DX-CD2™

User Manual

CD Rom, Inc.

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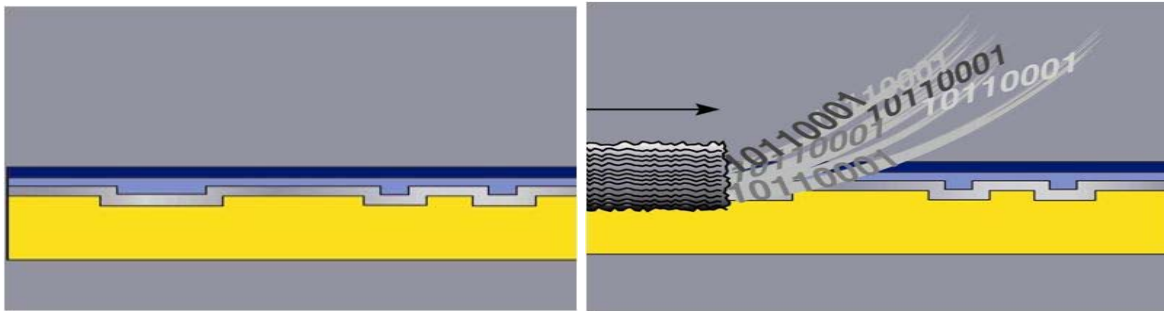
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DX-CD2^{TM} Package Contents

1. DX-CD2^{TM} Machine (Replaces DX-CDe^{TM})	5. Wire Brush
2. Instruction Manual	6. Cleaning Brush
3. Two Dust Bags (Replace when full)	7. DX-DVDm DVD Splitter
4. Two cutters (Replace as required for efficient cutting)	

Optical Disc Information Bearing Sub-layers Destruction Process

The DX-CD2 technology, in combination with the DX-DVDm as applicable, physically removes the information layer from the CD-ROM, DVD ROM, and Blu-ray disc permanently and safely while keeping the polycarbonate material intact. The DX-CD2™ design specification requires the data layer of optical drives to be ground to 250 microns - eliminating forensic recovery of data by any known means.
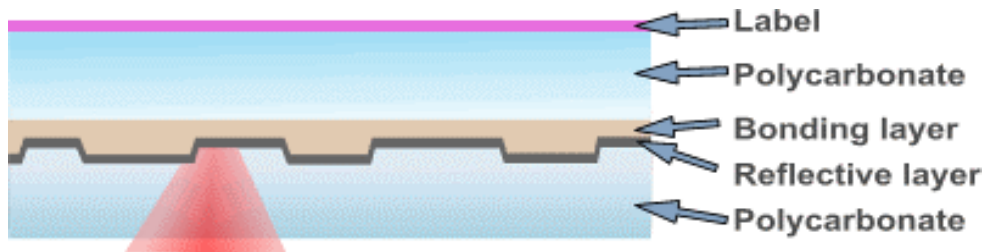
CD Construction
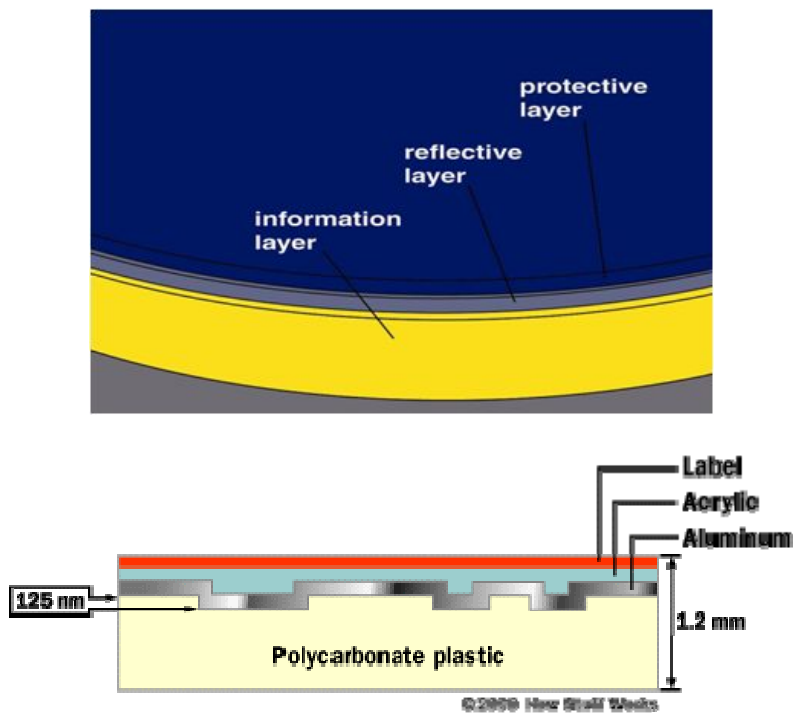
A CD-ROM is made up of multiple layers. It consists of one 1.2mm polycarbonate disc. Data resides in the "information layer" of pits and lands. Data is a sequence of 9 unique spaces of lands and 9 unique sizes of pits. Data is imbedded in the polycarbonate.

Data is contained in the polycarbonate surface of a commercially produced CD-ROM disc to a depth of @ 100 nanometers (0.001mm). To destroy the data 100% in a commercially produced disc, the grinding process needs to just penetrate the polycarbonate layer. Data is contained in the chemical layer on a recordable disc, between the polycarbonate layer and the protective surfacing on the discs. To destroy 100% of the data contained in a CD-R or CD-RW disc, the chemical surfacing above the polycarbonate needs to be removed. The grinding process of the DX-CD2 provides complete 100% destruction of the information layer of both commercially produced CD-ROM discs, and CD recordable discs.

DVD Construction

A DVD-ROM consists of two 0.6mm polycarbonate discs bonded together. Like the CD-ROM, data on a DVD-ROM resides in the "information layer" of pits and lands. Data is a sequence of 9 unique spaces of lands and 9 unique sizes of pits. Data is imbedded in the polycarbonate.

Data on a DVD-ROM is contained in the center of an assembled disc. To destroy the data 100% in a commercially produced disc, the two polycarbonate halves must be split to expose the information layer. Once split, the same grinding process as described for a CD-ROM applies.

Blu-ray Construction
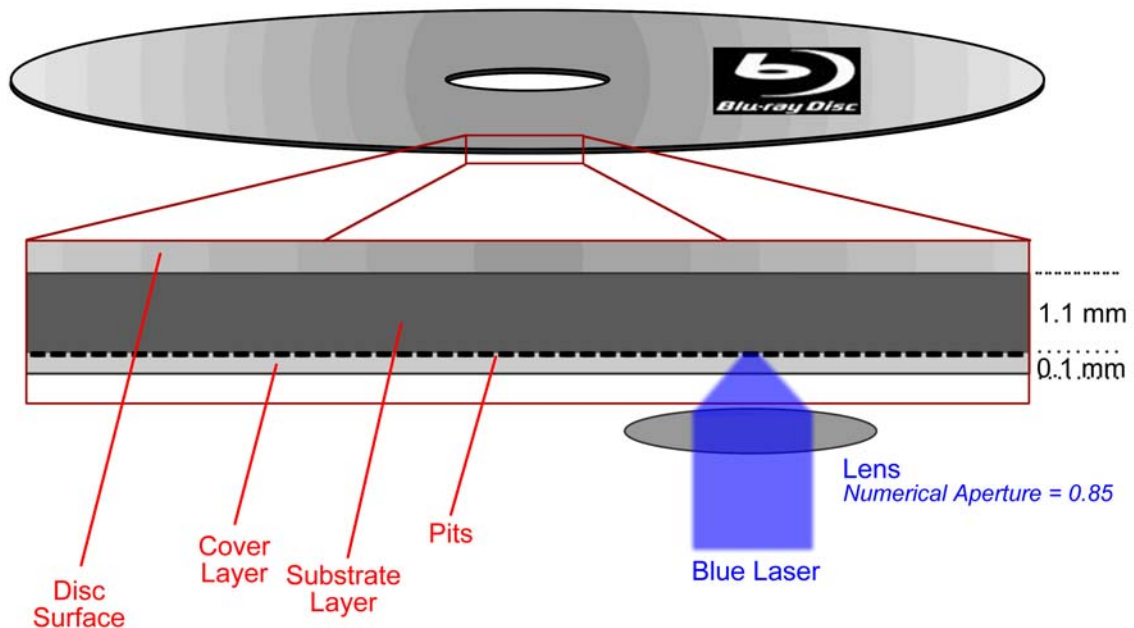
A Blu-ray disc, the final standard format which won over international acceptance from the HD-DVD format manufactured by Toshiba, is similar in construction to a CD-ROM. The data layer resides near the surface of the disc. The Blu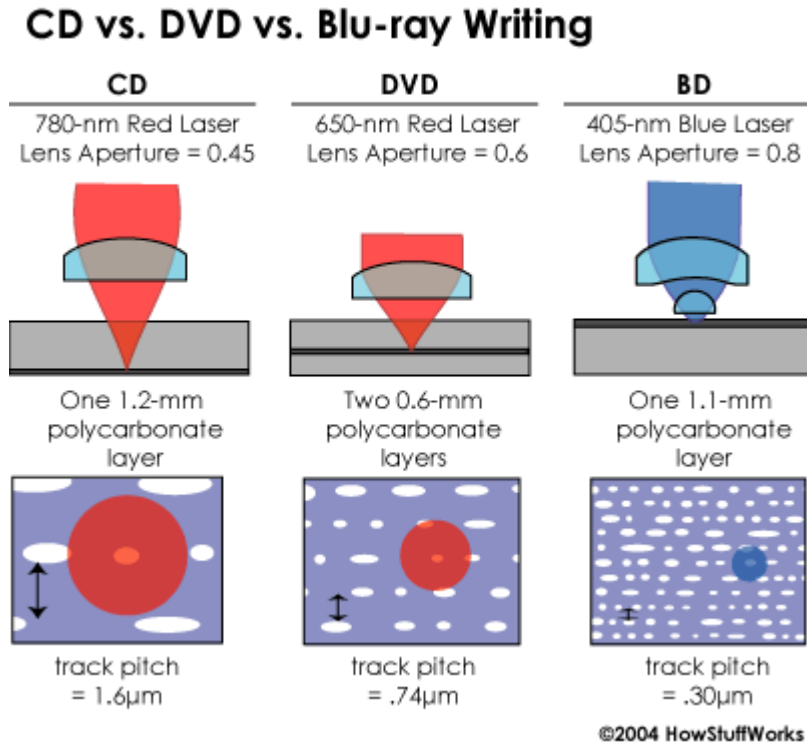-ray disc is 1.2mm thick, like a CD-ROM and a DVD, but unlike the standard DVD, the Blu-ray consist of one 1.1mm layer, then the data layer, and a very thin 0.1mm protective layer. To destroy the digital data content, the DX-CD2 does not need to first split the disc but simply to grind down into the Blu-ray disc slightly below the 0.1mm protective layer. This new standard for DVD will be the dominant form factor within the next 1-2 years while standard DVDs will become less and less prevalent in the storage industry.

Like the CD-ROM, data on a Blu-ray disc resides in the "information layer" of pits and lands. Data is a sequence of 9 unique spaces of lands and 9 unique sizes of pits. Data is imbedded in the polycarbonate.

Data is contained in the polycarbonate surface of a commercially produced Blu-ray disc to a depth of 0.1mm. To destroy the data 100% in a commercially produced disc, the grinding process needs to just penetrate the polycarbonate layer. The DX-CD2 accomplishes this.

CD / DVD / BD Construction Comparison

CD vs. DVD vs. Blu-ray Writing

CD	DVD	BD
780-nm Red Laser Lens Aperture = 0.45	650-nm Red Laser Lens Aperture = 0.6	405-nm Blue Laser Lens Aperture = 0.8
One 1.2-mm polycarbonate layer	Two 0.6-mm polycarbonate layers	One 1.1-mm polycarbonate layer
track pitch = 1.6µm	track pitch = .74µm	track pitch = .30µm

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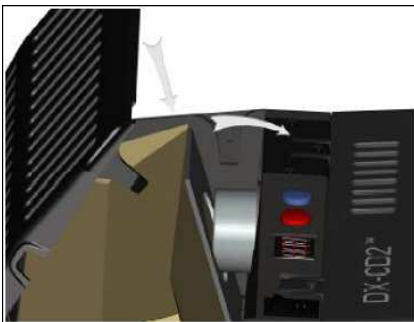
Operation

[Play Video of DX-CD2^{TM} Operation](#)

Position Dust Bag
Make certain the dust bag is inserted and properly seated before operation. If a vacuum bag is not present insert one before powering on the DX-CD2^{TM}. Place one cardboard end of the vacuum bag down and behind the two small retaining stands located below the dust vent tube in the waste collection bin at the rear of the DX-CD2^{TM}. Seat the throat of the vacuum bag over the dust vent tube and close the cover.

Apply Power
The DX-CD2^{TM} is equipped with a 120v, 60Hz power supply. Power supplies compatible with Europe and Asia (110-240v, 50-60Hz) are available upon request. Plug adapters may be required. For these units, once the unit has been plugged into a power source simply toggle the power switch to the ON position. The DX-CD2^{TM} will automatically adapt to the input power.

Place Disc in Unit

CD-ROM / R / RW: Place disc in the DX-CD2^{TM} with label side down. The information layer on a CD disc resides on the top of the disc just under the label (see CD Construction on Page 3). Slide the center of the disc over the disc retaining spindle (hub ring up). The hub ring is a raised section on the disc surface near the center. While not immediately visible to the eye, the hub ring can be felt by sliding one's fingertips across the surface of the disc. If the disc has no label the hub ring position is the method used to differentiate the label side from the side of the disc that data is read from or written to. Data is on the opposite side from the raised hub.

DVD: Split DVD and insert in accordance with the DX-DVDm DVD Disc Splitter User Guide. The information layer on a DVD resides in the middle between two pressed layers. (see DVD Construction on Page 4). Slide the center of the disc layers over the disc retaining spindle.

Blu-ray: Place disc in the DX-CD2^{TM} with label side up. The information layer on a Blu-ray disc resides on the bottom the disc, opposite side of the label (see Blu-ray Construction on Page 5). Slide the center of the disc over the disc retaining spindle. For Blu-ray discs only, select Speed 2 (slowest) and process the disc twice. Examine the cutter after 50 discs and replace if necessary. This is necessary to completely penetrate the protective layer and cut through the data layer.

Select Mode of Operation

The DX-CD2^{TM} has two modes of operation. See section on Selecting Speed to determine appropriate operational mode.
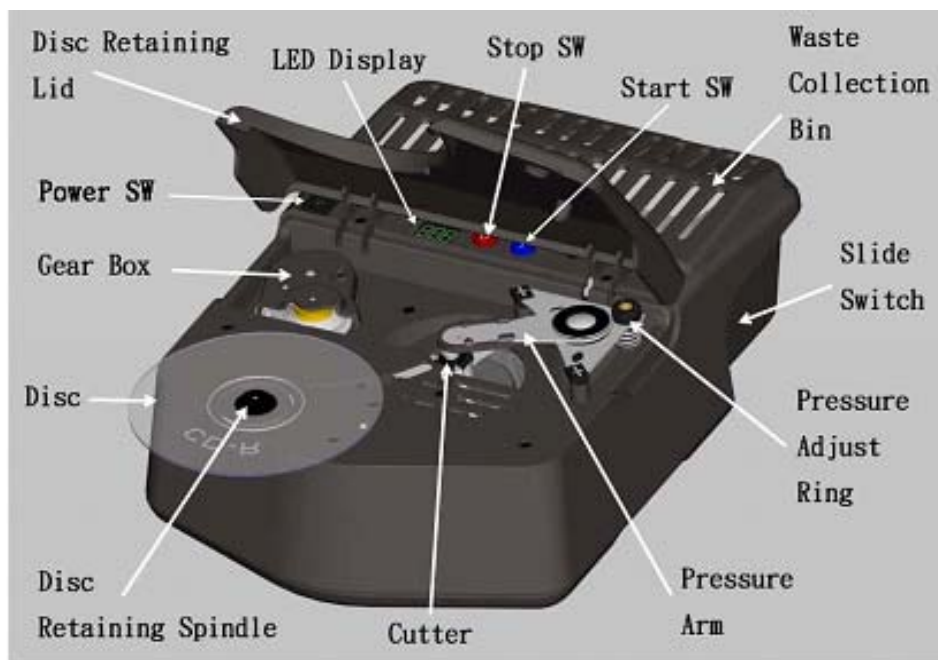
Selecting Speed - 2 Options

Introduction: The basic material of a CD-ROM disc is polycarbonate (plastic). This is overlaid with a reflective material that can be gold, silver or aluminum. Over this reflective material is a hard coating similar to varnish paint that minimizes scratching of the discs. The discs are 1.2mm in thickness but the variability from manufacturers is significant with as much as 0.15mm thickness differences. Coatings on the discs and artwork on top of the coatings are also highly variable from one manufacturer to another. The DX-CD2^{TM} is designed to work with all these factors in consideration. The DX-CD2^{TM} grinds the information layer which resides on the first 38mm of disc area, measured from the outer edge of the disc and inward towards the center. Some inkjet and thermal printable discs have coating beyond this area on the hub ring. Printable coating that remains on the hub ring after processing a disc is normal.

Do not attempt to handle the disc during a destruction phase.

Slide Switch

Speed 1 is the fastest speed. This speed is suitable for CD-R / RW media. It processes the disc in 14 seconds. Actual cutting time of the information bearing sub-layers is 11 seconds. This is the default speed. Place the slide switch in the up position and press blue button to activate speed 1. The three period indicators on the LED will not illuminate when speed 1 is activated. If the results are not adequate, as measured by complete removal of the printed surface layer so that you can see the clear polycarbonate (see example of properly destroyed disc from DX-CD2^{TM} Contents Package), then try speed 2.

**Speed 2** is the slowest speed. Use this speed for commercially produced CD-ROM media or if the results of Speed 1 is not adequate. This speed processes the disc in 26 seconds. Actual cutting time of the information bearing sub-layers is 21 seconds. To activate Speed 2 place the slide switch in the down position and press blue button. The three period indicators on the LED will illuminate when speed 2 is activated.

Sticky Labels on Classified CD-ROM discs.

The Department of Defense uses a sticky label to identify a CD-ROM disc that contains classified information. These DoD compliant labels are similar to an Avery® label used in bulk mailings that have pre-printed addresses. These labels have two materials other than the ink: the paper the ink is printed on, and glue underneath the paper that holds the label to the disc. When removing sticky labels from the CD-ROM discs, it may be necessary to slow the DX-CD2^{TM} to Speed 2 in order for the cutter, which spins at 8,000 RPMs to cut through the label and then into the information bearing sub-layers of the discs. The DX-CD2^{TM} **is not designed** to remove full-face labels, found on after-market CD labeling kits.

White Thermal CD-R Media. Verbatim DataLife Plus and

Mitsui ColorTherm white thermal media have a coating composition that can clog or gum the cutter teeth. If incomplete cutting of the information layer on these or similar discs are experienced, simply rotate the cutter arm assembly to the right and clean the cutter teeth with the included wire brush.

Cutter and Adjustment
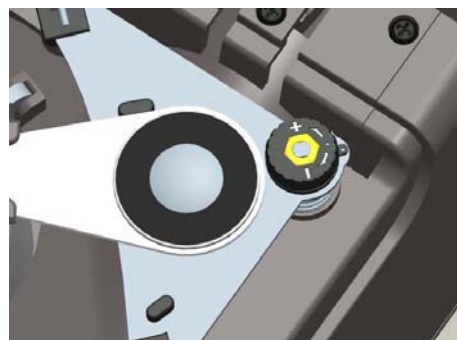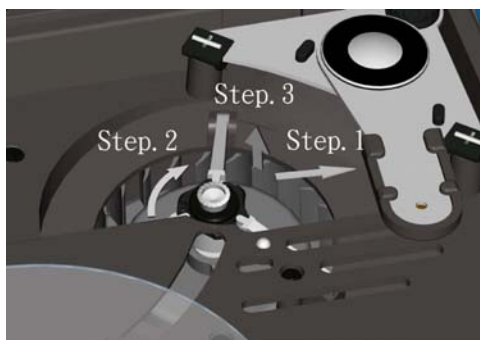
The cutter is user replaceable.   The cutter will service up to approximately 1000 discs.

Play Video of Cutter Replacement

Do not attempt to replace cutter while machine is in operation. Caution should be used when removing and installing cutter. Cutter teeth are sharp.

Remove Power
Turn power switch off prior to replacing cutter. Removing the DX-CD2^{TM} from the power source is acceptable; the memory control circuit contains a battery back-up and will retain the destroyed disc count.

Remove Old Cutter
Step 1: Rotate pressure arm to the right as shown above.

Step 2: Remove the old cutter by gently twisting the plastic housing of the cutter @ 1/8 turn clockwise.

Step 3: Gently grasp the cutter housing and pull straight up.

Insert New Cutter
Insert the new cutter by aligning the three plastic tabs and metal keyed shaft of the cutter into the cutter spindle receptacle. Gently press the cutter into position; press down and turn the plastic cutter housing @ 1/8 turn counter-clockwise. While holding plastic tabs, the cutter may need to be rotated to allow the shaft to drop in place. Reposition pressure arm to the center over cutter.

Play Video of Cutter Adjustment

Adjustment
Minor adjustment of cutting depth is possible by rotating the pressure adjustment ring either clockwise (to relieve pressure on the disc cutting surface) or counter-clockwise (to increase pressure on the disc cutting surface).

Cleaning the DX-CD2^{TM}

To clean the DX-CD2^{TM}, please remove the dust bag periodically and either dispose of the dust bag in a trash receptacle, or follow the instructions to send it to D3 Services for recycling (see back cover of this manual).

You can use a small vacuum cleaner to periodically vacuum any dust particles that have accumulated on the top surfaces of the unit. You may also use a moist cleaning towel to wipe the unit down. Please do not use chemical cleaning agents to clean the unit as the finish of the plastic parts may discolor.

Dust Bag Removal

Play Video of Dust Bag Replacement

To remove and clean, or remove and replace the dust bag, open the back cover by pressing under one of the Waste Collection Bin tabs while lifting up—repeat on opposite side; remove the bag and insert a new bag. The dust bags are designed to hold the information bearing layers up to 500 discs. If needed, additional replacement bags may be purchased using the order form on the back of this manual. Two dust bags were included in the original packaging.

Trouble Shooting-Technical Support

If the DX-CD2^{TM} LED indicator displays an error code consult the error code list below. Our technical support telephone number is tel. # 715-372-6700. You may also email us at **techsupport@4d3.com**

Error Code: E20 – Carefully vacuum out particle debris. Remove the particle debris with a vacuum; thoroughly clean around the Disc Retaining Spindle. Reset the LED indicator by depressing the red Stop button. If the problem persists call technical support to resolve the issue.

Error Code: 500 –This shows that 500 discs have been destroyed. Digital "500" will flash. This is a reminder to clean the unit and check both dust bag and cutter, replacing as necessary. To reset the LED indicator power the DX-CD2^{TM} off, depress and hold the blue Start button, power the DX-CD2^{TM} on while continuing to hold the blue Start button for two seconds or until a long beep is heard, then release the blue Start button.

After the Error Code: 500 is displayed and the unit is reset the LED will display the total discs destroyed. The example to the left represents 10,230 discs destroyed. The LED will first display 10 then 230. Turn power switch off and back on to exit this mode and reset the counter to 000.

Error Code: E00 – The DX-CD2^{TM} incorporates a safety feature to prevent the cutter from operating with the cover open. **E00** shows that the cover has been opened while power is applied to the unit. Simply shut the cover completely and the error will reset.

ORDER FORM

FAX ORDERS: 952-832-5434

Bill To: Ship To:

Bill To	Ship To
NAME	NAME
Company	Company
Address	Address
City State Zip	City State Zip
Phone/Fax	Phone/Fax
Email	Email

PRODUCT NAME	PRODUCT NO.	QTY	UNIT PRICE	TOTAL PRICE
DX-CD2™ Disc Destruction Device	123601			
Cutter, DX-CD2™	123603			
Dust Bag, DX-CD2™	791002			
DX-DVDm™ Manual DVD Splitter	123610			

Subtotal	
Freight (No charge for GSA orders, UPS Ground freight if shipped within the Continental US)	
Tax (6.5% MN)	
Grand Total	

Payment Method: Check Enclosed ☐   Credit Card ☐   Purchase Order ☐

VISA   M.C   AMEX

C.C.#
Expiration
V-Code
Signature
Print Name

RMA and Warranty

The DX-CD2 is designed to work with a mean time between failure of 8 hours a day, 5 days a week, 50 weeks a year of continuous daily use. As in any mechanical device, failures do occur. This section describes your rights and our responsibilities to correct any failure in workmanship, defective parts or failed parts for a period of 1 year from purchase date.

1. For end users, before a RMA# can be issued, the customer needs to obtain an approval from our tech support personnel--either verbally or via email.

2. An RMA# will be issued within 2 business days via email.

3. The RMA# issued is valid for **15 business days.** If the returned product is not received within 15 days, the RMA# will be voided and a new RMA# is required.

4. All returns require a RMA number, which must be prominently displayed on the box. **Packages without an RMA # will be returned unprocessed.** No Exceptions.

5. All warranties are VOID on visibly damaged, altered products or improperly packaged products. If the product has been opened through sealed fashioners, or if seals are broken, the Warranty is considered null and void. Warranty does not include dust bags or cutters.

6. Products can be returned for refund within **30 days of purchase.** Shipping charges are not refundable. A Restocking Fee of up to 15% may be charged at distributor discretion.

7. After 30 days of product purchase, products can **only** be returned for replacement.

8. If, after 30 days, customer insists on returning a product for store credit, such transaction requires management approval. The amount of credit issued is based on current selling price of the product and will account for damage or misuse of product.

9. Method of refund will be the same method as the original **method of payment** on the invoice.

10. All Products carry **One year parts and labor warranty** unless otherwise specified on the invoice.

11. A replacement product will carry the remainder warranty from the original invoice date.

12. All returns should be shipped to:

D3, Inc.
RMA Department
68323 Lea Street
Iron River, WI 54847
www.4d3.com
techsupport@4d3.com

Before and After Examples of Properly Processed Discs

CD-R

DVD

Blu-ray

Recycle for a Greener Earth

Earth as seen from Apollo 17

The DX-CD2^{TM} is designed to grind the data layer of a CD-ROM, CD-R, or CD-RW disc thus making the information totally unreadable. The resulting process produces a clear polycarbonate disc; the residual ink and metals are collected in the dust bag.

Both the dust bag and the polycarbonate disc can be discarded in a normal trash container. However, an alternative recycling program is offered, which takes all discarded materials and recycles them for a cleaner environment.

If you would like Digital Data Destruction to recycle your materials at no cost to you, except the freight to ship them to us, please collect your discs and any dust bags and send to:

Digital Data Destruction Services, Inc.
Recycle Program for DX-CD2™

68323 Lea Street
Iron River, WI 54847
www.d3services.com