SONY

4-680-373-**11**(1)

AIT Drive

User's Guide

AIT-2 TAPE DRIVE

SDX-500V

AIT-1 TAPE DRIVE

SDX-400V

Your AIT TAPE DRIVE is assigned a Model No. ATDNA2 for regulatory compliance certifications.
The number is indicated on the model number label on your drive along with the rated voltoge and current.

VORSICHT

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)	: ATDNA2
인증받은자의 상호	: SONY KOREA Corp.
제조년월일	: 별도표시
제조자／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 the one 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 them, 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.

Contents

Overview

The Sony SDX-500V and SDX-400V drives are high capacity data storage devices using Advanced Intelligent tape (AIT) technology. The SDX-500V and SDX-400V drives achieve high data reliability through Read-After-Write, an additional level of Error Correction Code, and other features.

The Sony SDX-500V and SDX-400V drives store data on tape using standard formats called AIT (Advanced Intelligent Tape) and ALDC formats.

Introduction

About AIT Drives

The SDX-500V is an internal AIT drive unit that uses data cartridges conforming to the AIT-2 format. The SDX-400V is an internal AIT drive unit that uses data cartridges conforming to the AIT-1 format. The SDX-500V supports AIT-1 and AIT-2 formats. The SDX-400V supports only AIT-1 format.

Features

The AIT Drive Unit SDX-500V has the following features:

- Supports reading and writing to data cartridges conforming to the AIT-1 and AIT-2 formats.
- Read After Write Function and third-level error correction code guarantee high data reliability.
- Data compression provides 130 gigabytes of storage on 230 m tape-length cartridge.*1

  The native capacity is 50 gigabytes of storage on 230 m tape-length cartridge.
- Stored data are automatically checked for compression.
- Wide Ultra SCSI LVD/SE interface is fully supported for host computer access.

The AIT Drive Unit SDX-400V has the following features:

- Supports reading and writing to data cartridges conforming to the AIT-1 format.
- Read After Write Function and third-level error correction code guarantee high data reliability.
- Data compression provides 91 gigabytes of storage on 230 m tape-length cartridge.*1

  The native capacity is 35 gigabytes of storage on 230 m tape-length cartridge.
- Stored data are automatically checked for compression.
- Wide Ultra SCSI LVD/SE interface is fully supported for host computer access.

*1 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

Installation

Avoid placing the drive in a location subject to:

– high humidity

– high temperature

– mechanical shock and vibration

– direct sunlight

* For details, see “Specifications” on page 27.

Operation

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

Transportation

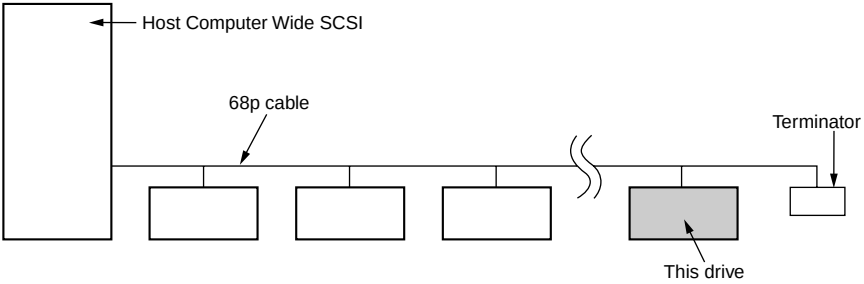
- Keep the original packing materials to facilitate safe transportation of the drive.
- Always remove the tape/media cartridge before moving the drive. After removing the drive from the computer, repack the drive into its original packing.

SCSI Termination

The SDX-500V and SDX-400V conform to the Microsoft PC97 standard which requires the internal (naked) drive to be terminated with an internal 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.



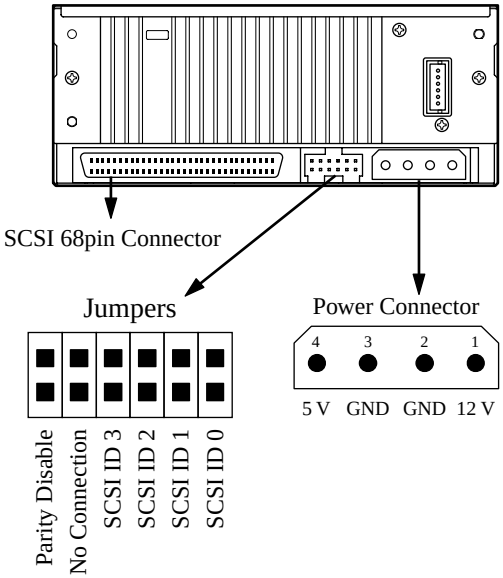
Example of SCSI setup

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

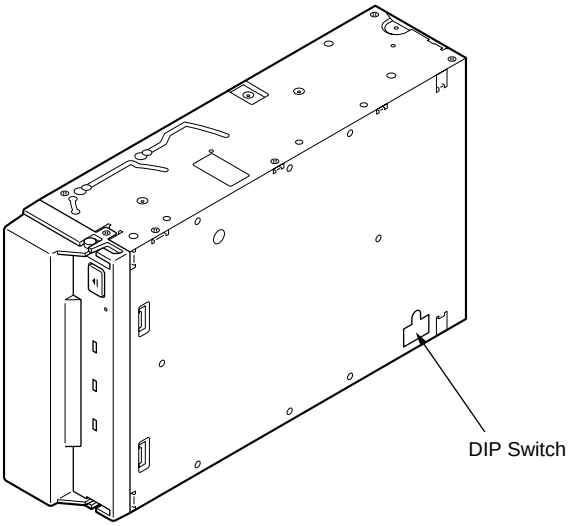
▮ = OPEN/Jumper not installed

▯ = 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)

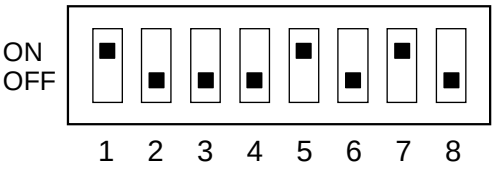


DIP Switch Positions

Default

1 Drive Mode (OFF)
2 Drive Mode (OFF)
3 Drive Mode (OFF)
4 Drive Mode (OFF)
5 Terminator Power (ON)
6 Reserved (OFF)
7 DC Control (1) (ON)
8 DC Control (2) (OFF)

DR (Disaster Recovery*) Mode



1 Drive Mode (ON)
2 Drive Mode (OFF)
3 Drive Mode (OFF)
4 Drive Mode (OFF)
5 Terminator Power (ON)
6 Reserved (OFF)
7 DC Control (1) (ON)
8 DC Control (2) (OFF)

* Disaster Recovery Mode is enabled only if VERITAS Backup Exec™ is running on Windows NT or Windows 2000. In Disaster Recovery Mode, the 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 your VERITAS Backup Exec documentation.

Emulation Mode*

1 Drive Mode (ON)
2 Drive Mode (ON)
3 Drive Mode (ON)
4 Drive Mode (ON)
5 Terminator Power (ON)
6 Reserved (OFF)
7 DC Control (1) (ON)
8 DC Control (2) (OFF)

* Emulation Mode returns the following in the Product Identification field of Inquiry of the SDX-500V.

SDX-500C

* Emulation Mode returns the following in the Product Identification field of Inquiry of the SDX-400V.

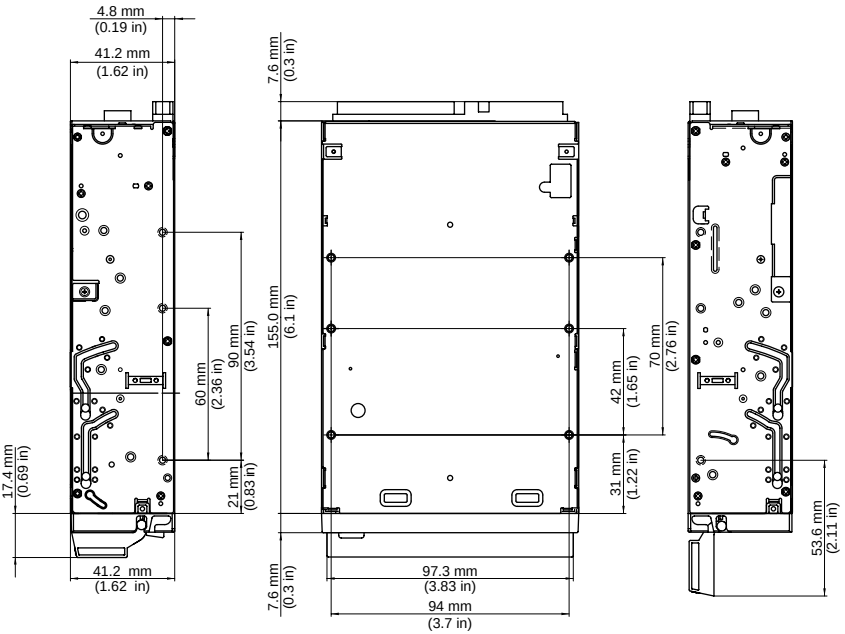
SDX-400C

Data Compression Control DIP switch

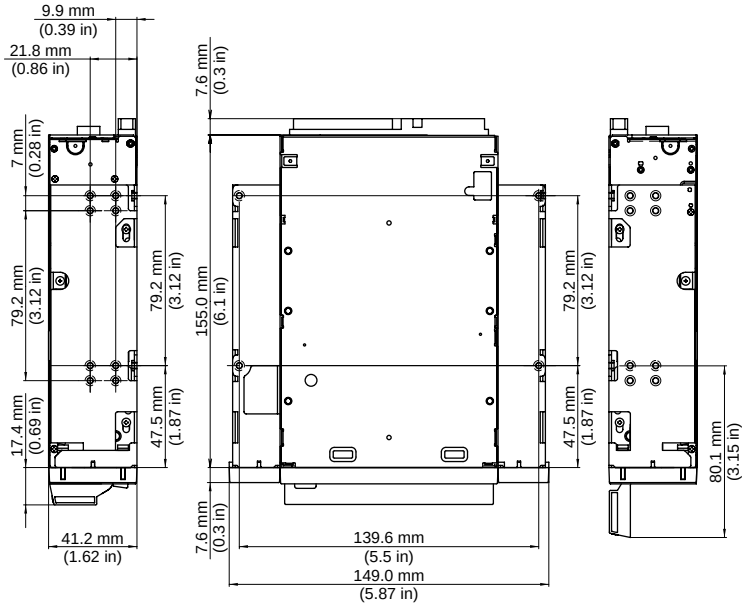
Data compression can be selected by DIP switches. Data compression is enabled while position 7 [DC Control (1)] is ON. Control by host can be disabled when position 8 [DC Control (2)] is ON.

Mounting Holes

For 3.5" Standard Height



For 5.25" Half Height

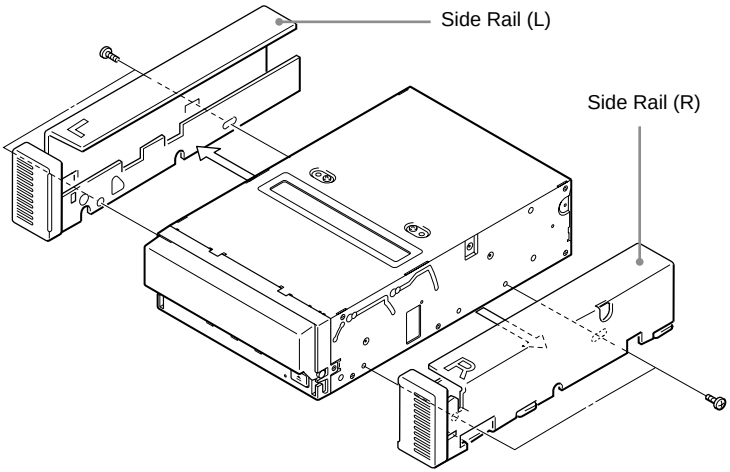


Reconfiguring from 5.25" Model to 3.5" Model

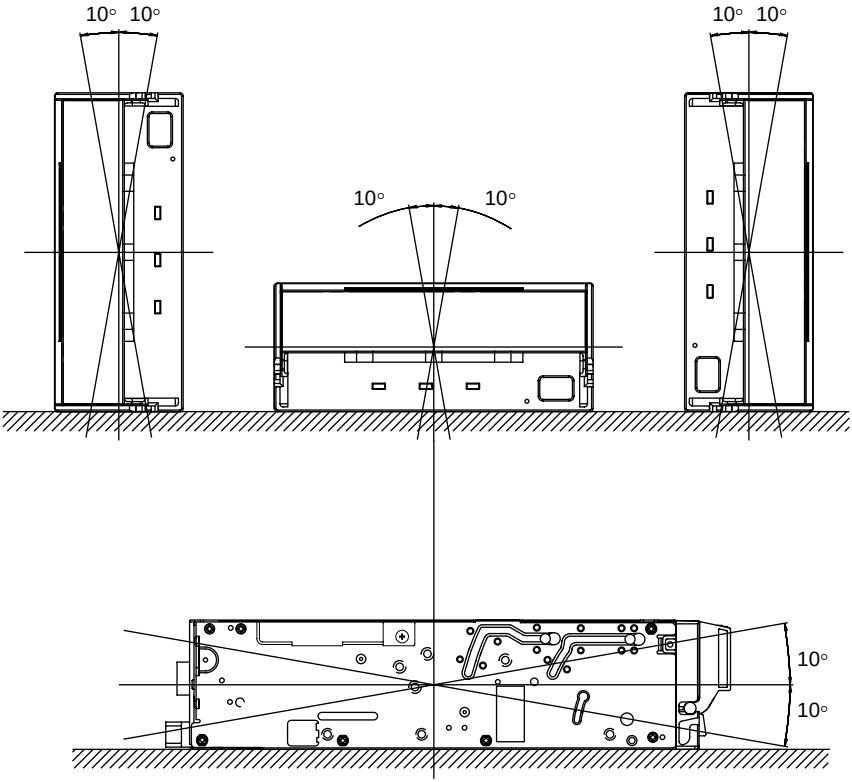
You can reconfigure the 5.25" model to the 3.5" model yourself.

1 Remove the 2 screws for each side rail.

2 Take the side rail off.



Orientation



Attaching and Removing the Dust Cover

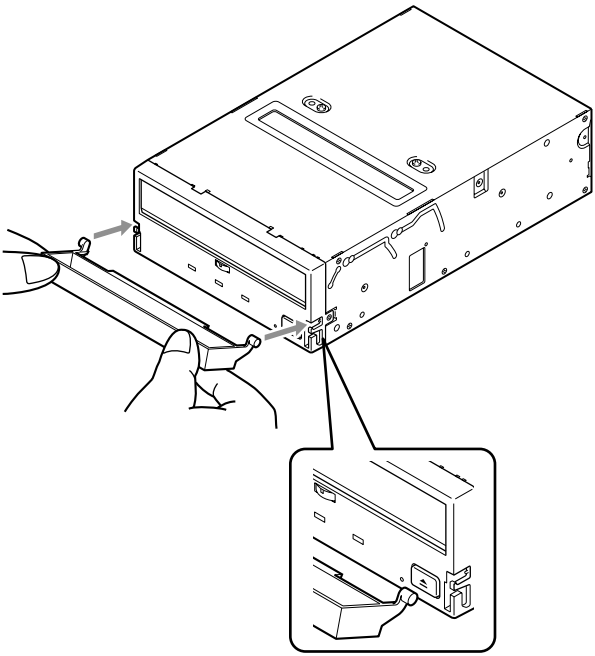
Attaching the Dust Cover

1 Align the dust cover's hinge clips (one on each side) with the pins of the drive bezel.

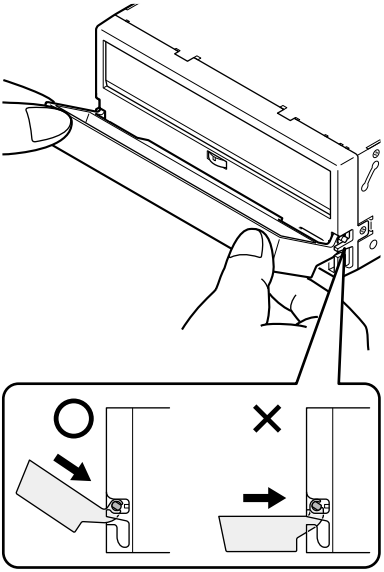
- The dust cover should be positioned so that the magnets* on the cover's back face the drive bezel.

  * 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.

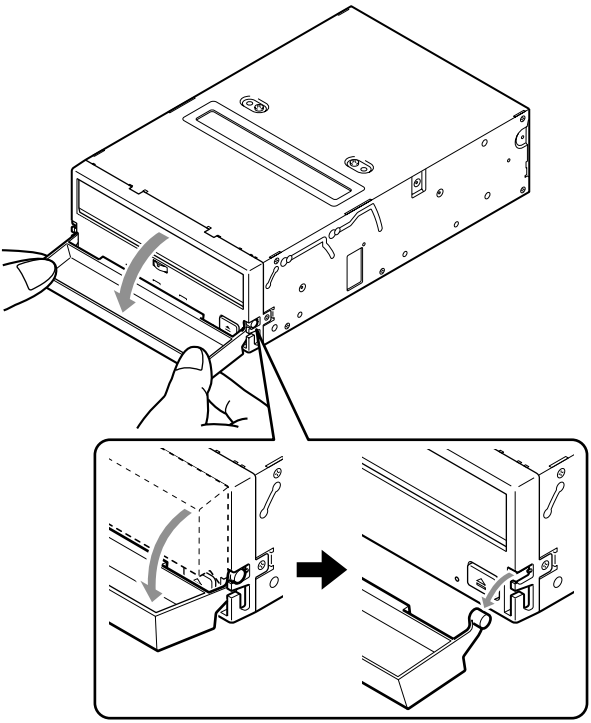
This completes attachment of the dust cover.

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

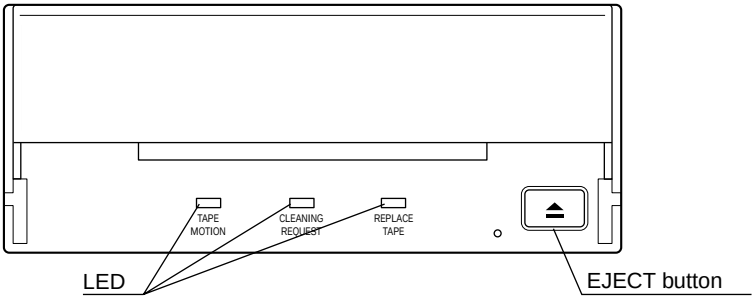
We recommend that you use the drive with the dust cover.

Operation

Location of 3 LEDs

There are three LED indications (TAPE MOTION LED, CLEANING REQUEST LED, REPLACE TAPE LED) and an EJECT button on the front panel of the unit.

Front Panel (for 3.5" Standard Height)



LED Indication for Drive Status

The LED indicators are defined as follows

LED			
TAPE MOTION	**CLEANING REQUEST**	**REPLACE TAPE**	**Sense**
■	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)

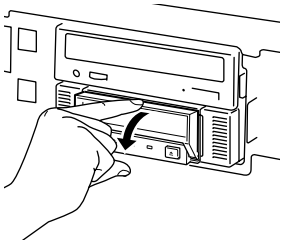
Loading a Cartridge

Note

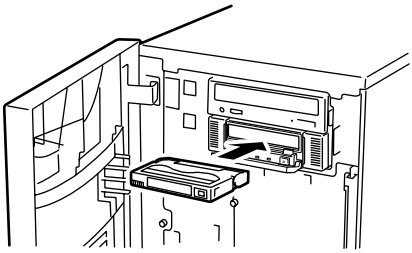
While setting the data cartridge, do not turn off the host computer. This may cause a malfunction or damage data.

1 Turn on the basic processing unit. 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 inserting the data cartridge to the extent, it is automatically set in the drive and the TAPE MOTION LED lights.

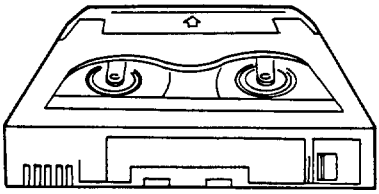
Unloading a Cartridge

The cartridge can be removed from the SDX-500V and SDX-400V either in response to a SCSI Unload Command, or by pressing the EJECT bottom.

By pressing EJECT button, the tape goes to BOT, the drive unthreads it, and ejects the cartridge 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-1 AIT-2

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 the SDX-500V and SDX-400V so the use of a cleaning cartridge is not needed. If however the drive experiences excessive errors, the use of a Sony cleaning cartridge is recommended.

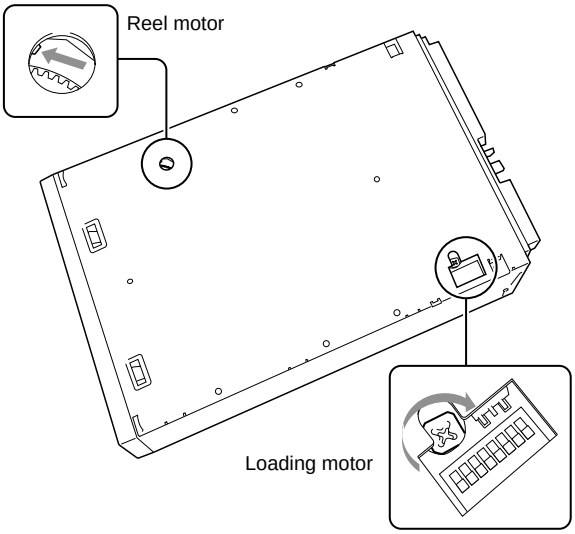
Emergency Tape Removal Procedure

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.

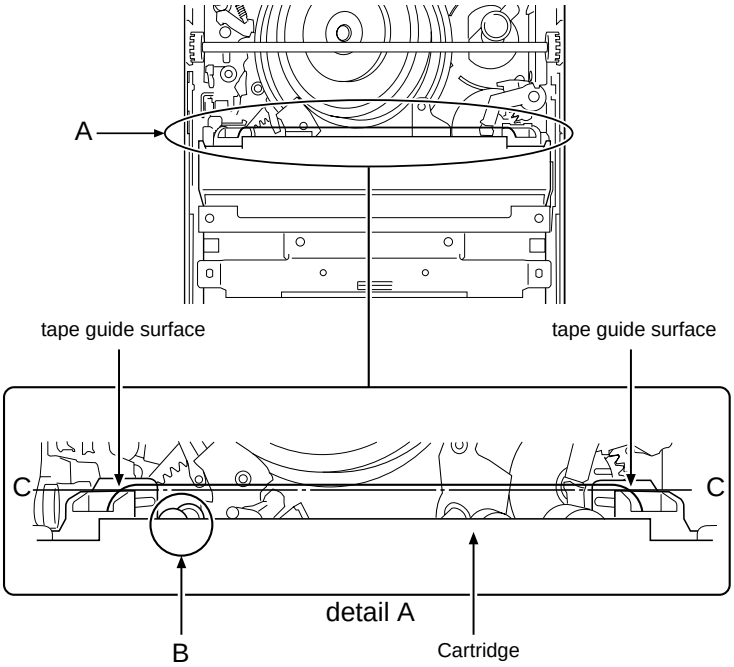
4 Rotate the motor shaft clockwise to bring the threading mechanism back to the initial position.



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 gear of the drive can be damaged.



The Initial Position of the Threading Mechanism

5 Before manual eject procedure, tape slack must be removed in order to prevent tape damage. Rotate the gear mechanism located on the bottom of the drive counterclockwize to tighten the tape.

6 After the tape slack has been removed, continue to turn the Loading moter shaft located on the bottom of the drive clockwise by 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.

WORM Function

The SDX-500V supports the WORM function. This section explains the WORM function.

What is “WORM”?

“WORM” is an acronym for “Write Once Read Many”, a function that allows data to be written to the same place on a tape only once, but permits that data to be read from the tape for any number of times. This drive supports WORM cartridges. When a WORM cartridge is used with an application that supports the WORM function, data that has been written to a tape can not be accidentally deleted or overwritten.

A WORM drive operates in the same manner as a non-WORM drive when used with a non-WORM cartridge (henceforth referred to as “regular cartridge”).

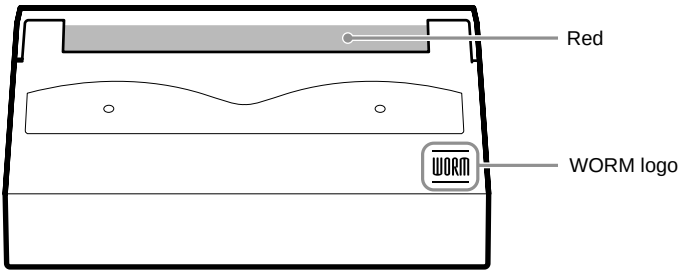
The operation of a WORM drive and a non-WORM drive differs according to the type of cartridge that is being used.

Tape Drive	Cartridge	
	Regular Cartridge (without WORM logo)	WORM Cartridge (with WORM logo)
Non-WORM drive	Read/Write Enabled	Waiting for Eject
WORM drive	Read/Write Enabled	Read/Append-Write Enabled

AIT-2 WORM cartridge: SDX2-50W

WORM Cartridges

WORM cartridges can be distinguished from regular cartridges by their WORM logo and red shutters.



AIT-2 WORM cartridge: SDX2-50W

How to Write Data onto a WORM Cartridge

As with a regular cartridge, there is no limit on how many times data can be read from a WORM cartridge. When writing data to a WORM cartridge, the data can not be written to a portion of the tape that has already been written.

When writing data onto a WORM cartridge, it is appended after data that has already been written onto the cartridge. Accordingly, you must move to the EOD area before writing data onto the cartridge.

SCSI Commands Supported by the WORM Drive

The WORM drives support the same SCSI commands that are supported by non-WORM drives. However, if an attempt is made to write to a portion of a tape where data has already been written, the following error information is returned: “Sense Key = 07, ASC = 27h, ASCQ = 00: Persistent Write Protect” or “Sense Key=03, ASC=27h, ASCQ=04: Write Position Error.”

AIT WORM-compliant Software (As of April, 2003)

Dantz Development	• Retrospect 6.0 for Windows 98/Me/2000/XP • Retrospect 5.0 for Macintosh supporting up to OS X
Bakbone Software	• NetVault 7.0 – Server/Client Platforms: Alfa Linux, Compaq Tru64, FreeBSD, HP-UX, IBM AIX, Linux Kernel, NCR MP-RAS, SCO OpenServer, SCO UnixWare, SGI Irix, Solaris (SPARC), Solaris (Intel), Windows NT/2000 – Client Platforms: Novell Netware, Windows 95/98/Me
Novastor	• Novabackup v7.1 for Windows 98 Second Edition/Me/NT/2000/XP • NovaNet 9 for Windows 9x/Me/NT/2000/2003 (.NET)/XP, Linux, NetWare 4.x-6.x

The company and product names appearing in the table above are trademarks and/or registered trademarks of their respective owners.

Notes

- The Company cannot accept liability for data written onto a WORM cartridge that is lost as a result of using this unit.
- Sony accepts no responsibility for any financial damages, lost profits, or claims made by third parties arising from the use of this product.

Interface Implementation

Supported SCSI Messages

Abort
Bus Device Reset
Command Complete
Disconnect
Extended Message
– Synchronous Data Transfer Request
– Wide Data Transfer Request
Identify (w/&w/o Disconnect)
Ignore Wide Residue
Message Parity Error
Message Reject
No Operation
Restore Pointers
Save Data Pointer

Supported SCSI Commands

Erase
Inquiry
Load/Unload
Locate
Log Sense
Log Select
Mode Select
Mode Sense
Prevent Allow Medium Removal
Read
Read Block Limits
Read Buffer
Read Position
Receive Diagnostic Result
Release Unit
Report Density Support
Report Luns
Request Block Address
Request Sense
Reserve Unit
Rewind
Seek Block
Send Diagnostic
Space
Test Unit Ready
Verify
Write
Write Buffer
Write Filemarks

Specifications

Product Specifications

Dimensions

	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"	740 g (26.1 oz.)
5.25"	970 g (34.2 oz.)

Altitude

Operating	0 to 10,000 feet

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 in front of the center of the drive front panel.

Shock

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

Temperature and Humidity Range

Temperature

Operating	5 ˚C to 40 ˚C (ΔT<10 ˚C/h) (41 ˚F to 104 ˚F (ΔT<50 ˚F/h))
Non-Operating (mech.)	– 40 ˚C to 70 ˚C (ΔT<20 ˚C/h) (– 40 ˚F to 158 ˚F (ΔT<68 ˚F/h))
Non-Operating (tape)	– 40 ˚C to 45 ˚C (ΔT<20 ˚C/h) (– 40 ˚F to 113 ˚F (ΔT<68 ˚F/h))

Humidity

Operating	20 to 80% RH, non-condensing Maximum wet bulb temperature = 26 ˚C
Non-Operating (mech.)	5 to 95% RH (ΔT<30%/h)
Non-Operating (tape)	20 to 80% RH (ΔT<30%/h)

Power Requirements

SDX-500V

Voltage	Max Ripple	Current	
		Typical	Maximum
5 V +/– 5 %	100 mVp-p	1.1 A	1.4 A
12 V +/– 10 %	150 mVp-p	0.4 A	1.2 A

SDX-400V

Voltage	Max Ripple	Current	
		Typical	Maximum
5 V +/– 5 %	100 mVp-p	1.1 A	1.4 A
12 V +/– 10 %	150 mVp-p	0.4 A	1.2 A

Suspended Particulate

Operating	Less than 150 microgram/m^3 Based Sampling period 24 hours

ESD

Discharge Voltage	< 15 kV: No operation failure < 20 kV: No drive damage

Air-cooling Requirement

Surrounding temperature	< 40 ˚C

Clean air flow is recommended to minimize the possibility of data loss.

Sony Contacts

For further information, please contact:

Sony Electronics Inc., Tape Storage Solutions (USA)

URL: http://www.storagebysony.com

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