

# **Assesment of AV Lite Feature for ATA-7**

**IDEMA – JAPAN  
Consumer HDD Committee**

# Intention of IDEMA-JAPAN

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- IDEMA-JAPAN consumer HDD committee appreciates T-13 activities.
- Companies of IDEMA-JAPAN committee member really need to standardize AV command. **To reject confusion and to get compatibility of manufactures and generation on HDD.**
- IDEMA-JAPAN consumer HDD committee agrees basic concept of current ATA-7 AV commands. However IDEMA-JAPAN consumer HDD committee requests some modification to avoid misunderstanding as well as to use them effectively.
- IDEMA-JAPAN understand Command completion within the Time Limit should always have priority.
- These comments to follow are discussed by IDEMA-JAPAN consumer HDD committee's Sub WG members;

**Toshiba, Hitachi, JVC, Matsushita, Sanyo, SONY, Pioneer, Orion Maxtor Japan, Seagate Japan, Western Digital Japan, Fujitsu,**

# **IDEMA-JAPAN's point of View**

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## **# IDEMA-JAPAN considers**

**ensuring compatibility between manufacturers and generations on HDD consumer use will encourage broad acceptance of HDD in the CE market.**

**# We appreciate your reflecting IDEMA-JAPAN's ideas in Streaming feature set at ATA committee in Oct. 2002**

**# However, responding to AV Lite proposed by Seagate being incorporated in ATA7 draft at ATA committee in Dec. 2002, IDEMA-JAPAN made an assessment on AV Lite.**

- 1) Comparison between AV Lite and AV Stream commands**
- 2) IDEMA-JAPAN's stance on this matter**

**As above, we would like to make IDEMA-JAPAN consensus-based requests to ATA committee.**

# AV-Lite vs Streaming Feature Set Comparison 1

Function	AV-Lite	Streaming Feature Set
Stream	In AV-Lite, when a stream error occurs, a required amount of data is transferred after timer expires.	CONFIGURE STREAM
CCTL	In Streaming Feature Set, a required amount of data is transferred within CCTL.	WRITE STREAM
Timer Set	Streams with different data transfer rates. AV-Lite does not support this function.	START STREAM
Timer Expires and Stream	Multiple write operations with different CCTLs can be carried out.	STOP STREAM
Conti Mode	In the case of AV-Lite, a single CCTL configured by Set Features command is applied to all AV Commands.	URGENT STREAM
Urgent Mode	Feature Set.	URGENT BIT

# AV-Lite vs Streaming Feature Set Comparison 2

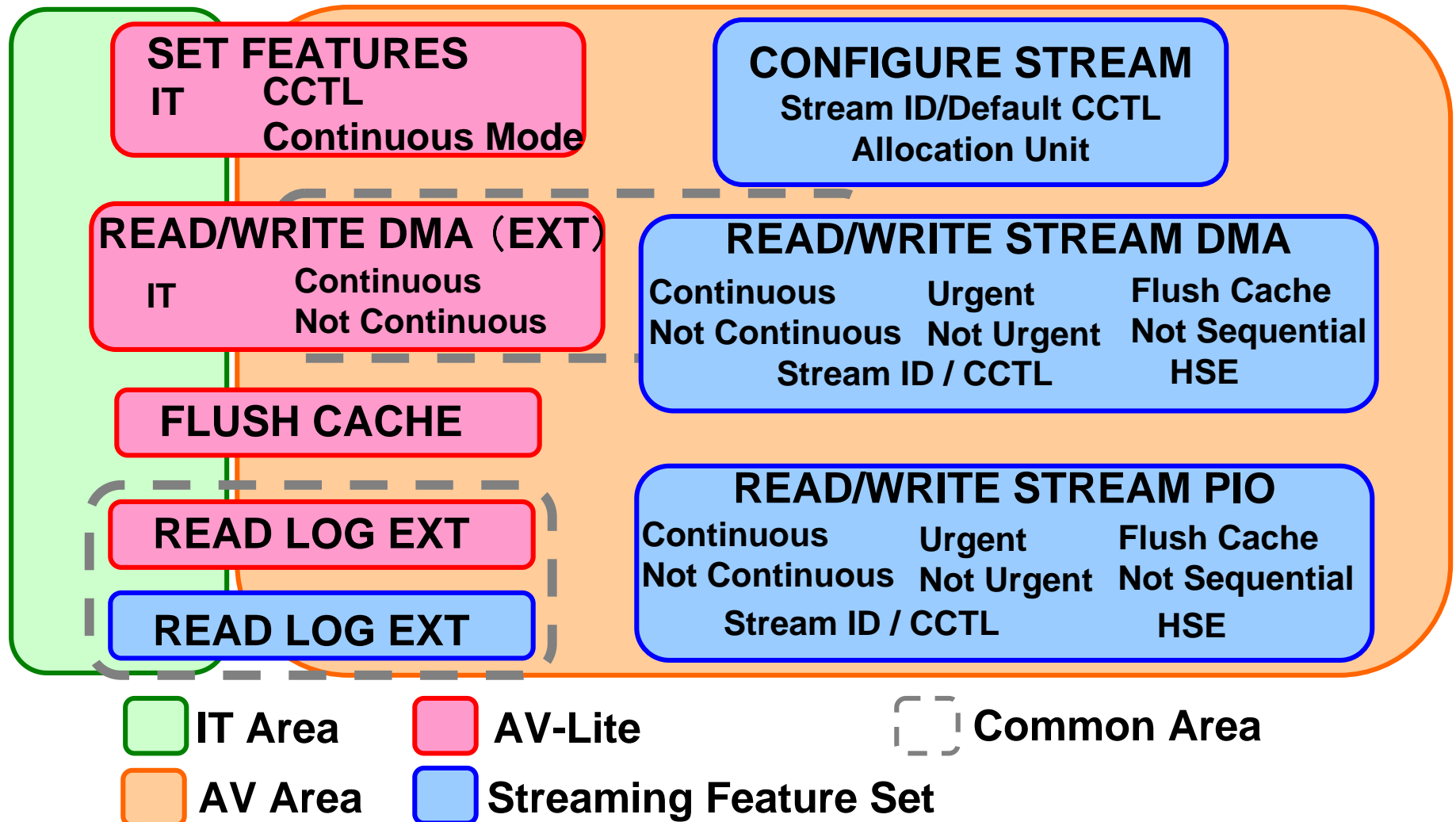
Function	AV-Lite	Streaming Feature Set
Cache Control	FLU	
Handle Streaming Error	No	Error
DMA		TREAM
PIO		TREAM
Stream Log		XT

AV-Lite does not support PIO transfer. However, PIO transfer mode can be effective in low-cost applications.

In AV-Lite, Streaming Feature Set has some control bits in all Streaming I/O Commands and it provides increased flexibility in AV data control.

Lite does not have an equivalent function.

# AV-Lite vs Streaming Feature Set Comparison 3



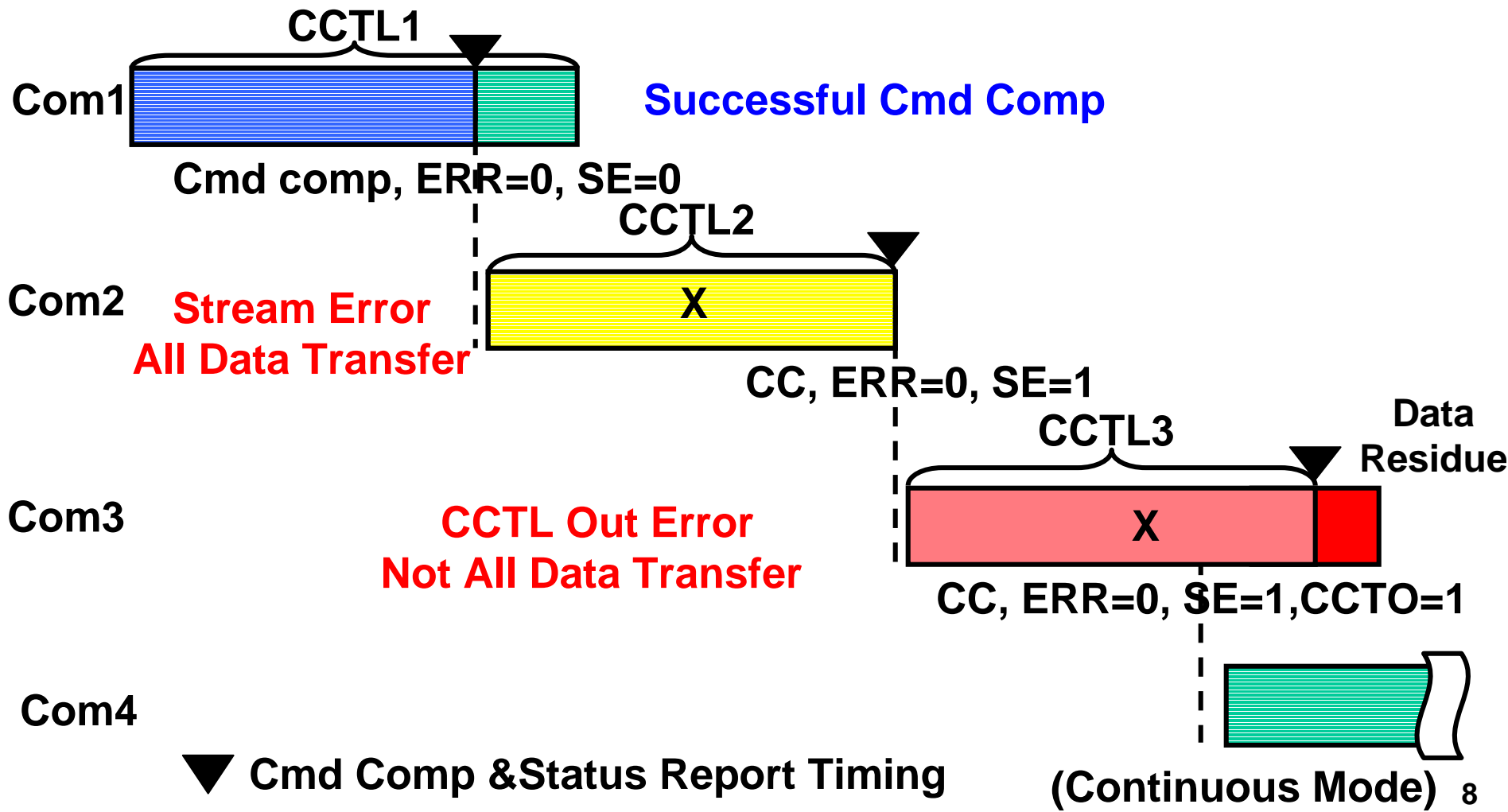
# Assesment-1 Summary of AV-Lite Feature

		Streaming Feature Set	AV-Lite	Possible Problem in AV-Lite
1	Independent CCTLs for Read and Write (Concept of Stream ID)	Supported	Not Supported	There exists a product which requires more clear CCTL management and R/W independent CCTL.
2	Read Stream Setting (HSE bit)	Supported	Not Supported	When Stream Error occurs while accessing Meta Data (IT Data), 1)Non-zero Worst Case Timer (AV Mode) →Impossible to recover data 2)Zero Worst Case Timer (IT Mode) →Streaming failure
3	Read Stream Setting (NS bit)	Supported	Not Supported	1)HDD →Cache Control can be Optimized. 2)Set →Read Look-ahead operation is carried over to the following command execution.
4	Max 128KB Access Mode	Not Supported	Supported	From now on, High-End HDDs become over 137GB and software designed for High-End HDD will be also used for Low-End HDDs (Less than 137GB). So, 48bit LBA mode will not be a problem.

# AV-Lite vs Streaming Feature Set Comparison

## Timer Setting & Management CCTL (Streaming Feature Set)

Relation between CMD, Time Period, and R/W Data Size are Clear

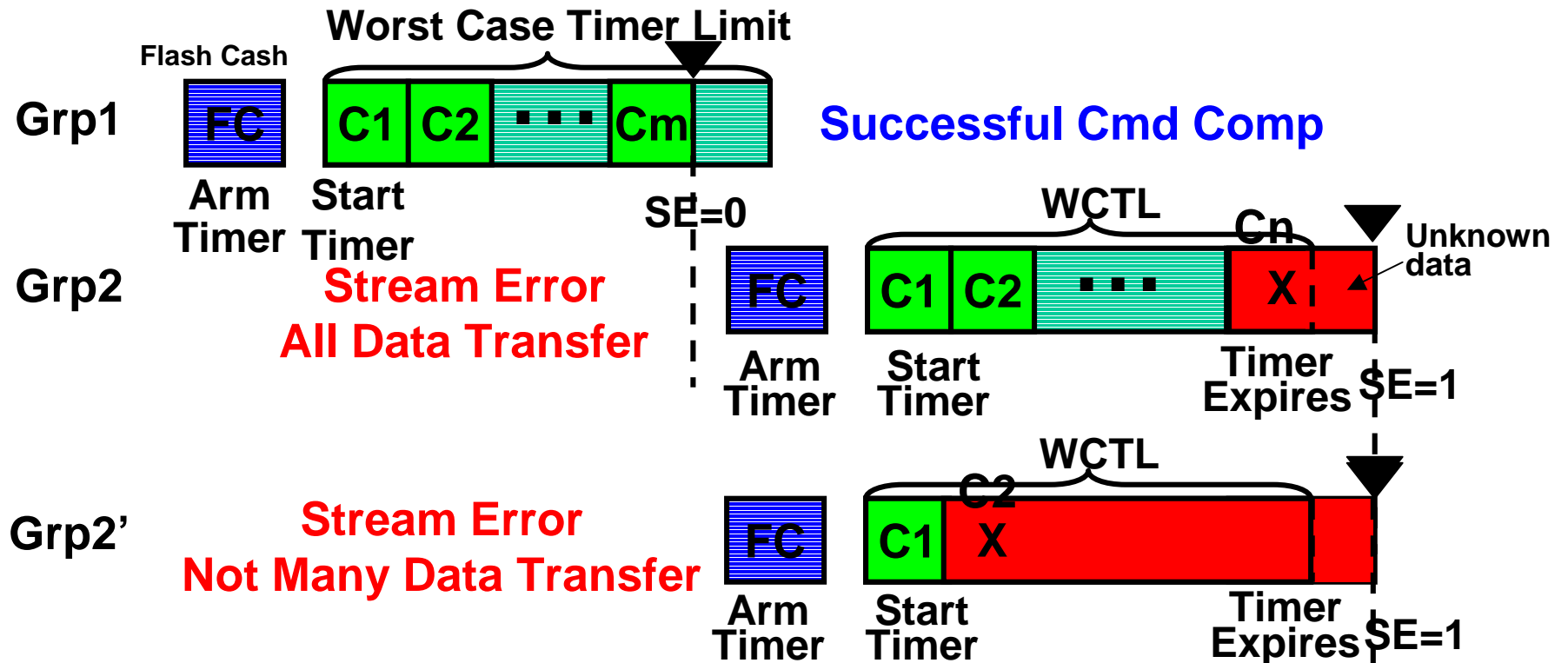


# AV-Lite vs Streaming Feature Set Comparison

## Timer Setting & Management CCTL (AV Lite)

2003.2.19  
JMA-JAPAN

Relation between CMD, Time Period, and R/W Data Size are not Clear



- Command completion within WCTL is not guaranteed.
- Device has no knowledge of the total number of commands, total sector count to be issued in a group of commands.

Cmd Comp

▼ Status Report Timing 9

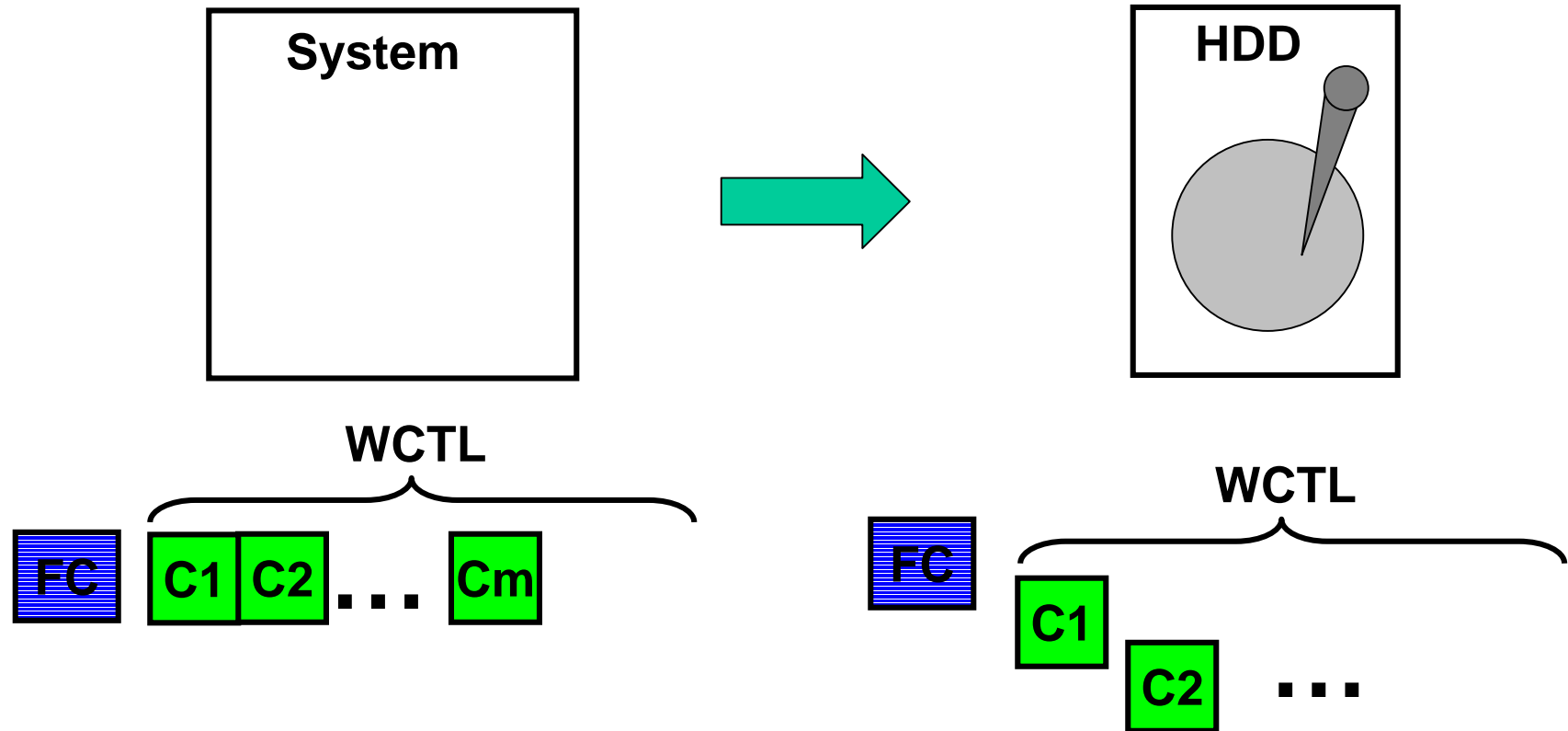
# AV-Lite vs Streaming Feature Set Comparison

## Timer Setting & Management CCTL

(AV Lite)

2003.2.19  
IBM-JAPAN

Relation between CMD, Time Period, and R/W Data Size are not Clear

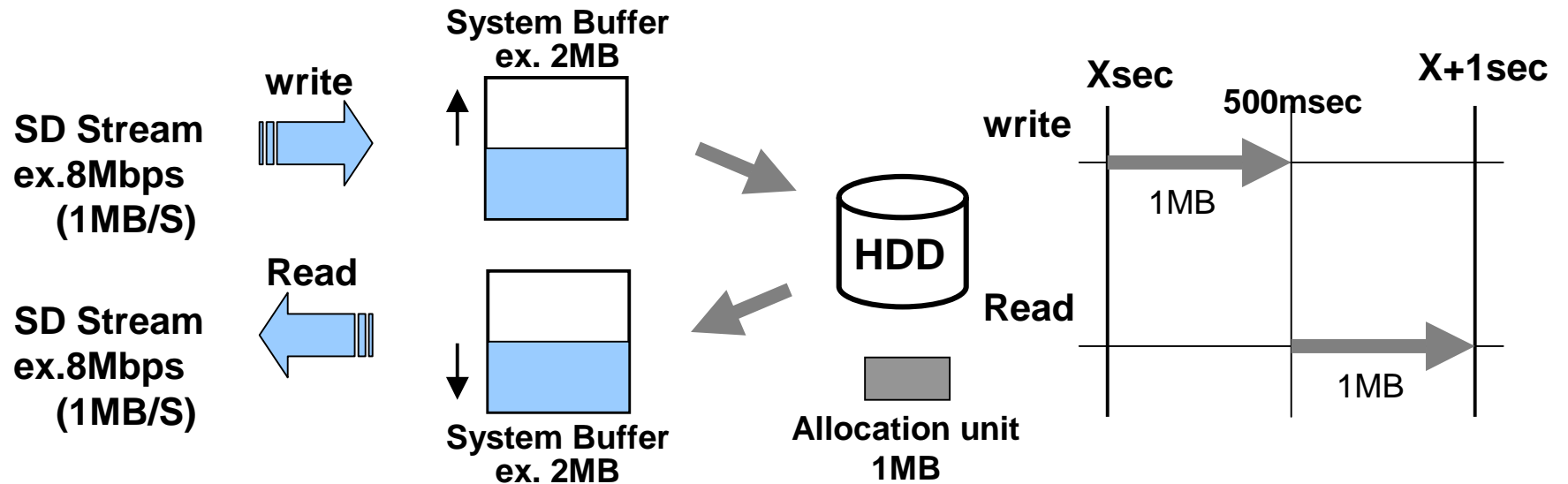


System only know  
total number of commands  
total sector count

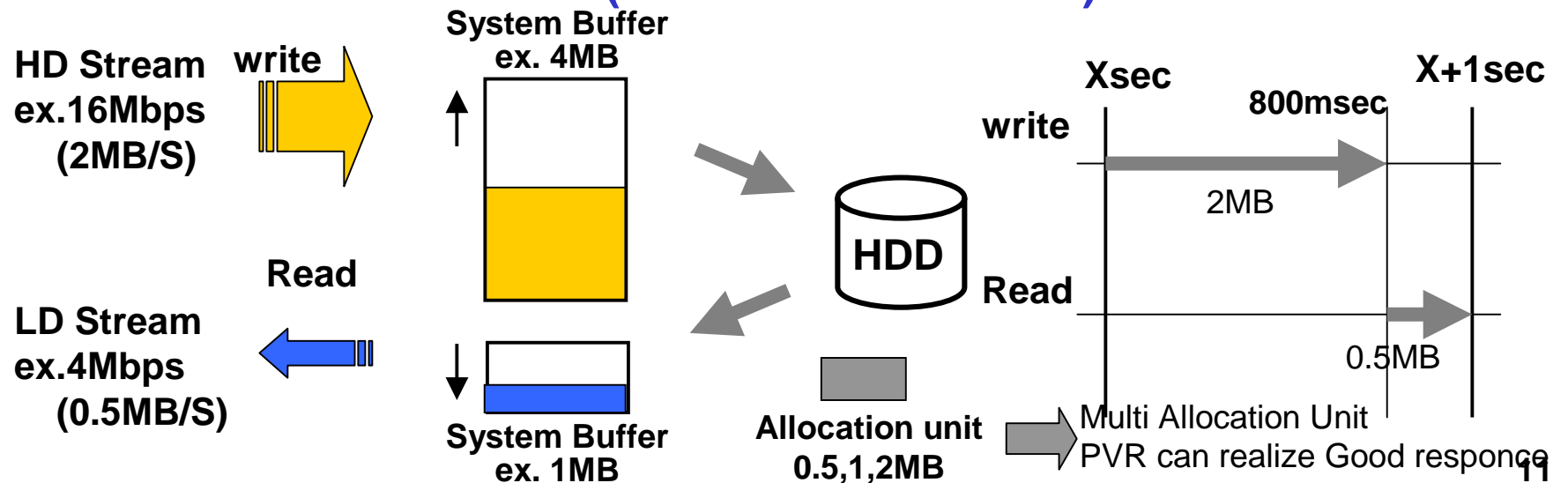
Device only know  
each CMD's parameter  
**can not know Desired behavior**

# Why Independent CCTLs is needed ?

## 1. Basic Case: Same CCTL

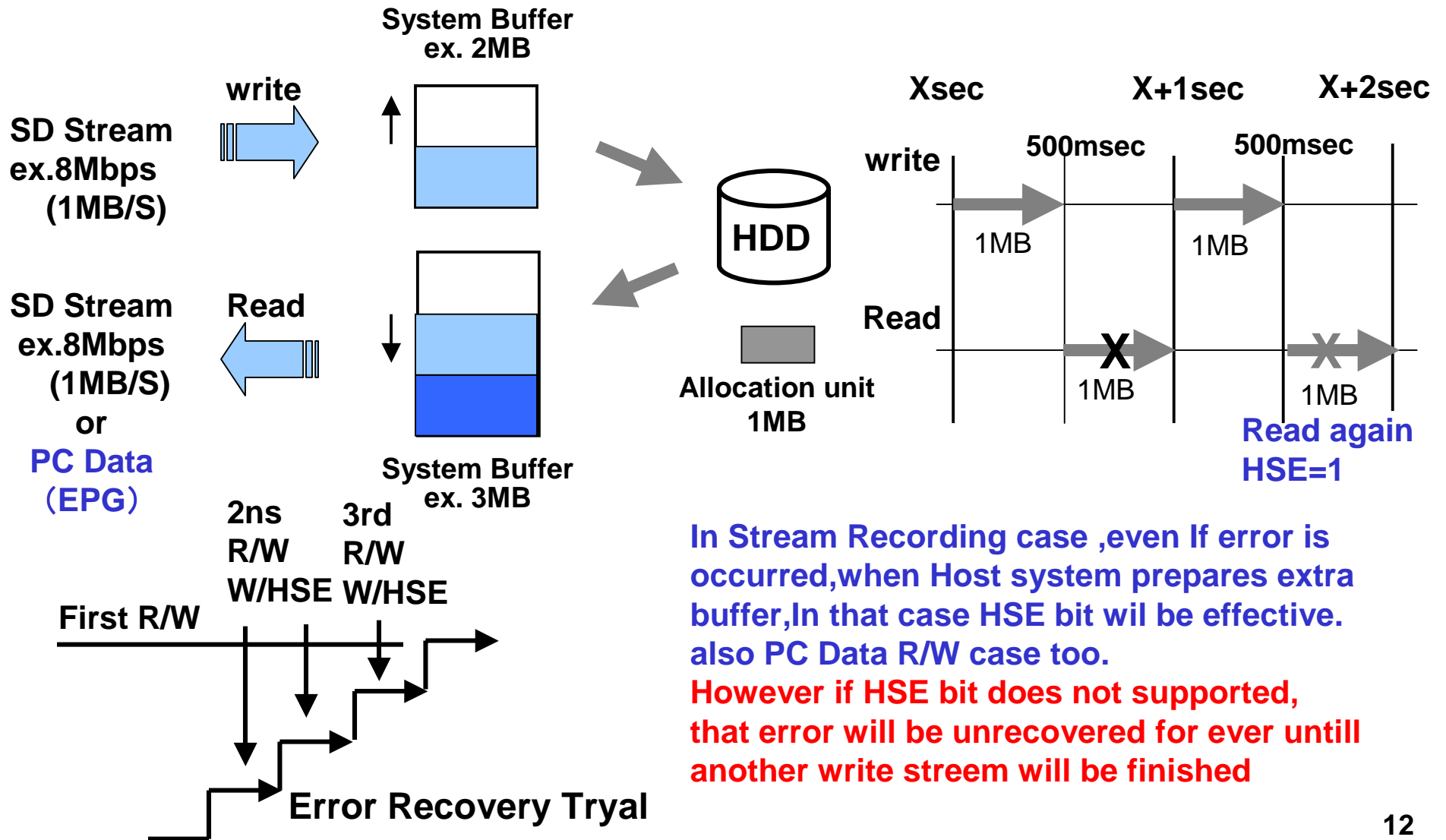


## 2. Actual Case: Different CCTL (stream ID must need)



# Why HSE bit is needed ?

## 3.Actual Case-2:CCTL+Handle Stream error

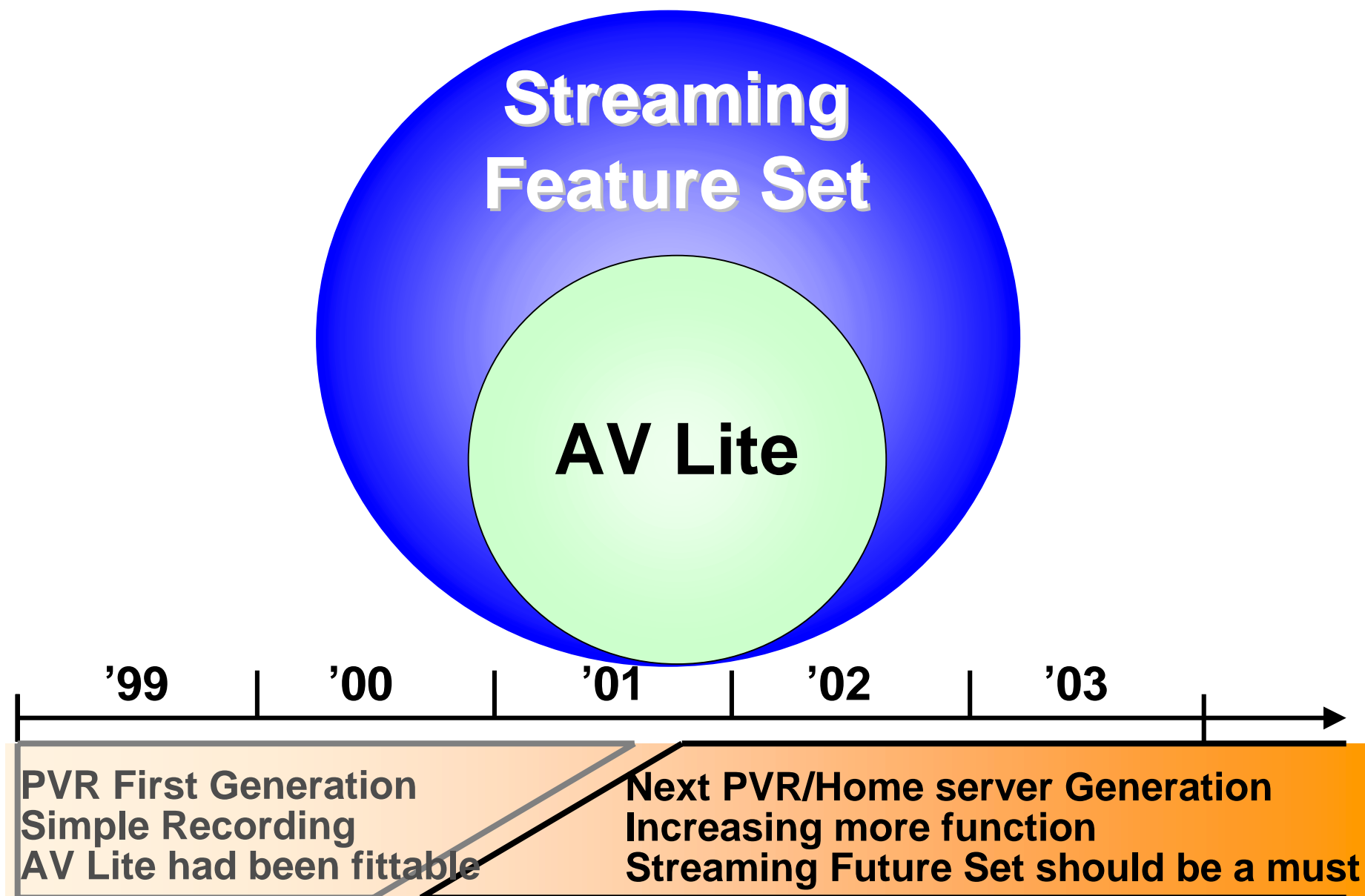


# Assesment-2 Summary of AV-Lite Feature

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- **All functions of AV-Lite are included in Streaming Feature Set.**
- **AV-Lite cannot set independent CCTLs for Read and Write.**
  - Streaming Feature Set can
    - 1) Independent CCTLs with each stream ID
    - 2) Definition of CCTL is clear
- ➔ **Limited flexibility in handling multiple AV stream**
  - When handling multiple streams with different data transfer rates, Set Features Command must be issued every time CCTL changes.  
Streaming Feature Set can handle multiple streams effectively by using Stream ID.
- **AV Lite lacks features which are important in handling both AV stream and PC Data simultaneously.**
  - e.g.) Handle Streaming Error Bit→This function increases the possibility of data recovery by resuming suspended ERP. AV-Lite does not support this function.

# Overview of AV-Lite & Streaming Feature Set



# The result of assessment by IDEMA-JAPAN

## Conclusions

**Only AV Stream command set should be a standard,  
with AV Lite removed**

## Reasons

- 1) AV Lite proposed by Seagate does not work adequately to AV applications from now.
  - 2) The presence of two kinds of AV cmd cause negative effects.
    - Cause confusion in the CE market with compatibility matter of software of AV set.
    - Low functional AV Lite cannot be used for inheritable recorder software's command in AV set using next generation HDD, and cannot realize compatibility between generations.
    - The simplicity of AV-Lite seems to make HDD firmware development easier. However, its function is too limited to satisfy increasing complexity of AV CE. Thus, it soon forces HDD Manufacturers to make extra efforts to implement AV Stream command set, too.
    - **For the above reasons, AV Lite should not be standardized.**
- Basics: Only one kind command should be standardized.**

# IDEMA-JAPAN assessment by member company

<i>SET Vendor</i>	<i>HDD Vendor</i>
<p><b>Function</b></p> <ul style="list-style-type: none"> <li>• Application burdened with frequently issuing the Set Feature command</li> <li>• Disadvantage of not supporting PIO mode from the system cost stand point</li> <li>• Disadvantage of not supporting Stream IDs when supporting multiple stream structure on Application</li> <li>• Insufficiency of maximum time out value (2.5s)</li> <li>• Incapability to handle the time limitation because of uncertainty of the timing of issuing a Flush cache command from Host</li> </ul> <p><b>Flexibility</b></p> <ul style="list-style-type: none"> <li>• No compatibility with feature AV function because of no plan of extending AV Lite function</li> </ul> <p><b>Standardization</b></p> <ul style="list-style-type: none"> <li>• Confusion of two AV standards for developing applications in the market</li> <li>• No necessity of the 28bit addressing in AV function if supporting the 48bit addressing for HDDs with capacity less than 137GB</li> </ul>	<p><b>HDD Implementation &amp; Test</b></p> <ul style="list-style-type: none"> <li>• Difficulty of supporting both AV functions because of Program size limitation of HDDs, but depending on customer's demand</li> <li>• A burden of double resources for HDD tests</li> <li>• A burden of evaluation resource of each application according to each PC driver for each AV standard</li> <li>• Possibility of two deferent models with each AV function, but considering avoid of supporting both AV functions concerning the trend of PC application</li> <li>• Although supporting 28bit addressing for current systems, no need of 28bit addressing AV function for next models because of implementation of 48bit addressing without 128KB transfer limitation</li> </ul> <p>• <b>Already Customer using AV Lite exists.</b></p>