# IBM TS2290 SAS Tape Drive Model H9S incorporates IBM Half-Height Linear Tape-Open (LTO) Ultrium 9 tape drive technology for increased capacity and reliability

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## At a glance

IBM(R) TS2290 Tape Drive is designed to deliver IBM tape reliability and performance at open systems prices. Features of the Ultrium(R) 9 model include:

- Specification data transfer rate of up to 300 MBps native and up to 750 MBps with 2.5 to 1 compression
- Support for LTO(R) Generation 9 media specification tape cartridge compressed capacity of up to 45 TB with 2.5 to 1 compression
- The ability to read and write on Ultrium 9 and 8 data cartridges
- 12 Gbps Serial Attached SCSI (SAS) attachment for Model H9S
- Encryption support in the tape drive to work with application-managed encryption
- 19-inch rack mount shelf option to accommodate two TS2290 tape drives side by side in the rack using just 2U of rack space
- Dual SAS ports per drive to improve availability
- Half-height (HH) drive form factor
- Support for media partitioning and self-describing tape through IBM Linear Tape File System (LTFS)

## Overview

IBM TS2290 Tape Drive (machine type 3580 model H9S) is an external, stand-alone or rack mountable unit designed to offer high capacity for the midrange systems environment. TS2290 incorporates IBM LTO Ultrium 9 HH SAS tape drives and is designed to support LTO Generation 9 media specification native data rate performance of up to 300 MBps, and up to 750 MBps with 2.5 to 1 compression. TS2290 tape drives support the LTO Generation 9 specifications for LTO tape drive technology, and LTO Generation 9 media to a compressed capacity of up to 45 TB with 2.5 to 1 compression (up to 18 TB native capacity) compared to previous LTO 8 compressed capacity of up to 30 TB with 2.5 to 1 compression (up to 12 TB native capacity) per tape cartridge. TS2290 can read and write to Ultrium 9 and Ultrium 8 cartridges. The Ultrium 9 tape drive is encryption-capable and designed to support application-managed encryption.

TS2290 tape drives use a 12 Gbps dual-port SAS interface for connection to a wide spectrum of system servers, including select IBM Power[(R)] Systems models, IBM Pureflex systems, and IBM BladeCenters. TS2290 also supports Microsoft[TM] Windows[TM] and UNIX[(R)] operating systems.

The following TS2290 HH LTO Ultrium 9 tape drive enhancements are designed to help improve performance, capacity, and reliability:

- Native LTO Generation 9 media specification data transfer rate of up to 300 MBps and up to 750 MBps with 2.5 to 1 compression
- LTO Generation 9 media specification tape cartridge native capacity support of 18 TB and compressed capacity of up to 45 TB with 2.5 to 1 compression
- 12 Gbps SAS attachment support
- 1 GB internal buffer
- Application-managed encryption support for half-height LTO Generation 9 SAS tape drive
- 16 KB cartridge memory with Ultrium 9 media
- Half-height drive form factor
- Two SAS ports per drive for improved availability and attachability
- IBM LTFS partitioning support

The enclosure width enables two TS2290 storage units to be mounted side by side in a 19-inch IBM server rack mount shelf kit, requiring 2U of rack space.

TS2290 tape drives provide an excellent migration path from digital linear tape (DLT or SDLT), 1/4 in (QIC), 4 mm (DAT), 8 mm, or older LTO generation tape drives.

Other media forms like disk have never really replaced tape in most data centers. Instead, tape has continued to be number one for storage archiving, and with the continued improvements in tape technology, tape is taking a more prominent role in a data center for both backup and archive. LTO tape is high in capacity and performance, very reliable, and still the lowest priced save/restore solution on the market today.

## Key requirements

Appropriate levels of host software are required to attach the IBM TS2290 tape drive to select IBM Power Systems, UNIX, and PC servers.

See the Technical information section for details.

## Planned availability date

December 3, 2021

Availability within a country is subject to local legal requirements.

## Description

3580 Tape Drive Model H9S (TS2290) is an external, stand-alone or rack shelf mountable half-height LTO tape unit designed to offer high capacity and performance for IBM Power Systems, Lenovo (formerly IBM System x), and other OEM system environments. LTO9 tape drives in the 3580 are available with a SAS electronic interface.

TS2290 incorporates IBM LTO Gen 9 half-height tape drives which are designed to provide maximum tape drive throughput native data rate performance of up to 300

MBps (up to 750 MBps with 2.5 to 1 compression) and a storage capacity of up to 45 TB with the introduction of the IBM LTO Ultrium 9 data cartridge. The LTO Gen 9 Tape Drive delivers 50% higher tape cartridge capacity of the LTO Ultrium 8 tape drives. IBM LTO Gen 9 tape drives can read and write LTO Ultrium 9 and 8 data cartridges. In addition, the Gen 9 SAS tape drive is encryption-capable and designed to support application-managed encryption.

The TS2290 attaches to IBM Power Systems and IBM PureFlex[R] servers, and supports Microsoft Windows and UNIX operating systems.

Specifications:

- Native LTO Generation 9 media specification data transfer rate of up to 300 MBps (up to 750 MBps with 2.5 to 1 compression)
- Support for LTO Generation 9 media specification tape cartridges with 18 TB native capacity, and a compressed capacity of up to 45 TB assuming 2.5 to 1 compression
- 12 Gbps SAS attachment support
- A 1 GB buffer
- Application-managed encryption support for half-height LTO Generation 9 SAS tape drives
- 16 KB cartridge memory with Ultrium 9 media
- Half-height drive form factor
- Two SAS ports per drive to improve availability and attachability
- Support for media partitioning and self-describing tape

IBM LTO Ultrium 9 Tape Cartridges will be available by ordering machine type 3589.

**Management software options**

*IBM Spectrum[R] Archive*

TS2290 leverages IBM Spectrum Archive for direct, intuitive and graphical access to data stored in IBM tape drives and libraries by incorporating the IBM LTFS format standard. LTFS compatibility enables tape-stored data to be accessed as if it were on disk or flash storage.

IBM Spectrum Archive enables users of LTO Ultrium 9 tape library systems to inventory cartridges and read, write, and search data on any cartridge, enabling writing of metadata and tagging of individual files for easy and fast access to files stored on cartridges.

*IBM Spectrum Protect*

IBM Spectrum Protect enables users to create, manage, and optimize archives, and provides management of concurrent copies of content, plus active, inactive, and off-site content.

## Product positioning

As you compare competitive tape solutions, consider:
- Capacity and performance requirements
- Data integrity, reliability, and availability
- Data security and encryption
- Storage usage and application requirements
- Affordability
- Loyalty to legacy or existing tape formats
- Work environment where space is limited

IBM TS2290 tape drives and software applications are designed to address these requirements and deliver a functionally rich tape storage solution incorporating LTO Ultrium 9 tape drive technology.

TS2290 is an excellent choice if you use tape drives that require large-capacity or high-performance tape backup. The TS2290, an entry offering to the family of IBM Ultrium tape products, is the answer to growing storage requirements and shrinking backup windows.

TS2290 tape drives are an excellent tape storage solution if you use digital linear tape drives or require high-performance tape backup. In addition to reading and writing on IBM LTO Ultrium 9 or 8 format tape cartridges, the TS2290 tape drive provides an excellent functional alternative to DLT/SDLT, 1/4 in, 4 mm, 8 mm, IBM Magstar MP 3570, or older LTO generation tape drives.

For capacity requirements greater than 45 TB (compressed) incorporating LTO Ultrium technology, consider an IBM TS2900 Tape Autoloader or TS4300 Entry/Mid-Range tape libraries, or the larger TS4500 Enterprise Tape Library.

For mission-critical data protection needs, optimized for enterprise multimode and host attachment, high-duty cycle and start/stop intensive tape applications, consider an IBM TS1160 Tape Drive with an IBM TS4500 Enterprise Tape Library or installed in a Rack Mount enclosure (feature #4804) which is available for the fiber channel interface.

## Product number

The following are newly announced features and model on the specified model of the IBM System Storage 3580 machine type:

| Description | Machine type | Model | Feature |
|---|---|---|---|
| TS2290 Tape Drive Model H9S with HHLTO9 SAS Tape Drive | 3580 | H9S | |
| TAA Compliance | 3580 | H9S | 0983 |
| Mini SAS-HD tape drive support | 3580 | H9S | 1413 |
| 4m Mini-SAS HD/ Mini-SAS 1x Cable | 3580 | H9S | 5507 |
| Rack Mount Shelf Kit w/PDU Line Cord | 3580 | H9S | 7003 |
| Ultrium Cleaning Cartridge | 3580 | H9S | 8002 |
| Ultrium 8 Data Cartridge (Single) | 3580 | H9S | 8804 |
| Ultrium 8 Data Cartridge (5-Pack) | 3580 | H9S | 8806 |
| Ultrium 9 Data Cartridge (Single) | 3580 | H9S | 8901 |
| Ultrium 9 Data Cartridges (5-pack) | 3580 | H9S | 8905 |
| ATTACHED TO WINDOWS SYSTEM | 3580 | H9S | 9212 |
| ATTACHED TO LINUX SYSTEM | 3580 | H9S | 9215 |
| ATTACHED TO AIX[R] SYSTEM | 3580 | H9S | 9600 |
| 2.8 m Power Cord 125V US/Canada | 3580 | H9S | 9800 |

| Description | Machine type | Model | Feature |
|---|---|---|---|
| 2.8 m Power Cord 250V Fran/Germ | 3580 | H9S | 9820 |
| 2.8 m Power Cord 250V Denmark | 3580 | H9S | 9821 |
| 2.8 m Power Cord 250V UK/China | 3580 | H9S | 9825 |
| 2.8 m Power Cord 250V Israel | 3580 | H9S | 9827 |
| 2.8 m Power Cord 250V Switzerland | 3580 | H9S | 9828 |
| 2.8 m Power Cord 250V South Africa | 3580 | H9S | 9829 |
| 2.8 m Power Cord 250V Italy | 3580 | H9S | 9830 |
| 2.8 m Power Cord 250V Australia | 3580 | H9S | 9831 |
| 2.8 m Power Cord 250V US/Canada | 3580 | H9S | 9833 |
| 2.8 m Power Cord 250V Uruguay | 3580 | H9S | 9834 |
| 2.8m Power Cord 125V Taiwan | 3580 | H9S | 9835 |
| 2.8 m Power Cord 250V China | 3580 | H9S | 9840 |
| 2.8 m Power Cord 250V Taiwan | 3580 | H9S | 9841 |
| 2.8 m Power Cord 125V Japan | 3580 | H9S | 9842 |
| 2.8 m Power Cord 250V Korea | 3580 | H9S | 9844 |
| 2.8 m Power Cord 250V India | 3580 | H9S | 9845 |
| 2.8 m Power Cord 250V Brazil | 3580 | H9S | 9847 |
| Rack Device to PDU Line Cord | 3580 | H9S | 9848 |
| OEM 1 FC ORDER INDICATOR | 3580 | H9S | ACW1 |
| OEM 1 Order Indicator | 3580 | H9S | ACY1 |
| No Rules Order Indicator | 3580 | H9S | ADNR |
| Shipping and Handling NC | 3580 | H9S | AG00 |
| Shipping and Handling - Charge | 3580 | H9S | AGGE |
| 3m Mini-SAS HD/ Mini-SAS HD 1X Cable | 3580 | H9S | AGKB |
| 1.5 m Mini-SAS HD/Mini-SAS HD 1X Cable | 3580 | H9S | AGKD |

## Publications

The following publication is shipped with the product. Additional copies are available.

| Title | Order number |
|---|---|
| *IBM Half Height LTO Tape Drive (SAS) Installation Quick Reference* | GC27-2276-03 |

The following publications are available. To order, contact your IBM representative.

| Title | Order number |
|---|---|
| *IBM Tape Device Driver Installation and Users Guide* (English) | GC27-2130 |
| *IBM Tape Device Driver Programming Reference* (English) | GA32-0566 |

These publications are also available at the  IBM Publications Center website.

Click on country, then enter publication number.

The device driver publications are also available at the  IBM Tape Device Drivers Installation and User's guide website.

All new IBM tape device drivers will only be posted to the web through the Fix Central download portal.

IBM maintains the latest levels of Storage tape drive and library device drivers and documentation on the Internet. Utilize the Fix Central download portal.

There are a few pull down menus to navigate to the correct download as follows:

1. In the first pull down menu labeled **Product Group,**  select *System Storage.*
2. In the next pull down menu that appears which is labeled **Product Family,** select *Tape Systems*.
3. With the next pull down menu,  **Product Type,**  select *Tape drivers and software.*
4. This will bring up the **Product** menu, which provides selections for *Platform drivers, Tools, or Software.*
5. In order to download your driver, select the correct operating system under **Platform drivers.**
6. Two more pull down menus will appear with information. Click **Continue.**
7. The next screen can be used to narrow the search, however, just click **Continue** to view what is available.

See the  *IBM Tape Device Drivers Installation and User's Guide* website.

IBM Documentation provides you with a single information center where you can access product documentation for IBM systems hardware, operating systems, and server software. Through a consistent framework, you can efficiently find information and personalize your access.

To access the IBM Publications Center Portal, go to the  IBM Publications Center website.

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. A large number of publications are available online in various file formats, which can currently be downloaded.

**National language support**

Not applicable.

## Services

### IBM Systems Lab Services

Systems Lab Services offers infrastructure services to help build hybrid cloud and enterprise IT solutions. From servers to storage systems and software, Lab Services can help deploy the building blocks of a next-generation IT infrastructure to empower a client's business. Lab Services consultants can perform infrastructure

services for clients online or onsite, offering deep technical expertise, valuable tools, and successful methodologies. Lab Services are designed to help clients solve business challenges, gain new skills, and apply best practices.

Lab Services offers a wide range of infrastructure services for IBM Power servers, IBM Storage systems, IBM Z[R], and IBM LinuxONE. Lab Services has a global presence and can deploy experienced consultants online or onsite around the world.

For assistance, contact Systems Lab Services at ibmsls@us.ibm.com.

To learn more, see the  IBM Systems Lab Services website.

**IBM Consulting**

As transformation continues across every industry, businesses need a single partner to map their enterprise-wide business strategy and technology infrastructure. IBM Consulting is the business acceleration partner to help cocreate change across an organization. IBM specialists can help businesses succeed through finding collaborative ways of working that forge connections across people, technologies, and partner ecosystems. IBM Consulting brings together the business expertise and an ecosystem of technologies that help solve some of the biggest problems faced by organizations. With methods that get results faster, an integrated approach, that is grounded in an open and flexible hybrid cloud architecture, and incorporating technology from IBM Research[R] and IBM Watson[R] AI,  IBM Consulting enables businesses to lead change with confidence and deliver continuous improvement across a business and its bottom line.

For additional information, see the  IBM Consulting website.

**IBM Technology Support Services (TSS)**

Get preventive maintenance, onsite and remote support and gain actionable insights into critical business applications and IT systems. Speed developer innovation with end-to-end support for over 240 open-source packages. Leverage powerful IBM analytics and AI-enabled tools to enable client teams to manage IT problems before they become emergencies.

The TSS offers extensive IT maintenance and support services that cover more than one niche of a client's environment. TSS covers products from IBM and other OEMs, including servers, storage, network, appliances, and software to help clients ensure high availability across their data center and hybrid cloud environment.

For details on available services, see the Technology support for hybrid cloud environments website.

**IBM TechU**

Improve your knowledge in hybrid cloud and AI solutions. IBM TechU provides the most recent content so that you can learn, engage, and increase your skills with IBM Technology specialists.

A one-year, renewable membership TechU digital membership provides access to IBM Systems online education to help address your technical enablement needs for existing and new projects.

Submit questions or comments to techuid@us.ibm.com.

For additional details, see the  IBM TechU website.

**IBM Expert Labs**

IBM Expert Labs can help clients accelerate their projects and optimize value by leveraging their deep technical skills and knowledge. With more than 20 years of industry experience, these specialists know how to overcome the biggest challenges to deliver business results that can have an immediate impact.

Expert Labs deep alignment with IBM product development allows for a strategic advantage as they are often the first in line to get access to new products, features, and early visibility into roadmaps. This connection with the development enables them to deliver First of a Kind (FOAK) implementations to address unique needs or expand a client's business with a flexible approach that works best for their organization.

For additional information, see the IBM Expert Labs website.

### IBM Security™ Expert Labs

With extensive consultative expertise on IBM Security software solutions, IBM Security Expert Labs helps clients and partners modernize the security of their applications, data, and workforce. With an extensive portfolio of consulting and learning services, Expert Labs provides project-based and premier support service subscriptions.

These services can help clients deploy and integrate IBM Security software, extend their team resources, and help guide and accelerate successful hybrid cloud solutions including critical strategies such as zero trust. Remote and on-premises software deployment assistance is available for IBM Cloud Pak(R) for Security, IBM Security QRadar(R)/QRoC, IBM Security SOAR/Resilient(R), IBM i2(R), IBM Security Verify, IBM Security Guardium(R), and IBM Security MaaS360(R).

For more information, contact Security Expert Labs at sel@us.ibm.com.

For additional information, see the IBM Security Expert Labs website.

## IBM support

For installation and technical support information, see the IBM Support Portal.

## Additional support

### IBM Garage™

IBM Garage is a framework for accelerating digital transformation. It helps you generate innovative ideas and equips you with the practices, technologies, and expertise to turn those ideas into business value in weeks. When you work with IBM Garage you bring pain points into focus. You empower your team to take manageable risks, adopt leading technologies, speed up solution development, and measure the value of everything you do. IBM Garage has experts and services to address a broad array of use cases, including capabilities for business transformation, hybrid cloud, analytics and AI, infrastructure systems, security, and more. To learn more, see the IBM Garage for Systems website.

## Technical information

### Specified operating environment

#### *Physical specifications*

- Width: 213 mm (8.4 in.)
- Depth: 332 mm (13.1 in.)
- Height: 58 mm (2.3 in.)
- Weight: 4.3 kg (9.4 lbs)

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

### Operating environment

- Maximum operating temperature: 40°C (104°F)
- Relative humidity: 20% - 80%
- Wet bulb (caloric value): 26.0°C (78.8°F)
- Power rating:
  - 100 V AC, 0.5 A 50/60 Hz
  - 240 V AC, 0.3 A 50/60 Hz
  - Power: 0.045 kVA

### Hardware requirements

TS2290 tape drives come with raven black covers and use a SAS interface. These drives can be attached to IBM Power Systems and non-IBM servers that support those interface specifications. A current list of supported open system configurations is available from the  IBM SSIC  website.

Select the *model,*  then **Product Details,**  and  *LTO Compatibility* to view the Independent Software Vendor Matrix (ISV) for the product.

A power cord option number, if applicable, should also be specified.

*Cables*

For TS2290 Model H9S, a SAS cable is required to attach a TS2290 tape drive to host a SAS adapter.

At least one of the following cables should be specified on the initial plant order:

- Feature #AGKB - 3 m Mini-SAS HD/Mini-SAS HD 1x Cable
- Feature #AGKD - 1.5 m Mini-SAS HD/Mini-SAS HD 1x Cable
- Feature #5507 - 4 m Mini-SAS HD/Mini-SAS 1x Cable

The following cable options are available for SAS attachment:

- Feature #AGKB - 3 m Mini-SAS HD/Mini-SAS HD 1x Cable
- Feature #AGKD - 1.5 m Mini-SAS HD/Mini-SAS HD 1x Cable
- Feature #5507 - 4 m Mini-SAS HD/Mini-SAS 1x Cable

See the **Special Features** section of the TS2290 (3580) tape drive sales manual for detailed descriptions of these features.

For a current list of HBAs that support the TS2290, go to the  IBM SSIC  website.

### Software requirements

For a current list of host software versions and release levels that support the TS2290, see the  IBM SSIC  website.

IBM Spectrum Protect, Business Rule Management System (BRMS), and other compatible software offerings provide storage and tape management software for the 3580 or TS2290 family of products. 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 the  IBM SSIC website.

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Select the **model,** then **Product Details,** then **LTO Compatability,** and view **ISV matrix for LTO** for the product.

IBM continues to work together with the ISVs to support the IBM LTO Ultrium tape drives or TS2290 family of products. Individual application vendors should be contacted for specific information and availability dates.

IBM maintains the latest levels of Storage tape drive and library device drivers and documentation on the Internet. Utilize the Fix Central download portal.

There are a few pull down menus to navigate to the correct download as follows:

1. In the first pull down menu labeled **Product Group,** select *System Storage.*
2. In the next pull down menu that appears which is labeled **Product Family,** select *Tape Systems.*
3. With the next pull down menu, **Product Type,** select *Tape drivers and software.*
4. This will bring up the **Product** menu, which provides selections for *Platform drivers, Tools, or Software.*
5. In order to download your driver, select the correct operating system. under **Platform drivers.**
6. Two more pull down menus will appear with information. Click **Continue.**
7. The next screen can be used to narrow the search, however just click **Continue** to view what is available.

See the *IBM Tape Device Drivers Installation and User's Guide* website.

### Compatibility

IBM LTO Ultrium 9 tape drives can read and write IBM LTO 9 and 8 data cartridges. The LTO Generation 9 media specification of 45 TB compressed data cartridges can only be used on the new IBM LTO Ultrium 9 tape drives.

### Limitations

SAS cable lengths are limited to 5.5 m (18 ft).

Installing more than one TS2290 tape drive on a SAS bus may impact tape drive or system performance. Intermixing of other SAS devices on the same bus as the TS2290 may also impact performance of those devices.

Although multiple systems may be attached to a tape drive, the systems cannot use the drive simultaneously.

While 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.

## Planning information

### Client responsibilities

Physical planning is a client responsibility. The TS2290 tape drive is designated as a customer setup unit (CSU). It is the client's responsibility to install the unit.

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

For optimum performance, the clients must obtain the latest level of firmware prior to installing the unit. Clients can download the latest level of firmware from the LTO website.

You are responsible for downloading or obtaining from IBM, and installing designated Machine Code (microcode, basic input/output system code (called BIOS), utility programs, device drivers, and diagnostics delivered with an IBM machine) and other software updates in a timely manner from an IBM internet website or from other electronic media, and following the instructions that IBM provides. You may request IBM to install Machine Code changes; however, you may be charged for that service.

### Cable orders

For TS2290 Model H9S, a SAS cable is required to attach a TS2290 tape drive to a host SAS adapter. Mini-SAS HD/Mini-SAS HD cables (features #AGKB and #AGKD) provide attachment from HBA SFF-8644 to the drive with SFF-8644.Mini-SAS/Mini-SAS HD cables (FC 5507 )provide attachment from HBA SFF-8088 to the drive with SFF-8644. At least one SAS cable should be specified on the initial plant order.

The following cable options are available for SAS attachment:

- Feature #AGKB - 3 m Mini-SAS HD/Mini-SAS HD 1x Cable
- Feature #AGKD - 1.5 m Mini-SAS HD/Mini-SAS HD 1x Cable
- Feature #5507 - 4 m Mini-SAS HD/Mini-SAS 1x Cable

See the **Specify or Special Features** section of the 3580 Sales Manual for a detailed description of the cables available.

### Installability

Installation time for the TS2290 tape drive is approximately 0.5 to 0.7 hours.

### Packaging

| Product | Shipment group | Number of boxes |
|---------|----------------|-----------------|
| 3580-H9S | TS2290 with Tape Drive (3580 Model H9S) | 1 |
| | Power cord option | |
| | One cleaning cartridge | |
| | Documentation kit that includes:<br><br>- License Agreement<br>- IBM TS2290 Statement of Limited Warranty<br>- IBM TS2290 Model H9S Quick Reference<br>- Device Driver pointer document<br>- Compliance document | |

## Security, auditability, and control

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

The client 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.

## Products - terms and conditions

### *Warranty period*

| Warranty and additional coverage options | Coverage summary[1] |
|---|---|
| Warranty Period: | 3 years |
| Service Level: | CRU including Parts Only, 9x5 Next Business Day |
| **Service upgrade options** | |
| Warranty Service upgrade | IBM On-Site Repair, 9x5 Same Day[2] and 24x7 Same Day options |
| Maintenance Services (Post-Warranty) | IBM On-Site Repair, Next Business Day and Same Day options |
| IBM Hardware Maintenance Services[3] - Committed maintenance | Yes |

[1] See to complete coverage details below

[2] Only offered in US and EMEA

[3] Not offered in the US

Three years

To obtain copies of the IBM Statement of Limited Warranty, contact your reseller or IBM. An IBM part or feature installed during the initial installation of an IBM machine is subject to the full warranty period specified by IBM. An IBM part or feature that replaces a previously installed part or feature assumes the remainder of the warranty period for the replaced part or feature. An IBM part or feature added to a machine without replacing a previously installed part or feature is subject to a full warranty. Unless specified otherwise, the warranty period, type of warranty service, and service level of a part or feature are the same as those for the machine in which it is installed.

### *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 through an IBM website. Certain machines contain remote support capabilities for direct problem reporting, remote problem determination, and resolution with IBM. You must follow the problem determination and resolution procedures that IBM specifies. Following problem determination, if IBM determines on-site service is required, scheduling of service will depend upon the time of your call, machine technology and redundancy, and availability of parts. If applicable to your product, parts considered Client 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-specific and location-specific information.

### *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 (mandatory) or a Tier 2 (optional) CRU.

### *Tier 1 (mandatory) CRU*

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

### Tier 2 (optional) 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 (NBD) delivery. IBM specifies, in the materials shipped with a replacement CRU, whether a defective CRU must be returned to IBM. When return is required, return instructions and a container are shipped with the replacement CRU. You may be charged for the replacement CRU if IBM does not receive the defective CRU within 15 days of your receipt of the replacement.

The following parts have been designated as Tier 1 CRUs:

- TS2290 Tape Drive Model H9S
- Power cords
- SAS cables

### CRU and On-site Service

At IBM's discretion, you will receive specified CRU service, or 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:

- 9 hours per day, Monday through Friday, excluding holidays, next business day response. Calls must be received by 3:00 PM local time in order to qualify for next business day response.

### Warranty service

IBM is now shipping machines with selected non-IBM parts that contain an IBM field replaceable unit (FRU) part number label. These parts are to be serviced during the IBM machine warranty period. IBM is covering the service on these selected non-IBM parts as an accommodation to their clients, and normal warranty service procedures for the IBM machine apply.

### International Warranty Service

International Warranty Service allows you to relocate any machine that is eligible for International Warranty Service and receive continued warranty service in any country where the IBM machine is serviced. If you move your machine to a different country, you are required to report the machine information to your Business Partner or IBM representative.

The warranty service type and the service level provided in the servicing country may be different from that provided in the country in which the machine was purchased. Warranty service will be provided with the prevailing warranty service type and service level available for the eligible machine type in the servicing country, and the warranty period observed will be that of the country in which the machine was purchased.

The following types of information can be found on the International Warranty Service website

- Machine warranty entitlement and eligibility
- Directory of contacts by country with technical support contact information
- Announcement Letters

### 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. See the Warranty services section for additional details.

IBM will attempt to resolve your problem over the telephone or electronically by access to an IBM website. Certain machines contain remote support capabilities for direct problem reporting, remote problem determination, and resolution with IBM. You must follow the problem determination and resolution procedures that IBM specifies. Following problem determination, if IBM determines on-site service is required, scheduling of service will depend upon the time of your call, machine technology and redundancy, and availability of parts.

- IBM On-Site Repair, Same Day On-Site Response Target, Monday-Sunday 00:00-24:00, 365 days a year

### Maintenance service options

### CRU and On-site Service

At IBM's discretion you will receive CRU service or 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, same day response. Monday-Sunday 00:00-24:00, 365 days a year

Customer Replaceable Units (CRUs) may be provided as part of the machine's standard warranty CRU Service except that you may install a CRU yourself or request IBM installation, at no additional charge, under the CRU and On-site Service level specified above. For additional information on the CRU Service, see the warranty information.

### 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, through an IBM website. Certain machines contain remote support capabilities for direct problem reporting, remote problem determination, and resolution with IBM. You must follow the problem determination and resolution procedures that IBM specifies. Following problem determination, if IBM determines on-site service is required, scheduling of service will depend upon the time of your call, machine technology and redundancy, and availability of parts. 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-specific and location-specific information. The following service selections are available as maintenance options for your machine type.

- IBM On-Site Repair, Next Business Day Response Target, Monday-Friday. Calls must be received by 3:00 PM local time in order to qualify for next business day response
- IBM On-Site Repair, Same Day On-Site Response Target, Monday-Sunday 00:00-24:00, 365 days a year

### 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.

### Customer Replaceable Unit (CRU) Service

If your problem can be resolved with a CRU (for example, keyboard, mouse, speaker, memory, or hard disk drive), and depending upon the maintenance service offerings in your geography,  IBM will ship the replacement CRU to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from IBM upon your request.

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 are shipped with the replacement CRU, and 2) you may be charged for the replacement CRU if IBM does not receive the defective CRU within 15 days of your receipt of the replacement.

CRUs may be provided as part of the machine's standard maintenance service except that you may install a CRU yourself or request IBM installation, at no additional charge, under any of the On-site Service levels specified above.

### 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.

## General terms and conditions

### Field-installable features

No

### Model conversions

No

### Machine installation

Client setup. Clients are responsible for installation according to the instructions IBM provides with the machine.

### Graduated program license charges apply

No

### Licensed Machine Code

IBM Machine Code is licensed for use by a client on the IBM machine for which it was provided by IBM under the terms and conditions of the IBM License Agreement for Machine Code, to enable the machine to function in accordance with its specifications, and only for the capacity authorized by IBM and acquired by the client. You can obtain the agreement from the License Agreement for Machine Code and Licensed Internal Code website.

Access to Machine Code updates is conditioned on entitlement and license validation in accordance with IBM policy and practice. IBM may verify entitlement through customer number, serial number, electronic restrictions, or any other means or methods employed by IBM in its discretion.

You may also obtain updated code by contacting your IBM representative.

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

### Educational allowance

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

The educational allowance is 15% for the products in this announcement.

## Prices

For all local charges, contact your local IBM representative or IBM Business Partner.

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## Regional availability

Argentina, Belize, Plurinational State of Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, and Bolivarian Republic of Venezuela

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