

ENDL TEXAS

Date: 10 January 2004
To: T10 Technical Committee and SNIA OSD TWG
From: Ralph O. Weber
Subject: OSD Error Handling Model and SPC-3 Sense Data Descriptors

A comment at the November OSD editing meeting suggested adding an Error Reporting subclause to the OSD model. This proposal recommends the text for that clause.

It has also been observed that OSD devices require sense data beyond that defined in SPC-3. This proposal suggests additions to the SPC-3 sense data to satisfy OSD needs as well as specifying how current sense data descriptors can be used to good effect by OSD devices.

Proposed Additions to OSD

At the end of clause 4 [Model] add the following.

4.x Error reporting

OSD devices shall use descriptor format sense data (see SPC-3) to report all errors.

All OSD sense data shall include the OSD object identification sense data descriptor (see SPC-3) to identify the object in which the reported error was detected.

When it is possible to identify a specific byte or range of bytes within a user object as being associated with an error, the information sense data descriptor (see SPC-3) shall be included in the sense data with the INFORMATION field set to the byte associated with the error or the first byte in the range of bytes associated with the error.

If a READ command (see 6.x) attempts to read bytes both before and beyond a user object's logical length, the command-specific information sense data descriptor (see SPC-3) shall be included in the sense data with the COMMAND-SPECIFIC INFORMATION field the number of bytes transferred before the object's logical length was reached.

If the OSD security level is not 0 or 1, the sense data shall include the OSD response integrity check value sense data descriptor (see SPC-3) with the RESPONSE INTEGRITY CHECK VALUE field containing an integrity check value (see 4.6.4.6) that is computed as described in 4.6.4.2.3.

Note If the status is not CHECK CONDITION, the response integrity check value is returned in the response integrity check value attribute in the Current Command attributes page (see 7.1.2.19).

The OSD CDB is very large. To reduce uncertainty in determining errors in CDB field settings or in parameter data, any sense data having the sense key set to ILLEGAL REQUEST should include the sense key specific sense data descriptor (see SPC-3) with the field pointer sense key specific data.

Errors other than those defined in this standard may be reported as needed. The sense data shall include the appropriate sense key and additional sense code (see SPC-3) to identify the condition.

Errors may occur after the command has completed. For such errors, SPC-3 defines a deferred error reporting mechanism.

Modify OSD 4.6.4.2.3 as follows:

For security level 2 and higher, the device server shall compute ~~an integrity check value that is placed in the response integrity check value attribute in the Current Command attributes page (see 7.1.2.19).~~ the response integrity check value ~~is computed~~ using:

- a) The algorithm specified in the capability INTEGRITY CHECK VALUE ALGORITHM field (see 4.6.4.4.3);
- b) The following array of bytes:
 - 1) The request nonce from the CDB (see 5.1.1.9);
 - 2) The status byte; and
- 3) If the status is CHECK CONDITION, the sense data bytes, ~~except for the bytes containing the RESPONSE INTEGRITY CHECK VALUE field (see 4.x and SPC-3);~~
and
- c) The capability key.

If the status is not CHECK CONDITION, the response integrity check value is placed in the response integrity check value attribute in the Current Command attributes page (see 7.1.2.19). If the status is CHECK CONDITION, the response integrity check value is placed in the RESPONSE INTEGRITY CHECK VALUE field of the OSD response integrity check value sense data descriptor (see SPC-3).

Modify the definition of the response integrity check value attribute in the Current Command attributes page as follows:

If ~~the command terminated with a CHECK CONDITION status or if~~ the OSD security level is 0 or 1, the response integrity check value attribute (number 3h) shall contain zero. Otherwise, the response integrity check value attribute shall contain an integrity check value (see 4.6.4.6) that is computed as described in 4.6.4.2.3.

Note x If a command terminates with a CHECK CONDITION status, the response integrity check value is returned in the sense data (see 4.x).

Proposed Additions to SPC-3

Add the following two sense data descriptors to table 13 and in proper order within subclause 4.5.2.

4.5.2.x OSD object identification sense data descriptor

The OSD object identification sense data descriptor (see table x1) provides information that identifies the OSD object associated with the error reported in the sense data (see OSD).

Table x1 — OSD object identification sense data descriptor format

Bit Byte	7	6	5	4	3	2	1	0
0	DESCRIPTOR TYPE (06h)							
1	ADDITIONAL LENGTH (12h)							
2	Reserved							
3	Reserved							
4	(MSB)		PARTITION_ID				(LSB)	
11								
12	(MSB)		OBJECT_ID				(LSB)	
19								

The PARTITION_ID field contains the Partition_ID (see OSD) of the partition that is associated with the error being reported.

The OBJECT_ID field contains the Collection_Object_ID or User_Object_ID (see OSD) of the object that is associated with the error being reported.

4.5.2.y OSD response integrity check value sense data descriptor

The OSD response integrity check value sense data descriptor (see table x2) contains the response integrity check value used when the OSD security level is 2 or higher.

Table x2 — OSD response integrity check value sense data descriptor format

Bit Byte	7	6	5	4	3	2	1	0
0	DESCRIPTOR TYPE (07h)							
1	ADDITIONAL LENGTH (0Ch)							
2	(MSB)		RESPONSE INTEGRITY CHECK VALUE				(LSB)	
13								

The RESPONSE INTEGRITY CHECK VALUE field contains the response integrity check value (see OSD) for the command for which the error being reported.