

1,000-year Storage Media

Original Message: On 08/02/2010 Toby Martin (OSU) wrote:

<http://www.theregister.co.uk/2009/07/23/millennial_disc_series/>

A US startup has developed a new DVD-R technology that it claims will be readable for 1,000 years.

Millenniata's tag line is "Write Once, Read Forever" - and if forever can be defined as 40 generations, that's exactly what its Millennial Disc Series promises.

Toby

Reply On Aug 3, 2010, at 8:26 AM, Alexander Dorsk (WHOI) wrote:

Hi All,

Greetings, this is Alex Dorsk, a former WHOI ship tech who now works at the WHOI data library.

I noticed that there was a post about optical media on the RVTEC list.

I thought I should mention that the general consensus in the library and archiving community is that optical media should **not** be considered archival material.

Many professional archiving organizations strongly condemn the use of optical media. These organizations include the National Archives and Records Administration, the Association for Recorded Sound Collections Technical Committee, the International Association of Sound and Audiovisual Archives, and Library of Congress working groups.

Optical media are often unreliable. From my own experience in the WHOI data library I have encountered many CDs and DVDs from 5 years ago which are no longer readable despite having been stored in a climate-controlled archival vault.

Optical media require infrastructure that is difficult to maintain. Will CD/DVD readers still be common in 20 years? This is not clear. Trends in computing (decreasing computer size, cloud storage) suggest that they will not. Many netbooks currently do not have optical media drives.

Caveat Archiver,

-Alex

Reply From: Alexander Dorsk on 8/4/2010

Many archiving associations recommend the use of redundant hard drive systems such as RAID arrays

in conjunction with multiple backups.

These systems are reliable if maintained properly. They make it far easier to migrate data to new systems as old systems become obsolete.

Sometimes optical media can be good as media for transferring data between the ship and the final archive. But we should not think of data on optical media as 'safe'. There is a good chance that data on optical media will not be retrievable in 20 years.

-Alex

P.S.

If you're interested in more about archiving, here a few links that may be helpful:

International Association of Sound and Audiovisual Archives:

<http://www.iasa-web.org/tc04/audio-preservation>

U.S. National Archives and Records Administration (NARA) Guidelines:

<http://www.archives.gov/preservation/technical/guidelines.pdf>

Association for Recorded Sound Collections (ARSC) Technical Committee Preservation of Archival Sound Recordings:

http://www.arsc-audio.org/pdf/ARSCTC_preservation.pdf

Some excerpts from these reports follow.

National Archives and Records Administration - Technical Guidelines for Digitizing Archival Materials for Electronic Access: Creation of Production Master Files ? Raster Images (guidelines.pdf), p.61

"We recommend that production master image files be stored on hard drive systems with a level of data redundancy, such as RAID drives, rather than on optical media, such as CD-R. An additional set of images with metadata stored on an open standard tape format (such as LTO) is recommended (CD-R as backup is a less desirable option), and a backup copy should be stored offsite. Regular backups of the images onto tape from the RAID drives is also recommended. A checksum should be generated and should be stored with the image files."

International Association of Sound and Audiovisual Archives Technical Committee Standards, Recommended Practices and Strategies (TC03_English.pdf)
p.5

"R-DAT and CD-R (audio) were the first digital recording systems with considerable market acceptance in the field of audio to have been employed as digital target formats for archiving purposes. Neither of these systems, however, has a proven record of archival stability. R-DAT, as a format, is obsolete and holdings are threatened by future unavailability of replay equipment and spare parts. CD-R is still

widely used, although, at present, the use of recordable CDs and DVDs must be seen as potentially dangerous to the survival of the sounds (cf IASA-TC 04, 6.6). The Technical Committee, therefore, strongly recommends the use of true file formats in a computer storage environment and reliance on the data integrity provisions associated therewith (cf paragraphs 10, 12, and 13, and IASA-TC 04, 6.1).”

Association for Recorded Sound Collections Technical Committee’s (ARSC TC) recommendations for preserving sound recordings (ARSTC_preservation.pdf)

p.7

“Optical discs require special mention as unsafe preservation storage media. Using this format requires costly test equipment to check the quality of both blank media and digital recordings. Even if this equipment is already available to an archive, the cost of storage media may be higher than the other formats, except in very small volume ? individual CDs or DVDs are not expensive, but the cost-per-megabyte is substantially greater than othermedia types.

Recordable audio CDs are generally not appropriate for archival storage. In addition to the other problems with optical discs, the format cannot hold files at higher bit depth and sample rate than 16 bit, 44.1 kHz, which is far less than the de facto 24 bit, 96 kHz standard. In addition, migrating an archive stored on optical discs is expensive, because it requires much human intervention. Further information on the use of optical discs may be found in the resource guide.”

From: Forcucci, David (USCG) on Fri, 6 Aug 2010

A smaller scale application is archiving of digital photos etc. at home. I have been struggling with the issue for a while. Right now I burn multiple copies to Taiyo Yuden/JVC Advanced Media brand DVDs.

For any discs being burned for shipboard data why not use the most stable media which would seem to be Millenniata? The writers are down to < \$500. The discs are less now too.

I for one will be checking out the Millenniata system. Thanks Toby!

Dave
Seattle

From: White, Douglas A.(U. Del) on Fri, 6 Aug 2010

Hi Dave,

Where are you finding the drives < \$500? And the media?

For those frustrated with the links on the original article (which is about a year old) here is a link to the drives and media being discussed:

<http://www.millenniata.com/solutions/products/>

Doug

Reply From: Powell, Christopher M. (ODU) on Fri, 6 Aug 2010

In the long term, rather than media durability, a larger issue for optical media will be obsolescence. The ubiquity of optical (CD and DVD) technologies, has been primarily driven by the entertainment industry, and as the entertainment industry quickly moves to the cloud and network distribution the associated industries which produce blank media, hardware and software will move on as well. As stated earlier in this thread, many new laptops come without an optical drive! Ten years from now optical drives will be a curiosity, not a mainstream technology.

I found this on the Optical Storage Technology Assoc website

"One thing is sure — nothing lasts forever and technologies inevitably change. Ultimately, since writable DVDs embody digital information, contents may be transferred to future storage systems as becomes necessary to preserve whatever has been stored on the discs."

<http://www.osta.org/technology/dvdqa/dvdqa11.htm>

I don't have anything against optical media, I use it everyday, but not as a backup.

My \$0.02

-cp

Christopher Powell
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