

IBM TotalStorage™ Enterprise Tape System 3590 for Midrange and Open Systems



Frame-mounted 3590 Model E11

Highlights

- **Attaches to IBM @server iSeries™ (AS/400®), pSeries™ (RS/6000®), xSeries™, Hewlett-Packard, Sun Microsystems, Intel-based systems running Linux®, Microsoft Windows NT® and Windows® 2000; and IBM @server zSeries™ (S/390®) systems**
- **Offers the choice of an Ultra SCSI interface (maximum instantaneous data rate is 40MB/sec) or native Fibre Channel attachment (maximum instantaneous data rate is 100MB/sec)**

- **Features an uncompressed drive data rate of up to 14MB/sec to help reduce backup and recovery times**
- **Includes a 10-cartridge Automated Cartridge Facility (ACF) that functions as a mini-library, which can randomly access up to 1.8TB of data (3:1 compression) for the 3590 Model H**
- **Uses 3590 extended-length tape cartridges that can contain up to 180GB of data (3:1 compression)**

Overview

The IBM TotalStorage Enterprise Tape System 3590 consists of a family of powerful integrated storage solutions that are designed to provide high levels of performance and data reliability for both stand-alone and automated systems.

Exceptional performance

The 3590 Tape Drive provides a native data rate of up to 14MB/sec. With Ultra SCSI attachment, the 3590 Models E and H are capable of reaching sustained data rates of up to 34MB/sec with 3:1 compression. With native Fibre Channel attachment, the maximum sustained data rate is 42MB/sec (with 3:1 compression).

High-capacity media

Using Extended High Performance Cartridge Tape, a 3590 Model H Tape Drive can store up to 60GB of data (180GB with 3:1 compression) on a single cartridge. A 3590 Model E Tape Drive can store up to 40GB of data (120GB with 3:1 compression) on a single cartridge, and a 3590 Model B can store up to 20GB of data (60GB with 3:1 compression) on a cartridge. Potential benefits include less tape cartridge handling, improvements in automation slot utilization, and a reduction in floor space requirements.

The 3590 metal particle tape media is housed in a cartridge with the same physical size as 3490 cartridges, enabling both to coexist in an IBM TotalStorage Enterprise Automated 3494 Tape Library. The Enterprise Tape Library 3494 with 3590 Tape Drives provides access to as much as 1122TB (with 3:1 compression) of data.

Improved data integrity and reliability

The 3590 Tape Drive is designed for mission-critical data storage. Error Correction Codes (ECC) and servo tracks written on each tape cartridge help promote data integrity. Resident diagnostics dynamically monitor drive and media performance to detect

potential problems and aid in resolution. In addition, the 3590 provides redundant data protection capabilities. Because data is systematically disbursed across the media as it is written and redundant parity checking bits are included, there is a lower chance of information loss should a media error occur.

Leading-edge technology

The 3590 Tape Drive uses a bidirectional longitudinal serpentine recording technique and a magneto-resistive head that concurrently reads and writes 16 data tracks. This means that 384 tracks of data can be reliably written onto 3590 media with the 3590 Model H Tape Drive. In addition, a digital channel technology helps further increase data integrity.

Investment protection

Existing Model B11, B1A, E11 and E1A Tape Drives can be field-upgraded to the Model H, which helps protect existing investments in 3590 technology. Media investments can also be protected, because the Model E drives can read (both 128 and 256 tracks) and write (256 tracks) to existing cartridges. Model H drives can read (both 128 and 256 tracks) and write (384 tracks) to existing cartridges. Customers can choose the 3590 model that best suits their performance/capacity requirements.

Cost-effectiveness

High-capacity media along with high-performance drives can mean that less equipment, fewer cartridges, and fewer tape mounts are required to process the same amount of data. This can translate into less floor space being

needed for tape drive, tape library and tape cartridge storage.

As data growth accelerates, the resulting potential savings from higher density media and higher performance drives can also help data center managers better control costs and more efficiently manage data. Because the 3590 Tape Drive can be used as the foundation for a broad array of storage systems, it helps protect existing investments. The 3590 also provides the capability to share tape drives through two Ultra SCSI or Fibre Channel ports.

Ease of use

The 3590 Models B11, E11 and H11 incorporate a standard 10-slot ACF for high-capacity, stand-alone unattended operation. The ACF can be used in random-access mode as a mini-library. Cartridges are loaded into the ACF in a convenient, portable 10-cartridge magazine. The 3590 also features an operator/service display showing device status, activities, error conditions and messages.

Fibre Channel support

The 3590 Models E11, E1A, H11 and H1A provide native Fibre Channel attachment for drives used in stand-alone configurations, with the Enterprise Tape Library 3494 or with a StorageTek Automated Cartridge System (ACS).

Fibre Channel servers can be supported at distances of up to 500 meters from the 3590 Tape Drive or up to 10 kilometers with the appropriate Fibre Channel fabric.

Fibre Channel Fabric:

- *IBM 2103 Fibre Channel Storage Hub (distance only)*
- *IBM TotalStorage SAN Switch 2109*
- *McDATA® ED-1000 Loop Switch for attaching to McDATA Enterprise Fibre Channel Directors*
- *INRANGE® FC/9000 Fibre Channel Directors*

High availability configuration support:

- *The new AIX® high-availability failover mechanism in the AIX tape device driver enables multiple redundant paths in a Storage Area Network (SAN) to 3590 Model E and Model H Tape Drives having Fibre Channel attachment. In the event of a path or component failure, the failover mechanism is designed to automatically seek to retry the current operation using an alternate, preconfigured path without aborting the current job in progress. This can help provide improved availability in a SAN configuration.*
- *The AIX tape device driver also offers dynamic load balancing for 3590 Fibre Channel drives used in an AIX SAN environment. The dynamic load balancing support optimizes resources and can improve overall performance for devices that have physical connections to multiple Host Bus Adapters (HBAs) in the same machine.*

Service

The 3590 Tape Drive does not require scheduled preventive maintenance. IBM customer engineers use a built-in diagnostic panel to perform service functions.

TotalStorage Enterprise Tape System 3590 at a glance

Model number	B11 (rack)	B1A (library)	E11 (rack)	E1A (library)	H11 (rack)	H1A (library)
3590 characteristics						
LZ1 compression	Standard	Standard	Standard	Standard	Standard	Standard
Recording technique	(interleaved serpentine longitudinal)					
Number of tracks ¹	128	128	256	256	384	384
Cartridge capacity (with compression ²)	10GB (30GB)	10GB (30GB)	20GB (60GB)	20GB (60GB)	30GB (90GB)	30GB (90GB)
Extended-length cartridge capacity (with compression ²)	20GB (60GB)	20GB (60GB)	40GB (120GB)	40GB (120GB)	60GB (180GB)	60GB (180GB)
Support for extended-length cartridge	Standard ⁴	Standard ⁴	Standard ⁴	Standard ⁴	Standard	Standard
10-cartridge magazine (with compression)	Up to 200GB	na	Up to 400GB	na	Up to 600GB	na
Total capacity with compression ²	Up to 600GB	na ³	Up to 1.2TB	na ³	Up to 1.8TB	na ³
Native drive data rate	9MB/sec	9MB/sec	14MB/sec	14MB/sec	14MB/sec	14MB/sec
Burst data rate with Ultra SCSI ²	40MB/sec	40MB/sec	40MB/sec	40MB/sec	40MB/sec	40MB/sec
Burst data rate with Fibre Channel ²	na	na	100MB/sec	100MB/sec	100MB/sec	100MB/sec
High-speed search	5 meters/sec	5 meters/sec	5 meters/sec	5 meters/sec	5 meters/sec	5 meters/sec
Operating environment						
Temperature with media in use	60° F to 90° F (16° C to 32° C)					
Relative humidity	20% to 80%					
Wet bulb maximum	73.4° F; 23° C	73.4° F; 23° C	78° F; 25° C	78° F; 25° C	78° F; 25° C	78° F; 25° C
Heat output (BTU/hr)	1,024	1,024	770	770	770	770
Power requirements (kVA)	0.300	0.300	0.225	0.225	0.225	0.225
Dimensions						
Height	20.6" (522mm)	10.5" (262mm)	20.6" (522mm)	10.5" (262mm)	20.6" (522mm)	10.5" (262mm)
Width	9.1" (230mm)	8.8" (221mm)	9.1" (230mm)	8.8" (221mm)	9.1" (230mm)	8.8" (221mm)
Depth	39.0" (988mm)	29.8" (750mm)	39.0" (988mm)	29.8" (750mm)	39.0" (988mm)	29.8" (750mm)
Weight	109.0 lbs (49.5 kg)	63.0 lbs (28.6 kg)	103.0 lbs (46.7 kg)	66.0 lbs (30.0 kg)	103.0 lbs (46.7 kg)	66.0 lbs (30.0 kg)

¹ B Models use eight sets of 16 tracks; E Models use 16 sets of tracks, H Models use 24 sets of tracks

² Depending on data content, with 3:1 LZ1 compression

³ Depending on library model, since B1A, E1A and H1A reside in an IBM 3494 or in a Silo Compatible Frame for the StorageTek 4410 or 9310 ACS

⁴ For models shipping after March 3, 2000

3590 models

The 3590 is available in several configurations for Ultra SCSI and Fibre Channel attachment:

- *The 3590 Models B11, E11 and H11 are rack-mounted and incorporate a 10-cartridge ACF for high-capacity unattended operation. The Models B11, E11 and H11 can be converted to Models B1A, E1A or H1A.*
- *The 3590 Models B1A, E1A and H1A have no ACF and are designed to be incorporated into the 3494 Enterprise Tape Library.*
- *The 3590 Model C12 Silo Compatible Frame (with one to four Model B1A, E1A or H1A tape drives) provides attachment to the StorageTek 4410 and 9310 ACS.*

For more information

For more information, contact your IBM representative or your IBM Business Partner. In the United States, you can also call IBM Direct: 1-800-IBM-CALL (1-800-426-2255). Or visit www.ibm.com/storage.



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GB equals one billion bytes when referring to hard drive capacity; accessible capacity may be less.

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