

Panasonic Optical Data Archiver freeze-ray

1 Scope

This document applies to Panasonic Optical Data Archiver “freeze-ray” that is designed and validated to meet large scale data center and enterprise market specific needs. Adoption of optical media enables storage of critical & valuable data safely for a long period. Optical data archive is an immutable and low cost solution to meet the ever-increasing data archive needs.

2 Product outline

300GB Archival Disc based Optical Data Archiver

- ✓ Meeting the need for ever-increasing data volumes
 - Density of 1,641.6TB (1.6PB) per standard 19 inch rack.
 - Optional density can be configured in the range of Min 547.2TB – Max 1,915.2TB (1.9PB).
- ✓ Adoption of immutable and low cost media
 - Physical Strength:
 - Physically WORM - no data overwrite (no falsification, human error free)
 - Optical Medium - no physical contact (no components damages, maintenance free)
 - Environmental Strength:
 - Thermal Tolerant - no media degradation (estimated life time of 100 years or more at temperature of 30°C and humidity of 70% RH based on accelerated test being conducted)
 - Disaster Recovery - no data damage (business continuity, restoration free)
 - Low Cost (TCO) achievement:
 - Capital Expenditure - no media obsolescence (one time investment, migration free)
 - Operational Expenditure - no power wasted (reduced cooling cost, low power usage)
- ✓ Library software ready to control the system easily in DCs
 - Conforms to MMC and SMC standard.
 - Library software installed in server enables direct access to drives and robotics.
- ✓ Meets the DC specific design requirements
 - Maintaining the system availability.
 - Optical Data Archiver has one or more drives to allow multiple access. In addition, if failure occurs in one of the drive, drive system can continuously operate.
 - Even in the event that the host system (upper layer of data archiver) suddenly freezes or the power supply stopped, it has been confirmed that the system can still be recovered through the hardware testing and forced error testing.

- Ensuring serviceability for DC technicians
 - Front (cold isle) serviceable
 - Tool less operation for drive exchange, robotics maintenance and all other services
 - FRU (Field Replaceable Unit) available for quick, easy and safe unit exchanges
- Matching DC environmental conditions
 - Altitude: DCs may be located at a maximum of 1000 meters above sea level. Our system works under any variation of air properties.
 - Temperature: System operating temperature is between 10°C ~ 35°C and can work under the un-air conditioning temperature in DCs.
 - Relative Humidity: System operating humidity specification is between 20% ~ 80% and can work under the relative humidity in DCs.
 - Particulates: DCs are usually equipped with air filtration but there still remains particulates in the air. Optical data archiver is designed to work in ISO class eight.
- Designed to function under transportation shock & vibration conditions
 - Transportation shock / vibration testing per ASTM D4169-09: To shorten the lead time of system installation at DC, magazines are inserted in the drawer and archive modules are mounted on the rack before shipping out from the integration site. Our system is designed for long distance transportation.
- Optional 19inch rack mountable Server Bay available
 - OCP server (not included) and OCP power supply (not included) unit mountable
 - Or customer can specify their own gear without the server bay
- Optional Data Archive Manager (DAM) middleware
 - REST API (Swift Object Storage), S3 API (emulated by swift3), NAS (CIFS/NFS) interface supported

3 System reliability for long-term data archive

3.1 Robotics

The robotics used in the Optical Data Archiver is robust and any calibration needed will be performed autonomously to no user intervention.

3.2 Robotics controller

The controller board that handles the robotics and the main system is capable of monitoring and reporting system data back to the server via the API.

- Temperature readings for each drives
- Ambient temperature of the base module
- Critical system voltages (12V, 24V, power supply voltages)
- Hardware and firmware revisions used in the system
- Fan operation and rotation speed

3.3 Data erasure feature

Supports the ability to corrupt data when data stored on the media is no longer required.

4 Product specifications

4.1 Main specifications

All values are specified under the standard operating condition. Refer to clause 5.3.

Table 4.1: Main specifications

Items	Specification	
	Standard Spec	Optional Spec
Capacity	1,641.6 TB (1.6PB)	547.2TB - 1,915.2TB (1.9PB)
Number of Magazine	456 Magazines	152 Magazine - 532 Magazine
Disc Type	300GB Archival Disc	-
AC Input	External power supply	-
Power Consumption	Ave. 262W	Ave. 137W - 386W
Writer unit	4 units (12 drives)	2 unit (6 drive) - 6 unit (18 drive)
Disc Access	Single disc access	RAID Access (RAID 0, 5, 6) with optional DAM middleware
Transfer rate	Ave. 720 MB/s (read/write)	Ave. 360 MB/s - 1,080 MB/s
Drive Type	300GB drive with double side OPU	-

4.2 Operational condition

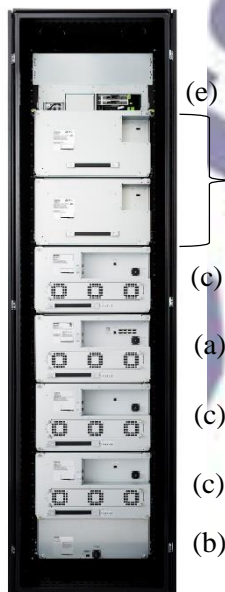
Table 4.2: Operational conditions

Item	Specification	Remarks
Temperature		
Operating	10°C to 35°C	
Shipping environment	-20°C to 60°C	Within 72 hours
Temperature inclination	10°C/hour maximum	at operating
Humidity		
Operating	20%RH to 80%RH	No condensing
Shipping environment	10%RH to 90%RH	
Humidity inclination	10%RH/hour maximum	

4.3 Structure of Optical Data Archiver

Fig.4.3: Structure image

Table 4.3: The structure table



Standard Spec	Number of unit
(a) Base module with writer unit (Size : 6U)	1
(b) Bottom module with robotics (Size : 4U)	1
(c) Expansion module w/ Drive (Size : 6U)	3
(d) Expansion module w/o Drive (Size : 6U)	2
(e) Server Bay - OCP server (not incl.), power supply (not incl.) mountable (Size : 3U)	1

4.4 Each module specifications

Table 4.4-1: Base module specifications

Items	Specification
	300G model
Writer unit	1 unit (300GB drive x3 units) **removable
DC Input	DC +12V/+24V* x1 12V/5A, 24V/0.1A
Power SW	Push SW with Green LED
SAS	SFF8644 x 2
USB for Hosts	USB 2.0 Type B x1
USB for expansion Module	USB 2.0Type A x8
Fan	2 Fans Air direction : Out to In **removable
Fan Control	Optimized
Drawer	10 drawers (76 Magazines) **removable
LED Indicator	5 LED
Dimensions (W x H x D)	447x 262 x 927mm (6U)
Weight	40Kg (w/o Magazines)

Table 4.4-2: Bottom module specifications

Items	Specification
DC Input	24 V DC* x1 *JN2 series(JAE) 24V/0.5A
USB	USB2.0 Type A x1
Drawer	No
LED Indicator	No
Remarks	Maintenance from rear side(hot isle)
Dimensions (W x H x D)	446x 175 x 867mm (4U)
Weight	23Kg

Table 4.4-3: Expansion module specifications with drive bay

Items	Specification
	300G model
Writer unit	1 unit (300GB drive x3 units) **removable
DC Input	DC +12V/+24V* x1 12/5A, 24V/0.1A
SAS	SFF8644 x 2
USB for Base module	USB 2.0Type A x1
Fan	2 Fans Air direction : Out to In **removable
Fan Control	Optimized
Drawer	10 drawers (76 Magazines) **removable
LED Indicator	5 LED
Dimensions (W x H x D)	447x 262 x 927mm (6U)
Weight	39Kg (w/o Magazines)

Table 4.4-4: Expansion module specifications w/o drive bay

Items	Specification
DC Input	No (VBUS)
USB	USB2.0 Type A x1
Drawer	10 drawers (76 Magazines) **removable
LED Indicator	No
Dimensions (W x H x D)	447x 262 x 927mm (6U)
Weight	25Kg (w/o Magazines)

Table 4.4-5: Magazine specifications

Items	Specification
	300GB
Capacity	3.6TB
Disc numbers	Twelve
Disc Type	300GB Archival Disc
RF ID	Yes
BCA (Disc ID)	Yes



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5 Precautions for use

5.1 Maintenance

Table 5.1: Maintenance policy of Optical Data Archiver.

Items	Implementation
Green marker for the Technician (Highlight the maintenance point)	Yes
Confirmation method of the gear connection	Yes
Screw for removing writer unit	Tool less (dropping protection)
Screw for removing drive	Tool less (dropping protection)
Fan exchange	Tool less (dropping protection)

5.2 Main FRU (Field Replaceable Unit) list

Table 5.2: Main FRU list of Optical Data Archiver

Item	Image
1) Writer Unit 2) Drive	
3) Magazines with 12 discs 4) Magazine Drawer	
5) DC FAN Motor Unit	
6) Expansion Unit	
7) Bottom Module	



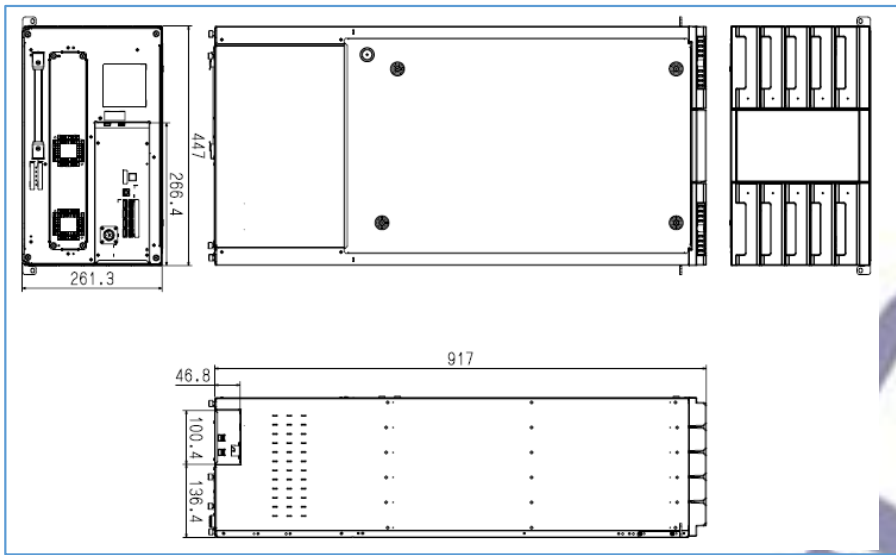
5.3 Standard operating condition

Table 5.2: Standard operating condition

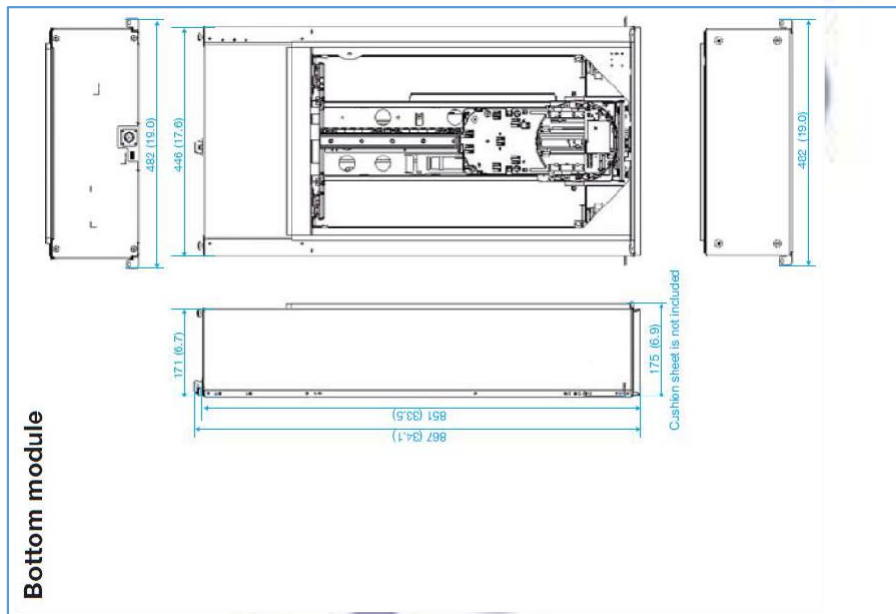
Item	Specification	Remarks
Power-supply voltage	+24V DC±5%, +12V DC ±5%	
Temperature	10°C~35°C	
Humidity	20% ~ 80%RH	
Inclination angle	0°±1°	Horizontal
Vibration and impact	Without vibration and impact	

6 Mechanical dimensions

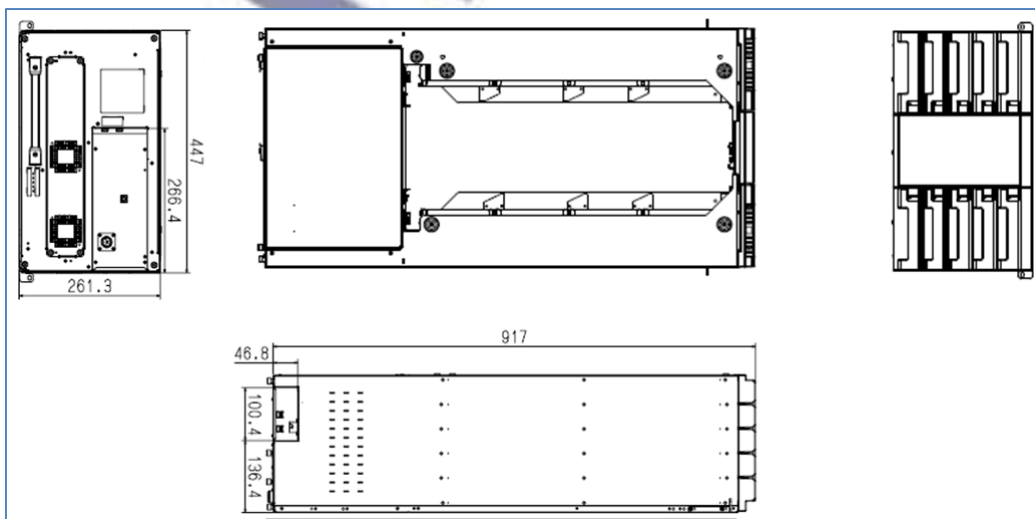
6.1 Base module dimensions



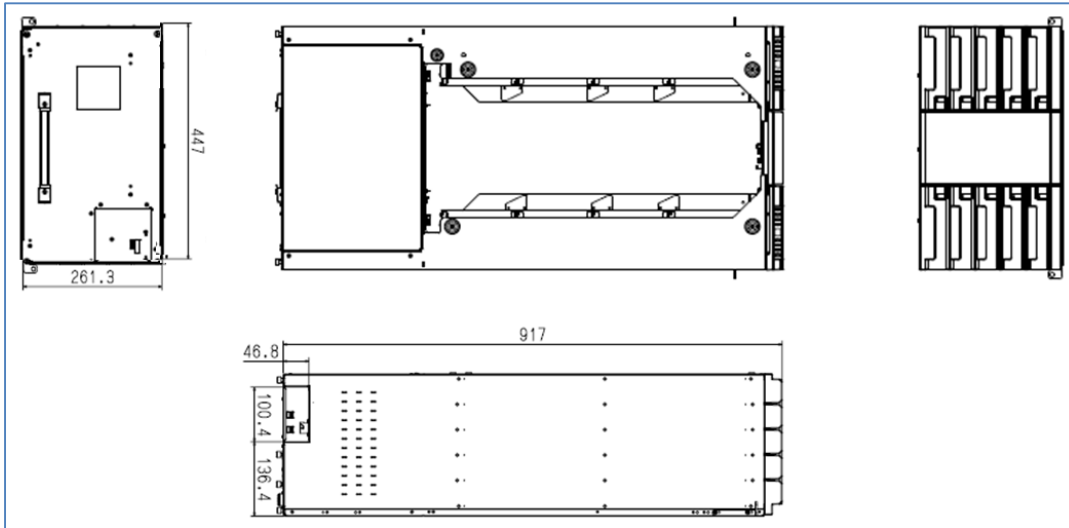
6.2 Bottom module dimensions



6.3 Expansion module dimensions (with writer unit)



6.4 Expansion module dimensions (without writer unit)



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