Introducing MIC Architecture:

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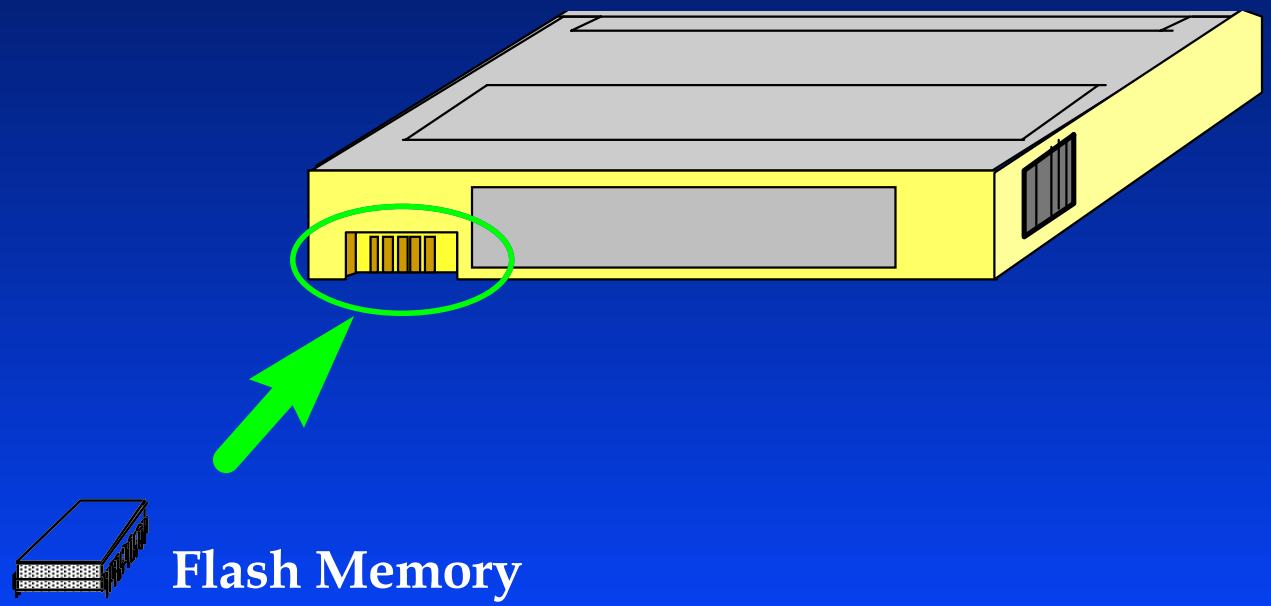
Customers Needs

- **Improved Reliability/ Data Integrity**
- **Faster Access to Data (Load/Unload, File Search)**
- **Better Data Set Management**

Approach to Solution

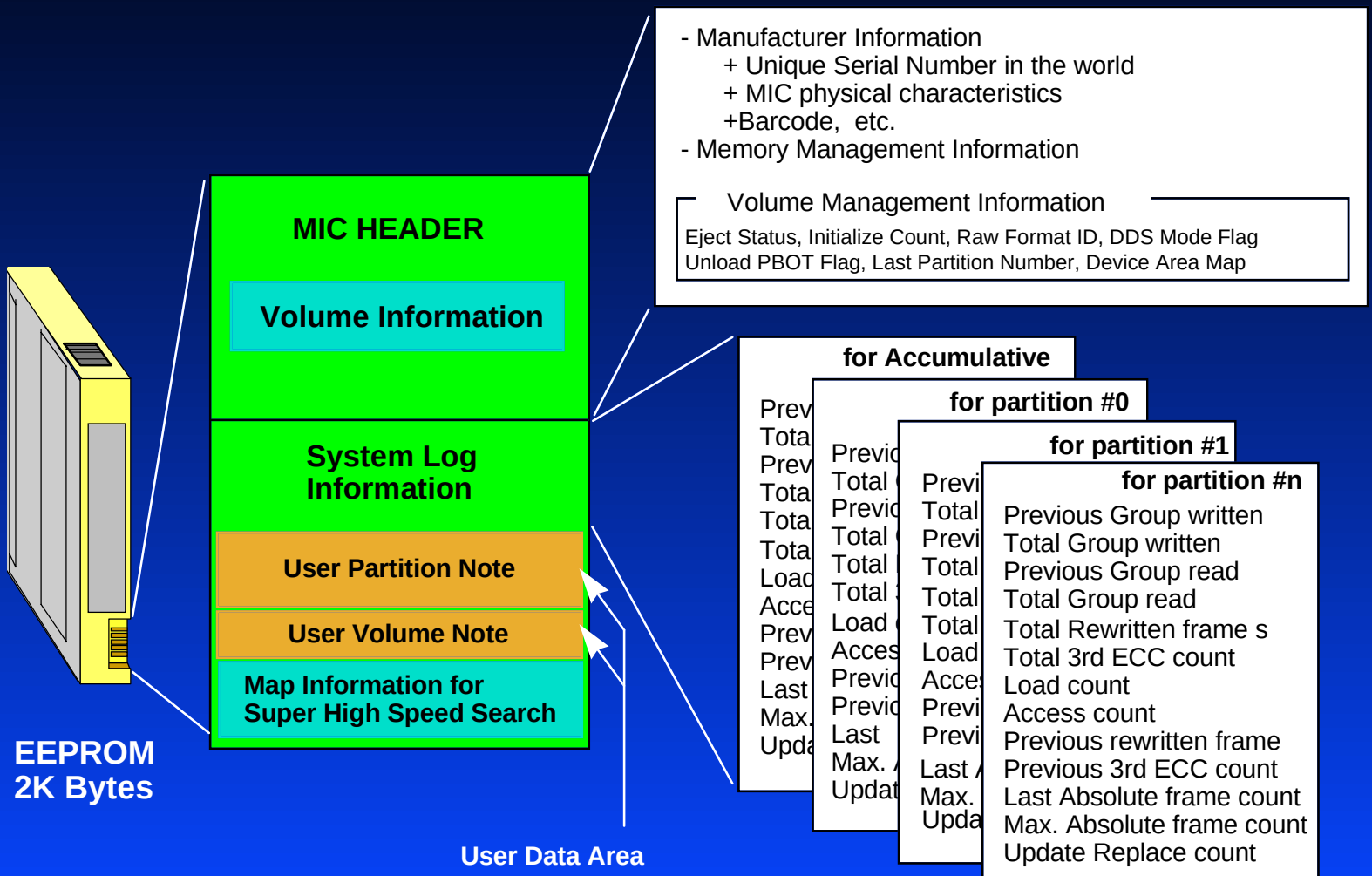
MIC .... *"Memory-in-Cassette" (MIC)*

To add Fast Access Capability



Flash Memory

MIC Data Structure



What does MIC Provide?

- **Reliability**
  - **Media history data will saved, even if the cassette was initialized.**
  - **Data Read Directly from EEPROM - not Tape Area.**
- **Access Speed**
  - **Load & Unload acceleration (25sec ⇒ 10sec)**
  - **Search Speed acceleration (225MB/sec ⇒ 450MB/sec)**
  - **Improves File Average Access (57sec ⇒ 28sec)**
- **Random Access User Memory**
  - **700Bytes (2KBytes MIC), 6.7KBytes (8KBytes MIC)**
  - **Intelligent Library Applications**
    - **Unique Volume Serial Number**
    - **Volume Use History**
    - **Date/ Origin of Manufacturer**

Enhanced Reliability

- **Media history is saved, even if the cassette was initialized.**
  - **Initialize Count**
  - **Total Group Written / Total Group Read**
  - **Total Rewritten Frames**
  - **Total 3rd ECC Count**
  - **Access Count / Update Replace Count**
  - **Load Count**
- **Data Read/Write Directly from/to MIC - not Tape Area.**
  - **Reduces Media Wear**
  - **Reduces Mechanism Wear**

Reduced Media Load/ Unload Time

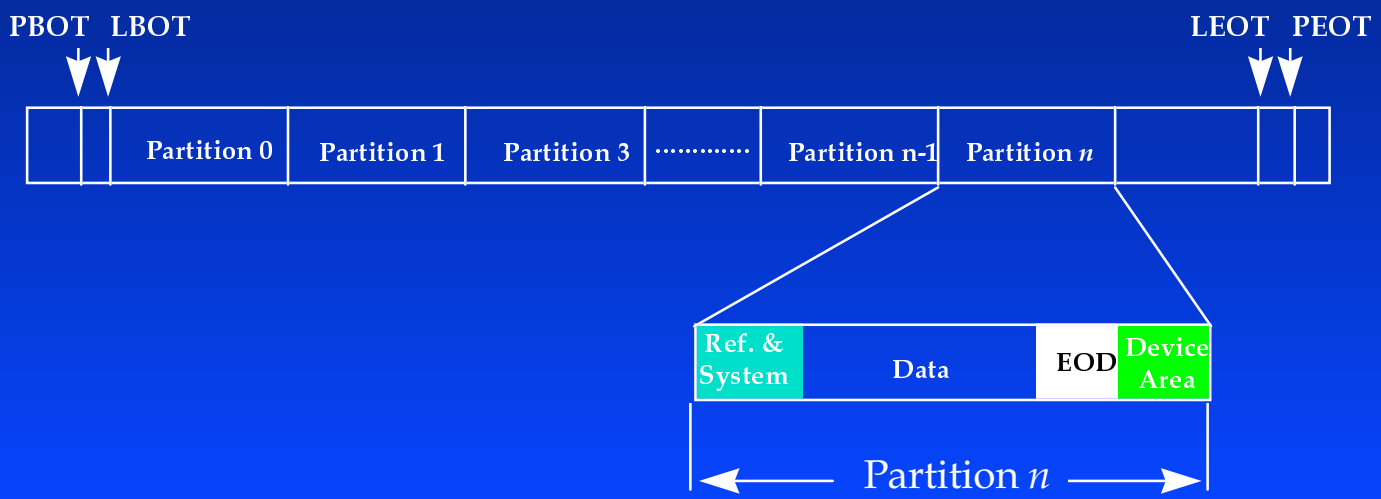
- **READ**
  - **Read System Log information from MIC instead of the tape while threading**
- **WRITE**
  - **Write System Log information only into MIC instead of tape while unthreading**
    - **Load Time 10 sec**
    - **Unload Time 17 sec**

Accelerated Search Speed

- **Use FF(Fast Forward) action automatically during long distance space operation**
- **Automatically creates the physical address map in MIC during write operation.**
- **Can reach the appropriate position in front of the target position without reading IDs from the tape.**
- **Invoke normal search speed between the appropriate position and the target position, while reading IDs from tape.**

How to Accelerate Average File Access

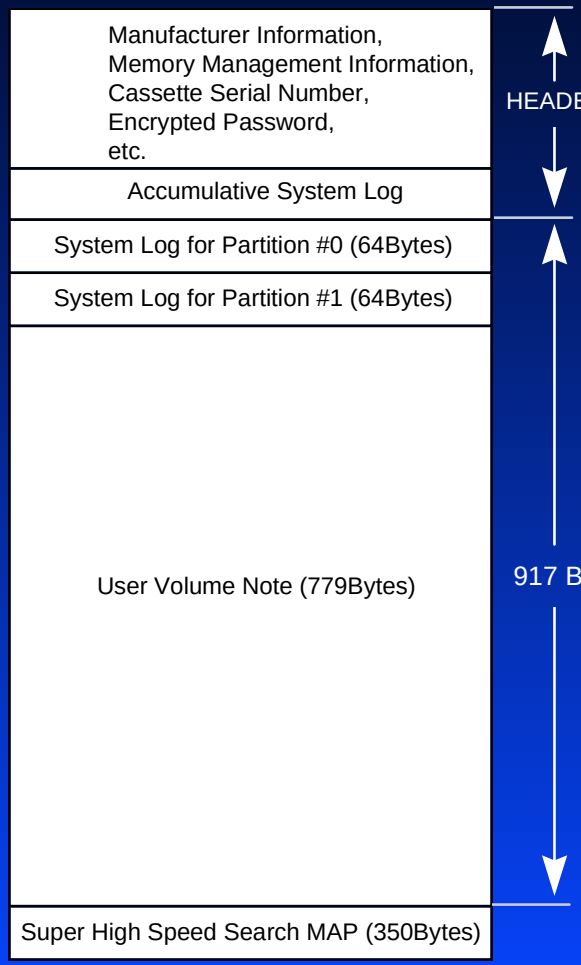
- **Application creates multi-partitions**
  - **Preformat Command (Mode Select Page 11h-14h)**
  - **Append Partition Command (Mode Select Page 32h)**
- **Each partition contains Load point (Device Area)**
- **Load/Unload operation can be done at Device Area of any partition. (MIC keeps the position information and both reels in the cassette will be locked.)**



How to Use the User Memory

- **AIT provides Log Sense/Select vendor unique Page**
  - **Page 3Dh MIC Fixed Length Information Page**
  - **Page 3Eh MIC Variable Length Information Page**

Example Usage 2

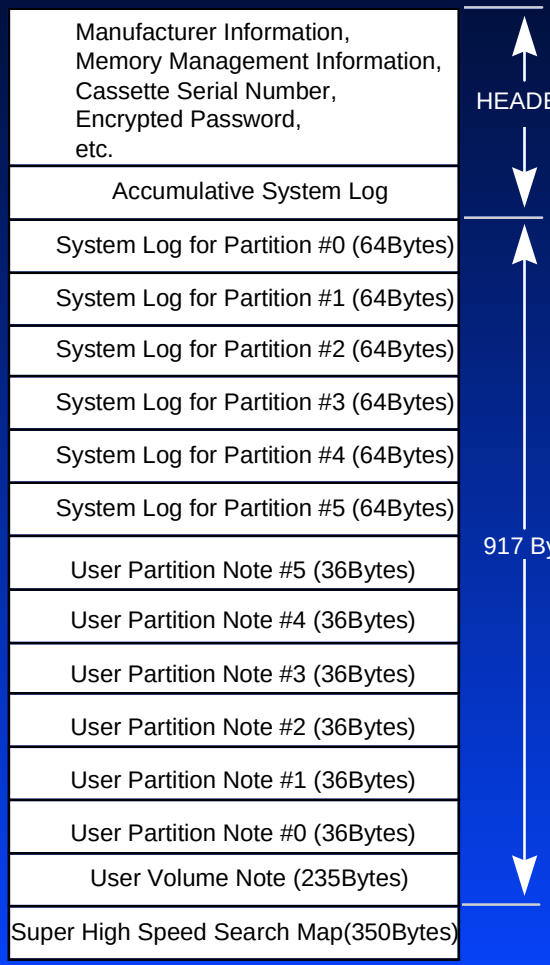


The overhead for User Volume Note is 10 bytes.
The overhead for an User Partition Note is 12 bytes.

User Volume Note shall be created before any User Partition Note. User Volume Note cannot be deleted, cannot be expanded and cannot be shrinked except initializing time.

- Give 779 bytes of pure user data for User Volume Note.
- Give 2 partitions.
- No User Partition Note.

Example Usage 1



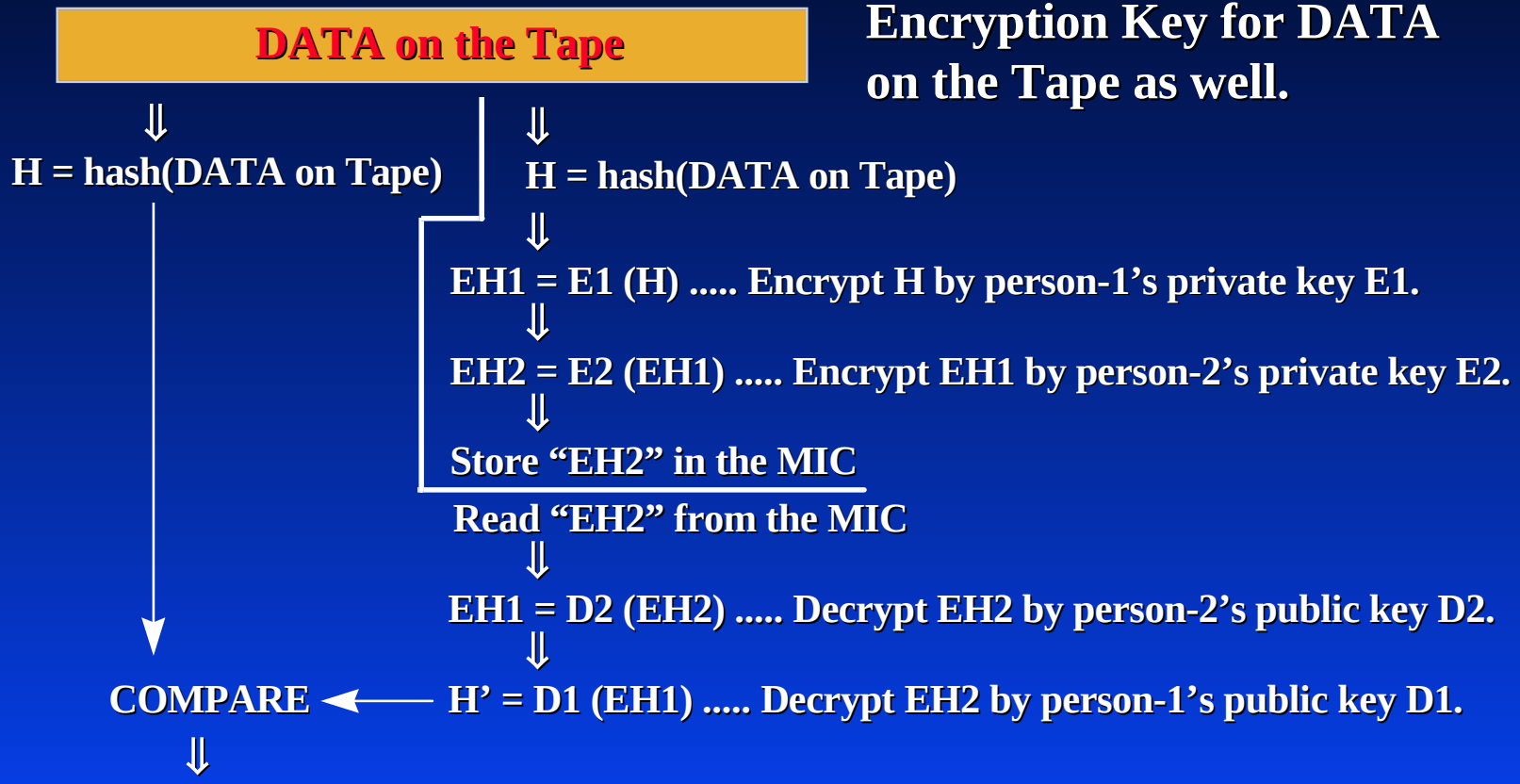
The overhead for User Volume Note is 10 bytes.
The overhead for an User Partition Note is 12 bytes.

User Volume Note shall be created before any User Partition Note. User Volume Note cannot be deleted, cannot be expanded and cannot be shrinked except initializing time.

- Give 235 bytes of pure user data for User Volume Note.
- Give 6 partitions.
- Then the equal size of User Partition Note is 36 bytes.

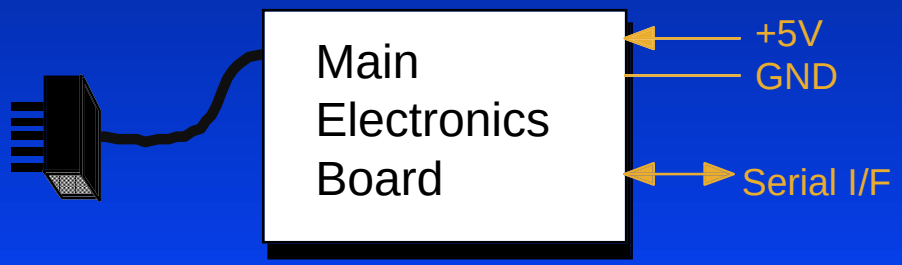
Example MIC Application 1

- **Large Capacity of Removable Media with Electronic Signature**



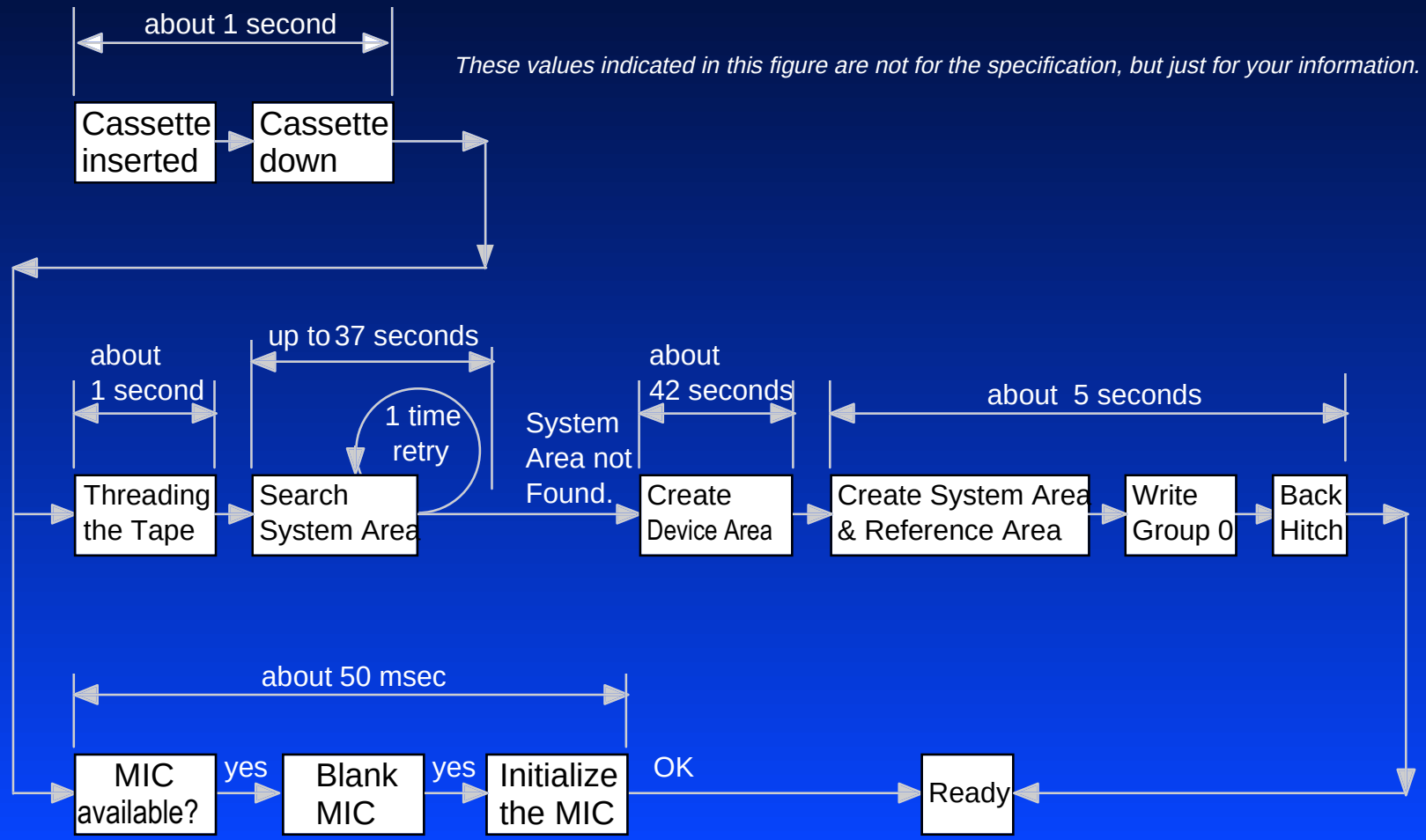
Outside of the Drive

- **External MIC Reader/Writer**
- **Evaluation Kit : (Q2 1997)**
  - **Main Electronics Board**
    - **Supports Serial I/F**
    - **Supports 1 MIC probe**
  - **MIC contact probe**
    - **User Documentation**
    - **Evaluation Only**
- **Productization**
  - **Q4 1997**



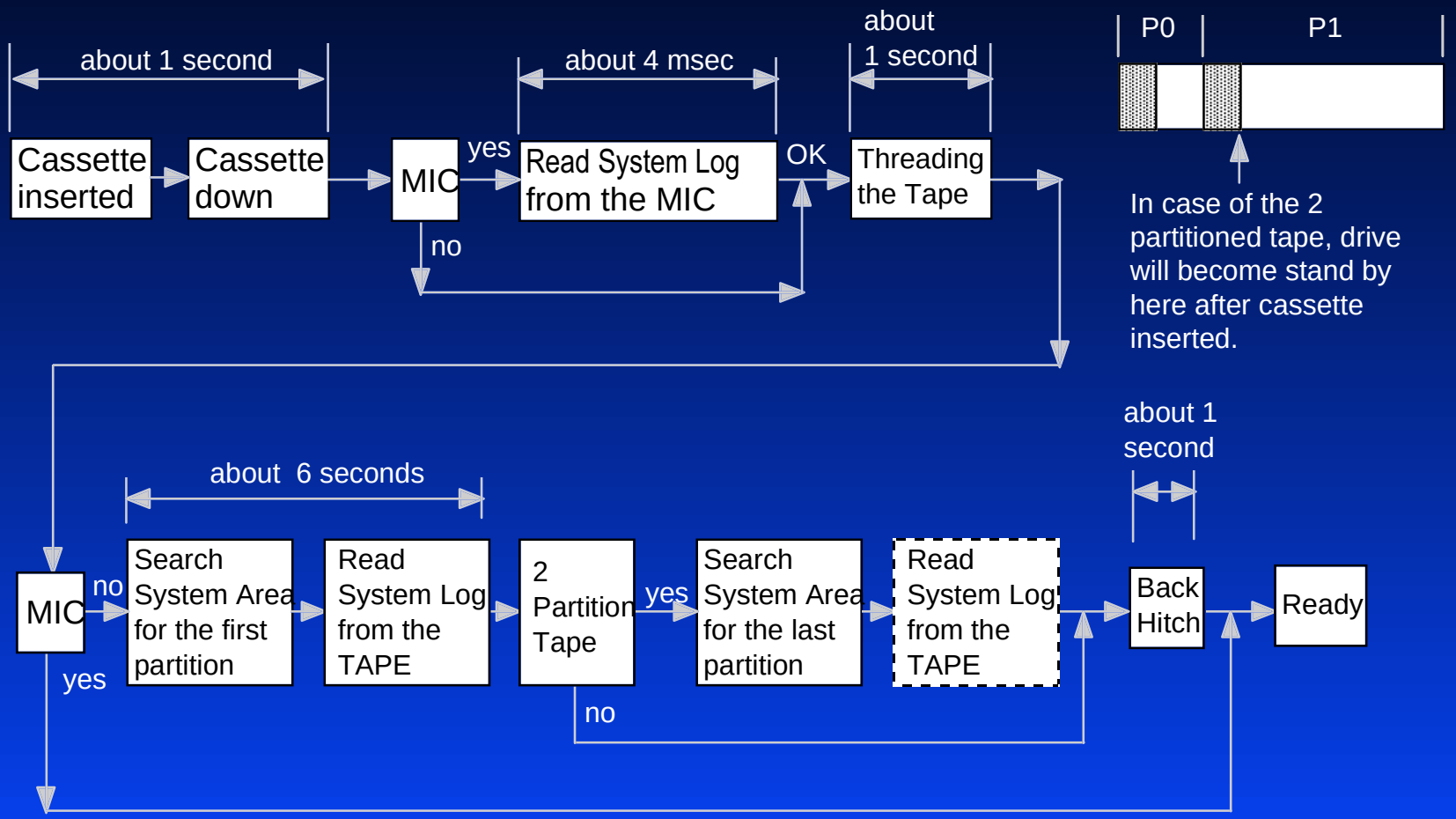
Tape Motion (Insert Blank Cassette ⇒ Ready)

MIC Phase-1 & 2



Tape Motion (Insert Non-Blank cassette ⇒ Ready)

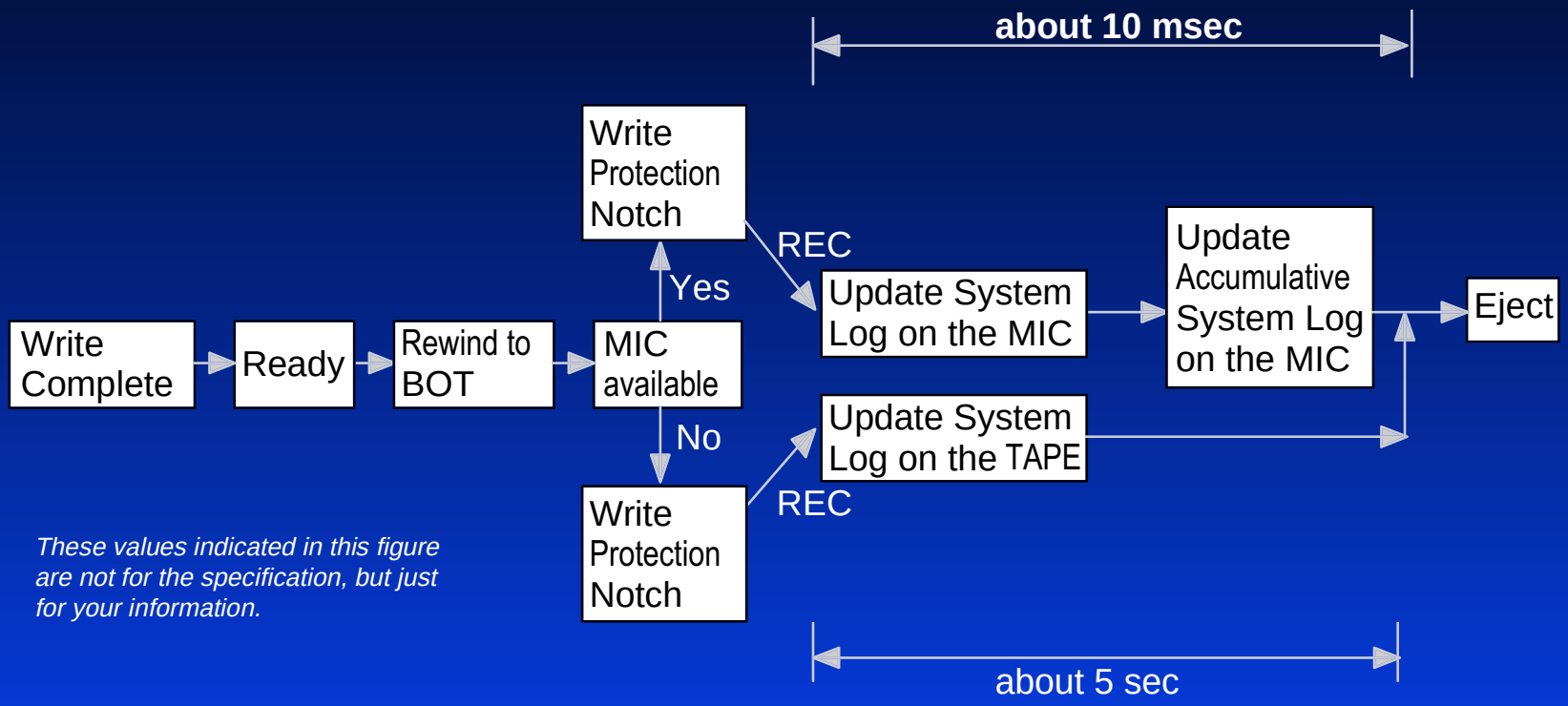
MIC Phase-1



These values indicated in this figure are not for the specification, but just for your information.

Tape Motion (Write Complete ⇒ Eject)

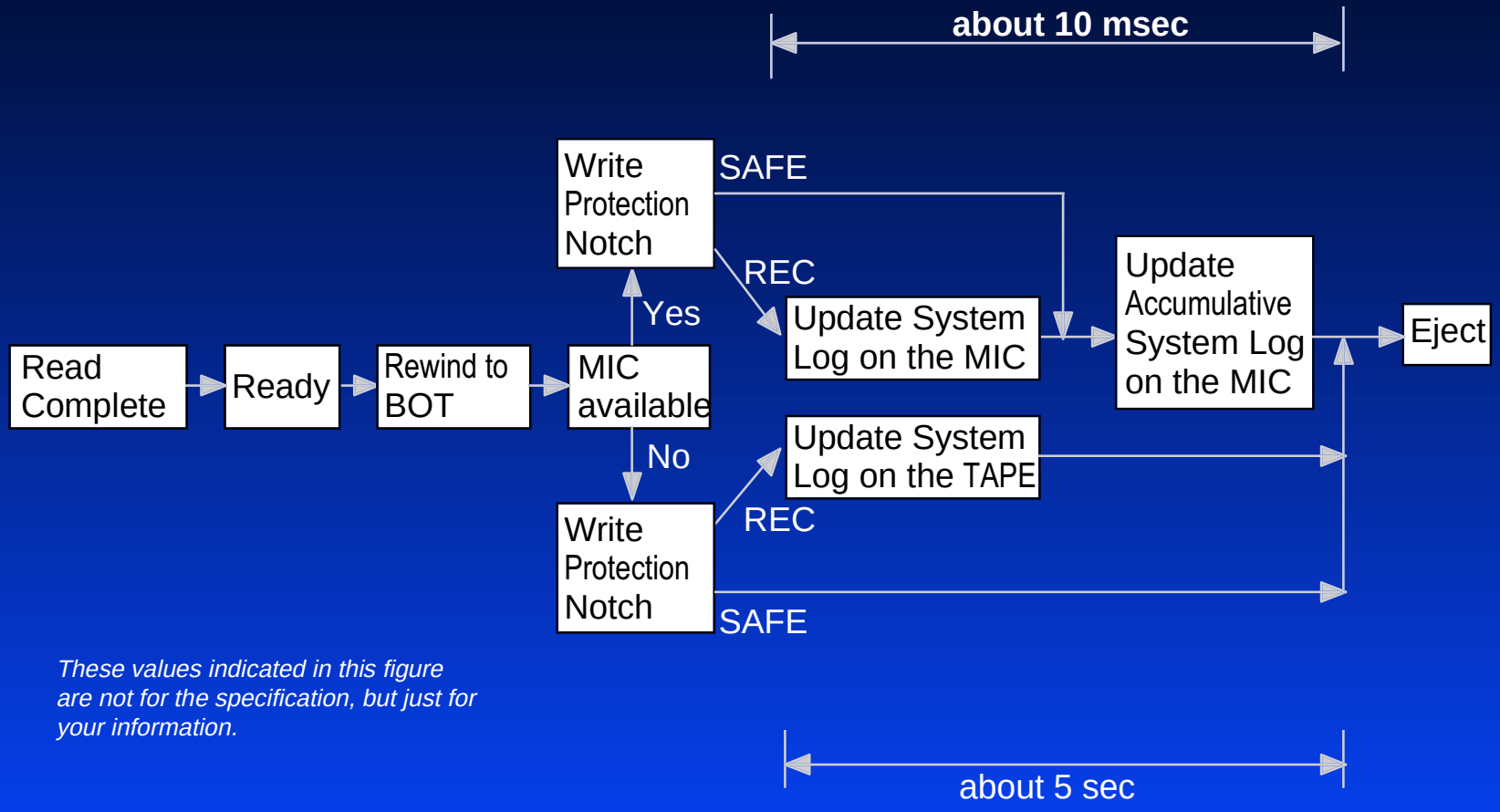
MIC Phase-1 & 2



These values indicated in this figure are not for the specification, but just for your information.

Tape Motion (Read Complete ⇒ Eject)

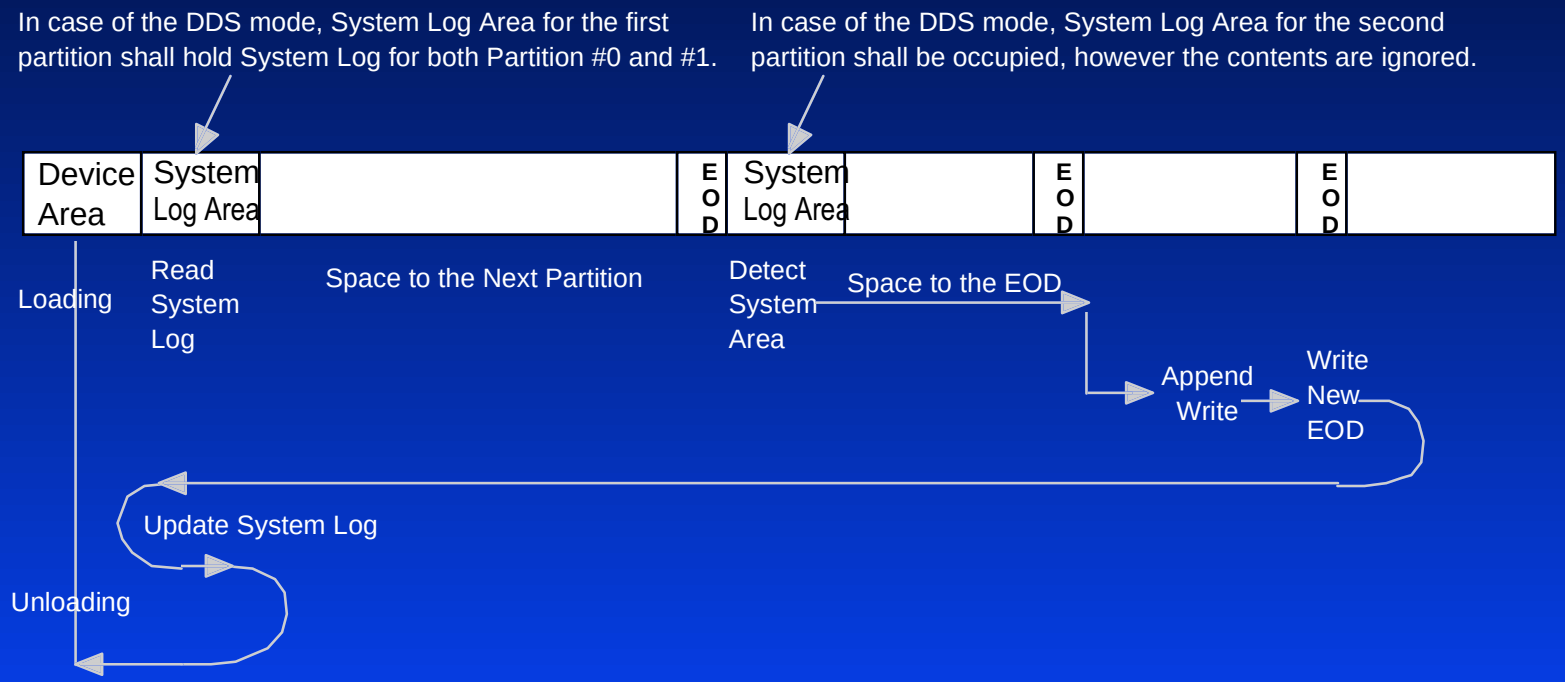
MIC Phase-1 & 2



These values indicated in this figure are not for the specification, but just for your information.

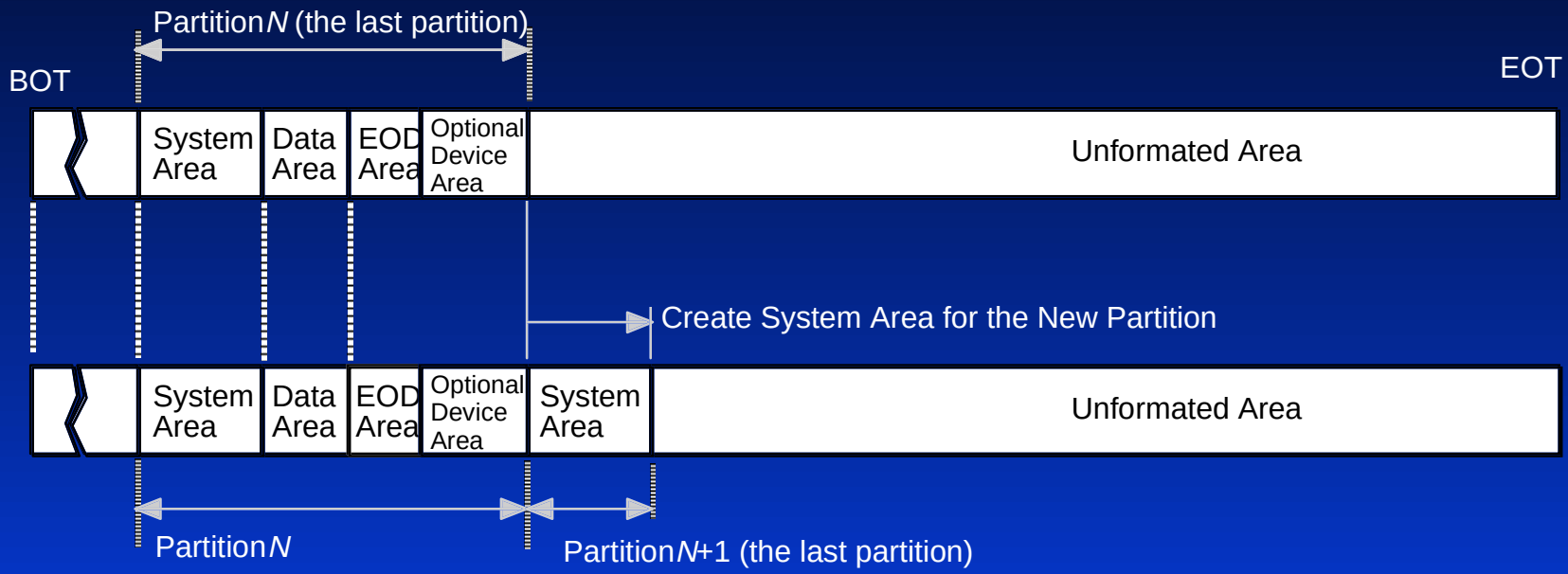
Append Write to the Last Partition

MIC Phase-1 & 2



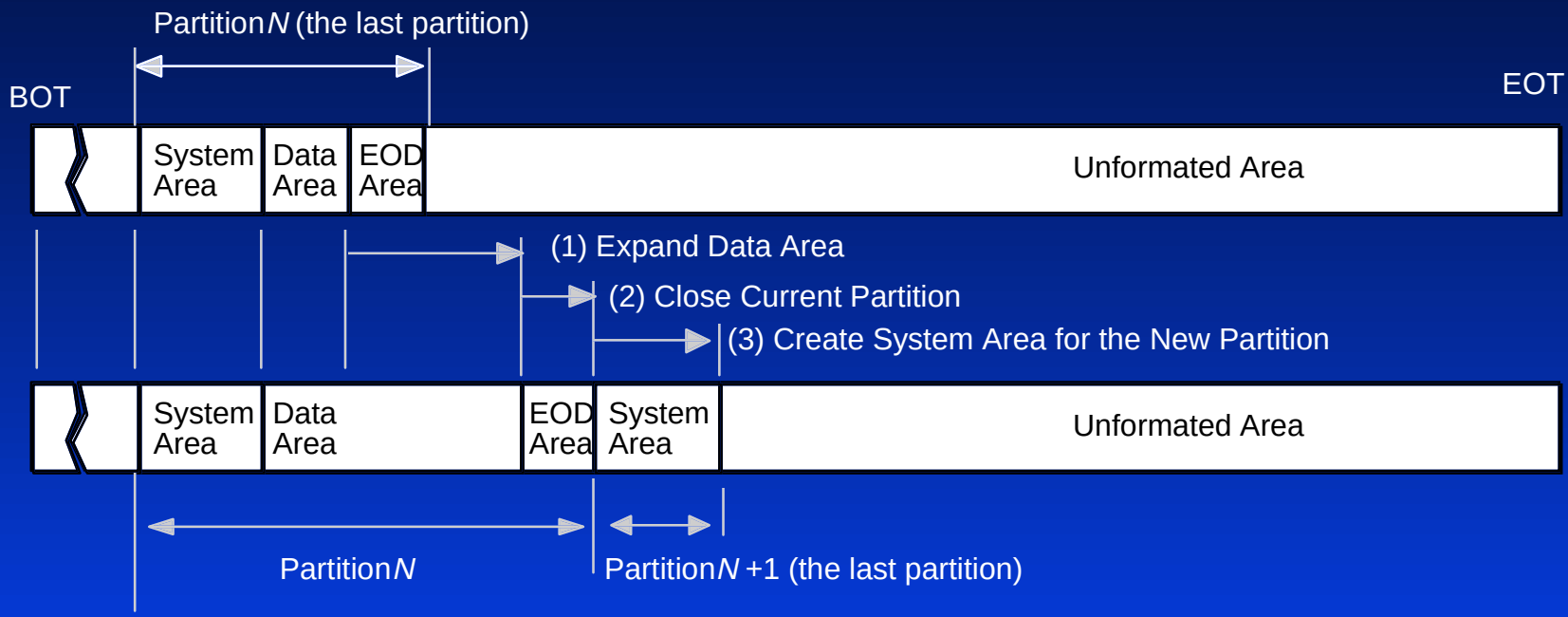
Tape Motion (Append Partition with Optional Device Area)

MIC Phase-2



Tape Motion (Append Partition *without Optional Device Area*)

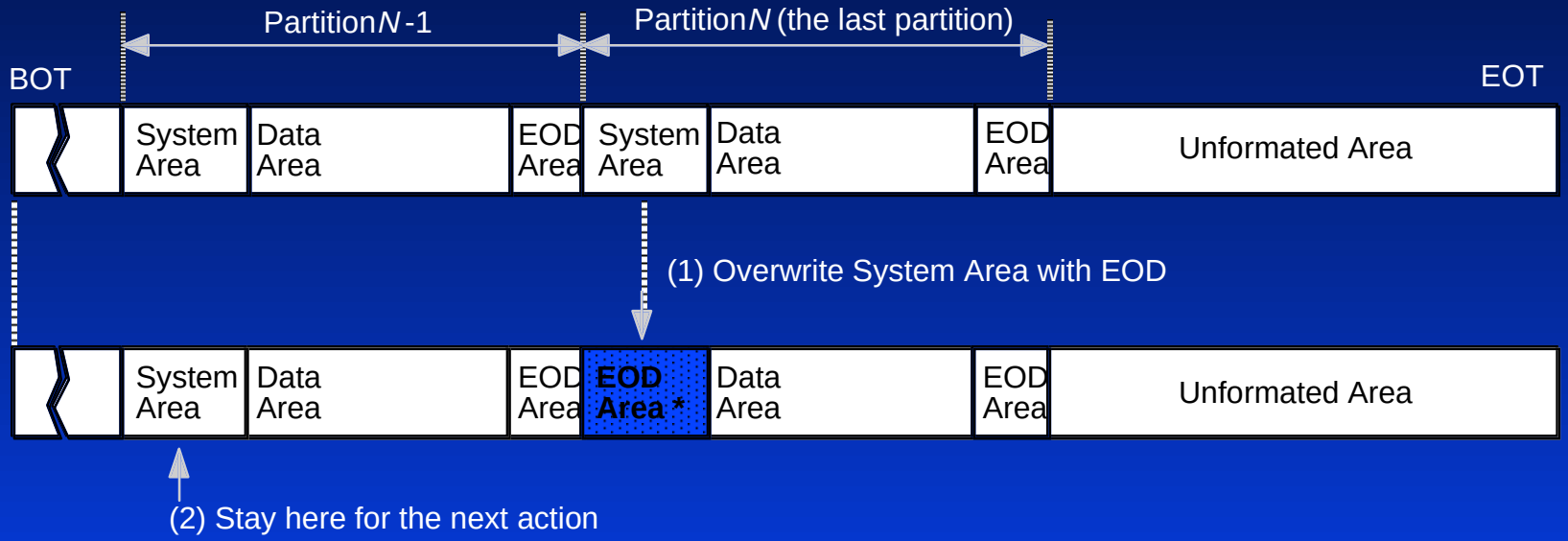
MIC Phase-2



Delete Partition

MIC Phase-2

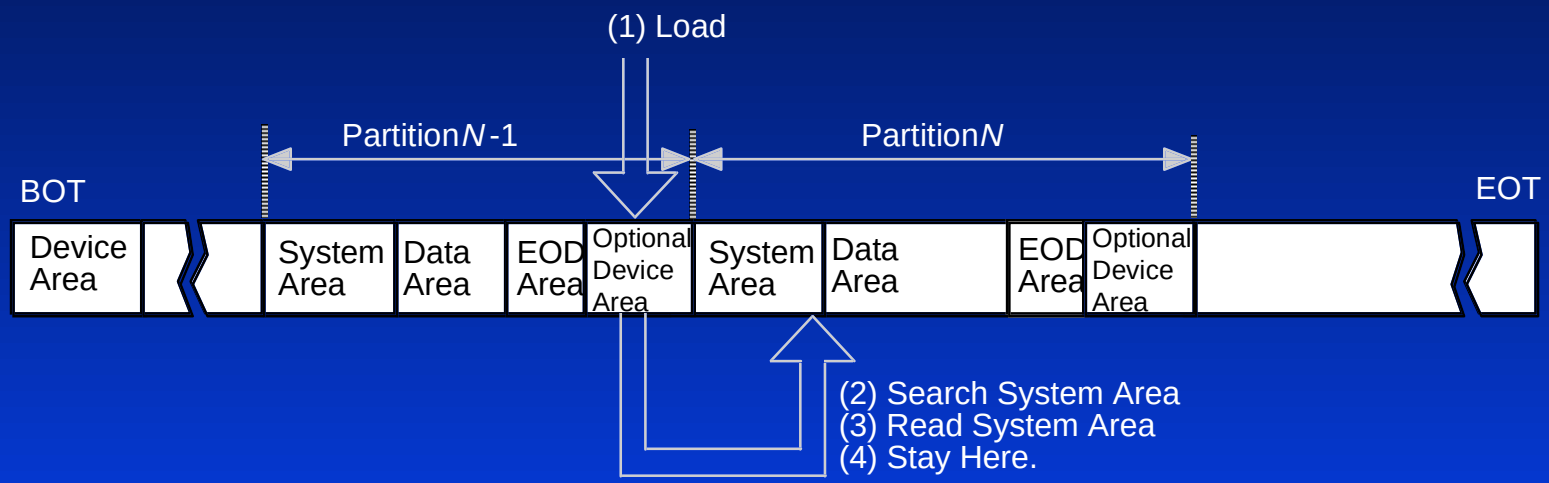
You can't delete partition, when optional device area is enabled.



* This EOD Area belongs to Partition N-1.

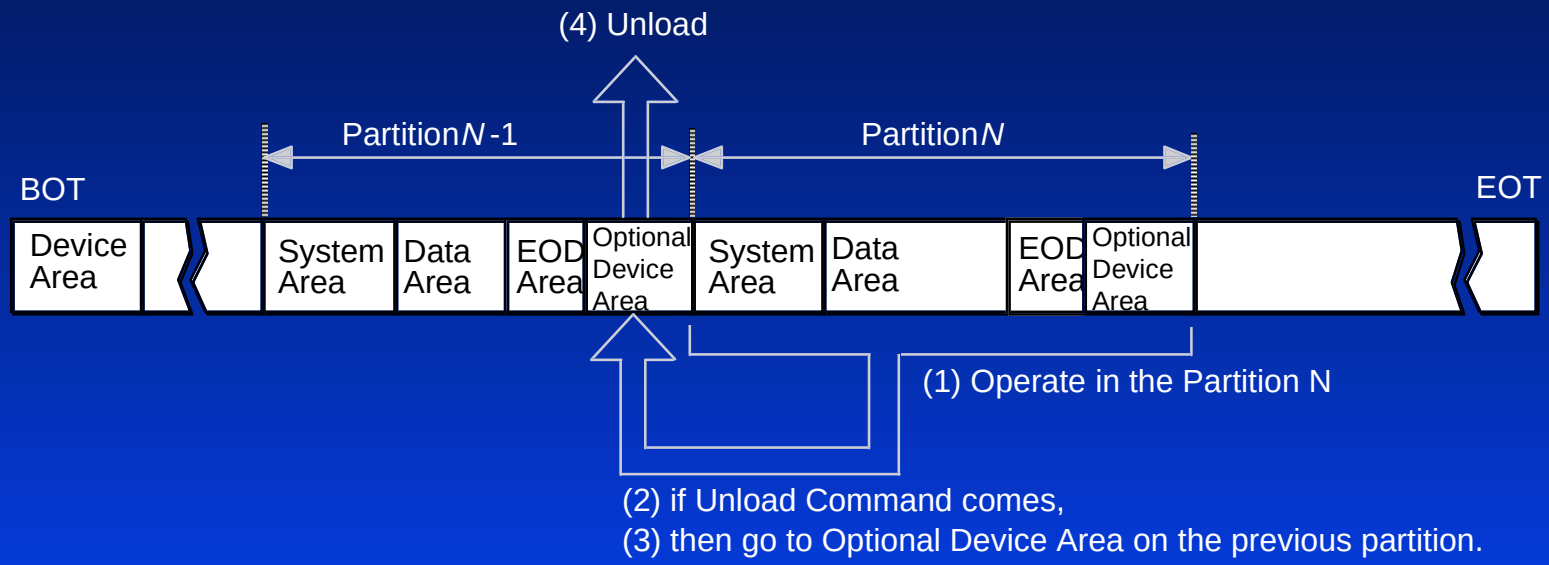
Load Tape

MIC Phase-2



Unload Tape

MIC Phase-2



Standardization Status

The MIC Format Reference in the ECMA-246 Standard:

"The MIC consists of a memory chip built into the case which may contain the system log as well as user information. The MIC is a feature not specified by this ECMA Standard, but its use may be subject to future standardization. However, in order to ensure that the MIC, if present, can be accessed by the drive, for all cartridges according to this ECMA Standard the requirements of Access holes and Recognition recesses are mandatory."

You can get ECMA-246 file from the ECMA ftp site.
`ftp://ftp.ecma.ch/ecma-st/E246-PDF.PDF`

MIC Technology Plans

- **Contact Type MIC Technology**
  - **Will release Large & Fast MIC**
- **Remote MIC Sensing**
  - **Feasibility Demonstrated (Lab)**
  - **Development Underway**
  - **Release TBD**

MIC Technology based on the Contact Type of 2KByte Chip

8KByte Version of MIC