

HP hard disk drive substitutions quality assured, compatible with customer systems



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Scope of this paper

This document outlines the quality assurance that HP gives to customers regarding hard disk drive (HDD) substitutions. This brief examines three parameters of SCSI hard disk drive technology that have undergone change, explains what the changes mean, and lists how HP ensures compatibility.

Like the rest of the technology industry, SCSI hard disk drives continue to evolve to meet the ever-increasing needs of the enterprise. While technology advances are inevitable, the rapid pace of change can quickly make older products difficult or impossible to source. Substitution of newer technology products is a natural consequence of ever-shortening product cycles coupled with multi-year service obligations.

Introduction

HP, along with its suppliers, has strived to ensure that newer drive technologies are backwards compatible across successive generations. The HP Hard Disk Drive Qualification (HDDQ) process is recognized throughout the industry as best-in-class and guarantees that the drives HP ships will work with customers' systems.



HP Hard Disk Drive

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Substitute HDD Qualification Procedure

When fulfilling a service spares order, customers may receive a hard disk drive that is different from their original. Substitute devices are necessary as older technology products reach end-of-life and are no longer available on the market. The HP HDDQ process consists of sophisticated, vigorous testing to ensure that disk drive substitutions are compatible with customers' systems. Customers enjoy peace of mind knowing that HP has developed and maintains one of the most disciplined and well-structured testing processes in the industry. With superior qualification and testing, HP is able to offer a three-year pre-failure warranty on HP SCSI hard disk drives.¹

The differences between the original and substituted product may be in spin speed, capacity, interface, or all of these. HP addresses these factors with the procedures described below:

¹ Must be running HP Insight Manager for Pre-Failure Warranty

Spin Speed

The rotational speed of the disk, commonly referred to as 'rpm', has changed in recent years from 7200 to 10,000, and now to 15,000 rpms. Increased spin speed results in reduced mechanical latency, which makes for a higher performing drive. A faster spin speed can also result in a drive that consumes more power and dissipates more heat. However, by reducing the rotating mass of the drive, these effects can be negated. As part of the HDD stringent qualification process, HP measures the power consumption of all drive types. Only drives with equal or lower power consumption characteristics relative to the original are allowed to be substituted into older applications.

Interface

Since 1981, there have been several generations of the SCSI protocol. Each new generation has doubled the performance of the previous one. SCSI performance has ranged from an 8-bit, single-ended (SE) interface transferring data up to 4 MB/s to the latest 16-bit, low-voltage differential (LVD) interface transferring data at 320 MB/s per channel. The drive communicates with the host controller across this interface, and much work has been done throughout the industry to retain backwards compatibility as new interfaces have been introduced. Although there have been many generations of SCSI, there are only three basic SCSI specifications: SCSI-1, SCSI-2, and SCSI-3. Table 1 lists the many variations of these specifications.

Table 1. Specifications of three basic SCSI protocol

Specification	SCSI name	Bus width	Bus speed	Data rate	Signaling method		
					SE	LVD	
SCSI-1	Asynchronous SCSI	8 bits	5 MHz	4 MB/s	X		
	Synchronous SCSI	8 bits	5 MHz	5 MB/s	X		
SCSI-2	Fast SCSI	8 bits	10 MHz	10 MB/s	X		
	Fast/Wide SCSI	16 bits	10 MHz	20 MB/s	X		
SCSI-3	SPI	Wide Ultra SCSI	16 bits	10 MHz	40 MB/s	X	
	SPI-2	Wide Ultra2 SCSI	16 bits	10 MHz	80 MB/s		X
	SPI-3	Ultra 160 SCSI	16 bits	10 MHz	160 MB/s		X
	SPI-4	Ultra 320 SCSI	16 bits	10 MHz	320 MB/s		X

Drives utilizing the newer interfaces can be substituted into older applications as long as the physical connections are compatible. The interface speed at which the drive and host controller operate at will be the slower of the two devices. Each drive on the bus negotiates independently with the host controller.

Capacity

Capacity is the disk drive parameter that has experienced the most growth. Steady increases in areal density have pushed the size of SCSI drives from 4.3GB to 146GB in less than ten years. The amount of data that can be put onto a single platter dictates the minimum capacity point for a given generation of product. Typically, substituting a higher capacity drive for a smaller capacity has no effect on the performance of an application. When a larger drive is introduced into an existing RAID set, the additional capacity above that of the existing set is unusable.

However, this has no effect on the operation. Smaller capacity drives can be artificially created by limiting the useable capacity of a drive through the firmware. Essentially, the firmware only allows a given amount of the total capacity to be accessed. HP employs this method in order to provide lower capacity drives after the native capacity units are no longer available. The HP qualification process includes testing of these drives to ensure continued compatibility in customer systems.

Summary

When hard disk drives age and reach end-of-life status, substitute drives are necessary. Spin speed, capacity, interface, or all of these factors are taken into account with HP HDDs. Customers will have peace of mind when employing HP HDD substitutes knowing that HP quality tests every hard disk drive before approving it for use. By purchasing HP disk drive products, the customer has bought into a tradition of excellence and commitment that consistently produces the highest quality at competitive price points, designed to fully integrate across the HP enterprise class line of servers and storage.

For more information

If you would like to provide feedback, please e-mail Levi.Norman@hp.com

For other hard disk drive information, please refer to:

<http://www.hp.com/products/harddiskdrives> and <http://www.hp.com>

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5982-1928ET, 10/2003