



IBM System Storage TS1130 Tape Drive Models E06 and other features enhance performance and capacity

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At a glance

With its higher performance and greater capacity as compared to the TS1120 Tape Drive Model E05, the use of the TS1130 Tape Drive can help save costs as you reduce your number of tape drives and cartridges, and associated floor space. Enhancements of the TS1130 Tape Drive:

- Native data rate performance of up to 160 MB/sec versus the 100 MB/sec data rate of the TS1120 Tape Drive Model E05.
- With the use of the IBM 3592 Extended Data cartridge (JB), the TS1130 Tape Drive can format a cartridge uncompressed of up to 1 TB (3 TB with 3:1 compression)
- High reliability of the 3592 drive and media maintained, and improved with added features:
 - Giant Magneto Resistive (GMR) head technology introduced for the first time
 - Head overcoat technology into tape, introduced for the first time, offering improved head protection and wear characteristics
 - Improved standby power management that automatically reduces fan speed when idle to lower power dissipation and reduce the risk of unnecessary airborne debris contamination over extended idle periods
- Encryption capabilities designed to work with the Encryption Key Manager component. Encryption management methods supported include System, Application, and Library Managed.
- Small form factor to help improve space efficiency of your tape infrastructure.
- Dual-ported native switched fabric interface designed to enhance the attachment flexibility.
- High reliability and availability design.

For ordering, contact:

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800-IBM-CALL Reference: YE001

Overview

The **IBM System Storage™ TS1130 Tape Drive, Models E06 and EU6** (machine type 3592) are the third generation of IBM's highly successful 3592 Enterprise Tape Drives. The TS1130 Tape Drive is supported for integration in the IBM System Storage TS1120 Tape Controller Model C06, IBM Enterprise Tape Controller 3592 Model J70, IBM System Storage TS3400 Tape Library, IBM System Storage

TS3500 Tape Library, IBM TotalStorage® 3494 Tape Library, and IBM Silo Compatible Tape Drive Frame 3592 Model C20, or racks that enable stand-alone installations.

Note: The TS1130 3592 Model EU6 is only available as an upgrade to the TS1120 3592 Model E05 Tape Drive. Through this change, the E05 canister is upgraded to include the components necessary to achieve the media capacity and performance points of the E06 tape drive through the Miscellaneous Equipment Specification (MES) process. Model upgrades beyond the Model EU6 will not be available. IBM's plans are subject to change without notice, and IBM does not warrant that future upgrades will be offered for the Model E06. In addition, IBM's standard warranty terms will apply because Model EU6 is only available as an MES to Model E05. Model EU6 will assume only any remaining warranty entitlements or the service status of Model E05 that has been upgraded.

The TS1130 Tape Drive is designed to provide higher levels of performance, reliability, and cartridge capacity than the TS1120 Model E05 Tape Drive. It has a high-technology Giant Magneto Resistive (GMR) head design and provides a native data rate performance of up to 160 MB/sec versus the 100 MB/sec data rate of the TS1120 Tape Drive Model E05. The TS1130 E06 Tape Drive has a dual-port 4-Gbps Fibre Channel interface for Fibre Channel attachment to host systems or a switched fabric environment.

With the use of the IBM 3592 Extended Data cartridge (JB), the TS1130 Model E06 can format a cartridge uncompressed up to 1 TB (3 TB with 3:1 compression). The TS1130 E06 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 TS3400, TS3500, or 3494 Tape Libraries.

The TS1130 Tape Drive also supports drive-based data encryption to help protect your data. The TS1130-based encryption and associated Encryption Key Manager component are supported in a wide variety of operating system environments including IBM System z™ (z/OS®, z/VM® (guest support-only), and z/VSE®), IBM System i™, IBM System x™, IBM System p™, HP-UX, Sun, Linux™, and Windows®. Three encryption management methods are supported: Application, System, or Library Managed. The encryption capability is supported when the TS1130 Tape Drive is integrated or attaches to the IBM supported tape libraries, subsystems, or controllers.

Note: Release 2.1 of the Encryption Key Manager is the minimum supported release level with the TS1130 Tape Drive. For the latest version of the Encryption Key Manager, refer to

<http://www.ibm.com/support/docview.wss?&uid=ssg1S4000504>

Key prerequisites

The TS1130 Tape Drive Model E06 is supported in a wide range of environments including selected IBM Power Systems, IBM System i, IBM System p, IBM System x, and other servers running AIX®, HP-UX, Linux, Sun Solaris SPARC, and Microsoft® Windows operating system environments. Support for IBM System z (z/OS, z/VM (guest support-only), and z/VSE operating system environments), attached through the IBM System Storage TS1120 Tape Controller Model C06, is available on System z servers through ESCON® or FICON™ channels. Refer to the Software requirements section for details.

Planned availability date

September 5, 2008

Description

The TS1130 Tape Drive (machine type 3592) is the third generation follow-on to the highly successful TS1120 Tape Drive Model E05, 3592 Tape Drive Model J1A, and the 3590 Enterprise Tape Drive. 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.
- Large-scale mass data archive applications where massive amounts of data need to be quickly saved to tape for storage and later recalled (examples include the seismic industry, data warehousing, and record management applications).

Capacity

The TS1130 is designed to provide up to 1 TB uncompressed capacity, 42% more native capacity than the TS1120 Tape Drive, and over three times the native cartridge capacity of a 3592 Model J1A. The exact ratio depends on which cartridge is used with the tape drive. The following table compares the cartridge capacity of the TS1130 versus the TS1120 and the 3592 Model J1A:

	3592 Model J1A native cartridge capacity	TS1120 Model E05 native cartridge capacity	TS1130 Model E06 native cartridge capacity
IBM 3592 Tape Cartridge (Extended)	NA	700 GB	1 TB
IBM 3592 Tape Cartridge (Standard)	300 GB	500 GB	640 GB
IBM 3592 Tape Cartridge (Economy)	60 GB	100 GB	128 GB

The following table compares the cartridge capacity of the TS1130 E06 Tape Drive with the TS1120 E05 Tape Drive and 3592 Tape Drive Model J1A at 3:1 compression:

	3592 Model J1A cartridge capacity (3:1)	TS1120 Model E05 cartridge capacity (3:1)	TS1130 Model E06 cartridge capacity (3:1)
IBM 3592 Tape Cartridge (Extended)	NA	2.1 TB	3 TB
IBM 3592 Tape Cartridge (Standard)	900 GB	1.5 TB	1.9 TB
IBM 3592 Tape Cartridge (Economy)	180 GB	300 GB	384 GB

NA = Not applicable

Performance

The TS1130 E06 uses a design that increases the native data rate up to 160 MB/sec versus the 100 MB/sec data rate of the TS1120 Tape Drive Model E05. The TS1130 E06 is designed to offer improved access characteristics in search velocity and rewind time versus the TS1120 E05. The TS1130 E06 has other enhancements designed to help aid small file and Hierarchical Storage Manager performance.

Note: The actual throughput you 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 160 MB/sec native data rate, other components may limit the actual effective data rate.

Capacity scaling

The TS1130 Model E06 is designed to support capacity scaling of an individual tape cartridge to 20% of maximum capacity (128 GB for standard tape cartridges or 200 GB for extended tape cartridges). Capacity scaling lets the utilized length of tape to be logically shortened, allowing improved data access times in trade off for reduced capacity. The tapes can subsequently be scaled back to full capacity, as needed.

The TS1130 Model E06 Tape Drive allows an application to issue a command to scale the IBM Tape Data 3592 cartridge. Cartridges pre-scaled for 20% capacity are also available for order with the 3599 Models E11, E21, 011, and 021. 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. You can exploit the capacity scaling capability of the TS1130 E06. For more information on using capacity scaling, refer to IBM System Storage TS1120 and TS1130 Tape Drives and TS1120 Controller: Introduction and Planning Guide 3592 Models J1A, E05, E06, EU6, J70 and C06 (GA32-0555).

Media and cartridge capacity

The TS1130 E06 provides capacity leadership with media reuse and uses the JB tape cartridge with an advanced metal particle tape specifically optimized for the enterprise tape environment. This provides a native cartridge capacity of 1,000 GB (or up to 3 TB with 3:1 compression). This can be 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 3494 and 3584 Tape Libraries and STK Silo ACS solutions. The IBM 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 TS1130 E06 has dual-ported 4-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 TS1120 Tape Controller Model C06 or the IBM Enterprise Tape Controller 3592 Model J70.

The TS1130 is supported in a wide range of environments, including selected IBM Systems, Sun, and Hewlett Packard servers, as well as Intel®-compatible servers running Linux and Microsoft Windows operating system environments.

Statistical Analysis and Recording System

The TS1130 E06 uses 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.

High-availability data path failover and dynamic load balancing

High-availability data path failover is available with the AIX, HP-UX, Linux, Solaris, and Windows IBM tape device drivers. The failover mechanism is designed to enable you to configure multiple redundant paths in a SAN environment that includes the TS1130. In the event of a path or component failure, the failover mechanism is designed to automatically enable error recovery to retry the current operation using an alternate, preconfigured path without aborting the current job in progress. This supports flexibility in SAN configuration, availability, and management.

A function in the AIX, HP-UX, Linux, Windows, and Sun Solaris tape device drivers, Dynamic Load Balancing, is also available for the TS1130 E06 Tape Drives used in a SAN environment. The dynamic load balancing support is designed to improve 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 can help optimize HBA resources and improves overall performance.

Additional enhancements

The TS1130 E06 incorporates tape enhancements, introduced with the TS1120 Tape Drive Model E05 and the 3592 Model J1A Tape Drive, that are designed to help improve performance, capacity, and availability:

- High reliability of the 3592 drive and media maintained and improved with added features:
 - Giant Magneto Resistive (GMR) head technology introduced for the first time
 - Head overcoat technology into tape, introduced for the first time, offering improved head protection and wear characteristics
 - Improved standby power management that automatically reduces fan speed when idle to lower power dissipation and reduce the risk of unnecessary airborne debris contamination over extended idle periods

- Enhanced performance for such functions as Recursive Accumulating Backhitchless Flush (RABF) as well as the addition of a new Same Wrap Backhitchless Flush (SWBF) function that extends virtual backhitch effectiveness for large files.
- N+1 power supplies: The TS1130 E06 supports 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.
- Digital speed matching: The TS1130 E06 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 allow slower hosts to stream the tape drive.
- 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 TS1130 E06 is designed to automatically perform recalibration in the field if it detects degraded performance.
- High resolution tape directory plus enhanced search speed: The TS1130 E06 Tape Drive maintains a 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 TS1130 E06 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.

In addition, the TS1130 E06 offers the following enhancements over the 3592 Model J1A Tape Drive:

- Large internal data buffer: The TS1130 E06 Tape Drive has a 1 GB internal data buffer versus a 512 MB maximum in the TS1120 Model E05. Along with enabling higher performance characteristics, the data buffer is designed to use support read ahead of compressed data from tape and provide high performance random skip forward sequential (short hop) locates common in database search and tape software recycle operations.
- Offboard data string searching: The TS1130 E06 Tape Drive can search the data content of host records for string matches offboard from the host server. The tape drive can perform this search at maximum data rate (160 MB/sec native) while it would take much longer for a host server to read the data, buffer the data to disk, and then parse the actual data stream with host software routines.
- Enhanced logic to report logical end-of-tape (LEOT): LEOT is now reported based on a combination of capacity-based and position-based LEOT indicators. The TS1130 E06 monitors the total accumulated number of physical tape datasets written to the volume and will report LEOT based on this capacity-based LEOT value. This allows tape copies to complete without overflow a much higher percentage of the time.

Accessibility by people with disabilities

A U.S. Section 508 Voluntary Product Accessibility Template (VPAT) containing details on accessibility compliance can be requested at

http://www.ibm.com/able/product_accessibility/index.html

Section 508 of the U.S. Rehabilitation Act

The IBM System Storage TS1130 Tape Drive is capable, when used in accordance with IBM's associated documentation, of satisfying the applicable requirements of Section 508 of the Rehabilitation Act, provided that any assistive technology used with the product properly interoperates with it. A U.S. Section 508 Voluntary Product Accessibility Template (VPAT) can be requested via IBM's Web site

http://www-3.ibm.com/able/product_accessibility/index.html

Product positioning

The TS1130 Tape Drive is the follow-on to the highly successful TS1120, 3592 Model J1A, and 3590 Enterprise Tape Drive. The TS1130 is supported in a wide range of environments, including IBM Power Systems, IBM System i, IBM System p, IBM System x, and other servers running AIX, HP-UX, Linux, Sun Solaris SPARC, and Microsoft Windows operating system environments. Support for IBM System z (z/OS, z/VM (guest support-only), and z/VSE operating system environments), attached through the TS1120 Tape Controller Model C06, is available on System z servers through ESCON or FICON channels. 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, and 3490E.

The TS1130 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 applications in TS3400, TS3500, and 3494 Tape Libraries, Sun 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 back up 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.
 - 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 recalled (examples include the seismic industry, data warehousing, and record management applications).
 - Environments where both streaming and start/stop (access), large and small file workloads are required.

Other target customers for the TS1130 Tape Drive are encryption opportunities in medium to large enterprises in the financial sector, government and public sector, and other industries that must protect their customer tape data from loss or theft.

Reference information

Refer to:

- IBM System Storage TS1130 Tape Drive supports controllers and subsystems, Hardware Announcement [108-494](#), dated July 15, 2008
- IBM System Storage TS1120 Tape Drive Model E05 supports encryption features, Hardware Announcement [106-655](#), dated August 29, 2006
- IBM System Storage TS1120 Tape Controller 3592 Model C06, Hardware Announcement [106-339](#), dated May 9, 2006
- IBM System Storage TS1120 Tape Drive Model E05, Hardware Announcement [105-413](#), dated October 11, 2005

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 108-493

<https://www.ibm.com/partnerworld/mem/sla.jsp?num=108-493>

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Publications

The following publications, including support for the TS1130, are available on July 15 at

<http://www-03.ibm.com/systems/storage/tape/library.html#publications>

Title	Order number
IBM Total Storage(R) 3494 Tape Library Introduction and Planning Guide	GA32-0448
IBM System Storage(TM) TS3500 Tape Library Introduction and Planning Guide	GA32-0559
IBM System Storage TS1120 and TS1130 Tape Drives and TS1120 Controller (3592 Models J1A, E05, E06, EU6, J70 and C06) Introduction and Planning Guide	GA32-0555
IBM 3953 Tape System Introduction and Planning Guide	GA32-5557

The IBM System Storage TS1120 and TS1130 Tape Drives (3592 Models J1A, E05, E06, and EU6) Maintenance Information — 15th Edition (July 2008) and a Device Driver README sheet are shipped with the product.

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<http://www.ibm.com/shop/publications/order>

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

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For more information, visit

<http://www.ibm.com/servers/eServer/xSeries/services.html>

Technical information

Specified operating environment

Physical specifications: TS1130 E06 Tape Drive canister:

- Width, front of drive: 150 mm (5.9 in)
- Width, overall: 195 mm (7.5 in)
- Height: 95 mm (3.8 in)
- Length, front of bezel to rear of closed retention latch: 467 mm (18.4 in)
- Weight: 5.7 Kg (12 lbs 7 oz)

To assure installability and serviceability in non-IBM industry-standard racks, review the installation planning information for any product-specific installation requirements.

Operating environment

- Temperature: 16° to 32°C (60° to 90°F) in operation (media in use)
- Relative humidity: 20% to 80% non-condensing (limited by media)
- Maximum wet bulb temperature: 26°C (78.8°F)
- Individual drive (including fan):
 - Electrical power: 17 watts*, idle, no tape loaded 46 watts* — max continuous (not peak), reading and writing
 - Heat output: 157 Btu/Hour* — max continuous
 - Capacity of exhaust: 0.34 Cubic meter/min (12 CFM) per drive
 - Noise level: 4.3 Bels idle; 6.3 Bels operating

* External ac/dc power supply losses and heat output not included.

Hardware requirements: TS1130 E06 Tape Drive

Each TS1130 E06 Tape Drive comes with Giant Magneto Resistive (GMR) head technology and dual-ported switched fabric 4-Gbps Fibre Channel attachments, for attachment to multiple servers or a single server with redundancy. It can be attached to IBM Power Systems, IBM System i™, IBM System p™, IBM System x, and other servers running AIX®, HP-UX, Linux™, Sun Solaris SPARC, and Microsoft® Windows® operating system environments. Support for IBM System z™ (z/OS®, z/VM® (guest support-only) and z/VSE® operating system environments), attached through the TS1120 Tape Controller Model C06, is available on System z servers through ESCON® or FICON™ channels. For the latest details on specific hardware, software, and Fibre Channel support for the TS1130 E06, refer to the following Web site

<http://www.ibm.com/servers/storage/tape/TS1130>

The TS1130 E06 Tape Drive is for installation in a TS3400, TS3500, or 3494 Tape Library, IBM Silo Compatible Tape Drive Frame 3592 Model C20, or racks that enable stand-alone installations. For all installations, the tape drive comes enclosed in a canister. In a 3494 frame, this canister installs into a cradle, of which two are installed per level with the Install Cradle Pair feature (#4800). For rack installation, a left drive cradle with a shelf must be installed before the right drive cradle can be installed. For both installations, cradles include redundant hot-swappable power supplies for both tape drives, as well as logic cards for management of power, serial numbers, and ID identifiers, and must be installed before the tape drive canisters can be installed. When installed in a 3592 Model C20, up to two tape drive canisters can be installed on a drive shelf. A cradle, or Model C20 drive shelf, includes dual-redundant hot-swappable power supplies for both tape drives, as well as logic cards for handling the dual power and the management of serial number and ID identifiers.

Up to 4 drives can be installed in a 3494 Model L22, up to 12 drives in a 3494 Model D22, or up to 8 drives in a Model D24 with an ESCON/FICON-attachable tape controller. Up to 20 TS1130 E06 Tape Drives can be installed in a 3592 Model C20. For installation in a rack, feature #4674, up to two TS1130 E06 Tape Drives can be installed in each cradle feature (#4802 or #4812). The cradle requires 10 EIA units of rack space. Two cradles can be mounted on a shelf, for a total of 4 tape drives on a shelf. A 2.0 meter rack, without a tape controller, can thus contain up to 16 tape drives. A 2.0 meter rack with a tape controller, or a 1.6 meter to 1.8 meter rack without a tape controller, can contain up to 12 tape drives. A 1.6 meter to 1.8 meter rack with a tape controller can contain up to 8 tape drives. If space is available, an existing customer rack may be used. Refer to the 3590, 3592, or 3494 Sales Manuals for further information.

Up to 12 TS1130 drives can be installed in a 3584 Model L22, L23, D22, or D23 frame. The 3584 Model L22 or L23 Base Frame and Model D22 or D23 Expansion Frame are designed for TS1130 Model E06, TS1120 Model E05, and 3592 Model J1A Tape Drives and 3592 cartridges. Each frame supports up to 12 tape drives with an incremental reduction of storage slots for each set of four drives installed.

A 3592 Fibre Drive Mounting Kit feature is required for installing a TS1130, TS1120, or 3592 Tape Drive in a TS3500:

- 1503 — 3592 J1A, E05, E06 Fibre Drive Mounting Kit for Models L22 and D22
- 1513 — 3592 J1A, E05 Fibre Drive Mounting Kit for Models L23 and D23
- 1515 — 3592 J1A, E05, E06 Fibre Drive Mounting Kit for Models L23 and D23

Note: For Models L23 and D23, the previous version of 3592 Fibre Drive Mounting Kit feature (#1513) is not compatible with TS1130.

Each TS1130, TS1120, or 3592 Tape Drive must be ordered separately, and is installed in a 3584 frame with one of the following feature numbers:

- 1674 — 3592 Drive Field Install
- 9677 — Plant Install 3592 J1A in 3584
- 9680 — Plant Install 3592 E05 in 3584
- 9683 — Plant Install 3592 E06 in 3584

Appropriate Fibre Channel cables should be ordered for each tape drive. Refer to the Cables section for a list of available cables. Also, refer to the Fibre Channel Cables section of the Special Feature Codes in the 3592 Model E06 Sales Manual for Fibre Channel cable information.

Labeled or initialized cartridges for TS1130 E06 Tape Drives can be ordered using machine type 3599. Refer to the Supplies information section.

Cables

A fiber optic cable is required for attaching a TS1130 E06 Tape Drive to host Fibre Channel adapters or other storage area Fibre Channel components. The cable can be customer supplied, or ordered with the TS1130 E06 Tape Drive in the lengths available. The attaching fiber cable must be 50.0/125 micrometers for distances up to 150 meters at 4-Gbps. The connector on the TS1130 E06 Tape Drive is a LC duplex connector type. The Fibre Channel cables with LC or SC duplex connectors can be ordered on the TS1130 E06 Tape Drive in the lengths indicated with the following feature numbers:

- 5913 — 13-meter Fibre Channel cable with an LC connector on one end and an SC connector on the other end
- 5922 — 22-meter Fibre Channel cable with an LC connector on one end and an SC connector on the other end
- 5961 — 61-meter Fibre Channel cable with an LC connector on one end and an SC connector on the other end
- 6013 — 13-meter Fibre Channel cable with LC connectors on both ends
- 6025 — 25-meter Fibre Channel cable with LC connectors on both ends
- 6061 — 61-meter Fibre Channel cable with LC connectors on both ends

IBM Networking Services are designed to deliver convenient, packaged services to help reduce the complexity of planning, ordering, and installing fiber optic cables. The appropriate fiber cabling is selected based upon the product requirements and the installed fiber plant. IBM Networking Services has a comprehensive set of scalable solutions to address IBM cabling requirements, from product level to enterprise level. IBM Network Integration and Deployment Services for enterprise fiber cabling provides planning, IBM Fiber Transport System trunking components, and installation services for small, medium, and large enterprises.

IBM Global Services has the expertise and personnel available to effectively plan and deploy the appropriate cabling with the future in mind. These services may include planning, consultation, cable selection, installation, and documentation, depending upon the services selected. These services are designed to be right-sized for your products or the end-to-end enterprise, and to take into consideration the requirements for all of the protocols and media types whether the focus is the data center, the SAN, the LAN, or the end-to-end enterprise. Contact your IBM representative for additional information on these services.

TS1130 Tape Drive

Each TS1130 Tape Drive comes with dual-ported switched fabric 4-Gbps Fibre Channel attachments, for attachment to multiple servers or a single server with redundancy. It can be attached to IBM System i, System p, System x, System z (z/OS, z/VM (guest support-only), and z/VSE), and non-IBM servers, workstations, and personal computers that support Fibre Channel interfaces. It can also attach to the TS1120 Tape Controller Model C06, 3592 Tape Controller Model J70, for attachment to ESCON or FICON channels on IBM System z. For the latest details on specific hardware, software, and Fibre Channel support for the TS1130 Tape Drive, refer to the following Web site

TS3400 or 3577 Tape Library encryption installation

The TS1130 Tape Drive may be installed and is supported in the IBM System Storage TS3400 Tape Library. The TS1130 encryption function requires a minimum level of microcode firmware level and is a customer's responsibility to load, configure, and maintain on the TS3400 Tape Library. The TS3400 supports the TS1130 built-in encryption capabilities and associated IBM Encryption Key Manager component, in a wide variety of operating system environments including IBM Power Systems, IBM System i, IBM System p, IBM System x, IBM System z (z/OS, z/VM (guest support-only), and z/VSE), Linux, HP-UX, Sun Solaris, Linux, and Microsoft Windows.

TS3500 or 3584 Tape Library encryption installations

The TS1130 Tape Drive may be installed and is supported in the IBM System Storage TS3500 Tape Library Models L22, L23, D22, and D23. The TS1130 encryption function requires a minimum level of microcode firmware level and is a customer's responsibility to load, configure, and maintain on the TS3500 Tape Library.

3494 Tape Library and 3953 Library Manager encryption support

TS1130 encryption support for tape drives in an Enterprise Tape Library 3494 or drives attached via a 3953 Library Manager requires a minimum level of microcode firmware in the library manager. The level of microcode firmware required will be shipped the first time you order #5595 or when you order #9595 and the 3592 Tape Controller is not located in a customer-owned rack (#4641). Installation of this firmware can also update the drive microcode firmware on any installed open-system attached TS1130 Tape Drive, TS1120 Tape Drive, or 3592 Model J1A Tape Drive. With this support, encryption, WORM, and standard tape cartridges in both sizes can be intermixed within the same tape library or a common tape cartridge scratch pool.

Media Interchange toleration support

Non-IBM 3494 or 3584 encryption open systems installations: Support for the TS1120 encryption function, installed in either a 3592 C20 Silo Compact Frame or a 19-inch Rack open-systems attached, requires a minimum level of microcode firmware for any 3592 J1A Enterprise Tape Drive, TS1120 Tape Drive, or TS1130 Tape Drive where the you intend to use tape cartridges from a common tape cartridge scratch pool.

The minimum level of microcode firmware will be the D310_C8C for the 3592 J1A Enterprise Tape drive and D311_D95 for the TS1120 Tape Drive (3592 E05) and D312_469 for the TS1130 Tape Drive (3592 E06), or may be ordered as follows:

- 3592 J1A Enterprise Tape Drive support: Feature #0500 Drive Microcode Update
- TS1120 Tape Drive (3592 E05) support: Feature #0500 Drive Microcode Update
- TS1130 Tape Drive (3592 E06) support: Feature #0500 Drive Microcode Update

IBM Tape Controller encryption installations

Support for the TS1120 encryption function, installed in any IBM controller attachment, requires a minimum level of microcode firmware for any 3592 J70 Enterprise Tape Controller, TS1120 Tape Controller (3592 C06), or 3590 A60 Enterprise Tape Controller where you intend to use tape cartridges from a common tape cartridge scratch pool.

The minimum level of microcode firmware will be the 1.19.5.x for the 3592 J70 Enterprise Tape Controller or 1.21.x.x for the TS1120 Tape Controller (3592 C06), or 1.16.1.11 for the 3590 A60 Enterprise Tape Controller. The level of microcode firmware required for the TS1120 Tape Controller (3592 C06) and the 3592 J70 Enterprise Tape Controller will be shipped the first time you order #5595 or #9595. To obtain the microcode required for the 3590 A60 Enterprise Tape Controller feature number 0520, Function Enhancement Field, should be ordered.

Fibre Channel Switch attachment

The TS1120 E05 Tape Drive is supported by a variety of Fibre Channel Switches and Fibre Channel Directors. The support is dependent on server, operating system, and host bus adapter that is being used.

Software requirements: The TS1130 Tape Drive is supported on the following operating systems, at the minimum levels indicated:

- AIX V5.2, V5.3, V6.1
- HP-UX 11iv1, 11iv2, 11iv3
- Sun Solaris 8, 9, 10 (SPARC-based)
- z/OS level 1.7, or later
- z/VSE V4.2 (when made available), or later
- i5/OS™ V5R3, or later
- Microsoft Windows 2003 (build 3790, or later) and Windows 2008
- Linux distributions: Red Hat Enterprise Linux (RHEL) 4, Red Hat Enterprise Linux (RHEL) 5, Novell SUSE Linux Enterprise Server 9 (SLES 9), and Novell SUSE Linux Enterprise Server 10 (SLES 10)

Encryption

Encryption support for the TS1130 Tape Drive in the TS3400, TS3500, or 3494 Tape Library, with Fibre Channel, is provided in i5/OS, AIX, HP-UX, Linux, Sun, and Microsoft Windows operating system environments. Support for System z, (z/OS, z/VSE, and z/VM (guest support-only) operating system environments), is available through the 3592 Model J70 Controller or TS1120 Tape Controller.

Three modes of encryption management are supported:

- System Managed (available for AIX, Linux, Solaris, Windows)
- Library Managed (available for OS/400®, i5/OS, AIX, Linux, HP-UX, Solaris, and Windows)
- Application Managed (IBM Tivoli® Storage Manager)

The installation of a TS1130 Tape Drive with encryption may require code updates for System z (z/OS, z/VSE, and z/VM (guest support-only), System i, System p, and supported open systems device drivers or storage management software. An update of the open systems device drivers can be obtained via anonymous FTP from

<ftp://ftp.software.ibm.com>

Look under the directory `storage/devdrv`.

For details on supported software versions and release levels for the TS1130 Tape Drive, as well as hardware support information, refer to the following Web site

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

The IBM Encryption Key Manager component for the Java™ platform is required for enabling System Managed and Library Managed Encryption.

Note: Release 2.1 of the Encryption Key Manager is the minimum supported release level with the TS1130 Tape Drive. For the latest version of the Encryption Key Manager, refer to

<http://www.ibm.com/support/docview.wss?&uid=ssg1S4000504>

To receive the Encryption Key Manager to run on HP-UX, Sun Solaris, and Microsoft Windows, the IBM TotalStorage Productivity Center (TPC) Basic Edition (TPC Basic Edition replaces TPC Limited Edition), licensed program product 5608-B01 is required. TPC Basic Edition electronic availability via Passport Advantage®, and media availability via Passport Advantage and AAS will include the IBM Encryption Key Manager component for the Java platform to run on HP-UX, Sun Solaris, and Microsoft Windows. Note that TPC Basic Edition is a chargeable program product, whereas the previous TPC Limited Edition was a no-charge offering. Several maintenance options are also available for ordering with the TPC Basic Edition.

For more information on ordering and pricing for TPC Basic Edition, licensed program product 5608-B01, refer to Software Announcement [207-263](#), dated October 23, 2007.

specific to your geography. Additional information is also available at

<http://www-03.ibm.com/systems/storage/software/center/index.html>

System z: The TS1130 (3592 Model E06) Tape Drive with encryption capability is supported for attachment to ESCON and FICON channels on System z servers.

z/OS

z/OS support for the TS1130 Tape Drive is provided at z/OS V1R7, or later release levels. Refer to enabling APAR OA22119. As with the TS1120 (3592 Model E05) Tape Drive, when using encryption, an Encryption Key Manager must be available to the z/OS system. Refer to z/OS DFSMS Software Support for the IBM System Storage TS1130 and TS1120 Tape Drives (3592), SC26-7514-04, for additional information. Also, refer to the 3592 PSP bucket.

If the Encryption Key Manager is run on a z/OS system, refer to

<http://www.ibm.com/support/docview.wss?&uid=ssg1S4000504>

for the latest IBM SDK Java requirements.

z/VSE

z/VSE V4.2 (when made available), or later is planned to support the TS1130 Tape Drive. When available, z/VSE V4.2 is designed to support Systems Managed Encryption with the TS1130 tape drive. z/VSE V4.2 support will require the Encryption Key Manager component running on another operating system other than z/VSE.

z/VM (guest support-only)

z/VM will provide guest toleration support for the TS1130 on supported releases of z/VM V5. This support will allow attachment of the TS1130 to guest operating systems that support it, including guest access to the drive's encryption capabilities. PTFs for APAR VM64459 will be required for the VM control program. PTFs for APAR VM64458 will be required for the RMS component of DFSMS/VM® FL221 for environments where RMS is required.

System p

System p supports System Managed and Library Managed Encryption with the IBM TS1130 tape drives and the TS3400, TS3500, or 3494 Tape Library, and Application Managed Encryption with a supported software application.

AIX V5.2, V5.3, or V6.1, or later is required for System Managed, Library Managed, and Application Managed Encryption.

System Managed Encryption with AIX requires:

- An Encryption Key Manager component be available to the AIX system.
- The IBM Tape Device Driver be installed, updated, and utilized. It may be downloaded from the following Web site

<ftp://ftp.software.ibm.com/storage/devdrvrr/AIX/>

Library Managed Encryption with AIX requires:

- An Encryption Key Manager component be available to the TS3400, TS3500, or 3594 Tape Library.
- A TS3400, TS3500, or 3494 Tape Library with IBM TS1130 tape drives and media.

If the Encryption Key Manager is run on a System p server with AIX, refer to

<http://www.ibm.com/support/docview.wss?&uid=ssg1S4000504>

for the latest IBM SDK Java requirements.

System i

System i supports Library Managed Encryption with IBM TS1130 tape drives and the TS3400, TS3500, or 3494 Tape Library.

i5/OS V5R3, or later is required for Library Managed Encryption.

System i support of Library Managed Encryption on the TS3400, TS3500, or 3494 requires:

- An Encryption Key Manager component be available to the TS3400, TS3500, or 3494 Tape Library.
- A TS3400, TS3500, or 3494 Tape Library with IBM TS1130 tape drives and media.

The Encryption Key Manager is supported on i5/OS V5R3, or later.

If the Encryption Key Manager is run on i5/OS, refer to

<http://www.ibm.com/support/docview.wss?&uid=ssg1S4000504>

for the latest IBM SDK Java requirements.

Linux

System x and other Intel®-based or AMD Opteron-based Linux servers, System p servers, and System z servers support System Managed and Library Managed with IBM TS1130 tape drives and the TS3400, TS3500, or 3494 Tape Library, and Application Managed Encryption with a supported software application.

Use of System Managed, Library Managed, and Application Managed Encryption on Linux requires one of the following:

- RHEL 4
- RHEL 5
- Novell SLES 9
- Novell SLES 10

System Managed Encryption with Linux requires:

- An Encryption Key Manager component be available to the Linux system.
- The IBM Tape Device Driver be installed, updated, and utilized. It may be downloaded from the following Web site

<ftp://ftp.software.ibm.com/storage/devdvr/Linux/>

Library Managed Encryption with Linux requires:

- An Encryption Key Manager component be available to the TS3400, TS3500, or 3494 Tape Library.
- A TS3400, TS3500, or 3494 Tape Library with IBM TS1130 tape drives and media.

If the Encryption Key Manager is run on a IBM server with Linux, refer to

<http://www.ibm.com/support/docview.wss?&uid=ssg1S4000504>

for the latest IBM SDK Java requirements.

Microsoft Windows

System x and other Intel-based or AMD Opteron-based Windows servers support System Managed and Library Managed Encryption with IBM TS1130 tape drives and the TS3400, TS3500, or 3494 Tape Library, and Application Managed Encryption with a supported software application.

Windows 2003 or Windows 2008 is required for System Managed, Library Managed, and Application Managed Encryption.

System Managed Encryption with Windows requires:

- An Encryption Key Manager component be available to the Windows system.
- The IBM Tape Device Driver be installed, updated, and utilized. It may be downloaded from the following Web site

<ftp://ftp.software.ibm.com/storage/devdvr/Windows/>

Library Managed Encryption with Windows requires:

- An Encryption Key Manager component be available to the TS3400, TS3500, or 3494 Tape Library.
- A TS3400, TS3500 or 3494 Tape Library with IBM TS1130 tape drives and media.

If the Encryption Key Manager is run on a server with Windows:

- Windows 2003 or Windows 2008 is required.
- An Encryption Key Manager CD is required and available through the IBM TPC Basic Edition, licensed program product 5608-B01. For information, visit

<http://www-03.ibm.com/systems/storage/software/center/index.html>

HP-UX

HP-UX servers support Library Managed Encryption with IBM TS1130 tape drives and the TS3400, TS3500, or 3494 Tape Library, and Application Managed Encryption with a supported software application.

HP-UX 11iv1, 11iv2, or 11iv3 is required for Library Managed and Application Managed Encryption.

Library Managed Encryption with HP-UX requires:

- An Encryption Key Manager component be available to the TS3400, TS3500, or 3494 Tape Library.
- A TS3400, TS3500, or 3494 Tape Library with TS1130 tape drives and media.

If the Encryption Key Manager is run on a server with HP-UX:

- HP-UX 11iv1, 11iv2, or 11iv3 is required.
- An Encryption Key Manager CD is required and available through the IBM TPC Basic Edition, licensed program product 5608-B01. For information, visit

<http://www-03.ibm.com/systems/storage/software/center/index.html>

Sun Solaris SPARC

Sun SPARC servers support System Managed and Library Managed Encryption with IBM TS1130 tape drives and the TS3400, TS3500, or 3494 Tape Library, and Application Managed Encryption with a supported software application.

Use of System Managed, Library Managed, and Application Managed Encryption on Solaris requires one of the following:

- Sun Solaris 8
- Sun Solaris 9
- Sun Solaris 10

System Managed Encryption with Sun Solaris SPARC requires:

- An Encryption Key Manager component be available to the Solaris system.
- The IBM Tape Device Driver be installed, updated, and utilized. The drivers may be downloaded from the following Web site

<ftp://ftp.software.ibm.com/storage/devdvr/Solaris/>

Library Managed Encryption with Sun Solaris SPARC requires:

- An Encryption Key Manager component be available to the TS3400, TS3500, or 3494 Tape Library.
- A TS3400, TS3500, or 3494 Tape Library with TS1130 tape drives and media.

If the Encryption Key Manager is run on a server with Solaris:

- One of the following is required:
 - Sun Solaris 8
 - Sun Solaris 9
 - Sun Solaris 10
- An Encryption Key Manager CD is required and available through the IBM TPC Basic Edition, licensed program product 5608-B01. For information, visit <http://www-03.ibm.com/systems/storage/software/center/index.html>

Application software

Tivoli Storage Manager supports Application Managed Encryption.

Tivoli Storage Manager and other compatible software offerings can provide storage and tape management software for the TS1130. Supporting software and applications must be obtained separately from IBM, IBM Business Partners, or independent software vendors (ISVs). A list of compatible software is available from your IBM representative or at

<http://www-1.ibm.com/storage/tape>

Select the model, "Product Details," then "Independent Software Vendor (ISV) matrix" for the product.

IBM continues to work together with the ISVs to support the TS1130. Individual application vendors should be contacted for specific information and availability dates.

Limitations

- Although multiple systems may be attached to a TS1130 E06 Tape Drive, the systems cannot use the drive simultaneously. The TS1130 E06 can only be varied online to one system at a time.
- TS1130 E06 Tape Drives cannot be attached to the same 3592 Model J70 Controller with 3590 Tape Drives.
- TS1130 E06 Tape Drives are not supported for attachment to a 3590 Controller Models A60, A50, or A00.

Planning information

Customer responsibilities: Physical planning is a customer responsibility. Current levels of the open systems device drivers should be obtained to ensure the TS1130 E06 is supported. The TS1120 Tape Controller Model C06, 3592 Tape Controller Model J70, and 3494 Tape Library may require subsystem microcode updates by the IBM service representative for the proper installation and operation of attached TS1130 E06 Tape Drive. For information on these requirements, refer to IBM System Storage TS1120 and TS1130 Tape Drives and TS1120 Controller Introduction and Planning Guide 3592 Models J1A, E05, E06, EU6, J70 and C06, GA32-0555.

Cable orders: Appropriate Fibre Channel cables should be ordered for each tape drive. Refer to the Cables section for a list of available cables. Also refer to the **Fibre Channel Cables** section of the **Special Feature Codes** in the 3592 Model E06 Sales Manual for Fibre Channel cable information.

Packaging

Product	Shipment group	Number of boxes
TS1130 E06	TS1130 Tape Drive Model E06 Power cord (for rack or frame attachment)	1

Fibre Channel cables as ordered
IBM System Storage TS1120 and TS1130
Tape Drives (3592 Models J1A, E05,
E06, and EU6) Maintenance Information
-- 15th Edition (July 2008)
Device Driver README sheet

Supplies: For end users and remarketers: Labeled, initialized, or bulk data media for the TS1130 E06 Tape Drive can be ordered directly through AAS using machine type 3599. Refer to the 3599 Sales Manual. IBM data media supplies are also planned to be available through media distributors.

For information about IBM branded media call 888-IBM Media (426-6336) in the U.S. and Canada, or visit

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

The part numbers for additional supplies are:

IBM part number	Supply item
18P7534	IBM Total Storage Enterprise Tape Cartridge 3592 (Data)
18P7535	IBM Total Storage Enterprise Tape Cartridge 3592 (Cleaning)
23R9830	IBM Total Storage Enterprise Tape Cartridge 3592 JB Data cartridge
23R9831	IBM Total Storage Enterprise Tape Cartridge 3592 JX WORM cartridge
18P7534	IBM Total Storage Enterprise Tape Cartridge 3592 JA 300 Data
18P7538	IBM Total Storage Enterprise Tape Cartridge 3592 JW 300 WORM
24R0316	IBM Total Storage Enterprise Tape Cartridge 3592 JJ 60 Data
24R0317	IBM Total Storage Enterprise Tape Cartridge 3592 JR 60 WORM

Note: The 3592 data cartridge has servo tracks written on it. These tracks enable the tape drive to accurately position the read/write head with respect to the media while the tape is in motion. If these servo tracks are damaged or removed (such as by Degausing), the cartridge is no longer useable.

Security, auditability, and control

This product uses the security and auditability features of host hardware, host software, or application software to which it is attached.

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 credit corporation financing: Yes

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 may 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.

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.

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.

Service level is 24 hours per day, 7 days a week, 4 hour average, same day response.

Warranty service upgrades

During the warranty period, warranty service upgrades provide an enhanced level of On-site Service for an additional charge. Service levels are response-time objectives and are not guaranteed. Refer to the Warranty service section for additional details.

IBM will attempt to resolve your problem over the telephone or electronically by access to 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.

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 on-site response-time objectives are available as warranty service upgrades for your machine. Available offerings are:

- 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 services

If required, IBM provides repair or exchange service depending on the types of maintenance 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. Service levels are response-time objectives and are not guaranteed. The specified level of maintenance 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. The following service selections are available as maintenance options for your machine type.

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.

Service levels are:

- 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: Three

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: Yes

Model conversions: Yes

Machine installation: Installation is performed by IBM. IBM will install the machine in accordance with the IBM installation procedures for the machine. In the United States, contact IBM at 800-IBM-SERV (426-7878); in other countries contact the local IBM office. For planning information, refer to IBM System Storage TS1130 and TS1130 Tape Drives and TS1120 Controller Introduction and Planning Guide 3592 Models J1A, E05, E06, EU6, J70 and C06, GA32-0555.

Graduated program license charges apply: No

Licensed Internal Code: IBM Licensed Internal Code is licensed for use by a customer on a

specific machine, designated by serial number, under the terms and conditions of the IBM Agreement for Licensed Internal Code, to enable a specific machine to function in accordance with its specifications, and only for the capacity authorized by IBM and acquired by the customer. You can obtain the agreement by contacting your IBM representative or visiting

http://www-1.ibm.com/servers/support/machine_warranties/licensed_internal_code.html

Machine LIC Type Model 3592-E06

IBM may release changes to the Licensed Internal Code. IBM plans to make the Licensed Internal Code changes available for download from the IBM System Storage technical Web site

http://www-304.ibm.com/jct01004c/systems/support/machine_warranties/warranties_licenses_maintenance.html

If the machine does not function as warranted and your problem can be resolved through your application of downloadable Licensed Internal Code, you are responsible for downloading and installing these designated Licensed Internal Code changes as IBM specifies. If you would prefer, you may request IBM to install the downloadable Licensed Internal Code changes; however, you may be charged for that service.

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

Product charges: For additional information and current prices, contact your local IBM representative.

Description	Machine type	Model	Feature number	Field install	Plant install
TS1130 Tape Drive	3592	E06			
Drive Microcode Update		E06	0500*	Y	N
Install 3592 in Rack		E06	4674*	N	N
Remove 3592 from Rack		E06	4772*	Y	N
Rack Left Cradle		E06	4802*	N	N
Rack Right Cradle		E06	4812*	N	N
Encrypt. Configuration/F		E06	5596*	Y	N
13 m LC/SC Fibre Cable		E06	5913*	N	N
22 m LC/SC Fibre Cable		E06	5922*	N	N
61 m LC/SC Fibre Cable		E06	5961*	N	N
13 m LC/LC Fibre Cable		E06	6013*	N	N
25 m LC/LC Fibre Cable		E06	6025*	N	N
61 m LC/LC Fibre Cable		E06	6061*	N	N
Encrypt. Configuration/P		E06	9596*	N	Y
Plant Install 3592 in 3494	3592	E06	9673*	N	Y
Plant Install 3592 in 3592 C20	3592	E06	9675*	N	Y
Plant Install 3592	3592	E06	9677*	N	Y

in 3584					
3592 Plant Ship with 3577	E06	9685*	N	Y	
3592 Field Install in 3577	E06	9686	N	Y	
3592 Field Install in a 3494	E06	9687	N	Y	
3592 Field Install in 3592 C20	E06	9688	N	Y	
3592 Field Install in 3584	E06	9689	N	Y	
zSeries(R) ESCON/FICON Attach	E06	9000*	N	N	
HP-UX Attachment	E06	9210*	N	N	
Sun Attachment	E06	9211*	N	N	
Windows Attachment	E06	9212*	N	N	
Other Non-IBM Attachment	E06	9213*	N	N	
Other Linux Attachment	E06	9215*	N	N	
zSeries Linux Attachment	E06	9216*	N	N	
iSeries(TM) OS/400 Attachment	E06	9400*	N	N	
pSeries(T) AIX Attachment	E06	9600*	N	N	

The following features are available through an MES only:

Description	Machine type	Model	Feature number	Field install	Plant install
TS1130 Tape Drive	3592	EU6#			
Drive Microcode Update		EU6	0500*	Y	N
Install 3592 in Rack		EU6	4674*	Y	N
Remove 3592 from Rack		EU6	4772*	Y	N
Rack Left Cradle		EU6	4802*	Y	N
Rack Right Cradle		EU6	4812*	Y	N
Encrypt. Configuration/F		EU6	5596*	Y	N
13 m LC/SC Fibre Cable		EU6	5913*	Y	N
22 m LC/SC Fibre Cable		EU6	5922*	Y	N
61 m LC/SC Fibre Cable		EU6	5961*	Y	N
13 m LC/LC Fibre Cable		EU6	6013*	Y	N
25 m LC/LC Fibre Cable		EU6	6025*	Y	N
61 m LC/LC Fibre Cable		EU6	6061*	Y	N

LC = Lucent Connector
SC = Standard Connector

Model EU6 is orderable through an MES and is not available on an initial plant order.

* This feature was previously announced on another model.

Alternative and maintenance service

Annual minimum maintenance charges: For additional information and current prices, contact your local IBM representative.

For ServiceELECT (ESA) maintenance service charges, contact IBM Global Services at 888-IBM-4343 (426-4343).

Model conversion purchase prices: For additional information and current prices, contact your local IBM representative.

Specify feature numbers: The following charges apply to features ordered for field installation:

Description	Feature	Charge
zSeries ESCON/FICON Attach	9000	\$ 0
HP-UX Attachment	9210	0
Sun Attachment	9211	0
Windows Attachment	9212	0
Other Non-IBM Attachment	9213	0
Other Linux Attachment	9215	0
zSeries Linux Attachment	9216	0
iSeries OS/400 Attachment	9400	0
pSeries AIX Attachment	9600	0

Description	Type	Model	Feature	List Price
TS1130 Tape Drive		3592E06		\$39,050.00
TS1130 Tape Drive		3592EU6		\$19,500.00
Drive Microcode Update		3592E06	500	\$500.00
Install 3592 in Rack		3592E06	4674	\$700.00
Remove 3592 from Rack		3592E06	4772	\$350.00
Rack Left Cradle		3592E06	4802	\$6,000.00
Rack Right Cradle		3592E06	4812	\$7,500.00
Encrypt. Configuration/F		3592E06	5596	\$500.00
13 m LC/SC Fibre Cable		3592E06	5913	\$225.00
22 m LC/SC Fibre Cable		3592E06	5922	\$250.00
61 m LC/SC Fibre Cable		3592E06	5961	\$427.00
13 m LC/LC Fibre Cable		3592E06	6013	\$225.00
25 m LC/LC Fibre Cable		3592E06	6025	\$330.00
61 m LC/LC Fibre Cable		3592E06	6061	\$427.00
Drive Microcode Update		3592EU6	500	\$500.00
Install 3592 in Rack		3592EU6	4674	\$700.00
Remove 3592 from Rack		3592EU6	4772	\$350.00
Rack Left Cradle		3592EU6	4802	\$6,000.00
Rack Right Cradle		3592EU6	4812	\$7,500.00
Encrypt. Configuration/F		3592EU6	5596	\$500.00
13 m LC/SC Fibre Cable		3592EU6	5913	\$225.00
22 m LC/SC Fibre Cable		3592EU6	5922	\$250.00
61 m LC/SC Fibre Cable		3592EU6	5961	\$427.00
13 m LC/LC Fibre Cable		3592EU6	6013	\$225.00
25 m LC/LC Fibre Cable		3592EU6	6025	\$330.00
61 m LC/LC Fibre Cable		3592EU6	6061	\$427.00

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