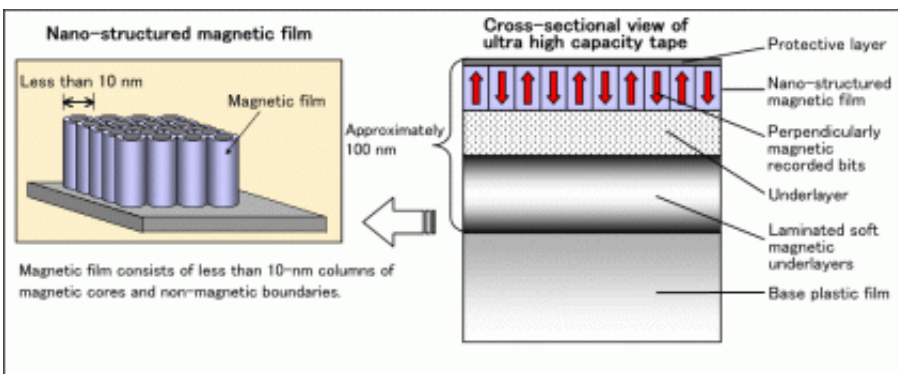


# 50 TB Per Tape Cartridge: Japanese Researchers Develop Ultra High Capacity Tape Media

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Schematic view of an ultra high capacity tape medium

Hitachi Maxell and Tokyo Institute of Technology today jointly announced the development of ultra high capacity tape media with ultra thin nano-structured magnetic film by using of facing targets sputtering method. The demonstrated a world-record areal density of 45.0 Gb/in<sup>2</sup> in linear formatted perpendicular magnetic recording media. This latest technology enables over 50 TB capacity per a standard tape cartridge, which equals to 33 times larger than a capacity of the latest LTO Ultrium 5 data cartridge.

Today, the usage of the data storage tape has expanded for the development of the information technology society, the electric archive

in the public libraries and the public records offices, and the long-term storage of the business writing. Especially, the eco-friendly [storage system](#), the so-called “green storage”, that lowers [power consumption](#) and considers the environment, is demanded recently.

The coating type medium, which is made by coating the magnetic powder on the base film, is commonly used as a tape medium for the data storage now. It was difficult to make a thin film with the [magnetic particles](#) of the size below 10 nm by the coating method though it was necessary to make the magnetic powder small to increase the areal recording density and to raise storage capacity a cartridge.

This time, the super-high density nanometer-sized magnetic thin film was achieved by an open innovation by the combination of Maxell’s tape medium design/evaluation technologies and the new thin-film formation method, "Facing Targets Sputtering method" that associate professor Shigeki Nakagawa et al. in the Tokyo Institute of Technology, Graduate School of Engineering, Department of Physical Electronics developed. It allows us to make the large-capacity magnetic tape by low-noise laminated soft magnetic underlayers and the magnetic recording film with less 10 nm-diameter crystal grains.

When the areal recording density of the tape medium with this nanometer-structured super-high density magnetic thin film was evaluated, it was clarified of the possession of the areal recording density of 45.0 Gb/in<sup>2</sup>. When one makes the data tape cartridge of the common, linear formatted package by this medium, the capacity of the cartridge could be 50 TB or more.

Detailed results will be presented at the 9th Perpendicular Magnetic Recording Conference (PMRC 2010; May 17 - 19, 2010, Sendai, Japan).

## **Features**

## **1. Formation of ultra high density nano-structured magnetic tape medium by facing targets sputtering**

The nano-structured [perpendicular magnetic recording](#) film was successively formed on a 4.5µm-thick base film by facing targets sputtering method, which was invented by Tokyo Institute of Technology, at room temperature without a substrate cooling system. Fine composite films, which couldn't be prepared by previously used magnetron sputtering methods, can be formed by facing targets sputtering, thanks to damage-less formation of films on a very thin plastic film with separated plasma from the film.

Also, the medium noise was dramatically reduced by a laminated structure of thin (10 nm thick) soft magnetic underlayers. Total thickness of films including a protective layer and underlayers was about 100 nm, that can contribute high-density recording.

## **2. Achievement of a world-record areal density**

A linear recording density of 531 kbpi and a track pitch of 300 nm without cross-track interference were confirmed by a specially designed tester, that enables precise head motion, when playback performance of the developed nano-structured magnetic tape medium was evaluated. The achieved areal density was 45.0 Gb/in<sup>2</sup>.

Source: Hitachi

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