

Mass Storage News

Opportunities and Trends in Data Storage & Retrieval

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200 GB Optical Media Is More Than A Vision

Holographic media is on its way, with blank discs shipping to drive developers like Sony.

Is it possible a 40-year-old technology can turn the archival world upside down in about 18 months? Companies worldwide are betting on holographic data storage to be the next big wave, becoming the next step up from DVD-based storage. Holographic data storage houses up to 200 GB of data in three dimensions on a disc the size of a normal DVD or CD.

"Holography started in the sixties but hasn't been commercialized for storage. The missing link has been media," states John Berg, CEO and president of Aprilis. The 26-employee Polaroid spin-off has just begun shipping media to optical manufacturers in Japan and Korea for development and testing of holographic disk drives. "The problem has been the large lasers needed to write holographic data were impractical in a disk drive. Polaroid's scientists have developed photosensitive media that is sensitive enough to work with low-power lasers like those found in DVD drives."

According to Nelson Diaz, president and CEO of Bell Labs spin-off InPhase, current holographic storage development has been assisted by other elements of the optic world. InPhase is also shipping developmental media to companies like Sony, as well as developing its own holographic drive. "The DVD and CD industries have developed low-cost lasers that are very affordable and can be used in holographic stor-

age devices," Diaz tells MSN. "And, the digital camera industry developed detectors [that are used in holographic drives to read media]. We've had these elements for about two or three years. Now, the ability to produce large quantities of low-cost, non-volatile media is the key to making holographic storage commercially viable."

The appeal for holographic storage seems obvious—4.7 GB on a DVD versus 200 GB on a holographic media disc. Hold up, says Aprilis' Berg—holography versus DVD, or even tape, isn't just a size issue. Because of the methods holographic drives use to write data, drives can perform file searches independent of a computer's CPU—digging through millions of files without using one processor cycle. So with a single firing of a laser, a drive can find Jane Doe's medical imaging in a disk full of 200 GBs of MRIs, and then deliver it to the CPU.

"Searches through archived data can be done 1 million times faster," says Berg. He believes holographic archiving can thus compete with—if not eliminate—tape-based storage. "Much more data can be online with holography than tape and online with the ability to find the right data in a timely manner. So, to promote holography simply as a large storage medium is a myopic view. Size isn't the issue; it's the unique capability of extremely high bandwidth and fast searches."

Diaz is developing write-once holographic media along with the ROM media used for unchangeable content distribution—such as a software company shipping a disc containing its applications. "InPhase's holographic drive is recordable, so it can be used in archiving enterprise-class data, like medical and insurance records," he says.

Uh-oh, sounds like yet another technology predicted as a grand tape replacement. "Saying companies will completely replace tape is insane," laughs Diaz. "There is too much archived data already on tape that would never be converted."

Strangely, little effort has been made to create a holographic storage standard so discs can be interchangeable between vendors.

Seemingly, format confusion and incompatibilities could slow market acceptance. "Basically we're targeting a market that doesn't require a level of standardization," Diaz counters.

"Professional video archiving has 15 formats. Enterprise data archival has multiple tape formats—LTO, DLT, AIT—there's no established format. If holography is taken to the consumer market as a DVD [video] replacement, then it definitely has to standardize in the way the big DVD players got together to standardize."

OK, we hear you—holographic storage is yet another "in-development" technology full of promise and low on delivery, right? Thinking these drives and media are as mirage-like as the 1960s visual experiments conjured by the term "holography"? "There's a lot of skepticism because holographic storage has been talked about for many years," Diaz admits. "But execs of Japanese companies, which are in the center of the optical world, don't share the skepticism. Almost every optical company has some sort of holographic development. Sony is the leader, but Pioneer, Phillips, Thompson—all the big optical companies—are working on it."

"The greater common belief is that holography is the next step," adds Berg. "CD gave way to DVD, now Blu-ray will replace DVD with 30 GB discs. Holography is next in the roadmap for optical disc storage. And, if it comes out soon enough, it could supplant Blu-ray as the next step past DVD. Holography has been accepted not as a question of if, but when."

OK, we bite—when? Berg expects beta drives to ship from Japan and Korea before the end of next year. Diaz agrees, adding that high volumes of commercial units will begin shipping in mid 2004.