MEDIA CONTROL (DATA DESTRUCTION) SECURITY GUIDELINES

Security Guidelines: are recommended processes, models, or actions to assist with implementing procedures with respect to the subject.

Overview

According to Texas Government Code §2175.128, DISPOSITION OF DATA PROCESSING EQUIPMENT, State agencies must dispose of data processing equipment (i.e., computers and peripherals) in a specific manner after exhausting all transfer opportunities within the agency itself. Equipment not transferred locally (within the agency) must be offered to a local school district, to an assistance organization specified by the school district, or to the Texas Department of Criminal Justice. These agencies will have the opportunity to repair, train with, or salvage parts from the proffered equipment. To prevent data or applications on the equipment from being compromised, the Texas Department of Information Resources (DIR) requires all donated storage media be wiped of ALL data to a degree such that the data is unrecoverable. If the data cannot be destroyed with sufficient confidence, DIR requires the media be removed and destroyed prior to transfer or disposal.

Scope

All personnel responsible for managing DEPARTMENTAL data processing equipment, especially those responsible for transferring or disposing of that equipment. Responsibility for meeting this standard is at the departmental level and not the Warehouse, General Services, or Property Control.

Purpose

The purpose of this document is to ensure all data is removed from any media before the media and system are transferred to another department or disposed of outside the University, to prevent violation of software license agreements, unauthorized release of confidential information, and/or unauthorized disclosure of trade secrets, copyrights, and other intellectual property.

Structure

This document covers only the guidelines for clearing digital media prior to disposal. Standards and other policies may be found at the Information Security web site (http://infosec.uthscsa.edu).

Special Notice

In all cases regarding wiping and/or physical destruction, those records subject to retention requirements according to HOP 2.2.1, Records and Information Management Retention, must be copied to an alternative storage device and must be accessible and retrievable for the duration of the mandated retention period.

Instructions

The focus of this document is the secure removal (wiping or destruction) of data from data storage media before transfer or disposal of the associated equipment. These same guidelines may also be applied to clearing media for reuse within the same department.

NOTE: The University has developed tools and procedures for clearing/wiping the media or for destroying the data on magnetic storage media by degaussing. Technical Support Representatives should contact the Triage Help Desk, 210-567-2069, for access to the wiping software or to schedule having the media degaussed.

For the purposes of this guideline, references to media or storage media include, but are not limited to:

- Hard disk drives (also referred to as hard drives and hard disks; both inside computers and external drives)
- Optical devices (CDs, DVDs, MOs)
- Solid state devices (flash media, USB or "thumb" drives, etc.); personal digital assistants (PDAs) are also included in this category
- Diskettes (floppies or floppy disks, including other small format removable devices, such as Zip disks, etc.)
- Magnetic tape (reel, digital, etc.)

Examples of many of these devices/media can be found in the appendix.

Clearing/Wiping:
Once all necessary data has been backed up and stored properly, follow these steps to clear/wipe the media based on the type of media. The following steps will completely destroy the data, rendering the data inaccessible but the device useable.

- Hard disk drives: Hard disk drives are the primary storage medium mounted inside the computer itself. If needed, more than one drive can be installed in a single system and wiped concurrently.
    - If the drive has been removed from its original system, place it in a system capable of booting from a floppy disk or CD-ROM.
    - Place the floppy disk or CD-ROM obtained from Triage in the appropriate drive and turn on the power. (Note: The system's BIOS may have to be configured to boot from the floppy or CD-ROM drive.)
    - Follow the instructions on the screen to set the desired number of overwrites to be performed (see the Media Control (Data Destruction) Security Standard).
    - Confirm the operation and allow the disk to be wiped.

- When complete, mark the disk according to local requirements and/or place it in the system to be transferred/disposed of.
- In cases where the hard disk drive is installed in a separate enclosure, this constitutes an external hard drive. The drive may be connected to a computer by either a USB cable or a IEEE-1394 (Firewire) cable as additional storage. External media of this type generally requires specialized wiping utilities, but the hard disk itself can be removed from the enclosure and installed and wiped in the main computer following the previous steps.

- Optical media
  - CD-RWs: Compact disks that are capable of being written and rewritten similar to a floppy disk. Like a hard disk drive, it must be completely overwritten. Generally, special utilities are required to wipe this type of removable media, so it may be more cost effective to physically destroy the disk. (See **Destruction**)
  - CD-Rs: Compact disks that can generally be written to only once. While several sessions may be written to the same CD-R, once the data is written, it can not be deleted. In this case, the CD-R should be broken into several pieces. (See **Destruction**)
  - DVDs: DVDs (digital video disks) are like large format compact disks, and have both write-once (DVD±R) and rewritable (DVD±RW) capabilities. Comments made concerning CDs apply to these formats also.
  - MOs: Magneto-optical disks or cartridges are precursors to the CD and DVD formats, and are seen less and less every year. Like the rewritable CDs and DVDs, the drives must be completely overwritten. Similarly, special utilities are required to wipe this type of removable media, so it may be more cost effective to physically destroy the disk. (See **Destruction**)

- Solid-state storage media: Solid-state storage traditionally has no moving parts and, instead, stores data on internal memory chips. These storage devices are almost exclusively removable media and do not require external power to maintain the data; simply separating them from the computer is not enough to wipe the data. Because they are removable, standard wiping utilities generally do not work with this media, so physical destruction is generally the preferred option. (See **Destruction**) Solid-state storage devices are produced and distributed under several formats and names, including, but not limited to, flash, compact flash, SD, mini-SD, xD, memory stick, and PCMCIA (also called PC Cards), among others. Representative images are included in the appendix at the end of this document.
  - **NOTE:** Personal digital assistants (PDAs) represent a significant threat to data loss since they are rapidly being found in all parts of

the industry, including education. With more people relying on them to store sensitive data, and since the data storage is internal and largely inaccessible, these devices are generally physically destroyed.

- Floppy disks: Floppy disks are relatively low-capacity removable devices that have been in service since the early days of computing. Due to the increasing capacities and decreasing costs of solid-state storage devices, floppy disks are seeing less use. Wiping floppy disks is generally not considered cost-effective, so they are usually destroyed. (See **Destruction**)

- Tape media: Due to the exceptionally large storage capacity of magnetic tape, it is considered impractical to wipe tape media, so they are usually destroyed. (See **Destruction**)

Detailed instructions for the wiping utilities are issued with the utility or on the utility disk itself. Follow all steps to meet the requirements of the media destruction standard.

Destruction:
If the information on the media is critical enough that disclosure MUST be prevented at all costs and wiping is not or may not be sufficient, the media must be removed from the host device (if applicable) and the data destroyed by different means. Additionally, there may be circumstances where wiping/cleaning the media is not possible or not efficient or economical:

1. Wiping not possible
    a. Equipment no longer available to control or access the media
    b. Outdated controllers (old hard drives)
    c. No tape reader (obsolete tape media)
    d. No drive available (floppy disks and other removable media)
    e. Media itself is inoperative (especially hard disk drives)
2. Not efficient or economical
    a. Large numbers of media (especially floppy disks)
    b. Long tape lengths (all forms)
    c. Wiping utility not available (optical media, such as CDs and DVDs)
3. Additional hardware and/or software required (some external drives, solid state media, and unique or unusual new media formats)

For those circumstances, the data must be destroyed by making the media unusable and the data irretrievable by all but extreme means, either by degaussing or physically destroying the structures holding the data. Degaussing is appropriate for all forms of magnetic media (all media except optical and solid state media), and physical destruction is appropriate for **all** media.

- Degaussing
  - Degaussing media means subjecting the media (tape, hard disk drive, floppy disk) to a strong electromagnetic field of reversing polarity for a specified period of time. This physically realigns the particles of the media, effectively wiping the data from the storage device. In cases where hard disk drives are degaussed, internal components are also damaged in such a way that the device is no longer recognized by the system's hardware and can not be reused.
  - Suggested minimum standards for the degaussing unit should subject the media to no less than 4000 Gauss field strength for a minimum of 20 seconds. In all cases, though, the manufacturer's recommendations should be followed for complete data erasure.
  - It is recommended that degausser manufacturers should state they meet DOD STD 5200.28-M requirements.

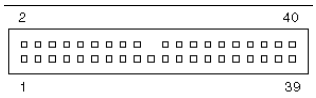
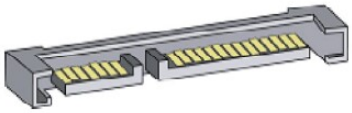
- Physical destruction
  - Hard disk drives
    - Hard disk drives represent the physically largest and most durable storage media currently in use. In an ideal situation, hard drives should be disassembled and the storage platters removed and broken into the smallest pieces available. Otherwise, the devices must be rendered unusable and the data on the platters irretrievable. Common practices include:
      - Striking the drive repeatedly with a hammer until the platters are broken and the circuit board destroyed
      - Drilling three or more holes through the platters and circuit board; the holes should be no less than three-quarters of an inch in diameter
  - Optical devices
    - Compact disks (CDs) and digital video disks (DVDs) should be shredded if a suitable device is available, or otherwise broken into four or more pieces.
    - Magneto-optical disks (MOs) and write-once, read-many (WORM) drives should be broken into four or more pieces.
    - Destruction by burning is also appropriate if environmentally feasible.
  - Solid state devices
    - Solid state devices come in too many shapes and sizes to address individually in this document, but the fastest and most efficient form of destruction is by breaking them into multiple pieces with a hammer.
    - Destruction by burning is also appropriate if environmentally feasible.

- Diskettes
  - Diskettes in all formats (8-inch, 5.25-inch, 3.5-inch, Zip, Orb, etc.) are generally most efficiently destroyed by breaking/removing the shell of the diskette and cutting the magnetic media into four or more pieces.
  - Destruction by burning is also appropriate if environmentally feasible.
- Magnetic tape
  - Magnetic tape (also referred to as backup tape) has been in use for several decades and may be found in many different formats at the University, from disk packs and 14” reels to the current multi-gigabyte digital tape cassettes.
  - Tape is generally destroyed by removing it from its reel/spindle/cassette and cutting or shredding it into as many pieces as possible.
  - If environmental conditions allow, this media format is best destroyed by burning.

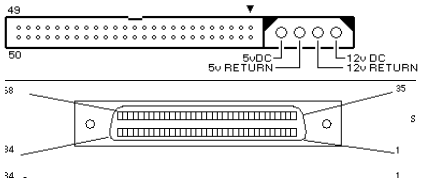
Exceptions

Exceptions to this standard are not applicable since the direction for clearing the data comes from the State of Texas and the direction for protecting the data is driven by multiple Federal requirements, including, but not limited to, HIPAA, GLB, FERPA, etc.

NOTE: The following images are of representative samples only. The images shown are not true-sized, nor are the sizes relative to each other. Many of the storage devices shown are obsolete or being phased out, but these devices may still exist in the University environment and may still contain sensitive information. **Use of these images should not be construed as endorsement or approval by the Information Security Office or the University of Texas Health Science Center at San Antonio**.

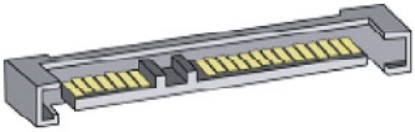
Hard Disk Drives	Example
Internal The physical characteristics of the 3.5” IDE, SATA, and SCSI drives are very similar in terms of height, width, and depth; the easiest way to tell the difference is the interface connector, which is shown with each representative format. Older SCSI drives and the obsolete MFM/RLL drives are physically larger that current drives, and the hard drives for mobile devices (notebooks, laptops, and tablets) are considerably smaller (2.5” width).	
IDE or parallel ATA (PATA), 3.5” (desktop)	 
IDE or parallel ATA (PATA), 2.5” (mobile)	 
Serial ATA (SATA)	 Desktop SATA (3.5”)  Mobile SATA (2.5”)  Connector (common to both)

SCSI



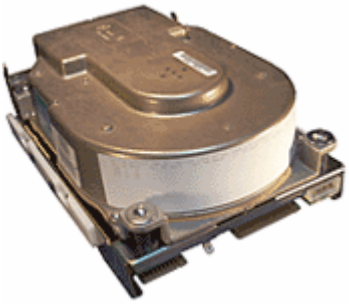
Either connector based on age of drive

Serial Attached SCSI

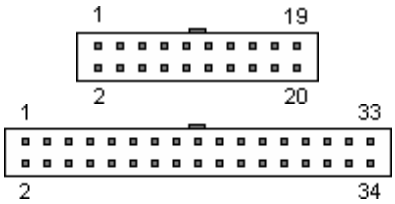


MFM/RLL (obsolete)

RLL



MFM



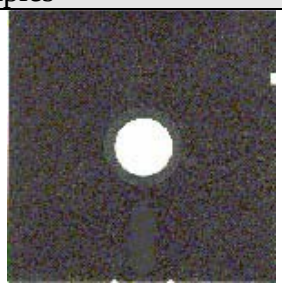
Connectors

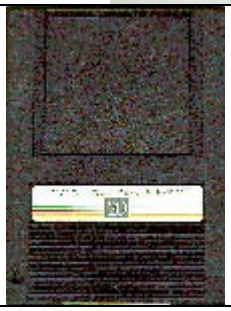
External

Generally, external hard disk drives are 3.5” or 2.5” drives in an external enclosure, interfacing with the computer via a USB or IEEE-1394 (FireWire) connection. If these drives cannot be cleaned using the University’s data clearing utility, they can still be removed from the enclosure and degaussed.

Solid State Storage Type	Example
Solid State Removable Drives [USB] (names include, but are not limited to:) Flash drives Jump drives Cruisers Thumb drives	
CompactFlash CompactFlash Type I (CF-I) CompactFlash Type II (CF-II) Extreme CompactFlash Extreme III CompactFlash Ultra II CompactFlash High Speed CompactFlash XS- Xtreme Speed CompactFlash CompactFlash Elite Pro	
MicroDrive IBM MicroDrive Hitachi MicroDrive	
MagicStor	
SmartMedia Card (SMC)	
xD-Picture Card	

TransFlash	
Memory Stick Memory Stick (MS) Memory Stick PRO (MS-PRO) Memory Stick Duo (MS-DUO) Memory Stick PRO Duo (MS-PRO DUO) High Speed Memory Stick PRO High Speed Memory Stick PRO Duo Memory Stick MagicGate Memory Stick MagicGate PRO Memory Stick MagicGate Duo Memory Stick MagicGate PRO Duo High Speed Memory Stick MagicGate PRO High Speed Memory Stick MagicGate PRO Duo Memory Stick Rom Memory Stick Select Extreme Memory Stick PRO Extreme III Memory Stick PRO Ultra II Memory Stick PRO	
Secure Digital Secure Digital (SD) MiniSD Extreme Secure Digital Extreme III Secure Digital Ultra II Secure Digital Secure Digital Elite Pro	
MultiMediaCard MultiMediaCard (MMC) High Speed MultiMediaCard MultiMediaCard 4.0 Reduced Size MultiMediaCard High Speed Reduced Size MultiMediaCard	
PCMCIA cards/PC Cards	

Diskettes (deprecated)	Examples
Floppy diskettes	 3.5”  5.25”
Floptical disks (deprecated or obsolete)	
Superdisk (deprecated or obsolete)	

Optical and Miscellaneous Magnetic Media	Examples
Compact disk media (includes recordable and re-writable)	
Digital video disk media (includes recordable and re-writable, in both +/- formats and DVD-RAM	
Magneto-optical media (obsolete)	 
Bernoulli disks (obsolete)	
Zip disks (deprecated or obsolete)	 

Jaz disks (deprecated or obsolete)	
SyQuest SparQ disks (obsolete)	
Other SyQuest formats (obsolete)	

Magnetic Tape and Miscellaneous	Examples
Digital tape	  

Reel tapes and reel packs (obsolete)	  
Diskpacks (obsolete)