IBM Diamondback Tape Library

Ultra high-density tape for
cyber resilient data archiving

Highlights

Provides ultra high-density
storage—up to 27 PB
per rack

Stores up to 69.7 PB
per library with
2.5:1 compression

Enhances security
with encryption and
WORM media

Improves cyber resilience
with air-gapped isolation

Enterprises today confront the challenge of managing more data than ever before, a problem that's especially severe for organizations with hundreds of petabytes of data. Examples can be found in areas as diverse as machine learning, autonomous driving, pharmaceutical research, particle accelerators, and astrophysics.

In addition to storing all this information, organizations also need backup and recovery systems for everyday data protection tasks. But even those systems aren't sufficient to counter the risk posed by floods, wildfires or other natural disasters—in addition to the increasingly prevalent threat of cyberattacks.

The IBM® Diamondback Tape Library was designed to provide sustainable, cost-effective data storage to address the problems of increasing data volumes, rising energy costs, frequent cyberattacks, and shrinking IT staffs.

IBM Diamondback is available with full IBM service through the IBM Service Expert Care Basic and IBM Service Expert Care Premium services. IBM Service Expert Care is recommended to provide optimal system availability and reduce downtime of drives and libraries. Other IBM Diamondback features include:

– Support for standardized reporting via the server interface to help administrators integrate IBM Diamondback with existing software
– Support for library management via REST API commands over SCSI
– Customer serviceable, high-performance robot with dual grippers to increase mount performance and system reliability
– Optional 5U of rack space on top of the library for Fibre Channel switches, tape data movers, or IBM Spectrum® Archive nodes
– Support for Open Recommended Access Order (oRAO), which can deliver up to 73% faster data retrieval access[1] to your LTO Ultrium 9 tape cartridges
– A physical "air gap" to isolate tape libraries from an organization's primary data storage systems and help improve cyber resilience

Ultra high-density storage
IBM Diamondback delivers ultra high-data density, with up to 27.9 PB[2] of native data in a single eight-square-foot library using LTO Ultrium 9 cartridges.

Massive capacity
Using standard 2.5:1 compression, each IBM Diamondback Tape Library can store up to 69.7 PB, which provides the high capacity organizations need to retain their growing volume of data.

Enhanced security
IBM Diamondback features tape-drive encryption, automatic data-path failover, dual robotic grippers, and WORM media support to improve management and help reduce risk in operations.

Enhanced cyber resilience
Because it's physically separated from an organization's primary storage systems, IBM Diamondback Tape Library provides an "air gap" that helps isolate archived data and improves cyber resilience.

IBM Diamondback—Specifications

Tape drives	IBM LTO-9 tape technology
Native data rate	400 MB/sec
Native capacity	18 TB
Cartridge types	IBM Ultrium 9, 8
Number of drives	Up to 14
Compression rate	2.5:1 compression
Number of tape cartridges	Up to 1584 (up to 1548 recommended with swap cells, cleaner cartridges and diagnostic media)
Maximum data transfer (native)	20.2 TB/hr
Maximum capacity (2.5:1 compression)	69.6 PB (1548 cartridges)
Drive interface	8 Gb/sec multi-mode Fibre Channel 8 Gb/sec single-mode Fibre Channel 12 Gb/sec SAS
Service magazine	One magazine with 10 cartridge slots
Management	Remote graphical user interface (GUI) SCSI and REST API (compatible with existing TS4500 APIs)
Operating systems support	See the IBM System Storage Interoperation Center RHEL, Linux®, Unix, IBM AIX®, HPUX, Microsoft Windows

*Not all standard features available at GA

IBM Diamondback—Physical characteristics

EIA space	42U
Height	2025 mm (79.7 in)
Width with covers	600 mm (23.6 in)
Depth (including front and rear doors)	1225 mm (48.23 in)
Weight of frame empty	413 kg (908 lb)
Max weight	785 kg (1727 lb)

IBM Diamondback—Operational environmental characteristics*

	Allowable[†]	Recommended[‡]	Maximum rate of change
Dry-bulb temperature	16 to 32ºC (60 to 90ºF)	16 to 25ºC (60 to 77ºF)	5ºC/Hour (9ºF/Hour)
Humidity range, non-condensing	20% to 80% RH	20% to 50% RH	5% RH/Hour with no condensation
Maximum dew point temperature	22ºC (72ºF)		
Maximum elevation	3050 m (10,000 feet)		

* Product equipment is removed from the original shipping container and installed but not in use—for example, during repair, maintenance, or upgrade.
† Derate maximum dry-bulb temperature 1°C/300 m above 900 m (1.8°F/1,000 feet above 3,000 feet).
‡ Derate maximum recommended dry-bulb temperature 1°C/300 m above 1,800 m (1.8°F/1,000 feet above 6,000 feet).

IBM Diamondback—Power requirements

	Power consumption (watts)			Cooling requirements
	Off*	Idle	Max cont. (not peak)	Btu/Hour max continuous†
Library without drives or PDU	11	95	130	442
Each LTO-9 drive‡	0	18	37	126
Each FC 1852 PDU (in top rack)	9	9	9	31
Each FC 1853 PDU (in frame)	17	17	17	58

* "Off" refers to power consumed when the library is connected to an AC power source and the library on/off switch is set to off.
† To calculate the total cooling required by the library in Btu/hr, multiply the total power in watts by 3.41. To convert Btu/hr to kBtu/hr, divide your result by 1000.
‡ Idle power is consumed when the drive has no tape cartridge loaded. Maximum continuous power is consumed when the drive is actively reading and writing to the tape. These power consumption values include the power that is required for the cooling fan at normal speed. In ambient environments that are hotter than the recommended range, the cooling fan might speed up and draw more power.

IBM Diamondback—Warranty and service options

Warranty term lengths	1-year, 3-year, 5-year
Warranty coverage	9 x 5 next business day, parts only, IBM on-site limited
Service Expert Care Term length	1 to 5 years
Service Expert Care Basic coverage	9 x 5 next business day, IOR (IBM on-site repair), support line
Service Expert Care Premium coverage	24 x 7 same day, IOR (IBM on-site repair), support line, predictive alerts, 30-minute response (sev1/2), remote code load, technical account manager (TAM)

IBM Diamondback—Top rack physical characteristics

EIA space	5U
Height	266.6 mm (10.5 in)
Width without covers†	542 mm (21.3 in)
Width with covers	600 mm (23.6 in)
Depth (including front and rear doors)	1225 mm (47.72 in)
Weight of top rack—empty‡	17.5 kg (38.5 lb)
Max loaded weight of top rack with 2 side-panels, front and rear doors	94 kg (206 lb)

Capacity depends on drives installed, number and type of cartridges used, and compression ratio achieved. Listed capacity is physical. Usable capacity may be less.
† Frame width only
‡ A top rack can optionally be installed on any Diamondback frame. Side panels and PDUs are also optional. Each side panel adds 6.8 kg (15 lbs). Each PDU adds 4.5 kg (10 lbs).

For more information
To learn more about the IBM Diamondback Tape Library, please contact your IBM representative or IBM Business Partner, or visit ibm.com/products/diamondback-tape-library.

1. Based on IBM internal testing of like user data sets, not all users will see these levels of performance improvements as optimization varies according to the number of segments retrieved. Source: Tsuyoshi Miyamura and Osamu Matsumiya, IBM LTO 9 Tape Drive RAO Performance Position Paper, May 2021 – https://www.ibm.com/downloads/cas/K4M5GBZ
2. Capacity depends on drives installed, number and type of cartridges used, and compression ratio achieved. Listed capacity is physical. Usable capacity may be less.

IBM®