



IBM TotalStorage Enterprise Tape Drive 3592 Model J1A enhances performance and capacity

Overview

The IBM TotalStorage™ Enterprise Tape Drive 3592 Model J1A is designed to provide higher levels of performance, reliability, and cartridge capacity than the IBM TotalStorage Enterprise Tape Drive 3590. The 3592 Model J1A is designed to meet the needs of tape customers across a broad range of computing environments, including selected IBM @server zSeries®, S/390®, IBM @server iSeries™, AS/400®, IBM @server pSeries™, RS/6000®, IBM @server xSeries®, Sun, and Hewlett Packard servers, as well as Intel®-compatible servers running Microsoft™ Windows® and Linux.

The 3592 Model J1A Tape Drive has a dual-ported 2-Gbps Fibre Channel interface Fibre Channel attachment to host systems or a switched fabric environment. It has a new high-technology design that increases the native data rate to up to 40 MB/sec, over 2.5 times the 14 MB/sec data rate of the 3590 E or H Models, and over 4 times the 9 MB/sec data rate of the 3590 B Models. With data compression and a 32 K blocksize, the Model J1A is designed to offer up to 2.5 times the data rate of the 3590 E or H Model.

With the use of the IBM TotalStorage Tape Data Cartridge 3592, the 3592 Model J1A provides a native cartridge capacity of up to 300 GB (900 GB with 3:1 compression), five times more than the maximum capacity of a 3590 H Model. The 3592 Model J1A is designed for automation and uses a tape cartridge with a form factor similar to the 3590 tape cartridges, which allows it to be used in the IBM TotalStorage Enterprise Tape Library 3494 and StorageTek Automated Cartridge System (ACS) solutions. If you require a stand-alone drive outside of a library, the 3592 Model J1A will also be available for installation in a stand-alone rack. The smaller size of the 3592

Model J1A Tape Drive allows more drives to be installed in a rack or frame than with the 3590 Tape Drive.

The 3592 Model J1A is designed to support capacity scaling of an individual tape cartridge to 60 GB. The effect of capacity scaling to 60 GB capacity is to reduce the average locate time to a random record (from load point) to 30% of the normal locate time. Additional enhancements have been made to the 3592 Model J1A Tape Drive that may help improve availability, performance, and capacity.

Key prerequisites

The Enterprise Tape Drive 3592 Model J1A is supported in a wide range of environments including selected iSeries, AS/400, pSeries, RS/6000, xSeries, zSeries Linux, Sun, and Hewlett Packard servers, as well as Intel-compatible servers running Linux or Microsoft Windows NT®, Windows 2000, or Windows Server 2003. A tape controller is required for attaching to ESCON® or FICON™ channels on S/390 or zSeries servers. Refer to the Technical information section for details.

Product number

3592-J1A

Planned availability dates

- February 6, 2004: Feature numbers 8802 and 8820
- October 31, 2003: All other features

At a glance

With its higher performance, greater capacity, and smaller size, as compared to an Enterprise Tape Drive 3590, the use of the **Enterprise Tape Drive 3592 Model J1A** may result in cost savings as you reduce your number of tape drives and cartridges, and the associated floor space. Enhancements over the 3590 include:

- Up to 40 MB/sec native data rate, over 2.5 times the 14 MB/sec for the 3590 E or H Models
- Up to 300 GB native cartridge capacity, a five times increase over the 60 GB for the 3590 H Models
- Dual-ported switched fabric 2-Gbps Fibre Channel attachments
- Small form factor that allows double the drives in a single 3494 frame, as compared to the 3590 Tape Drive
- High reliability and availability design

This summary announcement is provided for your information. Please refer to the complete letter for details or contact your IBM representative and/or IBM Business Partner.

Description

The Enterprise Tape Drive 3592 Model J1A is a follow-on to the highly successful Enterprise Tape Drive 3590. It is designed for high-performance tape applications, including:

- High-speed data save operations where backup windows are critical, and large amounts of data are archived to tape.
- Large-scale automated tape environments where performance and reliability are required. These are primarily half-inch tape drive environments.
- Large-scale mass data archive applications where massive amounts of data need to be quickly saved to tape for storage and later recall (examples include the seismic industry, data warehousing, and record management applications).

The 3592 Model J1A is the first model of a new family of tape products that are designed to meet the growing needs of both new and existing IBM tape customers across a wide range of environments. Advantages of the Enterprise Tape Drive 3592 Model J1A include:

- Higher performance, which can help reduce the number of tape drives required
- Larger capacity, to help you reduce the number of cartridges required and floor space needed
- Smaller form factor, which can help reduce the automation foot print
- Dual-ported native switched fabric interface, designed to enhance the attachment flexibility
- High reliability, to help you improve operations

Capacity

The 3592 Model J1A is designed to provide 5 to 15 times the native cartridge capacity of a 3590 E or H Model, or 15 to 30 times the cartridge capacity of a 3590 B Model. The exact ratio depends on which cartridge is used with the 3590 drive. The following table compares the cartridge capacity versus the 3590 H, E, and B Models.

	3590 Model B native cartridge capacity	3590 Model E native cartridge capacity	3590 Model H native cartridge capacity	3592 Model J1A native cartridge capacity
3590 High Performance Tape Cartridge	10 GB	20 GB	30 GB	NA
3590 Extended High Performance Tape Cartridge	20 GB	40 GB	60 GB	NA
Enterprise Tape Cartridge 3592	NA	NA	NA	300 GB

NA = Not Applicable

The following table compares the cartridge capacity of the 3590 drives with the 3592 J1A with 2:1 and 3:1 compression.

	3590 Model B cartridge capacity (2:1/3:1)	3590 Model E cartridge capacity (2:1/3:1)	3590 Model H cartridge capacity (2:1/3:1)	3592 Model J1A cartridge capacity (2:1/3:1)
3590 High Performance Tape Cartridge	20 GB/30 GB	40 GB/60 GB	60 GB/90 GB	NA
3590 Extended High Performance Tape Cartridge	40 GB/60 GB	80 GB/120 GB	120 GB/180 GB	NA
Enterprise Tape Cartridge 3592	NA	NA	NA	600 GB/ 900 GB

Performance

The 3592 Model J1A uses a new design that increases the native data rate to 40 MB/sec, versus the 14 MB/sec data rate of the 3590 E or H Model or the 9 MB/sec data rate of the 3590 B Model. With compression and a 32 K blocksize, the 3592 Model J1A can offer up to 2.5 times the data rate of the E or H Model. The 3592 Model J1A is designed to offer improved access characteristics in load/ready time, search velocity, and rewind time versus the 3590. The 3592 Model J1A has other enhancements designed to help aid small file and Hierarchical Storage Manager performance.

Note: The actual throughput a customer may achieve is a function of many components, such as system processor, disk data rate, data block size, data compressibility, I/O attachments, SAN, and the system or application software used. Although the drive is capable of a 40 MB/sec native data rate, other components may limit the actual effective data rate.

Capacity scaling

The 3592 Model J1A is designed to support capacity scaling of an individual tape cartridge to 60 GB. The effect of capacity scaling to 60 GB capacity is to reduce the average locate time to a random record (from load point) to 30% of the normal locate time.

The 3592 Model J1A Tape Drive allows an application to issue a command to scale an individual cartridge to 60 GB. Customers using OS/390® V2.10 and z/OS® can exploit the capacity scaling capability of the 3592 Model J1A. A new data class parameter will determine if a tape is to be scaled to 60 GB. Open processing will scale a tape when the associated data class requests it and the tape is being written from load point (DISP=NEW, file sequence 1). On a subsequent reading of a performance scaled MEDIA5 tape, the data will be entirely contained in the first 60 GB of the tape, yielding very fast locate and read times. DFSMSHsm™ and DFSMSdftp™ OAM can exploit this new feature, as well as other applications that use standard Open/Close/EOV processing. Refer to the publication *DFSMS Software Support for IBM TotalStorage Enterprise Tape System 3592* (SC26-7514-00) for more information about software support for the 3592 Model J1A.

Cartridges pre-scaled for 60 GB capacity are also available for order with the 3599 Model 011. These pre-scaled cartridges can be ordered (and labeled) for a specific VOLSER range. This allows capacity scaling to be exploited by an application that permits media pools to be defined by VOLSER range. For information on which Independent Software Vendors (ISV) support capacity scaling by command or with the pre-scaled cartridges, refer to the 3592 ISV site that can be accessed at:

<http://www.storage.ibm.com/tape/conntrix/>

For more information on using capacity scaling, refer to the capacity scaling considerations section of the *IBM TotalStorage Enterprise Tape System 3592 Introduction and Planning Guide* (GA32-0464).

Media and cartridge capacity

The 3592 Model J1A uses a new tape cartridge with an advanced metal particle tape specifically optimized for the enterprise tape environment, providing a native cartridge capacity of 300 GB (or up to 900 GB with 3:1 compression). This is a significant improvement over the 10 GB to 60 GB native cartridge capacity available with the 3590 B, E, or H Models. This can be very beneficial in space savings and economy of data storage since it can help lower the cost of storage per megabyte. For applications that fill current data cartridges, this can help reduce the number of tape cartridges required. The reduced number of cartridges may also help free up floor space for other requirements and reduce the number of automation slots used.

The robust 3590-style cartridge shell is designed to sustain a 1 meter drop. The cartridge has a similar form factor as the 3590 and 3490, allowing it to be used in Enterprise Tape Library 3494 and STK Silo ACS solutions. The Enterprise Tape Cartridge 3599 also contains cartridge memory that is a passive, contactless silicon

storage device. It is used to hold information about the specific cartridge, including the VOLSER, the media in the cartridge, and the drive.

Attachment options

The 3592 Model J1A has dual-ported 2-Gbps native switched fabric Fibre Channel interfaces. This offers attachment flexibility in an open systems environment. The drives can be directly attached to open systems servers with Fibre Channel, or to ESCON or FICON servers with the 3590 A60 or 3592 J70 Controller. The 3592 Model J1A is supported in a wide range of environments including selected zSeries, S/390, iSeries, AS/400, pSeries, RS/6000, xSeries, Sun, and Hewlett Packard servers, as well as Intel-compatible servers running Microsoft Windows and Linux. The 3592 Model J1A can also attach to zSeries servers with FCP channels and Linux. The 3592 Model J1A may provide value-add when supported in an Enterprise Tape Library 3494 and in a StorageTek 9310 ACS environment.

Statistical Analysis and Recording System

The 3592 Model J1A uses the Statistical Analysis and Recording System to assist in isolating failures between media and hardware. It is designed to use the cartridge performance history saved in the cartridge and drive performance history kept in the drive to determine the more likely cause of failure. It is designed to cause the drive to mark the media as degraded, and to indicate that the hardware has degraded.

AIX® high availability data path failover and dynamic load balancing

AIX high availability data path failover is designed to provide a failover mechanism in the AIX Atape device driver, that enables you to configure multiple redundant paths in a SAN environment with the 3592 Model J1A. In the event of a path or component failure, the failover mechanism is designed to automatically provide error recovery to retry the current operation using an alternate, preconfigured path without aborting the current job in progress. This allows you flexibility in SAN configuration, availability, and management.

A function in the AIX Atape device driver, Dynamic Load Balancing, is also available for the 3592 Model J1A Tape Drives used in an AIX SAN environment. The dynamic load balancing support is designed to optimize resources for devices that have physical connections to multiple Host Bus Adapters (HBA) in the same machine. When an application opens a device that has multiple HBA paths configured, the device driver determines which path has the HBA with the lowest usage, and assigns that path to the application. The device driver is designed to dynamically track the usage on each HBA as applications open and close devices, and balance the number of applications using each HBA in the machine. This may help optimize HBA resources and improve overall performance.

Additional enhancements

The 3592 Model J1A also has additional enhancements that may help improve performance, capacity, and availability including:

- **N+1 power supplies:** The 3592 Model J1A incorporates n+1 power supplies when it is installed in an automation frame. This is designed to help increase drive availability in the event of a power supply failure.

- Large internal data buffer: The 3592 Model J1A drive has a 128 MB internal data buffer versus a 16 MB maximum in the 3590 Tape Drive.
- Digital speed matching: The 3592 Model J1A is designed to dynamically perform digital speed matching to adjust the drive's native data rate to the net host data rate (after data compressibility has been factored out). This is designed to help to reduce the number of backhitch repositions and improve throughput performance.
- Channel calibration: The channel calibration feature is designed to allow for customization of each read/write data channel for optimum performance. The customization can enable compensation for variations in the recording channel transfer function, media characteristics, and read/write head characteristics. The 3592 Model J1A is designed to automatically perform recalibration in the field if it detects degraded performance.
- High resolution tape directory plus enhanced search speed: The 3592 Model J1A Tape Drive maintains a new tape directory structure with a high granularity of information about the physical position of data blocks on the media. This feature plus the increased search speed allow the 3592 Model J1A to have improved nominal and average access times for locate operations versus previous IBM tape drives.
- Streaming Lossless Data Compression (SLDC) algorithm: SLDC is an implementation of a Lempel-Ziv class 1 (LZ-1) data compression algorithm. It is an extension to Adaptive Lossless Data Compression (ALDC) and is designed to offer an improvement over previous IBM lossless compression algorithms.

- Large-scale automated tape installations where performance, capacity, and reliability are requirements
- Large-scale mass data archive applications where massive amounts of data need to be quickly saved to tape for storage and later recall (examples include the seismic industry, data warehousing, and record management applications)

Statement of general direction

IBM plans to add three significant features to the IBM TotalStorage Enterprise Tape Drive 3592 in the future. They are Write Once Read Many (WORM) functionality, cartridge segmentation, and lower capacity cartridges. IBM will introduce a new 3592 tape cartridge that is designed to work in conjunction with the IBM 3592 Tape Drive to provide WORM capability. This is intended to provide a cost-effective solution for non-rewriteable, non-eraseable long term records retention. In addition, IBM plans to support segmentation of an individual tape cartridge into two parts: a smaller portion at the beginning of the tape and a larger portion as the balance of the tape. This segmentation is designed to provide the customer with rapid access to data at the beginning of the tape, and high capacity storage on the remainder of the cartridge. Finally, as the IBM 3592 Tape Drive technology is designed to be able to support tape cartridges of varying capacities, IBM plans to provide alternative tape cartridges at lower capacity points. This is intended to provide customers with cartridges that provide rapid access to data at low cartridge costs. All information being released represents IBM's current intent, is subject to change or withdrawal, and represents only goals and objectives.

All statements regarding IBM's plans, directions, and intent are subject to change or withdrawal without notice.

Product positioning

The Enterprise Tape Drive 3592 Model J1A is the follow-on to the highly successful Enterprise Tape Drive 3590. The 3592 Model J1A is supported in a wide range of environments including selected zSeries, S/390, iSeries, AS/400, pSeries, RS/6000, xSeries, Sun, and Hewlett Packard servers, as well as Intel-compatible servers running Linux and Microsoft Windows NT, Windows 2000, or Windows Server 2003. It has significant performance and capacity benefits over the IBM 3590, as well as other half-inch tape drives such as the IBM 3480, 3490, or 3490E.

The 3592 Model J1A is designed for high-performance computing environments where high reliability, capacity, and performance are mandated. You should consider it in the following environments:

- Current Enterprise Tape Drive 3590 applications in Enterprise Tape Library 3494, STK Silo, or stand-alone environments where:
 - Space allocated to tape cartridges needs to be reduced within automation solutions or offline storage.
 - Backup windows are growing and there is a need for higher-performance tape drives to backup larger amounts of data in less time.
 - A Fibre Channel attached drive with native switched fabric capability is required.
- Other large scale tape environments, such as:
 - High-speed data save operations where backup windows are critical, and large amounts of data are archived to tape

Product number

Description	Machine type	Model	Feature number
Enterprise Tape Drive	3592	J1A	
Drive Microcode Update	3592	J1A	0500
Install J1A in rack	3592	J1A	4674
Remove J1A from rack	3592	J1A	4772
Rack Left Cradle	3592	J1A	4802
Rack Right Cradle	3592	J1A	4812
7 M LC/SC Fibre Cable	3592	J1A	5907
13 M LC/SC Fibre Cable	3592	J1A	5913
22 M LC/SC Fibre Cable	3592	J1A	5922
61 M LC/SC Fibre Cable	3592	J1A	5961
5 M LC/LC Fibre Cable	3592	J1A	6005
13 M LC/LC Fibre Cable	3592	J1A	6013
25 M LC/LC Fibre Cable	3592	J1A	6025
61 M LC/LC Fibre Cable	3592	J1A	6061
3592 Cleaning Cartridge	3592	J1A	8802
3592 Data Cart (20-pack)	3592	J1A	8820
zSeries ESCON/FICON Attach	3592	J1A	9000
Open System Device Drivers	3592	J1A	9200
HP-UX Attachment	3592	J1A	9210
Sun Attachment	3592	J1A	9211
Windows Attachment	3592	J1A	9212
Other Non-IBM Attachment	3592	J1A	9213
Other Linux Attachment	3592	J1A	9215
zSeries Linux Attachment	3592	J1A	9216
iSeries OS/400® Attachment	3592	J1A	9400
No Data Cartridges	3592	J1A	9590
pSeries AIX Attachment	3592	J1A	9600

Plant Install J1A in 3494	3592	J1A	9673
Plant Install J1A in C20	3592	J1A	9675

LC = Lucent Connector
SC = Standard Connector

Model Conversions: None

Feature Conversions: None

Reference information

- The IBM TotalStorage Enterprise Tape Drive 3592 attachment in the IBM TotalStorage Enterprise Automated Tape Library Models L22, D22, and D24 in Hardware Announcement 103-239, dated September 9, 2003
- The IBM TotalStorage Enterprise Tape Drive 3592 attachment in the IBM TotalStorage Silo Compatible Tape Drive Frame 3592 Model C20 in Hardware Announcement 103-233, dated September 9, 2003
- The IBM TotalStorage Enterprise Tape Drive 3592 attachment to ESCON/FICON channels through the IBM TotalStorage Enterprise Tape Controller 3590 Model A60 in Hardware Announcement 103-237, dated September 9, 2003
- The IBM TotalStorage Enterprise Tape Drive 3592 attachment to ESCON/FICON channels through the IBM TotalStorage Enterprise Tape Controller 3592 Model J70 in Hardware Announcement 103-236, dated September 9, 2003
- The IBM TotalStorage Enterprise Tape Cartridge 3592 available with new models of the 3599 in Hardware Announcement 103-238, dated September 9, 2003

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