Hardware Announcement
February 15, 2005

IBM TotalStorage 3588 Tape Drive provides an Ultrium 3 Tape Drive for the 3584 Tape Library

Overview

The **IBM TotalStorage® 3588 Tape Drive Model F3A** is designed for installation in a **IBM TotalStorage 3584 Tape Library** to offer high capacity, performance, and technology designed for the midrange open systems environment. This model incorporates the new Linear Tape-Open (LTO) **IBM TotalStorage Ultrium 3 Tape Drive**, which more than doubles maximum tape drive throughput data rate performance over the IBM LTO generation 2 Tape Drive (Ultrium 2). It has a native data transfer of up to 80 MB/sec. In addition, with the use of the **IBM TotalStorage LTO Ultrium 400 GB Data Cartridge**, the 3588 Tape Drive doubles the tape cartridge capacity up to 400 GB native physical capacity (800 GB with 2:1 compression), as compared to the IBM Ultrium 2 Tape Drives and cartridges. IBM Ultrium 3 Tape Drives can read and write LTO Ultrium 2 Data Cartridges and read LTO Ultrium 1 Data Cartridges. The 3588 Model F3A comes with a 2-Gbps Fibre Channel interface for connection to a wide spectrum of open system servers.

Other Ultrium 3 Tape Drive enhancements to help improve performance and reliability include the addition of a new dual stage 16 head actuator designed to provide precision head alignment, new independent tape loader and threader motors with positive pin retention, graceful dynamic breaking designed to maintain tension to help prevent stretching or breaking the tape and loose tape wraps, a larger 128 MB internal buffer, and highly integrated electronics using IBM-engineered copper technology.

The 3588 Tape Drive Model F3A can be installed in new or installed 3584 Tape Library Models L52 and D52, and also in installed 3584 Tape Library Models L32 and D32.

Product preview

The 3588 Tape Drive Model F3A fulfills the product preview included in Hardware Announcement 104-439, dated November 23, 2004.

IBM intends to introduce and support Write Once, Read Many (WORM) functionality in products featuring IBM TotalStorage LTO Ultrium 3 Tape Drives. Earlier non-WORM generation 3 drives can be upgraded for WORM support via an update of the firmware to use the new generation 3 WORM Media cartridge as it is made available. Products will be fully compliant to the LTO generation 3 standard for WORM functionality.

Previews provide insight into IBM plans and direction. Specific availability dates, ordering information, and terms and conditions will be provided when the product functionality is announced.

Key prerequisites

Appropriate levels of host software are required to attach the 3588 Tape Drive to selected IBM @server® i5 or iSeries™, AS/400®, IBM @server® p5 or pSeries®, RS/6000®, IBM @server® xSeries®, HP, Sun, UNIX®, and Intel™ servers. Refer to the **Technical information** section for details.

Planned availability date

March 4, 2005

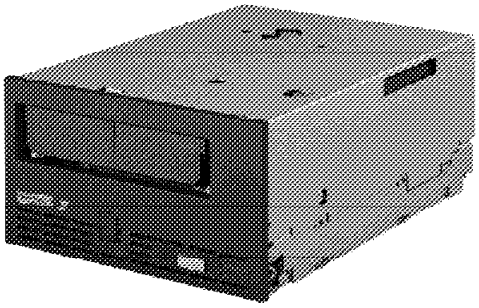
At a glance

The IBM TotalStorage 3588 Tape Drive Model F3A is an IBM LTO Ultrium 3 Tape Drive that combines IBM tape reliability and performance at open systems prices. The new Ultrium 3 Tape Drive:

- More than doubles maximum data transfer rate, up to 80 MB/sec native as compared to LTO Ultrium 2
- Doubles cartridge capacity, up to 400 GB native physical capacity per cartridge (800 GB with 2:1 compression)
- Includes a 2-Gbps Fibre Channel interface attachment
- Offers enhanced features over Linear Tape-Open (LTO) Ultrium 2 in new dual stage 16 channel head actuator, new independent tape loader and threader motors, and internal buffer size
- Adheres to LTO specifications
- Mounts in a 3584 Tape Library Model L52, L32, D52, or D32

For ordering, contact:
Your IBM representative, an IBM Business Partner, or the Americas Call Centers at
800-IBM-CALL Reference: YE001

Description



The IBM TotalStorage 3588 Tape Drive Model F3A is an IBM Linear Tape-Open (LTO) Ultrium 3 Tape Drive designed for the heavy demands of backup tape storage. The 3588 Tape Drive Model F3A is designed to mount in an IBM TotalStorage 3584 Tape Library and has a 2-Gbps Fibre Channel interface for attachment to IBM @server® p5 or pSeries, IBM @server® i5 or iSeries, IBM @server® xSeries, AS/400, RS/6000, HP, Sun, UNIX, and Intel servers.

The 3588 Tape Drive Model F3A incorporates third-generation IBM LTO Ultrium technology. It offers the following significant improvements over the Ultrium 2 Tape Drive:

- Maximum tape drive throughput data rate performance is more than doubled, up to 80 MB/sec native data transfer rate. Data tracks are now written 16 at a time. IBM Ultrium 3 Tape Drives can read and write, at eight data tracks at a time, LTO Ultrium 2 Data Cartridges at Ultrium 2 rates, and read LTO Ultrium 1 Data Cartridges at Ultrium 1 rates.

  Note: Although the 3588 Tape Drive provides the capability for excellent tape performance, other components of the system may limit the actual performance achieved. Also, although the compression technology used in the tape drive can typically double the amount of data that can be stored on the media, the actual degree of compression achieved is highly sensitive to the characteristics of the data being compressed.

- The tape cartridge capacity is doubled over the Ultrium 2 Data Cartridge up to 400 GB native physical capacity (800 GB with 2:1 compression), with the use of the new IBM TotalStorage LTO Ultrium 400 GB Data Cartridge. This is achieved by increasing the linear density, the number of tape tracks, and the media length. The tape itself is an advanced metal particle tape developed to help provide durability and capacity.

- Ultrium 2 cartridge compatibility — The Ultrium 3 Tape Drive can read and write on Ultrium 2 cartridges.

- 2-Gbps Fibre Channel attachment — The 3588 Model F3A comes with a 2-Gbps Fibre Channel interface for connection to a wide spectrum of open system servers. They are supported on AIX®, OS/400®, i5/OS, Sun Solaris, HP-UX, Microsoft™ Windows™ 2000, Windows 2003, Linux™, and other open systems.

- New dual stage 16 channel head actuator — designed to provide precision head alignment to help support higher track density and improved data integrity.

- New independent tape loader and threader motors and positive pin retention — designed to help improve the reliability of loading and unloading a cartridge, and to retain the pin even if tension is dropped. With an independent loader motor coupled with the positive pin retention, the tape threads with a higher level of reliability.

- Larger internal data buffer — There is a 128 MB internal data buffer in the Ultrium 3 Tape Drive as compared to a 64 MB internal data buffer in the Ultrium 2 Tape Drive.

- Highly integrated electronics using IBM-engineered copper technology — designed to reduce the total number of components in the drive, lower chip temperatures, and reduce power requirements, helping to provide for a more reliable drive. The generation 3 drive electronics are also designed to provide “on-the-fly” error correction capability for soft errors in the memory arrays in data and control paths.

- Graceful dynamic braking — In the event of power failure, reel motors are designed to maintain tension and gradually decelerate instead of stopping abruptly, helping reduce tape breakage, stretching, or loose tape wraps during a sudden power-down.

Proven IBM LTO Ultrium features enhanced in IBM LTO Ultrium 3 Tape Drive include:

- Servo and track layout technology — There are 704 data tracks in Ultrium 3 verses 512 data tracks in Ultrium 2. High bandwidth servo system features a low-mass servo to help more effectively track servo bands and improve data throughput with damaged media in less-than-optimal shock and vibe environments.

- Surface Control Guiding Mechanism — IBM′s patented Surface Control Guiding Mechanism is designed to guide the tape along the tape path in the IBM 3588 Tape Drive. This method uses the surface of the tape, rather than the edges, to control tape motion. This helps reduce tape damage (especially to the edges of the tape) and tape debris, which comes from the damaged edges and can accumulate in the head area.

- Magneto Resistive (MR) head design — Use of flat lap head technology in MR heads for Ultrium 3 helps minimize contact, debris accumulation, and wear on the tape as it moves over the read/write heads.

- Digital speed matching — The Ultrium 3 Tape Drive is designed to perform dynamic speed matching (at one of five speeds, 40, 50, 60, 70, 80 MB/sec) to adjust the drive′s native data rate as closely as possible to the net host data rate (after data compressibility has been factored out). This helps reduce the number of backhitch repositions and improve throughput performance. Speed matching on Ultrium 3 ranges from 40 to 80 MB/sec versus 17.5 to 35 MB/sec on Ultrium 2.

- Robust drive components optimized for automation environments — Drive designed using some of the most robust components available, such as: (1) all metal clutch, (2) steel ball bearings in loader, (3) robust leader block design, (4) single circuit card, to help enhance reliability and prolong the life of the drive.

- Power management — The Ultrium 3 Tape Drive power management function is designed to control the drive electronics to be either completely turned off or to be in a low-power mode when the circuit functions are not needed for drive operation.

- Adaptive read equalization — designed to automatically compensate for dynamic changes in readback signal response.

- Dynamic amplitude asymmetry compensation — designed to dynamically optimize readback signals for linear readback response from magneto resistive read head transducers.
- Separate writing of multiple filemarks — Separate writing of multiple filemarks is designed to cause any write command of two or more filemarks to cause a separate data set to be written containing all filemarks after the first. This feature has two advantages, first it helps improve performance if a subsequent append overwrites somewhere after the first filemark. Second, write of multiple filemarks typically indicates a point where an append operation might occur after the first of these filemarks. This change helps prevent having to rewrite datasets containing customer data and the first filemark in cases if such an append occurs.
- LTO Data Compression (LTO-DC) — The Ultrium 3 uses LTO-DC which is an implementation of a Lempel-Ziv class 1 (LZ-1) data compression algorithm. LTO-DC is an extension of Adaptive Lossless Data Compression (ALDC) and an improvement over previous IBM lossless compression algorithms. IBM's patented "Scheme-Swapping" compression is designed to look ahead at incoming data, and determine the most efficient storage method (either ALDC or pass-thru mode) to help provide optimal data compression and increased data throughput.
- LTO Cartridge Memory (LTO-CM) — Contained within the LTO Ultrium data cartridge is the LTO-CM, which is a passive, contactless silicon storage device that is physically a part of the cartridge. The LTO-CM is used to hold information about that specific cartridge, the media in the cartridge, and the data on the media. The storage capacity of the LTO-CM is 4,096 bytes. Communication between the drive and the LTO-CM is via a low-level RF field transmitted by the drive to the cartridge.
- Statistical Analysis and Reporting System (SARS) — The Ultrium 3 Tape Drive uses SARS to help isolate failures between media and hardware. The SARS use the cartridge performance history saved in the CM module and the drive performance history kept in the drive flash EEPROM to help determine the more likely cause of failure. SARS can cause the drive to request a cleaner tape, to mark the media as degraded, and to indicate that the hardware has degraded.

With support for LTO Ultrium-format tape data cartridges, the 3588 Tape Drive with the 3584 Tape Library can be a cost-effective solution for backup, save-and-restore, and archiving functions.

Product positioning

As you compare competitive tape solutions, consider:

- Capacity and performance requirements
- Data integrity, reliability, and availability
- Storage usage and application requirements
- Affordability
- Loyalty to legacy or existing tape formats

The 3588 Tape Drive and software applications are designed to address these requirements and constitute a functionally rich tape storage solution incorporating LTO Ultrium 3 Tape Drive technology.

The 3588 Tape Drive Model F3A is an excellent choice if you use tape drives that require larger-capacity or higher-performance tape backup. The 3588 is the answer to growing storage requirements and shrinking backup windows.

The 3584 Tape Library and IBM software applications excel in addressing these requirements and can constitute a functionally rich tape storage solution incorporating LTO Ultrium and 3592 tape technology. You also gain flexibility of automated tape library management and unattended save/restore operations.

The 3584 Tape Library models are a smart choice for tape automation for p5 and pSeries, RS/6000, i5 and iSeries, AS/400, IBM @server® zSeries® Linux, xSeries, and other popular open systems. The IBM 3584 utilizes the patented Multi-Path Architecture, designed to allow homogeneous or heterogeneous open systems applications to share the library robotics, with ALMS for storage slot pooling and flexible drive assignment. Additional 3584 features include: Capacity on demand entry library frames, LTO and 3592 drive technology choices and integration, dual active accessors, and 16-frame expansion.

The 3584 Tape Library with 3592 Model J1A Tape Drives should be considered when:

- 3592 Tape Drives are required in the 3584 Tape Library.
- A lower capacity, lower price library than the IBM TotalStorage Enterprise Tape Library 3494 is needed.
- A smaller footprint, higher density library than the 3494 is desired.
- ESCON® or FICON™ connections are not required.

The 3584 Tape Library Base Frame Model L52 offers 64 to 287 slots for LTO Ultrium tape cartridge media and up to 12 IBM LTO Ultrium Fibre Channel Tape Drives. It is designed to provide excellent price/performance in the open systems environments.

The 3584 Tape Library Base Frame Model L22 offers 58 to 260 slots for 3592 tape cartridge media and up to 12 IBM 3592 Tape Drives. The 3592 Tape Drives are designed to provide high capacity, performance, and reliability in open systems environments with tape drive flexibility to accommodate capacity as well as fast access where these requirements are needed.

Up to 16 3584 Tape Library Expansion Frame Models D22, D32, or D52 can be added to either the Model L22, L32, or L52. The Model D22 provides up to 400 cartridge slots for 3592 media, and can contain up to 12 3592 Tape Drives. The Model D32 provides up to 440 slots for Ultrium media, and can contain up to 12 Ultrium 1 or 2 Tape Drives. The Model D52 provides up to 440 slots for LTO media, and can contain up to 12 Ultrium 2 or 3 Fibre Channel Tape Drives. When a Model HA1 is attached, the last Model D22 or D52 in the 3584 Tape Library functions as a Service Bay B for the second accessor.

The 3584, part of a family of IBM TotalStorage LTO Ultrium tape products, is the answer to growing storage requirements and shrinking backup windows.

If you have existing digital linear tape experience or require high-performance automated tape backup, the 3584 Tape Library constitutes an excellent tape storage solution. The IBM LTO Ultrium Tape Drives in the 3584 Tape Library provide an excellent functional alternative to DLT/SDLT, 1/4-inch, 4mm, 8mm, or IBM Magstar® MP 3570 tape drives.

For capacity requirements less than 25 TB (native), a wide spectrum of tape libraries are available from the IBM TotalStorage Ultrium Tape family of products, depending on your customer's storage usage and requirements. Tape automation products to choose from include the IBM

TotalStorage 3582 or 3583 Tape Libraries and the IBM TotalStorage 3581 Tape Autoloader.

For mission-critical data protection needs, optimized for enterprise multimode and host attachment, high-cycle and start/stop intensive tape applications, consider the proven IBM TotalStorage 3592 Tape Drive with the IBM TotalStorage 3584 Tape Library or the IBM TotalStorage 3494 Tape Library.

Reference information

- The 3584 Tape Library support of the 3588 Model F3A, Hardware Announcement 105-061, dated February 15, 2005
- The 3584 Models D22, D52, L22, and L52, Hardware Announcement 104-135, dated April 27, 2004
- The IBM TotalStorage Enterprise Tape Drive 3592 Model J1A, Hardware Announcement 103-235, dated September 9, 2003
- The improved functions and expanded attachment to 16 frames in the UltraScalable Tape Library 3584, Hardware Announcement 103-171, dated June 3, 2003
- The Ultrium 2 Tape Drive in the UltraScalable Tape Library 3584, Hardware Announcement 103-004, dated January 28, 2003
- Expanded I/O and remote library access features for the UltraScalable Tape Library 3584, Hardware Announcement 101-165, dated June 12, 2001
- Native Fibre Channel Support for the UltraScalable Tape Library 3584, Hardware Announcement 101-041, dated February 20, 2001
- The UltraScalable Tape Library 3584, Hardware Announcement 100-237, dated August 23, 2000

Business Partner information

If you are a Direct Reseller - System Reseller acquiring products from IBM, you may link directly to Business Partner information for this announcement. A PartnerWorld ID and password are required (use IBM ID).

BP Attachment for Announcement Letter 105-063

https://www.ibm.com/partnerworld/mem/sla.jsp?num=105-063

IBM US Announcement Supplemental Information

February 15, 2005

Publications

Information on the 3588 Tape Drive Model F3A is contained in the following 3584 Tape Library publications. Additional copies are available. To order, contact your IBM representative:

Title	Order number
IBM TotalStorage® 3584 Tape Library Introduction and Planning Guide	GA32-0469
IBM TotalStorage 3584 Tape Library Operator Guide	GA32-0468
IBM Ultrium Device Driver Installation and User's Guide (English)	GA32-0430
IBM TotalStorage Tape Device Driver Installation and User's Guide (English)	GA35-0154

The publications listed above and the publication *IBM Ultrium Device Driver Programming Reference (English)* (GC35-0483) are also available at

http://www.ibm.com/servers/storage/tape/lto

The Publication Notification System (PNS) is available by order number/product number. Customers currently subscribing to PNS will automatically receive notifications by e-mail. Customers who want to subscribe can visit the PNS Web site location at

http://www.elink.IBMLink.ibm.com/public/applications/publications/cgibin/pbi.cgi

The publications listed on the notification can be ordered by calling the Pubs Support Group in Raleigh at 800-879-2755, option 1.

The IBM Publications Center Portal

http://www.elink.ibmlink.ibm.com/public/applications/publications/cgibin/pbi.cgi

The Publications Center is a worldwide central repository for IBM product publications and marketing material with a catalog of 70,000 items. Extensive search facilities are provided, as well as payment options via credit card. A large number of publications are available online in various file formats, which can currently be downloaded free of charge.

Note that PNS subscribers most often order their publications via the Publication Center.

Services

Integrated Technology Services

IBM services include business consulting, outsourcing, hosting services, applications, and other technology management.

These services help you learn about, plan, install, manage, or optimize your IT infrastructure for e-business. They can help you integrate your high-speed networks, storage systems, application servers, wireless protocols, and an array of platforms, middleware, and communications software for IBM and many non-IBM offerings. IBM is your one-stop shop for IT support needs.

For details on available services, contact your IBM representative or visit

http://www.ibm.com/services/

For details on education offerings related to specific products, visit

http://www.ibm.com/services/learning/index.html

Select your country, and then select the product as the category.

Technical information

Specified operating environment

Physical specifications

3588 Model F3A

- Width: 186 mm (7.3 in)
- Depth: 455 mm (17.9 in)
- Height: 89 mm (3.5 in)
- Weight: 4.96 kg (10.9 lb)

Operating environment

3588 Model F3A

- Temperature: 16° to 38°C (60° to 100°F)
- Relative humidity: 20 to 80 (percent)
- Wet bulb: 26°C (78.8°F) maximum
- Voltage: 5 V dc and 12 V dc
- Electrical power: 5.0 amps at 5 V dc and 2.0 amps at 12 V dc
- Heat output: 49 watts (0.17 kBTU/hour)
- Capacity of exhaust: 0.34 Cubic meter/min (12 CFM)
- Maximum sound power levels: 6.2 bels idle, 6.3 bels operating

This announcement is provided for your information only. For additional information, contact your IBM representative, call 800-IBM-4YOU, or visit the IBM home page at: http://www.ibm.com.

Hardware requirements: The 3588 Tape Drive Model F3A is designed for installation in the 3584 Tape Library Models D32, D52, L32, or L52. Up to 12 3588 Tape Drives can be installed in one of these frames (for a total of up to 192 Ultrium Tape Drives in a 16 frame library). The 3588 Tape Drives can be installed and intermixed within the same frame with other Ultrium 1 or 2 Tape Drives.

The 3588 Tape Drives have a 2-Gbps Fibre Channel interface for either point-to-point or Fibre Channel-Arbitrated Loop attachment. An LTO Fibre Drive Mounting Kit feature (#1504) is required on a 3584 frame to install a 3588 Tape Drive. The 3588 Tape Drive Model F3A must be ordered separately, and is designed for customer setup in the 3584 Tape Library. When ordered with a new 3584 coming from the plant, the following feature number should be specified on the 3588 Tape Drive and the 3584 Tape Library Frame into which it will be installed:

- 9678 — 3588 Drive Plant Install

The 3588 Model F3A is designed for customer setup. However, if the customer desires assistance with the installation, the following feature can be ordered on the 3584 frame (one feature for each drive that is needed):

- 1678 — 3588 Field Install Assist

Customer-owned 3588 Tape Drives, or 3588 Tape Drives removed from a 3584 library frame can be installed in another 3584 frame. A LTO Fibre Drive Mounting Kit feature (#1504) is required for installing a 3588 Tape Drive in a drive slot in a 3584 Model D32, D52, L32, or L52 frame.

Labeled or bulk quantities of LTO Ultrium cartridges can be ordered using machine type 3589 or purchased through distributors. Refer to the **Supplies** section for additional information.

Note: The 3584 requires that cartridges have appropriate bar code labels.

A 3588 Tape Drive in the 3584 Tape Library can be attached to IBM @server® i5 or iSeries™, IBM @server® p5 or pSeries®, IBM @server® xSeries®, AS/400®, RS/6000®, RS/6000 SP™ systems, Netfinity®, and non-IBM servers, workstations, and Intel™ servers that support Fibre Channel interfaces.

A current list of supported open system configurations for the 3588 Tape Drive is available from the following Web site

http://www.ibm.com/servers/storage/tape/lto

Select “LTO Support,” then the “Interoperability Matrix and Software ISVs,” and view the “Supported Servers and Operating Systems” for the product.

Cables: Cables are required to attach tape drives in the 3584 Tape Library to each server connection (up to the number of tape drive attachments installed). One or more of the following Fibre Channel cables should be specified on the 3584 frame.

Fibre Channel cables: A Fibre Channel cable is required to attach a 3588 Tape Drive in the 3584 Tape Library via the Fibre Channel patch panel feature (#1462), to host Fibre Channel adapters, the IBM 2109 SAN Fibre Switch, or other Fibre Channel components. The cable can be customer supplied or ordered with the 3584 Tape Library in the lengths shown. The attaching Fibre Channel cable must be a 50.0/125 micrometer short wavelength fiber-optic cable for distances up to 500 meters. These tape drives come with LC Duplex connectors. One 2.0 meter LC-LC Fibre Channel drive-to-patch panel cable is included with each Fibre Mounting Kit (#1504).

Features available for Fibre Channel cables, and their respective lengths, are available with the following feature numbers on the 3584 frame:

- 5907 — 7 m SC-LC Fibre Channel Cable
- 5913 — 13 m SC-LC Fibre Channel Cable
- 5922 — 22 m SC-LC Fibre Channel Cable
- 5961 — 61 m SC-LC Fibre Channel Cable
- 6005 — 5 m LC-LC Fibre Channel Cable
- 6013 — 13 m LC-LC Fibre Channel Cable
- 6025 — 25 m LC-LC Fibre Channel Cable
- 6061 — 61 m LC-LC Fibre Channel Cable

An interposer is available to connect a tape drive or server LC Duplex adapter to a SC Duplex cable with the following feature number:

- 5096 — Interposer SC-LC Fibre

Refer to the Special Features section of the 3584 Tape Library Sales Manual for detailed descriptions of these features.

Software requirements: The 3588 Tape Drive in the 3584 Tape Library is supported on the following operating systems at the minimum levels indicated:

- OS/400® V5R1, V5R2, V5R3, or later
- AIX® 5L V5.1, V5.2, V5.3, or later
- Sun Solaris 8 or 9
- Microsoft™ Windows™ 2000 (build 2195, or greater)
- Microsoft Windows 2003 (build 3790, or greater)
- HP-UX 11.00 and 11i (64 bit)
- Linux™ distributions: Red Hat Enterprise Linux Version 3 and SUSE LINUX Enterprise Server 8 (SLES 8)

For a current list of host software versions and release levels that support the 3584, refer to the following Web site

http://www.ibm.com/servers/storage/tape/compatibility/pdf/3584opn.pdf

An update of the open systems device drivers can be obtained via anonymous FTP from

ftp.software.ibm.com

Look under the directory storage/devdrvr.

Further information can be found in the *IBM TotalStorage Tape Device Driver Installation and User's Guide* (GC35-0154), also available at the above FTP site.

Tivoli® Storage Manager and other compatible software offerings provide storage and tape management software for the 3584. Supporting software and applications must be obtained separately from IBM, IBM Business Partners, or ISVs. A list of compatible software is available from your IBM representative or at

http://www.ibm.com/servers/storage/tape/compatibility/pdf/lto_isv_matrix.pdf

IBM continues to work together with ISVs to support the 3584 Tape Library. Individual application vendors should be contacted for specific information and availability dates. Consult with ISV providers for their support of mixed drive types and media types in the same logical library.

Compatibility: The 3588 Tape Drives can read and write LTO Ultrium 2 Data Cartridges and can read original LTO Ultrium Data Cartridges. The LTO Ultrium 400 GB Data Cartridges can only be used on the 3588 Tape Drives.

The LTO Ultrium 400 GB Data Cartridges are physically the same size as all previous LTO Ultrium Data Cartridges, and can therefore reside in the same 3584 library frames as those cartridges.

The 3588 Tape Drive and LTO Ultrium 3 cartridges can be resident in the same 3584 Tape Library with IBM LTO Ultrium 2 Tape Drives and cartridges, IBM LTO Ultrium 1 Tape Drives and cartridges, or with 3592 Tape Drives and cartridges.

Limitations

- Although the compression technology can increase the amount of data stored on the media, the actual degree of compression achieved is highly sensitive to the characteristics of the data being compressed.
- Fibre Channel cable lengths are limited to 500 meters (1650 ft).
- Although multiple systems may be attached to a tape drive, the systems cannot use the drive simultaneously.

Planning information

Customer responsibilities: Physical planning is a customer responsibility. Detailed planning information is in the *IBM TotalStorage 3584 Tape Library Introduction and Planning Guide* (GA32-0469). Current levels of the open systems device drivers should be obtained to ensure the 3588 Model F3A is supported.

Customers are responsible for obtaining the appropriate adapters, cables, and interposers (if required) for system attachment. Customers are also responsible for ordering media.

Cable orders: Cables are required to attach the 3588 Tape Drive Model F3A in the 3584 Tape Library to each server connection (up to the number of tape drive attachments installed). Refer to **Cables** in the **Hardware requirements** section for a list of cables for the 3588 Tape Drive.

Installability: Installation time for the 3588 Tape Drive is approximately 0.5 — 0.7 hours.

Direct customer support: Eligible customers can obtain installation and usage assistance through ASK Support using the search word 3584 or 3588.

Packaging

Product	Shipment group	Number of boxes
3588 Model F3A	3588 Tape Drive Model F3A Power Cord for attachment to a 3584 frame Open System device drivers	1

Supplies

For end users

IBM data media supplies including labeled, initialized, bulk data media, or cleaning cartridges can be purchased from IBM using machine type 3589. Refer to the 3589 Sales Manual.

The part numbers for additional supplies are:

IBM part number	Supply item
24R1922	IBM TotalStorage LTO Ultrium 400GB Data Cartridge
35L2087	IBM TotalStorage LTO Cleaning Cartridge (universal)
08L9129	Leader Pin Attachment Kit

For information about IBM branded media, such as additional IBM LTO Ultrium data or cleaning cartridges, call 888-IBM-MEDIA (426-6334) in the U.S. or Canada or refer to the following Web site

http://www.storage.ibm.com/media

Security, auditability, and control

This product uses the security and auditability features of the host hardware, software, and application software.

The customer is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communications facilities.

Terms and conditions

Volume orders: Contact your IBM representative.

IBM Global Financing: No

Warranty period: One year

Warranty service

If required, IBM provides repair or exchange service depending on the types of warranty service specified for the machine. IBM will attempt to resolve your problem over the telephone, or electronically via an IBM Web site. You must follow the problem determination and resolution procedures that IBM specifies. Scheduling of service will depend upon the time of your call and is subject to parts availability. If applicable to your product, parts considered Customer Replaceable Units (CRUs) will be provided as part of the machine′s standard warranty service. Service levels are response time objectives and are not guaranteed. The specified level of warranty service may not be available in all worldwide locations. Additional charges may apply outside IBM′s normal service area. Contact your local IBM representative or your reseller for country and location-specific information.

CRU service and on-site service for other selected parts

CRU service

IBM provides replacement CRUs to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from IBM upon your request. CRUs are designated as being either a Tier 1 or a Tier 2 CRU.

Tier 1 CRU

Installation of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.

For machines with on-site same-day response service, IBM will replace a Tier 1 CRU part at your request, at no additional charge.

Tier 2 CRU

You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge.

Based upon availability, CRUs will be shipped for next-business-day delivery. IBM specifies, in the materials shipped with a replacement CRU, whether a defective CRU must be returned to IBM. When return is required, (1) return instructions and a container is shipped with the replacement CRU and (2) you may be charged for the replacement CRU if IBM does not receive the defective CRU within 30 days of your receipt of the replacement.

No parts have been designated as Tier 1 CRU parts.

On-site service

IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well lit, and suitable for the purpose.

- 24 hours per day, 7 days a week, same-day response

ServiceSuite™ ***and ServiceElect (formerly ESA) maintenance:*** For ServiceElect (Z125-5510) and ServiceSuite (Z125-5745) Statements of Work

Warranty service upgrades

On-site service

IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well lit, and suitable for the purpose. The following service selections are available as warranty upgrades for your machine type.

For machines with on-site same-day response service IBM will replace a Tier 1 CRU part at your request, at no additional charge. For additional information on the CRU service, refer to the warranty information.

- 24 hours per day, 7 days a week, 2-hour average response

Maintenance services

If required, IBM provides repair or exchange service depending on the types of warranty service specified for the machine. IBM will attempt to resolve your problem over the telephone or electronically, via an IBM Web site. You must follow the problem determination and resolution procedures that IBM specifies. Scheduling of service will depend upon the time of your call and is subject to parts availability. If applicable to your product, parts considered CRUs will be provided as part of the machine′s standard maintenance service. Service levels are response time objectives and are not guaranteed. The specified level of warranty service may not be available in all worldwide locations. Additional charges may apply outside IBM′s normal service area. Contact your local IBM representative or your reseller for country and location-specific information.

CRU service and on-site service for other selected parts

CRU service

IBM provides replacement CRUs to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from IBM upon your request. CRUs are designated as being either a Tier 1 or a Tier 2 CRU.

Tier 1 CRUs

Installation of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.

For machines with on-site same-day response service, IBM will replace a Tier 1 CRU part at your request, at no additional charge.

Tier 2 CRUs

You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge.

Based upon availability, CRUs will be shipped for next-business-day delivery. IBM specifies, in the materials shipped with a replacement CRU, whether a defective CRU must be returned to IBM. When return is required, (1) return instructions and a container is shipped with the replacement CRU and (2) you may be charged for the replacement CRU if IBM does not receive the defective CRU within 30 days of your receipt of the replacement.

No parts have been designated as Tier 1 CRU parts.

On-site service

IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well lit, and suitable for the purpose. The following service selections are available as maintenance options for your machine type.

- 9 hours per day, Monday through Friday, excluding holidays, next-business-day response
- 9 hours per day, Monday through Friday, excluding holidays, 4-hour average, same-business-day response
- 24 hours per day, 7 days a week, 4-hour average response
- 24 hours per day, 7 days a week, 2-hour average response

Maintenance service

The preferred go-to-market offerings are ServiceElect and ServiceSuite. However, ICA legacy contracts will still be available for current customers until they are withdrawn.

Warranty service upgrades

On-site service

IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well lit, and suitable for the purpose. The following service selections are available as warranty upgrades for your machine type.

For machines with on-site same-day response service, IBM will replace a Tier 1 CRU part at your request, at no additional charge. For additional information on the CRU service, refer to the warranty information.

- 24 hours per day, 7 days a week, 2-hour average response

Maintenance services

If required, IBM provides repair or exchange service depending on the types of warranty service specified for

the machine. IBM will attempt to resolve your problem over the telephone or electronically, via an IBM Web site. You must follow the problem determination and resolution procedures that IBM specifies. Scheduling of service will depend upon the time of your call and is subject to parts availability. If applicable to your product, parts considered CRUs will be provided as part of the machine's standard maintenance service. Service levels are response time objectives and are not guaranteed. The specified level of warranty service may not be available in all worldwide locations. Additional charges may apply outside IBM's normal service area. Contact your local IBM representative or your reseller for country and location-specific information.

CRU service and on-site service for other selected parts

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Tier 1 CRUs

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For machines with on-site same-day response service, IBM will replace a Tier 1 CRU part at your request, at no additional charge.

Tier 2 CRUs

You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge.

Based upon availability, CRUs will be shipped for next-business-day delivery. IBM specifies, in the materials shipped with a replacement CRU, whether a defective CRU must be returned to IBM. When return is required, (1) return instructions and a container is shipped with the replacement CRU and (2) you may be charged for the replacement CRU if IBM does not receive the defective CRU within 30 days of your receipt of the replacement.

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- 24 hours per day, 7 days a week, 4-hour average response
- 24 hours per day, 7 days a week, 2-hour average response

Usage plan machine: No

IBM hourly service rate classification: Two

When a type of service involves the exchange of a machine part, the replacement may not be new, but will be in good working order.

Field-installable features: No

Model conversions: No

Machine installation: Customer setup, customers are responsible for installation according to the instructions IBM provides with the machine.

Graduated Program License Charges apply: No. This product does not contain Licensed Internal Code or Licensed Machine Code.

Educational allowance: A reduced charge is available to qualified education customers. The educational allowance may not be added to any other discount or allowance.

Prices

Description	Machine type	Model	Feature number	Purchase price	MMMC	Field install only	Plant install only
Ultrium 3 Tape Drive	3588	F3A		$22,800	$196		
3588 Drive Plant Install			9678	NC	NC	N	Y

MMMC = Monthly Minimum Maintenance Charge
NC = No charge
N = No
Y = Yes

Annual minimum maintenance charges: For ServiceElect (ESA) Maintenance Service Charges, contact IBM Global Services at 888-IBM-4343 (426-4343).

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