

# ***AIT Drive***

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User's Guide

*AIT-4 TAPE DRIVE*  
***SDX-900V Series***

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Your AIT TAPE DRIVE is assigned a Model No. ATDNA4 for regulatory compliance certifications.

The number is indicated on the model number label on your drive along with the rated voltage and current.

## **VORSICHT**

### **Für kunden in Deutschland**

Diese Ausrüstung erfüllt die Europäischen EMC-Bestimmungen für die Verwendung in folgender / folgenden Umgebung(en):

- Wohngegenden
- Gewerbegebiete
- Leichtindustriegebiete

(Diese Ausrüstung erfüllt die Bestimmungen der Norm EN55022, Klasse B.)

#### 사용자 안내문

이 기기는 가정용으로 전자파 적합등록을 한 기기로서 주거지역에서는 물론 모든 지역에서 사용할 수 있습니다.

기기의 명칭 (모델명) : ATDNA4  
인증받은자의 상호 : SONY KOREA Corp.  
제조년월일 : 별도표시  
제조사/제조국가 : SONY CORP./일본,중국

## IMPORTANT SAFEGUARDS

For your protection, please read these safety instructions completely before operating the appliance, and keep this manual for future reference.

Carefully observe all warnings, precautions and instructions on the appliance, or described in the operating instructions and adhere to them.

## USE

**Power Sources** – This unit should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of electrical power, consult your dealer or local power company.

**For the unit with a three-wire grounding type ac plug:**

If you are unable to insert the plug into the outlet, contact your electrician to have a suitable plug installed. Do not defeat the safety purpose of the grounding plug.

**AC Power cord: (for AC mains operating unit only)**

The AC power cord should have appropriate safety approvals or marking for the country in which the equipment will be used. Consult your dealer or local power company.

**Cleaning** – Unplug the unit from the wall outlet before cleaning or polishing it. Do not use liquid cleaners or aerosol cleaners. Use a cloth lightly dampened with water for cleaning the exterior of the unit.

**Object and Liquid Entry** – Never push objects of any kind into the unit through openings as they may touch dangerous voltage points or short out parts that could result in a fire or electric shock. Never spill liquid of any kind on the unit.

## INSTALLATION

**Water and Moisture** – Do not use power-line operated units near water – for example, near a bathtub, washbowl, kitchen sink, or laundry tub, in a wet basement, or near a swimming pool, etc.

**Power-Cord Protection** – Route the power cord so that it is not likely to be walked on or pinched by items placed upon or against it, paying particular attention to the plugs, receptacles, and the point where the cord exits from the appliance.

**Accessories** – Do not place the unit on an unstable cart, stand, tripod, bracket, or table. The unit may fall, causing serious injury to a child or an adult, and serious damage to the unit. Use only a cart, stand, tripod, bracket, or table recommended by the manufacturer.

**Ventilation** – The slots and openings in the cabinet are provided for necessary ventilation. To ensure reliable operation of the unit, and to protect it from overheating, these slots and openings must never be blocked or covered.

- Never cover the slots and openings with a cloth or other materials.
- Never block the slots and openings by placing the unit on a bed, sofa, rug or other similar surface.
- Never place the unit in a confined space, such as a bookcase, or built-in cabinet, unless proper ventilation is provided.

## SERVICE

**Damage Requiring Service** – Unplug the unit from the wall outlet and refer servicing to qualified service personnel under the following conditions:

- When the power cord or plug is damaged or frayed.
- If liquid has been spilled or objects have fallen into the unit.
- If the unit has been exposed to rain or water.
- If the unit has been subject to excessive shock by being dropped, or the cabinet has been damaged.
- If the unit does not operate normally when following the operating instructions. Adjust only those controls that are specified in the operating instructions. Improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the unit to normal operation.
- When the unit exhibits a distinct change in performance - this indicates a need for service.

**Servicing** – Do not attempt to service the unit yourself as opening or removing covers may expose you to dangerous voltage or other hazards.

Refer to all servicing to qualified service personnel.

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# Table of Contents

Overview .....	6
Introduction .....	7
About AIT Drives .....	7
Precautions .....	8
Installation .....	10
SCSI Connection/Setting the SCSI ID .....	10
Option Switches (DIP Switch) .....	11
Mounting Holes .....	14
Reconfiguring from 5.25" Model to 3.5" Model .....	15
Orientation .....	16
Attaching and Removing the Dust Cover .....	17
Attaching the Dust Cover .....	17
Removing the Dust Cover .....	19
Operation .....	20
Location of 3 LEDs .....	20
Drive Operation .....	21
Emergency Tape Removal Procedure .....	23
Interface Implementation .....	25
Supported SCSI Messages .....	25
Supported SCSI Commands .....	25
Specifications .....	26
Product Specifications .....	26
Sony Contacts .....	28

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# Overview

The Sony SDX-900V series drives are high capacity data storage devices using Advanced Intelligent tape (AIT) technology. The SDX-900V series drives achieve high data reliability through Read-After-Write, an additional level of Error Correction Code, and other features.

The Sony SDX-900V series drives store data on tape using standard formats called AIT (Advanced Intelligent Tape) and ALDC.

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# Introduction

## About AIT Drives

SDX-900V series drives are internal AIT drive units that use data cartridges conforming to the AIT-4 format.

### Features

The SDX-900V series drives have the following features:

- Support reading and writing to data cartridges conforming to the AIT-4 format.
- The Read-After-Write Function and third-level error correction code guarantee high data reliability.
- Data compression provides 520 gigabytes of storage on 246 m tape-length cartridge.\*<sup>1</sup>  
The native capacity is 200 gigabytes of storage on 246 m tape-length cartridge.
- Stored data is automatically checked for compression.
- Ultra 160 Wide SCSI LVD/SE interface is fully supported for host computer access.

\*<sup>1</sup> This is assuming 2.6 : 1 compression ratio.  
The degree of data compression attained while recording data varies according to system environment and data type.

# Precautions

## Useable Cartridges

SDX-900V series can be used with data and cleaning cartridges marked with the AIT-4 logo.



### Notes

- Be sure to use only data cartridges designed specifically for AIT (do not use 8 mm video cartridges) as this may damage the drives.
- Do not use anything but AIT cartridges with this system, as doing so can damage the AIT drive. Although commercially available 8mm videotapes resemble AIT cartridges in appearance, they have entirely different specifications and cannot be used.

## Installation

Avoid placing the drives in locations subject to:

- high humidity
- high temperature
- mechanical shock and vibration
- direct sunlight

\* For details, see “Specifications” on page 26.

## Operation

- Do not move the drives while they are operating. It may cause malfunctions.
- Avoid exposing the drives to sudden changes from low to high temperatures. This may cause condensation to collect inside the drives. If the ambient temperature should suddenly rise while the drives are turned on, turn them off and wait at least one hour before turning them back on. If you attempt to operate the drives immediately after a sudden increase in temperature, malfunctions may occur.
- Turning off the power to the drives while they are writing to tape may cause the tape to become unreadable. All previously negotiated parameters will be lost, whenever power to the drives is cycled.



## Transportation

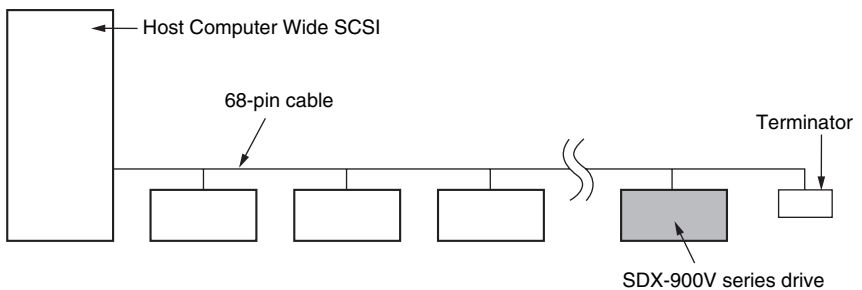
- Keep the original packing materials to facilitate safe transportation of the drives.
- Always remove the tape/media cartridge before moving the drives. After removing the drives from the computer, repack them into their original packing.

## SCSI Termination

The SDX-900V series drives conform to the Microsoft PC97 standard, which requires the internal (naked) drive to be terminated with an external terminator.

### Microsoft PC97 SCSI requirements

SCSI peripherals must not terminate the bus. Both internal and external cable ends are instead terminated by plug-in connectors.

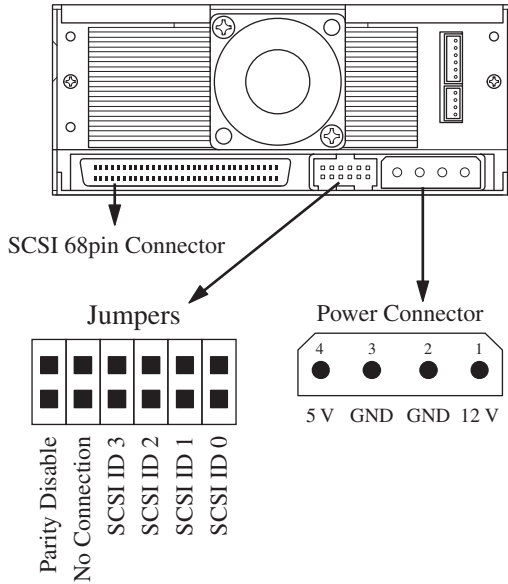


**Example of SCSI setup**

# Installation

## SCSI Connection/Setting the SCSI ID

SCSI ID	
SCSI ID	P.D. N.C. 3 2 1 0
0	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	



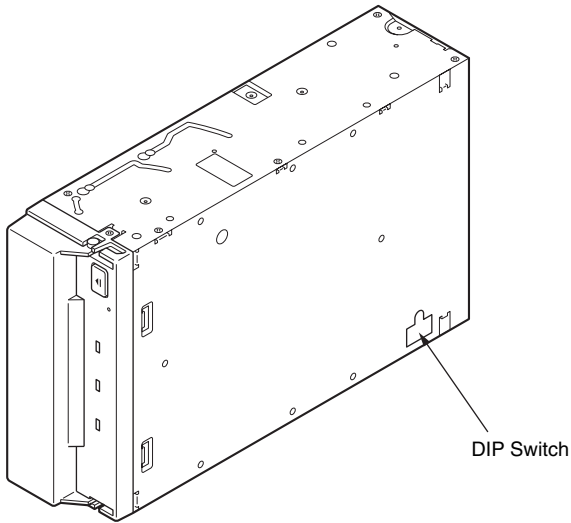
Parity	
Disable	
Enable	

**Note :** = CLOSED/Jumper  
 = OPEN/Jumper not installed  
 = Don't care

### Parity Disable Jumper

Parity check function can be disabled by Jumper. Parity check is disabled while left end jumper is installed. Parity generate function is always enabled.

## Option Switches (DIP Switch)



### DIP Switch Positions

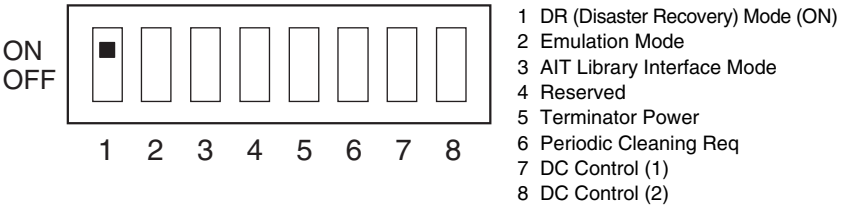
#### Default

ON	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
OFF	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	1	2	3	4	5	6	7	8

- 1 DR (Disaster Recovery) Mode (OFF)
- 2 Emulation Mode (OFF)
- 3 AIT Library Interface Mode (ON)
- 4 Reserved (OFF)
- 5 Terminator Power (ON)
- 6 Periodic Cleaning Req (ON)
- 7 DC Control (1) (ON)
- 8 DC Control (2) (OFF)

## DR (Disaster Recovery\*) Mode

To enable DR Mode, set position 1 [Drive Mode] switch to ON.

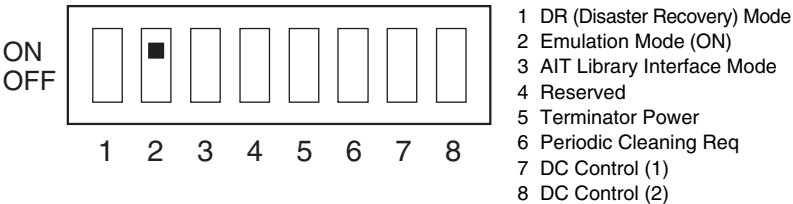


\* In Disaster Recovery Mode, an SDX-900V series drive enters the DR Standby Mode 15 seconds after you insert a write-protected tape into the drive, and all the drive LED blink. If you restart the drive while the LED are blinking, it starts as a CD-ROM device.

For details about the Disaster Recovery Mode, refer to the instruction manual that came with the application software you are using.

## Emulation Mode\*

To enable Emulation Mode, set the position 2 [Drive Mode] switch to ON.



\* Emulation Mode returns the following in the Product Identification field of Inquiry of a SDX-900V series drive.

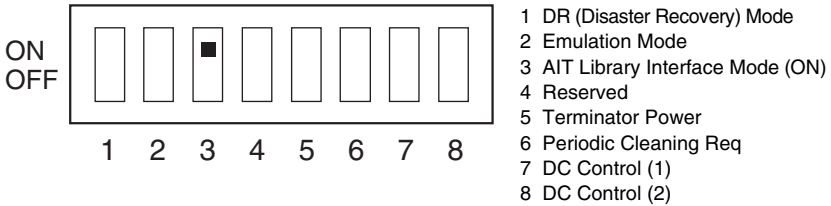
SDX-700C

## Data Compression Control DIP switch

Data compression can be selected by DIP switches. Data compression is enabled while position 7 [DC Control (1)] is ON. Control by host can be disabled when position 8 [DC Control (2)] is ON.

## Library Mode

The Library Mode can be enabled with a DIP switch.



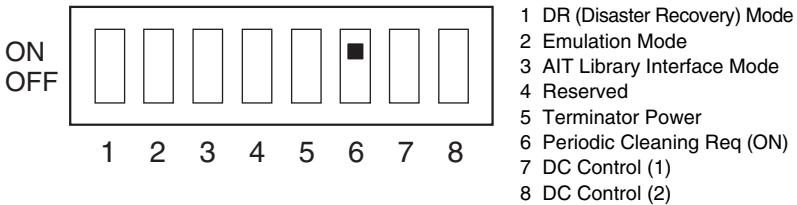
When switch 3 is ON, AIT Legacy Library Interface Mode is enabled. With this switch OFF, ACI Mode is enabled.

## Terminator Power Control DIP switch

This DIP switch determines whether terminator power is supplied to the SCSI bus. To enable terminator power, set position 5 [Terminator Power] switch to ON.

## Cleaning Request Mode

Periodic cleaning requests can be enabled by a DIP switch.



When switch 6 is ON, cleaning requests are enabled. When enabled, the “CLEANING REQUEST” LED on the front panel lights after every 100 hours of operation.

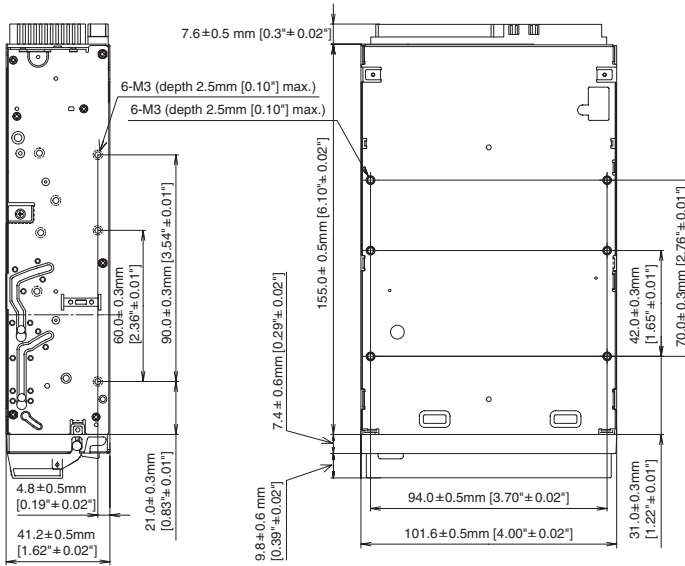
When this LED lights, clean the drive with a head cleaning cartridge.

### Note

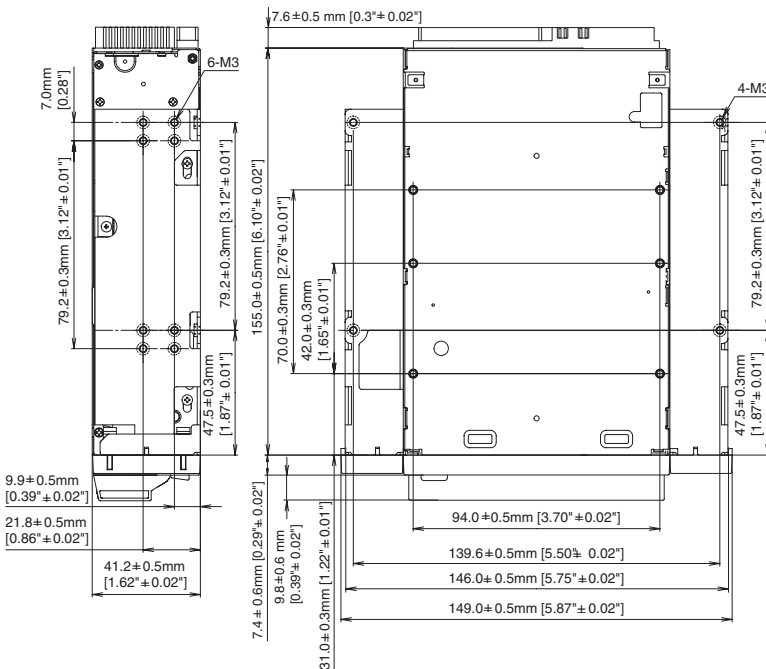
To maintain the drive in optimum condition in environments affected by dust and other contaminants, we recommend keeping cleaning requests enabled.

# Mounting Holes

## For 3.5" Standard Height



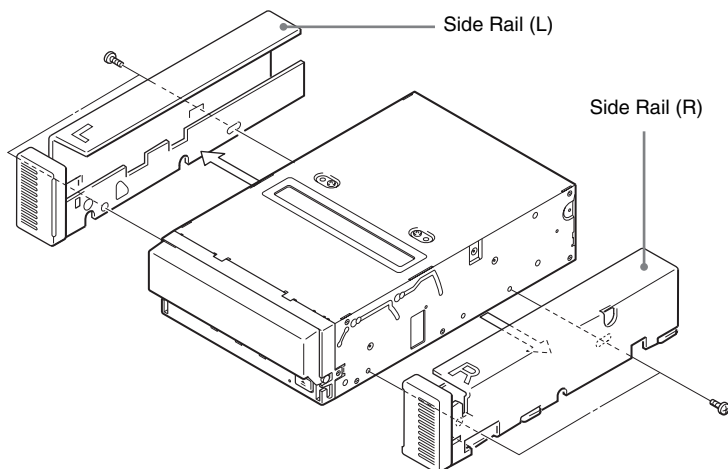
## For 5.25" Half Height



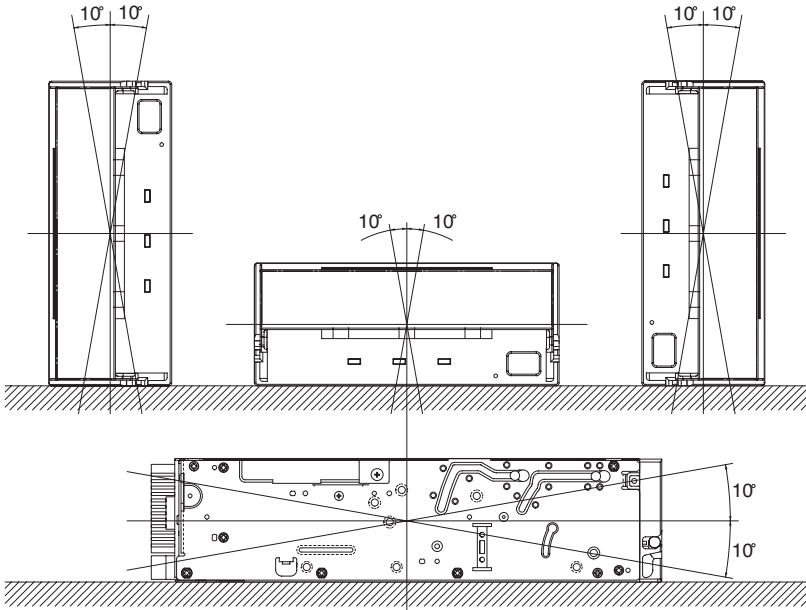
## Reconfiguring from 5.25" Model to 3.5" Model

You can reconfigure the 5.25" model to the 3.5" model yourself.

- 1** Remove the 2 screws for each side rail.
- 2** Take the side rail off.



# Orientation

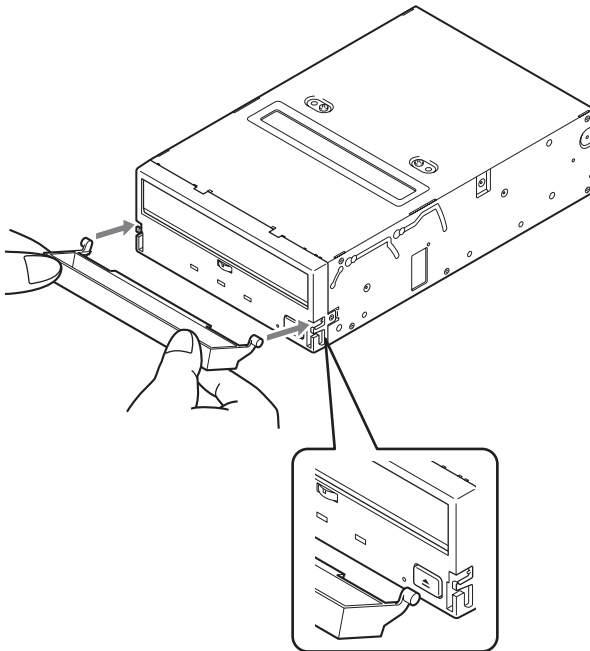




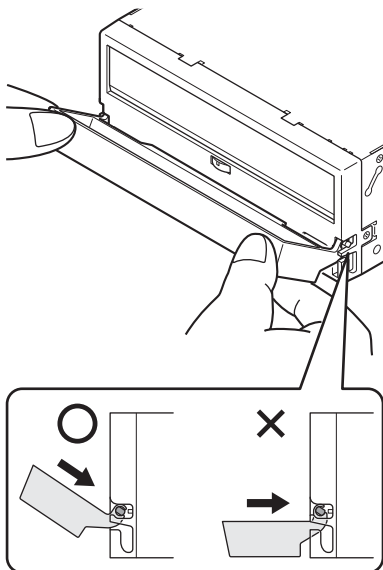
# Attaching and Removing the Dust Cover

## Attaching the Dust Cover

- 1 Align the dust cover's hinge clips (one on each side) with the pins of the drive bezel.
  - The dust cover should be positioned so that the magnets\* on the cover's back face the drive bezel.
  - \* This magnet does not affect the tape of the cartridge.
  - Holding the dust cover at an angle, as shown in the figure below, set the hinge clips on top of the bezel pins, positioning them so that they bracket the pins.



- 2** Press down at an angle on each side in turn until you hear the hinge clips click into place.



**Caution**

Do not press the dust cover in horizontally from the front. Doing so could cause the dust cover to break.

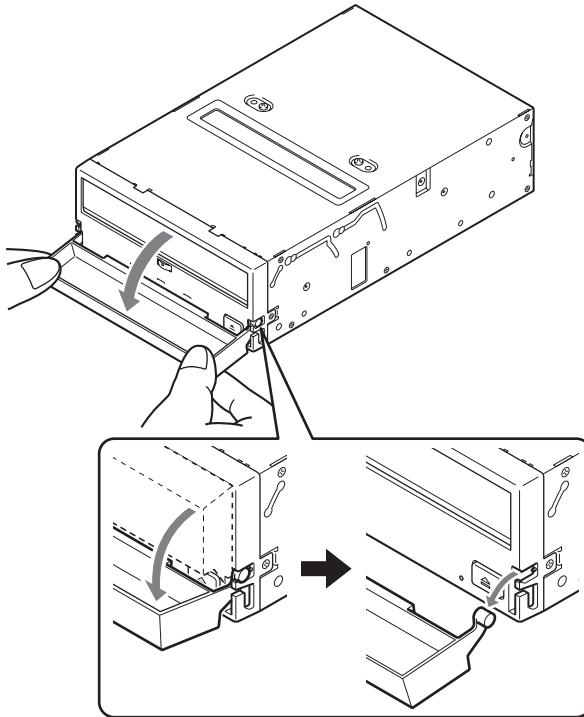
- 3** Close the dust cover.

This completes attachment of the dust cover.

## Removing the Dust Cover

- 1 Open the dust cover.
- 2 Holding the dust cover at both corners, carefully raise the dust cover.

The dust cover hinge clips and drive bezel pins uncouple.



### Note

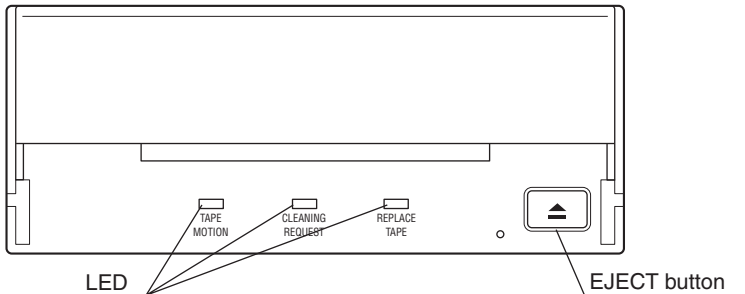
We recommend that you use the drive with the dust cover.

# Operation

## Location of 3 LEDs

There are three LED indicators (TAPE MOTION LED, CLEANING REQUEST LED, REPLACE TAPE LED) and an EJECT button on the front panel of the SDX-900V series drives.

### Front Panel



## LED Indication for Drive Status

The LED indicators are defined as follows

LED			Sense
TAPE MOTION	CLEANING REQUEST	REPLACE TAPE	
	Independent	Independent	Tape loaded
	Independent	Independent	Tape access in progress (write/read)
	Independent	Independent	Tape access in progress (others)
Independent		Independent	Cleaning is requested
Independent		Independent	Cleaning is not completed
Independent	Independent		Media error occurred
			H/W error occurred



on



Slow

1 pulse (0.9 sec on/0.3 sec off)



Fast

1 pulse (0.3 sec on/0.3 sec off)

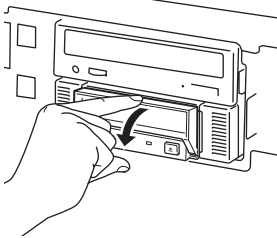
## Drive Operation

### Loading a Cartridge

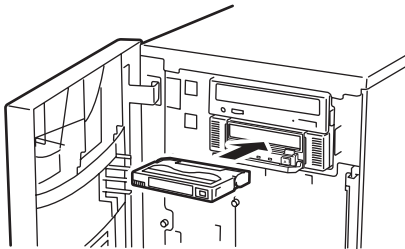
#### Note

While setting the data cartridge, do not turn off the host computer. This may cause a malfunction or damage data.

- 1** Turn on the host computer. Check that the drive's TAPE MOTION LED, CLEANING REQUEST LED and REPLACE TAPE LED go off.
- 2** Open the dust cover.



- 3** Set the AIT data cartridge orientation as shown here and insert it into the data cartridge slot.



By fully inserting the data cartridge, it is automatically set in the drive and the TAPE MOTION LED lights.

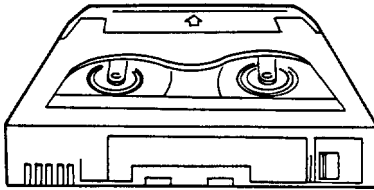
## Unloading a Cartridge

The cartridge can be removed from SDX-900V series drives in response to a SCSI Unload command, or by pressing the EJECT button.

When the EJECT button is pressed, the tape is rewound and the cartridge ejected from the slot.

## Write-protecting a Cartridge

Cartridges can be write-protected by sliding the tab on the back of the cartridge. In this state, data can be read from the tape but not written onto it.



AIT-4



Using your fingernail, push the switch in the direction of the arrow to protect the tape from writing or accidental erasure.



Return the switch to its original position to re-enable writing.

## Using a Cleaning Cartridge

A cleaning function is built into SDX-900V series drives so the use of a cleaning cartridge is not needed. If, however, the drive experiences excessive errors, use a cleaning cartridge with the AIT logo.

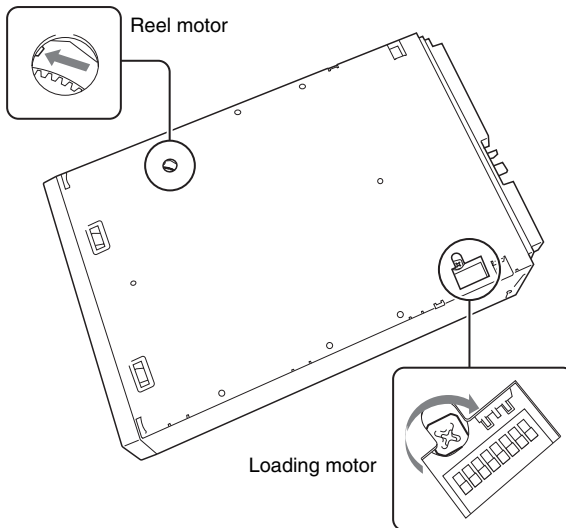
## How to Clean

- 1** Load the head-cleaning cartridge (SDX4-CL) into the SDX-900V. Cleaning starts automatically.
- 2** Cleaning takes from a few seconds to a minute for the SDX-900V, \*1 and the cartridge is automatically ejected when finished.

\*1 The cleaning time varies depending on the condition of the drive.

## Emergency Tape Removal Procedure

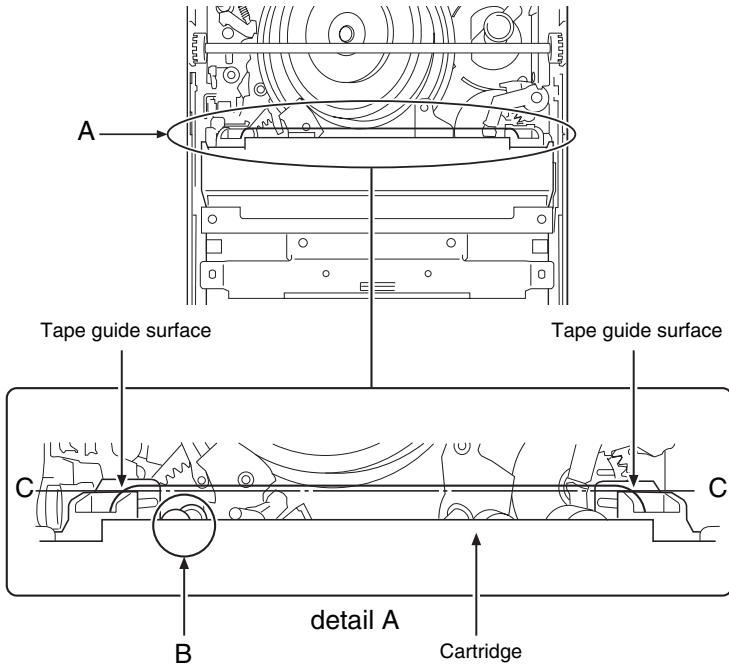
- 1** Remove the drive from the chassis or enclosure to allow access to the bottom of the drive.
- 2** Remove the drive's top cover.
- 3** Locate the small opening in the bottom of the drive and insert the tip of a precision screwdriver so that the Loading motor shaft can be rotated.
- 4** Rotate the motor shaft clockwise to bring the threading mechanism back to the initial position.



**Emergency Tape Removal Procedure**

**Caution**

Stop rotating the motor shaft immediately, when the guide B gets to the area below the line C-C (This line is defined by 2 circular tape guide surfaces of the cartridge). Otherwise, the gears of the drive can be damaged.



**The Initial Position of the Threading Mechanism**

- 5** Before the manual ejection procedure, tape slack must be removed in order to prevent tape damage. Rotate the gear mechanism located on the bottom of the drive counterclockwise to tighten the tape.
- 6** After the tape slack has been removed, continue to turn the Loading motor shaft located on the bottom of the drive clockwise with a precision screwdriver until the tape cartridge is lifted out of the drive mechanism and is ejected.
- 7** Return the drive to Sony for repair.



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# Interface Implementation

## Supported SCSI Messages

Abort	Identify
Target Reset	Ignore Wide Residue
Command Complete	Message Parity Error
Disconnect	Message Reject
Extended Message	No Operation
– Synchronous Data Transfer Request	
– Wide Data Transfer Request	
– Parallel Protocol Request	

## Supported SCSI Commands

Erase	Release (6)
Inquiry	Release (10)
Load/Unload	Report Density Support
Locate	Report Device Identifier
Log Sense	Report Luns
Log Select	Request Sense
Mode Select	Reserve (6)
Mode Sense	Reserve (10)
Persistent Reserve In	Rewind
Persistent Reserve Out	Send Diagnostic
Prevent Allow Medium Removal	Set Device Identifier
Read	Space
Read Attribute	Test Unit Ready
Read Block Limits	Write
Read Buffer	Write Attribute
Read Position	Write Buffer
Receive Diagnostic Result	Write Filemarks

# Specifications

## Product Specifications

### Dimensions

(not including bezel and protruding parts)

	3.5"	5.25"
Height	41.2 mm (1.62 in)	41.2 mm (1.62 in)
Width	101.6 mm (4.0 in)	146.0 mm (5.75 in)
Depth	155.0 mm (6.1 in)	155.0 mm (6.1 in)

### Mass

3.5"	780 g (27.5 oz.)
5.25"	1010 g (35.6 oz.)

### Altitude

Operating	0 to 3048 m (0 to 10,000 ft.)
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### Vibration

Operating	Swept Sine 5 to 500 Hz *0.25 G Peak 1 Octave/min. 3 axes, 3 directions
Non-operating	Swept Sine 5 to 500 Hz *0.5 G Peak 1 Octave/min. 3 axes, 3 directions

### Acoustic Noise

(A) curve weight

Streaming Write/Read	35 dB (A)
Insert/Eject	60 dB (A)

### Note

The sound-meter on (A) scale is located 1m (3.3 ft.) in front of the center of the drive front panel.

## Shock

Operating	No Data Loss Half Sine Performance 5 G Peak 3 ms 3 axes, 3 directions *Interval of 10 seconds
Non-operating	No Device Damage Half Sine 90 G Peak 3 ms (30 G Peak 11 ms) 3 axes, 3 directions *Interval of 10 seconds

## Temperature and Humidity Range

### Temperature

Operating	5°C to 40°C ( $\Delta T < 10^\circ\text{C/h}$ ) (41°F to 104°F ( $\Delta T < 18^\circ\text{F/h}$ ))
Non-operating (mech.)	- 40°C to 70°C ( $\Delta T < 20^\circ\text{C/h}$ ) (- 40°F to 158°F ( $\Delta T < 36^\circ\text{F/h}$ ))
Non-operating (tape)	- 40°C to 45°C ( $\Delta T < 20^\circ\text{C/h}$ ) (- 40°F to 113°F ( $\Delta T < 36^\circ\text{F/h}$ ))

### Humidity

Operating	20 to 80% RH, non-condensing Maximum wet bulb temperature = 26°C (78.8°F)
Non-operating (mech.)	5 to 95% RH ( $\Delta\text{RH} < 30\%/h$ ) Maximum wet bulb temperature = 45°C (113°F)
Non-operating (tape)	20 to 80% RH ( $\Delta\text{RH} < 30\%/h$ )

## Air-cooling Requirement

Surrounding temperature	< 40°C (104°F)
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Clean air flow is recommended to minimize the possibility of data loss.

## Power Requirements

Voltage	Max Ripple	Current	
		Typical	Maximum
5 V +/- 5 %	100 mVp-p	1.5 A	2.5 A
12 V +/- 10 %	150 mVp-p	0.75 A	3.0 A

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# Sony Contacts

**For further information, please contact:**

**Sony Electronics Inc., Tape Storage Solutions (USA)**

URL: <http://www.storagebysony.com>

**Sony Corporation**

**Electronic Devices Marketing Group, Product Marketing Div.**

**Computer Peripherals Dept., Tape Streamer Section**

Osaki Gate City East Tower, 1-11-1, Osaki

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URL: <http://www.sonyisstorage.com/>

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