



Knowing the Digital Difference

In case you're more familiar with traditional photography, it's important to understand that digital photography differs from film in many ways, and demands a different set of memory-keeping techniques.

With film, you take pictures, get film processed, order prints, store them in albums and usually keep the negatives as a backup. With digital, your photos are recorded as electronic data that's saved onto a limited-space memory chip in your camera. You can instantly preview your photos on the viewing screen, delete, "re-shoot," download them onto your computer, share and save electronically as well as print. But what about backing up?

Hardware

Computer hardware and media are very convenient ways to store and manage your photo collections. However, you should be aware of some of the issues around using them to store your precious memories for the long term.

Storage Devices

You may have noticed that some of the storage devices that were popular a few years ago are no longer used or even available. While floppy disks were the main storage medium in the early nineties, today you can't fit a single photo from a high-quality digital camera onto a floppy. In addition, new media will eventually replace the media we're using today. For example, CDs and DVDs will be replaced by media with higher capacities such as Blu-ray and HD DVDs. Over time, other media will replace these.

Do keep in mind that some computers and readers are built to read older storage media, but in general, you'll need to transfer your photo files from one medium to another as the technology evolves.

Tips:

- Make sure that all of your photos are stored on media that you can read on the computers you are using at any particular point in time.
- If you get a new computer, check all of your previous storage media to make sure the new computer can read them before you dispose of your old computer.
- If a medium is becoming harder to find in the stores, make sure you transfer your photos to a newer medium. Most likely, you'll be able to use a program like Windows Explorer or a backup program to make the transfer. If you use a backup program, make sure that it stores your files in a format that can be read by other programs such as Windows Explorer. Some backup programs store files in a format that can be read only by that program.
- Make sure you create backups on media with up-to-date technology.



Hard Disk Drives

Keep in mind that computer hard drives have a limited lifespan, and at some point in time, they will most likely fail. While they generally last for several years or more, they can also fail without warning. And when they do, it's sometimes, but not always, possible to "rescue" some of the files from the drive. Unfortunately, this can be quite expensive, and there's no guarantee that all photos - or the organizational structure of your collection - can be recovered.

An [external hard drive](#) that is disconnected from your computer is a good option for preserving digital photos; however it's possible for this drive to fail as well, especially if you haven't used it for a long time. In any case, it's likely to last longer than the one you keep running at all times.

Tips:

- Store your photos on more than one drive: It's unlikely that more than one drive will fail at the same time unless they are both connected to the same computer, which is then affected by either a virus or power surge.
- Store an extra copy of your photo collection on CD or DVD.
- Treat your hard drives very gently: They are susceptible to shock.
- Do not plug or unplug external drives from your computer while they're transferring photos or other data.
- If you keep photos on an external hard drive that's not connected to a computer, make sure you connect it to a computer and power it up every couple of months to make sure it's working properly.

CDs and DVDs

CDs and DVDs deteriorate over time, and their longevity depends on the quality of manufacture. It's better to purchase high-quality discs designed for archival applications or photo preservation. [These discs](#) are significantly more expensive than standard discs but are predicted to last a century or more. Low-quality discs may only last a few years, depending on storage conditions.

At the same time, CDs or DVDs written on one computer may not be readable on the CD/DVD drive in another computer. This may be due to the poor quality of the initial recording or an incompatible recording format.

Tips:

- Store your photos on more than one CD or DVD as it's unlikely that more than one disc will fail at exactly the same time
- Store your CDs and DVDs in high-quality sleeves or boxes, and in a cool, dark place. Store them vertically rather than horizontally stacked on one another.
- Make sure that you use a DVD format that you can read on all your computers (i.e. DVD+, DVD-, Blu-Ray and HD). Most computers can read the original DVD formats. The new high definition Blu-Ray



and HD DVD formats require compatible read/write devices as they are not compatible with earlier DVDs.

- Use write-once (+/-R) CDs or DVDs as opposed to read-write (+/-RW) as they are more reliable and more robust for reading on different computers.
- If you buy a new computer, make sure that it can read your old discs.
- If you want to label a DVD or CD, use only special disc marker pens, disc label paper or products that label discs directly (i.e., Epson printers, HP LightScribe).
- Access more detailed information on the proper care and handling of CDs and DVDs at <http://www.itl.nist.gov/div895/carefordisc/>.

Camera Phones

Have you noticed an improvement in the quality of pictures people are taking with camera phones? Combined with the fact that you almost always have your mobile phone with you, it's likely that some of your valued photo memories are on your phone! Unfortunately, many people leave photos on their phones and never transfer them to store, print and share with others. As a safety measure, make sure that you frequently copy your valued camera phone photos to your computer or wireless service, and then make sure these photos are backed up along with your other photos.

Check the user manual of your phone to learn how to do this. Typical methods for transferring photos are:

- Use a data cable or wireless connection to connect the phone with your computer and transfer your photos or "synchronize" your phone and computer.
- Some phones have a memory card that you can remove and insert directly into your computer, or into a card reader that connects to your computer. Sometimes these cards are hidden behind the battery so you may need to consult the user manual to find it.
- If it has the capability, send photos from your phone to your own e-mail address. Note that depending on your service plan you may be charged extra fees.
- Upload to your provider's online storage service, if available. Make sure that the storage service supports full-resolution pictures taken by your camera phone, and not thumbnail or scaled-down version of your pictures.
- Make prints. Some mobile service providers let you order prints, or you can use your phone's memory card to have them made at compatible retail kiosks.

Tip:

- Always transfer photos from your phone to your computer or to the storage service provided by your wireless carrier when you've taken any important photos that you don't want to lose.

Flash Memory

Flash memory, also referred to as USB drives, thumb drives, jump drives and camera cards are convenient for short-term portable storage and transferring your photos between devices. However, these devices are



not designed for long-term storage. Also, due to the large number of types of flash memory formats, [technology obsolescence](#) is a concern five to ten years from now.

Tip:

- Always transfer photos from your camera card to your computer, or copy them to online storage, make a backup, or make prints of the important photos you don't want to lose. [Learn more.](#)

Older Storage Media

Floppy disks and tapes will deteriorate over time with their actual longevity depending on the quality of manufacture and conditions of storage and handling. The contents can be damaged by magnetic fields, and unfortunately, there's currently no easy way for you to determine the expected lifespan of the storage media.

In addition, please be aware of possible incompatibilities:

- Tapes come in many different formats, and tapes written on one computer may not necessarily be readable on another computer.
- Floppy disks or tapes written on older or faulty computers may not be readable on another computer. Also, floppy disks will not hold enough of your photos to make it worth using for backup. [Learn more.](#)
- Newer computers will not have the ability to read these media.

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Copying Photos from One Place to Another

When you copy your photos from one place to another such as from a hard drive to a CD, it's always possible that something could go wrong. For example, a photo may not be readable in the new location because the file is corrupted in some way. It's also possible that not all files transfer because there's not enough space in the new location.

Tips:

- Double check that the correct number of photos transferred.
- Check the combined file sizes of all the photos in the folder where the photos came from as well as in the folder where you copied them. Make sure that the same amount of data is stored in both places. With Windows, right click on the folder name, then click on "properties" to get the combined size of all files plus the number of photos.
- Use photo software to check the photos in the new location.

If you're copying large folders containing many photos onto CDs or DVDs, you might want to break them up into subfolders that match the capacity of your disc so that you can keep track more easily. Be aware, that a DVD labeled with 4.7 GB capacity, for example, may in reality only hold around 4.2 GB of photos, so you may want to limit your folder sizes to this amount. Other disc types have similar capacity limitations where the



actual available capacity is less than that indicated on the packaging. This is because extra administrative data takes up space on these discs.

Software

Because of the complexity of modern software, including operating systems and applications, and because of malicious viruses, it's also possible that photo files can get lost or damaged because of software problems.

Viruses

Computer viruses can damage, alter or erase photo files, and as a result, the photos may no longer be visible.

Tips:

- Always use the most up-to-date anti-virus software.
- Keep backup copies of your most valuable photos on media or devices that are not connected to a computer such as CDs, DVDs or external hard drives or make prints.
- Even photos stored on a computer that's not connected to the Internet can be vulnerable to a virus, and should be protected with anti-virus software. Viruses may be transferred via media that you attach to the computer such as USB drives, external hard drives or insert such as CDs or DVDs created on another computer.
- Use write-once CD-R and DVD-Rs to backup your data: Even if a virus affects your computer, the photo files on the disc cannot be damaged. Ask for assistance at the store to find these types of discs.

Mistakes

It happens: People lose photos. At some time, you may have mistakenly erased an entire folder on your computer that's full of photos, or dragged and dropped a folder into another folder where it's gone "missing." In effect, those photos could get lost, especially if the folder isn't backed up again

Tips:

- Always be very careful when moving folders around with Windows Explorer or other applications that allow you to drag and drop, or cut and paste complete folders.
- If you're concerned that you or someone might have made this kind of mistake on your computer, take a look at your photo collection to see if anything appears to be missing. Some software packages allow you to print out a list of the folder names together with the file names, and you can use these lists to make sure your collection is complete.
- If you know that some photos are missing, search your entire computer for those photos. You might find them in an unexpected location. [Note: the computer's search function does not search the recycle bin or trash can, so you'll need to open it and see if the missing photos are there.]



- Warning: If you use Windows Explorer to erase photos from your camera, they will not be saved to the recycle folder on your computer, they'll permanently be deleted.
- Always double check to make sure you've copied all the photos onto your computer before erasing them from the camera.

Outdated Software

Just as computer hardware becomes obsolete, it's possible that the software you've been using will no longer work on a brand new computer with a new operating system. While this shouldn't affect your ability to look at your photos using a different program, you may have stored important information about your photos using the old software such as:

- Assignments of your photos to one or more albums
- Keywords
- Titles or captions
- Some edits to the photos

If you then decide to buy a different software package, this information may no longer be available to you.

Tips:

- Before buying a new computer, make sure your favorite software will work on it, or that a new version of that software is available.
- Go to the website of the company making your software periodically to make sure it's still providing support. Sometimes it happens that the software stops working on your computer and you'll need to reload it or get help from the manufacturer. This is also the case if you have a hard drive failure and need to reload the software onto a new disk drive.

File Format

Just as there are changes in computer hardware and computer software, it's possible that the file types we use for storing photos may also change in the future. While "JPEG" is currently the most popular format for consumer photos, discussions arise in the digital photo industry about possible new formats that will bring about quality improvements and other advantages. On the other hand, this means that you may end up with multiple file formats in your photo collection and may need to convert your photo collection to the new format. Please ask knowledgeable friends for advice or check with your camera or software manufacturer to find out what file format they support. Not to worry: JPEG will continue to be supported for many years to come, but best to remain watchful!

Other Factors

In addition to hardware and software issues, there are a number of other factors that can impact the longevity of your stored photo collection. Here you can learn more about maximizing the life of your photos — whether printed or stored digitally.



Aging of Storage Materials

All materials may be vulnerable to the effects of aging, and the term “degradation” refers to the reduction in quality of the materials used to preserve a photo. It’s a natural consequence of the chemical changes that happen to plastics, dyes, adhesives and even metals over time — the same materials that are used for [prints](#), [hard drives](#), and for [CDs and DVDs](#) which we use to store digital photo files.

The rate of degradation of hard drives, magnetic tape, and CDs and DVDs will also depend on:

- Proper disc handling (i.e., no scratches, shock)
- Proper storage (i.e., temperature, light, humidity)
- Initial recording quality (i.e., defect free disc, recorder quality)
- Disc construction which varies by manufacturer

While magnetic media are vulnerable to chemical degradation, physical damage and demagnetization, mechanical failure may also reduce the expected lifetime of your photos. Lifetimes range from about five years for the typical hard disk to 10-30 years for magnetic tape.

In general, high quality CDs and DVDs will last longer than magnetic media, however these discs are also vulnerable to chemical degradation and corrosion. Life expectancy predictions from manufacturers and others for CD and DVD discs range from five to 300 years, depending on the disc type and the person making the prediction. While a standard International Organization for Standardization, or ISO, test method for making CD-R lifetime predictions does exist, manufacturers do not yet consistently use this method to test their products.

In the future, the industry will develop test methods to provide better information for consumers to answer such as:

- Which disc should I buy?
- Will the brand make a difference?
- What should I look for in a disc?
- What is the minimum number of years the disc will last?
- Will price make a difference?

Technology Obsolescence

Computer and digital photo technologies have continued to evolve rapidly, and as a result, we have seen constant improvements in camera, scanner, computer and software capabilities. The downside of this tremendous development is, of course, technical obsolescence: Computers, storage devices, media, cameras, camera phones and software purchased as recently as three years ago may no longer work as well with newer products. This means that you’ll need to watch what’s happening with computers, or get some sound advice on how to maintain your photo collection over time so that you may continue to enjoy it, always.



Internet Services

Online services such as Kodak EasyShare Gallery, Shutterfly, Snapfish and others provide convenient ways to backup, print and share your photos with family and friends. Some wireless carriers such as Sprint also offer Internet photo sharing and storage services that allow subscribers to upload, print and share pictures taken from your camera phone or computer.

In addition, some services provide fee-based online backup services. In looking into these, be aware of their terms and conditions, and be sure to ask some basic questions such as, *“Does the service allow me to store my photos at their original resolution or does it always compress them to save space? Does the service guarantee the safety of my photos? If so, does this require payment of fees? What happens if the service is discontinued?”*

These services may or may not be suitable for long-term storage of your photos. In addition, some of the sites expect you to purchase prints or other products on a regular basis in order to continue storing the photos.

Tips:

- Be aware of the terms and conditions under which the website will keep your photos, and make sure that you meet any purchase requirements or fee payments.
- Keep high-resolution copies of your photos at home or other secure location, using one or more of the recommended alternatives.

Fading

During the long history of photography, materials, just like cameras, equipment and techniques, have also evolved. This has presented additional challenges to scientists who work to develop methods that predict how a photograph will look 10, 50, or even 100 years from now. A new set of print technologies known as digital inkjet, dye diffusion thermal transfer (often called “dye sublimation”), and digital versions of traditional “silver halide” photos has emerged out of the range of digital photographic techniques in practice.

While there's no accelerated method that simultaneously combines all the relevant factors that degrade photographs, there's general agreement regarding which individual factors are primary sources of degradation. This allows scientists to estimate the effects of each primary factor, and also enables recommendations on how best to display and store photographs in a way that minimizes the degradation resulting from each of these factors.

It's very important to create suitable storage and display conditions for printed photographs in order to preserve them as long as possible. Storage and display conditions have a dramatic effect on photo fading and the overall longevity of the photos. To maximize long term preservation of the print, it's important to control the factors that can cause prints to degrade. Begin by keeping the print environment “comfortable,” meaning moderate temperature and relative humidity. For maximum print life, store the print in a dark



location. “Dark storage” is best accomplished in high quality albums, with pages or sleeves designed for long term storage.

A few things to avoid:

- Avoid photo albums with storage sleeves made with polyvinyl chloride, as chemical out-gassing can damage the prints. Using high quality albums will help you avoid this plastic (which smells like a new shower curtain). Albums designated as “archival quality” may be a good choice.
- Avoid using ink and paper combinations that manufacturers of inkjet printers do not support.
- Avoid storage in hot, humid, or excessively dry areas.
- Avoid placing prints near un-vented kerosene furnaces and natural gas heaters, or near copiers, laser printers or air cleaners that may generate ozone. Pollutants generally do not affect prints in albums or prints framed behind glass.
- When displaying prints, avoid brightly lit areas—especially areas with direct sunlight—and use UV-protective glass or Plexi-Glass™ types of materials to protect the print. Again, to maximize the life of the print, store the print in the dark.

Manufacturers' claims regarding the display and storage longevity of their products often come from testing at an independent test lab, from measurements performed by the manufacturer, or in some cases, a combination of both. To best interpret these claims, follow the guidelines below:

1. Be sure to differentiate between “display” and “storage longevity” claims. For example, a claim that read “lasts 100 years when stored in a photo album” suggests that if stored in a quality photo album at moderate temperature and humidity, it should last approximately 100 years—and not that the print can be displayed in the presence of light for 100 years.
2. When determining storage longevity, look for key words such as “album”, “stored in dark”, “thermal degradation,” “temperature-induced fade testing” or “based on dark fade testing.” By contrast, claims relating to “display longevity” are typically associated with words such as “light-fastness,” “light fade,” “air pollutant fade,” or “ozone fade.” While “thermal degradation testing” applies to both storage and display longevity, it’s generally more important in storage longevity estimates. In addition, the reason glass or other protection is strongly recommended for display, is because it essentially removes the effect of airborne pollutants, but of course, light fade will still be a relevant factor.
3. How is the longevity claim supported? On packages where there’s little room for detailed footnotes, visit the company’s website to view their test assumptions. In other cases, the test details may be listed in the footnote near the claim.
4. Be clear on the system for which the claim is valid. For example, if an inkjet ink or printer package claims “50 years of display fade resistance,” make sure the manufacturer specifies what type of papers will validate the claim.
5. Take the time to go to manufacturers' website and access the section that explains their photo longevity claims in more detail.



6. Be cautious about generic terms such as “archival quality,” especially if specific testing doesn’t support the use of such a term.

While the rapid changes in the newer digital printing technologies, such as inkjet, have created challenges for measuring and predicting print life, it’s clear that fade resistance of name-brand digital media for making prints has improved significantly over the last several years. These include:

- Traditional photographic prints (“silver halide”) made by traditional photographic companies and usually obtained from retail stores or through online or mail order services. This includes on-site one-hour processing and overnight or two-day processing, but not prints made from kiosks.
- Photographic quality thermal prints made by traditional photographic companies for printing at home (often in camera printer docks), and from many retail kiosks.
- Photographic quality inkjet prints made by name-brand printer and imaging companies when used with specific brands of ink and paper for printing at home and on kiosks at some retail locations. For best longevity, it’s important to follow manufacturer recommendations about paper and ink types since certain ink and paper types are designed to work best with each other.

Remember that good control of the storage environment is important to maximizing long-term preservation of the print together with the quality of materials used to make the print. From category to category—traditional, thermal, inkjet—as well as within the category, you’ll notice a wide range of quality and performance. For additional information on the stability characteristics of the various media used for digital printing, please see the section called “[Printing.](#)” And remember the basic, common-sense usage guidelines: avoid brightly-lit display (or better yet, store away from light), and avoid conditions such as high humidity or temperature—if they make you uncomfortable, they’ll probably make your treasured photos uncomfortable as well.

Natural Disasters

The destruction caused by hurricane Katrina in August 2005 and the Pacific tsunami in December 2004 demonstrated how suddenly disaster could hit. The magnitude of these events dominated the media and our lives for months, but disasters on a smaller scale from fires to floods, continue to destroy homes and property on a daily basis. Of course, human safety and basic needs — food, water, and shelter — remain immediate concerns, but the emotional healing from the sense of grief, loss and displacement can take much longer.

At I3A, we believe that photographs help with the healing process. Sadly, when your photos are also casualties of the disaster, the sense of loss only becomes magnified.

Tips:

- Keep a copy of your important photos in locations outside of your home, such as at an Internet photo service, in a bank safety deposit box or at the house of a friend or relative.



- If you live in an area prone to natural disasters, make sure that you keep a backup in a location far away from your home.

Theft or Loss

Physical photo storage in the form of negatives, prints and albums are unlikely candidates for theft. However, thieves target many of today's electronic photo storage options and laptops, portable multimedia players and digital cameras, both at home and on the go.

Nowadays, you can store your entire photo collection on a single compact desktop computer, laptop or portable hard drive while in the past, negatives, prints and albums made for a very bulky collection. Unfortunately, if one of these devices is stolen, your photo collection is missing also.

The increasingly small size of portable electronic storage devices also makes them easy to lose. Consider that a 1GB camera flash card can hold about 500 of your photos in a package the size of a postage stamp.

Tips:

- Keep a copy of your important photos in locations outside of your home, such as at an Internet photo service, in a bank safe deposit box or at the house of a friend or relative.
- Copy your photos from your digital camera to your computer as soon as possible after you took them in case your camera gets lost or stolen
- Keep the original film negatives, slides or prints if you created your digital photo files with a scanner - they are less susceptible to theft.