

I'm up to my ears in digital image files!

In the 'good old days' of film, those people that insisted on keeping their 'original image' were forced to keep catalogues of film-strips and, because there was no way of hooking a name onto them directly, this usually involved keeping some kind of record in another book or index to tell us what was where. Time consuming - but those negatives, even going back 150 years, are 'hard copy' and they have stayed with us because we can access them - physically pick them up. We *could* use them in the way they were originally designed, by enlarger and chemical print technology, because those methods are not likely to be completely being replaced by computers. With digital images, much of the 'drudgery' of writing up record books and cutting up film has been removed..... but the methods of storage are subject to constantly evolving technology.

So the question is.... how do we keep them safe *and* in a format that will be accessible for the longest time?

The important thing to remember is that **no single method is foolproof** and that we don't know **what technology** will be available to anybody that wants to look at our pictures in three or more generations' time.

So, if no single method is 100% safe against deterioration or other effects, we need at least two archiving methods, maybe more. Your pictures are not just passing records of family members - they may one day be seen as visual records of 'our time'.

Step One... the minimalist approach.... just on one computer HD.

We keep our images on the hard disk of our computers....

Their safety is subject to major computer crash, fire, flood, famine, (well, ok, not famine) and any other damage, then there are the times you get a new computer, images get 'lost' in the transfer etc. As a single archiving method - this is, to say the least, useless.

Step Two... A little forethought.... HD plus external HD

A large external hard disk, which can be plugged in to your computer to provide permanent extra storage or just occasional storage, can help to solve the problem. You could even keep it in a separate room, or building, to provide a little more security against fire or theft. But then the convenience and instant access would disappear. They are occasionally subject to strange electronic faults and have been known to reformat themselves. Using them as your single archive system could be very risky. Great for access, not really a reliable archiving tool.

Step Three... Nearly solved it!... HD plus external HD plus quality DVDs

As well as your computer's hard disk, you could keep a lot of images on DVDs. In fact this would give you the best chance of keeping your images for the longest time.... but even that has potential problems....

(from a technical website)

Data Longevity on CD, DVD Media: How Long Will They Last?

In the early '90s when the first CD-R disc was introduced, manufacturers said the media had a data life in excess of 40 years. In the late 90s when the first DVD-R discs appeared on the scene, producers proclaimed a data life of at least 100 years. Throughout that time and even today the press will "discover" that the media is susceptible to CD or DVD rot that will eat your information - audio, video or data - in as little as two years after it is written.

Because CD and DVD media - in 2003 more than 7,150 million CD-R discs and more than 400 million DVDR discs were made and sold -- is used to archive nearly everything today it does make you worry. Especially when these discs are the only place you have precious, irreplaceable family memories - photos and movies - as well as vital family, personal and company data/documents.

So where does the truth lie? Somewhere across the complete spectrum.

Most people who burn a disc believe they have quality media. Unfortunately that only tells you the disc will be compatible (able to be played) in the vast majority of CD or DVD players. More importantly all better quality CD and DVD burners include technology called overburn/underburn protection. The basic construction of the two technologies enable you to burn your data in a very precise, very controlled manner.

Test Options

There are only two foolproof ways of proving the data life of the discs you use:

1. Write a few CD or DVD-Rs, then wait about 25-50 years and check if they still hold the correct data
2. Use a CD/DVD analyzer that is specially designed to retrieve very accurate information about your media and your data after accelerated ageing in test chambers where the discs are subjected to excessive temperature and humidity tests

The first is impractical. However, some of the first discs produced and written-to were archived and checked more recently. The data is still intact. The second provides only theoretical limits and doesn't take into consideration how you use, handle and store the media.

Between the CD-R discs produced in the early 80s to today's double layer DVD+R discs and throughout the brief optical industry there has been considerable progress in write performance, capacity, quality and obviously price.

Following the test procedures of the International Standards Organization (ISO) quality media manufacturers have been able to document data life-spans ranging from 50-200 years. But keep in mind there are wide differences between low budget media operations and quality media firms. In addition variations in manufacturing methods, materials and processes/procedures can dramatically effect the data life of the media you use.

Or as auto manufacturers say, "your mileage may vary."

Understanding Your Discs

It isn't vital that you understand the construction of CDR or DVDR media to produce a quality disc that can be read years from now anymore than you need to understand the internal combustion engine to drive. But understanding the difference between quality and cheap media may help you avoid lost family photos or videos later on.

Most people consider DVDR discs little more than overgrown CDR and while they are similar, they are also quite different.

Writable CD and DVD discs start with a piece of polycarbonate substrate onto which very precise grooves are molded. A dye layer is then precisely applied to the substrate followed by a reflective layer and one or more protective layers. A few of the media leaders have initiated the policy of applying two very resistant layers for added [data protection](#) when the discs are used, handled and stored.

Because of the faster read/write performance users expect, the leading manufacturers have developed new stamper technology for optimum groove (storage are) shape and ultra-precise molding technology. The molding is critical because disc flatness is extremely important when the media must be rotated at extremely high speeds - 52x for CDR and 8x for DVDR (soon to be 16x).

Media Problems

The quality of your media is directly related with the time the media will last without losing the information. As you can see there are a number of areas where manufacturers can shave a few cents in the overall cost of the media and areas where production can go amiss to dramatically shorten the data life of your stored information.

There are conflicting claims and consumer beliefs on which media is best for data retention of 30, 50, 100 years - green, gold, blue dye or gold/silver reflective layer. It is somewhat immaterial today. Firms like MKM and Verbatim have developed significantly improved, more sensitive and more stable dyes and reflective materials that virtually eliminate data loss during high-speed read/write processes and enhance long-term reliability.

Stories of CD and DVD 'rot' get much bigger headlines than de-lamination and oxidation. The truth is that, unlike earlier Laser Disc rot, CD/DVD rot doesn't affect this media which uses different dye technologies to store data.

De-lamination and oxidation usually occur at the outer edge of the disc and are often the result of the adhesive not being properly applied and cured during the production process. This usually happens when price-oriented manufacturers use equipment that is 2-3 generations old and the least expensive materials possible.

The Real Culprit

If you have purchased quality media from a quality manufacturer, you are still not assured of 50-100 years of data life!

You are the greatest danger to the data longevity of your personal, family and business information that is stored on CD and DVD. Direct exposure to sunlight and intense heat can do dramatic damage. Rapid changes in temperature and humidity can stress the materials. Gravity can bend and stress the discs. Fingerprints and smudges can do more damage than scratches.

Do

- Handle discs by the outer edge or the centre hole
- Use a non solvent-based felt-tip permanent marker to mark the label side of the disc
- Keep dirt or other foreign matter from the disc
- Store discs upright (book style) in original jewel cases that are specified for CDs and DVDs
- Return discs to their jewel cases immediately after use
- Leave discs in their spindle or jewel case to minimize the effects of environmental changes
- Remove the shrink wrap only when you are ready to record data on the disc
- Store in a cool, dry, dark environment in which the air is clean -- relative humidity should be in the range 20% - 50% (RH) and temperature should be in the range 4°C - 20°C
- Remove dirt, foreign material, fingerprints, smudges, and liquids by wiping with a clean cotton fabric in a straight line from the centre of the disc toward the outer edge
- Use deionized (best), distilled or soft tap water to clean your discs. For tough problems use diluted dish detergent or rubbing alcohol. Rinse and dry thoroughly with a lint-free cloth or photo lens tissue
- Check the disc surface before recording

Do not

- Touch the surface of the disc
- Bend the disc
- Store discs horizontally for a long time (years)
- Open a recordable optical disc package if you are not ready to record
- Expose discs to extreme heat or high humidity
- Expose discs to extreme rapid temperature or humidity changes
- Expose recordable discs to prolonged sunlight or other sources of UV light
- Write or mark in the data area of the disc (area where the laser "reads")
- Clean in a circular direction around the disc.

Reliable Medium

There is a lot of cheap CDR and DVDR media that has marginal quality. For some applications like games, quality isn't critical. For irreplaceable, vital data like family photos, special events, vacations and family/friends memories quality does matter. If you are backing up mission critical data on your computer, quality matters. Then it is important to select a brand of media that will keep your data safe, secure and available for years to come. Quality and low prices just don't seem to mix!
