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FLEXLINE™

ONLINE STORAGE SYSTEMS

INSTALLATION INSTRUCTIONS FOR NETWARE
Open Systems Host Attach

PRODUCT TYPE
SOLUTIONS

FlexLine™ 200/300 Series

**Installation Instructions for
NETWARE open systems disk
host attach**

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Third Edition (Oct 2004)

This edition contains 22 pages. See [“Summary of Change” on page iii](#) for the revision history and summary of changes made to this publication.

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Summary of Changes

Date	Edition	Description
Jun 2003	First	Initial Release
Oct 2003	Second	Converted to the GLS template, and updated terms to reflect the latest storage manager software.
Oct 2004	Third	Updated to reflect new FlexLine™ terminology

Novell Netware - Installation Instructions

1

The following pages help assure that you order and configure a viable solution for your Novell operating environment running:

- Netware 5.1 with support pack 2a (SP2A) or above, or
- Netware 6 with support pack 1 or above (and the Post SP1 NSS Modules).

Note: In both cases, JRE 1.3.1 or above is required.

Customers and StorageTek personnel should be familiar with the Site Preparation Guide for the FlexLine™ 200/300 Series storage systems. The Quality Assurance Manager (or representative) should also be contacted ahead of the actual installation to help complete the technical qualification worksheet and to ensure site readiness.

■ Introduction

This manual is organized to help plan your Novell configuration, provide order information, and help to install and attach your storage system to the Novell server running Netware. The following should be used in conjunction with the Siebel configurator.

Plan your site configuration

Prior to placing an order for StorageTek storage equipment, one should make sure of the system needs. First measure the locations of each current and future host, storage system, and other network components. Fill in this form with the requested information.

✓	Parameter	Outcome
	Netware operating level	
	Service Pack level	
	JRE level	
	Distance between host and storage system	
	Distance between other devices	

✓	Parameter	Outcome
	Number of HBAs needed (at least two are recommended)	
	Number of storage systems/cabinets being installed	
	Number of FC cables needed	

Select a Host Bus Adapter

Pick the type and quantity of host bus adapters (HBAs) for the host systems.

Quantity	Description
	QLogic QLA2310F (uses LC to LC Duplex SW FC optic cable)

Select the Fibre Channel Cables

Select the length of fiber optic cable and quantity for connection to the host systems. The following is an example of optical cables that may be ordered through StorageTek to attach a QLA2310F HBA to the model 4884 controller. Write in the quantities needed.

Quantity	2 Gb FC Optical Cable Description	Part #
	10 meters (32.8 feet) LC to LC Duplex	10800221
	50 meters (164 feet) LC to LC Duplex	10800222
	100 meters (328 feet) LC to LC Duplex	10800223
Other lengths are available. Consult the Siebel Configurator.		

There are also LC to SC cables that would allow one to use a 2 Gb HBA and cables with an existing switches. The following cables are available in this event.

Quantity	FC Optical Cable Description	Part #
	10 meters (32.8 feet) LC to SC	10800231
	50 meters (164 feet) LC to SC	10800232
	100 meters (328 feet) LC to SC	10800233

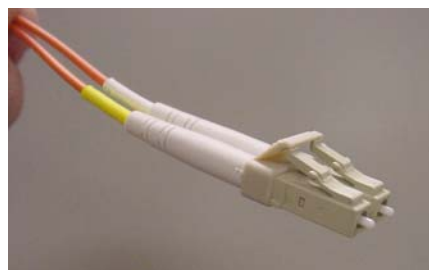
If installing through a switch, you may need a set of the following.

Quantity	1 Gb FC Optical Cable Description	Part #
	10 meters (32.8 feet) SC to SC Duplex	10800134
	50 meters (164 feet) SC to SC Duplex	10800137
	100 meters (328 feet) SC to SC Duplex	10800138
Other lengths are available. Consult the Siebel Configurator.		

Check your quantities against your earlier distance measurements to ensure your order includes all cable attachments. One end mates with the HBA, and the other end, typically, mates with the storage system host interface.

Note: Unless there is an existing management station, cable connections to the management station should be via 10BaseT Ethernet.

LC-ended Fibre Channel short wave optical cables are used with a Small Form-factor Pluggable (SFP) Transceiver that attaches to the host minihub.



Place your Order

200/300 Series storage systems use the Storage Manager software version 9.1x. You must order a host attach kit, which will provide the files (on CD) needed to install and run Storage Manager for Network. You will also need the SMclient field tool 8.x or 9.x (or better) for your laptop. The latest SMclient field tool (as of this release) is p/n 314073305. Place this order if you don't have it installed.

Make sure that you have the following.

✓	Description
	Novell Server running Netware 5.1, SP2A or higher, and JRE 1.3.1 or higher; or Novell Server running Netware 6, SP1 or higher, and JRE 1.3.1 or higher
	QLogic 2310F HBA(s)
	Appropriate Duplex Fibre Channel optic cables to configure your storage system

When you place a new order, a CD-ROM along with a CD insert (aka Quick Start Guide) will be in your host attach kit. The Quick Start Guide guides you through an installation—first referring you to the Preconfiguration and Maintenance Setup Instructions, P/N 95966, and then to any special instructions written to support your particular operating system installation.

CD-ROM file structure

During an installation you will be asked to install files from the CD supplied in the host-attach kit. The CD is structured (in most cases) with three main folders (Docs, Software, and Drivers). Inside the Docs folder are subfolders with pertinent documentation. The following table shows the subfolder names.

Sales and Preinstall	Diagnostic and Service	Engineering Papers
Hardware Install	Cabinet Docs	Miscellaneous
Software Install	Release Notes	

Inside the Software folder you will find files called: client.

Note: Utilities has been combined with the SMclient with this 9.1 release.

Inside the Drivers folder may be special HBA drivers and configuration files.

The special SMclient field tool CD is available and required to fulfill your preconfiguration requirements. It has special field maintenance tasks and activities to upgrade and help diagnose your storage system.

Note: Refer also to the PDF documents and configuration and support files to assist with your installation.

■ Installation

Once you have ordered your hardware and software, read the following information to attach 200/300 Series storage systems to a Novell server.

Before You Begin

The materials needed for the installation are provided below. Ensure that you have each of these items. The following pages provide more information about these materials (see headings) with specific steps and details on what to do.

In most cases, actual commands have been provided to help you with the installation, or help you configure or modify settings within the host or on the storage system.

Before you begin, make sure you have these items:

1. A Novell Server as described on page 3
2. Qlogic HBA(s) - model 2310F (with failover drivers)
3. SFP Transceivers for the Control Module (Controller)
4. Appropriate Fibre Channel optic cable(s) that will connect the host to the storage system

5. A 200/300 Series storage system that is fully configured.

Note: If you don't have your storage system configured, you can attach your laptop (running SMclient field tool 8.x/9.x) to it or use Storage Manager for Netware with the Direct Network Management software package. This will enable you to assign drives, volumes, and volume groups.

Caution: Unless there is already a management station, you must first setup the IP addresses on your storage system controllers via the serial port; and then use Direct Network Management from a laptop or any storage management station on the subnet.

Preliminary Steps

Check your Netware operating level

1. Type `VERSION` at the system console prompt to display your Novell Netware version and Support Pack Revision number.
2. Document this information for use later.

Note: On Netware servers you may have to toggle between screens using Alt-Esc (or Ctrl-Esc) to get to the system console screen.

Check your Java version

1. Type the command `java -version`

Note: You may have to toggle to the system logger screen on Netware 6 to see the output from the above command.

Install the Storage System

Refer to the Storage System Site Preparation Guide and the appropriate storage system installation documentation, as needed. Do NOT, however, attach fibre channel cables at this time.

After placing the hardware, refer to the Preconfiguration and Maintenance Setup Instructions, P/N 95966, and the SANtricity Storage Manager Concepts Guide. This will enable you to understand the proper configuration for the business environment, and to understand how to attach your laptop in order to configure the storage system for communications with your management station.

Note: The management station is used to configure and/or verify that the LUNs are set up as desired.

If you need more information about configuring LUNs, refer to the SANtricity Storage Manager version 9.1 for Netware Installation Guide.

Install SANtricity Storage Manager onto the customer's storage management station (attached via ethernet) and verify that the LUNs are set up as desired. Refer to the system configuration presentation, P/N 96034, and to the illustration on [page 13](#).

Proceed to the next section to verify or install the Novell NVSRAM file to the storage system.

Install Storage Manager components

If using the Netware host as the management station, refer to the SANtricity Storage Manager version 9.1 for Netware Installation Guide p/n ES147952.

Note: JRE 1.3.1 is required to run the Client under Netware.

Load NVSRAM

1. Verify or install the NVSRAM onto the controller (control module). Refer to the Storage Manager Concepts Guide, which provides the command:
`Storage Array (storage system) >> Download >> NVSRAM`

Note: Refer to the Interop Tool for the latest connectivity information, including the latest NVSRAM information.

Install the Host components

The following instructions tell how to attach the QLA 2310F and other components onto your Novell Netware operating environment.

Before you perform these instructions, check to see that you:

- are running the appropriate levels of Novell Netware, Support Pack, JRE.
- have the appropriate installation kit (HBAs, cables, etc.)
- know the configuration for your customer's site.

Install the Host Bus Adapters (HBAs)

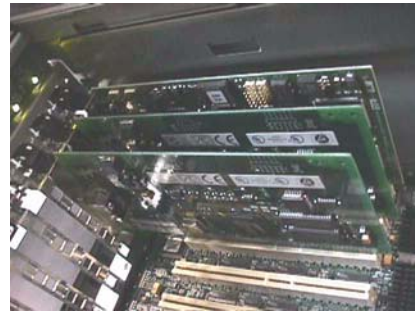
The following steps explain how to install the host adapters.

1. Quit any applications that are running and halt (down) the operating system.

Note: If your server supports, Hot Add PCI, refer to your hardware and Netware manuals for specific instructions.

2. Power off the Novell host, as appropriate.
3. Install the appropriate HBA (QLA 2310F) onto the host.

Note: There are various types of Novell servers. Locate the I/O card, which may be on a card module or behind an access panel. See examples below.



4. Power up the host.

Host Adapter Settings

1. During boot set QLogic Host Adapter BIOS Settings by pressing Alt-Q to access the QLogic BIOS utility, and verify settings:

In “Host Adaptor Settings”

- Frame Size = 2048
- Loop Reset Delay = 8

In “Advanced Adapter Settings”

- Execution Trottle = 255 (cannot exceed IOCB allocation)
- LUNs per Target = 32
- Enable Lip Reset = NO
- Enable Lip Full Login = YES
- Enable Target Reset = YES
- Login Retry Count = 30
- Port Down Retry Count = 70
- IOCB Allocation = 256
- >4GByte Addressing = Disabled (only used for greater than 4 Gigabytes of RAM)

Note: Check your HBA's readme file to configure the host adapter's LUNs per Target setting for more than 32 LUNs.

Note: On the 23xx HBAs, check the extended firmware settings to verify the correct data rate and connection options.

Install HBA Drivers

1. A QLogic driver is available on the CD that comes with your host attach kit. Check the connectivity information on the Interop Tool to make sure you have the latest information about drivers. Refer also to the supplier's web page for any additional information.

When you insert your CD, you may have to type `CDROM` at the system console to mount the CD. Type `VOLUMES` to verify that it is mounted and note the CD name. Also note the path to the driver on the CD, e.g. `CD_VOLNAME:\DRIVERS\QL650x`.

Note: Netware uses `LOAD NWCONFIG` command for driver installation. See the instructions that came with the driver for more specific information. Make sure to remove any previous drivers before adding the new drivers. Also the software will ask you to enter the HBA slot number. The typical instructions are: driver options, configure disk and storage device drivers, select an additional driver, and press insert (to select the diskette or directory with the driver files).

1. After specifying the path to your driver and completing the driver install, enter the `list storage adapters` command to verify the driver is installed.

Caution: Verify that `SCSIHD.CDM` and `SCSIHD.DDI` are installed on your Netware server. The SCSI support files are only copied to the server if SCSI devices were on the server during install. Some proprietary SCSI devices may be using non-standard SCSI support files; therefore, the standard SCSI support files may not have been copied even though there were SCSI devices. The absence of this file will cause the volumes from the storage device to be unbound. See the Novell TID # 10056732 for more information.

QLogic Host Adapter Startup Settings

Ensure that the HBA initialization line in the `C:\NWSERVER\STARTUP.NCF` file contains all of the settings after the `LOAD QL2XXX.HAM` command. See example below.

```
LOAD QL2300.HAM SLOT=3 /LUNS /XRETRY=600
```

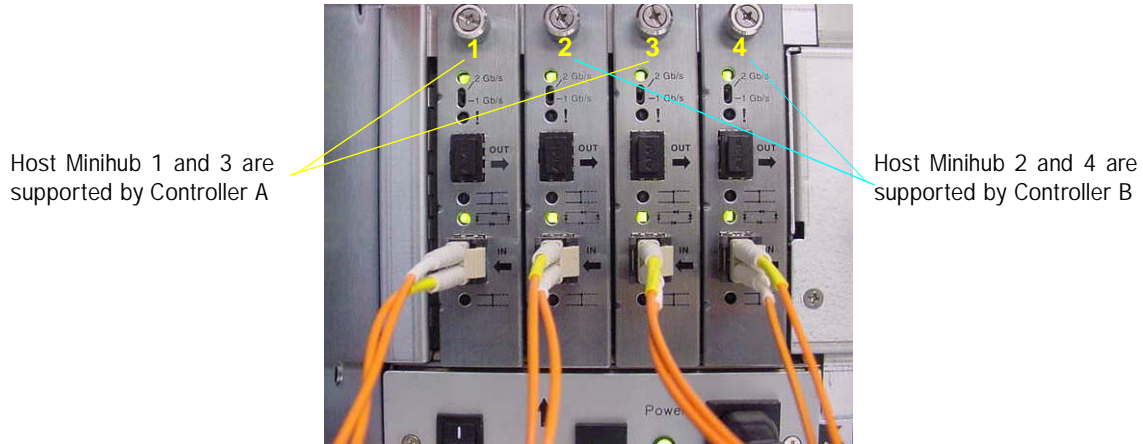
If the host system contains additional host bus adapters, a copy of this line must be entered into the `STARTUP.NCF` file for each HBA, ensuring that the `SLOT=x` setting is correct for each HBA.

Install Fibre Channel Cable

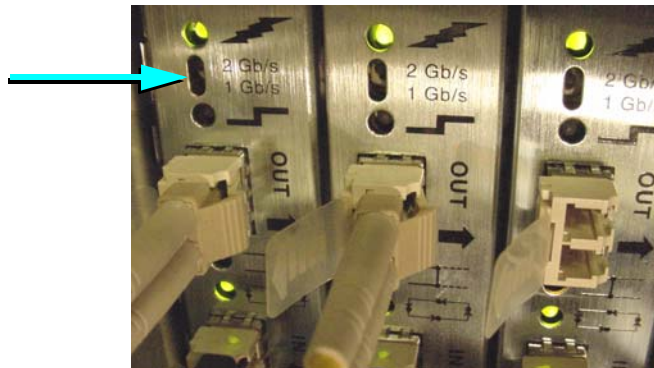
Attach cables using the following procedures.

1. Route the fibre channel interface cables between the storage system and the host or per your customer's system configuration plans.
2. Attach the fibre channel cables to the INPUT connectors on the controller's host interface minihubs.
3. Make sure that the host is attached to different controllers.

The following photograph shows the controller end of the Fibre Channel (FC) shortwave (fiber-optic) cable. In this case, LC to LC Duplex FC cables attach to the host minihubs, as shown below.

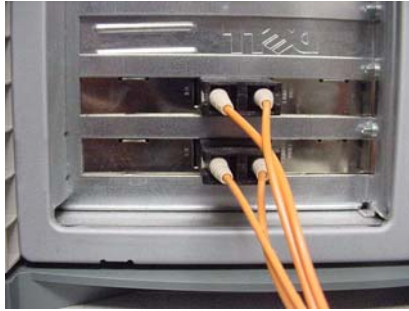


4. Make sure that your minihub speed switch setting (see arrow) is set to correspond with your HBA and Switch speed.



5. Connect the other end of the fibre cable(s) to the Host Bus Adapter (HBA). See examples of a Novell server with QLogic HBAs below.

Note: Refer to StorageTek's Interop Tool for the latest connectivity information. When connecting the storage system, you will have LC to LC Fibre Channel cables to route from the host to the Control Module's host interface (host minihubs), switches, or hubs.



6. Continue to the Failover Configuration Setup instructions.

Failover Configuration File Setup

For failover with the Qlogic driver, Qlogic has software to configure the failover paths. This software is called SANblade Manager, and is downloadable from the Qlogic web site.

Refer to the documents in the CD:\drivers\misc directory for guidance on how to configure the C:\NWSERVER\QL2X00.CFG file manually—for load balancing and path failover. An example QL2X00.CFG file has been provided.

The preferred path configuration is laid out in one byte (eight bit) increments from left to right as the bits in each one byte section are read (from right to left). Therefore, the following string:

55FEAA22

would cause the first eight LUNs to be enabled on the alternate path as per the following table.

7	6	5	4	3	2	1	0	LUN
0	1	0	1	0	1	0	1	

The second eight LUNs would be enabled on the alternate path as follows.

15	14	13	12	11	10	9	8	LUN
1	1	1	1	1	1	1	0	

Setup the Server and Finalize the Install

Before continuing, make sure that all customer data is backed up.

1. Enter the `list storage adapters` command, and note the host adapter designators (slot numbers).
2. Now enter the `scan all` command with the adapter designator variable; for example: `scan all A3`

3. For Netware 5, go into NWCONFIG (the drive management tool), and for Netware 6 proceed to step 6.
4. Configure the volumes by selecting:
 - a. NSS Disk Options
 - b. Storage
 - c. Assign Ownership (of your volumes to NSS)
 - Choose free space
 - d. Return to previous menu
 - e. NSS Volume Options
 - Enter name
5. For Netware 5, proceed to step 7.
6. In Netware 6, use the Remote Manager or Console One in the GUI to configure the volumes as NSS volumes. If using Console One, you may have difficulties if you have SP1 (NWSP1) installed and have not installed the Post SP1 NSS Modules for Netware 6 (NW6NSS1A). Refer to your Netware manuals for more information about configuring volumes in Console One or Remote Manager.
7. Return to the command line, and enter: `MOUNT ALL` to mount all of the volumes, or `MOUNT VOLNAME` to mount individual volumes.

Note: It is possible to assign volumes as traditional netware partitions in Netware 5 via:

```
Standard Disk Options >>
Modify Disk Partitions and Hot Fix >>
Select Volume and Create Network Disk Partition
```

selections, and following the screen menus to assign LUNs/volumes; but this is **not recommended or supported** because this partition type mirrors the FAT tables in RAM and may cause problems with large volume sizes.

In order to connect more than one netware server, it is recommended that you use the LUN Mapping feature as described on pages 4-6 through 4-12 of the Storage Manager Concepts Guide, p/n ES15672. It is also possible to use Novell's Netware Cluster Services for managing multi-host attachments.

There are some considerations with cluster that need to be addressed before configuration in this environment.

The main points that must be considered are:

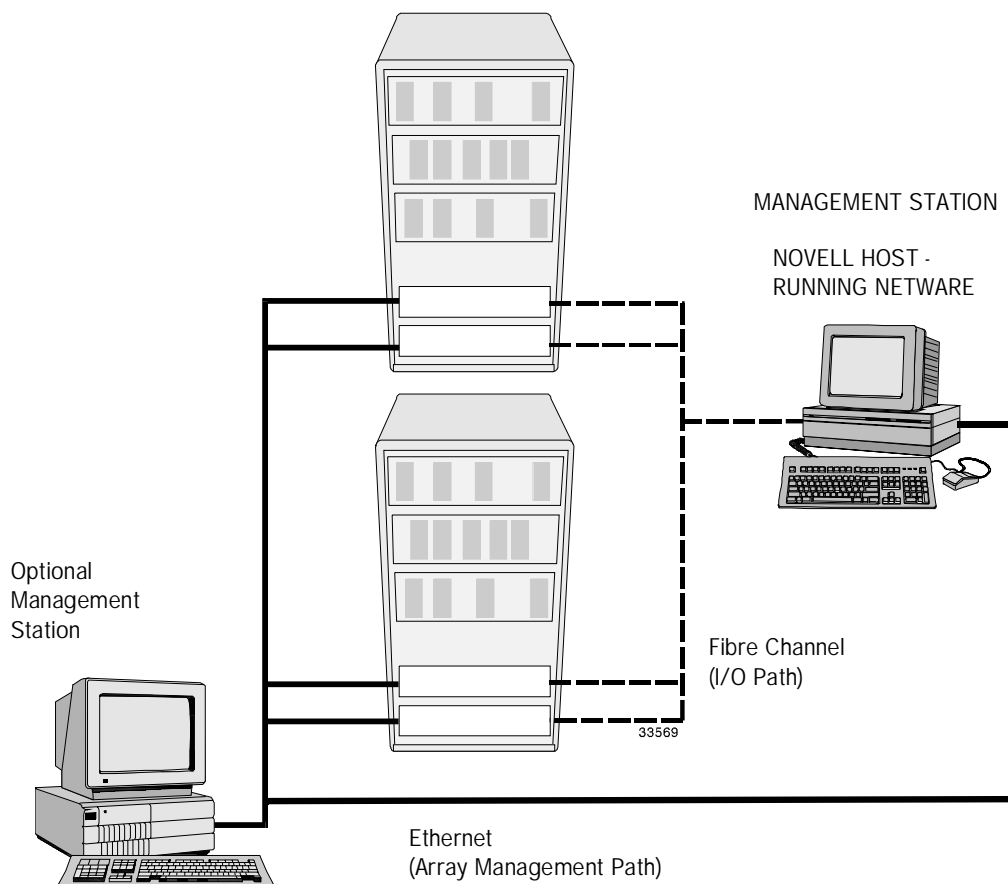
- Do not split a Physical Volume (as defined by the storage system) between multiple NSS volumes. Doing so could cause a ping-pong effect if a failover occurs on one server—when requests for I/O are coming down different paths from different servers. This would lead to an extreme performance hit and possible data corruption.
- When clustering, special attention should be given to the configuration of the volumes. The most effective way to do this is with LUN Mapping (SANshare Storage Partitioning) and by making each cluster volume available to the host group. It may be useful to put the cluster volumes on the lower LUN numbers and the individual host volumes following those.
- Novell clustering uses a Split Brain volume (SBD) to manage the cluster. The SBD must be available to all cluster members. A potential problem could occur if, in the cluster, the switch is zoned such that the A and B controllers are in separate zones. For this configuration all HBAs and both controllers should effectively be in the same zone. This means that all HBAs in all cluster member hosts should see both controllers through the switch.

The problem that may occur has to do with a scenario where the HBAs and controllers are in an 'A zone' 'B zone' configuration, and a host loses its primary path to the SBD. A failover would occur on the SBD for that host, but all other hosts would continue to communicate with the SBD on the primary path. This would result in ping-pong (also known as thrashing) of the SBD.

To resolve this issue zoning must allow each HBA to see both controllers. This configuration would allow the same type of failure as mentioned above to switch HBAs and still use the primary controller. A path failure between the switch and the storage system would allow all hosts to use their preferred HBA, but switch to the other controller. This resolution should not preclude the single volume/single NSS volume requirement.

Install your Array Management Tool

As appropriate, install SANtricity Storage Manager onto your Management Station. Refer to the Concepts Guide and to the following illustration.



Note: Both the Fibre Channel I/O path and the Ethernet Array Management Path are shown connected to both Controller CRUs. This is for different reasons. On the I/O side, it improves bandwidth; and on the Ethernet, it enables the management station to communicate to both controllers, which individually monitor status conditions.

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