

8-Inch Floppy Disk

Media Type: floppy disk

Date Introduced: 1971 by IBM, Alan Shugart

Dates in Use: Late 1971 – 1981

Physical Dimensions: 8" x 8", with 1 5/16" hole in centre

Storage Capacities: 100KB – 1+MB

Media Variations and/or Identifying Features: Originally designed to load microcode and diagnostics into large IBM mainframe computer systems, 8-inch diskettes became widely accepted as a data-storage medium. The first commercial 8-inch diskettes could only record on one side with storage capacities of less than 100 KB. In 1973, drives that could read up to 250 KB were introduced.

Common Manufacturers: IBM

Sources:

Computer History Museum "Computer History Timeline"
<http://www.computerhistory.org/timeline/> [accessed Oct. 23, 2007]

Digital Preservation Management: Implementing Short-Term Strategies for Long-Term Problems. "Chamber of Horrors: Obsolete and Endangered Media"
<http://www.library.cornell.edu/iris/tutorial/dpm/oldmedia/disks.html> [accessed Oct. 23, 2007].

Accurite. "Floppy Disk Drive Primer" <http://www accurite.com/FloppyPrimer.html>
[accessed Oct. 23, 2007].

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Assignment #2

DIGITAL STORAGE MEDIA

Media Format: 3-1/2 inch floppy disk, double-sided, double-density (DSDD)

Media Type: Disk

Date Introduced: 1986 by Apple

Dates in Use: 1986 - now (fading out)

Dimensions: 90mm x 94mm -- slightly longer than it is wide

Capacity: 720 kb (PC), 800 kB (Mac) for the DSDD type of disk

Media Variations and/or Identifying Features: spring-loaded metal cover, rigid plastic shell, diff. from DSHD (which has more capacity), write-protect mechanism

Common Manufacturers/Brands: Sony, Imation, IBM, 3M, and many other brands

Associated Hardware: 3.5" floppy disk drive (sometimes built in to PCs and older MACs)

Associated Software: OS (usually Windows/Mac to format disk), no software required.

Primary Usage: storage of files, transfer of data, back-up, software and driver installation (use recommended for short-term data storage only.)

Risks: shutter mechanism problem, catching inside the drive, getting stuck, and if mishandled, disk can break. Obsolescence is the main concern and risk right now, as the associated hardware is being phased out of being built-in to personal computers.

Condition Assessment: Will become obsolete in the near future.

Conservation Issues: Obsolescence of hardware - Most manufacturers have stopped making computers with 3 1/2" floppy drives built-in. Migrate data immediately and save the working media and hardware, if possible.

Sources:

Accurite. "Floppy Disk Drive Primer." <<http://www.accurite.com/FloppyPrimer.html>>

Entlich, Richard. "One Last Spin: Floppy Disks Head Toward Retirement."
<http://www.rlg.org/en/page.php?Page_ID=20492&Printable=1&Article_ID=1692>

UK National Archives. "Care, Handling, and Storage of Removable Media."
<http://www.nationalarchives.gov.uk/documents/media_care.pdf>

Wikipedia. "Floppy disk." <http://en.wikipedia.org/wiki/Floppy_disk>

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DIGITAL STORAGE MEDIA

Media Format: Zip disk

Media Type: (Disk, tape or solid state): Disk

Date Introduced: (year) 1990, Syquest introduced the 40 MB 5.25" removable hard disk cartridge; by 1992 Syquest upgraded the disks to 44MB and 88MB 5.25"; in spring 1993 Syquest introduced the 3.5" disk at 105MB.

Dates in Use: (years): 1990 - present

Dimensions: 3.88" x 3.92" (9.7 cm x 9.8 cm)

Capacity: currently Iomega offers 100, 250, 750 megabytes

Media Variations and/or Identifying Features: Iomega REV 35GB disk

Common Manufacturers/Brands: Iomega, Maxell, Fuji, Verbatim

Associated Hardware: (playback): Iomega Zip100 MB, 250 MB, 750 MB drives

Associated Software: Iomega Active Disk (software application that allows user to run the disks anywhere the disk is being used).

Primary Usage: Zip disks allow you to back up, transfer, secure and archive computer data. Enables user to transport large files and is portable. Can remove disk cartridge from drive and store in a secure place. Can also place a security password (password protection) on disk.

Risks: As disk sizes increase, zip drives that hold smaller formats will not read larger sized zip disks. There is a loss of compatibility. There are also issues regarding the potential loss of technical support for older zip disks.

Condition Assessment: TBD

Conservation Actions: Store disk properly in temperature controlled environments.

Resources:

Iomega website <http://www.iomega.com/zip/>

Lu, Cary. "Removable-drive wars flare. (SyQuest Technology, Iomega Corp developing new products to compete)," *Macworld*, July 1996.

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Assignment #2

DIGITAL STORAGE DEVICES—JAZ

Device Name: Jaz Drives

Date Introduced: 1GB drive introduced in 1995; 2GB drive introduced in 1997

Dates in Use: 1995 to 2003 (Iomega—primary manufacturer of Jaz storage media—discontinued production on Jaz drives but continues to provide support)

Dimensions: External drive-- 8.0" x 5.33" x 1.5"

Variations and/or Identifying Features: External drive that uses “hard disk” removable storage with 1GB or 2GB of memory; also comes as internal drive with removable storage; both external and internal drives originally used SCSI interface (adaptors for USB and Firewire have since been developed)

Common Manufacturers/Brands: Iomega Corporation, APS Technologies, LaCie

Associated Hardware: Iomega External and Internal Jaz Drives; APS Technologies' Jaz 2GB Pro; LaCie's 2 GB EKO External Jaz and 2GB d2 External Jaz

Associated Software: IomegaWare, Jaz Tools, Jaz Jet

Associated Media: 1GB and 2GB Jaz disks

Interface/Connectors: Originally a SCSI interface; in 1999, Iomega introduced USB adaptors and, later, Firewire connections (USB and Firewire both limited in operating system support)

Primary Usage: Jaz's portability and large capacity made it attractive for professionals—often professionals because the price of Jaz limited use in the general public's homes—to use it for creating, storing, cataloguing and sharing large files of graphic design, desktop publishing, multimedia, audio and video, among others.

Risk Assessment: An obsolete format, Iomega discontinued production on Jaz drives in 2003; external/removable drives tend to be more failure-prone than hard-drives; in 1996, the New York Times reported that Iomega estimates the Jaz disks' shelf-life to be 10 years; Iomega Jaz drives do not have internal cooling fans/devices, and therefore, constant use exposes disk and drive to continually high temperatures; the infamous "click of death" as experienced by many Jaz users describes the audible clicking sound the Jaz drive makes before it "dies" suddenly, affecting the disks as well (the "click of death" has also sparked class-action lawsuits to Iomega).

Conservation Actions: Jaz drives and disks are not recommended for long-term storage and any content on them should be duplicated in multiple storage media such as hard-drives, servers and other removable media more appropriate for long-term storage.

DIGITAL STORAGE MEDIA—JAZ DISKS

Media Format: Jaz Disks

Media Type: "rigid" disk/cartridge

Date Introduced: 1GB disk—December 1995; 2 GB disk—March 1998

Dates in Use: 1GB—1995 to present; 2GB—1997 to present [Iomega stopped production on new Jaz drives, but continues to sell Jaz disks and provide support]

Dimensions: 3.7 x 3.5 inches

Capacity: 1GB and 2 GB

Media Variations and/or Identifying Features: Removable storage disks with 3.5" rigid magnetic media; comes in 1GB and 2GB disks with the 2GB Jaz drive being backwards compatible (the 1GB drives, however, cannot read 2GB disks)

Common Manufacturers/Brands: Iomega

Associated Hardware: Iomega External and Internal Jaz Drives; APS Technologies' Jaz 2GB Pro; LaCie's 2 GB EKO External Jaz and 2GB d2 External Jaz

Associated Software: IomegaWare, Jaz Tools

Primary Usage: Jaz's portability and large capacity made it attractive for professionals—often professionals because the price of Jaz limited use in the general public's homes—to use it for creating, storing, cataloguing and sharing large files of graphic design, desktop publishing, multimedia, audio and video, among others.

Risk Assessment: An obsolete format, Iomega discontinued production on Jaz drives in 2003; 1GB Jaz drives cannot read 2GB disks (2GB drives are backward compatible, however); external/removable drives tend to be more failure-prone than hard-drives; in 1996, the New York Times reported that Iomega estimates the Jaz disks' shelf-life to be 10 years; Iomega Jaz drives do not have internal cooling fans/devices, and therefore, constant use exposes disk and drive to continually high temperatures; the infamous "click of death" as experienced by many Jaz users describes the audible clicking sound the Jaz drive makes before it "dies" suddenly, affecting the disks as well (the "click of death" has also sparked class-action lawsuits to Iomega).

Conservation Actions: Jaz drives and disks are not recommended for long-term storage and any content on them should be duplicated in multiple storage media such as hard-drives, servers and other removable media more appropriate for long-term storage.

Sources

Macworld. San Francisco: Nov 1998. Vol.15, Iss. 11; pg. 63 accessed at <http://proquest.umi.com/pqdweb?index=11&did=34898809&SrchMode=1&sid=1&Fmt=4&VInst=PROD&VType=PQD&RQT=309&VName=PQD&TS=1161272301&clientId=9269>.

PC Magazine; "Definition of: Jaz disk" accessed at http://www.pcmag.com/encyclopedia_term/0,2542,t=Jaz+disk&i=45595,0.0.asp.

Iomega Support & Downloads; Manuals and Specifications page accessed at https://iomega-na-en.custhelp.com/cgi-bin/iomega_na_en.cfg/php/enduser/std_adp.php?p_faqid=14432#jaz.

MacInTouch Special Reports, Iomega Problems accessed at <http://www.macintouch.com/jazprobs.html>.

Manes, Stephen. "Jaz Drive: A Lot of Backup Insurance in a Small Package." New York Times. (Late Edition (East Coast)). New York, N.Y.: Jul 9, 1996. pg. C.7, accessed at <http://ezproxy.library.nyu.edu:2082/pqdweb?index=72&did=9826250&SrcHMode=1&sid=3&Fmt=3&VInst=PROD&VType=PQD&RQT=309&VName=PQD&TS=1161415431&clientId=9269>.

Gibson Research Corporation. "What is the Click of Death?" accessed at <http://www.grc.com/tip/codfaq1.htm>.

Quarter Inch Cartridge (QIC)

Media Type: Magnetic tape

Date Introduced: 1972 by 3M

Dates in Use: 1972 – 1995 (QIC DC600); 1990-1995 (G2000 tape); 1995 – present (Travan cartridge)

Dimensions: 3.5-inch or 5.25-inch cartridges, with up to 1500 ft. of tape.

Storage Capacities: 250 MB – 50 GB

Media Variations and/ or Identifying Features: QIC is a linear format that was popular in the eighties and early nineties. They were available in the standard sizes, DC600 and DC2000, and were later replaced by QIC-Wide and Travan.

Common Manufacturers: Athana, Verbatim, Imation.

Associated Hardware: Single-capstan drive units containing magnetic read/write heads and electronics for read/write, motion control, and system interface functions. These drives are packaged in both 3.5-inch and 5.25-inch form factors.

Sources:

Digital Preservation Management: Implementing Short-Term Strategies for Long-Term Problems. “Chamber of Horrors: Obsolete and Endangered Media”
<http://www.library.cornell.edu/iris/tutorial/dpm/oldmedia/tapes.html> [accessed Oct. 23, 2007].

QIC Tape Solutions. <http://www.qic.org/>. [Accessed 2 November 2007].

Digital Data Storage (DDS) tape

Media type: Magnetic tape

Date Introduced: 1989 by Sony and HP

Dates in Use: 1989 - present

Physical Dimensions: 7.3cm x 5.4 cm x 1.0cm cartridge, 4mm tape

Storage Capacities: 1.3 GB – 80 GB

Media Variations and/or Identifying Features: DDS is a helical scan technology that uses the same 4mm metal particle tape as digital audio tape (DAT). Computer-grade DDS tape, however, must meet strict ANSI standards with a much lower Bit Error Rate than most DAT tape.

Common Manufacturers: Sony, Maxell, TDK, Fujifilm

Sources:

Avery, Lynne. "A Brief History of Tape." Exabyte.
www.exabyte.com/support/online/documentation/whitepapers/history.pdf [accessed 2 November 2007].

DAT Manufacturers Group Website. <http://www.datmgm.com/> [Accessed 2 November 2007].

Digital Preservation Management: Implementing Short-Term Strategies for Long-Term Problems. "Chamber of Horrors: Obsolete and Endangered Media"
<http://www.library.cornell.edu/iris/tutorial/dpm/oldmedia/tapes.html> [accessed Oct. 23, 2007].

Digital Linear Tape (DLT)

Media Format: Magnetic Tape

Date Introduced: 1985 (as TK50) by Digital Equipment Corporation (DEC)

Dates in Use: late 1980s - present

Dimensions: approx. 4"x4"x1" cartridge, with 1/2" linear tape

Storage capacity (native/compressed): 35/70 GB (DLT 7000); 40/80 GB (DLT 8000); 110/200 GB (SuperDLT)

Media Variations and/or Identifying Features: Data is recorded linearly, forming multiple parallel tracks along tape. Developed for client/ server environments and network backup. Features low-tension linear recording path, multiple channel read/write system, high capacity, data integrity. Backwards compatible through generations of DLT tape products.

Common Manufacturers: Quantum, Fujifilm

Sources:

Campbell, Brad. "Digital storage device: DLT Drive" MIAP Student Work Archive. http://www.nyu.edu/tisch/preservation/program/student_work/index.shtml [accessed October 23, 2007].

Digital Preservation Management: Implementing Short-Term Strategies for Long-Term Problems. "Chamber of Horrors: Obsolete and Endangered Media" <http://www.library.cornell.edu/iris/tutorial/dpm/oldmedia/tapes.html> [accessed Oct. 23, 2007].

Khurshurov, Andrei. Essential Guide to Computer Data Storage: From Floppy to DVD. Prentice-Hall, 2001. Accessed online by subscription at <http://safari.informit.com/0130927392/pref01>

Linear Tape-Open (LTO) Tape

Media Type: Magnetic tape

Date Introduced: 1998 by IBM, Quantum, and Hewlett-Packard; 2000 (LTO 1); 2002 (LTO 2); 2004 (LTO 3); 2007 (LTO 4)

Dates in Use: 2000 – 2006 (Accelis format); 2000 – present (Ultrium format).

Dimensions: 4"x4"x1" cartridge (Ultrium format);

Storage Capacities: 200 GB (LTO 1); 400 GB (LTO 2); 800 GB (LTO 3); 1.6 TB (LTO 4)

Media Variations and/or Identifying Features: Developed as an alternative “open format” technology to DLT that allowed users to have multiple sources of drives and media, and compatibility between products from different vendors. LTO is a linear multi-channel, bi-directional format with servo technology, data compression, track layout and error correction code. The standard form-factor of LTO technology is known as Ultrium. The Ultrium format is optimized for high capacity and performance with high reliability, and uses a single reel cartridge. Another form-factor, known as Accelis, was developed for fast data access, and used a two-reel cartridge that loaded at the midpoint of the tape. It never gained popularity and was discontinued in 2006.

Common Manufacturers: Fujifilm, Imation, Maxell, Sony, TDK.

Sources:

Wikipedia. “Linear Tape-Open.” http://en.wikipedia.org/wiki/Linear_Tape-Open [accessed 2 November 2007].

LTO Technology. <http://www.lto.org>. [Accessed 2 November 2007].

5.25-inch Magneto-optical (MO) Disk

Media Type: Magneto-Optical

Date Introduced: 1988

Dates in Use: 1988 – present

Dimensions: 5.25”

Storage Capacity: 650/600 MB (available 1988); 1.3 GB (available 1991); 2.6/2.3 GB; 5.2/4.8/4.1 GB

Media Variations and/or Identifying Features: Rewritable optical system that writes magnetically (with thermal assist) and reads optically. The 5.25-inch system is one of two ISO standards for MO systems. MO drives have varying capacities, reflecting different sizes of the data sector (bytes/sector).

Common Manufacturers: Fujitsu, Maxell, Nikon, Olympus, Philips, PDO Media, Sony, Verbatim

Associated Hardware: 5.25-inch MO drive. Drives are backwards compatible with disks written on older drives.

Sources:

Khurshdurov, Andrei. Essential Guide to Computer Data Storage: From Floppy to DVD. Prentice-Hall, 2001. Accessed online by subscription at <http://safari.informit.com/0130927392/ch05>

3.5-inch Magneto-optical (MO) Disk

Media Type: Magneto-Optical

Date Introduced: 1991

Dates in Use: 1991 – present

Dimensions: 3.5”

Storage Capacity: 128 MB (available 1991) -1.3 GB (available currently)

Media Variations and/or Identifying features: Rewritable optical system that writes magnetically (with thermal assist) and reads optically. The 3.5-inch system is one of two ISO standards for MO systems. MO drives have varying capacities, reflecting different sizes of the data sector (bytes/sector).

Common Manufacturers: Fujitsu, Maxell, Nikon, Olympus, Philips, PDO Media, Sony, Verbatim

Associated Hardware: 3.5 inch MO drive. Drives are backwards compatible with disks written on older drives.

Sources:

Khurshdurov, Andrei. Essential Guide to Computer Data Storage: From Floppy to DVD. Prentice-Hall, 2001. Accessed online by subscription at <http://safari.informit.com/0130927392/ch05>

Compact Disk (CD)

Media Type: Optical disk

Date Introduced: 1985 (CD-ROM); 1988 (CD-R); 1997 (CD-RW) by Philips and Sony;

Dates in Use: 1985 - present

Physical Dimensions: 12cm diameter, 1.2mm thick, 15mm centre hole

Storage Capacities: 550 MB (obsolete); 650 MB (CD-ROM); 700 MB (CD-R, CD-RW)

Media Variations and/or Identifying Features:

Compact disc digital audio (CD-DA), used for mass-market music, and Write-Once Read-Many (WORM) CD, a commercial format, are read-only formats of CD, i.e. CD-ROM. Compact disc-Recordable (CD-R), which are like WORM CDs but used non-commercially, and Compact Disc-Rewritable (CD-RW) are writable formats of CD. CD-Rs cannot be erased or reused, while CD-RWs can be used, erased and reused.

Compact discs are comprised of a substrate layer, a reflective layer and a protective lacquer layer. The substrate is usually made from polycarbonate plastic but can also be made of metal or etched glass. The reflective layer is aluminium or occasionally gold. Read-only CDs are made from molded polycarbonate with a spiral track of pits that hold the information. Read-only CDs are silver on both sides of the CD. Writable CDs are also made from molded polycarbonate but have dyes added to the laminate structure. Writable CDs appear green, gold or blue on one side.

Common Manufacturers: Fujifilm, Hewlett-Packard, Matsushita, Toshiba, Sony, Verbatim.

Sources:

BC Archival Preservation Service. 2001. Optical Disk Media. AABC Newsletter 11(3). Vancouver: Archives Association of British Columbia.
http://aabc.bc.ca/aabc/newsletter/11_3/bc_archival_preservation_service.htm. [Accessed 3 November 2007]

Byers, Fred R. Care and Handling of Cds and DVDs: A Guide for Librarians and Archivists. Washington, DC: Council on Library and Information Resources, 2003.

Optical Storage Technology Association. <http://www.osta.org/osta/index.htm>. [Accessed 2 November 2007].

**Handling New Media Fall 2006
Assignment #2**

DIGITAL STORAGE MEDIA

Media Format: DVD (Digital Versatile Disc or Digital Video Disc)

Media Type: Optical disc

Date Introduced: 1996 in Japan, 1997 in the U.S., 1998 in Europe, 1999 in Australia

Dates in Use: 1996 into the present day

Dimensions: The standard size is 1.2mm thick and 120mm in diameter

Capacity:

DVDs may have up to four layers of information, with two layers on each side. To read information on the second layer (on the same side), the laser focuses deeper into the DVD and reads the pits on the second layer, referred to as the "layer switch" or the "RSDL (reverse spiral dual layer) switch". To read information from the other side of the DVD, almost all DVD players require the user to manually flip the disc.

Physical Size	Single Layer Capacity	Dual/Double Layer Capacity
120mm, single sided	4.7GB	8.5GB
120mm, double sided	9.4GB	17GB
80mm, single sided	1.4GB	2.6GB
80mm, double sided	2.8GB	5.2GB

Media Variations and/or Identifying Features: DVD is actually a family of physical and application formats, of which there are three prerecorded formats: DVD-Video, DVD-audio, and DVD-ROM. A DVD disc may contain any combination of DVD-Video, DVD-Audio, and/or DVD-ROM application content.

1. **DVD-Video:** DVD-Video is principally a video and audio format used for movies, music concert videos, and other video-based programming. The DVD-Video provides up to 480 horizontal lines of resolution, a significant improvement over the 260 horizontal lines of resolution of standard VHS, and the 330 horizontal lines of resolution for broadcast TV. To minimize the amount of data required for video, DVD-Video uses MPEG-2 (Motion Pictures Experts Group) to compress its digital information.

2. **DVD-Audio:** The DVD-Audio format features high-resolution 2-channel stereo and multi-channel (up to 6 discrete channels of) audio. This format made its debut much later, in the summer of 2000, due to delay in squaring away the issue of copy protection. Despite widespread availability of DVD-Audio/Video players, to date, DVD-Audio titles are still very few in number and have not reach mainstream status. In comparison with the CD, DVD-Audio offers higher sampling rate capabilities, reproduction of up to six discrete audio channels, lossless data compression, and the capability to include extra materials (liner notes, lyrics) as digital files.
3. **DVD-ROM:** DVD-ROM is a data storage format similar to the CD-ROM. DVD-ROMs can only be used in DVD-ROM drives in computer systems. They allow for data archival and mass storage, as well as interactive and/or web-based content.

DVD also exists in recordable or rewritable formats. Write-once formats allow you to record to the disc once, while rewritable formats allow you to re-record over a previously recorded segment, making the entire disc reusable for repeated recordings (much like a VHS tape). There are three different, and incompatible, recordable DVD formats:

1. DVD “dash” (-): The first recordable format released on the market, the DVD-R and DVD-RW were developed by Pioneer and backed by the DVD forum.¹ The DVD “dash” has broader playback capabilities than DVD “plus.” The **write-once** formats use a red laser to record, permanently transforming a dye-recording layer on the DVD-R disc. Like the DVD-Video format, the video information is written as a single track, starting from the inner-most portion of the disc and spiraling out to the outer edge. DVD-R formats report a better than 90% backwards-compatibility with existing DVD-video players and DVD-ROM drives. The **rewritable** formats use phase-change technology, allowing video and data to be recorded incrementally as a series of sequential recording sessions. The format also allows for a single start-to-finish disc-at-once recording session, when the disc is finalized at the end. Finalization is a process that essentially "completes" the recording process and makes the disc readable by playback-only devices. DVD-RW has a backwards compatibility rate of roughly 65% with existing DVD-Video players and DVD-ROM drives.
2. DVD “plus” (+): The write-once format, or DVD+R, uses a red laser to permanently transform a dye-recording layer on the DVD+R disc, and allows editing to be performed until the disc is finalized. The finalization procedure takes only one minute, as

¹ The DVD Forum is an international association of hardware manufacturers, software firms, content providers and other users of Digital Versatile Discs. The Forum's purpose is to exchange and disseminate ideas and information about the DVD Format and its technical capabilities, improvements and innovations (www.dvdforum.org).

compared to the DVD-R format. Also, its tracking and speed control are less susceptible to interference and error than the DVD-R. The format is about 85% backwardly compatible. The DVD+RW rewritable format uses phase-change technology for multiple re-rewrites, up to 1,000 cycles. The DVD+RW is about 65% backwardly compatible. DVD+R(W) has a more robust error management system than DVD-R(W), allowing for more accurate burning to media independent of the quality of the media.

3. **DVD-RAM:** This format acts like random access memory (RAM), and is similar to a removable hard disk. DVD-RAM uses phase change dual and magneto-optic technologies for up to 100,000 recording cycles. The DVD-RAM is ideal for computer data storage due to its removable hard disk characteristic and robustness. Data storage is random and non-linear, meaning data can be stored in non-contiguous blocks, much like a computer hard disk.

Common Manufacturers/Brands: TDK, Sony, Verbatim, Ritek, Magnavox, Philips, Panasonic, Pioneer, Matsushita, RCA, Samsung, Sharp, Toshiba, Zenith
(see http://en.wikipedia.org/wiki/List_of_DVD_manufacturers for a more complete list)

Associated Hardware: DVD player (DVD drive with MPEG-2 decoder), or DVD computer drive

Associated Software: Playing a DVD on a DVD computer drive requires DVD software, such as Apple's DVD Player, WinDVD, VLC Media Player, MPlayer, and Power DVD.

Primary Usage: DVDs are primarily used for video storage, although, as discussed above, they may also be used for audio and data storage.

Risks: Information stored on DVD is at risk in three ways: from physical damage, from format obsolescence and from incompatibility between DVDs and DVD drives. Physical damage, which may occur at the data layer (wear the data is stored), or the polycarbonate substrate layer, can potentially render the disc unreadable, and can be the result of improper handling by the user or environmental factors. Improper handling primarily damages the substrate layer whose purpose is to focus the laser on the data layer beneath it. Anything in or on the polycarbonate layer that interferes with the ability of the laser to focus on the data layer will result in the misreading of data, such as, fingerprints, scratches, smudges, dirt, solvents and excessive moisture (which polycarbonate will absorb). Assuming proper physical handling, deterioration of the data layer is the primary cause for disc degradation, and ultimately, the "end of life" for the disc. Environmental factors that may damage the data layer include inappropriate temperature and relative humidity, exposure to light for DVD-Rs, exposure to moisture, exposure to microwaves, and improper individual storage.

Obsolescence is another risk for the DVD format, both for the media storage format itself, and for its associated hardware (and software for playback in computer drives). New technologies may potentially supersede the DVD storage format and its related hardware. Another concern is the obsolescence of associated compression schemes: MPEG-2 encoding for DVD-video, and the Meridian Lossless Packing (MLP) algorithm for DVD-audio. Once more advanced encoding formats supersede current formats, the requisite decoders to read compressed files on the media storage device will also disappear.

DVD-Videos also contain region codes, designed to limit playback and distribution a particular region of the world. As a result, not every disc is readable on every playback device, and vice versa (although all region players do exist).

Lastly, compatibility between discs and drives is an issue when recording data on DVD-R/RWs and DVD+R/RWs; frequently, recorded data may be readable by some drives but not others.

Condition Assessment: Under proper storage conditions, DVD-R and DVD+R discs should have life expectancy of 100 to 200 years or more. DVD-RW, DVD+RW, and DVD-RAM discs should have a life expectancy of 25 years or more. Little information is available for DVD-ROM discs (including audio and video), and thus there is greater uncertainty for their life expectancy, currently estimated at anywhere between 20 to 100 years. Physical longevity however, may be more of a peripheral concern in the face of compatibility issues and format obsolescence. Compatibility between recordable DVDs and DVD drives is unreliable, and testing of this issue has revealed that the compatibility failure rate may be very high.

Furthermore, both Sony and Toshiba have designed new DVD formats (the Blu-Ray and HD-DVD systems respectively), one of which is expected to succeed the current DVD technology. We are currently witnessing a battle for market penetration between the competing formats, although some experts suspect we may use both. The two formats each claim to include backward compatibility; however, it is only a matter of time before current DVD technology goes the way of Beta, and now, VHS.

Conservation Issues: DVD is not an archival storage medium, and its use – particularly that of recordable media – for long-term preservation constitutes a great risk. If possible, digital data should be stored on hard disks and backup tapes, with the DVD format reserved for access. Access copies should be migrated to newer storage formats as they emerge to avoid problems of backward compatibility.

http://portal.unesco.org/ci/en/ev.phpURL_ID=22734&URL_DO=DO_TOPIC&URL_SECTION=201.html.

<http://www.timefordvd.com/tutorial/DVDTutorial.shtml>

<http://en.wikipedia.org/wiki/DVD%2BR>

<http://www.itl.nist.gov/div895/carefordisc/CDandDVDCareandHandlingGuide.pdf>

CompactFlash

Media Type: Solid State

Date Introduced: 1994

Dates in Use: 1994 – present

Physical Dimensions: 43mm x 36mm x 3.3mm (CF Type I); 43mm x 36mm x 5mm (CF Type II)

Storage Capacities: 16 MB – 12 GB

Media Variations and/or Identifying Features: CompactFlash cards weigh about half an ounce and are the size of a matchbook. Both Type I and Type II cards have 50 pins and conform to ATA specs. CompactFlash is a non-volatile solid state storage medium, meaning that the cards contain no moving parts. Unlike SmartMedia cards, CompactFlash cards have built-in controllers.

Common Manufacturers: Canon, Hitachi, Lexar, SanDisk.

Sources:

Compact Flash Association. “Compact Flash Association, CF and Compact Flash ® Frequently Asked Questions.” <http://www.compactflash.org/faqs/faq.htm> [Accessed 2 November 2007].

SmartMedia Card

Media Type: Solid State

Date Introduced: 1995 by Toshiba

Dates in Use: 1995 - 2001

Dimensions: 45mm x 37mm x 0.76mm

Capacity: up to 128 MB

Media Variations and/or Identifying Features: An ATA (parallel) card with no built-in controller. Weighs 2g. Uses NAND flash memory.

Common Manufacturers: Toshiba, Samsung, Lexar, Sandisk

Associated Hardware: SmartMedia reader. Used with Toshiba, Fuji, and Olympus digital cameras.

Sources:

Khurshdurov, Andrei. Essential Guide to Computer Data Storage: From Floppy to DVD. Prentice-Hall, 2001. Accessed online by subscription at <http://safari.informit.com/0130927392/pref01>

Toshiba. "TOSHIBA INTRODUCES ITS 64MB AND 128MB SMARTMEDIA CARDS" http://www.toshiba.com/taec/news/press_releases/2000/to-115.jsp [Accessed 2 November 2007].

Wikipedia. "SmartMedia" <http://en.wikipedia.org/wiki/SmartMedia>. [Accessed 2 november 2007.].

Lauren Sorensen
Handling New Media
Fall 2006
Assignment #2

DIGITAL STORAGE MEDIA

Media Format: 5 1/4" floppy disk format, a magnetic disk recording medium. Also known as 5 1/4" "flexible diskette" or "minifloppy."

Media Type: (Disk, tape or solid state) Disk.

Date Introduced: (year) 1976, 1978.

Dates in Use: (years): 1976-late 1980s.

Dimensions: 5 1/4" (13.3 cm) by 5 1/4"

Capacity: There were three types of 5 1/4" floppy disks made. Single Side, with a capacity of 160 kilobyte (KB) 5.25" Double Side, 360 kilobyte (KB) capacity 5.25" Double Side High Density, 1.2 megabyte (MB) capacity.

These densities are not compatible.

Media Variations and/or Identifying Features:

The disks can be hard or soft-sectored, and effects which drive
The different capacities mentioned above can be identified by

Common Manufacturers/Brands:

Shugart Associates, Radio Shack, Apple

Associated Hardware: (playback) a 5 1/4" floppy disk drive.

Associated Software: Software compatible with the formats contained on the disk must be present on the computer which the files will be uploaded to, and downloaded from in order for the data to be retrieved. See conservation issues.

Primary Usage: The storage of small files such as documents or simple graphics, meant to be a portable media.

Risks: The presence of strong magnetic fields, bending, dirt and dust, or any Improper or unavailable drivers for the appropriate operating systems will render

any reading of the media impossible.

Condition Assessment: The floppy disks are bendable plastic, and the information is found inside, on round plastic disks coated with magnetic oxide particles. The disks are enclosed in a plastic jacket. 5 1/4" floppy disks feature a "write-enable" slot on the upper right corner. This can be covered with a sticky tab to disable this function.

Conservation Issues: As with other magnetic media such as videotape, these disks are subject to "sticky shed" syndrome, or binder hydrolysis, and therefore not recommended for long term storage situations. There is also a greater possibility for the introduction of dirt, dust and other debris onto the data-carrying magnetic head because one section of the floppy is open. These disks are obsolete, no longer available from manufacturers, so reformatting decisions would have to be made about the proper media to store data retrieved from the disk. 5 1/4" floppy disk drives are also no longer manufactured, which presents the issue of simple retrieval of information from the floppy disk. Many early forms of the 5 1/4" floppy did not feature any markings to distinguish single-density from double-density. In fact, many were marketed as single-density, when in fact both sides of the magnetic disk were coated.

<http://www.computerhope.com/help/floppy.htm>

http://en.wikipedia.org/wiki/Floppy_disk

<http://www.tpub.com/neets/book23/103.htm>

http://webworld.unesco.org/safeguarding/en/all_magn.htm