IBM Climate-Controlled Diamondback Tape Library

Ultra-high density tape library designed specifically for elevated temperature and humidity data centers.

Highlights

Provides ultra high-density storage—up to 61.9 PB per rack

Reduces the cost of tape deployments by up to 30%

Reduces temperature excursions and failures from external debris

Retains all the benefits of tape for archive storage.

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 are also being challenged by practical and regulatory limits on energy consumption. This has led to higher temperature and humidity operations in data centers and in some cases adiabatic data center operations with variable temperatures and humidities. Until now this has been a challenge for the use of tape in modern data centers.

Reduce tape costs by up to 30%

reduce co-location cost and/or eliminate tape rooms. [1]

The IBM® Climate-Controlled Diamondback Tape Library was designed to provide sustainable, cost-effective data storage to address the problems of increasing data volumes, frequent cyberattacks, shrinking IT staffs, and increased pressure to operate data centers at elevated temperatures and humidity to reduce energy consumption. IBM Climate-Controlled Diamondback offers the ease of deployment and service of a standard IBM Diamondback, deployable in a wide range of ASHRAE data center configurations.

IBM Climate-Controlled Diamondback is available with full IBM service through the IBM Storage Expert Care Basic and IBM Storage Expert Care Premium services. IBM Storage 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 Storage® Archive nodes
– Support for Open Recommended Access Order (oRAO), which can deliver up to 73% faster data retrieval access1 to your LTO Ultrium 9 / 10 tape cartridges
– Optional integrated IBM Storage Deep Archive for seamless S3 glacier storage classes to tape
– 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 61.9 PB[2] of native data in a single eight-square-foot library using LTO Ultrium 10 cartridges.

Reduces cost of tape deployment
BM Climate-Controlled Diamondback features an insulated and sealed climate-controlled operation that allows tape to be deployed in up to ASHRAE A4 datacenters without special tape rooms or conditions. Reducing the costs and challenges associated with traditional tape operations by up to 30%.

Reduce the impact of temperature changes and external debris
Localizing the control of the tape infrastructure reduces the impact of events such as rapid temperature changes and excursions from the normal operation; the tape infrastructure continues to operate normally in the sealed environment. In areas where external debris is a concern, the neutral pressure of the library reduce the likelihood of debris related tape failure.

All the tape benefits
While Climate-Controlled Diamondback operates with mor energy than traditional tape libraries, the total cost of energy over the life of operations is still 17 times lower than that of a comparable OCP HDD storage.[3] The cost of the HVAC is offset by the saving sin tape operational rooms or environmental controls, maintaining tapes total cost of ownership advantage.

IBM Climate-Controlled Diamondback—Specifications

Tape drives	IBM LTO-10 tape technology
Native data rate	400 MB/sec
Native capacity	LTO-10 30TB and/or 40TB
Cartridge types	IBM Ultrium 10, IBM Ultrium 10 40TB
Number of drives	Up to 14
Compression rate	2.5:1 compression
Number of tape cartridges	Up to 1584 (recommended up to 1548 data cartridges, and up to 1557 with swap cells, cleaner & diagnostic media
Maximum data transfer (native)	20.2 TB/hr
Maximum capacity (2.5:1 compression)	154.8 PB (1548 cartridges)
Drive interface	32 Gb/sec 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

Physical characteristics	IBM Climate-Controlled Diamondback
EIA space	42U + 251.5mm depth
Height	2025 mm (79.7 in)
Width with covers	600 mm (23.6 in)
Depth (including front and rear doors)	1471 mm (57.9 in)
Weight of frame empty	570 kg (1254 lb)
Max weight	1021 kg (2246 lb)

IBM Climate-Controlled Diamondback—Operational environmental characteristics*

	Allowable[†]	Recommended[‡]	Maximum rate of change
Dry-bulb temperature	5 to 45°C (46 to 114°F)	16 to 32°C (60 to 77°F)	8°C/Hour (15°F/Hour)
Humidity range, non-condensing	20% to 90% RH	20% to 50% RH	10% RH/Hour
Maximum dew point temperature	24°C (75°F)		
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 Climate-Controlled 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	1150	3921
Each LTO-9 drive[‡]	0	18	37	
				126
Each LTO-10 drive[‡]	0	24.8	35.8	
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 Climate-Controlled Diamondback – Warranty and service options

Warranty term lengths	1-year, 3-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)

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. When comparing data center tape specific rooms of 2.5EB compared to IBM Climate- Controlled Diamondback in a standard data center.
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.
3. When comparing IBM Climate-Controlled Diamondback and OCP Bryce Canyon infrastructure using 22TB HDDs, supporting 61.9PB of native data operating at 45ºC and 31% humidity.