USB Flash Drives Overview

By
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USB Flash Drives – What are they?

- Portable storage devices
- Nonvolatile electronically encoded Flash Memory
- Originally designed for use in BIOS
USB Flash Drives – What are they?

- USB 1.1 or USB 2.0 – Separate card reader/encoder unnecessary

- Recognized & mounted by operating system as an external drive
USB Flash Drives – What are they?

• They can be...
  - Written to & read from
  - Erased, reformatted, & partitioned

• They are...
  - Compact & easy to transport
  - Inexpensive & widely available
  - Easy-to use & come in a variety of capacities
USB Flash Drives – Basic Features

• Interface
  - USB 1.1
    - 12 Mb/sec data transfer
    - Compatible with USB 1.1 and USB 2.0 Ports
  - USB 2.0
    - 480 Mb/sec data transfer
    - Compatible with USB 2.0 Ports only
USB Flash Drives – Basic Features

• Compatibility
  – Most function with Mac, Windows, Linux out of box
    – Older versions of Mac OS and Windows may need separate drivers
    – Some preprogrammed features not compatible with certain platforms and/or operating systems
  – Only solution – in depth research ahead of time
    – Independent & manufacturers documentation
    – Disk/directory repair & maintenance apps
USB Flash Drives – Basic Features

• Physical Size
  - On average, they are the size & weight of a pack of chewing gum
  - iOmega Micro Mini USB Flash Drives
USB Flash Drives – Basic Features

• Physical Size (Cont)
  - Inherent portability leads to the addition of carry accessories
    - Pen–style clip
    - Key ring
    - Lanyard
USB Flash Drives – Basic Features

- Expandability
  - Relatively new & unique feature
  - Currently, only memory upgrades are available
    - Snap-on memory module
    - Flash memory card slot
  - The future: “LEGO–like” modular units?
USB Flash Drives – Basic Features

• Durability
  - More robust than CD/DVD media, floppies, Zips
  - No moving internal parts to damage
  - Nonvolatile flash memory resistant to:
    - Magnetic fields & airport X-ray machines
    - Moderate temperature & humidity
    - Water submersion (dry thoroughly before use)
  - 10 yrs degradation free
## USB Flash Drives – Basic Features

### Capacity

<table>
<thead>
<tr>
<th>Drive Capacity</th>
<th>Avg Price Range ($US)</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 MB</td>
<td>20-30</td>
</tr>
<tr>
<td>32 MB</td>
<td>20-30</td>
</tr>
<tr>
<td>64 MB</td>
<td>25-50</td>
</tr>
<tr>
<td>128 MB</td>
<td>40-60</td>
</tr>
<tr>
<td>256 MB</td>
<td>70-90</td>
</tr>
<tr>
<td>512 MB</td>
<td>140-200</td>
</tr>
<tr>
<td>1 GB</td>
<td>280-310</td>
</tr>
<tr>
<td>2 GB</td>
<td>540-850</td>
</tr>
</tbody>
</table>
USB Flash Drives – Basic Features

• Security
  - Read/Write protection switch
    - Available on all capacities
  - Basic password protection
    - Available on all capacities
USB Flash Drives – Basic Features

- Security (Cont)
  - 128 bit AES encryption
  - NIST standard symmetric-key algorithm
  - Fast and highly secure encryption/decryption
  - 16 MB to 128 MB capacities
  - Doubles the cost
USB Flash Drives – Basic Features

• Security (Cont)
  - Biometrics – Fingerprint Scanners
    - Scans fingerprint & compares against template
    - Available on moderate capacity drives
  - Triples the cost
USB Flash Drives – Basic Features

• Multiple Functions
  - USB Flash Drives equipped with other functions
    - MP3 player
    - Digital voice recorder
    - FM radio
    - 1.3 megapixel digital camera
USB Flash Drives – Basic Features

- Multiple Functions (Cont)
  - Everyday devices equipped with a USB Flash Drive
    - Pen
    - Wristwatch
    - Swiss Army Knife
USB Flash Drives – Mac Specifics

- **Interface – Apple Hardware USB Configuration**

  **2003** USB 2.0 ports: Compatible with any USB 1.1 or USB 2.0 drives

  **1998 - 2003** USB 1.1 ports: Compatible with USB 1.1 drives only. USB 2.0 can be added with compatible expansion card.

  **Before 1998** No built-in USB compatibility. USB 1.1 and USB 2.0 can be added with compatible expansion card but research is required.
USB Flash Drives – Mac Specifics

• File System Format Support
  - Resource Fork
    - Mac OS 9.2.x and Mac OS X apps store critical info in “resource fork”
    - When stored on file formats not supporting resource and data forks files, files can become corrupted.
USB Flash Drives – Mac Specifics

• File System Format Support (Cont)
  - HFS+
    - USB Flash Drives support HFS file format
    - Saving files onto HFS formatted drive one way to avoid corruption
USB Flash Drives – Mac Specifics

- Mac OS X Compatibility – Demonstration
  - “Plug and Play”
  - Apple Disk Utility
  - Carnegie Mellon University Disk Erase
USB Flash Drives – Mac Specifics

- Mac OS X Third-Party Applications – Demonstration
  - Micromat TechTool Pro 4.x
  - MicroMat Drive 10 1.x
  - Alsoft DiskWarrior 3.x (Demonstration)
  - Prosoft Engineering Data Rescue 10.x
USB Flash Drives – Mac Specifics

- Security Option – Demonstration
  - Disk Utility password protected Disk Image
USB Flash Drives – Mac Specifics

- Mac OS 9.2.x Compatibility
  - “Plug and Play” may not be applicable: Depending on the type of USB Flash Drive, additional drivers may be needed for older versions of Mac OS.
  - Our test drive worked with Mac OS 9.2.2
USB Flash Drives – Mac Specifics

- Mac OS 9.2.x Compatibility (Cont)
  - Apple Repair/Recovery applications offer mixed results
  - Drive Setup

![Drive Setup Window]

List of Drives

<table>
<thead>
<tr>
<th>Volume Name(s)</th>
<th>Type</th>
<th>Bus ID LUN</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;not supported&gt;</td>
<td>USB</td>
<td>0 0 0</td>
</tr>
<tr>
<td>Hard Disk</td>
<td>ATA</td>
<td>2 0 0</td>
</tr>
<tr>
<td>MMC RevR Extra</td>
<td>ATA</td>
<td>2 1 0</td>
</tr>
<tr>
<td>&lt;DVD-ROM drive&gt;</td>
<td>ATAPI</td>
<td>0 0 0</td>
</tr>
<tr>
<td>&lt;not supported&gt;</td>
<td>ATAPI</td>
<td>0 1 0</td>
</tr>
</tbody>
</table>

Cannot initialize a disk in an unsupported drive.
USB Flash Drives – Mac Specifics

- Mac OS 9.2.x Compatibility (Cont)
  - Disk First Aid
USB Flash Drives – Mac Specifics

- Mac OS 9.2.x Compatibility (Cont)
  - DiskWarrior 3.x
USB Flash Drives – Vendors

• Reliability
  - Many manufacturers, many products – Not a great deal of documentation
  - Conventional wisdom – Go with established IT companies
  - Larger capacity drives and high-end security features are more readily available from smaller firms
USB Flash Drives – Vendors

• Online Documentation
  - “Catalog” of information is small but growing
  - Patient and varied search should yield results
  - Two Examples:
    - http://www.homeofficereports.com/Flash%20Readers.htm
USB Flash Drives – Vendors

- Manufacturers
  - Crucial
  - iOmega
  - Lexar Media
  - SimpleTech
  - Wolverine
  - Interactive Media - Kanguru
  - JMTEK
  - SanDisk
  - Sony
USB Flash Drives – Pros & Cons

• Pros – General
  - Small physical size, large capacities, very portable.
  - Relatively inexpensive & widely available
  - Inexpensive and faster alternative to CD/DVD burning
  - Resistant to mag fields, x-rays, water, & temp
  - Sophisticated security options available
  - Upgradable & multifunctional
  - Most come with limited warranties
USB Flash Drives – Pros & Cons

• Pros – Mac
  - Disk Utility password protected disk image offers another level of security
  - Few compatibility issues with Mac OS X & Mac OS 9.2.x
  - Few compatibility issues with major disk & directory repair & recovery applications
  - Ideal moderate capacity storage solution for owners of USB Macs (no built-in floppy or Zip drives)
USB Flash Drives – Pros & Cons

• Cons – General

  - Small size makes them easy to lose or steal
  - Once lost/stolen, there is the possibility that stored data will be accessed
  - Higher per megabyte cost compared to other storage media & devices
  - Very little extensive or comprehensive performance reviews, reports, testing, & feedback.
  - May be durable but not indestructible & susceptible to viral infection
USB Flash Drives – Pros & Cons

- Cons – General (Cont)
  - Forget your password, resetting the drive will cost you your files
  - Forget your PIN on your 128 bit AES encrypted drive, forget accessing your files
USB Flash Drives – Pros & Cons

• Cons – Mac

- Keyboard USB ports are USB 1.1, own a USB 2.0 flash drive and a late model Mac other than a G5 and you will need to use an extension cable for easy connection
- Depending on the type of drive, age of hardware, & age of OS, additional drivers may be required
- Depending on the hardware and OS finding compatible USB 1.1 or USB 2.0 expansion card will require research
USB Flash Drives – More Info

- http://www.macos.utah.edu
  - Documentation section
  - USB Flash Drives Overview
  - More information and Links to related sites
Question & Answer
TechTool Pro 4.x Overview

By
Scott Doenges