Using Track-Following Servo Technology on LTO Tape Drives

Eighth NASA Goddard Space Flight Center
Conference on Mass Storage Systems and Technologies
in cooperation with
Seventeenth IEEE Symposium on Mass Storage Systems

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Agenda

- LTO Background
- Ultrium Roadmap
- Ultrium Technology

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LTO Initiative

- LTO announces open tape format for midrange in November '97
  - Tape market advantages
    - Multiple Manufacturers vendors
      - Cost competitive
      - Improved product availability
    - Patent Sharing
      - Aggressive technology roadmap
    - Certification Process
      - Compatibility Enforcement

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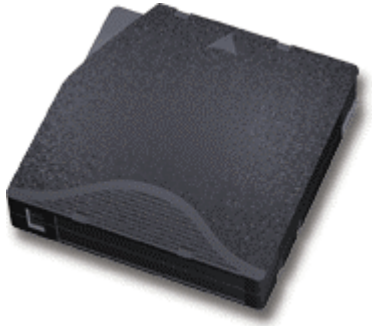
Tape Formats

- Accelis
  - Fast access load applications

- Ultrium
  - Backup, restore and archive applications



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Four Drive Manufacturers

Ultrium Drive Manufacturers

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Seven Media Manufacturers

Ultrium Media Manufacturers

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Four Generation Roadmap

Ultrium Tape Roadmap

	Generation 1	Generation 2	Generation 3	Generation 4
Capacity*	100GB	200GB	400GB	800GB
Transfer Rate*	10-20MBs/sec	20-40MBs/sec	40-80MBs/sec	80-160MBs/sec

* Native capacity and transfer rates
www.lto-technology.com

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Technology Roadmap

Ultrium Technology Roadmap

	Generation 1	Generation 2	Generation 3	Generation 4
Capacity*	100GB	200GB	400GB	800GB
Transfer Rate*	10-20MBs/sec	20-40MBs/sec	40-80MBs/sec	80-160MBs/sec
Media	Metal Particle	Metal Particle	Metal Particle	Metal Evaporative
Encoding	RLL 1.7	PRML	PRML	PRML
Head Channels	8	8	16	16
Tape Speed	2.7 to 5.4 m/s	3.75 to 7.5 m/s	3.75 to 7.5 m/s	3.75 to 7.5 m/s
Tape Length	580m	580m	800m	800m
Track Count	384	512	768	1024

* Native capacity and transfer rates

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Ultrium Tape Format

Metal Particle Tape

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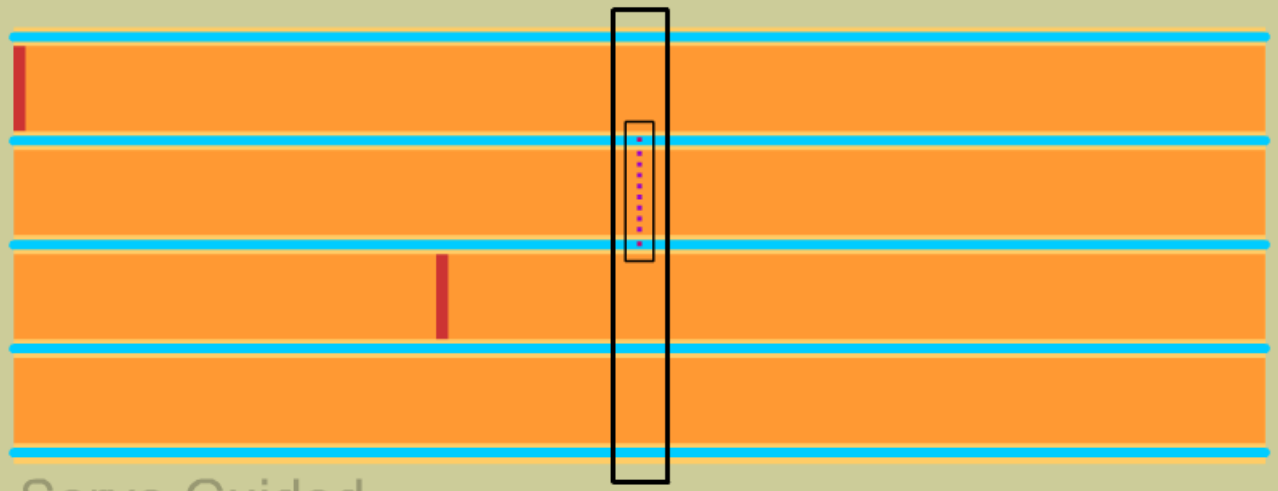
Ultrium Tape Format



Servo Guided
Recording Head

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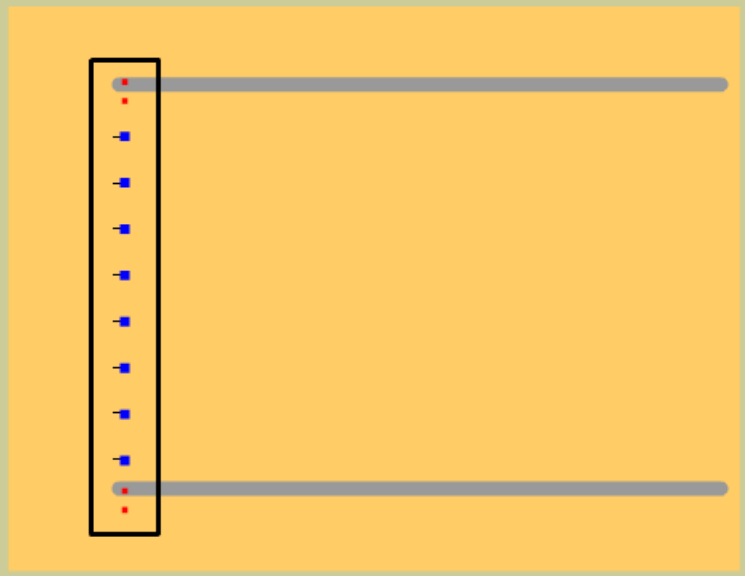
Serpentine Recording Method



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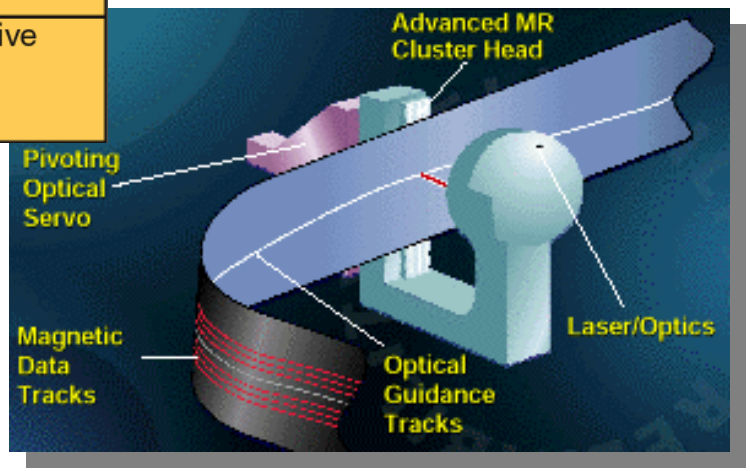
Technology Comparison

	LTO	SDLT
Servo	Magnetic track-following	Optical track-following
Servo Redundancy	Two head elements and redundant servo tracks	Limited due to single laser beam
Media	Metal Particle	Advanced Metal Particle with embedded laser-sensitive servo
Encoding	Run-length encoding	Enhanced partial response
Recording Heads	Magneto Resistive	Magneto Resistive Clustered



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Feasible Technology Progression

Ultrium Technology Roadmap

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More information: www.lto-technology.com
www.fcpa.com

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