To: T13 Technical Committee
From: Mark Overby, NVIDIA Corporation (moverby@nvidia.com)
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Subject: T13/07-123r0 ACS-2: REQUEST SENSE for ATA

Revision History
Revision 0 - Initial draft of document

Related Documents
ATA8-ACS (T13/1699-D) Revision 3e

1 Overview

This proposal creates a new mechanism to notify a host of asynchronous conditions from the device as well as an extended error mechanism.

When a device has a condition that requires attention from the host, but is not considered an error, the device indicates through the use of a status bit, that such a condition has occurred and the host should take action. This mechanism is intended to be analogous to the methods provided in SCSI for UNIT ATTENTION. In order to maintain backwards compatibility, this mechanism is only enabled by a direct action from the host.

In addition to the UNIT ATTENTION mechanisms, this proposal creates a mechanism to get detailed information about an error condition when it occurs. The method of retrieving this information is similar to sense data in a SCSI environment. Although SCSI has moved towards deprecation of the REQUEST SENSE command, the current ATA transports do not currently have a mechanism suitable for providing auto sense information. Therefore, it is appropriate to create a new command. To retrieve this extended information, a new command is introduced called REQUEST SENSE DATA. This command is a non-data command that returns additional information about the last condition or error from the device.

This proposal contains a feature set description for extended status reporting, IDENTIFY DEVICE changes, a SET FEATURES sub-command to enabled extended reporting, and modifications to the text for normal outputs.

2 Document Changes

2.1 Changes to ATA8-ACS (T13/1699-D r3e)

Note: This proposal does not actually modify ATA8-ACS as this proposal is targeted at ACS-2.

2.1.1 Changes to references

Add to table 2:

Table 2 — References Under Development

Name	Project Number
SCSI Primary Commands - 4 (SPC-4)	INCITS 1731D

2.1.2 Extended Status Reporting Feature Set

The optional extended status reporting feature set allows devices to report that additional error or non-error informational status is available from the device and can be retrieved by the host. This feature set is prohibited for devices implementing the PACKET command feature set.

This feature is enabled by the host by issuing a SET FEATURES command, subcode TBA, to the device. This enables the device to report that additional information is available. The host may disable this capability by issuing a SET FEATURES command, subcode TBA, to the device.

Once enabled, the device notifies the host of additional information by setting bit 11 of the device field in the normal or error outputs for a given command. The host retrieves this additional information by issuing a REQUEST SENSE DATA command to the device.

If the feature set is not enabled, the device may still make this information available through the REQUEST SENSE DATA command, but does not report the availability through the outputs of the command in the normal or error outputs. Devices that implement this feature set shall support the REQUEST SENSE DATA command when the feature set is enabled.

The device maintains only the most recent status. If more than one reportable event has occurred before the host issues a REQUEST SENSE DATA command, the device only reports the most recent status.

2.1.3 New IDENTIFY DEVICE bits

Two bits are requested. One to represent enablement of the feature, and another to represent support of the feature. Locations to be assigned as part of the development process of this proposal

2.1.4 SET FEATURES Subcodes

Add the following to table 27:

Table 27 — SET FEATURES Feature Field Definitions

Value	Description
TBA	Enable/Disable extended status reporting feature set

Add the following new sub-clause to the SET FEATURES command description.

7.47.<xx> Enabled/Disable extended status reporting feature set

A host enables the extended status reporting feature set by issuing this subcommand with bit one of the count field set to one.

A host disables the extended status reporting feature set by issuing this subcommand with bit one of the count field cleared to zero.

2.1.4 Modifications to normal and error outputs

For each normal and error output, the device field is modified as follows:

11: Extended status available
10:8: Reserved

2.1.5 REQUEST SENSE DATA Command

7.40 REQUEST SENSE DATA - TBA, Non-Data

7.40.1 Feature Set

This command is mandatory for devices implementing the extended status reporting feature set. This command is prohibited for devices implementing the PACKET command feature set.

7.40.2 Description

This command allows the host to obtain the most recent additional status information from the device.

7.40.3 Inputs

Table 28 —

Word	Name	Description
00h	Feature	Reserved
01h	Count	Reserved
02-04h	LBA	Reserved
05h	Device	**Bit Description** 15:8 Reserved
	Command	7:0 TBA

7.40.4 Normal Outputs

See table xx.

The sense key, additional sense code, and additional sense code qualifier fields shall be set to values that are permitted for block devices as defined in the SPC-4 standard.

Editors Note 1: The table for the normal outputs is below but would physically be located with the rest of the normal and error outputs in ACS. It is placed here purely as a convenience to the reader during this development of this proposal.

Table 29 —

Word	Name	Description
00h	Error	Reserved
01h	Count	Reserved
02h	LBA	Sense Key (see clause 7.40.4)
03h		Additional Sense Code (see clause 7.40.4)
04h		Additional Sense Code Qualifier (see clause 7.40.4)
05h	Device	**Bit Description** 15 Obsolete 14 N/A 13 Obsolete 12 Transport Dependent 11:8 Reserved
	Status	7:6 Transport Dependent 5:1 Reserved 0 Error

7.40.5 Error Outputs

The device shall not set bit 11 of the error output if this command completes in error.

See Table 94.