

Safe Handling of Born-Digital Physical Media

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.

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

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.
- 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.

- 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.).

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.).