

Tape storage milestone demonstrates record in areal density of 123 billion bits per square inch

April 10 2015

FUJIFILM Corporation announced that in conjunction with IBM, a new record in areal data density of 123 billion bits per square inch on linear magnetic particulate tape has been achieved. This breakthrough in data density equates to a standard LTO cartridge capable of storing up to 220 terabytes of uncompressed data. 220TB is more than 88 times the storage capacity of the current LTO Ultrium 6 tape. A tape of this size can preserve the human genome of 220 people on a single cartridge. This is the highest capacity storage media ever announced, including HDD, BD and solid memory NAND flash. This is the 4th time in less than 10 years that Fujifilm and IBM have accomplished record breaking storage capacities on tape.

"With high performance computing and cloud storage services on the rise, this [data density](#) achievement is significant," said Norio Shibata, corporate vice president, FUJIFILM, Recording Media Products Division. "Fujifilm and IBM are leading [technology](#) development companies committed to advance tape technology to meet the growing data requirements and position tape as the medium of choice for archival storage."

This record breaking demonstration was achieved using an advanced prototype tape incorporating NANOCUBIC technology developed by Fujifilm, with advanced tape-drive technologies developed by IBM.

Fujifilm's NANOCUBIC technology is enhanced to increase recording density by decreasing the magnetic particle size that is essential for high recording density. Fujifilm's original BaFe synthesis method increases the uniformity of BaFe particle size and decreases 25% of the switching field distribution(SFD), which is an important magnetic parameter for high density recording. The lower SFD leads to a high quality signal output due to the uniform magnetic property of each recorded bit. To ensure the stability of the ultra-fine BaFe particles Fujifilm improved the magnetic coercivity, yielding an archival life of over 30 years.

A highly controlled dispersion process and newly developed chemical compound allows the BaFe particles to separate and disperse more uniformly and increase perpendicular oriented ratio. Perpendicular orientation technology with BaFe produces high signal to noise ratio and better frequency response. Enhanced NANO coating technology with super smooth non-magnetic layer controls tape surface roughness and achieves smooth surface of magnetic layer for high signal output. Fujifilm's advanced servo writing technology decreases high frequency disturbance of servo tracks and enables a higher track density.

IBM researchers developed new technologies, including:

- A set of advanced servo control technologies that enable more accurate head positioning and increased track density.
- An enhanced write field head technology that enables the use of much finer barium ferrite particles.
- Innovative signal-processing algorithms for the data channel that enable reliable operation with an ultra-narrow 90nm wide giant magnetoresistive (GMR) reader.

Provided by Fujifilm

Citation: Tape storage milestone demonstrates record in areal density of 123 billion bits per square inch (2015, April 10) retrieved 19 April 2024 from <https://phys.org/news/2015-04-tape-storage-milestone-areal-density.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.