

Advanced Intelligent Tape

*Introducing Sony's New Tape
Technology:*

AIT



THIC Presentation - October 1996

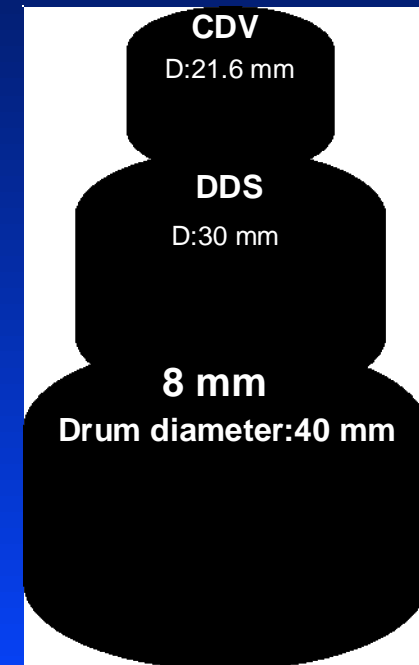
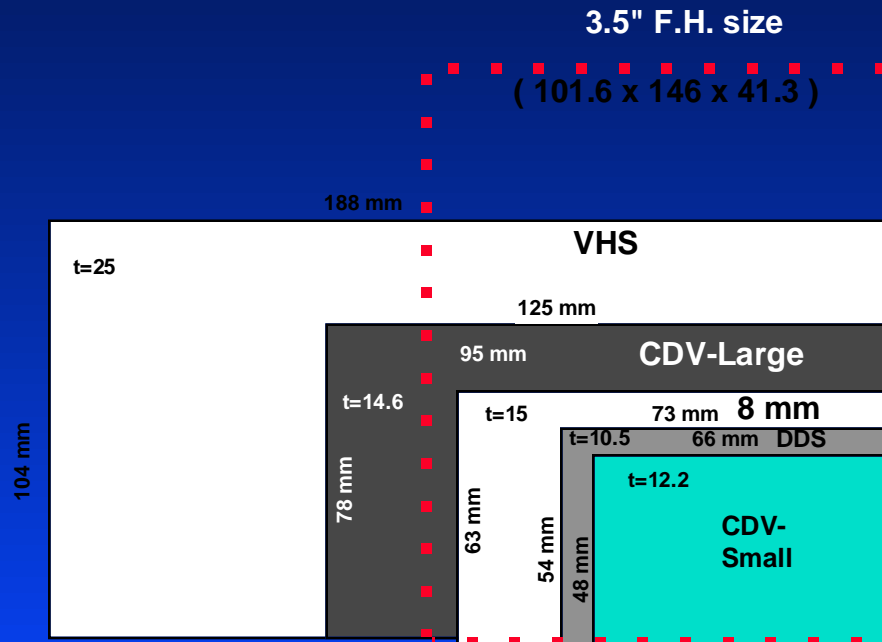
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Technology Design Considerations

What would it take to fit a 3.5" Form-Factor?

Capacity = Media Area

Transfer Rate = Head Speed
+ Multi Heads



AIT Product Specifications

- ◆ 25GB Native Capacity
- ◆ 3.0 MB/s Sustained Data Transfer
- ◆ 3.5" Form-Factor
- ◆ < 10 sec. Media Load Time w/MIC (20 sec. without)
- ◆ < 27 sec. Average File Access w/MIC (55 sec. without)



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AIT Product Specifications

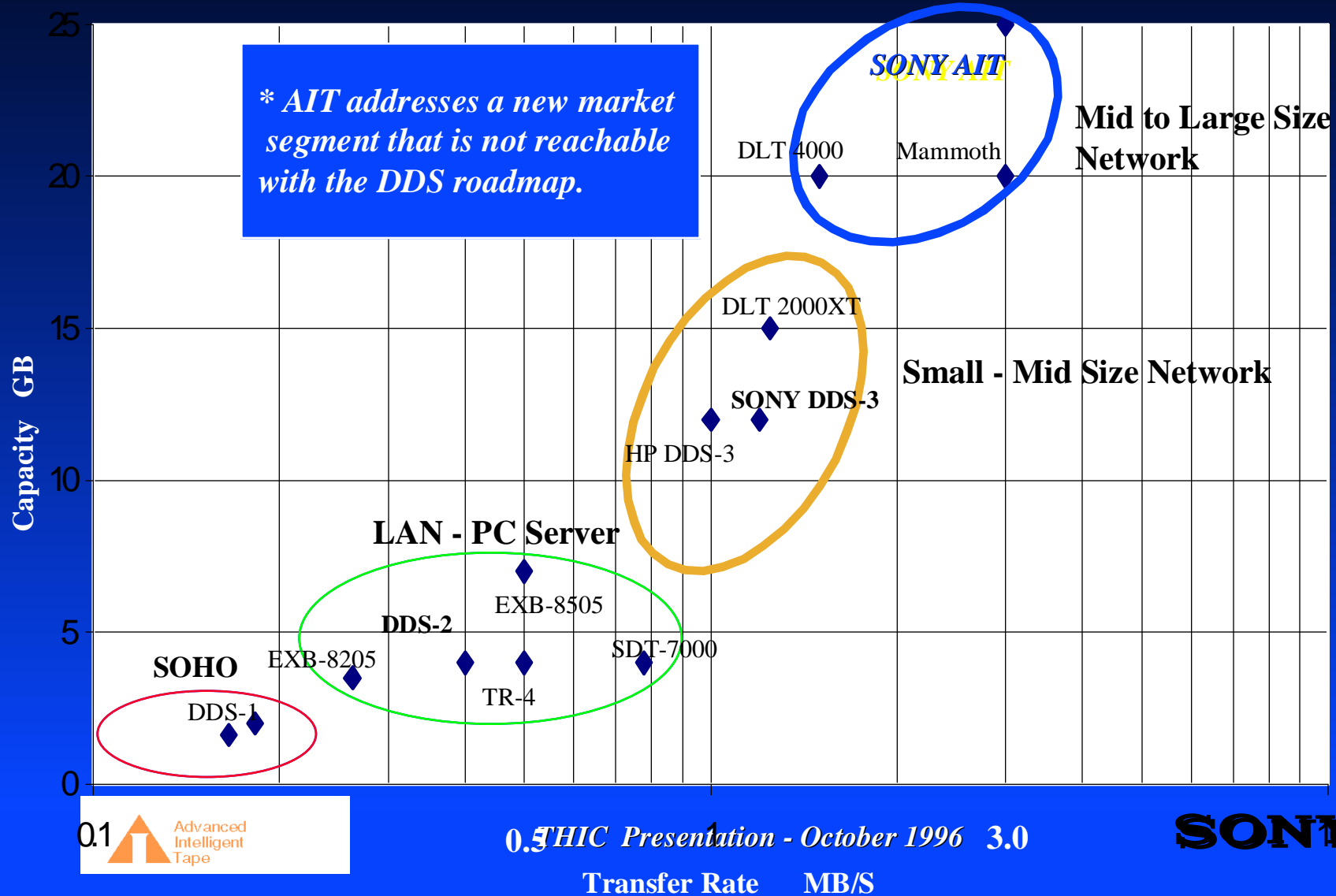
- ◆ Efficient Data Compressor using IBM's ALDC
- ◆ Fast/Wide SCSI Interface at 20MB/s Burst Xfer Rate
- ◆ Supports up to 256 On-Tape Partitions



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Tape Drive Market Segmentation



DDS/AIT Technology Comparison

	DDS-2	DDS-3	SDX-300
Capacity (Native)	4GB	12GB	25GB
Transfer Rate (Native)	366/700KB/s	1.2MB/s	3.0MB/s
Media	120mMP ⁺	125mMP ⁺⁺	170mME
Track Pitch	9.1μm	9.1μm	11μm
Linear Density	61 Kbpi	122 Kbpi	116Kbpi
Drum Speed	6000/9000	4200	4800
First Shipment	1H 1994	2H1996	2H1996



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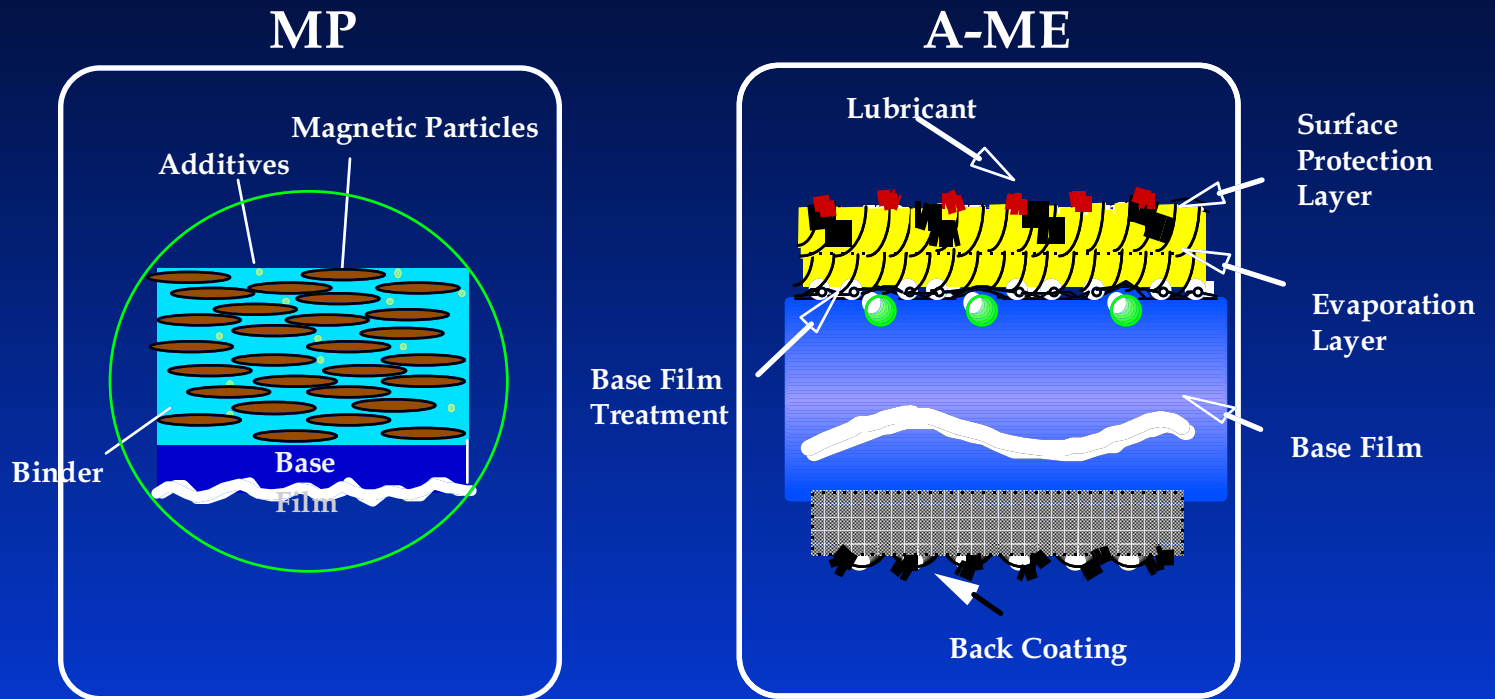
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AIT Product Design

Head/Media Reliability Considerations:

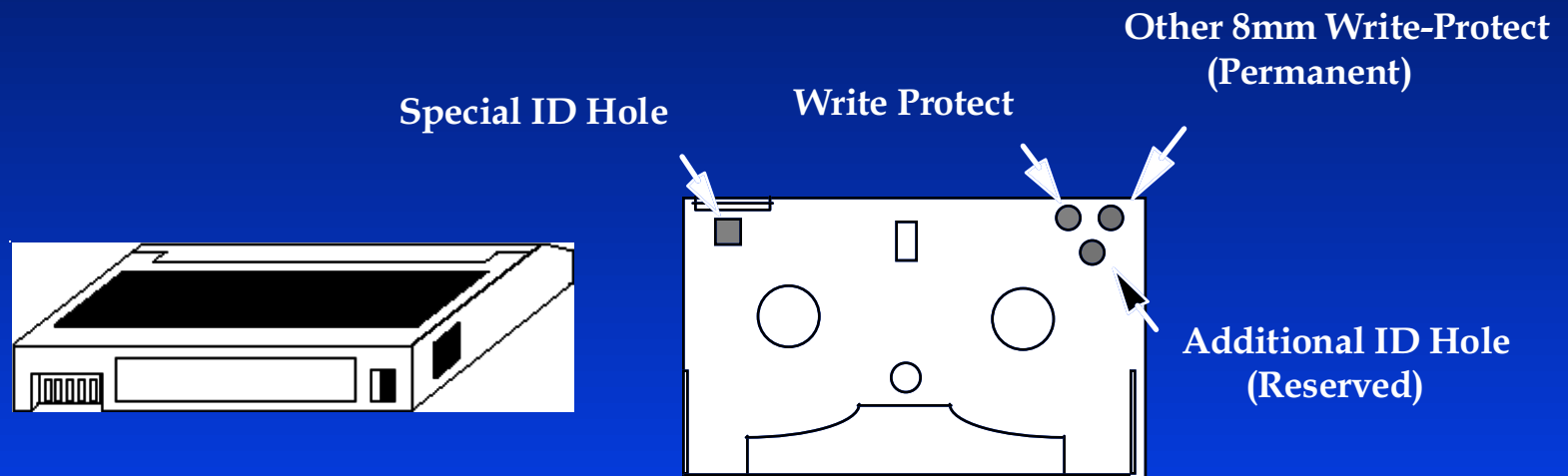
- ◆ Large Diameter, Low RPM Scanner
- ◆ Large Diameter MIG Head
- ◆ Extremely Durable, High Output Media

Advanced Metal Evaporated Tape



AIT Media Compatibility

- ◆ **Accept A-ME Cartridges Only**
- ◆ **Reject all other 8 mm Media**
- ◆ **Other 8mm mechanisms will accept AIT Cartridge , but it is permanently write protected**



Exceptional Media and Head Life

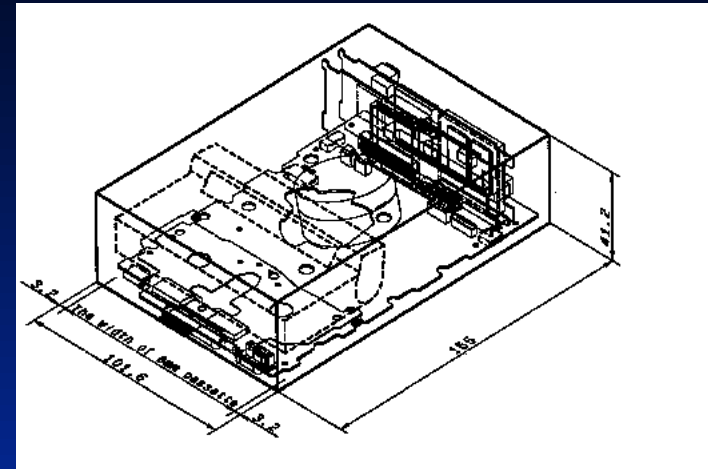


- ◆ Media Uses : Greater than 20,000
- ◆ Head Life : Minimum of 30,000 Hours
- ◆ Head Cleaning : No Periodic User Cleaning
- ◆ Media archival : >30 years

AIT Mechanical Design

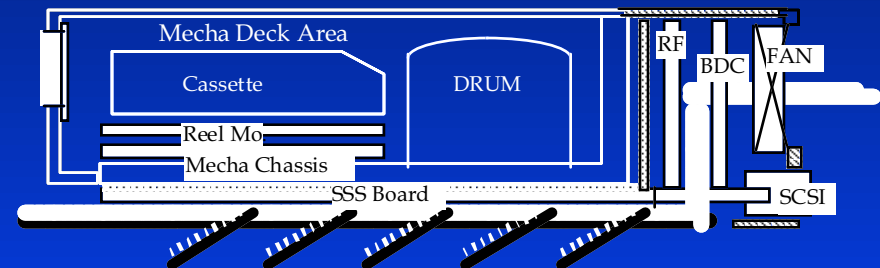
◆ Precision Control

- High Speed Reel Motor (x 150)
- Electronic Tension Control (Hall Effect)
- Ball Bearing Roller Guides
- No Mechanical Switches (Optical)



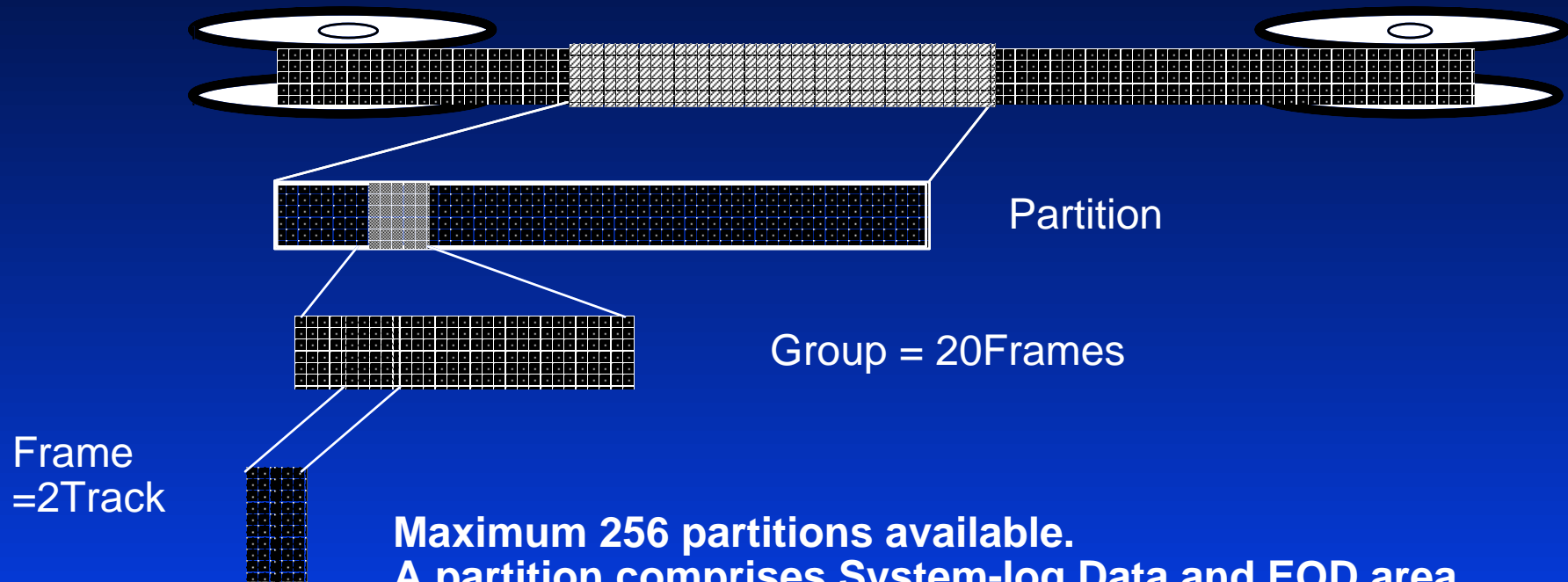
◆ Self-Cooling Design

- PCB lay-out under / behind Deck
- Variable Duty-Cycle Fan cools PCB and Baseplate
- No Airflow through Deck



AIT On-Tape Format

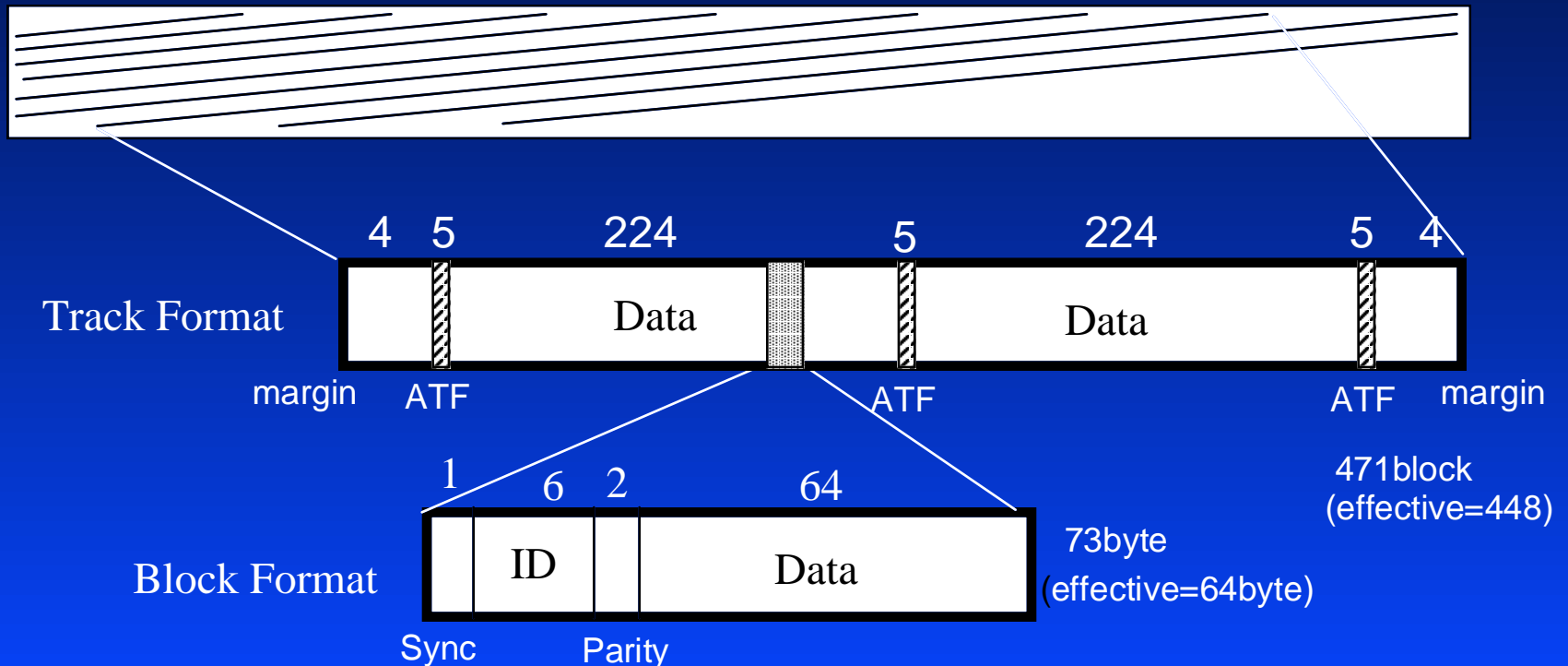
AIT Tape Format Structure (Framework is same as DDS Format)
“Enhanced” DDS Format



Maximum 256 partitions available.
A partition comprises System-log, Data and EOD area.
Data area have group structure.
A Group consists of 20 Frames.
A Frame consists of 2 Tracks.

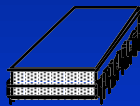
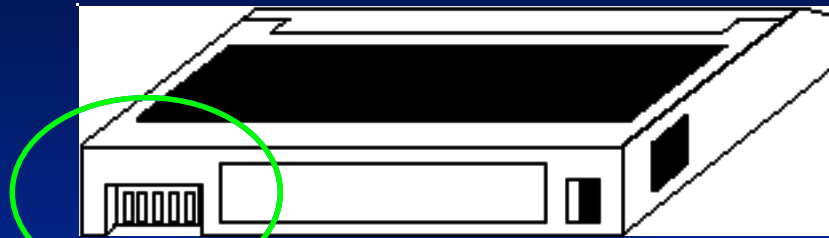
AIT Track & Block Format

A track consists of 471 blocks, comprising Data, ATF and margin.
 A data block consists of 73 bytes, comprising Sync, ID, Parity and Data.



AIT Intelligent Tape

MIC ... Memory In Cassette



Flash Memory

Memory Specification

Memory:	Serial I/F EEPROM 16 Kbits (32K, 64 Kbits) migration ... 256 Kbits ('97)
Interface:	Extended I ² C
R/W time:	read all data... 200 ms write all data... 2000 ms
R/W cycle:	1,000,000 times erase/write cycle No limited read cycle
ESD:	ESD protection circuit (~12KV)

AIT “Memory-in-Cassette” (MIC)

Features:

- ◆ Tape Structure & History Stored in Captive EEPROM
- ◆ Data Read Directly from EEPROM - not Tape Area
- ◆ Improves Data Set/Volume Management
- ◆ Provides Faster Access to Data (Load/Unload, Search)

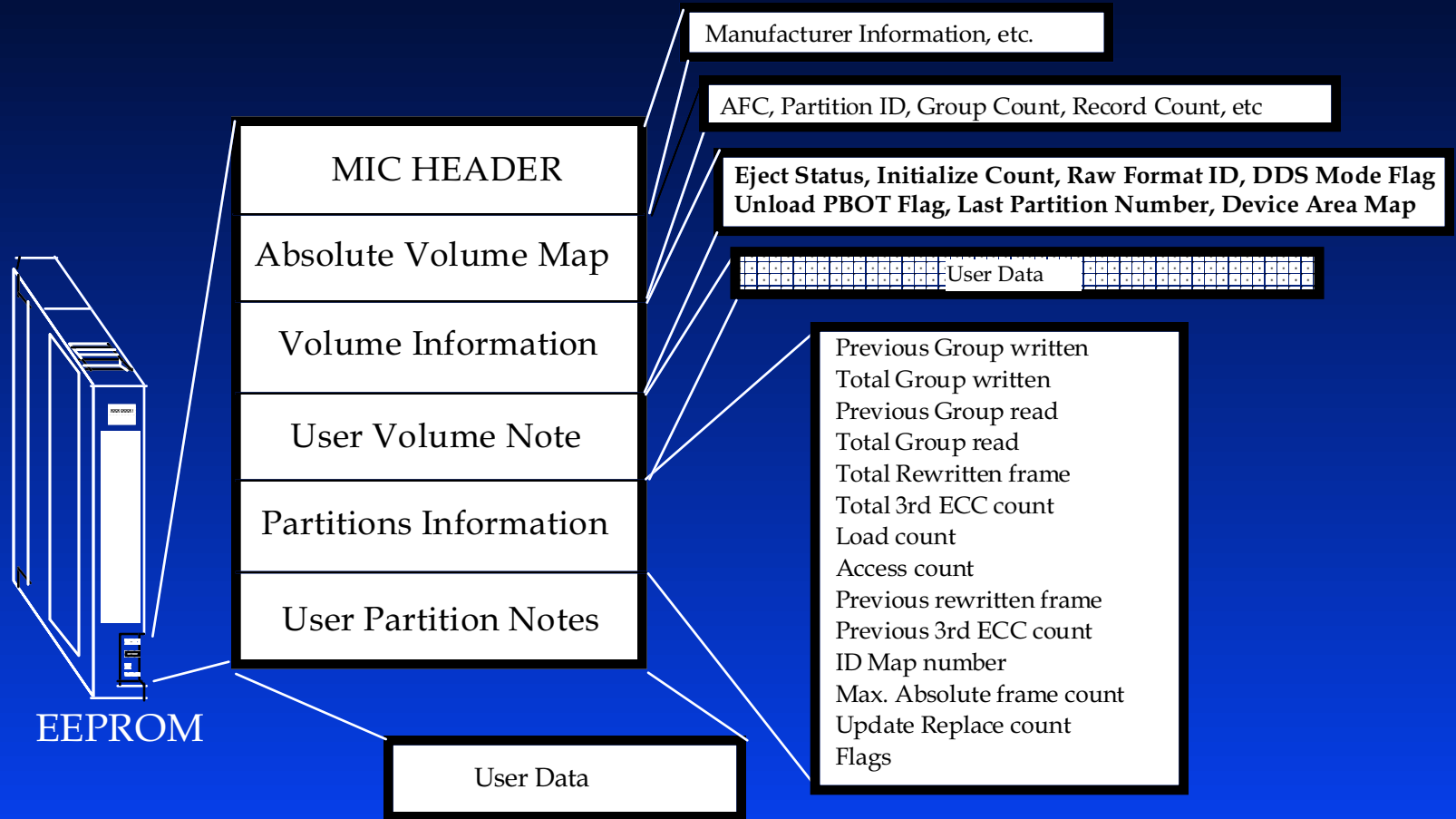


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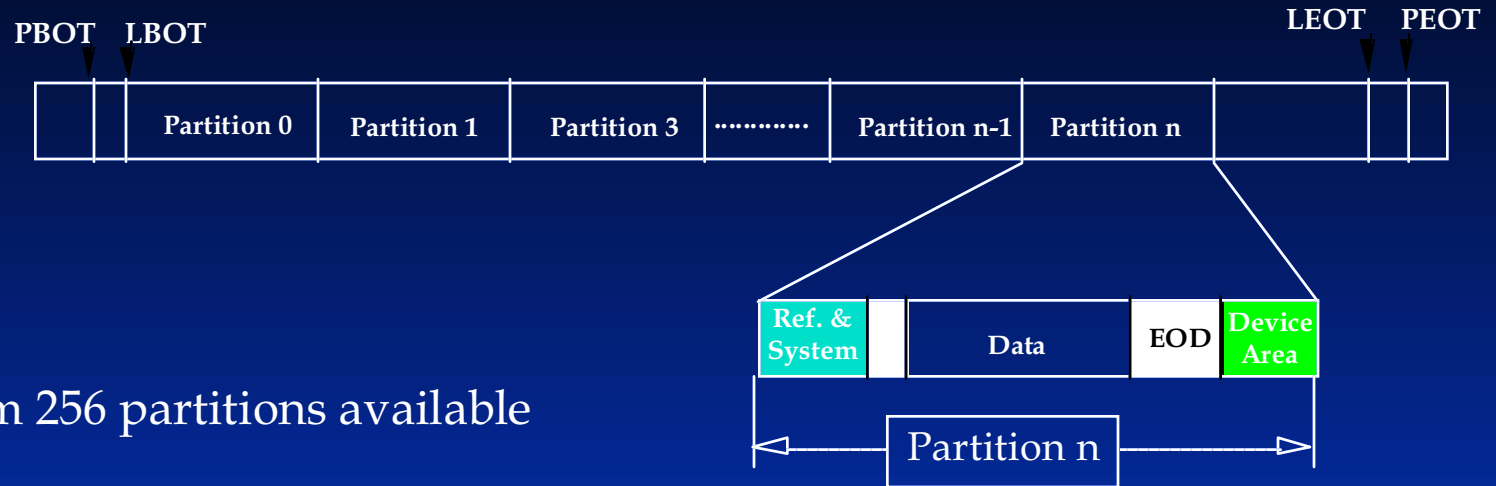
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MIC Data Structure

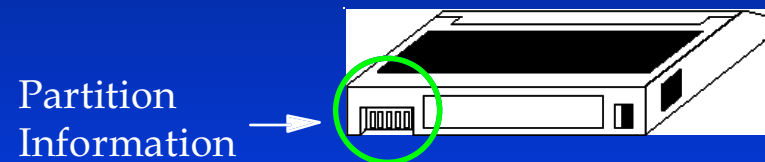
MIC Data Structure



Multiple Partitions & MIC



- Maximum 256 partitions available
- Load/Unload at any Partition
- Provides Partition insert and Append



AIT Migration Path



AIT-1

* 25GB
* 3MBps

1996

AIT-2

** 50GB
** 6MBps

1998

AIT-3

** 100GB
** 12MBps

2000

* native
** native - approx.

Tape	A-ME	A-ME+	A-ME++
Head	MIG	Hyper Metal	New Head
Coding	8,10 PRML	8,10 PRML+	Extended-PRML
Track Pitch	11μm	< 11μm	< 11μm
Drum Speed	4800rpm	> 4800rpm	> 4800rpm