



## Protecting and Preserving Your Photos

In the past, when we took photos, film served as both the recorder and our backup. The backup contained our processed slides or negatives. With digital photography, the camera's "camera card" can be considered the recorder. Yet if you only keep your photos on the camera card, it will eventually run out of space. And not only that: In case the card is erased, lost or damaged, you'd be left with no photos at all. To safeguard your photos, it's good practice to frequently transfer your photos to a new location — usually a computer — to view, share and manage more easily.

### Quick Tips for Backing Up:

- Copy photos from the camera card to another location as soon as possible after a significant event.
- Before you erase your camera card and reuse it, make sure you've stored your photos in at least two locations such as an external hard drive, CD or DVD, or online storage service.
- Make and store prints under recommended conditions to create an additional backup that will survive time and technology advances.
- Monitor technology changes to keep your collection up-to-date with current hardware and software developments.

### Transfer to Working Storage

There are many options for backing up your digital photos, but no matter what method you choose, the first step is to get your photos off of the camera and onto your working storage location.

*"Working storage"* is the place where you store, edit and manage your photo collection - usually your home computer hard drive. This is different from your backup storage.

*"Backup storage"* is the place where you keep an extra copy of all your photos in case your working storage fails, or you accidentally erase some of your photos. You should never edit your photos directly on the backup storage, and instead do all of your work on your "working storage". For greater safety, you may even have several sets of backup storage, each containing a copy of your photo collection.

### How often should you transfer your photos from your camera to your computer?

The obvious answer may be "when the camera card is full." While this seems logical, it may not actually be the best answer. If your camera card can store hundreds of photos at a time, and anything goes wrong with the card or you lose it, you run the risk of losing a lot of good photos that you intended to keep.

We recommend transferring photos to your computer:

- When you've just taken some great photos you'd like to share or keep
- Right after taking photos at a significant event
- Before performing a backup
- When your camera card is nearly full



There are many options available to easily transfer your photos to your computer or other storage location, including card reader, data cable, camera dock, and even wireless connections. Consult your camera manual for step-by-step instructions.

### **Card Reader**

Most digital cameras and many camera phones have removable camera cards. These cards can be removed from the camera and inserted into a card reader connected to, or built into, your computer, or directly into a printer or external hard drive. Camera cards come in many different formats and sizes, but fortunately, multi-format card readers are readily available, relatively inexpensive and easy to install using your computer's USB port.

### **Data Cables**

Most digital cameras, and some camera phones, come with a data cable to transfer your photos to your computer. The most common connection type is Universal Serial Bus (USB). Some cameras support FireWire, another high-speed data transfer method common in video cameras and DVD recorders. Check to see which connection methods your computer supports.

### **Camera Docks**

These accessories, available for a large number of digital cameras, provide an easy way to transfer your photos, when connected to a PC (usually via USB) and recharge your batteries at the same time. Printer docks add a third feature - quick 4x6 prints!

### **Wireless**

Digital cameras and camera phones with wireless connectivity (e.g. WiFi or Bluetooth) can transfer photos directly to computers, kiosks, and online services over wireless networks. In addition, many wireless service providers offer a wide range of camera phones with the ability to connect directly to services to upload, share, print and store your photos.

To assist you with transferring and managing your digital photos, most cameras come with photo management and organization software. Some of these software programs are available at no charge online. In addition, you can purchase more comprehensive programs from major retailers.

### **TIP:**

Use the software and cable bundled with the digital camera (or use other photo organization and management software) to transfer photos from your digital cameras to your PC or Mac. The process is almost automatic. Be sure to follow manufacturers' directions for connecting and transferring the photos, and make sure you know where the software stores your photos so that you can make backups.



## The Backup Plan

Over time, the photo collection in your working storage location — usually the hard drive on your computer — can grow quite large and valuable. To protect your memories over the long term, it's important to create a backup plan and practice it on a regular basis. We use the term "backup" to mean a second copy of your digital photo file collection, and also the process of creating that copy.

Your backup plan in its simplest sense is the answer to four questions:

### 1. What backup method will work best for me?

Using the information in the [Learn](#) and sections of this website, choose one or more backup storage methods consistent with your needs, goals and budget. Then review the [How to backup](#) section to ensure the time and effort required meets your schedule.

**Tip:** If you're familiar with most of the issues, go directly to the [Table: Backup Methods at a Glance](#) and pick the method or methods that meet your requirements.

### 2. Where will I keep my backup copy?

The best way to be sure that your photos will be safe is to keep your backup copy in a separate physical location outside your home. Granted, this takes more effort, but it will guarantee that your memories will survive fire, flood, theft and other disasters. Suggestions include:

- o Your office
- o The home of a relative or close friend
- o A safe deposit box at a bank
- o An online storage service

Choosing a different geographic region will provide additional security for your collection in case of a big natural disaster.

### 3. When, and how often, will I backup my photo collection?

Make a backup any time you have taken photos that you consider to be valuable, or whenever you have spent a lot of effort organizing your collection. You should make a complete backup on CD or DVDs at least once a year as insurance in case your storage media unexpectedly fail. Making successive "generations" of backups each year is a good way to prevent problems caused by [aging media](#).

We recommend backing up new photos right after a significant event or occasion when you've taken photos that are important to you. Of course, if they're still on your camera or camera card, you'll want to first transfer them to your working storage. This is also the best time to organize and label these photos, making sure that they're easy to find as well as protected.



You should also back up your collection whenever you've spent a lot of time organizing, labeling or editing your photos. Don't forget to make backups of slideshows, collages, artwork and other creative projects on your computer.

When you want to make a new backup, you might be tempted to overwrite an old backup on an external hard drive. Our recommendation is that you keep two or three generations' worth of backups before you reuse the media. This way you have extra backups on hand in case one of them fails.

As you know from the [Learn section](#), the aging of media means that at some point in the future, your backup media will become unreadable. You can guard against this possibility by making sure that you make a complete backup of your collection once a year on a day you can remember such as New Year's Day.

**Tips:**

- Make a backup on an external hard drive or on CDs or DVDs when you buy a new computer, and just before you use your old computer for the last time. You can then copy your photos from this backup to your new computer. Make sure that all your photos are on the new computer before you recycle or give away your old computer. Don't forget to check various folders and sub-folders (including MyPictures) on your old computer to make sure you haven't forgotten any photos.
- If you're very confident about your knowledge of computers, you may want to make smaller backups by performing a backup on only a portion of your collection whenever you have made some changes or added photos. While this is more economical and saves storage space, you need to be very disciplined in order to make these partial backups work reliably.

If you have a large collection of photos which is greater than, say 12GB, you'll require more than three DVDs, and might like to use the following backup schedule:

- The basic rule of storing photos in at least two places still applies.
- Whenever you've taken a set of important photos or edited them, make a backup to CDs or DVDs, or to an external hard drive.
- Once a year, backup your entire collection to a hard drive. Nowadays, you can store several years' worth of backups in separate directories on the bigger hard drives available. This way you have protection in case you accidentally erase a folder of photos one year.
- Every three years, backup your entire collection to a set of write-once DVDs.

If you have a very large collection, say 100GB or more, you might like to use several hard drives, and store each annual "generation" of backup on a different drive. It's still wise to keep a set of write-once CDs or DVDs containing your photos because of the remote possibility of viruses erasing data on your hard drive.



#### 4. How should I guard against my storage becoming obsolete?

You know from the [Learn](#) section that most storage devices will become obsolete over time. Because of this, you may have no way of retrieving your photos. This is why you need to keep an eye on trends in the technology marketplace, and move your photos to newer technology devices as frequently as every five to 10 years.

##### **Monitor**

Monitoring is a continuous process over the lifetime of your collection. You are the curator of your photo collection, much as the curator of an art gallery maintains both the condition of and access to the exhibits. The condition of your backup storage relates to its age and to its [physical properties](#).

You should monitor the condition of your backup storage once a year by doing the following:

- o Check to see that you can view photos from your backup storage on your computer.
- o Check your CDs and DVDs for scratches and dirt.
- o If there's an increase in the noise level coming from your hard drive, there's an increased risk of failure.
- o If you encounter any problems or errors, make a new backup right away.

##### **Access**

This refers to the support for and compatibility of your backup given the current hardware and software technology. [Learn more here](#). For example, you may have documents on a 15-year-old 3.5" disk, but may be hard-pressed to find a compatible disk drive or software program capable of reading it on today's computers. There are no rules for when a particular digital photo format or technology will no longer be supported. Storage formats used for commercial content such as CDs or DVDs are often supported longer, yet these formats may eventually be replaced by newer technologies. An easy way to monitor changes of this type is to take notice of the features that appear — and disappear — in new personal computer models to ensure you'll be able to access your backup.

##### **Migrate**

When monitoring tells you that a technology change in storage media is imminent, you'll need to change or update your backup technology to become compatible with current standards

In effect, if you see new storage technologies coming, we recommend that you wait for a year or two to make sure that the new storage technologies are viable, and can make fresh backups to the new medium. Just make sure you create backups on the new medium before the old storage method becomes obsolete.

Obsolescence of a storage technology means that you can no longer buy compatible reader devices in regular retail stores. Today, for example, while it's still possible to obtain floppy disks, it's more difficult to get writing or reading devices for them. Given the high capacity of DVDs, it's likely that CDs will become less popular over time — even while most DVD devices can still read or write CDs.





## How to backup?

Digital photos can be backed up in a variety of ways. To protect and preserve your photo memories, we recommend the following two-part approach:

1. For your most valuable and irreplaceable photos: [Make or order high quality prints](#) or photo albums, and store them under recommended conditions to ensure that they will survive time and technology advances.
2. For your entire photo collection, backup using one or more of the following methods:
  - o [Copy to an external hard drive](#)
  - o [Make CDs or DVDs](#)
  - o [Upload to online photo services or dedicated online storage services](#)

## Prints

While you may not immediately think of printing as a way to backup your photos, you should definitely do this for your most valuable ones. The biggest advantage of printing is that you can enjoy your photos even if you don't have a computer, and if your other backup methods fail.

### **Making your prints at home:**

- With the wide range of printers and printing materials to choose from, and with varying levels of longevity, be sure to choose carefully.
- Stick to well-known brands and manufacturers: Follow your printer manufacturer's recommendation for the paper and ink combination with the best longevity.

### **Making your prints at a retail store from your CD or DVD or camera card:**

- Services for printing your digital photos are now widely available at retail locations where you've had your film processed, including supermarkets, drug stores, department stores and photo-specialty shops. Many are also equipped with self-service kiosks where you can select, edit and print your photos directly from your camera card or CD. Ask a sales person for help if you're not sure how to use these devices.
- Some retailers will also let you order calendars, photo albums and the like. Make sure that your albums are printed on acid-free buffered paper for best longevity.

Ordering your prints from an online photo website such as Creative Memories' Photo Center, Fujifilm's YourPix.com, Kodak EasyShare Gallery, Shutterfly, or Snapfish:

- Visit the website and follow the instructions. In most cases you need to first upload your photos, and then you select the ones you want to have printed and you place your order using a credit card.
- See if the photo site also allows you to create and order photo albums or calendars. Make sure that your albums are printed on acid-free buffered paper for the best longevity.



### Storing your prints:

- Keep your prints "comfortable." They like to live where you live, and are best kept at a moderate temperature and relative humidity. For maximum print life, keep them in the dark.
- High quality albums with pages or sleeves designed for long-term storage will best preserve your prints.
- For prints on display, avoid bright light, and ideally display prints under UV protective glass or a Plexi-Glass™ type of material.
- Label the print with the file name so you can find the file and make a reprint, or use the photo for a calendar or memory book at a future date.
- To access additional information on standards and the assessment of print permanence, visit the section titled "Fading" in the [Learn](#) area.
- Make sure that you store your prints in accordance with the recommendations in this section.

### External Hard Drives

An external hard drive may serve as a relatively safe and easy to use backup device on both PCs and MACs. Be aware, however, the limited lifetime of these drives. [Learn more here](#). Expect five years of service, but some drives fail earlier, especially if they're jolted while in operation. Some drives last longer. External hard drives generally have a large capacity (300 GB are common as of 2006) and can store tens of thousands of photos for average consumers. They offer a convenient way to backup your entire computer hard drive and, when needed, to migrate to a new computer.

### When purchasing a hard drive:

- Look for a well-respected manufacturer that provides a good warranty.
- Don't buy the latest and highest-capacity drive: It's best to allow the technology to evolve to the point where it's more reliable.
- Most drives have USB to connect to your computer. Some drives have FireWire (or iLink or IEEE1394) connectors that are much faster than USB. It's best to stick to USB, which is much more common on computers, unless you know your computer already has FireWire. Back-up speed is not so critical — you can always let the backup run overnight.

### Copying your photos to your external hard drive:

- Use Windows Explorer (or FileManager) on your computer to transfer the photos to the hard drive. If you keep all your photos within a specific folder and its sub-folders, you can easily copy them to your external hard drive in one step using the "drag and drop" technique.
- Many photo management programs and external hard drives come with backup software that can make the backup process easier. With such software, make sure that other programs such as Windows Explorer can read the files copied to your external hard drive.



*Note:* Some proprietary backup software will store your photos in a special format that can be retrieved only by that software. If you need to restore some photos several years down the road, you could be out of luck if that software is no longer available.

- Don't forget to label your external hard drive with its contents and date of backup.

### **Storing your external hard drive:**

- Store your hard drive at room temperature away from heat sources.
- Treat your hard drives very gently: They are susceptible to shock.
- Keep your backup drive disconnected and away from your computer, and maybe even in a different location altogether. Be aware that computer viruses can still get onto your hard drive when connected. If you suspect that your computer has a virus, ask a knowledgeable person to help you before you reconnect your backup drive to the computer. [Learn more here.](#)
- 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.
- Any time you make a backup on a hard drive, write the date of the backup and what set of photos you actually backed up onto the drive with a stick-on label. Trust us, you'll be very glad you labeled your backups should you ever need them in future.

## **CDs and DVDs**

CDs and DVDs are optical discs that rely on lasers to record and read digital data. They're used extensively in the marketplace for pre-recorded music and movies. Consequently, these formats have a far greater chance of surviving the test of time than magnetic tapes or disks used for limited applications within the computer industry. Pre-recorded CDs and DVDs use a different technology to store data, and may have very different lifetimes from discs designed for home recording — even though the same mechanism may be used to read the discs.

These discs provide a good and inexpensive way to back up your photos, but you need to be aware of the varying longevity of these storage media. A major advantage of CDs or DVDs is that you can purchase discs that can be written to only once - a great way of keeping your photos from being deleted accidentally or by viruses.

### **When purchasing CDs or DVDs:**

- Look for well-respected brands, yet be aware that some companies sell discs made by manufacturers that may have lower quality standards.
- Use high-quality archival or photo grade CDs or DVDs if you decide to make use of these media as your primary backup copies. Because of the materials used to make them, these CDs or DVDs generally cost significantly more.





- Avoid the lowest-cost CDs and DVDs, which may compromise both materials and manufacturing quality due to the fact that these manufacturers shift production of the discs to facilities designed for low cost over high quality.
- Use media such as CD-R, DVD-R, and DVD+R that are not rewritable. These discs use a permanent dye change that is more stable than the reversible phase change used for rewritable media such as CD-RW, DVD-RW, DVD+RW and DVD-RAM. Discs that are not rewritable also prevent files from being accidentally deleted and eliminate the virus threat.
- There's no easy way for a consumer to determine which CDs or DVDs are best for long-term backup. To get the best quality discs, check with your retailer or online store for:
  1. Write-once CD-Rs with a phthalocyanine dye layer and an inert gold metallic layer. They appear greenish-yellow and are available from various suppliers including MAM-A with their Gold CDR 74, Delkin with their eFilm Archival Gold, Apogee with their CD-R Gold, and Kodak with their Gold Preservation Disc.

*Note:* Accelerated aging tests at the National Institute of Standards and Technology and at the Canadian Conservation Institute confirm that these CD Rs are more stable to light, heat and humidity and significantly less vulnerable to data loss than other CD-Rs.
  2. Write-once DVDs of archival quality.
  3. If you're unable to identify the type of CD-R that you're using, be sure to contact the supplier for information.
- If you get a DVD, make sure you buy the right type for your CD/DVD drive. Examples include DVD+, DVD-, DVD-RAM, Blu-Ray and HD-DVD.
- In general, you're better off sticking to more established technologies for your backup needs: CD, DVD+, and DVD-. As usual, it takes newer technologies some time to get established.
- High-quality CD-Rs last longer than high-quality DVDs, so for particularly valuable photos, you might select CDs. Even though these CD Rs have better inherent stability than DVDs, they're more vulnerable to physical damage than DVDs, so take care when handling these discs.

### Copying your photos to your CDs or DVDs:

- Use Windows Explorer on your computer to transfer the photos to the CD/DVD. If you keep all your photos within a specific folder and its sub-folders, you can easily copy them to a CD/DVD drive in one step using the "drag and drop" technique. For DVDs, you may have to use an additional program that is usually shipped with your computer or DVD drive to copy your photos or "burn" them to the DVD. Some software programs for recording CDs and DVDs will provide additional information on disc quality that will help ensure that your discs last as long as possible.
- Many photo management programs and external hard drives come with backup software that can make the backup process easier. With such software, make sure you can read the files on your CD or DVD by other programs such as Windows Explorer. Some proprietary backup software may store



photos in a special format that can be retrieved only by that software. If you need to restore some photos several years down the road, you could be out of luck if that software is no longer available.

- If you have insufficient space on the disc to store your folder, break up the folder into smaller sub-folders and store each of them on its own disc. Be aware that a DVD labeled with 4.7 GB capacity may actually hold only about 4.2 GB of photos, so you'll need to limit your sub-folder sizes to 4.2 GB. Other disc types may have similar capacity limitations because administrative data take up space on these discs. You can check the size of your sub-folder by right clicking on the folder name in Windows Explorer, and then clicking on "Properties."
- If possible, avoid using the full disc capacity. Studies at the National Institute of Standards and Technology show that files are vulnerable to an edge effect that begins to appear at 10 percent from the end of the disc, and becomes significant around five percent from the end of the disc. Some CD recorders can even exceed stated disk capacity, compounding the problem even more.
- After "burning" your CD or DVD, check the recording by using the "verify" function of your software or another software package such as CDCheck, which is available at no cost for personal use at <http://www.kvipu.com/CDCheck/>. Verification does not ensure that the discs will be readable in a wide variety of players so you may want to test different drives to ensure compatibility.
- Don't forget to label your CDs or DVDs with their contents and date of backup. Use a special marker specifically designed to label CDs and DVDs. Solvent-based pens, ballpoint pens or other sharp writing instruments and adhesive labels may damage CDs. The best location to label a disc is near the reinforced hub where there's no stored data. You'll be very glad you labeled your backups should you ever need them in future.
- Unrecorded CDs and DVDs have a limited shelf life and should be used within five years.

#### **Storing your CDs or DVDs:**

- Store your CDs or DVDs at room temperature away from heat sources.
- Store your CD or DVDs in an upright position, and not stacked horizontally.
- Use translucent CD or DVD cases which don't have a plastic insert to hold the disc. Some of the colored plastic inserts for standard jewel cases contain plasticizers or other materials that may reduce disc lifetime.
- Avoid storing acidic paper inserts with your CDs or DVDs.
- For more details on handling CDs and DVDs, the National Institute of Standards and Technology guide is available at <http://www.itl.nist.gov/div895/carefordisc/disccare.html>.

#### **TIPS:**

- Check that you've transferred the correct number of photos. With Windows, right click on the folder name, then click on "Properties" to get the total number of photos in the folder.
- Check the combined file sizes of all the photos in the folder where the photos came from as well as on the CD or DVD you copied them to. Make sure that you store the same amount of data in both places.



With Windows, right click on the folder name, and then click on “Properties” to get the size of all photo files combined.

- Use photo software to check if you can view the photos on the CD or DVD.

## Online Storage Services

Online photo services such as Kodak Gallery, Shutterfly, Snapfish, Fujifilm.net and Sprint Picture Mail Service can provide a useful backup capability for your photo collection. These services also provide a variety of handy features such as sharing photos with your friends and family through email or ordering prints, printed albums, CDs and DVDs. In addition, you might like to keep an eye out for online backup services that are emerging, and that will store any files from your computer including photo and video.

Selecting an online site to store your photos:

- Read the terms and conditions to make sure that the site will work for you. For more information, visit the [Learn](#) section.
- Check with friends and relatives to see what sites they might recommend.
- Select a site run by a reputable company – you don’t want a site to go out of business when you most need the backup.
- Check to see if the site can upload your full resolution photos.
- Check to see how you can get your photo files back from the site through download or by ordering CDs or DVDs. Some companies charge fees. In some cases, you can download individual photos to your computer, but it might be very tedious to download thousands of photos.

### Copying your photos to a photo site or backup service:

- Follow the instructions on the website for uploading your photos. Often, there’ll be a small program that you can download from the site that will make it easier to make the upload.
- Even with a high-speed Internet connection, it can take many hours to upload your photo collection to the site. Let the backup run overnight so that no one is using the computer during the backup.
- Break up your collection into smaller chunks and upload only a few sub-folders at a time so that you have fewer problems if the Internet connection fails.

### TIPS:

- Share your important photos with friends and relatives as an informal way of backing up your photos.
- Make sure that you understand the terms and conditions of a photo website regarding payments, minimum orders required to maintain your account, and appropriateness of the photos.
- Use the online photo site to order prints of your most valuable photos.



## Other Backup Methods

Keep an eye out for new backup technologies. Some promising technologies include:

- Networked hard drives for centralized home storage. These systems, while still expensive, are becoming more available, and can be advantageous for large collections kept on multiple computers in a household.
- Digital photo to film: Digital photos printed onto traditional film. Since film can last a very long time with good storage, this is a method that may become more available to consumers in the future.

### **Backup methods not recommended for long-term backup:**

- Tape: not easily available to consumers
- Regular camera cards
- USB or thumb or flash drives
- Old computer media such as floppy disks