

Guidelines for Storing and Handling Born-Digital Media

Author: Monique Lassere

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Magnetic Disk

Floppy Disks

Storage & Handling

- Disks not being used should be stored upright in a dust proof container or in their paper or Tyvek sleeve.
- Sleeves are used for 8" and 5.25" floppy disk formats to prevent the contamination of the disk surfaces through the openings in the protective jacket.

- A dust proof container/storage box are used for 3.5" format. The 3.5" format usually does not come with a sleeve nor does it require a sleeve since the jacket provides better protection for the disk.
- This disk storage box provides physical protection for the disks and prevents debris from coming in contact with the floppies.

Cleaning

Due to their age and the open structure of the chassis and the disc, floppy discs may need to be cleaned. Inspect visually for mold by rotating the media in your hands inside the envelope / sleeve (5.25" or 8"). Mold can be removed with a clean cotton ball and isopropyl alcohol (at least 90%). (Use antiseptic cotton balls). Wipe toward the hub from the outer edge. Rotate, inspect, wipe; repeat. This is sufficient for diskettes with relatively few spots of mold. For extensive mold damage, consult Digital Preservation staff.

Labels

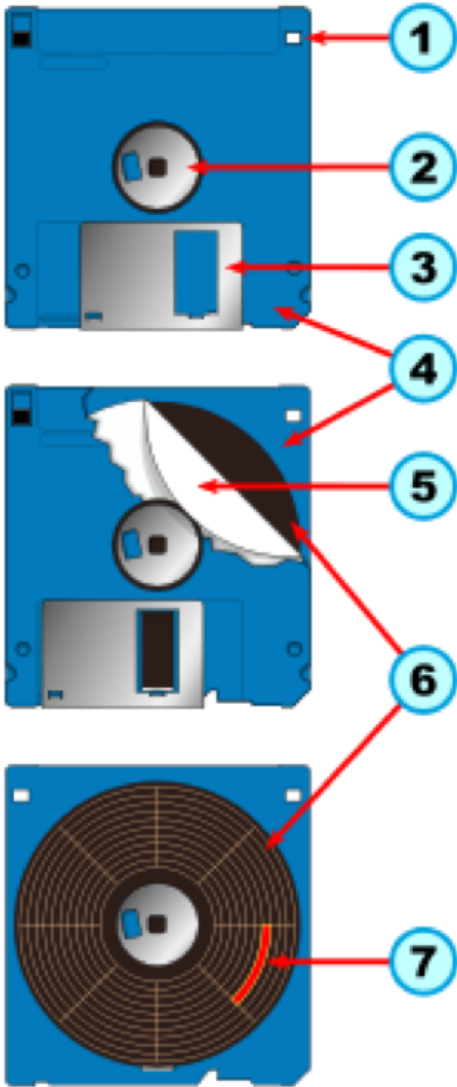
If possible, the label should be written on before placing it on the disk. If, however, you must write on a label that has already been applied, use only a felt or nylon tip pen, never a ballpoint pen or pencil. Never use an eraser on a disk label, and use peelable labels which don't leave a residue. Peel off the old label when putting a new one on; don't apply labels in layers.

Magnetic fields

Since the data on a disk are stored in minute magnetic regions, the information can be altered or completely eliminated if the disk is exposed to a magnetic field. Permanent magnets such as those on typing guides or those used to hold memos on the side of a file cabinet should be kept at least one foot away from disks. Permanent magnets are also found in loudspeakers. Although it is not likely that a speaker in a housing will cause problems with a disk, it is best not to tempt fate by putting disks on top of a speaker.

Disk Surface

On a single sided disk, the recording surface is on the lower side, i.e., opposite from the label. Thus removing it from the drive and laying it on a dusty desk is not recommended. Just about anything is large enough to interrupt the contact between the head and disk surface and result in a loss of data (see Figure 1). When the disk is removed from the drive it should always be stored in its protective envelope. Don't ever touch the surface of the disk; fingerprints are bad news.



Internal Hard Disk Drives



Shock Prevention

Hard drives are complex and delicate mechanisms. There are two kinds of shocks to be avoided: electrostatic discharge (ESD) and impact.

The most basic precaution you can take when handling electronics is to touch grounded metal (such as the chassis of your computer) before touching sensitive electronics. This is particularly important if you are in a static-rich environment, like a low-humidity room with wool carpeting.

Protect your drive from impact. Avoid rough handling and dropping the drive. When transporting, make sure to wrap in anti-static and shock absorbent material (i.e. bubble wrap) and/or place in protective case. Ensure that there is little open space in the packaging as to limit movement and shock (bubble wrap can be used to fill space, for example).

Storage & Handling

Special handling is required to protect hard drives from damage. Hard drives can be damaged by excessive physical force or from Electrostatic Discharge (ESD).

Place internal hard drives in ESD bags in a conductive bin. Do not place materials over the internal drives. Do not stack hard drives. Do not stand hard drives on their sides. Do not obstruct or cover any air filter holes on the drives.

With clean hands, avoid touching any part of the drive other than the sides and/or the chassis (if it has one).

Cleaning

If there is dust in the internal hard drive, compressed air can be used to free the dust. Use short bursts of air to dislodge dust. Further cleaning must be done by Digital Preservation staff.

Labels

Label a flat surface on the drive, if possible. Otherwise, label the ESD bag the drive is placed in.

Temperature

Avoid extreme heat, high humidity, rapid temperature or humidity changes, and prolonged sunlight or other sources of ultraviolet light.

Surface

Parts of internal hard drives may be exposed, lacking a metal sheath to cover the electronic components.

External Hard Disk Drives

Hard Disk Drives (HDD), JAZ, ZIP





Storage & Handling

Do not stack hard drives.

Do not stand hard drives on their sides.

Do not obstruct or cover any air filter holes on the drives.

Shock Prevention

Protect your drive from impact. Avoid dropping it and rough handling. When you carry it somewhere, put it in a protective case of some sort.

Cleaning

If there is dust in the internal hard drive, compressed air can be used to free the dust. Use short bursts of air to dislodge dust. Further cleaning must be done by Digital Preservation staff.

Surface and Labels

If the drive comes with a cover, place the label on the cover. It is permissible to label the surface of an external hard drive, jaz disk, or zip disk since the disk is covered by the chassis. Avoid writing directly on the drive.

Temperature

Avoid extreme heat, high humidity, rapid temperature or humidity changes, and prolonged sunlight or other sources of ultraviolet light.

Optical Media

CD-ROM, WORM (CD-R), CD-RW, DVD, Blu-Ray



Storage and Handling

Handle discs by the outer edge or the center hole. Avoid writing on disc, but if necessary, use a non-solvent-based felt-tip permanent marker to mark the label side of the disc. Do not use pens, pencils, or fine tip markers to write on the disc. Avoid dirt or other foreign matter from touching or sticking to disc. Store discs upright (book style) in plastic cases specified for CDs and DVDs or archival quality sleeves. Leave discs in their packaging (or cases) to minimize the effects of environmental changes.

Cleaning

Remove dirt, foreign material, fingerprints, smudges, and liquids by wiping with a clean cotton fabric in a straight line from the center of the disc toward the edge. Use CD/DVD-cleaning detergent, isopropyl alcohol, or methanol to carefully remove stubborn dirt or material.

Labels

Never place adhesive labels directly to disc. Place labels on enclosure/covering the disc is placed in. Do not try to peel off or reposition a label that has already been placed on a disc.

Temperature

Store discs in a cool, dry, dark environment with clean air. Do not expose discs to extreme heat, high humidity, rapid temperature or humidity changes, and prolonged sunlight or other sources of ultraviolet light.

Disk surface

Avoid touching the disk surface other than the sides of the disc (center hole or outer edges). Smudges on the underside of the disc will affect the disc's performance once it is placed in a drive.

Quick Reference Guide for Care and Handling

Do:

1. Handle discs by the outer edge or the center hole.
2. Use a non-solvent-based felt-tip permanent marker to mark the label side of the disc.
3. Keep dirt or other foreign matter from the disc.
4. Store discs upright (book style) in plastic cases specified for CDs and DVDs.
5. Return discs to storage cases immediately after use.
6. Leave discs in their packaging (or cases) to minimize the effects of environmental changes.
7. Open a recordable disc package only when you are ready to record data on that disc.
8. Store discs in a cool, dry, dark environment in which the air is clean.
9. Remove dirt, foreign material, fingerprints, smudges, and liquids by wiping with a clean cotton fabric in a straight line from the center of the disc toward the outer edge.
10. Use CD/DVD-cleaning detergent, isopropyl alcohol, or methanol to remove stubborn dirt or material.
11. Check the disc surface before recording.

Do not:

1. Touch the surface of the disc.
2. Bend the disc.
3. Use adhesive labels.
4. Store discs horizontally for a long time (years).
5. Open a recordable optical disc package if you are not ready to record.
6. Expose discs to extreme heat or high humidity.
7. Expose discs to extremely rapid temperature or humidity changes.
8. Expose recordable discs to prolonged sunlight or other sources of ultraviolet light.
9. Write or mark in the data area of the disc (the area the laser "reads").
10. Clean by wiping in a direction going around the disc.

For CDs especially do not:

1. Scratch the label side of the disc.
2. Use a pen, pencil, or fine-tip marker to write on the disc.
3. Write on the disc with markers that contain solvents.
4. Try to peel off or reposition a label.

General recommendations for long-term storage conditions:

For archiving recordable (R) discs, it is recommended to use discs that have a gold metal reflective layer.

Archival Storage Facility—Recommendation for storing CDs and DVDs together

Media	Temperature	Relative Humidity (RH)
CD, DVD	Less than 20°C (68°F) Greater than 4°C (39°F)	20% to 50% RH

A temperature of 18°C and 40% RH would be considered suitable for long-term storage.

A lower temperature and RH is recommended for extended-term storage.

Memory Storage Devices

Flash Storage

Flash Drive



Storage & Handling

Avoid rough handling and dropping. Do not open or separate the flash drive chassis. Do not put the flash drive in your pocket.

Cleaning

If necessary, use short bursts of compressed air to dislodge dust. Further cleaning must be done by Digital Preservation staff.

Labels

Label a flat surface on the drive, if possible. Otherwise, label the enclosure/cover the drive is placed in.

Temperature

Avoid extreme heat, high humidity, rapid temperature or humidity changes, and prolonged sunlight or other sources of ultraviolet light. Do not put the flash drive in your pocket as humidity and heat risks damaging the drive.

Surface

Solid State Disk Drive



The storage and handling for solid state disk (SSD) drives are very similar to those of internal and external hard disk drives. The difference between the two lies in their storage technology: SSD's rely on flash and DRAM-based memory, while HDDs rely on magnetic storage.

Storage & Handling

Avoid rough handling and dropping. Do not open or separate the flash drive chassis. Place in a protective case of some sort when transporting.

Cleaning

If necessary, use short bursts of compressed air to dislodge dust. Further cleaning must be done by Digital Preservation staff.

Labels

Label a flat surface on the drive, if possible. Otherwise, label the ESD bag the drive is placed in.

Temperature

Avoid extreme heat, high humidity, rapid temperature or humidity changes, and prolonged sunlight or other sources of ultraviolet light.

Memory Card



Storage & Handling

Avoid rough handling and dropping. Do not open or separate the memory card chassis. Place in a protective case of some sort when transporting. Do not put the memory card in your pocket.

Cleaning

Cleaning should not be necessary. If necessary, use short bursts of compressed air to dislodge dust. Sticky residue can be removed with a damp cloth and isopropyl alcohol or water. Further cleaning must be done by Digital Preservation staff.

Labels

Label a flat surface on the card, if possible. Otherwise, label the enclosure/covering the card is placed in.

Temperature

Avoid extreme heat, high humidity, rapid temperature or humidity changes, and prolonged sunlight or other sources of ultraviolet light. Do not put the memory card in your pocket as humidity and heat risks damaging the drive

Resources

<https://www.dpbestflow.org/data-storage-hardware/hard-drive-handling#hard>

https://www.atarimagazines.com/creative/v9n12/205_Floppy_disk_handling_and_.php

http://www.retrotechnology.com/herbs_stuff/clean_disks.html#whole

Byers, Fred R. Care and Handling of CDs and DVDs: A Guide for Librarians and Archivists. Washington, D.C. : Gaithersburg, Md: Council on Library and Information Resources ; National Institute of Standards and Technology, 2003. <https://www.clir.org/pubs/reports/pub121/>.