

## Device Segmentation

### 1. Purpose

The purpose of this new group of commands is to allow the host to define a series of private data segments which are not addressed by the normal Read/Write commands. This allows BIOS, Device Driver and OS firmware/software vendors to place data on the device which is protected from applications that do not know about these new commands. In effect this creates a new way for the host to store non-volatile system information.

### 2. Overview

Segment commands allow the host to allocate new, independent, areas on the device to store data called segments. These segments are allocated from a pool of 2048 *private* sectors which the device does not report as available for *public* storage. All commands for accessing, allocating and deallocating segments are linear in nature. When the host reads or writes a specific segment the device must process the entire segment. This means that the host is unable to request a specific sector of information from a given segment.

When the host requires a new segment, it shall first allocate space for the segment. The drive shall make the allocation and respect this allocation across all forms of reset, until the host issues a deallocate command. When the host issues a deallocate command the device shall return the space to the *private* area. Once the segment has been allocated the host may issue Read/Write segment commands to access this segmented area.

### 3. Changes to Identify Device Information

Identify Device shall report that the drive supports Segmentation and how many segments are defined. Word 53 bit 2 shall be set to 1 if the device supports segmentation. If the device supports segmentation, word 82 reports the number of currently defined segments, and word 83 reports the number of free sectors in the *private* area.

### 4. New Commands

There are 4 new commands required to support segmentation:

- Allocate Segment. This shall be issued before data can be stored in a segment
- Deallocate Segment. This shall be issued to return the space a segment occupies to public access
- Read Segment. Allows the host to read the data in a segment
- Write Segment. Allows the host to write data in a segment

#### 4.1 Allocate Segment

Command Code -

Protocol - Non-Data Transfer

Inputs - The number of sectors requested is specified in LBA (27:0)

Normal Outputs - The segment number is returned in the Sector Count register.

Error Outputs - If the device is unable to allocate the new segment because the device is out of *private* space, or 255 segments have already been defined, an aborted command shall be generated.

Prerequisites - None

Description - The Allocate Segment command allocates a new segment from the *private* storage area. The space for this segment shall be subtracted from word 83 and the number of segments shall be incremented by 1, in the ID Device Information. Segment allocations shall be retained across all forms of reset. The only way to return the space allocated to segment to the *private* storage area is for the host to issue a deallocate command. The device shall initialize the first few bytes of the segment to contain the segment length.

## 4.2 Deallocate Segment

Command Code -

Protocol - Non-Data Transfer

Inputs - The Sector Count register shall be set to the segment number

Normal Outputs - None

Error Outputs - The device returns an aborted command if the number in the sector count register does not point to a valid segment.

Prerequisites - Allocate Segment.

Description - The Deallocate Segment command returns a segment to the *private* storage area. . The space for this segment shall be added to word 83 and the number of segments shall be decremented by 1, in the ID Device Information

## 4.3 Read Segment

Command Code -

Protocol - PIO Data In

Inputs - The Sector Count register shall be set to the segment number

Normal Outputs - Number of sectors to transfer is placed in LBA (27:0)

Error Outputs - This follows the same conventions as the Read Buffer command. If the sector count register contains an invalid Segment number this command is aborted.

Prerequisites - Allocate Segment.

Description - The Read Segment command transfers the Segment specified in the Sector Count register to the host. This is a sequential transfer which always moves the entire segment. An Interrupt is generated when the data is available and the number of sectors to transfer is placed in LBA (27:0). Interrupts shall not be generated between sectors for this type of transfer.

## 4.4 Write Segment

Command Code -

Protocol - PIO Data Out

Inputs - The Sector Count register shall be set to the segment number

Normal Outputs - Number of sectors to transfer is placed in LBA (27:0)

Error Outputs - This follows the same conventions as the Write Buffer command. If the sector count register contains an invalid Segment number this command is aborted.

Prerequisites - Allocate Segment.

Description - The Write Segment command transfers the Segment specified in the Sector Count register from the host to the device. This is a sequential transfer which always transfers the entire segment. Interrupts shall not be generated between sectors for this type of transfer.

## 5. Segment Data Format

Each segment shall implement the format described below. The Allocate Segment command places the length of the segment in bytes at offset 0. The host shall alter this value to match the true size of the host data

Offset	Size	Description
0	Double Word	Number of bytes used by this segment
4	28 Bytes	Zero filled string Identifying this segment
5.. (Value at offset 0)n		Host defined data space
(Value at offset 0)+1..?		Unused space