



# New Cleaning Technology from Exabyte

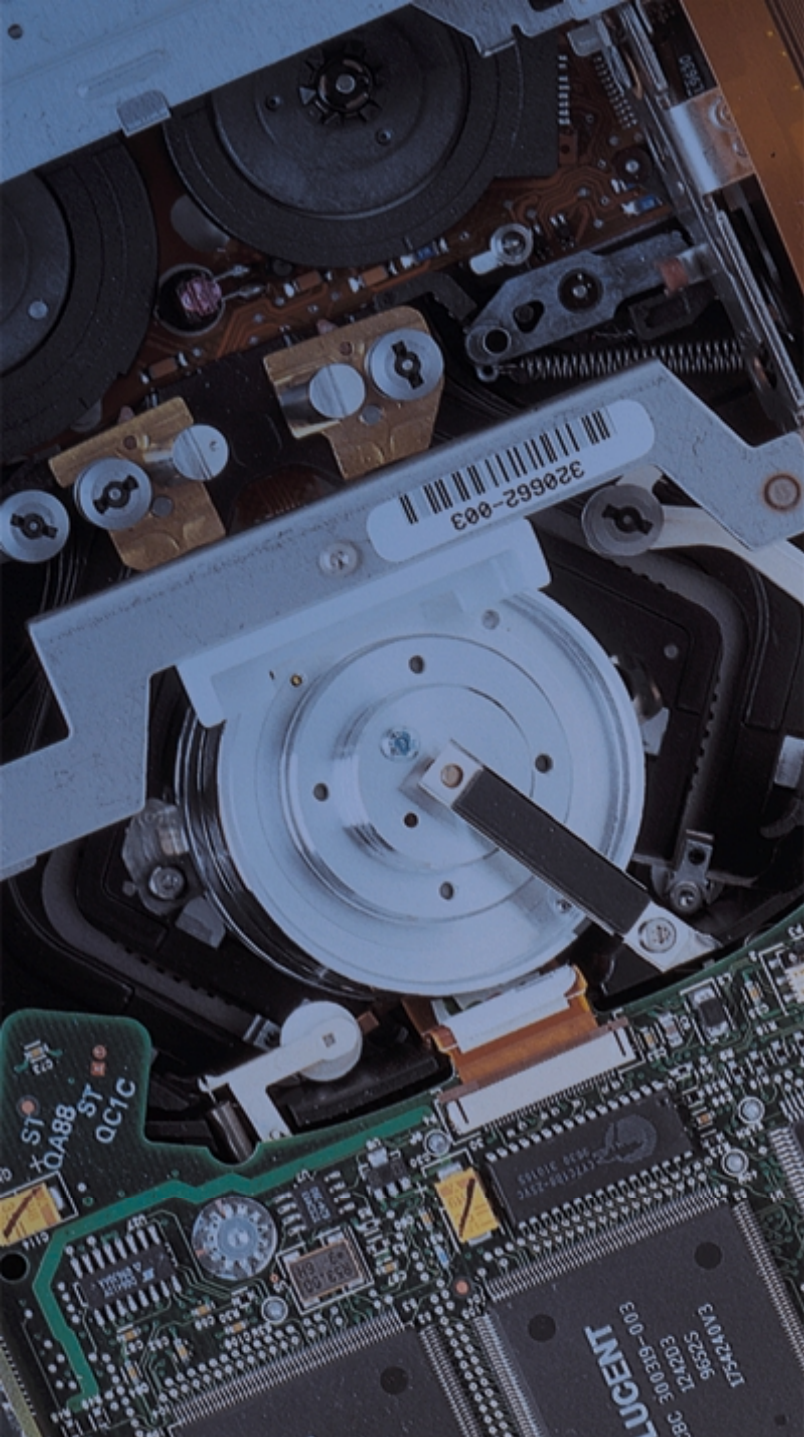
**Leif Skaar**  
**Director of Media Technology**  
**Exabyte Corporation**  
**1685 38th St**  
**Boulder CO 80301**  
**Phone: +1-303-417-4333 FAX: +1-303-417-7170**  
**e-mail: leif@exabyte.com**

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 **Exabyte**



# New Cleaning Technology from Exabyte

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# Tape Paths Must Be Cleaned

- Sources of Contamination
  - ◆ Head staining
    - Binders
    - Lubricants
  - ◆ Oxides
  - ◆ Air born dust
- Effects of Contamination
  - ◆ Head clogging
  - ◆ Head to tape separation
  - ◆ Media damage
  - ◆ Data loss



# Traditional Cleaning Methods

- Do nothing until the drive fails
  - ◆ Pioneered by home VHS users
  - ◆ The largest singled root cause of failure for tape drives is lack of cleaning
- Cleaning Cartridges
  - ◆ Cloth based tape with cleaning fluid
  - ◆ Abrasive MP tape
  - ◆ Abrasive AME tape



# Traditional Cleaning Methods

- Cleaning wheels
  - ◆ Pioneered by the video industry
  - ◆ Only good for removing loose debris, not effective for stains
  - ◆ Cleaning can be automatically invoked by the drive
  - ◆ Foam type
    - Good cleaning
    - Poor debris retention
  - ◆ Stacked Cloth
    - Excellent cleaning
    - Excellent debris retention



# Traditional Cleaning Methods

- Cleaning blades
  - ◆ First used by half inch reel-to-reel tapes
  - ◆ Good for removing loose debris from media
  - ◆ Can also remove lubricant and cause media damage
- Burnishing heads
  - ◆ Used on high end helical scan data drives
  - ◆ Rotating heads that remove media debris and smoothes the media surface before the media contacts the read/write heads



# Impacts of Not Cleaning

- Error rates increase
  - ◆ Backup may fail due to time window constraints
  - ◆ Backup may fail due to lack of tape capacity caused by rewrites
- False field failures
  - ◆ Drives are returned to the factory maintenance



# Impacts of Cleaning

- Manual intervention required
  - ◆ Some one must insert the cleaning tape
  - ◆ For unattended, overnight backup, the backup operation may abort and not complete
- Cleaning can be automated in tape libraries
  - ◆ Intelligent software needed
- Premature head failures due to over-cleaning with abrasive media



# A New Approach to Cleaning is Needed

- No operator intervention required
  - ◆ Cleaning indicators are ignored
  - ◆ Drive knows when it needs to be cleaned and should be able to completely clean itself
- Effective stain removal is needed
  - ◆ New media is smoother and allows stain to accumulate
- Head wear must be minimized
  - ◆ Aggressive cleaning tapes cause premature head failure



# A Total Cleaning Solution from Exabyte

- Stacked cloth cleaning wheel
  - ◆ Automatically invoked by the drive
  - ◆ Removes loose debris
  - ◆ Prevents head clogs
  
- Burnishing heads
  - ◆ Keeps media clean
  - ◆ Prevents head clogs



# A Total Cleaning Solution from Exabyte

- Cobalt Series Media with SmartClean Technology
  - ◆ Low abrasivity cleaning media included at the beginning of each tape cartridge
  - ◆ Removes staining caused by binders and lubricants
  - ◆ Use of cleaning media is under the control of the drive
    - No operator intervention required
    - Prevents head wear due to over cleaning



# Cobalt Series Media

- Leader tape
- Cleaning Media - 2.25 m
- Tape recognition window
- AME Media - 225 m
- Trailer tape



# Load and Cleaning Process

- The tape loads on AME media section
- The tape then moves in reverse across the recognition window
- The cartridge type is recognized
- The tape is then positioned at LBOT
- A cleaning operation can be performed at any time by rewinding into the cleaning tape area
- Cleaning is triggered by drive read/write data



# AME Media

AME media is thin-film media

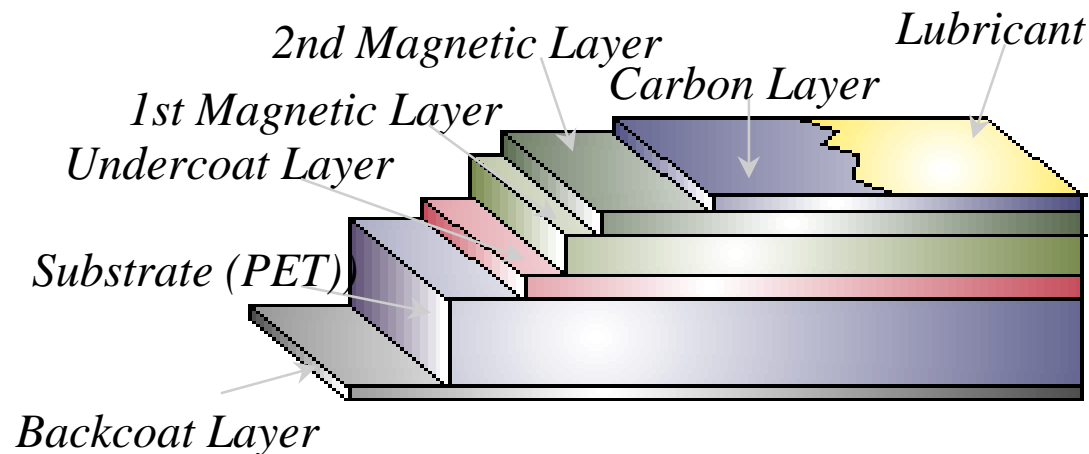
## Feature

- Diamond-like Carbon Coating
- Thinner magnetic layer
- High Areal density

**Lifetime warranty**

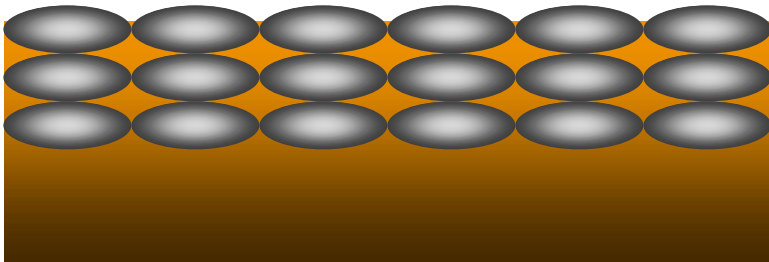
## Benefit

- Longer head life due to low abrasion
- Longer Media/Higher Capacity
- High capacity, Fast transfer rate
- Guaranteed long-term data security



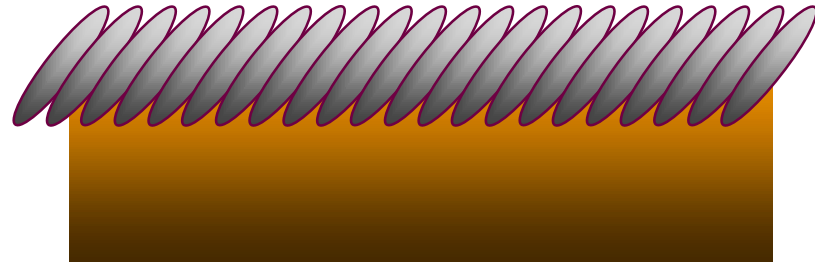


# Comparisons: MP & AME



**MP**

Traditional MP coating processes result in a lower density distribution of particles. The disk industry stopped using this coating technology over a decade ago.



**AME**

With AME, the domains are more vertically aligned for higher density and superior signal output. State of the art for the disk industry