IBM TS4500 Tape Library supports LTO Ultrium 8 single-mode fiber tape drives for applications that require high bandwidth over long distances

Table of contents

1 Overview
2 Key prerequisites
3 Planned availability date
4 Technical information
5 Publications
6 Terms and conditions
7 Prices
8 Order now

At a glance

- High bandwidth data transmissions over long distances
- Native data transfer rate of up to 360 MBps for full-high (FH) tape drives
- LTO™ Generation 8 media specification tape cartridge compressed capacity of up to 30 TB (up to 12 TB native)
- 8 Gbps Fibre Channel dual-ported drive attachment
- A 1 GB internal buffer
- Support for media partitioning and self-describing tape with IBM Spectrum Archive™ Enterprise Edition
- LTO Ultrium 8 encryption support
- Support for new TS1080 (3588-F8S) drives into 3584 models L55 and D55
- LTO Ultrium 8 cartridge capacity of up to 278 PB per library (up to 695 PB with 2.5 to 1 compression)

Overview

IBM TS1080 tape drive model F8S is an LTO Ultrium 8 tape drive enabled with singlemode fiber, designed for the heavy demands of backup and archive tape storage applications that require high bandwidth over long distances. TS1080 Model F8S can be installed in a TS4500 tape library and delivers maximum throughput with a native data transfer of up to 360 MBps.

Unlike the conventional multimode fiber optics, the singlemode fiber optics permits only one mode or ray of light to be transmitted. The small core and the single light wave virtually eliminate any distortion that could result from overlapping light pulses, providing the least signal attenuation and the highest transmission speeds of any fiber cable type. These benefits make it suitable for long distance, higher bandwidth applications such as those in modern hyperscaled environments, to reach distances up to 50 times farther than multimode fiber applications.

TS1080 tape drives support the LTO Generation 8 media specification of over double the compressed capacity of up to 30 TB with 2.5 to 1 compression (up to 12 TB native capacity) as compared to previous LTO 7 compressed capacity of up to 15 TB with 2.5 to 1 compression (up to 6 TB native capacity) per tape cartridge. IBM LTO 8
tape drives can read and write LTO Ultrium 7. TS1080 has an 8 Gbps Fibre Channel dual-ported interface for connection to a wide spectrum of open system servers and hyperscaled environments.

### Key prerequisites

Appropriate levels of host and drive software are required to attach TS1080 Model F8S to a wide range of environments, including select IBM Power Systems™, IBM System p, and other servers running Linux® and Microsoft® Windows® operating system environments that support Fibre Channel interfaces.

### Planned availability date

December 7, 2018

### Description

TS1080 Model F8S with singlemode fiber optics is designed for the heavy demands of backup and archive tape storage applications that require high bandwidth over long distances. TS1080 Model F8S is designed to be installed in a TS4500 tape library, and delivers maximum throughput with a native data transfer of up to 360 MBps.

Unlike the conventional multimode fiber optics which has a core diameter size of 62.5 microns, the singlemode fiber optics cable has a small core size of less than 10 μm that permits only one mode or ray of light to be transmitted. The small core and the single light-wave virtually eliminate any distortion that could result from overlapping light pulses, providing the least signal attenuation and the highest transmission speeds of any fiber cable type. As a result, singlemode fibers are suitable for long distance, higher bandwidth applications and can reach up to 50 times more distance than multimode fiber cables. Within hyperscaled data centers, multimode fibers can typically reach 300 to 400 meters for a very long time, and when connecting over longer distances, singlemode fiber can reach up to 80 km, and even farther.

TS1080 has an 8 Gbps Fibre Channel dual-ported interface for connection to a wide spectrum of open system servers (including select IBM Power Systems, IBM System p, and other servers running Linux and Microsoft Windows operating system) and hyper-scaled environments.

TS1080 Model F8S, part of the eighth-generation IBM LTO Ultrium family, is supported by HD2 frames of the TS4500 tape library and delivers the same capabilities as TS1080 Model F8C. For complete information about Model F8C, see Hardware Announcement 117-078, dated October 10, 2017.

### Accessibility by people with disabilities

A US Section 508 Accessibility Compliance Report containing details on accessibility compliance can be found on the Product accessibility information website.

### Product positioning

TS1080 Model F8S with singlemode fibre is designed for the heavy demands of backup and archive tape storage applications that require high bandwidth over long distances, and represents the perfect complement to the existing Model F8C.

The singlemode fiber tape drive only transmits one mode or ray of light. Its small core and the single light wave virtually eliminate any distortion that could result
from overlapping light pulses, delivering the least signal attenuation and the highest transmission speeds of any fiber cable type. As a result, singlemode fibers are suitable for highly specialized, long distance, higher bandwidth applications and can reach up to 50 times farther than multimode fiber cables. Multimode tape drives transmit multiple signals over the same fiber optics cable and typically only reach up to 300 to 400 meters, being the most common and cost-effective transmission mode within data centers.

Reference information

For more information, see the following announcements:

- IBM TS4500 Tape Library, Hardware Announcement 114-072, dated May 19, 2014
- IBM TS1155 Tape Drive, Hardware Announcement 117-038, dated May 9, 2017
- IBM TS1080 Tape Drive Model F8C, Hardware Announcement 117-078, dated October 10, 2017

For IBM statement on compliance with European Union Directive on Restriction of the use of certain Hazardous Substances in Electrical and Electronic Equipment (2002/95/EC) (RoHS), go to the IBM and the Environment website.

Product number

The following are newly announced features and model on the specified model of the IBM System Storage (R) 3584 and 3588 machine types:

<table>
<thead>
<tr>
<th>Description</th>
<th>Machine type</th>
<th>Model</th>
<th>Feature number</th>
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<tbody>
<tr>
<td>IBM TS1080 Tape Drive LTO8 Single Mode Fiber</td>
<td>3588</td>
<td>F8S</td>
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<td>TAA Compliance</td>
<td>3588</td>
<td>F8S</td>
<td>0983</td>
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<td>3588 F8S Drive Plant Install</td>
<td>3588</td>
<td>F8S</td>
<td>9611</td>
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<td>3588 F8S Drive Field Install</td>
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<td>IBM Systems Lab Services Post-Sale Services: 1 Day</td>
<td>3588</td>
<td>F8S</td>
<td>SVCS</td>
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<td>BP Post-Sale Services: 1 Day</td>
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<td>F8S</td>
<td>SVBP</td>
</tr>
<tr>
<td>Other IBM Post-Sale Services: 1 Day</td>
<td>3588</td>
<td>F8S</td>
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<td>1st Quad Drive Mounting Kit</td>
<td>3584</td>
<td>D55</td>
<td>1531</td>
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<td>D55</td>
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<td>D55</td>
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<td>D55</td>
<td>1534</td>
</tr>
<tr>
<td>SMF Quad Drive-to-Patch Panel cables</td>
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<td>D55</td>
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<td>D55</td>
<td>9611</td>
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<tr>
<td>Direct Fiber - No Patch Panel Cables</td>
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<td>D55</td>
<td>9713</td>
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<tr>
<td>1st Quad Drive Mounting Kit</td>
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<td>L55</td>
<td>1531</td>
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**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 IBMid).

BP Attachment for Announcement Letter 118-100

**Education support**

Call IBM IT Education Services at 800-IBM-TEACH (426-8322) for catalogs, schedules, and enrollments.

**Publications**

Information on TS1080 Model F8C Tape Drive is contained in the TS4500 Tape Library publications. See the [TS4500](#) documentation in IBM Knowledge Center.

<table>
<thead>
<tr>
<th>Title</th>
<th>Form number</th>
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</thead>
<tbody>
<tr>
<td>TS4500 Introduction and Planning Guide</td>
<td>SC27-5990-06</td>
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</table>

**IBM Knowledge Center** 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.

**Services**

**IBM Systems Lab Services**

IBM Systems Lab Services offers a wide array of services available for your enterprise. It brings expertise on the latest technologies from the IBM development community and can help with your most difficult technical challenges.

IBM Systems Lab Services exists to help you successfully implement emerging technologies so as to accelerate your return on investment and improve your satisfaction with your IBM systems and solutions. Services examples include initial implementation, integration, migration, and skills transfer on IBM systems solution
capabilities and recommended practices. IBM Systems Lab Services is one of the service organizations of IBM's world-renowned IBM Systems Group development labs.

For details on available services, contact your IBM representative or go to the Lab Services website.

Global Technology Services

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

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

For details on available services, contact your IBM representative or go to the IBM Global Technology Services website.

For details on available IBM Business Continuity and Recovery Services, contact your IBM representative or go to the Resiliency Services website.

Details on education offerings related to specific products can be found on the IBM authorized training website.

Technical information

Specified operating environment

**Physical specifications**

Height and length of the LTO 8 tape drives:

- Width: 156 mm (6.1 in.)
- Depth: 366 mm (14.4 in.)
- Height: 84.76 mm (3.3 in.)
- Weight: 3.29 kg (7.25 lb)

**Operating environment**

Equipment environment specifications for IBM TS1080 tape drives:

- Temperature: 10°C to 40°C (50°F to 104°F)
- Relative humidity: 20% - 80% noncondensing
- Wet bulb temperature: 26°C (78.8°F) maximum
- Electrical power: 5.0 amps peak at 12 V DC, 40 watts max continuous
- Noise level: 5.8 Bels operating

Equipment environment specifications for IBM TS4500 tape library:

- Temperature: 15°C to 32°C (60°F to 90°F)
- Relative humidity: 20% - 80% noncondensing
- Wet bulb temperature: 26°C (78.8°F) maximum
- Electrical power: 4.1 amps at 200-240 V AC, 1.1 kVA (max per frame)
TS4500 is classified as a Category 1 product as defined in C-S 1-1710-006. The maximum noise level (operating/idle) in bels (at recommended ambient temperature) is 7.5 bels.

**Hardware requirements**

TS1080 Model F8S is designed for installation in TS4500 tape library model L55 or D55. There can be up to sixteen TS1080 models installed in one of these frames (up to 12 in frame 1) for a total of up to 128 Ultrium tape drives. TS1080 can be installed and intermixed within the same frame with other LTO 5 or higher tape drives.

TS1080 Model F8S has an 8 Gbps Fibre Channel interface that may attach in either Fabric topology or Arbitrated Loop topology.

A Quad Drive Mounting Kit feature (#1531, #1532, #1533, or #1534) is required on a TS4500 tape library frame to install up to four TS1080 tape drives. TS1080 Model F8S must be ordered separately. When ordered with a new TS4500 coming from the plant, one of the following feature numbers should be specified:

- Feature number 9611 (3588 F8S Plant Install) should be specified on the TS1080 and the TS4500 tape library frame into which it will be installed if it is going to be shipped with the TS4500 tape library frame.
- Feature number 9690 (LTO, TS1140, TS115x Field Install Drive in 3584) should be specified on the TS4500 tape library frame into which it will be installed.

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

**Note:** The TS4500 requires that cartridges have appropriate bar code labels.

TS1080 Model F8S in the TS4500 Tape Library can be attached to a wide range of environments, including select IBM Power Systems, IBM System p, or other servers running Linux and Microsoft Windows operating system environments that support Fibre Channel interfaces.

A current list of supported open system configurations for Model F8S is available at the [IBM System Storage Interoperation Center (SSIC)](http://www.ibm.com/servers/storage/ssic) website.

Select the **model**, then **Interoperability Matrix**, and view the **Supported Servers and Operating Systems** for the product.

**Cables**

Cables are required to attach tape drives in the TS4500 tape library to each server connection, up to the number of tape drive attachments installed. A Fibre Channel cable should be specified on the TS4500 frame.

**Fibre Channel cables**

A Fibre Channel cable is required to attach a TS1080 Model F8S tape drive in TS4500 tape library models to host adapters or other storage area network components. The cable can be customer-supplied, or ordered with the TS4500 tape library in the lengths available. The attaching fiber cable must be either a 50.0/125 micrometers MMF or a 9/125 micrometers SMF (for long distances). The connector on the TS1080 tape drive is a Lucent Connector (LC) of either MMF or SMF.

The following features are available for Fibre Channel cables in the TS4500 frame:

- Feature number AGK1 - 10 m OM3 fiber Cable (LC)
- Feature number AGK2 - 25 m OM3 fiber Cable (LC)
- Feature number AGK3 - 80 m OM3 fiber Cable (LC)
See the Special Features section of the TS4500 or 3584 tape library Sales Manual for detailed descriptions of these features.

Host bus adapter (HBA) support

For a current list of HBAs that support the TS1080 or TS4500, go to the IBM SSIC website.

Software requirements

LTO Ultrium or Enterprise tape drives in the TS4500 Tape Library

For the latest supported hardware interoperability configurations, go to the IBM SSIC website.

The installation of a TS4500 or 3584 tape library may require code updates for supported open systems device drivers or storage management software. According to the Solutions Assurance Product Review (SAPR) Guide, the account team or Business Partner should ensure that the customer checks the support levels required for their particular software environment prior to the installation of the TS1080. A Solutions Assurance call is required at a minimum for the installation of the first TS1080 in an account.

IBM Security Key Lifecycle Manager and other industry-leading compatible software offerings provide storage and tape management software for the TS4500 (machine type 3584). Supporting software and applications must be obtained separately from IBM, IBM Business Partners, or ISVs. A list of compatible software is available from your IBM representative or at the IBM Tape Storage website.

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

Application software

For a list of compatible software, operating systems, and servers for LTO tape drives, go to the IBM Tape Storage website.

1. Click IBM TS4500 Tape Library > Product details
2. Click Learn more > Interoperability matrix or ISV matrix

For a list of compatible software, operating systems, and servers for 3588 tape drives, go to the IBM Tape Storage website.

1. Click the appropriate tape drive > Product details
2. Click Learn more > Interoperability matrix or ISV matrix

For complete IBM storage interoperability information, including operating systems, servers, switches, and adapters supported by the TS4500 tape library in a SAN configuration, go to the IBM SSIC website.

Compatibility

Compatible servers and software

The TS4500 tape library is supported by a wide variety of servers, operating systems, and adapters. There are many ways to determine the servers and software that support the TS4500 tape library.

These attachments can change throughout the lifecycle of the product. To determine the latest attachments, or to get a comprehensive list of compatible software, perform one of the following actions:

- For a list of compatible software, operating systems, and servers for LTO and 3588 tape drives, see the IBM Tape storage website.
For complete IBM storage interoperability information, including operating systems, servers, switches, and adapters supported by the TS4500 tape library in a SAN configuration, go to the IBM SSIC website.

Contact your IBM sales representative.

Notes:

1. IBM does not provide application software with the TS4500 tape library. To order software, contact your IBM sales representative, IBM Business Partner, or an Independent Software Provider.
2. If you attach your library to a non-IBM platform with non-IBM software, it is recommended that you contact your software vendor to obtain a matrix of compatible hardware, software, firmware revisions, and adapter cards.

Limitations

- The TS4500 tape library supports a mixture of LTO drive types in a logical library, but it does not support a mixture of LTO and 3592 tape drives in a logical library. Some independent software vendors (ISVs) support mixed drive types within logical libraries; others do not. Some ISVs that support mixed drive types do so with restrictions. For details, contact your ISV.
- For situations where the ISV support does not exist or does not meet your requirements, the TS4500 tape library provides another option to protect your investment by partitioning the tape drives into separate logical libraries. You can customize the partition to any number of slots by using menus.
- Although the compression technology can increase the amount of data stored on the media, the actual degree of compression achieved is highly sensitive to the characteristics of the data being compressed.
- Fibre Channel cable lengths are limited to 500 meters (1,650 ft).
- Although multiple systems may be attached to a tape drive, the systems cannot use the drive simultaneously.
- A Model S24 or Model S54 frame cannot be an end (left-most or right-most) frame in a TS4500 tape library.

Planning information

Client responsibilities

Physical planning is a customer responsibility. Detailed planning information is in the IBM TS4500 Introduction and Planning Guide (SC27-5990-06). Current levels of the open systems device drivers should be obtained to ensure that the TS1080 LTO Ultrium Tape Drives are supported.

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

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

Cables are required to attach tape drives in the TS4500 Tape Library to each server connection, up to the number of tape drive attachments installed.

Installability

Installation time for each field-installed TS1080 tape drive in the TS4500 tape libraries is approximately 0.5 to 0.7 hours.
Direct client support

Eligible customers can obtain installation and usage assistance through ASK Support using the search word 3584, 3588, TS4500, or TS1080.

Packaging

<table>
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<tr>
<th>Product</th>
<th>Shipment group</th>
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</thead>
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<tr>
<td>3588 Model F8S</td>
<td>3588 Tape Drive Model F8S</td>
<td>1</td>
</tr>
</tbody>
</table>

Security, auditability, and control

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

IBM Systems Lab Services

For details on available services, contact your IBM representative or go to the Lab Services website.

IBM Electronic Services

IBM has transformed its delivery of hardware and software support services to help you achieve higher system availability. Electronic Services is a web-enabled solution that offers an exclusive, no-additional-charge enhancement to the service and support available for IBM servers. These services are designed to provide the opportunity for greater system availability with faster problem resolution and preemptive monitoring. Electronic Services comprises two separate, but complementary, elements: Electronic Services news page and Electronic Services Agent.

The Electronic Services news page is a single internet entry point that replaces the multiple entry points traditionally used to access IBM Internet services and support. The news page enables you to gain easier access to IBM resources for assistance in resolving technical problems.

The Electronic Service Agent™ is no-additional-charge software that resides on your server. It monitors events and transmits system inventory information to IBM on a periodic, client-defined timetable. The Electronic Service Agent automatically reports hardware problems to IBM. Early knowledge about potential problems enables IBM to deliver proactive service that may result in higher system availability and performance. In addition, information collected through the Service Agent is made available to IBM service support representatives when they help answer your questions or diagnose problems. Installation and use of IBM Electronic Service Agent for problem reporting enables IBM to provide better support and service for your IBM server.

To learn how Electronic Services can work for you, go to the IBM Electronic Service Agent website.

Terms and conditions

Volume orders

Contact your IBM representative.
IBM Global Financing

Yes

Products - terms and conditions

Warranty period

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<tr>
<th>Warranty and additional coverage options</th>
<th>Coverage summary⁽¹⁾</th>
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</thead>
<tbody>
<tr>
<td>Warranty Period: 1 year⁽²⁾</td>
<td>IBM On-Site, 24x7 Same Day</td>
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<td>Service Level: IBM On-Site, 24x7 Same Day</td>
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<table>
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<tr>
<th>Service upgrade options</th>
<th>Coverage summary</th>
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</thead>
<tbody>
<tr>
<td>Warranty Service Upgrade</td>
<td>IBM On-Site Repair, 24x7 Same Day</td>
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<tr>
<td>Maintenance Services (Post-Warranty):</td>
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<tr>
<td>IBM Hardware Maintenance Services - committed maintenance⁽³⁾</td>
<td>Yes</td>
</tr>
</tbody>
</table>

⁽¹⁾ See complete coverage details below
⁽²⁾ Known exception: Turkey (Warranty period: 2 years)
⁽³⁾ Not offered in the US

Warranty Period:

Service Level:

Warranty and additional coverage options

Service upgrade options

One year

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 via 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 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.

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

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 customers, 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.

Maintenance service options

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, 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 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.

**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:

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

**Machine Exchange Service**

IBM will initiate shipment of a replacement machine to your location. You are responsible for its installation and verification of operation. You must pack the failed machine into the shipping container that contained the replacement machine and return the failed machine to IBM. Transportation charges, both ways, are paid by IBM. You may be charged for the replacement machine if IBM does not receive the failed machine within 15 days of your receipt of the replacement.

**Non-IBM parts service**

Under certain conditions, IBM provides services for selected non-IBM parts at no additional charge for machines that are covered under warranty service upgrades or maintenance services.

This service includes hardware problem determination (PD) on the non-IBM parts (for example, adapter cards, PCMCIA cards, disk drives, memory) installed within IBM machines and provides the labor to replace the failing parts at no additional charge.

If IBM has a Technical Service Agreement with the manufacturer of the failing part, or if the failing part is an accommodations part (a part with an IBM FRU label), IBM may also source and replace the failing part at no additional charge. For all other non-IBM parts, customers are responsible for sourcing the parts. Installation labor is provided at no additional charge, if the machine is covered under a warranty service upgrade or a maintenance service.

**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**

Yes

**Model conversions**

No
**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 1-800-IBM-SERV (426-7378). In other countries, contact the local IBM office.

**Graduated program license charges apply**

No

**Licensed Internal Code and Licensed Machine Code**

This product does not contain Licensed Internal Code or Licensed Machine Code.

**Educational allowance**

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

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

---

**Prices**

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

The following are newly announced features and model on the specified model of the IBM System Storage 3588 machine type:

<table>
<thead>
<tr>
<th>Description</th>
<th>Model number</th>
<th>Feature numbers</th>
<th>Initial / MES / Both / Support</th>
<th>CSU</th>
<th>RP MES</th>
</tr>
</thead>
<tbody>
<tr>
<td>TS1080 LTO8 SINGL MODE FIBER</td>
<td>F8S</td>
<td>0983</td>
<td>Both</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>TAA Compliance</td>
<td>F8S</td>
<td>9611</td>
<td>Initial</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>3588 F8S Drive Plant Install</td>
<td>F8S</td>
<td>9612</td>
<td>Initial</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>IBM Systems Lab Services Post-Sale Services: 1 Day</td>
<td>F8S</td>
<td>SVCS</td>
<td>Both</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>BP Post-Sale Services: 1 Day</td>
<td>F8S</td>
<td>SVBP</td>
<td>Both</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Other IBM Post-Sale Services: 1 Day</td>
<td>F8S</td>
<td>SVNN</td>
<td>Both</td>
<td>Yes</td>
<td>No</td>
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</table>

The following are newly announced features of the IBM System Storage 3584 machine type:
<table>
<thead>
<tr>
<th>Description</th>
<th>Model number</th>
<th>Feature numbers</th>
<th>Initial / MES / Both / Support</th>
<th>CSU</th>
<th>RP MES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Quad Drive Mounting Kit</td>
<td>D55</td>
<td>1531</td>
<td>Both</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>2nd Quad Drive Mounting Kit</td>
<td>D55</td>
<td>1532</td>
<td>Both</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>3rd Quad Drive Mounting Kit</td>
<td>D55</td>
<td>1533</td>
<td>Both</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>4th Quad Drive Mounting Kit</td>
<td>D55</td>
<td>1534</td>
<td>Both</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>SMF Quad Drive-to-Patch Panel cables</td>
<td>D55</td>
<td>1537</td>
<td>Initial</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>3588 F8S Drive Plant Install</td>
<td>D55</td>
<td>9611</td>
<td>Initial</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Direct Fiber - No Patch Panel Cables</td>
<td>L55</td>
<td>1531</td>
<td>Both</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>1st Quad Drive Mounting Kit</td>
<td>L55</td>
<td>1532</td>
<td>Both</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>2nd Quad Drive Mounting Kit</td>
<td>L55</td>
<td>1533</td>
<td>Both</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>3rd Quad Drive Mounting Kit</td>
<td>L55</td>
<td>1534</td>
<td>Both</td>
<td>No</td>
<td>No</td>
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<tr>
<td>SMF Quad Drive-to-Patch Panel cables</td>
<td>L55</td>
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<td>Both</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>3588 F8S Drive Plant Install</td>
<td>L55</td>
<td>9611</td>
<td>Initial</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Direct Fiber - No Patch Panel Cables</td>
<td>L55</td>
<td>9713</td>
<td>Both</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

CSU = Customer setup
RP MES = Returnable parts MES

**Alternative service**
<table>
<thead>
<tr>
<th>Machine type-model</th>
<th>IOR IBM Same day On-site Repair (IOR, 24 x 7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3588-F8S</td>
<td></td>
</tr>
</tbody>
</table>

**ServiceElect (ESA) charges**

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

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