TO: T10 Membership, ADI Working Group
FROM: Rod Wideman, Quantum; rod.wideman@quantum.com
DATE: January 7, 2009
SUBJECT: ADC-3 SET/REPORT AUTOMATION DEVICE ATTRIBUTE commands (document T10/08-021r3)

Rev0 – Initial draft (which was initially for an automation device serial number subpage)
Rev1 – Re-titled and rewrote, based on working group feedback. New approach of using a command to provide serial number as an attribute instead of as a mode parameter.
Rev2 – Updated based on feedback from July working group meeting, but without adding a REPORT AUTOMATION DEVICE ATTRIBUTE command (yet).
Rev3 – Changed to SET AUTOMATION DEVICE ATTRIBUTES and added REPORT AUTOMATION DEVICE ATTRIBUTES command.

Related Documents
T10/05-351r2
ADC-3r11
T10/08-022r0

Introduction
This document proposes a change to address item 2.7 in T10/05-351, which states:

2.7 Add a parameter to a stream device server that contains the serial number of the media changer containing the removable medium device, and add a method for an application client within the media changer to set this parameter (ADC-2, SSC-3; CA); *<< Priority A, Difficulty B >>*

A corresponding proposal for SSC-3 (T10/08-022r0) was also prepared, to make use of the capability described in this proposal.

Discussion
The approach taken is to provide a means by which the automation device can provide its serial number to the DT device, which then can be made available as a VPD page via the RMC device server (e.g., an SSC-3 device server). The serial number is defined to be the product serial number of an automation device's SMC logical unit that includes the DT device as part of its data transfer elements.

If ADI bridging is enabled, then of course the serial number could be available via the local SMC device server, since an Inquiry to the remote SMC device server can be performed. This proposal is creating a means to obtain the serial number of the automation device that is hosting the DT device without depending on bridging being enabled. In this proposal I've chosen not to create rules between the two, so as to not preclude various combinations that are possible and valid. I felt the current definitions prevented simply making the serial number the remote SMC logical unit serial number. This resulted in some more complex wording of what the serial number is.

The corresponding proposal for SSC-3 defines a new device type specific VPD page.

Comments from the working group that led to this revision included:

- Make serial number field fixed length (and rename it); 32 bytes in length
- Map SPC PSN field as right-aligned ASCII data, as much as fits (language exists in SPC to use)

These comments led to discussion of a preferred alternative approach (which is now this proposal):

- Define new command for setting the serial number to avoid the MODE SENSE/MODE SELECT issue;
- Create general purpose command that includes serial number as parameter/attribute type.
- General purpose command as command pair for setting and reporting.

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Proposed Changes to ADC-3

Proposed new text is shown in blue and tracked changes color. Proposed deletions are shown in ~~red strikeout~~.

Changes to 5.1:

Add the following row to Table 7:

REPORT AUTOMATION DEVICE ATTRIBUTES	A3h/00h	O	5.y

Add the following row to Table 7:

SET AUTOMATION DEVICE ATTRIBUTES	A4h/00h	O	5.x

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New sub-clause 5.x (sub-clause numbering determined by placement in clause):

5.x SET AUTOMATION DEVICE ATTRIBUTES command

5.x.1 SET AUTOMATION DEVICE ATTRIBUTES command introduction

The SET AUTOMATION DEVICE ATTRIBUTES command (see table X) is used to pass attributes of the automation device (e.g., serial number) to the ADC device server. The device server may use any attributes set by this command to:

a) add the attribute to log entries the DT device creates;
b) provide the attribute to the DT device for use by other device servers;
c) report the attribute to application clients in response to commands; or
d) other uses beyond the scope of this standard.

Table X — SET AUTOMATION DEVICE ATTRIBUTES command

Bit / Byte	7	6	5	4	3	2	1	0
0	OPERATION CODE (A4h)							
1	Reserved			SERVICE ACTION (00h)				
2	Reserved							
5								
6	(MSB)			PARAMETER LIST LENGTH				
9								(LSB)
10	Reserved							
11	CONTROL							

See SPC-3 for the description of the PARAMETER LIST LENGTH field.

The device server shall retain the attributes sent with a SET AUTOMATION DEVICE ATTRIBUTES command until:

a) a SET AUTOMATION DEVICE ATTRIBUTES command is processed that changes the attribute; or
b) a hard reset condition occurs.

5.x.2 Automation device attributes parameter list format

An automation device attributes parameter list shall have the format shown in table X+1. Automation device attributes shall be listed in ascending numerical order based on the ATTRIBUTE IDENTIFIER field (see 5.x.3).

Table X+1 — Automation device attributes parameter list format

Bit / Byte	7	6	5	4	3	2	1	0
0	(MSB)			PARAMETER DATA LENGTH				
3								(LSB)
	Automation device attribute list							
4	Automation device attribute (first)							
n	Automation device attribute (last)							

The PARAMETER DATA LENGTH field shall contain the number of bytes of attribute data.

The format of the automation device attributes is described in 5.x.3.

No automation device attributes shall be changed and a SET AUTOMATION DEVICE ATTRIBUTES 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 automation device attribute with an attribute length that exceeds the maximum length shown in table X+3 for that attribute;
b) an automation device attribute with an unsupported or reserved FORMAT field (see 5.x.3) value;
c) an automation device attribute with an unsupported value in the ATTRIBUTE VALUE field (see 5.x.3); or
d) an automation device attribute with a value in the FORMAT field that does not match the value shown in table X+3.

If a SET AUTOMATION DEVICE ATTRIBUTES command parameter data contains an automation device attribute with an ATTRIBUTE LENGTH field set to zero, then one of the following actions shall occur:

a) If the automation device attribute is supported, then the attribute shall be changed to the non-existent state; or
b) If the automation device attribute is not supported, then the automation device attribute shall be ignored and this shall not be considered an error.

5.x.3 Automation device attribute format

Each automation device attribute shall be communicated between the application client and device server in the format shown in table X+2.

Table X+2 — Automation device attribute format

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

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The ATTRIBUTE IDENTIFIER field (see table X+3) specifies the automation device attribute to be set.

Table X+3 — ATTRIBUTE IDENTIFIER field

Code	Description	Format	Maximum length (bytes)
0000h	Reserved		
0001h	Automation device serial number [a]	ASCII	32
0002h – 7FFFh	Reserved		
8000h – FFFFh	Vendor specific		

[a] Although the formats may differ, this is the same serial number as reported via the Unit Serial Number VPD page (see SPC-3) by the automation device's SMC device server that associates this DT device to a data transfer element (see SMC-2).

The FORMAT field (see table 13) specifies the format of the data in the ATTRIBUTE VALUE field.

[Comment: this is referring back to the existing table 13 in 5.3.3, since the definitions are identical.]

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

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

New sub-clause 5.y (sub-clause numbering determined by placement in clause):

5.y REPORT AUTOMATION DEVICE ATTRIBUTES command

The REPORT AUTOMATION DEVICE ATTRIBUTES command (see table Y) requests the device server to send the automation device attributes parameter list (see 5.x.2) to the application client.

Table Y — REPORT AUTOMATION DEVICE ATTRIBUTES command

Byte \ Bit	7	6	5	4	3	2	1	0
0	OPERATION CODE (A3h)							
1	Reserved			SERVICE ACTION (00h)				
2	Reserved							
5								
6	(MSB)							
9	ALLOCATION LENGTH							(LSB)
10	Reserved							
11	CONTROL							

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See SPC-3 for the description of the ALLOCATION LENGTH field.

The parameter list returned in response to a REPORT AUTOMATION DEVICE ATTRIBUTES command shall have the format shown in table X+1.