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Patent Acquisition Opportunity

Sharp Corporation
Hard Disk Drive

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MiiCs & Partners

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Executive Summary

Portfolio overview

- The portfolio comprises 30 US patents assigned to Sharp Corporation.
- The technology in this portfolio relates to magnetic recording media and magnetic head.
- Main feature are thermally assisted magnetic recording, shingle magnetic recording(SMR), and bit patterned media(BPM).
- Evidence of Use is available.

NOVELTY

- Improvements to the high density recording on the magnetic recording media and magnetic head.

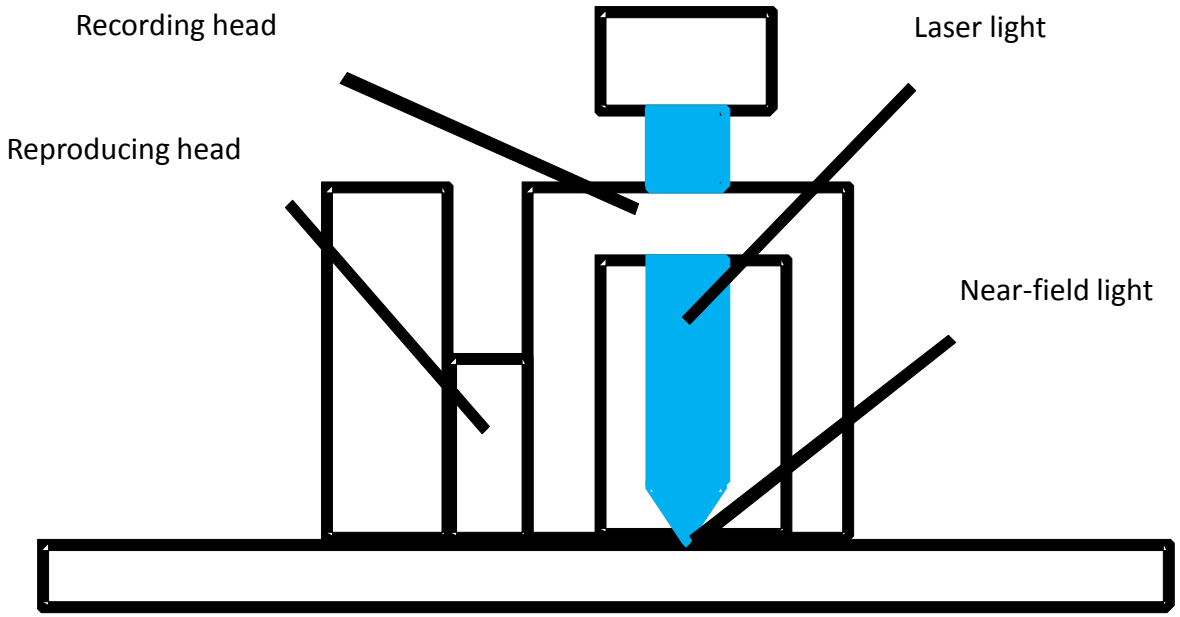
IMPORTANCE

- A valuable portfolio for companies producing HDD, HDD media and magnetic head.

Overview of the High Density Recording Technology

Thermally Assisted Magnetic Recording

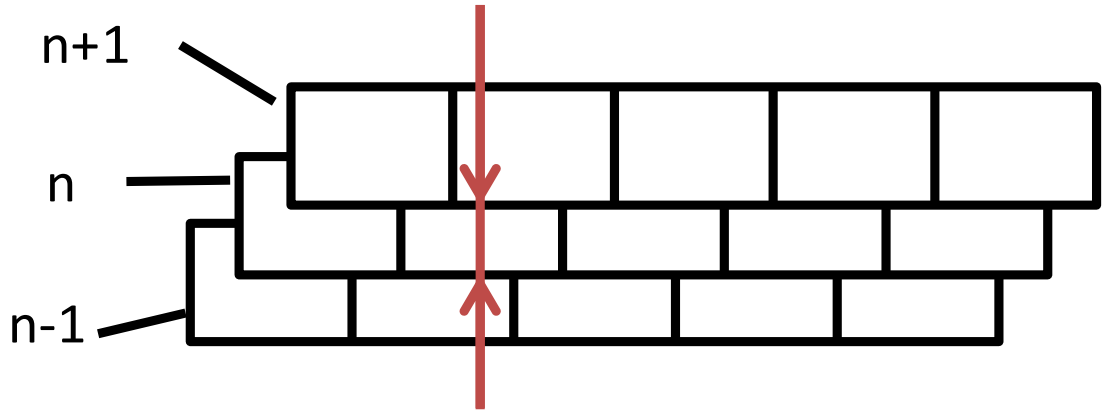
- The system which gives thermal energy by irradiating a laser beam to a recording area in writing data and makes lower magnetic coercive force of a medium temporarily.
- The incident light is narrowed down to very small region (several tens of nm) by near-field light.
- It is possible to use a high-coercivity material, and it is possible to write the stable data.



Overview of the High Density Recording Technology

SMR (Shingled Magnetic Recording)

- Recording method for recording track enables high track density recording by recording overlapping like tiles.
- The width of the recording head is kept wide and it is possible to write stable data.



Evidence of Use

US8,792,194	Model No. Seagate ST5000AS0011 / ST8000AS0002 HGST Ultrastar Archive Ha10 Filing date : Apr. 13, 2012 Expiration date: Aug. 23, 2032
(A)	【Claim 1】 A magnetic recording reproducing apparatus, comprising: a magnetic recording medium having an information recording area; a magnetic recording element which records information by applying a recording magnetic field to the magnetic recording medium to form recording columns extending in a first direction; a magnetic reproducing element which reproduces information by detecting a leaked magnetic field from the magnetic recording medium; a moving mechanism which moves positions of the magnetic recording element and the magnetic reproducing element relative to the magnetic recording medium, in the first direction and a second direction perpendicular to the first direction; and
(B)	a controller which controls the magnetic recording element and the moving mechanism to form in the information recording area a plurality of recording columns adjacent to each other in the second direction so that each of the recording columns partially overlap with an adjacent recording column in the second direction,

Example of large capacity HDD using SMR technology

HGST “Ultrastar Archive Ha10”

Seagate “ST8000AS0002”

Conventional versus SMR Writing

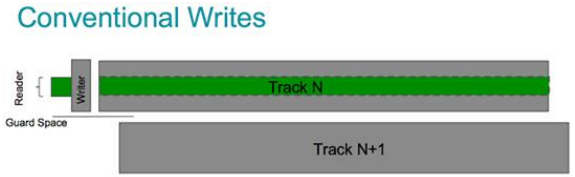


Figure 1. Conventional Track Spacing

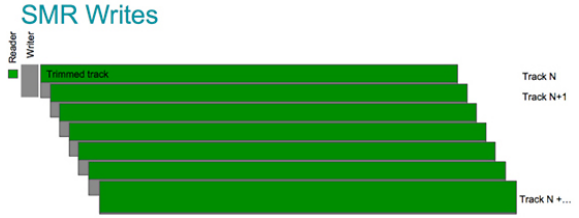


Figure 2. Track Spacing Enabled by SMR Technology

Evidence of Use

US8,792,194	Model No. Seagate ST5000AS0011 / ST8000AS0002 HGST Ultrastar Archive Ha10 Filing date : Apr. 13, 2012 Expiration date: Aug. 23, 2032
(C)	【Claim 1】 wherein the controller controls the magnetic recording element and the moving mechanism so that a first recording column partially overlap with a previously formed second recording column in the second direction, and that a recording start position of the first recording column is positioned upstream, relative to a recording direction, of a recording start position of the second recording column.

Updating a band with new data

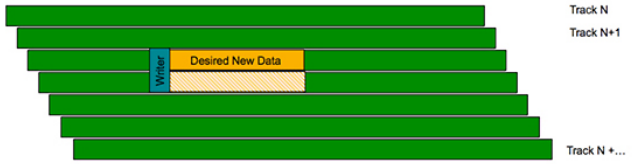


Figure 3. Writer Overlap on Trimmed Tracks

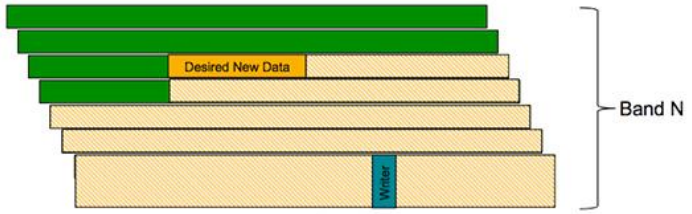


Figure 4. SMR Band Structure

1. Read old data
2. Merge with new data
3. Write new data, refreshing old data

Ref. source (http://www.seagate.com/tech-insights/breaking-areal-density-barriers-with-seagate-smr-master-ti/)

Contact

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