To: INCITS T10 Committee

From: Paul Entzel, Quantum

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Subject: SPC-4, SMC-3 and ADC-2: add new ADC-2 command to set Volume Identifier

1 Revision History

Revision 0:
Posted to the T10 web site on 16 December 2004.

Revision 1:
Updated based on discussion at the January 2005 T10 meeting, see ADI working group meeting minutes 05-030.

2 General

In addition to the time of day, there is a desire to add other information to the event logs that can be used to coordinate logs from more than one device. Specifically, if the drive saved the bar code from the medium in its log it would make coordinating logs between the drive and the library easier.

This proposal adds a command to the ADC-2 command set that can pass the Volume Tag to the drive as parameter data. While the current proposal only gives the command the ability to pass a Volume Tag to the drive, the command was left generic enough that other types of attributes could be added later.

As an alternative, more fields could be added to the NOTIFY DATA TRANSFER DEVICE command to allow a parameter block to be passed and indicate what to do with it, but I felt this command was overloaded enough already.

3 Proposed change in ADC-2

3.1 Addition to table 5 in subclause 5.1

Add the following row to the table:

SET MEDIUM ATTRIBUTE	A9h/1Fh	Optional	5.3

3.2 Add a new subclause in clause 5

5.3 SET MEDIUM ATTRIBUTE command

5.3.1 SET MEDIUM ATTRIBUTE command introduction

The SET MEDIUM ATTRIBUTE command (see table X) is used to pass attributes of the medium to the DT Device. The device server may use any attributes set by this command to:

a) add the attribute to log entries it creates;

b) add the attribute to the device type specific area in the MAM;

c) report the attribute to application clients via SCSI commands or other means beyond the scope of this standard; or

d) other uses beyond the scope of this standard.

Table X – SET MEDIUM ATTRIBUTE command

Bit / Byte	7	6	5	4	3	2	1	0
0	OPERATION CODE (A9h)							
1	SERVICE ACTION (1Fh)							
2 - 5	Reserved							
6	(MSB)							
7 - 8	PARAMETER LIST LENGTH							
9								(LSB)
10	Reserved							
11	CONTROL							

The PARAMETER LIST LENGTH field specifies the length in bytes of parameter data contained in the Data-Out Buffer. A parameter list length value of zero indicates that the Data-Out Buffer is empty. This shall cause the attribute specified to be cleared in the device server. If the parameter list length exceeds the maximum length value from table Y for the attribute specified, then the command shall be terminated with a CHECK CONDITION status, with the sense key set to ILLEGAL REQUEST, and the additional sense code set to INVALID FIELD IN CDB.

All medium attributes set by the SET MEDIUM ATTRIBUTE command shall be cleared by the device server when the medium is removed from the device.

5.3.2 SET MEDIUM ATTRIBUTE parameter list format

The parameter list shall have the format shown in table X1. Attributes should be sent in ascending numerical order.

Table X1 – SET MEDIUM ATTRIBUTE parameter list format

Bit / Byte	7	6	5	4	3	2	1	0
0	(MSB)							
3	PARAMETER LIST LENGTH (n-4)							(LSB)
4	First attribute							
	…							
n	Last attribute							

The PARAMETER DATA LENGTH field should contain the number of bytes of attribute data and shall be ignored by the device server.

The format of the attributes is described in 5.3.3.

No attributes shall be changed, the SET MEDIUM ATTRIBUTE command shall be terminated with CHECK CONDITION status, with the sense key set to ILLEGAL REQUEST, and the additional sense code set to INVALID FIELD IN PARAMETER LIST if the parameter data contains any of the following:

a) An attribute with incorrect ATTRIBUTE LENGTH field (see 5.3.3) contents;

b) An attribute with an unsupported or reserved FORMAT field (see 5.3.3) value; or

c) An attribute with unsupported ATTRIBUTE VALUE field (see 5.3.3) contents and a non-zero ATTRIBUTE LENGTH field value.

If the SET MEDIUM ATTRIBUTE command parameter data contains an attribute with an ATTRIBUTE LENGTH field (see 5.3.3) set to zero, then one of the following actions shall occur:

a) If the attribute is supported, the attribute's value shall be cleared; or

b) If the attribute is not supported, the attribute shall be ignored; this shall not be considered an error.

5.3.3 SET MEDIUM ATTRIBUTE attribute format

Each medium attribute shall be communicated between the application client and device server in the format shown in table X2.

Table X2 – Attribute format

Bit / Byte	7	6	5	4	3	2	1	0
0	(MSB)			ATTRIBUTE IDENTIFIER				
1								(LSB)
2	Reserved						FORMAT	
3	(MSB)			ATTRIBUTE LENGTH (n-4)				
4								(LSB)
5				ATTRIBUTE VALUE				
n								

The ATTRIBUTE IDENTIFIER indicates the medium attribute to be set. Table Y describes the attribute that can be set by the SET MEDIUM ATTRIBUTE command.

Table Y – ATTRIBUTE IDENTIFIER field values

ATTRIBUTE IDENTIFIER	Description	Format	Maximum length (bytes)
00h	Volume identification (see SMC-3)	ASCII	32
01h - FFh	Reserved.		

The FORMAT field (see table Y1) specifies the format of the data in the ATTRIBUTE VALUE field.

Table Y1 – FORMAT field values

FORMAT	Name	Description
00b	BINARY	The ATTRIBUTE VALUE field contains binary data.
01b	ASCII	The ATTRIBUTE VALUE field contains left-aligned ASCII data.
10b – 11b		Reserved

The ATTRIBUTE LENGTH field specifies the length in bytes of the ATTRIBUTE VALUE field.

The ATTRIBUTE VALUE field contains the intended value of the attribute.

4 Proposed changes to SPC-4

In the table named “Device type attributes” (table 224 in SPC3r21), add a line:

0008h	VOLUME IDENTIFIER	32	ASCII	7.3.2.2.5

Modify the row showing 0008h-020Ah as reserved to indicate 0009h-020Ah.
Add a new subclause 7.3.2.2.5 bumping the existing subclauses down:

7.3.2.2.5 VOLUME IDENTIFIER
Indicates the volume identifier (see SMC-3) of the medium. If the device server supports this attribute but does not have access to the volume identifier, it shall report this attribute with an attribute length value of zero.

5 Proposed change to SMC-3

SMC-2 uses the term “volume identification” and “volume tag” somewhat interchangeable in some places, but then uses the term “volume identification” to indicate the ASCII portion of the volume tag. Since ADC needs a unique term to define the ASCII portion of the volume tag, this proposal attempts to clean up SMC-3 definitions in this area. Since the VIQ field in the volume tag refers to the ASCII portion as the “volume identifier”, I chose to use this term as the name for the ASCII portion of the volume tag. No technical change is intended to SMC-3, all changes requested are strictly editorial to correct the nomenclature.

Subclause 5.4.3 from SMC-3 revision 6 is shown with proposed changes

5.1 Changes to subclause 5.4.3

Volume tag information consists of a ~~VOLUME IDENTIFICATION field plus a VOLUME SEQUENCE NUMBER field.~~volume identifier, volume identifier qualifier, and volume sequence number.

Table 1 defines the fields within the primary and alternate volume tag information fields that may be present in READ ELEMENT STATUS descriptors and in the data format for the SEND VOLUME TAG command.

Table 1 — Volume tag information format

Bit / Byte	7	6	5	4	3	2	1	0
0	VOLUME ~~IDENTIFICATION~~IDENTIFIER							
31								
32	VIQ							
33	Reserved							
34	(MSB)	VOLUME SEQUENCE NUMBER						
35								(LSB)

The VOLUME ~~IDENTIFICATION~~IDENTIFIER field shall contain the volume identifier for the medium. The volume identifier consists of a left justified sequence of characters. Unused positions shall be blank (20h) filled. In order for the SEND VOLUME TAG translate with template to work, the characters '*' and '?' (2Ah and 3Fh) shall not appear in the VOLUME IDENTIFICATION field and there shall be no blanks (20h) in the significant part (non blank filled) of the VOLUME IDENTIFICATION field. If volume ~~tag information~~ identifier for a particular element cannot be determined, the VOLUME IDENTIFICATION field shall be filled with 00h.

The Volume ~~Identification~~ Identifier Qualifier (VIQ) field provides additional information as defined by table 2.

The VOLUME SEQUENCE NUMBER is a 2-byte integer field. If the volume sequence number is not used, this field shall be zero.

NOTE 3 — For compatibility with existing volume label conventions, it is recommended that the characters in the significant non-blank portion of the VOLUME ~~IDENTIFICATION~~ IDENTIFIER field be restricted to the set: '0'…'9', 'A'…'Z'' and '_'.

Table 2 — Volume ~~Identification~~ Identifier Qualifier

Code	Description
0h	This value shall be returned when the volume identifier has been determined or the medium changer does not contain a volume tag reader (see device capabilities mode page description).
1h	The volume identifier is currently inaccessible (e.g. medium is loaded in a data transfer element such that a barcode label can not be accessed and there is no prior knowledge of the label).
2h	The volume identifier is unreadable or there is a problem with the volume tag reader.
3h - FFh	Reserved