Panasonic

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Panasonic Corporation

A scalable optical disc library system that supports demand for long-term storage of important data

Started receiving orders for Data Archiver LB-DH8 series

Advantages of the special characteristics of optical discs: Achieving both low power consumption and running costs

Model name and series name	Scalable optical disc library system LB-DH8 series
Sales price	Open price
Order starting date	February 2015

Panasonic Corporation will start receiving orders from February 2015 for the Data Archiver LB-DH8 series, a scalable optical disc library system. To meet the need for long-term storage at data centers, which are increasingly being built and enlarged worldwide, the Data Archiver LB-DH8 series allows multiple data storage modules to be configured in the server storage rack as the customer requires.

The system consists of a Data Archiver Magazine holding data storage optical discs and three types of modules: a Bottom Module (magazine carrier), a Base Module (magazine recording and playback unit), and an Expansion Module (Magazine loader), combined with magazine management software. The base module can house up to 76 data archiver magazines, each storing 1.2 TB of data. A maximum of 91.2 TB can be stored in each module. The 19" rack holds seven modules to realize high-volume optical disc storage of 638.4 TB per rack.

Same as in the former model, RAID technology is used for high-speed data transfer at up to 216 MB/sec, ensuring high reliability that protects data from unforeseen damage. An optical disc that has a data storage life of 50 years is adopted to eliminate costs that would otherwise be needed for periodic data migration. Data can be stored at room temperature, eliminating the cost of air conditioning. The system also enables data centers to effectively reduce the total costs needed for long-term data storage.

Disc life is estimated to be 50 years or more based on accelerated tests conducted by Panasonic, at a temperature of 30˚C and humidity of 70% RH

[Major Features]

(1) Meeting the need for long-term storage of ever-increasing volumes of data at data centers

Optical disc storage offers long-term data storage of large volumes of up to 638.4 TB per rack. Standard racks are supported. This serves the need for long-term storage at rapidly expanding data centers in Japan and abroad.

(2) Scalable module extension allowing flexible operation

The system offers from minimum configuration of the bottom module and base module for minimizing initial investment to maximum configuration by adding modules. A scalable module extension supports flexible operations.

(3) Advantages of the special characteristics of optical discs: Achieving both low power consumption and running costs and ease of emergency response.

Standby power consumption is a very low 7 W[1], significantly lowering power consumption

and reducing power costs. Data can be taken out and physically transferred by the magazine and stored at room temperature in the event of emergencies, which is useful for BCPs.

[1] Minimum configuration (at DC 24 V input)

[Background to Development]

Information assets of companies and public agencies are globally on the increase year by year. Digital data generated worldwide was 4.4 ZB <zettabyte, ZB = 10^{21} bytes> in 2013, and is expected to reach 44 ZB by 2020. <Source: IDC Digital Universe Study, sponsored by EMC, April 2014>

Data volume will increase almost tenfold in the next seven years: demand for long-term storage of large volumes of data will increase exponentially. The data center business market is expected to further expand in the future, taking into account the expansion of cloud services for reducing costs and BCP measures against disasters.

In response to this market trend, Panasonic has leveraged our optical drive technology, media technology and sophisticated robotics technology to develop the Data Archiver LB-DH8 series, a scalable optical disc library system, to meet the need for long-term storage, which is predicted to continue to increase in the future. Using the benefits of the long durability of optical discs, this system can safely and reliably store large volumes of digital data over a long period at low running costs to support customers' information asset management.

[Explanation of Features]

(1) Meeting the need for long-term storage of ever-increasing volumes of data at data centers

Our newly-developed robotics technology has realized a scalable module structure in the system.

The 19" rack holds seven modules that realize high-capacity optical disc storage of 638.4 TB at low bit cost.

The depth of the Archiver is 917 mm, allowing it to be installed in standard 1,000-mm racks at data centers. This facilitates its use in existing customer environments.

(2) Scalable module extension allowing flexible operation

Module configuration is selectable from three patterns: a minimum configuration that allows the system to be adopted with a low initial investment, and maximum configurations 1 and 2 that suit specific demands for writing and reading functions. The system allows flexible configurations that respond to the needs of individual customers.

Even in the minimum configuration, 76 data archiver magazines, each holding 1.2 TB, can be installed in the main unit (base module) for reading and writing. A single module can store as much as 91.2 TB of data.

- Minimum configuration: Bottom module and base module
  Adoptable at minimal initial investment cost Stores up to 91.2 TB of data.
- Maximum configuration 1: Bottom module, base module, and six expansion modules (without recording and playback unit). Up to 638.4TB data can be stored. This is an optimum configuration, typically for data centers for the purpose of cold archive[3] storage at low bit cost.

[3] Long-term storage of data rarely used but prohibited to be deleted for the purpose of making such data readily available online.

- Maximum configuration 2: Bottom module, base module, and six expansion modules (with recording and playback unit). Stores up to 638.4 TB of data. Seven recording

and playback units also enable simultaneous writing to and reading from multiple magazines to fulfill customers' demands for multi-access. (Fig.1)
The magazine carrier elevator installed in the bottom module quickly transfers 12 discs in a magazine housed in each module to the recording and playback unit to ensure smooth writing and reading of large volumes of data.
Design takes into account maintenance efficiency. Structural units, including the recording and playback unit and magazine carrier elevator, installed in the module can be easily removed or set in the rack-mounted state. (Fig.2)
RAID technology is used to distribute and record data onto discs. It achieves a maximum data transmission speed of 216 MB/sec. The archiver supports RAID 5 and RAID 6 to enable the customer to select their required level of fault tolerance. The archiver also employs RAID technology to increase availability and reliability to protect data on drives and discs from unforeseen damage.

(3) Advantages of the special characteristics of optical discs: Achieving both low power consumption and running costs and ease of emergency response

Standby power consumption is a very low 7 W[1], significantly lowering power consumption and reducing power costs. Optical discs for the Panasonic Archiver, which have a data storage life of 50 years[2] are adopted to abolish the cost and work of regular data migration.
Since optical discs are highly resistant to changes in temperature, light, humidity and to ageing, they can be stored at room temperature, eliminating the costs associated with air conditioning during storage. There are no concerns about physical wear, as optical discs are a contactless medium.
The data archiver magazine drawer is detachable. Data can be taken out and physically transferred by the magazine in the event of emergencies, which is useful for BCPs.

[1] Minimum configuration (at DC 24 V input)
[2] Estimated based on accelerated tests by Panasonic

[Applicable software]

Dedicated magazine management middleware facilitates management

- Data Archiver Manager

(1) Server OS: Compatible with Windows

All data archiver magazines installed in multiple data archivers are managed as a single logical volume. A client can easily access the data they require without worrying about data storage location, such as in which magazine a file to be accessed is stored or in which archiver the magazine is installed.
CIFS network protocol supports the NAS head function.

(2) Server OS: Compatible with Linux

We have newly developed a data archiver manager supported under Linux by extending object storage technology.
Magazines are managed by controlling the I/O of files using REST[4] based API. A single name space function[5] makes it possible to manage large-scale archive data and configure scalable storage. NAS head function is also feasible.

[4] Representational State Transfer, a method of giving a unique identifier (URI) to all resources (files) and accessing using HTTP.
[5] A function for expressing data on the network with a unique URL. A system that is well suited for storage scalability of large-volume data.

[Major specifications]

■ Data Archiver

Model name	**Data Archiver**	
Series name	**LB-DH8 series**	
Model number	**Base module**	**LB-DH80A0G (SAS model)**
		LB-DH80S0G (iSCSI model)
		LB-DH80F0G (FC model)
	Bottom module	**LB-DH81Z0G**
	Expansion module	**LB-DH82Z0G (without recording or playback unit)**
		LB-DH82A0G (with recording and playback unit, SAS model)
		LB-DH82S0G (with recording and playback unit, iSCSI model)
		LB-DH82F0G (with recording and playback unit, FC model)
Outer dimensions	**19" rack (EIA) supported** **Width: 447 mm** **Height: 10 U - 46 U** **Depth: 917 mm (without protruding part), 927 mm (with protruding part)**	
Weight (excl. disc magazines)	**LB-DH80A0G、LB-DH80S0G、LB-DH80F0G**	**ca.45kg**
	LB-DH81Z0G	**ca.22kg**
	LB-DH82Z0G	**ca.29kg**
	LB-DH82A0G、LB-DH82S0G、LB-DH82F0G	**ca.44kg**
Power supply	**DC24V**	
Host interface	**SAS, iSCSI, or FC (to be selected)**	
Management interface	**LAN, USB 2.0, I/O port**	
Number of recording and playback units	**1 to 7**	
Number of installable magazines	**Up to 532**	
Storage capacity	**Up to 638.4 TB**	
Data transfer rate	**216 MB/sec max. per recording and playback unit**	
Function	**Encryption: XTS-AES256, RAID: RAID 0, RAID 5, RAID 6**	
Usage environment	**During operation: 10˚C - 40˚C, 20% - 80% RH (no dew condensation)** **During transportation: -20˚C -60˚C, 10% - 90% RH (no dew condensation)**	
Example of combination	**Minimum configuration (10 U, 76 magazines, 1 recording and playback unit)** **LB-DH80A0G: 1 unit, LB-DH81Z0G: 1 unit** **Maximum configuration (46 U, 532 magazines, 7 recording and playback units)** **LB-DH80A0G: 1 unit, LB-DH81Z0G: 1 unit, LB-DH82A0G: 6 units**	
Bundled software	**Data Archiver Manager** **(Windows/Linux)**	

■ Data Archiver Manager

Model name	**Data Archiver Manager (software)**
Supported OS	**Administrative server** **Microsoft® Windows Server® 2008 R2 (64-bit) Standard Edition**
	Administrative server **Red Hat Enterprise Linux 7, Cent OS 7**

■ Data Archiver Magazine

Model name	**Data Archiver Magazine**		
Model number	**LM-BM12LB5 (5 magazines)**	**LM-BM12LB16 (16 magazines)**	**LM-BM12LB30 (30 magazines)**
Outer dimensions[6]	**129.5mm (W) × 20.8 mm (H) × 131.3 mm (D)**		
Mass[6]	**About 300 g**		
Built-in disc[7]	**BD−R XL 100GB 12 discs**		
Storage capacity[7]	**1.2TB**		

[6] Size and capacity per magazine

[7] Storage capacity per built-in disc

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- Data capacity indicated in the description refers to capacity in the unformatted state, based on 1 TB = 10^{12} bytes
- Product ratings and designs may be subject to change for modification and improvement without prior notice.
- Note that life performance of the product does not assure zero damage or failure.

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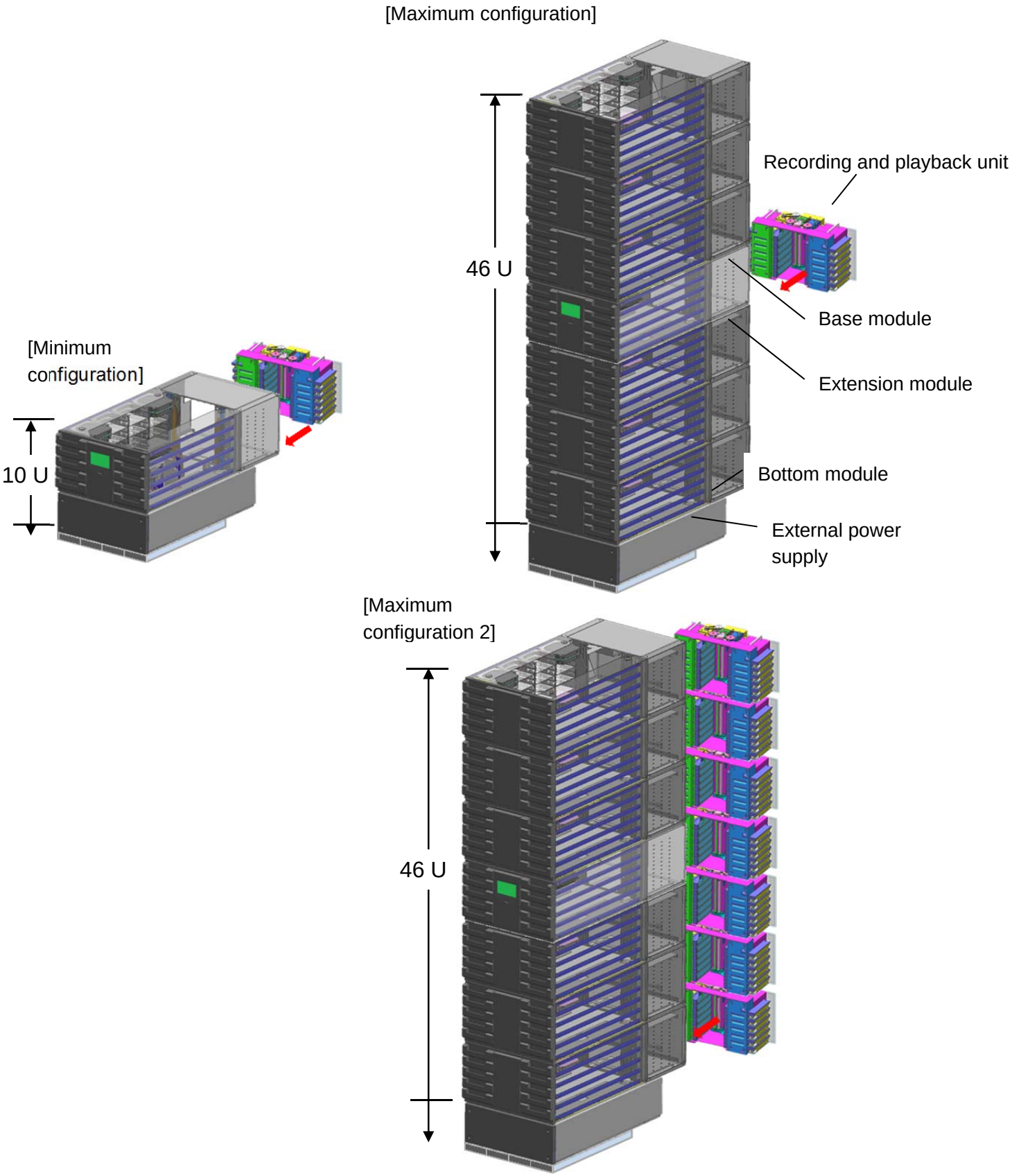
[Maximum configuration]
46 U
Recording and playback unit
Base module
Extension module
Bottom module
External power supply
[Minimum configuration]
10 U
[Maximum configuration 2]
46 U

Fig.1