

# Freefall Control Feature Proposal

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## 1 Introduction

This proposal defines the method to enable and disable the device freefall sensor, and the reporting of the freefall sensor supporting and enabling status on the IDENTIFY DEVICE command data. The enable of the freefall sensor allows the device to protect its data on the event of freefall. The implementation of protecting data from damage is vendor specific.

## 2 Feature Set Definition

Freefall Control feature is for the device to act on its data protection in the event of freefall detection. When this feature is enabled, upon detecting a freefall event the device should protect its data from the mechanical contacts that could damage the data on the device. The implementation of this freefall feature is vendor specific.

## 3 Change to SET FEATURE Command

When the Freefall Control feature set is support, it is enabled and disabled by the SET FEATURE command. The enable and disable of this feature is non-volatile; the state of the enable or disable is not affected by device power cycle. After the feature is enabled, the device shall keep this feature enable until further change by the SET FEATURE enable/disable Freefall Control subcommand.

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- SET FEATURE command with Feature Code "41h": Enable Freefall Control feature.
- SET FEATURE command with Feature Code "C1h": Disable Freefall Control feature.
- ~~SET FEATURE command with Feature Code "83h": Simulate Freefall Control event.~~

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The SET FEATURE Enable Freefall Controll uses the following task file registers as inputs to control the Freefall features:

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.Register	7	6	5	4	3	2	1	0
Feature	41h							
Sector Count	Sensitivity Level (00h – FFh)							
LBA Low	Reserved							
LBA Mid	Reserved							
LBA High	Reserved							

The SET FEATURE Disable Freefall Controll uses the following task file registers as inputs to control the Freefall features:

.Register	7	6	5	4	3	2	1	0
Feature	C1h							
Sector Count	Reserved							
LBA Low	Reserved							
LBA Mid	Reserved							
LBA High	Reserved							

This command allows the host to configure the parameters of the Freefall Control.

A value of zero in the sensitivity level means that the setting of the sensitivity is the vendor's recommended setting. Other values set the sensitivity from host and the meanings are vendor unique. Generally, the higher the sensitivity value, the more sensitive the device is to changes in acceleration.

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The SET FEATURE/Simulate Freefall Control subcommand uses the following task file registers as inputs to control the simulated Freefall features:

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.Register	7	6	5	4	3	2	1	0
Feature	83h							
Sector Count	Simulate Event Time (in seconds), 0 is device specific							
LBA Low	Delay to simulated event (ms) bits [7: 0]							
LBA Mid	Delay to simulated event (ms) bits [15: 8]							
LBA High	Reserved							

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This command allows the host to generate a simulated Freefall-Control event for the testing of the host software handling.

After completing of this command, at the given delay passes, a simulated high acceleration event is triggered. The presence of this feature and the accuracy of this time is vendor dependent. Supporting of this feature is optional. Supporting of the freefall simulate subcommand code is required when the Freefall Control feature is supported.

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Deleted: this feature is not supported, the command should be aborted.

Normal outputs: If the device reports supporting of this feature and the SET FEATURE command with Feature Code 41h or C1h is accepted, the device should response with command successful and no error.

Error outputs: If the feature is not supported, or the device for any reason can not perform the feature set requirement, the device should response with 51h/04h to abort the command.

#### 4 Change to **DCO Command**

Need to add a "Reporting support for the Freefall Control feature set is allowed" bit to the Device Configuration Overlay data structure. The DCO word 21 bit 11 is used for this feature set reporting.

- 1=Reporting support for the Freefall Control feature set is allowed.
- 0=Reporting support for the Freefall Control feature set is not allowed.

#### 5 Change to IDENTIFY DEVICE Command

Need to add a bit in IDENTIFY DEVICE command information to indicate the Freefall Control feature set is supported. Need to add another bit in the IDENTIFY DEVICE command information to indicate the Freefall Control feature set is enabled or disabled.

The definitions of these bits in the IDENTIFY DEVICE command are:

- **IDENTIFY Word 119, Bit 5**: 1=Freefall Control feature is supported. This bit indicates the Freefall Control feature is supported.
- **IDENTIFY Word 120, Bit 5**: 1=Freefall Control feature is enabled. This bit indicates the Freefall feature is enabled.
- **IDENTIFY Word 53, Bit 15:8**, Freefall Sensor Sensitivity. This value indicates current Freefall sensor sensitivity setting. The setting can be changed by a SET FEATURE command. If the Freefall Control feature set is not supported, this field shall be reserved.

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C, Bit 8 Freefall Control Mechanism is Functional. If this bit is 1 it indicates the Freefall Control mechanism in the device is diagnosed functional. If this bit is 0 it indicates the mechanism is not functional. ¶

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Word	O	S	F	Description
	M	P	V	
119	M	B		<b>Supported Settings</b>
		B	F	<b>5</b> 1 = Freefall Control Feature supported
120	M	B		Command set/feature enabled/supported
		B	F	<b>5</b> 1 = Freefall Control Feature enabled
<u>53</u>	M	B		Freefall Control <u>Sensitivity Level</u>

		B	V	<u>15:8</u>	<b>Sensitivity level:</b> 00h - <u>use the vendor's recommended setting</u> 01h - FFh sensitivity; a larger number means more sensitive	Deleted: 7-0
Key:						Formatted: Centered
O/M	Mandatory/optional requirement.				V The contents of the field is variable and may change depending on the state of the device or the commands executed by the device.	Formatted: Indent: First line: 0.5 ch
	M Support of the word is mandatory.				X The content of the field may be fixed or variable	Deleted: if the Freefall Control is disabled
	O Support of the word is optional.				S/P Content applies to Serial or Parallel transport	Formatted: Font: Bold
F/V	Fixed/variable content				S Serial Transport	Formatted: Font color: Black, (Asian) Japanese
	F The content of the field is fixed and does not change. The DCO command may change the value of a fixed field. For removable media devices, these values may change when media is removed or changed.				P Parallel Transport	
					B Both Serial and Parallel Transports	
					N Belongs to a transport other than Serial or Parallel	

Note: The Freefall Control Mechanism functionality needs to be included in the Device Statistic Information Page. A defined bit is set to 1 it indicates the Freefall Control mechanism in the device is diagnosed functional, otherwise the bit is clear to 0.

Document footnote: Highlights with yellow marks are the new assigned information for this Freefall Control feature set.

		B	F	15-8	Reserved
				§	Freefall Control Mechanism is Functional