

**DVD-R Drive**

**CRD-DV1**

**OWNER'S MANUAL**

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## FCC Compliance Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. Operation is subject to the following two conditions. (1) This device may not cause harmful interference. (2) This device must accept any interference received, including interference that may cause undesired operation. These limits are designed to provide reasonable protection against harmful interference in residential installations. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Move the equipment away from receiver.
- Plug the equipment into an outlet and circuit different from that which powers the receiver.
- If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions.

### CAUTION:

Use of controls or adjustments, or performance of procedures other than those specified herein may result in hazardous radiation exposure.

The equipment should not be adjusted or repaired by anyone except qualified service personnel.

Any changes or modifications to the equipment by the user not expressly approved by the manufacturer could void the user's authority to operate the equipment.

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus as set out in the Radio Interference Regulations of the Canadian Department of Communications.

LE PRÉSENT APPAREIL NUMÉRIQUE N'ÉMET PAS DE BRUITS RADIOÉLECTRIQUES DÉPASSANT LES LIMITES APPLICABLES AUX APPAREILS NUMÉRIQUES DE CLASSE B PRESCRITES DANS LE RÈGLEMENT SUR LE BROUILLAGE RADIOÉLECTRIQUE ÉDICTÉ PAR LE MINISTÈRE DES COMMUNICATIONS DU CANADA.

NOTE: Locate serial number (shown on top plate of unit) and record it here → \_\_\_\_\_

Document No.  (1/1)	Document Name  <b>Revision History</b>	
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1. Revision History

Revision No.	Manager	Change Description	Check	Approval
First Edition		Newly issued		



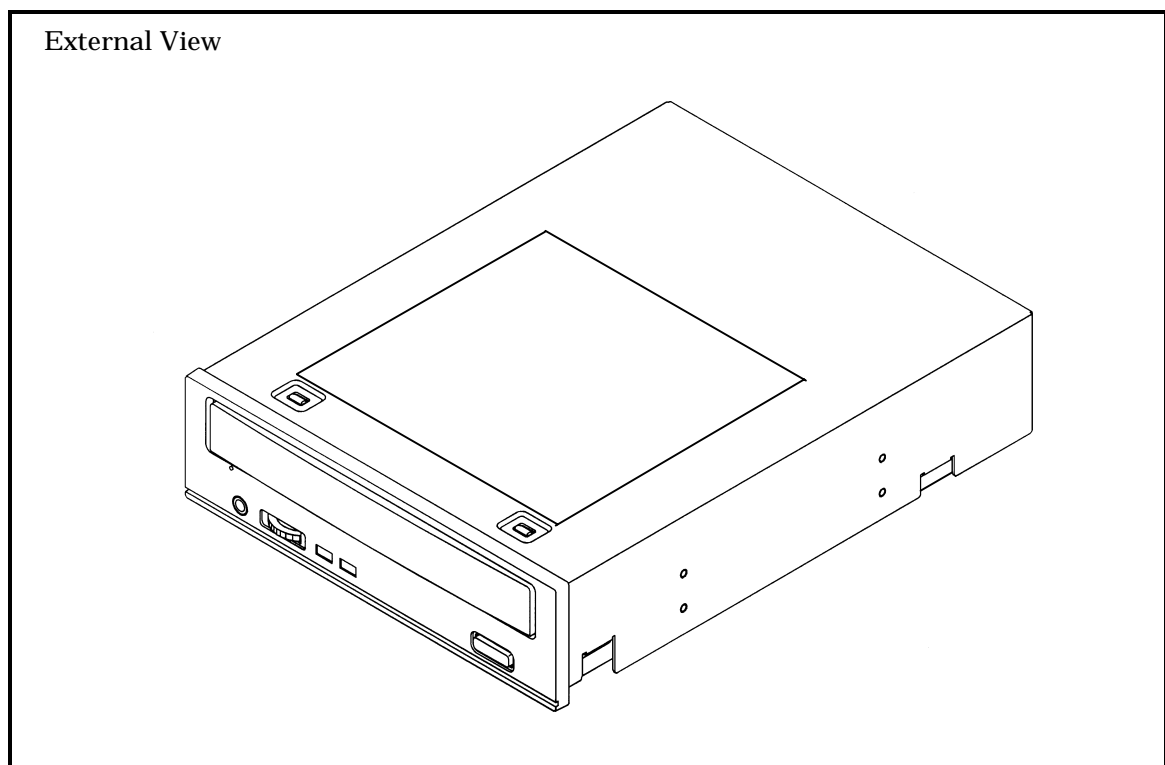
Document No.  (1/3)	Document Name  <b>General Description</b>	
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## General Description

### (1) Model Name: CRD-DV1

(DVD-R drive with MAX  $\times 12$  speed reading,  $\times 4$  speed writing, CD-R drive with MAX  $\times 40$  speed reading,  $\times 24$  speed writing, and  $\times 12$  rewriting)

### (2) External View



### (3) General Specifications

#### 1) Characteristics

- \* Half-height and built-in type
- \* Conforms to Orange Book Part 2, 3 & DVD-R for general specifications.
- \* Equipped with the newly developed automatic strategy LSI with the data reliability enhanced.
- \* DVD-R drive with MAX  $\times 12$  speed reading(CAV),  $\times 4$  speed writing (CLV), CD-R drive with MAX  $\times 40$  speed reading,  $\times 24$  speed writing, and  $\times 12$  rewriting)
- \* ATAPI is employed to enable high speed data transmission.
- \* Automatic loading mechanism
- \* Emergency disc ejecting function
- \* Data verifying function
- \* Media condition check function
- \* CD-DA read function
- \* BURN-Proof Technology implemented

“BURN-Proof” stands for Proof against Buffer Under Run error, not for proof against burning.

Document No.  (2/3)	Document Name  <b>General Description</b>	
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## (4) Applications

Wide range of applications available, such as image data filing, management of CAD/CAM, drawing data and financial affairs, audio data storage and electronic publication.

## (5) Main Specifications

Items	Specifications	
Dimensions	148 (W) x 194.2 (D) x 42.3 (H) mm	
Mass	1020 g	
Recording Form	Orange-book part 2, 3 Disc-at-once Track-at-once	Fixed packet Variable packet DVD-R for general 2.0 Disc at Once Recording Incremental Recording
Front Panel	Eject key, Emergency eject pinhole, LED (busy and write) Headphone jack, Volume	
Eject	Automatic loading	
Power Supply	DC 5 × (1 ± 5 %) V	DC 12 × (1 ± 10 %) V

## (6) Operational environment for the “write/rewrite” application software

Items	Specifications	
Host Machine	IBM compatible PC (Celeron433 MHz or more)	(Note 1)
OS	MS-Windows 98SE/ME/2000/NT4.0/XP	(Note 2)
Memory	MS-Windows 98SE/ME/NT: MS-Windows2000/WindowsXP:	128 MB or more. 128 MB required. 256 MB recommended.
Hard disc	Empty Storage Capacity: 5GB or more (20GB or more recommended) Average seek time: 20 ms or less Transmission rate: 2 MB/s or more Do not use the HDD which calibrates thermally during operation.	
Recommended Media	CD-R (×4 ~ ×24)	: MITSUI CHEMICAL , HITACHI MAXELL, RITEK, ACER, CMC (T.B.D)
	CD-RW (×4 ,×10, ×12)	:MITSUBISHI CHEMICAL, RICOH (T.B.D) (Note 3)(Note 4)
	DVD-R(×1, ×2, ×4)	MITUBISHI CHEMICAL,HITACHI MAXELL, PIONEER VIDEO,TAIYO YUDEN,TDK (T.B.D)

(Note 1) If any problem occurs, negotiation is required to settle the matter.

(Note 2) Windows NT4.0 doesn't have ATAPI-DMA-Driver in the standard.

Therefore, this Drive and IDE-HDD function with PIO-Mode.

(Note 3) We intend to add the proper media one by one in the near future.

(Note 4) Please refer to the latest information on the web: [www.burn-proof.com](http://www.burn-proof.com).

Document No.  (3/3)	Document Name  <b>General Description</b>	
<p>(7) Scope</p> <p>This specification is applied to the CD-R/RW/DVD-R drive “CRD-DV1” which is designed by SANYO Electric Co., Ltd.</p> <p>(8) Contents</p> <p>1) Model No.           CRD-DV1</p> <p>2) Performance       Write function onto CD-R/RW/DVD-R disc in combination with the write application software and CD-ROM/DVD-ROM read function, in combination with the CD-ROM/DVD-ROM application software.</p> <p>3) Applications       Write onto and read of the CD-R/RW/DVD-R disc. Read of CD-ROM/DVD-ROM disc.</p> <p>4) Dimensions       Refer to the item “Dimensions and Dimensional Drawing”.</p> <p>5) Notes for handling                           Refer to the Manual and Notes for Handling.</p> <p>6) Others</p> <p>a. The specifications of this product are the same as in the delivery specifications. If any fault or malfunction of the product occurs when it is used under any conditions except for our guaranteed conditions, our company has no responsibility for the claim.</p> <p>b. The specifications of this product are subject to change to enhance the performance.</p> <p>c. The change of notice is issued when the specification is changed only.</p> <p>d. If any doubt occurs regarding the contents of the specifications, negotiation is required to settle the matter.</p>		

Document No.  (1/2)	Document Name Dimensions, External View and Names and Functions of Each Part	
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## 1. Dimensions and External View

### (1) External View

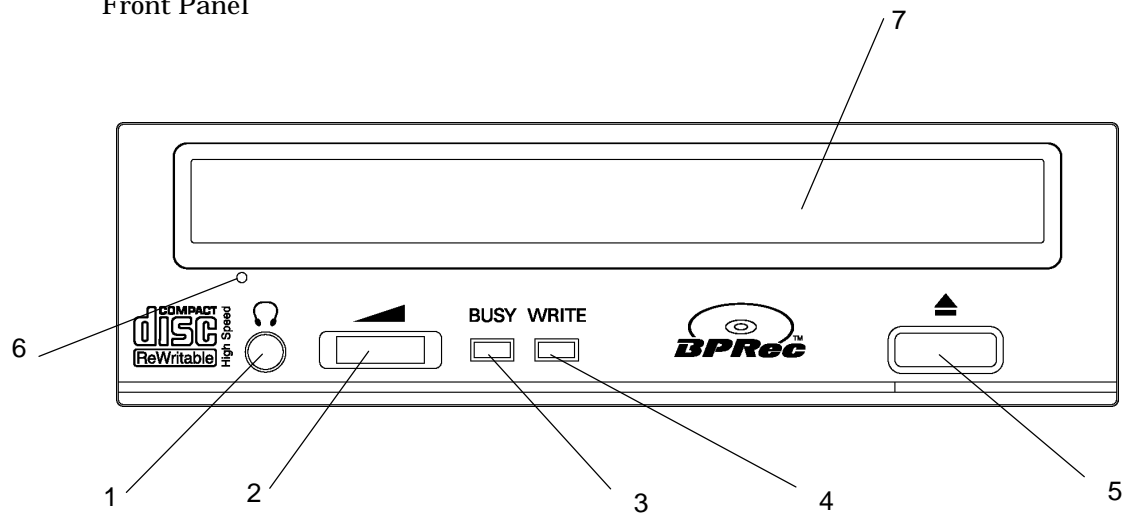
Refer to the "General Description".

### (2) Dimensions and Dimensional Drawing

Refer to the attached document "Dimensions and Dimensional Drawing".

### (3) Names and Functions of Each Part on the Front Panel

#### Front Panel



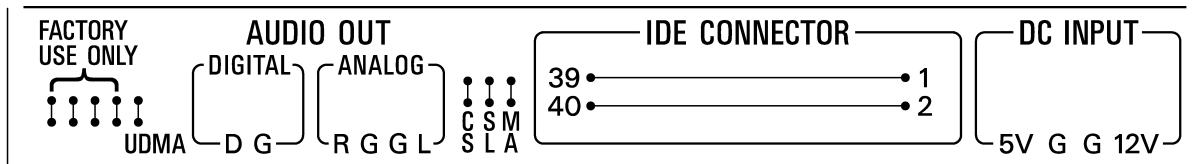
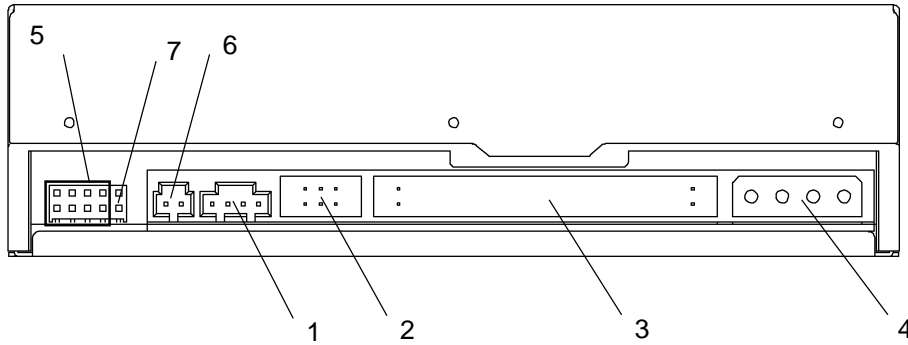
- |                            |   |  |
|----------------------------|---|--|
| 1. Headphone Terminal      | : | The headphone with a stereo mini plug is connected through this terminal.  |
| 2. Headphone Volume        | : | The volume of the headphone connected to the headphone terminal is adjusted using this volume dial. When the volume dial is turned right, the volume becomes louder.                 |
| 3. BUSY indicator          | : | Command executing.   |
| ON                         |   | Reading disc and accessing condition   |
| ON-AND-OFF                 |   | TOC reading condition & EJECT condition  |
| OFF                        |   | Pause or Stop condition  |
| 4. WRITE indicator         | : | This is ON when the data is written onto the disc.   |
| 5. EJECT key               | : | The disc is ejected, using this key. This key is available even when the tray is moving. When the PRV command is transmitted from HOST or during writing, this key is not available. |
| 6. Emergency eject pinhole | : | If the disc is not ejected when the key is pressed, because of power failure or run away of the software, this pinhole is used to take out the disc.                                 |
| 7. Disc tray               | : | The disc is placed on this tray.   |



Document No.  (2/2)	Document Name Dimensions, External View and Names and Functions of Each Part	
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(4) Names and Functions of Each Part on the Rear Panel

Rear Panel

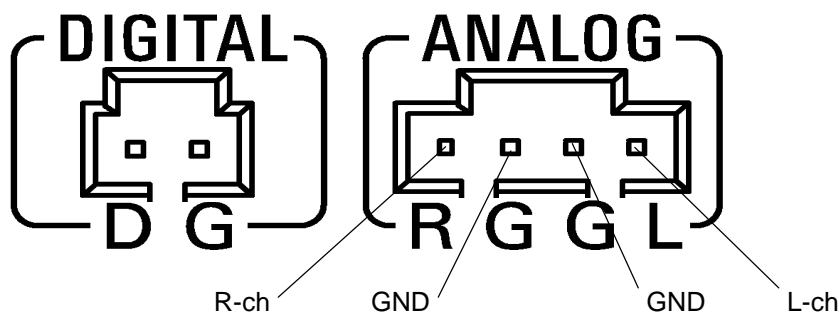


- 1. ANALOG AUDIO Connector : The audio analog signal output connector.
- 2. CS/SL/MA Pins : By covering the jumper block, these pins are used to set the CD-R drive to either a Master or Slave mode to work with the hard disk drive inside the personal computer.  
Default is Master.
- 3. IDE Connector : Using a 40-pin connector, the ATAPI terminal of the host computer is connected to this connector.
- 4. DC Connector : This is the power supply terminal.
- 5. FACTORY USE ONLY Pins : These pins are used only for the test in the factory. Don't cover the jumper block on them.
- 6. DIGITAL AUDIO Connector : The audio digital signal output connector.
- 7. UDMA Pins : UDMA mode is enabled by covering the jumper block on the 2 pins of the UDMA jumper terminals.  
Default is ON.  
(Note 1) In case of using some personal computes, UDMA mode need to be disable.

Document No.  (1/3)	Document Name  <b>Terminal Description</b>	
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## 1. AUDIO Terminals

The audio signal is output through these terminals. These terminals are used when the sound board applicable to these terminals, is attached to the personal computer.



## 2. Jumper Terminals (CS/SL/MA)

### SL Jumper Terminals:

To set to Slave mode, cover the jumper block on the 2 pins of the SL jumper terminals.

If the IDE controller of the personal computer supports two devices, set the CD-R drive to Slave mode. The hard disk drive inside the personal computer is set to Master mode.

### MA Jumper Terminals:

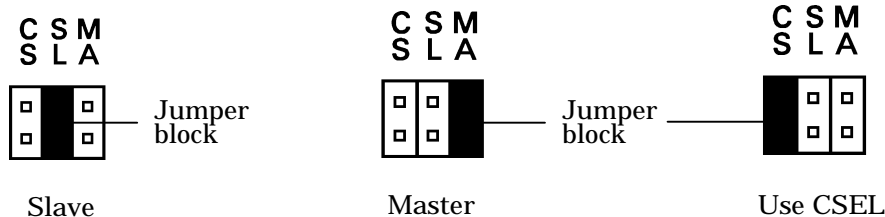
To set to Master mode, cover the jumper block on the 2 pins of the MA jumper terminals.

If the IDE controller of the personal computer supports up to four devices, set the CD-R drive to either a Primary Slave, a Secondary Master or a Secondary Slave mode. Primary or Secondary is set up by the IDE controller, while Master or Slave mode is set up by covering the jumper block on the rear of the CD-R drive. The hard disk drive inside the personal computer is set to Primary Master mode.

### CS Jumper Terminals:

If the personal computer is supporting CSEL (Cable Select) signal, cover the jumper block on the 2 pins of the CS jumper terminals and remain Slave and Master open.

An exclusive interface cable is necessary.



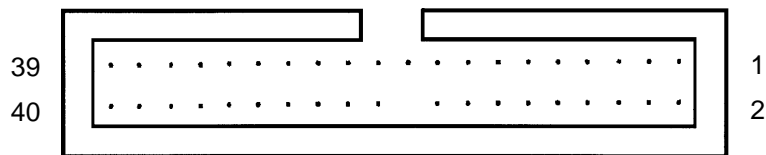
Document No.  (2/3)	Document Name  <b>Terminal Description</b>	
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### 3. IDE Connector Terminals (ATAPI CONNECTOR)

The IDE terminal of the host computer is connected through these terminals.

Use the 40-pin IDE cable.

The pin marked "1" means pin No. 1. Connect the IDE cable of the color-coding (normally red) on one edge to pin No. 1.

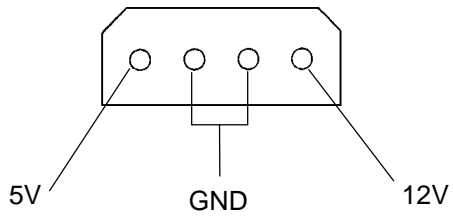


PIN NO.	SIGNAL NAME	PIN NO.	SIGNAL NAME
2	Ground	1	RESET-
4	DD8	3	DD7
6	DD9	5	DD6
8	DD10	7	DD5
10	DD11	9	DD4
12	DD12	11	DD3
14	DD13	13	DD2
16	DD14	15	DD1
18	DD15	17	DD0
20	(keypin)	19	Ground
22	Ground	21	DMARQ
24	Ground	23	DIOW-:STOP
26	Ground	25	DIOR-:HDMARDY- :HSTROBE
28	CSEL	27	IORDY:DDMARDY- :DSTROBE
30	Ground	29	DMACK-
32	reserved	31	INTRQ
34	PDIAG-	33	DA1
36	DA2	35	DA0
38	CS1-	37	CS0-
40	Ground	39	DASP-

Document No.  (3/3)	Document Name  <b>Terminal Description</b>	
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#### 4. DC Connector Terminals (DC INPUT)

The DC power supply cable is connected through these terminals.



Document No.  (1/1)	Document Name  <b>Environmental Conditions</b>	
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## Environmental Conditions

Items	Environmental Conditions
Temperature	Operation : 5 °C < t <sub>o</sub> < 40 °C Storage : -30 °C < t <sub>no</sub> < 60 °C
Humidity	Operation : (20 to 80) % (non-condensing) Storage : 90 % (40 °C, 48 h)
Mean-Time-Between-Failure (MTBF)	30000 POH DUTY 20 % (read operation) (Note 1)
Life	Tray loading : 20000 cycles Traverse mechanism : 1000000 seek
Vibration	Operation: Read 0.98 m/s <sup>2</sup> (0.1 G) [(10 to 500) Hz] Random Vibration Without operation (transportation): 800 cpm (13.3 Hz), 3 mm (1.06 G), Up/Down 20 min.
Impact	Drop Impact: 490 m/s <sup>2</sup> (50 G), 3 directions, 6 ms

(Note 1) POH : Power On Hour (live current time)

DUTY : Actual operation time

Document No.  (1/3)	Document Name  <b>Reliability</b>	
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## 1. Estimate Conditions

### 1) Standard test position

For the standard test position, the + side of the Z axis shall be in the upper direction, provided that the Z axis shall be the outgoing beam and the direction of the outgoing beam shall be + side.

### 2) Standard Estimate Environments

Temperature :  $(22 \pm 2)$  °C

Humidity :  $(50 \pm 5)$  % RH

However, when no doubt occurs regarding the judgment, the test may be performed under the following conditions.

Temperature :  $(15 \text{ to } 30)$  °C

Humidity :  $(45 \text{ to } 85)$  % RH

### 3) Disc to be estimated

Test Disc made by ALMEDIO Inc. ROM DISK, DA DISK, CD-R DISK (RICOH),  
CD-RW (RICOH, MITSUBISHI CHEMICAL) DVD-R(XXXXXXXXX ?) TBD

However, when no doubt occurs regarding the judgment, TCD-784 made by ALMEDIO Inc. may be used.

### 4) Power Supply Voltage

Power supply :  $DC 5 \times (1 \pm 5 \%)$  V

Power supply :  $DC 12 \times (1 \pm 10 \%)$  V

## 2. Reliability

The results should conform to the criteria of each item after the test has been performed under the following conditions.

There shall be no crack, deformation or distortion from the external view of the product after the test.

Unless otherwise specified, the measurement conditions of this test for each item shall be subject to the above estimate conditions.

However, the temperature in this test shall be specified to the surrounding temperature of the drive unit, rather than the surrounding temperature of the set unit where this product is built-in.

Document No.  (2/3)	Document Name  <b>Reliability</b>	
Test items	Test conditions	Criteria
1. Operating temperature test	Operation under low temperature: +5 °C Operation under high temperature: +40 °C Leave the product for 4 hours without operation in the environmental temperatures, as above. Turn on the power and leave the product for 10 minutes. Immediately after that, check the performance under the same environmental temperatures as above. However, there should be no dew condensation.	The performance should conform to the standards described in the Reliability Estimation Standard Table.
2. Practical operation temperature test	Operation under low temperature: +5 °C Operation under high temperature: +40 °C Leave the product for 4 hours without operation in the environmental temperatures, as above. Turn on the power of the product and leave the product for 10 minutes. Immediately after that, check the performance under the same environmental temperatures as above. However, there should be no dew condensation.	There should be no errors in the practical operation. When this product is built in the set unit, make sure that the temperature does not exceed the range described on the left.
3. Storage test under low temperature.	Temperature: $(-30 \pm 2) ^\circ\text{C}$ Leave the product for 24 hours without operation in the above environmental temperature range, and then leave it at normal temperature for 24 hours. After that, measure the characteristic change. However, there should be no dew condensation.	The characteristics should conform to the standards described in the Reliability Estimation Standards Table.
4. Storage test under high temperature	Temperature: $(60 \pm 2) ^\circ\text{C}$ Leave the product for 24 hours without operation in the above environmental temperature range, and then leave it at normal temperature for 24 hours. After that, measure the characteristic change. However, there should be no dew condensation.	The characteristics should conform to the standards described in the Reliability Estimation Standards Table.
5. Storage under high temperature and high humidity	Temperature and humidity: $(40 \pm 2) ^\circ\text{C}$ , $(90 \pm 2) \% \text{RH}$ Leave the product for 24 hours without operation in the above environmental temperature range, and then leave it at normal temperature for 24 hours. After that, measure the characteristic change. However, there should be no dew condensation.	The characteristics should conform to the standards described in the Reliability Estimation Standards Table.
6. Unit Vibration (without operation)	Amplitude: 800 cpm (13.3 Hz) 3 mm (1.06 G) The above amplitude is applied to the product for 20 minutes for Up/Down direction.	The characteristics should conform to the standards described in the Reliability Estimation Standards Table.
7. Unit Impact (without operation)	Impact: $490 \text{ m/s}^2$ (50 G), 3 directions Impact time: 6 ms Measure the performance after applying the above impact for each direction.	The characteristics should conform to the standards described in the Reliability Estimation Standards Table.
8. Pick-up Slide Operation	Random Seek After 1000000 times operation, the performance is checked.	There should be no errors in the practical operation.
9. Jamming	When the product is built in the set unit, the level of electromagnetic wave which is emitted from the unit shall conform to the local radio wave standards. (When any problems occurs, the negotiation is required to support the counter measures).	

Document No.  (3/3)	Document Name  <b>Reliability</b>	
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The following table shows the reliability standards for the main parts (units) which are used in this product.

Test items	Test conditions	Criteria
10. Laser diode life	Check the recorded power after 1000 hours of operation at 60 °C. (except for breakage caused by static electricity)	The error rate should be 1 % or less.
11. Spindle motor life	Measure the current in the motor after 1000 hours operation.	The initial value should be +35 % or less.
12. Feeder motor life	After the pick-up slide operation as described in item 8, measure the consumption current in the motor.	The values should be conform to the pull-out torque 1500pps $9.8 \times 10^{-4}$ N-m (10grf-cm) or more.

### 3. Reliability Standards

The reliability standards are as follows.

#### 1).CD

Items		Before Test	Change in Values after Test	Remarks
1/3 stroke mean access time	×40 CAV speed	0.27 s or less	0.35 s or less	Mean value measured after reciprocating operation for (0 to 20) min. (one way value)

#### 2).DVD

Items		Before Test	Change in Values after Test	Remarks
1/3 stroke mean access time	×12 CAV speed	0.27 s or less	0.35 s or less	Mean value measured after reciprocating operation for (0 to 20) min. (one way value)



Document No.  (1/1)	Document Name  <b>Lot No. Reliability Description</b>	
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Lot No. Description

[Serial No. Indication]

1	2	3	4	5	6	7	8
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A	B	C	D	D	D	D	D

- |  |   |
|--|---|
| A. Factory:                                | Korea Tokyo Electronics: 6,<br>Sanyo Media Tech: 3, SSHQ: 8   |
| B. Year of manufactured:                   | (1996: 6, 1997: 7, 1998: 8, 1999: 9, 2000: 0, 2001: 1,<br>2002: 2, 2003: 3, 2004: 4, 2005: 5)   |
| C. Month of manufactured:                  | Form Jan. to Sep.: 1 ~ 9 & Form Oct. to Dec.:X ~Z<br>(Jan: 1, Feb: 2, Mar: 3, Apr: 4, May: 5, Jun: 6, Jul: 7,<br>Aug:8, Sep: 9, Oct: X, Nov: Y, Dec: Z) |
| D. Manufacturing Serial No.:<br>(5 digits) | Start from 00001.<br>When the number reach to 99999, the next is 00000,<br>then 00001 again.  |

Document No.  (1/1)	Document Name  <b>Safety Standards</b>	
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Safety Standards


5. UL (UL1950 / FDA1040)

(2) CUL (UL1950)

(3) Label

**BURN-Proof™**

DVD-R DRIVE MODEL No. CRD-DV1 5V --- 2.0A / 12V --- 2.0A  E158800	<div style="border: 2px solid black; padding: 5px; width: fit-content; margin: 0 auto;">                     CLASS 1 LASER PRODUCT                      ACCORDING TO IEC 825                      LASER KLASSE 1 NACH IEC 825                 </div>
THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS : (1)THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE. AND (2)THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRABLE OPERATION. <div style="border: 1px solid black; display: inline-block; padding: 2px;">FCC ID : JBQCDR029</div>	CAUTION VISIBLE AND INVISIBLE LASER RADIATION WHEN OPEN. AVOID EXPOSURE TO BEAM. VORSICHT! SICHTBARE UND UNSICHTBARE LASERSTRAHLUNG, WENN ABDECKUNG GEÖFFNET. NICHT DEM STRAHL AUSSETZEN. VARNING SYNLLIG OCH OSYNLLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD. STRÅLEN ÄR FARLIG. ADVARSEL SYNLLIG OG USYNLLIG LASERSTRÅLING VED ÅBNING. UDGÅ UDSÆTTELSE FOR STRÅLING. VARO! NÄKYVÄÄ JA NÄKYMÄTÖN AVATTAESSA OLET ALTTIINA LASERSÄTEILYLLE. ÄLÄ KATSO SÄTEESEN.
COMPLIES WITH FDA RADIATION PERFORMANCE STANDARDS, 21 CFR SUBCHAPTER J. <b>SANYO Electric Co., Ltd</b> 5-5, Keihan-Hondori 2-chome Moriguchi City, Osaka 570-8677, Japan MADE IN JAPAN <span style="float: right;">SMT</span> MANUFACTURED : <span style="float: right;">ROM Ver. :</span>	

FACTORY USE ONLY 	AUDIO OUT DIGITAL { D G } ANALOG { R G G L }	IDE CONNECTOR 39 --- 1 40 --- 2	DC INPUT 5V G G 12V
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Document No.  (1/3)	Document Name  <b>Electrical Characteristics</b>	
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## Electrical Performance

Items	Specifications		
Reading speed	DVD-Read	×12(CAV) speed :	6.7MB/s(disc in side) to 16.2MB/s(disc out side)
	CD-Read	×40(CAV) speed:	2.4 MB/s (disc in side) to 6.0MB/s (disc out side) (typical)
Writing speed	DVD-R	×1, ×2, ×4(CLV)	
	CD-R	×4, ×8, ×16, ×20 ,(CLV), ×24(ZCLV)	
	CD-RW	×4, ×10, ×12(CLV)	
Mean random seek time	130 ms (typical) CD		
	130 ms (typical) DVD-ROM		
Buffer size	8 MB		
Photo CD	Applied		
Audio(CD)	Sampling Frequency	44.1 kHz	
	T.H.D. (Total Harmonic Distortion)	Line Out	Headphone
		0.15 % (1 kHz)	0.4 % (1 mW, 1 kHz)
	Channel Separation	60 dB	28 dB
	S/N ratio	70 dB	65 dB
Max Output	0.6 V (typical)	0.8 V (typical)	
Error rate	< 10 <sup>-9</sup> (soft read error) CD		
	< 10 <sup>-12</sup> (hard read error) CD		

## Power Consumption

Item	Specifications	
Power Consumption	DC 5 V	2.0 A (Peak)
	DC 12 V	2.0 A (Peak)

Document No.  (2/3)	Document Name  <b>Electrical Characteristics</b>	
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## Mechanisms

Items	Specifications
Pick-up	NA : 0.51/0.67 Focus : Astigmatism Tracking : DPP/DPD Wave length : 784/660 nm (standard)
Traverse mechanism	Stepping motor
Spindle motor	DC brushless motor
Loading mechanism	Automatic loading system

## Usable Media of DVD

Media name	Capacity	Reading	Writing
DVD-ROM single	4.7GB	○	-
DVD-ROM dual	8.7GB	○	-
DVD-RAM V1.0	2.6GB	×	×
DVD-RAM V2.0	4.7GB	×	×
DVD-R V2.0 for General	4.7GB	○	○
DVD-RW V1.1	4.7GB	○	×

Document No.  (3/3)	Document Name  <b>Electrical Characteristics</b>	
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## Application Discs

Items	Specifications
CD-ROM	mode 1
CD-ROMXA (Video CD)	mode 2 form 1, mode 2 form 2
CD-DA	Applicable
Photo CD	Single session, multi-session
CD-I, CD-G, CD-TEXT	Applicable
CD Extra	2 Session First Session : CD-DA Second Session : Data
Disc dia.	12 cm, 8 cm
Storage capacity	12 cm : 656 MB (mode 1) 748 MB (mode 2) 8 cm : 180 MB
Disc thickness	1.2 mm
Track pitch	1.6 $\mu$ m

Items	Specifications
DVD-R/DVD-ROM	DVD-ROM,DVD-VIDEO
Disc dia.	12 cm
Storage capacity	12 cm:4.7GB
Disc thickness	1.2 mm
Track pitch	0.74 $\mu$ m

## Interface

Items	Specifications
Interface	ATAPI
Transfer Rate	U-DMA 33 MB/s

## Connector

Item	Specifications
I/O terminal (rear panel)	Power connector (+5 V, +12 V 4 P) ATAPI terminal (40 P) Audio out (4 P), (2 P)

Document No.  (1/3)	Document Name  <b>Function Description</b>	
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## 1. External View/Mechanism

### (1) Tray type disc loading system

The disc is loaded on the TRAY.

### (2) LED Indicator

BUSY : ON — Command executing conditions

ON-AND-OFF — TOC reading condition & EJECT condition

OFF — Pausing and stop conditions

WRITE : ON — Recording condition

OFF — Others

### (3) EJECT key

The disc is taken out using this key. This key is available even when the tray is moving. However, this key is not available under the recording condition or when the PRV command is transmitted from the HOST.

### (4) 8 cm/12 cm disc applicable.

The read of 8 cm and 12 cm pit discs and the write of 12 cm pit discs of the CD-R disc are available.

## 2. Data read processing

### (1) Read speed

The standard, CD Max  $\times 40$ /DVD Max  $\times 12$  are applicable. Arbitrary speed can be set using the ATAPI command.

### (2) Read data mode (Note 1-1)

C D	D V D
MODE 1	2048Byte only
MODE 2 / Form 1	
MODE 2 / Form 2	
CD-DA	
ISRC	
Media catalogue No.	
Sub-codeQ R-W	

### (3) Audio playback

TNO playback (MSF search)

PAUSE function

(Note 1-1) Audio playback becomes possible by using the host application.  
(as per ATAPI command specifications)

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### 3. Data write processing

#### (1) Write speed

- i. DVD-R  $\times 1, \times 2, \times 4$ (CLV)
- ii. CD-R  $\times 4, \times 8, \times 16, \times 20$ , (CLV)、 $\times 20 \sim \times 24$  (ZCLV) write speed are applicable. (mastering write)
- iii. CD-RW  $\times 4, \times 10, \times 12$ (CLV), write speed are applicable.  
Arbitrary speed can be set using the ATAPI command.

#### (2) Write system

CD-R/RW	DVD-R
Track-at-once	Disc-at-once
Disc-at-once	Incremental write
Packet write (variable length/fixed length)	

#### (3) Write data mode

CD-R/RW	DVD-R
MODE 1	2048Byte only
MODE 2	
MODE 2 / Form 1	
MODE 2 / Form 2	
MODE 2 / Combination of Form 1 and Form 2 (Note 2-1)	
CD-DA (Note 2-2)	
ISRC	
Media catalogue No.	
CD-TEXT	

#### (4) Optimum write function

The strategy and write laser power are set automatically according to the characteristics of the disc. This is performed when the disc is replaced or the CLV speed is changed.

In addition, the write condition is checked during writing the data, and the running OPC function which sets the optimum laser power, is performed.

#### (5) BURN-Proof

Seamless Linking is defined for the action and the signal quality to stop and start recording in the one EFM recording.

(Note 2-1) This is applicable only within the approved range of the CD-ROM and CD-ROM XA.

(Note 2-2) Host computer makes and transfers the RAW data which includes pre-gap in the case of the disc-at-once writing. At this time, the track management information needs to provide instructions to transfer the start and end address of the actual audio data portion.

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<p><b>4. Servo/access</b></p> <p>(1) Servo Automatic Adjustment When the disc is loaded, the focus, tracking offset and servo gain are adjusted automatically.</p> <p>(2) Sled Control using the Stepping Motor Driving The mechanisms and circuits related to the sled are simplified. The micro step operation is controlled using the micro computer when the access-time-specific trapezoidal driving occurs and the read/write operation is performed.</p> <p>(3) High speed access using the learning function The number of tracks calculated from the CLV speed and pick-up position are corrected so that the disc program area is kept at the access time accompanied with the travel of the sled. Then, the corrected number of tracks is stored and the final number of tracks on the disc are calculated in order to reduce the number of seeks.</p> <p><b>5. Other Functions</b></p> <p>(1) Multi-volume applicable To switch the sessions, the SESSION SELECTOR is used.</p> <p>(2) Disc identification codes The discs produced by each manufacturer are identified using the disc identification codes prepared by the Orange Society for the Research. This is referred to when the laser power and strategy are decided, when the writing operation is performed.</p> <p>(3) Device type Device type is 05 (CD-ROM) only.</p> <p><b>6. CRD-DV1 Interface</b></p> <p>The host computer interface of the CRD-DV1 conforms to the ATAPI.</p> <p><b>7. BURN-Proof</b></p> <p>In some case of disc condition, an error may happen by the failer of BURN-Proof function because it controls previous recorded data and new recording data by the advanced signal management system. In addition to the stated above, a BURN-Proof function also does not work correctly due to the unexpected accident like a power cut and a malfunction of PC and so forth.</p> <p><b>8. SHOCK-BP</b></p> <p>Please refer to the latest information on the web: <a href="http://www.burn-proof.com">www.burn-proof.com</a>. (TBD)</p> <p><b>9. Safe-BP</b></p> <p>Please refer to the latest information on the web: <a href="http://www.burn-proof.com">www.burn-proof.com</a>. (TBD)</p>		



Document No.  (1/1)	Document Name  <b>Handling Manual</b>	
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(1) How to use

Before using this product, make sure that the device driver for the Combo driver is installed in the personal computer.

1) How to insert the disc.

- i. Turn on the power of the main machine where the product is attached.
- ii. Press the eject key to open the disc tray.
- iii. Place the disc on the tray so that the printed side is upside.
- iv. Press the eject key to close the disc tray.
- v. Read the disc. The read indicator goes on-and-off during the TOC read operation. Then the indicator goes on.

Write the data onto the disc. The write indicator goes on while the data is written.

2) How to take out the disc.

- i. Make sure that each indicator is OFF.
- ii. Press the eject key to open the disc tray.
- iii. Take out the disc.
- iv. Press the eject key to close the disc tray.

3) How to take out the disc in an emergency.

When the disc can't be ejected because of power failure or run-away of the software, take the following measures to force the take out of the disc.

- i. Prepare a steel paper clip. Extend the paper clip.
- ii. Insert the end of the paper clip into the emergency eject hole and press it strongly to eject the disc tray.
- iii. Pull the disc tray toward you and take out the disc.

Push back the disc tray.

(2) Product ID, Vender ID

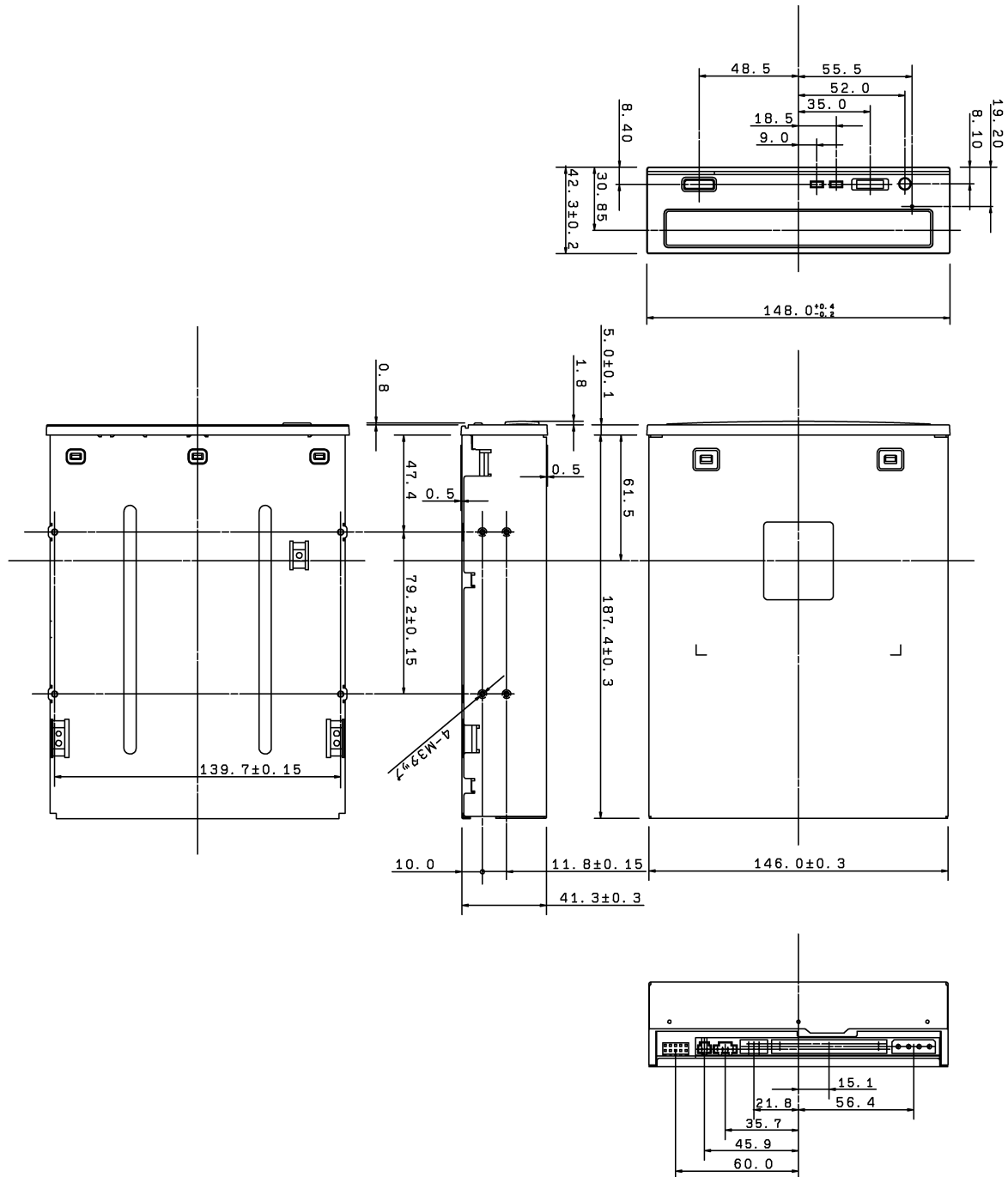
Product ID: CRD-DV1 , Vender ID: GENERIC

Document No.  (1/5)	Document Name  <b>Notes for Handling</b>	
<p>1. Don't look at the laser beam. Don't look at the laser beam source. If the laser beam hits your eyes, it might cause damage to your eyes.</p> <p>2. Don't use deformed or cracked CDs and DVDs. Don't use cracked, deformed CDs and DVDs or repaired CDs and DVDs with adhesives. As the disc turns with high speed within the product, broken pieces might scatter and hurt you.</p> <p>3. Don't touch the inside components of this product. Don't disassemble or modify this product. It might cause the breakdown of this product.</p> <p>4. Don't touch the connector parts. If you touch the connector parts of this product, it might cause a contact fault or breakdown because of the oil from your hands or static electricity. Also, don't touch the connector part on the personal computer when this product is connected or disconnected.</p> <p>5. Don't connect and disconnect this product excessively. When this product is connected and disconnected repeatedly, the connector part becomes heavily loaded and this might cause the breakdown of this product. Don't connect and disconnect this product excessively, except for necessary cases.</p> <p>6. How to prevent the breakdown</p> <ul style="list-style-type: none"><li>(1) Don't impact or vibrate this product.</li><li>(2) Keep the product where no fluid or alien substances can enter into this product.</li><li>(3) Don't use this product on an incline.</li><li>(4) Don't move this product with the disc inside.</li></ul> <p>7. Installation Place Avoid the following places for using this product.</p> <ul style="list-style-type: none"><li>(1) Places of high temperature or great changes in temperature.</li><li>(2) Places where sunlight can hit the product directly.</li><li>(3) Places with strong vibrations.</li><li>(4) Places with uneven surfaces.</li></ul>		

Document No.  (2/5)	Document Name  <b>Notes for Handling</b>		
<p>8. Maintenance</p> <p>(1) The dirt on this product should be cleaned off lightly with a soft cloth with some water or diluted neutral detergent.</p> <p>(2) Make sure not to use volatile chemicals such as benzine and thinner, because they might cause deformation and color change of the product.</p> <p>9. Notes for the Handling of the Disc.</p> <p>(1) When you carry the disc, don't touch the side where no letters are printed.</p> <p>(2) Don't write letters on the disc or attach paper or a seal.</p> <p>(3) Dust or finger prints on the side without any printing should be cleaned off by a soft cloth.</p> <p>(4) When the disc is cleaned, always clean from the center to the outer rim.</p> <p>(5) Don't use benzine, thinner, cleaner for analog LP or a static electricity preventing agent, because these might cause damage to the disc.</p> <p>(6) Keep the discs in the disc case. Don't put the disc in a place where sunlight can hit directly or the temperature increases.</p> <p>10. It is prohibited from copying, selling and transferring datas and programs that are protected by the copyright to the authorities without permission. However, personal use of the sound and images that are recorded with this product is permitted.</p> <p>11. Application</p> <p>The following applications may be supported by this product, in future. (Therefore, we are not responsible for any defects or damages using other applications. Also, some version no. of above Applications may not recognize the drive. Please contact to the Application maker.)</p> <p>Software DVD Player: WinDVD (InterVideo Inc.), PowerDVD  Software writing Storage: NERO Version5 (AHEAD) B'sRecorderGold(BHA)  , Software DVD Video Recording: DVD it!, Ulead Video Studio</p> <p>12. Drive Mount</p> <p>This drive has holes for heat radiation at top cabinet and side cabinet. Please do not fill these ventilation holes. Please avoid any components from these ventilation holes over 5mm in order to keep circulation.</p>			

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## Dimensions

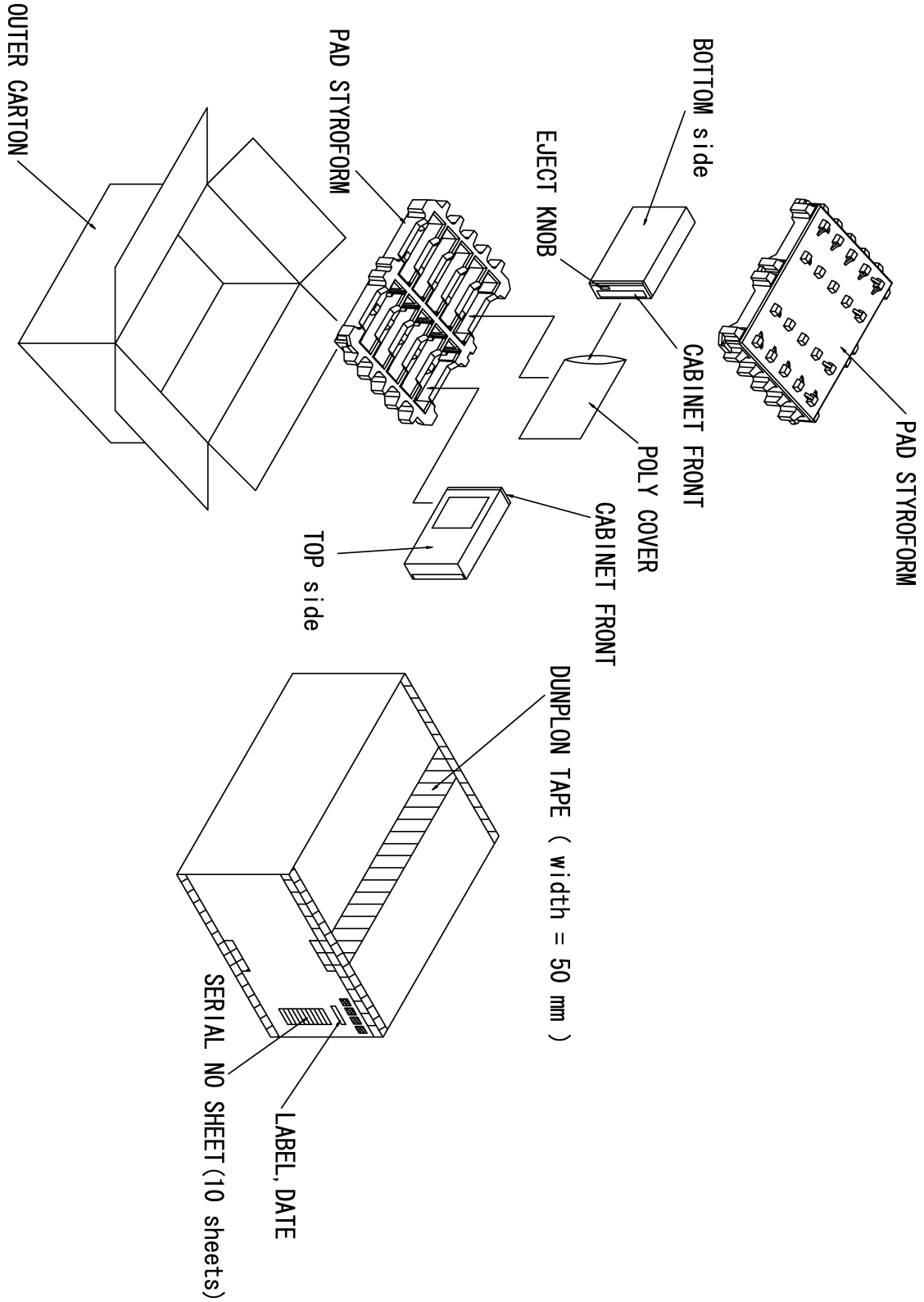


The following items should be considered when enclosure chassis for this drive is designed.

1. Over 5 mm space should be needed between top of drive and enclosure chassis.
2. Don't press the production label even if there are any reasons.

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Package



Document No.

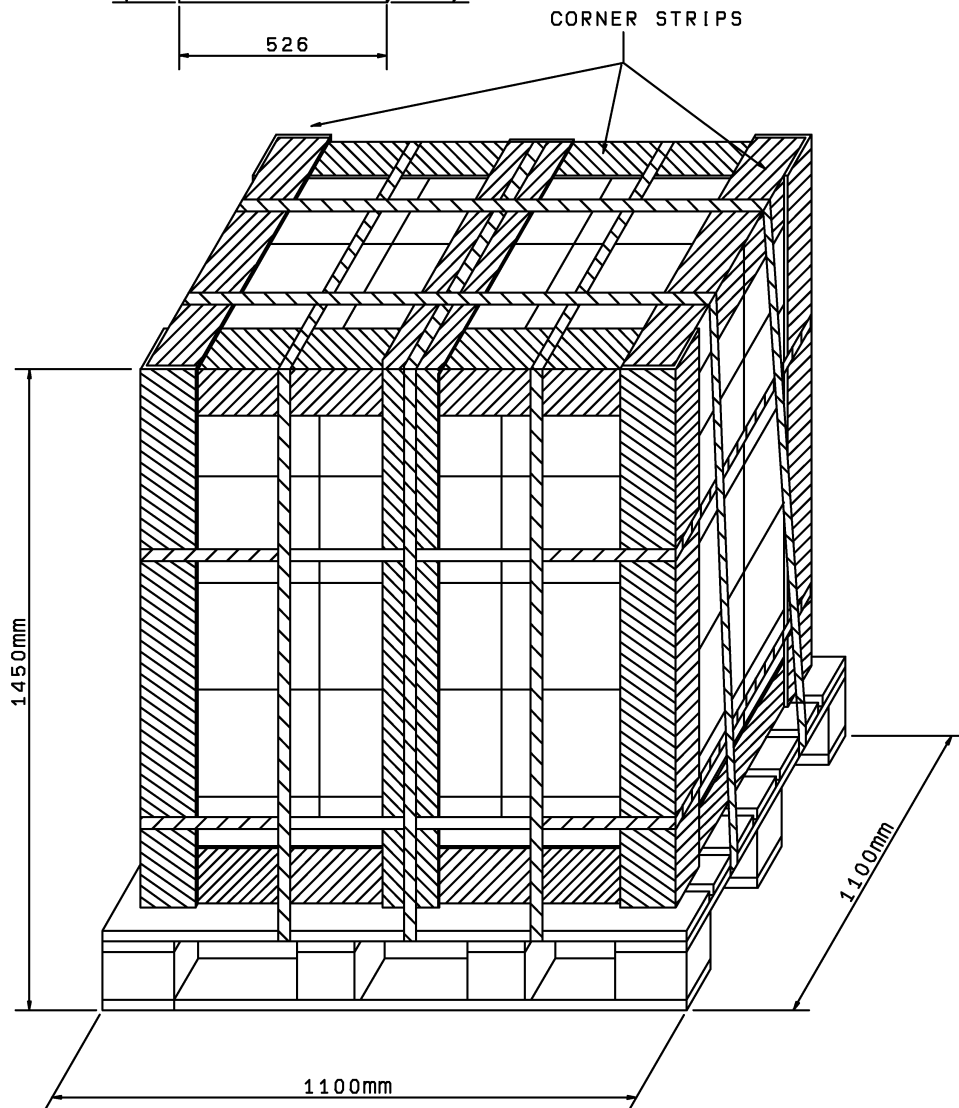
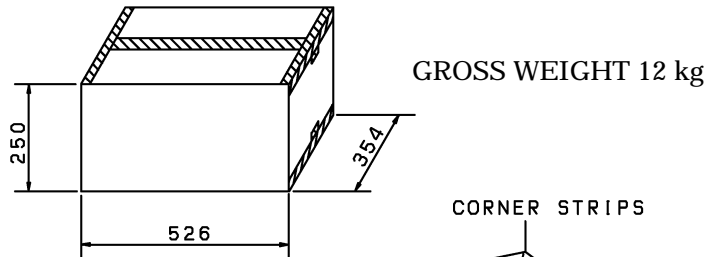
Document Name

## Notes for Handling

(5/5)

## Package Configuration

OUTER CARTON (mm) 10 PCS

300 unit 1 pallet: 6 box  $\times$  5 stack (30 box)

Pallets are to be banded and stretch-wrapped.

Corner strips are attached.