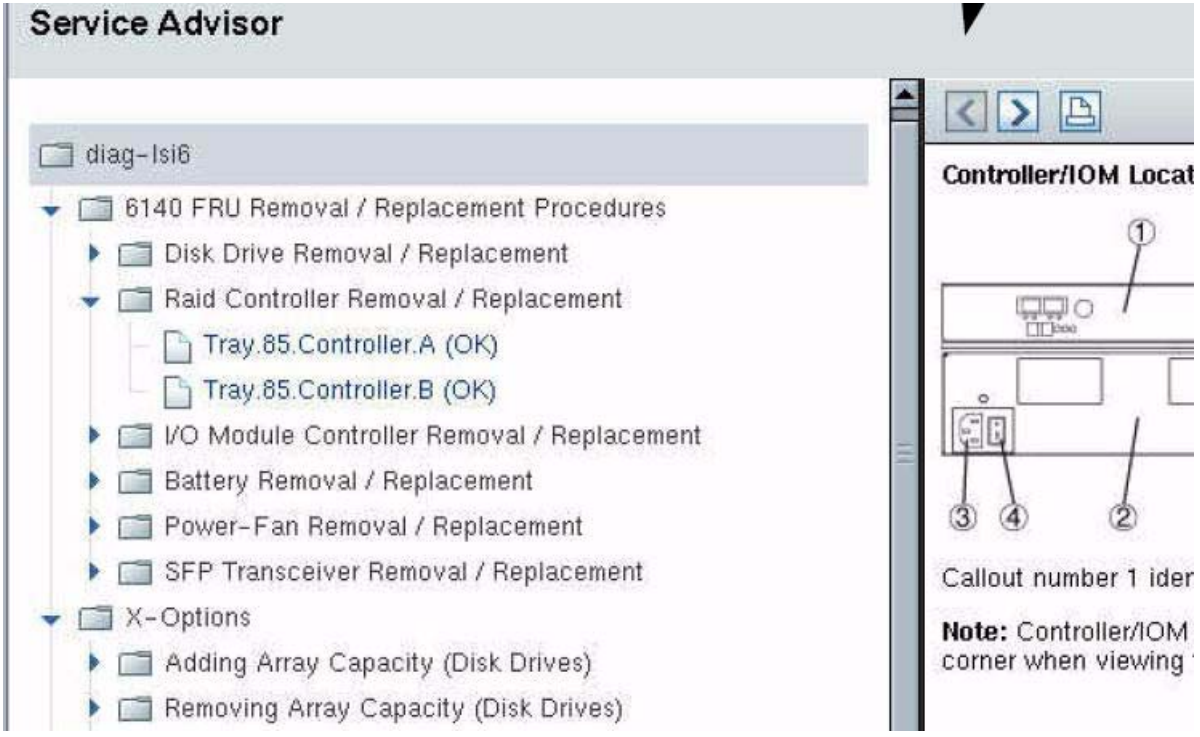
The CAM software automatically determines what firmware levels to downlevel, and upgrades controller firmware, IOM firmware, and drive firmware as appropriate.

FIGURE 2-4 CAM - Array Health Status



CAM software also helps us with troubleshooting. If CAM indicates that there is a problem, then Service Advisor can be selected. This displays the following information about the array. See FIGURE 2-5.

FIGURE 2-5 CAM - Service Advisor Screen



As you can see in FIGURE 2-5, FRU status is displayed for the various components in the controller tray or expansion tray. Also the location of each particular FRU is shown in the right panel.

FIGURE 2-6 shows a 6140 error on tray 85, drive 1. The right panel provides information about how to remedy this situation.

FIGURE 2-6 CAM - Service Advisor Drive Error Display

Refer to the *Sun StorageTek 6540 Array Getting Started Guide* and to the CAM documentation manuals for more information.

CHAPTER 3

Ordering

Sun StorageTek™ 6000 products are ordered online by using the Sun web. Browser interface button and drop-menu selections are available to facilitate your order. The following pages provide a brief introduction to the process.

The following topics are covered in this chapter.

"Logging In" on page 29

"Product Selections" on page 32

"Service Plan" on page 36

"Summary Screen" on page 38

"Recommended Configurations" on page 39

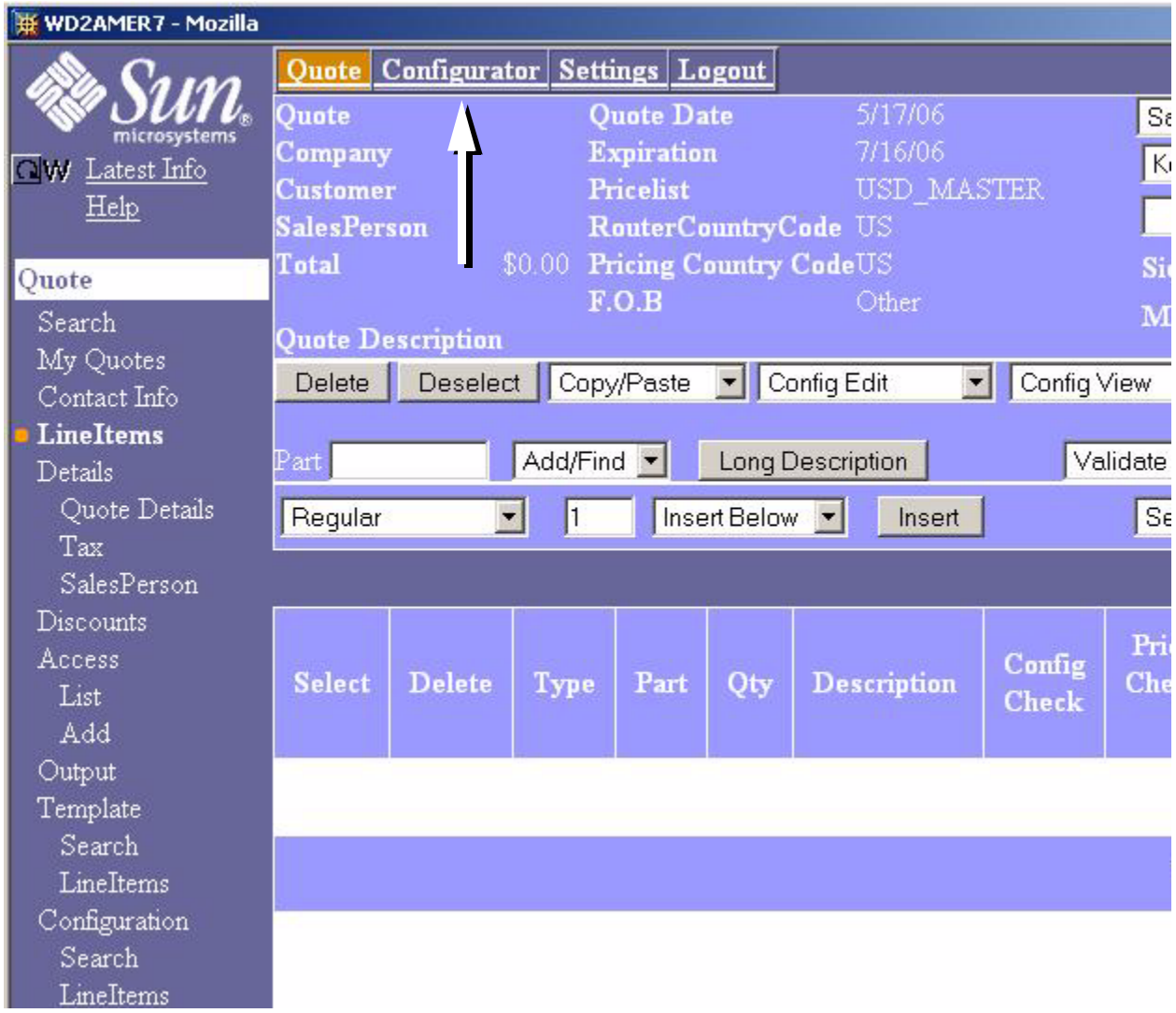
Logging In

The first step of the ordering process is to bring up the web page at:
`http://webdesk.central/`

This will display a log-in page, which requires your user name and LDAP password.

Once you are logged in, you need to click on *Configurator* (as shown in FIGURE 3-1).

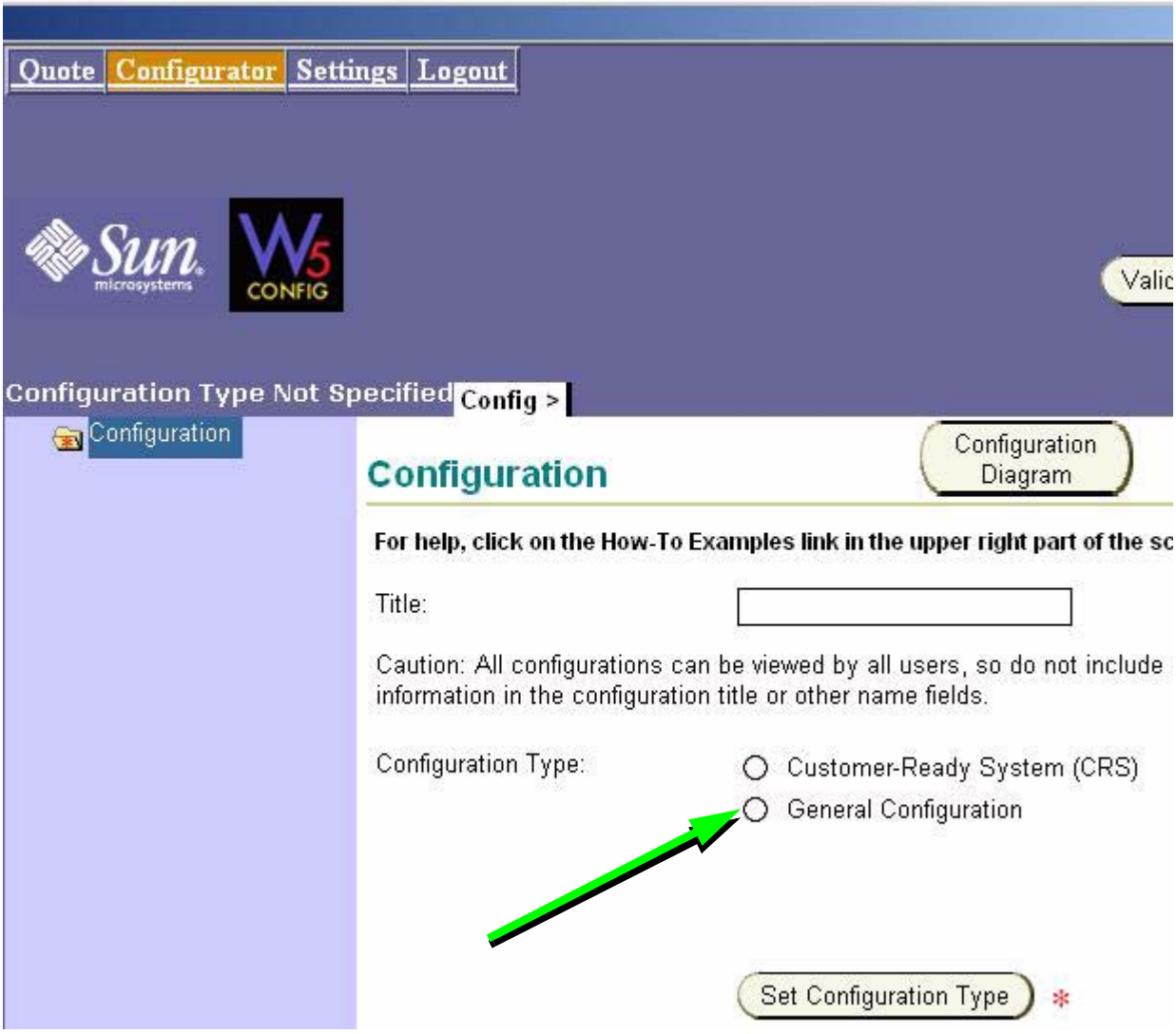
FIGURE 3-1 Main Ordering Screen



Once inside the configurator, you select *New Config* (lower-left corner), and then you place a general order by selecting *General Configuration*, as shown in FIGURE 3-2. This will allow you to then select the Disk Storage option, which will provide (display) the widest variety of disk storage products.

Note – A Customer-Ready System is a custom order that can be used to integrate various Sun products (Sun servers, Sun StorageTek disk, etc.).

FIGURE 3-2 Configuration Screen



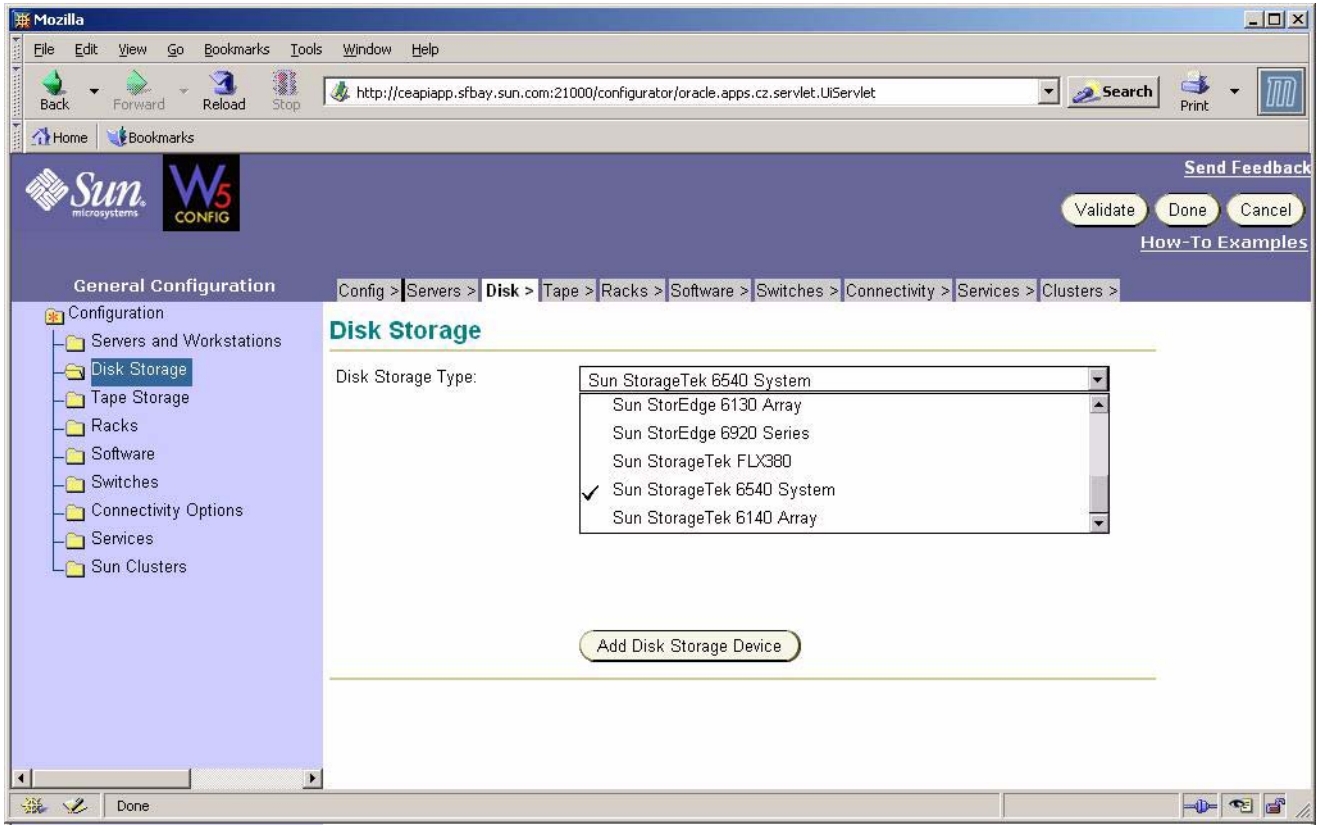
When ready click on the *Set Configuration Type* button.

Note – The red asterisk (*) means that it is mandatory.

Product Selections

Clicking on Set Configuration Type will bring up the following screen (FIGURE 3-3), which will allow you to select Disk Storage and then use the drop-down to select the Disk Storage Type.

FIGURE 3-3 Product Selection Screen

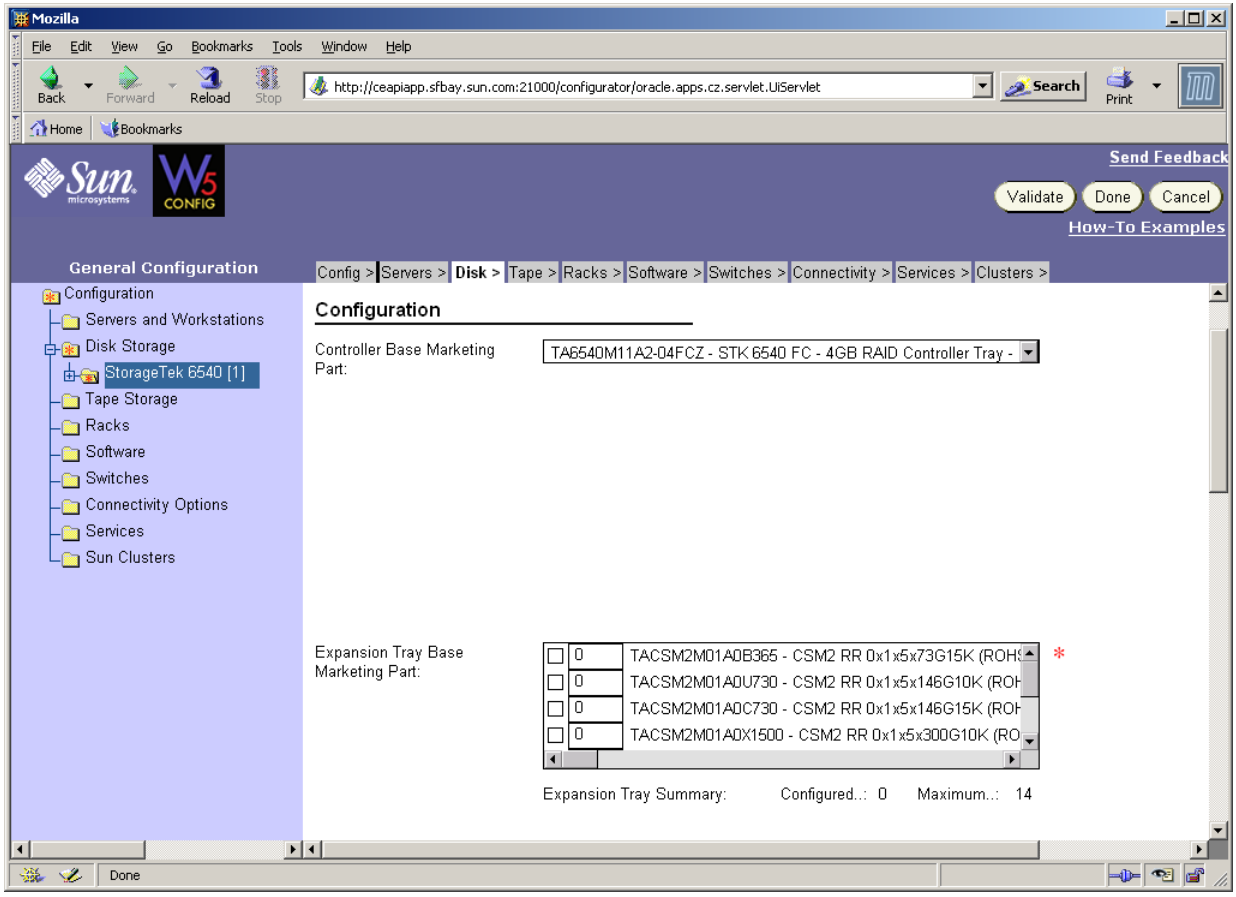


Select Disk Storage and then click on *Add Disk Storage Device*, which will then allow you to order the desired hardware and software components that come with the particular disk storage system array that you select. See FIGURE 3-4, FIGURE 3-5, FIGURE 3-6, and FIGURE 3-7 for screen examples on how the ordering process is used to select hardware and software.

This first window allows you to select the controller tray and its particulars.

Note – Power cord, FC cables, and a modem are included with your Sun StorageTek 6540 Array.

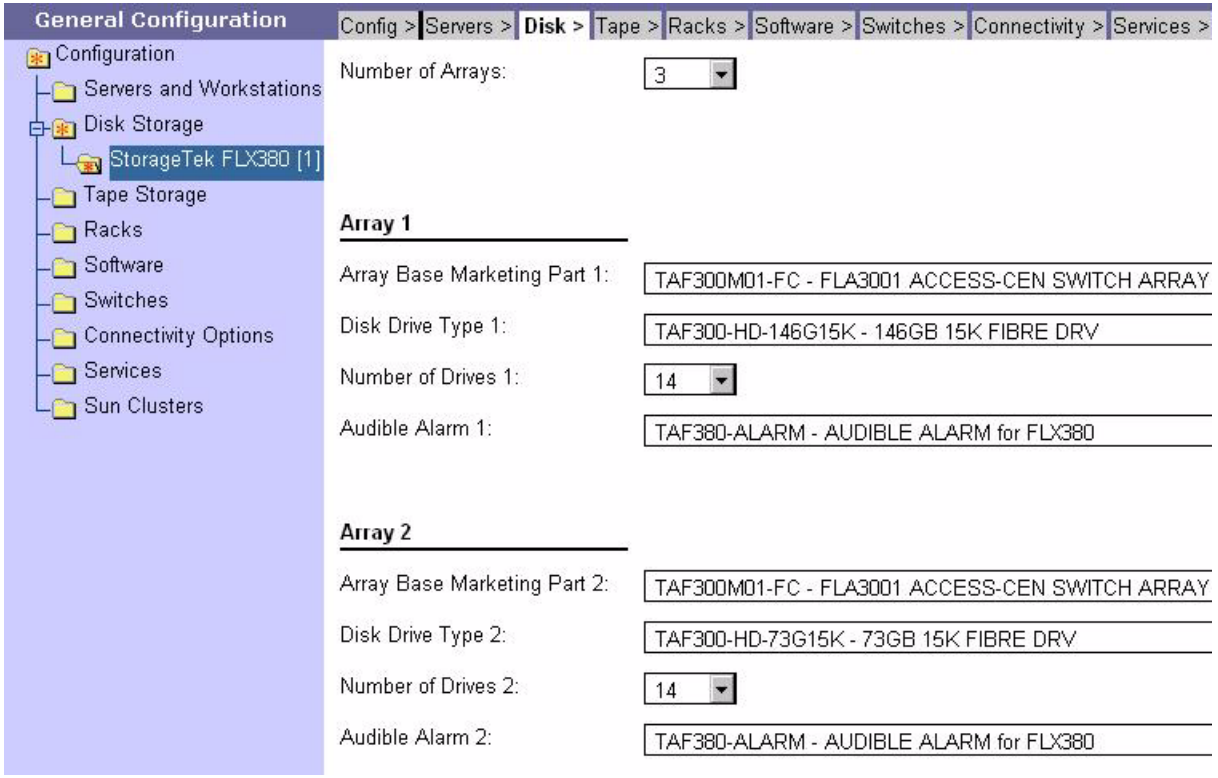
FIGURE 3-4 First Selections - 6540 Order Example



As you scroll down in the window, you come to the area where you can select the expansion trays and drive types that you want. See FIGURE 3-5.

Note – The term Array normally refers to the entire Sun StorageTek 6540 solution, however, in the window displayed in FIGURE 3-5 Array refers to one expansion tray. In the case of a 6540, the expansion tray is a CSM2 expansion tray. The expansion trays that are offered depend on the storage system's controller tray offered and the types of expansion trays supported.

FIGURE 3-5 Second Selections - FLX380 Order Example

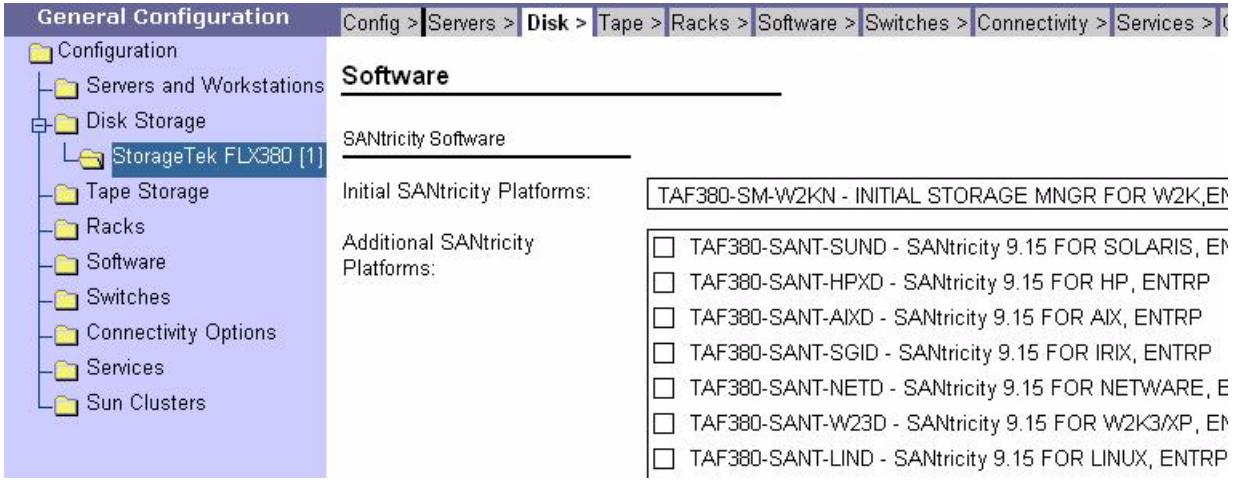


As you continue to scroll down in the configurator's selection window, you come to the software selection area where you can select the type of software you want to manage your storage. Here, you are able to select the software for your particular management station's operating system.

Note – You will automatically be given the StorageTek Common Array Manager software, however, existing customers may select SANtricity Storage Manager if that is the storage management software desired.

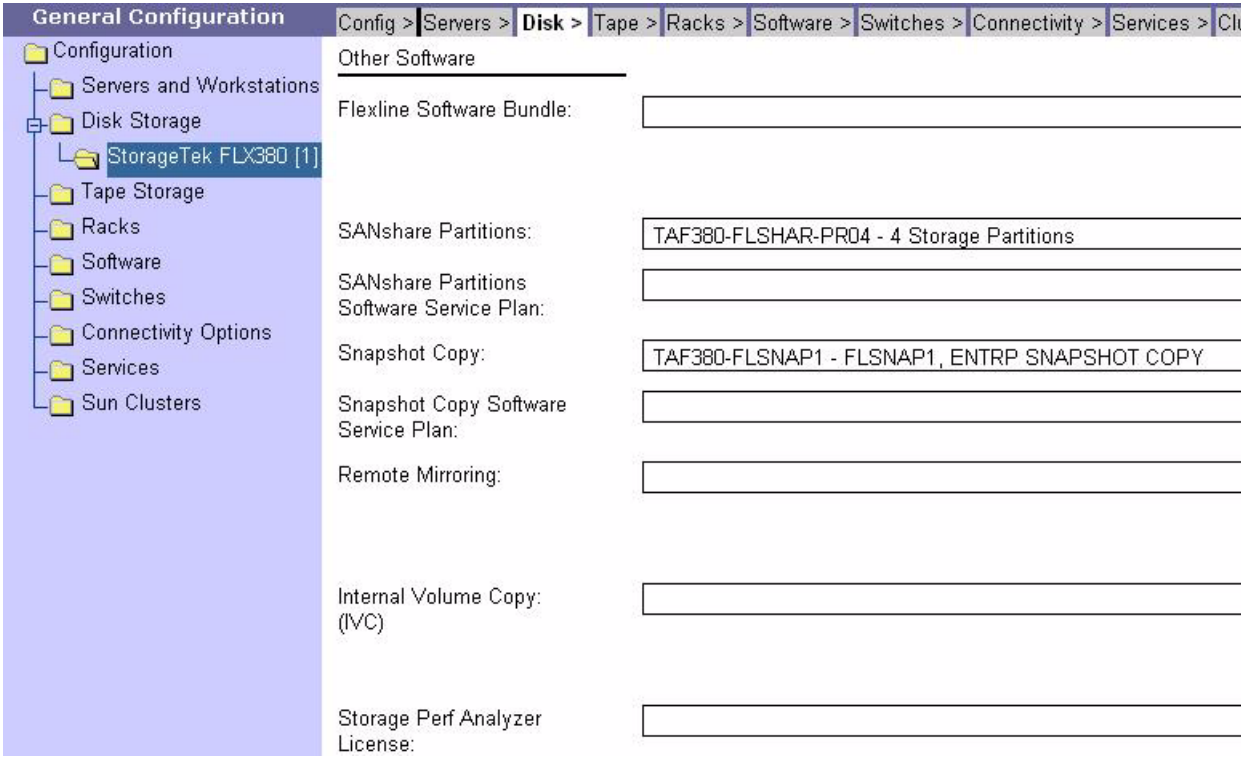
Only the certified levels of software will be displayed on the configuration window. The below example (FIGURE 3-6) shows the level of software appropriate for the older StorageTek FlexLine™ 380 enterprise storage system.

FIGURE 3-6 Third Selections



The next selection area allows you to select premium features.

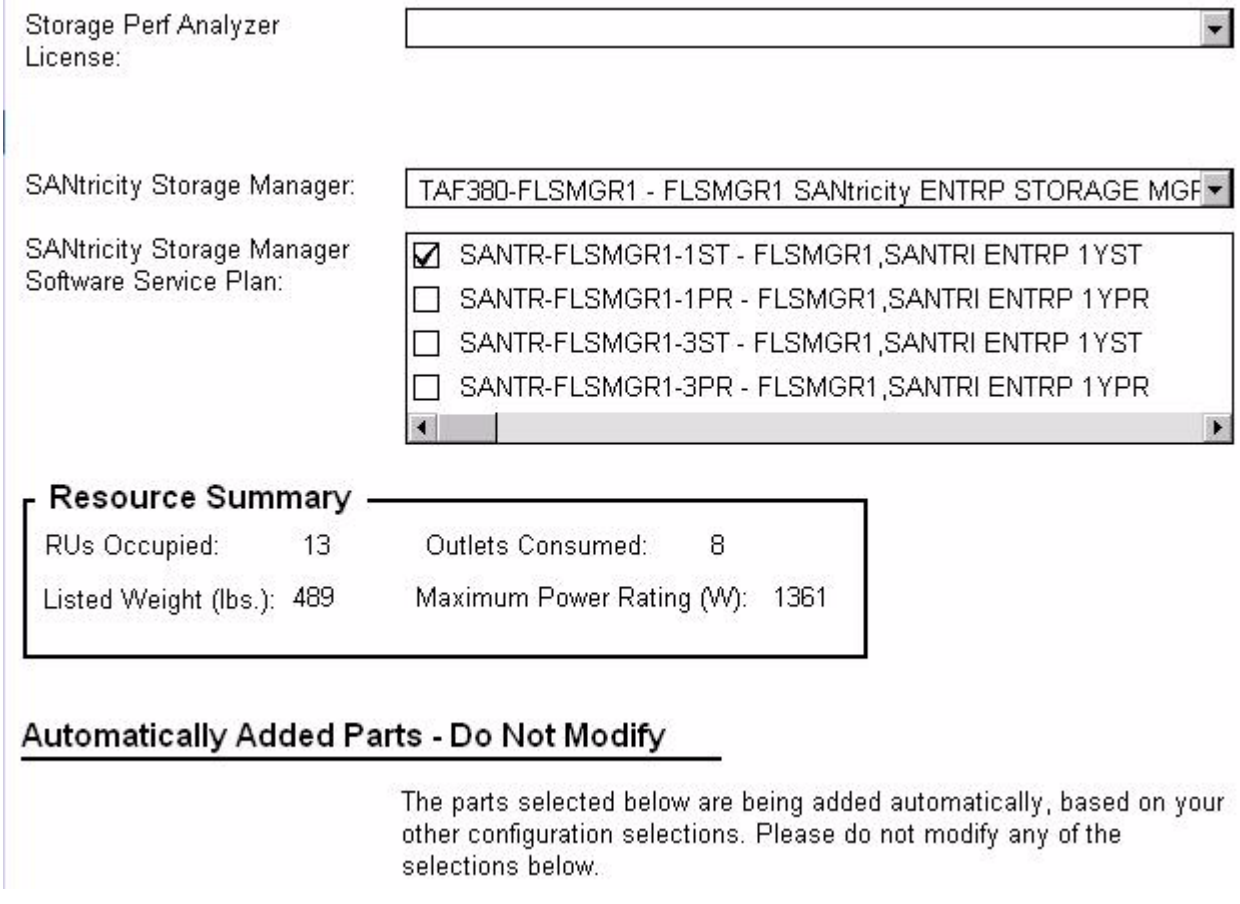
FIGURE 3-7 Fourth Selections



Service Plan

Once you are done configuring your solution, the configurator asks you to select a service plan (see FIGURE 3-8).

FIGURE 3-8 Final Screens - FLX380 Example

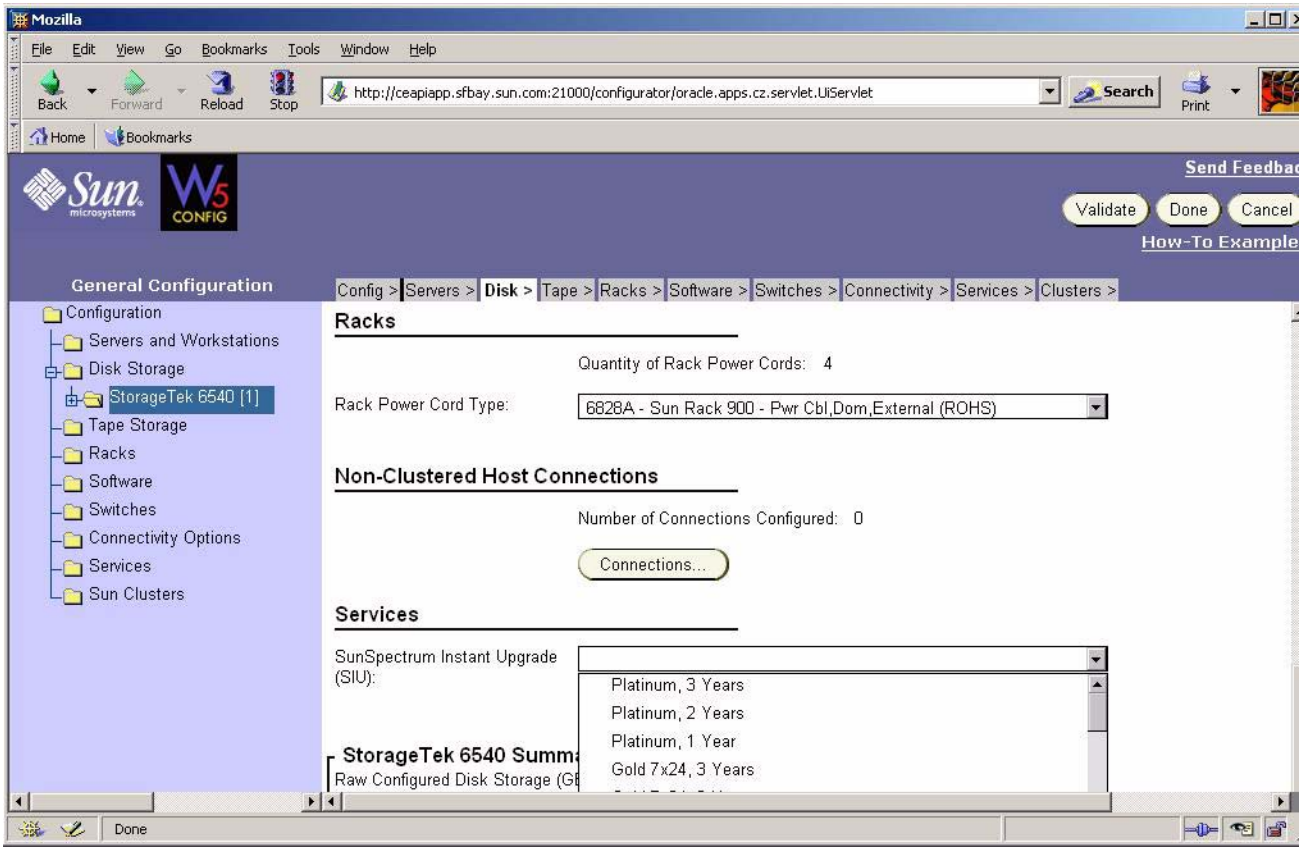


At this point you can validate and finish processing the order.

FIGURE 3-9 shows the cabinet, host connections, and service package selection screen.

Note – The Sun Rack 1000-38 cabinet is the targeted cabinet to be used for the Sun StorageTek 6540 Array. Using this 38U cabinet will ensure that the cabling drawings in your Sun documentation will match what you actually have at the site.

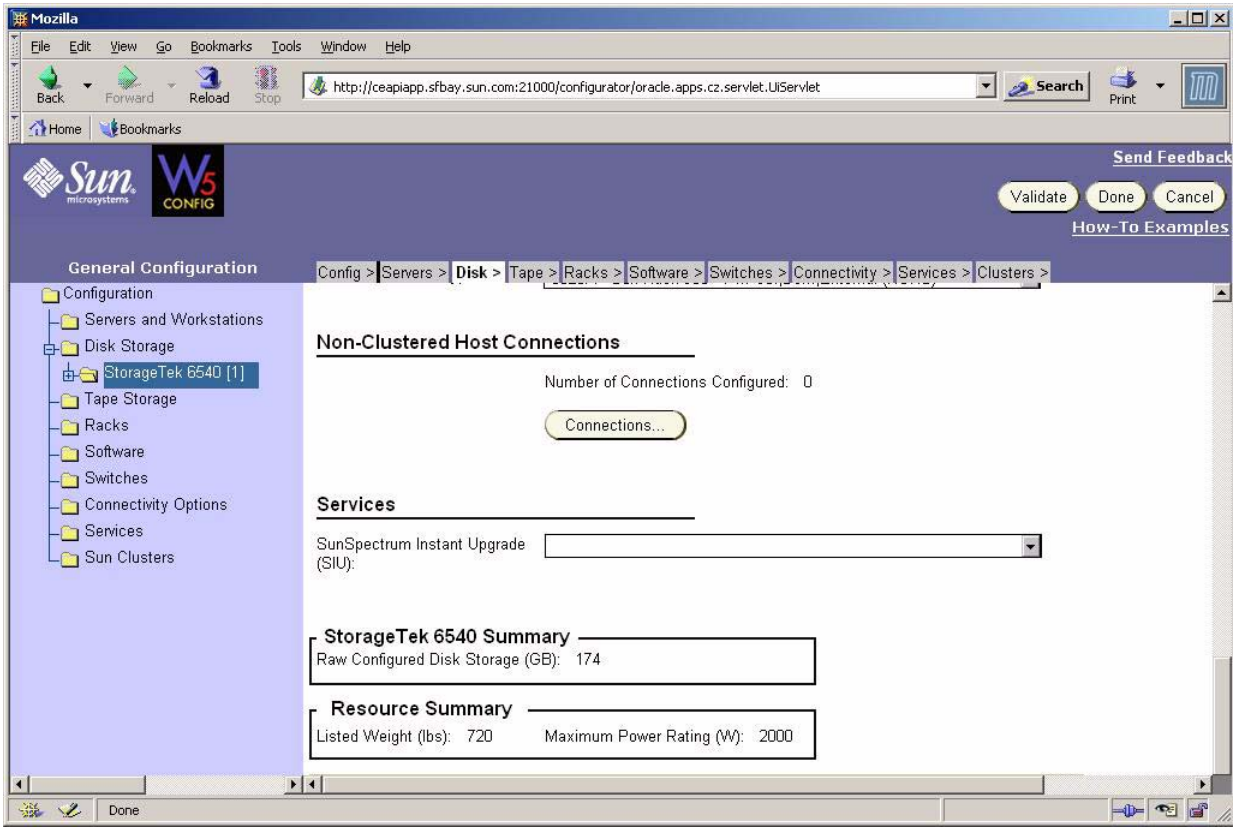
FIGURE 3-9 Final Screens - 6540 Example



Summary Screen

FIGURE 3-10 provides the bottom portion of the screen, showing the summary information.

FIGURE 3-10 Summary Screen - 6540 Example



Recommended Configurations

The Sun StorageTek™ 6540 Array is a 4-Gb storage system. It has eight host ports and four backend drive channels (eight drive interface ports). To take full advantage of the performance capabilities of the model 6998 controllers, a minimum one controller tray and four expansion trays (1x4) configuration is recommended.

If you use RAID 5, however, and plan to do vertical stripping, then best practices would recommend that you configure a 4+1 Virtual Disk (Raid Group). Ideally, you would use a 1x5 configuration—putting five disks (one from each expansion tray) into the virtual disk. This means that all of the volumes created within that virtual disk would be stripped across five drives (in different expansion trays). Many sites configure 4+1 and 8+1 Virtual Disks, which work best with either 5 or 9 expansion trays attached to your 6540 controller tray.

Glossary

agent A Storage Automated Diagnostic Environment program that runs on a management host, monitoring its storage elements and diagnosing any problems.

alarm A warning of an existing or approaching alert. See also event.

alert A subtype of an event that requires user intervention. The term *actionable event* often describes an alert. See also event.

array A disk subsystem or storage system, made up of multiple disk drives, that functions as a single large device. A high-availability (HA) array configuration has multiple paths and controllers to the backend expansion trays of disk drives.

array hot spare A disk that serves as a hot spare within an array; a reserve disk that can be made available to all virtual disks within an array. See also hot spare.

block The amount of data sent or received by the host per I/O operation; the size of a data unit.

capacity The amount of storage you must allocate to storage elements, including volumes, pools, and virtual disks (aka volume groups). Capacity planning should include allocations for volume snapshots and volume copies.

CLI Command-line interface. The SSCS command-line interface is available from the remote CLI client or through an SSCS directory on the Solaris Operating System management software station.

controller tray A tray with an installed redundant RAID controller pair. In a Sun StorageTek 6540 Array, a 1x1 means one controller tray and one expansion tray. Configurations may go up to a 1x6 for the 6140 array (which is six total trays as defined in the 6140 terminology), and up to a 1x14 for the 6540 array. This assumes that the latest expansion trays (with 16 drive slots) are used.

control path The route used for communication of system management information, usually an out-of-band connection.

customer LAN See site LAN.

DAS See direct access storage (DAS).

data host Any host that uses the system for storage. A data host can be connected directly to the system (DAS) or can be connected to an external switch that supports multiple data hosts (SAN). See also host.

data path The route taken by a data packet between a data host and the storage device.

direct access storage (DAS) A storage architecture in which one or two hosts that access data are connected physically to a storage array.

disk A physical drive component that stores data.

event A notification of something that happened on a device. There are many types of events, and each type describes a separate occurrence. See also alarm and alert.

expansion tray A tray that does not have a RAID controller, used to expand the storage capacity of an array. This type of tray must be attached to a controller tray to function.

failover and recovery The process of changing the data path automatically to an alternate path.

fault coverage The percentage of faults detected against all possible faults or against all faults of a given type.

FC See Fibre Channel (FC).

Fibre Channel (FC) A bi-directional serial data-transfer protocol, deployed across a wide range of storage hardware and commonly used for storage area network (SAN) configurations. Fibre Channel speeds run at one-gigabit (Gb) per second, and bandwidth depends on the number of channels from the controller tray.

Fibre Channel switch A networking device that can send packets directly to a port associated with a given network address in a Fibre Channel SAN. The Fibre Channel switches are used to expand the number of servers that can connect to a particular storage port. Each switch is managed by its own management software.

field-replaceable unit (FRU) An assembly component that is designed to be replaced on site, without the system having to be returned to the manufacturer for repair. Servicing FRUs is documented in the Service Advisor software.

FRU See field-replaceable unit (FRU).

HBA See host bus adapter (HBA).

host As a function of the Sun StorageTek array configuration, a host represents a data host and is mapped to initiators and volumes to create a storage domain. See also data host, initiator.

host bus adapter (HBA) A controller board on the server that allows the server to attach to external storage or other devices. See also initiator.

host group A group of hosts with common storage characteristics that can be mapped to volumes. See also host.

hot spare The drive used by a controller to replace a failed disk. See also array hot spare.

in-band traffic System management traffic that uses the data path between a host and a storage device. See also out-of-band traffic.

initiator On a Fibre Channel network, a host that requests transactions with storage elements. Each connection represents a separate initiator, so if a host is connected to the system through two HBAs, the system identifies two different initiators. Initiators can be grouped into host groups. Sun's MPxIO software provides a round-robin mode, where multiple HBAs are grouped together and the system identifies the group of HBAs as one initiator.

IOPS A measure of transaction speed, representing the number of input and output transactions per second.

LAN Local area network.

logical unit (LUN) The identifier for a volume as it is recognized by a particular host. The same volume can be represented by a different LUN to a different host.

LUN See logical unit (LUN).

MAC Address See media access control (MAC) address.

management host A Solaris, Windows, or LINUX host serving the configuration, management, and monitoring software for the Sun StorageTek array. The software on the station can be accessed with a browser to run the browser interface or with a remote thin-scripting client to access the SSCS CLI commands.

media access control (MAC) address The physical address identifying an Ethernet controller board. The MAC address, also called an Ethernet address, is set at the factory and must be mapped to the IP address of the device.

multipathing A design for redundancy that provides at least two physical paths to a target.

out-of-band traffic System management traffic outside of the primary data path that uses an Ethernet network. See also in-band traffic.

PDU See power distribution unit (PDU).

pool See storage pool.

power distribution unit (PDU) The assembly that provides power management for the storage system. The redundant design uses two PDUs in each system so that the system's data path continues to function if one of the PDUs fails.

profile See storage profile.

RAID Redundant array of independent disks. A configuration in which several drives are combined into a single virtual drive to improve performance and reliability. Also called a RAID set or a RAID group.

RAS Reliability, availability, and serviceability.

remote CLI client Also called the thin-scripting client, the remote CLI client runs the SSCS command-line interface on any qualified host in the network. The client communicates with the management software through a secure out-of-band interface, HTTPS.

The client must be installed on a host that has network access to the system. The available clients are for the Solaris, Microsoft Windows 2000 and Windows 2003, Linux, HP-UX, IBM AIX, SGI, and Novell operating environments.

remote monitoring Monitoring of the functions and performance of a hardware system from a location other than where the hardware resides.

remote support The remote management host uses Sun Remote Services Net Connect 3.1 software to communicate problems with Sun service.

SAN See storage area network (SAN).

site LAN The local area network at your site. When the system is connected to your LAN, the system can be managed through a browser from any host on the LAN.

snapshot A copy of a volume's data at a specific point in time.

SSCS Sun Storage Command System, the CLI that can be used to manage the array.

storage area network (SAN) An architecture in which the storage host are connected to each other to increase data availability and storage utilization.

Storage Automated Diagnostic Environment An automated fault management system (FMS) for SAN devices. The FMS provides health and telemetry for Sun SAN devices.

storage domain A storage partition created through the mapping of initiators to hosts and the mapping of volumes to hosts or host groups.

storage pool A collection of volumes with a common configuration, availability, and performance. You assign a profile to a pool to define the attributes of the pool.

storage profile A set of storage pool attributes that optimize the storage pool for a particular access pattern and level of data protection. You assign a profile to a pool to define the attributes of the pool.

storage tray An enclosure containing disks. A tray with dual RAID controllers is called a controller tray; a tray without a controller is called an expansion tray (aka drive tray).

stripe size The total amount of data in a stripe, representing the block size multiplied by the number of disks in the stripe. See also striping.

striping A storage allocation method in which data is stored over a series of disks or virtual disks, improving performance.

target The recipient of initiator commands, usually a volume.

thin-scripting client See remote CLI client.

tray See storage tray.

virtual disk A collection of physical disks that share a RAID level and disk type (FC or SATA). Virtual disks are created as a result of an option during the development of a volume. May also be known as a volume group.

volume A container in which applications, databases, and file systems store data. Volumes are created from virtual disks, based on the characteristics of a storage pool. A volume is seen by a Data Host as a single disk.

volume snapshot See snapshot.

WWN World Wide Name. A unique 64-bit number assigned by a recognized naming authority such as the IEEE that identifies a connection (device) or a set of connections to the network. The WWN is constructed from the number that identifies the naming authority, the number that identifies the manufacturer, and a unique number for the specific connection.

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