

CF 5.0

Introduction



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What is CF 5.0?

- What is CF 5.0?
 - CF 5.0 supports “48-bit commands”
 - CF 5.0 supports the ACS-2 Data Set Management “Trim hint”
 - CF 5.0 supports two Video Performance Guarantee mechanisms
 - Hosts must support both
 - (Developer interest)
 - CF 5.0 supports JEDEC-friendly input levels
 - CF 5.0 references ATA-6 & ACS-2 (and not ATA-4)



What is CF 5.0?

(48-bit commands)

- CF 5.0 enables support for 48-bit commands
 - 48-bit commands allow 2 TB and larger cards
 - 48-bit commands are faster
- How do 48-bit commands enable larger cards?
 - The 48-bit Logical Block Address space allows unique addressing of 144 million GB of data
 - The existing 28-bit commands can be used to address the lower 137 GB of a card
- How are 48-bit commands faster?
 - 48-bit commands enable a single command to transfer up to 32 MB of data
 - 28-bit commands enable a single command to transfer only 128 KB of data
 - A 4 MB picture capture can be reduced to one large data write operation and several small file table updates
 - As opposed to a write sequence of 32 data write & file table updates



What is CF 5.0?

(Data Set Management - Trim)

- CF 5.0 supports the Trim “hint”
 - The “Data Set Management” command allows a host to inform a card which data does not need further background management
 - A trim hint is quick operation – it is not an erase operation
 - A trim hint tells the card to remove stale active data from its internal allocation list
 - Why Trim deleted data?
 - Reduces wear leveling operations for stale data
 - Reduces internal copies of unrelated stale data in the middle of a real write
 - Why Trim the free or full space of the device?
 - This command can be used to clean (free space) or reset (full space) the allocation table
 - Cards should work the same when they are new and when they are “experienced”
 - No more speed degradation over time and use!



What is CF 5.0?

(Video Performance Guarantee solutions)

- There are two Video Performance Management solutions in CF 5.0
 - The Global Performance Guarantee
 - A new extended identify device command that allows a card to pass on preferred operating modes and the performance to expect in these modes
 - The Streaming Performance Management
 - A new set of commands that
 - Allows a card to pass to the host its preferred Write or Read size and alignment,
 - Allows the hosts and cards to manage streaming data, optimizing host and card performance,
 - Guarantees card performance when the card and the host meet certain requirements.
 - Hosts must implement both to be compliant with the “Video Performance Guarantee” feature.
 - Cards need to implement only one method
- Both methods allow a card to provide several performance mode entries; ten for Streaming Performance Management, and twenty for the Global Performance Guarantee method.
 - Each entry provides worst case performance guarantee for a given transfer mode (e.g. UDMA 6)
 - Each entry includes a guarantee for both
 - a series of a specified size of random file table updates and
 - a series of a specified size of sequential write operations
- The card may support one or more Video Performance Guarantee profiles



Video Performance Guarantee Profiles

- CFA will define common profiles with the input of host and card suppliers
 - A profile is a reproducible (for testing) description of how a camera saves data
 - This includes the data phases and any saving overhead (frame stitching, File table, directory writing, etc....)
 - A reproducible access pattern allows a card's performance to be characterized and a performance level "guaranteed" for that environment.
 - Marketing & technical teams are collecting vendor specific profiles
 - Camera/Vendor specific access patterns are being coalesced into standardized "generic" models that can marketed as such by cameras and cards
 - Potential end targets
 - HD (guaranteed support of a targeted 10 MB/s stream)
 - Pro (guaranteed support of a targeted 20 MB/s stream)
 - 4k (guaranteed support of a targeted 75 MB/s stream)



What other changes are in CF 5.0?

- CF 5.0 supports JEDEC-friendly input levels (new hardware)
 - Card controller ASIC developer notes
 - Standard IO pads can be used instead of custom pads
 - These have been tested to be backward compatible with legacy hosts in the field
- CF 5.0 references ATA-6 & ACS-2 (and not ATA-4)
 - ATA (T13) spec developer notes
 - Allows ATA spec developers to remove CHS support from future T13 specifications



What is CF 5.0?

(Key Feature Review)

- What is different in CF 5.0 for hosts?
 - CF 5.0 cards support “48-bit commands”
 - CF 5.0 cards support the ACS-2 Data Set Management “Trim hint”
 - CF 5.0 cards support one of two Video Performance Guarantee mechanisms
 - Hosts must support both

