IBM Half-high LTO Generation 3 SAS Tape Drive
Product Guide (withdrawn product)

The IBM Half High LTO Generation 3 SAS Tape Drive is the third-generation Linear Tape-Open (LTO) offering that delivers enterprise class capacity at an entry-level LTO Generation 3 price point. The drive offers an attractively priced entry offering into LTO technology for mid- to high-end System x servers requiring high-capacity, high-performance, and high-reliability tape solutions. These compact, half-high 5.25” internal and external form factor offerings leverage IBM copper-based technology to enable low-power, low-temperature integration into IBM System x tower servers, external IBM 1U rack-mount enclosures or for the external unit to be used as a standalone table top or shelf unit.

Using its onboard hardware data compression feature and assuming a 2:1 compression ratio, this drive can store up to 800 GB compressed per cartridge at a backup rate of up to 160 MBps. The LTO Generation 3 delivers strong performance with data transfers up to 80 MBps in native mode (288 GB/hr) and up to 160 MBps in compressed mode (576 GB/hr).

Figure 1 shows the IBM Internal Half-high LTO Generation 3 SAS Tape Drive.

Figure 1. IBM Internal Half-high LTO Generation 3 SAS Tape Drive

Did you know?
The IBM Half-high LTO Generation 3 SAS Tape Drive is also designed to work with write once read many (WORM) cartridges to store data in a non-erasable, non-rewritable format. This can help support the long-term retention of reference data and meet the requirements of many regulatory bodies worldwide. The 400 GB WORM cartridge includes advanced security features that are designed to prevent the alteration or deletion of stored data, and is identified by its unique two-tone color.

Part number information

Table 1 lists the ordering part numbers and feature codes.

Table 1. Ordering part numbers and feature codes

Description	Part number	Feature code
IBM Internal Half-high LTO Generation 3 SAS Tape Drive	43W8478	5393
IBM External Half High LTO Gen 3 SAS Drive, with US line cord	3628L3X	None
IBM External Half High LTO Gen 3 SAS Drive, with no line cord	3628N3X	None
IBM LTO Ultrium 400 GB Data Cartridge - 5 pack	25R0032	5346 (1 cartridge)
IBM LTO Ultrium 400 GB WORM Data Cartridge	96P1203 *	Not available
IBM LTO Universal Cleaning Cartridge	49Y9893	5347

* To order WORM cartridges, in United States and Canada, please call 1-888-IBM-MEDIA. For all other geographic locations, please select your country and distributor from http://ibm.com/systems/storage/media/distributors/.

The part number for the IBM Internal Half-high LTO Generation 3 SAS Tape Drive includes the following items:

- LTO Generation 3 SAS tape drive assembly
- Mounting screws
- CD-ROM containing the User's Guide
- Cleaning cartridge
- Drive rails
- SAS cable for internal tape connectivity

The part numbers for the IBM External Half-high LTO Generation 3 SAS Tape Drive includes the following items:

- LTO Generation 3 SAS tape drive in an external enclosure
- CD-ROM containing the User's Guide
- Cleaning cartridge
- 3 meter external SAS cable
- 3628L3X also includes a 2.8 meter (9 ft) 10A / 125V US line cord
-

Features

The IBM Half-high LTO Generation 3 SAS tape drive has the features and benefits listed in Table 2:

Table 2. Features and benefits

Feature	Benefits
6 Gbps SAS host interface	• Fast connection to the server
160 MBps max data transfer rate	• Helps reduce the time required for backup • 3.3x transfer rate increase from previous generation LTO Gen 2 (24 MBps Native)
Up to 800 GB cartridge capacity	• Helps store greater amounts of data as your business grows
Digital Speed Matching (DSM)	• Supported on Ultrium 4 media in increments of 30 MBps to 80 MBps • Along with a larger buffer, helps to maximize drive performance when data rates are less than optimal
256 MB Buffer	• Together with Digital Speed Matching, helps the drive mitigate fluctuations in data rates
Adaptive Data Compression	• With the 256 MB buffer, helps you achieve optimal performance and storage capacity • Helps improve data throughput and tape repositions • Helps support data integrity through synchronous, dynamic swapping of data compression scheme
16 channel head	• Increases data throughput to support higher drive speeds
Timing-based servo positioning	• Patented technology that provides greater precision when writing data to tape • Enables the drive to support the use of narrower tracks • With the 16 channel head, linear density of the data is increased
Advanced tape loader and threader mechanism	• Improves error recovery and provides greater reliability when loading threading and unloading tape cartridges • Independent loader and threader motors, coupled with positive pin retention helps retain the pin during a miss-pick and helps improve load & thread reliability • Designed to improve drive and media reliability
“On-the-fly” Adaptive channel calibration	• Allows the drive to adjust to variations in the media and head while calibrating the channel. • Helps improve data throughput rates and data integrity
Copper based chips	• Based on IBM copper chip technology, provides improved performance while providing lower overall power consumption over previous generations of LTO drives.

Superior power management	• Enables the drive to operate in write mode and idle mode for when the drive is not in use • Improves heat dissipation and provides greater operational efficiency than previous-generation LTO drives
WORM support	• WORM capable cartridges give you the option of storing vital data in a non-erasable, non-rewritable format, to meet strict regulatory requirements for data retention • Helps address evolving regulatory initiatives
Flexible mounting alternatives	• Half height external SAS tape drive for a low cost and space efficient table top or shelf unit alternative to mounting a drive internally in your server. • 5.25” half high internal SAS tape drive designed for internal installation in IBM System x tower servers or external IBM 1U rackmount enclosures

Specifications

The Half-high LTO Generation 3 SAS tape drive has the following specifications:

- 6 Gbps SAS host interface
- Uses IBM Ultrium LTO 3 data cartridges and LTO cleaning cartridges
- Up to 400 GB native capacity, and up to 800 GB in compressed mode (2:1 compression)
- 80 MBps native back-up rate and up to 160 MBps in compressed mode (2:1 compression)
- Burst data-transfer rate of 300 MBps
- Internal buffer size of 256 MB
- Read/Write compatibility with LTO Gen 2 cartridges. Read compatibility with LTO Gen 1 cartridges

Physical specifications

The IBM Internal Half-high LTO Generation 3 SAS Tape Drive has the following physical specifications:

- Height: 43 mm (1.75 in.)
- Width: 149 mm (5.85 in.)
- Depth: 210 mm (8.40 in.)
- Weight: 1.5 kg (3.3 lb.)

The IBM External Half-high LTO Generation 3 SAS Tape Drive has the following physical specifications:

- Height: 58 mm (2.3 in)
- Width: 213 mm (8.4 in)
- Depth: 332 mm (13.1 in)
- Weight: 4.3 kg (9.5 lb)

Figure 2 shows the IBM External Half High LTO Gen 3 SAS Drive.

Figure 2. IBM External Half High LTO Gen 3 SAS Drive

Operating environment

The IBM Half-high LTO Generation 3 SAS Tape Drive is supported in the following environment:

- Temperature:
  - Operating: 10 to 40 °C (50 to 104 °F)
  - Non-operating: -40 to 60 °C (-40 to 140 °F)
- Relative humidity:
  - Operating: 20% to 80% (non-condensing)
  - Non-operating: 10% to 90% (non-condensing)
- Maximum altitude:
  - Operating: 3000 m (10000 ft)
  - Non-operating: 3000 m (10000 ft)

Warranty

The IBM Internal Half-high LTO Generation 3 SAS Tape Drive has a one-year limited warranty. When installed in a System x server, this tape drive assumes your system's base warranty and any IBM ServicePac upgrade. The IBM External Half-high LTO Generation 3 SAS Tape Drive has a three-year warranty.

The IBM LTO Ultrium 400 GB Data Cartridge has a limited lifetime warranty.

Supported servers

The IBM Half-high LTO Generation 3 SAS Tape Drive is supported in the IBM System x servers listed in the following table.

Table 3. Supported System x servers (Part 1)

	x3100 M3	x3200 M2	x3200 M3	x3250 M2	x3250 M3	x3350	x3400	x3400 M2	x3400 M3	x3455	x3500	x3500 M2	x3500 M3
Internal LTO 3 SAS Tape Drive (installed internally to the server)	N	Y*	Y	N	N	N	Y	Y	Y	N	Y	Y	Y
Internal LTO 3 SAS Tape Drive (installed externally in an enclosure)	N	Y*	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
External LTO 3 SAS Tape Drive	N	N	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y

* The tape drive is supported in x3200 M2 machine types 4367 and 4368 only.

Table 3. Supported System x servers (Part 2)

	x3550 M2	x3550 M3	x3620 M3	x3630 M3	x3650	x3650 M2	x3650 M3	x3655	x3690 X5	x3755	x3755 M3	x3850 M2	x3950 M2	x3850 X5
Internal LTO 3 SAS Tape Drive (installed internally to the server)	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Internal LTO 3 SAS Tape Drive (installed externally in an enclosure)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
External LTO 3 SAS Tape Drive	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y

Internal use

The following components are needed:

- A supported SAS host bus adapter installed in the server (see Table 3)
- An available 5.25-inch, half-height bay

External use

If the internal tape drive is to be installed in an external enclosure, the following components are needed. We describe these enclosures and the enclosure adapter kit in the following section.

- A supported SAS host bus adapter installed in the server (see Table 3)
- A supported external enclosure
    - IBM 1U Rackmount Tape Enclosure
    - IBM 4U Rackmount Tape Enclosure (now withdrawn)
    - IBM Half High Tabletop Tape Enclosure

- An IBM SAS Enclosure Adapter Kit (40K2599)

If the external tape drive is to be used, the a supported SAS host bus adapter installed in the server is needed. The host bus adapters supported with the tape drive are listed in the following table.

Table 4. Host bus adapters for use with the IBM Half-high LTO Generation 3 SAS Tape Drive

Description	**Part number**	**Feature code**
IBM SAS HBA Controller	25R8060	1681
IBM 3Gb SAS HBA Controller v2	44E8700	3583
IBM 6Gb SAS HBA Controller	46M0907	3875

For the latest and most accurate compatibility information, visit our ServerProven Web site at: http://ibm.com/servers/eserver/serverproven/compat/us/ or the IBM System x Configuration and Options Guide at: http://www.ibm.com/systems/xbc/cog/.

Supported enclosures and enclosure kit

The enclosures and enclosure kit shown in the following table may also be used with the internal tape drive when it is to be installed externally.

Table 5. Enclosures for use with the IBM Internal Half-high LTO Generation 3 SAS Tape Drive

Description	Part number	Feature code
IBM 1U Rack-mount Tape Enclosure	87651UX (AG)* 87651NX (AP and EMEA)†	8765HC1 fc 2290
IBM 4U Rack-mount Tape Enclosure (withdrawn)	87664UX (AG)* 8766NX (AP and EMEA)†	Not applicable
IBM Half High Tabletop Tape Enclosure	8767HHX (AG)* 8767HNX (AP and EMEA)†	8767HC1 fc 2287
IBM SAS Enclosure Adapter Kit‡	40K2599	5382

* These models are for customers in the Americas Group (AG - Canada, U.S., and countries in South America). These models ship with a NEMA 5-15P line cord
† These models are for customers in the countries known collectively as Asia Pacific (AP) and Europe, Middle East, Africa (EMEA). These models do not ship with a line cord.
‡ One adapter kit is needed per drive.

The IBM SAS Enclosure Adapter Kit, 40K2599, includes the following items:

- Internal SAS connector
- 3-meter external SAS cable

The following figure shows the IBM Half-high LTO Generation 3 SAS Tape Drive installed in the right-most bay of the IBM 1U Rack-mount Tape Enclosure (87651UX):

Figure 3. The tape drive installed in the 1U Rack-mount Tape Enclosure

Popular configurations

This section illustrates how the IBM Half-high LTO Generation 3 SAS Tape Drive can be used in configurations.

Internal installation

The following figure shows the IBM Half-high LTO Generation 3 SAS Tape Drive installed internally in a tower server.

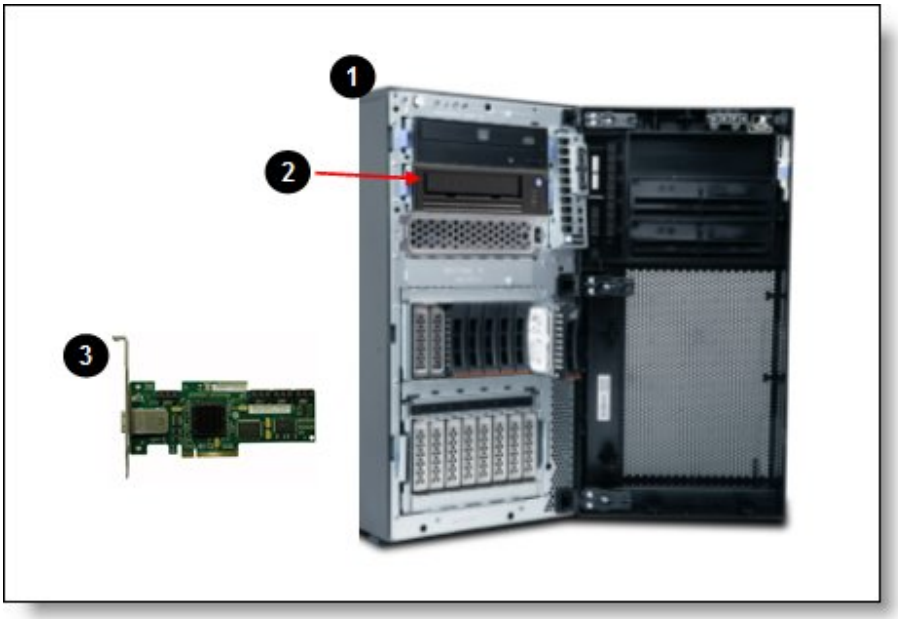

Figure 4. The IBM Half-high LTO Generation 3 SAS Tape Drive installed internally in a tower server

The parts used are listed in the following table.

Table 6. Components used when installing the IBM Half-high LTO Generation 3 SAS Tape Drive into a x3500 M2 server

Diagram reference	Part number/ machine type	Description	Quantity
1	Varies	Supported server	1
2	43W8478	IBM Half High LTO Generation 3 SAS Tape Drive (includes internal cable)	1
3	46M0907	IBM 6 Gb SAS HBA Controller	1

Installation in a 1U external enclosure

The following figure shows the IBM Half-high LTO Generation 3 SAS Tape Drive installed in an IBM 1U Tape Drive External Enclosure and connected to a rack server.

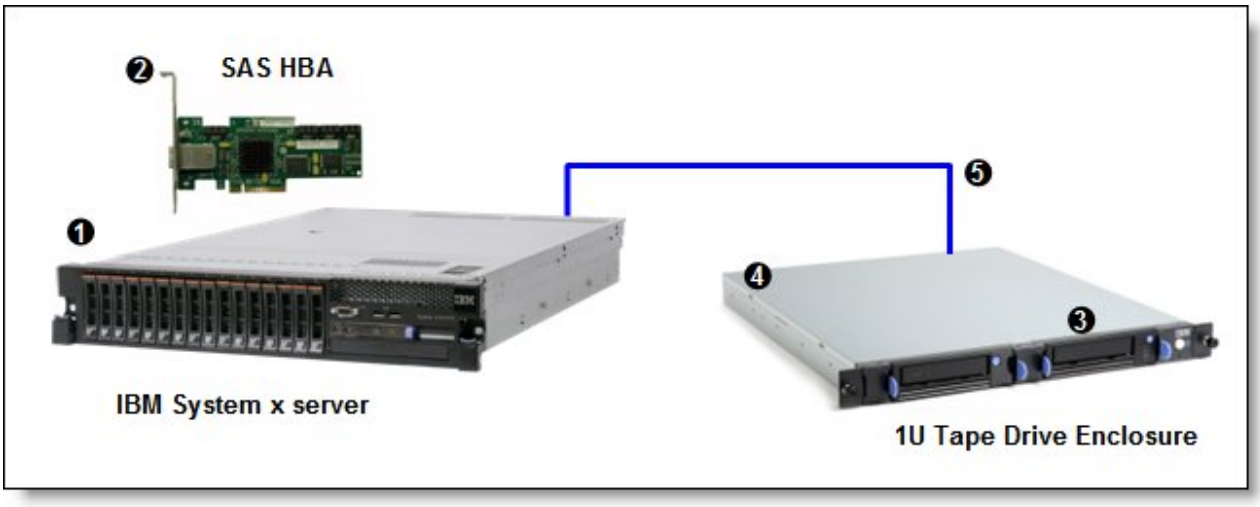

Figure 5. The tape drive installed in an IBM 1U Tape Drive External Enclosure and connected to a rack server

The parts used are listed in the following table.

Table 7. Components used when connecting the IBM Half-high LTO Generation 3 SAS Tape Drive installed in an external tape drive enclosure to a supported System x server

Diagram reference	Part number/ machine type	Description	Quantity
1	Varies	Supported System x server	1
2	46M0907	IBM 6 Gb SAS HBA Controller	1
3	43W8478	IBM Half-high LTO Generation 3 SAS Tape Drive	1
4	87651UX	IBM 1U Tape Drive External Enclosure	1
5	40K2599	IBM SAS Enclosure Adapter Kit (includes internal SAS connector and a 3-meter external SAS cable). See Figure 5.	1

The following figure shows an IBM 1U Tape Drive External Enclosure without the SAS Adapter Kit and after installing the SAS Adapter Kit.

Figure 6. The 1U Tape Drive Enclosure with and without the SAS Enclosure Adapter Kit

Supported software products

The IBM Half-high LTO Generation 3 SAS Tape Drive supports the following software products:

- CA Brighstor
- Tivoli Storage Manager
- Symantec Backup Exec
- Symantec Net Backup

Supported operating systems

The IBM Half-high LTO Generation 3 SAS Tape Drive supports the following operating systems:

- SUSE Linux
- Red Hat Linux
- Microsoft Windows 2003
- Microsoft Windows 2008

See IBM ServerProven for the latest information on the specific versions and service packs supported: http://ibm.com/servers/eserver/serverproven/compat/us/.

Related publications

For more information, refer to the following resources:

- IBM HH LTO Generation 3 SAS Tape Drive Installation and User Guide: http://www.ibm.com/support/docview.wss?uid=psg1MIGR-5072266
- Installation Guide for IBM 1U Rackmount Tape Enclosure http://www.ibm.com/support/docview.wss?uid=psg1MIGR-64787
- Installation Guide for IBM 4U Rackmount Tape Enclosure http://www.ibm.com/support/docview.wss?uid=psg1MIGR-64794
- Installation Guide for IBM Half High Tabletop Tape Enclosure http://www.ibm.com/support/docview.wss?uid=psg1MIGR-64792
- IBM System x Configuration and Options Guide http://www.ibm.com/systems/xbc/cog/
- IBM US Announcement Letter for the IBM HH LTO Generation 3 SAS Tape Drive http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS107-450

Related product families

Product families related to this document are the following:

- Backup Units

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