memorandum

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T10/04-335r2

To	From	Subject	Date
INCITS T10 Committee	Michael Banther, HP	WORM Tamper Read Enable	3 December 2004

Revision History

Revision 0 – Initial proposal.

Revision 1 – Corrected a cut and paste error in the ASC and ASCQ Assignment tables. Revision 0 inadvertently included WORM MEDIUM – CANNOT ERASE which doesn't exist and used the wrong ASCQ value for WORM MEDIUM – OVERWRITE ATTEMPTED.

Revision 2 – Modified per discussion in T10 SSC-3 working group, 10 November 2004 (see 04-390r0, item 6.2).

Background

HP and other tape drive vendors wish to include a Write Once Read Multiple (WORM) capability in SSC-3. Previous and on-going proposals seek to add the necessary specifications: 04-211r1 and 04-312r0.

Support for WORM operation raises the question, what does a streaming device server do if it detects tampering in a previously written WORM cartridge? This proposal adds a WORM Tamper Read Enable bit that allows the application client to specify the behavior of the device server in this situation.

Proposed changes to SSC-3

2.3 References under development

At the time of publication, the following referenced standards were still under development. For information on the current status of the document, or regarding availability, contact the relevant standards body or other organization as indicated.

ISO/IEC 14776-313, *SCSI Primary Commands – 3 standard*

ISO/IEC 14776-412, *SCSI Architecture Model – 2 standard*

ISO/IEC 14776-352, *SCSI Media Changer Commands – 2 standard*

T10/1729-D, *SCSI Primary Commands – 4*

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8.3.3 Device Configuration mode page

The Device Configuration mode page (see table 62) is used to specify the appropriate sequential-access device configuration.

Table 62 – Device Configuration mode page

Bit / Byte	7	6	5	4	3	2	1	0
0	PS	Rsvd	PAGE CODE (10h)					
1	PAGE LENGTH (0Eh)							
2	Rsvd	Obsolete	CAF	ACTIVE FORMAT				
3	ACTIVE PARTITION							
4	WRITE OBJECT BUFFER FULL RATIO							
5	READ OBJECT BUFFER EMPTY RATIO							
6	(MSB)	WRITE DELAY TIME						
7								(LSB)
8	OBR	LOIS	RSMK	AVC	SOCF		ROBO	REW
9	GAP SIZE							
10	EOD DEFINED			EEG	SEW	SWP	BAML	BAM
11	(MSB)	OBJECT BUFFER SIZE AT EARLY WARNING						
12								
13								(LSB)
14	SELECT DATA COMPRESSION ALGORITHM							
15	WTRE		OIR	REWIND ON RESET		ASOCWP	PERSWP	PRMWP

The WORM Tamper Read Enable (WTRE) field specifies how the device server responds to detection of compromised integrity of a WORM medium when processing a locate, read, read reverse, space, or verify operation.

If the WTRE field is set to 00b, the device server shall respond in a vendor-specific manner.

If the WTRE field is set to 01b, detection of compromised integrity on a WORM medium shall not affect processing of a task.

If the WTRE field is set to 10b, the device server shall return CHECK CONDITION status and shall set the sense key to MEDIUM ERROR and the additional sense code to WORM MEDIUM – INTEGRITY CHECK. The position of the medium may have changed.

The value 11b is reserved for the WTRE field. The device server shall return CHECK CONDITION status to a MODE SELECT command with the WTRE field set to 11b. The device server shall set the sense key to ILLEGAL REQUEST and the additional sense code to INVALID FIELD IN PARAMETER LIST.

The WTRE field shall have no effect on the processing of a locate, read, read reverse, space, or verify operation when the device contains a non-WORM medium.

NOTE: An application client should set the WTRE bit to one only for the recovery of data from a WORM medium where the integrity of the stored data has been compromised.

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Proposed changes to SPC-4

4.5.6 Sense key and sense code definitions

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The additional sense codes and additional sense code qualifiers are defined in table 28.

Table 28 — ASC and ASCQ assignments (part 14 of 15)

		D	DIRECT ACCESS BLOCK DEVICE (SBC-2)													Device Column key
		.	T	SEQUENTIAL ACCESS DEVICE (SSC-2)													blank = code not used
		.		L	PRINTER DEVICE (SSC)												not blank = code used
		.			P	PROCESSOR DEVICE (SPC-2)											
		.			.	W	WRITE ONCE BLOCK DEVICE (SBC)										
		.			.		R	CD/DVD DEVICE (MMC-2)									
		.			.			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	
												.					
												.					
												.					
30h	0Ch		T													WORM MEDIUM – OVERWRITE ATTEMPTED	
30h	0Dh		T													WORM MEDIUM – INTEGRITY CHECK	
50h	00h		T													WRITE APPEND ERROR	
												.					
												.					
												.					

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D.2 Additional Sense Codes

Table D.1 is a numerical order listing of the additional sense codes and the additional sense code qualifiers.

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Table D.1 — ASC and ASCQ assignments (part 7 of 15)

		D	DIRECT ACCESS BLOCK DEVICE (SBC-2)												Device Column key
		.	T	SEQUENTIAL ACCESS DEVICE (SSC-2)											blank = code not used
		.		L	PRINTER DEVICE (SSC)										not blank = code used
		.			P	PROCESSOR DEVICE (SPC-2)									
		.			.	W	WRITE ONCE BLOCK DEVICE (SBC)								
		.			.		R	CD/DVD DEVICE (MMC-2)							
		.			.			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
												.				
												.				
												.				
30h	0Ch		T													WORM MEDIUM – OVERWRITE ATTEMPTED
30h	0Dh		T													WORM MEDIUM – INTEGRITY CHECK
30h	10h						R									MEDIUM NOT FORMATTED
												.				
												.				
												.				