

Safe Handling of Born-Digital Physical Media

(Find a PDF of these tips [HERE](#))

SAFE HANDLING AND WRITE PROTECTION FOR (BORN DIGITAL) PHYSICAL MATERIALS

1. ALL Removable Media

- Store Upright (to prevent any weight being placed on disks, etc.; and to avoid floppies being laid on top of magnetic appliances).
 - Don't Touch! (for CD's, this means only touch the edges and center; for floppies, this means NEVER open the plastic/vinyl case)
 - Too much or too little humidity is bad. For longer-term storage, the National Archives of the United Kingdom recommends between 35% and 45% humidity.
 - Most if not all removable media is designed to last no more than 5 years!
 - Magnetic removable media should not be kept near any equipment that generates a magnetic or electrical field.
 - If media is stored in an environment that differs significantly in temperature and humidity from the one in which it will be used, it must be acclimated slowly, to avoid condensation.
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2. Floppies (3.5", 5.25", 8")

- These are the most fragile of the removable media.
- Avoid ANY magnetic fields. This includes (land-line) telephones and speakers.
- X-rays and Ultraviolet should not affect the data, but excessive light exposure could damage plastic jackets.
- Avoid excessive humidity. Not only can humidity ruin a floppy disk, but mold can as well.
- These are easily damaged by dust or fingerprints. Never open or remove the protective "door" on a 3.5" floppy, and never hold a 5.25" floppy anywhere but the label area at the top.

Write Protection:

- Double check the disk case for indications about write-protection (such as a "locked" symbol or an arrow).
 - To make sure write-protection is "on":
 - * 3.5" Floppy: Slide write-protect tab toward the side opposite insertion (usually "up"). You will be able to see through the hole.
 - * 5.25" Floppy: add tape or a label to cover the write-protection notch on the side of the vinyl case
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3. CD's and DVD's

- Avoid fingerprints or smudges by touching only the center or edges of the disc.
- Do not write on discs with any solvent-based markers, ball-point pens, pencil, etc.
- Do not attach labels directly to discs because this could damage the disc, or cause an imbalance that could damage the player or drive. Instead, label the jewel case.
- Avoid scratches on EITHER side of the disc. For CD's the data is located just below the laquer layer, so the label side may be *more* vulnerable than the plastic side. DVD's are less vulnerable, since the data is located in the center layer of the disc.
- Magnets are not a concern for optical media.
- CD's that have absorbed a large quantity of moisture can become unreadable, but may work properly once they dry out.
- Avoid prolonged heat exposure, such as leaving discs in direct sunlight, or placing them on or near a hot CPU.
- Prolonged exposure to sunlight, or other sources of UV light, will cause the dye (recordable) layer in R discs to break down significantly. Keep all discs out of the sun and away from UV light.

Write Protection:

- CD-R's and DVD-R's are automatically write-protected once they have been "burned." CD-RW and DVD-RW are write-protected only once the "session" has been closed. For born-digital materials, one hopes that this has been done, but proceed with caution, anyway.
- It is possible to write-protect optical media by using a read-only optical drive (CD-ROM/DVD-ROM drive), but in order to access any RW media with an open session, you need a device that can write as well.
- For the moment, USB write-blockers do not seem to work with external optical drives.

4. USB Flash Drives (also "solid state" USB or Firewire hard drives)

*Static electricity CAN damage flash drives! Before inserting a USB flash drive, be sure to discharge any electrostatic charge you may be carrying by touching something metal. Be especially careful during dry conditions.

- It is possible to use an anti-static wristband, designed to keep your body "grounded" while working with electrostatically sensitive items.
- The most common way data is damaged on a flash drive is when the drive is interrupted while writing. To prevent this ALWAYS properly unmount the drive before removal (i.e. "Safely Remove Hardware").
- Flash drives can withstand most magnetic fields without being damaged, but avoid strong magnetic fields, nevertheless.
- Be especially careful when inserting or pulling on these, since they can be easily bent or broken.
- Do not mail flash drives, since US Postal Service's irradiation of mail can damage them. X-rays do not appear to be a problem.
- Avoid excessive moisture, heat, pressure, etc.

Write Protection:

- Most USB flash drives do not have a write-protection tab, though some do.
- Use a USB write-blocker device with any USB device

5. Memory Cards (SD, Micro SD, Memory Stick Duo, etc.)

- Memory cards look like floppy disks, but they are actually "solid state" media.
- Never touch the metallic contacts.

*Static electricity can damage memory cards, just as it does USB flash drives. Be sure to discharge any static electricity by touching something metal before handling any memory cards.

- Never force a memory card into a slot.
- Avoid excessive moisture, heat, pressure, etc.

Write Protection:

- Double check the disk case/ jacket for indications about write-protection (such as a "lock" symbol, arrow, etc.).
- To make sure write-protection is "on":

SD Card: slide write-protect tab toward the side opposite insertion (usually "down")

Micro SD and Memory Stick (Sony): check the case/ jacket for a write-protection tab

6. Hard Drives (for Solid State Drives, SSD, see Care for Flash Media, above)

- Hard Drives are classified by type and size. The type is an indication of what connector cable is needed.
- Types: IDE/PATA/ATA/EIDE, SATA, SCSI, FibreChannel. IDE/PATA was used 1986-2003. SATA was used 2003-today. If you are working with other types, an adapter can be purchased for under \$10.
- Common sizes are: 2.5" (laptops) and 3.5" (desktops).
- Avoid shocking the drive: Don't bump it while it is spinning. Don't drop it. Don't unplug it while it is spinning.
- Electrostatic Discharge (ESD) is a concern when removing a hard drive from a computer (and especially when working with more recent Solid State Drives).
- Internal and external hard drive housings will protect against most ESD, but a wrist cable and/or ESD protection mat should be used.

- Be sure to ground the computer from which the drive is being removed. This means plugging it into a grounded outlet (make sure the computer is turned off), or connecting it to the center screw of the outlet strikeplate.
- Removal is usually straightforward: unplug the drive, press necessary tabs, and pull it out. However, be careful not to damage other computer components with ESD, and don't get scratched by internal parts.
- When transporting or storing hard drives, safeguard against shock from ESD or dropping by keeping drives in special anti-static hard cases.
- When transporting hard drives, always carry them in a padded box or bin that will absorb any shock if they are dropped.
- Don't put labels on the "breathing" holes.

Write Protection:

- For internal hard drives, use a write-blocking device that is designed for hard drives. These will accommodate SATA and IDE/PATA. For other types, you may purchase an adapter for about \$10.
- For external hard drives, use a write-blocking device according to whatever connection you have (USB/Firewire/Etc.).

7. Audio and VHS Tapes

- Avoid magnetic fields. Keep tapes away from speakers, magnets, or any devices that produce an electromagnetic or magnetic field.
- Do not touch the tape. Prevent dust or humidity from accumulating on the tape by only using it in dust free, low-humidity environments.
- Adjust tape tension appropriately before inserting into any device.
- Always rewind tapes before storage. Store upright.
- Avoid excessive heat, moisture, pressure, etc.
- Magnetic tape works better under relatively dryer conditions.
- Baking: Some professional data recovery organizations will gradually dehydrate magnetic tape that has absorbed too much moisture in a controlled environment over the course of several hours. Do not attempt this with a regular oven or without undertaking serious research to determine how to dry the tape without damaging it.

Write Protection:

- These tapes have write-protection tabs, as part of the plastic case, which must be broken off to prevent accidental recording.

LINKS, GUIDES, REFERENCE

http://www.archiveteam.org/index.php?title=Rescuing_Floppy_Disks

- This is a great site for trying to figure out how to access things that are on floppy discs.

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

- This is just a quick overview of floppy disc care.

The UK National Archives has a Guide: Digital Preservation Guidance Note #3: Care, Handling, and Storage of Removable Media

<http://www.nationalarchives.gov.uk/documents/information-management/removable-media-care.pdf>

- This is a basic guide to all kinds of removable media.

<http://www.itl.nist.gov/iad/894.05/docs/CDandDVDCareandHandlingGuide.pdf>

- Here is an extensive guide for all kinds of CD's and DVD's (ROM, R, RW, etc.).