



To: T10 Technical Committee
 From: Kevin Marks and Steven Chin - Dell, Inc.
 Date: October 21, 2005
 Subject: T10/05-262r2 - SPC-4/SSC-3: ASC/ASCQ for Medium Thread Failure

Revision History

- Revision 0 (07/08/05) - Initial proposal
- Revision 1 (07/27/05) – Modified based on SSC-3 WG (July 13) Comments:
 - Add rows into Table 2 - Error conditions and sense keys for thread failure in SSC-3
 - Add text below Table 2 referencing ASC/ASCQ
- Revision 2 (10/10/05) – Modified based on SSC-3 WG (Sept) Comments:
 - Updated error table to SSC-3r01d
 - Modified table 3 text to “process of mounting or de-mounting” and text describing error and sense key
 - Added definitions for thread, load, mount, etc.

Related Documents

SCSI Primary Commands - 4 (T10/1729-D) SPC-4r00
 SCSI Stream Commands - 3 (T10/1611-D) SSC-3r01c

Overview

Dell sees a need to define an ASC/ASCQ to standardize the tape drives response when a medium thread or unthread failure occurs. A medium thread failure is defined as a failure to thread the medium during a load/mount operation, generally referred to as a drop leader, miss pick, buckle failure, etc depending on tape technology and vendor. This allows diagnostic software and in the future, tape software to quickly identify what the specific failure is instead of the commonly used HARDWARE ERROR/ INTERNAL TARGET FAILURE or MEDIUM ERROR.

Suggested Changes to SPC-4 (in blue):

Add new row to the Additional Sense Code table in the current ANNEX D.2, Table D.1 of SPC-4.

Table D.1 — ASC and ASCQ assignments

		D - DIRECT ACCESS BLOCK DEVICE (SBC-2)														
		. T - SEQUENTIAL ACCESS DEVICE (SSC-2)														
		. . L - PRINTER DEVICE (SSC)														
		. . . P - PROCESSOR DEVICE (SPC-2)														
		. . . . W - WRITE ONCE BLOCK DEVICE (SBC)													
		. . . . . R- CD/DVD DEVICE (MMC-4)													
		. . . . . . O - OPTICAL MEMORY BLOCK DEVICE (SBC)													
		. . . . . . . M - MEDIA CHANGER DEVICE (SMC-2)													
		. . . . . . . . A - STORAGE ARRAY DEVICE (SCC-2)													
		. . . . . . . . . E - ENCLOSURE SERVICES DEVICE (SES)													
		. . . . . . . . . . B - SIMPLIFIED DIRECT-ACCESS DEVICE (RBC)													
		. . . . . . . . . . . K - OPTICAL CARD READER/WRITER DEVICE (OCRW)													
		. . . . . . . . . . . . V - AUTOMATION/DRIVE INTERFACE (ADC)													
		. . . . . . . . . . . . . F- OBJECT-BASED STORAGE (OSD)													
															
ASC	ASCQ	D	T	L	P	W	R	O	M	A	E	B	K	V	F	Description
...
53h	00h	D	T	L		W	R	O	M				B	K		MEDIA LOAD OR EJECT FAILED

53h	01h	T					UNLOAD TAPE FAILURE
53h	02h	D T	W R O M	B K			MEDIUM REMOVAL PREVENTED
53h*	03h*	T					MEDIUM THREAD OR UNTHREAD FAILURE
54h	00h		P				SCSI TO HOST SYSTEM INTERFACE FAILURE
....		

*Editor's Note: The ASC/ASCQ of 53h/03h has not been assigned and may change to another value.

Suggested Changes to SSC-3 (in blue):

3.1.xx de-mounted: A state of a volume when it is being loaded, threaded, unloaded, unthreaded, or when not attached to the device.

3.1.xx mount: A process in which a volume is being loaded.

3.1.xx mounted: A state of a volume when the device is physically capable of processing commands that cause the medium to be moved.

3.1.xx load: A process of mounting a volume on a suitable transport mechanism.

3.1.xx thread: A part of the loading process in which the recording medium is being positioned on a suitable transport mechanism (e.g. spooled on to a take up reel, wrapped around the surface of a helical scan drum, etc.)

3.1.xx unload: A process of de-mounting a volume from a suitable transport mechanism.

3.1.xx unthread: A part of the unloading process in which the recording medium is being detached from the suitable transport mechanism (e.g. de-spooled from a take up reel, unwrapped from around the surface of a helical scan drum, etc.)

4.2.10.3 Error conditions

If any of the following conditions occur during the processing of a command or if a deferred error prevented the command from processing, the device server shall return CHECK CONDITION status. The appropriate sense key and additional sense code should be set. Table 2 illustrates some error conditions and the applicable sense keys. Table 2 does not provide an exhaustive enumeration of all conditions that may cause the CHECK CONDITION status.

Table 3 — Error conditions and sense keys

CONDITION	SENSE KEY
.....
Attempt a WRITE, READ, READ REVERSE, VERIFY, or RECOVER BUFFERED DATA command with the FIXED bit set to one and MODE SENSE block length set to zero.	ILLEGAL REQUEST
Attempt to perform an erase, format, partition, set capacity, or write-type operation on write protected medium.	DATA PROTECT
Deferred write error.	MEDIUM ERROR VOLUME OVERFLOW HARDWARE ERROR
<u>Medium failed to thread or unthread during the process of mounting or de-mounting.</u>	<u>MEDIUM ERROR HARDWARE ERROR</u>

See the READ(16) (see 5.3), READ REVERSE(16) (see 5.4), VERIFY(16) (see 5.5), WRITE(16) (see 5.6), READ(6) (see 6.4), READ REVERSE(6) (see 6.5), VERIFY(6) (see 6.7), WRITE(6) (see 6.8), and RECOVER BUFFERED DATA (see 7.6) commands for a description of the FIXED bit.

The Read-Write Error Recovery mode page (see 8.3.5) current values specify behavior when an unrecoverable read or write error is encountered. If the Read-Write Error Recovery mode page is not implemented, the behavior is vendor-specific.

In the case of a deferred write error, the sense data VALID bit shall be set to zero.

In the case of an unrecovered write error or a deferred write error, if buffered mode 1h is selected, the error shall be reported to the first application client issuing a command (other than INQUIRY or REQUEST SENSE). If buffered mode 2h is selected, the error shall be reported to the initiator with unwritten data in the object buffer.

In the case of a write attempt to write protected medium, the additional sense code specifies the cause of the DATA PROTECT sense key (see 4.2.11).

In the case of a medium thread or unthread failure, the additional sense code shall be set to MEDIUM THREAD OR UNTHREAD FAILURE. A sense key set to MEDIUM ERROR should be returned if the drive is unable to thread or unthread the medium due to a failure of the medium. A sense key set to HARDWARE ERROR should be returned if the drive is unable to thread or unthread the medium due to a failure of the device (e.g. the drive is now in an unusable state, such as TapeAlert code 38h).

4.2.11 Write protection

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