

# **SET FEATURES: Set Profile subcommand**

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**Revision 8**

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**Document Status**

Revision History		
Rev	Date	Description
0	February 1, 2007	Initial draft
1	February 2, 2007	Added definition of IDENTIFY DEVICE bits
2	March 28, 2007	Specified interaction with Power Management and Advanced Power Management feature sets
3	June 12, 2007	Incorporate review comments from April plenary; generalized into a facility to grant permissions for vendor-specific behaviours; retitled the proposal.
4	August 22, 2007	Generalized more, retitled the proposal, added a state machine
5	Oct. 03, 2007	Incorporated suggestions from Aug. 2007 plenary
6	August 1, 2008	Eliminated the state diagram, renamed to 'set profiles', added use of Enhanced Error Reporting feature set.
7	August 4, 2008	Added Marty Stevens (Dell) as co-author
8	October 6, 2008	<ol style="list-style-type: none"> <li>1. simplified the profiles available;</li> <li>2. added a device statistic to report self-maintenance time needs</li> <li>3. clarified misc other language</li> </ol>

## 1 Introduction

The management of device power management and performance may have significant impacts on a system. ACS does not offer the host fine control over these parameters, leaving the details of management mainly to a variety of vendor specific features within the device.

There are situations where a host application would like to influence the device's decision making without actually knowing or controlling the internals of the device operation. For example, a host may want to tell the device that high performance is required now, but that reduced performance is acceptable at other times.

A device may want information from the host as well. Different internal maintenance strategies could be used if the device knows that the host wants it to conserve power (e.g. on battery power) as opposed to if the device knows that it is connected to a plentiful power source (e.g. while charging).

## 2 Scope

This new feature is intended for inclusion in ACS-2.

## 3 Overview

A new SET FEATURES subcommand is proposed enabling the host to set profile profiles to the device to perform various types of vendor specific behaviours.

There are several policies defined here where the host informs the device of various profiles that may not be mutually exclusive.

- 1) Higher performance is preferred, even if the device consumes more energy.
- 2) Lower energy consumption is preferred, even if lower performance results.

Some examples of how this could be used are:

- 1) Green-conscious workplace
  - a) low-energy state desktops
- 2) Roadwarrior
  - a) At the end of a short flight, has battery life but needs performance to finish work before landing
  - b) High energy state notebook
- 3) Media center
  - a) Needs a responsive system, but low energy when playing movies
- 4) Typical laptop
  - a) Low-energy state notebook, with occasional periods of background activity to enhance reliability.

[It may be useful to the host if the device could indicate what its needs are for background processing time for self-maintenance operations \(e.g. 'I need 10 minutes for self-maintenance in the next 24 hours'\).](#)

## 4 Changes to ACS

### 4.1 Changes to clause 4

#### 4.1.1 Set Profile ~~Feature~~feature set

The Set Profile feature set allows the host to specify a usage profile to the device.

The SET FEATURES 'Set Profile' subcommand makes profile selections that are valid until the next power-on reset or until changed again with the SET FEATURES 'Set Profile' subcommand (see [Editors note: add xref to 7.48.new]). SCT Feature Control allows the host to change the power-on default profile selections (see [Editors note: add xref to 8.3.5]). The IDENTIFY DEVICE command indicates support of this feature, the current selection, and the power-on default selection. A device statistic allows the device to inform the host of self-maintenance needs and urgency (see [Editors note: add xref to new device statistic] ).

The device shall attempt to satisfy the profiles ~~to the best of its abilities~~ in a vendor specific manner. The device may behave in a non-preferred manner. If the Extended Status Reporting feature set is supported and enabled, ~~but the device~~ shall notify the host on entry to such a mode of operation (see Table 1~~Table 1~~).

**Table 1 - Device Action on entering a non-preferred profile mode**

Enhanced Error Reporting feature set	Device Action
Supported	Return a Unit Exception error (see <u>Table 3</u> <del>Table 3</del> ) in response to the next command received from the host. If REQUEST SENSE DATA EXT is the next command, the device shall return the following information in the normal outputs.  Sense Key = TBD  ASC/ASCQ = TBD
Not supported	Unspecified

## 4.2 Changes to clause 7

### 4.2.1 Changes to DCO

None

### 4.2.2 Changes to SCT Feature Control

#### 4.2.2.1 (Add new row to Table 89)

**Table 89 — Feature Code List**

Feature Code	State Definition
TBD Z	The value in State sets the power-on defaults for the Set Profile feature set. State shall be set to a value that is valid for the SET FEATURES 'Set Profile' subcommand LBA(7:0) field (see [Editors note: add xref to 7.48.new]).

### 4.2.3 Changes to IDENTIFY DEVICE data

Word	O M	S P	F V	Description
TBD A	M		F	Supported Selections TBD 1 1=Set Profile feature set is supported
TBD D	O		V V	15:8 Default Set Profile Selection 7:0 Current Set Profile Selection

#### **TBD A Supported Selections**

If bit TBD1 is set to one, then the Set Profile feature set is supported.

#### **TBD D Default Set Profile Selection**

This is the default Set Profile feature set selection after processing a power-on reset (see [Editors note: add xref to 7.48.new]). If the Set Profile feature set is not supported, this shall be cleared to zero.

#### **TBD D Current Set Profile Selection**

This is the current Set Profile feature set selection (see [Editors note: add xref to 7.48.new]). After processing a power-on reset, this shall have the same value as the Default Set Profile Selection. If the Set Profile feature set is not supported, this shall be cleared to zero.

### 4.3 SET FEATURES - EFh, Non-Data

#### 4.3.1.1 Description

Table 50 - SET FEATURES Feature field definitions

Value	Description
TBD3	Set Profile

#### 7.48.new Set Profile

Subcommand code TBD3 allows the host to specify profiles to the device. Bits (7:0) of the LBA field in the SET FEATURES command specify the profiles requested (See [Table 2](#) ~~Table-2~~). If the Set Profile feature is not supported (IDENTIFY DEVICE word TBD A, bit TBD1), the device shall return command aborted.

Table 2 - System Use Profiles

Profile ID	Profile Name
00h	<a href="#">Balanced performance and power usage</a> <a href="#">No preference is specified for either power or performance.</a> <del>Use power on default.</del>
01h	<a href="#">Higher performance with possible higher power usage</a> <a href="#">The device should maximize performance.</a>
02h	<a href="#">Reduced power usage with possible lower performance</a> <a href="#">The device should minimize power usage.</a>
03h to FFh	Reserved

### 4.4 Changes to Normal and Error Outputs

#### 4.4.1 Changes to Error Outputs

Add new error: Unit Exception Error

Table 3 - Unit Exception Error

Name	Description
Error	<b>BitDescription</b> 7:0 7Fh
Count	Reserved
LBA	Reserved
Device	<b>BitDescription</b> 7 Obsolete 6 N/A

	5 Obsolete 4 Transport Dependent - See 3:0 Reserved
Status	<b>BitDescription</b> 7:6 Transport Dependent - See . 5 Device Fault - See 4 N/A 3 Transport Dependent - See . 2:1 N/A 0 Error - See

## 4.5 Changes to Annex A

### 4.5.1 New device statistic for Log 04h, page TBD

<u>Offset</u>	<u>Type</u>	<u>Content</u>										
<u>TBD</u>	<u>QWord</u>	<u>Self-Maintenance Needs</u>										
		<table> <thead> <tr> <th><u>Bit</u></th> <th><u>Meaning</u></th> </tr> </thead> <tbody> <tr> <td><u>63:56</u></td> <td><u>Device Statistics Flags, (See Table TBD)</u></td> </tr> <tr> <td><u>55:32</u></td> <td><u>Reserved</u></td> </tr> <tr> <td><u>31:16</u></td> <td><u>Estimated Self-Maintenance Duration</u></td> </tr> <tr> <td><u>15:0</u></td> <td><u>Estimated Self-Maintenance Deadline</u></td> </tr> </tbody> </table>	<u>Bit</u>	<u>Meaning</u>	<u>63:56</u>	<u>Device Statistics Flags, (See Table TBD)</u>	<u>55:32</u>	<u>Reserved</u>	<u>31:16</u>	<u>Estimated Self-Maintenance Duration</u>	<u>15:0</u>	<u>Estimated Self-Maintenance Deadline</u>
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<u>31:16</u>	<u>Estimated Self-Maintenance Duration</u>											
<u>15:0</u>	<u>Estimated Self-Maintenance Deadline</u>											

#### 1.1.1.1 Self-Maintenance Needs

##### 1.1.1.1.1 Description

Estimated Self-Maintenance Duration specifies the estimated amount of time required to perform self-maintenance operations. Estimated Self-Maintenance Deadline specifies how long from the current time the device is able to wait before self-maintenance operations may be self-initiated to protect the health of the device.

##### 1.1.1.1.2 Update Interval

None

##### 1.1.1.1.3 Measurement Unit

Estimated Self-Maintenance Duration: \_\_\_\_\_ seconds

Estimated Self-Maintenance Deadline: \_\_\_\_\_ seconds

##### 1.1.1.1.4 Initialization

This statistic may change at any time.

**4.5.4.6 Changes to Annex B - Command Set Summary**

**4.5.4.6.1 Changes to the Historical Set Feature Code Assignments Table**

Feature Code	Description	ATA Standard								ACS-2
		1	2	3	4	5	6	7	8 ACS	
TBD3	Set Profile	R	R	R	R	R	R	R	R	C
Key:		A = Reserved for assignment by the CompactFlash? Association. F = If the device does not implement the CFA feature set, this command code is Vendor specific. M = Reserved for the Media Card Pass Through Command feature set. S = Reserved for Serial ATA. T = Reserved for Technical Report T13/DT1696 (Time-Limited Commands). C = a defined command. E = a retired command. O = Obsolete. R = Reserved, undefined in current specifications. V = Vendor specific commands.								