Document No. (1/1)	Document Name Lot No. Reliability Description	

Lot No. Description

[Serial No. Indication]

1	2	3	4	5	6	7	8
□	□	□	□	□	□	□	□
A	B	C	D	D	D	D	D

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

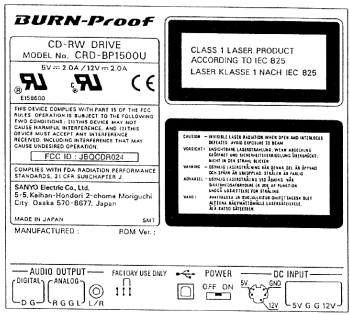
Document No.	Document Name	
(1/1)	Safety Standards	

Safety Standards

(1) UL (UL1950 / FDA1040)

(2) CUL (UL1950)

(3) Label



Document No.	Document Name	
(1/3)	Electrical Characteristics	

Electrical Performance

Items	Specifications		
Reading speed	×16 ~ ×40 (CAV) speed : 2.4 MB/s (disc in side) to 6.0MB/s (disc out side) (typical)		
Writing speed	×2, ×4, ×8, ×12, ×16 CLV, ×16 ~ ×24 (ZCLV) (write) ×2, ×4, ×8, ×10, CLV (rewrite)		
Mean random seek time	130 ms (typical)		
Buffer size	2 MB		
Photo CD	Applied		
Audio	Sampling	: 44.1 kHz	
		Line Out	Headphone (Vol. = 1 mW)
	T.H.D.	: 0.15 % (1 kHz)	: 0.2 %(1 kHz) (Vol. = Max.)
	Channel Separation	: 70 dB	: 28 dB
	S/N ratio	: 70 dB	: 65 dB
	Output	: 0.7 V (typical)	: 0.9 V (typical)
Error rate	$< 10^{-9}$ (soft read error) $< 10^{-12}$ (hard read error)		

Power Consumption

Item	Specifications
Power Consumption	DC 5 V 2.0 A (Peak), 1.5 A (typical) DC 12 V 2.0 A (Peak), 1.5 A (typical)

Document No.	Document Name	
(2/3)	Electrical Characteristics	

Mechanisms

Items	Specifications
Pick-up	NA : 0.50 Focus : Astigmatism Tracking : DPP Wave length : 783 nm (standard)
Traverse mechanism	Stepping motor
Spindle motor	DC brushless motor
Loading mechanism	Automatic loading system

Document No.	Document Name	
(3/3)	Electrical Characteristics	

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 μm

Interface

Items	Specifications
Interface	USB2.0
Transfer Rate	480 MB/s

Connector

Item	Specifications
I/O terminal (rear panel)	Power connector (4 P), (5 P) USB2.0 terminal Audio out (4 P), (2 P)

Document No.	Document Name	
(1/3)	Function Description	

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, CLV & ×16 ~ ×40 CAV are applicable. Arbitrary speed can be set using the ATAPI command.

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

MODE 1

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)

Document No.	Document Name	
(2/3)	Function Description	

3. Data write processing

(1) Write speed

i. CD-R ×2 and ×4, ×8, ×12, ×16, ×16 ~ ×24 (ZCLV) write speed are applicable. (mastering write)

CD-R ×2 and ×4, ×8, ×12, ×16 write speed are applicable. (packet write)

ii. CD-RW ×2, ×4, ×8, ×10 write speed are applicable.

Arbitrary speed can be set using the ATAPI command.

(2) Write system

Track-at-once

Disc-at-once

Packet write (variable-length/fixed-length)

(3) Write data mode

MODE 1

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 th 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.

Document No.	Document Name	
(3/3)	Function Description	

4. Servo/access

(1) Servo Automatic Adjustment

When the disc is loaded, the focus, tracking offset and servo gain are adjusted automatically.

(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.

(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 thread. 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.

5. Other Functions

(1) Multi-volume applicable

To switch the sessions, the SESSION SELECTOR is used.

(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.

(3) Device type

Device type is 05 (CD-ROM) only.

6. CRD-BP1500U Interface

The host computer interface of the CRD-BP1500U conforms to the USB2.0.

7. BURN-Proof

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.

Document No. (1/1)	Document Name Handling Manual	

(1) Installation of the device driver

In order to use this product, the device driver for the CD-R drive has to be installed. Before using this product, install the device driver according to the device driver "Install Manual" attached to the "OS" or "Mother Board".

(2) Connection to the audio equipment

When the sound is played back though your stereo amplifier, connect the stereo mini plug of the cable to the headphone terminal of this product.

(3) How to use

Before using this product, make sure that the device driver for the CD-R 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.

(4) Product ID, Vender ID

Product ID: CRD-BP1500U , Vender ID: GENERIC

Document No.	Document Name	
(1/6)	Notes for Handling	

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.

2. Don't use deformed or cracked CDs.

   Don't use cracked, deformed CDs or CDs repaired with adhesives. As the disc turns with high speed within the product, broken pieces might scatter and hurt you.

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.

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.

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.

6. How to prevent the breakdown

   (1) Don't impact or vibrate this product.

   (2) Keep the product where no fluid or alien substances can enter into this product.

   (3) Don't use this product on an incline.

   (4) Don't move this product with the disc inside.

7. Installation Place

   Avoid the following places for using this product.

   (1) Places of high temperature or greate changes in temperature.

   (2) Places where sunlight can hit the product directly.

   (3) Places with strong vibrations.

   (4) Places with uneven surfaces.

Document No. (2/6)	Document Name Notes for Handling	

8. Maintenance
   (1) The dirt on this product should be cleaned off lightly with a soft cloth with some water or diluted neutral detergent.
   (2) Make sure not to use volatile chemicals such as benzine and thinner, because they might cause deformation and color change of the product.
9. Notes for the Handling of the Disc.
   (1) When you carry the disc, don't touch the side where no letters are printed.
   (2) Don't write letters on the disc or attach paper or a seal.
   (3) Dust or finger prints on the side without any printing should be cleaned off by a soft cloth.
   (4) When the disc is cleaned, always clean from the center to the outer rim.
   (5) Don't use benzine, thinner, cleaner for analog LP or a static electricity preventing agent, because these might cause damage to the disc.
   (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.
10. It is prohibited from copying, selling and transfering 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.
11. Application
    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.)

· NERO	(AHEAD Software gmbh)
· InCD	(AHEAD Software gmbh)
· Media Player	(Microsoft Windows)
· CD Player	(Microsoft Windows)
· Kodak Photo CD Player	V2.0 or more (Kodak)

12. Recommended accessory
    (1) Case

Company	Product No.
Do Top Technology	DEL-1831, DEL-2002

Document No.	Document Name	
(3/6)	Notes for Handling	

(2) USB 2.0 PCI board

Company	Product No.
Ratoc SYSTEN	REX-PCIU2, REX-CBU2
MELCO INC.	IFC-USB2P
Adaptec INC	AUA-3100LP, AUA-5100
Orange Micro	Orange USB 2.0 Hi-Speed PCI Board Orange USB 2.0 Hi-Speed Card Bus PC Card
Dura Micro INC.	EN-10079
ATEN International	IC-250U 5 port USB2.0 PCI Host Controller IC-230U / USB 2.0 Low Profile PCI card (3 ports)

(3) AC Adaptor

Company	Product No.
NIDEC POTRANS CORPORATION	SKB2505B, SKB2505A, SMB2505A

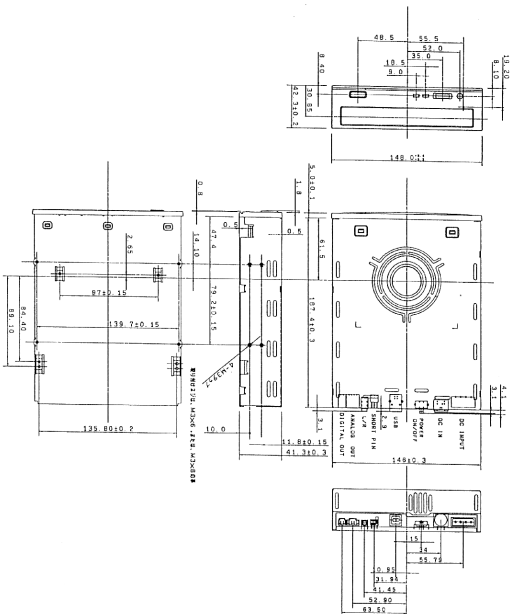
13. Drive Mount

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.

Document No. (4/6)	Document Name	
	Notes for Handling	

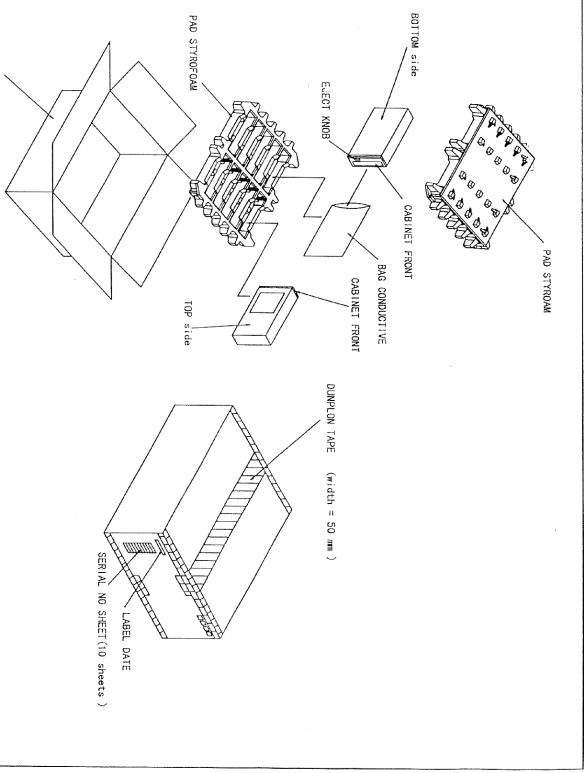
Dimensions



The following items should be considered when enclosure chassis for this drive is designed.
1. Over 5 mm space should needed between top of drive and enclosure chassis.
2. Don't press the production label even if there are any reasons.

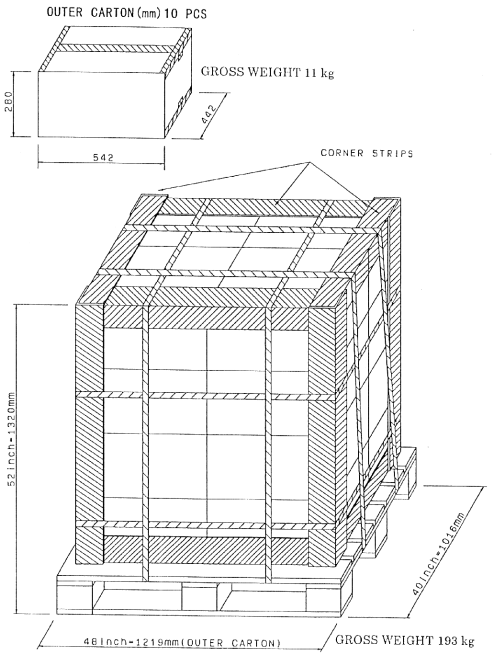
Document No. (5/6)	Document Name Notes for Handling	

Package



Document No. (6/6)	Document Name Notes for Handling	

Package Configuration



160 unit 1 pallet: 4 box × 4 stack (16 box)

Pallets are to be banded and stretch-wrapped.

Corner strips are attached.

CRD-BP1500U

TENTATIVE

2001.07.04